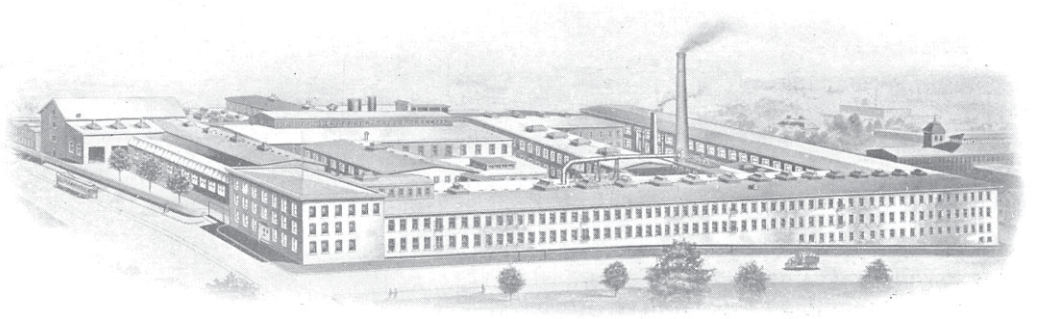

WORKS OF THE FALES & JENKS MACHINE COMPANY
1925

ILLUSTRATED CATALOG

AND

HANDBOOK OF FORMULAS AND TABLES

RELATING TO

THE FALES & JENKS

RING SPINNING FRAME

FOR COTTON

FALES & JENKS MACHINE COMPANY

BUILDERS OF

RING SPINNING MACHINERY
FOR COTTON

RING TWISTING MACHINERY
FOR COTTON, WOOL, WORSTED, LINEN AND JUTE

PAWTUCKET, RHODE ISLAND, U. S. A.

ESTABLISHED 1830 INCORPORATED 1876

ROBERT R. JENKS, PRESIDENT
J. RICHMOND FALES, VICE-PRESIDENT
HERBERT G. BEEDE, SECRETARY
FREDERIC W. EASTON, TREASURER
WILLIAM H. ARMSTRONG, MANAGER

SOUTHERN OFFICE, GREENVILLE, S. C.
1400-1401 WOODSIDE BUILDING

NORTHERN AND EXPORT OFFICE, PAWTUCKET, R. I.
320 DEXTER STREET

WRITTEN AND COMPILED BY WM. MCLEOD FRASER

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By Fales & Jenks Machine Company

INTRODUCTION

In compiling this catalog we have endeavored to give such information as will be useful and convenient for those interested in our ring spinning frames.

We build two styles of ring spinning frames; one for China or India cotton, and the other for American or Egyptian cotton. The former style is described in our book entitled "The Fales & Jenks Ring Spinning Frame for Short Staple Cotton." The latter or standard type, herein described, is built in two widths—36 inches and 39 inches, with our very latest improved box-head, adjustable type.

The floor plan, over-all lengths and general arrangement of driving pulleys shown and described in this book apply only to our Standard frame.

The draft gearing tables are the same as previously published except that they have been enlarged. Our new twist gearing tables are much more inclusive than any heretofore published. They are used in conjunction with a new table of twist constants which includes the constant for every ordinary arrangement of gearing used on our Standard frames.

In our warp, filling and hosiery twist tables, we have covered the full range and general variations of twist now used on various classes of work in the yarn and weaving mills of the United States.

Our new production tables now give the production under each multiplier from 5.00 to 2.50 inclusive, thus giving the production not only for warp and filling, but also for hosiery yarns. These tables are based on the average results actually obtained in practice; and furthermore we

have endeavored to give not only the production of the different numbers of yarn, but also to show the general conditions upon which that production is based.

Our new cylinder speed table as introduced into this book has been greatly enlarged and includes the different sizes of cylinders from 6 inches to 10 inches in diameter and the different sizes of spindle whirls from ¾ inches to 1¼ inches in diameter.

We have also introduced into this book a new cotton yardage table; and also a table showing the sizes and dimensions of bobbins for the different sizes of rings, both warp and filling. This table also gives the weight of yarn on the bobbin.

The roving and yarn numbering tables given herein, while based on tables previously published, have been carefully revised to give a more even grading of the weights and yarn numbers.

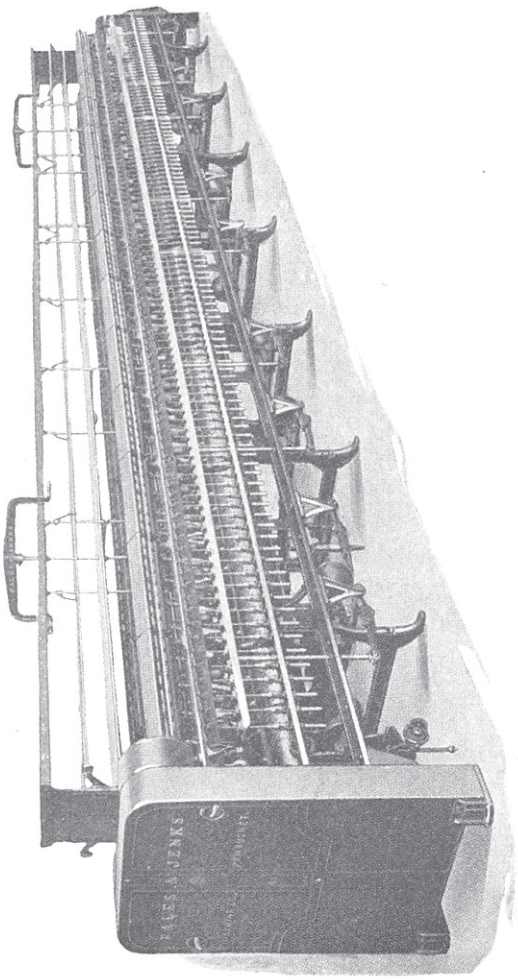
The specification form which we have given in this book shows the detailed information required to enable us to execute properly an order for ring spinning frames.

We are always ready to give any information desired concerning our ring spinning machinery, also in regard to our ring twisting machinery illustrated and described in our book entitled "The Fales & Jenks Ring Twister for Cotton."

Our long record as manufacturers of ring spinning and twisting machinery, dating back to 1845 (when the first ring spinning frame ever built was produced in our shop) and 1846 (when the first ring twister was built), has given us a fund of experience, knowledge and information which, carefully preserved in our records and throughout our organization, we freely offer to our customers and friends.

FALES & JENKS MACHINE CO.

INDEX



RING SPINNING FRAME, STANDARD MODEL

RING SPINNING FRAME

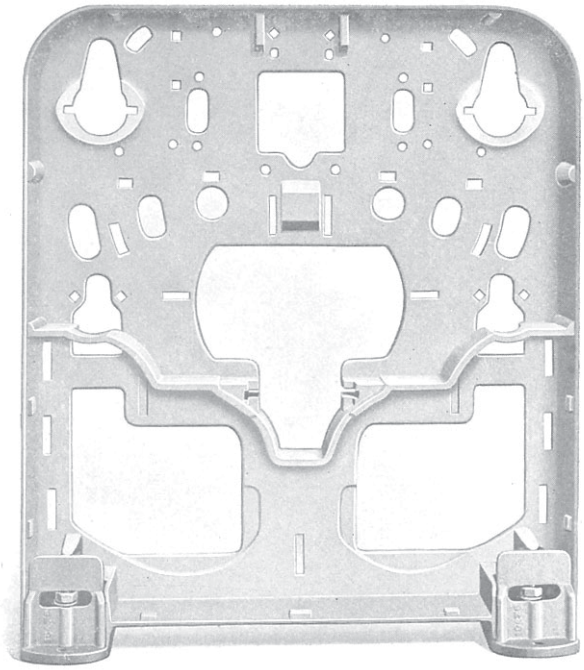
STANDARD MODEL

FOR WARP, FILLING AND HOSIERY TWIST

On the opposite page is shown a cut of our latest frame with new style box-head. This frame we have designed and built with the following points in view; to make a rigid, substantial frame by means of ribbing and bracing; to make a simple frame easily oiled and cleaned; to make a convenient frame by retaining our standard arrangement of twist and draft gearing, and finally, to make an adjustable frame easily leveled and completely adjustable for the different lengths of traverse.

This type of frame is built in two widths—36 inches and 39 inches, each width of one height only, but adjustable for any traverse from 5 inches to 8 inches. The over-all lengths with additions for the various combinations of pulleys and outboard bearings will be found in the length tables.

Various details of this frame are illustrated and described on the following pages.



BOX-HEAD

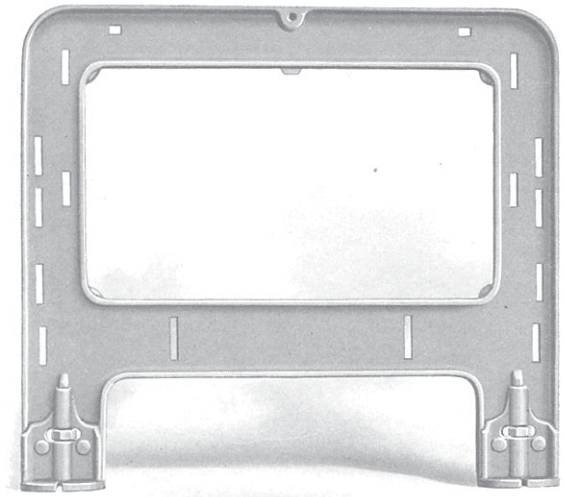
The Box-Head retains the general form and neat appearance of our older type. An exclusive feature of our style of head is the heavy inside cross rib, which serves not only to strengthen the head, but also to separate completely the upper from the lower part. This latter feature is important, since it obviates the danger of accidentally dropping gears, nuts, wrenches, etc., into the lower part of the head, and also helps to prevent the dangerous accumulation therein of oily waste, fly and dirt.

The upper part of the head is enclosed by hinged doors provided with spring latches, while the lower part has loose panels provided with hook lugs so designed that the panels can be removed or replaced easily without the use of bolts, nuts or screws.

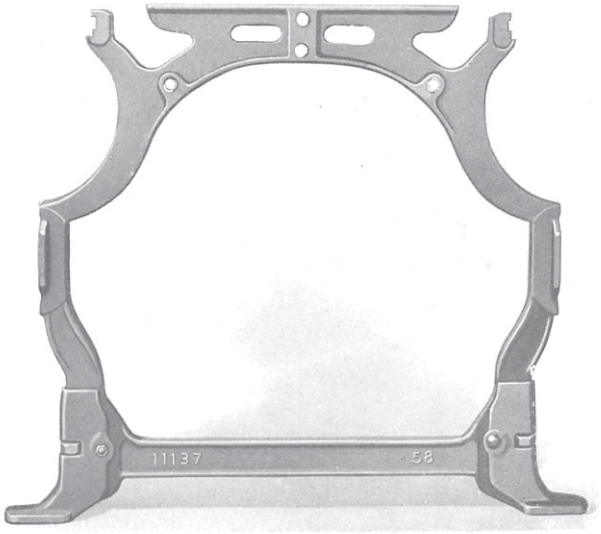
The opening in the back of the head necessary for the introduction of the cylinder shaft and jack gear stand is made sufficiently large to allow the easy removal or replacement of the cylinder. The unused portion of this opening is provided with a cover to prevent as far as possible the entrance of fly and dirt into the head.

When the head is fully equipped with the necessary girts, bearing boxes, etc., all the openings are covered.

The head end has two adjustable feet or floor supports so designed that at every point of adjustment the upper edge of the foot is concealed back of the panel and the opening completely covered.



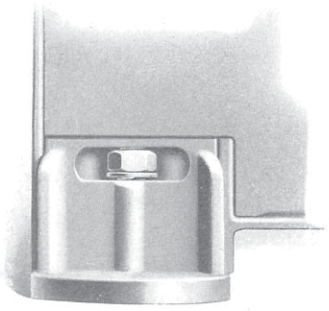
FOOT END



CENTRE or SAMPSON

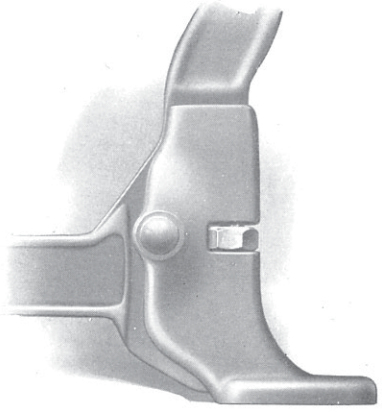
The Foot End is our heavy open type with wide webbing and deep flanges. The slots shown in the illustration are provided for the adjustment of the spindle rails and the foot end girt, also for attaching such outrigger brackets as are necessary for the proper application of pulley or direct motor drive. The foot end is provided with adjustable feet or floor supports so designed that they appear to be a part of the foot end.

The Centres or Sampsons have been built in simple, direct design with heavy ribbing to obtain strength, with simple rounded surfaces to prevent the collection of fly and dirt, and with slots for the up and down adjustment of the spindle rails. Adjustable feet or floor supports are applied to the centres and form a part of the design.



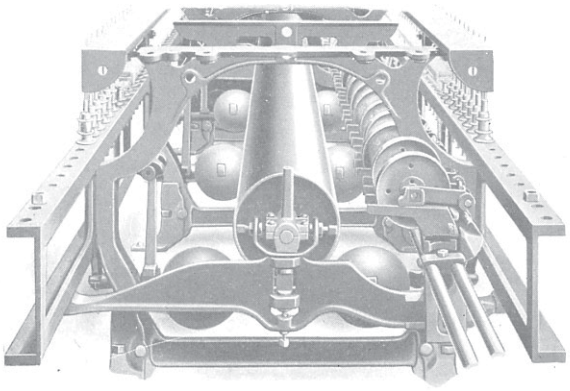
ADJ. FOOT
on HEAD END

ADJ. FOOT
on FOOT END

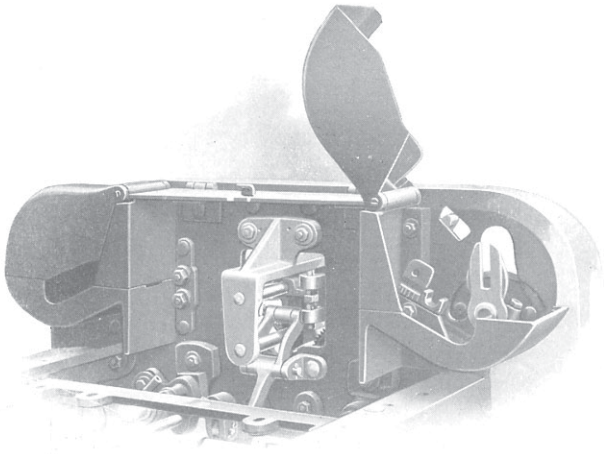


ADJ. FOOT on SAMPSON

A Patent Adjustable Foot is applied to every floor support, which includes the two on the head-end, the two on the foot end as well as all the centre or Sampson supports. Our adjustable foot is unquestionably the simplest, neatest and most substantial device for the purpose ever applied to this or any other class of textile machinery. It consists of a cast-iron shoe as a support, a large jack screw for the adjustment and suitable bolts for clamping the shoe securely in place. The adjustment is made by means of a nut movable up or down on the stationary jack screw, thereby controlling the up and down adjustment of the shoe, while the bolts for clamping the shoe fasten it securely to the head end, the foot end or the centre, as the case may be, after the proper adjustment has been made. Each shoe is so designed that it completely encloses the jack screw and thus prevents any collection of fly or dirt. Furthermore, the design is so compact and symmetrical that the shoe in each case appears to be almost a part of the main casting itself.



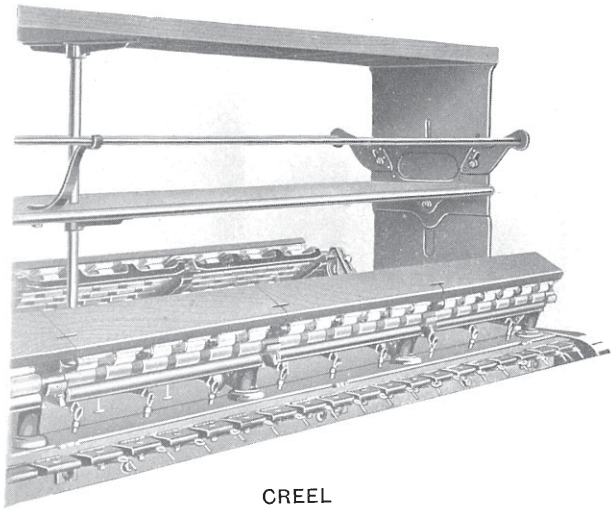
FRAMEWORK
Showing Cylinder and Tape Pulleys



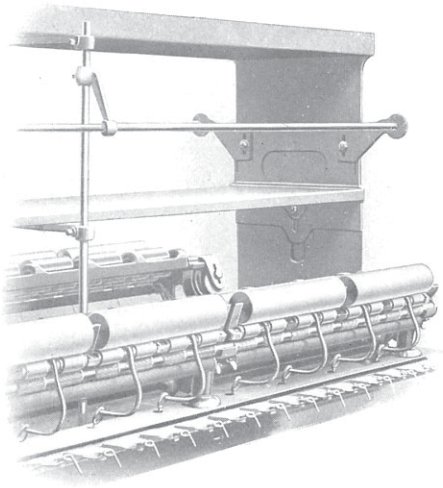
LOCKING DEVICE
Viewed from back of Head End

The Framework is of the regular construction, with angle roller beams for the roll stands and thread-boards, and with heavy box rails for the spindles, cylinder girts, builder motion and rockers. The box or spindle rails have web pieces between the centres or Sampsons, as well as reinforced web pieces for bolting to the centres. An exclusive, valuable and patented feature of this frame is the construction and arrangement by which the spindle rail with all attached parts, such as the builder motion, ring rails, wave motion, and the cylinder may be raised or lowered to suit the various requirements of short or long traverse, for fine or coarse work. Any ordinary frame can be entirely readjusted in two hours' time.

The Locking Device is attached to the back of the head end and is operated by the shipper handle through the shipper rod connections. When any one or more of the head end doors or draft gear bonnets are open, the frame cannot be started; this prevents accidents while changing gears. On the other hand when the frame is in operation, none of the doors or bonnets can be opened; this prevents accidents while running.



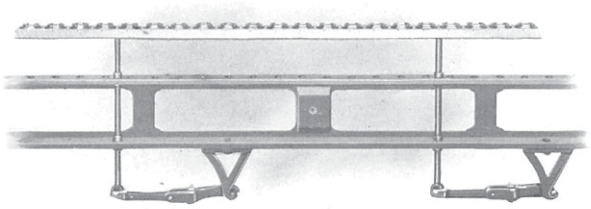
CREEL
Showing Upright Middle Rods and End Castings.
Lever-weighted Frame



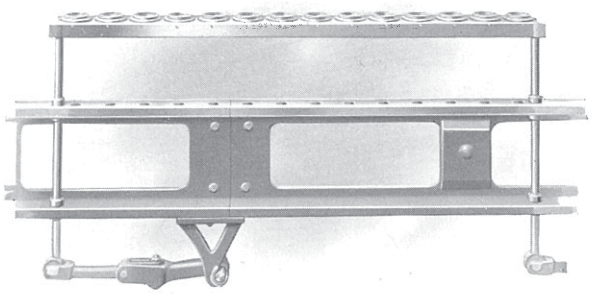
CREEL
Showing Upright Side Rods and End Castings.
Self-weighted Frame

The Creel is rigidly attached to the frame either by means of upright side rods or by upright middle rods, which in turn are securely bolted through the deck to cast-iron cross girts fastened under the roller beam. The ends of the creels are braced and supported by adjustable creel end castings, which in turn are bolted to suitable cross girts. The creels are made either one or two stories in height for either single or double roving. Our standard arrangement of the creel is termed the O. G. layout, and with this arrangement any creel bobbin may be removed and replaced by a full bobbin without interfering with the adjacent bobbins.

The cuts on the opposite page give views of the creel at the foot end of the frame. The upper view shows the creel attached to a lever weighted frame, while the lower view shows it attached to a self-weighted frame. Either style of weighting can be furnished on our spinning frames.

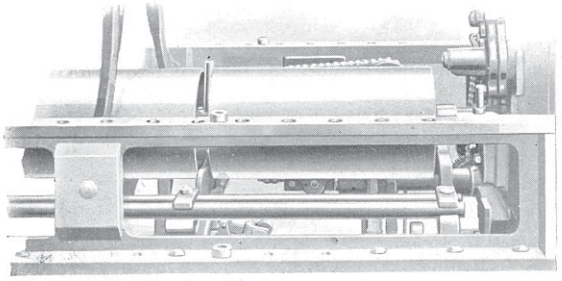


RING RAILS, Overhanging Type
Showing Lifting Rods and Rocker Beams

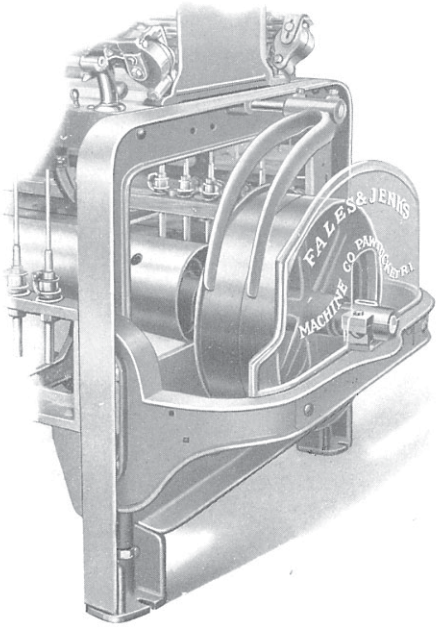


RING RAILS, End Supported Type
Showing Lifting Rods and Rocker Beams

The Ring Rails are all made in short lengths and are made strong and rigid by means of a deep flange extending the full length of the under front side. The rails, being short in length, can be removed easily when necessary. They are brought to a level by means of adjustable fingers on the rocker beams, the adjustment at each lifting rod being made by means of a bolt and locked in adjustment by a suitable check nut. On our standard frames for ordinary spinning the ring rails are supported in a manner illustrated in the upper view on the opposite page. On long frames for fine spinning the ring rails are supported at the ends, as shown in the lower view on the opposite page. This latter method of supporting the ring rails is used, because perfect alignment and absolute steadiness is necessary for the spinning of fine yarns.



CYLINDERS

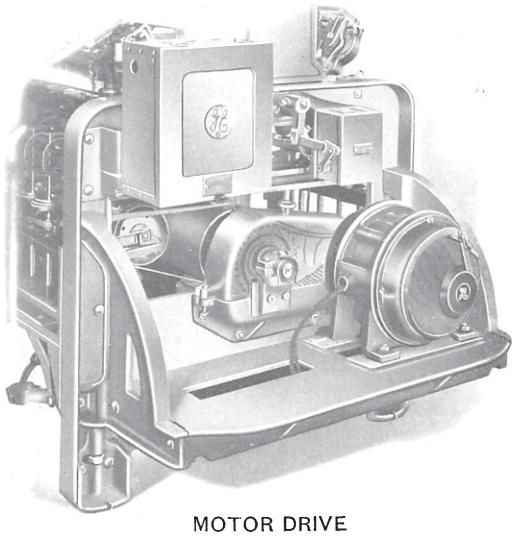


DRIVING PULLEYS
Showing Outrigger and Belt Guard

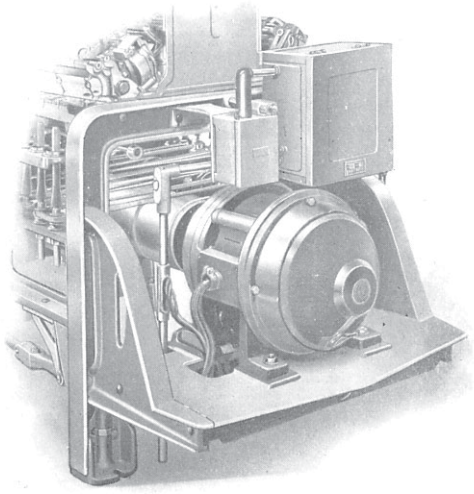
The Cylinders are usually 8 inches in diameter, are made of extra heavy tin and are of a patented reinforced construction. They are used in short lengths to insure strength, durability and freedom from vibration, the extreme length being limited to ten feet. The humming noise of the cylinder has been eliminated to a large extent by the use of a very short head end section, which effectively prevents the hum of vibration, due to the gears, from being transmitted to other sections of the cylinder. The cylinder bearings are of ample dimensions and are self-oiling. If so desired special ball or roller bearings can be furnished.

The Driving Shaft, made from high-grade 60 carbon crucible analysis steel, is unusually large, and in addition is supported at its outer end by a substantial outboard bearing, which effectively prevents any belt strain from springing the cylinders. The outrigger is made with heavy brackets and a cross bar which can be removed easily when changing the pulleys.

The Driving Pulleys are made in sizes from 7 inches to 24 inches in diameter, and from 2⅛ inches to 4⅛ inches face. The loose pulley is equipped with a moccasin bushing, which is substantially self-oiling and requires a new supply of oil about once in three months. The driving pulleys are usually located at the foot end of the frame, but may be located at the geared end of the frame if preferred.

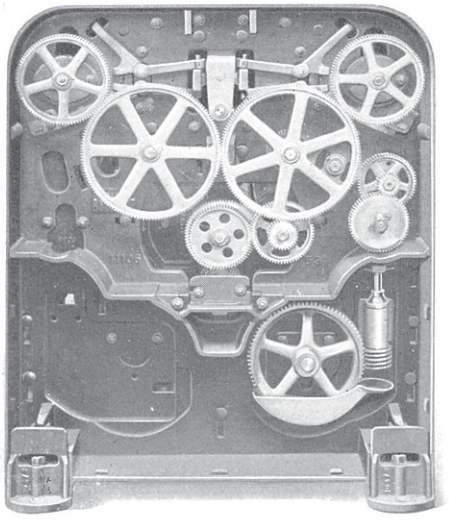


MOTOR DRIVE
Chain

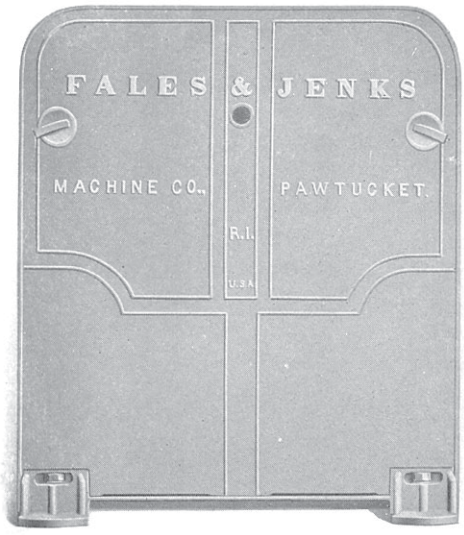


MOTOR DRIVE
Direct

Motor Drive is furnished when specified. The motor may be direct or chain connected, as desired. Occasionally a gear connection is furnished. When direct connected, the shaft of the motor extends directly into the cylinder. This method does not allow for any change in speed unless a variable speed motor is used. When chain connected, the sprocket on the motor shaft is connected to a sprocket on the cylinder shaft by means of a flexible chain. The chain and sprockets are provided with a cover which prevents the accumulation of fly and dirt. This latter method permits a change in speed by altering the size of the sprockets. The motor in either case is set on a heavy and well designed cross girt which is supported by two strong brackets securely fastened to the foot end of the frame. In addition to these two supports, a bracket is fixed in the center underneath the cross girt and firmly attached to the cross rib of the foot end. This bracket serves not only as a support, but prevents any side motion which the motor might make, especially when starting. Various types of switches are used and brackets are provided for any type. The horsepower of the motor depends upon the size and number of spindles on the frame.



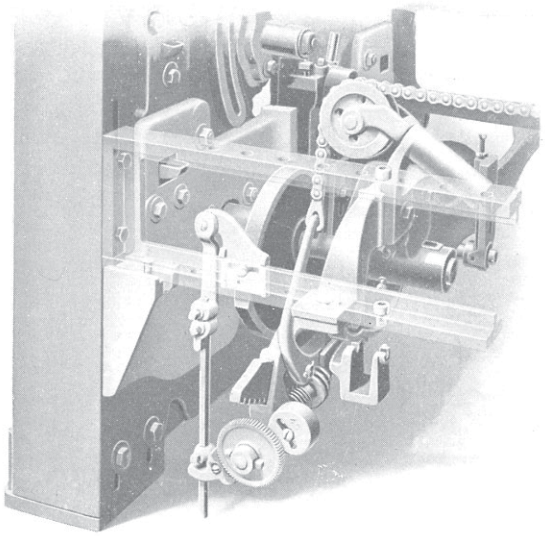
GEARING
Showing Builder Motion Drive



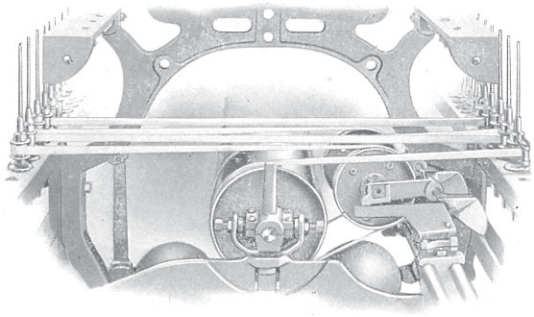
Showing the Doors and Panels which enclose the
GEARING

All Gearing is totally enclosed, either within the head end or beneath the draft gear covers. All the spur gears are machine cut on automatic machinery and the worm gears are accurately hobbed on special machines. All gear shaft bearings are ample in length and size, and either generous oil pockets or convenient oil tubes are provided so that every bearing can be oiled from the back of the head while the frame is in operation. The thrust of the builder motion worm is carried on a hardened steel collar provided with a special oil duct for lubrication. By the use of a slotted stud plate for the draft crown gears and an adjustable jack stand for the changes of variable cylinder and jack gears, a large range of twist and draft can be obtained.

The Builder Motion, more fully described on the following page, is also equipped with a jack stand and change gear drive, the regular twist gears being used as the change gears.



BUILDER MOTION

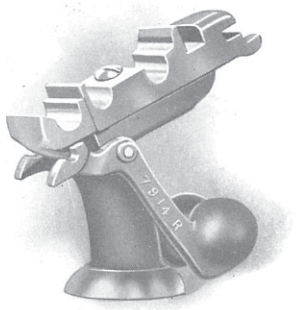


TAPE DRIVE
Showing Tension Device

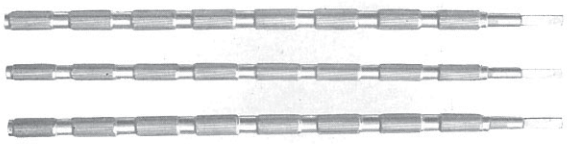
The Builder Motion is designed for warp wind, filling wind or a combination of both if desired. The change from warp to filling is easily and quickly made, since both cams, together with the complete builder arm, remain always in place. The change from one wind to the other is quickly made by changing the cam roll from one cam roll holder to the other and by substituting the filling worm for the warp rack or vice versa. The builder is driven by means of a train of spur gears embodying the use of a change gear or lay gear by means of which the speed of the wave motion can be regulated and the filling wind finely adjusted. The builder motion cams are driven by means of a worm and worm gear, with the result that practically all backlash is eliminated from the cam motion.

The Tape Drive with which most of our frames are equipped insures a steady, even speed of the spindles, and consequently a uniform twist in the yarn. The drive comprises four spindles, two on each side of the frame, driven by means of a tape passing over the cylinder, around the four spindles and over the idler pulley.

The Idler Pulley or Tension Device is a modification of the sliding Finlayson type, but has a swinging weighted lever carrying one end of the sliding carriage, thus doing away with an excess of sliding friction but retaining sufficient friction to prevent jumping. The tension device is securely clamped to suitable pipe rails running the full length of the frame.



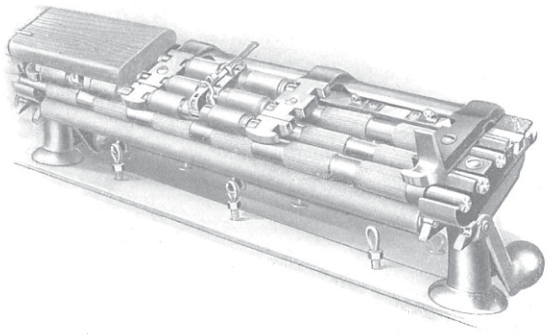
ROLL STAND
Showing Underclearer Weights



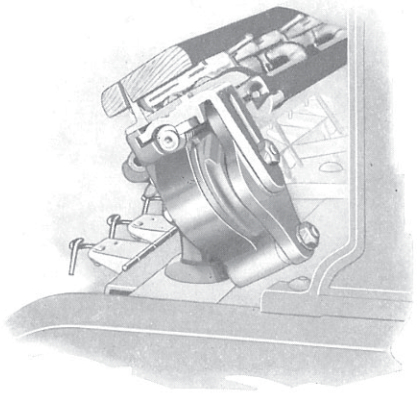
FLUTED ROLLS

The Roll Stands are of ample width to insure long life both to the stands themselves and to the necks of the rolls. Each roll stand slide is provided with a stop lug, which effectively prevents the cap bar from falling back into the roving when the frame is stripped for cleaning and scouring. Each roll stand has a deep oil pocket milled inside the front edge, by means of which a storage of oil is provided for the front roll bearings.

The Fluted Rolls are made of special crucible analysis steel, and each boss is accurately ground to pass the test of limit gauges, allowing a variation of .0015 inch either side of the standard size. The front fluted rolls are casehardened, which prevents the flutes from being accidentally bruised or roughened, and also adds materially to the life of the roll necks. The middle and back fluted rolls can be furnished with hardened necks and squares, but we prefer to make them semi-casehardened all over, including the necks and squares. All the rolls have irregular fluting, which effectively prevents any fluting of the leather-covered top rolls. A space of approximately one-half inch is provided between the roll stand bearings and the fluted bossing, so that oil from the bearings is not easily carried to the leather top rolls.



TOP ROLLS, CAP BARS
TOP CLEARERS and TRUMPET RODS



TRAVERSE MOTION

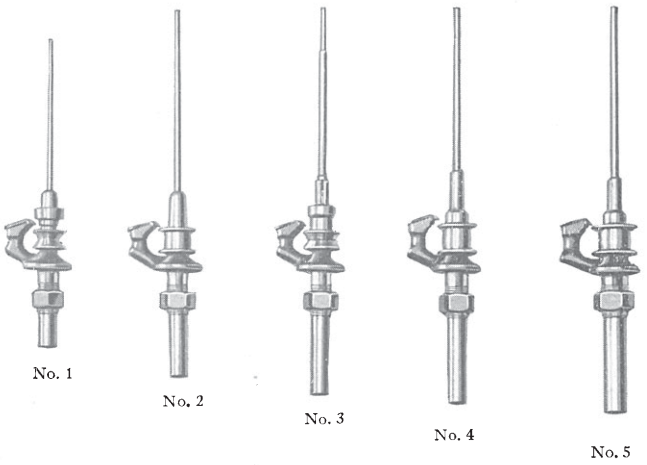
The Top Rolls are furnished either solid or shell front with solid middle and back rolls in the common lever weighted system, or if preferred, dead weighted front top rolls with middle and back rolls self-weighted can be supplied.

The Cap Bars are so designed that the trunnions of the front top rolls project above the cap bar, so that the waste may be removed easily from the trunnions. The cap bars are made independent of each other, so that they may be removed separately without in any way interfering with adjacent bars. Ample clearance is provided between the ends of the cap bar for easy adjustment of the fluted rolls, and for oiling the bearings.

The Top Clearers are of the flat stationary type for the lever weighted frame, or of the revolving type for the dead weighted frame.

The Trumpet Rods are made of cold drawn steel, and are equipped with brass trumpets which may be adjusted easily from the top while the frame is in operation. When desired a plain flat steel rod with drilled and countersunk holes can be used in place of the trumpet rod.

The Trumpet Rod Traverse Motion is of the variable type, so designed that the traverse continually varies in length from short to long and vice versa, and thus prevents the leather top rolls from becoming creased at the ends of the traverse. The complete traverse mechanism as a unit is carried on the foot end roll stand slide, requiring no readjustment when changing the setting of the rolls.



No. 1 No. 2 No. 3 No. 4 No. 5

SPINNING SPINDLES

No. 1—For fine counts, band whirl, cup bobbin drive.
No. 2—For medium fine counts, tape whirl, large taper bobbin drive.
No. 3—For medium count, band whirl, centrifugal clutch bobbin drive.
No. 4—For medium coarse counts, tape whirl, standard taper bobbin drive.
No. 5—For coarse counts, tape whirl, standard taper bobbin drive.

No. 1 No. 2 No. 3 No. 4

SPINNING RINGS

No. 1—Double adjustable ring.
No. 2—Double adjustable ring in cast iron holder.
No. 3—Double adjustable ring in steel plate holder.
No. 4—Common single flange ring.

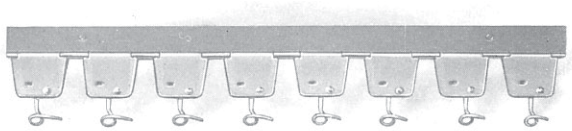
The Spindles with which our frames are equipped are of the standard Fales & Jenks type. They are manufactured in our own spindle shop, a department equipped with the most modern machinery of our own special design and of standard manufacture.

Fales & Jenks spindles are made of the very best material and with all the care, attention, knowledge and skill which we have acquired by an experience of over seventy-five years in spindle development and manufacture. In addition to the Fales & Jenks spindle we are prepared to furnish any of the other well-known types, such as the Rabbeth, Whitin or Draper. A large percentage of our spindles are made for tape drive, but we furnish band drive if preferred. We are also prepared to make and furnish our special ball bearing spindle in suitable sizes for all classes of work.

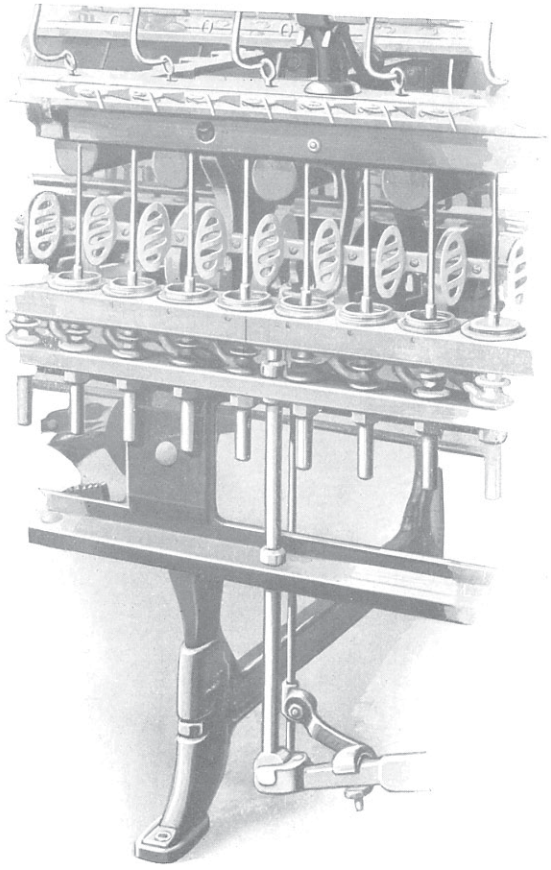
The Rings furnished with our frames are usually double-flanged in either cast-iron or steel-plate holders. The cast-iron holders have a pin traveler cleaner. The steel-plate holders have the traveler cleaner stamped up on the holder.

SIZES OF SPINNING RING FLANGES

No.	1	flange is	$\frac{4}{32}$	inch	wide
"	2	"	" $\frac{5}{32}$	inch	"
"	$2\frac{1}{2}$	"	" $\frac{11}{64}$	inch	"
"	3	"	" $\frac{6}{32}$	inch	"



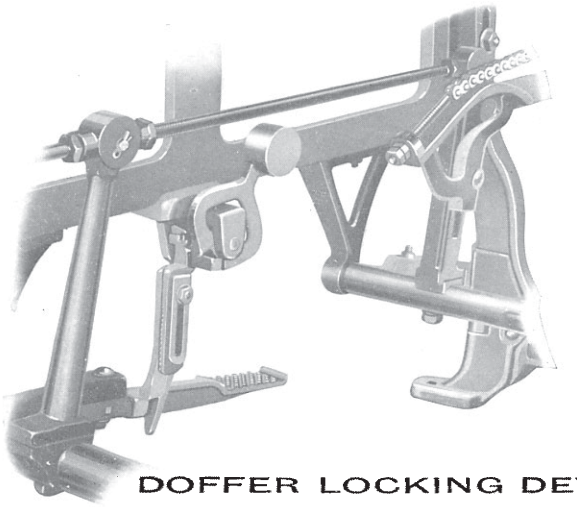
THREAD BOARD — All Metal



SEPARATORS
Showing Lifting Rod and method of attaching to Rocker

The Thread Boards can be furnished as follows: Wooden backs and blocks with Wamsley lifter; wooden backs with metal blocks, or all metal, as desired. Any style of guide wire desired can be supplied with any style of thread board selected.

The Separators which we usually furnish with our frames are the Fales & Jenks automatic type, in which the separator blades travel up and down with the ring rail but with a shorter traverse, thus maintaining the position of the separator blade midway between the ring rail and the thread board. The separators are carried on a continuous channel rod and are operated as to the up and down travel by means of lifting rods supported on the rocker finger and adjustable along the finger to vary the travel. The separators are so arranged that they can be tipped back out of the way for doffing. Other standard types of separators can be supplied if preferred. When desired we can furnish separators fastened to the back of the ring rail, which travel up and down with it, maintaining the same relative position with the ring rail. These, like the style above described, can be tipped back out of the way for doffing.



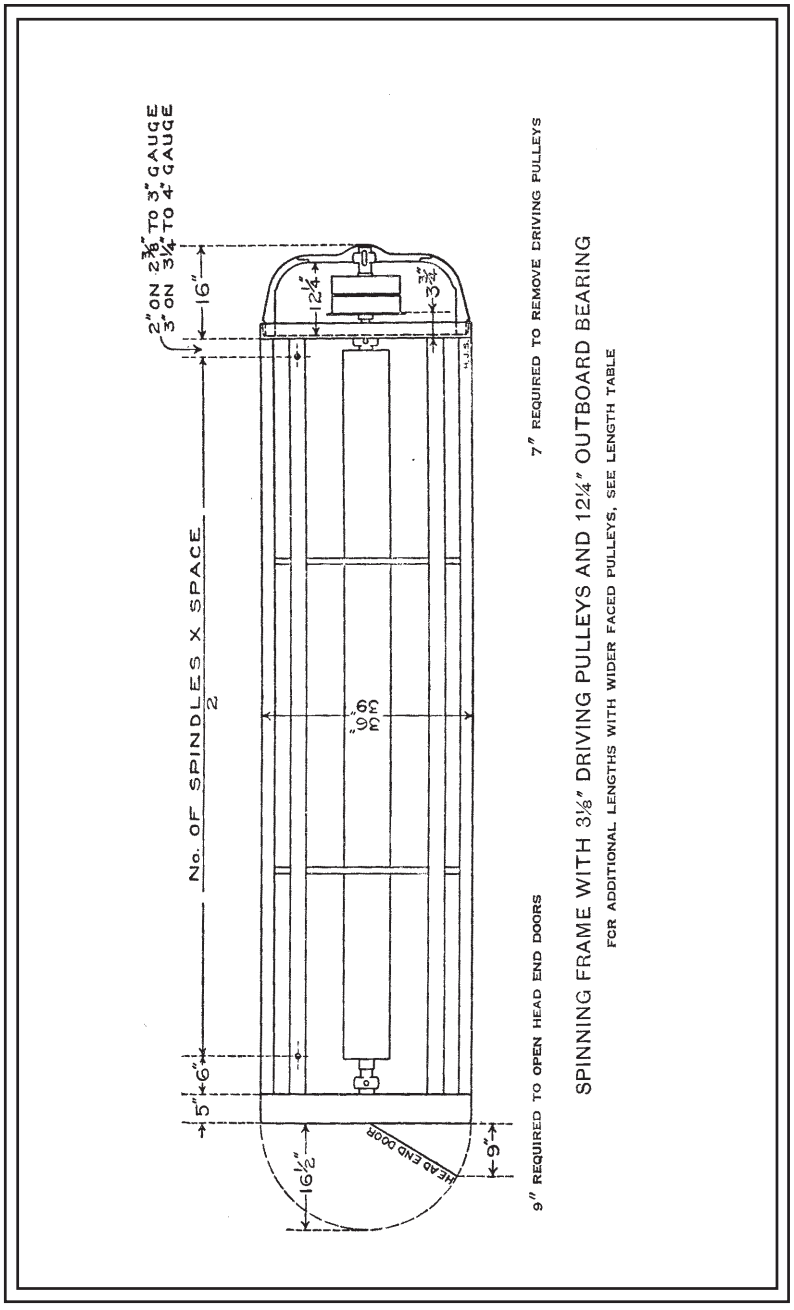
DOFFER LOCKING DEVICE
Viewed from inside of Frame

HANK CLOCK IN HEAD END

A Doffer Locking Device, of simple design, is attached to the spindle rail. It is operated in connection with the foot lever of the doffer rocker beam. When this lever is pushed down by the foot of the operator, the ring rail is automatically locked at its lowest position. To release the rail, the doffer weight is tripped and the foot lever of the doffer rocker beam is slightly depressed, thus allowing the ring rail to resume its operative position.

The Fales & Jenks Hank Clock is furnished when desired. This clock is of entirely new design, neatly made and ingeniously fitted and geared inside the head end. The face of the clock fits into an opening designed in the head end door. Tampering is prevented by means of a special lock screw. The same clock may be used with ⅞ inch, 1 inch or 1⅛ inch roll by simply changing two external driving gears.

FLOOR PLAN FOR SPINNING FRAME



SPINNING FRAME WITH 3⅛" DRIVING PULLEYS AND 12¼" OUTBOARD BEARING

FOR ADDITIONAL LENGTHS WITH WIDER FACED PULLEYS, SEE LENGTH TABLE

LENGTH TABLE

LENGTH OF SPINNING FRAMES WITH 3⅛" FACE DRIVING PULLEYS AND 12¼" OUTBOARD BEARINGS
FRAMES GEARED AND BELTED AT OPPOSITE ENDS

4 OR 8 BOSS ROLLS

No. of Spindles	LENGTH OVER ALL				
	2⅜ In. Gauge	2½ In. Gauge	2⅝ In. Gauge	2¾ In. Gauge	3 In. Gauge
112	13 ft. 6 in.	14 ft. 1 in.	14 ft. 8 in.	15 ft. 3 in.	16 ft. 5 in.
128	15 ft. 1 in.	15 ft. 9 in.	16 ft. 5 in.	17 ft. 1 in.	18 ft. 5 in.
144	16 ft. 8 in.	17 ft. 5 in.	18 ft. 2 in.	18 ft. 11 in.	20 ft. 5 in.
160	18 ft. 3 in.	19 ft. 1 in.	19 ft. 11 in.	20 ft. 9 in.	22 ft. 5 in.
176	19 ft. 10 in.	20 ft. 9 in.	21 ft. 8 in.	22 ft. 7 in.	24 ft. 5 in.
192	21 ft. 5 in.	22 ft. 5 in.	23 ft. 5 in.	24 ft. 5 in.	26 ft. 5 in.
208	23 ft. 0 in.	24 ft. 1 in.	25 ft. 2 in.	26 ft. 3 in.	28 ft. 5 in.
224	24 ft. 7 in.	25 ft. 9 in.	26 ft. 11 in.	28 ft. 1 in.	30 ft. 5 in.
240	26 ft. 2 in.	27 ft. 5 in.	28 ft. 8 in.	29 ft. 11 in.	32 ft. 5 in.
256	27 ft. 9 in.	29 ft. 1 in.	30 ft. 5 in.	31 ft. 9 in.	34 ft. 5 in.
272	29 ft. 4 in.	30 ft. 9 in.	32 ft. 2 in.	33 ft. 7 in.	36 ft. 5 in.
288	30 ft. 11 in.	32 ft. 5 in.	33 ft. 11 in.	35 ft. 5 in.	38 ft. 5 in.
304	32 ft. 6 in.	34 ft. 1 in.	35 ft. 8 in.	37 ft. 3 in.	40 ft. 5 in.
320	34 ft. 1 in.	35 ft. 9 in.	37 ft. 5 in.	39 ft. 1 in.	42 ft. 5 in.
336	35 ft. 8 in.	37 ft. 5 in.	39 ft. 2 in.	40 ft. 11 in.	44 ft. 5 in.
352	37 ft. 3 in.	39 ft. 1 in.	40 ft. 11 in.	42 ft. 9 in.	46 ft. 5 in.
368	38 ft. 10 in.	40 ft. 9 in.	42 ft. 8 in.	44 ft. 7 in.	48 ft. 5 in.
384	40 ft. 5 in.	42 ft. 5 in.	44 ft. 5 in.	46 ft. 5 in.	50 ft. 5 in.
400	42 ft. 0 in.	44 ft. 1 in.	46 ft. 2 in.	48 ft. 3 in.	52 ft. 5 in.
416	43 ft. 7 in.	45 ft. 9 in.	47 ft. 11 in.	50 ft. 1 in.	
432	45 ft. 2 in.	47 ft. 5 in.	49 ft. 8 in.	51 ft. 11 in.	
448	46 ft. 9 in.	49 ft. 1 in.	51 ft. 5 in.		
464	48 ft. 4 in.	50 ft. 9 in.			
480	49 ft. 11 in.	52 ft. 5 in.			

For Additions to Above Lengths see Page 43

LENGTH TABLE

LENGTH OF SPINNING FRAMES WITH 3⅛" FACE DRIVING PULLEYS AND 12¼" OUTBOARD BEARINGS
FRAMES GEARED AND BELTED AT OPPOSITE ENDS

6 BOSS ROLLS

No. of Spindles	LENGTH OVER ALL				
	3 In. Gauge	3¼ In. Gauge	3½ In. Gauge	3¾ In. Gauge	4 In. Gauge
120	17 ft. 5 in.	18 ft. 9 in.	20 ft. 0 in.	21 ft. 3 in.	22 ft. 6 in.
132	18 ft. 11 in.	20 ft. 4½ in.	21 ft. 9 in.	23 ft. 1½ in.	24 ft. 6 in.
144	20 ft. 5 in.	22 ft. 0 in.	23 ft. 6 in.	25 ft. 0 in.	26 ft. 6 in.
156	21 ft. 11 in.	23 ft. 7½ in.	25 ft. 3 in.	26 ft. 10½ in.	28 ft. 6 in.
168	23 ft. 5 in.	25 ft. 3 in.	27 ft. 0 in.	28 ft. 9 in.	30 ft. 6 in.
180	24 ft. 11 in.	26 ft. 10½ in.	28 ft. 9 in.	30 ft. 7½ in.	32 ft. 6 in.
192	26 ft. 5 in.	28 ft. 6 in.	30 ft. 6 in.	32 ft. 6 in.	34 ft. 6 in.
204	27 ft. 11 in.	30 ft. 1½ in.	32 ft. 3 in.	34 ft. 4½ in.	36 ft. 6 in.
216	29 ft. 5 in.	31 ft. 9 in.	34 ft. 0 in.	36 ft. 3 in.	38 ft. 6 in.
228	30 ft. 11 in.	33 ft. 4½ in.	35 ft. 9 in.	38 ft. 1½ in.	40 ft. 6 in.
240	32 ft. 5 in.	35 ft. 0 in.	37 ft. 6 in.	40 ft. 0 in.	42 ft. 6 in.
252	33 ft. 11 in.	36 ft. 7½ in.	39 ft. 3 in.	41 ft. 10½ in.	44 ft. 6 in.
264	35 ft. 5 in.	38 ft. 3 in.	41 ft. 0 in.	43 ft. 9 in.	46 ft. 6 in.
276	36 ft. 11 in.	39 ft. 10½ in.	42 ft. 9 in.	45 ft. 7½ in.	48 ft. 6 in.
288	38 ft. 5 in.	41 ft. 6 in.	44 ft. 6 in.	47 ft. 6 in.	50 ft. 6 in.
300	39 ft. 11 in.	43 ft. 1½ in.	46 ft. 3 in.	49 ft. 4½ in.	
312	41 ft. 5 in.	44 ft. 9 in.	48 ft. 0 in.	51 ft. 3 in.	
324	42 ft. 11 in.	46 ft. 4½ in.	49 ft. 9 in.		
336	44 ft. 5 in.	48 ft. 0 in.	51 ft. 6 in.		
348	45 ft. 11 in.	49 ft. 7½ in.			
360	47 ft. 5 in.	51 ft. 3 in.			
372	48 ft. 11 in.				
384	50 ft. 5 in.				
396	51 ft. 11 in.				

For Additions to Above Lengths, see Opposite Page

ADDITION TO LENGTHS GIVEN IN ABOVE TABLE

The lengths given in the preceding length tables are figured with a 3⅛ inch face pulley, a 12¼ inch outboard bearing and a 4½ inch box on outrigger.

With a 3⅛ inch face pulley, 11¼ inch outboard bearing and a 2½ inch box, subtract 1 inch
With a 3⅝ inch face pulley, 13¼ inch outboard bearing and a 4½ inch box, add 1 inch
With a 4⅛ inch face pulley, 14¼ inch outboard bearing and a 4½ inch box, add 2 inches

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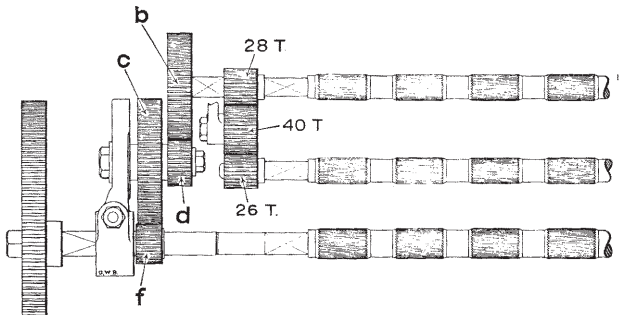
The additions for various motor connections can be given only approximately

With a 5 H. P. motor, 1800 R. P. M., chain connected, add approximately 6 inches
With a 5 H. P. motor, 1200 R. P. M., chain connected, add approximately 8 inches
With a 5 H. P. motor, 1800 R. P. M., direct connected, add approximately 0 inches
With a 5 H. P. motor, 1200 R. P. M., direct connected, add approximately 1 inch

With a 7½ H. P. motor, 1800 R. P. M., chain connected, add approximately 9 inches
With a 7½ H. P. motor, 1200 R. P. M., chain connected, add approximately 11 inches
With a 7½ H. P. motor, 1800 R. P. M., direct connected, add approximately 1 inch
With a 7½ H. P. motor, 1200 R. P. M., direct connected, add approximately 2 inches

With a 10 H. P. motor, 1800 R. P. M., chain connected, add approximately 12 inches
With a 10 H. P. motor, 1200 R. P. M., chain connected, add approximately 13 inches
With a 10 H. P. motor, 1800 R. P. M., direct connected, add approximately 2 inches
With a 10 H. P. motor, 1200 R. P. M., direct connected, add approximately 3 inches

Note: If coupling is to be used with any of the above direct drives add an additional 10½ inches.



DRAFT GEARING

DRAFT FORMULAS

f = FRONT ROLL PINION. c = CROWN GEAR.

d = DRAFT CHANGE GEAR. b = BACK ROLL GEAR.

m = DIAM. OF FRONT ROLL. n = DIAM. OF BACK ROLL.

$$\frac{c \times b \times m}{f \times d \times n} = \text{DRAFT.}$$

$$\frac{c \times b \times m}{f \times n} = \text{DRAFT CONSTANT.}$$

$$\frac{\text{DRAFT CONSTANT}}{\text{DRAFT CHANGE GEAR}} = \text{DRAFT.}$$

$$\frac{\text{DRAFT CONSTANT}}{\text{DRAFT}} = \text{DRAFT CHANGE GEAR.}$$

EXAMPLES:—

FRONT ROLL PINION 30T. CROWN GEAR 84T.

DRAFT CHANGE GEAR 24T. BACK ROLL GEAR 84T.

DIAM. OF FRONT ROLL 1" OR $\frac{8}{8}$". DIAM. OF BACK ROLL $\frac{7}{8}$".

$$\frac{84 \times 84 \times 8}{30 \times 24 \times 7} = 11.20, \text{ DRAFT.}$$

$$\frac{84 \times 84 \times 8}{30 \times 7} = 268.80, \text{ DRAFT CONSTANT.}$$

$$\frac{268.80}{24} = 11.20, \text{ DRAFT.}$$

$$\frac{268.80}{11.20} = 24, \text{ DRAFT CHANGE GEAR.}$$

DRAFT GEARING TABLE

"C" STYLE GEARING

FRONT ROLL 1 INCH DIAM. **BACK ROLL ⅞ INCH DIAM.**

FRONT ROLL PINION 30 TEETH BACK ROLL GEAR 84 TEETH

Change Gears	DRAFT					
	84 T. Crown	100 T. Crown	120 T. Crown	138 T. Crown	147 T. Crown	160 T. Crown
24	11.20	13.33	16.00	18.40	19.60	21.33
25	10.75	12.80	15.36	17.66	18.82	20.48
26	10.34	12.31	14.77	16.98	18.09	19.69
27	9.96	11.85	14.22	16.35	17.42	18.96
28	9.60	11.43	13.71	15.77	16.80	18.29
29	9.27	11.03	13.24	15.23	16.22	17.66
30	8.96	10.67	12.80	14.72	15.68	17.07
31	8.67	10.32	12.39	14.25	15.17	16.52
32	8.40	10.00	12.00	13.80	14.70	16.00
33	8.15	9.70	11.64	13.38	14.25	15.52
34	7.91	9.41	11.30	12.99	13.84	15.06
35	7.68	9.14	10.97	12.62	13.44	14.63
36	7.47	8.89	10.67	12.27	13.07	14.22
37	7.26	8.65	10.38	11.94	12.71	13.84
38	7.07	8.42	10.11	11.62	12.38	13.47
39	6.89	8.21	9.85	11.32	12.06	13.13
40	6.72	8.00	9.60	11.04	11.76	12.80
41	6.56	7.80	9.37	10.77	11.47	12.49
42	6.40	7.62	9.14	10.51	11.20	12.19
43	6.25	7.44	8.93	10.27	10.94	11.91
44	6.11	7.27	8.73	10.04	10.69	11.64
45	5.97	7.11	8.53	9.81	10.45	11.38
46	5.84	6.96	8.35	9.60	10.23	11.13
47	5.72	6.81	8.17	9.40	10.01	10.89
48	5.60	6.67	8.00	9.20	9.80	10.67
49	5.49	6.53	7.84	9.01	9.60	10.45
50	5.38	6.40	7.68	8.83	9.41	10.24
51	5.27	6.27	7.53	8.66	9.22	10.04
52	5.17	6.15	7.38	8.49	9.05	9.85
53	5.07	6.04	7.25	8.33	8.88	9.66
54	4.98	5.93	7.11	8.18	8.71	9.48
55	4.89	5.82	6.98	8.03	8.55	9.31
56	4.80	5.71	6.86	7.89	8.40	9.14
57	4.72	5.61	6.74	7.75	8.25	8.98
58	4.63	5.52	6.62	7.61	8.11	8.83
59	4.56	5.42	6.51	7.48	7.97	8.68
60	4.48	5.33	6.40	7.36	7.84	8.53
Constants	268.80	320.00	384.00	441.60	470.40	512.00

DRAFT GEARING TABLE

"C" STYLE GEARING

FRONT ROLL 1⅛ INCH DIAM. BACK ROLL 1 INCH DIAM.

FRONT ROLL PINION 30 TEETH BACK ROLL GEAR 84 TEETH

Change Gears	DRAFT					
	84 T. Crown	100 T. Crown	120 T. Crown	138 T. Crown	147 T. Crown	160 T. Crown
24	11.03	13.13	15.75	18.11	19.29	21.00
25	10.58	12.60	15.12	17.39	18.52	20.16
26	10.18	12.12	14.54	16.72	17.81	19.38
27	9.80	11.67	14.00	16.10	17.15	18.67
28	9.45	11.25	13.50	15.53	16.54	18.00
29	9.12	10.86	13.03	14.99	15.97	17.38
30	8.82	10.50	12.60	14.49	15.44	16.80
31	8.54	10.16	12.19	14.02	14.94	16.26
32	8.27	9.84	11.81	13.58	14.47	15.75
33	8.02	9.55	11.45	13.17	14.03	15.27
34	7.78	9.26	11.12	12.79	13.62	14.82
35	7.56	9.00	10.80	12.42	13.23	14.40
36	7.35	8.75	10.50	12.08	12.86	14.00
37	7.15	8.51	10.22	11.75	12.51	13.62
38	6.96	8.29	9.95	11.44	12.19	13.26
39	6.78	8.08	9.69	11.15	11.87	12.92
40	6.62	7.88	9.45	10.87	11.58	12.60
41	6.45	7.68	9.22	10.60	11.29	12.29
42	6.30	7.50	9.00	10.35	11.03	12.00
43	6.15	7.33	8.79	10.11	10.77	11.72
44	6.01	7.16	8.59	9.88	10.52	11.45
45	5.88	7.00	8.40	9.66	10.29	11.20
46	5.75	6.85	8.22	9.45	10.07	10.96
47	5.63	6.70	8.04	9.25	9.85	10.72
48	5.51	6.56	7.88	9.06	9.65	10.50
49	5.40	6.43	7.71	8.87	9.45	10.29
50	5.29	6.30	7.56	8.69	9.26	10.08
51	5.19	6.18	7.41	8.52	9.08	9.88
52	5.09	6.06	7.27	8.36	8.91	9.69
53	4.99	5.94	7.13	8.20	8.74	9.51
54	4.90	5.83	7.00	8.05	8.58	9.33
55	4.81	5.73	6.87	7.90	8.42	9.16
56	4.73	5.63	6.75	7.76	8.27	9.00
57	4.64	5.53	6.63	7.63	8.12	8.84
58	4.56	5.43	6.52	7.49	7.98	8.69
59	4.48	5.34	6.41	7.37	7.85	8.54
60	4.41	5.25	6.30	7.25	7.72	8.40
Constants	264.60	315.00	378.00	434.70	463.05	504.00

DRAFT GEARING TABLE

"C" STYLE GEARING

FRONT ROLL 1⅛ INCH DIAM. **BACK ROLL 1⅛ INCH DIAM.**

FRONT ROLL PINION 30 TEETH BACK ROLL GEAR 84 TEETH

Change Gears	DRAFT					
	84 T. Crown	100 T. Crown	120 T. Crown	138 T. Crown	147 T. Crown	160 T. Crown
24	9.80	11.67	14.00	16.10	17.15	18.67
25	9.41	11.20	13.44	15.46	16.46	17.92
26	9.05	10.77	12.92	14.86	15.83	17.23
27	8.71	10.37	12.44	14.31	15.24	16.59
28	8.40	10.00	12.00	13.80	14.70	16.00
29	8.11	9.66	11.59	13.32	14.19	15.45
30	7.84	9.33	11.20	12.88	13.72	14.93
31	7.59	9.03	10.84	12.46	13.28	14.45
32	7.35	8.75	10.50	12.08	12.86	14.00
33	7.13	8.48	10.18	11.71	12.47	13.58
34	6.92	8.24	9.88	11.36	12.11	13.18
35	6.72	8.00	9.60	11.04	11.76	12.80
36	6.53	7.78	9.33	10.73	11.43	12.44
37	6.36	7.57	9.08	10.44	11.12	12.11
38	6.19	7.37	8.84	10.17	10.83	11.79
39	6.03	7.18	8.62	9.91	10.55	11.49
40	5.88	7.00	8.40	9.66	10.29	11.20
41	5.74	6.83	8.20	9.42	10.04	10.93
42	5.60	6.67	8.00	9.20	9.80	10.67
43	5.47	6.51	7.81	8.99	9.57	10.42
44	5.35	6.36	7.64	8.78	9.35	10.18
45	5.23	6.22	7.47	8.59	9.15	9.96
46	5.11	6.09	7.30	8.40	8.95	9.74
47	5.00	5.96	7.15	8.22	8.76	9.53
48	4.90	5.83	7.00	8.05	8.58	9.33
49	4.80	5.71	6.86	7.89	8.40	9.14
50	4.70	5.60	6.72	7.73	8.23	8.96
51	4.61	5.49	6.59	7.58	8.07	8.78
52	4.52	5.38	6.46	7.43	7.92	8.62
53	4.44	5.28	6.34	7.29	7.77	8.45
54	4.36	5.19	6.22	7.16	7.62	8.30
55	4.28	5.09	6.11	7.03	7.48	8.15
56	4.20	5.00	6.00	6.90	7.35	8.00
57	4.13	4.91	5.89	6.78	7.22	7.86
58	4.06	4.83	5.79	6.66	7.10	7.72
59	3.99	4.75	5.69	6.55	6.98	7.59
60	3.92	4.67	5.60	6.44	6.86	7.47
Constants	235.20	280.00	336.00	386.40	411.60	448.00

DRAFT GEARING TABLE

"D" STYLE GEARING

FRONT ROLL 1⅛ INCH DIAM. **BACK ROLL 1⅛ INCH DIAM.**

FRONT ROLL PINION 30 TEETH BACK ROLL GEAR 96 TEETH

Change Gears	DRAFT					
	84 T. Crown	100 T. Crown	120 T. Crown	138 T. Crown	147 T. Crown	160 T. Crown
24	11.20	13.33	16.00	18.40	19.60	21.33
25	10.75	12.80	15.36	17.66	18.81	20.48
26	10.33	12.31	14.77	16.98	18.09	19.69
27	9.95	11.85	14.22	16.35	17.42	18.96
28	9.60	11.43	13.71	15.77	16.80	18.29
29	9.26	11.03	13.24	15.22	16.22	17.66
30	8.96	10.67	12.80	14.72	15.68	17.07
31	8.67	10.32	12.39	14.24	15.17	16.52
32	8.40	10.00	12.00	13.80	14.70	16.00
33	8.14	9.70	11.64	13.38	14.25	15.52
34	7.90	9.41	11.29	12.98	13.83	15.06
35	7.68	9.14	10.97	12.61	13.44	14.63
36	7.46	8.89	10.67	12.26	13.06	14.22
37	7.26	8.65	10.38	11.93	12.71	13.84
38	7.07	8.42	10.11	11.62	12.37	13.47
39	6.89	8.21	9.85	11.32	12.06	13.13
40	6.72	8.00	9.60	11.04	11.76	12.80
41	6.55	7.80	9.37	10.77	11.48	12.49
42	6.40	7.62	9.14	10.51	11.20	12.19
43	6.25	7.44	8.93	10.26	10.93	11.91
44	6.10	7.27	8.73	10.03	10.69	11.64
45	5.97	7.11	8.53	9.81	10.45	11.38
46	5.84	6.96	8.35	9.60	10.22	11.13
47	5.71	6.81	8.17	9.39	10.00	10.89
48	5.60	6.67	8.00	9.20	9.80	10.67
49	5.48	6.53	7.84	9.01	9.60	10.45
50	5.37	6.40	7.68	8.83	9.40	10.24
51	5.27	6.27	7.53	8.65	9.22	10.04
52	5.16	6.15	7.38	8.49	9.04	9.85
53	5.07	6.04	7.25	8.33	8.87	9.66
54	4.97	5.93	7.11	8.17	8.71	9.48
55	4.88	5.82	6.98	8.02	8.55	9.31
56	4.80	5.71	6.86	7.88	8.40	9.14
57	4.71	5.61	6.74	7.74	8.25	8.98
58	4.63	5.52	6.62	7.61	8.11	8.83
59	4.55	5.42	6.51	7.48	7.97	8.68
60	4.48	5.33	6.40	7.36	7.84	8.53
Constants	268.80	320.00	384.00	441.60	470.40	512.00

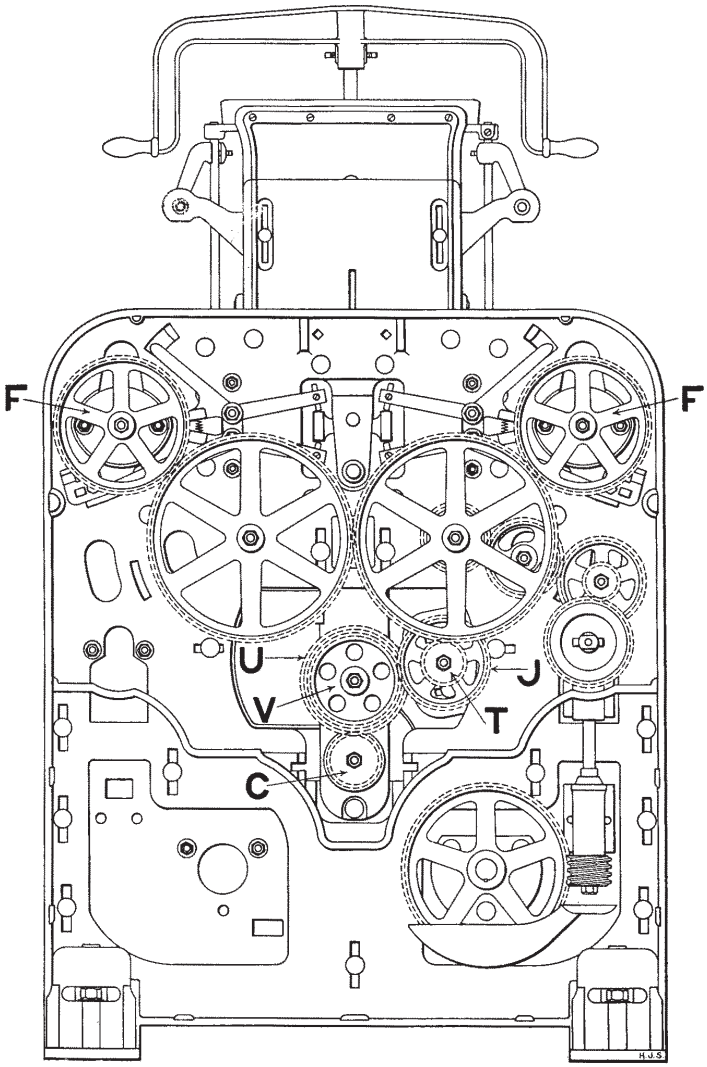
TWIST GEARING TABLES

Various sizes of cylinders and rolls, also a large variation in gearing combinations have been used on our spinning frames in the last few years. For this reason we have endeavored to produce a twist gearing table that would cover all conditions.

On the following pages will be found our tables of twist constants. At the top of each table will be found the diameter of the cylinder, the diameter of the front roll and a combination of gearing. It is only necessary to find the combination which agrees with the combination of a particular frame and in this table will be found the machine constant opposite the particular diameter of spindle whirl.

On the pages following the table of twist constants will be found our twist gearing tables which are figured for practically every constant from 120 to 1518. After having found the machine constant in the table of constants, it is only necessary to refer to the twist gearing table, and in the column headed by that particular constant, or the one nearest to it, the number of turns twist will be found opposite the number of teeth in the twist gear which is to be used to produce that number of turns twist.

TWIST GEARING FOR SPINNING



BOX-HEAD SHOWING TWIST GEARING

TWIST FORMULAS

C = CYLINDER GEAR.
U = UNIVERSAL JACK GEAR.
V = VARIABLE CYLINDER GEAR.
J = JACK GEAR.
T = TWIST CHANGE GEAR.
F = FRONT ROLL GEAR.
O = CIRCUM. OF FRONT ROLL.
R = RATIO CYL. TO WHIRL.

$$\frac{U \times J \times F \times R}{C \times V \times T \times O} = \text{TWIST PER INCH.}$$

$$\frac{U \times J \times F \times R}{C \times V \times O} = \text{TWIST CONSTANT.}$$

$$\frac{\text{TWIST CONSTANT}}{\text{TWIST CHANGE GEAR}} = \text{TWIST PER INCH.}$$

$$\frac{\text{TWIST CONSTANT}}{\text{TWIST PER INCH}} = \text{TWIST CHANGE GEAR.}$$

EXAMPLES:—

CYLINDER GEAR 40T
UNIVERSAL JACK GEAR 81T.
VARIABLE CYLINDER GEAR 77T.
JACK GEAR 54T
TWIST CHANGE GEAR 38T
FRONT ROLL GEAR 95T
CIRCUM. OF 1″ FRONT ROLL 3.1416″.
RATIO 8″ CYL. TO 1″ WHIRL 7.26

$$\frac{81 \times 54 \times 95 \times 7.26}{40 \times 77 \times 38 \times 3.1416} = 8.20 \text{ TWIST PER INCH.}$$

$$\frac{81 \times 54 \times 95 \times 7.26}{40 \times 77 \times 3.1416} = 311.77 \text{ TWIST CONSTANT}$$

$$\frac{311.77}{38} = 8.20 \text{ TWIST PER INCH.}$$

$$\frac{311.77}{8.20} = 38 \text{ TWIST CHANGE GEAR.}$$

Note:—The formulas for band driven frames are the same as for tape driven frames except that no Universal Jack Gear or Variable Cylinder Gear is used.

TWIST GEARING COMBINATIONS FOR BAND AND TAPE DRIVEN SPINNING FRAMES

THE TWIST GEARING COMBINATIONS IN EACH COLUMN HAVE BEEN FIGURED SO AS TO GIVE THE SAME TWIST CONSTANT. THIS ALLOWS THE SAME CONSTANT TABLES AND TWIST GEARING TABLES TO BE USED IN ALL CASES.

TWIST GEARING COMBINATIONS

BAND DRIVEN FRAME WITH 112 T. FRONT ROLL GEAR	50 C. 60 J.	40 C. 70 J.	30 C. 80 J.	23 C. 87 J.	20 C. 90 J.
TAPE DRIVEN FRAME WITH 112 T. FRONT ROLL GEAR	50 C. 60 U. J. 65 V. C. 65 J.	40 C. 70 U. J. 65 V. C. 65 J.	30 C. 80 U. J. 65 V. C. 65 J.	23 C. 87 U. J. 65 V. C. 65 J.	20 C. 90 U. J. 65 V. C 65 J.
BAND DRIVEN FRAME WITH 95 T. FRONT ROLL GEAR	46 C. 65 J.	36 C. 74 J.	28 C. 88 J.	20 C. 89 J.	17 C. 90 J.
TAPE DRIVEN FRAME WITH 95 T. FRONT ROLL GEAR	46 C. 65 U. J. 70 V. C. 70 J.	36 C. 74 U. J. 70 V. C. 70 J.	28 C. 88 U. J. 70 V. C. 70 J.	20 C. 89 U. J. 70 V. C. 70 J.	17 C. 90 U. J. 70 V. C. 70 J.
TAPE DRIVEN FRAME WITH 95 T. FRONT ROLL GEAR. CYLINDER GEAR OF 40 T. AND UNIVERSAL JACK GEAR OF 81 T. ARE PERMANENT GEARS. MAKE CHANGES WITH VARIABLE CYLINDER GEAR AND JACK GEAR	40 C. 81 U. J. 77 V. C. 54 J.	40 C. 81 U. J. 65 V. C. 66 J.	40 C. 81 U. J. 51 V. C. 79 J.	40 C. 81 U. J. 41 V. C. 90 J.	40 C. 81 U. J. 36 V. C. 94 J.

TABLE OF TWIST CONSTANTS 36″ & 39″ SPINNING FRAMES

TAPE DRIVE FRONT ROLL 1″ DIAM.
CYLINDER 6″ DIAM.

FRONT ROLL GEAR 95 TOOTH CYLINDER GEAR 40 TOOTH
UNIVERSAL JACK GEAR 81 TOOTH

Nominal Diameter of Spindle Whirl	TWIST CONSTANTS				
	Jack Gear 54T Var. Cylinder 77T	Jack Gear 66T Var. Cylinder 65T	Jack Gear 79T Var. Cylinder 51T	Jack Gear 90T Var. Cylinder 41T	Jack Gear 94T Var. Cylinder 36T
3/4″	300.3	436.9	668.1	945.9	1125.4
13/16″	280.3	407.7	623.4	882.7	1057.3
7/8″	262.7	382.2	584.4	827.5	991.2
1″	233.3	339.3	518.9	734.7	880.0
1 1/8″	209.8	305.2	466.6	660.7	791.3
1 1/4″	190.5	277.2	423.8	600.1	718.8

TABLE OF TWIST CONSTANTS 36″ & 39″ SPINNING FRAMES

TAPE DRIVE FRONT ROLL 1⅛″ DIAM.
CYLINDER 6″ DIAM.

FRONT ROLL GEAR 95 TOOTH CYLINDER GEAR 40 TOOTH
UNIVERSAL JACK GEAR 81 TOOTH

Nominal Diameter of Spindle Whirl	TWIST CONSTANTS				
	Jack Gear 54T Var. Cylinder 77T	Jack Gear 66T Var. Cylinder 65T	Jack Gear 79T Var. Cylinder 51T	Jack Gear 90T Var. Cylinder 41T	Jack Gear 94T Var. Cylinder 36T
3/4″	267.0	388.4	593.8	840.8	1000.3
13/16″	249.1	362.4	554.1	784.6	933.5
7/8″	233.5	339.8	519.5	735.6	875.1
1″	207.3	301.6	461.2	653.0	776.9
1 1/8″	186.4	271.2	414.7	587.3	698.7
1 1/4″	169.3	246.4	376.7	533.4	634.6

TABLE OF TWIST CONSTANTS 36″ & 39″ SPINNING FRAMES

TAPE DRIVE FRONT ROLL 1″ DIAM.
CYLINDER 6½″ DIAM.

FRONT ROLL GEAR 95 TOOTH CYLINDER GEAR 40 TOOTH
UNIVERSAL JACK GEAR 81 TOOTH

Nominal Diameter of Spindle Whirl	TWIST CONSTANTS				
	Jack Gear 54T Var. Cylinder 77T	Jack Gear 66T Var. Cylinder 65T	Jack Gear 79T Var. Cylinder 51T	Jack Gear 90T Var. Cylinder 41T	Jack Gear 94T Var. Cylinder 36T
¾″	325.1	473.0	723.2	1024.0	1218.2
13/16″	303.3	441.3	674.7	955.4	1136.6
⅞″	284.1	413.3	632.0	894.8	1064.6
1″	252.5	367.3	561.6	795.2	946.1
1⅛″	227.3	330.6	505.6	715.8	849.8
1¼″	206.3	300.2	459.0	649.9	773.2

TABLE OF TWIST CONSTANTS 36″ & 39″ SPINNING FRAMES

TAPE DRIVE FRONT ROLL 1⅛″ DIAM.
CYLINDER 6½″ DIAM.

FRONT ROLL GEAR 95 TOOTH CYLINDER GEAR 40 TOOTH
UNIVERSAL JACK GEAR 81 TOOTH

Nominal Diameter of Spindle Whirl	TWIST CONSTANTS				
	Jack Gear 54T Var. Cylinder 77T	Jack Gear 66T Var. Cylinder 65T	Jack Gear 79T Var. Cylinder 51T	Jack Gear 90T Var. Cylinder 41T	Jack Gear 94T Var. Cylinder 36T
¾″	289.0	420.4	642.8	910.2	1082.9
13/16″	269.6	392.2	599.7	849.2	1010.3
⅞″	252.5	367.4	561.7	795.4	946.3
1″	224.4	326.5	499.2	706.9	841.0
1⅛″	202.0	293.9	449.4	636.3	755.3
1¼″	183.4	266.8	408.0	577.7	687.3

TABLE OF TWIST CONSTANTS 36″ & 39″ SPINNING FRAMES

TAPE DRIVE FRONT ROLL 1″ DIAM.
CYLINDER 7″ DIAM.

FRONT ROLL GEAR 95 TOOTH CYLINDER GEAR 40 TOOTH
UNIVERSAL JACK GEAR 81 TOOTH

Nominal Diameter of Spindle Whirl	TWIST CONSTANTS				
	Jack Gear 54T Var. Cylinder 77T	Jack Gear 66T Var. Cylinder 65T	Jack Gear 79T Var. Cylinder 51T	Jack Gear 90T Var. Cylinder 41T	Jack Gear 94T Var Cylinder 36T
¾″	349.9	509.0	778.3	1102.0	1311.1
13/16″	326.8	475.5	727.0	1029.4	1224.6
⅞″	306.3	444.0	681.4	964.8	1147.8
1″	271.7	393.8	604.4	855.8	1018.1
1⅛″	244.8	356.1	544.5	771.0	910.0
1¼″	222.1	322.0	494.2	699.7	832.4

TABLE OF TWIST CONSTANTS 36″ & 39″ SPINNING FRAMES

TAPE DRIVE FRONT ROLL 1⅛″ DIAM.
CYLINDER 7″ DIAM.

FRONT ROLL GEAR 95 TOOTH CYLINDER GEAR 40 TOOTH
UNIVERSAL JACK GEAR 81 TOOTH

Nominal Diameter of Spindle Whirl	TWIST CONSTANTS				
	Jack Gear 54T Var. Cylinder 77T	Jack Gear 66T Var. Cylinder 65T	Jack Gear 79T Var. Cylinder 51T	Jack Gear 90T Var. Cylinder 41T	Jack Gear 94T Var. Cylinder 36T
¾″	311.0	452.5	691.8	979.6	1165.4
13/16″	290.5	422.6	646.2	915.0	1088.6
⅞″	272.3	396.1	605.7	857.6	1020.3
1″	241.5	351.4	537.2	760.7	905.0
1⅛″	217.6	316.5	484.8	685.3	815.3
1¼″	197.5	287.3	439.2	621.9	739.9

TABLE OF TWIST CONSTANTS 36″ & 39″ SPINNING FRAMES

TAPE DRIVE FRONT ROLL 1″ DIAM.
CYLINDER 7½″ DIAM.

FRONT ROLL GEAR 95 TOOTH CYLINDER GEAR 40 TOOTH
UNIVERSAL JACK GEAR 81 TOOTH

Nominal Diameter of Spindle Whirl	TWIST CONSTANTS				
	Jack Gear 54T Var. Cylinder 77T	Jack Gear 66T Var. Cylinder 65T	Jack Gear 79T Var. Cylinder 51T	Jack Gear 90T Var. Cylinder 41T	Jack Gear 94T Var. Cylinder 36T
¾″	375.5	546.2	835.3	1182.3	1407.2
13/16″	350.3	509.7	779.3	1103.4	1312.7
⅞″	328.1	477.3	729.8	1033.4	1229.5
1″	290.9	423.3	647.2	916.3	1090.2
1⅛″	262.3	381.6	583.5	826.2	982.9
1¼″	238.0	346.2	529.3	749.5	891.7

TABLE OF TWIST CONSTANTS 36″ & 39″ SPINNING FRAMES

TAPE DRIVE FRONT ROLL 1⅛″ DIAM.
CYLINDER 7½″ DIAM.

FRONT ROLL GEAR 95 TOOTH CYLINDER GEAR 40 TOOTH
UNIVERSAL JACK GEAR 81 TOOTH

Nominal Diameter of Spindle Whirl	TWIST CONSTANTS				
	Jack Gear 54T Var. Cylinder 77T	Jack Gear 66T Var. Cylinder 65T	Jack Gear 79T Var. Cylinder 51T	Jack Gear 90T Var. Cylinder 41T	Jack Gear 94T Var. Cylinder 36T
¾″	333.8	485.5	742.5	1051.4	1250.8
13/16″	397.9	453.0	692.7	980.8	1166.8
⅞″	291.7	424.3	648.7	918.6	1092.8
1″	258.6	376.3	575.2	814.5	969.0
1⅛″	233.2	339.2	518.6	734.4	873.7
1¼″	211.5	307.7	470.5	666.2	792.6

TABLE OF TWIST CONSTANTS 36″ & 39″ SPINNING FRAMES

TAPE DRIVE FRONT ROLL 1″ DIAM.
CYLINDER 8″ DIAM.

FRONT ROLL GEAR 95 TOOTH CYLINDER GEAR 40 TOOTH
UNIVERSAL JACK GEAR 81 TOOTH

Nominal Diameter of Spindle Whirl	TWIST CONSTANTS				
	Jack Gear 54T Var. Cylinder 77T	Jack Gear 66T Var. Cylinder 65T	Jack Gear 79T Var. Cylinder 51T	Jack Gear 90T Var. Cylinder 41T	Jack Gear 94T Var. Cylinder 36T
¾″	399.9	581.8	889.5	1259.5	1498.4
13/16″	373.4	543.2	830.6	1176.0	1399.1
⅞″	349.5	508.4	777.3	1100.7	1309.5
1″	310.2	451.2	689.9	976.9	1162.2
1⅛″	279.8	407.1	622.5	881 4	1048.5
1¼″	253.8	369.2	564.5	799.3	950.9

TABLE OF TWIST CONSTANTS 36″ & 39″ SPINNING FRAMES

TAPE DRIVE FRONT ROLL 1⅛″ DIAM.
CYLINDER 8″ DIAM.

FRONT ROLL GEAR 95 TOOTH CYLINDER GEAR 40 TOOTH
UNIVERSAL JACK GEAR 81 TOOTH

Nominal Diameter of Spindle Whirl	TWIST CONSTANTS				
	Jack Gear 54T Var. Cylinder 77T	Jack Gear 66T Var. Cylinder 65T	Jack Gear 79T Var. Cylinder 51T	Jack Gear 90T Var. Cylinder 41T	Jack Gear 94T Var. Cylinder 36T
¾″	355.5	517.1	790.7	1119.5	1331.9
13/16″	331.9	482.9	738.3	1045.4	1243.7
⅞″	310.6	451.9	690.9	978.4	1164.0
1″	275.7	401.1	613.3	868.3	1033.1
1⅛″	248.7	361.9	553.3	783.4	932.0
1¼″	225.6	328.2	501.8	710.5	845.2

TABLE OF TWIST CONSTANTS 36″ & 39″ SPINNING FRAMES

TAPE DRIVE FRONT ROLL 1″ DIAM.
CYLINDER 8½″ DIAM.

FRONT ROLL GEAR 95 TOOTH CYLINDER GEAR 40 TOOTH
UNIVERSAL JACK GEAR 81 TOOTH

Nominal Diameter of Spindle Whirl	TWIST CONSTANTS				
	Jack Gear 54T Var. Cylinder 77T	Jack Gear 66T Var. Cylinder 65T	Jack Gear 79T Var. Cylinder 51T	Jack Gear 90T Var. Cylinder 41T	Jack Gear 94T Var. Cylinder 36T
¾″	424.7	617.8	944.6	1337.5	
13/16″	396.1	576.2	881.0	1247.4	1484.0
⅞″	371.3	540.1	825.8	1169.3	1391.1
1″	330.1	479.1	732.7	1037.4	1234.3
1⅛″	296.5	431.3	659.5	933.8	1111.0
1¼″	269.6	392.2	599.6	849.1	1010.1

TABLE OF TWIST CONSTANTS 36″ & 39″ SPINNING FRAMES

TAPE DRIVE FRONT ROLL 1⅛″ DIAM.
CYLINDER 8½″ DIAM.

FRONT ROLL GEAR 95 TOOTH CYLINDER GEAR 40 TOOTH
UNIVERSAL JACK GEAR 81 TOOTH

Nominal Diameter of Spindle Whirl	TWIST CONSTANTS				
	Jack Gear 54T Var. Cylinder 77T	Jack Gear 66T Var. Cylinder 65T	Jack Gear 79T Var. Cylinder 51T	Jack Gear 90T Var. Cylinder 41T	Jack Gear 94T Var. Cylinder 36T
¾″	377.5	549.2	839.7	1188.9	1414.4
13/16″	352.0	512.1	783.1	1108.8	1319.1
⅞″	330.0	480.1	734.1	1039.4	1222.8
1″	293.4	425.9	651.3	922.2	1097.1
1⅛″	263.5	383.4	586.2	830.1	987.5
1¼″	239.6	348.6	533.0	754.7	897.9

TABLE OF TWIST CONSTANTS 39″ SPINNING FRAMES

TAPE DRIVE FRONT ROLL 1″ DIAM.
CYLINDER 9″ DIAM.

FRONT ROLL GEAR 95 TOOTH CYLINDER GEAR 40 TOOTH
UNIVERSAL JACK GEAR 81 TOOTH

Nominal Diameter of Spindle Whirl	TWIST CONSTANTS				
	Jack Gear 54T Var. Cylinder 77T	Jack Gear 66T Var. Cylinder 65T	Jack Gear 79T Var. Cylinder 51T	Jack Gear 90T Var. Cylinder 41T	Jack Gear 94T Var. Cylinder 36T
¾″	449.9	654.5	1000.7	1416.9	
13/16″	419.1	609.7	932.3	1320.0	
⅞″	392.6	571.2	873.4	1236.6	1471.2
1″	348.6	507.2	775.5	1098.0	1306.3
1⅛″	314.0	456.8	698.5	989.0	1176.6
1¼″	285.4	415.2	634.8	898.8	1069.4

TABLE OF TWIST CONSTANTS 39″ SPINNING FRAMES

TAPE DRIVE FRONT ROLL 1⅛″ DIAM.
CYLINDER 9″ DIAM.

FRONT ROLL GEAR 95 TOOTH CYLINDER GEAR 40 TOOTH
UNIVERSAL JACK GEAR 81 TOOTH

Nominal Diameter of Spindle Whirl	TWIST CONSTANTS				
	Jack Gear 54T Var. Cylinder 77T	Jack Gear 66T Var. Cylinder 65T	Jack Gear 79T Var. Cylinder 51T	Jack Gear 90T Var. Cylinder 41T	Jack Gear 94T Var. Cylinder 36T
¾″	399.9	581.8	889.5	1259.5	1498.4
13/16″	372.6	542.0	828.7	1173.4	1395.9
⅞″	349.0	507.7	776.3	1099.2	1307.7
1″	309.9	450.8	689.3	976.0	1161.1
1⅛″	279.1	406.1	620.9	879.1	1045.9
1¼″	253.7	369.0	564.3	799.0	950.5

TABLE OF TWIST CONSTANTS 39″ SPINNING FRAMES

TAPE DRIVE FRONT ROLL 1″ DIAM.
CYLINDER 9½″ DIAM.

FRONT ROLL GEAR 95 TOOTH CYLINDER GEAR 40 TOOTH
UNIVERSAL JACK GEAR 81 TOOTH

Nominal Diameter of Spindle Whirl	TWIST CONSTANTS				
	Jack Gear 54T Var. Cylinder 77T	Jack Gear 66T Var. Cylinder 65T	Jack Gear 79T Var. Cylinder 51T	Jack Gear 90T Var. Cylinder 41T	Jack Gear 94T Var. Cylinder 36T
¾″	484.2	695.5	1063.4	1505.7	
13/16″	445.2	647.6	990.3	1402.1	
⅞″	416.6	606.0	926.6	1312.0	
1″	369.1	537.0	821.1	1162.6	1383.1
1⅛″	331.5	482.3	737.5	1044.2	1242.3
1¼″	301.6	438.8	670.9	950.0	1130.2

TABLE OF TWIST CONSTANTS 39″ SPINNING FRAMES

TAPE DRIVE FRONT ROLL 1⅛″ DIAM.
CYLINDER 9½″ DIAM.

FRONT ROLL GEAR 95 TOOTH CYLINDER GEAR 40 TOOTH
UNIVERSAL JACK GEAR 81 TOOTH

Nominal Diameter of Spindle Whirl	TWIST CONSTANTS				
	Jack Gear 54T Var. Cylinder 77T	Jack Gear 66T Var. Cylinder 65T	Jack Gear 79T Var. Cylinder 51T	Jack Gear 90T Var. Cylinder 41T	Jack Gear 94T Var. Cylinder 36T
¾″	425.0	618.2	945.3	1338.4	
13/16″	395.7	575.7	880.2	1246.3	1482.7
⅞″	370.3	538.7	823.6	1166.2	1387.4
1″	328.1	477.3	729.8	1033.4	1229.4
1⅛″	294.7	428.7	655.5	928.2	1104.2
1¼″	268.1	390.0	596.4	844.4	1004.6

TABLE OF TWIST CONSTANTS 39″ SPINNING FRAMES

TAPE DRIVE FRONT ROLL 1″ DIAM.
CYLINDER 10″ DIAM.

FRONT ROLL GEAR 95 TOOTH CYLINDER GEAR 40 TOOTH
UNIVERSAL JACK GEAR 81 TOOTH

Nominal Diameter of Spindle Whirl	TWIST CONSTANTS				
	Jack Gear 54T Var. Cylinder 77T	Jack Gear 66T Var. Cylinder 65T	Jack Gear 79T Var. Cylinder 51T	Jack Gear 90T Var. Cylinder 41T	Jack Gear 94T Var. Cylinder 36T
¾″	502.0	730.3	1116.7		
13/16″	468.7	681.8	1042.5	1476.1	
⅞″	437.1	635.8	972.2	1376.6	
1″	387.9	564.4	862.9	1221.8	1453.6
1⅛″	348.2	506.5	774.5	1096.7	1304.7
1¼″	317.0	461.2	705.1	998.4	1187.8

TABLE OF TWIST CONSTANTS 39″ SPINNING FRAMES

TAPE DRIVE FRONT ROLL 1⅛″ DIAM.
CYLINDER 10″ DIAM.

FRONT ROLL GEAR 95 TOOTH CYLINDER GEAR 40 TOOTH
UNIVERSAL JACK GEAR 81 TOOTH

Nominal Diameter of Spindle Whirl	TWIST CONSTANTS				
	Jack Gear 54T Var. Cylinder 77T	Jack Gear 66T Var. Cylinder 65T	Jack Gear 79T Var. Cylinder 51T	Jack Gear 90T Var. Cylinder 41T	Jack Gear 94T Var. Cylinder 36T
¾″	446.2	649.2	992.6	1405.4	
13/16″	416.6	604.4	926.7	1312.1	
⅞″	388.5	565.2	864.2	1223.6	1455.7
1″	344.8	501.6	767.0	1086.0	1292.1
1⅛″	309.5	450.3	688.5	974.8	1159.7
1¼″	281.8	409.9	626.8	887.5	1055.8

TWIST GEAR TABLE

Twist Change Gear	TWIST PER INCH — CONSTANTS										Twist Change Gear
	120	122	124	126	128	130	132	134	136	138	
16	7.50	7.62	7.75	7.87	8.00	8.12	8.25	8.37	8.50	8.62	16
17	7.06	7.18	7.29	7.41	7.53	7.65	7.76	7.88	8.00	8.12	17
18	6.67	6.78	6.89	7.00	7.11	7.22	7.33	7.44	7.56	7.67	18
19	6.32	6.42	6.53	6.63	6.74	6.84	6.95	7.05	7.16	7.26	19
20	6.00	6.10	6.20	6.30	6.40	6.50	6.60	6.70	6.80	6.90	20
21	5.71	5.81	5.90	6.00	6.10	6.19	6.29	6.38	6.48	6.57	21
22	5.45	5.55	5.64	5.73	5.82	5.91	6.00	6.09	6.18	6.27	22
23	5.22	5.30	5.39	5.48	5.57	5.65	5.74	5.83	5.91	6.00	23
24	5.00	5.08	5.17	5.25	5.33	5.42	5.50	5.58	5.67	5.75	24
25	4.80	4.88	4.96	5.04	5.12	5.20	5.28	5.36	5.44	5.52	25
26	4.62	4.69	4.77	4.85	4.92	5.00	5.08	5.15	5.23	5.31	26
27	4.44	4.52	4.59	4.67	4.74	4.81	4.89	4.96	5.04	5.11	27
28	4.29	4.36	4.43	4.50	4.57	4.64	4.71	4.79	4.86	4.93	28
29	4.14	4.21	4.28	4.34	4.41	4.48	4.55	4.62	4.69	4.76	29
30	4.00	4.07	4.13	4.20	4.27	4.33	4.40	4.47	4.53	4.60	30
31	3.87	3.94	4.00	4.06	4.13	4.19	4.26	4.32	4.39	4.45	31
32	3.75	3.82	3.87	3.94	4.00	4.06	4.12	4.19	4.25	4.31	32
33	3.64	3.70	3.76	3.82	3.88	3.94	4.00	4.06	4.12	4.18	33
34	3.53	3.59	3.65	3.71	3.76	3.82	3.88	3.94	4.00	4.06	34
35	3.43	3.49	3.54	3.60	3.66	3.71	3.77	3.83	3.89	3.94	35
36	3.33	3.39	3.44	3.50	3.56	3.61	3.67	3.72	3.78	3.83	36
37	3.24	3.30	3.35	3.41	3.46	3.51	3.57	3.62	3.68	3.73	37
38	3.16	3.21	3.26	3.32	3.37	3.42	3.47	3.53	3.58	3.63	38
39	3.08	3.13	3.18	3.23	3.28	3.33	3.38	3.44	3.49	3.54	39
40	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	40
41	2.93	2.98	3.02	3.07	3.12	3.17	3.22	3.27	3.32	3.37	41
42	2.86	2.90	2.95	3.00	3.05	3.10	3.14	3.19	3.24	3.29	42
43	2.79	2.84	2.88	2.93	2.98	3.02	3.07	3.12	3.16	3.21	43
44	2.73	2.77	2.82	2.86	2.91	2.95	3.00	3.05	3.09	3.14	44
45	2.67	2.71	2.76	2.80	2.84	2.89	2.93	2.98	3.02	3.07	45
46	2.61	2.65	2.70	2.74	2.78	2.83	2.87	2.91	2.96	3.00	46
47	2.55	2.60	2.64	2.68	2.72	2.77	2.81	2.85	2.89	2.94	47
48	2.50	2.54	2.58	2.62	2.67	2.71	2.75	2.79	2.83	2.87	48
49	2.45	2.49	2.53	2.57	2.61	2.65	2.69	2.73	2.78	2.82	49
50	2.40	2.44	2.48	2.52	2.56	2.60	2.64	2.68	2.72	2.76	50
51	2.35	2.39	2.43	2.47	2.51	2.55	2.59	2.63	2.67	2.71	51
52	2.31	2.35	2.38	2.42	2.46	2.50	2.54	2.58	2.62	2.65	52
53	2.26	2.30	2.34	2.38	2.41	2.45	2.49	2.53	2.57	2.60	53
54	2.22	2.26	2.30	2.33	2.37	2.41	2.44	2.48	2.52	2.56	54
55	2.18	2.22	2.25	2.29	2.33	2.36	2.40	2.44	2.47	2.51	55
56	2.14	2.18	2.21	2.25	2.29	2.32	2.36	2.39	2.43	2.46	56
57	2.11	2.14	2.18	2.21	2.25	2.28	2.32	2.35	2.39	2.42	57
58	2.07	2.10	2.14	2.17	2.21	2.24	2.28	2.31	2.34	2.38	58
59	2.03	2.07	2.10	2.14	2.17	2.20	2.24	2.27	2.30	2.34	59
60	2.00	2.03	2.07	2.10	2.13	2.17	2.20	2.23	2.27	2.30	60
61	1.97	2.00	2.03	2.07	2.10	2.13	2.16	2.20	2.23	2.26	61
62	1.94	1.97	2.00	2.03	2.06	2.10	2.13	2.16	2.19	2.23	62
63	1.90	1.94	1.97	2.00	2.03	2.06	2.10	2.13	2.16	2.19	63
64	1.87	1.91	1.94	1.97	2.00	2.03	2.06	2.09	2.12	2.16	64
65	1.85	1.88	1.91	1.94	1.97	2.00	2.03	2.06	2.09	2.12	65
66	1.82	1.85	1.88	1.91	1.94	1.97	2.00	2.03	2.06	2.09	66
67	1.79	1.82	1.85	1.88	1.91	1.94	1.97	2.00	2.03	2.06	67
68	1.76	1.79	1.82	1.85	1.88	1.91	1.94	1.97	2.00	2.03	68
69	1.74	1.77	1.80	1.83	1.85	1.88	1.91	1.94	1.97	2.00	69
70	1.71	1.74	1.77	1.80	1.83	1.86	1.89	1.91	1.94	1.97	70

TWIST GEAR TABLE

Twist Change Gear	TWIST PER INCH CONSTANTS										Twist Change Gear
	140	142	144	146	148	150	152	154	156	158	
16	8.75	8.87	9.00	9.12	9.25	9.37	9.50	9.62	9.75	9.87	16
17	8.24	8.35	8.47	8.59	8.71	8.82	8.94	9.06	9.18	9.29	17
18	7.78	7.89	8.00	8.11	8.22	8.33	8.44	8.56	8.67	8.78	18
19	7.37	7.47	7.58	7.68	7.79	7.89	8.00	8.11	8.21	8.32	19
20	7.00	7.10	7.20	7.30	7.40	7.50	7.60	7.70	7.80	7.90	20
21	6.67	6.76	6.86	6.95	7.05	7.14	7.24	7.33	7.43	7.52	21
22	6.36	6.45	6.55	6.64	6.73	6.82	6.91	7.00	7.09	7.18	22
23	6.09	6.17	6.26	6.35	6.43	6.52	6.61	6.70	6.78	6.87	23
24	5.83	5.92	6.00	6.08	6.17	6.25	6.33	6.42	6.50	6.58	24
25	5.60	5.68	5.76	5.84	5.92	6.00	6.08	6.16	6.24	6.32	25
26	5.38	5.46	5.54	5.62	5.69	5.77	5.85	5.92	6.00	6.08	26
27	5.19	5.26	5.33	5.41	5.48	5.56	5.63	5.70	5.78	5.85	27
28	5.00	5.07	5.14	5.21	5.29	5.36	5.43	5.50	5.57	5.64	28
29	4.83	4.90	4.97	5.03	5.10	5.17	5.24	5.31	5.38	5.45	29
30	4.67	4.73	4.80	4.87	4.93	5.00	5.07	5.13	5.20	5.27	30
31	4.52	4.58	4.65	4.71	4.77	4.84	4.90	4.97	5.03	5.10	31
32	4.37	4.44	4.50	4.56	4.62	4.69	4.75	4.82	4.87	4.94	32
33	4.24	4.30	4.36	4.42	4.48	4.55	4.61	4.67	4.73	4.79	33
34	4.12	4.18	4.24	4.29	4.35	4.41	4.47	4.53	4.59	4.65	34
35	4.00	4.06	4.11	4.17	4.23	4.29	4.34	4.40	4.46	4.51	35
36	3.89	3.94	4.00	4.06	4.11	4.17	4.22	4.28	4.33	4.39	36
37	3.78	3.84	3.89	3.95	4.00	4.05	4.11	4.16	4.22	4.27	37
38	3.68	3.74	3.79	3.84	3.89	3.95	4.00	4.05	4.11	4.16	38
39	3.59	3.64	3.69	3.74	3.79	3.85	3.90	3.95	4.00	4.05	39
40	3.50	3.55	3.60	3.65	3.70	3.75	3.80	3.85	3.90	3.95	40
41	3.41	3.46	3.51	3.56	3.61	3.66	3.71	3.76	3.80	3.85	41
42	3.33	3.38	3.43	3.48	3.52	3.57	3.62	3.67	3.71	3.76	42
43	3.26	3.30	3.35	3.40	3.44	3.49	3.53	3.58	3.63	3.67	43
44	3.18	3.23	3.27	3.32	3.36	3.41	3.45	3.50	3.55	3.59	44
45	3.11	3.16	3.20	3.24	3.29	3.33	3.38	3.42	3.47	3.51	45
46	3.04	3.09	3.13	3.17	3.22	3.26	3.30	3.35	3.39	3.43	46
47	2.98	3.02	3.06	3.11	3.15	3.19	3.23	3.28	3.32	3.36	47
48	2.92	2.96	3.00	3.04	3.08	3.12	3.17	3.21	3.25	3.29	48
49	2.86	2.90	2.94	2.98	3.02	3.06	3.10	3.14	3.18	3.22	49
50	2.80	2.84	2.88	2.92	2.96	3.00	3.04	3.08	3.12	3.16	50
51	2.74	2.78	2.82	2.86	2.90	2.94	2.98	3.02	3.06	3.10	51
52	2.69	2.73	2.77	2.81	2.85	2.88	2.92	2.96	3.00	3.04	52
53	2.64	2.68	2.72	2.75	2.79	2.83	2.87	2.91	2.94	2.98	53
54	2.59	2.63	2.67	2.70	2.74	2.78	2.81	2.85	2.89	2.93	54
55	2.55	2.58	2.62	2.65	2.69	2.73	2.76	2.80	2.84	2.87	55
56	2.50	2.54	2.57	2.61	2.64	2.68	2.71	2.75	2.79	2.82	56
57	2.46	2.49	2.53	2.56	2.60	2.63	2.67	2.70	2.74	2.77	57
58	2.41	2.45	2.48	2.52	2.55	2.59	2.62	2.66	2.69	2.72	58
59	2.37	2.41	2.44	2.47	2.51	2.54	2.58	2.61	2.64	2.68	59
60	2.33	2.37	2.40	2.43	2.47	2.50	2.53	2.57	2.60	2.63	60
61	2.29	2.33	2.36	2.39	2.43	2.46	2.49	2.52	2.56	2.59	61
62	2.26	2.29	2.32	2.35	2.39	2.42	2.45	2.48	2.52	2.55	62
63	2.22	2.25	2.29	2.32	2.35	2.38	2.41	2.44	2.48	2.51	63
64	2.19	2.22	2.25	2.28	2.31	2.34	2.37	2.41	2.44	2.47	64
65	2.15	2.18	2.22	2.25	2.28	2.31	2.34	2.37	2.40	2.43	65
66	2.12	2.15	2.18	2.21	2.24	2.27	2.30	2.33	2.36	2.39	66
67	2.09	2.12	2.15	2.18	2.21	2.24	2.27	2.30	2.33	2.36	67
68	2.06	2.09	2.12	2.15	2.18	2.21	2.24	2.26	2.29	2.32	68
69	2.03	2.06	2.09	2.12	2.14	2.17	2.20	2.23	2.26	2.29	69
70	2.00	2.03	2.06	2.09	2.11	2.14	2.17	2.20	2.23	2.26	70

Remainder of twist gear table (pages 64-131) omitted.

TWIST TABLE

Number of Yarn	Square Root of No. of Yarn	WARP TWIST — Square Root Multiplied by					
		5.00	4.75	4.50	4.25	4.00	3.75
		Extra Frame	Ordinary Frame	Medium Frame	Low Frame	Extra Mule	Ordinary Mule
1	1.000	5.00	4.75	4.50	4.25	4.00	3.75
2	1.414	7.07	6.72	6.36	6.01	5.66	5.30
3	1.732	8.66	8.23	7.79	7.36	6.93	6.50
4	2.000	10.00	9.50	9.00	8.50	8.00	7.50
5	2.236	11.18	10.62	10.06	9.50	8.94	8.39
6	2.450	12.25	11.64	11.02	10.41	9.80	9.19
7	2.646	13.23	12.57	11.91	11.25	10.58	9.92
8	2.828	14.14	13.44	12.73	12.02	11.31	10.61
9	3.000	15.00	14.25	13.50	12.75	12.00	11.25
10	3.162	15.81	15.02	14.23	13.44	12.65	11.86
11	3.317	16.58	15.75	14.92	14.10	13.27	12.44
12	3.464	17.32	16.45	15.59	14.72	13.86	12.99
13	3.606	18.03	17.13	16.22	15.33	14.42	13.52
14	3.742	18.71	17.77	16.84	15.90	14.97	14.03
15	3.873	19.36	18.40	17.43	16.46	15.49	14.52
16	4.000	20.00	19.00	18.00	17.00	16.00	15.00
17	4.123	20.62	19.58	18.55	17.52	16.49	15.46
18	4.243	21.21	20.15	19.09	18.03	16.97	15.91
19	4.359	21.79	20.70	19.62	18.53	17.44	16.35
20	4.472	22.36	21.24	20.12	19.01	17.89	16.77
21	4.583	22.91	21.77	20.62	19.48	18.33	17.18
22	4.690	23.45	22.28	21.11	19.93	18.76	17.59
23	4.796	23.98	22.78	21.58	20.38	19.18	17.98
24	4.899	24.49	23.27	22.05	20.82	19.60	18.37
25	5.000	25.00	23.75	22.50	21.25	20.00	18.75
26	5.099	25.50	24.22	22.95	21.67	20.40	19.12
27	5.196	25.98	24.68	23.38	22.08	20.78	19.49
28	5.292	26.46	25.13	23.81	22.49	21.17	19.84
29	5.385	26.93	25.58	24.23	22.89	21.54	20.19
30	5.477	27.39	26.02	24.65	23.28	21.91	20.54
31	5.568	27.84	26.45	25.05	23.66	22.27	20.88
32	5.657	28.28	26.87	25.46	24.04	22.63	21.21
33	5.745	28.72	27.29	25.85	24.42	22.98	21.54
34	5.831	29.15	27.70	26.24	24.78	23.32	21.87
35	5.916	29.58	28.10	26.62	25.14	23.66	22.19
36	6.000	30.00	28.50	27.00	25.50	24.00	22.50
37	6.083	30.41	28.89	27.37	25.85	24.33	22.81
38	6.164	30.82	29.28	27.74	26.20	24.66	23.12
39	6.245	31.22	29.66	28.10	26.54	24.98	23.42
40	6.325	31.62	30.04	28.46	26.88	25.30	23.72
41	6.403	32.02	30.41	28.81	27.21	25.61	24.01
42	6.481	32.40	30.78	29.16	27.54	25.92	24.30
43	6.557	32.79	31.15	29.51	27.87	26.23	24.59
44	6.633	33.17	31.51	29.85	28.19	26.53	24.87
45	6.708	33.54	31.86	30.19	28.51	26.83	25.16
46	6.782	33.91	32.22	30.52	28.82	27.13	25.43
47	6.856	34.28	32.56	30.85	29.14	27.42	25.71
48	6.928	34.64	32.91	31.18	29.44	27.71	25.98
49	7.000	35.00	33.25	31.50	29.75	28.00	26.25
50	7.071	35.36	33.59	31.82	30.05	28.28	26.52
51	7.141	35.71	33.92	32.14	30.35	28.57	26.78
52	7.211	36.06	34.25	32.45	30.64	28.85	27.04
53	7.280	36.40	34.58	32.76	30.94	29.12	27.30
54	7.349	36.75	34.91	33.07	31.23	29.39	27.56
55	7.416	37.08	35.23	33.37	31.51	29.66	27.81
56	7.483	37.42	35.55	33.67	31.80	29.93	28.06
57	7.550	37.75	35.86	33.97	32.09	30.20	28.31
58	7.616	38.08	36.17	34.27	32.37	30.46	28.56
59	7.681	38.41	36.49	34.57	32.64	30.72	28.80
60	7.746	38.73	36.79	34.86	32.92	30.98	29.05

TWIST TABLE—(*Continued*)

Number of Yarn	Square Root of No. of Yarn	FILLING TWIST Square Root Multiplied by			HOSIERY TWIST Square Root Multiplied by			
		3.50	3.35	3.25	3.00	2.75	2.50	2.25
		Extra Frame	Ordinary Frame	Ordinary Mule	Extra Hosiery	Ordinary Hosiery	Medium Hosiery	Low Hosiery
1	1.000	3.50	3.35	3.25	3.00	2.75	2.50	2.25
2	1.414	4.95	4.73	4.60	4.24	3.89	3.53	3.18
3	1.732	6.06	5.80	5.63	5.20	4.76	4.33	3.90
4	2.000	7.00	6.70	6.50	6.00	5.50	5.00	4.50
5	2.236	7.83	7.48	7.27	6.71	6.15	5.59	5.03
6	2.450	8.57	8.20	7.96	7.35	6.73	6.12	5.51
7	2.646	9.26	8.86	8.60	7.94	7.27	6.61	5.95
8	2.828	9.90	9.47	9.19	8.48	7.78	7.07	6.36
9	3.000	10.50	10.05	9.75	9.00	8.25	7.50	6.75
10	3.162	11.07	10.59	10.28	9.49	8.69	7.90	7.11
11	3.317	11.61	11.11	10.78	9.95	9.12	8.29	7.46
12	3.464	12.12	11.60	11.26	10.39	9.52	8.66	7.79
13	3.606	12.62	12.07	11.72	10.82	9.91	9.01	8.11
14	3.742	13.10	12.53	12.16	11.23	10.29	9.35	8.42
15	3.873	13.56	12.97	12.59	11.62	10.65	9.68	8.71
16	4.000	14.00	13.40	13.00	12.00	11.00	10.00	9.00
17	4.123	14.43	13.81	13.40	12.37	11.34	10.31	9.28
18	4.243	14.85	14.21	13.79	12.73	11.66	10.60	9.55
19	4.359	15.26	14.60	14.17	13.08	11.98	10.89	9.81
20	4.472	15.65	14.98	14.53	13.42	12.30	11.18	10.06
21	4.583	16.04	15.35	14.89	13.75	12.60	11.46	10.31
22	4.690	16.42	15.71	15.24	14.07	12.90	11.73	10.55
23	4.796	16.79	16.06	15.59	14.39	13.19	11.99	10.79
24	4.899	17.15	16.41	15.92	14.70	13.47	12.25	11.02
25	5.000	17.50	16.75	16.25	15.00	13.75	12.50	11.25
26	5.099	17.85	17.08	16.57	15.30	14.02	12.75	11.47
27	5.196	18.19	17.40	16.89	15.59	14.29	12.99	11.69
28	5.292	18.52	17.72	17.20	15.88	14.55	13.23	11.91
29	5.385	18.85	18.04	17.50	16.16	14.81	13.46	12.12
30	5.477	19.17	18.34	17.80	16.43	15.06	13.69	12.32
31	5.568	19.49	18.65	18.10	16.70	15.31	13.92	12.53
32	5.657	19.80	18.95	18.38	16.97	15.55	14.14	12.73
33	5.745	20.11	19.24	18.67	17.24	15.80	14.36	12.93
34	5.831	20.41	19.53	18.95	17.49	16.03	14.58	13.12
35	5.916	20.71	19.81	19.23	17.75	16.27	14.79	13.31
36	6.000	21.00	20.10	19.50	18.00	16.50	15.00	13.50
37	6.083	21.29	20.38	19.77	18.24	16.72	15.21	13.69
38	6.164	21.58	20.65	20.03	18.49	16.95	15.41	13.87
39	6.245	21.86	20.92	20.30	18.74	17.17	15.61	14.05
40	6.325	22.14	21.19	20.55	18.98	17.39	15.81	14.23
41	6.403	22.41	21.45	20.81	19.21	17.61	16.01	14.41
42	6.481	22.68	21.71	21.06	19.44	17.82	16.20	14.58
43	6.557	22.95	21.96	21.31	19.67	18.03	16.39	14.75
44	6.633	23.22	22.22	21.56	19.90	18.24	16.58	14.92
45	6.708	23.48	22.47	21.80	20.12	18.45	16.77	15.09
46	6.782	23.74	22.72	22.04	20.35	18.65	16.96	15.26
47	6.856	23.99	22.96	22.28	20.57	18.85	17.14	15.43
48	6.928	24.25	23.20	22.52	20.78	19.05	17.32	15.59
49	7.000	24.50	23.45	22.75	21.00	19.25	17.50	15.75
50	7.071	24.75	23.69	22.98	21.21	19.44	17.68	15.91
51	7.141	24.99	23.92	23.21	21.42	19.64	17.85	16.06
52	7.211	25.24	24.16	23.44	21.63	19.83	18.03	16.22
53	7.280	25.48	24.38	23.66	21.84	20.02	18.20	16.38
54	7.349	25.72	24.61	23.88	22.05	20.21	18.37	16.54
55	7.416	25.96	24.84	24.10	22.25	20.39	18.54	16.69
56	7.483	26.19	25.07	24.32	22.45	20.58	18.71	16.84
57	7.550	26.42	25.29	24.54	22.65	20.76	18.87	16.99
58	7.616	26.66	25.51	24.75	22.85	20.94	19.04	17.14
59	7.681	26.88	25.73	24.96	23.04	21.12	19.20	17.28
60	7.746	27.11	25.95	25.17	23.24	21.30	19.36	17.43

TWIST TABLE—*(Continued)*

Number of Yarn	Square Root of No. of Yarn	WARP TWIST Square Root Multiplied by					FILLING TWIST Square Root Multiplied by		
		4.75	4.50	4.25	4.00	3.75	3.50	3.35	3.25
		Ordinary Frame	Medium Frame	Low Frame	Extra Mule	Ordinary Mule	Extra Frame	Ordinary Frame	Ordinary Mule
61	7.810	37.10	35.15	33.19	31.24	29.29	27.34	26.16	25.38
62	7.874	37.40	35.43	33.46	31.50	29.53	27.56	26.38	25.59
63	7.937	37.70	35.72	33.73	31.75	29.76	27.78	26.59	25.80
64	8.000	38.00	36.00	34.00	32.00	30.00	28.00	26.80	26.00
65	8.062	38.30	36.28	34.26	32.25	30.23	28.22	27.00	26.20
66	8.124	38.59	36.56	34.53	32.50	30.47	28.43	27.21	26.40
67	8.185	38.88	36.83	34.79	32.74	30.70	28.65	27.42	26.60
68	8.246	39.17	37.11	35.05	32.98	30.92	28.86	27.62	26.80
69	8.307	39.46	37.38	35.30	33.23	31.15	29.07	27.83	27.00
70	8.367	39.74	37.65	35.56	33.47	31.37	29.28	28.03	27.19
71	8.426	40.02	37.92	35.81	33.70	31.60	29.49	28.23	27.38
72	8.485	40.31	38.18	36.06	33.94	31.82	29.70	28.42	27.58
73	8.544	40.58	38.45	36.31	34.18	32.04	29.90	28.62	27.77
74	8.602	40.86	38.71	36.56	34.41	32.26	30.11	28.81	27.96
75	8.660	41.14	38.97	36.81	34.64	32.48	30.31	29.01	28.15
76	8.718	41.41	39.23	37.05	34.87	32.69	30.51	29.20	28.33
77	8.775	41.68	39.49	37.29	35.10	32.91	30.71	29.39	28.52
78	8.832	41.95	39.74	37.54	35.33	33.12	30.91	29.58	28.70
79	8.888	42.22	40.00	37.77	35.55	33.33	31.11	29.77	28.89
80	8.944	42.49	40.25	38.01	35.78	33.54	31.30	29.96	29.07
81	9.000	42.75	40.50	38.25	36.00	33.75	31.50	30.15	29.25
82	9.055	43.01	40.75	38.48	36.22	33.96	31.69	30.33	29.43
83	9.110	43.27	41.00	38.72	36.44	34.16	31.89	30.51	29.61
84	9.165	43.53	41.24	38.95	36.66	34.37	32.08	30.70	29.79
85	9.220	43.79	41.49	39.19	36.88	34.57	32.27	30.88	29.96
86	9.274	44.05	41.73	39.41	37.09	34.78	32.46	31.06	30.14
87	9.327	44.31	41.97	39.64	37.31	34.98	32.65	31.24	30.31
88	9.381	44.56	42.21	39.87	37.52	35.18	32.83	31.42	30.49
89	9.434	44.81	42.45	40.09	37.74	35.38	33.02	31.60	30.66
90	9.487	45.06	42.69	40.32	37.95	35.58	33.20	31.78	30.83
91	9.539	45.31	42.93	40.54	38.16	35.77	33.39	31.95	31.00
92	9.592	45.56	43.16	40.77	38.37	35.97	33.57	32.13	31.17
93	9.644	45.81	43.40	40.99	38.57	36.16	33.75	32.30	31.34
94	9.695	46.05	43.63	41.20	38.78	36.36	33.93	32.48	31.51
95	9.747	46.30	43.86	41.42	38.99	36.55	34.11	32.65	31.68
96	9.798	46.54	44.09	41.64	39.19	36.74	34.29	32.82	31.84
97	9.849	46.78	44.32	41.86	39.40	36.93	34.47	32.97	32.01
98	9.900	47.02	44.55	42.08	39.60	37.12	34.65	33.16	32.17
99	9.950	47.26	44.77	42.29	39.80	37.31	34.82	33.33	32.34
100	10.000	47.50	45.00	42.50	40.00	37.50	35.00	33.50	32.50
101	10.050	47.74	45.22	42.71	40.20	37.69	35.17	33.58	32.66
102	10.100	47.97	45.45	42.93	40.40	37.87	35.35	33.84	32.82
103	10.149	48.21	45.67	43.13	40.60	38 06	35.52	34.00	32.98
104	10.198	48.44	45.89	43.34	40.79	38.24	35.69	34.16	33.14
105	10.247	48.67	46.11	43.55	40.99	38.43	35.86	34.33	33.30
106	10.296	48.90	46.33	43.76	41.18	38 61	36.03	34.49	33.46
107	10.344	49.13	46.55	43.96	41.38	38.79	36.20	34.65	33.62
108	10.392	49.36	46.77	44.17	41.57	38.97	36.37	34.81	33.77
109	10.440	49.59	46.98	44.37	41.76	39.15	36.54	34.98	33.93
110	10.488	49.82	47.20	44.57	41.95	39.33	36.71	35.14	34.09
111	10.536	50.04	47.41	44.78	42.14	39.51	36.87	35.29	34.24
112	10.583	50.27	47.62	44.98	42.33	39.69	37.04	35.45	34.39
113	10.630	50.49	47.84	45.18	42.52	39.86	37.21	35.61	34.55
114	10.677	50.72	48.05	45.38	42.71	40.04	37.37	35.77	34.70
115	10.724	50.94	48.26	45.58	42.90	40.21	37.53	35.92	34.85
116	10.770	51.16	48.47	45.77	43.08	40.39	37.70	36.08	35.00
117	10.817	51.38	48.67	45.97	43.27	40.56	37.86	36.24	35.15
118	10.863	51.60	48.88	46.17	43.45	40.74	38.02	36.39	35.30
119	10.909	51.82	49.09	46.36	43.63	40.91	38.18	36.54	35.45
120	10.955	52.03	49.30	46.56	43.82	41.08	38.34	36.70	35.60

TWIST TABLE—(*Continued*)

Number of Yarn	Square Root of No. of Yarn	WARP TWIST					FILLING TWIST		
		Square Root Multiplied by					Square Root Multiplied by		
		4.75	4.50	4.25	4.00	3.75	3.50	3.35	3.25
		Ordinary Frame	Medium Frame	Low Frame	Extra Mule	Ordinary Mule	Extra Frame	Ordinary Frame	Ordinary Mule
121	11.000	52.25	49.50	46.75	44.00	41.25	38.50	36.85	35.75
122	11.045	52.47	49.70	46.94	44.18	41.42	38.66	37.00	35.90
123	11.091	52.68	49.91	47.14	44.36	41.59	38.82	37.15	36.04
124	11.136	52.89	50.11	47.33	44.54	41.76	38.97	37.30	36.19
125	11.180	53.11	50.31	47.52	44.72	41.93	39.13	37.45	36.34
126	11.225	53.32	50.51	47.71	44.90	42.09	39.29	37.60	36.48
127	11.269	53.53	50.71	47.89	45.08	42.26	39.44	37.75	36.63
128	11.314	53.74	50.91	48.08	45.25	42.43	39.60	37.90	36.77
129	11.358	53.95	51.12	48.27	45.43	42.59	39.75	38.05	36.91
130	11.402	54.16	51.31	48.46	45.61	42.76	39.91	38.20	37.06
131	11.446	54.37	51.50	48.65	45.78	42.92	40.06	38.34	37.20
132	11.489	54.57	51.70	48.83	45.96	43.08	40.21	38.49	37.34
133	11.533	54.78	51.90	49.02	46.13	43.25	40.36	38.63	37.48
134	11.576	54.99	52.09	49.20	46.30	43.41	40.52	38.78	37.62
135	11.619	55.19	52.29	49.38	46.48	43.57	40.67	38.92	37.76
136	11.662	55.39	52.48	49.56	46.65	43.73	40.82	39.07	37.90
137	11.705	55.60	52.67	49.75	46.82	43.89	40.97	39.21	38.04
138	11.747	55.80	52.86	49.92	46.99	44.05	41.12	39.35	38.18
139	11.790	56.00	53.05	50.11	47.16	44.21	41.26	39.50	38.32
140	11.832	56.20	53.24	50.29	47.33	44.37	41.41	39.64	38.45
141	11.874	56.40	53.43	50.46	47.50	44.53	41.56	39.78	38.59
142	11.916	56.60	53.62	50.64	47.67	44.69	41.71	39.92	38.73
143	11.958	56.80	53.81	50.82	47.83	44.84	41.85	40.06	38.86
144	12.000	57.00	54.00	51.00	48.00	45.00	42.00	40.20	39.00
145	12.042	57.20	54.19	51.18	48.17	45.16	42.15	40.34	39.14
146	12.083	57.39	54.37	51.35	48.33	45.31	42.29	40.48	39.27
147	12.124	57.59	54.56	51.53	48.50	45.47	42.44	40.62	39.40
148	12.166	57.79	54.75	51.71	48.66	45.62	42.58	40.75	39.54
149	12.207	57.98	54.93	51.88	48.83	45.77	42.72	40.89	39.67
150	12.247	58.18	55.11	52.05	48.99	45.93	42.87	41.03	39.80
151	12.288	58.37	55.30	52.22	49.15	46.08	43.01	41.16	39.94
152	12.329	58.56	55.48	52.40	49.32	46.23	43.15	41.30	40.07
153	12.369	58.75	55.66	52.57	49.48	46.38	43.29	41.44	40.20
154	12.410	58.95	55.85	52.74	49.64	46.54	43.43	41.57	40.33
155	12.450	59.14	56.03	52.91	49.80	46.69	43.57	41.71	40.46
156	12.490	59.33	56.21	53.08	49.96	46.84	43.72	41.84	40.59
157	12.530	59.52	56.39	53.25	50.12	46.99	43.86	41.98	40.72
158	12.570	59.71	56.57	53.42	50.28	47.14	43.99	42.11	40.85
159	12.610	59.90	56.75	53.59	50.44	47.29	44.13	42.24	40.98
160	12.649	60.08	56.92	53.76	50.60	47.43	44.27	42.37	41.11
161	12.689	60.27	57.10	53.93	50.75	47.58	44.41	42.51	41.24
162	12.728	60.46	57.28	54.09	50.91	47.73	44.55	42.64	41.37
163	12.767	60.64	57.45	54.26	51.07	47.88	44.68	42.77	41.49
164	12.806	60.83	57.63	54.43	51.22	48.02	44.82	42.90	41.62
165	12.845	61.01	57.80	54.59	51.38	48.17	44.96	43.03	41.75
166	12.884	61.20	57.98	54.76	51.54	48.32	45.09	43.16	41.87
167	12.923	61.38	58.15	54.92	51.69	48.46	45.23	43.29	42.00
168	12.962	61.57	58.33	55.09	51.85	48.61	45.37	43.42	42.12
169	13.000	61.75	58.50	55.25	52.00	48.75	45.50	43.55	42.25
170	13.038	61.93	58.67	55.41	52.15	48.89	45.63	43.68	42.37
171	13.077	62.11	58.85	55.58	52.31	49.04	45.77	43.81	42.50
172	13.115	62.30	59.02	55.74	52.46	49.18	45.90	43.94	42.62
173	13.153	62.48	59.19	55.90	52.61	49.32	46.04	44.06	42.75
174	13.191	62.66	59.36	56.06	52.76	49.47	46.17	44.19	42.87
175	13.229	62.84	59.53	56.22	52.92	49.61	46.30	44.32	42.99
176	13.267	63.02	59.70	56.38	53.07	49.75	46.43	44.44	43.12
177	13.304	63.19	59.87	56.54	53.22	49.89	46.56	44.57	43.24
178	13.342	63.37	60.04	56.70	53.37	50.03	46.70	44.70	43.36
179	13.379	63.55	60.21	56.86	53.52	50.17	46.83	44.82	43.48
180	13.416	63.73	60.37	57.02	53.67	50.31	46.96	44.94	43.60

PRODUCTION TABLES

On the following pages will be found our production tables of warp, filling and hosiery yarns.

In preparing these tables our object has been to fully cover the ordinary range of warp, filling and hosiery yarns in a series of tables, based upon the various warp, filling and hosiery twists, each table being headed by its respective multiplier or base. The twist multipliers and the resultant twist per inch may be found in the tables on the four previous pages, in which we have given a complete gradation of warp, filling and hosiery twists.

Each production table gives the usual range of yarns under its particular twist base and shows the gauge, ring, traverse and size of bobbin, which our long experience and a careful consideration of actual conditions have determined as a fair average. It will of course be understood that our reference to actual conditions not only refers to the practical working conditions of the spinning frame itself, but also takes into consideration the grade and staple of cotton used for specific purposes.

The front roll speeds, with the corresponding spindle speeds, have been decided upon after a careful study of data obtained from many of the best mills of the country. We believe that these speeds are conservative and that they represent a fair average of actual running conditions.

The front roll speeds given in the table are for a 1 inch diameter roll. Immediately following the production table will be found a table showing the comparative roll speeds of a 7/8 inch, a 1 inch and a 1 1/8 inch diameter roll; this table shows the comparative speeds of these rolls which will give the same delivery of yarn. To substitute a different diameter roll speed in the production table will in no way affect any of the other figures in the table. For example a 1 1/8 inch diameter roll running at 133 r. p. m. gives exactly the same result as a 1 inch diameter roll running at 150 r. p. m.

We have given the production for 48, 54 and 60 hours per week, in order to conform to the running time of the various sections of the country. In estimating this production, due allowance has been made for cleaning, oiling, doffing, ends down and stoppages. This allowance, carefully proportioned for the different numbers of yarn and the staple of cotton used, varies from 4 to 24 per cent. Following the table of comparative roll speeds will be found a table giving the production on a percentage basis. This table corresponds with our production tables except that one is given in per cent. while the other is given in pounds per spindle. In this table if the production is 76% it is readily seen that the allowance is 24%; if 90% the allowance is 10% and so on.

PRODUCTION TABLE

WARP TWIST - EXTRA FRAME - BASE 5.00

Number of Yarn	Gauge	Ring	Traverse	Barrel of Bobbin	Twist per Inch	R. P. M. of 1 inch Front Roll	R. P. M. of Spindle	POUNDS PER SPINDLE PER WEEK OF		
								48 Hours	54 Hours	60 Hours
2	4″	2½″	8″	1″	7.07	180	4000	20.46	23.02	25.58
3	"	"	"	"	8.66	173	4700	13.45	15.13	16.81
4	"	"	"	"	10.00	166	5200	9.81	11.03	12.26
5	"	"	"	"	11.18	160	5600	7.66	8.61	9.57
6	3½″	2¼″	7½″	15/16″	12.25	155	6000	6.26	7.04	7.82
7	"	"	"	"	13.23	150	6200	5.26	5.91	6.57
8	"	"	"	"	14.14	147	6500	4.56	5.13	5.70
9	"	"	"	"	15.00	145	6800	4.00	4.50	5.00
10	3¼″	2⅛″	7½″	⅞″	15.81	143	7100	3.58	4.03	4.48
11	"	"	"	"	16.58	140	7300	3.20	3.60	4.00
12	"	"	"	"	17.32	138	7500	2.93	3.29	3.66
13	"	"	"	"	18.03	136	7700	2.66	2.99	3.32
14	"	"	"	"	18.71	135	7900	2.45	2.75	3.06
15	3″	2″	7″	⅞″	19.36	133	8100	2.28	2.57	2.85
16	"	"	"	"	20.00	132	8300	2.12	2.39	2.65
17	"	"	"	"	20.62	131	8500	1.98	2.23	2.48
18	"	"	"	"	21.21	129	8600	1.88	2.12	2.35
19	"	"	"	"	21.79	127	8700	1.74	1.95	2.17
20	3″	1⅞″	7″	⅞″	22.36	125	8800	1.65	1.85	2.06
21	"	"	"	"	22.91	124	8900	1.55	1.75	1.94
22	"	"	"	"	23.45	122	9000	1.46	1.64	1.82
23	"	"	"	"	23.98	121	9100	1.38	1.55	1.72
24	"	"	"	"	24.49	120	9200	1.32	1.49	1.65
25	"	"	"	"	25.00	119	9300	1.26	1.41	1.57
26	"	"	"	"	25.50	118	9400	1.19	1.34	1.49
27	2¾″	1¾″	6½″	13/16″	25.98	117	9500	1.14	1.29	1.43
28	"	"	"	"	26.46	116	9600	1.10	1.23	1.37
29	"	"	"	"	26.93	115	9700	1.06	1.19	1.32
30	"	"	"	"	27.39	114	9800	1.01	1.13	1.26
31	"	"	"	"	27.84	113	9900	.96	1.03	1.20
32	"	"	"	"	28.28	112	9900	.94	1.05	1.17
33	"	"	"	"	28.72	110	9900	.90	1.01	1.12
34	2¾″	1⅝″	6½″	13/16″	29.15	108	9900	.85	.95	1.06
35	"	"	"	"	29.58	107	9900	.82	.93	1.03
36	"	"	"	"	30.00	105	9900	.78	.88	.98
37	"	"	"	"	30.41	103	9800	.75	.85	.94
38	"	"	"	"	30.82	101	9800	.72	.81	.90
39	"	"	"	"	31.22	100	9800	.69	.77	.86
40	"	"	"	"	31.62	99	9800	.67	.76	.84
42	"	"	"	"	32.40	96	9800	.62	.69	.77
44	"	"	"	"	33.17	94	9800	.58	.65	.72
46	2¾″	1½″	6″	13/16″	33.91	92	9800	.54	.60	.67
48	"	"	"	"	34.64	90	9800	.51	.58	.64
50	"	"	"	"	35.36	88	9800	.48	.54	.60
55	"	"	"	"	37.08	84	9800	.42	.47	.52
60	"	"	"	"	38.73	80	9700	.37	.41	.46
65	"	"	"	"	40.31	77	9700	.33	.37	.41
70	"	"	"	"	41.83	74	9700	.29	.32	.36
75	"	"	"	"	43.30	71	9700	.26	.30	.33
80	"	"	"	"	44.72	68	9600	.23	.26	.29

PRODUCTION TABLE

WARP TWIST - ORDINARY FRAME - BASE 4.75

Number of Yarn	Gauge	Ring	Traverse	Barrel of Bobbin	Twist per Inch	R. P. M. of 1 inch Front Roll	R. P. M. of Spindle	POUNDS PER SPINDLE PER WEEK OF		
								48 Hours	54 Hours	60 Hours
3	4″	2½″	8″	1″	8.23	175	4500	13.95	15.70	17.44
4	"	"	"	"	9.50	168	5000	10.18	11.45	12.72
5	"	"	"	"	10.62	162	5400	7.94	8.94	9.93
6	"	"	"	"	11.64	157	5700	6.50	7.31	8.12
7	3½″	2¼″	7½″	15/16″	12.57	152	6000	5.46	6.14	6.82
8	"	"	"	"	13.44	149	6300	4.74	5.33	5.92
9	"	"	"	"	14.25	147	6600	4.15	4.67	5.19
10	"	"	"	"	15.02	145	6800	3.73	4.19	4.66
11	3¼″	2⅛″	7½″	⅞″	15.75	142	7000	3.32	3.74	4.15
12	"	"	"	"	16.45	140	7200	3.03	3.41	3.79
13	"	"	"	"	17.13	138	7400	2.76	3.11	3.45
14	"	"	"	"	17.77	137	7600	2.54	2.86	3.18
15	"	"	"	"	18.40	135	7800	2.37	2.66	2.96
16	3″	2″	7″	⅞″	19.00	134	8000	2.20	2.48	2.75
17	"	"	"	"	19.58	133	8200	2.06	2.31	2.57
18	"	"	"	"	20.15	131	8300	1.94	2.18	2.42
19	"	"	"	"	20.70	129	8400	1.82	2.05	2.28
20	"	"	"	"	21.24	127	8500	1.70	1.92	2.13
21	"	"	"	"	21.77	126	8600	1.62	1.82	2.02
22	3″	1⅞″	7″	⅞″	22.28	124	8700	1.51	1.70	1.89
23	"	"	"	"	22.78	123	8800	1.44	1.62	1.80
24	"	"	"	"	23.27	122	8900	1.37	1.54	1.71
25	"	"	"	"	23.75	121	9000	1.30	1.47	1.63
26	"	"	"	"	24.22	120	9100	1.24	1.40	1.55
27	"	"	"	"	24.68	119	9200	1.18	1.33	1.48
28	2¾″	1¾″	6½″	13/16″	25.13	118	9300	1.13	1.27	1.41
29	"	"	"	"	25.58	117	9400	1.08	1.22	1.35
30	"	"	"	"	26.02	116	9500	1.04	1.17	1.30
31	"	"	"	"	26.45	115	9600	.99	1.12	1.24
32	"	"	"	"	26.87	114	9600	.97	1.09	1.21
33	"	"	"	"	27.29	112	9600	.92	1.04	1.15
34	"	"	"	"	27.70	110	9600	.88	.99	1.10
35	"	"	"	"	28.10	109	9600	.85	.95	1.06
36	2¾″	1⅝″	6½″	13/16″	28.50	107	9600	.81	.91	1.01
37	"	"	"	"	28.89	106	9600	.78	.87	.97
38	"	"	"	"	29.28	104	9600	.75	.85	.94
39	"	"	"	"	29.66	103	9600	.72	.81	.90
40	"	"	"	"	30.04	102	9600	.70	.78	.87
42	"	"	"	"	30.78	99	9600	.65	.73	.81
44	"	"	"	"	31.51	97	9600	.60	.68	.75
46	"	"	"	"	32.22	95	9600	.57	.64	.71
48	"	"	"	"	32.91	93	9600	.54	.60	.67
50	2¾″	1½″	6″	13/16″	33.59	91	9600	.50	.57	.63
55	"	"	"	"	35.23	87	9600	.44	.50	.55
60	"	"	"	"	36.79	82	9500	.38	.43	.48
65	"	"	"	"	38.30	79	9500	.34	.38	.42
70	"	"	"	"	39.74	75	9400	.30	.34	.38
75	"	"	"	"	41.14	72	9300	.26	.30	.33
80	"	"	"	"	42.49	69	9200	.24	.27	.30
85	"	"	"	"	43.79	66	9100	.22	.25	.28
90	"	"	"	"	45.06	64	9100	.20	.23	.25

PRODUCTION TABLE

WARP TWIST - MEDIUM FRAME - BASE 4.50

Number of Yarn	Gauge	Ring	Traverse	Barrel of Bobbin	Twist per Inch	R. P. M. of 1 inch Front Roll	R. P. M. of Spindle	POUNDS PER SPINDLE PER WEEK OF		
								48 Hours	54 Hours	60 Hours
5	4″	2½″	8″	1″	10.06	170	5400	8.54	9.61	10.68
6	"	"	"	"	11.02	164	5700	6.95	7.82	8.69
7	"	"	"	"	11.91	160	6000	5.87	6.61	7.34
8	"	"	"	"	12.73	157	6300	5.10	5.74	6.38
9	3½″	2¼″	7½″	15/16″	13.50	155	6600	4.48	5.04	5.60
10	"	"	"	"	14.23	153	6800	4.02	4.53	5.03
11	"	"	"	"	14.92	151	7100	3.61	4.06	4.51
12	"	"	"	"	15.59	149	7300	3.30	3.72	4.13
13	3¼″	2⅛″	7½″	⅞″	16.22	147	7500	3.01	3.38	3.76
14	"	"	"	"	16.84	145	7700	2.75	3.10	3.44
15	"	"	"	"	17.43	144	7900	2.58	2.91	3.23
16	"	"	"	"	18.00	143	8100	2.41	2.71	3.01
17	"	"	"	"	18.55	142	8300	2.25	2.53	2.81
18	3″	2″	7″	⅞″	19.09	140	8400	2.09	2.35	2.61
19	"	"	"	"	19.62	138	8500	1.98	2.22	2.47
20	"	"	"	"	20.12	136	8600	1.85	2.08	2.31
21	"	"	"	"	20.62	134	8700	1.74	1.95	2.17
22	"	"	"	"	21.11	133	8800	1.65	1.85	2.06
23	"	"	"	"	21.58	131	8900	1.55	1.75	1.94
24	3″	1⅞″	7″	⅞″	22.05	130	9000	1.49	1.67	1.86
25	"	"	"	"	22.50	129	9100	1.42	1.60	1.78
26	"	"	"	"	22.95	128	9200	1.35	1.52	1.69
27	"	"	"	"	23.38	127	9300	1.29	1.45	1.61
28	"	"	"	"	23.81	126	9400	1.24	1.40	1.55
29	"	"	"	"	24.23	125	9500	1.18	1.33	1.48
30	"	"	"	"	24.65	124	9600	1.14	1.28	1.42
31	2¾″	1¾″	6½″	13/16″	25.05	122	9600	1.08	1.22	1.35
32	"	"	"	"	25.46	121	9700	1.04	1.17	1.30
33	"	"	"	"	25.85	120	9700	1.00	1.13	1.25
34	"	"	"	"	26.24	119	9800	.96	1.08	1.20
35	"	"	"	"	26.62	117	9800	.92	1.04	1.15
36	"	"	"	"	27.00	116	9800	.88	.99	1.10
37	"	"	"	"	27.37	114	9800	.85	.95	1.06
38	"	"	"	"	27.74	112	9800	.82	.92	1.02
39	"	"	"	"	28.10	111	9800	.79	.89	.99
40	2¾″	1⅝″	6½″	13/16″	28.46	109	9800	.75	.85	.94
42	"	"	"	"	29.16	107	9800	.70	.79	.88
44	"	"	"	"	29.85	105	9800	.66	.75	.83
46	"	"	"	"	30.52	102	9800	.61	.68	.76
48	"	"	"	"	31.18	99	9700	.58	.65	.72
50	"	"	"	"	31.82	97	9700	.54	.61	.68
55	"	"	"	"	33.37	92	9700	.47	.53	.59
60	"	"	"	"	34.86	88	9600	.41	.46	.51
65	"	"	"	"	36.28	84	9600	.36	.41	.45
70	2¾″	1½″	6″	13/16″	37.65	81	9600	.32	.36	.40
75	"	"	"	"	38.97	78	9500	.30	.33	.37
80	"	"	"	"	40.25	75	9400	.26	.30	.33
85	"	"	"	"	41.49	72	9300	.23	.26	.29
90	"	"	"	"	42.69	69	9200	.22	.24	.27
100	"	"	"	"	45.00	64	9000	.18	.21	.23
110	"	"	"	"	47.20	59	8800	.15	.17	.19
120	"	"	"	"	49.30	54	8400	.13	.14	.16

PRODUCTION TABLE

WARP TWIST - LOW FRAME - BASE 4.25

Number of Yarn	Gauge	Ring	Traverse	Barrel of Bobbin	Twist per Inch	R. P. M. of 1 inch Front Roll	R. P. M. of Spindle	POUNDS PER SPINDLE PER WEEK OF		
								48 Hours	54 Hours	60 Hours
7	3½"	2¼"	7½"	15/16"	11.25	162	5700	5.82	6.54	7.27
8	"	"	"	"	12.02	159	6000	5.06	5.69	6.32
9	"	"	"	"	12.75	157	6300	4.49	5.05	5.61
10	"	"	"	"	13.44	155	6500	4.03	4.54	5.04
11	3¼"	2⅛"	7½"	⅞"	14.10	153	6800	3.66	4.12	4.58
12	"	"	"	"	14.72	151	7000	3.31	3.73	4.14
13	"	"	"	"	15.33	149	7200	3.02	3.39	3.77
14	"	"	"	"	15.90	148	7400	2.78	3.13	3.48
15	"	"	"	"	16.46	147	7600	2.61	2.93	3.26
16	3"	2"	7"	⅞"	17.00	146	7800	2.42	2.73	3.03
17	"	"	"	"	17.52	145	8000	2.27	2.56	2.84
18	"	"	"	"	18.03	143	8100	2.14	2.40	2.67
19	"	"	"	"	18.53	141	8200	1.99	2.24	2.49
20	"	"	"	"	19.01	140	8300	1.88	2.12	2.35
21	3"	1⅞"	7"	⅞"	19.48	138	8400	1.77	1.99	2.21
22	"	"	"	"	19.93	136	8500	1.66	1.87	2.08
23	"	"	"	"	20.38	134	8600	1.56	1.76	1.95
24	"	"	"	"	20.82	133	8700	1.50	1.69	1.88
25	"	"	"	"	21.25	132	8800	1.43	1.61	1.79
26	"	"	"	"	21.67	131	8900	1.37	1.54	1.71
27	"	"	"	"	22.08	130	9000	1.31	1.48	1.64
28	2¾"	1¾"	6½"	13/16"	22.49	129	9100	1.26	1.42	1.58
29	"	"	"	"	22.89	128	9200	1.20	1.35	1.50
30	"	"	"	"	23.28	127	9300	1.15	1.30	1.44
31	"	"	"	"	23.66	125	9300	1.10	1.23	1.37
32	"	"	"	"	24.04	124	9400	1.06	1.19	1.32
33	"	"	"	"	24.42	123	9400	1.02	1.15	1.28
34	"	"	"	"	24.78	122	9500	.98	1.11	1.23
35	"	"	"	"	25.14	120	9500	.94	1.06	1.18
36	"	"	"	"	25.50	119	9500	.90	1.02	1.13
37	2¾"	1⅝"	6½"	13/16"	25.85	117	9500	.87	.98	1.09
38	"	"	"	"	26.20	115	9500	.83	.94	1.04
39	"	"	"	"	26.54	114	9500	.82	.92	1.02
40	"	"	"	"	26.88	112	9500	.78	.87	.97
42	"	"	"	"	27.54	110	9500	.72	.81	.90
44	"	"	"	"	28.19	107	9500	.67	.76	.84
46	"	"	"	"	28.82	105	9500	.63	.71	.79
48	"	"	"	"	29.44	103	9500	.59	.67	.74
50	"	"	"	"	30.05	101	9500	.57	.64	.71
55	2¾"	1½"	6"	13/16"	31.51	96	9500	.49	.55	.61
60	"	"	"	"	32.92	92	9500	.43	.49	.54
65	"	"	"	"	34.26	87	9400	.38	.42	.47
70	"	"	"	"	35.56	84	9400	.34	.38	.42
75	"	"	"	"	36.81	80	9300	.30	.33	.37
80	"	"	"	"	38.01	77	9200	.27	.31	.34
85	"	"	"	"	39.19	74	9100	.25	.28	.31
90	"	"	"	"	40.32	71	9000	.22	.25	.28
100	2¾"	1⅜"	6"	¾"	42.50	66	8800	.18	.21	.23
110	"	"	"	"	44.57	61	8600	.16	.18	.20
120	"	"	"	"	46.56	57	8300	.14	.15	.17
130	"	"	"	"	48.45	53	8100	.11	.13	.14
140	"	"	"	"	50.29	50	7900	.10	.12	.13

PRODUCTION TABLE

WARP TWIST - EXTRA MULE - BASE 4.00

Number of Yarn	Gauge	Ring	Traverse	Barrel of Bobbin	Twist per Inch	R. P. M. of 1 inch Front Roll	R. P. M. of Spindle	POUNDS PER SPINDLE PER WEEK OF		
								48 Hours	54 Hours	60 Hours
9	3¼″	2⅛″	7½″	⅞″	12.00	164	6200	4.58	5.15	5.72
10	"	"	"	"	12.65	162	6400	4.11	4.63	5.14
11	"	"	"	"	13.27	160	6700	3.74	4.21	4.68
12	"	"	"	"	13.86	158	6900	3.42	3.85	4.28
13	"	"	"	"	14.42	156	7100	3.12	3.51	3.90
14	3″	2″	7″	⅞″	14.97	154	7200	2.86	3.22	3.58
15	"	"	"	"	15.49	153	7400	2.68	3.02	3.35
16	"	"	"	"	16.00	151	7600	2.48	2.79	3.10
17	"	"	"	"	16.49	149	7700	2.30	2.59	2.88
18	"	"	"	"	16.97	146	7800	2.16	2.43	2.70
19	3″	1⅞″	7″	⅞″	17.44	144	7900	2.02	2.27	2.52
20	"	"	"	"	17.89	142	8000	1.89	2.12	2.36
21	"	"	"	"	18.33	141	8100	1.78	2.01	2.23
22	"	"	"	"	18.76	139	8200	1.70	1.91	2.12
23	"	"	"	"	19.18	138	8300	1.62	1.82	2.02
24	"	"	"	"	19.60	136	8400	1.52	1.71	1.90
25	2¾″	1¾″	6½″	13/16″	20.00	135	8500	1.45	1.63	1.81
26	"	"	"	"	20.40	134	8600	1.38	1.56	1.73
27	"	"	"	"	20.78	133	8700	1.33	1.49	1.66
28	"	"	"	"	21.17	132	8800	1.28	1.44	1.60
29	"	"	"	"	21.54	130	8800	1.22	1.37	1.52
30	"	"	"	"	21.91	129	8900	1.18	1.32	1.47
31	"	"	"	"	22.27	127	8900	1.11	1.25	1.39
32	"	"	"	"	22.63	126	9000	1.07	1.21	1.34
33	"	"	"	"	22.98	125	9000	1.02	1.15	1.28
34	2¾″	1⅝″	6½″	13/16″	23.32	124	9100	.99	1.12	1.24
35	"	"	"	"	23.66	122	9100	.94	1.06	1.18
36	"	"	"	"	24.00	121	9100	.91	1.03	1.14
37	"	"	"	"	24.33	120	9200	.89	1.00	1.11
38	"	"	"	"	24.66	119	9200	.86	.97	1.08
39	"	"	"	"	24.98	117	9200	.82	.93	1.03
40	"	"	"	"	25.30	116	9200	.79	.89	.99
42	"	"	"	"	25.92	113	9200	.74	.83	.92
44	"	"	"	"	26.53	110	9200	.69	.77	.86
46	"	"	"	"	27.13	108	9200	.64	.72	.80
48	2¾″	1½″	6″	13/16″	27.71	106	9200	.61	.68	.76
50	"	"	"	"	28.28	104	9200	.58	.65	.72
55	"	"	"	"	29.66	99	9200	.50	.56	.62
60	"	"	"	"	30.98	95	9200	.44	.50	.55
65	"	"	"	"	32.25	90	9100	.38	.43	.48
70	"	"	"	"	33.47	87	9100	.34	.39	.43
75	"	"	"	"	34.64	83	9000	.31	.35	.39
80	"	"	"	"	35.78	79	8900	.27	.31	.34
85	"	"	"	"	36.88	76	8800	.25	.28	.31
90	"	"	"	"	37.95	73	8700	.22	.25	.28
100	"	"	"	"	40.00	68	8500	.19	.22	.24
110	2¾″	1⅜″	6″	¾″	41.95	63	8300	.16	.18	.20
120	"	"	"	"	43.82	57	7900	.14	.15	.17
130	"	"	"	"	45.61	53	7600	.11	.13	.14
140	"	"	"	"	47.33	49	7300	.10	.11	.12
150	"	"	"	"	48.99	46	7000	.09	.10	.11
160	"	"	"	"	50.60	43	6800	.08	.09	.10

PRODUCTION TABLE

WARP TWIST - ORDINARY MULE - BASE 3.75

Number of Yarn	Gauge	Ring	Traverse	Barrel of Bobbin	Twist per Inch	R. P. M. of 1 inch Front Roll	R. P. M. of Spindle	POUNDS PER SPINDLE PER WEEK OF		
								48 Hours	54 Hours	60 Hours
10	3″	2″	7″	⅞″	11.86	163	6100	4.04	4.55	5.05
11	"	"	"	"	12.44	161	6300	3.67	4.13	4.59
12	"	"	"	"	12.99	159	6500	3.37	3.79	4.21
13	"	"	"	"	13.52	157	6700	3.10	3.49	3.88
14	"	"	"	"	14.03	155	6800	2.85	3.20	3.56
15	3″	1⅞″	7″	⅞″	14.52	154	7000	2.66	3.00	3.33
16	"	"	"	"	15.00	153	7200	2.49	2.80	3.11
17	"	"	"	"	15.46	150	7300	2.30	2.58	2.87
18	"	"	"	"	15.91	148	7400	2.16	2.43	2.70
19	"	"	"	"	16.35	146	7500	2.02	2.28	2.53
20	"	"	"	"	16.77	144	7600	1.90	2.13	2.37
21	2¾″	1¾″	6½″	13/16″	17.18	143	7700	1.81	2.03	2.26
22	"	"	"	"	17.59	141	7800	1.70	1.92	2.13
23	"	"	"	"	17.98	140	7900	1.62	1.82	2.02
24	"	"	"	"	18.37	139	8000	1.54	1.73	1.92
25	"	"	"	"	18.75	138	8100	1.46	1.65	1.83
26	"	"	"	"	19.12	137	8200	1.40	1.58	1.75
27	"	"	"	"	19.49	136	8300	1.34	1.50	1.67
28	"	"	"	"	19.84	135	8400	1.28	1.44	1.60
29	2¾″	1⅝″	6½″	13/16″	20.19	134	8500	1.23	1.39	1.54
30	"	"	"	"	20.54	132	8500	1.18	1.33	1.48
31	"	"	"	"	20.88	131	8600	1.14	1.28	1.42
32	"	"	"	"	21.21	129	8600	1.10	1.23	1.37
33	"	"	"	"	21.54	128	8700	1.05	1.18	1.31
34	"	"	"	"	21.87	127	8700	1.00	1.13	1.25
35	2¾″	1⅝″	6½″	13/16″	22.19	126	8800	.97	1.09	1.21
36	"	"	"	"	22.50	125	8800	.93	1.04	1.16
37	"	"	"	"	22.81	124	8900	.90	1.02	1.13
38	"	"	"	"	23.12	123	8900	.88	.99	1.10
39	"	"	"	"	23.42	121	8900	.85	.95	1.06
40	"	"	"	"	23.72	119	8900	.81	.91	1.01
42	2¾″	1½″	6″	13/16″	24.30	117	8900	.76	.86	.95
44	"	"	"	"	24.87	114	8900	.70	.78	.87
46	"	"	"	"	25.43	111	8900	.66	.74	.82
48	"	"	"	"	25.98	109	8900	.62	.69	.77
50	"	"	"	"	26.52	107	8900	.59	.67	.74
55	"	"	"	"	27.81	102	8900	.50	.57	.63
60	"	"	"	"	29.05	98	8900	.45	.50	.56
65	"	"	"	"	30.23	93	8800	.39	.44	.49
70	"	"	"	"	31.37	89	8800	.35	.40	.44
75	"	"	"	"	32.48	85	8700	.31	.35	.39
80	"	"	"	"	33.54	82	8600	.28	.32	.35
85	2¾″	1⅝″	6″	¾″	34.57	78	8500	.26	.29	.32
90	"	"	"	"	35.58	75	8400	.23	.26	.29
100	"	"	"	"	37.50	70	8200	.19	.22	.24
110	"	"	"	"	39.33	65	8000	.17	.19	.21
120	"	"	"	"	41.08	59	7600	.14	.15	17
130	"	"	"	"	42.76	54	7300	.12	.14	.15
140	"	"	"	"	44.37	50	7000	.11	.12	.13
150	2¾″	1¼″	5½″	¾″	45.93	47	6800	.09	.10	.11
160	"	"	"	"	47.43	44	6600	.08	.09	.10
170	"	"	"	"	48.89	42	6400	.07	.08	.09
180	"	"	"	"	50.31	39	6200	.06	.07	.08

PRODUCTION TABLE

FILLING TWIST - EXTRA FRAME - BASE 3.50

Number of Yarn	Gauge	Ring	Traverse	Barrel of Bobbin	Twist per Inch	R. P. M. of 1 inch Front Roll	R. P. M. of Spindle	POUNDS PER SPINDLE PER WEEK OF		
								48 Hours	54 Hours	60 Hours
10	3″	1⅞″	7½″	11/16″	11.07	165	5700	4.05	4.55	5.06
11	"	"	"	"	11.61	163	5900	3.68	4.14	4.60
12	"	"	"	"	12.12	161	6100	3.37	3.79	4.21
13	"	"	"	"	12.62	159	6300	3.07	3.46	3.84
14	"	"	"	"	13.10	157	6500	2.85	3.20	3.56
15	"	"	"	"	13.56	156	6600	2.64	2.97	3.30
16	2¾″	1¾″	7½″	11/16″	14.00	155	6800	2.49	2.80	3.11
17	"	"	"	"	14.43	152	6900	2.30	2.58	2.87
18	"	"	"	"	14.85	150	7000	2.17	2.44	2.71
19	"	"	"	"	15.26	148	7100	2.02	2.28	2.53
20	"	"	"	"	15.65	147	7200	1.93	2.17	2.41
21	"	"	"	"	16.04	145	7300	1.82	2.04	2.27
22	"	"	"	"	16.42	143	7400	1.71	1.93	2.14
23	"	"	"	"	16.79	142	7500	1.62	1.82	2.02
24	2¾″	1⅝″	7″	5/8″	17.15	141	7600	1.56	1.76	1.95
25	"	"	"	"	17.50	140	7700	1.49	1.67	1.86
26	"	"	"	"	17.85	139	7800	1.42	1.59	1.77
27	"	"	"	"	18.19	138	7900	1.36	1.53	1.70
28	"	"	"	"	18.52	137	8000	1.30	1.46	1.62
29	"	"	"	"	18.85	136	8100	1.25	1.40	1.56
30	2¾″	1⅝″	7″	5/8″	19.17	135	8100	1.20	1.35	1.50
31	"	"	"	"	19.49	134	8200	1.14	1.29	1.43
32	"	"	"	"	19.80	132	8200	1.11	1.25	1.39
33	"	"	"	"	20.11	131	8300	1.06	1.20	1.33
34	"	"	"	"	20.41	130	8300	1.03	1.16	1.29
35	"	"	"	"	20.71	129	8400	1.00	1.13	1.25
36	"	"	"	"	21.00	128	8400	.95	1.07	1.19
37	2¾″	1½″	7″	5/8″	21.29	127	8500	.92	1.04	1.15
38	"	"	"	"	21.58	125	8500	.89	.99	1.11
39	"	"	"	"	21.86	124	8500	.85	.95	1.06
40	"	"	"	"	22.14	123	8600	.83	.94	1.04
42	"	"	"	"	22.68	121	8600	.78	.87	.97
44	"	"	"	"	23.22	118	8600	.73	.82	.91
46	"	"	"	"	23.74	115	8600	.68	.77	.85
48	"	"	"	"	24.25	113	8600	.64	.72	.80
50	"	"	"	"	24.75	111	8600	.61	.68	.76
55	"	"	"	"	25.96	106	8600	.53	.59	.66
60	"	"	"	"	27.11	101	8600	.46	.51	.57
65	2¾″	1¾″	6½″	9/16″	28.22	97	8600	.41	.46	.51
70	"	"	"	"	29.28	93	8500	.36	.41	.45
75	"	"	"	"	30.31	89	8500	.33	.37	.41
80	"	"	"	"	31.30	85	8400	.29	.32	.36
85	"	"	"	"	32.27	82	8300	.26	.30	.33
90	"	"	"	"	33.20	79	8200	.24	.27	.30
100	"	"	"	"	35.00	73	8000	.20	.23	.25
110	"	"	"	"	36.71	67	7700	.17	.19	.21
120	"	"	"	"	38.34	61	7300	.14	.16	.18
130	2¾″	1¼″	6″	9/16″	39.91	56	7000	.12	.14	.15
140	"	"	"	"	41.41	52	6800	.10	.12	.13
150	"	"	"	"	42.87	49	6600	.09	.10	.11
160	"	"	"	"	44.27	46	6400	.08	.09	.10
170	"	"	"	"	45.63	43	6200	.07	.08	.09
180	"	"	"	"	46.96	41	6000	.06	.07	.08

PRODUCTION TABLE

FILLING TWIST - ORDINARY FRAME - BASE 3.35

Number of Yarn	Gauge	Ring	Traverse	Barrel of Bobbin	Twist per Inch	R. P. M. of 1 inch Front Roll	R. P. M. of Spindle	POUNDS PER SPINDLE PER WEEK OF		
								48 Hours	54 Hours	60 Hours
5	3″	1⅞″	7½″	11/16″	7.48	178	4200	8.10	9.11	10.12
6	"	"	"	"	8.20	175	4500	6.71	7.55	8.39
7	"	"	"	"	8.86	172	4800	5.73	6.44	7.16
8	"	"	"	"	9.47	170	5100	5.02	5.64	6.27
9	"	"	"	"	10.05	168	5300	4.54	5.11	5.68
10	2¾″	1¾″	7½″	11/16″	10.59	165	5500	4.00	4.50	5.00
11	"	"	"	"	11.11	164	5700	3.66	4.11	4.57
12	"	"	"	"	11.60	162	5900	3.34	3.76	4.18
13	"	"	"	"	12.07	161	6100	3.11	3.50	3.89
14	"	"	"	"	12.53	160	6300	2.87	3.23	3.59
15	"	"	"	"	12.97	159	6500	2.70	3 03	3.37
16	"	"	"	"	13.40	157	6600	2.49	2 80	3.11
17	"	"	"	"	13.81	155	6700	2.34	2.64	2.93
18	2¾″	1⅝″	7″	5/8″	14.21	152	6800	2.17	2.44	2.71
19	"	"	"	"	14.60	151	6900	2.04	2.30	2.55
20	"	"	"	"	14.98	149	7000	1.94	2.18	2.42
21	"	"	"	"	15.35	147	7100	1.82	2.04	2.27
22	"	"	"	"	15.71	146	7200	1.73	1.94	2.16
23	"	"	"	"	16.06	145	7300	1.63	1.84	2.04
24	"	"	"	"	16.41	144	7400	1.58	1.77	1.97
25	"	"	"	"	16.75	143	7500	1.50	1.68	1.87
26	"	"	"	"	17.08	142	7600	1.44	1.62	1.80
27	2¾″	1½″	7″	5/8″	17.40	141	7700	1.38	1.55	1.72
28	"	"	"	"	17.72	140	7800	1.32	1.49	1.65
29	"	"	"	"	18.04	139	7900	1.26	1.42	1.58
30	"	"	"	"	18.34	138	7900	1.22	1.38	1.53
31	"	"	"	"	18.65	137	8000	1.18	1.32	1.47
32	"	"	"	"	18.95	135	8000	1.12	1.26	1.40
33	"	"	"	"	19.24	134	8100	1.07	1.21	1.34
34	"	"	"	"	19.53	132	8100	1.03	1.16	1.29
35	"	"	"	"	19.81	131	8200	1.00	1.13	1.25
36	"	"	"	"	20.10	130	8200	.96	1.08	1.20
37	"	"	"	"	20.38	129	8300	.92	1.04	1.15
38	2¾″	1⅜″	6½″	9/16″	20.65	128	8300	.89	1.00	1.11
39	"	"	"	"	20.92	127	8300	.86	.97	1.08
40	"	"	"	"	21.19	127	8400	.84	.95	1.05
42	"	"	"	"	21.71	123	8400	.78	.88	.98
44	"	"	"	"	22.22	120	8400	.74	.83	.92
46	"	"	"	"	22.47	118	8400	.69	.77	.86
48	"	"	"	"	23.20	115	8400	.64	.72	.80
50	"	"	"	"	23.69	113	8400	.61	.68	.76
55	"	"	"	"	24.84	108	8400	.53	.59	.66
60	"	"	"	"	25.95	103	8400	.46	.52	.58
65	"	"	"	"	27.00	98	8300	.41	.46	.51
70	2¾″	1¼″	6″	9/16″	28.03	94	8300	.37	.41	.46
75	"	"	"	"	29.01	90	8200	.33	.37	.41
80	"	"	"	"	29.96	87	8200	.30	.33	.37
85	"	"	"	"	30.88	84	8100	.27	.31	.34
90	"	"	"	"	31.78	80	8000	.25	.28	.31
100	"	"	"	"	33.50	74	7800	.21	.23	.26
110	"	"	"	"	35.14	69	7600	.18	.20	.22
120	"	"	"	"	36.70	63	7300	.14	.16	.18

PRODUCTION TABLE

FILLING TWIST - ORDINARY MULE - BASE 3.25

Number of Yarn	Gauge	Ring	Traverse	Barrel of Bobbin	Twist per Inch	R. P. M. of 1 inch Front Roll	R. P. M. of Spindle	POUNDS PER SPINDLE PER WEEK OF		
								48 Hours	54 Hours	60 Hours
7	2¾″	1¾″	7½″	11/16″	8.60	175	4700	5.76	6.48	7.20
8	"	"	"	"	9.19	173	5000	5.04	5.67	6.30
9	"	"	"	"	9.75	171	5200	4.49	5.05	5.61
10	"	"	"	"	10.28	168	5400	4.02	4.52	5.02
11	"	"	"	"	10.78	167	5700	3.67	4.13	4.59
12	"	"	"	"	11.26	165	5800	3.37	3.79	4.21
13	"	"	"	"	11.72	164	6000	3.13	3.52	3.91
14	"	"	"	"	12.16	163	6200	2.89	3.25	3.61
15	"	"	"	"	12.59	161	6400	2.70	3.03	3.37
16	2¾″	1⅝″	7″	⅝″	13.00	159	6500	2.50	2.81	3.12
17	"	"	"	"	13.40	157	6600	2.34	2.64	2.93
18	"	"	"	"	13.79	155	6700	2.19	2.47	2.74
19	"	"	"	"	14.17	154	6800	2.06	2.32	2.58
20	"	"	"	"	14.53	152	6900	1.95	2.20	2.44
21	"	"	"	"	14.89	150	7000	1.84	2.07	2.30
22	"	"	"	"	15.24	149	7100	1.74	1.96	2.18
23	"	"	"	"	15.59	148	7200	1.65	1.85	2.06
24	"	"	"	"	15.92	147	7300	1.59	1.79	1.99
25	"	"	"	"	16.25	146	7400	1.52	1.71	1.90
26	2¾″	1½″	7″	⅝″	16.57	145	7500	1.45	1.63	1.81
27	"	"	"	"	16.89	144	7600	1.38	1.56	1.73
28	"	"	"	"	17.20	143	7700	1.33	1.49	1.66
29	"	"	"	"	17.50	142	7800	1.29	1.45	1.61
30	"	"	"	"	17.80	141	7900	1.23	1.39	1.54
31	"	"	"	"	18.10	140	7900	1.18	1.33	1.48
32	2¾″	1½″	7″	⅝″	18.38	139	8000	1.14	1.29	1.43
33	"	"	"	"	18.67	138	8100	1.10	1.23	1.37
34	"	"	"	"	18.95	136	8100	1.05	1.18	1.31
35	"	"	"	"	19.23	135	8200	1.02	1.15	1.28
36	"	"	"	"	19.50	134	8200	.99	1.12	1.24
37	"	"	"	"	19.77	133	8300	.95	1.07	1.19
38	2¾″	1⅜″	6½″	9/16″	20.03	132	8300	.92	1.04	1.15
39	"	"	"	"	20.30	130	8300	.88	.99	1.10
40	"	"	"	"	20.55	128	8300	.86	.96	1.07
42	"	"	"	"	21.06	126	8300	.81	.91	1.01
44	"	"	"	"	21.56	123	8300	.75	.85	.94
46	"	"	"	"	22.04	120	8300	.70	.78	.87
48	"	"	"	"	22.52	117	8300	.66	.74	.82
50	"	"	"	"	22.98	115	8300	.62	.70	.78
55	"	"	"	"	24.10	110	8300	.54	.60	.67
60	"	"	"	"	25.17	105	8300	.47	.53	.59
65	"	"	"	"	26.20	100	8200	.42	.47	.52
70	2¾″	1¼″	6″	9/16″	27.19	96	8200	.38	.42	.47
75	"	"	"	"	28.15	92	8100	.33	.37	.41
80	"	"	"	"	29.07	88	8000	.30	.34	.38
85	"	"	"	"	29.96	85	8000	.27	.31	.34
90	"	"	"	"	30.83	82	7900	.26	.29	.32
100	"	"	"	"	32.50	76	7800	.21	.23	.26
110	"	"	"	"	34.09	71	7600	.18	.20	.22
120	"	"	"	"	35.60	65	7300	.15	.17	.19

PRODUCTION TABLE

HOSIERY TWIST - EXTRA HOSIERY - BASE 3.00

Number of Yarn	Gauge	Ring	Traverse	Barrel of Bobbin	Twist per Inch	R. P. M. of 1 inch Front Roll	R. P. M. of Spindle	POUNDS PER SPINDLE PER WEEK OF		
								48 Hours	54 Hours	60 Hours
9	2¾"	1¾"	7½"	11/16"	9.00	174	4900	4.69	5.27	5.86
10	"	"	"	"	9.49	171	5100	4.19	4.72	5.24
11	"	"	"	"	9.95	169	5300	3.81	4.28	4.76
12	"	"	"	"	10.39	167	5400	3.50	3.93	4.37
13	"	"	"	"	10.82	166	5600	3.24	3.65	4.05
14	"	"	"	"	11.23	165	5800	2.99	3.37	3.74
15	"	"	"	"	11.62	163	6000	2.79	3.14	3.49
16	"	"	"	"	12.00	161	6100	2.58	2.91	3.23
17	"	"	"	"	12.37	159	6200	2.40	2.70	3.00
18	2¾"	1⅝"	7"	⅝"	12.73	158	6300	2.26	2.54	2.82
19	"	"	"	"	13.08	157	6400	2.13	2.39	2.66
20	"	"	"	"	13.42	155	6500	2.01	2.26	2.51
21	"	"	"	"	13.75	153	6600	1.90	2.13	2.37
22	"	"	"	"	14.07	152	6700	1.79	2.02	2.24
23	"	"	"	"	14.39	151	6800	1.70	1.92	2.13
24	"	"	"	"	14.70	150	6900	1.64	1.85	2.05
25	"	"	"	"	15.00	149	7000	1.56	1.76	1.95
26	"	"	"	"	15.30	148	7100	1.50	1.68	1.87
27	"	"	"	"	15.59	147	7200	1.43	1.61	1.79
28	2¾"	1½"	7"	⅝"	15.88	146	7300	1.38	1.55	1.72
29	"	"	"	"	16.16	145	7400	1.33	1.49	1.66
30	"	"	"	"	16.43	144	7400	1.27	1.43	1.59
31	"	"	"	"	16.70	143	7500	1.22	1.38	1.53
32	"	"	"	"	16.97	142	7600	1.18	1.32	1.47
33	"	"	"	"	17.24	141	7600	1.14	1.28	1.42
34	2¾"	1½"	7"	⅝"	17.49	139	7600	1.08	1.22	1.35
35	"	"	"	"	17.75	138	7700	1.06	1.19	1.32
36	"	"	"	"	18.00	137	7700	1.02	1.15	1.28
37	"	"	"	"	18.24	136	7800	.98	1.11	1.23
38	"	"	"	"	18.49	135	7800	.95	1.07	1.19
39	"	"	"	"	18.74	133	7800	.91	1.03	1.14
40	2¾"	1⅜"	6½"	9/16"	18.98	131	7800	.89	1.00	1.11
42	"	"	"	"	19.44	128	7800	.82	.93	1.03
44	"	"	"	"	19.90	125	7800	.77	.86	.96
46	"	"	"	"	20.35	122	7800	.72	.81	.90
48	"	"	"	"	20.78	119	7800	.67	.76	.84
50	"	"	"	"	21.21	117	7800	.64	.72	.80
55	"	"	"	"	22.25	112	7800	.56	.63	.70
60	"	"	"	"	23.24	107	7800	.49	.55	.61
65	"	"	"	"	24.18	102	7700	.42	.48	.53
70	"	"	"	"	25.09	98	7700	.38	.43	.48
75	"	"	"	"	25.98	94	7700	.34	.39	.43
80	2¾"	1¼"	6"	9/16"	26.83	90	7600	.31	.35	.39
85	"	"	"	"	27.65	87	7600	.28	.32	.35
90	"	"	"	"	28.45	84	7500	.26	.29	.32
100	"	"	"	"	30.00	79	7400	.22	.24	.27
110	"	"	"	"	31.46	73	7200	.18	.21	.23
120	"	"	"	"	32.86	67	6900	.15	.17	.19

PRODUCTION TABLE

HOSIERY TWIST - ORDINARY HOSIERY - BASE 2.75

Number of Yarn	Gauge	Ring	Traverse	Barrel of Bobbin	Twist per Inch	R. P. M. of 1 inch Front Roll	R. P. M. of Spindle	POUNDS PER SPINDLE PER WEEK OF		
								48 Hours	54 Hours	60 Hours
10	2¾"	1¾"	7½"	11/16"	8.69	172	4700	4.27	4.81	5.34
11	"	"	"	"	9.12	170	4900	3.89	4.37	4.86
12	"	"	"	"	9.52	168	5000	3.62	4.08	4.53
13	"	"	"	"	9.91	167	5200	3.30	3.72	4.13
14	"	"	"	"	10.29	166	5400	3.05	3.43	3.81
15	"	"	"	"	10.65	164	5500	2.84	3.20	3.55
16	"	"	"	"	11.00	162	5600	2.63	2.96	3.29
17	"	"	"	"	11.34	160	5700	2.45	2.75	3.06
18	"	"	"	"	11.66	158	5800	2.28	2.57	2.85
19	"	"	"	"	11.98	157	5900	2.15	2.42	2.69
20	2¾"	1⅝"	7"	⅝"	12.30	155	6000	2.03	2.29	2.54
21	"	"	"	"	12.60	154	6100	1.93	2.17	2.41
22	"	"	"	"	12.90	153	6200	1.83	2.06	2.29
23	"	"	"	"	13.19	152	6300	1.74	1.95	2.17
24	"	"	"	"	13.47	151	6400	1.67	1.88	2.09
25	"	"	"	"	13.75	150	6500	1.59	1.79	1.99
26	"	"	"	"	14.02	149	6600	1.52	1.71	1.90
27	"	"	"	"	14.29	148	6600	1.46	1.64	1.82
28	"	"	"	"	14.55	147	6700	1.39	1.57	1.74
29	"	"	"	"	14.81	146	6800	1.34	1.50	1.67
		"								
30	2¾"	1½"	7"	⅝"	15.06	145	6900	1.28	1.44	1.60
31	"	"	"	"	15.31	144	6900	1.23	1.39	1.54
32	"	"	"	"	15.55	143	7000	1.19	1.34	1.49
33	"	"	"	"	15.80	142	7000	1.14	1.28	1.42
34	"	"	"	"	16.03	140	7000	1.10	1.23	1.37
35	"	"	"	"	16.27	139	7100	1.06	1.20	1.33
36	"	"	"	"	16.50	138	7100	1.03	1.16	1.29
37	"	"	"	"	16.72	137	7200	.99	1.12	1.24
38	"	"	"	"	16.95	136	7200	.96	1.08	1.20
39	"	"	"	"	17.17	134	7200	.92	1.04	1.15
40	"	"	"	"	17.39	132	7200	.90	1.01	1.12
42	2¾"	1⅜"	6½"	9/16"	17.82	129	7200	.85	.95	1.06
44	"	"	"	"	18.24	126	7200	.78	.87	.97
46	"	"	"	"	18.65	123	7200	.73	.82	.91
48	"	"	"	"	19.05	120	7200	.68	.77	.85
50	"	"	"	"	19.44	118	7200	.65	.73	.81
55	"	"	"	"	20.39	113	7200	.56	.63	.70
60	"	"	"	"	21.30	108	7200	.50	.56	.62
65	"	"	"	"	22.17	103	7200	.43	.49	.54
70	"	"	"	"	23.00	99	7100	.38	.43	.48
75	"	"	"	"	23.81	95	7100	.35	.40	.44
80	"	"	"	"	24.60	91	7000	.31	.35	.39

PRODUCTION TABLE

FILLING TWIST - MEDIUM HOSIERY - BASE 2.50

Number of Yarn	Gauge	Ring	Traverse	Barrel of Bobbin	Twist per Inch	R. P. M. of 1 inch Front Roll	R. P. M. of Spindle	POUNDS PER SPINDLE PER WEEK OF		
								48 Hours	54 Hours	60 Hours
12	2¾"	1¾"	7½"	11/16"	8.66	169	4600	3.54	3.98	4.42
13	"	"	"	"	9.01	168	4800	3.29	3.70	4.11
14	"	"	"	"	9.35	167	4900	3.03	3.41	3.79
15	"	"	"	"	9.68	165	5000	2.82	3.18	3.53
16	"	"	"	"	10.00	163	5100	2.62	2.95	3.28
17	"	"	"	"	10.31	161	5200	2.43	2.74	3.04
18	"	"	"	"	10.60	159	5300	2.30	2.58	2.87
19	"	"	"	"	10.89	158	5400	2.17	2.44	2.71
20	"	"	"	"	11.18	156	5500	2.02	2.28	2.53
21	"	"	"	"	11.46	155	5600	1.92	2.16	2.40
22	2¾"	1⅝"	7"	⅝"	11.73	154	5700	1.84	2.07	2.30
23	"	"	"	"	11.99	153	5800	1.74	1.96	2.18
24	"	"	"	"	12.25	152	5800	1.66	1.87	2.08
25	"	"	"	"	12.50	151	5900	1.58	1.78	1.98
26	"	"	"	"	12.75	150	6000	1.51	1.70	1.89
27	"	"	"	"	12.99	149	6100	1.46	1 65	1.83
28	"	"	"	"	13.23	148	6100	1.40	1.58	1.75
29	"	"	"	"	13.46	147	6200	1.34	1.51	1 68
30	"	"	"	"	13.69	146	6300	1.30	1.46	1.62
31	"	"	"	"	13.92	145	6300	1.24	1.40	1.55
32	2¾"	1½"	7"	⅝"	14.14	144	6400	1.20	1.35	1.50
33	"	"	"	"	14.36	143	6400	1.15	1.30	1.44
34	"	"	"	"	14.58	141	6500	1.10	1.24	1.38
35	"	"	"	"	14.79	140	6500	1.07	1.21	1.34
36	"	"	"	"	15.00	139	6500	1.04	1.17	1.30
37	"	"	"	"	15.21	138	6600	1.00	1.13	1.25
38	"	"	"	"	15.41	137	6600	.97	1.09	1.21
39	"	"	"	"	15.61	135	6600	.93	1.04	1.16
40	"	"	"	"	15.81	133	6600	.90	1.02	1.13
42	"	"	"	"	16.20	130	6600	.84	.95	1.05
44	2¾"	1⅜"	6½"	9/16"	16.58	127	6600	.78	.87	97
46	"	"	"	"	16.96	124	6600	.73	.82	.91
48	"	"	"	"	17.32	121	6600	.69	.77	.86
50	"	"	"	"	17.68	119	6600	.66	.74	.82
55	"	"	"	"	18.54	114	6600	.57	.64	.71
60	"	"	"	"	19.36	109	6600	.50	.56	.62
65	"	"	"	"	20.15	104	6600	.43	.49	.54
70	"	"	"	"	20.92	100	6600	.39	.44	.49
75	"	"	"	"	21.65	96	6500	.35	.40	.44
80	"	"	"	"	22.36	92	6500	.32	.36	.40

TABLE OF COMPARATIVE ROLL SPEEDS

COMPARATIVE R.P.M. OF 7/8 INCH, 1 INCH AND 1 1/8 INCH DIAMETER ROLLS GIVING THE SAME DELIVERY OF YARN

COMPARATIVE ROLL SPEEDS			Delivery of Rolls in Inches Per Minute At Speeds Given	COMPARATIVE ROLL SPEEDS			Delivery of Rolls in Inches Per Minute At Speeds Given
R.P.M. of 7/8" Diam. Roll	R.P.M. of 1" Diam. Roll	R.P.M. of 1 1/8" Diam. Roll		R.P.M. of 7/8" Diam. Roll	R.P.M. of 1" Diam. Roll	R.P.M. of 1 1/8" Diam. Roll	
42	37	33	**116**	83	73	65	**229**
43	38	34	**119**	85	74	66	**232**
45	39	35	**123**	86	75	67	**236**
46	40	36	**126**	87	76	67	**239**
47	41	36	**129**	88	77	68	**242**
48	42	37	**132**	89	78	69	**245**
49	43	38	**135**	90	79	70	**248**
50	44	39	**138**	91	80	71	**251**
51	45	40	**141**	93	81	72	**254**
53	46	41	**145**	94	82	73	**258**
54	47	42	**148**	95	83	74	**261**
55	48	43	**151**	96	84	75	**264**
56	49	44	**154**	97	85	75	**267**
57	50	44	**157**	98	86	76	**270**
58	51	45	**160**	99	87	77	**273**
59	52	46	**163**	100	88	78	**276**
61	53	47	**166**	102	89	79	**280**
62	54	48	**170**	103	90	80	**283**
63	55	49	**173**	104	91	81	**286**
64	56	50	**176**	105	92	82	**289**
65	57	51	**179**	106	93	83	**292**
66	58	52	**182**	107	94	83	**295**
67	59	52	**185**	108	95	84	**298**
69	60	53	**188**	110	96	85	**302**
70	61	54	**192**	111	97	86	**305**
71	62	55	**195**	112	98	87	**308**
72	63	56	**198**	113	99	88	**311**
73	64	57	**201**	114	100	89	**314**
74	65	58	**204**	115	101	90	**317**
75	66	59	**207**	116	102	91	**320**
77	67	59	**210**	118	103	91	**324**
78	68	60	**214**	119	104	92	**327**
79	69	61	**217**	120	105	93	**330**
80	70	62	**220**	121	106	94	**333**
81	71	63	**223**	122	107	95	**336**
82	72	64	**226**	123	108	96	**339**

TABLE OF COMPARATIVE ROLL SPEEDS

COMPARATIVE R.P.M. OF 7/8 INCH, 1 INCH AND 1 1/8 INCH DIAMETER ROLLS GIVING THE SAME DELIVERY OF YARN

COMPARATIVE ROLL SPEEDS			Delivery of Rolls in Inches Per Minute At Speeds Given	COMPARATIVE ROLL SPEEDS			Delivery of Rolls in Inches Per Minute At Speeds Given
R.P.M. of 7/8" Diam. Roll	R.P.M. of 1" Diam. Roll	R.P.M. of 1 1/8" Diam. Roll		R.P.M. of 7/8" Diam. Roll	R.P.M. of 1" Diam. Roll	R.P.M. of 1 1/8" Diam. Roll	
124	109	97	**342**	166	145	129	**456**
126	110	98	**346**	167	146	130	**459**
127	111	99	**349**	168	147	131	**462**
128	112	99	**352**	169	148	131	**465**
129	113	100	**355**	170	149	132	**468**
130	114	101	**358**	171	150	133	**471**
131	115	102	**361**	172	151	134	**474**
132	116	103	**364**	174	152	135	**478**
134	117	104	**368**	175	153	136	**481**
135	118	105	**371**	176	154	137	**484**
136	119	106	**374**	177	155	138	**487**
137	120	107	**377**	178	156	139	**490**
138	121	107	**381**	179	157	139	**493**
139	122	108	**383**	180	158	140	**496**
140	123	109	**386**	182	159	141	**500**
142	124	110	**390**	183	160	142	**503**
143	125	111	**393**	184	161	143	**506**
144	126	112	**396**	185	162	144	**509**
145	127	113	**399**	186	163	145	**512**
146	128	114	**402**	187	164	146	**515**
147	129	115	**405**	188	165	147	**518**
148	130	115	**408**	190	166	147	**522**
150	131	116	**412**	191	167	148	**525**
151	132	117	**415**	192	168	149	**528**
152	133	118	**418**	193	169	150	**531**
153	134	119	**421**	194	170	151	**534**
154	135	120	**424**	195	171	152	**537**
155	136	121	**427**	196	172	153	**540**
156	137	122	**430**	198	173	154	**543**
158	138	123	**434**	199	174	155	**547**
159	139	123	**437**	200	175	155	**550**
160	140	124	**440**	201	176	156	**553**
161	141	125	**443**	202	177	157	**556**
162	142	126	**446**	203	178	158	**559**
163	143	127	**449**	204	179	159	**562**
164	144	128	**452**	206	180	160	**565**

PRODUCTION TABLE IN PERCENTAGE

No. of Yarn	ESTIMATED PER CENT. OF PRODUCTION											
	5.00	4.75	4.50	4.25	4.00	3.75	3.50	3.35	3.25	3.00	2.75	2.50
2	76	...	...	...	...	...	...	...	...	...	...	...
3	78	80	...	...	...	...	...	...	...	...	...	...
4	79	81	...	...	...	...	...	...	...	...	...	...
5	80	82	84	...	...	...	...	76	...	...	...	...
6	81	83	85	...	...	...	...	77	...	...	...	...
7	82	84	86	84	...	...	...	78	77	...	...	...
8	83	85	87	85	...	...	...	79	78	...	...	...
9	83	85	87	86	84	...	...	80	79	81	...	...
10	84	86	88	87	85	83	82	81	80	82	83	...
11	84	86	88	88	86	84	83	82	81	83	84	...
12	85	87	89	88	87	85	84	83	82	84	85	84
13	85	87	89	88	87	86	84	84	83	85	86	85
14	85	87	89	88	87	86	85	84	83	85	86	85
15	86	88	90	89	88	87	85	85	84	86	87	86
16	86	88	90	89	88	87	86	85	84	86	87	86
17	86	88	90	89	88	87	86	86	85	86	87	86
18	87	89	90	90	89	88	87	86	85	86	87	87
19	87	89	91	90	89	88	87	86	85	86	87	87
20	88	90	91	90	89	88	88	87	86	87	88	87
21	88	90	91	90	89	89	88	87	86	87	88	87
22	88	90	91	90	90	89	88	87	86	87	88	88
23	88	90	91	90	90	89	88	87	86	87	88	88
24	88	90	92	91	90	89	89	88	87	88	89	88
25	88	90	92	91	90	89	89	88	87	88	89	88
26	88	90	92	91	90	89	89	88	87	88	89	88
27	88	90	92	91	90	89	89	88	87	88	89	89
28	89	90	92	91	91	89	89	88	87	88	89	89
29	89	90	92	91	91	90	89	88	88	89	89	89
30	89	90	92	91	91	90	89	89	88	89	89	89
31	89	90	92	91	91	90	89	89	88	89	89	89
32	90	91	92	92	91	90	90	89	88	89	89	89
33	90	91	92	92	91	90	90	89	88	89	89	89
34	90	91	92	92	91	90	90	89	88	89	89	89
35	90	91	92	92	91	90	90	89	89	90	90	90
36	90	91	92	92	91	90	90	89	89	90	90	90
37	90	91	92	92	92	90	90	89	89	90	90	90
38	91	92	93	92	92	91	90	89	89	90	90	90
39	91	92	93	93	92	91	90	89	89	90	90	90
40	91	92	93	93	92	91	90	90	90	91	91	91
42	91	92	93	93	92	91	91	90	90	91	91	91
44	91	92	93	93	92	91	91	90	90	91	91	91
46	91	92	93	93	92	91	91	90	90	91	91	91
48	92	93	94	93	92	91	91	90	90	91	91	91
50	92	93	94	94	93	92	91	91	91	92	92	92
55	92	93	94	94	93	92	92	91	91	92	92	92
60	93	94	94	94	93	92	92	91	91	92	92	92
65	93	94	94	94	93	93	92	91	91	92	92	92
70	93	94	94	94	93	93	92	92	92	93	93	93
75	94	94	95	94	94	93	93	92	92	93	93	93
80	94	94	95	95	94	93	93	92	92	93	93	93
85	...	95	95	95	94	93	93	92	92	93	...	...
90	...	95	95	95	94	94	93	93	93	93	...	...
100	...	...	95	95	94	94	94	93	93	93	...	...
110	...	...	95	95	95	94	94	93	93	94	...	...
120	...	...	95	95	95	95	94	94	94	94	...	...
130	...	...	...	95	95	95	94	...	...	...	...	...
140	...	...	...	95	95	95	95	...	...	...	...	...
150	...	...	...	...	95	95	95	...	...	...	...	...
160	...	...	...	...	96	95	95	...	...	...	...	...
170	...	...	...	...	...	96	95	...	...	...	...	...
180	...	...	...	...	...	96	95	...	...	...	...	...

BREAKING WEIGHTS OF COTTON YARNS

So many conditions must be taken into consideration in the manufacture of yarn that it is almost impossible to give a perfect table of breaking weights for every number. The staple and grade of cotton used, the amount of twist, spinning conditions and other things, all enter into the making of strong or weak yarns.

On the following two pages will be found our new table of breaking weights for cotton yarn. The average breaking weights for carded warp yarns will be found in the column under multiplier 2.00; this column is printed in heavy type. For combed warp yarns the average breaking weights will be found in the column under multiplier 2.50 and up, according to the quality. In the column under multiplier 1.75, and down, according to the quality, will be found the breaking weights for soft twisted yarns.

BREAKING WEIGHTS

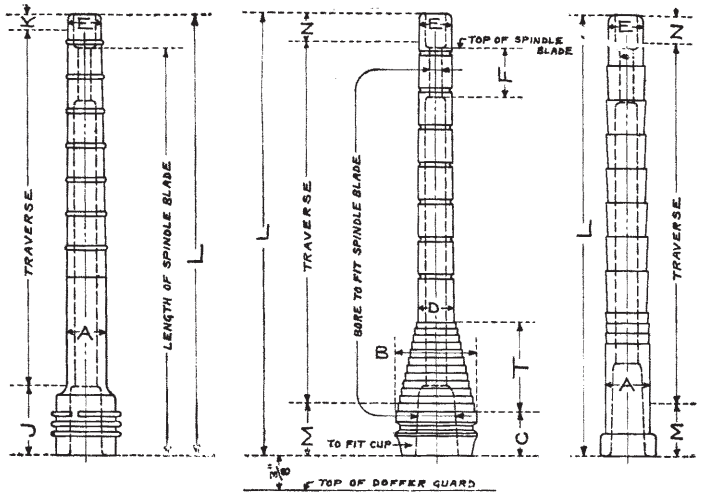
Number of Yarn	Weight in Grains of 120 Yards	BREAKING WEIGHT OF YARNS								
		Weight in Grains of 120 Yards Multiplied by								
		1.25	1.50	1.75	2.00	2.25	2.50	2.75	3.00	3.25
1.	1000.0	1250.0	1500.0	1750.0	**2000.0**	2250.0	2500.0	2750.0	3000.0	3250.0
2.	500.0	625.0	750.0	875.0	**1000.0**	1125.0	1250.0	1375.0	1500.0	1625.0
3.	335.0	418.7	502.5	586.2	**670.0**	753.7	837.5	921.2	1005.0	1088.7
4.	250.0	312.5	375.0	687.5	**500.0**	562.3	625.0	687.5	750.0	812.5
5.	200.0	250.0	300.0	350.0	**400.0**	450.0	500.0	550.0	600.0	650.0
6.	167.5	209.4	251.5	293.1	**335.0**	376.9	418.8	460.6	502.5	544.4
7.	143.5	179.4	215.3	251.1	**287.0**	322.9	358.8	394.6	430.5	466.4
8.	125.0	156.3	187.8	218.8	**250.0**	281.3	312.5	343.8	375.0	406.3
9.	111.1	138.8	166.5	194.3	**222.2**	249.8	277.5	305.3	333.3	360.8
10.	100.0	125.0	150.0	175.0	**200.0**	225.0	250.0	275.0	300.0	325.0
11.	91.0	118.6	136.5	159.3	**182.0**	204.8	227.5	250.3	273.0	295.8
12.	83.3	104.1	125.0	145.8	**166.6**	187.4	208.3	229.1	249.9	270.3
13.	76.9	96.1	115.4	134.6	**153.8**	173.0	192.3	211.5	230.7	249.9
14.	71.5	89.4	107.3	126.9	**143.0**	160.9	178.8	196.6	214.5	232.4
15.	66.7	83.4	100.1	116.7	**133.4**	150.1	166.8	183.4	200.1	216.8
16.	62.5	78.1	93.8	109.4	**125.0**	140.6	156.3	171.9	187.5	203.1
17.	58.8	73.5	88.2	102.9	**117.6**	132.3	147.0	161.7	176.4	191.1
18.	55.5	69.4	83.3	97.1	**111.0**	124.9	138.5	152.6	166.5	180.4
19.	52.5	65.6	78.8	91.9	**105.0**	118.1	131.3	144.4	157.5	170.6
20.	50.0	62.5	75.0	87.5	**100.0**	112.5	125.0	137.5	150.0	162.5
21.	47.5	59.4	71.3	83.1	**95.0**	106.9	118.8	130.6	142.5	154.4
22.	45.5	56.9	68.3	79.6	**91.0**	102.4	113.8	125.1	136.5	147.9
23.	43.5	54.5	65.3	76.1	**87.0**	97.9	108.8	119.6	130.5	141.8
24.	41.6	52.0	62.4	72.8	**83.2**	93.6	104.0	114.4	124.8	135.2
25.	40.0	50.0	60.0	70.0	**80.0**	90.0	100.0	110.0	120.0	130.0
26.	38.4	48.0	57.6	67.2	**76.6**	86.4	96.0	105.6	115.2	124.8
27.	37.0	46.3	55.5	64.8	**74.0**	83.3	92.5	101.8	111.0	120.2
28.	35.7	44.6	53.6	62.5	**71.4**	80.3	89.3	98.2	107.1	116.0
29.	34.4	43.0	51.6	60.2	**68.8**	77.4	86.0	94.6	103.2	111.8
30.	33.3	41.6	50.0	58.3	**66.6**	74.9	83.3	91.6	99.9	108.2
31.	32.2	40.3	48.3	56.3	**64.4**	72.5	80.5	88.6	96.6	104.7
32.	31.2	39.0	46.8	54.6	**62.4**	70.2	78.0	85.8	93.6	101.4
33.	30.3	37.9	45.5	53.0	**60.6**	68.2	75.8	83.3	90.9	98.5
34.	29.4	36.8	44.1	51.5	**58.8**	66.2	73.5	80.9	88.2	95.6
35.	28.5	35.6	42.8	50.1	**57.0**	64.1	71.3	78.4	85.5	92.6
36.	27.8	34.8	41.7	48.7	**55.6**	62.6	69.5	76.5	83.4	90.4
37.	27.0	33.8	40.5	47.3	**54.0**	60.8	67.5	74.3	81.0	87.8
38.	26.3	32.9	39.5	46.0	**52.6**	59.2	65.8	72.3	78.9	85.5
39.	25.6	32.0	38.4	44.8	**51.2**	57.6	64.0	70.4	76.8	83.2
40.	25.0	31.3	37.5	43.8	**50.0**	56.3	62.5	68.8	75.0	81.2
41.	24.4	30.5	36.6	42.7	**48.8**	54.9	61.0	67.1	73.2	78.8
42.	23.8	29.8	35.7	41.7	**47.6**	53.6	59.5	65.5	71.4	77.4
43.	23.2	29.0	34.8	40.6	**46.4**	52.2	58.0	63.8	69.6	75.4
44.	22.7	28.4	34.1	39.7	**45.4**	51.1	56.8	62.4	68.1	73.8
45.	22.2	27.8	33.3	38.9	**44.4**	50.0	55.5	61.1	66.6	72.2
46.	21.7	27.1	32.6	38.0	**43.4**	48.8	54.3	59.7	65.1	70.5
47.	21.3	26.6	32.0	37.3	**42.6**	47.9	53.3	58.6	63.9	69.2
48.	20.8	26.0	31.2	36.4	**41.6**	46.8	52.0	57.2	62.4	67.6
49.	20.4	25.5	30.6	35.7	**40.8**	45.9	51.0	56.1	61.2	66.3
50.	20.0	25.0	30.0	35.0	**40.0**	45.0	50.0	55.0	60.0	65.0
51.	19.6	24.5	29.4	34.2	**39.2**	44.1	49.0	53.9	58.8	63.7
52.	19.2	24.0	28.8	33.6	**38.4**	43.2	48.0	52.8	57.6	62.4
53.	18.8	23.5	28.2	32.9	**37.6**	42.3	47.0	51.7	56.4	61.1
54.	18.5	23.1	27.8	32.4	**37.0**	41.6	46.3	50.9	55.5	60.1

BREAKING WEIGHTS

Number of Yarn	Weight in Grains of 120 Yards	BREAKING WEIGHT OF YARNS — Weight in Grains of 120 Yards Multiplied by								
		1.25	1.50	1.75	2.00	2.25	2.50	2.75	3.00	3.25
55.	18.2	22.8	27.3	31.9	**36.4**	41.0	45.5	50.1	54.6	59.2
56.	17.8	22.3	26.7	31.2	**35.6**	40.1	44.5	49.0	53.4	57.9
57.	17.5	21.9	26.3	30.6	**35.0**	39.4	43.8	47.7	52.5	56.9
58.	17.2	21.5	25.8	30.1	**34.4**	38.7	43.0	47.3	51.6	55.9
59.	16.9	21.1	25.4	29.6	**33.8**	38.0	42.3	46.5	50.7	55.0
60.	16.7	20.8	25.1	29.3	**33.4**	37.6	41.8	45.9	50.1	54.3
61.	16.4	20.5	24.6	28.7	**32.8**	36.9	41.0	45.1	49.2	53.3
62.	16.2	20.3	24.3	28.4	**32.4**	36.5	40.5	44.6	48.6	52.7
63.	15.9	19.9	23.9	27.8	**31.8**	35.8	39.8	43.3	47.7	51.7
64.	15.6	19.5	23.4	27.4	**31.2**	35.1	39.0	42.9	46.8	50.7
65.	15.4	19.3	23.1	27.0	**30.8**	34.7	38.5	42.4	46.2	50.1
66.	15.2	19.0	22.8	26.6	**30.4**	34.2	38.1	41.8	45.6	49.4
67.	14.9	18.6	22.2	26.1	**29.8**	33.5	37.3	41.0	44.7	48.4
68.	14.7	18.4	22.1	25.7	**29.4**	33.1	36.8	40.4	44.1	47.8
69.	14.5	18.1	21.7	25.4	**29.0**	32.6	36.2	39.8	43.5	47.1
70.	14.3	17.9	21.5	25.0	**28.6**	32.2	35.8	39.3	42.9	46.5
71.	14.1	17.6	21.2	24.7	**28.2**	31.7	35.3	38.8	42.3	45.8
72.	13.9	17.4	20.9	24.3	**27.8**	31.3	34.8	38.2	41.7	45.2
73.	13.7	17.1	20.6	24.0	**27.4**	30.8	34.2	37.7	41.1	44.5
74.	13.5	16.9	20.3	23.6	**27.0**	30.4	33.8	37.1	40.5	43.9
75.	13.3	16.6	20.0	23.3	**26.6**	29.9	33.3	36.6	39.9	43.2
76.	13.2	16.5	19.7	23.0	**26.3**	29.6	33.0	36.2	39.5	42.8
77.	13.0	16.2	19.5	22.8	**26.0**	29.2	32.5	35.8	39.0	42.3
78.	12.8	16.0	19.2	22.4	**25.6**	28.8	32.1	35.3	38.5	41.6
79.	12.6	15.8	18.9	22.1	**25.2**	28.4	31.5	34.7	37.8	41.0
80.	12.5	15.6	18.8	21.9	**25.0**	28.1	31.3	34.4	37.5	40.6
81.	12.4	15.5	18.6	21.7	**24.8**	27.9	31.0	34.1	37.2	40.3
82.	12.2	15.3	18.3	21.4	**24.4**	27.5	30.5	33.6	36.6	39.7
83.	12.1	15.1	18.2	21.2	**24.2**	27.2	30.3	33.3	36.3	39.3
84.	11.9	14.9	17.9	20.8	**23.8**	26.8	29.8	32.7	35.7	38.7
85.	11.7	14.6	17.6	20.4	**23.4**	26.3	29.3	32.2	35.1	38.0
86.	11.6	14.5	17.4	20.3	**23.2**	26.1	29.0	31.9	34.8	37.7
87.	11.5	14.4	17.3	20.1	**23.0**	25.9	28.8	31.6	34.5	37.4
88.	11.4	14.3	17.1	20.0	**22.8**	25.7	28.5	31.4	34.2	37.1
89.	11.2	14.0	16.8	19.6	**22.4**	25.2	28.0	30.8	33.6	36.4
90.	11.1	13.9	16.7	19.4	**22.2**	25.0	27.8	30.5	33.3	36.1
92.	10.9	13.6	16.4	19.1	**21.8**	24.5	27.3	30.0	32.7	35.4
94.	10.6	13.3	15.9	18.6	**21.2**	23.9	26.5	29.2	31.8	34.5
96.	10.4	13.0	15.7	18.2	**20.8**	23.4	26.0	28.6	31.2	33.8
98.	10.2	12.8	15.3	17.9	**20.4**	23.0	25.5	28.1	30.6	33.2
100.	10.0	12.5	15.0	17.5	**20.0**	22.5	25.0	27.5	30.0	32.5
105.	9.5	11.9	14.3	16.6	**19.0**	21.4	23.8	26.1	28.5	30.9
110.	9.1	11.4	13.7	15.9	**18.2**	20.5	22.8	25.0	27.3	29.6
115.	8.7	10.9	13.1	15.3	**17.4**	19.6	21.8	24.0	26.1	28.3
120.	8.3	10.4	12.4	14.5	**16.6**	18.7	20.8	22.8	24.9	27.0
125.	8.0	10.0	12.0	14.0	**16.0**	18.0	20.0	22.0	24.0	26.0
130.	7.7	9.6	11.5	13.4	**15.4**	17.3	19.2	21.0	23.1	25.0
135.	7.4	9.3	11.1	13.0	**14.8**	16.7	18.5	20.4	22.2	24.1
140.	7.1	8.9	10.7	12.5	**14.3**	16.1	17.9	19.6	21.4	23.2
145.	6.9	8.6	10.4	12.1	**13.8**	15.5	17.3	19.0	20.7	22.4
150.	6.7	8.3	10.0	11.7	**13.3**	15.0	16.7	18.3	20.0	21.7
155.	6.5	8.1	9.7	11.3	**13.0**	14.5	16.1	17.8	19.4	21.0
160.	6.3	7.8	9.4	10.9	**12.5**	14.1	15.6	17.2	18.8	20.3
165.	6.1	7.6	9.1	10.6	**12.1**	13.6	15.2	16.7	18.2	19.7
170.	5.9	7.4	8.8	10.3	**11.8**	13.2	14.7	16.2	17.6	19.1

STYLES AND DIMENSIONS OF SPINNING BOBBINS

FILLING WIND



FOR CENTRIFUGAL CLUTCH STYLE WHIRL
BOBBIN CHANGING

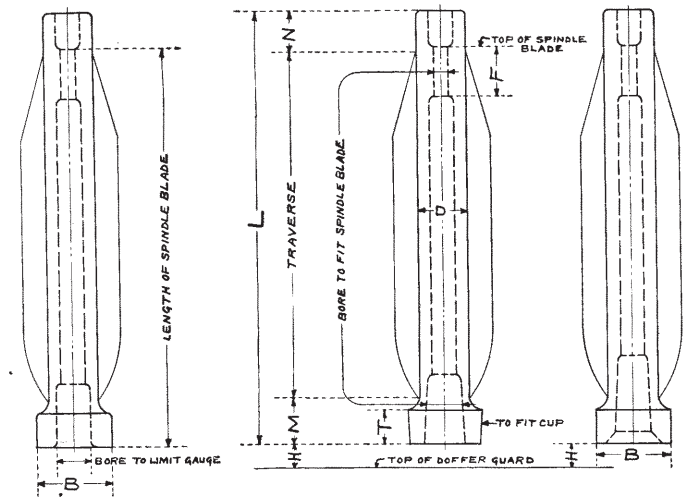
FOR CUP STYLE WHIRL
PLAIN

FOR WHITIN STYLE WHIRL
SHUTTLE CHANGING

Size of Ring	Length of Traverse	DIMENSIONS												Lbs. of Yarn on Bobbin
		L	M	N	C	T	B	F	J	K	A	E	D	
1 1/8"	5 1/2"	6 3/4"	3/4"	1/2"	1/2"	1 1/4"	1"	1"	1"	1/4"	5/8"	1/2"	9/16"	.040
1 3/16"	6"	7 1/4"	3/4"	1/2"	1/2"	1 1/4"	1"	1"	1"	1/4"	5/8"	1/2"	9/16"	.050
1 1/4"	6"	7 1/4"	3/4"	1/2"	1/2"	1 5/16"	1 1/16"	1"	1"	1/4"	5/8"	1/2"	9/16"	.058
1 5/16"	6 1/2"	7 3/4"	3/4"	1/2"	1/2"	1 3/8"	1 1/8"	1"	1"	1/4"	5/8"	1/2"	9/16"	.069
1 3/8"	6 1/2"	7 13/16"	3/4"	9/16"	1/2"	1 3/8"	1 1/8"	1"	1"	5/16"	5/8"	1/2"	9/16"	.078
1 1/2"	7"	8 5/16"	3/4"	9/16"	1/2"	1 1/2"	1 1/4"	1 1/16"	1"	5/16"	11/16"	9/16"	5/8"	.101
1 5/8"	7"	8 3/8"	13/16"	9/16"	9/16"	1 9/16"	1 5/16"	1 1/16"	1 1/16"	5/16"	11/16"	9/16"	5/8"	.125
1 3/4"	7 1/2"	8 15/16"	13/16"	5/8"	9/16"	1 5/8"	1 3/8"	1 1/8"	1 1/16"	3/8"	3/4"	5/8"	11/16"	.152
1 7/8"	7 1/2"	8 15/16"	13/16"	5/8"	9/16"	1 11/16"	1 7/16"	1 1/8"	1 1/16"	3/8"	3/4"	5/8"	11/16"	.181

STYLES AND DIMENSIONS OF SPINNING BOBBINS

WARP WIND



CENTRIFUGAL CLUTCH STYLE — CUP STYLE — WHITIN STYLE

Size of Ring	Length of Traverse	DIMENSIONS								Lbs. of Yarn on Bobbin
		L	M	N	T	F	B	H	D	
1 5/8"	6"	7 1/4"	11/16"	9/16"	1/2"	1 1/16"	1"	3/8"	3/4"	.079
1 1/2"	6"	7 1/4"	11/16"	9/16"	1/2"	1 1/16"	1 1/16"	3/8"	13/16"	.097
1 5/8"	6 1/2"	7 7/8"	3/4"	5/8"	9/16"	1 1/8"	1 1/16"	3/8"	13/16"	.131
1 3/4"	6 1/2"	7 7/8"	3/4"	5/8"	9/16"	1 1/8"	1 1/16"	3/8"	13/16"	.163
1 7/8"	7"	8 3/8"	3/4"	5/8"	9/16"	1 1/8"	1 1/8"	3/8"	7/8"	.198
2"	7"	8 3/8"	3/4"	5/8"	9/16"	1 1/8"	1 1/8"	3/8"	7/8"	.238
2 1/8"	7 1/2"	8 7/8"	3/4"	5/8"	9/16"	1 3/16"	1 3/16"	3/8"	7/8"	.298
2 1/4"	7 1/2"	8 15/16"	3/4"	11/16"	9/16"	1 3/16"	1 3/16"	3/8"	15/16"	.336
2 1/2"	8"	9 1/2"	13/16"	11/16"	5/8"	1 1/4"	1 1/4"	3/8"	1"	.444

CYLINDER SPEED TABLE

REVOLUTIONS PER MINUTE OF 6 INCH CYLINDER REQUIRED FOR VARIOUS SPINDLE SPEEDS

R. P. M. of Spindle	REVOLUTIONS PER MINUTE OF CYLINDER					
	¾ IN. WHIRL Ratio 7.03	13/16 IN. WHIRL Ratio 6.56	⅞ IN. WHIRL Ratio 6.15	1 IN. WHIRL Ratio 5.46	1⅛ IN. WHIRL Ratio 4.91	1¼ IN. WHIRL Ratio 4.46
3000				549	610	672
3100				567	631	695
3200				586	651	717
3300				604	672	739
3400				622	692	762
3500			569	641	712	784
3600			585	659	733	807
3700			601	677	753	829
3800			617	695	773	852
3900			634	714	794	874
4000		609	650	732	814	896
4100		625	666	750	835	919
4200		640	682	769	855	941
4300		655	699	787	875	964
4400		670	715	805	896	986
4500	640	685	731	824	916	1008
4600	654	701	747	842	936	1031
4700	668	716	764	860	957	1053
4800	682	731	780	879	977	1076
4900	697	746	796	897	997	1098
5000	711	762	813	915	1018	1121
5100	725	777	829	934	1038	1143
5200	739	792	845	952	1059	1165
5300	753	807	861	970	1079	1188
5400	768	823	878	989	1099	1210
5500	782	838	894	1007	1120	1233
5600	796	853	910	1025	1140	1255
5700	810	868	926	1043	1160	1278
5800	825	884	943	1062	1181	1300
5900	839	899	959	1080	1201	1322
6000	853	914	975	1098	1221	1345
6100	867	929	991	1117	1242	1367
6200	881	945	1008	1135	1262	1390
6300	896	960	1024	1153	1283	1412
6400	910	975	1040	1172	1303	1434
6500	924	990	1056	1190	1323	1457
6600	938	1006	1073	1208	1344	1479
6700	953	1021	1089	1227	1364	1502
6800	967	1036	1105	1245	1384	1524
6900	981	1051	1121	1263	1405	1547
7000	995	1067	1138	1282	1425	1569
7100	1009	1082	1154	1300	1446	1591
7200	1024	1097	1170	1318	1466	1614
7300	1038	1112	1186	1336	1486	1636
7400	1052	1128	1203	1355	1507	1659

CYLINDER SPEED TABLE

REVOLUTIONS PER MINUTE OF 6 INCH CYLINDER REQUIRED FOR VARIOUS SPINDLE SPEEDS

R. P. M. of Spindle	REVOLUTIONS PER MINUTE OF CYLINDER					
	¾ IN. WHIRL Ratio 7.03	13/16 IN. WHIRL Ratio 6.56	⅞ IN. WHIRL Ratio 6.15	1 IN. WHIRL Ratio 5.46	1⅛ IN. WHIRL Ratio 4.91	1¼ IN. WHIRL Ratio 4.46
7500	1066	1143	1219	1373	1527	1681
7600	1081	1158	1235	1391	1547	1704
7700	1095	1173	1252	1410	1568	1726
7800	1109	1189	1268	1428	1588	1748
7900	1123	1204	1284	1446	1608	1771
8000	1137	1219	1300	1465	1629	1793
8100	1152	1234	1317	1483	1649	1816
8200	1166	1250	1333	1501	1670	1838
8300	1180	1265	1349	1520	1690	1860
8400	1194	1280	1365	1538	1710	1883
8500	1209	1295	1382	1556	1731	
8600	1223	1310	1398	1575	1751	
8700	1237	1326	1414	1593	1771	
8800	1251	1341	1430	1611	1792	
8900	1266	1356	1447	1630	1812	
9000	1280	1371	1463	1648		
9100	1294	1387	1479	1666		
9200	1308	1402	1495	1684		
9300	1322	1417	1512	1703		
9400	1337	1432	1528	1721		
9500	1351	1448	1544	1739		
9600	1365	1463	1560	1758		
9700	1379	1478	1577	1776		
9800	1394	1493	1593	1794		
9900	1408	1509	1609	1813		
10000	1422	1524	1626			
10100	1436	1539	1642			
10200	1450	1554	1658			
10300	1465	1570	1674			
10400	1479	1585	1691			
10500	1493	1600	1707			
10600	1507	1615	1723			
10700	1522	1631	1739			
10800	1536	1646	1756			
10900	1550	1661	1772			
11000	1564	1676				
11100	1578	1692				
11200	1593	1707				
11300	1607	1722				
11400	1621	1737				
11500	1635					
11600	1650					
11700	1664					
11800	1678					
11900	1692					
12000	1706					

CYLINDER SPEED TABLE

REVOLUTIONS PER MINUTE OF 6½ INCH CYLINDER REQUIRED FOR VARIOUS SPINDLE SPEEDS

R. P. M. of Spindle	REVOLUTIONS PER MINUTE OF CYLINDER					
	¾ IN. WHIRL Ratio 7.61	13/16 IN. WHIRL Ratio 7.10	⅞ IN. WHIRL Ratio 6.65	1 IN. WHIRL Ratio 5.91	1⅛ IN. WHIRL Ratio 5.32	1¼ IN. WHIRL Ratio 4.83
3000				507	563	621
3100				524	582	641
3200				541	601	662
3300				558	620	683
3400				575	639	703
3500			526	592	657	724
3600			541	609	676	745
3700			556	626	695	766
3800			571	642	714	786
3900			586	659	733	807
4000		563	601	676	751	828
4100		577	616	693	770	848
4200		591	631	710	789	869
4300		605	646	727	808	890
4400		619	661	744	827	910
4500	591	633	676	761	845	931
4600	604	647	691	778	864	952
4700	617	661	706	795	883	973
4800	630	676	721	812	902	993
4900	643	690	736	829	921	1014
5000	657	704	751	846	939	1035
5100	670	718	766	862	958	1055
5200	683	732	781	879	977	1076
5300	696	746	796	896	996	1097
5400	709	760	812	913	1015	1118
5500	722	774	827	930	1033	1138
5600	735	788	842	947	1052	1159
5700	749	802	857	964	1071	1180
5800	762	816	872	981	1090	1200
5900	775	830	887	998	1109	1221
6000	788	845	902	1015	1127	1242
6100	801	859	917	1032	1146	1262
6200	814	873	932	1049	1165	1283
6300	827	887	947	1065	1184	1304
6400	840	901	962	1082	1203	1325
6500	854	915	977	1099	1221	1345
6600	867	929	992	1116	1240	1366
6700	880	943	1007	1133	1259	1387
6800	893	957	1022	1150	1278	1407
6900	906	971	1037	1167	1296	1428
7000	919	985	1052	1184	1315	1449
7100	932	1000	1067	1201	1334	1469
7200	946	1014	1082	1218	1353	1490
7300	959	1028	1097	1235	1372	1511
7400	972	1042	1112	1252	1390	1532

CYLINDER SPEED TABLE

REVOLUTIONS PER MINUTE OF 6½ INCH CYLINDER REQUIRED FOR VARIOUS SPINDLE SPEEDS

R. P. M. of Spindle	REVOLUTIONS PER MINUTE OF CYLINDER					
	¾ IN. WHIRL Ratio 7.61	13/16 IN. WHIRL Ratio 7.10	⅞ IN. WHIRL Ratio 6.65	1 IN. WHIRL Ratio 5.91	1⅛ IN. WHIRL Ratio 5.32	1¼ IN. WHIRL Ratio 4.83
7500	985	1056	1127	1269	1409	1552
7600	998	1070	1142	1285	1428	1573
7700	1011	1084	1157	1302	1447	1594
7800	1024	1098	1172	1319	1466	1614
7900	1038	1112	1187	1336	1484	1635
8000	1051	1126	1203	1353	1503	1656
8100	1064	1140	1218	1370	1522	1677
8200	1077	1154	1233	1387	1541	1697
8300	1090	1169	1248	1404	1560	1718
8400	1103	1183	1263	1421	1578	1739
8500	1116	1197	1278	1438	1597	1759
8600	1130	1211	1293	1455	1616	1780
8700	1143	1225	1308	1472	1635	1801
8800	1156	1239	1323	1489	1654	1821
8900	1169	1253	1338	1505	1672	1842
9000	1182	1267	1353	1522	1691	
9100	1195	1281	1368	1539	1710	
9200	1208	1295	1383	1556	1729	
9300	1222	1309	1398	1573	1748	
9400	1235	1323	1413	1590	1766	
9500	1248	1338	1428	1607	1785	
9600	1261	1352	1443	1624	1804	
9700	1274	1366	1458	1641	1823	
9800	1287	1380	1473	1658	1842	
9900	1300	1394	1488	1675	1860	
10000	1314	1408	1503	1692		
10100	1327	1422	1518	1708		
10200	1340	1436	1533	1725		
10300	1353	1450	1548	1742		
10400	1366	1464	1563	1759		
10500	1379	1478	1578			
10600	1392	1492	1593			
10700	1406	1507	1609			
10800	1419	1521	1624			
10900	1432	1535	1639			
11000	1445	1549				
11100	1458	1563				
11200	1471	1577				
11300	1484	1591				
11400	1498	1605				
11500	1511					
11600	1524					
11700	1537					
11800	1550					
11900	1563					
12000	1576					

CYLINDER SPEED TABLE

REVOLUTIONS PER MINUTE OF 7 INCH CYLINDER REQUIRED FOR VARIOUS SPINDLE SPEEDS

R. P. M. of Spindle	REVOLUTIONS PER MINUTE OF CYLINDER					
	¾ IN. WHIRL Ratio 8.19	13/16 IN. WHIRL Ratio 7.65	⅞ IN. WHIRL Ratio 7.17	1 IN. WHIRL Ratio 6.36	1⅛ IN. WHIRL Ratio 5.73	1¼ IN. WHIRL Ratio 5.20
3000				471	523	576
3100				487	541	596
3200				503	558	615
3300				518	575	634
3400				534	593	653
3500			488	550	610	673
3600			502	566	628	692
3700			516	581	645	711
3800			529	597	663	730
3900			543	613	680	750
4000		522	557	628	698	769
4100		535	571	644	715	788
4200		549	585	660	732	807
4300		562	599	676	750	826
4400		575	613	691	767	846
4500	549	588	627	707	785	865
4600	561	601	641	723	802	884
4700	573	614	655	738	820	903
4800	586	627	669	754	837	923
4900	598	640	683	770	855	942
5000	610	653	697	786	872	961
5100	622	666	711	801	890	980
5200	634	679	725	817	907	1000
5300	647	692	739	833	924	1019
5400	659	705	753	849	942	1038
5500	671	718	767	864	959	1057
5600	683	732	781	880	977	1076
5700	695	745	794	896	994	1096
5800	708	758	808	911	1012	1115
5900	720	771	822	927	1029	1134
6000	732	784	836	943	1047	1153
6100	744	797	850	959	1064	1173
6200	757	810	864	974	1082	1192
6300	769	823	878	990	1099	1211
6400	781	836	892	1006	1116	1230
6500	793	849	906	1022	1134	1250
6600	805	862	920	1037	1151	1269
6700	818	875	934	1053	1169	1288
6800	830	888	948	1069	1186	1307
6900	842	901	962	1084	1204	1326
7000	854	915	976	1100	1221	1346
7100	866	928	990	1116	1239	1365
7200	879	941	1004	1132	1256	1384
7300	891	954	1018	1147	1273	1403
7400	903	967	1032	1163	1291	1423

CYLINDER SPEED TABLE

REVOLUTIONS PER MINUTE OF 7 INCH CYLINDER REQUIRED FOR VARIOUS SPINDLE SPEEDS

R. P. M. of Spindle	REVOLUTIONS PER MINUTE OF CYLINDER					
	¾ IN. WHIRL Ratio 8.19	13/16 IN. WHIRL Ratio 7.65	⅞ IN. WHIRL Ratio 7.17	1 IN. WHIRL Ratio 6.36	1⅛ IN. WHIRL Ratio 5.73	1¼ IN. WHIRL Ratio 5.20
7500	915	980	1046	1179	1308	1442
7600	927	993	1059	1194	1326	1461
7700	940	1006	1073	1210	1343	1480
7800	952	1019	1087	1226	1361	1500
7900	964	1032	1101	1242	1378	1519
8000	976	1045	1115	1257	1396	1538
8100	989	1058	1129	1273	1413	1557
8200	1001	1071	1143	1289	1431	1576
8300	1013	1084	1157	1305	1448	1596
8400	1025	1098	1171	1320	1465	1615
8500	1037	1111	1185	1336	1483	1634
8600	1050	1124	1199	1352	1500	1653
8700	1062	1137	1213	1367	1518	1673
8800	1074	1150	1227	1383	1535	1692
8900	1086	1163	1241	1399	1553	1711
9000	1098	1176	1255	1415	1570	1730
9100	1111	1189	1269	1430	1588	1750
9200	1123	1202	1283	1446	1605	1769
9300	1135	1215	1297	1462	1623	1788
9400	1147	1228	1311	1477	1640	1807
9500	1159	1241	1324	1493	1657	
9600	1172	1254	1338	1509	1675	
9700	1184	1267	1352	1525	1692	
9800	1196	1281	1366	1540	1710	
9900	1208	1294	1380	1556	1727	
10000	1221	1307	1394	1572		
10100	1233	1320	1408	1588		
10200	1245	1333	1422	1603		
10300	1257	1346	1436	1619		
10400	1269	1359	1450	1635		
10500	1282	1372	1464			
10600	1294	1385	1478			
10700	1306	1398	1492			
10800	1318	1411	1506			
10900	1330	1424	1520			
11000	1343	1437				
11100	1355	1450				
11200	1367	1464				
11300	1379	1477				
11400	1391	1490				
11500	1404					
11600	1416					
11700	1428					
11800	1440					
11900	1452					
12000	1465					

CYLINDER SPEED TABLE

REVOLUTIONS PER MINUTE OF 7½ INCH CYLINDER REQUIRED FOR VARIOUS SPINDLE SPEEDS

R. P. M. of Spindle	REVOLUTIONS PER MINUTE OF CYLINDER					
	¾ IN. WHIRL Ratio 8.79	13/16 IN. WHIRL Ratio 8.20	⅞ IN. WHIRL Ratio 7.68	1 IN. WHIRL Ratio 6.81	1⅛ IN. WHIRL Ratio 6.14	1¼ IN. WHIRL Ratio 5.57
3000				440	488	538
3100				455	504	556
3200				469	521	574
3300				484	537	592
3400				499	553	610
3500			455	513	570	628
3600			468	528	586	646
3700			481	543	602	664
3800			494	558	618	682
3900			507	572	635	700
4000		487	520	587	651	718
4100		500	533	602	667	736
4200		512	546	616	684	754
4300		524	559	631	700	771
4400		536	572	646	716	789
4500	511	548	585	660	732	807
4600	523	560	598	675	749	825
4700	534	573	611	690	765	843
4800	546	585	625	704	781	861
4900	557	597	638	719	798	879
5000	568	609	651	734	814	897
5100	580	621	664	748	830	915
5200	591	634	677	763	846	933
5300	602	646	690	778	863	951
5400	614	658	703	792	879	969
5500	625	670	716	807	895	987
5600	637	682	729	822	912	1005
5700	648	695	742	837	928	1023
5800	659	707	755	851	944	1041
5900	671	719	768	866	960	1059
6000	682	731	781	881	977	1077
6100	693	743	794	895	993	1095
6200	705	756	807	910	1009	1113
6300	716	768	820	925	1026	1131
6400	728	780	833	939	1042	1149
6500	739	792	846	954	1058	1166
6600	750	804	859	969	1074	1184
6700	762	817	872	983	1091	1202
6800	773	829	885	998	1107	1220
6900	784	841	898	1013	1123	1238
7000	796	853	911	1027	1140	1256
7100	807	865	924	1042	1156	1274
7200	819	878	937	1057	1172	1292
7300	830	890	950	1071	1188	1310
7400	841	902	963	1086	1205	1328

CYLINDER SPEED TABLE

REVOLUTIONS PER MINUTE OF 7½ INCH CYLINDER REQUIRED FOR VARIOUS SPINDLE SPEEDS

R. P. M. of Spindle	REVOLUTIONS PER MINUTE OF CYLINDER					
	¾ IN. WHIRL Ratio 8.79	13/16 IN. WHIRL Ratio 8.20	⅞ IN. WHIRL Ratio 7.68	1 IN. WHIRL Ratio 6.81	1⅛ IN. WHIRL Ratio 6.14	1¼ IN. WHIRL Ratio 5.57
7500	853	914	976	1101	1221	1346
7600	864	926	989	1116	1237	1364
7700	875	939	1002	1130	1254	1382
7800	887	951	1015	1145	1270	1400
7900	898	963	1028	1160	1286	1418
8000	910	975	1041	1174	1302	1436
8100	921	987	1054	1189	1319	1454
8200	932	1000	1067	1204	1335	1472
8300	944	1012	1080	1218	1351	1490
8400	955	1024	1093	1233	1368	1508
8500	967	1036	1106	1248	1384	1526
8600	978	1048	1119	1262	1400	1543
8700	989	1060	1132	1277	1416	1561
8800	1001	1073	1145	1292	1433	1579
8900	1012	1085	1158	1306	1449	1597
9000	1023	1097	1171	1321	1465	1615
9100	1035	1109	1184	1336	1482	1633
9200	1046	1121	1197	1350	1498	1651
9300	1058	1134	1210	1365	1514	1669
9400	1069	1146	1223	1380	1530	1687
9500	1080	1158	1236	1395	1547	
9600	1092	1170	1250	1409	1563	
9700	1103	1182	1263	1424	1579	
9800	1114	1195	1276	1439	1596	
9900	1126	1207	1289	1453	1612	
10000	1137	1219	1302	1468		
10100	1149	1231	1315	1483		
10200	1160	1243	1328	1497		
10300	1171	1256	1341	1512		
10400	1183	1268	1354	1527		
10500	1194	1280	1367			
10600	1205	1292	1380			
10700	1217	1304	1393			
10800	1228	1317	1406			
10900	1240	1329	1419			
11000	1251	1341				
11100	1262	1353				
11200	1274	1365				
11300	1285	1378				
11400	1296	1390				
11500	1308					
11600	1319					
11700	1331					
11800	1342					
11900	1353					
12000	1365					

CYLINDER SPEED TABLE

REVOLUTIONS PER MINUTE OF 8 INCH CYLINDER REQUIRED FOR VARIOUS SPINDLE SPEEDS

R. P. M. of Spindle	REVOLUTIONS PER MINUTE OF CYLINDER					
	¾ IN. WHIRL Ratio 9.36	13/16 IN. WHIRL Ratio 8.74	⅞ IN. WHIRL Ratio 8.18	1 IN. WHIRL Ratio 7.26	1⅛ IN. WHIRL Ratio 6.55	1¼ IN. WHIRL Ratio 5.94
3000				413	458	505
3100				426	473	521
3200				440	488	538
3300				454	503	555
3400				468	519	572
3500			427	482	534	589
3600			440	495	549	606
3700			452	509	564	622
3800			464	523	580	639
3900			476	537	595	656
4000		457	489	551	612	673
4100		469	501	565	625	690
4200		480	513	579	642	707
4300		491	526	592	657	723
4400		503	538	606	673	740
4500	480	514	550	620	688	757
4600	491	526	562	634	703	774
4700	502	537	575	647	719	791
4800	512	549	587	661	734	808
4900	523	560	599	675	749	824
5000	534	572	611	689	765	841
5100	544	583	623	702	780	858
5200	555	594	636	716	795	875
5300	566	606	648	730	810	892
5400	576	617	660	744	825	909
5500	587	629	672	758	841	925
5600	598	640	685	771	856	942
5700	608	652	697	785	872	959
5800	619	663	709	799	887	976
5900	630	675	721	813	902	993
6000	641	686	733	826	917	1010
6100	651	697	746	840	933	1026
6200	662	709	758	854	948	1043
6300	673	720	770	868	963	1060
6400	683	732	782	882	979	1077
6500	694	743	795	895	994	1094
6600	705	755	807	909	1009	1111
6700	715	766	819	923	1024	1127
6800	726	778	831	937	1040	1144
6900	737	789	844	950	1055	1161
7000	747	800	856	964	1070	1178
7100	758	812	868	978	1086	1195
7200	769	823	880	992	1101	1212
7300	779	835	892	1006	1116	1228
7400	790	846	905	1019	1131	1245

CYLINDER SPEED TABLE

REVOLUTIONS PER MINUTE OF 8 INCH CYLINDER REQUIRED FOR VARIOUS SPINDLE SPEEDS

R. P. M. of Spindle	REVOLUTIONS PER MINUTE OF CYLINDER					
	¾ IN. WHIRL Ratio 9.36	13/16 IN. WHIRL Ratio 8.74	⅞ IN. WHIRL Ratio 8.18	1 IN. WHIRL Ratio 7.26	1⅛ IN. WHIRL Ratio 6.55	1¼ IN. WHIRL Ratio 5.94
7500	801	858	917	1033	1147	1262
7600	811	869	929	1047	1162	1279
7700	822	881	941	1061	1177	1296
7800	833	892	953	1074	1193	1313
7900	844	903	966	1088	1208	1329
8000	854	915	978	1102	1223	1346
8100	865	926	990	1116	1239	1363
8200	876	938	1002	1129	1254	1380
8300	886	949	1014	1143	1269	1397
8400	897	961	1027	1157	1284	1414
8500	908	972	1039	1171	1300	1430
8600	918	983	1051	1184	1312	1447
8700	929	995	1063	1198	1328	1464
8800	940	1006	1075	1212	1343	1481
8900	950	1018	1088	1225	1358	1498
9000	961	1029	1100	1239	1374	1515
9100	972	1041	1112	1253	1389	1531
9200	982	1052	1124	1267	1404	1548
9300	993	1064	1136	1280	1419	1565
9400	1004	1075	1149	1294	1435	1582
9500	1014	1086	1161	1308	1450	
9600	1025	1098	1173	1322	1465	
9700	1036	1109	1185	1336	1480	
9800	1047	1121	1198	1349	1496	
9900	1057	1132	1210	1363	1511	
10000	1068	1144	1222	1377		
10100	1079	1155	1234	1391		
10200	1089	1167	1246	1404		
10300	1100	1178	1259	1418		
10400	1111	1189	1271	1432		
10500	1121	1201	1283			
10600	1132	1212	1295			
10700	1143	1224	1308			
10800	1153	1235	1320			
10900	1164	1247	1332			
11000	1175	1258				
11100	1185	1270				
11200	1196	1281				
11300	1207	1292				
11400	1217	1304				
11500	1228					
11600	1239					
11700	1250					
11800	1260					
11900	1271					
12000	1282					

CYLINDER SPEED TABLE

REVOLUTIONS PER MINUTE OF 8½ INCH CYLINDER REQUIRED FOR VARIOUS SPINDLE SPEEDS

R. P. M. of Spindle	REVOLUTIONS PER MINUTE OF CYLINDER					
	¾ IN. WHIRL Ratio 9.94	13/16 IN. WHIRL Ratio 9.27	⅞ IN. WHIRL Ratio 8.69	1 IN. WHIRL Ratio 7.71	1⅛ IN. WHIRL Ratio 6.94	1¼ IN. WHIRL Ratio 6.31
3000					432	475
3100					446	491
3200					461	507
3300					475	522
3400					489	538
3500				453	504	554
3600				466	518	570
3700				479	533	586
3800				492	547	602
3900				505	561	618
4000			460	518	576	633
4100			471	531	590	649
4200			483	544	605	665
4300			494	557	619	681
4400			506	570	634	697
4500		485	517	583	648	713
4600		496	529	596	662	729
4700		507	540	609	677	744
4800		517	552	622	691	760
4900		528	563	635	706	776
5000	503	539	575	648	720	792
5100	513	550	586	661	734	808
5200	523	560	598	674	749	824
5300	533	571	609	687	763	839
5400	543	582	621	700	778	855
5500	553	592	632	713	792	871
5600	563	604	644	726	806	887
5700	573	614	655	739	821	903
5800	583	625	667	752	835	919
5900	593	636	678	765	850	935
6000	603	647	690	778	864	950
6100	613	658	701	791	878	966
6200	623	668	713	804	893	982
6300	633	679	724	817	907	998
6400	643	690	736	830	922	1014
6500	653	701	747	843	936	1030
6600	663	711	759	856	951	1045
6700	674	722	771	869	965	1061
6800	684	733	782	881	979	1077
6900	694	744	794	894	994	1093
7000	704	755	805	907	1008	1109
7100	714	765	817	920	1023	1125
7200	724	776	828	933	1037	1141
7300	734	787	840	946	1051	1156
7400	744	798	851	959	1066	1172

CYLINDER SPEED TABLE

REVOLUTIONS PER MINUTE OF 8½ INCH CYLINDER REQUIRED FOR VARIOUS SPINDLE SPEEDS

R. P. M. of Spindle	REVOLUTIONS PER MINUTE OF CYLINDER					
	¾ IN. WHIRL Ratio 9.94	13/16 IN. WHIRL Ratio 9.27	⅞ IN. WHIRL Ratio 8.69	1 IN. WHIRL Ratio 7.71	1⅛ IN. WHIRL Ratio 6.94	1¼ IN. WHIRL Ratio 6.31
7500	754	809	863	972	1080	1188
7600	764	819	874	985	1095	1204
7700	774	830	886	998	1109	1220
7800	784	841	897	1011	1123	1236
7900	794	852	909	1024	1138	1251
8000	804	862	920	1037	1152	1267
8100	814	873	932	1050	1167	1283
8200	824	884	943	1063	1181	1299
8300	835	895	955	1076	1195	1315
8400	845	906	966	1089	1210	1331
8500	855	916	978	1102	1224	1347
8600	865	927	989	1115	1239	1362
8700	875	938	1001	1128	1253	1378
8800	885	949	1012	1141	1268	1394
8900	895	960	1024	1154	1282	1410
9000	905	970	1035	1167	1296	1426
9100	915	981	1047	1180	1311	1442
9200	925	992	1058	1193	1325	1458
9300	935	1003	1070	1206	1340	1473
9400	945	1014	1081	1219	1354	1489
9500	955	1024	1093	1232	1368	
9600	965	1035	1104	1245	1383	
9700	975	1046	1116	1258	1397	
9800	985	1057	1127	1271	1412	
9900	995	1067	1139	1284	1426	
10000	1006	1078	1150	1297		
10100	1016	1089	1162	1309		
10200	1026	1100	1173	1322		
10300	1036	1111	1185	1335		
10400	1046	1121	1196	1348		
10500	1056	1132	1208			
10600	1066	1143	1219			
10700	1076	1154	1231			
10800	1086	1165	1242			
10900	1096	1175	1254			
11000	1106	1186				
11100	1116	1197				
11200	1126	1208				
11300	1136	1218				
11400	1146	1229				
11500	1156					
11600	1167					
11700	1177					
11800	1187					
11900	1197					
12000	1206					

CYLINDER SPEED TABLE

REVOLUTIONS PER MINUTE OF 9 INCH CYLINDER REQUIRED FOR VARIOUS SPINDLE SPEEDS

R. P. M. of Spindle	REVOLUTIONS PER MINUTE OF CYLINDER					
	¾ IN. WHIRL Ratio 10.53	13/16 IN. WHIRL Ratio 9.81	⅞ IN. WHIRL Ratio 9.19	1 IN. WHIRL Ratio 8.16	1⅛ IN. WHIRL Ratio 7.35	1¼ IN. WHIRL Ratio 6.68
3000					408	449
3100					421	464
3200					435	479
3300					448	494
3400					462	508
3500				428	476	523
3600				441	489	538
3700				453	503	553
3800				465	517	568
3900				477	530	583
4000			435	490	544	598
4100			446	502	557	613
4200			457	514	571	628
4300			467	526	585	643
4400			478	539	598	658
4500		458	489	551	612	673
4600		468	500	563	625	688
4700		479	511	575	639	703
4800		489	522	588	653	718
4900		499	533	600	666	733
5000	474	509	544	612	680	748
5100	484	519	554	625	693	763
5200	493	530	565	637	707	778
5300	503	540	576	649	721	793
5400	512	550	587	661	734	808
5500	522	560	598	674	748	823
5600	531	570	609	686	761	838
5700	541	581	620	698	775	853
5800	550	591	631	710	789	868
5900	560	601	642	723	802	883
6000	569	611	652	735	816	898
6100	579	621	663	747	829	913
6200	588	632	674	759	843	928
6300	598	642	685	772	857	943
6400	607	652	696	784	870	958
6500	617	662	707	796	884	973
6600	626	672	718	808	897	988
6700	636	682	729	821	911	1002
6800	645	693	739	833	925	1017
6900	655	703	750	845	938	1032
7000	664	713	761	857	952	1047
7100	674	723	772	870	965	1062
7200	683	733	783	882	979	1077
7300	693	744	794	894	993	1092
7400	702	754	805	906	1006	1107

CYLINDER SPEED TABLE

REVOLUTIONS PER MINUTE OF 9 INCH CYLINDER REQUIRED FOR VARIOUS SPINDLE SPEEDS

R. P. M. of Spindle	REVOLUTIONS PER MINUTE OF CYLINDER					
	¾ IN. WHIRL Ratio 10.53	13/16 IN. WHIRL Ratio 9.81	⅞ IN. WHIRL Ratio 9.19	1 IN. WHIRL Ratio 8.16	1⅛ IN. WHIRL Ratio 7.35	1¼ IN. WHIRL Ratio 6.68
7500	712	764	816	919	1020	1122
7600	721	774	826	931	1034	1137
7700	731	784	837	943	1047	1152
7800	740	795	848	955	1061	1167
7900	750	805	859	968	1074	1182
8000	759	815	870	980	1088	1197
8100	769	825	881	992	1102	1212
8200	778	835	892	1004	1115	1227
8300	788	846	903	1017	1129	1242
8400	797	856	914	1029	1142	1257
8500	807	866	924	1041	1156	1272
8600	816	876	935	1053	1170	1287
8700	826	886	946	1066	1183	1302
8800	835	897	957	1078	1197	1317
8900	845	907	968	1090	1210	1332
9000	854	917	979	1102	1224	1347
9100	864	927	990	1115	1238	1362
9200	873	937	1001	1127	1251	1377
9300	883	948	1011	1139	1265	1392
9400	892	958	1022	1151	1278	1407
9500	902	968	1033	1164	1292	
9600	911	978	1044	1176	1306	
9700	921	988	1055	1188	1319	
9800	930	998	1066	1200	1333	
9900	940	1009	1077	1213	1346	
10000	949	1019	1088	1225		
10100	959	1029	1099	1237		
10200	968	1039	1109	1250		
10300	978	1049	1120	1262		
10400	987	1060	1131	1274		
10500	997	1070	1142			
10600	1006	1080	1153			
10700	1016	1090	1164			
10800	1025	1100	1175			
10900	1035	1111	1186			
11000	1044	1121				
11100	1054	1131				
11200	1063	1141				
11300	1073	1151				
11400	1082	1162				
11500	1092					
11600	1101					
11700	1111					
11800	1120					
11900	1130					
12000	1139					

CYLINDER SPEED TABLE

REVOLUTIONS PER MINUTE OF 9½ INCH CYLINDER REQUIRED FOR VARIOUS SPINDLE SPEEDS

R. P. M. of Spindle	REVOLUTIONS PER MINUTE OF CYLINDER					
	¾ IN. WHIRL Ratio 11.19	13/16 IN. WHIRL Ratio 10.42	⅞ IN. WHIRL Ratio 9.75	1 IN. WHIRL Ratio 8.64	1⅛ IN. WHIRL Ratio 7.76	1¼ IN. WHIRL Ratio 7.06
3000					386	424
3100					399	438
3200					412	453
3300					425	467
3400					438	481
3500				405	451	495
3600				416	463	509
3700				428	476	524
3800				439	489	538
3900				451	502	552
4000			410	462	515	566
4100			420	474	528	580
4200			430	486	541	594
4300			441	497	554	609
4400			451	509	567	623
4500		431	461	520	579	637
4600		441	471	532	592	651
4700		451	482	543	605	665
4800		460	492	555	618	679
4900		470	502	567	631	694
5000	446	479	512	578	644	708
5100	455	489	523	590	657	722
5200	464	499	533	601	670	736
5300	473	508	543	613	682	750
5400	482	518	553	625	695	764
5500	491	527	564	636	708	779
5600	500	537	574	648	721	793
5700	509	547	584	659	734	807
5800	518	556	594	671	747	821
5900	527	566	605	682	760	835
6000	536	575	615	694	773	849
6100	545	585	625	706	786	864
6200	554	595	635	717	798	878
6300	563	604	646	729	811	892
6400	571	614	656	740	824	906
6500	580	623	666	752	837	920
6600	589	633	676	763	850	934
6700	598	642	687	775	863	949
6800	607	652	697	787	876	963
6900	616	662	707	798	889	977
7000	625	671	717	810	902	991
7100	634	681	728	821	914	1005
7200	643	690	738	833	927	1019
7300	652	700	748	844	940	1033
7400	661	710	758	856	953	1048

CYLINDER SPEED TABLE

REVOLUTIONS PER MINUTE OF 9½ INCH CYLINDER REQUIRED FOR VARIOUS SPINDLE SPEEDS

R. P. M. of Spindle	REVOLUTIONS PER MINUTE OF CYLINDER					
	¾ IN. WHIRL Ratio 11.19	13/16 IN. WHIRL Ratio 10.42	⅞ IN. WHIRL Ratio 9.75	1 IN. WHIRL Ratio 8.64	1⅛ IN. WHIRL Ratio 7.76	1¼ IN. WHIRL Ratio 7.06
7500	670	719	769	868	966	1062
7600	679	729	779	879	979	1076
7700	688	738	789	891	992	1090
7800	697	748	800	902	1005	1104
7900	705	758	810	914	1018	1118
8000	714	767	820	925	1030	1133
8100	723	777	830	937	1043	1147
8200	732	786	841	949	1056	1161
8300	741	796	851	960	1069	1175
8400	750	806	861	972	1082	1189
8500	759	815	871	983	1095	1203
8600	768	825	882	995	1108	1218
8700	777	834	892	1006	1121	1232
8800	786	844	902	1018	1134	1246
8900	795	854	912	1030	1146	1260
9000	804	863	923	1041	1159	1274
9100	813	873	933	1053	1172	1288
9200	822	882	943	1064	1185	1303
9300	831	892	953	1076	1198	1317
9400	840	902	964	1087	1211	1331
9500	848	911	974	1099	1224	
9600	857	921	984	1111	1237	
9700	866	930	994	1122	1250	
9800	875	940	1005	1134	1262	
9900	884	950	1015	1145	1275	
10000	893	959	1025	1157		
10100	902	969	1035	1168		
10200	911	978	1046	1180		
10300	920	988	1056	1192		
10400	929	998	1066	1203		
10500	938	1007	1076			
10600	947	1017	1087			
10700	956	1026	1097			
10800	965	1036	1107			
10900	974	1046	1117			
11000	983	1055				
11100	991	1065				
11200	1000	1074				
11300	1009	1084				
11400	1018	1094				
11500	1027					
11600	1036					
11700	1045					
11800	1054					
11900	1063					
12000	1072					

CYLINDER SPEED TABLE

REVOLUTIONS PER MINUTE OF 10 INCH CYLINDER REQUIRED FOR VARIOUS SPINDLE SPEEDS

R. P. M. of Spindle	REVOLUTIONS PER MINUTE OF CYLINDER					
	¾ IN. WHIRL Ratio 11.75	13/16 IN. WHIRL Ratio 10.97	⅞ IN. WHIRL Ratio 10.23	1 IN. WHIRL Ratio 9.08	1⅛ IN. WHIRL Ratio 8.15	1¼ IN. WHIRL Ratio 7.42
3000					368	404
3100					380	417
3200					392	431
3300					404	444
3400					417	458
3500				385	429	471
3600				396	441	485
3700				407	453	498
3800				418	466	512
3900				429	478	525
4000			391	440	490	539
4100			400	451	503	552
4200			410	462	515	566
4300			420	473	527	579
4400			430	484	539	592
4500		410	439	495	552	606
4600		419	449	506	564	619
4700		428	459	517	576	633
4800		437	469	528	588	646
4900		446	478	539	601	660
5000	425	455	488	550	613	673
5100	434	464	498	561	625	687
5200	442	474	508	572	638	700
5300	451	483	518	583	650	714
5400	459	492	527	594	662	727
5500	468	501	537	605	674	741
5600	476	510	547	616	687	754
5700	485	519	557	627	699	768
5800	493	528	566	638	711	781
5900	502	537	576	649	723	795
6000	510	546	586	660	736	808
6100	519	556	596	671	748	822
6200	527	565	606	682	760	835
6300	536	574	615	693	773	849
6400	544	583	625	704	785	862
6500	553	592	635	715	797	876
6600	561	601	645	726	809	889
6700	570	610	654	737	822	902
6800	578	619	664	748	834	916
6900	587	628	674	759	846	929
7000	595	638	684	770	858	943
7100	604	647	694	781	871	956
7200	612	656	703	792	883	970
7300	621	665	713	803	895	983
7400	629	674	723	814	907	997

CYLINDER SPEED TABLE

REVOLUTIONS PER MINUTE OF 10 INCH CYLINDER REQUIRED FOR VARIOUS SPINDLE SPEEDS

R. P. M. of Spindle	REVOLUTIONS PER MINUTE OF CYLINDER					
	¾ IN. WHIRL Ratio 11.75	13/16 IN. WHIRL Ratio 10.97	⅞ IN. WHIRL Ratio 10.23	1 IN. WHIRL Ratio 9.08	1⅛ IN. WHIRL Ratio 8.15	1¼ IN. WHIRL Ratio 7.42
7500	638	683	733	825	920	1010
7600	646	692	742	837	932	1024
7700	655	701	752	848	944	1037
7800	663	711	762	859	957	1051
7900	672	720	772	870	969	1064
8000	680	729	782	881	981	1078
8100	689	738	791	892	993	1091
8200	697	747	801	903	1006	1105
8300	706	756	811	914	1018	1118
8400	714	765	821	925	1030	1132
8500	723	774	830	936	1042	1145
8600	731	783	840	947	1055	1159
8700	740	793	850	958	1067	1172
8800	748	802	860	969	1079	1185
8900	757	811	869	980	1092	1199
9000	765	820	879	991	1104	1212
9100	774	829	889	1002	1116	1226
9200	782	838	899	1013	1128	1239
9300	791	847	909	1024	1141	1253
9400	800	856	918	1035	1153	1266
9500	808	865	928	1046	1165	
9600	817	875	938	1057	1177	
9700	825	884	948	1068	1190	
9800	834	893	957	1079	1202	
9900	842	902	967	1090	1214	
10000	851	911	977	1101		
10100	859	920	987	1112		
10200	868	929	997	1123		
10300	876	938	1006	1134		
10400	885	948	1016	1145		
10500	893	957	1026			
10600	902	966	1036			
10700	910	975	1045			
10800	919	984	1055			
10900	927	993	1065			
11000	936	1002				
11100	944	1011				
11200	953	1020				
11300	961	1030				
11400	970	1039				
11500	978					
11600	987					
11700	995					
11800	1004					
11900	1012					
12000	1021					

TABLE OF RATIOS

The whirl of our tape drive spindles is made slightly larger than the nominal diameter as given in the table on the opposite page. By doing this the ratios of the cylinder and whirl are practically the same for both band and tape drive; consequently our table of ratios will serve for either band or tape driven frames. These ratios were obtained by actual test in our own shop. The thickness of the tape and the size of the band used will cause the ratios to vary.

Formulas for figuring the ratio:

$$\frac{\text{DIAM. OF CYL. PLUS THICKNESS OF TAPE}}{\text{ACTUAL DIAM. OF WHIRL PLUS THICKNESS OF TAPE}} = \text{RATIO, For Tape Drive.}$$

$$\frac{\text{DIAM. OF CYL. PLUS THICKNESS OF BAND}}{\text{DIAM. OF WHIRL PLUS 1.3 X THICKNESS OF BAND}} = \text{RATIO, For Band Drive.}$$

No allowance for slippage, etc., is given in the above formulas so that the figured ratio can be only approximate, although, in most cases, near enough for all practical purposes.

TABLE OF RATIOS

Nominal Diameter of Spindle Whirl	NUMBER OF TURNS OF SPINDLE TO ONE TURN OF CYLINDER								
	Cylinder 6 Inches Diameter	Cylinder 6 ½ Inches Diameter	Cylinder 7 Inches Diameter	Cylinder 7 ½ Inches Diameter	Cylinder 8 Inches Diameter	Cylinder 8 ½ Inches Diameter	Cylinder 9 Inches Diameter	Cylinder 9 ½ Inches Diameter	Cylinder 10 Inches Diameter
¾ ″	7.03	7.61	8.19	8.79	9.36	9.94	10.53	11.19	11.75
13/16 ″	6.56	7.10	7.65	8.20	8.74	9.27	9.81	10.42	10.97
⅞ ″	6.15	6.65	7.17	7.68	8.18	8.69	9.19	9.75	10.23
1 ″	5.46	5.91	6.36	6.81	7.26	7.71	8.16	8.64	9.08
1 ⅛ ″	4.91	5.32	5.73	6.14	6.55	6.94	7.35	7.76	8.15
1 ¼ ″	4.46	4.83	5.20	5.57	5.94	6.31	6.68	7.06	7.42

THE ABOVE RATIOS WERE OBTAINED BY ACTUAL TEST

COTTON YARDAGE TABLE

Number of Yarn	Yards per Lb.	Number of Yarn	Yards per Lb.	Number of Yarn	Yards per Lb.	Number of Yarn	Yards per Lb.
1.	0,840	8.	6,720	15.	12,600	22.	18,480
.10	0,924	.10	6,804	.10	12,684	.10	18,564
.20	1,008	.20	6,888	.20	12,768	.20	18,648
.30	1,092	.30	6,972	.30	12,852	.30	18,732
.40	1,176	.40	7,056	.40	12,936	.40	18,816
.50	1,260	.50	7,140	.50	13,020	.50	18,900
.60	1,344	.60	7,224	.60	13,104	.60	18,984
.70	1,428	.70	7,308	.70	13,188	.70	19,068
.80	1,512	.80	7,393	.80	13,272	.80	19,152
.90	1,596	.90	7,476	.90	13,356	.90	19,236
2.	1,680	9.	7,560	16.	13,440	23.	19,320
.10	1,764	.10	7,644	.10	13,524	.10	19,404
.20	1,848	.20	7,728	.20	13,608	.20	19,488
.30	1,932	.30	7,812	.30	13,692	.30	19,572
.40	2,016	.40	7,896	.40	13,766	.40	19,656
.50	2,100	.50	7,980	.50	13,860	.50	19,740
.60	2,184	.60	8,064	.60	13,944	.60	19,824
.70	2,268	.70	8,148	.70	14,028	.70	19,908
.80	2,352	.80	8,232	.80	14,112	.80	19,992
.90	2,436	.90	8,316	.90	14,196	.90	20,076
3.	2,520	10.	8,400	17.	14,280	24.	20,160
.10	2,604	.10	8,484	.10	14,364	.10	20,244
.20	2,688	.20	8,568	.20	14,448	.20	20,328
.30	2,772	.30	8,652	.30	14,532	.30	20,412
.40	2,865	.40	8,736	.40	14,616	.40	20,496
.50	2,940	.50	8,820	.50	14,700	.50	20,580
.60	3,024	.60	8,904	.60	14,784	.60	20,664
.70	3,108	.70	8,988	.70	14,868	.70	20,748
.80	3,192	.80	9,072	.80	14,952	.80	20,832
.90	3,276	.90	9,156	.90	15,036	.90	20,916
4.	3,360	11.	9,240	18.	15,120	25.	21,000
.10	3,444	.10	9,324	.10	15,204	.10	21,084
.20	3,528	.20	9,408	.20	15,288	.20	21,168
.30	3,612	.30	9,492	.30	15,372	.30	21,252
.40	3,696	.40	9,576	.40	15,456	.40	21,336
.50	3,780	.50	9,660	.50	15,540	.50	21,420
.60	3,864	.60	9,744	.60	15,624	.60	21,504
.70	3,948	.70	9,828	.70	15,708	.70	21,588
.80	4,032	.80	9,912	.80	15,792	.80	21,672
.90	4,116	.90	9,996	.90	15,876	.90	21,756
5.	4,200	12.	10,080	19.	15,960	26.	21,840
.10	4,284	.10	10,164	.10	16,044	.10	21,924
.20	4,368	.20	10,248	.20	16,128	.20	22,008
.30	4,452	.30	10,332	.30	16,212	.30	22,092
.40	4,536	.40	10,416	.40	16,296	.40	22,176
.50	4,620	.50	10,500	.50	16,380	.50	22,260
.60	4,704	.60	10,584	.60	16,464	.60	22,344
.70	4,788	.70	10,668	.70	16,548	.70	22,428
.80	4,872	.80	10,752	.80	16,632	.80	22,512
.90	4,956	.90	10,836	.90	16,716	.90	22,596
6.	5,040	13.	10,920	20.	16,800	27.	22,680
.10	5,124	.10	11,004	.10	16,884	.10	22,764
.20	5,208	.20	11,088	.20	16,968	.20	22,848
.30	5,292	.30	11,172	.30	17,052	.30	22,932
.40	5,376	.40	11,256	.40	17,136	.40	23,016
.50	5,460	.50	11,340	.50	17,220	.50	23,100
.60	5,544	.60	11,424	.60	17,304	.60	23,184
.70	5,628	.70	11,508	.70	17,388	.70	23,268
.80	5,712	.80	11,592	.80	17,472	.80	23,352
.90	5,796	.90	11,676	.90	17,556	.90	23,436
7.	5,880	14.	11,760	21.	17,640	28.	23,520
.10	5,964	.10	11,844	.10	17,724	.10	23,604
.20	6,048	.20	11,928	.20	17,808	.20	23,688
.30	6,132	.30	12,012	.30	17,892	.30	23,772
.40	6,216	.40	12,096	.40	17,976	.40	23,856
.50	6,300	.50	12,180	.50	18,060	.50	23,940
.60	6,384	.60	12,264	.60	18,144	.60	24,024
.70	6,468	.70	12,348	.70	18,228	.70	24,108
.80	6,552	.80	12,432	.80	18,312	.80	24,192
.90	6,636	.90	12,516	.90	18,396	.90	24,276

COTTON YARDAGE TABLE

Number of Yarn	Yards per Lb.	Number of Yarn	Yards per Lb.	Number of Yarn	Yards per Lb.	Number of Yarn	Yards per Lb.
29.	24,360	**43.**	36,120	**66.**	55,440	**131.**	110,040
.20	24,528	.20	36,288	.50	55,860	**132.**	110,880
.40	24,696	.40	36,456	**67.**	56,280	**133.**	111,720
.60	24,864	.60	36,624	.50	56,700	**134.**	112,560
.80	25,032	.80	36,792	**68.**	57,120	**135.**	113,400
30.	25,200	**44.**	36,960	.50	57,540	**136.**	114,240
.20	25,368	.20	37,128	**69.**	57,960	**137.**	115,080
.40	25,536	.40	37,296	.50	58,380	**138.**	115,920
.60	25,704	.60	37,464	**70.**	58,800	**139.**	116,760
.80	25,872	.80	37,632	.50	59,220	**140.**	117,600
31.	26,040	**45.**	37,800	**71.**	59,640	**141.**	118,440
.20	26,208	.20	37,968	**72.**	60,480	**142.**	119,280
.40	26,376	.40	38,136	**73.**	61,320	**143.**	120,120
.60	26,544	.60	38,304	**74.**	62,160	**144.**	120,960
.80	26,712	.80	38,472	**75.**	63,000	**145.**	121,800
32.	26,880	**46.**	38,640	**76.**	63,840	**146.**	122,640
.20	27,048	.20	38,808	**77.**	64,680	**147.**	123,480
.40	27,216	.40	38,976	**78.**	65,520	**148.**	124,320
.60	27,384	.60	39,144	**79.**	66,360	**149.**	125,160
.80	27,532	.80	39,312	**80.**	67,200	**150.**	126,000
33.	27,720	**47.**	39,480	**81.**	68,040	**151.**	126,840
.20	27,888	.20	39,648	**82.**	68,880	**152.**	127,680
.40	28,056	.40	39,816	**83.**	69,720	**153.**	128,520
.60	28,224	.60	39,984	**84.**	70,560	**154.**	129,360
.80	28,392	.80	40,152	**85.**	71,400	**155.**	130,200
34.	28,560	**48.**	40,320	**86.**	72,240	**156.**	131,040
.20	28,728	.20	40,488	**87.**	73,080	**157.**	131,880
.40	28,896	.40	40,656	**88.**	73,920	**158.**	132,720
.60	29,064	.60	40,824	**89.**	74,760	**159.**	133,560
.80	29,232	.80	40,992	**90.**	75,600	**160.**	134,400
35.	29,400	**49.**	41,160	**91.**	76,440	**161.**	135,240
.20	29,568	.20	41,328	**92.**	77,280	**162.**	136,080
.40	29,736	.40	41,496	**93.**	78,120	**163.**	136,920
.60	29,904	.60	41,664	**94.**	78,960	**164.**	137,760
.80	30,072	.80	41,832	**95.**	79,800	**165.**	138,600
36.	30,240	**50.**	42,000	**96.**	80,640	**166.**	139,440
.20	30,408	.20	42,168	**97.**	81,480	**167.**	140,280
.40	30,576	.40	42,336	**98.**	82,320	**168.**	141,120
.60	30,744	.60	42,504	**99.**	83,160	**169.**	141,960
.80	30,912	.80	42,672	**100.**	84,000	**170.**	142,800
37.	31,080	**51.**	42,840	**101.**	84,840	**171.**	143,640
.20	31,248	.50	43,260	**102.**	85,680	**172.**	144,480
.40	31,416	**52.**	43,680	**103.**	86,520	**173.**	145,320
.60	31,584	.50	44,100	**104.**	87,360	**174.**	146,160
.80	31,752	**53.**	44,520	**105.**	88,200	**175.**	147,000
38.	31,920	.50	44,940	**106.**	89,040	**176.**	147,840
.20	32,088	**54.**	45,360	**107.**	89,880	**177.**	148,680
.40	32,256	.50	45,780	**108.**	90,720	**178.**	149,520
.60	32,424	**55.**	46,200	**109.**	91,650	**179.**	150,360
.80	32,592	.50	46,620	**110.**	92,400	**180.**	151,200
39.	32,760	**56.**	47,040	**111.**	93,240	**181.**	152,040
.20	32,928	.50	47,460	**112.**	94,080	**182.**	152,880
.40	33,096	**57.**	47,880	**113.**	94,920	**183.**	153,720
.60	33,264	.50	48,300	**114.**	95,760	**184.**	154,560
.80	33,432	**58.**	48,720	**115.**	96,600	**185.**	155,400
40.	33,600	.50	49,140	**116.**	97,440	**186.**	156,240
.20	33,768	**59.**	49,560	**117.**	98,280	**187.**	157,080
.40	33,936	.50	49,980	**118.**	99,120	**188.**	157,920
.60	34,104	**60.**	50,400	**119.**	99,960	**189.**	158,760
.80	34,272	.50	50,820	**120.**	100,800	**190.**	159,600
41.	34,440	**61.**	51,240	**121.**	101,640	**191.**	160,440
.20	34,608	.50	51,660	**122.**	102,480	**192.**	161,280
.40	34,776	**62.**	52,080	**123.**	103,320	**193.**	162,120
.60	34,944	.50	52,500	**124.**	104,160	**194.**	162,960
.80	35,112	**63.**	52,920	**125.**	105,000	**195.**	163,800
42.	35,280	.50	53,340	**126.**	105,840	**196.**	164,640
.20	35,448	**64.**	53,760	**127.**	106,680	**197.**	165,480
.40	35,616	.50	54,180	**128.**	107,520	**198.**	166,320
.60	35,784	**65.**	54,600	**129.**	108,360	**199.**	167,160
.80	35,952	.50	55,020	**130.**	109,200	**200.**	168,000

ROVING TABLE

Weight in Grains of 12 Yards	Hank Roving	Weight in Grains of 12 Yards	Hank Roving	Weight in Grains of 12 Yards	Hank Roving	Weight in Grains of 12 Yards	Hank Roving	Weight in Grains of 12 Yards	Hank Roving
2.	50.00	**9.**	11.11	**16.**	6.25	**23.**	4.35	**30.**	3.33
.1	47.62	.1	10.99	.1	6.21	.1	4.33	.1	3.32
.2	45.45	.2	10.87	.2	6.17	.2	4.31	.2	3.31
.3	43.48	.3	10.75	.3	6.13	.3	4.29	.3	3.30
.4	41.67	.4	10.64	.4	6.10	.4	4.27	.4	3.29
.5	40.00	.5	10.53	.5	6.06	.5	4.26	.5	3.28
.6	38.46	.6	10.42	.6	6.02	.6	4.24	.6	3.27
.7	37.04	.7	10.31	.7	5.99	.7	4.22	.7	3.26
.8	35.71	.8	10.20	.8	5.95	.8	4.20	.8	3.25
.9	34.48	.9	10.10	.9	5.92	.9	4.18	.9	3.24
3.	33.33	**10.**	10.00	**17.**	5.88	**24.**	4.17	**31.**	3.23
.1	32.26	.1	9.90	.1	5.85	.1	4.15	.1	3.22
.2	31.25	.2	9.80	.2	5.81	.2	4.13	.2	3.21
.3	30.30	.3	9.71	.3	5.78	.3	4.12	.3	3.19
.4	29.41	.4	9.62	.4	5.75	.4	4.10	.4	3.18
.5	28.57	.5	9.52	.5	5.71	.5	4.08	.5	3.17
.6	27.78	.6	9.43	.6	5.68	.6	4.07	.6	3.16
.7	27.03	.7	9.35	.7	5.65	.7	4.05	.7	3.15
.8	26.32	.8	9.26	.8	5.62	.8	4.03	.8	3.14
.9	25.64	.9	9.17	.9	5.59	.9	4.02	.9	3.13
4.	25.00	**11.**	9.09	**18.**	5.56	**25.**	4.00	**32.**	3.12
.1	24.39	.1	9.01	.1	5.52	.1	3.98	.1	3.12
.2	23.81	.2	8.93	.2	5.49	.2	3.97	.2	3.11
.3	23.26	.3	8.85	.3	5.46	.3	3.95	.3	3.10
.4	22.73	.4	8.77	.4	5.43	.4	3.94	.4	3.09
.5	22.22	.5	8.70	.5	5.41	.5	3.92	.5	3.08
.6	21.74	.6	8.62	.6	5.38	.6	3.91	.6	3.07
.7	21.28	.7	8.55	.7	5.35	.7	3.89	.7	3.06
.8	20.83	.8	8.47	.8	5.32	.8	3.88	.8	3.05
.9	20.41	.9	8.40	.9	5.29	.9	3.86	.9	3.04
5.	20.00	**12.**	8.33	**19.**	5.26	**26.**	3.85	**33.**	3.03
.1	19.61	.1	8.26	.1	5.24	.1	3.83	.1	3.02
.2	19.23	.2	8.20	.2	5.21	.2	3.82	.2	3.01
.3	18.87	.3	8.13	.3	5.18	.3	3.80	.3	3.00
.4	18.52	.4	8.06	.4	5.15	.4	3.79	.4	2.99
.5	18.18	.5	8.00	.5	5.13	.5	3.77	.5	2.99
.6	17.86	.6	7.94	.6	5.10	.6	3.76	.6	2.98
.7	17.54	.7	7.87	.7	5.08	.7	3.75	.7	2.97
.8	17.24	.8	7.81	.8	5.05	.8	3.73	.8	2.96
.9	16.95	.9	7.75	.9	5.03	.9	3.72	.9	2.95
6.	16.67	**13.**	7.69	**20.**	5.00	**27.**	3.70	**34.**	2.94
.1	16.39	.1	7.63	.1	4.98	.1	3.69	.1	2.93
.2	16.13	.2	7.58	.2	4.95	.2	3.68	.2	2.92
.3	15.87	.3	7.52	.3	4.93	.3	3.66	.3	2.92
.4	15.62	.4	7.46	.4	4.90	.4	3.65	.4	2.91
.5	15.38	.5	7.41	.5	4.88	.5	3.64	.5	2.90
.6	15.15	.6	7.35	.6	4.85	.6	3.62	.6	2.89
.7	14.93	.7	7.30	.7	4.83	.7	3.61	.7	2.88
.8	14.71	.8	7.25	.8	4.81	.8	3.60	.8	2.87
.9	14.49	.9	7.19	.9	4.78	.9	3.58	.9	2.87
7.	14.29	**14.**	7.14	**21.**	4.76	**28.**	3.57	**35.**	2.86
.1	14.08	.1	7.09	.1	4.74	.1	3.56	.1	2.85
.2	13.89	.2	7.04	.2	4.72	.2	3.55	.2	2.84
.3	13.70	.3	6.99	.3	4.69	.3	3.53	.3	2.83
.4	13.51	.4	6.94	.4	4.67	.4	3.52	.4	2.82
.5	13.33	.5	6.90	.5	4.65	.5	3.51	.5	2.82
.6	13.16	.6	6.85	.6	4.63	.6	3.50	.6	2.81
.7	12.99	.7	6.80	.7	4.61	.7	3.49	.7	2.80
.8	12.82	.8	6.76	.8	4.59	.8	3.47	.8	2.79
.9	12.66	.9	6.71	.9	4.57	.9	3.46	.9	2.79
8.	12.50	**15.**	6.67	**22.**	4.55	**29.**	3.45	**36.**	2.78
.1	12.35	.1	6.62	.1	4.52	.1	3.44	.1	2.77
.2	12.20	.2	6.58	.2	4.50	.2	3.42	.2	2.76
.3	12.05	.3	6.54	.3	4.48	.3	3.41	.3	2.75
.4	11.90	.4	6.49	.4	4.46	.4	3.40	.4	2.75
.5	11.76	.5	6.45	.5	4.44	.5	3.39	.5	2.74
.6	11.63	.6	6.41	.6	4.42	.6	3.38	.6	2.73
.7	11.49	.7	6.37	.7	4.41	.7	3.37	.7	2.72
.8	11.36	.8	6.33	.8	4.39	.8	3.36	.8	2.72
.9	11.24	.9	6.29	.9	4.37	.9	3.34	.9	2.71

ROVING TABLE—(*Continued*)

Weight in Grains of 12 Yards	Hank Roving	Weight in Grains of 12 Yards	Hank Roving	Weight in Grains of 12 Yards	Hank Roving	Weight in Grains of 12 Yards	Hank Roving	Weight in Grains of 12 Yards	Hank Roving
37.	2.70	**48.**	2.08	**65.**	1.54	**100.**	1.00	**190.**	.53
.1	2.70	.2	2.07	.5	1.53	101.	.99	192.	.52
.2	2.69	.4	2.07	66.	1.52	102.	.98	194.	.52
.3	2.68	.6	2.06	.5	1.50	103.	.97	196.	.51
.4	2.67	.8	2.05	67.	1.49	104.	.96	198.	.51
.5	2.67	49.	2.04	.5	1.48	105.	.95	200.	.50
.6	2.66	.2	2.03	68.	1.47	106.	.94	202.	.50
.7	2.65	.4	2.02	.5	1.46	107.	.93	204.	.49
.8	2.65	.6	2.02	69.	1.45	108.	.93	206.	.49
.9	2.64	.8	2.01	.5	1.44	109.	.92	208.	.48
38.	2.63	**50.**	2.00	**70.**	1.43	**110.**	.91	**210.**	.48
.1	2.62	.2	1.99	.5	1.42	111.	.90	212.	.47
.2	2.62	.4	1.98	71.	1.41	112.	.89	214.	.47
.3	2.61	.6	1.98	.5	1.40	113.	.88	216.	.46
.4	2.60	.8	1.97	72.	1.39	114.	.88	218.	.46
.5	2.60	51.	1.96	.5	1.38	115.	.87	220.	.45
.6	2.59	.2	1.95	73.	1.37	116.	.86	222.	.45
.7	2.58	.4	1.95	.5	1.36	117.	.85	224.	.45
.8	2.58	.6	1.94	74.	1.35	118.	.85	226.	.44
.9	2.57	.8	1.93	.5	1.34	119.	.84	228.	.44
39.	2.56	**52.**	1.92	**75.**	1.33	**120.**	.83	**230.**	.43
.1	2.56	.2	1.92	.5	1.32	121.	.83	235.	.43
.2	2.55	.4	1.91	76.	1.32	122.	.82	240.	.42
.3	2.54	.6	1.90	.5	1.31	123.	.81	245.	.41
.4	2.54	.8	1.89	77.	1.30	124.	.81	250.	.40
.5	2.53	53.	1.89	.5	1.29	125.	.80	255.	.39
.6	2.53	.2	1.88	78.	1.28	126.	.79	260.	.38
.7	2.52	.4	1.87	.5	1.27	127.	.79	265.	.38
.8	2.51	.6	1.87	79.	1.27	128.	.78	270.	.37
.9	2.51	.8	1.86	.5	1.26	129.	.78	275.	.36
40.	2.50	**54.**	1.85	**80.**	1.25	**130.**	.77	**280.**	.36
.2	2.49	.2	1.85	.5	1.24	131.	.76	285.	.35
.4	2.48	.4	1.84	81.	1.23	132.	.76	290.	.34
.6	2.46	.6	1.83	.5	1.23	133.	.75	295.	.34
.8	2.45	.8	1.82	82.	1.22	134.	.75	300.	.33
41.	2.44	55.	1.82	.5	1.21	135.	.74	305.	.33
.2	2.43	.2	1.81	83.	1.20	136.	.74	310.	.32
.4	2.42	.4	1.81	.5	1.20	137.	.73	315.	.32
.6	2.40	.6	1.80	84.	1.19	138.	.72	320.	.31
.8	2.39	.8	1.79	.5	1.18	139.	.72	330.	.30
42.	2.38	**56.**	1.79	**85.**	1.18	**140.**	.71	**340.**	.29
.2	2.37	.2	1.78	.5	1.17	141.	.71	350.	.29
.4	2.36	.4	1.77	86.	1.16	142.	.70	360.	.28
.6	2.35	.6	1.77	.5	1.16	143.	.70	370.	.27
.8	2.34	.8	1.76	87.	1.15	144.	.69	380.	.26
43.	2.33	57.	1.75	.5	1.14	145.	.69	390.	.26
.2	2.31	.2	1.75	88.	1.14	146.	.68	400.	.25
.4	2.30	.4	1.74	.5	1.13	147.	.68	410.	.24
.6	2.29	.6	1.74	89.	1.12	148.	.68	420.	.24
.8	2.28	.8	1.73	.5	1.12	149.	.67	430.	.23
44.	2.27	**58.**	1.72	**90.**	1.11	**150.**	.67	**440.**	.23
.2	2.26	.2	1.72	.5	1.10	152.	.66	450.	.22
.4	2.25	.4	1.71	91.	1.10	154.	.65	460.	.22
.6	2.24	.6	1.71	.5	1.09	156.	.64	470.	.21
.8	2.23	.8	1.70	92.	1.09	158.	.63	480.	.21
45.	2.22	59.	1.69	.5	1.08	160.	.62	490.	.20
.2	2.21	.2	1.69	93.	1.08	162.	.62	500.	.20
.4	2.20	.4	1.68	.5	1.07	164.	.61	525.	.19
.6	2.19	.6	1.68	94.	1.06	166.	.60	550.	.18
.8	2.18	.8	1.67	.5	1.06	168.	.60	575.	.17
46.	2.17	**60.**	1.67	**95.**	1.05	**170.**	.59	**600.**	.17
.2	2.16	.5	1.65	.5	1.05	172.	.58	625.	.16
.4	2.16	61.	1.64	96.	1.04	174.	.57	650.	.15
.6	2.15	.5	1.63	.5	1.04	176.	.57	675.	.15
.8	2.14	62.	1.61	97.	1.03	178.	.56	700.	.14
47.	2.13	.5	1.60	.5	1.03	180.	.56	725.	.14
.2	2.12	63.	1.59	98.	1.02	182.	.55	775.	.13
.4	2.11	.5	1.57	.5	1.02	184.	.54	825.	.12
.6	2.10	64.	1.56	99.	1.01	186.	.54	900.	.11
.8	2.09	.5	1.55	.5	1.01	188.	.53	1000.	.10

COTTON YARN TABLE

Weight in Grains of 120 Yds.	Number of Yarn	Weight in Grains of 120 Yds.	Number of Yarn	Weight in Grains of 120 Yds.	Number of Yarn	Weight in Grains of 120 Yds.	Number of Yarn	Weight in Grains of 120 Yds.	Number of Yarn
5.	200.0	**12.**	83.33	**19.**	52.63	**26.**	38.46	**33.**	30.30
.1	196.1	.1	82.64	.1	52.36	.1	38.31	.1	30.21
.2	192.3	.2	81.97	.2	52.08	.2	38.17	.2	30.12
.3	188.7	.3	81.30	.3	51.81	.3	38.02	.3	30.03
.4	185.2	.4	80.65	.4	51.55	.4	37.88	.4	29.94
.5	181.8	.5	80.00	.5	51.28	.5	37.74	.5	29.85
.6	178.6	.6	79.37	.6	51.02	.6	37.59	.6	29.76
.7	175.4	.7	78.74	.7	50.76	.7	37.45	.7	29.67
.8	172.4	.8	78.12	.8	50.51	.8	37.31	.8	29.59
.9	169.5	.9	77.52	.9	50.25	.9	37.17	.9	29.50
6.	166.7	**13.**	76.92	**20.**	50.00	**27.**	37.04	**34.**	29.41
.1	163.9	.1	76.34	.1	49.75	.1	36.90	.1	29.33
.2	161.3	.2	75.76	.2	49.50	.2	36.77	.2	29.24
.3	158.7	.3	75.19	.3	49.26	.3	36.63	.3	29.15
.4	156.3	.4	74.63	.4	49.02	.4	36.50	.4	29.07
.5	153.8	.5	74.07	.5	48.78	.5	36.36	.5	28.99
.6	151.5	.6	73.53	.6	48.54	.6	36.23	.6	28.90
.7	149.3	.7	72.99	.7	48.31	.7	36.10	.7	28.82
.8	147.1	.8	72.46	.8	48.08	.8	35.97	.8	28.74
.9	144.9	.9	71.94	.9	47.85	.9	35.84	.9	28.65
7.	142.9	**14.**	71.43	**21.**	47.62	**28.**	35.71	**35.**	28.57
.1	140.8	.1	70.92	.1	47.39	.1	35.59	.1	28.49
.2	138.9	.2	70.42	.2	47.17	.2	35.46	.2	28.41
.3	137.0	.3	69.93	.3	46.95	.3	35.34	.3	28.33
.4	135.1	.4	69.44	.4	46.73	.4	35.21	.4	28.25
.5	133.3	.5	68.97	.5	46.51	.5	35.09	.5	28.17
.6	131.6	.6	68.49	.6	46.30	.6	34.97	.6	28.09
.7	129.9	.7	68.03	.7	46.08	.7	34.84	.7	28.01
.8	128.2	.8	67.57	.8	45.87	.8	34.72	.8	27.93
.9	126.6	.9	67.11	.9	45.66	.9	34.60	.9	27.86
8.	125.0	**15.**	66.67	**22.**	45.45	**29.**	34.48	**36.**	27.78
.1	123.5	.1	66.23	.1	45.25	.1	34.36	.1	27.70
.2	122.0	.2	65.79	.2	45.05	.2	34.25	.2	27.62
.3	120.5	.3	65.36	.3	44.84	.3	34.13	.3	27.55
.4	119.0	.4	64.94	.4	44.64	.4	34.01	.4	27.47
.5	117.6	.5	64.52	.5	44.44	.5	33.90	.5	27.40
.6	116.3	.6	64.10	.6	44.25	.6	33.78	.6	27.32
.7	114.9	.7	63.69	.7	44.05	.7	33.67	.7	27.25
.8	113.6	.8	63.29	.8	43.86	.8	33.56	.8	27.17
.9	112.4	.9	62.89	.9	43.67	.9	33.44	.9	27.10
9.	111.1	**16.**	62.50	**23.**	43.48	**30.**	33.33	**37.**	27.03
.1	109.9	.1	62.11	.1	43.29	.1	33.22	.1	26.95
.2	108.7	.2	61.73	.2	43.10	.2	33.11	.2	26.88
.3	107.5	.3	61.35	.3	42.92	.3	33.00	.3	26.81
.4	106.4	.4	60.98	.4	42.74	.4	32.89	.4	26.74
.5	105.3	.5	60.61	.5	42.55	.5	32.79	.5	26.67
.6	104.2	.6	60.24	.6	42.37	.6	32.68	.6	26.60
.7	103.1	.7	59.88	.7	42.19	.7	32.57	.7	26.53
.8	102.0	.8	59.52	.8	42.02	.8	32.47	.8	26.46
.9	101.0	.9	59.17	.9	41.84	.9	32.36	.9	26.39
10.	100.0	**17.**	58.82	**24.**	41.67	**31.**	32.26	**38.**	26.32
.1	99.01	.1	58.48	.1	41.49	.1	32.16	.1	26.25
.2	98.04	.2	58.14	.2	41.32	.2	32.05	.2	26.18
.3	97.09	.3	57.80	.3	41.15	.3	31.95	.3	26.11
.4	96.15	.4	57.47	.4	40.98	.4	31.85	.4	26.04
.5	95.24	.5	57.14	.5	40.82	.5	31.75	.5	25.97
.6	94.34	.6	56.82	.6	40.65	.6	31.65	.6	25.91
.7	93.46	.7	56.50	.7	40.49	.7	31.55	.7	25.84
.8	92.59	.8	56.18	.8	40.32	.8	31.45	.8	25.77
.9	91.74	.9	55.87	.9	40.16	.9	31.35	.9	25.71
11.	90.91	**18.**	55.56	**25.**	40.00	**32.**	31.25	**39.**	25.64
.1	90.09	.1	55.25	.1	39.84	.1	31.15	.1	25.58
.2	89.29	.2	54.95	.2	39.68	.2	31.06	.2	25.51
.3	88.50	.3	54.64	.3	39.53	.3	30.96	.3	25.45
.4	87.72	.4	54.35	.4	39.37	.4	30.86	.4	25.38
.5	86.96	.5	54.05	.5	39.22	.5	30.77	.5	25.32
.6	86.21	.6	53.76	.6	39.06	.6	30.67	.6	25.25
.7	85.47	.7	53.48	.7	38.91	.7	30.58	.7	25.19
.8	84.75	.8	53.19	.8	38.76	.8	30.49	.8	25.13
.9	84.03	.9	52.91	.9	38.61	.9	30.40	.9	25.06

COTTON YARN TABLE—(*Continued*)

Weight in Grains of 120 Yds.	Number of Yarn	Weight in Grains of 120 Yds.	Number of Yarn	Weight in Grains of 120 Yds.	Number of Yarn	Weight in Grains of 120 Yds.	Number of Yarn	Weight in Grains of 120 Yds.	Number of Yarn
40.	25.00	**47.**	21.28	**54.**	18.52	**61.**	16.39	**68.**	14.71
.1	24.94	.1	21.23	.1	18.48	.1	16.37	.1	14.68
.2	24.88	.2	21.19	.2	18.45	.2	16.34	.2	14.66
.3	24.81	.3	21.14	.3	18.42	.3	16.31	.3	14.64
.4	24.75	.4	21.10	.4	18.38	.4	16.29	.4	14.62
.5	24.69	.5	21.05	.5	18.35	.5	16.26	.5	14.60
.6	24.63	.6	21.01	.6	18.32	.6	16.23	.6	14.58
.7	24.57	.7	20.96	.7	18.28	.7	16.21	.7	14.56
.8	24.51	.8	20.92	.8	18.25	.8	16.19	.8	14.53
.9	24.45	.9	20.88	.9	18.21	.9	16.16	.9	14.51
41.	24.39	**48.**	20.83	**55.**	18.18	**62.**	16.13	**69.**	14.49
.1	24.33	.1	20.79	.1	18.15	.1	16.10	.1	14.47
.2	24.27	.2	20.75	.2	18.12	.2	16.08	.2	14.45
.3	24.21	.3	20.70	.3	18.08	.3	16.05	.3	14.43
.4	24.15	.4	20.66	.4	18.05	.4	16.03	.4	14.41
.5	24.10	.5	20.62	.5	18.02	.5	16.00	.5	14.39
.6	24.04	.6	20.57	.6	17.99	.6	15.97	.6	14.37
.7	23.98	.7	20.53	.7	17.95	.7	15.95	.7	14.35
.8	23.92	.8	20.49	.8	17.92	.8	15.92	.8	14.33
.9	23.87	.9	20.45	.9	17.89	.9	15.90	.9	14.31
42.	23.81	**49.**	20.41	**56.**	17.86	**63.**	15.87	**70.**	14.29
.1	23.75	.1	20.37	.1	17.83	.1	15.85	.1	14.27
.2	23.70	.2	20.33	.2	17.79	.2	15.83	.2	14.25
.3	23.64	.3	20.28	.3	17.76	.3	15.80	.3	14.22
.4	23.58	.4	20.24	.4	17.73	.4	15.77	.4	14.20
.5	23.53	.5	20.20	.5	17.70	.5	15.75	.5	14.18
.6	23.47	.6	20.16	.6	17.67	.6	15.72	.6	14.16
.7	23.42	.7	20.12	.7	17.64	.7	15.70	.7	14.14
.8	23.36	.8	20.08	.8	17.61	.8	15.67	.8	14.12
.9	23.31	.9	20.04	.9	17.57	.9	15.65	.9	14.10
43.	23.26	**50.**	20.00	**57.**	17.54	**64.**	15.62	**71.**	14.08
.1	23.20	.1	19.96	.1	17.51	.1	15.60	.1	14.06
.2	23.15	.2	19.92	.2	17.48	.2	15.58	.2	14.04
.3	23.09	.3	19.88	.3	17.45	.3	15.55	.3	14.03
.4	23.04	.4	19.84	.4	17.42	.4	15.53	.4	14.01
.5	22.99	.5	19.80	.5	17.39	.5	15.50	.5	13.99
.6	22.94	.6	19.76	.6	17.36	.6	15.48	.6	13.97
.7	22.88	.7	19.72	.7	17.33	.7	15.46	.7	13.95
.8	22.83	.8	19.69	.8	17.30	.8	15.43	.8	13.93
.9	22.78	.9	19.65	.9	17.27	.9	15.41	.9	13.91
44.	22.73	**51.**	19.61	**58.**	17.24	**65.**	15.38	**72.**	13.89
.1	22.68	.1	19.57	.1	17.21	.1	15.36	.1	13.87
.2	22.62	.2	19.53	.2	17.18	.2	15.34	.2	13.85
.3	22.57	.3	19.49	.3	17.15	.3	15.31	.3	13.83
.4	22.52	.4	19.46	.4	17.12	.4	15.29	.4	13.81
.5	22.47	.5	19.42	.5	17.09	.5	15.27	.5	13.78
.6	22.42	.6	19.38	.6	17.06	.6	15.24	.6	13.77
.7	22.37	.7	19.34	.7	17.04	.7	15.22	.7	13.76
.8	22.32	.8	19.31	.8	17.01	.8	15.20	.8	13.74
.9	22.27	.9	19.27	.9	16.98	.9	15.17	.9	13.72
45.	22.22	**52.**	19.23	**59.**	16.95	**66.**	15.15	**73.**	13.70
.1	22.17	.1	19.19	.1	16.92	.1	15.13	.1	13.68
.2	22.12	.2	19.16	.2	16.89	.2	15.11	.2	13.66
.3	22.08	.3	19.12	.3	16.86	.3	15.08	.3	13.64
.4	22.03	.4	19.08	.4	16.84	.4	15.06	.4	13.62
.5	21.98	.5	19.05	.5	16.81	.5	15.04	.5	13.61
.6	21.93	.6	19.01	.6	16.78	.6	15.02	.6	13.59
.7	21.88	.7	18.98	.7	16.75	.7	14.99	.7	13.57
.8	21.83	.8	18.94	.8	16.72	.8	14.97	.8	13.55
.9	21.79	.9	18.90	.9	16.69	.9	14.95	.9	13.53
46.	21.74	**53.**	18.87	**60.**	16.67	**67.**	14.93	**74.**	13.51
.1	21.69	.1	18.83	.1	16.64	.1	14.90	.1	13.50
.2	21.65	.2	18.80	.2	16.61	.2	14.88	.2	13.48
.3	21.60	.3	18.76	.3	16.58	.3	14.86	.3	13.46
.4	21.55	.4	18.73	.4	16.56	.4	14.84	.4	13.44
.5	21.51	.5	18.69	.5	16.53	.5	14.81	.5	13.42
.6	21.46	.6	18.66	.6	16.50	.6	14.79	.6	13.40
.7	21.41	.7	18.62	.7	16.47	.7	14.77	.7	13.39
.8	21.37	.8	18.59	.8	16.45	.8	14.75	.8	13.37
.9	21.32	.9	18.55	.9	16.42	.9	14.73	.9	13.35

COTTON YARN TABLE—(*Continued*)

Weight in Grains of 120 Yds.	Number of Yarn	Weight in Grains of 120 Yds.	Number of Yarn	Weight in Grains of 120 Yds.	Number of Yarn	Weight in Grains of 120 Yds.	Number of Yarn	Weight in Grains of 120 Yds.	Number of Yarn
75.	13.33	**82.**	12.20	**89.**	11.24	**102.**	9.80	**116.**	8.62
.1	13.32	.1	12.18	.1	11.22	.2	9.78	.2	8.61
.2	13.30	.2	12.17	.2	11.21	.4	9.77	.4	8.59
.3	13.28	.3	12.15	.3	11.20	.6	9.75	.6	8.58
.4	13.26	.4	12.14	.4	11.19	.8	9.73	.8	8.56
.5	13.25	.5	12.12	.5	11.17	103.	9.71	117.	8.55
.6	13.23	.6	12.11	.6	11.16	.2	9.69	.2	8.53
.7	13.21	.7	12.09	.7	11.15	.4	9.67	.4	8.52
.8	13.19	.8	12.08	.8	11.14	.6	9.65	.6	8.50
.9	13.18	.9	12.06	.9	11.12	.8	9.63	.8	8.49
76.	13.16	**83.**	12.05	**90.**	11.11	**104.**	9.62	**118.**	8.47
.1	13.14	.1	12.03	.2	11.09	.2	9.60	.2	8.46
.2	13.12	.2	12.02	.4	11.06	.4	9.58	.4	8.45
.3	13.11	.3	12.00	.6	11.04	.6	9.56	.6	8.43
.4	13.09	.4	11.99	.8	11.01	.8	9.54	.8	8.42
.5	13.07	.5	11.98	91.	10.99	105.	9.52	119.	8.40
.6	13.05	.6	11.96	.2	10.96	.2	9.51	.2	8.39
.7	13.04	.7	11.95	.4	10.94	.4	9.49	.4	8.38
.8	13.02	.8	11.93	.6	10.92	.6	9.47	.6	8.36
.9	13.00	.9	11.92	.8	10.89	.8	9.45	.8	8.35
77.	12.99	**84.**	11.90	**92.**	10.87	**106.**	9.43	**120.**	8.33
.1	12.97	.1	11.89	.2	10.85	.2	9.42	.2	8.32
.2	12.95	.2	11.88	.4	10.82	.4	9.40	.4	8.31
.3	12.94	.3	11.86	.6	10.80	.6	9.38	.6	8.29
.4	12.92	.4	11.85	.8	10.78	.8	9.36	.8	8.28
.5	12.90	.5	11.83	93.	10.75	107.	9.35	121.	8.26
.6	12.89	.6	11.82	.2	10.73	.2	9.33	.2	8.25
.7	12.87	.7	11.81	.4	10.71	.4	9.31	.4	8.24
.8	12.85	.8	11.79	.6	10.68	.6	9.29	.6	8.22
.9	12.84	.9	11.78	.8	10.66	.8	9.28	.8	8.21
78.	12.82	**85.**	11.76	**94.**	10.64	**108.**	9.26	**122.**	8.20
.1	12.80	.1	11.75	.2	10.62	.2	9.24	.2	8.18
.2	12.79	.2	11.74	.4	10.59	.4	9.23	.4	8.17
.3	12.77	.3	11.72	.6	10.57	.6	9.21	.6	8.16
.4	12.76	.4	11.71	.8	10.55	.8	9.19	.8	8.14
.5	12.74	.5	11.70	95.	10.53	109.	9.17	123.	8.13
.6	12.72	.6	11.68	.2	10.50	.2	9.16	.2	8.12
.7	12.71	.7	11.67	.4	10.48	.4	9.14	.4	8.10
.8	12.69	.8	11.66	.6	10.46	.6	9.12	.6	8.09
.9	12.67	.9	11.64	.8	10.44	.8	9.11	.8	8.08
79.	12.66	**86.**	11.63	**96.**	10.42	**110.**	9.09	**124.**	8.06
.1	12.64	.1	11.61	.2	10.40	.2	9.07	.2	8.05
.2	12.63	.2	11.60	.4	10.37	.4	9.06	.4	8.04
.3	12.61	.3	11.59	.6	10.35	.6	9.04	.6	8.03
.4	12.59	.4	11.57	.8	10.33	.8	9.03	.8	8.01
.5	12.58	.5	11.56	97.	10.31	111.	9.01	125.	8.00
.6	12.56	.6	11.55	.2	10.29	.2	8.99	.2	7.99
.7	12.55	.7	11.53	.4	10.27	.4	8.98	.4	7.97
.8	12.53	.8	11.52	.6	10.25	.6	8.96	.6	7.96
.9	12.52	.9	11.51	.8	10.22	.8	8.94	.8	7.95
80.	12.50	**87.**	11.49	**98.**	10.20	**112.**	8.93	**126.**	7.94
.1	12.48	.1	11.48	.2	10.18	.2	8.91	.2	7.92
.2	12.47	.2	11.47	.4	10.16	.4	8.90	.4	7.91
.3	12.45	.3	11.45	.6	10.14	.6	8.88	.6	7.90
.4	12.44	.4	11.44	.8	10.12	.8	8.87	.8	7.89
.5	12.42	.5	11.43	99.	10.10	113.	8.85	127.	7.87
.6	12.41	.6	11.42	.2	10.08	.2	8.83	.2	7.86
.7	12.39	.7	11.40	.4	10.06	.4	8.82	.4	7.85
.8	12.38	.8	11.39	.6	10.04	.6	8.80	.6	7.84
.9	12.36	.9	11.38	.8	10.02	.8	8.79	.8	7.82
81.	12.35	**88.**	11.36	**100.**	10.00	**114.**	8.77	**128.**	7.81
.1	12.33	.1	11.35	.2	9.98	.2	8.76	.2	7.80
.2	12.32	.2	11.34	.4	9.96	.4	8.74	.4	7.79
.3	12.30	.3	11.33	.6	9.94	.6	8.73	.6	7.78
.4	12.29	.4	11.31	.8	9.92	.8	8.71	.8	7.76
.5	12.27	.5	11.30	101.	9.90	115.	8.70	129.	7.75
.6	12.25	.6	11.29	.2	9.88	.2	8.68	.2	7.74
.7	12.24	.7	11.27	.4	9.86	.4	8.67	.4	7.73
.8	12.22	.8	11.26	.6	9.84	.6	8.65	.6	7.72
.9	12.21	.9	11.25	.8	9.82	.8	8.64	.8	7.70

COTTON YARN TABLE—(*Continued*)

Weight in Grains of 120 Yds.	Number of Yarn	Weight in Grains of 120 Yds.	Number of Yarn	Weight in Grains of 120 Yds.	Number of Yarn	Weight in Grains of 120 Yds	Number of Yarn	Weight in Grains of 120 Yds.	Number of Yarn
130.	7.69	**165.**	6.06	**200.**	5.00	**270.**	3.70	**400.**	2.50
.5	7.66	.5	6.04	201.	4.98	271.	3.69	405.	2.47
131.	7.63	166.	6.02	202.	4.95	272.	3.68	410.	2.44
.5	7.60	.5	6.01	203.	4.93	273.	3.66	415.	2.41
132.	7.58	167.	5.99	204.	4.90	274.	3.65	420.	2.38
.5	7.55	.5	5.97	205.	4.88	275.	3.64	425.	2.35
133.	7.52	168.	5.95	206.	4.85	276.	3.62	430.	2.33
.5	7.49	.5	5.93	207.	4.83	277.	3.61	435.	2.30
134.	7.46	169.	5.92	208.	4.81	278.	3.60	440.	2.27
.5	7.43	.5	5.90	209.	4.78	279.	3.58	445.	2.25
135.	7.41	**170.**	5.88	**210.**	4.76	**280.**	3.57	**450.**	2.22
.5	7.38	.5	5.87	211.	4.74	282.	3.55	455.	2.20
136.	7.35	171.	5.85	212.	4.72	284.	3.52	460.	2.17
.5	7.33	.5	5.83	213.	4.69	286.	3.50	465.	2.15
137.	7.30	172.	5.81	214.	4.67	288.	3.47	470.	2.13
.5	7.27	.5	5.80	215.	4.65	290.	3.45	475.	2.11
138.	7.25	173.	5.78	216.	4.63	292.	3.42	480.	2.08
.5	7.22	.5	5.76	217.	4.61	294.	3.40	485.	2.06
139.	7.19	174.	5.75	218.	4.59	296.	3.38	490.	2.04
.5	7.17	.5	5.73	219.	4.57	298.	3.36	495.	2.02
140.	7.14	**175.**	5.71	**220.**	4.55	**300.**	3.33	**500.**	2.00
.5	7.12	.5	5.70	221.	4.52	302.	3.31	505.	1.98
141.	7.09	176.	5.68	222.	4.50	304.	3.29	510.	1.96
.5	7.07	.5	5.67	223.	4.48	306.	3.27	515.	1.94
142.	7.04	177.	5.65	224.	4.46	308.	3.25	520.	1.92
.5	7.02	.5	5.63	225.	4.44	310.	3.23	525.	1.90
143.	6.99	178.	5.62	226.	4.42	312.	3.21	530.	1.89
.5	6.97	.5	5.60	227.	4.41	314.	3.18	535.	1.87
144.	6.94	179.	5.59	228.	4.39	316.	3.17	540.	1.85
.5	6.92	.5	5.57	229.	4.37	318.	3.14	545.	1.83
145.	6.90	**180.**	5.56	**230.**	4.35	**320.**	3.12	**550.**	1.82
.5	6.87	.5	5.54	231.	4.33	322.	3.11	555.	1.80
146.	6.85	181.	5.52	232.	4.31	324.	3.09	560.	1.79
.5	6.83	.5	5.51	233.	4.29	326.	3.07	565.	1.77
147.	6.80	182.	5.49	234.	4.27	328.	3.05	570.	1.75
.5	6.78	.5	5.48	235.	4.26	330.	3.03	575.	1.74
148.	6.76	183.	5.46	236.	4.24	332.	3.01	580.	1.72
.5	6.73	.5	5.45	237.	4.22	334.	2.99	585.	1.71
149.	6.71	184.	5.43	238.	4.20	336.	2.98	590.	1.69
.5	6.69	.5	5.42	239.	4.18	338.	2.96	595.	1.68
150.	6.67	**185.**	5.41	**240.**	4.17	**340.**	2.94	**600.**	1.67
.5	6.64	.5	5.39	241.	4.15	342.	2.92	610.	1.64
151.	6.62	186.	5.38	242.	4.13	344.	2.91	620.	1.61
.5	6.60	.5	5.36	243.	4.12	346.	2.89	630.	1.59
152.	6.58	187.	5.35	244.	4.10	348.	2.87	640.	1.56
.5	6.56	.5	5.33	245.	4.08	350.	2.86	650.	1.54
153.	6.54	188.	5.32	246.	4.07	352.	2.84	660.	1.52
.5	6.51	.5	5.31	247.	4.05	354.	2.82	670.	1.49
154.	6.49	189.	5.29	248.	4.03	356.	2.81	680.	1.47
.5	6.47	.5	5.28	249.	4.02	358.	2.79	690.	1.45
155.	6.45	**190.**	5.26	**250.**	4.00	**360.**	2.78	**700.**	1.43
.5	6.43	.5	5.25	251.	3.98	362.	2.76	710.	1.41
156.	6.41	191.	5.24	252.	3.97	364.	2.75	720.	1.39
.5	6.39	.5	5.22	253.	3.95	366.	2.73	730.	1.37
157.	6.37	192.	5.21	254.	3.94	368.	2.72	740.	1.35
.5	6.35	.5	5.19	255.	3.92	370.	2.70	750.	1.33
158.	6.33	193.	5.18	256.	3.91	372.	2.69	760.	1.32
.5	6.31	.5	5.17	257.	3.89	374.	2.67	770.	1.30
159.	6.29	194.	5.15	258.	3.88	376.	2.66	780.	1.28
.5	6.27	.5	5.14	259.	3.86	378.	2.65	790.	1.27
160.	6.25	**195.**	5.13	**260.**	3.85	**380.**	2.63	**800.**	1.25
.5	6.23	.5	5.12	261.	3.83	382.	2.62	820.	1.22
161.	6.21	196.	5.10	262.	3.82	384.	2.60	840.	1.19
.5	6.19	.5	5.09	263.	3.80	386.	2.59	860.	1.16
162.	6.17	197.	5.08	264.	3.79	388.	2.58	880.	1.14
.5	6.15	.5	5.06	265.	3.77	390.	2.56	900.	1.11
163.	6.13	198.	5.05	266.	3.76	392.	2.55	925.	1.08
.5	6.12	.5	5.04	267.	3.75	394.	2.54	950.	1.05
164.	6.10	199.	5.03	268.	3.73	396.	2.53	975.	1.03
.5	6.08	.5	5.01	269.	3.72	398.	2.51	1000.	1.00

SPECIFICATIONS

Total Number of Frames?

Number of Warp Frames?

Number of Filling Frames?

Number of Combination Frames equipped with Warp Rings?

Number of Combination Frames equipped with Filling Rings?

Number of Spindles per Frame?

Gauge, or distance from centre to centre of spindles?

Size of Warp Rings?

Size of Filling Rings?

What make of Rings? *See Foot Note.*

What style of Holders? *See Foot Note.*

Are Traveler Cleaners wanted?

What pattern of spindle? Diameter of Whirl? *See Foot Note.*

Length of Traverse? Number of teeth in Lay Gear?

What style of Separators? Shall we nickel plate Blades?

Long or Short Boss Rolls?

Diameter of Front Bottom Rolls? Middle? Back?

Shall we caseharden Front Bottom Rolls?

Shall we semi-caseharden Middle and Back Bottom Rolls?

Top Rolls, self-weighted or lever-weighted style?

Front Top Rolls, Shell or Solid?

Pitch of Roll Stands?

Kind of Lever Screws? (Lever-weighted style.) *See Foot Note.*

What style of Saddle? (Lever-weighted style.) *See Foot Note.*

What style of Stirrup? (Self-weighted style.) *See Foot Note.*

SPECIFICATIONS *(Continued)*

What style of Guide Wires? *See Foot Note.*

What kind of Thread Boards?

Diameter of Cylinder?

Diameter of Tight Pulley? Width of Face?

Diameter of Loose Pulley?

Belt from above or below? Are Belt Guards wanted?

If Motor Drive, give full details.

Roving, double or single? Creels, one or two story?

Diameter of Creel Bobbin, when full? Length of traverse?

What Hank Roving?

Number of Yarn to be Spun?

Range of Twist?

For what Turns Twist shall we furnish three changes of Twist gears?

Range of Draft?

For what Draft shall we furnish three changes of Draft gears?

Width of Frame?

Give shipping instructions.

Give marking for export.

Shall we send men to erect?

Remarks:

NOTE:—If present equipment is to be matched, do not fail to send sample SPINDLE, also sample RING and RING HOLDER. If LEVER SCREWS, SADDLES, STIRRUPS, and GUIDE WIRES are to be matched, send samples also.

FALES & JENKS MACHINERY

MANUFACTURED

UNDER ONE OR MORE OF THE FOLLOWING
U. S. PATENTS

No.	910,450	No.	1,131,167
"	916,977	"	1,146,396
"	921,218	"	1,148,741
"	999,088	"	1,148,745
"	1,055,733	"	1,174,961
"	1,064,234	"	1,209,163
"	1,064,279	"	1,259,203
"	1,064,280	"	1,306,517
"	1,064,281	"	1,403,832
"	1,075,004	"	155,761
"	1,075,184	"	1,450,348
"	1,075,185	"	1,488,902
"	1,075,205	"	1,511,257
"	1,086,699	"	1,515,651

Other patents pending

INSTRUCTIONS FOR ORDERING

REPAIR PARTS

We urge our customers to observe the following instructions when ordering repair parts, so as to avoid delay and the possibility of errors.

Always give the order number of the frame found on a plate fastened to the inside of the Head End or, on our later frames, to the outside of the Head End.

All cast-iron parts have pattern numbers which will be found on the castings: this pattern number should always be given.

Rods and Pins, the over-all length and diameter should be given.

Shafts and Studs, the over-all length and greatest diameter should be given.

Cylinders, if in three sections state whether for Head End, Middle or Foot End section: if in four sections state whether for Head End (short), Head End (long), Middle or Foot End section; if in five sections state whether for Head End (short), Head End (long), Head Middle, Foot Middle or Foot End section. Always give length of section and the diameter.

Ring Rails, give gauge and state the number of spindles covered by the particular section of Ring Rail. If the Ring Rails are round end state whether for Head or Foot End of frame and whether right or left hand, so designated when facing the geared end of the frame.

Roller Beams and Box or Spindle Rails, if in three sections state whether for Head, Middle or Foot, right or left; and if in four sections state whether Head, Head Middle, Foot Middle or Foot, right or left.

Driving Pulleys, give diameter of pulleys, width of face and diameter of driving shaft.

Top, Middle or Bottom Creel Boards, if in three sections state whether for Head, Middle or Foot; and if in four sections, state whether for Head, Head Middle, Foot Middle or Foot. In ordering Side Boards state in addition whether for right or left side of frame.


AKERMAN
STANDARD