FABRIC ANALYSIS.

(Continued from October issue.)

Testing Strength and Stretch of Fabrics.

Fabrics purchased by the Government Clothing Departments, Railway Companies, Police, Fire, etc., Departments of our large cities, are tested to ascertain if they reach a minimum standard of strength and stretch. Cloths intended for special purposes, such as sail cloths, sheetings, linings, foundation cloths for card clothing, etc., are subjected to tests for strength and stretch. These tests are of value to the manufacturer, as they enable him to accurately compare the quality

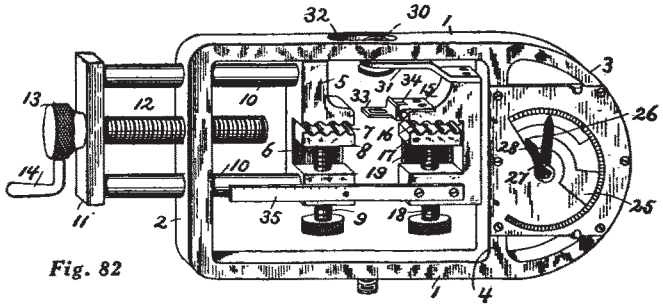

Fig. 82

of his own productions with those of his competitors. They also afford the most positive means of indicating the effect of bleaching, dyeing, finishing, etc., on the cloth.

It is frequently found that the strength and stretch of a cloth on leaving the loom are much greater than when the cloth is finished, ready for the market, and for this reason very elaborate experiments are now being made in some of the dyeing and finishing works in this country for the purpose of discovering in which processes the cloth is affected. It is only by such experimental work that the source of the defects which arise from the present methods of manufacture can be ascertained and the remedy attempted.

The object of this process is to ascertain the strength of cloth, *i. e.* to ascertain the amount of tension required to tear it apart, thus ascertaining the quality of the material (as to strength) used in its construction.

A cloth tester used for this work is shown in Figs. 82 and 83, the object of which is to provide not only means for indicating the strength of the fabric tested, but at the same time also means by which the texture or structure of the fabric may be examined while testing its strength. Fig. 82 is a perspective view of this tester, and Fig. 83 a bottom or back view of it.

The frame of this tester comprises parallel side members 1, an end member 2 at right angles to the side members, and a curved or semi-circular member 3 at the opposite end. At the junction of the member 3 and the side members 1, a cross bar 4 is formed.

Movable in the frame thus referred to is a block 5, which has a recess 6, one wall 7 of which is provided with teeth, which, co-acting with a corrugated block 8, form jaws for clamping the fabric to be tested. The part 8 is movable in the recess 6, and it is moved toward and from the jaw section 7 by means of a screw 9, engaging in a tapped opening in the block 5. Guide rods 10 extend outward from the block 5 through openings in the end portion 2 of the frame, and at the outer end these guide bars are connected by a cross head 11, and mounted to turn in this cross head is a screw 12, which engages in a tapped hole in the portion 2 of the frame. The screw 12 has a milled head 13, and also a handle 14, so that it can be easily turned while stretching the material. Another block 15 is also movable in the frame and has a recess, one wall 16 of which is corrugated to provide a jaw section co-acting with the corrugations or teeth on the other jaw section or block 17 in the recess in the block, the latter being adjusted by means of a screw 18. A plate 19 is attached to the rear side of the block 15, and the rear side of the recess 6 is also closed by a cross piece or bridge. These closures provide a stop against which the straight edge of the fabric to be tested is placed when between the jaws, to insure the placing of the threads lengthwise of the pulling strain. From the block 15, guide rods 20, 21, extend through openings in the cross bar 4, guide rod 21 being provided with a rack 22, engaging with a pinion 23, one end of the shaft of said pinion having a bearing in a plate 24, extended from the cross bar 4, and the other end of said pinion shaft extends through an opening in a dial plate 25, secured to the frame of the machine.

Loosely mounted on the shaft of the pinion is the indicating pointer 26, and rigidly connected to said shaft is a shifting arm 27, having a pin 28, adapted to engage with the pointer 26. A coiled spring 29 is attached at one end to the frame section 3 and at the other end to the block 15, said spring serving as a counterbalance for strain on fabric.

As a means for observing the texture and structure of the fabric while being stretched, a magnifying glass arranged in a tube 30, attached to an arm 31, extended from the block 15 is employed. The upper member 1 of the frame is provided with a slot 32, into which the upper portion of the tube passes and wherein said tube moves as the block moves. Also attached to the block 15 is a plate 33, having a rectangular sight-opening in line with the magnifying glass. In order that the plate 33 may be swung upward to permit the blocks 5 and 15, to move close together, the said plate has a hinge connection 34 with the block 15.

In operation, after clamping a strip of the fabric to be tested in the clamping device and the outer edge is trimmed off close to the outer surface of the clamping device, the screw 12 is operated to draw the block 5 outward. The block 15 is also drawn against the resistance of the spring 29. The rack 22 in its movement with the block 15 rotates the pinion 23, and consequently also the arm 27, and the pin 28 on said arm 27 will engage with the pointer 26, moving it over the dial.

When the fabric breaks, the block 15 is immediately drawn back to its normal position by means of the spring returning the arm 27 to its normal position, but leaving the pointer 26, having frictional contact with the dial at its adjusted place on the dial, from which the strength of the fabric may be observed.

The texture of the fabric may be observed through the magnifying glass during the whole operation of testing it for strength — that is, by its use the parting of the interlacing (weave) of warp and filling can be observed.

This device if desired may be made quite small and comparatively light, so that it can be carried in the pocket.

To observe the stretching quality of the fabric being tested, a gauge 35 attached to the block 15 is employed, its scale co-acting with a pointer or indicator mark on the block 5.

Fig. 84 shows the power tester as built by Henry L. Scott & Co., Providence, R. I., in its perspective view, adapted for handling the toughest fabric structures, like tire cloth, etc.

It is designed with two heavy cast iron ends holding four solid steel bars 1½ inches in diameter so fastened as to give greater rigidity than a cast frame. This construction has the advantage of leaving all parts in full view and easily accesible. All parts are protected, making it impossible for the samples to catch, or the operator to be injured.

Resistance to the pull on the sample is obtained by dead weight and there are no springs to influence the test. The recording head is a one piece casting rigidly fastened to the frame. The main shaft rotates in two hardened steel self-aligning frictionless ball bearings protected by dust caps,

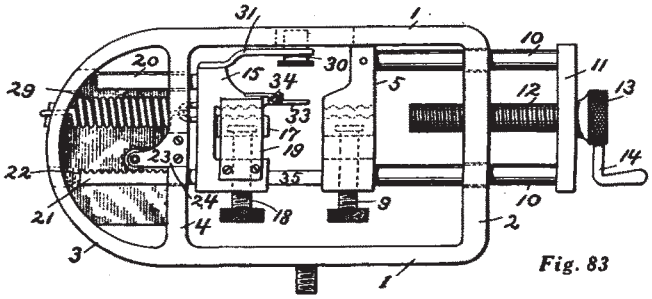

Fig. 83

eliminating all possibility of unnatural strain, cramping and excess friction. On this shaft is affixed a large metal drum having a finished surface 4 inches in diameter to receive a chain connecting with the head clamp. This large drum insures great sensibility and allows the line of pull of the machine to come in the exact center all ways. Attached rigidly to each side of this drum are two finished steel bars, heavily riveted at their lower end to form one solid unit. These double bars carry the resistance weights which are iron and made in sections for convenience in handling. The two levers fastened rigidly in this manner, support the weight evenly upon the shaft bearings, avoiding any tendency to cramp or distort the working parts. The capacity of the machine is determined by the number of weights placed upon the levers. Two rows of graduations can be placed upon

the dial, the outer row reading from 0 to any capacity desired up to 2,000 pounds. The inner row may be made to read from 0 to any capacity desired so that by removing certain weights (shown shaded) a more delicate machine is obtained for lighter materials. Thus a machine for tire fabrics may be constructed with a total capacity of 800 pounds and by removing part of the weights a machine of 400 pounds capacity may be had for tapes, braids, etc. The dial hand or indicator is positively operated by a single gear whose shaft rotates in "jewel" ball bearings.

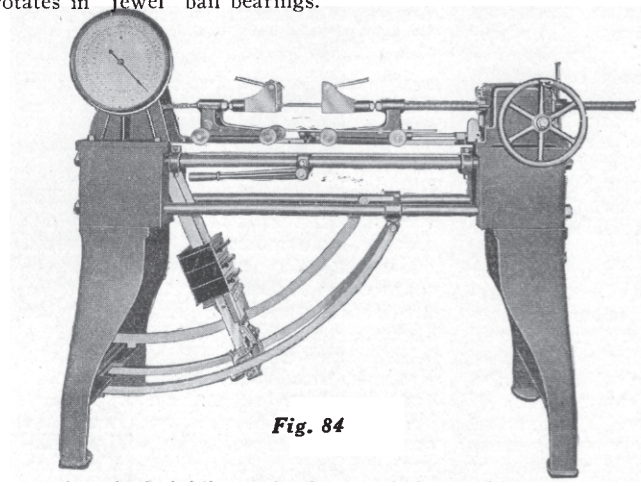

Fig. 84

Attached rigidly to the frame of the machine are two one inch curved steel quadrants the upper side of which are provided with machine cut teeth. On the outer sides of the weight levers are six steel pawls of varying length which engage the rack teeth and hold the weight levers and dial pointer at the exact position of the break. A third quadrant without teeth is suspended from the frame and passes between the weight levers connecting with a long hand lever on the head end of the machine. To re-set the weight lever and dial hand, it is only necessary for the operator to pull this lever. This action moves the upper quadrant downward, operating a lever which in turn trips the pawls and applies two brakes to the under side of the toothed quadrants allowing the weight lever to swing slowly to its normal position. A safety cam on the upper quadrants prevents any possibility of the weight lever swinging too rapidly and injuring the machine.

When it is desirable to drive by motor, a small gear attachment is used to replace the tight and loose pulleys increasing the speed in a ratio of 3 to 1, thus enabling the drive to be made by a single belt direct from a one quarter H. P. motor placed on the floor under the machine.

In making a test, the operator stands directly before the dial, and with the right hand on the horizontal lever can start, stop or reverse the machine at will. With the left hand, the machine is re-set, as described before.

The clamps are supported on carriages mounted on wheels which roll on two tracks or flat steel bars placed on edge. They are constructed with swinging flat anvils or gripping surfaces and automatically tighten on the sample as the stretch is applied.

A compensating elasticity scale, consisting of a steel tape which automatically winds and unwinds, is attached to the machine. On the moving carriage is an adjustable rod to which the end of the tape is attached in such manner as to bring the zero mark opposite a pointer on the head clamp when the sample is in place. The net stretch is read at the time of the break.

England to Clothe our Soldiers.

The Cloth Department of Great Britain's War Office having decided to make provision of an additional 16,000,000 yards of khaki, followed by the reports of big orders for the American Army, leaves little room for doubt that the machinery in the woolen and worsted industries in the West Riding, will very shortly be running on full time again. For, seeing that the goods are required for purely military purposes there will be no question of difficulty in obtaining the necessary supplies of raw material. There is every prospect that the West Riding will be working at its highest pressure for some months to come.

Regarding the American orders, which, so far as can be ascertained at present, will include cloth and blankets, the indications are that when the American troops are in Europe the whole of the cloth required by them for renewals will be produced in Great Britain. This, of course, means a saving of shipping which would otherwise be employed in transporting the material from the United States. Other Allies are also arranging for large quantities of military cloth. One result of this increased demand for khaki will probably be that the civilian trade will suffer a still further curtailment, for there is no other section from which extra plant and labor can be withdrawn.

Methods of and Apparatus for Making Imitation Leather.

According to a late English (patented) process, the fabric is coated with a solution containing nitrated cotton and oil, calendered, and a japanning composition applied to the surface. The material is then baked.

The Use of Fehling's Solution in the Determination of the Degree of Bleaching of Cellulose.

In determining the copper value of cellulose, according to *Freiberger,* several precautions are necessary. As traces of sodium silicate dissolved from the glass materially increase the copper value, freshly prepared alkaline tartrate should be used, and the caustic soda should be prepared in an iron vessel from sodium. Old copper sulphate solutions give high results. Stoneware jars should be used for distilled water, and rubber stoppers should be avoided.

In using "Gnehm's" apparatus, the sides of the flask should be protected against overheating, and the liquid should be kept boiling; after removing the source of heat, the liquor should immediately be poured off and the fibres rapidly washed with water at 80 deg. *C.,* to avoid further deposition of copper from the dilute Fehling's solution. Only a small amount of copper should separate in a blank test, and should be deducted from the copper value.

Wool Situation in Bradford.

Much interest is manifested in the new contracts for khaki and other fabrics required by Great Britain and its allies. These contracts are said to be for execution between next January and the end of April. It is stated that, in view of the large demand for military cloths, there is every probability of a reduction of the supply of wool allocated for civilian trade.

As a possible war measure and to conserve wool supplies it seems probable that new standards for both military and civilian cloths will be adopted.

Uruguayan Export Duties on Wool and Hides.

Law of November 9 increased export duties on the following products to 4 per cent, assessed on stated valuations for fiscal year 1917-18, *viz:* Raw wool, 120 pesos per 100 kilos; washed wool, 200 pesos per 100 kilos; dry cattle hides, 80 pesos per 100 kilos; salted cattle hides, 45 pesos per 100 kilos; sheepskins, 75 pesos per 100 kilos; tallow, 25 pesos per 100 kilos. Pulled wool, valuation fixed later. New rates in effect since November 9. (Uruguayan peso, $1.03; kilo, 2.2046 pounds.)

Inquiries for the lighter shades of ladies' wear are much in evidence, and, notwithstanding the war, a greater business than ever in this direction is expected during the next six months. Some dyers report the demand for color to be unprecedented, showing that the taste for gorgeous shades which made our dull streets like a fairyland this summer is in no whit abated. Of course, the wonderful shades with which we are now familiar are comparatively new; but the idea that the availability of the color has created the demand is not altogether true.