# HORIZONTAL WARPING MILL

As far as the warping equipment is concerned, the weaver has a choice of: warping board, warping reel, or sectional warp beam. The two latter are suitable for long warps, but both have their drawbacks.

The best of all would be a warping mill, i.e. a vertical or horizontal reel with an automatic movement for winding the yarn. This further can be combined with a warping drum, i.e. an arrangement which permits direct beaming from the mill. Unfortunately no such equipment can be found on the market and the only way to get it, is to make it.

We shall divide the building of a warping mill into 2 stages:
1) We shall make a horizontal reel, which can be used as a beaming drum
2) Later, we shall add an attachment for guiding the yarn when warping.

The superiority of a horizontal reel over a vertical one is that with the former the warp does not need to be chained before it is beamed. When the warping comes to an end we have to take the warp off a vertical reel, because the moment we release the tension by untying one end of the warp - the whole warp will slide down. On a horizontal reel it remains in place and can be gradually transferred to the loom and beamed. This not only saves one operation, but leaves the warp in much better order than in case of its being chained. Finally a horizontal reel can be easily transformed into a beaming drum, and a vertical one cannot.

The reel has two main parts: the rotating frame, and the base. The dimensions of both depend on the size of warp wanted. The longer and wider the warp, the larger the reel, so that usually we make a compromise and settle let's say on 30 yards of maximum length, and an average bulk - e.g. 1000 ends of 10/2 cotton.

The material used will be any good hardwood with streight grain, kiln dried if seasoned wood is not available. All parts of the rotating frame as well as of the base are made of 2 by 2 finished on all sides, which means about $1\frac{3}{4}$" after finishing. In all we shall need about 60 running feet of this lumber.

Fig. 1 shows the parts for the rotating frame. In this case they are held together at the corners with 5/16 bolts (2" long), but a more ambitious craftsman can make if not better, at least a better looking joint. Pieces B and C are joined with 1/2" bolts, 8" long, threaded nearly on the whole length. This length will be necessary to install an automatic feed later on.

Fig. 3 and 4 explain the construction of the base. The same 3/16 bolts are used here.

To make the cross or crosses (depending on the method used) we must have two additional pieces (fig. 5) attached to the rotating frame. The pegs can be made from an old broom handle.

The last piece at this stage is the brake (fig. 6) Two discs are cut from 5/8 plywood, one with $\frac{1}{2}$" hole in the centre, the other

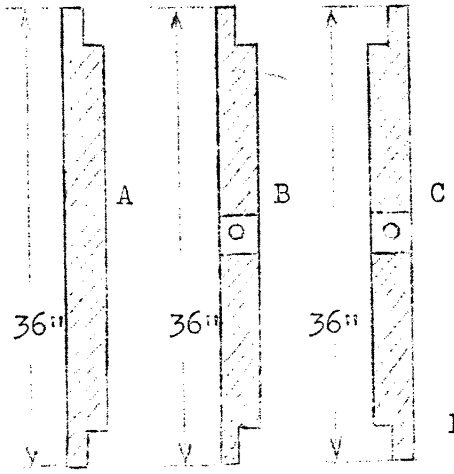


Fig.1

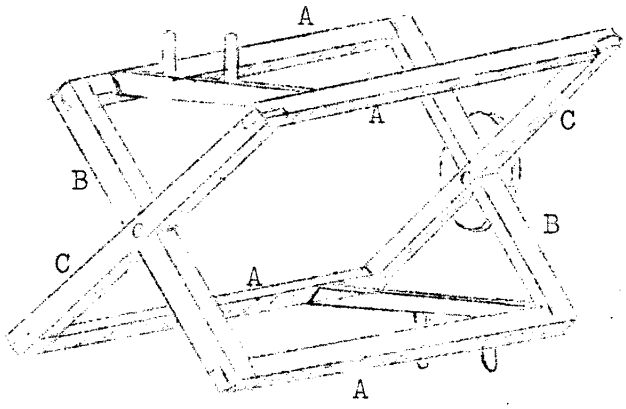


Fig.2

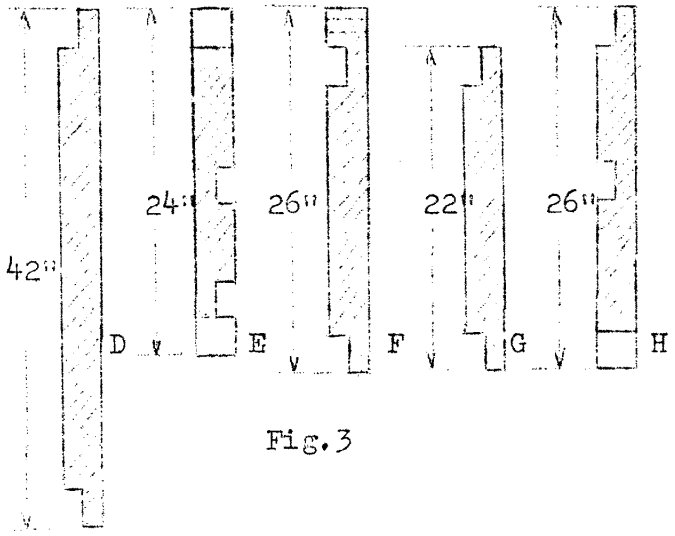


Fig.3

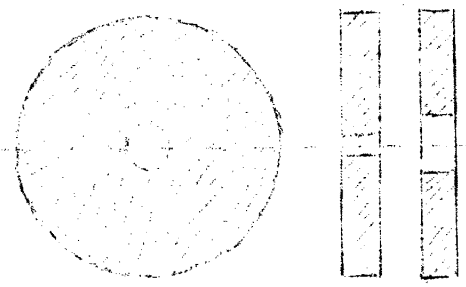

Fig.6

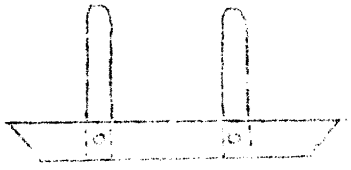

Fig.5

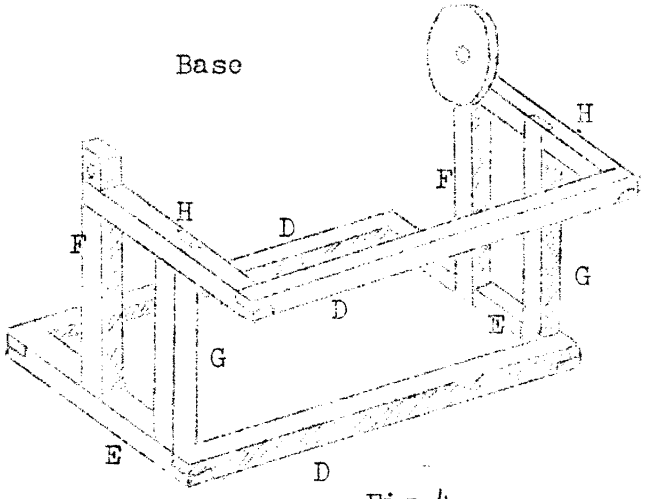


Fig.4

Only all over dimensions are given. Other can be figured out during work.

with 1" hole. One of those discs is screwed to the side of the frame (fig.2) and the other (with the larger hole) to the base (fig.4)

Now we can start to assemble the reel. The base comes first with the brake secured with at least three heavy screws to the pieces F and G. Then we do the same with the rotating frame (4 screws on the braking disc), but we do not insert the long $\frac{1}{2}$" bolts.

Then the frame is placed inside the base, so that the holes in the pieces B and C are in line with the holes in F. One $\frac{1}{2}$" bolt is inserted from the inside through the frame, then a washer and nut, and finally through F in the base. It has to be screwed into the nut held in place until the whole bolt passes through. Then it is tightened and a similar operation repeated with the second bolt. If the frame and the base were properly assembled, the frame should turn in the base without any effort, the two braking discs being about $\frac{1}{2}$" apart.

For the warping it is all we need, but the beaming directly from the reel requires tension, and the brake will furnish it. To engage the brake we need an additional nut and washer on the outside of the long bolt protruding from the base. We can tighten this nut as much as wanted, thus regulating the tension of warp.

Now the warping is done exactly as in case of a vertical reel, but if we want to use the reel for beaming as well, it is important to make the warp very carefully, winding the ends without crossing and without piling them all in one place. Later on, when we shall add the automatic feed, this will not be necessary.

There are two ways in which our reel can be used:

1) The warp is made with one cross only. The reel is placed more or less to the front of the loom but not directly in front. The brake set for a very light tension - just enough to prevent the frame from turning by itself. The lease rods are untied on one end, put through the cross ( still on the reel), tied, and then the end of warp is released from the pegs (by loosening the bolt). We carry the lease rods to the loom, tie them to the frame, spread the warp on a raddle placed on the slabstock, and tie it to the back apron.

Now one person stands in fron of the loom, as far from it as possible, holds the warp in both hands and walks to the loom, while the other person is turning the warp beam. The warp will gradually unwind from the warping reel.

2). The warp is made with a cross at each end. Then the reel is somehow fixed to the floor or otherwise attached, so that it cannot move. The simplest way is to take two 4" wood screws, cut off the heads and bend the ends (fig.7), then to select a place for the reel, directly in front of the loom and as far as possible, and drive the screws in the floor, so that they will held the back beam of the base. The holes in the floor should be drilled first (3/16 drill for a $\frac{1}{4}$" screw) - then they hardly show at all. The screws are removed by turning the bent end, when the beaming is finished.

Now we proceed as before, but with much higher tension, i.e. much tighter brake. We shall need one attachment to keep the warp centered in the loom. This consists of two pegs driven into a piece of wood about 3" apart (fig.8) This " gatherer" should be tied to the centre of the breast piece of the loom. The warp with the lease rods in place is unwound just enough to reach the back of the loom, the lease rods tied to the frame, and the warp placed between the 2 pegs of the gatherer (fig.9). Now it must be spread and laced to the back apron in

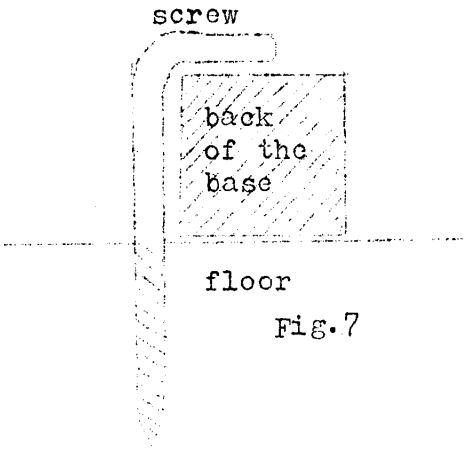


Fig.7

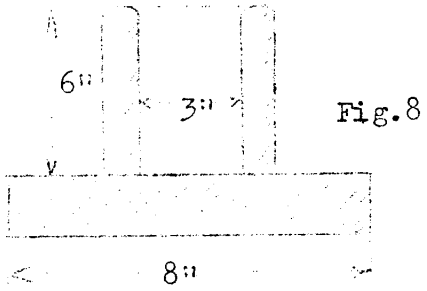


Fig.8

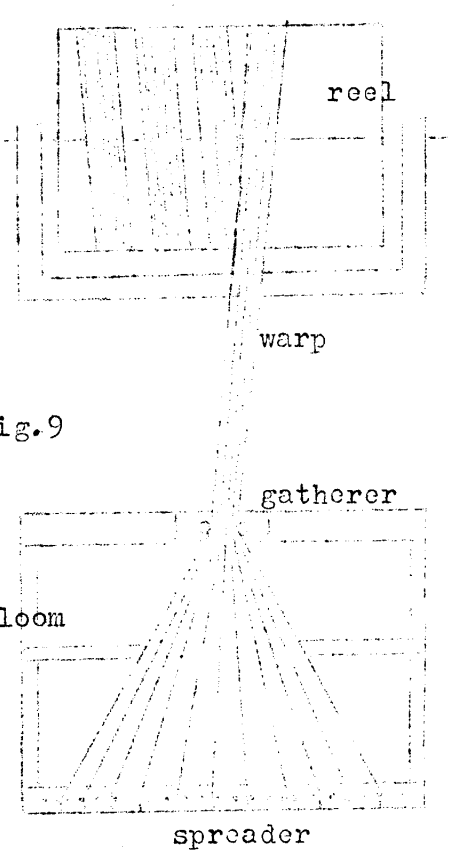


Fig.9

such a way that the tension of warp will be even on the whole width. This is done with a long piece of a rather smooth string, which is pulled alternately through the loops in strands of warp (all strands of about the same width), and through the holes in the apron, or around a steel rod if there is one attached to the apron.

At this stage the lease-rods are removed. After having made sure that the tension of warp is even, or correcting it by adjusting the lacing string, we may start beaming. If the warp has been properly made the beaming may proceed at any speed, particularly if a roll of paper is used to separate the layers of warp. When working with sheets of paper their sdjusting takes more time than the actual beaming. The paper in rolls may be either heavy wrapping paper, or building paper (not treated with anything). The latter is quite cheap and satisfactory. Care must be taken to start a roll straight or the paper will always have a tendency to go to one side.

This is of course the most efficient method of beaming, since it does not require any help, and since it goes as fast as the warp beam can be turned.

On the other hand the warping itself is longer than usual, because the warp must be prepared very carefully. In the next issue of HW we shall describe a "heck-block" or an automatic feeding attachment, which will take care of this part of our work, and which will let us do the warping in a much shorter time.

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