



able to the mill. Goods spoiled by such a person will soon make him a most expensive fixture to the finishing department. A competent shear-tender, besides, if possible, being somewhat of a mechanic, must in all cases be a person who attends strictly *only* to his vocation while the shear is running; he must watch his machine only and pay no attention to other affairs in the room. He must be a person capable of saying whether a piece under operation is sheared sufficiently or still needs one or more runs; he must be able to match the fabric under operation to a sample given him to go by; he must be able to sew (thread) the fabrics to be sheared by him so that they will not wrinkle, *i. e.*, so that they permit him to shear as close as is possible to both ends of the piece, without cutting in the fabric or making shear marks, which will be the case provided the cloth is allowed to wrinkle; giving in turn to the mill every possible inch of finished length of cloth in the piece. For this reason, the stitches must be made fine and regular, a mill sewing machine being a very valuable adjunct for this work. It will be readily understood that a careful shear-tender, even at higher wages than a boy, or a careless person, will soon repay his cost to the mill.

**The object of shearing** is to level the nap, as previously raised by means of gidding, napping, or brushing, on the face of the fabric, this nap, or pile, is, of course, more or less irregular in length and has to be sheared off level to different lengths in different fabrics, to permit the certain finish required by the particular fabric under operation to be produced. In some instances, the nap or pile is completely sheared off, in order to produce what is called a "*clear face*," or "*threadbare*" finish on the face of the fabric, in which case, the interlacing of the threads producing the weave or pattern is clearly shown; whereas in other instances, a short nap is left, standing more or less erect on the face of the fabric, to produce what is termed a "*velvet finish*;" again in connection with some fabrics, the nap or pile may be required to be laid down on the face of the fabric, producing in this manner what is known as a "*face finish*" to the fabric. In the latter two instances, the interlacing of warp and filling is not discernible, neither the individual threads, both being hid, or covered, by the pile or nap on the face of the fabric.

**Preparing goods for the shear.** After the goods have passed through the wet finishing process and are dried, they should then be back-burled, preparatory for shearing, that is to say, have all knots or bunches removed that may be found upon the back of the cloth and which may have been overlooked in the burling as was done before fulling, so that there will be no chance for holes being cut in the cloth, caused by said knots or bunches raising the face of the fabric when it is going over the rest. Although the first

burling, if carefully done, should insure us against the necessity of this extra back-burling at this point, still it is well to do it, since there may be found some small threads and bunches which have not been noticed in the first burling, which during the process of wet finishing have become enlarged. It must be remembered that most any bunch upon the back of the cloth is apt to be the cause of a hole, or, at least, a shear mark in the cloth, in the process of shearing.

We next take the piece from the back-burlers and put it into the shear, taking care to get it as straight as possible, in order to avoid chances for wrinkles and to keep it running straight during the process of shearing. To impart a uniform appearance to goods of the same style, *i. e.*, so that they shade exactly alike, requires skill and taste, as well as good judgment on the part of the shear-tender; he must remember that no matter how perfectly every previous process the fabric has passed through was performed, that only a slight variation in the amount of shearing will cause a corresponding change in the appearance of the goods. Goods of one order batch, no matter how well manipulated the mill, will always vary somewhat in their weight, a point which needs consideration by the shear-tender, from the fact that any variation in the weight of the goods, will call for a variation in the treatment by him, in order to insure a uniform appearance amongst the number of pieces comprising the order. For example: Among two pieces of the same style, one may have come  $\frac{1}{2}$  oz. lighter in weight from the loom than the other, and while the fuller rectified this difference, either by shrinking the lighter fabric sufficiently less in length or flocking it sufficiently heavier in order to balance the weight required, still they will not shear exactly alike. One piece may need to be sheared with the blades a trifle lower than on the other, or, on account of a denser nap occasioned by the difference in the fulling, it may be necessary to give the one fulled heavier one or two extra runs on the shear, so as to properly clear its face, work which, as will be readily understood, requires experience as well as good judgment on the part of the shear-tender, in order to be able to obtain the best results. The overseer certainly may assist the man in difficult cases; however, as a rule, he has other work to look after, which will not admit of his troubling with average variations in the goods, for which reason, in order to insure the best possible results, the shear-tender must be thoroughly competent, under the direction of the overseer, to attend to such affairs himself.

To a great extent, the skill required by the shear-tender varies with the kind of goods made by the mill. For this reason, for example, with some styles of dress goods, or light-weight cheviots, and with others where only a slight cropping is all that is needed, little change, if any, as to the setting of the

blades will be required, whereas in connection with goods requiring considerable gigging, for example, fancy cassimeres and face goods, more skill on the part of the shear-tender will be required. In connection with such goods, care should be taken to set the blades up so that they can accomplish the work well, since, if set too low, more nap will be delivered to them than they can properly cut, the blades in turn pulling, *i. e.*, drawing out some of the nap from the fabric, besides wearing out the blades more than is necessary. Set the blades well up, lowering them in turn gradually, allowing them at the same time to cut the nap of the fabric under operation clean and even, as the work proceeds. It is best to lower the blades gradually; and if the required clearness can be obtained by several runs, with the blades in one position, this is more preferable than to lower the blades another notch, as it leaves a soft, velvety face to a fancy cassimere, and an even finish upon face goods.

It is necessary for the shear-tender to save a sample of each style, by which to shade, the other pieces of the same style, in order to get the number of pieces comprising the lot as near alike as to shade as possible, in turn avoiding variations in the appearance of the face of the goods, which will appear in different pieces if depending upon memory or judgment only. A slight difference in the light, often leads to misjudgment.

**The construction of a shear.** Before going into any further details, it will be well to give a description of the construction and operation of the shear, a feature best explained in connection with the accompanying illustration, Fig. 1, being a diagram showing in outlines, the construction and working parts of what is known as a "single shear" (taking the Parks & Woolson Shear as a model). In said illustration, the dotted line *A* represents the run of the cloth, to be sheared, through the machine. The same, as received from the back-burling, is then placed in an open folded condition into the scray *B* of the machine. Next, the front end is passed up over guide rod *C*, then down around another guide rod *D*, to a front draft break roll *E*, which, with another guide rod *F*, acts to put tension on the cloth as it is passed to the shearing mechanisms. From the rod *F*, the cloth passes upwardly and over a guide rod *G*, then around a specially shaped brush rest *H*, which puts the cloth in position to have its nap, on the face, raised to a perpendicular position by means of raising brush *I*, and in which condition the cloth travels to the cloth rest *J* of the shearing mechanism. The brush rest *H* is made adjustable, so that the cloth can be given more or less raising (brushing effect) as may be required. In passing from the brush rest *H* to the cloth rest *J*, the back of the cloth is operated upon by a flock brush *K*, provided for the cleaning off of any loose threads, flocks, etc., from that side of the cloth, so that they will

not get under the cloth at the cloth rest *J* and lift the corresponding places on the face of the fabric into the path of the blades of the shear cylinder *L*.

The shearing mechanism consists of the cloth rest *J*, over which the fabric passes, the ledger blade *M* which acts as the lower part of the mechanism for the actual shearing, and the shear cylinder or revolver *L*, which is made up of a series of spirally placed blades, with their cutting edges extending the same distance from the centre, said shearing cylinder being revolved at a high rate of speed.

After leaving the cloth rest *J*, the fabric then passes down past a guide roll *N* and under two rolls *O* and *P*, and up again over a guide roll *Q*. A laying

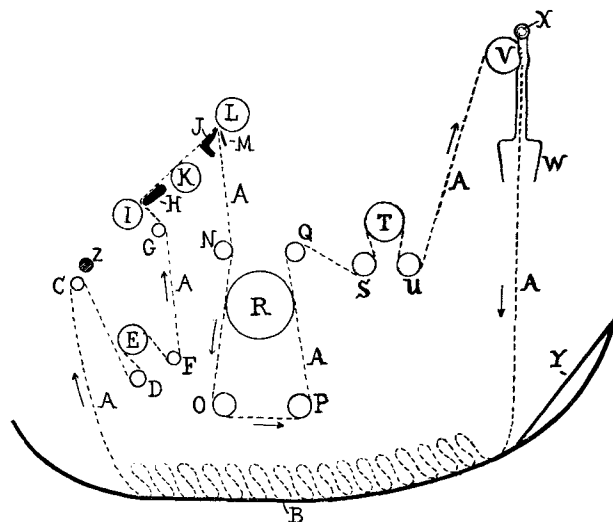


FIG. 1.

brush *R* is conveniently placed, so as to act on the face of the fabric twice, and which brush thus does the work of two single contact brushes. From the guide roll *Q*, the cloth passes under a guide roll *S*, then up over a draft roll *T* and down again under another guide roll *U*, and from there it passes up over a folder roll *V* to the folder *W*, which is given a vibratory motion, using the point *X* as a pivot for this motion. From the folder, the cloth drops back into the scray *B*, until, on the final run through the machine, it is folded, as shown in the illustration Fig. 2 on the table *Y*, which, when not needed, is turned out of the way. *Z* indicates the shipper rod, extending across the front of the machine, being connected at one end to the shipper lever so that the machine can be stopped or started by the operator from either side.

The other style of shears met with, are those known as "double shears," the same being simply two single shears set tandem on the same frame, the two sets of blades being stationed at different heights on the machine, in order to permit the operator to watch both cutting lines at the same time. In connection with work requiring but one or two runs, the single shear certainly has its proper place

in such a mill, still at the same time, it remains a question whether it would not pay such mills, in order to get a better finish without loss of time, to install double shears, the extra price of a double shear being only slightly above that of the price of a set of extra blades. Since you need the latter anyway for emergency cases, this certainly speaks in favor of the double shear, and then no stoppage is possible, since in case of damage, etc., to one set, said double shear then can be run temporarily as a single shear until the other set is returned, repaired, or re-ground, etc., as the case may be, from the builder to whom it was shipped, or the repair shop of the mill in connection with larger establishments who employ competent mechanics for such purposes.

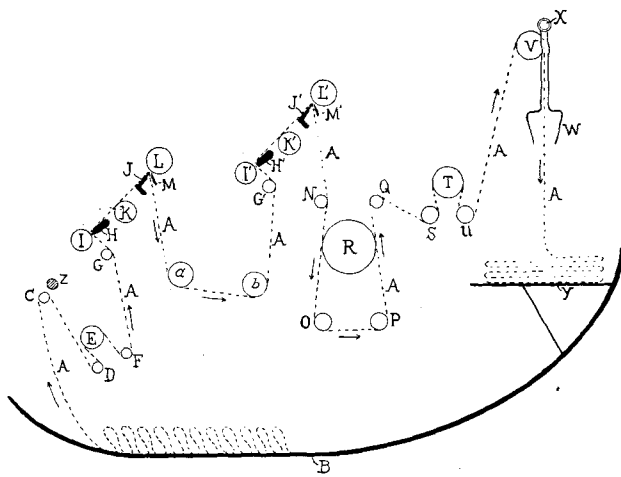


FIG. 2.

However, with the greater majority of our mills, the use of the double shear is an absolute necessity, all fabrics made there requiring absolutely more than one run through the machine, and when by the use of the double shear, double the amount of work, as compared to a single shear, can be done, and this with no additional expense for labor and at much less cost to install (one double shear being a great deal cheaper to install as compared to two single shears). A saving of room is also effected, one double shear requiring very little more room, and this in depth only, than a single shear, whereas each single shear calls for the same amount of light as a double shear does, *i. e.*, a claim for windows.

In order to illustrate to the reader the principle of construction and the working of a double shear, diagram Fig. 2 is given, showing the working parts of a double shear (P. & W. Model) in outlines. Letters of reference in this illustration are selected to correspond to those as have been used in connection with diagram Fig. 1, the second shear-set being indicated by prime (') signs. Two additional rollers *a* and *b* are needed to transfer the fabric from the first cutting arrangement (*J, L* and *M*) to the second cutting arrangement (*J', L'* and *M'*), and of which roller *a* is a guide roll and roller *b* is a draft roll.

**A few practical points.** A shear must be set firm and level on its feet, so that there will be no twist or other stresses in the blades or rest, and so that all bearings will run free. Machine builders do not advise bolting of the feet of the machine to the floor.

Another good suggestion is thus: Level right and left by the edge of the rest. If the rest is not in proper position, place the level on the driving shaft. Level front to back by the top of the main frames of the machine.

A steel straight edge is an absolute necessity to the finisher, since without it, in connection with the setting, grinding and running of the shear, he is at sea. Although straight edges can be had in all lengths, those carried in stock by the builders are 72 to 80 inches, 66½, 60½, 38½ and 32½.

The proper position of the raising brush *I* is often overlooked, which is a big mistake, and often times the cause of uneven shearing. It should be set just close enough to raise the fibres lightly and on each side alike, for if the one side raises more than the other, it will cause it to shear lower on that side of the fabric. Do not force the fabric too hard against this raising brush *I*, since in this way, the nap of the cloth would get reversed from the way as laid at gigging. The proper way to adjust this brush is to have it raise the nap as nearly straight as possible on the cloth, so that the shear blades can act on the nap to the best advantage. When this brush gets badly worn and will not raise the nap uniformly all across the width of the cloth, the brush must be cut down to make it cylindrical, or when in too bad a condition for having this done, refilled.

Flocks, as accumulating in the flock-pan of the back brush *K*, must be removed regularly, because if said pan is allowed to become too full—in connection with the steel rest—flock-holes are liable to be made.

In passing the seams through, the blades must be lifted, but on no consideration should they be let down with a plunge, because this action puts the rest out of its proper position. The seams should be very carefully sewed, using a mill sewing machine for this purpose, it will pay for the extra trouble it may take to do this. When the seam comes along, permit the same to run up as close to the shear-blades of the revolver as can be done, without cutting the seam, and when then the revolver is lifted quickly. After the seam has just passed between the rest and the blades of the revolver, let the latter down quickly but without any jar, a feature which must be positively avoided since continued jarring, caused by letting down the blades harshly, will in time affect the setting devices of the revolver, and which will become out of true, with the consequent result of uneven work.

(To be continued)