

(No Model.)

T. H. WORRALL.  
CIRCULAR PLUSH GOODS KNITTING MACHINE.

No. 459,902.

Patented Sept. 22, 1891.

Fig. 1.

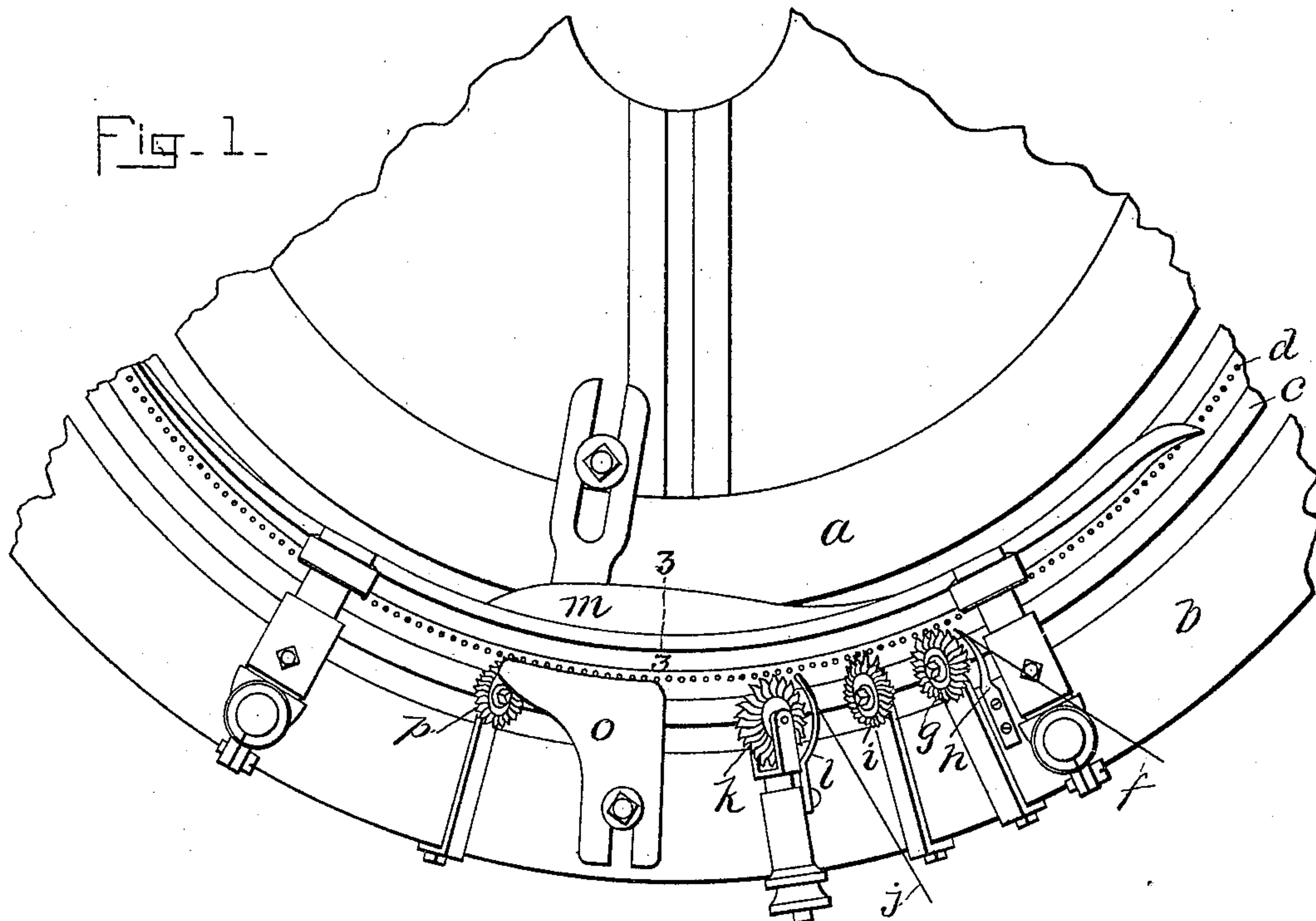


Fig. 2.

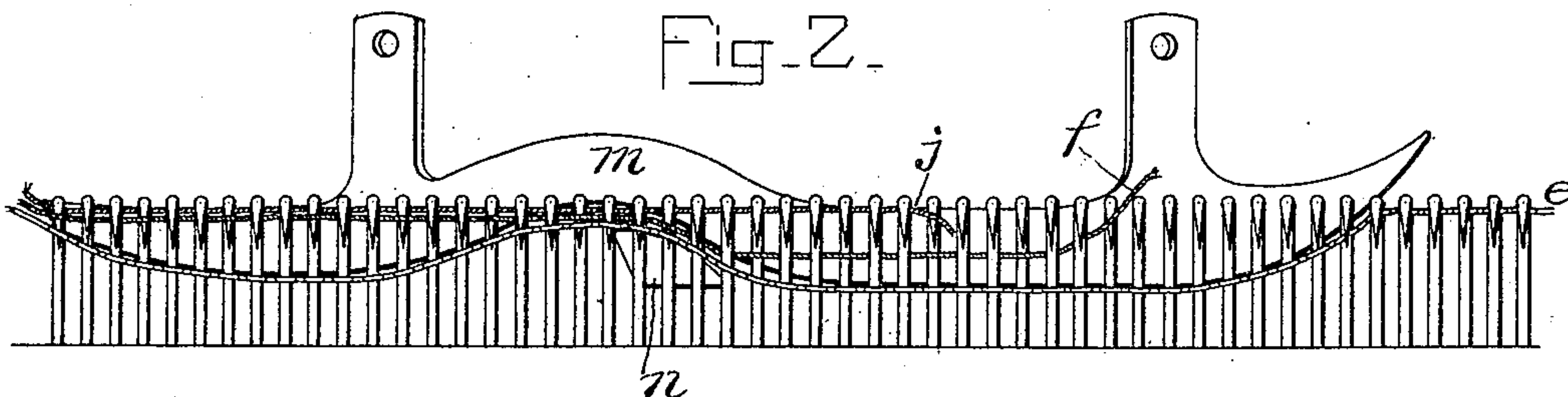
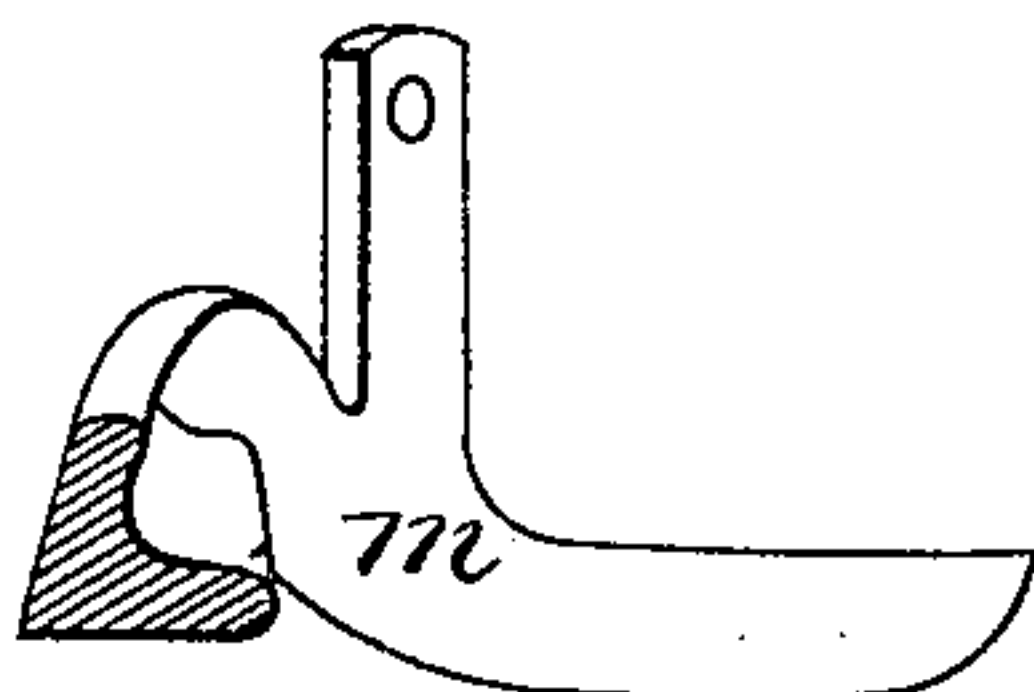


Fig. 3.



WITNESSES:

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# UNITED STATES PATENT OFFICE.

THOMAS H. WORRALL, OF LACONIA, NEW HAMPSHIRE.

## CIRCULAR PLUSH-GOODS KNITTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 459,902, dated September 22, 1891.

Application filed August 6, 1890. Serial No. 361,173. (No model.)

*To all whom it may concern:*

Be it known that I, THOMAS H. WORRALL, of Laconia, in the county of Belknap and State of New Hampshire, have invented certain new and useful Improvements in Circular Plush-Goods Knitting Machines, of which the following is a specification.

My invention has special reference to knitting-machines of the class adapted to knit plush-back fabrics—such machines, for instance, as are illustrated in United States Letters Patent to Kent and Leeson, dated March 9, 1875, No. 160,685.

It is the object of my invention to provide improved means for raising the plush-thread and passing it over the points of and upon the beards of those needles in front of which it is laid. Difficulty has been met with in raising the plush-thread, as just mentioned, from the fact that the means employed to accomplish this end have been liable to engage the fabric also, resulting in the breaking of needles and other injuries to the machine, as well as damage to the goods being produced.

My invention consists of a push-back so constructed as to render certain the position of the fabric and threads at the point where they are to be operated upon and also relieve the stitches from undue strain at all points.

The invention also consists of improved means for raising the plush-thread over the beards of the needles in front of which it passes.

The invention will first be described in connection with the annexed drawings and letters of reference marked thereon, forming a part of this specification, and then be pointed out in the appended claims.

In the said drawings, Figure 1, is a plan view of so much of a knitting-machine as it is necessary to show in order explain my improvements which are applied to the machine. Fig. 2 is a front view of a number of needles, showing my improved push-back therebeyond, the yarns or threads in position in the needles, and the push-up shoe. Fig. 3 is a sectional detail taken on the line 3 3 of Fig. 1.

Similar letters of reference designate similar parts or features, as the case may be, in all of the views.

In the drawings, *a* designates the inside stationary frame, *b* the outside stationary

frame, and *c* the revolving cylinder, of a commonly-organized knitting-machine provided with spring-beard needles *d*.

*e* in Fig. 2 is designed to represent the stitches forming the edge of the fabric being produced.

*f* designates the plush-thread, which is introduced by the plush-wheel *g* from the yarn-guide *h*, said wheel operating to lay the plush-thread behind two needles in front of the next following, behind two next following the one in front of which the thread is laid in front of the next following, and so on, as is clearly represented at the right in Fig. 2. This wheel *g* may be of any suitable construction to accomplish the function just mentioned, and in addition thereto, in conjunction with the clearing-wheel *i*, to carry the plush-thread down far enough upon the stems of the needles to permit the binding-thread *j* to be introduced under the beards of the needles, as is common in the production of fabrics of the character mentioned. The binding-thread *j* is introduced beneath the beards of the needles and carried up thereunder by the wheel *k*, receiving yarn from the yarn-guide *l* and operating substantially as an ordinary stitch-wheel.

For the sake of clearness of illustration and description I have omitted to show the usual stitch-wheel, dividing-wheel, presser, landing, and knocking-over wheels which are common in the production of an ordinary knit fabric, these devices having nothing to do with my present improvement.

*m* designates the push-back, which is constructed as a single piece or part and supported from brackets connected with the outside stationary frame or ring *b*, as is clearly shown in Fig. 1, though it might as well be supported from under the stationary part of the frame. The contour of the lower edge or operating-face of the push-back is such as to depress the fabric before the plush-thread is introduced into the needles, keeping it depressed until after the binding-thread is introduced into the needles, when it curves upward, permitting the fabric to be drawn up on the needles at the point where the plush-thread is to be carried over upon the beards of the needles and then curved down again to permit the regular knitting-



thread to be introduced into the needles and to allow of the operation of the dividing-wheel, when it curves upward again to a point above the needles, permitting the ordinary pressing, landing, and knocking-over wheels to perform their functions. From the point at which the operating-face of the push-back commences to curve upward after the binding-thread has been laid into the needles to the point where it returns to a low line to permit of the action of the stitch-wheel said operating-face is broadened on a horizontal line, as is clearly represented in Fig. 3, the extent of such broadened surface corresponding substantially to the degree of upward curve of the operating-face. This broadening of the operating-face of the push-back has a twofold purpose, one of which is to take up the slack of the fabric at this point which would otherwise occur, and the other is to avoid drawing the stitches on the edge of the fabric at a sharp angle round the operating-face of the push-back at the point where the plush-thread is carried up on the beards of the needles.

*n* designates a push-up shoe arranged beneath the push-back *m* at the point where it curves upward and adapted to engage the fabric and push it up on the needles, as will be clearly understood by inspection of Fig. 2. The push-up shoe *n* is preferably supported upon the inner stationary frame *a*.

*o* designates a shoe-presser supported, as here shown, upon the outside ring or frame *b* and constructed and arranged to engage the beards of the needles and press the same inward at the point where the push-up shoe operates upon the fabric to raise it and the plush-thread *f* to the highest point limited by the push-back between the wheel *k* and the point where the usual stitch-wheel operates. The pressing of the beards of the needles by the shoe-presser *o* and the raising of the fabric and plush-thread *f* by the push-up shoe *n*, assisted by the tension on the fabric caused by the operation of the take-up mechanism, (not shown,) effects the carrying of the plush-thread over and up onto the beards of those needles in front of which the said plush-thread was laid.

*p* designates a clearing-wheel, which operates in conjunction with the push-up shoe *o* to insure the carrying up of the plush-thread upon the needles should it from any cause have a tendency to "hang" thereon. After the plush-thread has been carried up on the beards of the needles the fabric is depressed by the push-back, all as hereinbefore explained.

By constructing the push-back of a single piece I am enabled to make it stiffer and to more certainly maintain its position with respect to the line that it is desired the fabric and plush-thread should take than if the same were constructed in two parts, as has been proposed heretofore, and by broadening the operating-face of the push-back at its raised or upwardly-curved part I am enabled to maintain an equal tension upon the loops

upon the needles comprising the edge of the fabric, and by employing the push-up shoe to raise the fabric and plush-thread on the stems of the needles I am enabled to bring the same into such position that the clearing-wheel *i* may be employed with certainty of not engaging the fabric or injuring the needles or other parts of the machine; and by the use of a shoe-presser instead of a wheel I am enabled to operate upon a greater number of needles to press in the beards of the same, so that should the plush-thread be from any cause drawn up on the stems of the needles before the fabric reaches its highest point said thread will still be carried over and upon the beards of the needles.

It is obvious that other forms of wheels than those shown may be employed for introducing the plush and binding threads, and that other changes may be made in the arrangement and form of parts comprising my improvements without departing from the nature and spirit of my invention.

Having thus explained the nature of my invention and described a way of constructing and using the same, I declare that what I claim is—

1. A push-back for knitting-machines, having its working edge or face broadened at its upwardly-curved point, as set forth.

2. A push-back for knitting-machines, having its working edge or face broadened at its upwardly-curved point, the extent of such broadened surface corresponding with the extent of the upward curve, as set forth.

3. The combination, with the stationary frame, the revolving cylinder and needles, and means for introducing a plush-thread into the needles, of a push-back constructed of a single piece or part and having its working edge or face upwardly curved at a point intermediate of its ends, a push-up shoe *n* beneath the push-back at the upwardly-curved point, and a needle-presser to press the beards of the needles at the upwardly-curved point of the push-back, as set forth.

4. The combination, with the stationary frame, the revolving cylinder and needles, and means for introducing a plush-thread into the needles, of a push-back constructed as a single piece or part and having its working edge or face upwardly curved at a point intermediate of its ends, a push-up shoe *n* beneath the push-back at the upwardly-curved point, a needle-presser to press the beards of the needles at the upwardly-curved point of the push-back, and a clearing-wheel *p* to co-operate with the push-up shoe *n*, as set forth.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 23d day of July, A. D. 1890.

THOMAS H. WORRALL,

Witnesses:

HORACE S. HUTCHINS,  
ARCHIE MERCHANT.