

O. S. HOSMER.
Darning-Machine.

No. 162,656.

Patented April 27, 1875.

Fig. 7.

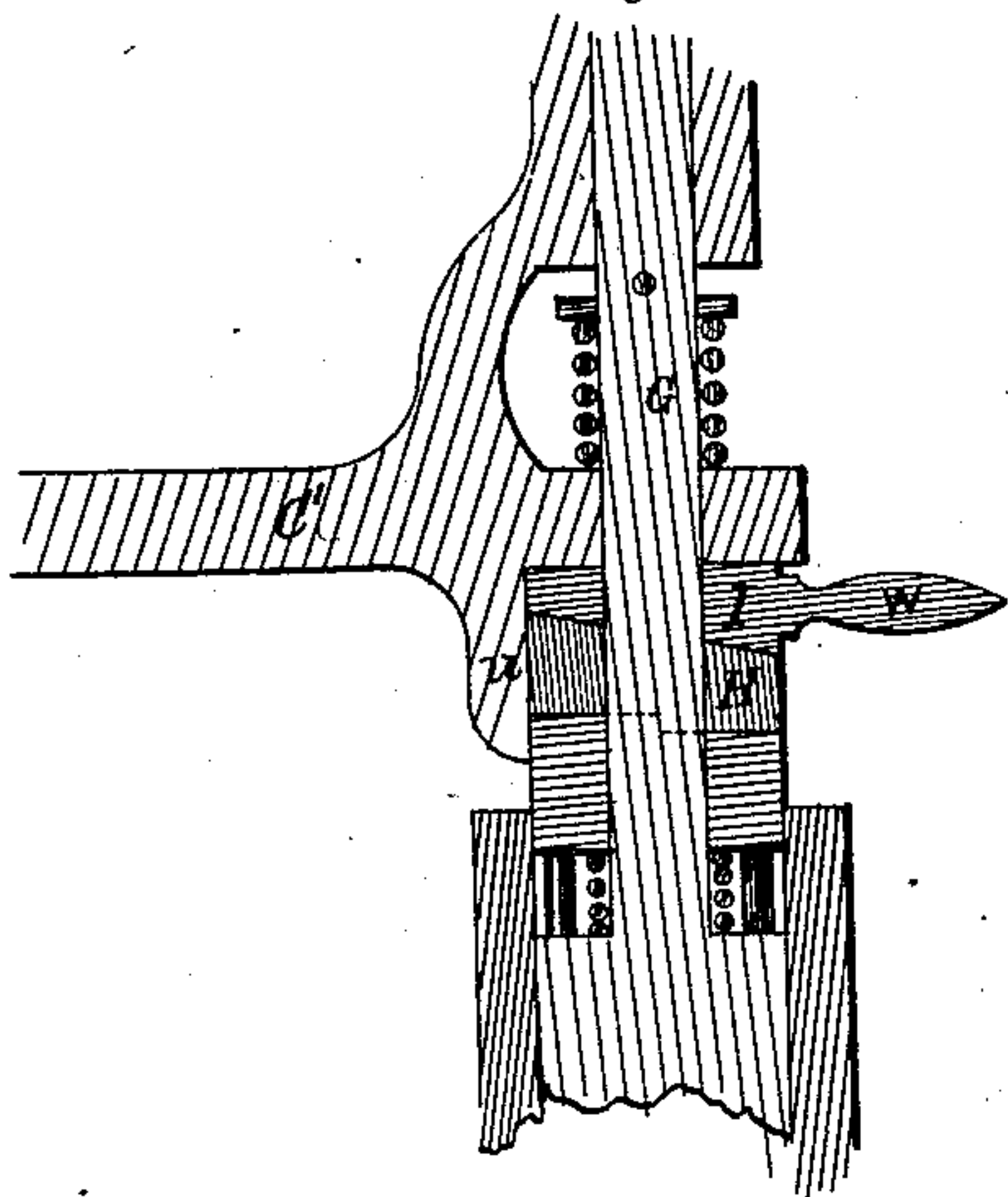


Fig. 6.

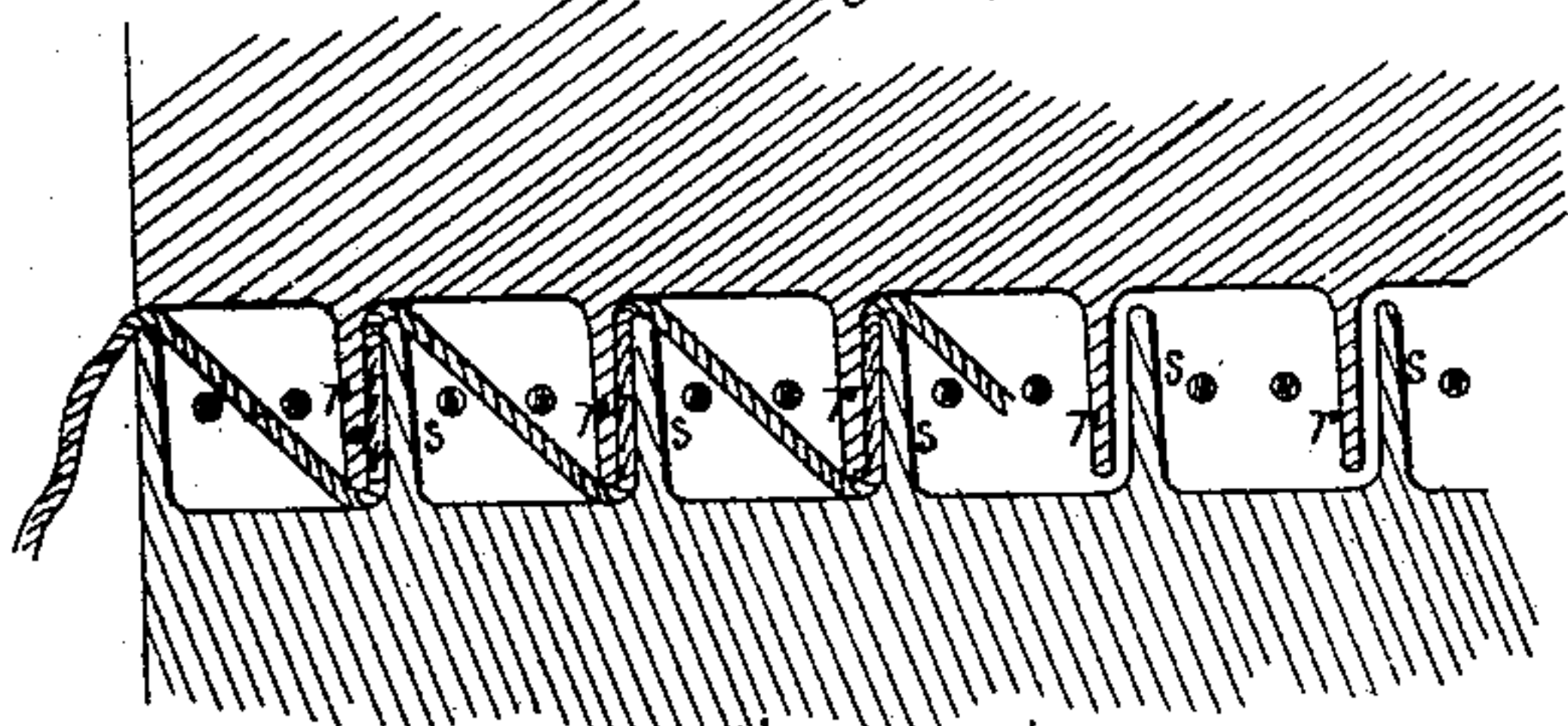


Fig. 5.

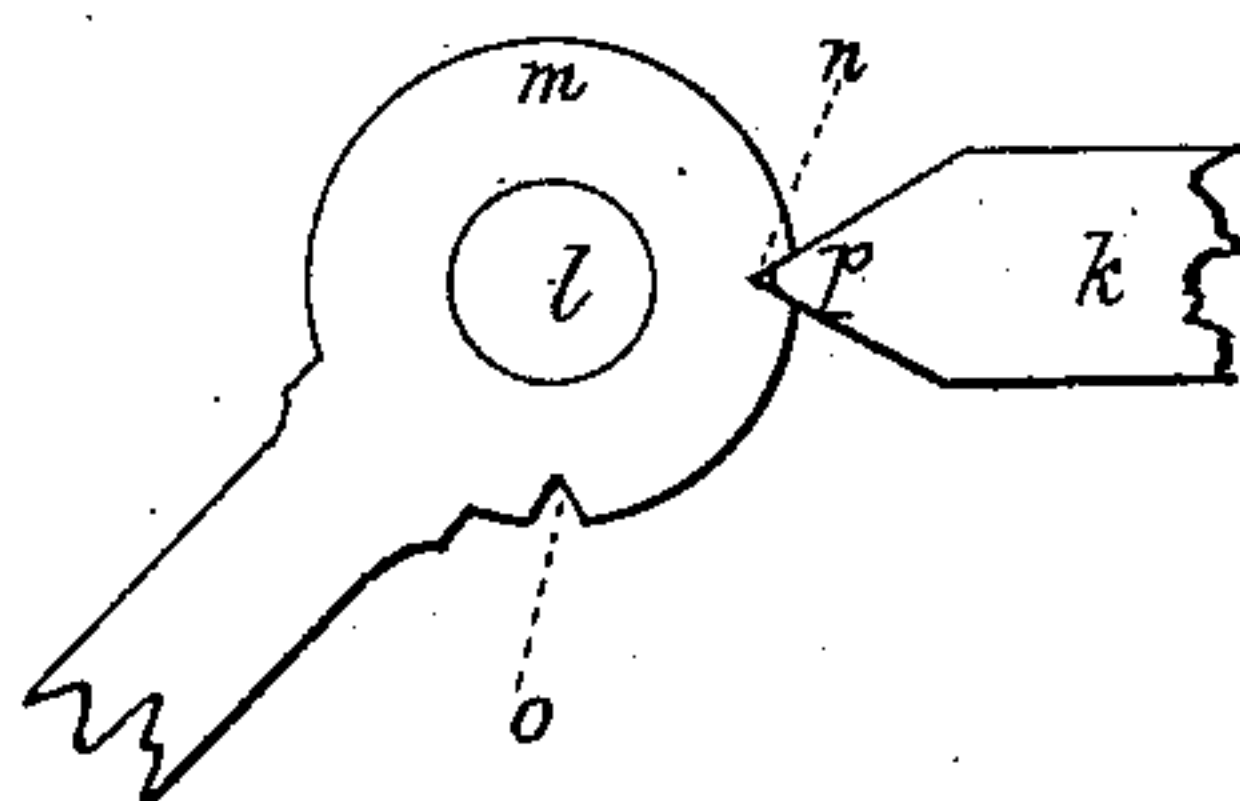


Fig. 4.

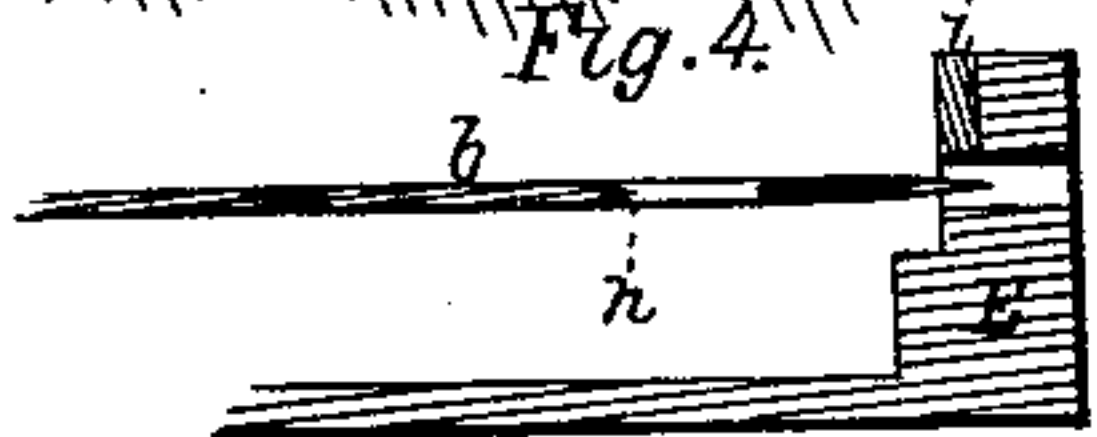


Fig. 3.

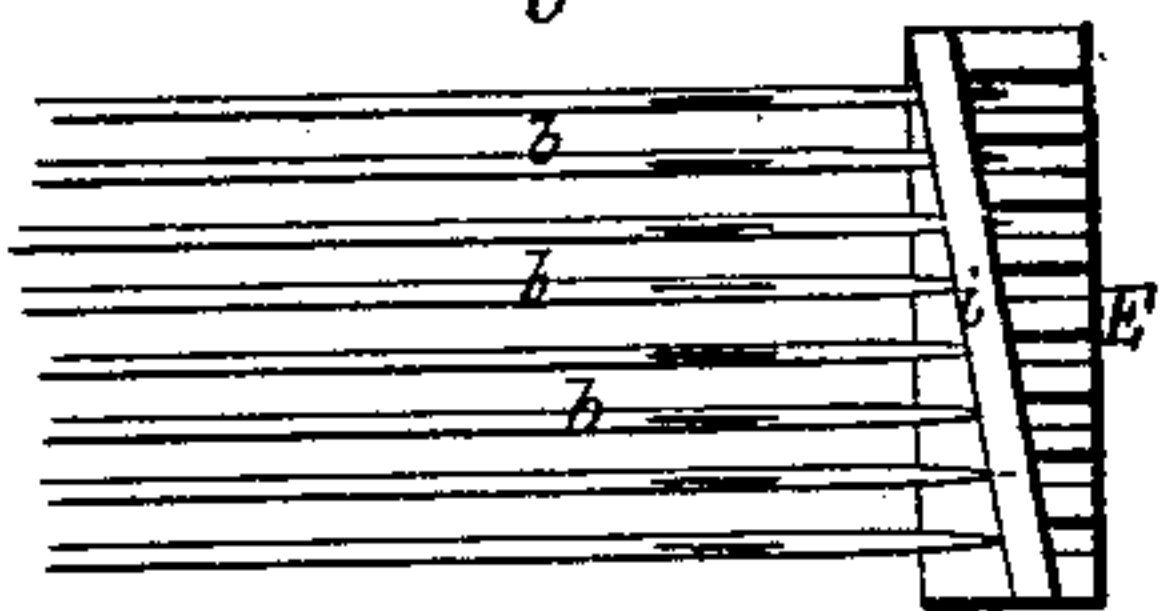


Fig. 2.

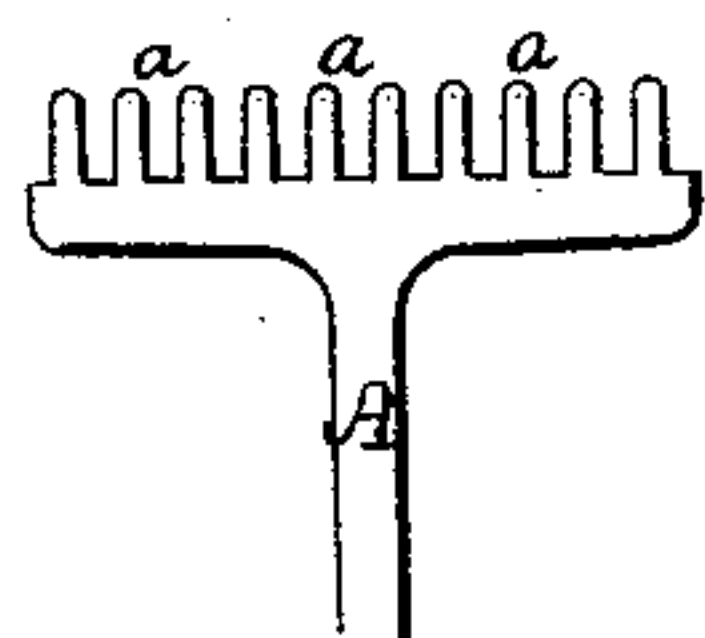
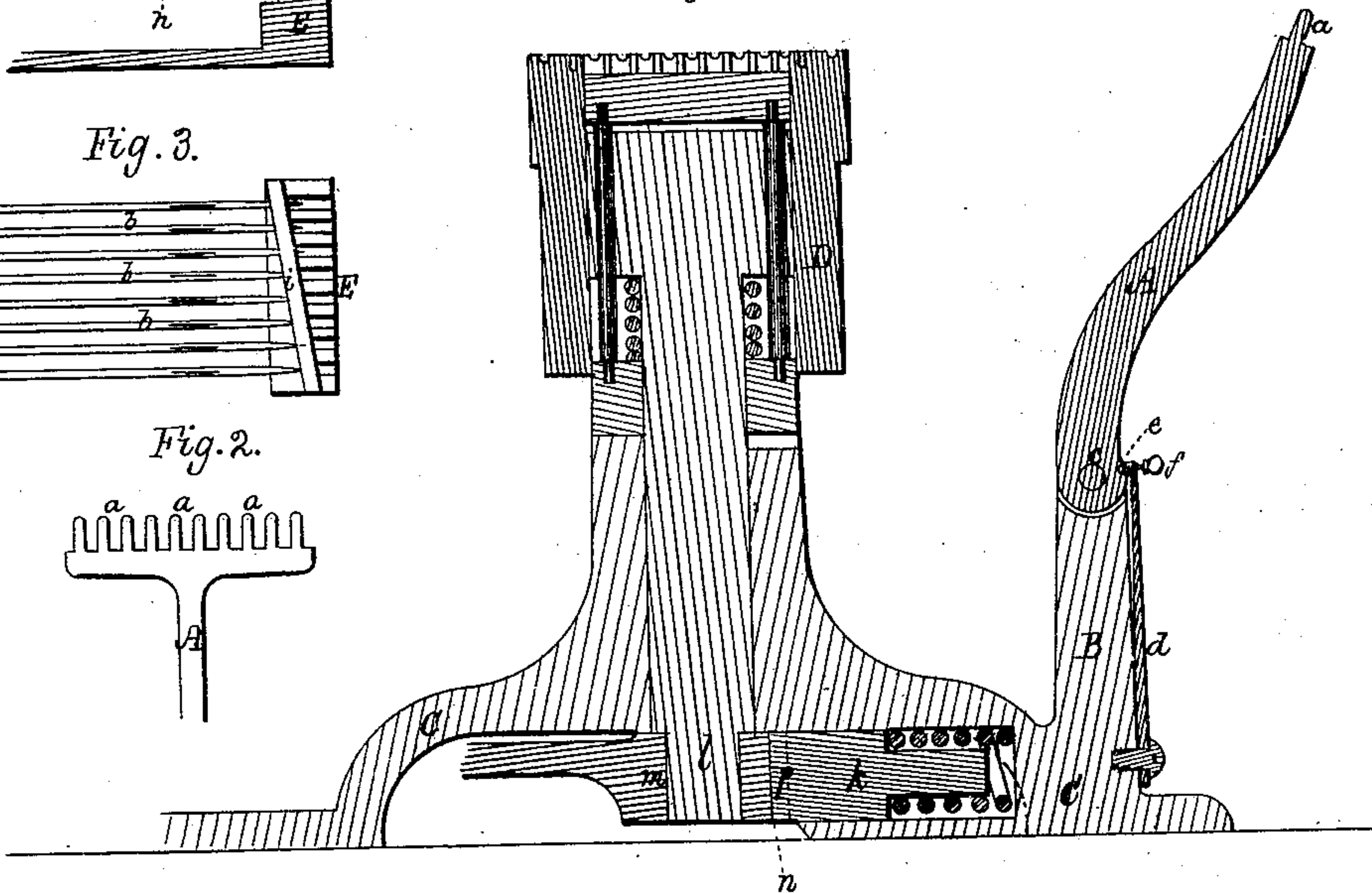


Fig. 1.



WITNESSES.

H. Hummewell.
H. Boardman

Orin S. Hosmer.
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UNITED STATES PATENT OFFICE.

OREN S. HOSMER, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO CYRUS CARPENTER AND EDWIN STRAIN, TRUSTEES, OF SAME PLACE.

IMPROVEMENT IN DARNING-MACHINES.

Specification forming part of Letters Patent No. **162,656**, dated April 27, 1875; application dated November 4, 1874.

To all whom it may concern:

Be it known that I, OREN S. HOSMER, of Boston, Suffolk county, Massachusetts, have invented certain Improvements in Machinery for Darning Garments, &c., of which the following is a specification:

My invention relates to machinery for darning stockings and other articles, for which I received Letters Patent No. 154,483, dated August 25, 1874.

My present improvements contemplate the addition of the following elements: First, mechanism for cutting the yarns, after the withdrawal of the needles from the work; second, mechanism which will exert sufficient tension on the yarn to take up the slack of the loops while the needles draw the yarn between the dies; third, mechanism to lock in position the guide-cylinder or plungers when once adjusted, in order to prevent breaking the needles.

The above are the more salient features of my improvements. Others will be noted in the description, which I shall now proceed to give, of the manner in which my invention is or may be carried into effect.

The drawings accompanying this specification represent, in Figure 1, a vertical section of lower guide-cylinder and plunger and accessories of a machine for darning, of the character before named; Fig. 2, a view of the series of pins constituting part of the tension device; Fig. 3, a plan of the needle-guide, and Fig. 4 a section of the same, and of a needle, showing my method of cutting the refuse end of the yarn. Fig. 5 is a plan of the lower end of the stem or standard of the lower plunger with a disk and bolt combined with it, as hereinafter explained. Fig. 6 is a section of the working faces of the two plungers and tubular guide-cylinders or clamps, showing a new construction of parts to be duly explained. Fig. 7 is a section of the stem or rod of the upper plunger, with the parts immediately connected therewith, showing an adjusting device, to be hereinafter explained.

In these drawings, A represents an upright swaying or vibratory bar or arm pivoted at bottom to the top of a post, B, erected upon the base C of the machine, and in front of the

lower guide-cylinder, the bar A being formed at top with a series of spurs or points, *a a*, &c., in number and disposition corresponding to the needles *b*. The lower end of the arm A is practically a segment of a circle, of which its pivot *c* is the center, and a spring, *d*, is affixed at its lower end to the base of the post B, while the upper end of such spring wipes against the segmental periphery of the arm, and constitutes a drag or friction upon the latter.

In order to maintain the arm A in its normal position, remote from the cylinder D of the machine, I make a notch, *e*, in its lower part, and I form upon the free end of the spring *d* a spur, *f*, which takes into this notch a further addition, which I prefer to make to such spring, being a knob, *g*, by which the arm A may be freed from the control of the spring.

After the needles have been advanced between the dies and threaded, as explained in my patent before mentioned, the operator, with a small instrument, which may be provided for the purpose, or a large pin, pushes the yarn from between each pair of needles about one of the pins *a*. In this way a series of loops of yarn are formed, the object being to give each needle all the yarn needed, to enable it to perform its work properly, and to insure a measured equal and uniform supply of yarn to all the needles. This feature is valuable, whether the arm A be used as part of a tension or not. The loop-pins *a* may be set at various distances from the dies, according to the length which it is desired the loose ends of yarn projecting from the darned part shall have, and according to the size of the hole to be darned. In case the arm A is not used for a tension, the loops, after being formed, as described, may be slipped off from the pins *a*, preparatory to the backward movement of the needles. When it is used as a tension, the operator, after making the loops, as explained, advances the arm A sufficiently to release it from the hold of spur *f*.

As the needles are withdrawn, and the yarns drawn through the material, and across the hole to be darned, the arm A exerts a tension upon such yarns sufficient to yield to any undue strain upon them, and at the same time

takes up any slack which would otherwise exist, and constitutes a valuable addition to machines of this character.

In order to cut off the refuse ends of the yarns, as before premised, I reduce the inner boundary of the eye of each needle to a sharp edge, as shown at *h*, the result of which, as before stated, is that as each needle, after having been withdrawn to its fullest extent in the act of drawing the yarns through the material, returns, and the bend or loop of the yarn arrives at, and is obstructed by, the guide-plate *E*. The knife-edge *h* instantly severs the yarn which may be within each eye.

I prefer that the outer face *i* of the guide-plate *E* should be disposed obliquely to the path of movement of the needles in order that but one yarn shall be cut at a time, and thus lessen, to a great extent, the power required to effect the severing of the entire number of yarns simultaneously.

In carrying out the fourth portion of these improvements, in one practical manner in which the result may be accomplished, I add to the under side of the base *C* a spring-bolt, *k*, which plays in a chamber in such base, and I affix to the lower end of the shank or stem *l* of the lower plunger a concentric disk, *m*, in whose periphery I create two notches or indentations, *n o*, into one or the other of which the wedge-shaped nose *p* of the bolt enters and locks the shank, and with it the lower guide-cylinder and plunger, firmly in place, the two notches and the bolt being so arranged that the said guide-cylinder and plunger are held in one or the other of their operative positions.

The value of the bolt *k* and notched disk *m*, or their equivalents, consists, as before stated, in the fact that they prevent premature or accidental movement of the cylinders and plungers while the needles are within them, as, but for some precaution of this nature, many needles would doubtless be broken by beginners. I transpose the lips of the spurs of the plungers, or, in other words, in lieu of employing a furcated tooth or spur, as shown in my patent before cited, I employ simply a series of single lips or teeth, *r r* or *s s*, &c., and cause each tooth *r* of the series of one die to approach (when the dies meet) very closely the next adjacent tooth *s* of the opposite plunger, as shown in Fig. 6 of the accompanying drawings, the result being that each yarn, in lieu of describing a series of right-angular bends about each tooth of every furcated spur, as shown in my patent, passes from the lower edge of one tooth *r* of one plunger diagonally upward to and about the upper edge of the next adjacent tooth *s* of the opposite plunger, thence directly downward between the last-named tooth, *s*, and the adjoining tooth *r* of the first plunger, and so on, thus enabling me to introduce or employ twice the number of needles and yarns within a given space, and consequently produce a much more compact and durable texture than before.

In my patented machine I encompass the stem or shank *G* of the upper plunger of the machine with a tubular block, *H*, which is prevented from rotating with the plunger by a pendent lip or abutment, *u*, hanging from the under side of the goose-neck *C* of the machine, the meeting-faces of the block *H* and upper plunger being sloping or oblique, in order that, as the plunger is turned a quarter of a circle in one direction, it shall descend toward the opposite plunger, and, when reversed, rise above the latter. This descent of the plunger is arbitrary; and, in order to vary the distance between it and the lower plunger, to adapt the machine to materials of varying thicknesses, I mount loosely upon the stem *G* before named a cylindrical sleeve, *I*, whose lower face, like that of the block *H*, is eccentric or oblique with respect to its axis, thus producing an annular wiper-cam, which operates in connection with the upper face of the said block *H*, which is also oblique or eccentric, but in a reverse direction, to determine the height of the latter, and, consequently, regulate the extent of space intervening between the plungers when they are brought together. A suitable handle, *w*, is to be added to the sleeve *I*, whereby the latter may be readily turned.

In darning with this machine (and the remark holds good with my patented machine) I do not produce irregular, hard, and unsightly lumps and ridges, which is the result of darning by hand; but, on the contrary, I produce a new textile fabric which is pliable and soft, and fully equal in appearance, ease, and durability to the original material.

This machine is applicable to a wide range of useful purposes, and comprehends within its scope many operations aside from that of darning articles. Among other purposes for which I have demonstrated it to be valuable it is very useful, with slight modifications, in closing certain seams in knit garments.

I do not confine myself to this mode of cutting off the refuse ends of the yarns, as it may be effected in various ways. For instance, a shear-blade may be pivoted to the face of the guide-plate *H*, and operated by the devices which advance the needles in such manner as to sever the yarns before the needles reach such guide-plate.

I claim—

1. In machinery of the kind herein specified, the combination of the following elements, namely, ribbed die-plates, which clamp in ridges the fabric placed between them, reciprocating needles, which move in the plane of needle-passages, between the plates, and tension mechanism, substantially as described, arranged for operation, with said plates and needles, substantially as set forth.

2. In organized machinery of the kind herein specified the combination, with the ribbed clamping-dies and the needles which reciprocate between said plates, of the cutter, substantially as specified, which severs the yarn

after the withdrawal of the needles from the fabric, substantially as set forth.

3. A needle having one boundary of its eye reduced to a sharp edge for cutting the yarns, substantially as and for purposes stated.

4. The guide-plate through which the needles pass, having its face arranged at an angle to, or obliquely with, the path of movement of the needles, in order that but one yarn may be severed at a time, or the series of yarns in succession, substantially as and for purposes stated.

5. The combination, with the guide-cylinders or plungers, of a lock, substantially as described, to lock the same in position, and prevent breaking of the needles, substantially as set forth.

6. In combination with the stem of the plunger, the notched disk *m* and bolt *k*, substantially as and for purposes stated.

7. The arrangement of the teeth of the plunger, substantially as herein described, whereby the yarns are caused to travel or be laid in a path similar to the saw-teeth, substantially as and for purposes stated.

8. The combination, with the reciprocating needles, of the plungers or dies, adjustable to and from each other to vary the distance between them, substantially as and for the purposes set forth.

9. The combination of the tubular sleeve I with one of the plungers and its shaft, as a means of adjusting the height of the plunger, substantially as and for purposes stated.

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Witnesses:

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