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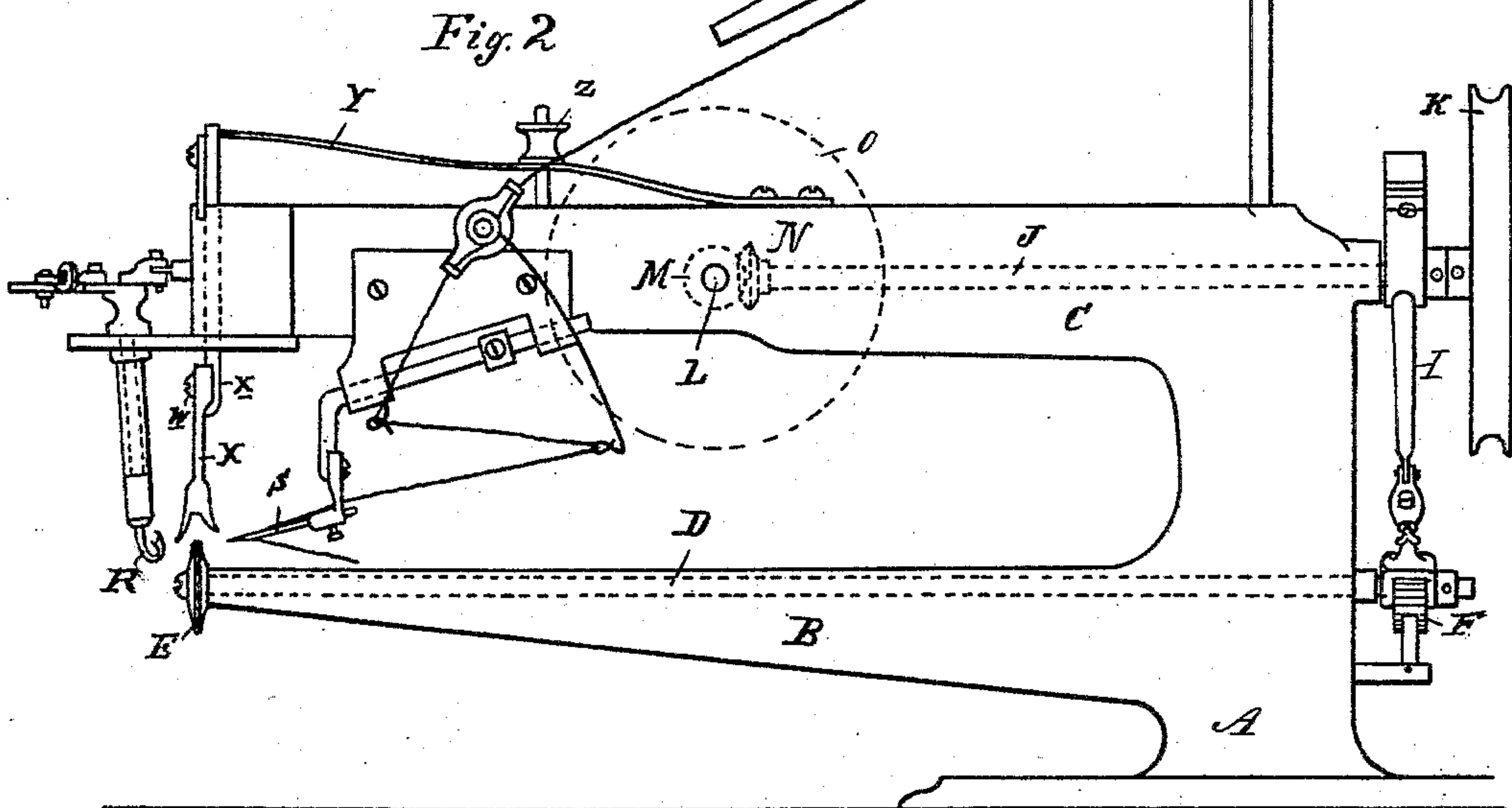
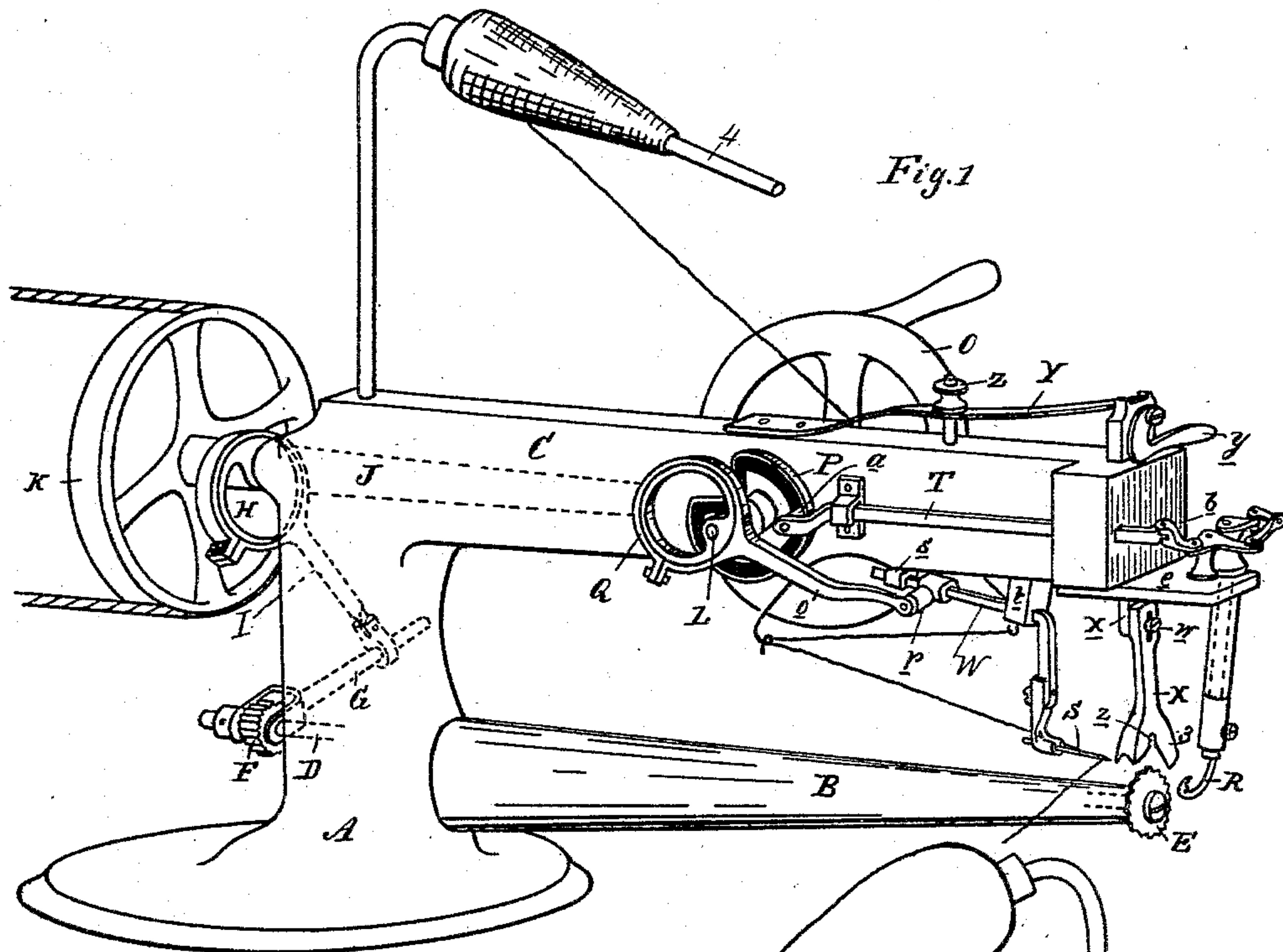
2 Sheets—Sheet 1.

H. H. HUMPHREY.

SEWING MACHINE FOR MAKING LOOP STITCH LININGS.

No. 411,894.

Patented Oct. 1, 1889.



Attest:
John Schuman.
[Signature]

Inventor:
H. Hubert Humphrey.
by his atty
[Signature]

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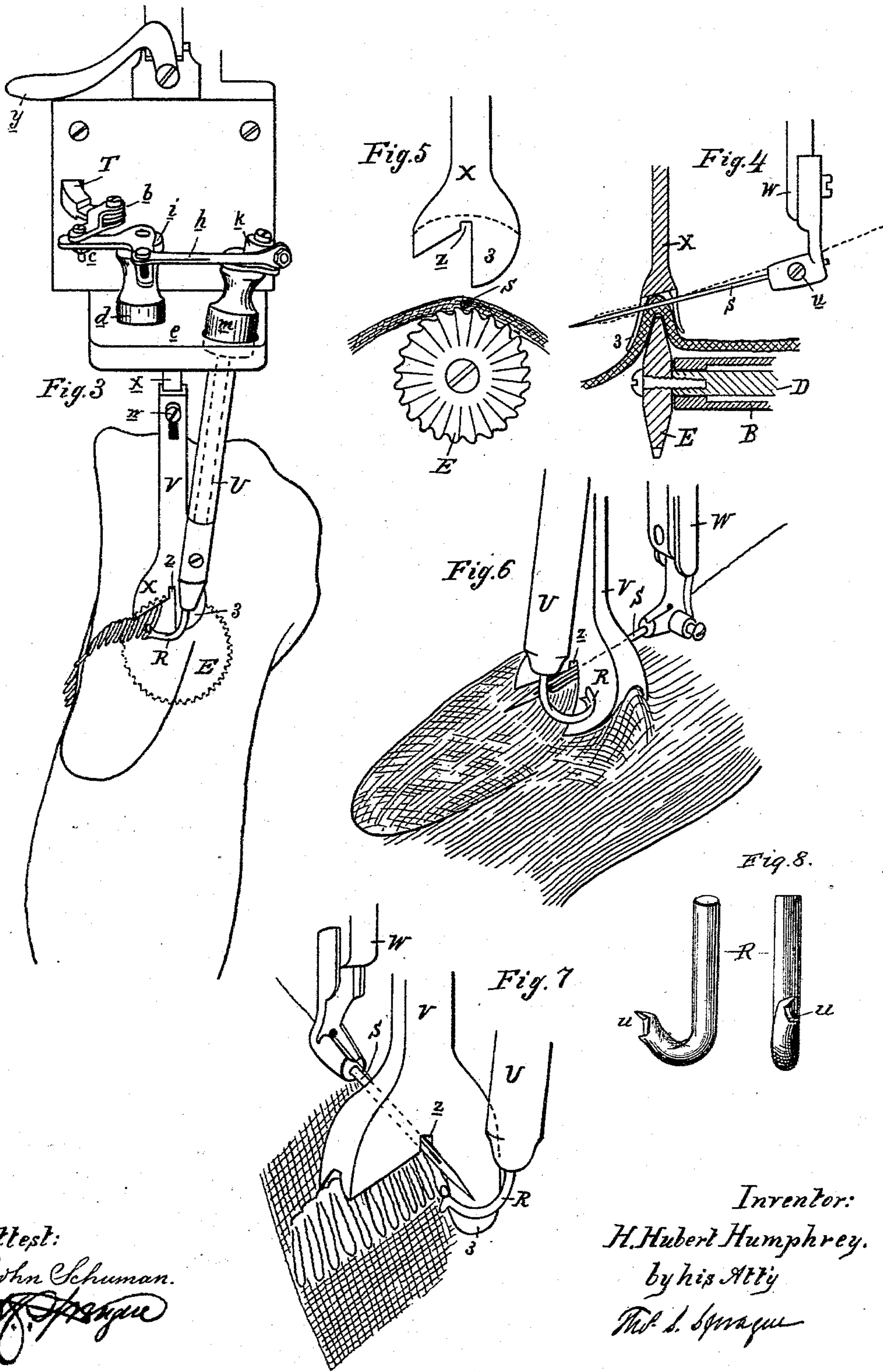
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UNITED STATES PATENT OFFICE.

HENRY HUBERT HUMPHREY, OF DETROIT, MICHIGAN.

SEWING-MACHINE FOR MAKING LOOP-STITCH LININGS.

SPECIFICATION forming part of Letters Patent No. 411,894, dated October 1, 1889.

Application filed November 24, 1886. Renewed July 13, 1889. Serial No. 317,466. (No model.)

To all whom it may concern:

Be it known that I, HENRY HUBERT HUMPHREY, of Detroit, in the county of Wayne and State of Michigan, have invented new and useful Improvements in Machines for Making Loop-Stitch Linings; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, which form a part of this specification.

The nature of this invention relates to certain new and useful improvements in machines for making loop-stitch linings.

Heretofore loop-stitch linings have been put into round knit goods by hand, and at a comparatively large expense.

The object of this invention is to construct a machine by means of which such loop-stitch linings can be put in with better results, greater regularity, and at a moiety of the expense.

The invention consists in the peculiar construction and arrangement with relation to each other of the various parts and in their various combinations, as more fully hereinafter described.

Figure 1 is a perspective view of my machine. Fig. 2 is a side elevation from the opposite side to that shown in Fig. 1. Fig. 3 is a front end elevation. Fig. 4 is a sectional detail showing more clearly the operation of the machine. Fig. 5 is a side elevation of the feed-disk and of the presser-foot. Fig. 6 is an enlarged sectional detail showing the operation of the looper at the moment the loop is formed. Fig. 7 is an enlarged sectional detail showing the relative position of the looper and needle before the loop is formed. Fig. 8 shows in perspective and front view the looper detached and on an enlarged scale.

In the accompanying drawings, which form a part of this specification, A represents a standard, which supports the operating parts, and is adapted to be attached to a table or other suitable foundation. Secured to said standard, or forming an integral part thereof, are two horizontally-projecting arms B and C, the former forming the table proper of the machine and the latter supporting all the operating parts thereof, except the feed-disk. The table B is preferably round in cross-section and tapering in form, the better to facili-

tate work upon round knit fabrics. Through this standard and table passes a shaft D, (shown in dotted line in Fig. 2,) upon the end of which, and at the end of said table B, there is secured the feed-disk E, which is thicker at its center than at its periphery, the latter being serrated, as more clearly shown in Figs. 4 and 5, and projecting above the upper plane of the table, for the purposes hereinafter explained. In order to produce a regular but interrupted rotation of this shaft and feed-disk, a ratchet-wheel F is secured to the rear end of the shaft D, which is actuated by a pawl G, to which the necessary movement is given by means of the eccentric cam and connecting-rod I, such cam being secured to the main driving-shaft J, (shown in dotted lines in Figs. 1 and 2,) which rotates in a suitable bore or chamber therefor in the arm C. This movement must be regulated so as to partially rotate the shaft carrying the feed-disk at the instant the needle is withdrawn from the fabric being operated upon.

The shaft J has upon its end, if it is desired to operate the machine otherwise than by hand, a pulley K, over which a belt may be thrown for the purpose.

L is a shaft transversely journaled in the arm C, and near the end of the chamber therein, within which the shaft J revolves, and upon this shaft there is secured a bevel-pinion M, adapted to engage with a like pinion N upon such shaft J, and upon one end of this shaft L there is a hand-wheel O, for the purpose of operating the machine when desired. Upon the opposite end of the shaft L there is secured the channeled cam P and the eccentric Q, the former being adapted to intermittently rotate the looper R, and the latter to give a reciprocating motion to the needle S, as hereinafter described.

T is a bar having a feather or pin *a* projecting at right angles thereto and adapted to travel in the channel of the cam P. The opposite end of this bar is pivotally secured to the link *b*, which is pivotally secured to one arm of the bell-crank lever *c*, the other arm of which is slotted, as shown in Fig. 3. This bell-crank is pivotally secured upon the top of the stud *d*, which is attached to and rests upon the plate *e*, which is attached to the arm C. A link or lever *h*, having an ad-

justing-bolt *i*, connects the bell-crank with the lever *k* upon the head *m* of the looper, the shaft of the latter running down through the cylindrical guide *U*, which is secured to the plate. This guide *U* stands diagonal to the vertical plane of the presser-foot *V*, in order to give an upward throw to the point of the looper across the path of the needle, thereby holding the loop, which for the time being is engaged with the looper, a little to one side and out of the path of the needle in forming the next loop. The peculiar form and shape of the lower end of this looper will be seen very clearly in Fig. 8, and its extreme end terminates in two points *u*, the upper one being preferably, although not necessarily, slightly the longer of the two, and the looper is so adjusted and arranged that at the instant the loop is formed by the needle, as shown in Fig. 6, the partial rotation of such looper will project the upper jaw thereof into the loop and between the yarn or thread and the needle, holding such loop, as shown in Fig. 7, until the needle is withdrawn and again projected to form the succeeding loop, when, through the operation of the cam *P* and the intermediate connecting parts, the looper will swing backward, and thus release the first loop formed, after which it commences to move forward, and its long point will enter the second partially-formed loop between the needle and the yarn, and in its continued forward motion complete the formation of said second loop, and hold the same while the needle is making another backward and forward motion. When the looper again releases the loop, it then holds and forms another, the whole operation being substantially the same as in many single-thread chain-stitch sewing-machines, except that the looper carries the yarn to one side of the needle's path, instead of holding it open and in the path of the needle, as in chain-stitch sewing-machines. The length of the loop may be regulated, as desired, by the bolt *i* and slotted arm of the bell-crank lever *c*.

The eccentric *Q* is connected by means of a strap *o* and wrist-pin *p* with the needle-arm *W*, which is supported in suitable guides *s* *t*, projecting below the bottom of the arm *C*, the guide *s* being shorter than the guide *t*, in order to make the needle reciprocate in a line diagonal to the vertical plane of the presser-foot *X*. The needle *S* is secured in the end of the needle-arm and held therein by the set-screw *u*, and the sides of the needle are preferably grooved from the eye toward the head to allow the yarn or thread to lie closer to the axis of the needle. The lower end of the needle-arm is perforated, as shown in Figs. 6 and 7, to allow the yarn to be passed through to the needle. Of course the feed roll or disk *E* is stationary during the travel of the needle in either direction, but is in operation between the withdrawal of such needle from the fabric until the commencement of the next

projecting movement, and the movements of the needle, feed-disk, and looper must be so regulated and adjusted that each will perform its function at just the right time and in such manner as not to interfere with the proper movement of the other.

The presser-foot *X* is suspended by means of a set-screw *w* from the bottom of the slide *x*, which passes through the head of the arm *C*, and a cam-lever *y* is employed to raise or lower it, as occasion may require, and a regulated tension is obtained by means of the spring *Y* and set-screw *Z*. The lower end of the presser-foot is concave to conform to the shape of the feed-disk, and it has a notch *z* cut in the end, through which the needle passes in its reciprocations. It also has a lip *3* upon the front side to compel the fabric to bend over the edge of the feed-disk and keep out of the way of the looper.

The action of the feed-disk, presser-foot, and needle are clearly seen in Fig. 4, where the fabric is forced to form a ridge over the edge of the feed-disk and is held in place by the presser-foot, while the needle passes through the ridge to form the loop on one side of the fabric without piercing the opposite side.

A bobbin-holder *4* is supported on top of the machine, or in any other convenient place, to carry the bobbin and yarn, and a tension device of any of the known constructions is employed to regulate the tension of the yarn or thread, as shown in Fig. 2.

What I claim as my invention is—

1. In a machine for the purpose described, and in combination with the needle and looping mechanism thereof, a feed-disk which decreases in thickness from the center to the periphery and a notched presser-foot extending down on both sides of said disk, and constructed and arranged to press the fabric into a ridge, substantially as described.

2. In a machine for the purpose described, an oscillating looper, a feed-disk which decreases in thickness from the center to the periphery, a grooved presser-foot extending down on each side of the disk, and a reciprocating needle running in a path substantially parallel with the axis of the disk, substantially as described.

3. In a machine for the purpose described, the combination of the table *B*, shaft *D*, carrying upon its end a serrated feed-disk, which decreases in thickness from the center to the periphery, said shaft running through said table, a presser-foot extending down both sides of the disk, and a ratchet-wheel *F*, secured on said shaft, with the pawl *G*, connecting strap *I*, and eccentric *H*, secured on the main driving-shaft *J*, substantially as specified.

4. In a machine for the purpose described, the combination, with the stitch-forming mechanism and feeding devices, of the shaft *L*, journaled transversely through the arm *C*, with the channeled cam *P* and its connec-

tions with the looper R, and eccentric Q and its connections with the needle-bar W, substantially as set forth.

5 5. In a machine for the purposes described, the main driving-shaft J, journaled longitudinally in the arm C and carrying upon its end a bevel-pinion N, in combination with shaft L, journaled transversely in the arm C and carrying a bevel-pinion M, the eccentric
10 H, the feed-disk and its connections with the eccentric H, channeled cam P, the looper R and its connections with the cam P, and the eccentric Q, the needle and its bar, and its

connections with the eccentric Q, substantially as specified.

15 6. In a machine for the purpose described, and in combination with the sewing devices and the feed-disk, a recessed presser-foot extending down both sides of the feed-disk, and having lip 3 extending down between the
20 looper and the material being operated on, substantially as described.

H. HUBERT HUMPHREY.

Witnesses:

H. S. SPRAGUE,
E. SCULLY.