

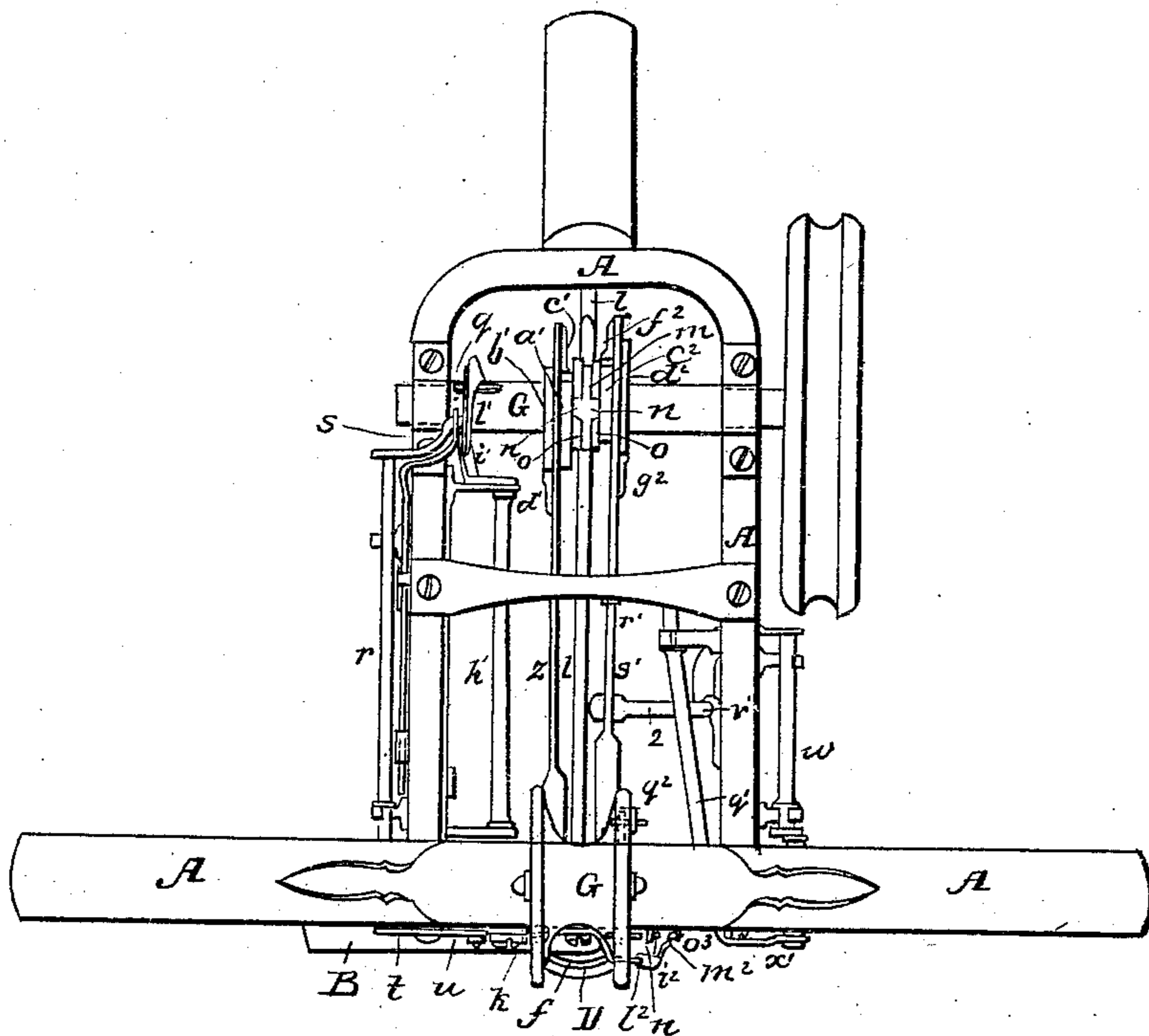
W. DUCHEMIN.
Sewing Machine.

5 Sheets—Sheet 1.

No. 59,715.

Patented Nov. 13, 1866.

Fig. 1.



Witnesses:
Samuel A. Piper
Hartie.

Inventor:
William Duchemin
by his attorney
R. H. Eddy

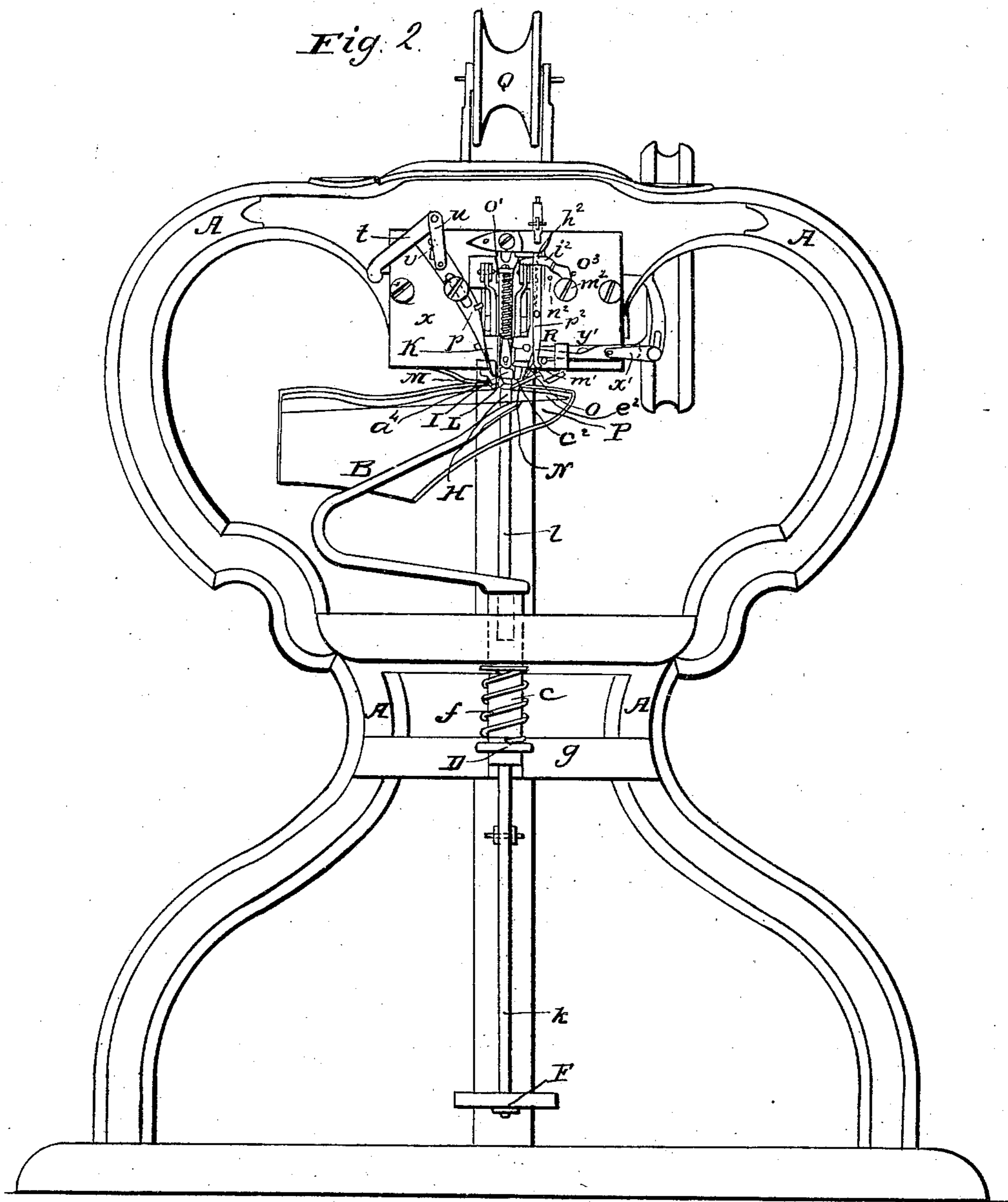
W. DUCHEMIN.

5 Sheets—Sheet 2.

Sewing Machine.

No. 59,715.

Patented Nov. 13, 1866.



Witnesses:
Samuel St. Pierre
Hurtis

Inventor:
Wm. Duchemin
by his Attorney
R. H. Eddy

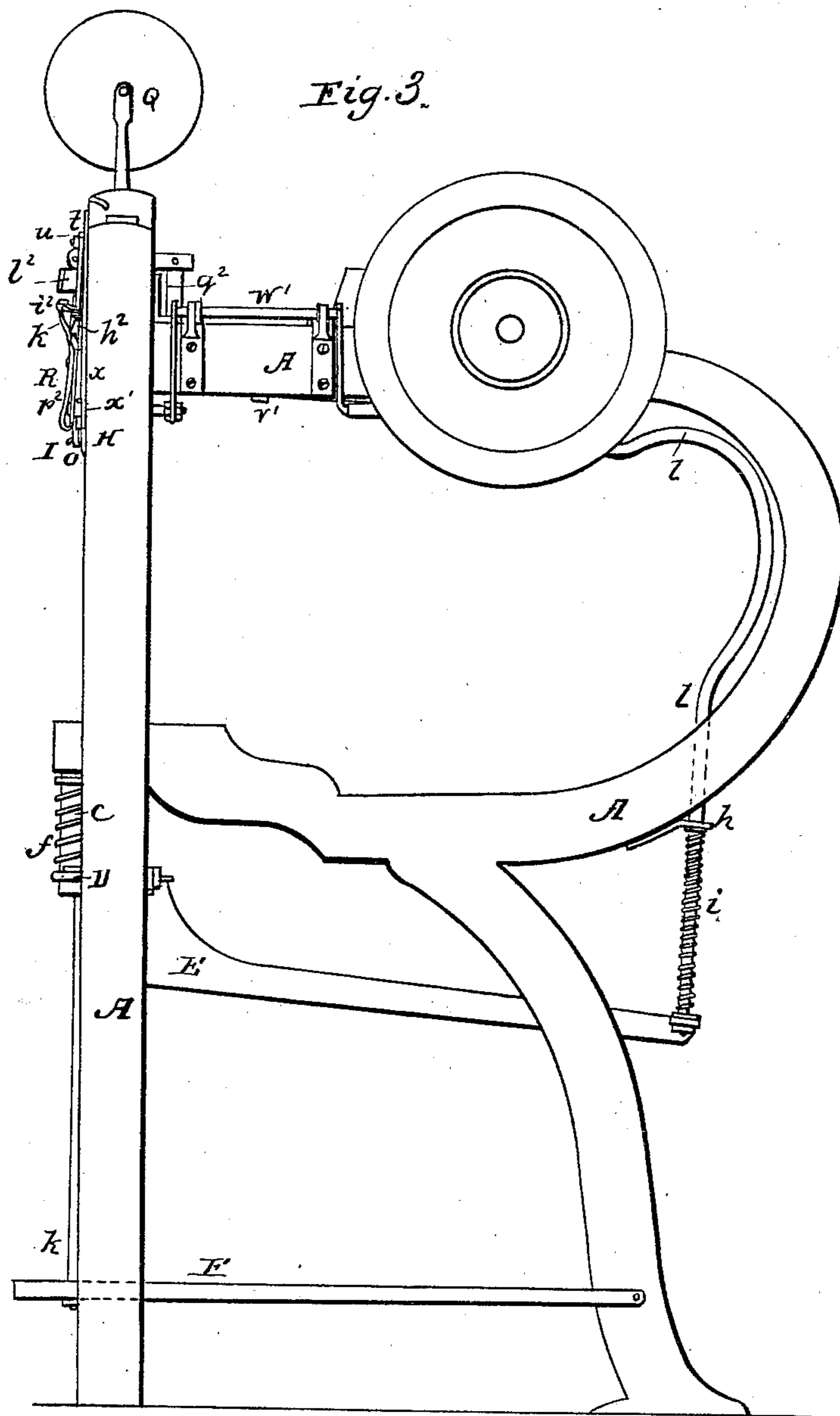
W. DUCHEMIN.

Sewing Machine.

5 Sheets—Sheet 3.

No. 59,715.

Patented Nov. 13, 1866.



Witnesses:
Samuel M. Piper
Houston.

Inventor
W. Duchemin
by his attorney
R. H. Eddy

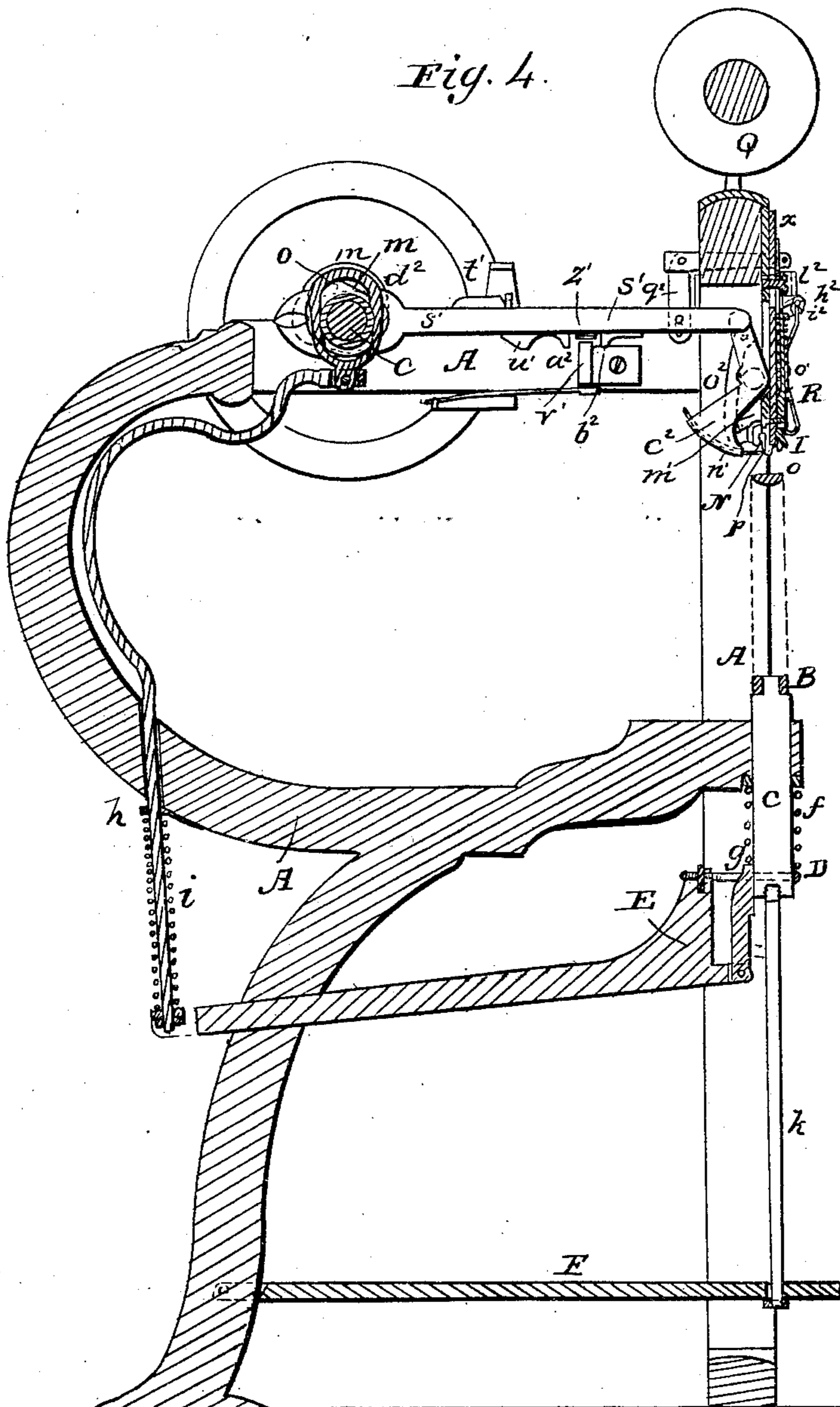
W. DUCHEMIN.
Sewing Machine.

5 Sheets—Sheet 4.

No. 59,715.

Patented Nov. 13, 1866.

Fig. 4.



Witnesses:
Samuel D. Piper
Huntis.

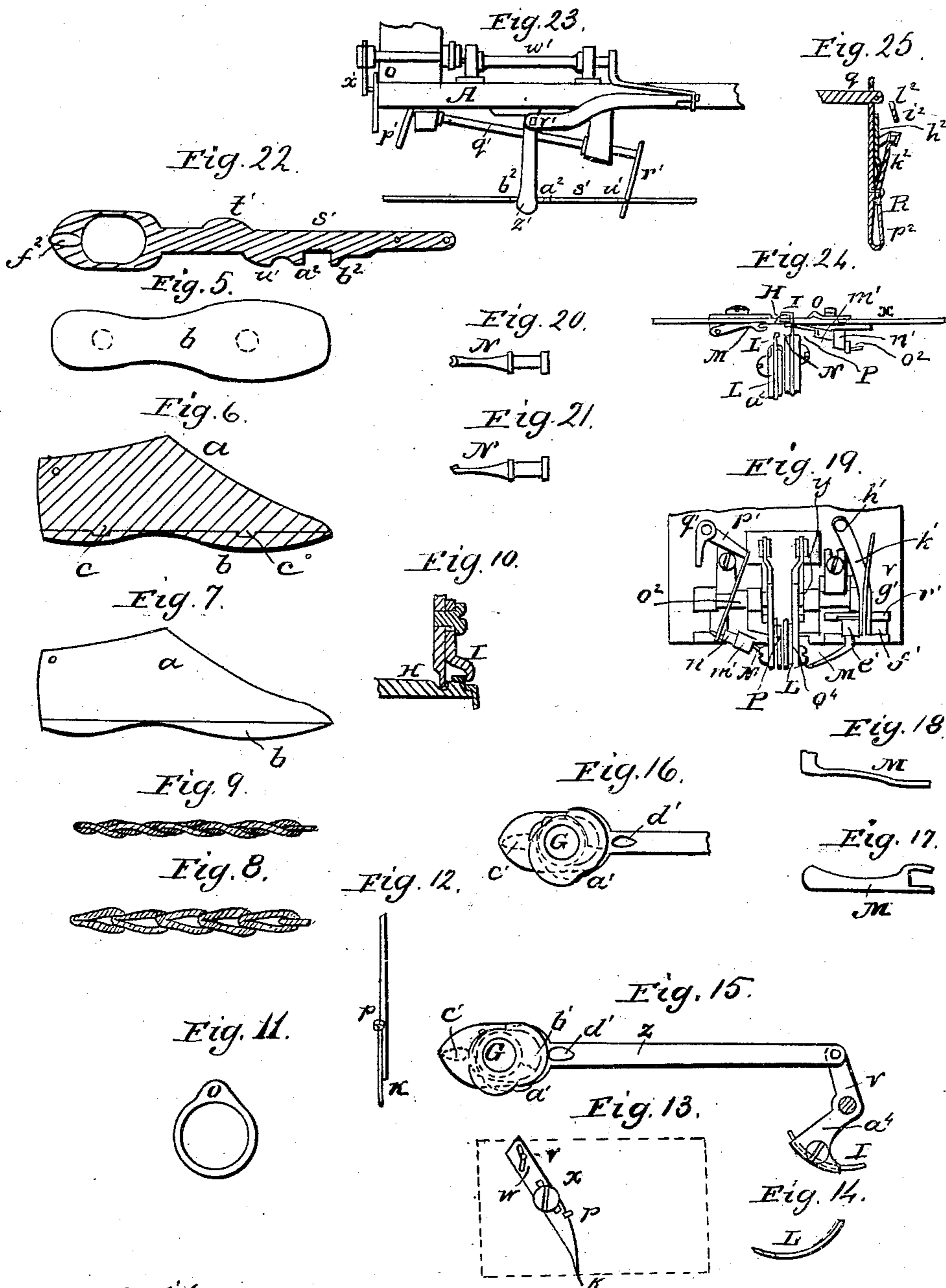
Inventor:
William Duchemin
by his Attorney
R. H. Ledy

W. DUCHEMIN.

Sewing Machine.

No. 59,715.

Patented Nov. 13, 1866.



Witnesses:
Samuel H. Soper
Huntis

Inventor:
W. Duchemin
by his Attorney
R. H. Hedy

UNITED STATES PATENT OFFICE.

WILLIAM DUCHEMIN, OF LYNN, MASSACHUSETTS, ASSIGNOR TO HIMSELF
AND SULLIVAN E. CLOUGH, OF SAME PLACE.

IMPROVEMENT IN SEWING-MACHINES FOR SEWING TOGETHER THE SOLES AND UPPERS OF SHOES.

Specification forming part of Letters Patent No. **59,715**, dated November 13, 1866.

To all whom it may concern:

Be it known that I, WILLIAM DUCHEMIN, a citizen of Great Britain, but now a resident of Lynn, in the county of Essex and State of Massachusetts, have invented a new and useful Machine for Sewing together the Sole and Upper of a Shoe; and do hereby declare the same to be fully described in the following specification, and represented in the accompanying drawings, of which—

Figure 1 denotes a top view; Fig. 2, a front elevation, Fig. 3 a side elevation, and Fig. 4 a longitudinal vertical and central section, of it.

The machine in question is calculated to perform a chain-stitch made of one thread, but unlike the ordinary chain-stitch in one particular—that is, every loop of it, before reception of the loop which goes through it, is twisted at least half a revolution. The purpose of thus twisting the loop is to render the stitch more difficult to be drawn out or unraveled, especially when the thread used in its formation is waxed.

The last employed for the lasting of a shoe to be sewed on this machine has also a peculiarity, which is essential to it and the machine—that is to say, such last is made with a false bottom, which on removal of the body of the last is left in the shoe and serves to hold the upper and the sole together, preparatory to and while they are in the act of being sewed. A bottom view of such last is represented in Fig. 5, a longitudinal section in Fig. 6, and a side elevation of it in Fig. 7. In these figures, *a* is the body, and *b* the false bottom of the last, the two being connected by dowels *c c* extending from the body into the false bottom, and so formed as to enable the body and bottom to be readily separated when occasion may require.

One great advantage of the last made with the false or movable bottom is that one last-body will suffice for any number of the bottoms. When the lasting of a shoe may have been effected the body part *a* of the last may be extracted from the shoe, leaving the false bottom therein. Another and similar false bottom may be applied to the body, and another shoe may be lasted on the two. Thus I save in stock in lasts, as I require only

one last-body and a series of the bottoms, instead of a number of whole lasts equal to the number of false bottoms.

Fig. 8 is a front view of the old or common chain-stitch. Fig. 9 is a similar view of the stitch made by the machine herein described, each loop being represented in Fig. 8 as without any twist. In Fig. 9, however, it is exhibited as having what is termed “a twist,” or sometimes a “half-twist.”

The means of supporting the shoe while being sewed by my improved machine differ from those in any other sewing-machine of which I have any knowledge. They consist not only of the false bottom hereinbefore described, but of a bent arm to enter the shoe, the false bottom piece resting on such arm. The shoe-sole is to be channeled parallel to its edge, and at a short distance therefrom, such channel being for reception of the sewing, and also to aid in maintaining the shoe in its due relation to the sewing mechanism during the performance of the latter.

Fig. 10 represents a transverse section of the sole and its channel, with the upper lying on the sole, and it also shows the manner in which the main and auxiliary gages, to be hereinafter described, rest on the sole, one going into the channel and the other resting on the upper, where it overlaps the sole. As the upper varies more or less in thickness around the sole, it becomes necessary to have the auxiliary gage self-adjusting relatively to the main gage. In other words, it becomes necessary that the auxiliary gage should be movable vertically, and be supported against or by a spring, which will cause it to press down upon the upper and rise or fall thereon, in accordance with the variation of the thickness thereof.

In the drawings marked Figs. 1, 2, 3, and 4, *A* denotes the frame of the machine, such frame being properly formed and constructed for supporting the operative members or parts of the mechanism.

The bent arm for aiding in supporting the shoe is shown at *B*, such shoe, with the false bottom of the last, as applied to the arm, being represented in red lines in Fig. 2. The said arm is supported by and so as to be capable of swiveling in the upper end of a slid-

ing-post, C, which is upheld by a spring, *f*, resting on a cross-bar, *g*, of the frame A. This spring enables the arm to accommodate itself to the variations of thickness of the upper and the last-bottom during the operation of feeding the shoe; but while the sewing is being performed, as well as while the awl may be puncturing the sole and upper, the post C should be held firmly, so as to be immovable. This is accomplished by means of a brake, D, which spans the post and is connected to the shorter arm of a right-angular lever, E. (See Figs. 3 and 4. To the longer arm of the said lever and to a stationary abutment, *h*, a spring, *i*, is applied so as to press the said arm downward and thereby cause the brake to be drawn closely against the vertical post. The said post also has a treadle, F, connected with it by a rod, *k*. The purpose of the said treadle is to enable a person to depress the bent arm B far enough from the sewing mechanism to allow a shoe containing a false last-bottom to be either arranged upon or removed from the said arm.

There extends from the longer arm of the lever E, and through the spring *i* in the abutment *h*, a rod, *l*, which terminates at top in an eye, *m*, through which the driving-shaft G of the machine passes. Projections *n n* from the eye rest on the periphery of a cam, *o*, fixed to the driving-shaft. This cam is exhibited in side view in Fig. 11. At the proper time—that is, while the feeder is in operation—this cam, by its action against the projections *n n*, will cause the brake to release its pressure against the post C.

The main gage of the machine is exhibited at H, and the auxiliary gage at I. (See Figs. 2 and 4.) The said main gage is stationary, except that it should be so fixed to the frame of the machine as to be capable of vertical adjustment to properly adapt sewing mechanism to a sole when the foot of the main gage may rest on the bottom of the channel of such sole. The auxiliary gage I plays vertically on the main gage, and is pressed downward by a spring, *o*¹, suitably applied, the purpose of such spring being that hereinbefore mentioned or alluded to.

The mechanism for effecting the sewing of the chain-stitch with a twist or half-twist in each loop consists, besides mechanism for supporting the shoe, of a thread-carrier, K, a needle, L, a loop-advancer, M, a loop-twister, N, and a feeder, O, and their operative mechanisms. To these also may be added an awl, P, and its operative mechanism, to be hereinafter described.

I have also applied to the said sewing machinery a mechanism for extracting the tacks used in the lasting of the upper and sole. This tack-extracting mechanism is made to so operate as to extract each tack just before it would be likely to come into the way of the sewing mechanism were it to be allowed to remain in the last-bottom *b*.

The thread-carrier K is shown in Fig. 2.

It receives the thread from a spool, Q, arranged on the top of the frame. Such thread goes down through an eye, *p*, fixed to the side of the carrier, and is led through an eye formed in the lower end or part of such carrier.

Fig. 12 is an inner edge view of the thread-carrier. It has a mechanism applied to it for moving it up and down and causing it to lay the thread into the hook of the needle. The mechanism for moving the thread-carrier longitudinally consists of a cam, *q*, (fixed on the driving-shaft G,) a shaft, *r*, and two arms, *s t*, and a link, *u*, by which one of such arms is connected with the thread-carrier. The other arm rests on the periphery of the cam, the whole being arranged as represented in the drawings.

The mechanism which, in connection with that for imparting to the thread-carrier its longitudinal movements, gives to the said carrier the necessary movement to cause it to cast the thread into the hook of the needle in order that, when the needle is next retracted, it may seize upon the thread and draw it in the form of a loop through the shoe, consists of a stud, *v*, and a slot, *w*. (See Fig. 2, and also Fig. 13, which represents these parts more definitely.) The stud is stationary or projects from the face-plate *x* of the frame of the machine. The slot is made in the shank of the thread-carrier.

The needle L is curved and hooked, a side view of it being shown in Fig. 14. It is carried by a lever, *a*¹. (See Fig. 15, which is an outer side view of this lever and its operative mechanism connected with it and the driving-shaft.) The fulcrum of the lever, which is a rocker-shaft, is seen at *y*. The upper arm of the lever is jointed to a slider, *z*, which embraces the driving-shaft, and is moved longitudinally at the proper times by means of two cams, *a*¹ *b*¹, fixed on the driving-shaft, one of the said cams serving to move the slider in one direction and the other to move it in the opposite direction.

To the needle is also given a slight forward motion after it may have been retracted far enough to draw the loop through the shoe. This forward movement is to enable the loop to be readily disengaged from the barb of the hook of the needle, and is produced by the cam *a*¹, which advances the needle. The shapes of the two cams *a*¹ *b*¹, as well as their relative positions, and those of the studs or projections *c*¹ *d*¹, against which they act, are given in Fig. 16.

The office of the loop-advancer M is to seize the upper part of the bow of the loop while such loop is held by the needle, and press such upper part forward and raise it over and drop it upon the hook of the loop-twister, which, after having received the loop, is to be revolved and moved so as to put the necessary twist in the loop and present it for the next advance of the needle, in order that the needle may pass through it.

This advancer (shown in top view in Fig. 17

and in side view in Fig. 18) is furcated and has a thread-receiving notch in the extremity of each of the prongs of the fork. The advancer is projected from a carriage, e^1 , applied to the inner side of the plate x , as seen in Fig. 19, which exhibits a view of the inner side of such plate with the mechanism directly applied to it.

The carriage e^1 is supported between and by horizontal and parallel ways $f^1 f^1$, and has a spring, g^1 , for retracting it. A shaft, h^1 , provided with two arms, $v^1 k^1$, has one arm connected with the carriage and the other resting against a cam, l^1 , placed on one side of the cam, for operating the thread-carrier. The loop-advancer carriage will receive its proper movements by the action of the said cam l^1 , shaft h^1 , arms $v^1 k^1$, and spring g^1 during a revolution of the driving-shaft.

The loop-twister N (shown in Figs. 2 and 19, and more particularly in Figs. 20 and 21, of which Fig. 20 is a top view, and Fig. 21 a side elevation of it) is supported by and in a bracket, m^1 , so as to be capable of being revolved axially. A crank, n^1 , projecting from the shank of the twister N, is, by means of a rod, o^2 , connected with an arm, p^1 , projecting from a shaft, q^1 . (See Figs. 1 and 19.) A forked arm, r^1 , projects from the shaft q^1 and spans the slider s' , composing part of the machine by which the awl is operated, such slider being formed as represented in longitudinal section in Fig. 22. Two cams, $t' u'$, on the said slider serve to actuate the forked arm r^1 so as to impart to the loop-twister its necessary motions.

The feeder (shown in Fig. 2 at O) has reciprocating longitudinal and intermittent movements imparted to it by proper mechanism, such mechanism consisting of two bent levers, $v' w'$, an under-side view of which is given in Fig. 23, each of such levers consisting of a shaft and two arms projecting therefrom. One arm of one of such levers is connected with the feeder by a link or pitman, x' , the said feeder being arranged in a groove, y' , such as will support and guide it and allow it to rise as it is moved back.

One arm, z' , of the other bent lever extends between two studs, $a^2 b^2$, projecting down from the slider s' . Thus, it will be seen that by the action of the studs $a^2 b^2$ against the arm z' , while the slider is in movement, the necessary motions will be imparted through and by the levers $v' w'$ to the feeder.

The awl P (shown in Fig. 2, and more particularly with the needle and other parts in Fig. 24, which is an under-side view of them) is carried by a lever, c^2 , whose upper arm is jointed to the slider s' , embraces the driving-shaft, and is operated or moved back and forth by means of two cams, $d^2 e^2$, fixed on the shaft G, and working against projections $f^2 g^2$ from the slider.

The mechanism for extracting the lasting-tacks is next to be described. It consists mainly of a pair of spring-pinchers, R. (See

Figs. 2 and 3, and more particularly in Fig. 25, which is a vertical section of these pinchers and their operative mechanism.) They are closed by means of a spring, h^2 , and opened by a movable cam, i^2 , against which the upper arm k^2 of their jaw-lever p^2 is drawn during the upward movement of the pinchers. The said cam turns on a center-pin, m^2 , and between two stops, $n^2 o^3$. By the action of gravity the cam i^2 will fall in front of the arm k^2 just before it makes such descent. While the pinchers are descending the arm k^2 will be moved against the cam, and by it be moved, so as to move the movable jaw of the pinchers away from their other jaw, in order that the pinchers may receive the head of a tack between their jaws during their descent. After the pinchers may have thus passed upon the tack, their arm k^2 will throw aside and pass by the cam, and, finally, be brought against another or stationary cam, l^2 , by which the pinchers will be opened, in order that the tack may fall or be discharged from them. The mechanism for raising and lowering the pinchers consists of a bent lever, q^2 , arranged as shown in Fig. 4 and jointed to the slider s' . The pinchers are suspended from the upper or horizontal arm of the said bent lever.

I would remark that, for the advancer and the twister, with their operative mechanism, as described, I contemplate using any ordinary well-known means of seizing and extending the loop, and presenting it for the reception of another loop carried by the needle, the difference between such and the mechanism hereinbefore described being that while the former does not effect the twisting of the loop, the latter does accomplish such.

Having thus described my invention, what I claim is as follows:

1. In combination with the machinery for sewing, as described, or its equivalent, the shoe supporter or arm B, provided with mechanism for operating it, substantially as described, such arm being to be used in connection with the bottom piece of the last, in manner and for the purpose as hereinbefore explained.

2. The combination of a mechanism for extracting the tacks, substantially as explained.

3. The combination of the loop-advancer M and the loop-twister N with the hooked needle L, the feeder O, and the thread-carrier K, each being constructed and provided with mechanism for operating it, substantially as described.

4. The combination of the loop-advancer M, the loop-twister N, the hooked needle L, the awl P, the feeder O, and the thread-carrier K, each being provided with mechanism for operating it, substantially as specified.

5. The combination of the main and auxiliary gages H and I with the arm B, and mechanism for sewing, substantially as described.

WILLM. DUCHEMIN.

Witnesses:

R. H. EDDY,
F. P. HALE, Jr.