5 Sheets—Sheet 1.

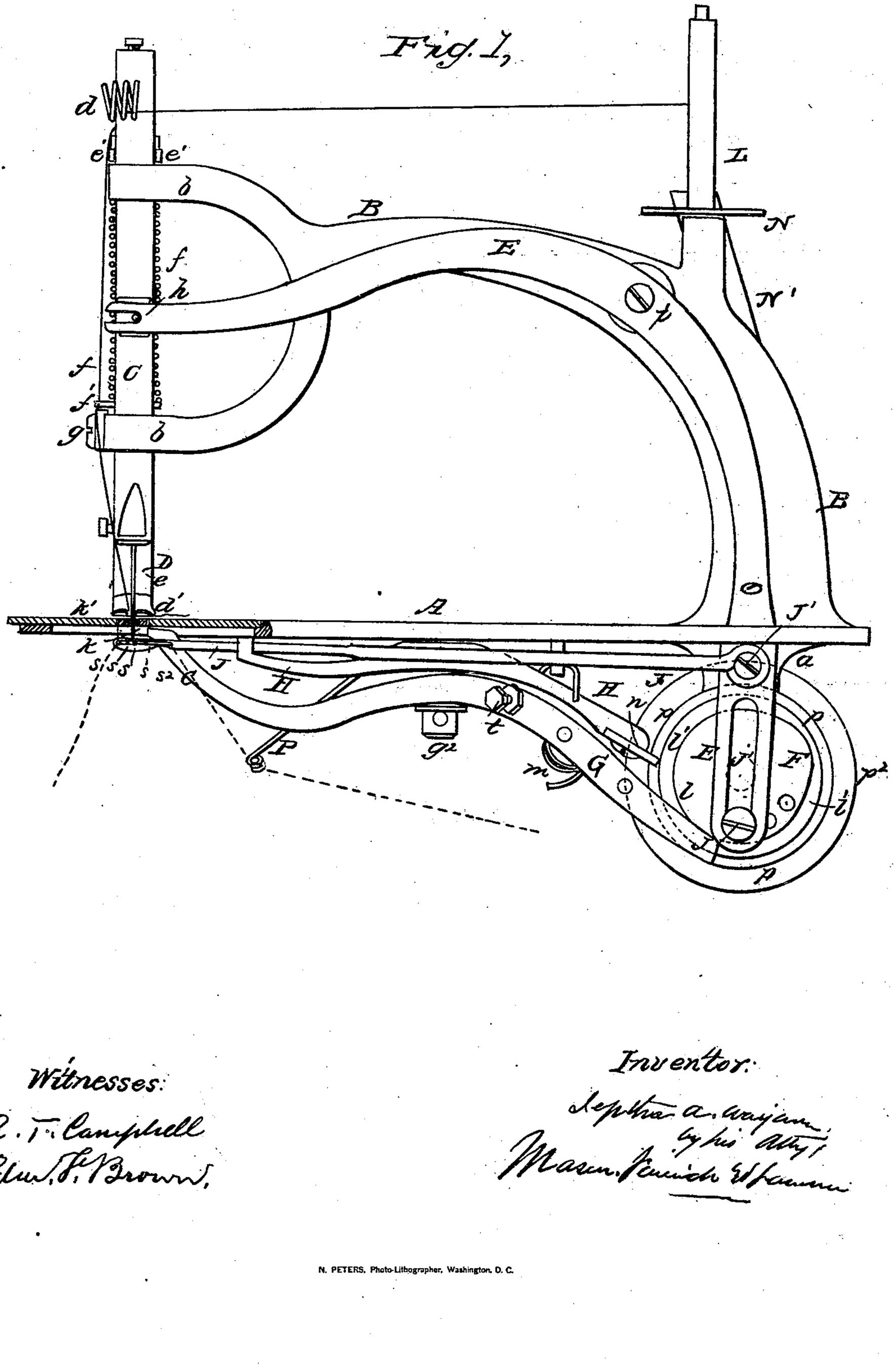
J. A. WAGNER.

Sewing Machine.

No. 40,296.

Patented Oct. 13, 1863.

Fig. 1.



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Inventor:

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by his Attys

Mason Fenwick & Lawrence

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Fig. 2,

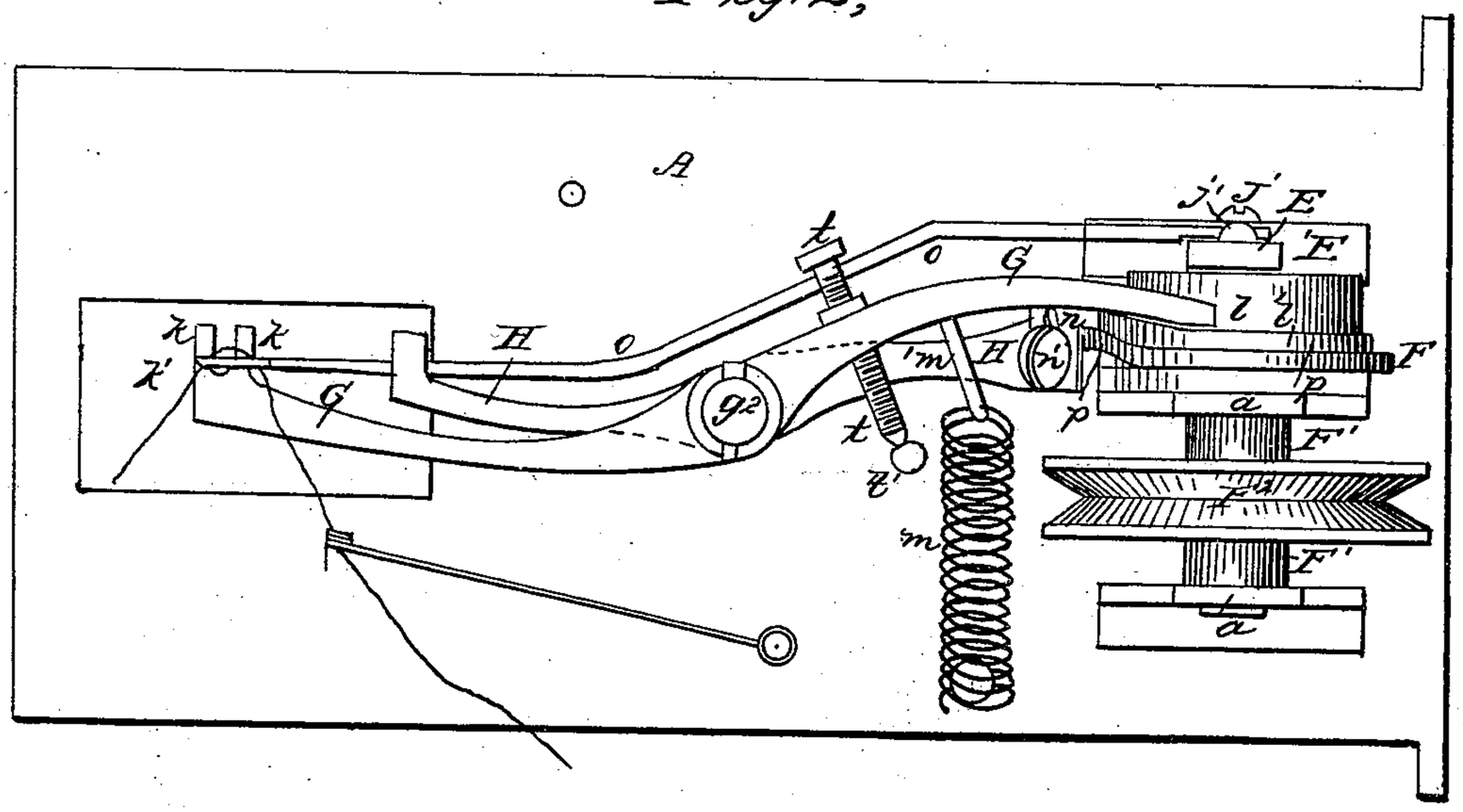
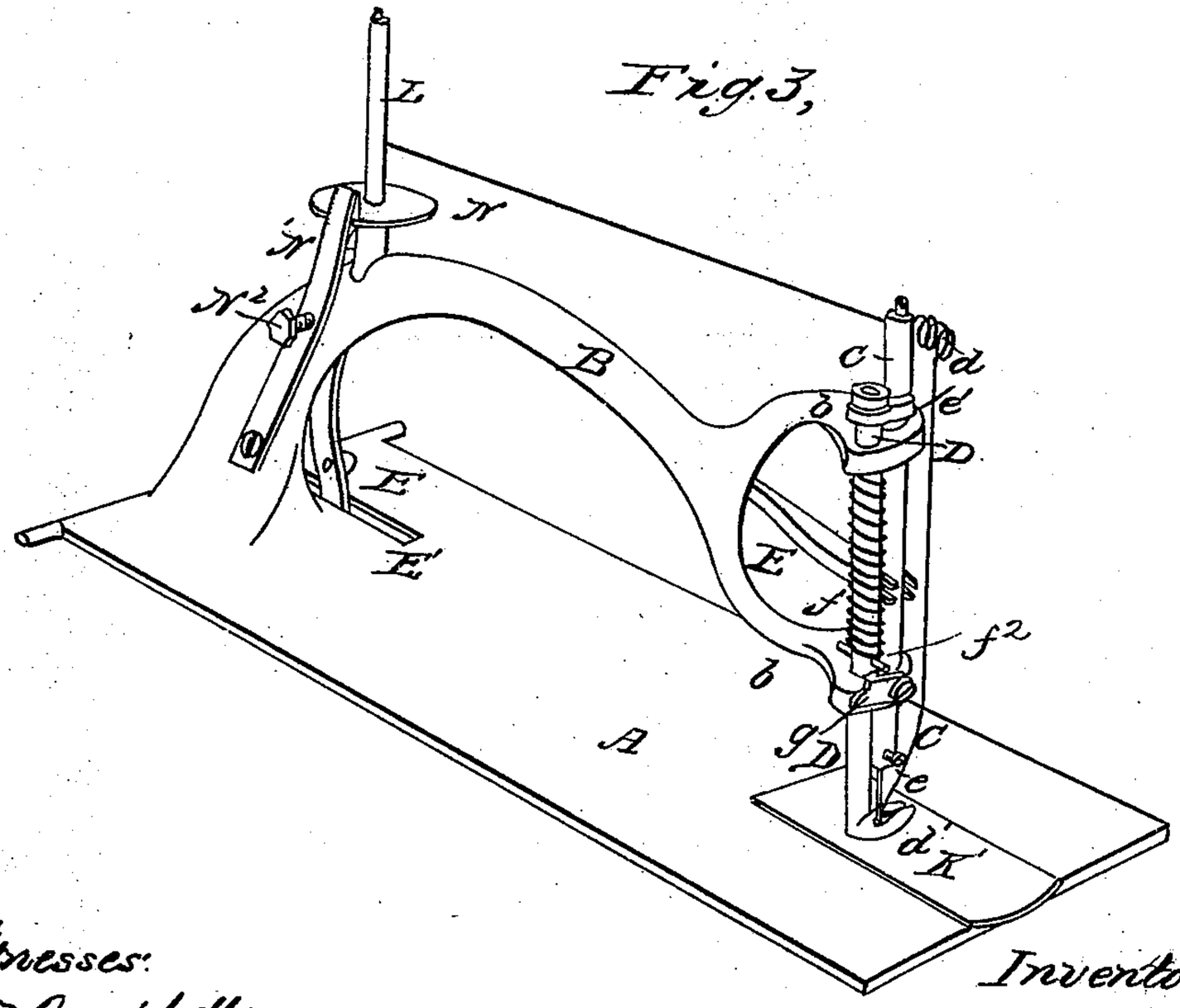


Fig. 3,



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5 Sheets—Sheet 3.

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Fig. 4,

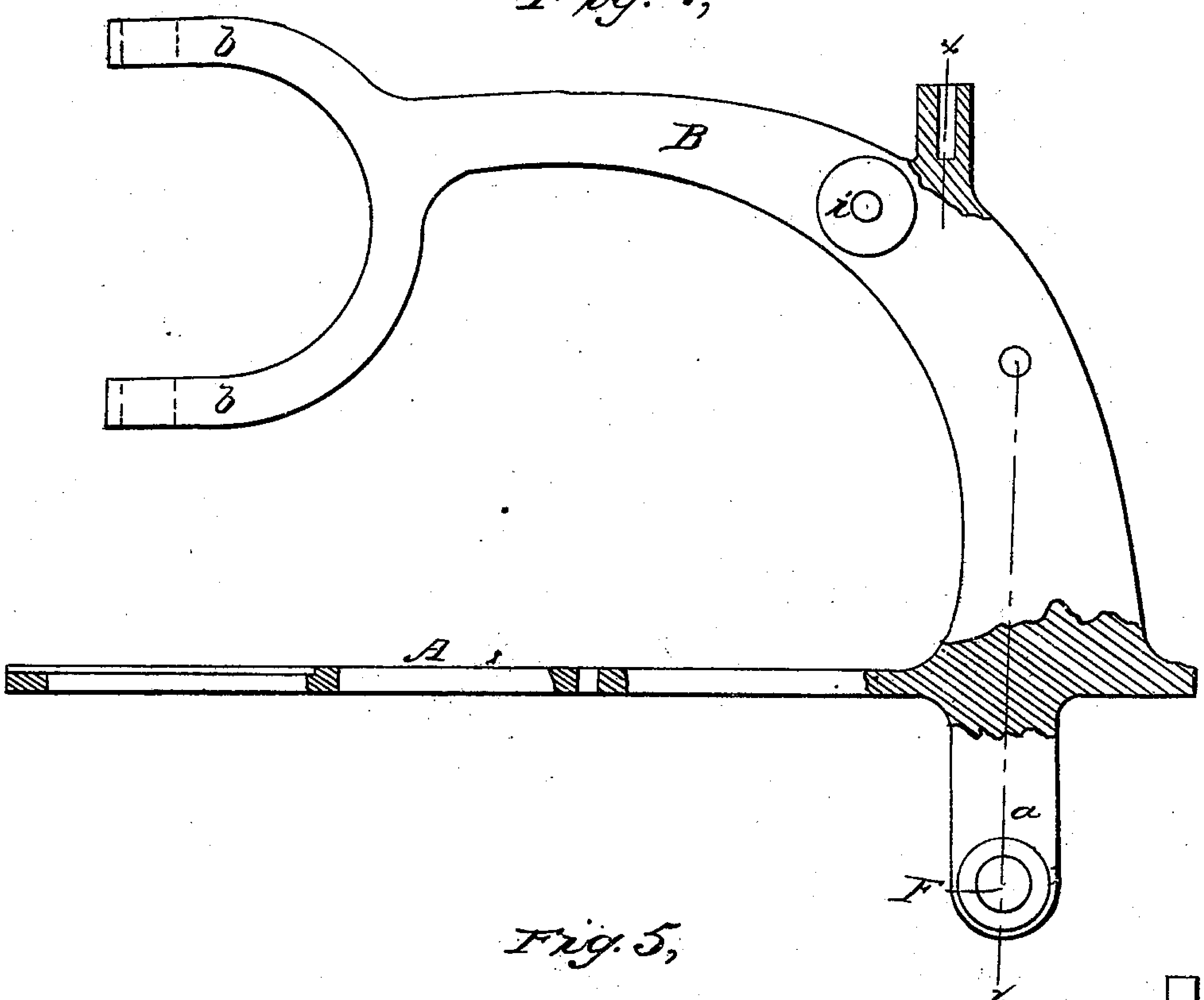
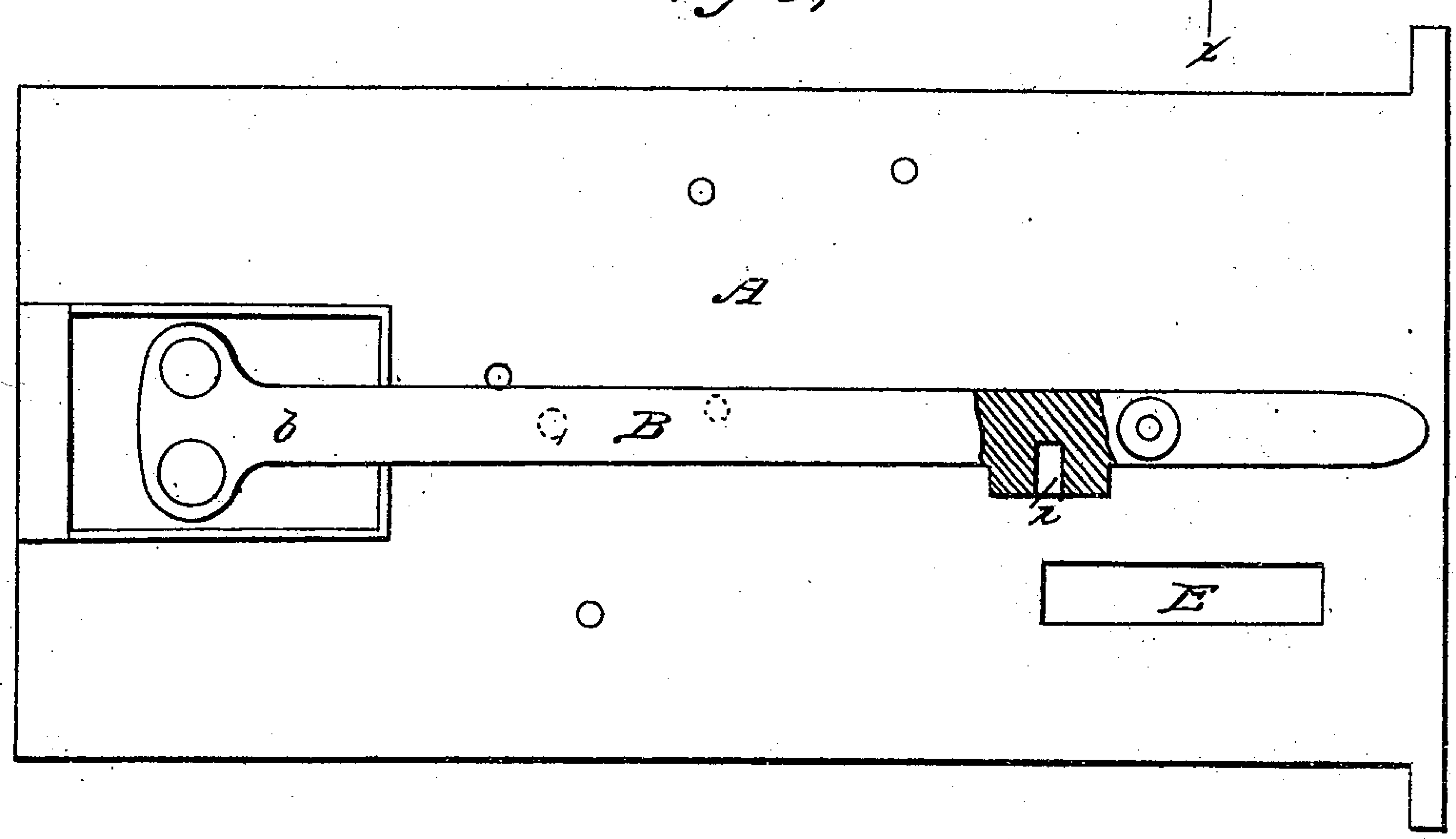


Fig. 5,



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5 Sheets—Sheet 4.

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Fig. 6,

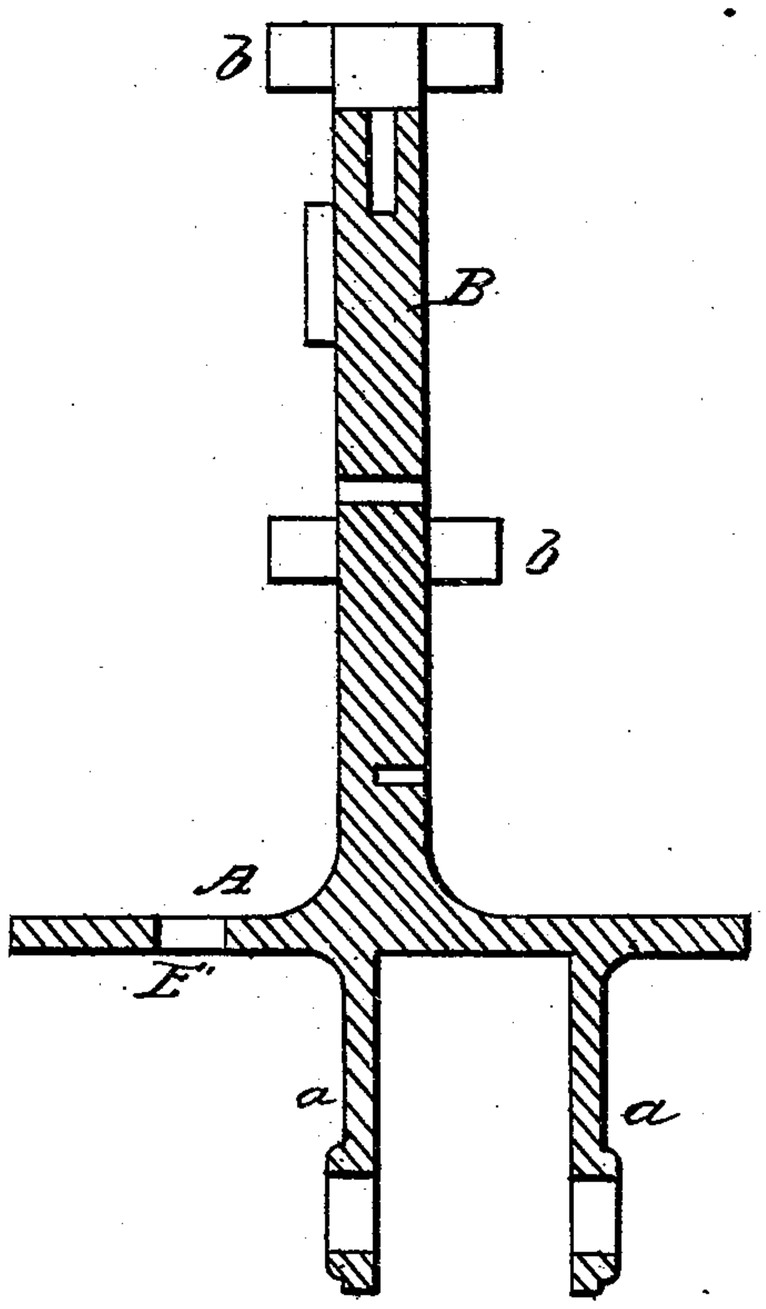
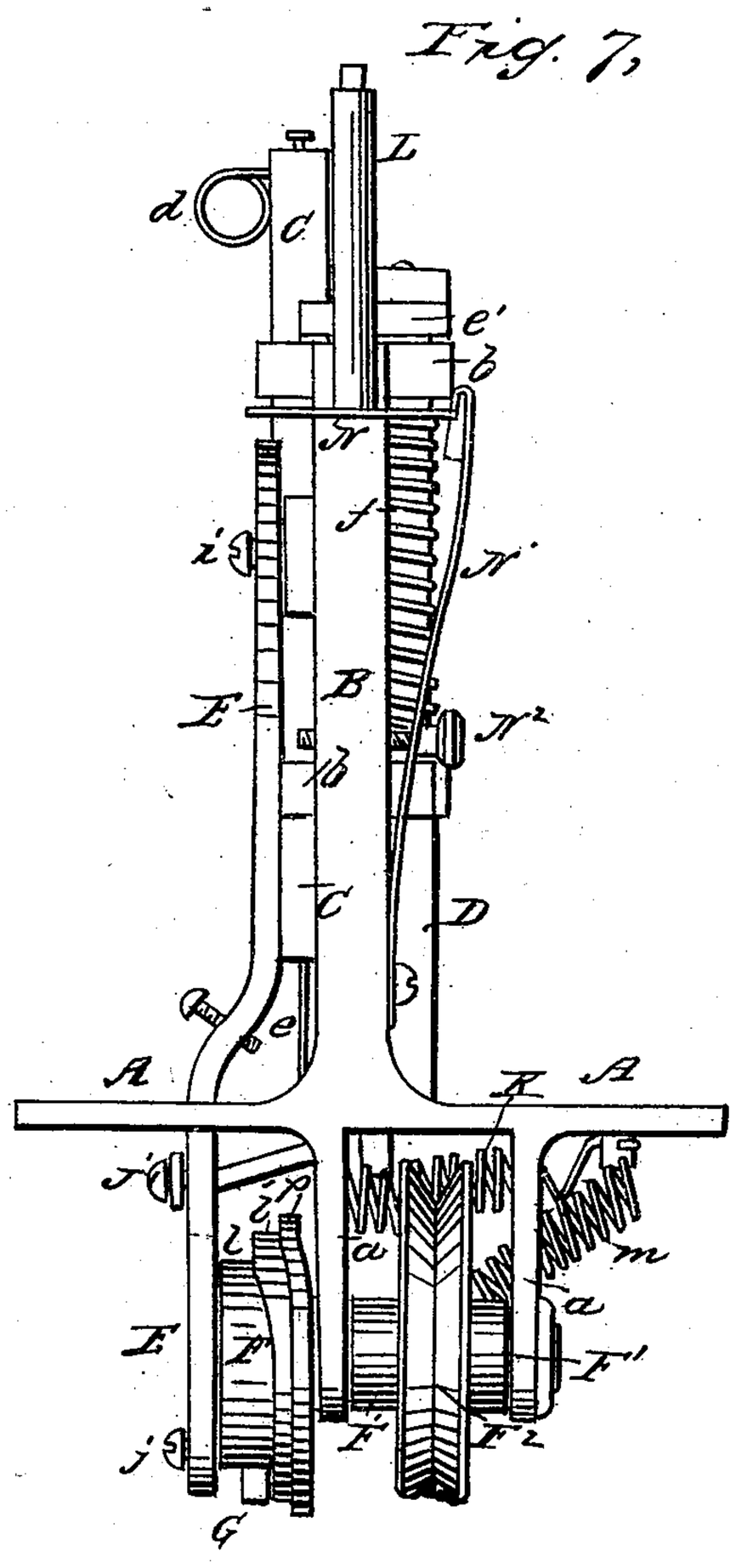


Fig. 7,



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5 Sheets—Sheet 5.

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Fig. 8,

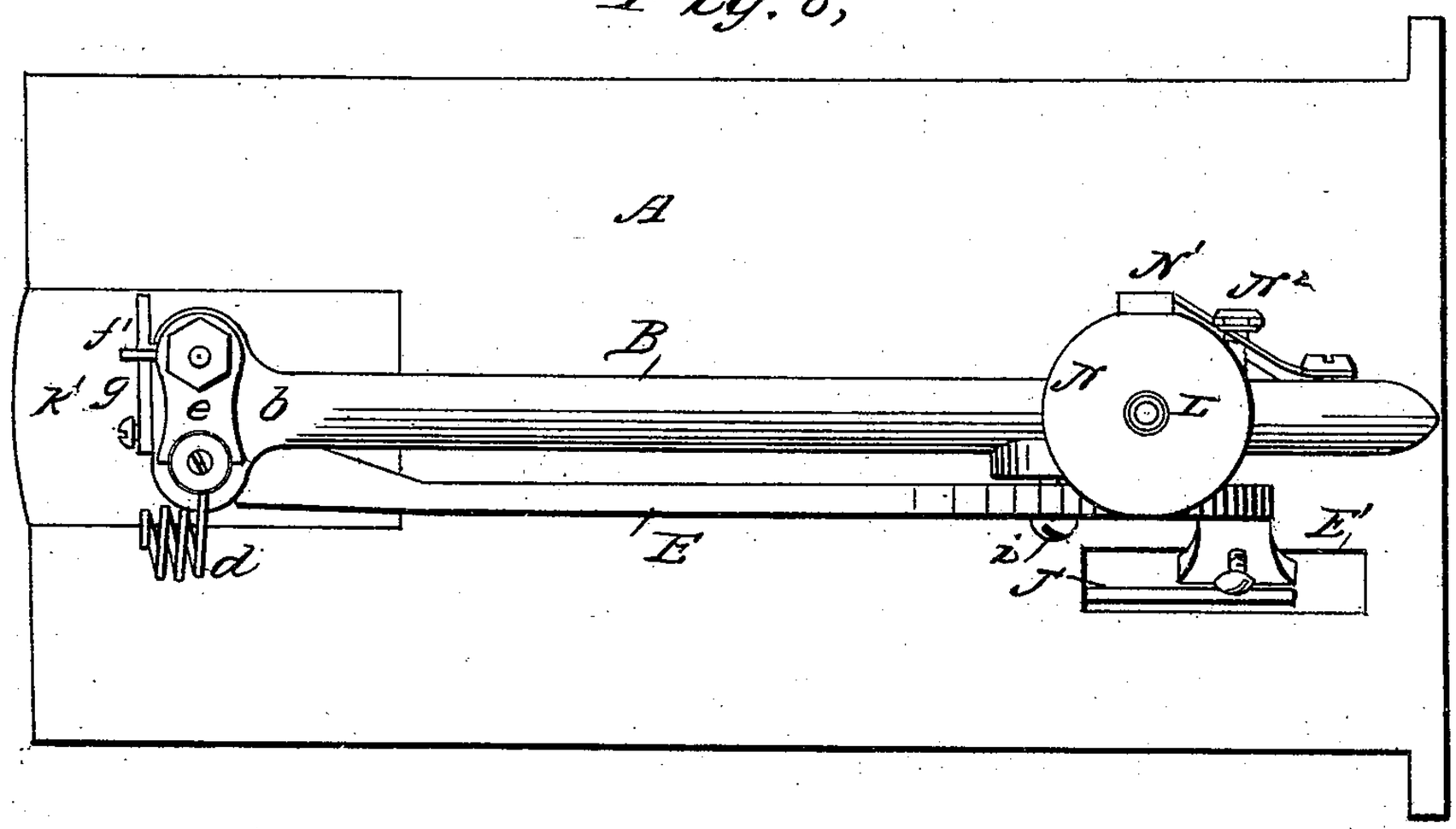
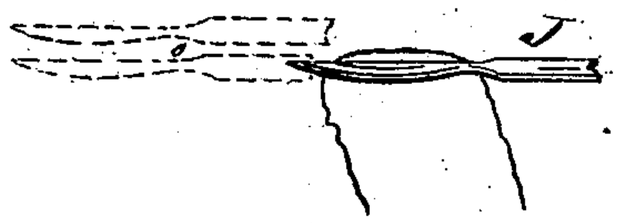


Fig. 9,



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UNITED STATES PATENT OFFICE.

JEPTHA A. WAGENER, OF PULTNEY, NEW YORK.

IMPROVEMENT IN SEWING-MACHINES.

Specification forming part of Letters Patent No. **40,296,** dated October 13, 1863.

To all whom it may concern:

Be it known that I, JEPTHA A. WAGENER, of Pultney, in the county of Steuben and State of New York, have invented certain new and useful Improvements in Sewing-Machines; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1 is a side elevation of my improved sewing-machine with that portion of the bed-plate through which the needle passes broken away. Fig. 2 is a bottom view of Fig. 1. Fig. 3 is a perspective view of the machine. Fig. 4, Sheet 2, is a vertical longitudinal section taken centrally through the bed-plate. Fig. 5 is a top view of Fig. 4, showing merely the frame of the machine. Fig. 6 is a vertical section through Fig. 4, taken in the course indicated by red line *x x* thereon. Fig. 7 is a rear elevation, and Fig. 8 shows a top view of the machine complete. Fig. 9 is a detail showing the movements of the lower needle or looper.

Similar letters of reference indicate corresponding parts in the several figures.

This invention and improvement in sewing machinery has for its object the production of a simple and cheap double-lock-stitch machine which is simple in its operation and manipulation, which will not readily get out of order, and in the event of a derangement of its parts they can be readily readjusted.

To enable others skilled in the art to make and use my invention, I will describe its construction and operation.

In the accompanying drawings, A represents a quadrangular bed-plate, which is cast with an overhanging forked bracket, B, on its upper surface, and two perpendicular bearings, *a a*, on its lower surface, the latter being situated near the rear end of the bed-plate, as shown in Figs. 2, 4, 6, and 7. The forked arms *b b* of the bracket B are flattened out and perforated for receiving through their ends the vertical sliding bars C D. The bar C carries on its lower end the needle *e*, and near its upper end a coiled tension-spring, *d*, which will be hereinafter described. The bar D carries on its lower end the curved and slotted pressure-foot *d'*, and on its upper end a yoke-plate, *e'*, which partially encompasses the needle-bar C, and serves to steady the foot-bar D and to prevent this bar from wabbling in its forked bearings or guide-arms *b b*. A spring, *f*, is coiled around the bar D between the arm *b b*, which spring keeps this bar down and the foot *d'* pressed upon the work which is placed on the bed-plate. The pin *f'*, which projects out at right angles from the bar D, is caught by a pivoted finger or latch, *g*, when it is desired to keep the foot *d'* up from the work. When the pin *f'* is released from latch *g* the spring *f* instantly throws the foot down on the bed-plate of the machine.

By making in one casting foundation adapted for giving three determined pivot points or bearings for the working mechanism employed a very important result is attained—to wit, the necessity of having the part B, which supports the needle-bar or lever E, screwed to the bed-plate is obviated, and thus the inconvenience resulting from the part B working loose and wabbling, so as to destroy the perfect working of the machine, is overcome. It is the production in one piece of casting that will afford the three pivot bearings or points as I have shown, that I regard the leading feature of my improvement, for without this construction of casting the machine with the relatively-arranged pivot-bearings would be almost useless and inoperative after but short use of the machine, from the fact that a bracket, E, screwed to the bed-plate soon works loose and wabbles, so as to endanger the needles in descending toward the hole through the bed-plate. Again, it will be seen that the lower bearings, *a a*, are cast directly under the heel of the bracket with the table or bed-plate projecting out and forming a solid continuation of these projections *a a* and B. This gives me a large body of metal at the point where the strain upon the machine is greatest, and also forms a very convenient and compact frame, which is in this way especially adapted for the reception of the long arm or lever G, and also the mechanism for operating this lever, which latter is, in my machine, brought directly under the heel of the bracket and supported in the bearings which I have cast with the bed-plate A.

I am aware that a machine has been made in which the bracket B and the bed-plate A have been cast solid or in one piece; and I am

also aware that it is a common practice to make the lower bearings which support the driving parts of sewing-machines and the bed-plate in one casting, the bracket in such cases being cast separate, and afterward bolted on.

I am further aware that a sewing-machine has been constructed in which the bracket, bed-plate, and bearings have been cast in one piece; but in this machine the lower bearing is advanced some distance in front of the heel of the bracket, and consequently prevents the following objections: In casting sewing-machine-frames which have their beds or tables like my machine these plates cool much more rapidly than the thicker parts which are cast on them. Hence the castings are more or less "warped"—that is to say, the forward end of the bed-plate and the bearings which are cast at or near this end do not always preserve the same relative distance with the end of the overhanging bracket. In other words, machines cast in the same mold and with the same pattern vary in respect to the distance of certain points with certain other points; the extreme forward end of the bed-plate of one machine will be nearer to the free end of the bracket than that of another machine, although, as I stated before, the same patterns may have been used for both machines. This change of the parts in casting creates considerable trouble, where all the movable parts of the machine are required to work with mathematical nicety; and to provide for this change the workmen must change the length of the levers and the speed of the different parts for each machine, which creates a great deal of confusion in the shop. In my machine I obviate the necessity of making the levers or other detachable parts vary in size by arranging the position of the bearings *a a* in a vertical plane with the heel of the bracket, and not, as in the case of the machine referred to, in advance of the heel of the bracket, where it is subject to the changes of position of the bed-plate. I also at the same time obtain the advantages of having the bracket, bed-plate, and lower bearings cast in one homogeneous piece, and also of increased strength of the frame A B *a* at the points where these parts unite, thus making a machine which is capable of withstanding the shocks and concussions to which it is subjected.

Although the machines having the parts B or *a* bolted to them may work well at first, it has been found in practice that in all machines of this form and construction these parts do become loose, and consequently create confusion in the operation of the machine. It is therefore this particular character of machine that I have improved upon, and not upon a machine using a single thread or one having a rotating shaft in the place of vibrating levers G H and needle J. I desire to employ such devices and to combine them with a frame or foundation which consists of the parts A B *a*, cast in one piece and arranged in the position or relation shown in Figs. 4 and 6. I do not desire to prevent others from bolting, riveting, or otherwise applying the parts B *a* to the bed-plate A, when said parts are made separate. Such machines have been made hitherto and my experience in their practical operation proves the facts above stated.

Where the bracket, bed-plate, and lower bearings are cast as above shown, the only change required to compensate for the warping of the bed-plate is that of adjusting the needle *e* lengthwise according to the relation which the front end of the bed-plate A bears to the positive points *i* and F′.

E is a curved or bowed lever, forked on its upper end, and also slotted so as to form four prongs, two of which embrace notches cut in the needle-bar, while the other two prongs receive a pin, *h*, which attaches the end of the lever E to the needle-bar and allows this end to vibrate upon a fulcrum or pivot-connection, *i*, of the bracket B, as shown in Figs. 1, 7, and 8. The lever E passes down through the slot E′ in the bed-plate A, and is again pivoted at its lowermost end to the vertical plane face of a cam-wheel, F, by means of pin *j*, which passes through an oblong slot, *j′*, formed in the lever E. The rotation of cam-wheel F vibrates this lever E and causes it to communicate a vertical reciprocating movement to the needle-bar C. The extent of this movement may be regulated by changing the pin *j* to one or the other of the holes in the cam-wheel shown in Fig. 1. The cam-wheel F is keyed on the end of a short transverse shaft, F′, which has its bearings in the supports *a a*, and between these supports the belt-wheel F^2 is keyed to shaft F′, (shown in Figs. 2 and 7,) by means of which motion is communicated to the cam-wheel.

In the center of the bed-plate A, and projecting perpendicularly from its bottom surface, is a pivot-pin, g^2, which serves as a fulcrum for two curved levers, G H. The lower lever, G, carries on its forward end the serrated and forked device *k* for feeding the material under the needle, which device works through slots made through the removable portion *k′* of the bed-plate as shown in Fig. 1. This feed-bar or lever G projects backward and downward from the pivot-bearing g^2, and its rear end impinges upon the surfaces of the cam *l* of cam-wheel F and flange *l′*, which give to the lever the required movements for feeding the cloth under the needle. The rear end of this lever G is held against the cam-flange *l′* by the helical spring *m*, (shown in Figs. 2 and 7,) one end of which is secured to the bottom of the bed-plate, and the other end is slipped through the eye of a pin, *m′*, which is secured to one side of the feed-bar.

Above the lever or feed-bar G is a lever, H, above referred to, which has a slotted plate, *n*, secured to its rear end by means of a set-screw, *n′*, which, when loosened, will allow the plate *n* to be adjusted laterally with respect to the cam-flange *p*, against the side of which the edge of plate *n* abuts, as shown clearly in Fig. 2. The forward or upper end of lever H has an offset formed on it, through which the

forward end of the looping-needle J passes, and in which this needle is supported. This lever H receives a horizontal vibrating motion from the flange-cam *p*, which it communicates to the forward end of the looper. The adjustable plate *n* is used for the purpose of increasing or diminishing the extent of vibration of the looper.

The object of the slotted adjusting-plate *n* is to adapt the machine to work with different-sized perforating-needles. For coarse needles the vibration of the looping-needle J must be greater, and for fine needles this vibration must be less. Some needles will differ in their relation to the looping-needle, and whenever it becomes necessary to change the needle *e*, and the machine does not work well with the new needle, the plate *n* is adjusted, and the vibration of the looper J is thus made to conform to this needle. This looper J is a tapering rod bent so as to form two obtuse angles, *o o*. It is flattened at its smallest end, as shown in Figs. 1 and 2, and through this flattened end three or more perforations, *s s s*, are made. The longitudinal slot *s'* extends along a short distance and terminates at a large perforation, s^2, made through the looper. These holes are for the purpose of receiving the thread which is below the bed-plate, as indicated in blue lines, Figs. 1 and 2, as will be hereinafter described. The rear end of looper J' has an eye formed on it, through which a screw, J, passes, which pivots this end of the looper to the lever E at a point above the slot in this lever and below the bed-plate of the machine. A spring, K, Fig. 7, keeps the edge of plate *n* up against the flange-cam *p*, and this cam gives a horizontal vibrating movement to the lever H, which is communicated to the forward end of the looper, as above described. The lower end of lever E gives a reciprocating motion to the looper J, the extent of which may be regulated by adjusting this looper lengthwise on the lever E or by bending the looper at its angles so as to increase or diminish its length, and thus attain the above-mentioned result.

The extent of vibration of the feed-bar G is adjusted by means of a screw, *t*, which passes through the bar and abuts against a stationary pin, *t'*, projecting from the bed-plate, as shown in Fig. 1. By adjusting this screw *t* any desired length of stitch may be obtained.

L represents the rotating spool-holder, the hollow stem of which projects up from the bracket B. (Shown in Fig. 1.) This stem receives the spool of thread, which is secured to the stem in any suitable manner. The circular flange N at the base of the tubular stem is intended as a bearing for a flat spring-plate, N'. This spring is secured at its lower end to the base of the bracket B, and projects upward sufficiently far to bear upon the edge of said flange. The screw N^2 passes loosely through this spring N', and is tapped into the side of the bracket, as shown in Fig. 7, so that by adjusting this screw N^2 the pressure, and consequently the friction of the spring upon the flange of the spool-holder, may be increased or diminished at pleasure, and in this way the tension of the upper thread (indicated in red) may be regulated. A piece of leather or other substance of a similar character may be attached to the upper end of the spring N' at the point where this spring impinges upon the circular flange N, thus insuring a suitable friction-surface. In the operation of my machine for making a double lock-stitch the upper thread is passed from the spool, which may be supposed to be on the stem of spool-holder L, through the helical spring *d*, and down through the eye of the needle *e* in bar C, as shown in Fig. 1. The lower thread is carried from its spool, which may be situated in any convenient place about the machine, through an eye which is formed on the lower end of a wire spring, P, and then through the large hole *s'* in looper J, and back again through one of the smaller holes *s*. The needles now being threaded, the material to be sewed is put upon the bed-plate A, adjusted under the needle, and held down on the bed by the pressure-foot *d'*. Motion is given to the cam-wheel F, and the needle descends through the work and passes on one side of the flat end of the looper, which is receding from the needle and leaving a strand of its thread around the needle. The needle continues to descend and the looper to recede from it until this looper commences its advancing movement on the opposite side of the needle. Then the needle rises and the looper passes through the loop formed in the upper thread, and in this way the stitch is formed, the looper changing its position with reference to the needle at each stroke, first passing on one side of the needle and then on the other side. The spring P is used to keep the lower thread under constant and uniform tension, and the spring *d*, which may be in an oblique, inclined, or horizontal position with respect to the needle-bar C, is for a similar purpose. In this latter spring the elasticity may be increased or diminished by passing the thread between the coils of wire, and thus changing it from one coil to another, so that the farther the bearing of the thread upon the spring is arranged from the bar C the greater elasticity will be obtained, and vice versa. This spring *d* may be made of two, three, or more coils of wire, and it should be rigidly fixed to the needle-bar at or near its upper end. The wire should be sufficiently coarse to make a stiff spring, which will not yield so much as to make a loose stitch or so little as to break the upper thread.

From the above description it will be seen that the three bearings g^2 F' *i* support all the principal working parts of my machine, which are few in number and exceedingly simple in their construction. One cam-wheel F gives the several motions to the three levers E G H, two of which are so arranged on one pivot-bearing that they can be easily got at for oiling and adjusting. The timing of the levers so that they will all work in harmony one with

the other can easily be accomplished by means of the adjusting-plate *n* and the set-screw *t*, as above described. The perforations *s* and s^2, through the flattened end of the looping-needle J, carry the lower thread, and are also used for the purpose of adapting the machine to work with thread of different degrees of fineness. For example, when the thread is very fine it is passed through the large hole s^2 and back again through the hole *s* nearest the end of the looper, and for coarser thread the holes nearer the large hole s^2 are used.

The object of making the series of transverse holes *s s s* s^2 through the flattened point of the looper J is to enable the perforating-needle *e* to take the loop from the needle J quicker when coarse thread is used than it does when fine thread is used. When the coarse thread is passed through the hole s^2 and then through one of the intermediate holes it will be seen that when the looper recedes, leaving a loop upon the needle *e*, the stitch will be formed quicker than when the thread is passed through the hole nearest the point of the looper, and consequently the loop will be drawn tight in coarse or thick work, while if the work is very fine and it is not necessary to use coarse thread the loop is not drawn so quickly, thus allowing the needle to make its full backward stroke. By means of these holes between the large hole s^2 and the small hole nearest the point of the needle I am in this way enabled to adapt the machine to work equally as well with fine thread as with coarse, and to work well in thick and thin material, the play of the needle J being always adequate to allow of the using of fine or coarse threads under the conditions stated.

Having now described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a sewing-machine combining the working parts C, E, F, G, H, and J, arranged and operating as described, the use of a frame or foundation composed of the parts A B *b b* and *a a*, cast in one solid piece, in their respective positions, shown in Figs. 4 and 6, for the purposes described.

2. In a sewing-machine having the vibrating levers G, H, and E, arranged to operate as described, the construction of the laterally-adjusting plate *n*, applied to the rear end of the change-bar H, for the purpose of adapting the machine to work with different-sized needles, substantially as described.

3. A tapering flat-pointed looping-needle, J, constructed with positive angles *o o*, and three or more holes, *s s s* s^2, through its flattened end, whereby this needle is adapted to work well with fine or coarse thread, and also can be set to compensate for any change in the length of the lower needle, J, substantially as described.

4. The helical tension-spring *d*, applied to the needle-bar C, and arranged in a horizontal or inclined plane, for the purpose of giving the desired tension to the upper thread, said spring being constructed substantially as described.

5. In a machine operating as described, and having the three pivot-points g^2, *j*, and *i*, lever E G, and change-bar H, the adjusting slotted plate *n*, spring K, and cam-wheel F, operating as described, for the purpose of giving the required lateral movements to the looping-needle J, substantially as set forth.

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