

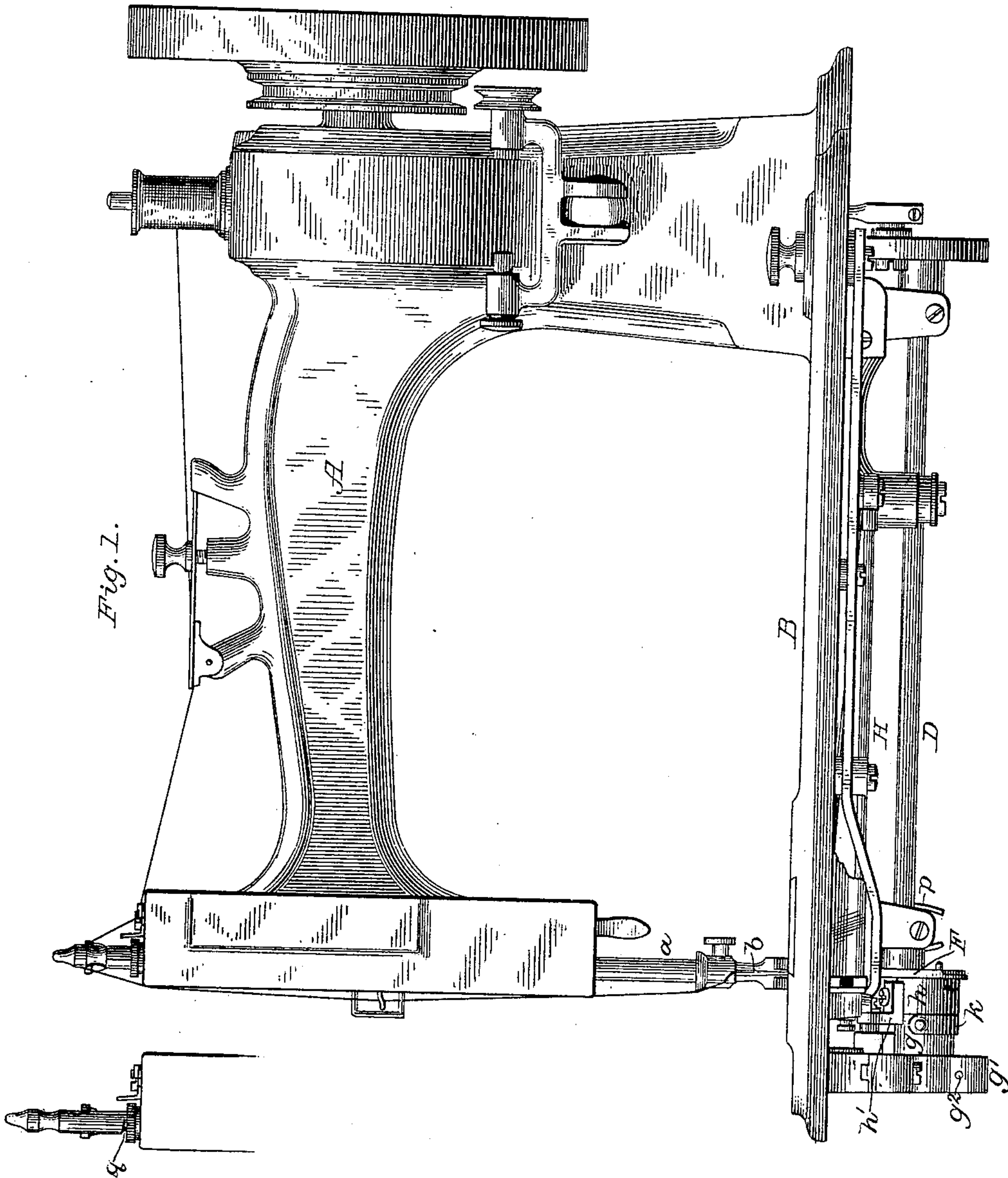
(No Model.)

5 Sheets—Sheet 1.

J. KEITH.
SEWING MACHINE.

No. 273,854.

Patented Mar. 13, 1883.



Attest:

Philip F. Larner,
Howell Bartle

Inventor:
Jeremiah Keith.
By M. C. Wood
Attorney.

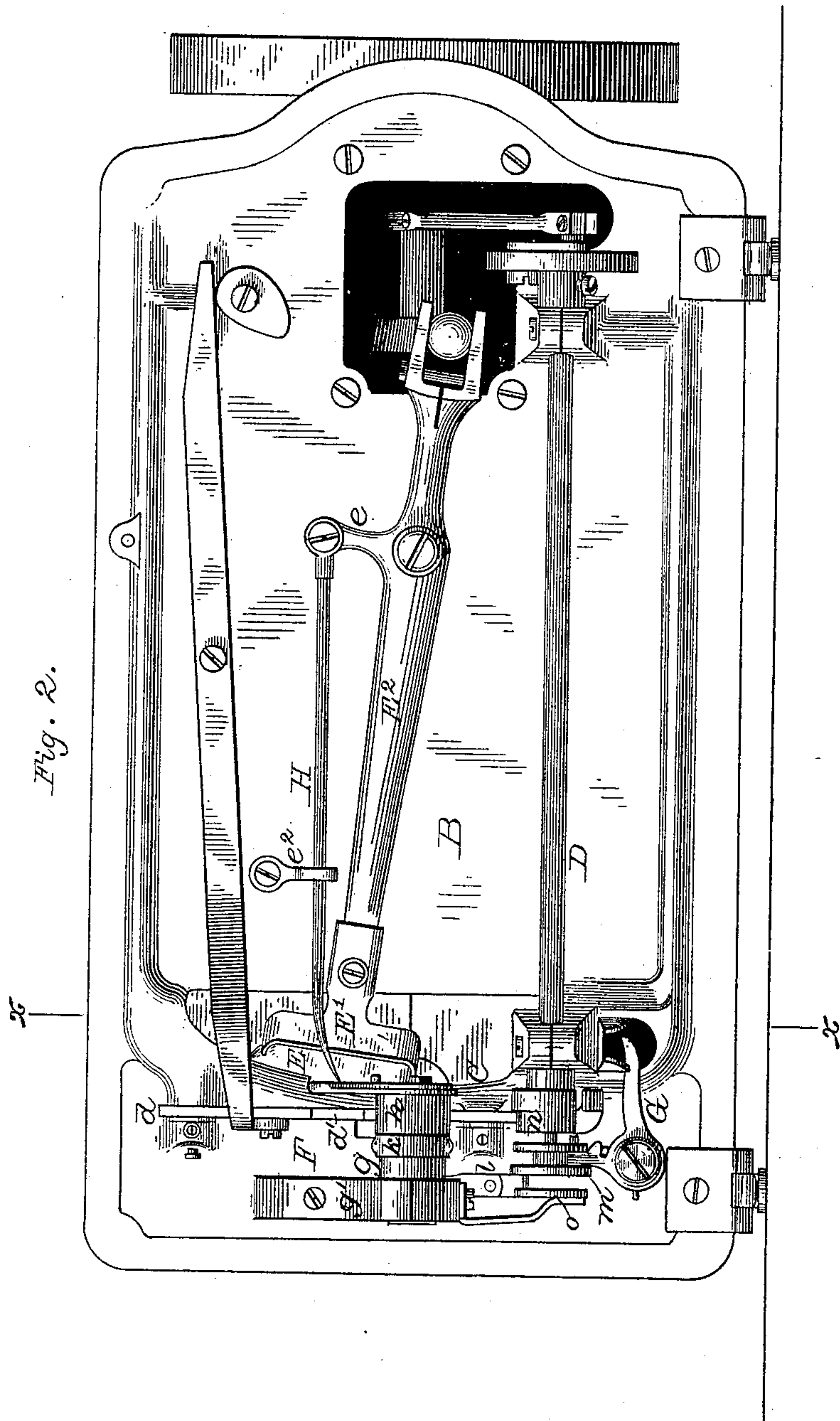
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5 Sheets—Sheet 2.

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SEWING MACHINE.

No. 273,854.

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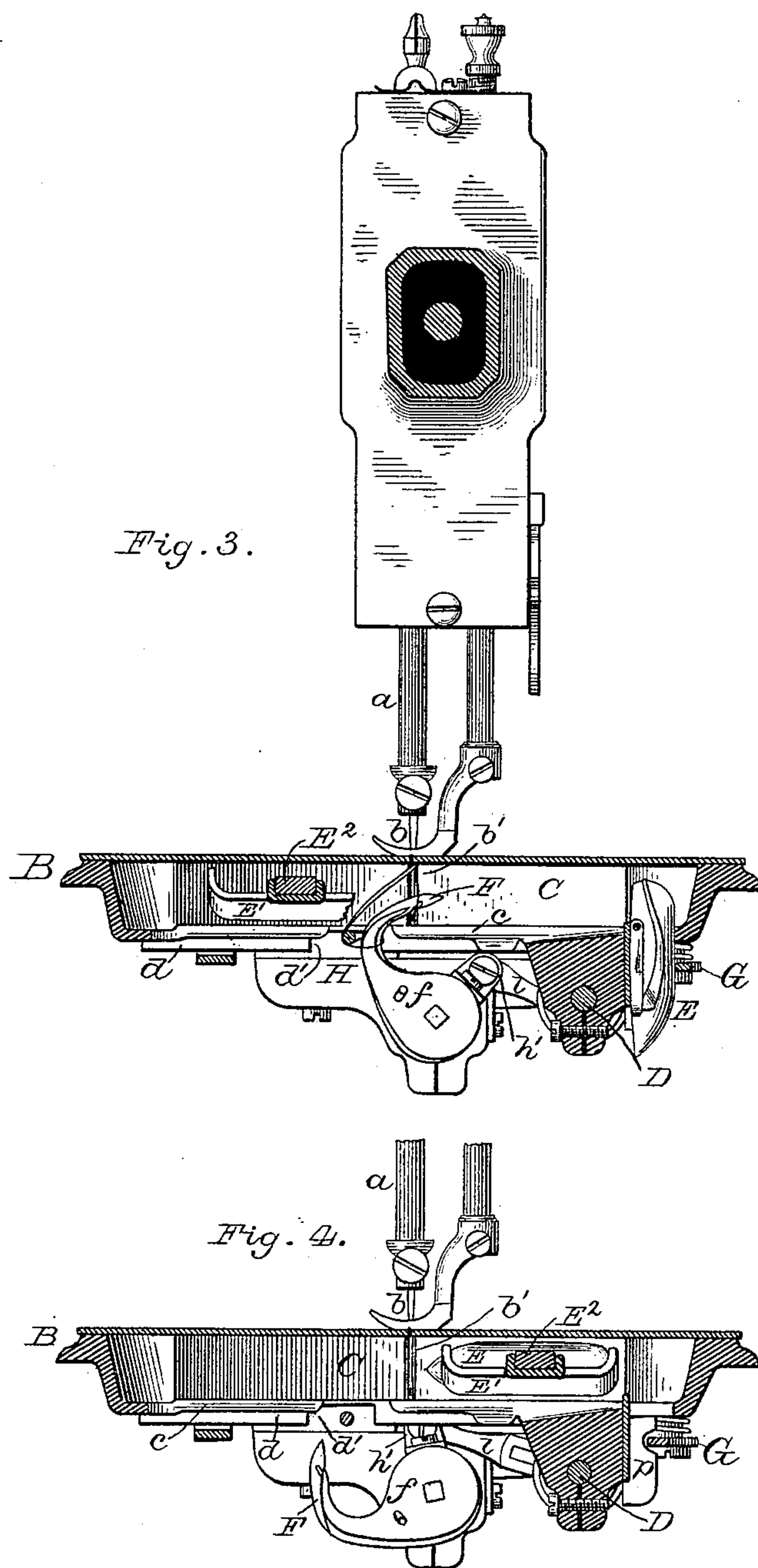
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5 Sheets—Sheet 3.

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(No Model.)

5 Sheets—Sheet 4.

J. KEITH.
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Fig. 5.

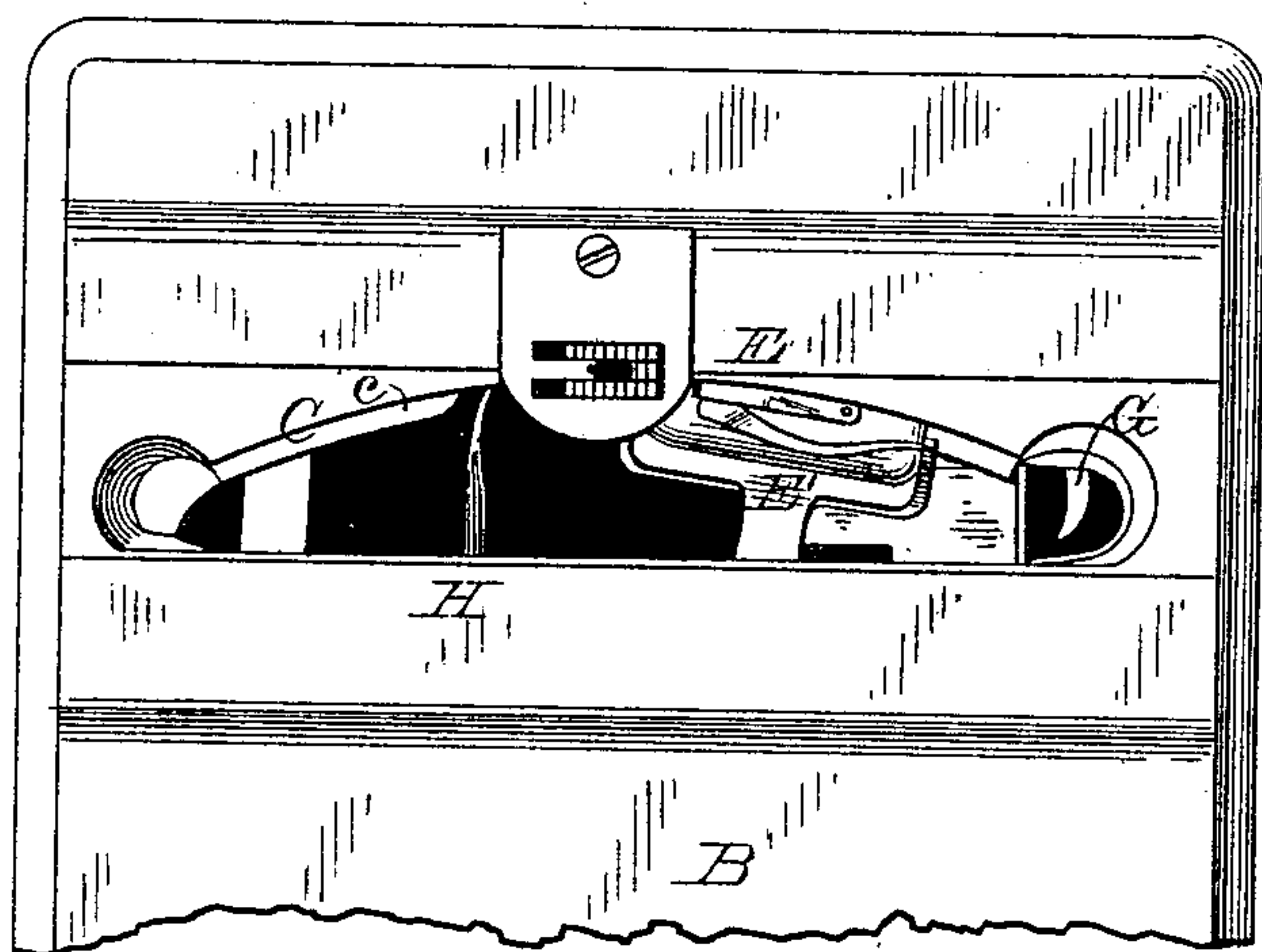
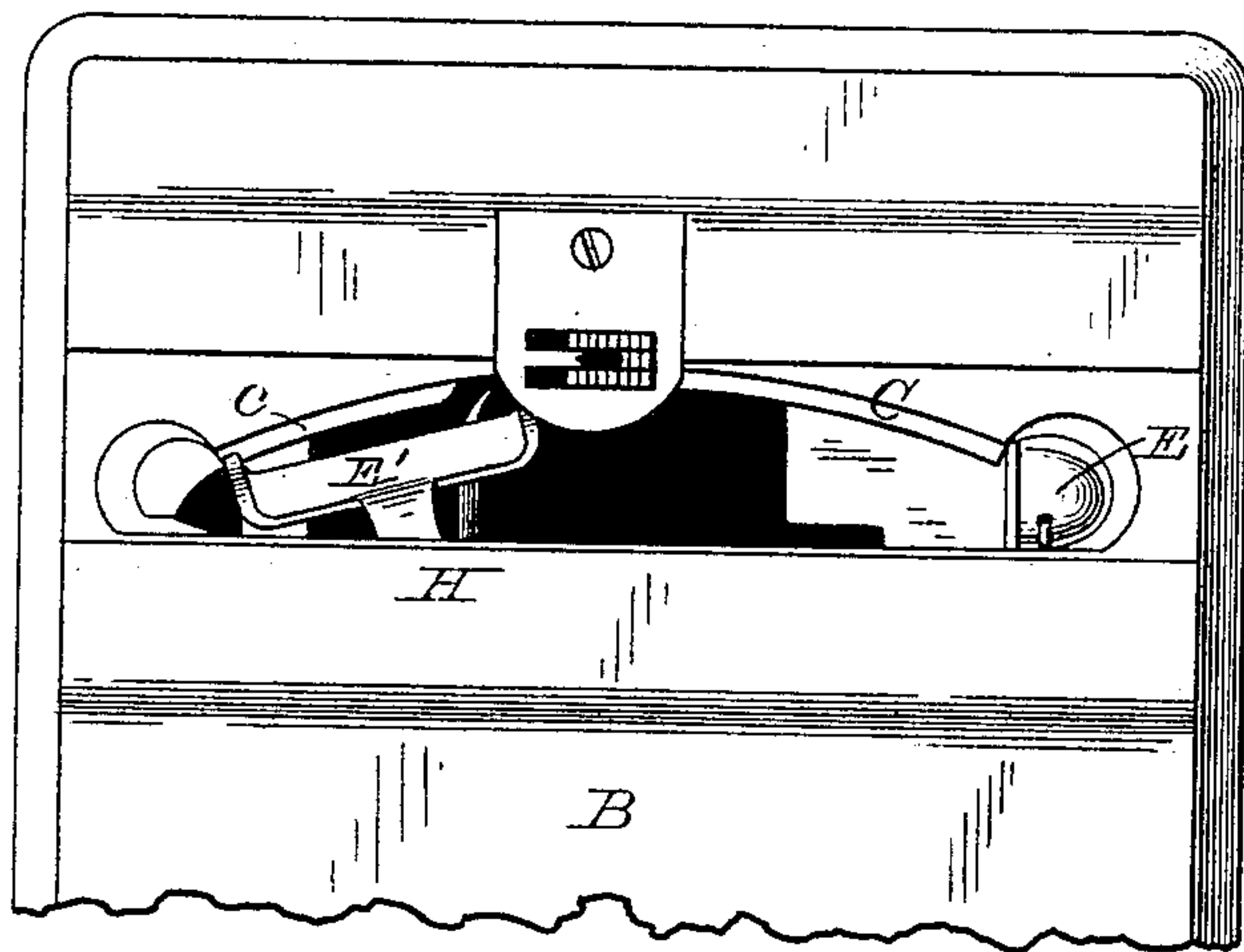


Fig. 6.



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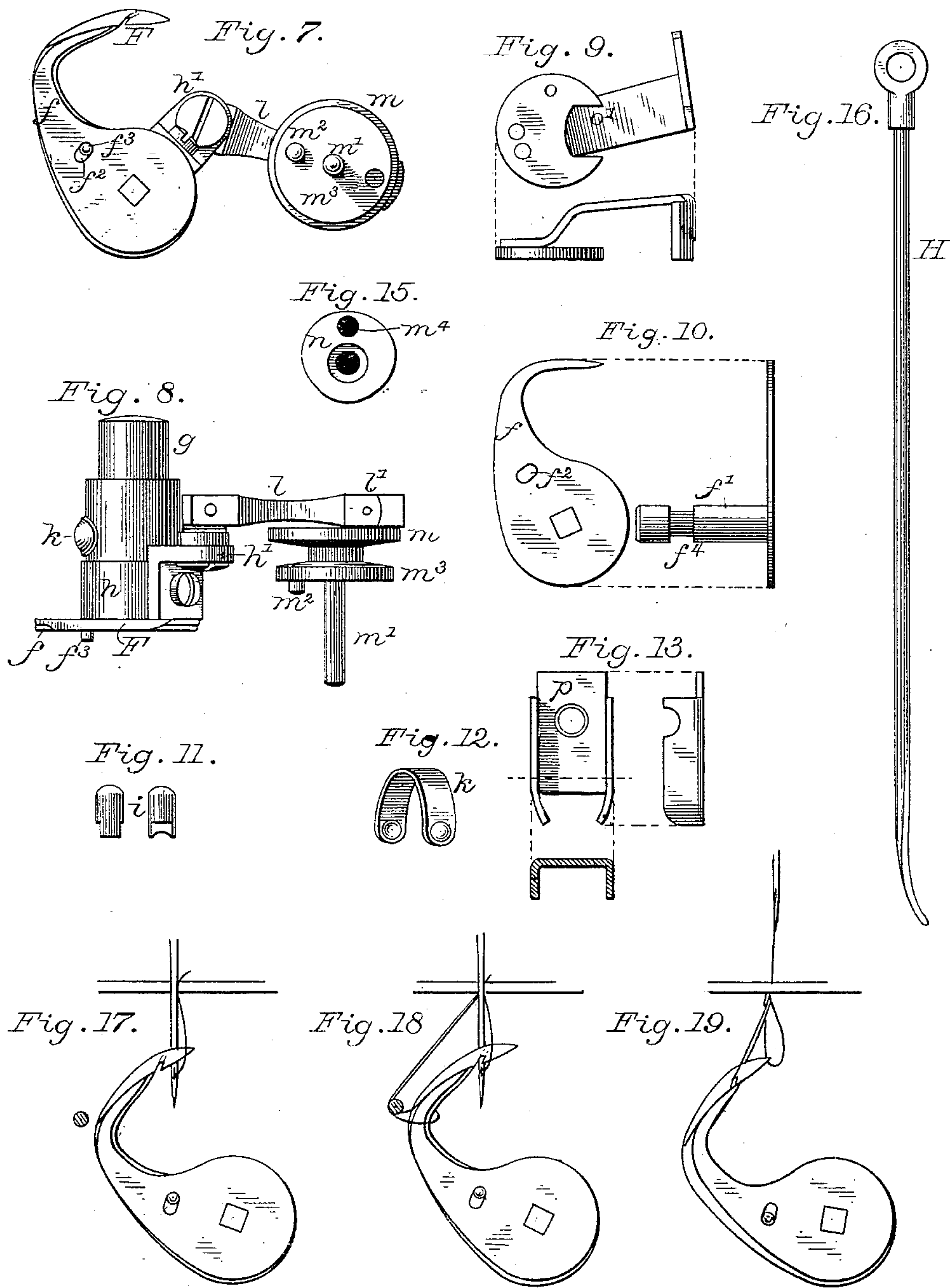
Inventor:

Jeremiah Keith.
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Attest:
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Fig. 14.
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UNITED STATES PATENT OFFICE.

JEREMIAH KEITH, OF FLORENCE, MASSACHUSETTS.

SEWING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 273,854, dated March 13, 1883.

Application filed August 30, 1882. (No model.)

To all whom it may concern:

Be it known that I, JEREMIAH KEITH, formerly of Providence, Rhode Island, and now of Florence, in the town of Northampton, county of Hampshire, and State of Massachusetts, have invented certain new and useful Improvements in Sewing-Machines; and I do hereby declare that the following specification, taken in connection with the drawings furnished and forming a part of the same, is a clear, true, and complete description of the several features of my invention.

My said improvements relate to that class of machines shown and described in certain prior Letters Patent issued to me, and which embody mechanism for separately forming either a "lock-stitch" or a "chain-stitch" at the will of the operator.

So far as my knowledge extends, I am the first to devise and disclose, as shown in my said Letters Patent of the United States, issued October 26, A. D. 1880, and July 5, A. D. 1881, and respectively numbered 233,626 and 243,710, the combination, with an eye-pointed needle, of any device co-operating therewith for forming a chain-stitch, which so co-operates with said needle that the needle does not pass through or traverse a thread-loop. It is to be understood, however, that certain features of my present invention are not limited to that particular type of chain-stitch mechanism, as will be hereinafter more fully indicated.

In machines embodying my said prior improvements a looper is employed, which draws a loop from an eye-pointed needle, and maintains control thereof until proper to release it. The needle rises after the looper has engaged with the thread and thereafter descends wholly outside of said loop and beyond its apex in the line of feed, and then the looper engages with the next needle-loop and draws it through the previous loop, which is immediately thereafter released from the looper, leaving the thread free to be drawn upward for completing the stitch. In said prior machines as devised by me the draft of the thread-loop, or, in other words, the movement of said loop away from the needle, is at right angles to the line in which the feed-motion operates, and therefore when a loop is drawn tightly by the looper said loop extends angularly to the plane of the needle-path; but in accordance with cer-

tain features of my present invention the operation of my looper is such that the looper, the thread-loop, and the standing thread always occupy substantially the same vertical plane as the needle-path, and the looper moves in the line in which the feed-motion operates; but, as in my prior machines, the needle never traverses or enters a loop.

As described in my said Letters Patent, my prior loopers were longitudinally reciprocated, and a cast-off was therewith employed; but I now employ a cast-off looper which is axially mounted and oscillates, and it involves several novel features in its construction, arrangement, and mode of operation, and although I have now shown it and hereinafter describe the same as adapted to operate in a machine embodying a curved shuttle-race and a reciprocating shuttle, and arranged to operate in a vertical plane parallel with the path of the needle, it is to be understood that said novel looper has value peculiar to itself, regardless of the particular character of the shuttle-race, and whether said looper be operated in a plane parallel with the path of the needle or at right angles thereto, and whether or not said looper moves toward and from the needle in a line corresponding to the line of feed.

In both of my said prior machines, as described in my said prior Letters Patent, the looper performs its work on the same side of the needle as that on which the shuttle operates instead of having a looper and a shuttle arranged to operate upon opposite sides of the same needle, as has heretofore been proposed for machines having a needle which traverses the loop; and in my said machines the shuttle and the looper may be alternately employed without involving any necessity for a shuttle-race which is movable or is constructed in parts or sections, which must be changed or adjusted adjacent to the path of the needle, and thereby alter the needle-recess, whenever a change in stitch is desired, as is the case in machines involving a needle which traverses each loop.

As heretofore organized by me, the longitudinally-reciprocating looper moved to and fro in contact with the face of the shuttle-race, so that each loop of thread at its side adjacent to the needle-path was more or less pinched between the looper and the race-face; but as now organized by me my present looper is wholly free

from said contact, and no portion of the thread is pinched, as before, thus assuring such smooth and free movements of the thread as are essential for obtaining the best results.

5 In my prior Letters Patent, No. 243,710, I show and describe a notch, groove, or slight vertical recess in the face of the race, near the needle-path, for retarding the movement of the loop while the looper moves forward for en-
10 gaging with a fresh loop, in order that the preceding loop shall not be released until after the new loop is fully engaged by the looper; but with my present looper I employ for the first time in this connection, so far as my knowl-
15 edge extends, a loop-controller which is positively actuated with movements at right angles to the path of the looper.

Instead of employing a looper which is moved positively in one direction and returned by a
20 spring, as shown in my prior Letters Patent, I now operate my looper positively in both directions, and it can be readily driven either by means of a cam or a rock-shaft, or, as is preferred by me, a rotating shaft, and in the machine hereinafter particularly described I utilize for that purpose a revolving feed-shaft.

In machines of this general class means have been provided for throwing the looping mechanism, which co-operates with the eye-pointed
30 needle for forming the chain-stitch, out of the pathway of the shuttle when a lock-stitch is desired. The liability of unskilled and careless operators to attempt to use a shuttle without first putting the looper out of the way should be specially guarded against for pre-
35 venting serious injury to the machine, and therefore, instead of relying upon thumb-screws, slides, &c., as heretofore, I have devised shifting or adjusting mechanism, which
40 of necessity involves the insertion and removal of any suitable device into and from a receptacle therefor—as, for instance, a special plug or a screw-driver—the presence or absence of which will promptly and assuredly indicate to
45 the eye of the operator the existing condition of adjustment of the looper with reference to the path of the shuttle; and to render this indication all the more apparent and absolutely certain I have so organized the adjusting mechanism that the shuttle itself, when removed
50 from its carrier, is made to serve as a shipping medium for throwing the looper into and maintaining it in its proper working position, and also so that when said shuttle is next removed
55 for use in its carrier the looper is necessarily rendered inactive and is retired wholly from the path of the shuttle, and it there remains until next required.

In my former machines my longitudinally-reciprocated looper operated upon what I will
60 term a "tight" loop—i. e., it was short and under considerable strain or tension at the time of its release from the looper; but in my present machines my looper operates with a free loop
65 with sufficient thread to secure smooth and free movements thereof, and for the first time in this class of machines I have now so organ-

ized the looper, the needle, and the shuttle-carrier that the latter operates in sweeping, brushing, or inclining the loop, as originally
70 opened or developed, by the lifting of the needle toward the looper as it advances to enter and engage with said loop.

After a full description of my said improvements in connection with the accompanying
75 drawings, the features deemed novel will be specified in detail in the several clauses of claims hereunto annexed.

Referring to the five sheets of drawings, Figure 1, Sheet 1, is a side elevation of a machine
80 embodying the several features of my improvements. Fig. 2, Sheet 2, is a view of the same machine with its bed-plate turned upward. Fig. 3, Sheet 3, is a lateral vertical section of the machine on line *x*, Fig. 2, with the mech-
85 anism adjusted for forming a chain-stitch. Fig. 4, Sheet 3, is the same view as Fig. 3 with the mechanism arranged for forming a lock-stitch. Fig. 5, Sheet 4, is a top view of the bed-plate of the machine with the slide-plates removed
90 and the mechanism adjusted for forming the chain-stitch as in Fig. 3. Fig. 6, Sheet 4, is the same view as Fig. 5 with the mechanism adjusted for forming the lock-stitch. Figs. 7
95 to 16, inclusive, Sheet 5, are separate or detail views of various detached portions of the mechanism for forming the chain-stitch. Figs. 17,
18, and 19 illustrate three of the different positions occupied by the looper in forming a chain-
100 stitch, first, in its rearmost position after engaging with a needle-loop; second, on its way forward for a fresh loop; and, third, after passing the last loop through the first.

The head A of the machine and its internal mechanism may be variably constructed; but
105 that shown corresponds with the well-known "Crown" machine. The needle-bar *a* reciprocates as in shuttle-machines generally, and the needle *b*, by its partial lift, develops a thread-loop at the side of the needle, which is
110 as suitable for the proper working of the chain-stitch mechanism as for the shuttle in making a lock-stitch.

Below the bed-plate B the mechanism for operating the shuttle and the feed-bar, and for
115 adjusting the latter, is substantially as heretofore employed in said Crown machines.

The curved shuttle-race C and the needle recess or groove *b'* are substantially as heretofore in said Crown machine, and no change
120 is requisite therein, except dispensing with a portion of a strengthening-web, *c*, at the lower edge of the race, so as to afford a recessed space for the proper entrance and operation of the mechanism for forming the chain-stitch, and
125 adjacent to said space the feed-bar *d* is correspondingly recessed, as at *d'*. This feature of employing in a machine having interchangeable mechanism for producing the chain and the lock stitch a raceway in which no change
130 is required to enable the shuttle or the looper to properly co-operate with an eye-pointed needle is separately involved in one of the features of my invention, and, so far as my knowl-

edge extends, I am the first to organize chain-stitch mechanism in a shuttle-machine so that the face of the race adjacent to the needle is and need be in no manner changed; and, although I show such a race in one of my prior patents in combination with a longitudinally-reciprocating looper, I now for the first time employ the same with an axially-mounted oscillating looper. In a machine for making a shuttle-stitch and a chain-stitch, and having a race and needle recess that can, without any change therein, be interchangeably employed with a looper or a shuttle, I am also the first to organize a looper which reciprocates in a plane parallel with the feed-bar, and this arrangement in such a machine is involved in one of the features of my invention, because of its value in causing the thread-loops beneath the work-plate to always occupy a plane substantially parallel with the needle-path and with the standing thread, thereby enabling the working of the loop without any sidewise pull upon the thread.

The feed-shaft D is substantially as heretofore, and although it is a rotating shaft in this machine it can as well be a rock-shaft for operating a feed-bar, and whether it be rocked or rotated, it will be equally serviceable for my purposes, it being only requisite that it either be lengthened or hollow at its outer end to afford an internal bearing, as will be hereinafter further explained.

The shuttle E, shuttle carrier E', and the vibrating shuttle-lever E², are also substantially as heretofore, and differ only in that, for my present purposes, I have provided the shuttle-lever with a laterally-projecting arm, e, adjacent to its fulcrum, for purposes hereinafter indicated.

Considered with reference to forming the shuttle lock-stitch, the machine shown is in no material matter unlike said Crown machine, and the variations in construction of certain parts to which I have referred have been made merely with reference to the proper reception of the devices required for forming the chain-stitch, and they in no manner affect the operation of the lock-stitch-forming mechanism.

The looper F, (see Figs. 7 and 8,) and its cast-off f, Fig. 10, are supported by a stud, g, which is securely clamped at its outer end in a hole or seat within a metal bracket, g', depending from the under side of the bed-plate parallel with the feed-bar. The bracket g' is slotted vertically at its lower end into the hole which receives the stud, and a set-screw, g², serves to partially close the slot, and thereby clamp the stud firmly in its seat. The oscillating looper is axially mounted, and has a hollow hub, h, at its inner side, which is journaled to and upon the inner end of the stud g, the latter having a shoulder against which the edge or face of the hub h has an endwise bearing, and said hub is provided with a radial arm, h', which may be integral with the hub, or separately constructed and applied thereto by

means of a screw, as shown. The oscillating cast-off f is also axially mounted, its axis, Fig. 10, being a stud, f', rigidly connected to the cast-off, and having its bearing within the stud g, which is made hollow for that purpose. The cast-off between its outer end and its axis has a slot, f², through its face, and said slot is partially occupied by a lug, f³, which projects into and through said slot from the adjacent face of the looper. The difference between the length of said slot and the diameter of said lug represents the extent of movement which the oscillating looper can make in either direction before it causes the cast-off to move with it. The axis f' of the cast-off is annularly chambered or recessed near its inner end, as at f⁴, Fig. 10, for the reception of the inner ends of two friction-pins, i, Fig. 11, which loosely occupy radial holes in the fixed stud g, and the inner end of each of said pins has not only a concave bearing-surface for frictional contact with said recessed portion f⁴, but also two side surfaces or shoulders, which bear upon the periphery of the cast-off axis at each side of said recess. The friction-pins are forced inwardly and maintained in frictional contact with the cast-off axis by means of a C-shaped spring, k, Fig. 12, which partially encircles the stud g, and has a cup-shaped bearing at each end for properly engaging with or upon the rounded outer end of each pin. The looper is slipped loosely upon the stud, and is confined to its bearing by the cast-off, which lies outside of the looper and is itself confined to the stud by the radial pins which occupy the annular recess in its axis.

The oscillating movements of the looper are derived from the revolving feed-shaft D, and the connecting mechanism may be widely varied without material departure from certain features of my invention.

The oscillating hook-looper, in combination with an eye-pointed needle and a cast-off, is involved in certain features of my invention regardless of the particular manner in which the cast-off is constructed and operated, because it is obvious that the cast-off may be variously applied for co-operation with said oscillating looper, so as to cause it to cover the looper-hook during its backward movement and uncover it when the looper moves forward.

The complex link l, Figs. 7 and 8, which is composed of two parts pivoted together at l', to render it laterally flexible, is employed for connecting the looper hub-arm h' to the crank-pin of the crank-plate m. The loose or rotative stud h² in the hub-arm is flat at its outer end, and occupies a slot in the adjacent end of said link, and it is pivoted thereto, so that the flexibility of the link at l' is made fully available for freely permitting the crank to be moved to and fro in the line of its axis when the looper is thrown into and out of action. The crank-plate m has an axis or stud, m', which freely occupies a bearing within the outer end of the feed-shaft D at the portion thereof on which the usual feed-bar cam, n, is

mounted, and it is rotatively connected to said shaft and cam by means of a pin, m^2 , projecting from the face of a disk, m^3 , (said disk being integral with or connected to the crank-plate m and its stud,) and enters a hole, m^4 , in the side or end of the feed-cam n , Fig. 15, thereby locking or clutching the crank to the feed-shaft, for operating the looper, and enabling it to be readily disconnected when the looper is not required.

A spring for imparting movement to the looper in one direction, as in my former machines, can well be relied upon in connection with a longitudinally-reciprocating looper; but with the oscillating looper, having a greater range of movement with its hook, it is important that said looper be positively operated in both directions, and such operation is therefore separately involved in one of the features of my invention.

Outside of the crank-plate and parallel therewith is a rigid stop-plate, o , Fig. 9, which is supported at the end of an arm screwed to the bracket g' , and has a radial rectangular recess, o' , for the reception of the adjacent end of the link l when the crank has been moved outwardly, thereby securely locking the crank and the looper against all movement except that incident to their sliding readjustment for working the looper. The sides and bottom edge of the recess in the stop plate may be made slightly flaring, so as to facilitate the entrance of the link, and so may the hole m^4 have a tapered entrance; but care should of course be taken to avoid undue lost motion as between the feed-shaft and the looper as well as between said shaft and the mechanism from which it derives its motion. On what are known as "power-machines," for heavy work, the pin m^2 may be in the form of a wedge, and of considerable size, and square near its base, and employed with a recess in the cam n corresponding thereto in form, thus obviating the necessity of that precise relative position of the parts as when constructed as shown.

The sliding of the crank-plate to and fro for connecting it to and disconnecting it from the feed-shaft may be effected by a variety of well-known shifting or shipping mechanism without departure from certain features of my invention. I have employed a bell-crank lever, G , Fig. 14, which is pivoted upon the end of a stud depending from the bed-plate. The short arm of said lever occupies the space between the crank-plate and disk m , and a spiral spring encircling the studs so bears against said short arm as to normally maintain the crank-plate out of connection with the feed-shaft and within the custody of the stop-plate. The long arm of said lever may be moved outwardly by hand and locked or maintained in that position against the action of the spring by means of any device of suitable size and form introduced between said lever and an adjacent abutting surface; or levers of other kinds may be used, or clutches of different

forms, without departure from certain features of my invention.

It is of great importance that the looper should never be in position for service while attempting to form a lock-stitch, and in view of that fact I recognize the importance of having the shifting or shipping mechanism controlled by way of a socket or receptacle into which something must be bodily placed and wholly removed for throwing the looper into and out of action. I have therefore provided a socket or receptacle at p , near one end of the shuttle-race beneath the rear sliding work-plate, into which a tapered plug may be inserted for moving the bell-crank lever; or a piece of flat metal of proper width may be inserted flatwise and then turned edgewise for the same purpose without departure from certain features of my invention; but in order to reduce the liability of accidents to a minimum I have so constructed this socket, Fig. 13, that the shuttle E constitutes the shipping medium, and therefore the shuttle must be removed from its carrier and inserted in said socket before the looper can be used, and of course the shuttle must be replaced in the carrier when a lock-stitch is desired, thereby properly throwing the looper out of action and wholly clear from the shuttle-path.

With the shifting or shipping mechanism shown in my prior patents the socket referred to may be obviously employed in accordance with my present invention, it being only necessary that the bed-plate or some other portion of the machine should have an opening or socket or receptacle, which is partially crossed or traversed by a lever or an arm to which such movement will be imparted by the entrance of the shuttle or other device similarly inserted as will cause the looper to be thrown into and out of adjustment for service. To prevent the shuttle from undue abrasion, the surfaces with which it engages when serving as a shipping medium should be those of such soft metal as copper or brass. This novel feature of employing a shipping-socket suitable for the reception of a shuttle or other equivalent detachable device for forming a lock-stitch to serve as a shipping medium is of value, and constitutes a portion of my invention, regardless of the particular character of mechanism employed in forming the chain-stitch.

As hereinbefore indicated, my former machines embodied a looper which moved in close contact with the face of the shuttle-race; but it will be seen that my present looper is never in contact with said race, and therefore it is obvious that neither the pinching of the thread between the looper and the race nor a notch or recess in the face of said race can be relied upon for aiding to control the loop during the forward movement of the looper. The oscillating looper, vibrating, as described, in a plane parallel with the vertical plane of the needle, is separately involved in one of the features of my invention, because of its peculiar value, whether it be operated in contact with the face

of the race, or more remote therefrom, as shown, or whether with a curved or a straight race, because the loop drawn out by it, whether short or long, is drawn at an angle more nearly approximating to the line of the standing thread than is possible with my prior longitudinally-reciprocating loopers; and, moreover, with the oscillating looper, as described, each loop, after being fully drawn by the looper, is loose and free instead of under strain or tension, as in my prior machines. I now employ the reciprocating loop controller H, Fig. 16, the curved tip of which moves forward and at right angles to the looper, and overlies it when the looper is at its most rearward position, so that said controller may pass between the loop when fully drawn from the needle, and to so lift and control said loop that it passes freely backward upon the shank of the looper as soon as the looper next advances to receive a fresh loop, and by the time the looper has fully advanced the loop-controller has retired, leaving the loop just controlled by it free to pass or slip from the looper, as illustrated in Figs. 17 to 19 inclusive. This reciprocating loop-controller may be operated in various ways without departure from certain features of my invention, so long as it properly controls the loop during the forward movement of the looper; but a distinctive feature of my invention involves the direct combination of said loop-controller with the vibrating shuttle-lever E^2 , said lever having the rectangular arm e , to which the rear end of the loop-controller is pivoted, its forward end being supported by the horizontal guide-plate e^2 , which is secured to a stud depending from the work-plate. The loop-controller has a slight tendency to incline the loose or free loop slightly toward the feed-bar, and in machines intended for operation at unusually high speed a plate may be downwardly extended from the rear side of the needle-race, between it and the feed-bar, so slotted as to allow of the reciprocation therein of the working end of the loop-controller, so that each loop will be arrested against lateral movement by its contact with the surface of said plate next to the looper. The vibrations of the shuttle-lever and the carrier E' are in such time with relation to the forward movement of the oscillating looper that said carrier co-operates with said looper and the eye-pointed needle in brushing or wiping the needle-loop toward the looper as its point advances; but it does not always so operate by actual contact with said loop, but sometimes by means of the air set in motion by it. The value of this service by the shuttle-carrier is specially noticeable when fine silk is used, or such thread as naturally kinks or twists when free from tension in a large loop.

In my prior machines the longitudinally-reciprocating looper and the shuttle-carrier were closely timed together; but the movements of the looper were of so much shorter range than my oscillating looper and the needle-loop was

so small that the shuttle carrier could not and did not perform the valuable service in this connection that it does in my present machine. 70

It is obvious that the interlocking of the looper-crank with the crank-shaft can only be effected when the crank-shaft occupies a certain position, in order that the pin m^2 on the disk m^3 will register with and enter the hole m^4 in the feed-cam n ; and, also, that the shifting of said looper-crank from its rotative position can only be effected when the end of the link l registers with the recess o' in the stop-plate o . These positions for adjustment can of course be readily determined by observation of the parts themselves; but as that involves the removal of the belt and the tipping of the machine edgewise on its bed-plate, it is advisable and of great value that the relative position of the parts below the work-plate can be determined by observing the upper portions of the machine. 85

With a needle accurately adapted for the Crown machine, I have so arranged the interlocking parts that after the shuttle has been removed from its carrier and the needle-bar moved downward, so that the needle-eye is fairly above the work-plate, or the surface of the cloth thereon, the feed-shaft and looper-crank are in proper position for locking or interlocking; but, as needles may vary, I have provided a shipping-indicator upon the upper portion of the machine, and, I believe, I am the first to provide, in a machine capable of producing various kinds of stitches, means for accurately determining the desired relative positions of the parts beneath the work-plate preparatory to throwing either of the separate stitch-forming devices into and out of action. This shipping-indicator may be variously provided for—as, for instance, in the form of a pointer adjacent to the hand-wheel, which should be provided with a notch to register with said pointer; or, as I prefer, the needle-bar is laterally recessed on its front side, as at q , so as to be readily observed by the operator, so that when said indicator-recess registers, during the descending movement of the needle-bar, with the top surface of the machine-head or with the upper edge of the usual bushing or cup thereon, it will assuredly determine the correct position of the feed-shaft for locking it to or interlocking it from the looper-crank. 120

It is not to be understood that the main portions of my present improvements are limited in their application to any particular type of shuttle-machines. As shown in my prior Letters Patent, my prior longitudinally-reciprocating looper was practically applicable only to a straight shuttle-race; but my present oscillating looper is equally well adapted to straight or curved races, and whether said curved races occupy a horizontal or a vertical plane it is obvious that only such slight changes will be requisite as would necessarily be involved in each particular variation in the form and arrangement of the shuttle-race. 130

It is not deemed necessary to further describe the operation of the machine described, because, so far as relates to the shuttle-stitch, it operates substantially as any other reciprocating-shuttle machine, and the operations of the mechanism for forming the chain-stitch have been referred to in detail from time to time in connection with descriptions of said mechanism.

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

1. The combination, substantially as hereinbefore described, of an eye-pointed needle, an oscillating looper vibrating in a vertical plane parallel with the path of the needle, and a fixed race provided with a needle-recess in said immovable race, which enables the looper or a shuttle to co-operate with said needle and on the same side thereof for respectively forming a chain or a lock stitch, as set forth.

2. The combination, substantially as hereinbefore described, of a vibrating looper and an eye-pointed needle, a fixed shuttle-race and needle-recess therein, with which and without change in said race or recess said looper or a shuttle can interchangeably co-operate on the same side of the needle, and a feed-bar which reciprocates in a line parallel with the plane in which the looper vibrates.

3. The combination, substantially as hereinbefore described, of an eye-pointed needle, an axially-mounted oscillating hook-looper, a cast-off co-operating with said looper, and a race-way which is adapted for the interchangeable co-operation with said needle of the hook-looper for chain-stitching or a shuttle for lock-stitching.

4. The combination of a needle, an axially-mounted oscillating hook-looper, and an oscillating cast-off axially connected to and controlled by the looper, substantially as described, whereby the hook of the looper is uncovered during its forward movement toward the needle and covered or closed during its backward movement.

5. The combination of the oscillating hook-looper axially mounted upon a fixed stud, and a cast-off having an independent axis, on which it oscillates with the looper, except during the initial movements of the looper in either direction, substantially as described.

6. The combination of the oscillating hook-looper having a projecting lug on its face, the hollow stud on which it is mounted, the oscillating cast-off slotted to receive the lug on the looper, the axis of the cast-off within the stud, the radial pins in said stud for bearing upon the axis of cast-off, and the spring for forcing said pins into frictional contact with said axis, substantially as described.

7. The combination, substantially as hereinbefore described, of an eye-pointed needle, a positively-operated hook-looper, and a cast-off moving with said looper except during its initial movement in either direction.

8. In a sewing-machine embodying a race

and shuttle-driving mechanism, the combination, substantially as hereinbefore described, of an eye-pointed needle, an oscillating hook-looper positively vibrated in a plane parallel with the path of the needle, and a shipper for throwing the looper into and out of action.

9. In a sewing-machine embodying a race and shuttle-driving mechanism, the combination, substantially as hereinbefore described, of the eye-pointed needle, the oscillating hook-looper, the cast-off, the feed-shaft connected to said looper, and shipping mechanism for connecting and disconnecting said looper at the will of the operator.

10. In a sewing-machine organized for chain and for lock stitching, the combination, substantially as hereinbefore described, of an eye-pointed needle, a looper and its operating mechanism and shifting mechanism, which in part traverses or lies across a socket or receptacle in a fixed portion of the frame of the machine, whereby upon the insertion or removal of a plug or its equivalent into or from said receptacle the looper is thrown into and out of action.

11. In a sewing-machine embodying a shuttle-race and shuttle-driving mechanism, the combination of a looper for chain-stitching, and looper-operating mechanism, which is controlled by way of a socket or receptacle adapted to receive a shuttle, substantially as described, whereby the shuttle is necessarily removed from its carrier for use as a shifting medium for throwing the looper into and out of action.

12. The combination, substantially as hereinbefore described, of an eye-pointed needle, a hook-looper, a cast-off, and a reciprocating loop-controller, which positively controls a thread-loop during the forward movement of the looper.

13. In a sewing-machine embodying a shuttle-race and a shuttle-driving lever, the combination of a hook-looper, a cast-off, and a loop-controller pivoted to and actuated by said lever, substantially as described.

14. The combination, substantially as hereinbefore described, of the eye-pointed needle, the oscillating looper, and the reciprocating shuttle-carrier, which serves to throw the needle-loop toward and facilitate its engagement by the looper.

15. In a machine embodying separate mechanism for producing a lock-stitch and a chain-stitch, and shifting mechanism for throwing the chain-stitch mechanism into and out of action, the combination, substantially as hereinbefore described, of said shifting mechanism and an indicator in the upper portion of the machine, for readily and accurately adjusting the position of the parts of the machine beneath the work-plate preparatory to moving the shifting mechanism.

JEREMIAH KEITH.

Witnesses:

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E. L. KIELY.