No. 685,836. Patented Nov. 5, 1901.

J. B. HADAWAY.

GAGING MECHANISM FOR SHOE SEWING MACHINES.

(Application filed May 14, 1898.)

(No Model.) 5 Sheets—Sheet 1.

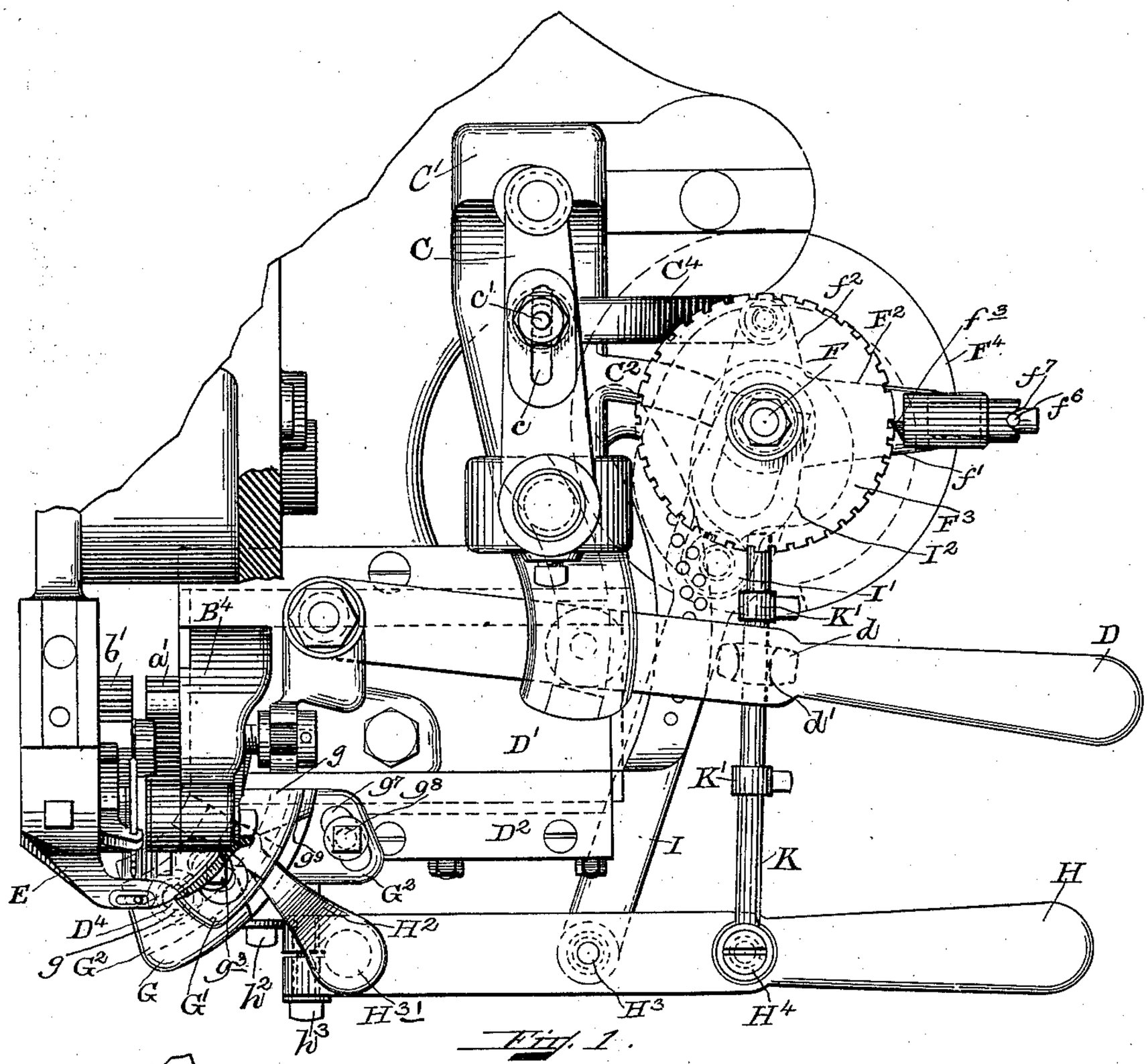


Fig. 1.

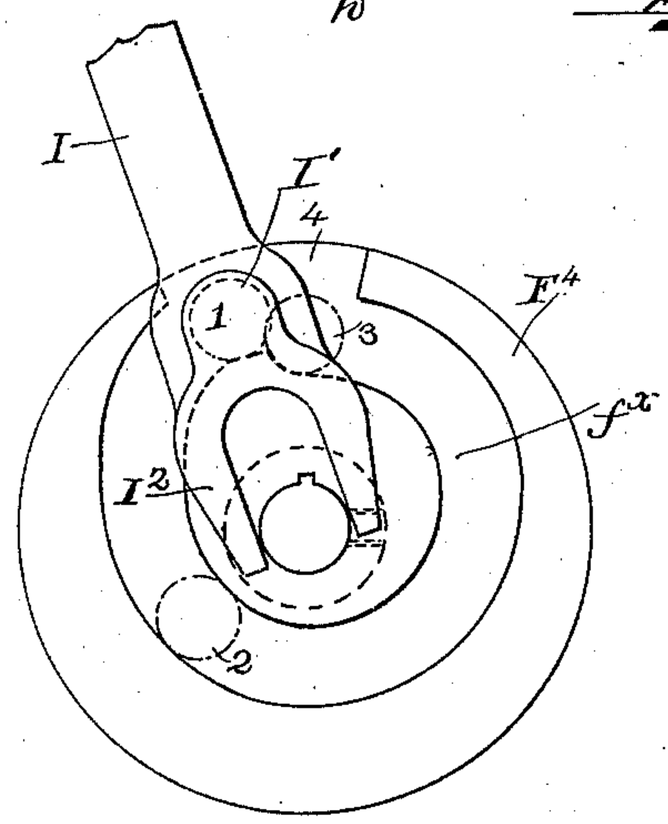
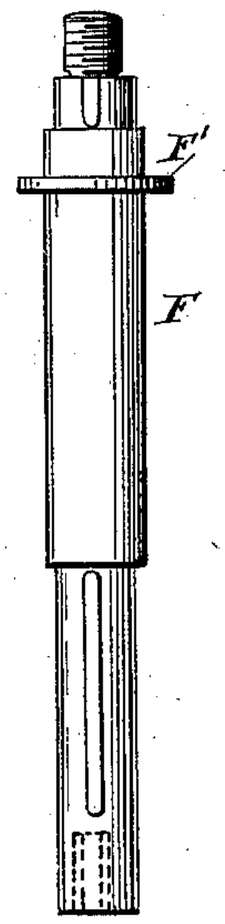


Fig. 6.



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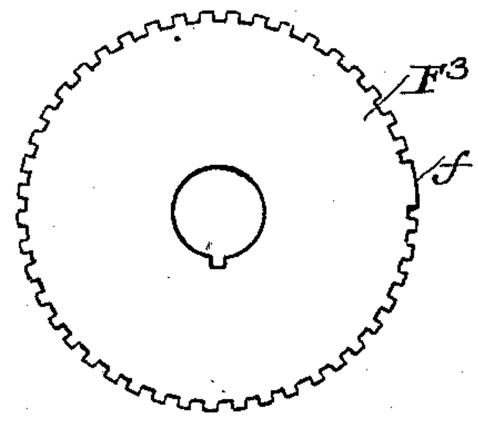

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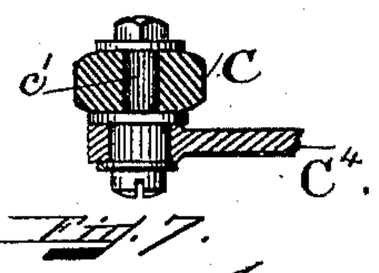

Fig. 7.

Witnesses:
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No. 685,836. Patented Nov. 5, 1901.

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GAGING MECHANISM FOR SHOE SEWING MACHINES.

(Application filed May 14, 1898.)

(No Model.) 5 Sheets—Sheet 2.

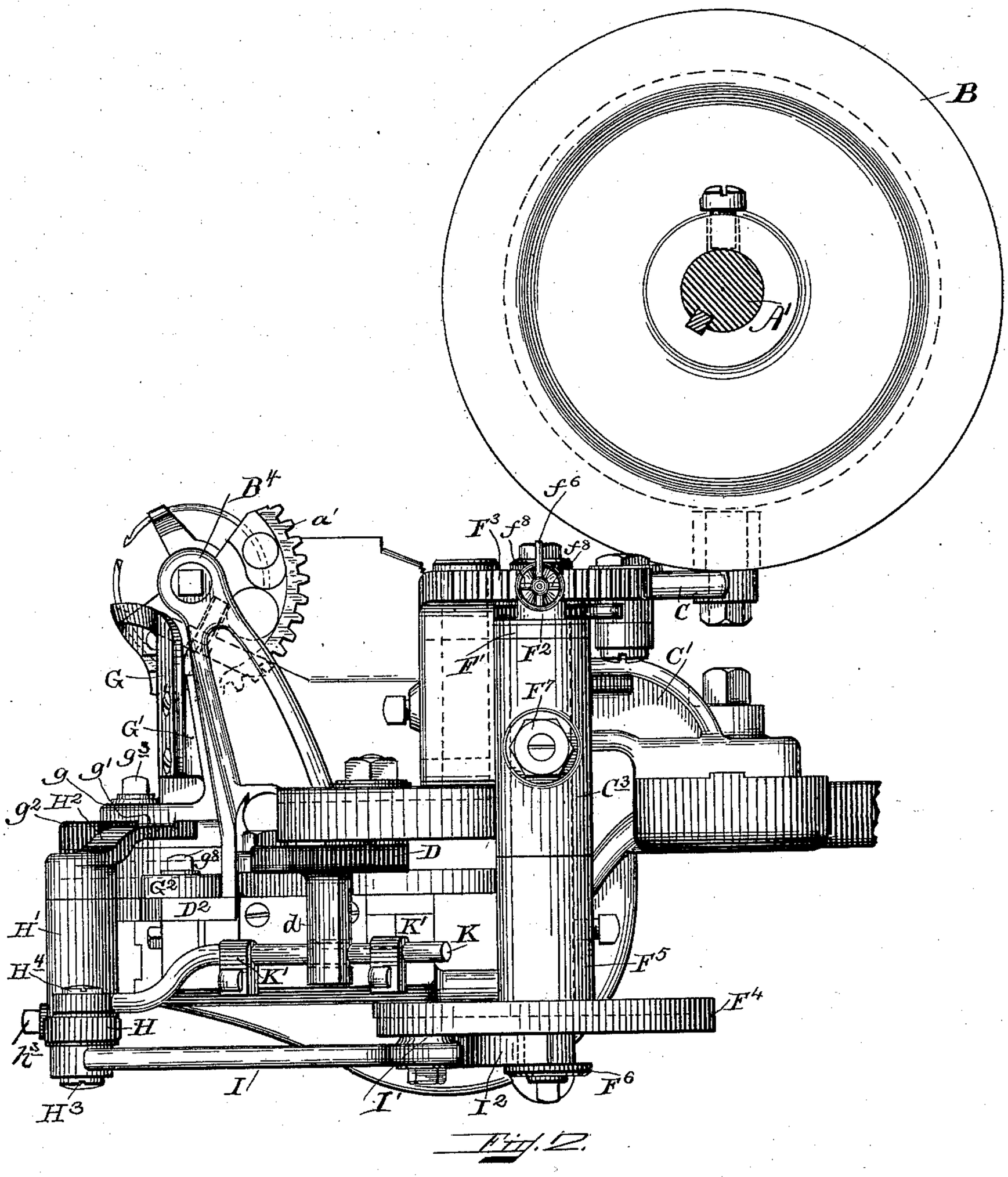

Fig. 2.

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GAGING MECHANISM FOR SHOE SEWING MACHINES.

(Application filed May 14, 1898.)

(No Model.) 5 Sheets—Sheet 3.

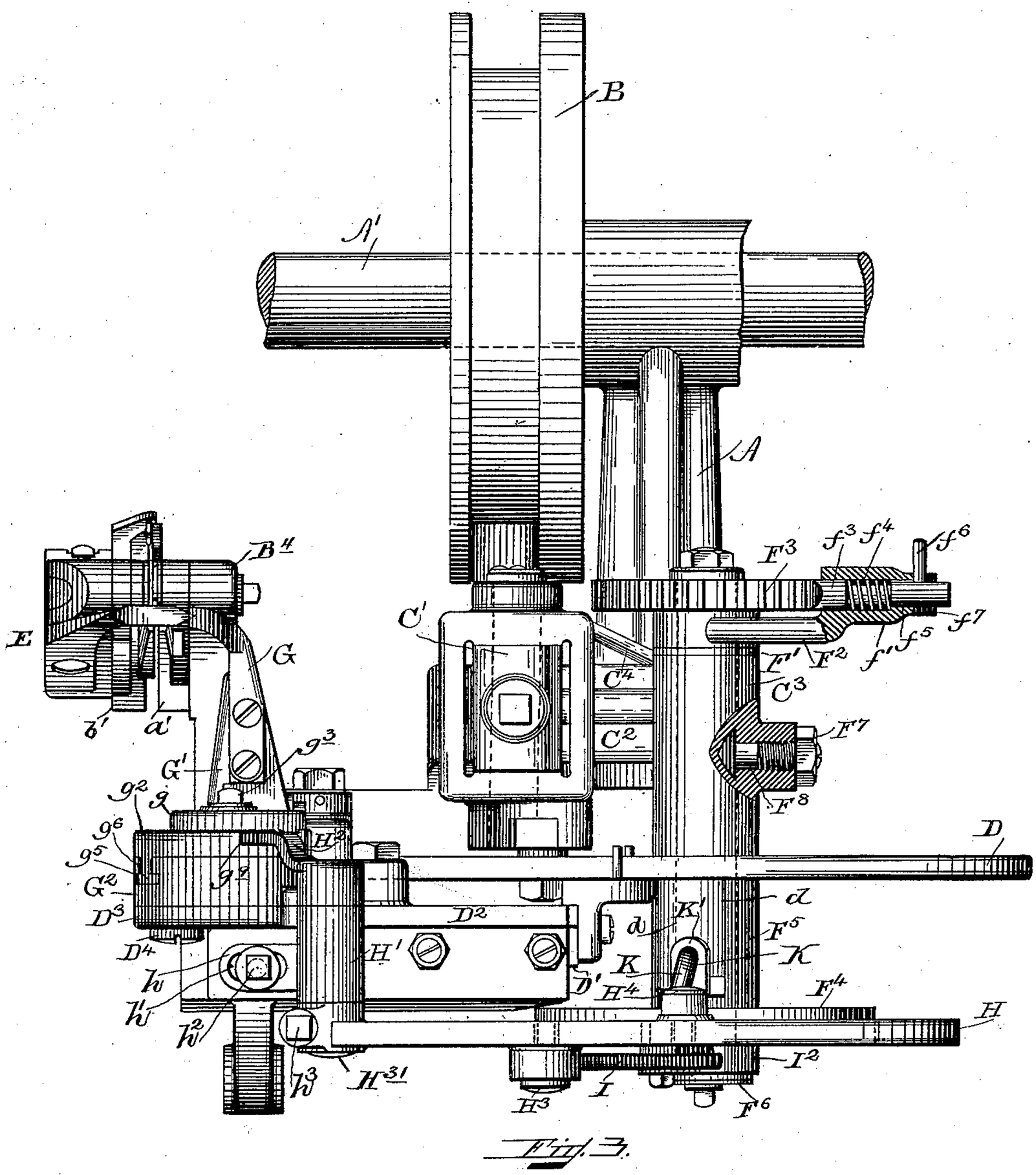

Fig. 3.

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No. 685,836. Patented Nov. 5, 1901.

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GAGING MECHANISM FOR SHOE SEWING MACHINES.

(Application filed May 14, 1898.)

(No Model.) 5 Sheets—Sheet 4.

Fig: 8.

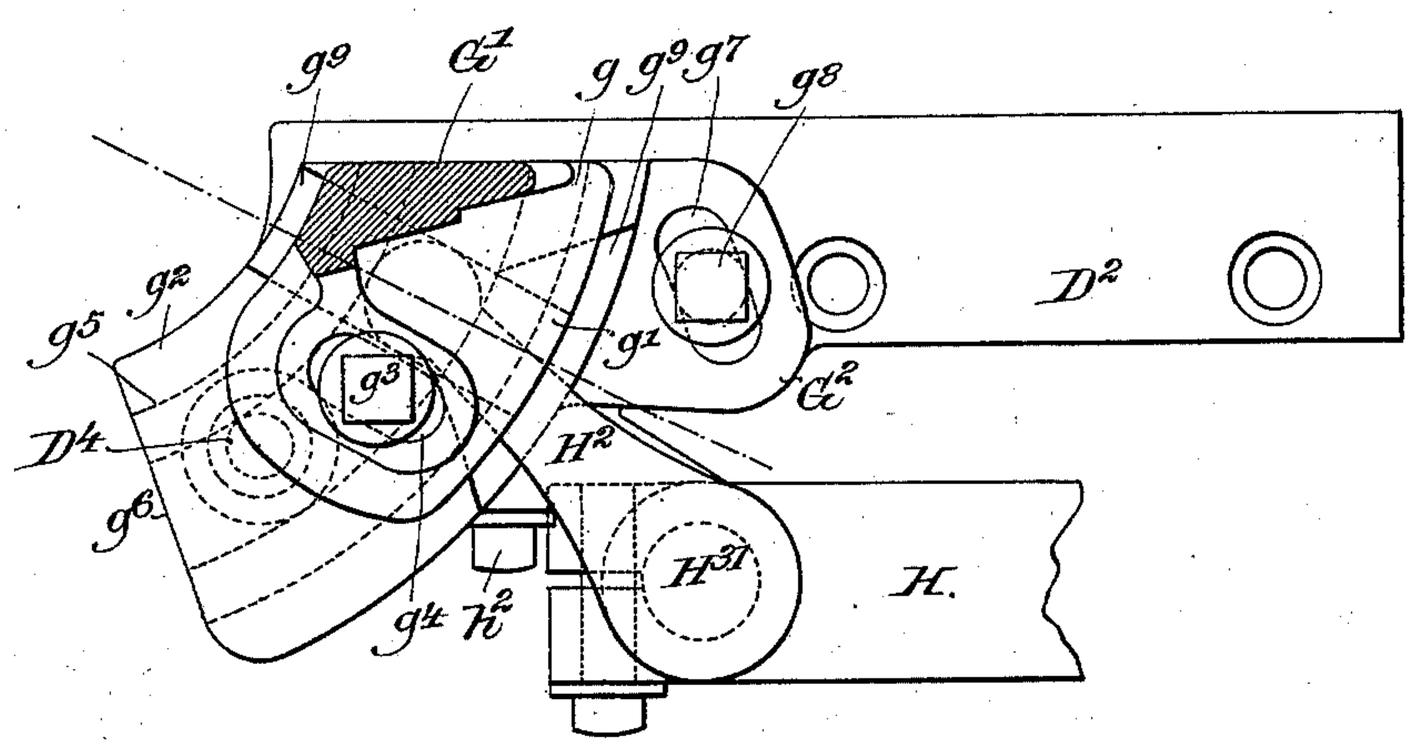
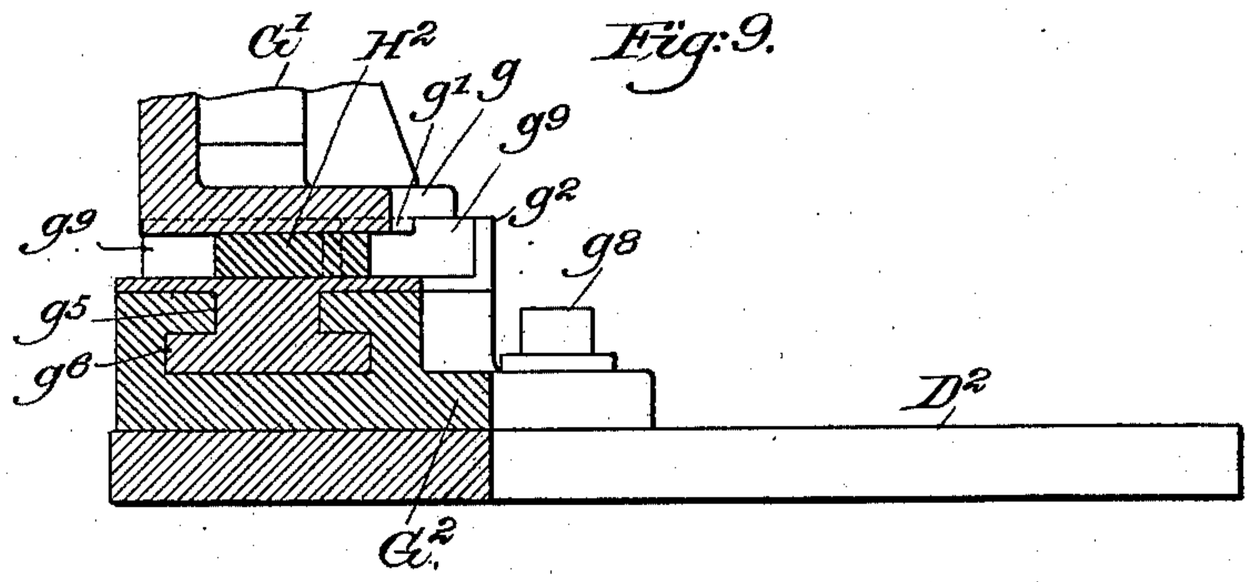


Fig: 9.



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No. 685,836. Patented Nov. 5, 1901.

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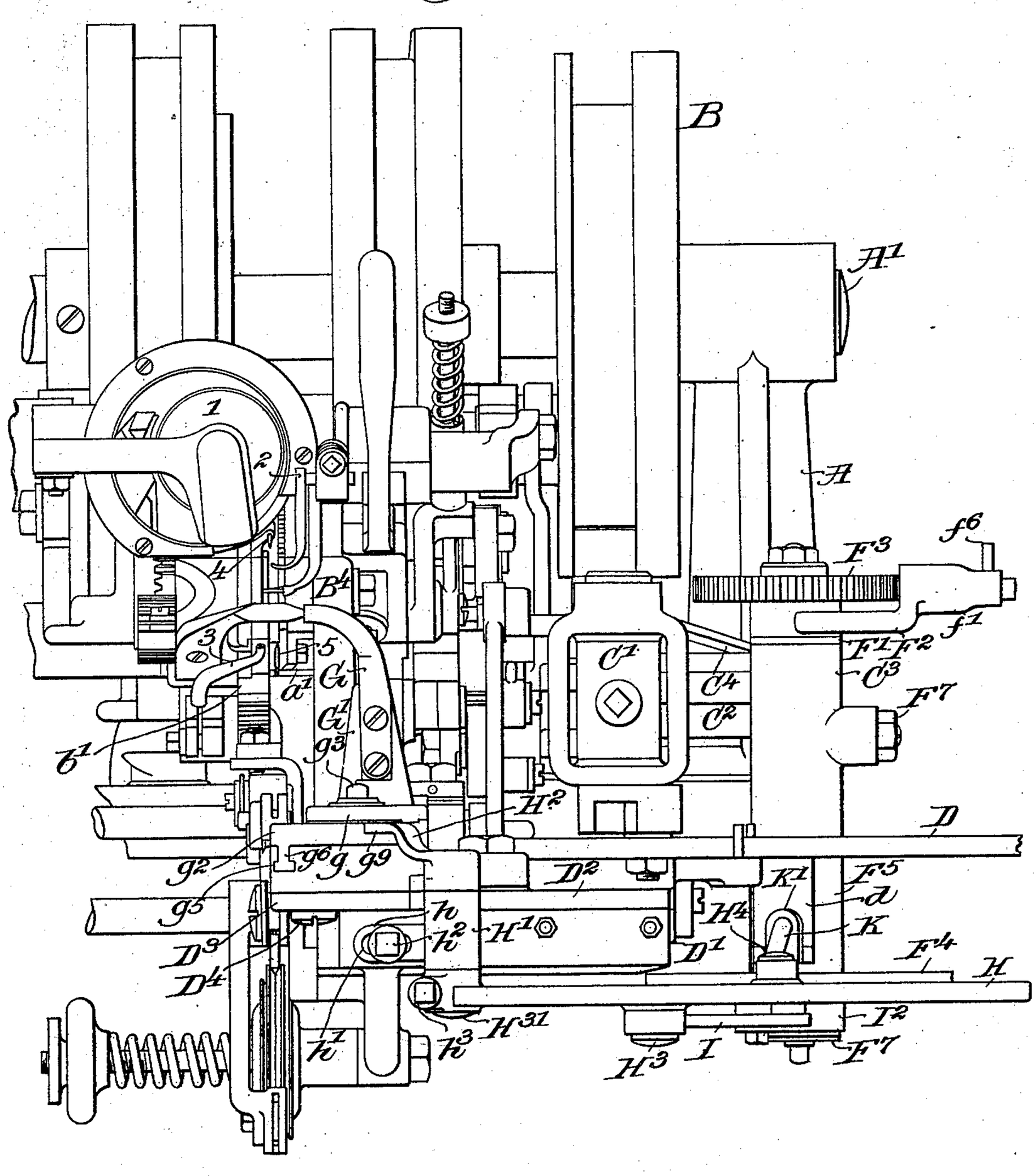
GAGING MECHANISM FOR SHOE SEWING MACHINES.

(Application filed May 14, 1898.)

(No Model.) 5 Sheets—Sheet 5.

Fig. 10.



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UNITED STATES PATENT OFFICE.

JOHN B. HADAWAY, OF BROCKTON, MASSACHUSETTS.

GAGING MECHANISM FOR SHOE-SEWING MACHINES.

SPECIFICATION forming part of Letters Patent No. 685,836, dated November 5, 1901.

Application filed May 14, 1898. Serial No. 680,703. (No model.)

To all whom it may concern:

Be it known that I, JOHN B. HADAWAY, a citizen of the United States, residing at Brockton, in the county of Plymouth and State of Massachusetts, have invented certain new and useful Improvements in Gaging Mechanism for Shoe-Sewing Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

The present invention relates to gaging mechanism for shoe-sewing machines, and more particularly for that type of shoe-sewing machines adapted to stitch the outsole to the lasted upper and welt of a welted shoe.

In some forms of shoes the outsole projects varying distances beyond the upper, as in the so-called "Baltimore-edge" shoes, wherein the sole at the outer side of the "ball" portion projects out farther from the upper or is wider than it is at the toe portion or at the inner side of the ball of the shoe. In securing the outsole to the welt it is necessary that the line of stitches be accurately positioned at a uniform distance from the edge of the sole whether the sole edge extends out uniformly on all sides or be of varying width, as in the type of shoe above referred to, and much difficulty has been experienced in operating upon such shoes by reason of the fact that the work-gages of the sole-sewing machine as now constructed are either fixed for operating upon shoes with soles of uniform width or such gages have been rendered adjustable by means of hand-levers or other devices arranged to be manipulated by the operator. With such devices the positioning of the shoe and the sole edge with relation to the stitch-forming devices must largely depend upon the skill of the operator, and great care and judgment have been necessary in order to accurately position the shoe to secure the desired position of the line of stitches in shoes where the soles extend beyond the upper varying distances.

The object of the present invention is to provide a shoe-sewing machine of the type referred to with an automatically-variable gage which shall accurately position the shoe with relation to the stitch-forming devices, so as to secure the sewing of the line of stitches in the proper position in the shoe and to provide means whereby one machine will sew many different sizes of shoes; and my invention consists, broadly, in the combinations of means to secure these results and in the various other combinations hereinafter set forth and claimed.

One form of my invention is illustrated in the accompanying drawings, in which—

Figure 1 shows in plan and partial sectional view portions of a sole-sewing machine with the present invention embodied therein. Fig. 2 shows a side elevation and partial section of the machine looking at the right of Fig. 1. Fig. 3 shows a front elevation of the machine as shown in Fig. 2, with a part broken out to show underlying construction. Figs. 4, 5, 6, 7, 8, and 9 show details of construction which will be hereinafter described. Fig. 10 shows a partial front elevation of a sole-sewing machine with the present invention embodied therein.

Similar reference characters refer to similar parts throughout the specification and drawings.

In the machine illustrated in the drawings the fixed gage or work-table E is mounted in its usual position in front of the needle-segment b'. The upper side of the fixed gage or work-table may be designated the "work-supporting face," as its function is to support the work in proper horizontal position with relation to the stitch-forming mechanism, and the front face of the fixed gage may be designated a "work-guiding" face, as its function is to engage the upper of the lasted shoe and guide it, so as to present the desired part thereof to the stitch-forming mechanism.

The awl-segment a' is mounted upon the upright B^4, carried by the feed-slide D', and reciprocated through means of the feed-regulating lever D, which is moved by the feed-lever C, pivoted upon the stand C', and in turn oscillated by means of the cam B, mounted upon the main shaft A'. This main shaft, supported in standards A, of which only one is shown, mounted in the usual manner upon the bed of the machine, carries the usual cams (not shown) by which the operative parts of the stitch-forming devices are actuated and is driven by a belt or otherwise from any desired source of power.

The shuttle 1, the thread-lifter 2, the looper 3, the needle 4, and the awl 5, together with the other parts so far described, may be and preferably are, except as hereinafter stated, the same as in the patents to French and Meyer, Nos. 473,870 and 525,047, so much only of the machine being shown as is necessary to show how the improvement coöperates therewith.

My invention contemplates the use, in connection with the part of the machine so far described or so much thereof as may be necessary to carry out the stitch-forming operation, of an automatic variable gage which is to be gradually and progressively moved with relation to the stitch-forming devices, so as to vary the position of the seam during the sewing operation.

In the form of my invention shown in the drawings the movable gage G is a curved wedge-shaped piece of metal with an approximately horizontally disposed upper end, which is adapted to be moved by suitable means, so as to project it in front of the work-guiding face of the fixed gage or work-table and between it and the upper of the shoe being sewed. The gage is provided in the illustrated form of the invention with a downwardly-extending portion, by means of which it may be attached in any desired manner to a gage-carrier G′. It is desirable that the movable gage be made adjustable, so that the path of movement of the gage may be changed to accommodate the machine to different classes of work. To this end the gage-carrier G′ is formed with an upper part g, provided on its under side with a depending tongue g', which is adapted to engage and slide in the upper part of a slot g^9 in the upper side of the lower part g^2 of the gage-carrier, the two parts being screwed together in the desired relation to each other by a cap-bolt g^5, screwed into the lower part g^2 and passing down through a slot g^4, arranged in the upper part g parallel to the tongue g'. Thus it is seen that the tongue and groove will secure an adjustment of the position of the path of movement of the gage without substantially changing its length or at all changing the direction of that path.

The provision that is shown in the machine of the drawings for controlling the direction of the path of movement of the movable gage is a gage-carrier guide G^2, which is provided on its upper side with a circularly-curved groove g^5, adapted to receive a correspondingly-shaped tongue g^6 upon the bottom of the lower part g^2 of the gage-carrier G′, so that when motion is imparted by any suitable means to the gage-carrier it will move in the arc of a circle which corresponds to the curve of the tongue and groove of the gage-carrier and gage-carrier guide. The curve of the tongue and groove is such that the path of movement of the gage will carry it from a position in the rear of that shown in Fig. 1 of the drawings around in front of the work-guiding face of the fixed gage or work-table, so as to engage the upper of the shoe being sewed and present its sole in the desired position with relation to the stitch-forming mechanism. For different forms of extension-soles it is desirable that the direction of the path of movement of the movable gage be changed or adjusted to adapt the machine to the work, and to this end the gage-carrier guide G^2 is adjustably supported upon any convenient part of the machine. In the machine of the drawings the front plate D^2 of the feed-slide guide is provided with a projecting ear D^3 on its left-hand end, through which passes a pivot-screw D^4, to which is pivoted the gage-carrier guide G^2. The position of this pivot is preferably near or directly below the point of the fixed gage or work-table, so that when the gage-carrier guide is adjusted about the pivot as a center to change the direction of the path of movement of the movable gage the point of the path directly over the pivot will not be changed. In other words, that point of the path of movement of the movable gage which intersects the axis of the pivot will not be changed by changing the direction of the path of movement of the movable gage. If, however, the gage-carrier be so adjusted by means of the tongue and groove that the path of movement of the movable gage does not intersect the axis of the pivot, the only difference will be that that point of the path of movement of the movable gage nearest to the axis of the pivot will be but slightly moved with relation to the point of the fixed gage or work-table by adjustment of the gage-carrier guide to secure a change in the direction of the path of movement of the gage. Suitable holding means are provided to secure the gage-carrier in its adjusted position, and for this purpose in the machine of the drawings the gage-carrier guide is provided with the slot g^7, through which passes the cap-bolt g^8, which screws into the plate D^2 of the feed-slide guide. By the tongue-and-groove adjustment between the two parts of the gage-carrier the position and by the pivotal adjustment of the gage-carrier guide the direction of the path of movement of the movable gage are changed to secure the desired path of movement of the movable gage to adapt the machine to the sewing of different kinds of shoes.

In the machine of the drawings the gage-carrier is provided with a slot g^9, V-shaped at the outside and parallel-sided at its inner end, into which extends the gage-lever arm H^2, provided on its extreme end with a circular enlargement adapted to engage the parallel-sided inner end of the recess g^9, by which the gage-carrier is adapted to be moved. The gage-lever arm H^2 is provided on its outer end with a vertical shaft H^{31}, rotatably supported in a bearing H′, which is adjustably mounted upon the front of the feed-slide guide D^2, so as to be capable of being moved closer to or farther from the gage-carrier. It

is obvious that as the bearing H′ is moved to the left, being brought nearer to the gage-carrier, the enlargement on the end of the gage-lever arm will be moved farther into the parallel-sided inner end of the slot g^9 and nearer the center of curvature of the groove g^5, and the result of a movement of the gage-lever arm through a certain arc will cause a correspondingly-increased movement of the movable gage. In other words, as the bearing H′ is moved toward the gage-carrier the length of the path of movement of the movable gage will be proportionately increased. To secure this adjustment, I have provided the bearing H′ with a projection h, slotted longitudinally at h' and adapted to be secured in the desired position by a cap-bolt h^2, screwed into the front face of the feed-slide guide. The purpose of this adjustment is to adapt the machine to the sewing of different sizes of shoes, as will be hereinafter more fully set forth, it being sufficient at this point to show that by this means the length of the path of movement of the movable gage may thus be changed. Upon the lower end of the shaft H^{31} the gage-lever H is adjustably secured by means of a cap-bolt h^3, passing through the slotted end of the gage-lever, so that the lever may be secured in any desired position on the shaft H^{31}, as shown.

Automatic pattern mechanism is provided for actuating the movable gage, so as to vary the position of the seam during the sewing operation, and for this purpose any desired pattern mechanism may be employed, the preferred form of which is described as follows: Projecting outwardly from one side of the stand C′ is an arm C^2, which carries at its outer end a bearing C^3 for the cam-shaft F, which latter is shown in detail in Fig. 5. The cam-shaft is provided on its upper end with a projecting flange F′, which rests upon and is thus supported by the upper face of the bearing C^3. Upon the upper side of this flange is carried a loose bell-crank lever F^2, above which is carried a ratchet-disk F^3, provided with square teeth, as shown, so as to be actuated in either direction by the reversible ratchet hereinafter described, said ratchet-disk being splined upon the shaft and held in position by a nut and washer. The shaft F is shouldered above the bell-crank lever, which is made a little thinner than the distance from the upper side of the flange F′ to the shoulder, so that when the ratchet-disk is clamped down upon the shoulder by the nut the bell-crank lever will remain loose and capable of being oscillated upon the shaft. Upon the lower end of the cam-shaft is carried a gage-cam F^4, which is provided with a sleeve F^5, splined on the cam-shaft and held at the desired height thereon by a set-screw and provided on its under side with a cam-groove $f^\times$, hereinafter more fully described. The lower end of the cam-shaft is provided with a screw-threaded hole adapted to receive a cap-bolt by means of which a collar F^6 is fastened to the shaft. The purpose of this collar is hereinafter pointed out. In order to provide against accidental rotation of the cam-shaft, there is provided a friction-brake, which consists of a screw F^7, which enters a boss in the side of the bearing C^3 and is adapted to compress a piece of rawhide or other suitable substance F^8 against the cam-shaft. In the machine of the drawings the bell-crank lever receives its motion from the feed-lever, it being connected thereto by a connection C^4, which is pivoted to the feed-lever and to the arm f^2 of the bell-crank lever, as shown. The feed-lever is provided with a longitudinal slot c, so that the amplitude of oscillation to be imparted to the bell-crank lever may be varied by moving the connection toward and from the fulcrum. A cross-section of the feed-lever C, a longitudinal section of the end of the connection C^4, and the connecting-bolt c' are shown in detail in assembled position in Fig. 7. The other arm f' of the bell-crank lever is provided with a spring-pressed pawl f^3, adapted to engage the teeth of the ratchet-disk. It is mounted in a recess in the end of the lever and pressed toward the ratchet-disk by means of a spiral spring f^4, located behind it. The spindle of the pawl projects outwardly through the spiral spring and through the hole f^5 in the bell-crank arm and carries on its outer end a pin f^6. Notches f^7 in the outer end of the arm f' of the bell-crank lever are adapted to engage and hold the pin f^6 of the pawl, so that it will be held in the position as shown in Fig. 1, which will secure left-hand rotation of the cam-shaft, or in the opposite position, which would secure right-hand rotation of the cam-shaft, and the notches f^8 at right angles thereto, the bottoms of which are farther distant from the center, are adapted to engage and hold the pin f^6 in position, so that the pawl will be withdrawn from engagement with the ratchet-disk and inoperative to actuate it. Provision is made for rotating the gage-cam one revolution and causing it to automatically stop at the completion thereof, and to this end I have shown the ratchet-disk as provided with one wide tooth f, so that when rotation is imparted to the ratchet-disk by the pawl it will continue to impart a step-by-step rotation to the disk until the wide tooth f comes under the pawl, which will occur when one revolution of the ratchet-disk is completed, and further movement will then cease by reason of the failure of the pawl to pass beyond the smooth surface of this tooth.

The gage-lever H is adapted in certain positions of the gage-cam, hereinafter defined, to be moved by hand; but for automatic movement it is moved by means of the cam-link I, pivoted at H^3 to the gage-lever, the said link carrying upon its upper side at its cam end a cam-roller I′, which is adapted to enter and be actuated by the cam-groove $f^\times$, above referred to, of the gage-cam. The cam-link must be supported and guided by appro-

priate provisions, and for this purpose the cam end of the link is forked at I^2 and embraces the lower end of the cam-shaft F between its forks, being held from downward displacement by means of the washer F^6, carried by the lower end of the cam-shaft F, as above described.

For certain classes of work it may be desirable to have a connection between the gage-lever and the feed-regulating lever D, and to this end there is shown a connecting-link K pivoted to the gage-lever at H^4 and passing loosely through an opening d' in a lug d, depending from the lower side of the feed-regulating lever, so that two stops K', adjustably fixed upon the link K upon opposite sides of the lug d, by engagement with said depending lug of the feed-regulating lever will secure a movement of one lever from the other. By this means changing the feed (or length of stitch) may secure the throwing of the movable gage into and out of operation, or the throwing of the gage into and out of operation may secure a change of feed.

The operation of the machine of the drawings is as follows: Assuming that it is desired to sew a right shoe, the movable gage is entirely withdrawn from in front of the work-guiding face of the fixed gage or work-table by moving the gage-lever to a position somewhat farther out than the position in which it is shown in the drawings. The cam-roller I' will be completely withdrawn from the cam-groove $f^\times$ through the opening 4 of said groove. (Clearly shown in Fig. 6.) The ratchet-disk and gage-cam will be in the position shown in Fig. 1. The feed-regulating lever will be in approximately the position shown in the drawings—that is to say, in its outer position—so as to make long stitches, for the stitches are longer in the shank than in the fore part of the sole. The pawl will be in the position shown in Fig. 1, but with its flat face in the opposite direction from that shown, and the ratchet-disk and cam-groove will be stationary by reason of the fact that the oscillations of the pawl will be of insufficient amplitude to carry the pawl above the wide tooth. The outside of the shank of the sole at a point near the heel will be laid on the work-supporting face of the fixed gage or work-table and the machine set in operation to sew the outside of the shank, during which operation the upper of the shoe will be pressed against the work-guiding face of the fixed gage or work-table. The movable gage and its associated parts will remain stationary and in the position above described. Before the completion of the sewing of the outside of the shank the feed-regulating lever will be moved inward to shorten the stitches. The gage-lever will be moved inward to carry the cam-roller I' into the cam-groove $f^\times$ of the gage-cam at the point indicated by l in Fig. 6. The pawl will be turned over by the operator with its flat face in the position shown in Fig. 1. Continued motion of the machine will begin the sewing of the outside of the fore part of the sole. The gage-cam will be progressively turned to the left as seen in Fig. 1, (to the right as seen in Fig. 6,) and the cam-roller I' on the cam-link will enter the groove $f^\times$ at the point l, and the gage-cam will draw the gage-lever inward, thus forcing the movable gage gradually and progressively outward and between the work-guiding face of the fixed gage or work-table and the upper of the shoe, so that the distance of the seam or line of stitches from the upper will gradually increase until the roller reaches that part of the groove (indicated by 2, Fig. 6) which corresponds to the outside of the ball of the shoe. Then the distance of the seam or line of stitches from the upper will gradually decrease until the roller arrives at the point (indicated approximately by 3) which corresponds to a point on the outside of the sole near the toe. At the time the pawl will have arrived at the wide tooth f, and the ratchet-disk and gage-cam will cease to be rotated, and the cam-roller will remain at the point 3 of the cam-groove during the sewing of the remainder of the fore part of the sole, the distance of the seam or line of stitches from the upper remaining constant and corresponding to the distance of the point 3 of the cam-groove from the center of the gage-cam. Then the gage-lever will be moved outward, thereby withdrawing the gage from in front of the work-guiding face of the fixed gage or work-table and at the same time withdrawing the cam-roller from the groove of the gage-cam through the opening 4. The feed-regulating lever, too, will be moved outward to increase the length of the stitches, and the parts, with the exception of the pawl, will thus be restored to the position they occupied during the sewing of the outside of the shank, and continued operation of the machine will sew the inside of the shank of the sole. The next shoe taken up by the operator to be sewed will be a left shoe, and sewing will begin with the parts in the same position by laying the inside of the shank of the sole on the work-supporting face of the fixed gage or work-table and first sewing this portion of the sole. Before the completion of the sewing of the inside of the shank of the sole the feed-regulating lever will be moved inward to shorten the stitches. The gage-lever will also be moved inward until the cam-roller I' assumes the position indicated at 3 in the cam-groove of the gage-cam. The position of the parts is thus seen to be the same as that occupied during the sewing of the inside and toe of the fore part of the right shoe. Continued operation of the machine will sew the inside of the fore part of the shoe and around the toe to a point on the outside and near the toe. There the pawl will be turned over and immediately begin to rotate the ratchet-disk and gage-cam to the right, as seen in Fig. 1, (in the opposite direction to that in which it was rotated during the sew-

ing of the right shoe,) and the variations of the distance of the seam or line of stitches from the upper will take place in the inverse order to that described in sewing the right shoe. At the conclusion of the sewing of the fore part of the sole the ratchet-disk and gage-cam will cease rotation, and then the gage-lever and feed-regulating lever will be moved to the position for sewing the shank of the shoe, as above described, at the conclusion of which the parts will be in position ready to sew a right shoe.

The machine of the drawings, as before stated, is especially adapted to the sewing of "Baltimore-edge" shoes; but by providing appropriate gage-cams and ratchet-disks the machine will sew shoes with different forms of extension-edge soles. By variations of the pitch of the teeth of the ratchet-disk it is possible to make gage-cams correspond to different fractional parts of the fore part of the sole or to the whole thereof.

An exceedingly-useful feature of my invention is the provisions for sewing different sizes of shoes with the same gage-cam without changing the machine in any way except in matter of adjustment. With stitches of the same length different gage-cams or ratchet-disks would of course be necessary in sewing shoes of different sizes to allow for the different lengths of seams; but this is obviated by increasing the length of the stitches with and in proportion to the increased size of the shoe. Thus, for instance, if the gage-cam and ratchet-disk illustrated in the drawings were designed to sew a certain-sized shoe with a certain number of stitches per inch around the fore part of the shoe and it is desired to sew larger shoes on the machine all that is necessary is to adjust the feed-lever so that the number of stitches per inch would be proportionately diminished—that is, the length of the stitches would be proportionately increased and the gage-cam and ratchet-disk would then correspond to the larger-sized shoe. By decreasing the length of the stitches the same gage-cam and ratchet-disk would in like manner be adapted to the sewing of smaller-sized shoes. This result may also be accomplished by adjustment of the bearing H′ to the right or left in order to vary the amplitude of oscillation of the movable gage or, in other words, the length of its path of movement. When the bearing is moved to the right, the length of the path of movement of the movable gage will be decreased, and then the same gage-cam and ratchet-disk will make the larger sizes of shoes, and when moved to the left the corresponding smaller sizes can be made. My invention therefore contemplates the use of one gage-cam and ratchet-disk for sewing different sizes of shoes.

Having thus described the preferred form of my invention and its mode of operation, I claim as broadly novel and desire to secure by Letters Patent of the United States—

1. In a shoe-sewing machine, the combination with shoe-sewing mechanism, of a movable work-gage, and mechanism for automatically actuating said work-gage during the sewing operation, to vary the position of the seam with relation to the upper of the shoe, substantially as described.

2. In a shoe-sewing machine, the combination with shoe-sewing mechanism, of a fixed work-gage for supporting the projecting edge of the sole, a movable work-gage and mechanism for automatically and progressively advancing the movable gage in front of the fixed gage during the sewing operation to vary the position of the seam with relation to the upper of the shoe, substantially as described.

3. In a shoe-sewing machine, the combination with shoe-sewing mechanism, comprising a work-feeding mechanism, of a movable work-gage, and mechanism actuated by the work-feeding mechanism for automatically moving the gage during the sewing operation, substantially as described.

4. In a shoe-sewing machine, the combination with stitch-forming and work-feeding mechanism, of a movable work-gage, mechanism for automatically moving the gage during the sewing operation to vary the position of the seam, and means for relatively adjusting the feeding and gage-moving mechanisms for operation upon shoes of different sizes, substantially as described.

5. In a shoe-sewing machine, the combination with stitch-forming mechanism, of a movable work-gage, mechanism for automatically moving said gage during the sewing operation, and means for adjusting the movements of the gage to properly position said gage for shoes for different sizes, substantially as described.

6. In a shoe-sewing machine, the combination with shoe-sewing mechanism, of a movable work-gage, mechanism for automatically moving said gage during the sewing operation to vary the position of the seam with relation to the upper of the shoe, and means for changing the path of movement of said gage, substantially as described.

7. In a shoe-sewing machine, the combination with shoe-sewing mechanism, of a movable work-gage and pattern mechanism for actuating said gage, constructed and arranged to actuate the gage to position the seam on a right shoe when turning in one direction and a left shoe when turning in the opposite direction, and mechanism for actuating the shoe-sewing and pattern mechanisms, substantially as described.

8. In a shoe-sewing machine, the combination with shoe-sewing mechanism, of a movable gage and mechanism for automatically advancing and retracting said gage, and means under the control of the operator for connecting said gage with and disconnecting said gage from its actuating mechanism, substantially as described.

9. In a shoe-sewing machine, the combination with shoe-sewing mechanism, of a movable gage, mechanism for automatically advancing and retracting said gage, means under the control of the operator for bringing the gage-actuating mechanism into operation, and means for automatically stopping said gage during the continued operation of the shoe-sewing mechanism, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

JOHN B. HADAWAY.

Witnesses:
T. HART ANDERSON,
HORACE VAN EVEREN.