

No. 687,966.

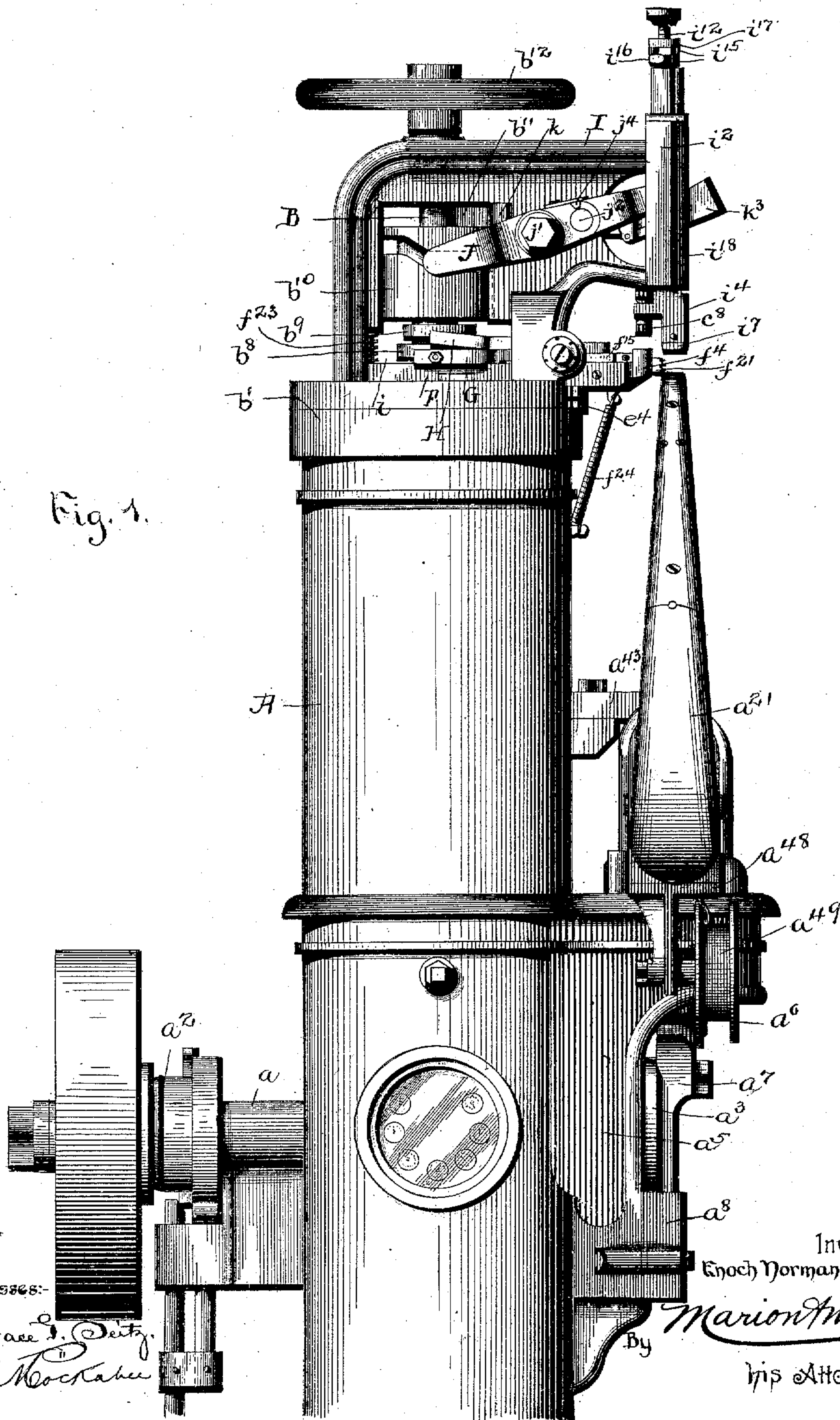
Patented Dec. 3, 1901.

E. NORMANCUT.
SHOE SEWING MACHINE.

(Application filed Apr. 14, 1898.)

(No Model.)

12 Sheets—Sheet 1.



Witnesses:-

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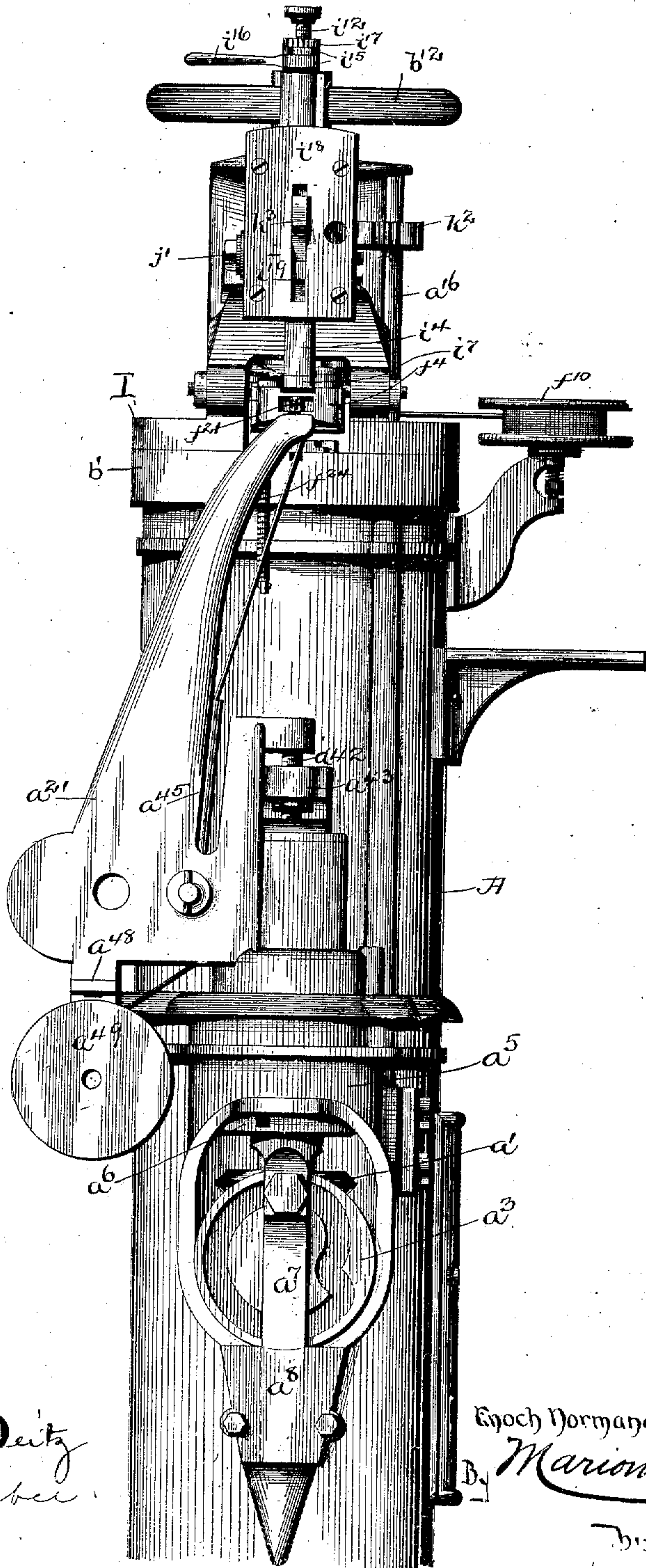
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12 Sheets—Sheet 2.

Fig. 2.



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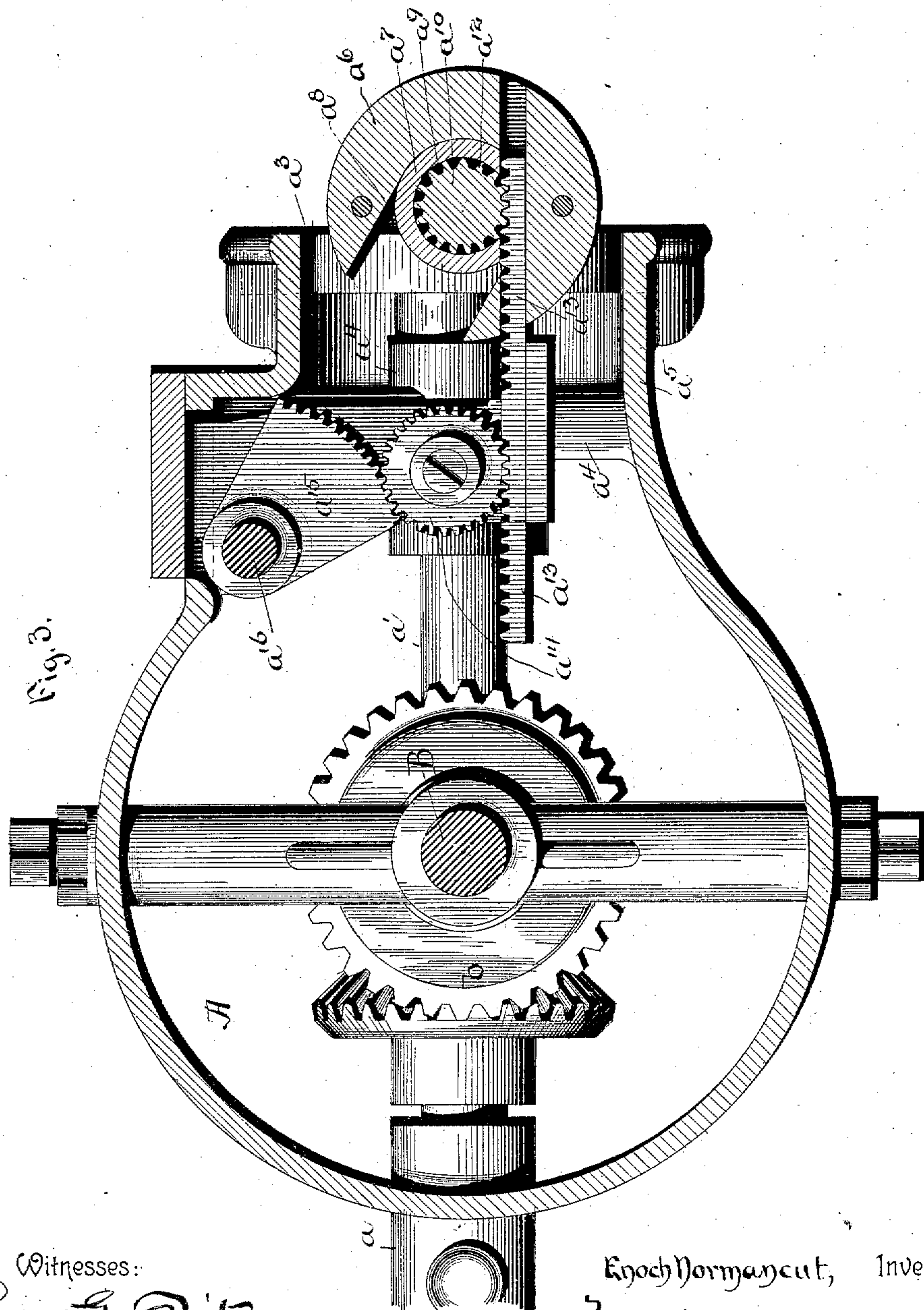
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12 Sheets—Sheet 3.



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Fig. 7.

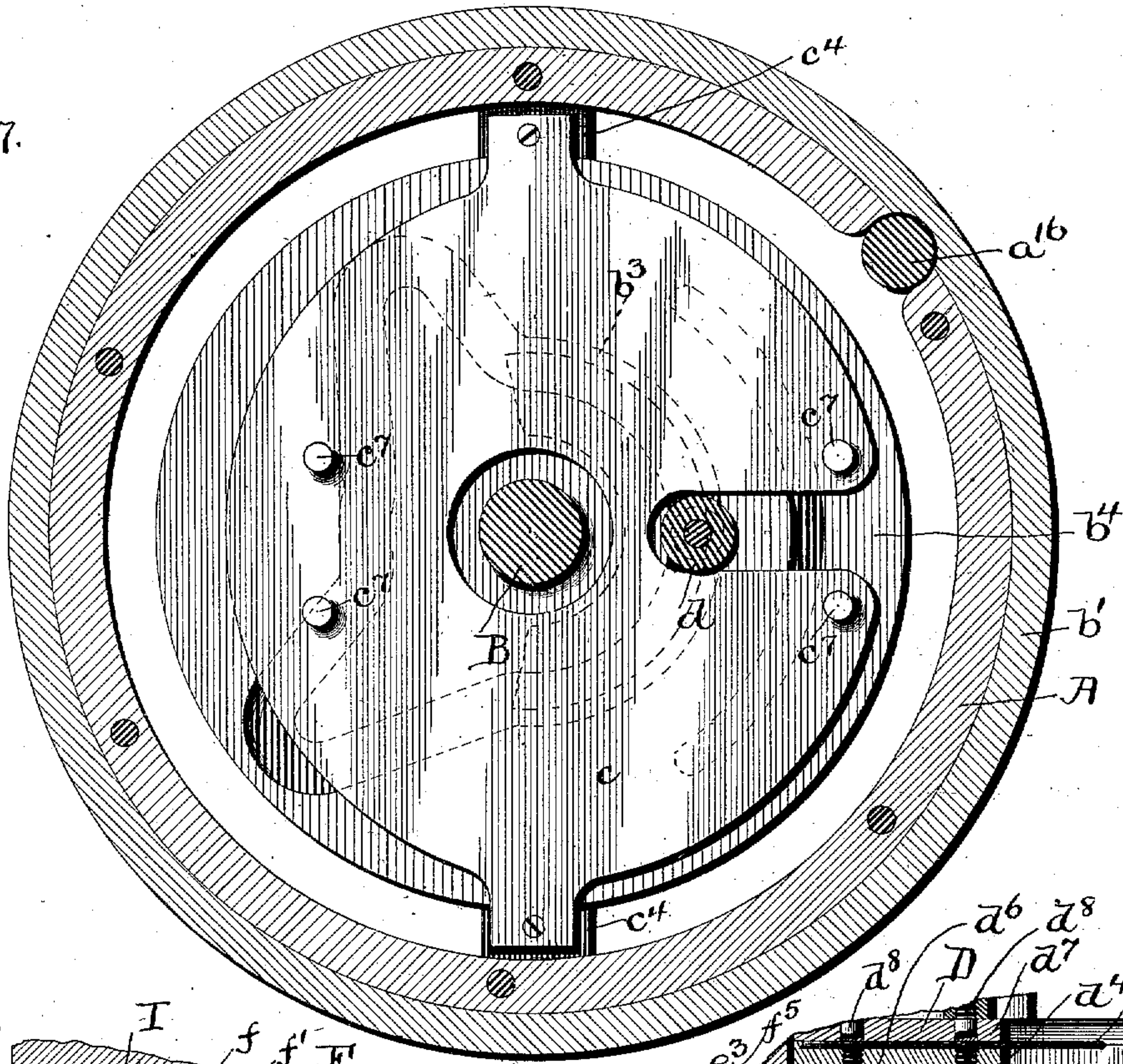
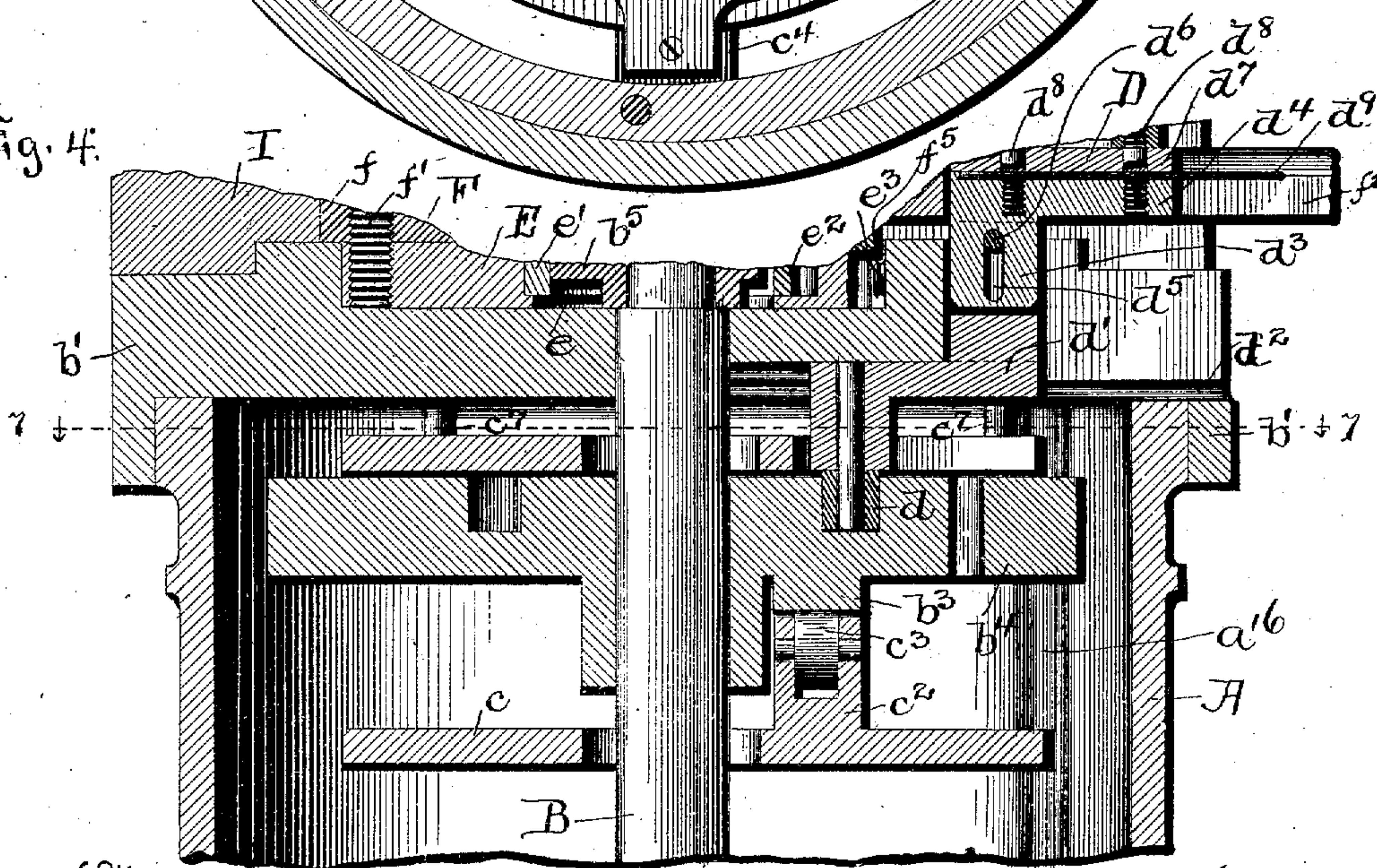


Fig. 4.



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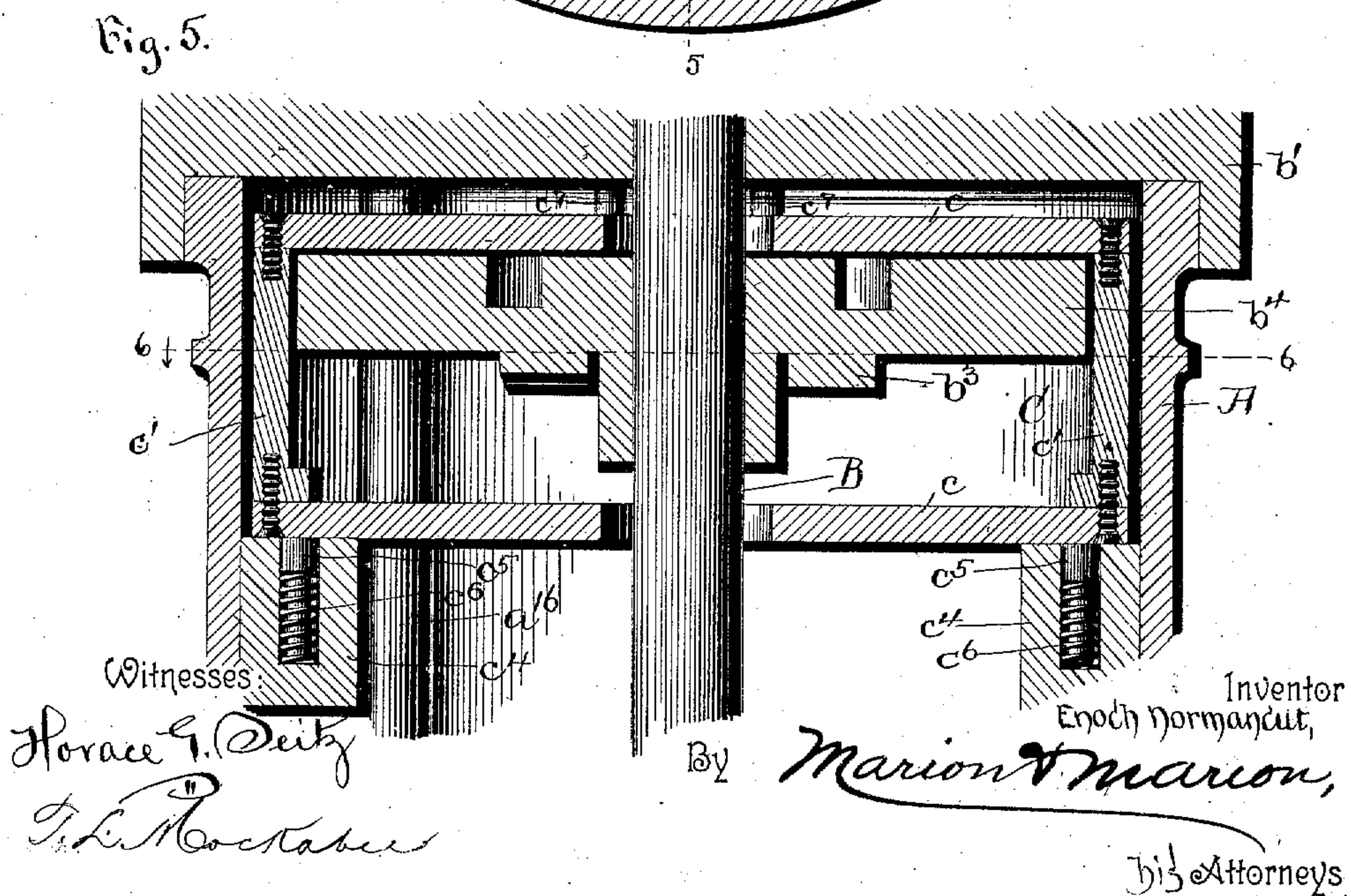
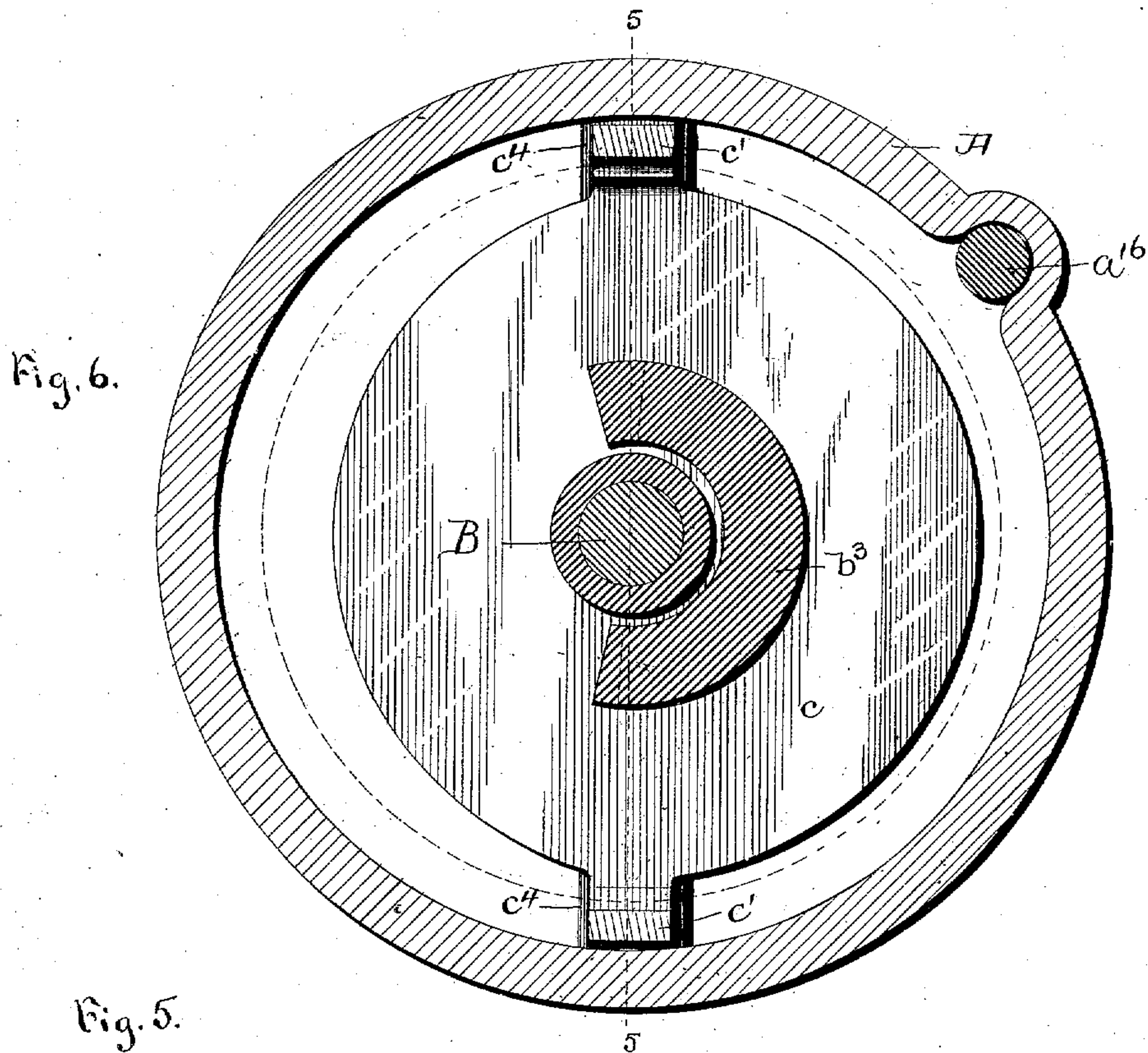
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12 Sheets—Sheet 5.



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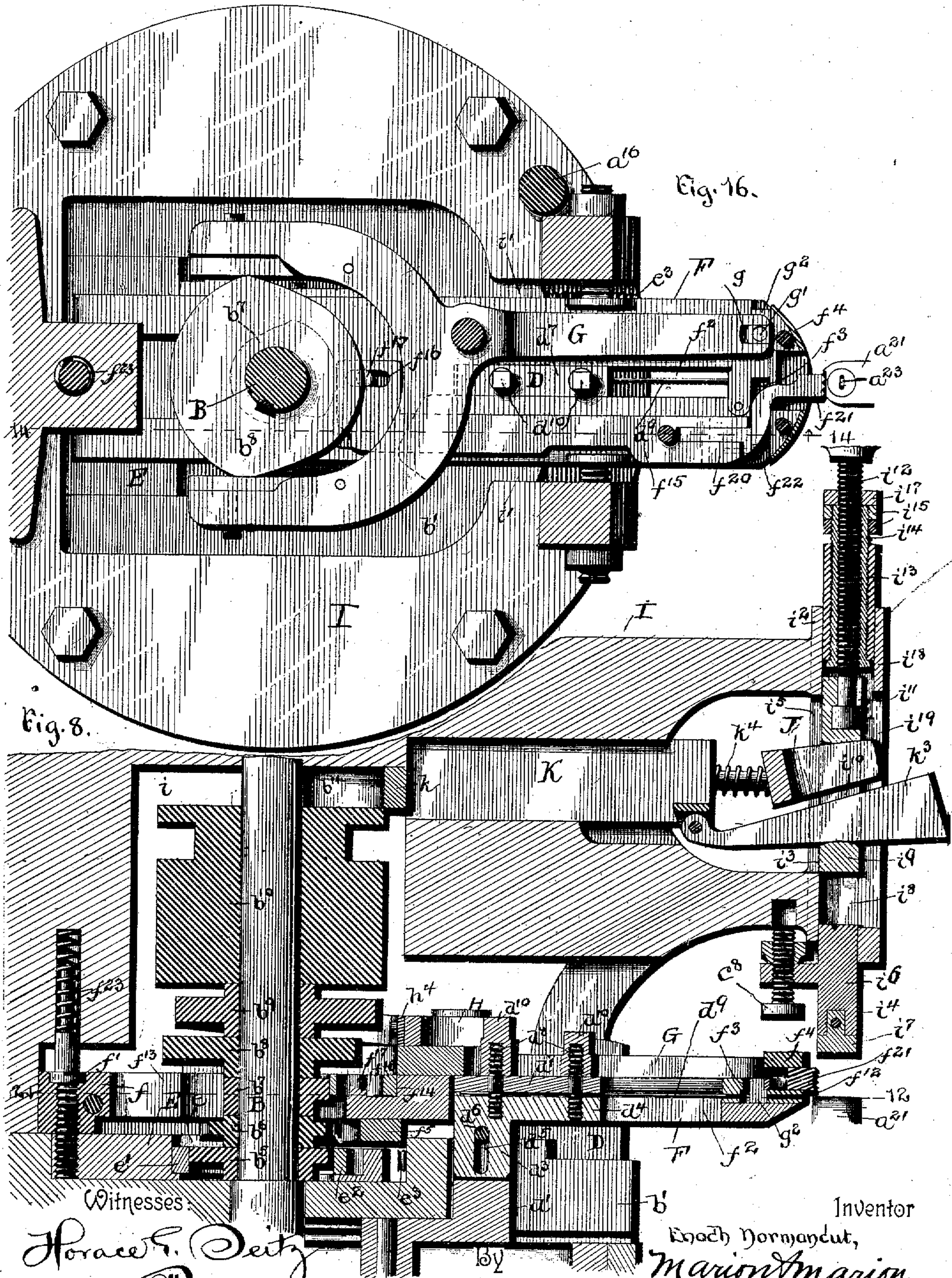
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12 Sheets—Sheet 6.



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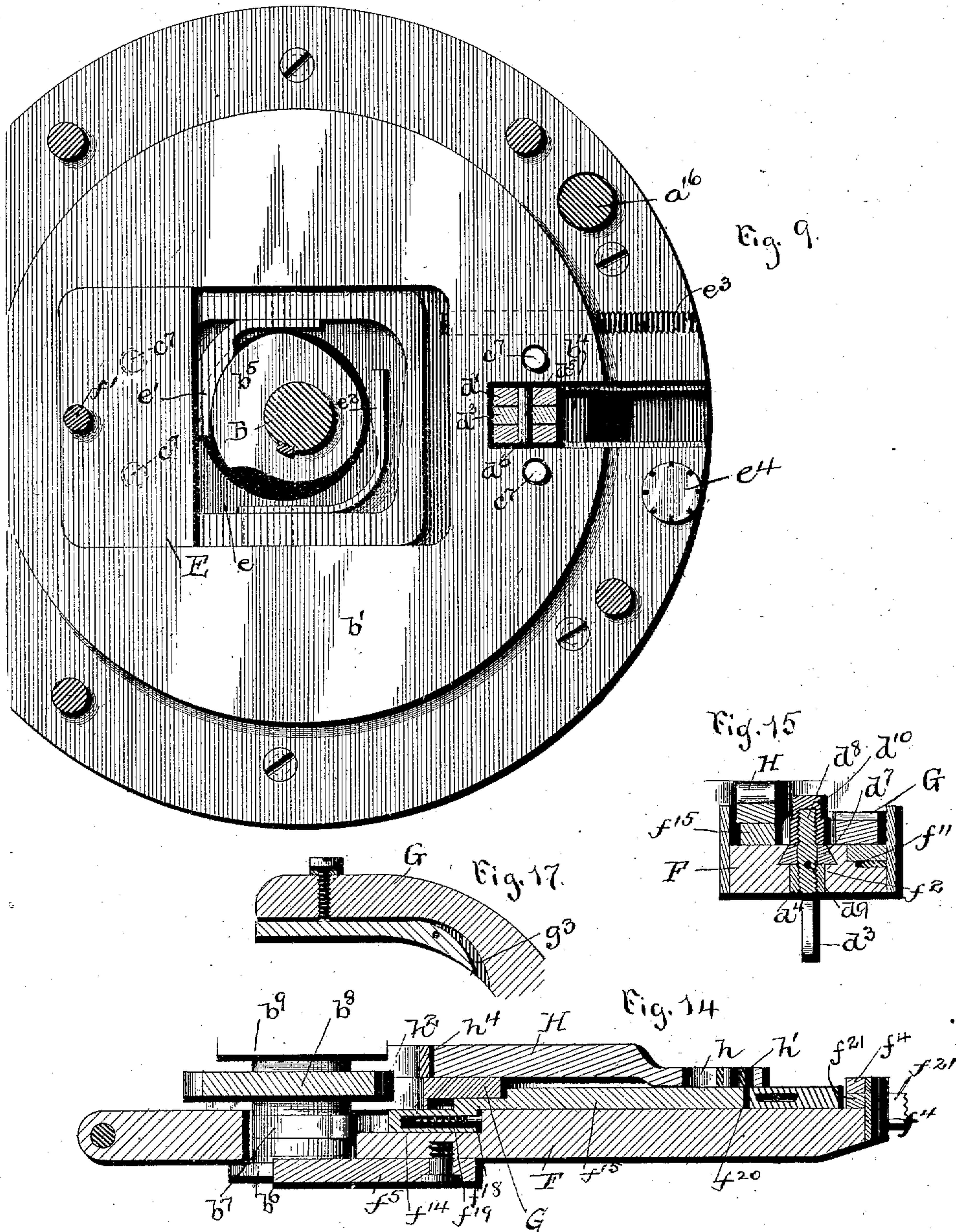
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12 Sheets—Sheet 7.



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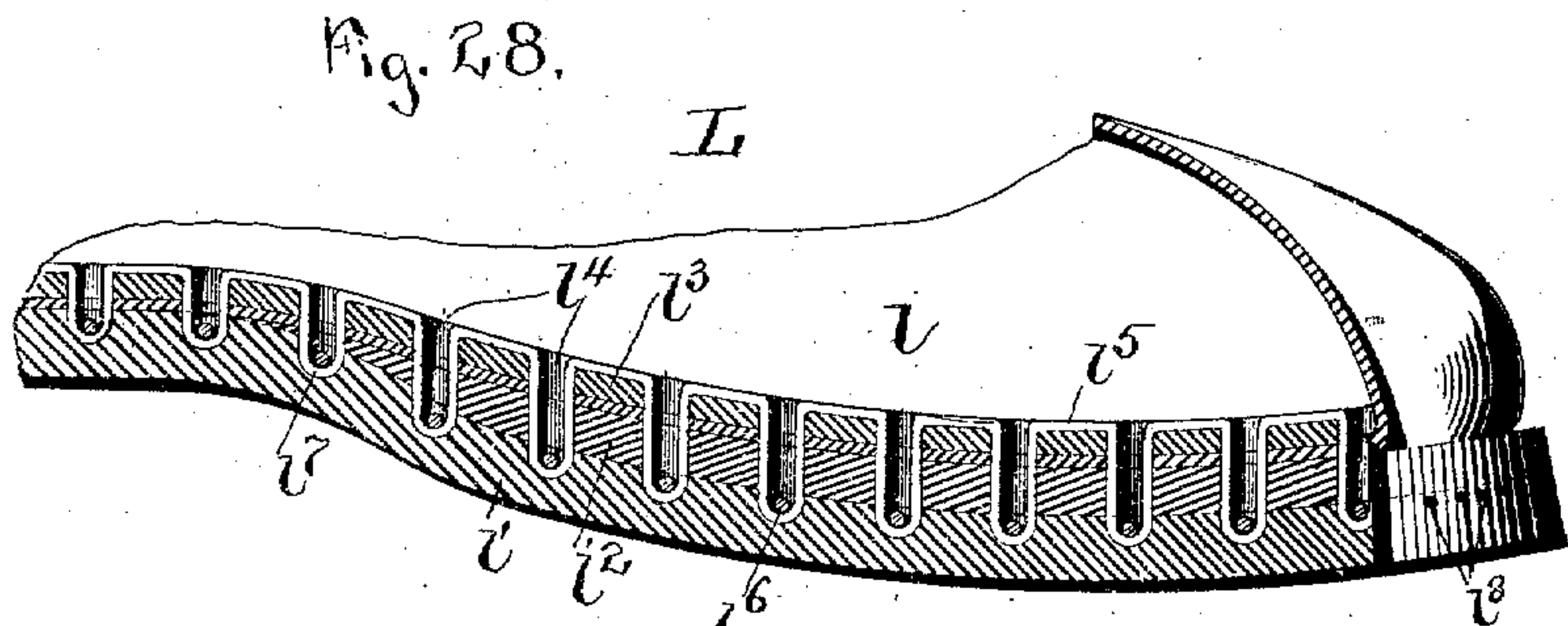
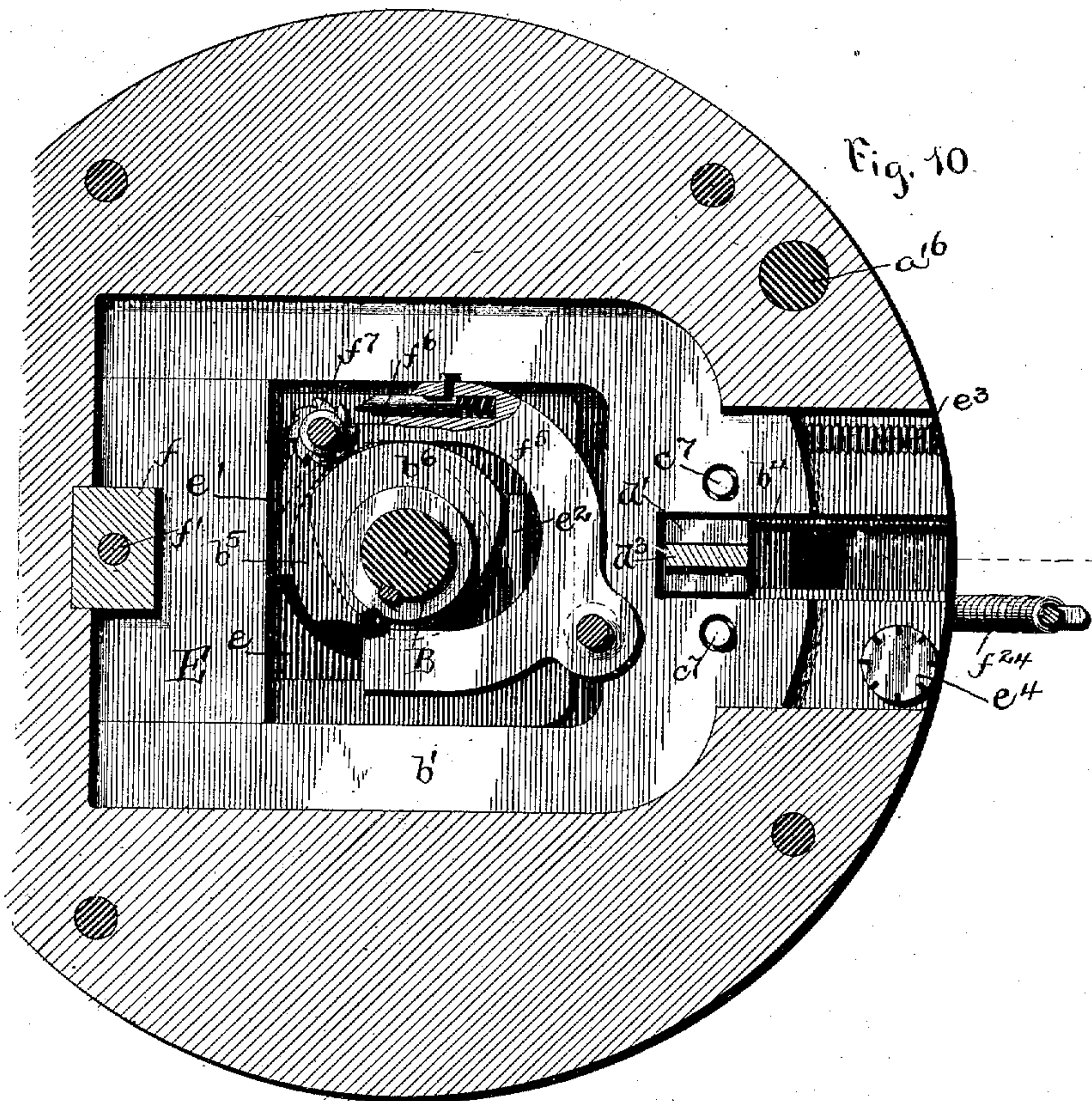
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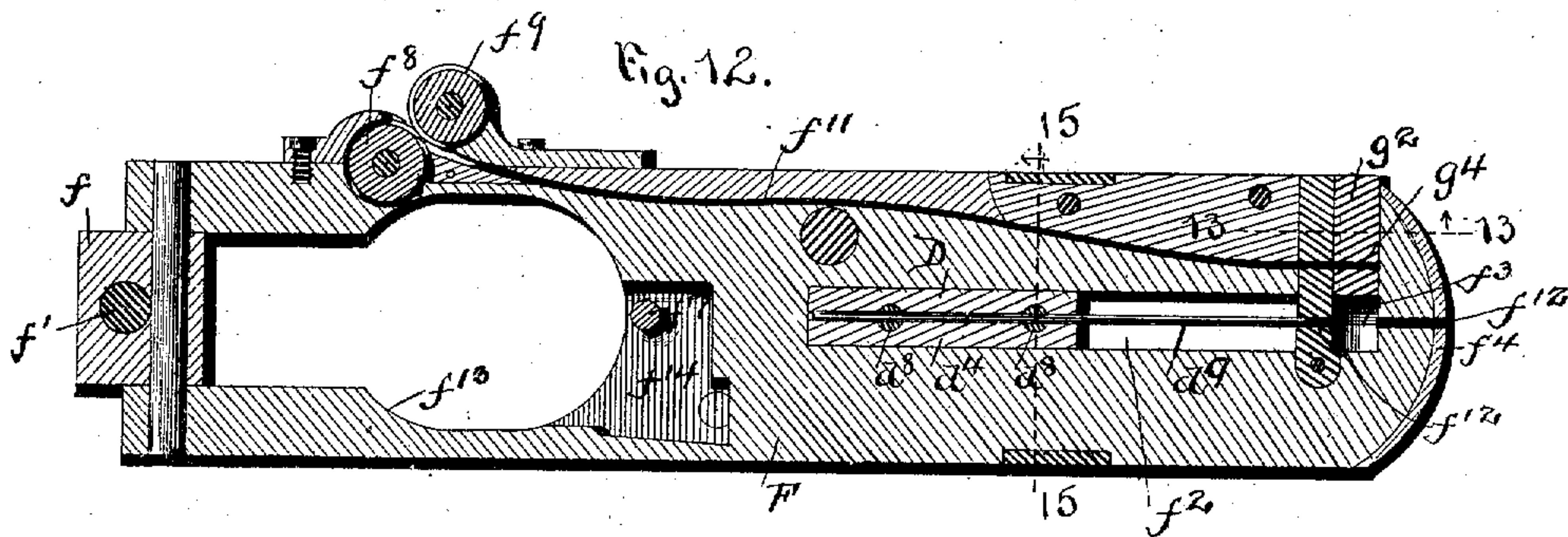
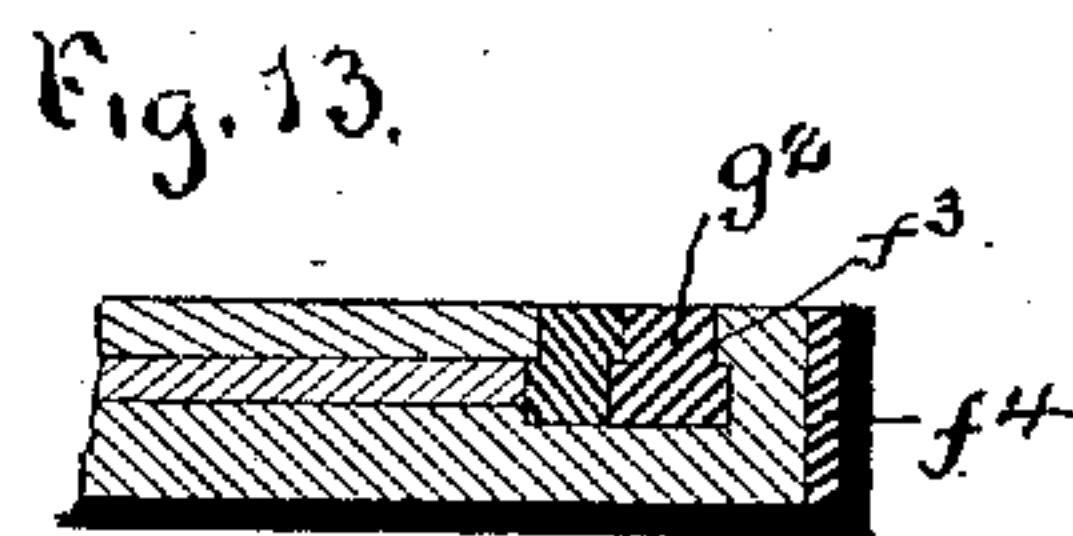
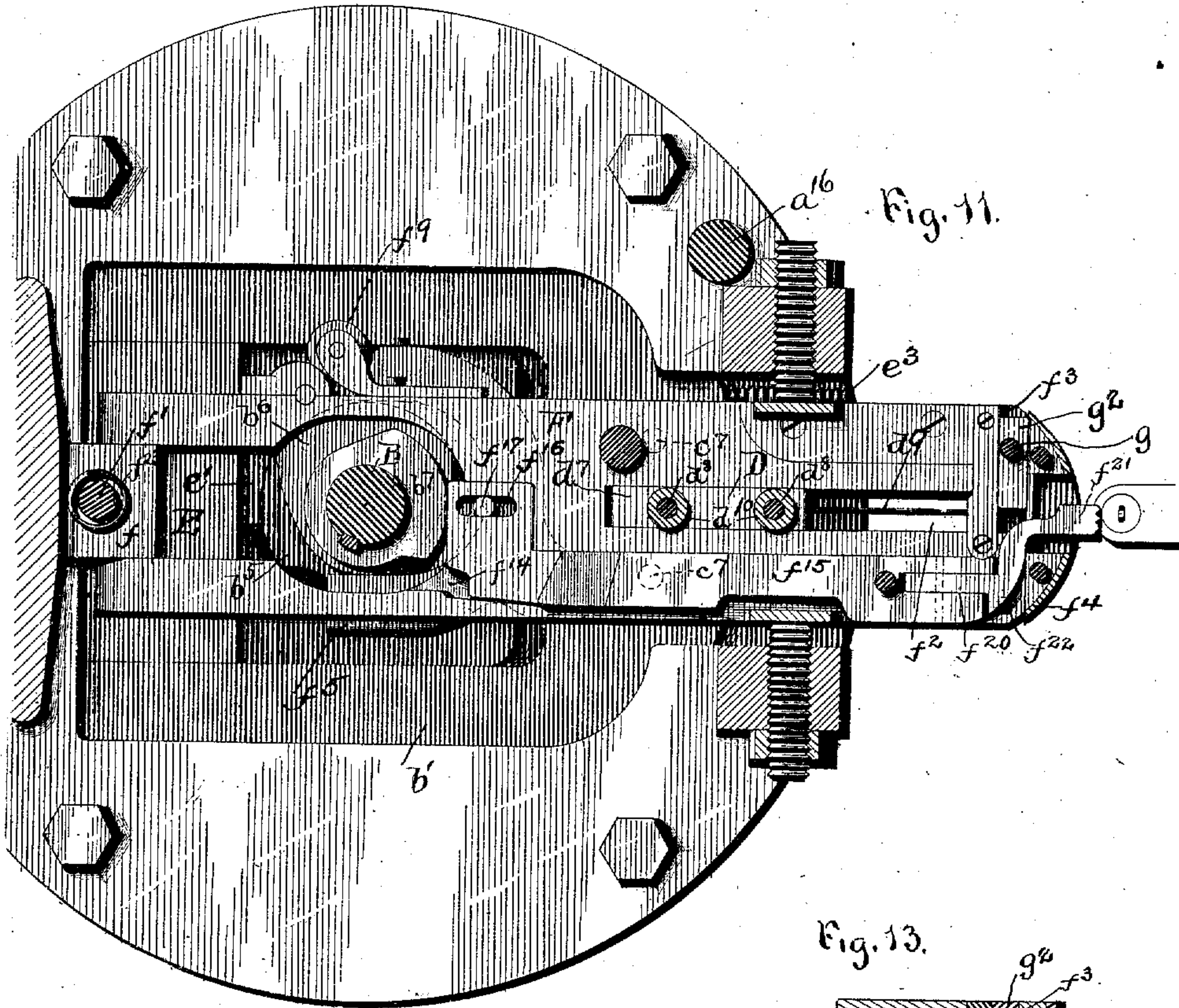
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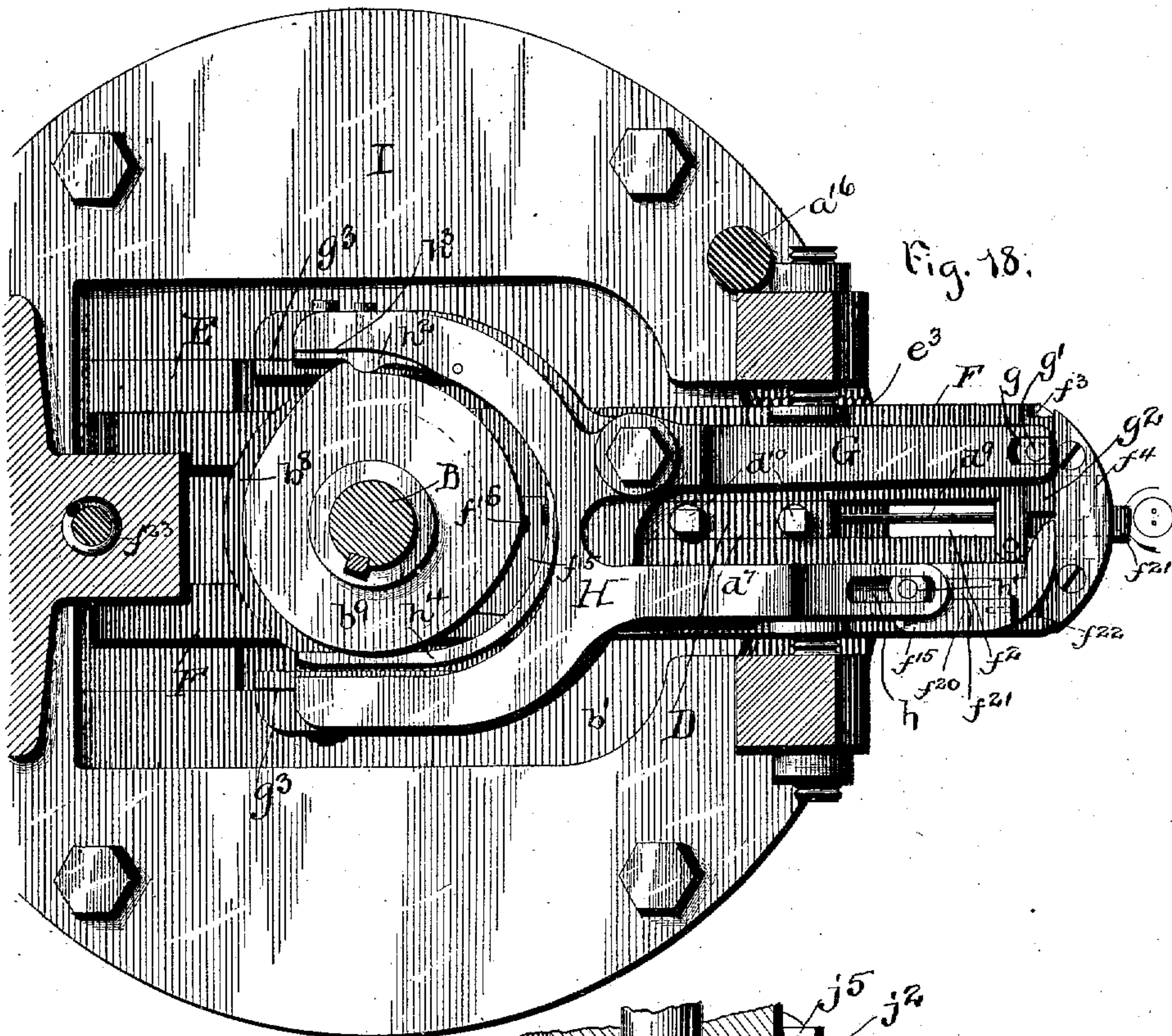


Fig. 18.

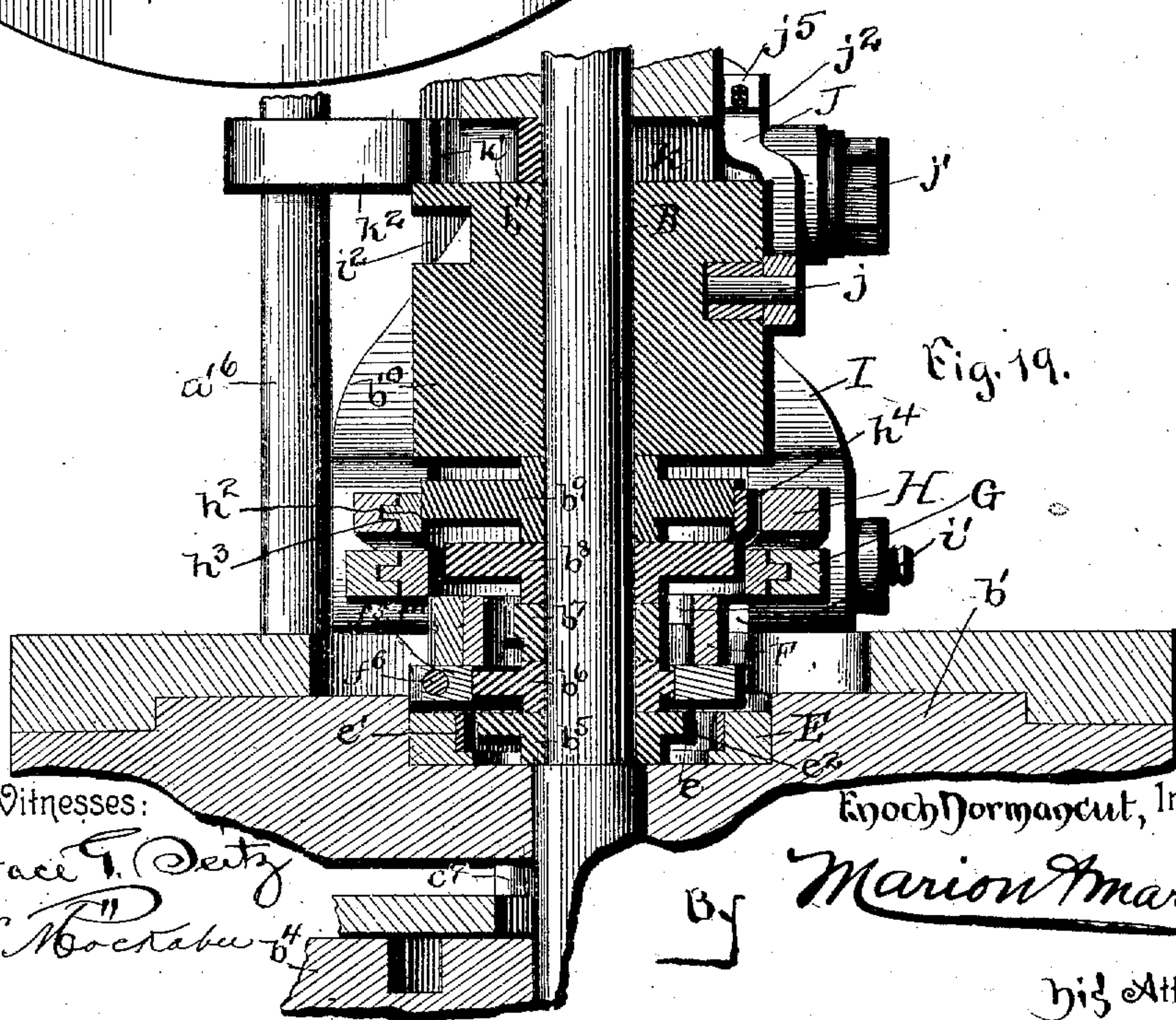


Fig. 19.

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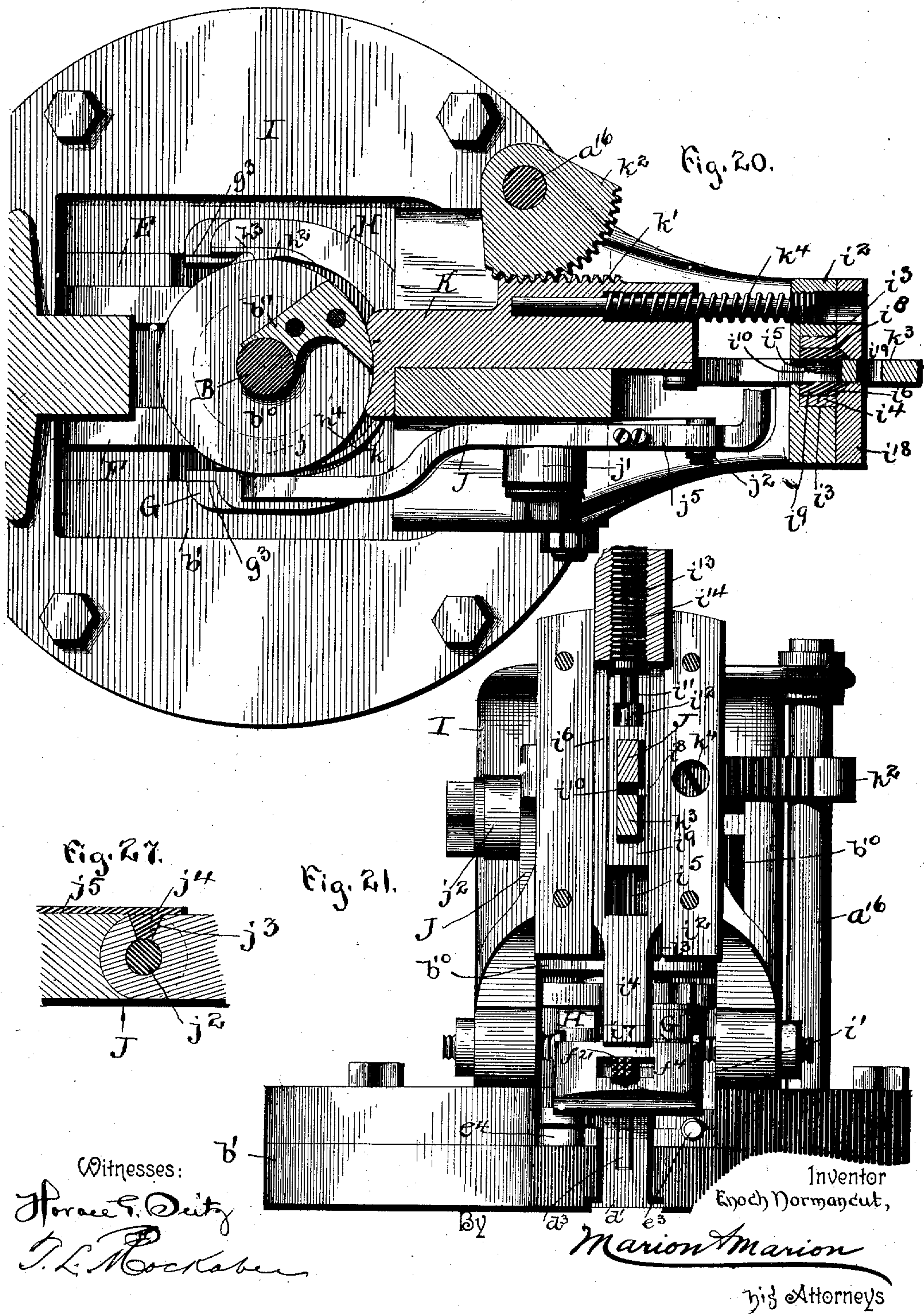
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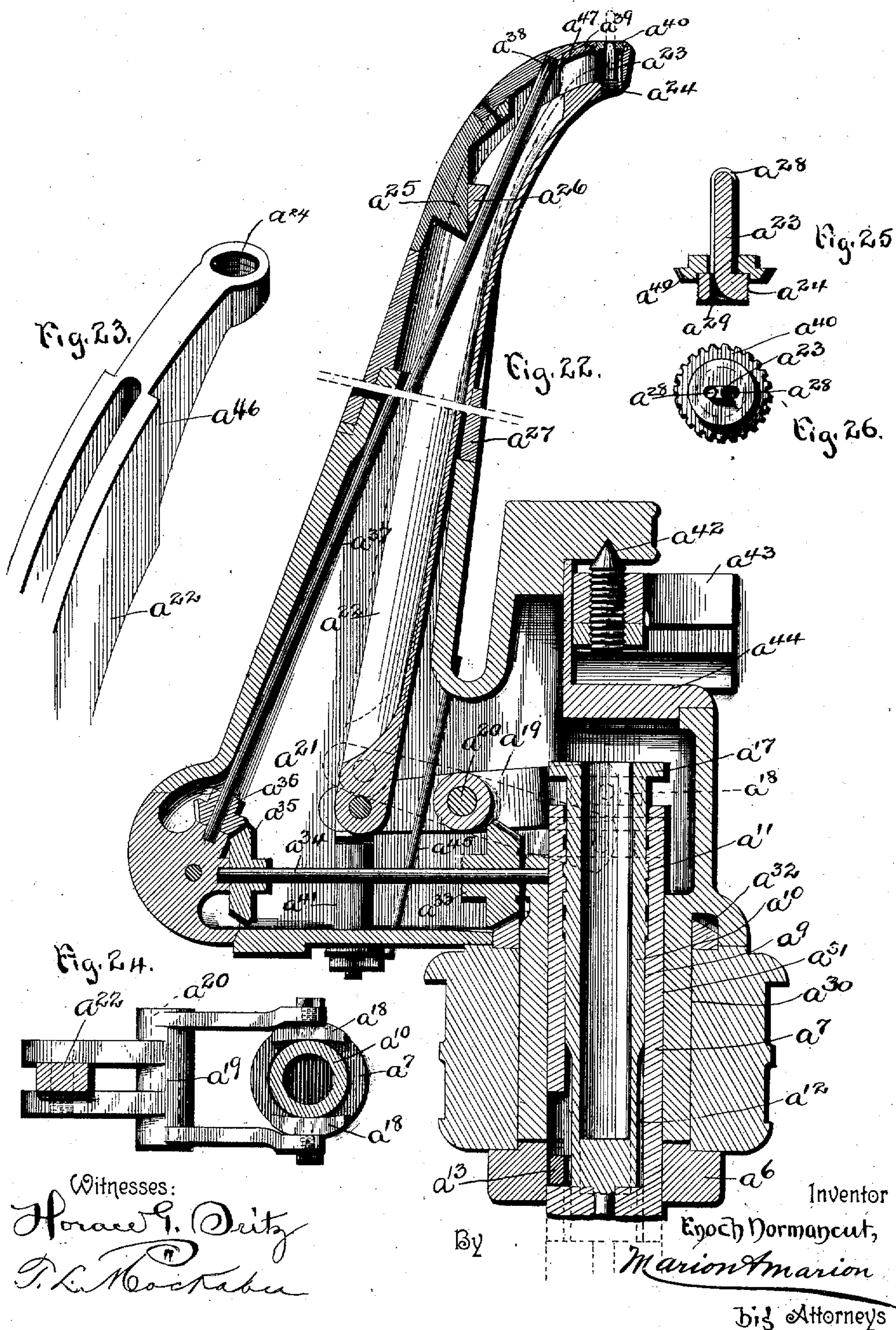
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SHOE SEWING MACHINE.

(Application filed Apr. 14, 1898.)

(No Model.)

12 Sheets—Sheet 12.



UNITED STATES PATENT OFFICE.

ENOCH NORMANCUT, OF MONTREAL, CANADA, ASSIGNOR TO THE
COLUMBIA WIRE SEWING LOCK STITCH MACHINE CO., LIMITED,
A CORPORATION OF MAINE.

SHOE-SEWING MACHINE.

SPECIFICATION forming part of Letters Patent No. 687,966, dated December 3, 1901.

Application filed April 14, 1898. Serial No. 677,634. (No model.)

To all whom it may concern:

Be it known that I, ENOCH NORMANCUT, a citizen of the Dominion of Canada, residing in the city and district of Montreal, Province of Quebec, Canada, have invented certain new and useful Improvements in Shoe-Sole-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.

My invention relates to improvements in shoe-sewing machinery, and has particular relation to that class of these machines in which the sewing material consists of wire.

The object of my invention is to provide a device of this character which will sew the sole of a boot or shoe to the upper from the inside of the shoe and without cutting a channel, without turning, and without piercing a hole through the sole of the shoe.

A further object is to provide a machine in which the sewing material will be passed to a regulated distance from the top of the sole regardless of its thickness.

A further object is to provide a machine with means for automatically regulating the stitch without regard to the thickness of the sole.

A further object is to provide a dust-proof shoe-horn containing the mechanism for operating the upright needle.

A further object is to provide a machine of this class in which the wire to form the stitch is formed in continuous strips.

A further object is to provide a machine of this class with means for corrugating the wire bur before it is passed into the sole, preventing its easy withdrawal.

To these and other ends not particularly herein set forth my invention consists in the improved construction and combination of parts hereinafter fully described, and particularly set forth in the appended claims.

In the drawings, in which similar letters of reference indicate similar parts in all of the views, Figure 1 is a side elevation of a portion of my improved machine, showing the general construction of the operating portion.

Fig. 2 is a front elevation of the same. Fig. 3 is a horizontal sectional view of the body, taken at a point a slight distance above the horizontal driving-shaft, the view showing the means for regulating the height to which the upright needle is to be passed. Fig. 4 is a vertical longitudinal section of the upper portion of the body and a portion of the head, the section showing the "shooter-operating" cam, the side-needle-operating cam, and the connections between the side-needle carrier and its operating-cam. Fig. 5 is a vertical transverse view of the parts shown in Fig. 4, the view being taken at right angles to that of Fig. 4 and on the line 5 5 of Fig. 6. Fig. 6 is a horizontal sectional view of the body, taken on the line 6 6 of Fig. 5 and showing the position of the shooter-operating cam-face. Fig. 7 is a horizontal sectional view of the body portion, taken on the line 7 7 of Fig. 4, the view showing the side-needle-operating cam and the general form of the shooter-plates. Fig. 8 is a central longitudinal sectional view of the head, showing the various cams mounted on the upright shaft and also showing the various operating parts connected therewith. Fig. 9 is a horizontal sectional view taken on the line above the lower cam, showing the slide-plate-operating cam, the slide-plate, and its various cam-bearing surfaces. Fig. 10 is a similar view taken on a line above the second cam, showing the wire-feed-operating cam, the lever actuated by said cam, and the ratchet-wheel for feeding the wire. Fig. 11 is a similar view taken above the feed-bar-operating cam, showing the lever-bar plate, the feed-bar, the operating-cam for said feed-bar, and the wire-feed rollers. Fig. 12 is a horizontal sectional view of the lever-bar plate, showing the wire-feeding rollers, the passage for the wire, the cutter, and the side-needle carrier. Fig. 13 is a sectional view taken on the line 13 13 of Fig. 12. Fig. 14 is a sectional view taken generally on the line 14 14 of Fig. 16, showing the feed-bar spring-actuated pin, the means for mounting the wire-feed lever, and the construction of the feed-bar-operating lever. Fig. 15 is a cross-sectional view taken

on the line 15 15 of Fig. 12, showing the side-needle carrier and its guides. Fig. 16 is a horizontal sectional view taken from the above cutter-lever-operating cam, showing the cam, the cutter-bar lever, and the parts located below the line of the section. Fig. 17 is a horizontal sectional view of one of the cam-operating ends of the cutter-bar lever, showing the means for adjusting the movement of said lever. Fig. 18 is a horizontal sectional view taken on a line above the feed-bar-operating lever, showing the operating-cam, the feed-bar-operating lever and its connections, and the various other parts located below the line of the section. Fig. 19 is a vertical transverse section of the head, taken at right angles to Fig. 8. Fig. 20 is a horizontal sectional view taken on a line above the wiper-cam and showing the rocking lever for operating the pressure-bar, the cam which operates said lever, the slide for regulating the height to which the upright needle passes, the wiper-cam for operating the slide, the spring for applying the pressure to the upright-needle-regulating mechanism, and the guide at the front of the head, said guide containing the pressure-bar and its operating mechanism. Fig. 21 is a front elevation of the head with the face-plate of the guide removed. Fig. 22 is a vertical longitudinal section of the shoe-horn, showing the operating parts, the manner in which it is connected to the body, and the movement of the upright needle. Fig. 23 is a detail of the upper end of the needle-bar. Fig. 24 is a detail view of the rocking frame, showing the slide-blocks for operating the needle-bar. Fig. 25 is a sectional view of the upright needle, showing the grooves for the wire, the opening for the passage of the wire, and the gear-wheel within which it operates. Fig. 26 is a plan view of the parts shown in Fig. 25. Fig. 27 is a sectional view of the rocking lever operating the pressure-bar, showing the hinged joint. Fig. 28 is a similar view showing the stitch formed in sewing three pieces of the leather sole together and also showing the difference in the depth of the loop when sewing through the varying thicknesses.

In the sewing of the shoe-soles to uppers by machinery it has heretofore been the practice to make the stitch of two varying forms, one of which is the chain-stitch formed by the use of the McKay machine and the lock-stitch as formed by the use of the Goodyear machine. Both of these machines make use of thread waxed during its passage through the machine.

To unite the sole and the upper by the McKay process, the sewing is done from the bottom of the sole, and therefore from the outside of the shoe, and to protect the thread from wear it must be inserted within a channel which is cut on the outer face of the shoe, the channel being afterward closed by pressing the turned-up portion onto the main portion of the sole. In this construction several disadvantages appear, the principal ones

being the fact that thread is used, the thread being easily worn through, and when worn the stitches are liable to become loosened, the wax coating on the thread being the only means for holding it in place. Another disadvantage consists in the forming of the channel, this requiring a waste of time both in forming the channel and then closing it after it has been formed, while a shoe in which this channel is formed wears faster by reason of the fact of the liability of it becoming loosened whenever one portion of the turned-down portion becomes worn through, thus exposing the sewing-threads. Some of these disadvantages disappear in the use of the Goodyear process, in which the sewing is from the inside of the shoe, the stitch being known as the "lock-stitch," which eliminates the liability of the sole becoming loose when one of the threads becomes worn through; but in this process the shoe must be turned after sewing, which necessitates the reshaping of the shoe after having been sewed, causing a loss of time, in addition to which some shoes are entirely ruined in the turning, thus making an entire loss. Both processes require the use of waxed thread, which is disadvantageous, as the thread is easily worn through and the wax coating becomes hardened, causing the threads to break if the sole is bent. To obviate these various disadvantages and provide a strong and substantial fastening, yet which will allow the sole to be flexible, I make use of the machine hereinafter described, which sews with spooled wire instead of thread, the machine forming a lock-stitch which will securely unite the sole, no matter what its thickness may be, to the upper, the sewing taking place from the inside of the shoe, by means of which no channel is required to be cut in the sole, nor need the shoe be turned after being sewed. In addition to this the stitch is entirely hidden and there is no surface which is liable to be worn through quickly, as in the case of the channel.

To form the stitch-seam, which will be hereinafter described in detail, I provide a machine which I now proceed to describe in detail.

In each of the figures of the drawings the machine is shown with all operating parts located in the same relative positions, excepting in Fig. 12, wherein the cutter is shown as having reached its limit of outward movement in order that the passage of the wire into the opening in the cutter may be clearly shown.

A designates the frame or body of my machine, which is in the form of a hollow column, having a suitable pedestal. (Not shown.) At the rear end of the frame or column A is provided an integral bearing a , within which is mounted a shaft a' , which forms the driving power for the machine. A suitable friction-clutch a^2 serves to connect the power from the main driving-shaft a' to the drive-shaft, the friction-clutch being operated by suitable treadle mechanism, (not shown,) the

friction-clutch used necessarily being such as will enable the machine to be at all times under the control of the operator and which will also serve to stop the machine automatically at a predetermined point of its revolution upon release of the treadle, the mechanism being such that the machine will always return to its initial position before stopping. The shaft a' is extended longitudinally across and through the frame A and has its free end provided with a cam a^3 . The cam a^3 is located in an extension a^5 , formed at the front of the frame A and has its front face a slight distance in rear of the axial line of the upright needle. The shaft a' is mounted in a suitable bearing a^4 in the rear of the cam a^3 .

Mounted to have vertical movement within a suitable vertical bearing a^6 , formed in the extension a^5 , is a suitable plunger a^7 , the lower end of which is mounted in a suitable guide a^8 . The plunger a^7 is connected to the cam a^3 by means of a suitable roller connection, the cam a^3 serving to give the plunger a vertical movement for a purpose to be hereinafter described. The upper end of the plunger a^7 is provided with an opening a^9 , within which is adapted to be placed a whirl a^{10} , the whirl being provided with a quick-acting screw-thread a^{11} , which is adapted to cooperate with a similar screw-thread formed on the plunger a^7 within the opening a^9 . The whirl a^{10} is provided at its lower end with a suitable gear a^{12} , to operate which I provide a suitable sliding rack a^{13} , the rear end of which is connected with a small gear-wheel a^{14} , mounted on a suitable removable bearing-plate secured to the extension a^5 and within the frame A, said small gear-wheel being operated by means of segmental gear a^{15} , mounted on the vertical shaft a^{16} .

It will be apparent that when the shaft a^{16} is rotated the segmental gear a^{15} will be oscillated and will in turn operate the sliding rack a^{13} through the medium of the gear-wheel a^{14} , the movement of the sliding rack a^{13} being communicated to the gear a^{12} on the whirl a^{10} , thus causing the whirl a^{10} to be rotated, and inasmuch as the connection between the whirl a^{10} and the plunger a^7 is formed by means of screw-threads the whirl a^{10} will be moved vertically in said plunger a distance corresponding to the distance which the rack a^{13} travels, a long movement of the rack a^{13} raising the whirl a^{10} to its upper limit of movement.

The upper end of the whirl a^{10} is provided with an annular flange a^{17} , between which and the top of the plunger a^7 are mounted suitable guide-blocks a^{18} . (Best shown in Fig. 24.) The slide-blocks a^{18} are pivotally connected to one end of a rocking frame a^{19} , pivotally mounted, as at a^{20} , within the shoe-horn a^{21} . The rear end of the rocking frame a^{19} is provided with a pivotally-mounted needle-bar a^{22} , in the upper end of which is mounted the upright needle a^{23} , the connections being by means of minute screw-threads a^{24} . To cause the upright needle to have an exact vertical

movement, I provide a suitable guide a^{25} within the shoe-horn near its top, against which a slide-block a^{26} , formed integrally within the needle-bar a^{22} , is adapted to have movement, a sleeve a^{27} serving to prevent the needle-bar from moving in an opposite direction and away from the guide a^{25} . While the sleeve a^{27} serves to prevent the needle-bar from having a tendency to move away from the guide a^{25} , yet as an additional safeguard to make the movement of the needle-bar true and exact I provide the needle-bar with suitable shoulders a^{28} , which are adapted to have movement against the face of similar shoulders a^{29} , formed within the shoe-horn. It will be apparent, therefore, that the movement of the needle-bar a^{22} cannot be varied, the slide-block a^{26} preventing its movement in one direction laterally, while the sleeve a^{27} and the shoulders a^{28} a^{29} prevent its movement in the opposite direction.

The upright needle a^{23} is formed of suitable material having its contour preferably slightly oval in cross-section. At the ends of the oval and at the point of greatest diameter the needle a^{23} is provided with a suitable groove a^{30} , formed, preferably, as shown in Figs. 25 and 26, the groove at one end of the oval having a connection with the opening a^{29} , formed in the base of the upright needle.

The extension a^5 of the frame is provided with a vertical opening a^{30} , within which is adapted to be placed to have a rotary movement the lower end of the shoe-horn a^{21} , said lower end being provided with an opening a^{31} , within which the plunger a^7 is adapted to have its movement. Horizontally mounted on the top of the extension a^5 is a suitable stationary beveled gear a^{32} , within which a beveled gear a^{33} , mounted on a suitable shaft a^{34} in the shoe-horn a^{21} , is adapted to mesh and operate. At the opposite end of the shaft a^{34} a beveled gear a^{35} is adapted to cooperate with a similar gear a^{36} , mounted on the shaft a^{37} , which extends upward through the horn to the top, the upper end of the shaft a^{37} being provided with a gear a^{38} , adapted to operate a small beveled gear a^{39} , which in turn operates a similar gear a^{40} , mounted in the shoe-horn at its top and which is adapted to receive the oval portion of the needle a^{23} . By means of this construction it will be obvious that as the shoe-horn is rotated within its bearing in the extension a^5 the rotary movement of the shoe-horn will be communicated to the gear a^{40} by means of the connections heretofore described, the motion of the gear a^{40} being in such manner as will hold the needle a^{23} in a fixed position relatively to the horn regardless of the position of the horn. While the gear a^{40} will hold the needle a^{23} relatively stationary, yet as the needle-bar a^{22} revolves with the shoe-horn while the needle remains stationary it will be apparent that the needle-bar a^{22} will have a movement about the needle; but inasmuch as the connection between the needle-bar and the neo-

dle is made by means of the minute screw-threads a^{24} the vertical movement of the needle within the needle-bar itself will be but slight and will have no effect whatever upon the operation of the needle itself. As the needle a^{23} must be subjected to a considerable amount of pressure, it will be apparent that the connection between the needle-bar and the needle must be strong, and it is for this reason that I make use of the minute screw-threads a^{24} .

To prevent a downward movement of the needle-bar a^{22} beyond its proper distance, I provide a suitable buffer-cushion a^{41} , by means of which the downward movement of the rear end of the rocking frame a^{19} will be stopped with a cushioned movement, thus preventing any undue effect which might be caused by the rocking frame contacting with a solid stop or buffer.

The shoe-horn a^{21} is mounted on a center point a^{42} , formed in a bearing a^{43} , this construction serving to retain the horn in its true alinement. A removable cap a^{44} serves to close the opening formed at the top of the bracket portion of the shoe-horn, and thereby closes the inside of the horn against the entrance of any foreign substances. A suitable guide a^{45} for the upright-needle wire extends upward through the body of the shoe-horn. A suitable bracket a^{48} is removably connected to the shoe-horn, which bracket is adapted to contain the spool a^{49} , which carries the wire adapted for use with the upright needle, the wire passing from the spool upward through the guide a^{45} into the opening a^{29} , formed in the base of the needle, and then carried upward and over the top of the needle and within the groove a^{28} , the end of the wire when the first stitch is made being bent over the upper end of the needle a^{23} to form a loop. This is done to enable the needle to carry the wire loop into the material being sewed. After the first stitch is made, however, this is not required, as the end of the wire is secured in the material in fixed position, the needle carrying the wire into each successive stitch automatically until the entire material is sewed, when the wire for the upright needle is cut off and the shoe removed.

B designates the central vertical upright shaft, which is adapted to be driven by means of a suitable gear connection b , operated by a shaft a' . The shaft B extends upwardly through the cap-plate b' and head I and has removably affixed thereto the cams hereinafter described for operating the various portions of the machine which have not been described.

To better explain the various operations of the different cams, it is thought best to describe each in detail in the order in which they are placed upon the shaft, beginning with the lower cam and following with the cam above and last described. As hereinbefore explained, the figures of the drawings show the position of the cams on the shaft B

with relation to each other, all being shown at the period of rotation of the shaft B when the machine is in position for the making of a new stitch, the material having been fed forward, as hereinafter described.

The first cam to be described is the cam-face b^3 , formed on the underside of the face-cam b^4 , hereinafter described. This cam serves the purpose of operating what I term a "shooter-frame" C, formed of two plates c , located above and below the face-cam b^4 , the two plates being connected together by suitable braces c' . The lower plate c is provided on its upper face with an integral lug c^2 , which is adapted to form a bearing for the contact-roller c^3 , which rides against the cam-face b^3 and serves to give the shooter-frame a vertical downward movement. Secured to the inner face of the frame or body A and at diametrically opposite sides thereof are brackets c^4 , having suitable openings for the reception of pins c^5 , adapted to have vertical movement in said openings, the upper ends of said pins abutting against the lower face of the lower plate c . Springs c^6 are mounted in said openings surrounding the shank of said pins and serve to force the shooter-frame upward when the contact-roller c^3 passes from its position on one portion of the cam-face b^3 to its other position. The upper face of the upper plate c is provided with suitable pins c^7 , which are adapted to extend upward through the cap-plate b' for a purpose which will be hereinafter described. These pins are arranged on opposite sides of the central line drawn longitudinally of the machine, the pins being arranged in series, the front series having a greater length than the rear series, and therefore extending to a greater height.

It will be obvious that when the contact-roller c^3 is riding against the raised portion of the cam-face b^3 the shooter-frame will be held in its lowermost position against the action of the springs c^6 ; but when the roller has reached the point of changing the springs c^6 will cause the shooter-frame to move upward with a quick motion, inasmuch as the change in the position of the rising face of the cam b^3 is abrupt. When the cam-face b^3 has been rotated a sufficient distance for the contact-roller c^3 to contact with the opposite changing-point, it will be readily seen that the shooter-frame will be moved downward against the action of the spring c^6 , but with a slower movement than that of the upward movement of the shooter-frame, inasmuch as the change is less abrupt than the change hereinbefore described. As the contact-roller c^3 is located above the lower plate c , any downward movement of the contact-roller c^3 will force the entire shooter-frame C, with its pins, c^7 downward.

As it is necessary in the operation of the machine, as hereinafter described, that the shooter-frame C be capable of moving to various heights, it is essential that the frame C have a yielding upward-actuating means,

while the downward movement must bring the frame C to its lower position. This yielding means is provided by the pins c^5 and springs c^6 , which force the frame C upward until its movement is stopped by means hereinafter described. This stop may occur before the contact-roller reaches the height of the one portion of the cam-face b^3 , in which case the roller c^3 will not make a contact until it reaches the changing-point, where the shooter-frame C is again moved downward.

The face of the cam b^4 is formed, preferably, as shown in Fig. 7, from which it will be seen that the period of operation is confined to half of its revolution. The operating-groove formed in the face of the cam is adapted to receive a roller d , connected with a sliding link d' , which is mounted to have movement in the guides d^2 , formed in the cap-plate b' . The upper end of the link d' is bifurcated to receive an extension b^3 , formed on the lower portion d^4 of the side-needle carrier D. The extension d^3 is provided with an elongated slot d^5 , adapted to receive a pin d^6 , which connects the extension d^3 with the bifurcated portion of the link d' . The needle-carrier D is preferably formed of the lower portion d^4 and upper portion d^7 , the connection being made by suitable screw-threaded pins d^8 , which are adapted to force the upper and lower portions d^7 d^4 toward each other and firmly bind and hold the side needle d^9 , which is adapted to be placed within suitable grooves formed on the meeting faces of said upper and lower portions. As the side needle must necessarily be placed at the center, the pins d^8 are provided with suitable openings, through which the needle passes, as best shown in Figs. 4, 12, and 15. Suitable nuts d^{10} are secured on the pins d^8 and serve to bind the upper and lower portions of the needle-carrier D together.

It will be apparent that as the shaft B rotates the roller d will follow the contour of the operating-groove formed on the face-cam b^4 and cause the link d' to have two movements forward and backward in its guides, the one following the other with but a slight period of rest between the two motions, and that the first motion will be of greater length than the second, while the forward movement of the link will be quicker on its first motion than on its second. The link d' , being mounted in guides fixedly formed on the cap-plate b' , will have an exact central horizontal movement which cannot vary, while the side-needle carrier is mounted in guides formed in the lever-bar plate, which is adapted to be raised and lowered. As the link d' and side-needle carrier D are movably connected together, the connection being an automatically-adjustable one, and both are mounted in guides, it will be obvious that any movement of the link d' caused by the operating-groove of the face-cam b^4 will be communicated to the side-needle carrier D without any loss of time or power.

E designates a slide-plate mounted within a recess formed in the top of the cap-plate b' . The slide-plate E is provided with an opening e , within which the side cam b^5 is adapted to operate, the said slide-plate being provided with a bearing-plate e' , against which the side of the cam is adapted to operate during a portion of its revolution. A bearing-spring e^2 , connected to the slide-plate E, serves to move the slide-plate E forward when the outer face of the cam b^5 contacts with the operating-face of the spring e^2 . The set-screw e^3 , secured in the cap-plate b' and extending into the recess of the cap-plate, serves to regulate the distance forward which the slide-plate can move.

It will be apparent that while the rearward movement of the slide-plate is fixed, its normal position being as shown in Fig. 9, the forward movement must be capable of being regulated by reason of the fact that the stitch-seam is formed at varying distances from the edge of the sole in different styles of shoes, and as the movement of the slide-plate must correspond with this varying distance a movable contact-plate must be formed to enable the cam b^5 , which has a fixed movement, to operate when the movement of the slide-plate E is limited by the position of the set-screw e^3 , and this is accomplished by means of the bearing-spring e^2 .

Inasmuch as the parts of the mechanism operated by the cam b^6 are connected to the lever-bar plate, it is thought best to describe this plate in detail before describing the action of the cam b^6 and the mechanism it operates.

F designates the lever-bar plate, which is adapted to rest on the rear portion of the slide-plate E at its rear end and on an adjustable pin e^4 , located at the front of the cap-plate b' . The lever-bar plate is bifurcated at its rear end and has pivotally connected with said bifurcated portion a block f , which is secured to the slide-plate E by means of the tapping-screw f' . The plate F is provided in its front portion with a suitable longitudinal guide f^2 , within which the side-needle carrier D is adapted to be movable, as hereinbefore explained. At the front end of the lever-bar plate F a suitable transverse guide f^3 is provided, within which is adapted to be placed the cutter, the operation of which will presently appear. A cap portion f^4 is secured to the front of the plate F and serves to retain the feed-bar in position and also serves as a rear support for the sole when the feed-nose is disengaged from the edge of the sole.

To the under side of the lever-bar plate F is pivotally secured the wire-feed-operating lever f^5 , which is operated by means of the cam b^6 . One side of the lever f^5 is provided with a suitable spring-actuated pin f^6 , the front end of which is adapted to contact with and rotate a ratchet-wheel f^7 , mounted in a suitable bearing formed at the side of the lever-bar plate, the movement of said ratchet-

wheel serving to operate a small grooved roller f^8 , mounted in said bearing secured to the side of the lever-plate F. A similar grooved-roller f^9 is removably secured in a removable bearing connected to the lever-bar plate in juxtaposition to the aforementioned bearing, the rollers $f^8 f^9$ being mounted in such a position that an opening is formed between them through which the wire passes, the rollers forming a contact with the wire as it is passed from the wire-reel f^{10} into the passage f^{11} , formed in the lever-bar plate F, the wire in passing between the grooved rollers $f^8 f^9$ being slightly corrugated by the corrugations formed in the grooves of the rollers. The passage f^{11} leads through the lever-bar plate F to the guide f^3 , the wire passing through the passage and into an opening formed in the cutter, as hereinafter described.

In order that the side needle d^9 can pass outward through the center of the front of the lever-bar plate F, I provide a suitable opening f^{12} , as clearly shown in Fig. 12.

It will be apparent that as the cam b^6 is rotated it will cause the lever f^5 to be moved in such manner that the front of the pin will coact with the ratchet-wheel f^7 , thus feeding the wire forward a fixed distance at each revolution of the shaft B, and at the same time the wire will receive the slight corrugations by reason of the corrugated faces formed in the grooved rollers $f^8 f^9$.

The lever-bar plate F is provided with an opening f^{13} , through which the shaft B passes and within which a cam b^7 , the purpose of which will now be set forth, is mounted to be actuated by said shaft. The upper face of the lever-bar plate is provided with a recess f^{14} , within which is adapted to be placed and have movement the rear end of the feed-bar f^{15} . This feed-bar is provided with an elongated slot f^{16} , adapted to receive a fixed stud f^{17} , formed on the lever-bar plate F. The rear face of the feed-bar f^{15} is adapted to contact with the face of the cam b^7 at all times and is held in contact by means of the spring-actuated stud f^{18} , located in the opening f^{19} in the feed-bar, as clearly shown in Fig. 14. The front end of the feed-bar is bifurcated, as at f^{20} , and in the opening formed by said bifurcated portion is adjustably mounted the feed-nose f^{21} , formed substantially as shown in Fig. 16. The feed-nose f^{21} is adjustable in said opening by reason of the set-screw f^{22} , said screw serving to regulate the distance of the extreme front end of the feed-nose from the center of the upright needle, in order that the feed-nose may be regulated according to the distance it is desired to have between the stitch and the edge of the sole of the boot or shoe. The feed-nose is formed substantially as shown in Figs. 11, 14, and 16, being provided with a rearwardly-extending portion which fits within the bifurcated portion f^{20} . This rearwardly-extending portion is provided with a slot, as best shown in Fig. 14, through which and the bifurcated

end is passed a pin, which holds the feed-nose in position against vertical movement. The nose being adjustable longitudinally by means of the set-screw f^{22} will be held against longitudinal movement excepting when being adjusted. By this construction it will be apparent that as the cam b^7 rotates the feed-nose f^{21} will be brought into and out of engagement with the edge of the sole of the boot or shoe and allow, by reason of its being withdrawn within the opening at the front of the lever-bar plate F, the feed-bar to have its position changed, as hereinbefore described, without any liability of the boot or shoe being carried backward with it during its movement in preparing for a new feed.

Pivotally mounted on the upper side of the lever-bar plate F is the cutter-lever G, the front end of which is provided with an opening g , to receive a pin-and-collar connection g' , formed on the top of the cutter g^2 . The rear end of the lever G is bifurcated, the inner face of the bifurcated ends being adapted to engage the face of the cam b^8 . The cam-acting faces of the bifurcated end of the lever are pivotally and adjustably mounted in suitable slotted openings g^3 to allow of the exact regulation of the movement of the cutter at the front end of said lever, as best shown in Fig. 17. The cutter g^2 is provided with an opening g^4 , within which the wire is adapted to be fed by means of the lever f^5 when the cutter is at its farthest point away from the longitudinal center of the lever-bar plate F. By this construction it will be apparent that when the lever G is at its farthest movement on one side the cutter g^2 will be in such position that the wire from the passage f^{11} will pass into the opening g^4 a sufficient distance to form the desired length of bur, the length of bur being regulated by the movement of the lever f^5 against the ratchet-wheel f^7 . As the cam b^8 is moved it will cause the lever G to be oscillated on its pivot, thus moving the cutter g^2 toward the longitudinal center of the lever-bar plate F, this movement causing the wire to be cut off, as will be clearly understood by referring to the drawings. The movement of the cutter is continued toward the center until the opening g^4 , which contains the bur which has just been cut off from the wire, comes into alignment with the opening f^{12} , the side needle, which is then in position for driving the bur into the opening in the sole of the boot or shoe formed by its first movement, then driving the bur forward, the side needle passing through the openings $g^4 f^{12}$ during the operation. After the side needle has inserted the bur into the sole of the boot or shoe and has been withdrawn the cutter is moved backward into position for the reception of a new bur, when the operation is repeated.

Pivotally mounted on the pivot-point upon which the lever G is mounted is the feed-bar-operating lever H, the front end of which is provided with an elongated slot h , adapted to receive the pin-and-collar connection h' ,

formed with the feed-bar f^{15} . The rear end of the lever H is bifurcated and is adapted to be operated by means of the cam b^9 , as shown in Fig. 18. One of the ends of the lever H is provided with a cam-acting face h^2 , pivotally and adjustably mounted within a slotted recess h^3 in a manner similar to that shown in Fig. 17, while the opposite end of the lever is provided with the spring-bearing h^4 . This construction is such that as the cam b^9 is rotated the lever H will be oscillated to move the feed-nose f^{21} backward and forward across the front of the lever-bar plate F and forms the means for feeding the work. By reason of the peculiar shape of the cam b^9 , as shown in Fig. 18, the feed-bar after carrying the work forward its full distance, and thereby bringing the wire from the reel on the shoe-horn to the full length of movement of the work, the sudden change in the face of the cam b^9 causes the feed-bar to have a short movement backward, causing the work to be carried back, and thereby creating a slight slack in the wire for the upright needle to allow of the needle moving into the sole without drawing on the spooled wire, preventing any tendency of the wire to cut the sole of the boot or shoe when the upright needle makes its next stitch and allows the needle to more easily pass into the sole.

I designates the head of the machine, which is secured to the cap-plate b' by suitable cap-screws. The head I is provided with a transverse opening i , within which the various cams herein described are adapted to operate, and also with a longitudinal opening i' , communicating with the transverse opening i , the lever-bar plate F being adapted to operate in said longitudinal opening. The front of the head I is provided with a guide i^2 , having a vertical slot i^3 for the reception of the slidable pressure-foot i^4 . The guide i^2 is provided with a transverse slot i^5 , which communicates with the vertical slot i^3 and serves to allow of the passage of the pressure-bar lever and the upright needle-adjustment mechanism to the pressure-foot i^4 . The pressure-foot i^4 consists of a slide-bar i^6 , adapted to slide within the vertical slot i^3 , and has its lower end provided with a removable pressure-plate i^7 . The slide-bar i^6 is also provided with a vertical slot i^8 , within which is adapted to slide the adjustment-slide i^9 , which slide is in turn provided with a vertical slot i^{10} , which communicates with the slot i^5 in the guide i^2 . The upper end of the adjustment-slide i^9 is provided with a slotted opening i^{11} , having its lower end enlarged for the reception of the head of the adjusting-screw i^{12} , which serves to raise and lower the adjustment-slide i^9 in the vertical slot i^8 . The upper end of the sliding bar i^6 is provided with a screw-threaded opening i^{13} , within which the pressure-releasing screw i^{14} is adapted to have movement, said pressure-releasing screw being provided with a screw-threaded opening, within which the adjust-

ing-screw i^{12} has its movement. Adjusting-nuts i^{15} are mounted on the said adjusting-screw i^{12} , one of which is provided with an operating-handle i^{16} . A suitable lock-nut i^{17} serves to retain the adjusting-screw i^{12} in position after having been adjusted. i^{18} designates a removable face-plate provided with a vertical slot i^{19} , having communication with the slots i^5 i^{10} .

Fixedly mounted on the upright shaft B, above the feed-cam b^9 , is a side cam b^{10} , within which one end of a pivotally-mounted rocking lever J is adapted to have operative connection by means of a suitable pin-and-roller stud j , operating in the grooved face of the cam. The opposite end of the lever J extends forwardly into and through the slots i^5 , i^{10} , and i^{19} , the adjustment-slide i^9 normally resting on the upper face of the forward end of said lever. Between the pivotal pin j' of the rocking lever and the front end of said rocking lever the lever is provided with a hinged joint j^2 , the construction being such as to form an opening j^3 , having oppositely-inclined sides at the top of the lever, this opening j^3 being adapted to receive a suitable friction-block j^4 , normally held in contact with the inclined sides of the opening by means of a spring j^5 .

To the top of the cam b^{10} is secured a suitable wiper-cam b^{11} , which is adapted to ride against the face of a wiper k , formed on the end of a slide K, mounted to have longitudinal movement in the head I. The slide K is provided on one side with a suitable rack-gear k' , which is adapted to cooperate with a segmental gear k^2 , mounted on the upper end of the shaft a^{16} . Pivotaly connected to the front end of the slide K is a sliding wedge k^3 , the front end of which extends through the slots i^5 , i^{10} , and i^{19} below the front end of the rocking lever J. In order that the slide K may have a quick action when released from contact with the wiper-cam b^{11} , I provide an actuating-spring k^4 , which serves to force the slide K toward the shaft B.

As shown in the drawings, the front end of the lever J and the sliding wedge k^3 practically fill the slot i^{10} when the pressure-bar i^4 is in its upper position, which is when the side cam b^{10} begins its period of rest. This serves to hold the pressure-bar i^4 above the work to be done and allows of the insertion of the work on the shoe-horn and allows the feed-nose f^{21} to move the work forward. As the cam b^{10} , carrying the wiper-cam b^{11} , is rotated the wiper-cam b^{11} contacts with the wiper k and causes the slide K and the sliding wedge k^3 to be moved forward against the action of the spring k^4 , thus releasing the adjustment-slide i^9 from its locked position. After this is done the rocking lever J is oscillated on its pivot j' by means of the roller connection j , riding up the inclined face of the groove in the cam b^{10} , this movement of the rocking lever serving to force the pressure-bar i^4 downward on the face of the sole which is to be

sewed. As the thickness of the sole is sometimes greater than the distance between the upper face of the shoe-horn and the lower face of the pressure-bar when the pressure-bar is in its lowermost position, and as the movement of the rear end of the rocking lever J is the same in all cases, and as such movement of the rocking lever would cause a too great pressure on the sole, I have provided the hinged joint j^2 , as hereinbefore described, this construction enabling the rear end of the rocking lever J to move upward to its upper position while the lower face of the pressure-bar rests on the sole of the shoe without increasing the pressure on the sole, the front end of the lever remaining stationary, the block j^4 being forced upward against the action of the spring as the roller j^7 passes up the inclined face of the groove on the cam b^{10} , and when the pressure on the sole exceeds the resistance of the block j^4 , which resistance is regulated by the shape of the opening. After the roller j^7 has passed up the inclined face of the cam b^{10} and the pressure of the lever is applied to the pressure-bar the wiper-cam b^{11} passes beyond contact with the wiper k and the spring k^4 forces the slide K rearward until the inclined face of the sliding wedge k^3 binds against the lower face of the lever J and the lower face of the slot i^{10} , thus locking the pressure-bar i^4 in fixed position and preventing its upward movement until released by the wiper-cam b^{11} again coming into contact with the wiper k on its next revolution.

By referring to Figs. 8 and 21 it will be apparent that the adjustment-screw i^{12} will raise and lower the adjustment-slide i^9 to adjust it, and such adjustment regulates the distance between the lower face of the pressure-plate i^7 and the upper face of the shoe-horn, this adjustability allowing of the sewing of soles of varying thicknesses. This adjustment, however, is used to regulate the general thickness, such as sewing shoes with two soles or with three soles, as desired. The individual adjustment for each shoe—that is, the passing from thick to thinner portions of the same sole—is done automatically, as hereinafter explained.

The pressure-release screw i^{14} forms the connection between the adjustment-slide i^9 and the pressure-bar i^4 ; yet the specific purpose of this screw is to raise the pressure-bar i^4 whenever the machine is being operated to exhibit the working of the parts or when it is desired to move the machine only a part of its revolution, the rotation of the screw i^{14} serving to raise the pressure-plate i^7 above the limit of movement of the upright needle.

By reason of the construction hereinbefore set forth it will be perfectly obvious that the movement of the lever J will be fixed by reason of the actuating-groove in the cam b^{10} , and this would tend to increase the pressure on a sole of great thickness; but this increase of pressure is eliminated by the automatic pressure-regulating means formed by the

hinged joint j^2 , the pressure being the same whether the sole be thick or thin. When the proper amount of pressure has been applied, the pressure-bar i^4 is locked in position by the slide-wedge k^3 moving inward until its upper edge contacts with the lower edge of the front end of the rocking lever, and this position is maintained until the upright needle and side needle have both performed their work, when the pressure is released, as herein described.

In the stitch formed by the machine described it will be noticed that the loop extends into the sole to within a certain distance from its outer face, and this distance remains the same irrespective of the thickness of the sole. This distance may be varied as desired by adjusting the screw i^{12} in an obvious manner, especially when it is remembered that the movement of the adjustment-slide i^9 is the same without regard to its relative position with the pressure-bar i^4 .

By referring to Fig. 28 it will be seen that the length of each loop varies with the thickness of the sole, and inasmuch as it is desired that the loops must extend to within a predetermined distance of the face of the sole, as hereinbefore explained, this variation in the thickness requires that the movement of the upright needle must be automatically varied in a corresponding manner, and it is to perform this work that I have provided the slide K and rack-gear k' , the operation of which will now be described.

As the adjustment-slide i^9 moves downward with the pressure-bar i^4 , the movement of the rocking lever J allowing of this downward movement, it will be apparent that when the pressure-bar does not move downward its full limit of movement, which is the case when sewing, the adjustment-slide will have a similar shortened movement, and as the space between the lower face of the front end of the lever J and the lower end of the slot i^{10} is lessened in an obvious manner when the pressure-bar does not pass down to its full limit of movement, the sliding wedge k^3 will be prevented from passing inward to its full distance when actuated by the spring k^4 . This necessarily limits the movement of the slide K, and therefore limits the oscillatory movement of the shaft a^{16} to a corresponding extent. As the lower end of the shaft a^{16} is provided with a segmental gear which must necessarily have the same movement as the gear k^2 , this limitation of the movement of the gear k^2 will limit the movement of the segmental gear a^{15} , and by means of the gear-wheel a^{14} necessarily limits the movement of the rack a^{13} . As the rack a^{13} is adapted to impart a rotary movement to the whirl a^{10} , it will be seen that a limitation of this movement of the rack a^{13} will vary the height to which the whirl a^{10} will be forced by reason of the quick-acting screw-threads. When the whirl a^{10} has reached the end of its upward movement caused by the action of the rack a^{13} , the movement of the whirl a^{10} being

dependent on the movement of the rack a^{13} the face-cam a^3 causes the plunger a^7 to be moved downward, carrying with it the whirl a^{10} , which is then in its upper position. This downward movement of the plunger a^7 and the whirl a^{10} does not communicate motion to the rocking frame a^{19} until the lower face of the annular flange a^{17} contacts with the upper face of the slide-blocks a^{18} ; but when this contact takes place a further downward movement of the plunger and whirl will cause the rocking frame a^{19} to be rocked on its pivot, thus causing the needle-bar to be raised and forcing the needle containing the wire into the shoe to its proper distance. After the needle has made its insertion the plunger is moved upward again by the action of the cam a^3 , carrying with it the slide-blocks a^{18} , and thus moving the rocking frame a^{19} on its pivot and moving the needle-bar and needle downward out of contact with the sole of the shoe. The whirl a^{10} retains its upper position until the wiper-cam b^{11} again contacts with the wiper k , when the shaft a^{16} will be rotated, and thus cause the rack a^{13} to rotate the whirl a^{10} in an opposite direction, bringing it downward into its normal position, where it rests until the wiper-cam again passes from contact with the wiper-shaft in the making of a new stitch. The movement of the plunger a^7 is the same in each revolution of the cam a^3 , so that on the movement of the whirl a^{10} depends the time when the needle-bar begins its upward movement. A movement of the rack to its full extent will rotate the whirl to a height which would cause the annular flange a^{17} to contact with the sliding blocks a^{18} only when the plunger has reached a point near its lower limit of movement, in which case the upward movement of the needle-bar and needle would be slight. In fact such needle-bar movement would be limited to the remaining downward movement of the plunger a^7 , and as this movement of the whirl is regulated by the position of the sliding wedge k^3 it will be apparent that the upright needle will move within the same distance from the upper face of the sole as it is moved on the shoe-horn, regardless of the thickness of the sole itself.

As it is desirable to actuate the machine by hand, especially in case of accident or to adjust the various parts, I provide a hand-wheel b^{12} , mounted on the upper end of the shaft B, above the head I.

The operation of the machine is as follows: With the machine in the position shown in the drawings, which is the position occupied by the parts just after the feed has moved the work forward its proper distance, as the shaft B rotates, the first movement of the parts is occasioned by the cam b^{10} , which, by reason of the roller j riding up the inclined groove of the cam, causes the rocking lever to be oscillated on its pivot, which forces downward the pressure-bar i^4 into contact with the sole of the shoe or boot. At this time the wiper-

cam b^{11} is in contact with the wiper k and the sliding wedge k^3 is in its forward position. At this time the cam b^8 is in engagement with the cutter-bar lever G, the cutter being on its way away from the center of the lever-bar plate F. The remaining cams are not in operative position. As the shaft B rotates, the wiper k is released from contact with the wiper-cam b^{11} , and the spring k^4 actuates the shaft a^{16} and thus raises the whirl a^{10} to the proper distance. The cam a^3 then operates, as hereinbefore described, causing the upright needle to make its stitch and be withdrawn from the sole of the shoe. As the upright needle is passing into the sole of the shoe the feed-cam b^7 is released from contact with the feed-bar f^{15} and the spring f^{18} forces the feed-bar inward, withdrawing the feed-nose f^{21} within the cap f^4 and the lever-bar plate F. As the upright needle continues its movement upward the contact-roller c^3 is released from its contact with the cam-face b^3 and allows the shooter-frame C to pass upward, carrying with it in its upward movement the lever-bar plate F by reason of the contact of the pins c^7 with the under side of said plate, the latter passing upward until the upper face of the cap f^4 abuts against an adjusting-screw c^8 , mounted on the pressure-bar i^4 . I will state that the pins e^7 on the upper plate of the shooter-frame are of different heights, the rear series of pins e^7 being of a less height than those of the front series, for the reason that the rear end of the lever-bar plate cannot move to as great a height as the front end, it sometimes being the case that when a thin-sole boot is being sewed there is no movement in the rear end of the lever-bar plate at all, while the front portion is moved to its proper height. As the adjusting-screw c^8 is mounted on the pressure-bar i^4 , it will be apparent that the upward movement of the lever-bar plate F is automatically regulated by the movement of the pressure-bar, and therefore insures the insertion of the wire bur at the same distance from the top of the sole regardless of the thickness of the sole. As shown in the drawings, and especially in Fig. 8, the adjusting-screw c^8 is adjustably mounted in the pressure-bar i^4 . The object attained by making this screw c^8 adjustable is to regulate the height to which the lever-bar plate F passes, so as to cause the side needle to enter the edge of the sole at the proper place to pass within the loop in order that the bur will be placed in its proper position. It is to be understood that this adjustment only takes place when the distance between the outer face of the sole of the shoe and the loop is varied, as hereinbefore explained, the variation of the height of the lever-bar plate F during the stitching of the seam to correspond with the length of the loop being governed by the movement of the pressure-bar i^4 in an obvious manner. As the shooter-frame moves upward against the action of a spring f^{23} , mounted above the block f and serving to

normally hold the lever-bar plate F downward, and also against the action of a spring f^{24} , (see Fig. 1,) secured to the under face of the lever-bar plate F and to the frame of the machine, the face-cam b^4 begins its operation by the roller d entering the first of the outwardly-extending grooves formed on the cam, and thereby causes the side-needle carrier D to begin its outward movement. At this period of the revolution of the shaft B the wire-feed cam b^6 begins its operation on the operating-lever f^3 and feeds the wire into the opening g^4 , formed in the cutter g^2 . As the side needle-carrier is traveling forward and after the shooter-frame C has been moved upward the slide-plate E is moved forward by the action of the cam b^5 , carrying with it the lever-bar plate F, the lever-bar plate moving out until the face of the cap f^4 abuts against the edge of the sole, which is then held firmly in position by the pressure-bar i^4 , the set-screws e^3 being regulated to stop the forward movement of the slide E just as the cap f^4 reaches the edge of the sole. The cam b^5 continues its movement without changing the position of the slide, the cam operating against the bearing-spring e^3 . The movement of the side needle is so timed that the side needle passes into the edge of the sole of the boot or shoe and under the loop left by the upright needle just after the upright needle has commenced its downward movement, the two needles in fact almost meeting, by which it will be seen that the wire loop cannot be withdrawn by the downward movement of the upright needle. As the side needle reaches the limit of its first forward movement the cutter g^2 begins its movement toward the center of the lever-bar plate and reaches the center just after the side needle has passed out of the path of movement of the cutter. At this time the feed-bar f^{15} commences its movement backward to be in position to come into contact with the sole after the stitch has been formed, this movement being caused by the cam b^9 engaging with one side of the feed-bar-operating lever H. After the cutter g^2 has passed to its position where the opening g^4 is in alignment with the opening f^{12} the side needle begins its second forward movement and carries the wire bur into the opening made on the first forward movement of the side needle, the side needle in the second movement having a shorter motion than on its first movement, as clearly shown in the drawings, the difference being the length of the bur. After the bur has been inserted and the side needle is withdrawn from the sole, but during its rearward movement, the cam b^3 engages with the contact-roller c^3 and draws the shooter-frame downward, allowing the lever-bar plate F to pass down to its normal position, just after which the cam b^5 causes the slide-plate E to be moved rearward, thus bringing the face of the cap f^4 away from the edge of the sole of the shoe, while at the same

time the feed-bar f^{15} is moved outward toward the work by the action of the feed-cam b^7 . The feed-bar f^{15} moves in this direction until the feed-nose f^{21} engages with the edge of the sole of the boot or shoe, after which the lever J is oscillated by the roller j passing down the inclined face of the groove of the cam b^{10} , thus causing the pressure-bar i^4 to move upward, the wiper k just prior to the movement of the roller j coming in contact with the wiper-cam b^{11} , causing the slide K to move forward, releasing the sliding wedge k^3 from engagement with the rocking lever J and allowing the pressure-bar i^4 to move and the rocking lever to operate. As the pressure-bar i^4 is released the feed-bar f^{15} is moved forward by the action of the feed-cam b^9 , thus feeding the work forward, and, as hereinbefore explained, carrying the work forward and then returning it a slight distance to relieve the tension on the wire, when the machine is in position for another stitch.

By the construction shown and described therein I form a stitch-seam such as shown in Fig. 28, in which L represents a shoe comprising the upper L , the outer sole L' , slip-sole L'' , and inner sole L^3 . The upright needle in making its upward movement makes the opening l^4 and carrying the wire strip l^5 into the opening, the wire remaining in the opening and forming loops l^7 . As hereinbefore explained, the side needle passes into the edge of the sole, passing between the upper edge of the upright needle and the loop l^7 , forming the openings l^8 , within which the burs l^6 are placed upon the second forward movement of the side needle. The stitch-seam thus formed is a lock-stitch and cannot be pulled out, as the burs l^6 , which are about three-sixteenths of an inch in length, extend across the loop in an opening made to fit it.

It will be readily understood that no channel is required, that no hole is pierced through the sole, and that the sewing will be done from the inside of the shoe, the shoe being complete when the last stitch is sewed, there being no turn to be made or a channel to close. The length of the loop being regulated by the thickness of the sole, and as this regulating takes place prior to the movement of the upright needle, which feeds the wire as well as inserts it, prevents the insertion of any surplus wire, and the wire being always kept taut by the bur l^6 there is no liability of the inner ends of the loop being pushed into the inner part of the shoe and against the foot of the wearer.

The wire used is of small diameter, and therefore forms but a narrow line around the side of the sole; but the fact that thin wire is used does not render the stitch liable to be pulled out. In fact, in practice I have found that the wire, instead of being pulled out, will have, by reason of the pressure of the leather on the sides of the opening l^4 , a tendency to push the wire toward the center of the opening, thus making the loop more taut.

As there is but a single line of wire on each side of the shoe, the stitch-seam made does not prevent the sole from being flexible, the burs being inserted in the side not presenting any difficulties.

While I have shown necessary adjuncts in the machine—such as set-screws, wire-adjustment devices, &c.—I have not set them forth in detail, as their construction is obvious and form a necessary part of the construction of the machine, but do not form particular elements of my invention, being necessary adjuncts. The advantages of this construction are many, the principal one being that I have provided a construction which will operate in a perfect manner and which will unite several pieces of leather without regard to their thickness.

I reserve to myself the right to make any and all modifications that may be necessary commensurate with the breadth of the claims, such changes and modifications being only used when necessary to make the device more perfect in its operation.

I do not make claim herein for the feed mechanism described nor the specific structure of the feed-bar, &c., said mechanism forming the subject-matter of a divisional application filed August 10, 1901, Serial No. 71,669.

Having thus described my invention, what I claim as new is—

1. A machine for sewing shoes, comprising in its construction a cap-plate; a slide-plate mounted therein; means for imparting a longitudinal movement to said slide-plate; a lever-bar plate mounted pivotally on said slide-plate, said lever-bar plate being normally held in its lower position; a pressure-bar mounted in the head of the machine, to have a regulated movement therein; means for actuating said pressure-bar; means for raising said lever-bar plate and said slide-plate from their normal position; and means, connected to said pressure-bar, for automatically limiting the upward movement of the lever-bar plate.

2. A machine for sewing shoes, comprising in its construction a cap-plate; a slide-plate mounted therein, means for imparting a longitudinal movement to said slide-plate; a lever-bar plate mounted pivotally on said slide-plate, said lever-bar plate being normally held in its lower position; a pressure-bar mounted in the head of the machine to have a regulated movement therein; means for actuating said pressure-bar; means for raising said lever-bar plate and said slide-plate from their normal position; and a set-screw mounted adjustably on said pressure-bar, for limiting the upward movement of said lever-bar plate.

3. A machine for sewing shoes, comprising in its construction a cap-plate; a slide-plate mounted therein; means for imparting a longitudinal movement to said slide-plate; a lever-bar plate mounted pivotally on said slide-plate, said lever-bar plate being normally held

in its lower position; a pressure-bar mounted in the head of the machine to have a regulated movement therein; means for actuating said pressure-bar; means for raising said lever-bar plate and said slide-plate from their normal position; and means, adjustably connected to said pressure-bar, for automatically limiting the upward movement of the lever-bar plate.

4. A machine for sewing shoes, comprising in its construction a lever-bar plate normally resting in its lower position; a side-needle carrier mounted therein; means for imparting a reciprocating movement horizontally to said side needle; means for raising the front end of said lever-bar plate to a position to allow of the side needle entering into the work; and means for automatically limiting the segment within which said lever-bar plate moves, whereby the angle at which said side-needle carrier may operate is retained within proper limits.

5. A machine for sewing shoes, comprising in its construction a cap-plate; a lever-bar plate mounted therein; means for imparting a regulated longitudinal movement to said lever-bar plate, said plate serving to form a guide for the shoe, when said plate is in its forward position; a vertically-moving shooter-frame for raising said lever-bar plate from its normal or lower position, said frame contacting with said lever-bar plate at a plurality of points, whereby said plate is held from tilting laterally; and means for automatically regulating the position to which said lever-bar plate is raised.

6. A machine for sewing shoes, comprising in its construction a cap-plate; a slide-plate mounted therein; means for imparting a longitudinal movement to said slide-plate; a lever-bar plate pivotally connected to said slide-plate, said lever-bar plate normally resting in its lower position and forming a guide for the shoe, when in its forward position; means for moving said lever-bar plate vertically on its pivot, said vertical movement being limited automatically; and means for moving said slide-plate and said lever-bar plate vertically after said lever-bar plate has reached its limit of pivotal movement, whereby the angle at which said lever-bar plate may be carried is automatically regulated.

7. A machine for sewing shoes, comprising in its construction a cap-plate; a slide-plate mounted therein; means for imparting a longitudinal movement to said slide-plate; a lever-bar plate pivotally connected to said slide-plate, said lever-bar plate serving to form a guide for the shoe when said plate is in its forward position; and a shooter-frame, movable vertically within said cap-plate, said frame being adapted to impart a pivotal movement to said lever-bar plate within a limited segment, a further movement of said shooter-frame serving to impart a true vertical movement to said slide-plate and said lever-bar

plate, whereby the pivotal movement of said lever-bar plate will be automatically regulated.

8. A machine for sewing shoes, comprising
5 in its construction a cap-plate; a slide-plate mounted therein; means for imparting a longitudinal movement to said slide-plate; a lever-bar plate pivotally secured to said slide-plate; a shooter-frame mounted in said machine,
10 said frame having its upper face provided with a plurality of upwardly-extending pins, arranged in series, each series being of different height, said pins being adapted to contact with the under face of said lever-bar plate and said slide-plate respectively; and
15 means for imparting a vertical movement to said shooter-frame, whereby said lever-bar plate will have a segmental movement on its pivot, within a limited distance, a further
20 vertical movement of said frame serving to move said lever-bar plate and said slide-plate in a true vertical direction.

9. The combination with a shoe-sole-sewing machine; of mechanism for imparting a vertical
25 movement to the side-needle support, said mechanism comprising a shooter-frame having a series of plates fixedly connected together; pins mounted on the upper face of the top plate; and means for varying the position
30 of said frame within the body of the machine.

10. The combination with a shoe-sole-sewing machine; of mechanism for imparting a vertical movement to the side-needle support, said mechanism comprising a shooter-frame,
35 having a series of plates fixedly connected together; pins mounted on the upper face of the top plate; a cam-face rotatively mounted within said machine; means connected to said frame and actuated by said cam-face for moving
40 said frame in one direction; and auxiliary means for moving said frame in the opposite direction.

11. The combination with a shoe-sole-sewing machine; of mechanism for imparting a
45 vertical movement to the side-needle support, said mechanism comprising a shooter-frame having a series of plates fixedly connected together; pins mounted on the upper face of the top plate; a cam-face rotatively mounted in
50 said machine; means connected to said frame and actuated by said cam-face for moving said frame in one direction; and auxiliary means mounted in the body of the machine for moving said frame in the opposite direction.
55

12. The combination with a shoe-sole-sewing machine; of mechanism for imparting a vertical movement to the side-needle support, said mechanism comprising a shooter-frame
60 having a series of plates fixedly connected together; pins mounted on the upper face of the top plate; a cam-face rotatively mounted in said machine; a contact-roller mounted in said frame and adapted to ride against said
65 cam-face for moving said frame in one direction; and auxiliary means mounted in the

body of the machine for moving said frame in the opposite direction.

13. The combination with a shoe-sole-sewing machine; of mechanism for imparting a
70 vertical movement to the side-needle support, said mechanism comprising a shooter-frame having a series of plates fixedly connected together; pins mounted on the upper face of the top plate; a cam-face rotatively mounted
75 in said machine; a contact-roller mounted in said frame and adapted to ride against said cam-face for moving said frame in one direction; and spring-actuated pins mounted in the body of said machine for moving said
80 frame in the opposite direction.

14. A machine for sewing shoes, comprising in its construction a shoe-horn; a needle-bar guided therein to have a true vertical movement; means for imparting a movement to
85 said needle-bar; and a stop, located within said shoe-horn, for limiting the downward movement of said needle-bar.

15. A machine for sewing shoes, comprising in its construction a shoe-horn; a needle-bar
90 guided therein to have a true vertical movement; means for imparting movement to said bar; and a yielding cushioning-stop for limiting the downward movement of said needle-bar.
95

16. A machine for sewing shoes, comprising in its construction a vertical plunger; a whirl mounted in said plunger; a rack-gear adapted to actuate said whirl; connections between
100 said whirl and said plunger for moving said whirl vertically in said plunger when said rack is reciprocated; a pressure-bar; means actuated by the movement of the pressure-bar in said machine for reciprocating said rack-gear; a needle-bar and means whereby the
105 same is adapted to be actuated by the movement of said whirl and said plunger, said needle-bar being guided to have a true vertical movement; and a stop for limiting the downward movement of said needle-bar.
110

17. A machine for sewing shoes, comprising in its construction a vertical plunger; a whirl mounted in said plunger; a rack-gear adapted to actuate said whirl; means for imparting
115 movement to said gear; connections between said whirl and said plunger for moving said whirl vertically in said plunger when said rack is reciprocated; a needle-bar and means whereby the same is adapted to be actuated by the movements of said whirl and said
120 plunger, said needle-bar being guided to have a true vertical movement; and a buffer for limiting the downward movement of said needle-bar.

18. A machine for sewing shoes, comprising
125 in its construction a vertical plunger; a whirl mounted in said plunger; a rack-gear adapted to actuate said whirl; connections between said whirl and said plunger for moving said whirl vertically in said plunger when said
130 rack is reciprocated; a pressure-bar; means actuated by the movement of the pressure-

bar, for reciprocating said gear to an automatically-regulated distance; a needle-bar and means whereby the same is adapted to be actuated by the movement of said whirl 5 and plunger, said needle-bar being guided to have a true vertical movement; and a buffer for limiting the downward movement of said needle-bar.

19. A machine for sewing shoes, comprising 10 in its construction a vertical plunger having a central opening; a whirl operatively mounted in said opening to have a vertical movement, said whirl having a flange; a rack adapted to actuate said whirl; means for im- 15 parting a movement to said rack; a rocking frame mounted in juxtaposition to said whirl, said rocking frame being actuated by said plunger and said whirl; a needle-bar mounted at the free end of said rocking frame, said 20 needle-bar being adapted to receive a regulated vertical movement by the movement of said plunger and said whirl; a buffer for limiting the downward movement of said needle-bar; and an upright needle removably and 25 rotatably secured in said needle-bar.

20. A machine for sewing shoes, comprising in its construction a cap-plate; a lever-bar plate, carrying bur-inserting mechanism, 30 mounted therein, said lever-bar plate having a longitudinal movement in said cap-plate; means for imparting a longitudinal movement to said lever-bar plate, said lever-bar plate being held normally in lower position; means for raising said lever-bar plate to a regulated 35 distance, whereby the bur will be brought into proper position for its insertion in the sole of the shoe; and auxiliary means, connected to said head and the body of said machine, for returning said lever-bar plate to 40 its normal position.

21. A machine for sewing shoes, comprising in its construction a head; a lever-bar plate 45 mounted therein, said lever-bar plate serving to form a guide for the shoe, when said plate is in its forward position; means for imparting a longitudinal movement to said plate; means for imparting a vertical movement to 50 said plate; and auxiliary means connected to said plate and to the body of the machine for returning said plate to its normal position.

22. A machine for sewing shoes, comprising in its construction a lever-bar plate; a side-needle carrier mounted in said plate; means 55 for imparting a reciprocating movement to said side-needle carrier; a shooter-frame for moving said lever-bar plate into a raised regulated position; an upright needle mounted to have a vertical movement in front of said lever-bar plate; means for imparting a vertical 60 movement to said upright needle; and a spring, connected to said lever-bar plate and the body of said machine, for returning said lever-bar plate to its normal position.

23. A machine for sewing shoes, comprising 65 in its construction a lever-bar plate, a side-needle carrier mounted in said plate; means

for imparting a reciprocating movement to said side-needle carrier; a shooter-frame for moving said lever-bar plate to a raised regulated position; an upright needle mounted to 70 have a vertical movement in front of said lever-bar plate; means for imparting a vertical movement to said upright needle; and means, connected to said plate and to the body of the machine for automatically return- 75 ing said lever-bar plate to its normal position.

24. A machine for sewing shoes, comprising in its construction a lever-bar plate, forming a guide for the shoe when in its forward po- 80 sition; means for imparting a regulated longitudinal movement to said plate; means for imparting a regulated vertical movement to said plate in an upward direction; and auxiliary means, connected to said plate and to 85 the body of the machine, for returning said plate to its normal position.

25. A machine for sewing shoes, comprising in its construction a cap-plate; a head removably connected thereto; a slide-plate 90 mounted in said cap-plate; means for imparting a longitudinal movement to said slide-plate; a lever-bar plate removably connected to said slide-plate, said lever-bar plate forming a guide for the shoe when said plate is in 95 its forward position; a feed-bar pivotally connected to said lever-bar plate; and means for imparting a longitudinal and a transverse movement to said feed-bar.

26. A machine for sewing shoes, comprising in its construction a head; a lever-bar plate 100 mounted to have a longitudinal movement therein, said lever-bar plate serving to form a guide for the shoe, when said plate is in its forward position; means for imparting a longitudinal movement to said lever-bar plate; 105 a feed-bar pivotally mounted on said lever-bar plate; a cam-face mounted on the operating-shaft, adapted to impart a longitudinal movement to said feed-bar in one direction; means, independent of said cam-face, con- 110 nected to said feed-bar and to said lever-bar plate, for imparting a longitudinal movement in the opposite direction; and means for imparting a transverse movement to said feed-bar. 115

27. A machine for sewing shoes, comprising in its construction a head; a lever-bar plate mounted to have a longitudinal movement 120 therein, said lever-bar plate forming a guide for the shoe, when said plate is in its forward position; a feed-bar pivotally mounted thereon; a cam mounted on the operating-shaft of said machine adapted to impart a longitudinal movement to said feed-bar in one direc- 125 tion; a spring-actuated pin adapted to move said feed-bar in the opposite longitudinal direction; and means for imparting a transverse movement to said feed-bar, when said lever-bar plate is out of contact with the shoe.

28. A machine for sewing shoes, comprising 130 in its construction a lever-bar plate forming a guide for the shoe, when in a forward po-

sition; means for imparting a longitudinal movement to said lever-bar plate; a feed-bar pivotally mounted thereon; means for imparting a longitudinal movement to said feed-bar; and means for imparting a transverse movement to said feed-bar when said feed-bar has reached a position at the end of its longitudinal movements.

29. A machine for sewing shoes, comprising
 10 its construction a lever-bar plate forming a guide for the shoe, when in its forward position; means for imparting a longitudinal movement to said lever-bar plate; a feed-bar pivotally mounted thereon; a cam-face adapted to impart a longitudinal movement to said feed-bar in one direction; a spring-actuated pin adapted to impart a longitudinal movement to said feed-bar in an opposite direction; a feed-bar-operating lever pivotally connected to said lever-bar plate and said feed-bar, said feed-bar-operating lever being adapted to impart a transverse movement to said feed-bar when said bar has been placed at the end of its longitudinal position;
 25 and means for imparting a transverse movement to the front end of said operating-lever.

30. A machine for sewing shoes, comprising in its construction a cap plate; a slide-plate mounted in said cap-plate; means for imparting a longitudinal movement to said slide-plate; a lever-bar plate removably connected to said slide-plate, said lever-bar plate forming a guide for the shoe, when said plate is in its forward position; a feed-bar pivotally mounted on said lever-bar plate; and means for imparting a longitudinal and transverse movement to said feed-bar, when said lever-bar plate is in its rear position.

31. A machine for sewing shoes, comprising
 40 in its construction a cap-plate; a slide-plate mounted therein; means for imparting a regulated longitudinal movement to said slide-plate; a lever-bar plate removably connected to said slide-plate, said lever-bar plate forming a guide for the shoe, when said plate is in its forward position; a feed-bar pivotally mounted on said lever-bar plate; means for moving said feed-bar longitudinally on said lever-bar plate; a feed-bar-operating lever adapted to move said feed-bar transversely of said lever-bar plate when said feed-bar has reached a position at the end of its longitudinal movement; and means for imparting movement to said feed-bar-operating lever.

32. A machine for sewing shoes, comprising
 55 in its construction a cap-plate; a slide-plate mounted therein; means for imparting a regulated longitudinal movement to said slide-plate; a lever-bar plate removably connected to said slide-plate, said lever-bar plate forming a guide for the shoe, when said plate is in its forward position; a feed-bar pivotally mounted on said lever-bar plate; means for moving said feed-bar longitudinally on said lever-bar plate; a feed-bar-operating lever adapted to move said feed-bar transversely of

said lever-bar plate when said feed-bar has reached a position at the end of its longitudinal movement, and during the period when said lever-bar plate is in its rearmost position; and means for imparting movement to said feed-bar-operating lever.

33. A machine for sewing shoes, comprising in its construction a lever-bar plate forming a guide for the shoe, when in its forward position; means for imparting a longitudinal movement to said lever-bar plate; a feed-bar pivotally mounted on said plate; an operating-cam for imparting a longitudinal movement to said feed-bar in one direction; means, independent of said cam-face, for imparting a longitudinal movement to said feed-bar in the opposite direction; and means for imparting a transverse movement to said feed-bar, said longitudinal and transverse movement means, being operated when said lever-bar plate is in its rearmost position.

34. A machine for sewing shoes, comprising in its construction a head; a lever-bar plate, moving longitudinally of said head, said lever-bar plate serving to form a guide for the shoe, when said plate is in its forward position; means for imparting a longitudinal movement to said lever-bar plate; a feed-bar pivotally mounted on said lever-bar plate; a cam-face adapted to impart a longitudinal movement to said feed-bar in one direction; a spring-actuated pin adapted to impart a longitudinal movement to said feed-bar in the opposite direction; a feed-bar-operating lever pivotally connected to said lever-bar plate, said feed-bar-operating lever being adapted to impart a transverse movement to said feed-bar when said feed-bar has reached a position at the end of its longitudinal movement; and means for imparting a movement to said feed-bar-operating lever, the movement of said feed-bar being given when the lever-bar plate is in its rear position.

35. A machine for sewing shoes, comprising in its construction a cap-plate; a slide-plate mounted therein; a lever-bar plate removably secured to said slide-plate, said lever-bar plate serving to form a guide for the shoe when said plate is in its forward position; a cam-face rotatably mounted on the operating-shaft of the machine adapted to impart a longitudinal movement to said slide-plate; means for regulating the movement of said slide-plate in one direction; and a bearing-spring mounted in said slide-plate, said bearing-spring forming one of the faces against which said cam rides.

36. A machine for sewing shoes, comprising in its construction a cap-plate; a slide-plate mounted therein; a lever-bar plate removably secured to said slide-plate, said lever-bar plate serving to form a guide for the shoe when said plate is in its forward position; an operating-cam, having a face adapted to move said slide-plate longitudinally in both directions; means for adjustably regulating the movement of said slide-plate in a forward direc-

tion; and means, operated by said cam-face, for moving said slide-plate to its forward position, said means serving to automatically compensate for the limitation in movement of said slide-plate.

37. A machine for sewing shoes, comprising in its construction a cap-plate; a slide-plate mounted therein; a lever-bar plate removably connected to said slide-plate, said lever-bar plate serving to form a guide for the shoe when said plate is in its forward position; an operating-cam having a face adapted to impart a longitudinal movement to said slide-plate in both directions; means for adjustably regulating the movement of said slide-plate in its forward direction; and a bearing-spring mounted in said slide-plate, said spring serving to move said slide-plate forwardly, by the contacting of the face of said cam, said spring also serving to compensate automatically for the limitation of the longitudinal movement of said slide-plate.

38. A machine for sewing shoes, comprising in its construction a lever-bar plate; a side-needle carrier mounted therein; and means, having movement entirely within the body of the machine, for imparting a reciprocating movement to said side-needle carrier, said means having a reciprocating movement parallel with the movement of the carrier.

39. A machine for sewing shoes, comprising in its construction a lever-bar plate; a side-needle carrier mounted therein; a cam-face mounted on the operating-shaft of said machine; and connections, having a movement entirely within the body of the machine, between said carrier and said cam-face, for imparting a reciprocating movement to said carrier, said connections having a horizontal reciprocating movement.

40. A machine for sewing shoes, comprising in its construction a lever-bar plate; a side-needle carrier mounted therein; a face-cam mounted on the operating-shaft of said machine, said face-cam being provided with an actuating-groove; a roller mounted to have movement within said groove; and connections, having a movement entirely within the body of the machine, between said roller and said carrier whereby said carrier will be reciprocated in said lever-bar plate, said con-

nections having a horizontal reciprocating movement.

41. A machine for sewing shoes, comprising in its construction a lever-bar plate; a side-needle carrier mounted therein, said carrier having an extension; a link movably connected to said extension; a cam-face mounted on the operating-shaft of said machine; and a roller mounted on said link and having an operating connection with said cam-face, whereby said link and said carrier will have a reciprocating movement in said lever-bar plate, the movement of the operating mechanism being entirely within the body of the machine.

42. A machine for sewing shoes comprising a pivotally-mounted work-table; an upright needle movable vertically therein; a side needle movable across the path of movement of said upright needle; means for imparting movement to said upright and side needles; a pressure-bar; means for moving said pressure-bar into contact with the work being operated upon, the pressure of said contact being automatically regulated; means for automatically relieving the excess pressure caused by the thickness of the shoe-sole; and means for feeding the work forward when the pressure is released.

43. A machine for sewing shoes comprising a pivotally-mounted work-table; an upright needle movable vertically therein; a side needle movable across the path of movement of the upright needle; means for imparting movement to said upright and side needles; a pressure-bar; means for moving said pressure-bar into and out of contact with the work being operated upon, the pressure of said contact being automatically regulated; means for automatically relieving the excess pressure caused by the thickness of the shoe-sole; means operated by the movement of said pressure-bar, for regulating the movement of said upright needle; and means for feeding the work when the pressure is released.

In witness whereof I have hereunto set my hand in the presence of two witnesses.

ENOCH NORMAN CUT.

Witnesses:

J. A. MARION,
HORACE G. DEITZ.