

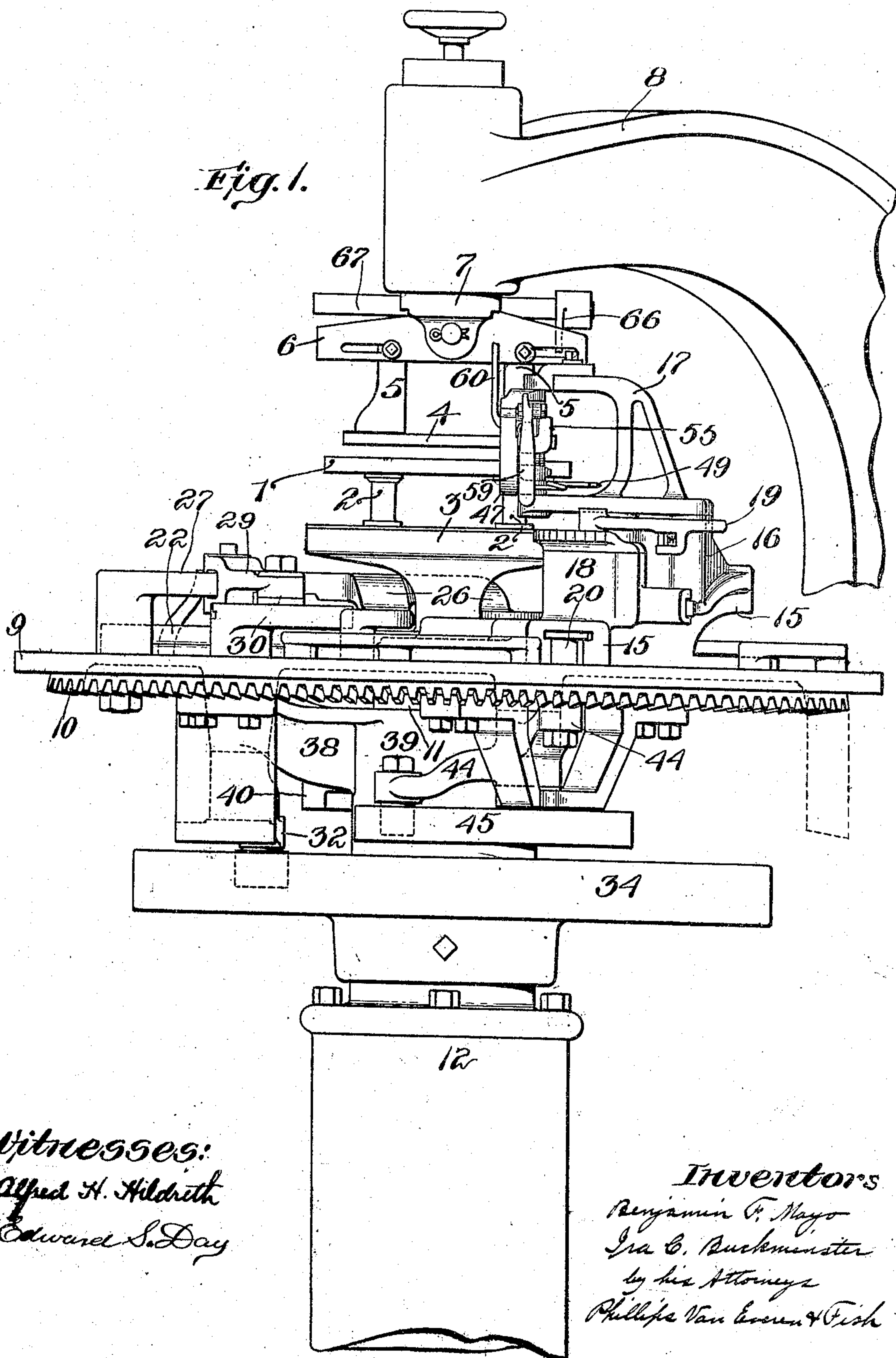
B. F. MAYO & I. C. BUCKMINSTER.
SOLE ROUNDING MACHINE.

APPLICATION FILED APR. 4, 1905. RENEWED JUNE 20, 1908.

911,511.

Patented Feb. 2, 1909.

5 SHEETS—SHEET 1.



B. F. MAYO & I. C. BUCKMINSTER.

SOLE ROUNDING MACHINE.

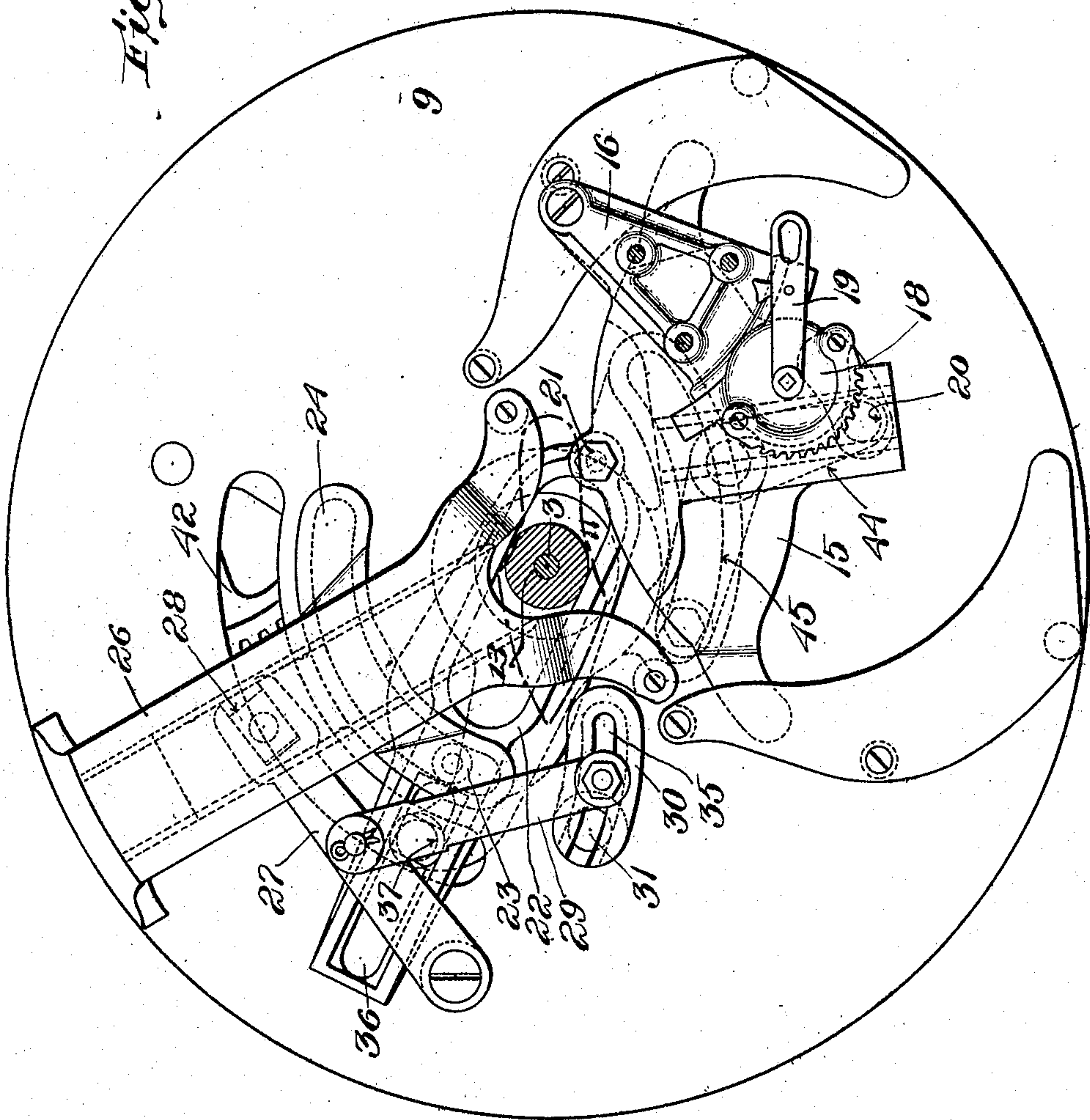
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5 SHEETS—SHEET 2.

Fig. 2.



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5 SHEETS—SHEET 3.

Fig. 3.

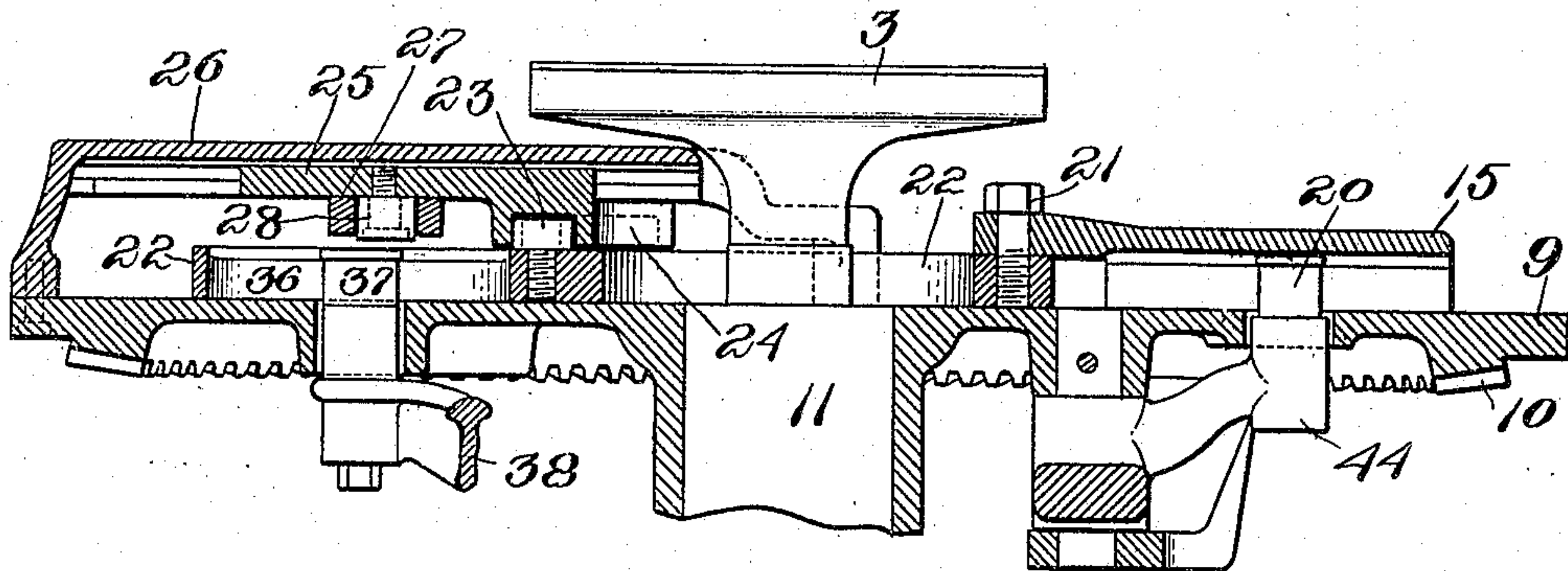
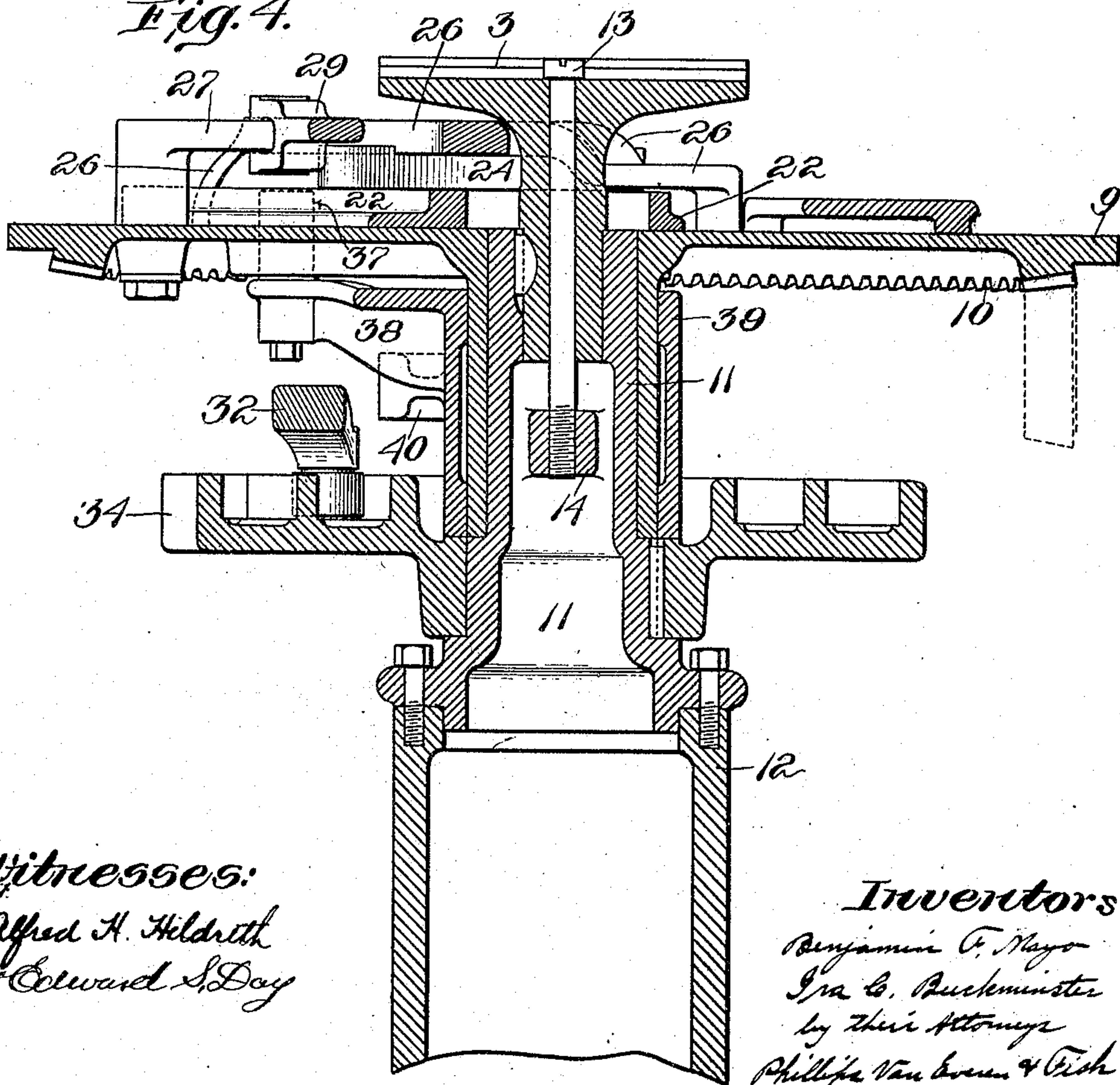


Fig. 4.



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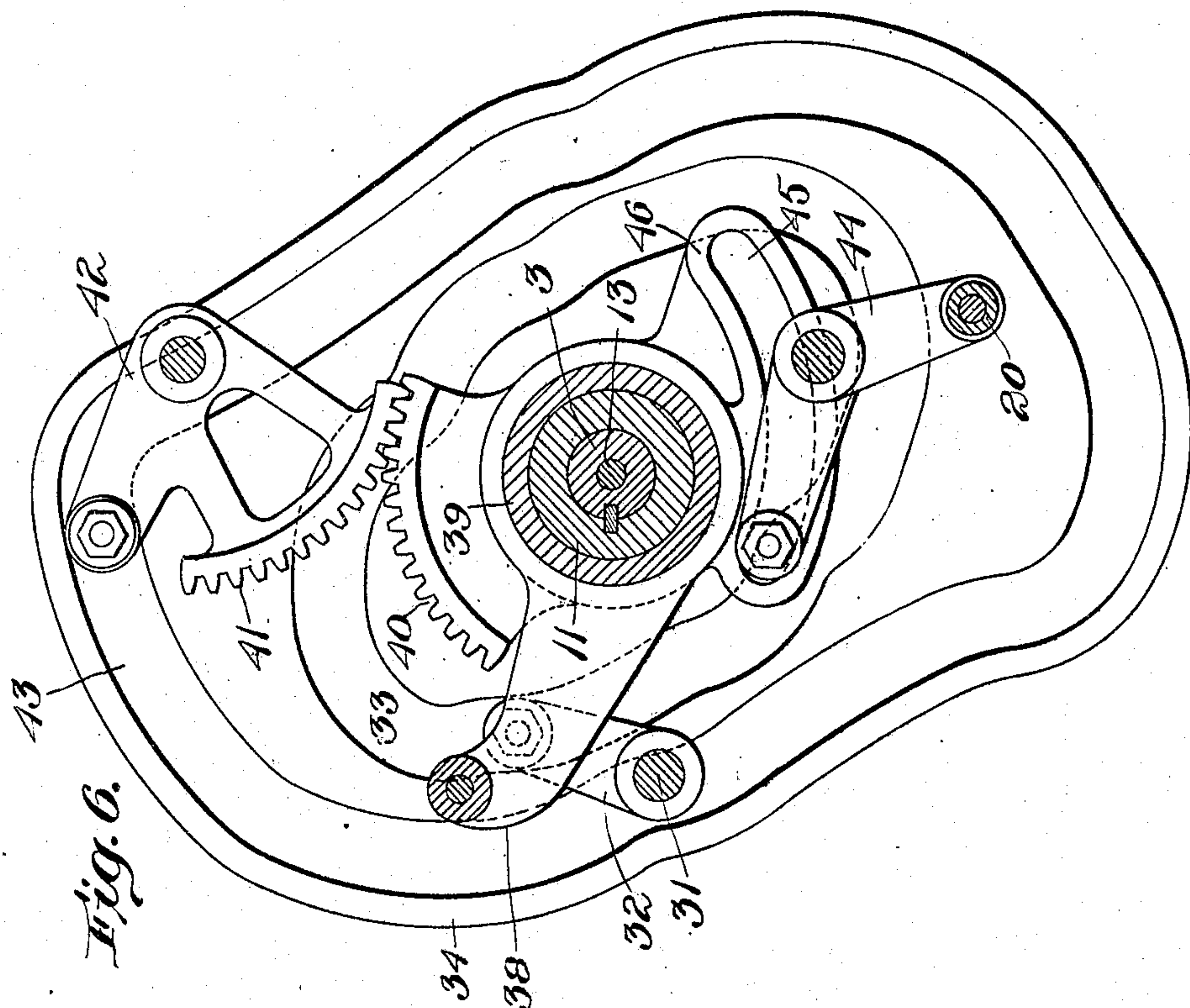


Fig. 6.

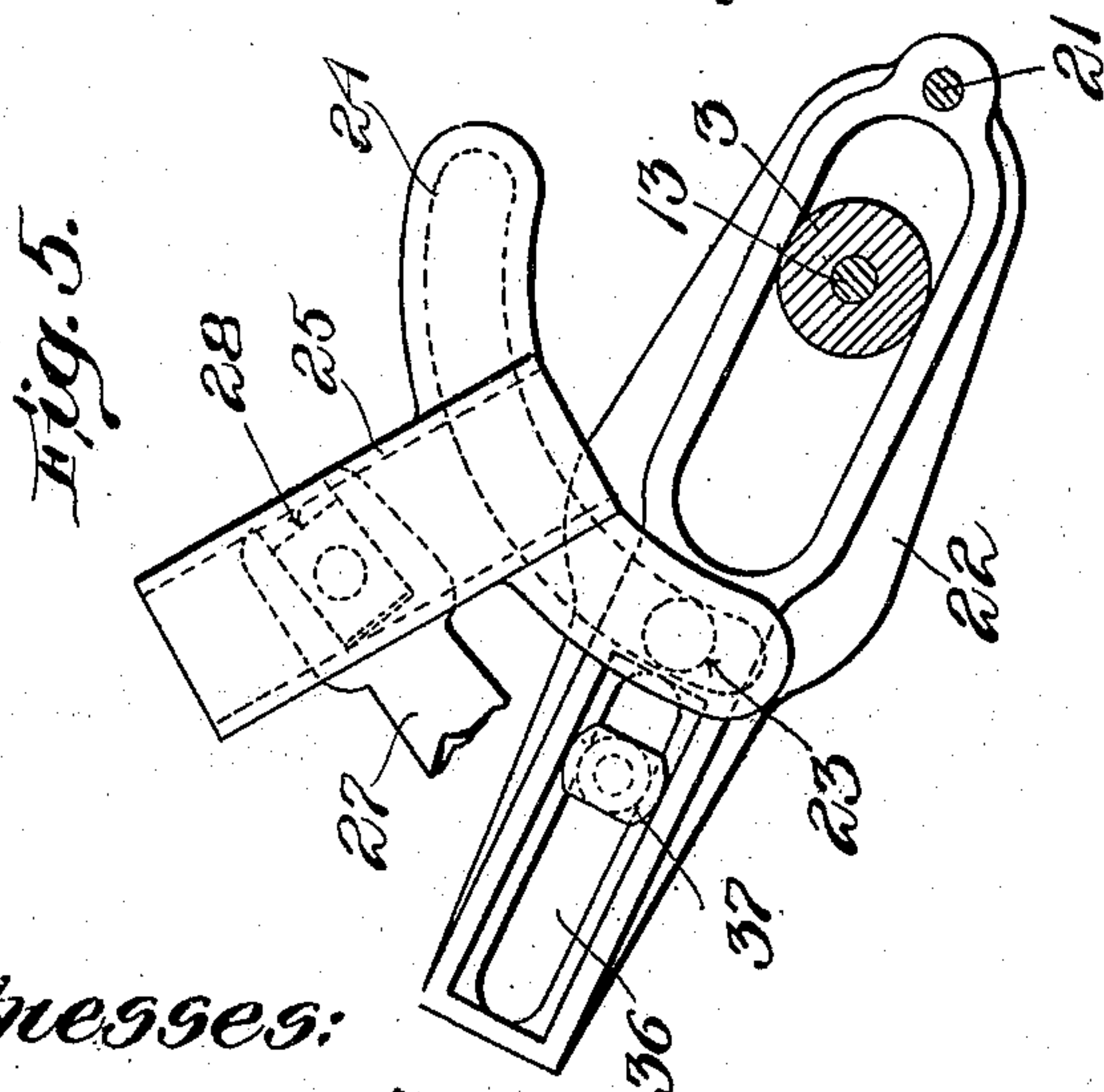


Fig. 5.

Witnesses:

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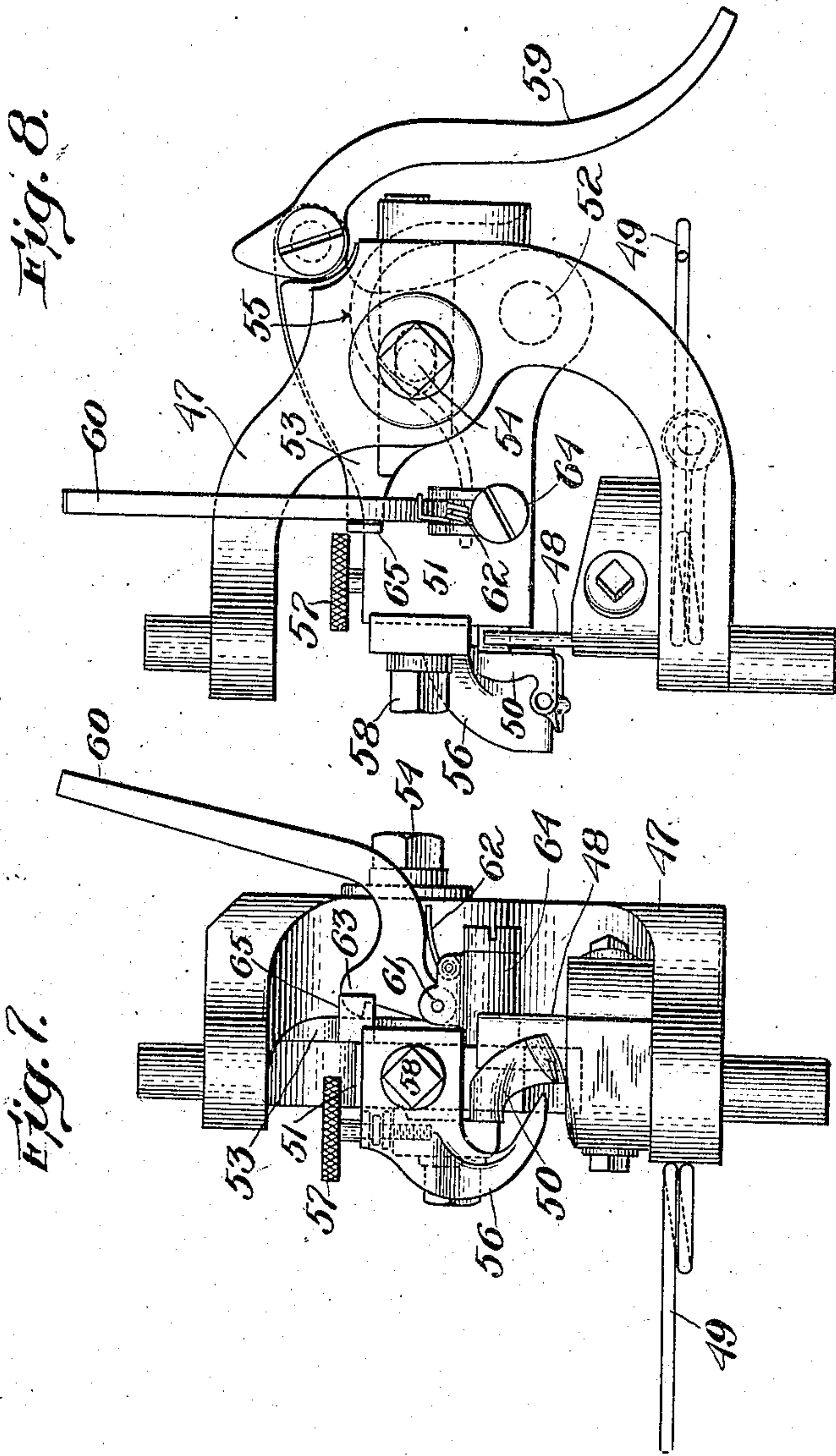
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5 SHEETS—SHEET 5.



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UNITED STATES PATENT OFFICE.

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SOLE-ROUNDING MACHINE.

No. 911,511.

Specification of Letters Patent.

Patented Feb. 2, 1909.

Application filed April 4, 1905, Serial No. 253,743. Renewed June 20, 1908. Serial No. 439,595.

To all whom it may concern:

Be it known that we, BENJAMIN F. MAYO and IRA C. BUCKMINSTER, citizens of the United States, residing at Salem and Beverly, in the county of Essex and State of Massachusetts, have invented certain new and useful Improvements in Sole-Rounding Machines; and we 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 sole rounding or sole channeling machines of that class which comprise a pattern of the shape of the sole to be rounded or channeled, a knife carrier and means for relatively moving the pattern and knife carrier to transfer the point of operation of the knife around the pattern.

The object of the present invention is to provide a machine of this class having improved means for actuating the knife carrier during the relative movement of the knife carrier and pattern so as to cause the knife to readily follow the curves and angles of the pattern without any liability of injuring the pattern or of moving away from the edge of the pattern at any point.

The invention is designed particularly for use in connection with patterns which present sharp curves or angles at certain points, and particularly at the toe end of the pattern, although it is equally capable of being used advantageously in connection with any form of pattern.

A feature of the invention contemplates the provision of means for so actuating the carrier during the relative movement of the carrier and pattern that the carrier is swung through a substantial arc while the knife is at the end of the pattern about a center which remains substantially stationary with relation to the pattern and in proximity to the end of the pattern during the swinging movement of the carrier. By so actuating the carrier the knife, after it reaches the end of the pattern, is caused to remain stationary in alinement with the point about which the carrier is swinging, until the carrier is

swung around the end of the pattern, and thus any liability of the knife moving away from the edge of the pattern is avoided, and soles with narrow or sharp pointed toes can be rounded or channeled in a satisfactory manner.

Another feature of the invention contemplates imparting swinging movements to the carrier, during the relative movement of the carrier and pattern, about a point fixed with relation to the carrier, and in maintaining said point in proximity to the edge of the pattern throughout the entire rounding or channeling operation. In machines of the class to which the present invention relates, the knife or knives are mounted to move inwardly and outwardly on the knife carrier, and are yieldingly pressed towards the pattern in order to maintain them in the same position with relation to the edge of the pattern throughout the rounding or channeling operation. By swinging the knife carrier about a point fixed with relation to the carrier and maintaining said point in proximity to the edge of the pattern, the carrier can be readily moved to the proper positions to cause the knife holder to follow this pattern, and the pressure of the knife holder against the pattern is not varied to any considerable extent.

In addition to the broad features of invention above referred to, the present invention also consists in certain devices and combinations of parts, hereinafter described and claimed, for actuating the knife carrier during the relative movement of the knife carrier and pattern, the advantages of which will be obvious to those skilled in the art from the specific description of the preferred embodiment of the invention hereinafter contained.

It is to be understood that the broad features of the invention are not limited to any specific mechanism for actuating the knife carrier, and that the devices and combinations of parts hereinafter described and claimed are not limited to use in a machine having the specific construction illustrated in the drawings accompanying this application, and that, except as defined in the

claims, are not limited to any specific construction or arrangement.

The various features of the present invention are preferably embodied in a machine in which the pattern is stationary, and in which the relative movement of the pattern and knife carrier to transfer the point of operation of the knife around the pattern is produced by moving the knife carrier, as machines of this type are simpler and more compact in construction than machines in which the relative movement of the knife carrier and pattern is produced by moving the pattern, and, furthermore, can be used to cut soles from strips or sheets of material as well as from blanks having merely sufficient stock for a single sole. The features of the present invention, however, are equally applicable to a machine in which the pattern is movable with relation to the knife carrier, as will be apparent to those skilled in the art.

A preferred form of the present invention is illustrated in the accompanying drawings, in which—

Figure 1 is a view in front elevation of a portion of a sole rounding and channeling machine embodying the same; Fig. 2 is a plan view of the rotating table and the parts mounted thereon, the standard upon which the pattern is supported being shown in cross section, and the pattern being indicated by a dot and dash line; Fig. 3 is a vertical sectional view of the rotating table and the parts carried thereby taken on a plane extending longitudinally of the pattern, the parts being shown in the position which they occupy when the rounding knife is at the heel end of the pattern; Fig. 4 is a vertical sectional view of the rotating table and of the cams and mechanism for actuating the knife carrier, with the parts shown in the position which they occupy in Fig. 2; Fig. 5 is a detail plan view of a portion of the mechanism for actuating the knife carrier; Fig. 6 is a sectional plan view taken on a plane passing beneath the rotating table; Fig. 7 is a view in front elevation of the knife holder removed from the machine; Fig. 8 is a view in side elevation of the knife holder.

In the machine illustrated in the drawings the pattern is stationary and is indicated at 1 as supported upon standards 2 adjustably secured on a fixed support 3. During the rounding and channeling operation the material to be operated upon is held in position on the pattern 1 by means of a clamp 4 which is secured upon the lower ends of standards 5 adjustably secured to a cross-bar 6 pivotally mounted upon the lower end of a slide 7 which is mounted to move vertically in the overhanging portion 8 of the machine frame.

The relative movement of the knife carrier and pattern to transfer the point of operation of the knife around the pattern is produced by a table 9 mounted to rotate about

the center of the pattern and provided upon its lower surface with a series of bevel gear teeth 10, by means of which the table is rotated from a bevel pinion at a uniform rate of speed, as is usual in this class of machines. The bevel pinion is indicated in dotted lines in Figs. 1 and 4. The table 9 is provided with a downwardly extending hub which is mounted upon the cylindrical upper end of a standard 11 secured upon the upper end of the base 12 of the machine. The support 3 upon which the pattern is mounted is provided with a downwardly extending cylindrical portion which is fitted into the upper end of the standard 11, and the support is rigidly secured in position by means of a key shown in Figs. 4 and 5, engaging the standard 11, and a bolt 13 passing downwardly through the support and screwing into a cross web 14 of the standard 11.

The knife carrier is indicated at 15 and is of substantially the same construction as a knife carrier which has heretofore been used in this class of machines. The knife holder is supported so as to move inwardly and outwardly on the carrier in the usual manner, the movement of the holder being produced by an arm 16 pivotally mounted at its outer end upon the knife carrier, and having secured thereto a bracket 17 in which the knife holder is mounted. The inner end of the arm 16 is provided with segmental gear teeth engaging a pinion acted upon by a coiled spring contained in the casing 18, on the knife carrier, and an arm 19 provided with a pawl adapted to cooperate with ratchet teeth on the casing 18 serves as a means for swinging the arm 16 outwardly and locking it in its outward position when it is desired to remove the knife holder from engagement with the pattern. The knife carrier 15 is pivotally mounted upon the table 9 by means of a pivot pin 20, which pin extends into a slot in the lower surface of the carrier so that a sliding movement of the carrier with respect to its pivot is permitted, and the carrier can move bodily inwardly and outwardly on the table 9.

The parts of the machine above described are constructed and arranged in substantially the same manner as the corresponding parts of well-known sole rounding machines, the various features of the present invention being embodied in mechanism which will now be described for actuating the knife carrier during the revolution of the table 9.

In the illustrated embodiment of the invention the knife carrier 15 is pivotally connected at 21 to a swinging and sliding member 22 provided with a slot through which the cylindrical portion of the support 3 passes. The member 22 is adapted to swing with relation to the table 9 about the cylindrical portion of the support 3 and to move radially, the resultant action of these swing-

ing and radial movements being to maintain the pivotal connection 21 in proximity to the edge of the pattern and to cause the knife carrier to swing about this point as a center. In the construction illustrated, the swinging and radial movements are imparted to the member 22 by means of cams acting through intermediate mechanism.

The means for imparting radial movements to the member 22 comprise a stud 23 mounted upon the member 22 which engages a segmental slot 24 in a slide 25 which is mounted to reciprocate in a radially extending guideway formed in the under surface of a bracket 26 secured to the table 9. The slide 25 is reciprocated by means of an arm 27 pivoted at one end upon the table 9 and provided with a slot at the other end engaging a block 28 pivotally mounted upon the slide 25. A link 29 connects the arm 27 to an arm 30 secured upon the upper end of a rock shaft 31 journaled in the table. To the lower end of the rock shaft 31 is secured an arm 32 provided with a stud engaging a cam groove 33 in a stationary cam disk 34. This cam disk is mounted upon the lower end of the standard 11 and is rigidly secured thereto. During the rotation of the table 9 the stud on the arm 32 travels in the cam groove 33 and thus through the connections above described the desired radial movements are imparted to the member 22.

The means for imparting swinging movements to the member 22 comprises a block 37 engaging a slot 36 in the member 22 and pivotally mounted upon the outer end of an arm 38 projecting from a hub 39 mounted to rotate freely upon the hub of the table 9. The hub 39 is provided with a segmental gear 40 which meshes with a segmental gear 41 upon a bent lever 42 pivotally mounted upon the table 9. The lever 42 is provided with a stud which engages a cam groove 43 in the stationary cam disk 34 and the cam groove is so shaped that during the revolution of the table 9 the lever 42 is oscillated, and through the hub 39, arm 38 and block 37 the desired swinging movements are imparted to the member 22. During the swinging movements of the member 22 the stud 23 travels along the segmental slot 24 in the slide 25, and during the radial movements of the member 22 the block 37 travels along the slot 36 in the member 22, so that neither the swinging nor the radial movements are interfered with. The swinging movements which are imparted to the member 22 during the rotation of the table 9 move the pivotal connection 21 with relation to the table, and by reason of the engagement of the knife carrier by the pivot 20 cause the knife carrier to swing about the point 21 as a center. The swinging movements about the point 21 which are thus imparted to the knife carrier tend to maintain the knife carrier in such

positions with relation to the pattern that the knife holder can move readily inwardly and outwardly on the carrier so as to follow the curves and angles of the pattern.

The cam groove 43 and the mechanism actuated thereby for swinging the member 22 may be relied upon to impart the desired swinging movements to the carrier 15 about the point 21. In order to increase the extent of the swinging movements imparted to the knife carrier, and at the same time obviate the necessity of sharp changes in the curves of the cam groove 43, the machine illustrated in the drawings is provided with mechanism for moving the pivot 20 with relation to the table 9. To this end the pivot 20 is carried upon one end of a lever 44 pivotally mounted upon the table 9 and the other end of the lever is provided with a stud which engages a cam groove 45 in an arm 46 projecting from the hub 39. The shape of the cam groove 45 is such that the lever 44 is oscillated whenever the hub 39 is rotated with relation to the hub of the table, the rotation of the hub 39 causing a simultaneous movement of the pivotal connection 21 and the pivot 20 with relation to the table in opposite directions.

In the machine illustrated in the drawings, the shape and arrangement of the cam grooves 33, 43 and 45 and the mechanism between the cam grooves and the knife carrier are such that the point 21 on the carrier is caused to move in a path closely approximating in shape that of the pattern, and the knife carrier is swung about the point 21 so that the direction of the inward and outward movements of the knife holder on the knife carrier is maintained substantially normal to the curves of the pattern throughout the entire rounding and channeling operation. Also, the point 21 is caused to remain stationary when it reaches the end of the pattern until the knife carrier has been swung about the point 21 as a center from one side of the pattern to the other. There is thus no tendency for the knives to move away from the pattern in passing around the toe of a narrow or pointed pattern. By maintaining the direction of the inward and outward movements of the knife holder on the knife carrier substantially normal to the curves of the pattern while passing along the sides as well as around the ends of the pattern, the knives are also caused to pass around the sharp curves or angles at the junction of the shank and forepart without liability of moving away from the pattern.

To adapt the machine for operation with patterns of different sizes, the pivotal connection of the link 37 to the arm 30 is moved inwardly and outwardly in the slot 35. In the construction illustrated in the drawings, the slot 35 is curved, being struck about the pivotal connection of the link 37

with the arm 27 as a center when the slide 25 is in its extreme outward position. An adjustment of the pivotal connection of the link 37 with the arm 30, therefore, varies the extreme outward position of the point 21 without varying its extreme inward position. The point 21 moves in a substantially elliptical path, and when the machine is adjusted for operation with patterns of different sizes, the long diameter of the ellipse is varied while the short diameter remains substantially the same. For this reason the machine is well adapted for operation with patterns differing widely in size, the pressure of the knife holder against the edge of the pattern being substantially the same throughout the entire rounding operation under all adjustments of the machine.

It will be noted that the machine is adjusted for operation with patterns of different sizes by adjusting the extent of the radial movements of the member 22, the mechanism for imparting swinging movements to the member 22 having no means of adjustment. The angular movements of the member 22 with relation to the table 9 remain constant throughout all adjustments of the machine, and it will be apparent that the point 21 always remains stationary at the end of the pattern for the same period of time regardless of the distance of the point 21 from the center of the table. The knife carrier is therefore swung in substantially the same manner when the point 21 reaches the end of the pattern regardless of the size of the pattern for which the machine is adjusted, the arc through which the pattern is swung, however, slightly increasing with the size of the pattern on account of the decrease in the distance between the point 21 and the pivot 20.

The machine illustrated in the drawings is designed to round a sole and at the same time channel and groove the sole, and is accordingly provided with a rounding knife and with a channeling and grooving knife. These knives are mounted upon a knife holder 47 pivotally supported in the bracket 17. The rounding knife is indicated at 48 and is secured to the holder 47 by a suitable clamp. A spring 49 is secured to one side of the holder 47 and its free end is arranged to engage the bracket 17, the object of this spring being to assist in turning the holder after the knives have passed from the forepart onto the shank portion of the pattern. The channeling and grooving knife is indicated at 50 and is secured by a clamp upon an arm 51 pivoted at 52 upon a block 53 which is adjustably secured to the holder 47 by means of a holding screw 54. The knife 50 is provided with cutting edges adapted to simultaneously channel and groove the sole. This knife constitutes the subject matter of an application of Benjamin F. Mayo, one of

the present applicants, executed of even date herewith. The arm 51 is acted upon by a spring 55 which tends to hold the channeling and grooving knife in operative position, the downward movement of the arm 51 under the force of the spring being limited by a presser foot 56 which is adapted to rest upon the surface of the sole in front of the cutting edges of the channeling and grooving knife. This presser foot is vertically adjustable by means of an adjusting screw 57 and is clamped in adjusted position by a clamping screw 58.

59 indicates a cam lever pivotally mounted upon a projection from the arm 51 and provided with a cam surface arranged to engage the adjacent surface of the block 53. By means of this lever the arm 51 is actuated to raise the channeling and grooving knife out of engagement with the work. The arm 51 is held in its raised position by means of a latch 60 pivoted at 61 and acted upon by a spring 62. A projection 63 on the latch lever is arranged to extend over a projecting portion of the block 53 when the arm 51 is in its raised position. The pivot 61 of the latch lever 60 is mounted in a sleeve 64 supported upon a stud projected from the arm 51 so that the latch lever 60 is allowed to turn about the stud as a pivot and remain in a substantially vertical position during the upward movement of the arm 51.

The operation of the machine illustrated in the drawings has been indicated in connection with the description given above of the construction and arrangement of its various parts, and will be readily understood by those skilled in the art without a separate description thereof. It may be stated, however, that with the exception of Fig. 3 the drawings illustrate the positions which the parts assume when the machine is at rest, the knives at this time being at one side of the heel end of the pattern. Before the machine is thrown into operation the channeling and grooving knife is raised from the work and held in such position by the latch lever 60. During the operation of the machine the knives travel around the heel end of the pattern and as they reach the shank portion the latch 60 is engaged by a tripping plate 66 upon a rod 67 secured in the overhanging portion of the machine frame. The channeling and grooving knife is thus allowed to come into engagement with the work and remains in engagement therewith while the knives pass around the pattern and return to the starting point.

The nature and scope of the present invention having been indicated and a machine embodying the invention in its preferred form having been specifically described, what is claimed is:—

1. A sole rounding machine, having, in combination, a knife carrier and a pattern

relatively movable to transfer the point of operation of the knife around the pattern, and means for swinging the knife carrier while the knife is at the end of the pattern about a center in proximity to the end of the pattern, and having a substantially fixed position with relation to the pattern.

2. A sole rounding machine, having, in combination, a knife carrier and a pattern relatively movable to transfer the point of operation of the knife around the pattern, means for swinging the knife carrier, while the knife is at the end of the pattern, about a center having a substantially fixed position with relation to the pattern, and means for adjusting said center to positions in proximity to the ends of patterns of different sizes.

3. A sole rounding machine, having, in combination, a knife carrier and a pattern relatively movable to transfer the point of operation of the knife around the pattern, and means for imparting inward and outward and swinging movements to the knife carrier during such relative movement, the swinging movement of the knife carrier while the knife is at the end of the pattern taking place about a center in proximity to the end of the pattern and having a substantially fixed position with relation to the pattern.

4. A sole rounding machine, having, in combination, a knife carrier and a pattern relatively movable to transfer the point of operation of the knife around the pattern, and mechanism independent of the pattern acting during such relative movement to impart swinging movements to the carrier about a center fixed with relation to the carrier and to maintain said center in proximity to the edge of the pattern.

5. A sole rounding machine, having, in combination, a knife carrier and a pattern relatively movable to transfer the point of operation of the knife around the pattern, and mechanism acting, during such relative movement, to impart swinging movements to the carrier about a center fixed with relation to the carrier, to maintain said center in proximity to the edge of the pattern and to hold said center at the end of the pattern substantially stationary with relation to the pattern during a swinging movement of the carrier.

6. A sole rounding machine, having, in combination, a pattern and a support mounted for relative rotary movement about a center, a knife carrier pivotally mounted on the support, a member mounted to swing on said center as a pivot and connected to the knife carrier, and means for swinging said member with relation to the support during the relative rotary movement of the pattern and support.

7. A sole rounding machine, having, in combination, a pattern and a support mount-

ed for relative rotary movement about a center, a knife carrier pivotally mounted on the support and having a sliding movement with respect to its pivot, a member mounted to swing on said center as a pivot and to move radially, a pivotal connection between said member and the knife carrier, means for swinging said member with relation to the support during the relative rotary movement of the pattern and support, and means for moving said member radially.

8. A sole rounding machine, having, in combination, a pattern and a support mounted for relative rotary movement about a center, a knife carrier pivotally mounted on said support and having a sliding movement with respect to its pivot, a member mounted to swing on said center as a pivot and to move radially, a pivotal connection between said member and the knife carrier, a cam and suitable connections for swinging said member with relation to the support during the relative rotary movement of the pattern and support, and a cam and suitable connections for moving said member radially.

9. A sole rounding machine, having, in combination, a knife carrier and a pattern relatively movable to transfer the point of operation of the knife around the pattern, cams, and mechanism intermediate the cams and the carrier acting when actuated by said cams to impart inward and outward and swinging movements to the carrier.

10. A sole rounding machine, having, in combination, a pattern and a support mounted for relative rotary movement about a center, a knife carrier pivotally mounted on the support, a member mounted to swing on said center as a pivot, a pivotal connection between said member and the knife carrier, means for swinging said member to move said pivotal connection with relation to the support during the relative rotary movement of the pattern and support and means for simultaneously moving the pivot of the knife carrier with relation to the support in the opposite direction.

11. A sole rounding machine, having, in combination, a pattern, a rotary support, a knife carrier mounted thereon, mechanism mounted on the rotary support and acting when actuated to impart inward and outward and swinging movements to the knife carrier, and cams for actuating said mechanism.

12. A sole rounding machine, having, in combination, a knife carrier and a pattern relatively movable to transfer the point of operation of the knife around the pattern, cams, and mechanism actuated by said cams for imparting swinging movements to the carrier about a center fixed with relation to the carrier and for maintaining said center in proximity to the edge of the pattern.

13. A sole rounding machine, having, in combination, a knife carrier and a pattern

relatively movable to transfer the point of operation of the knife around the pattern, and means for actuating the knife carrier during such relative movement to impart swinging movements to the carrier about a center fixed with relation to the carrier, and to maintain said center in proximity to the edge of the pattern.

In testimony whereof we affix our signatures, in presence of two witnesses:

BENJAMIN F. MAYO.
IRA O. BUCKMINSTER.

Witnesses:

FRANK O. FISK,
ALBERT H. HANCOCK.