

No. 780,188.

PATENTED JAN. 17, 1905.

W. S. HUSON.
MECHANICAL MOVEMENT.

APPLICATION FILED OCT. 1, 1897. RENEWED MAY 23, 1904.

4 SHEETS—SHEET 1.

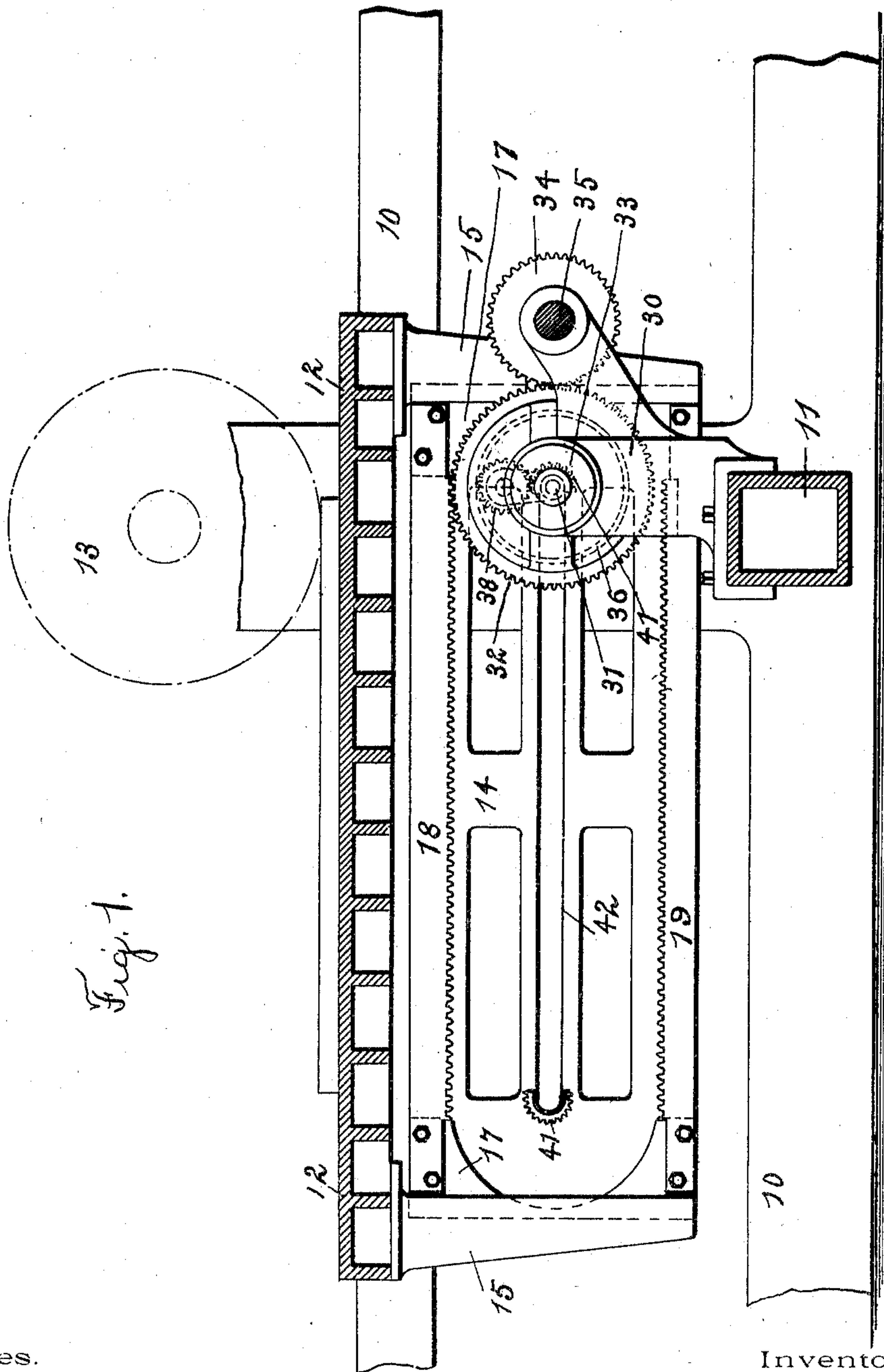


Fig. 1.

Witnesses.

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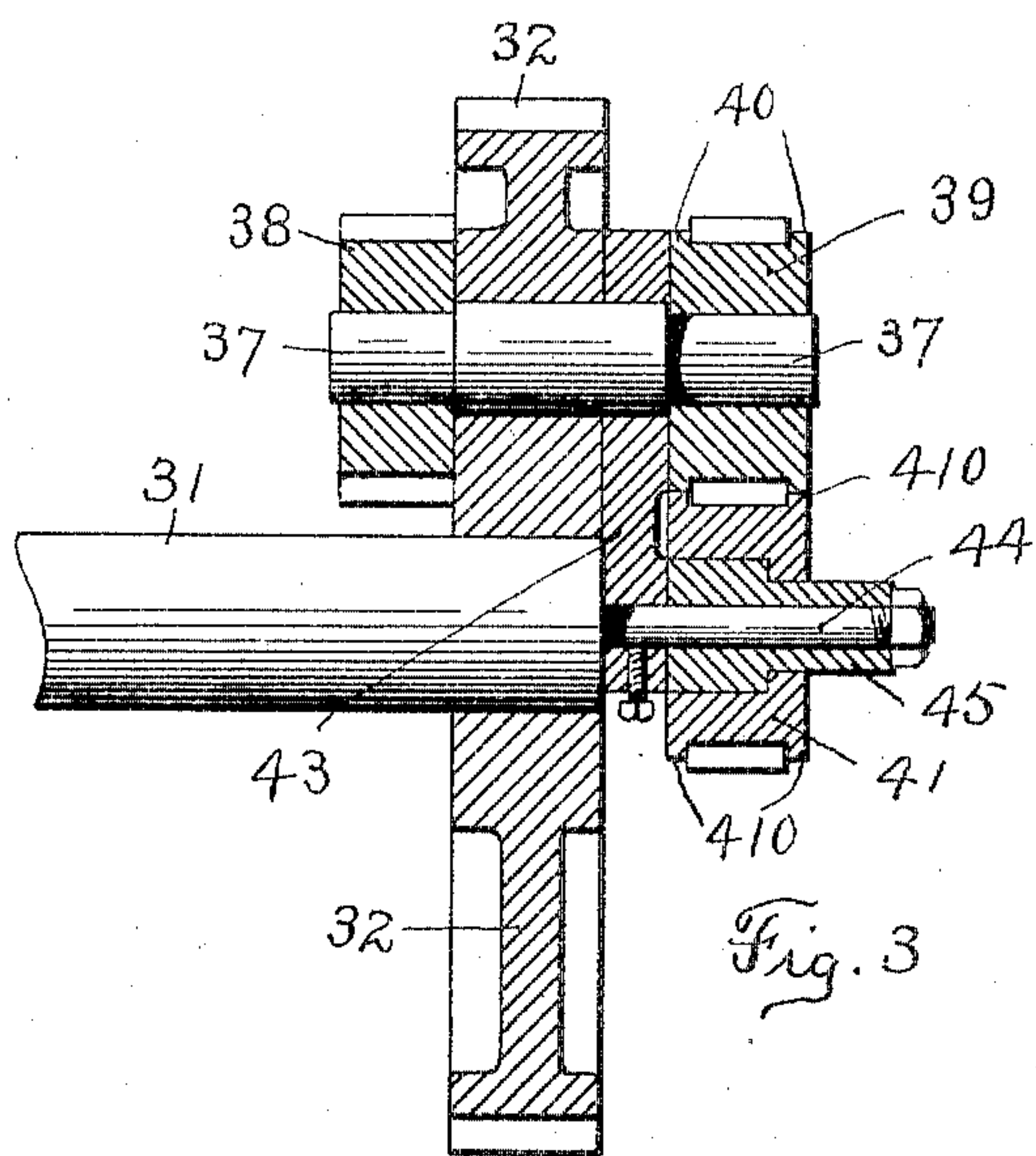
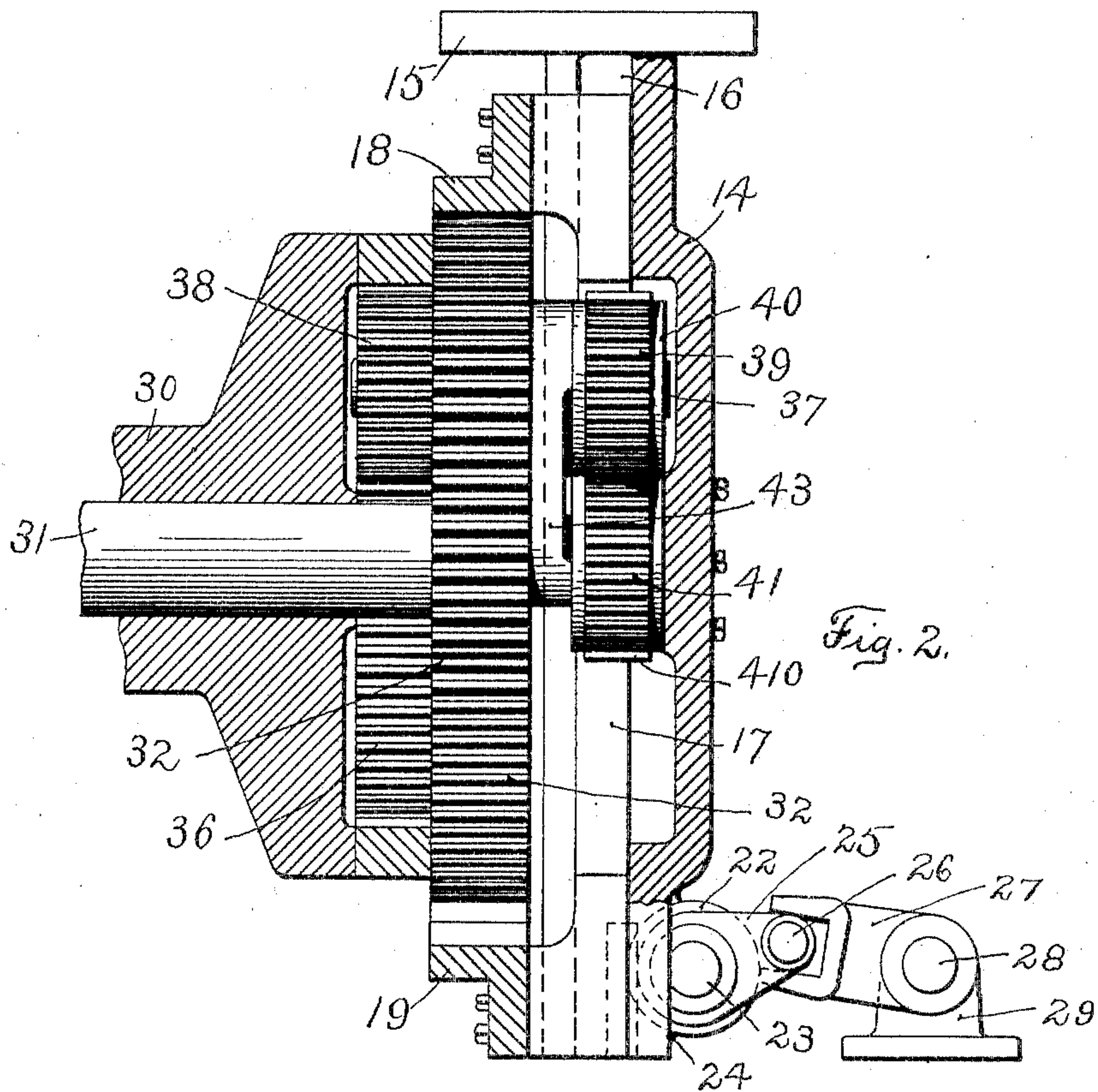
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4 SHEETS—SHEET 2.



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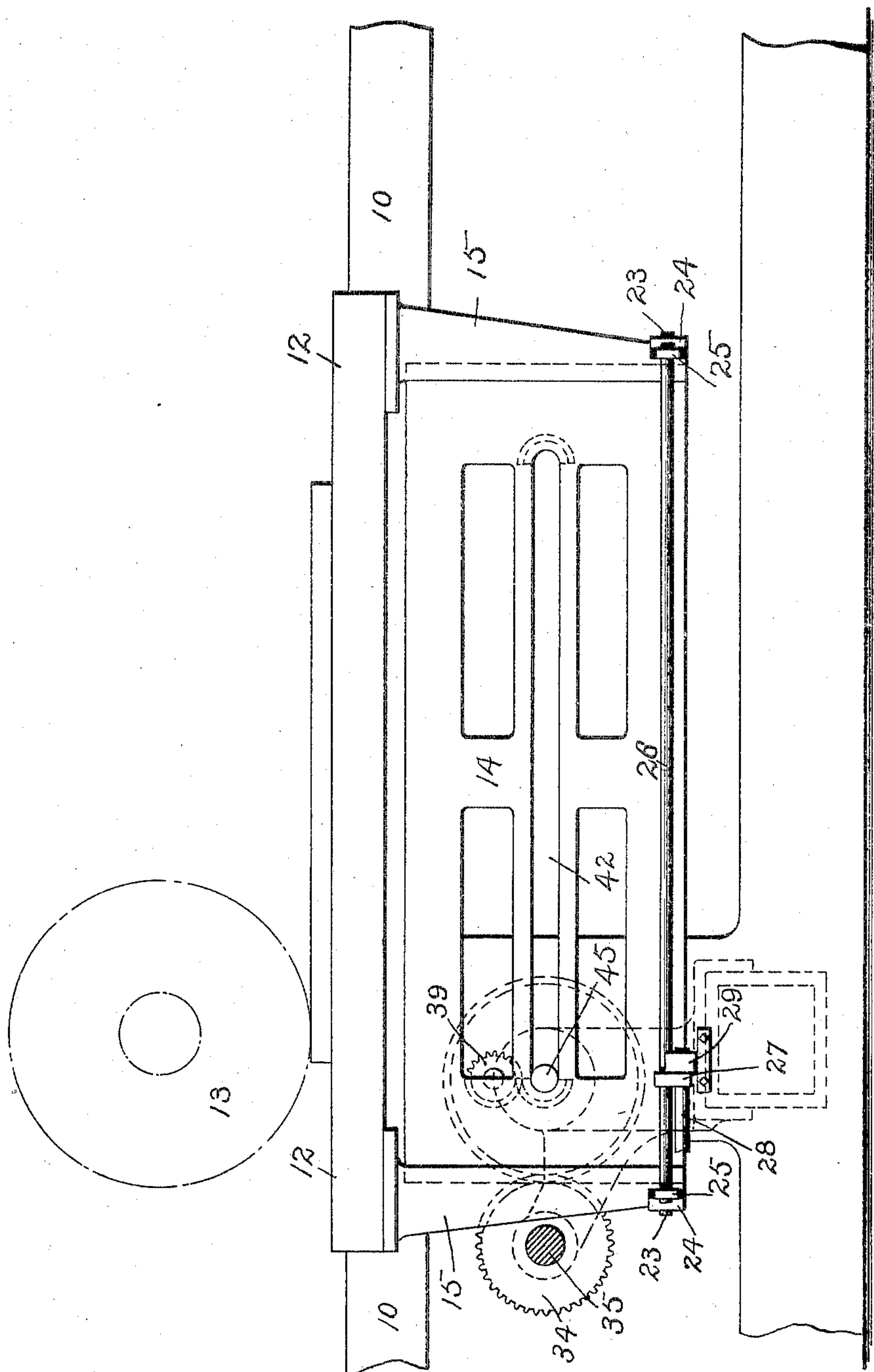


Fig. 4.

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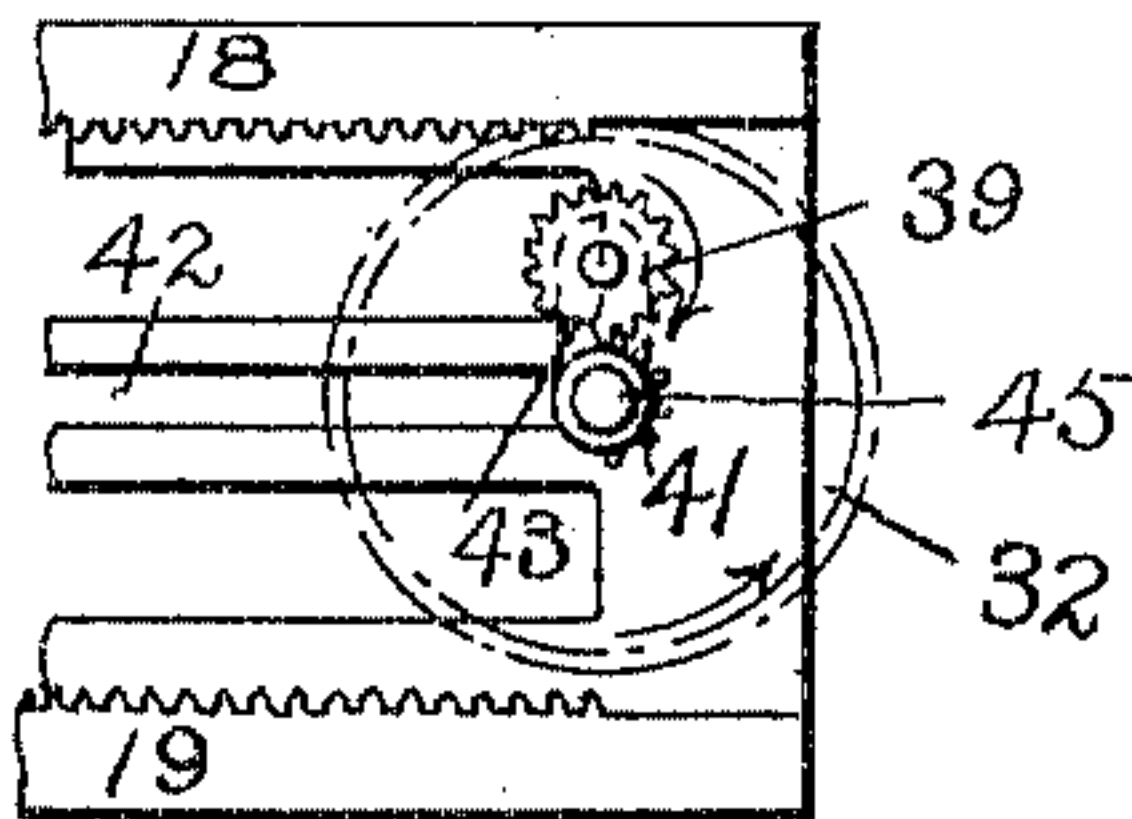


Fig. 5.

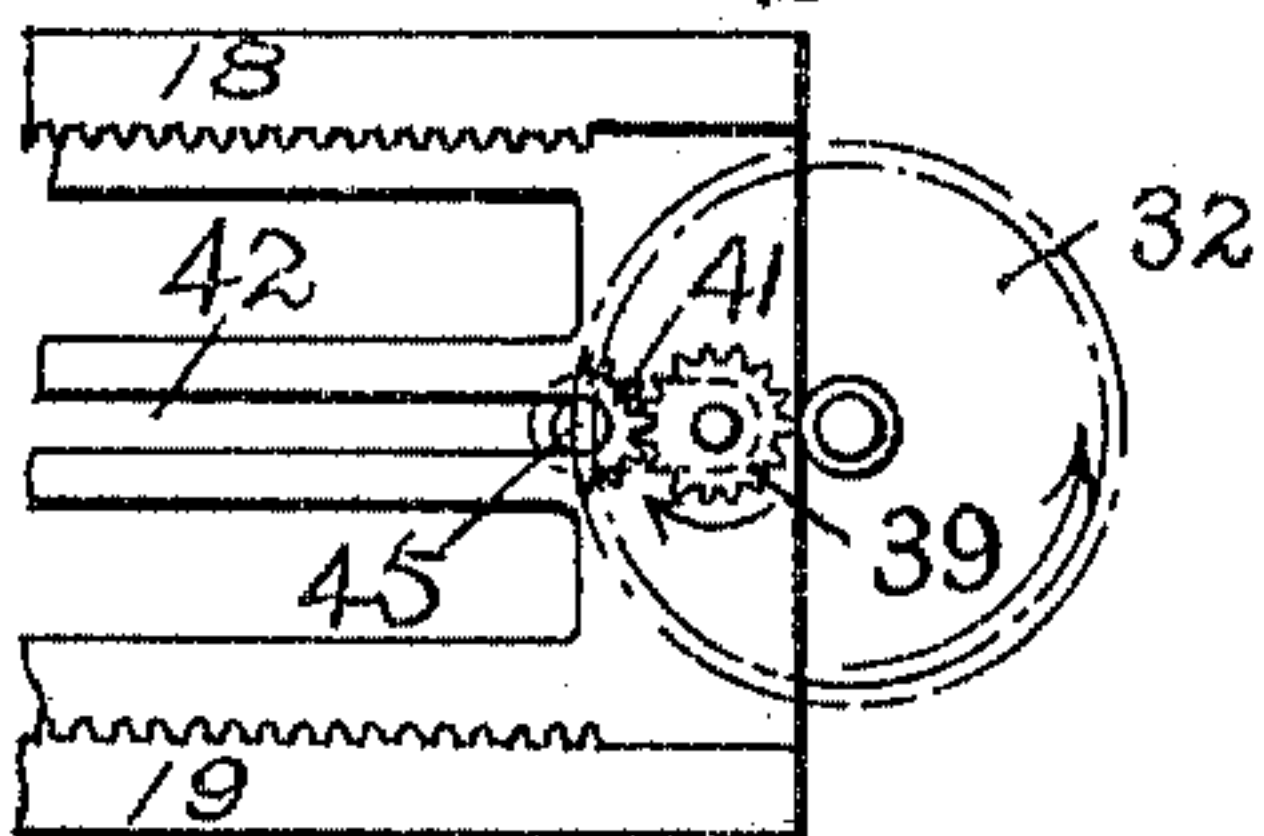


Fig. 6.

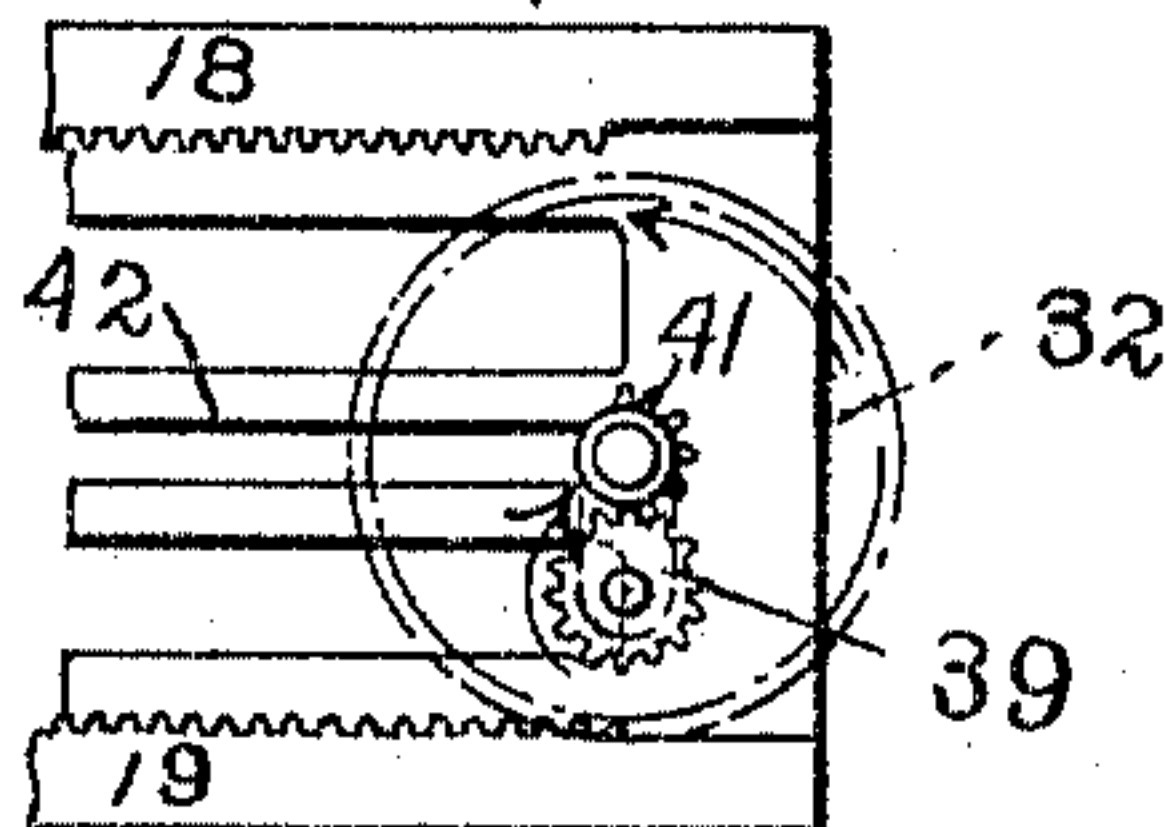


Fig. 7.

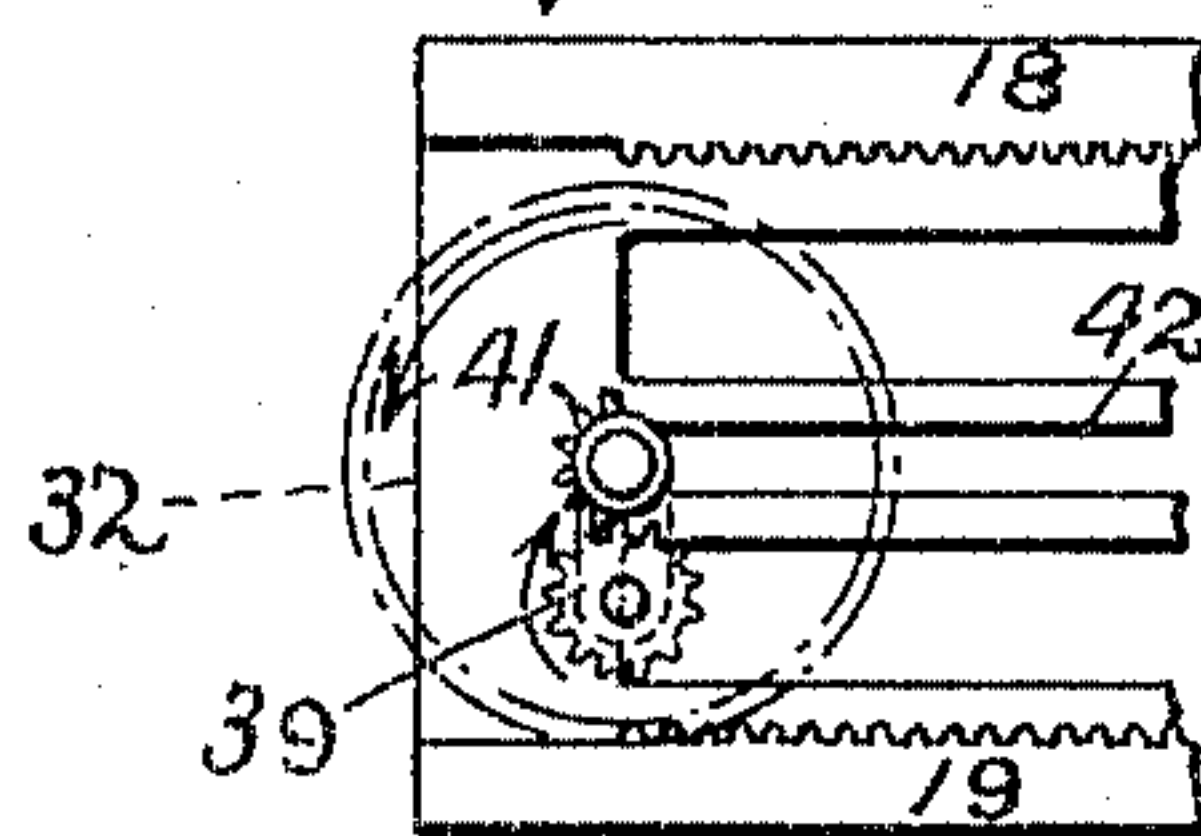


Fig. 8.

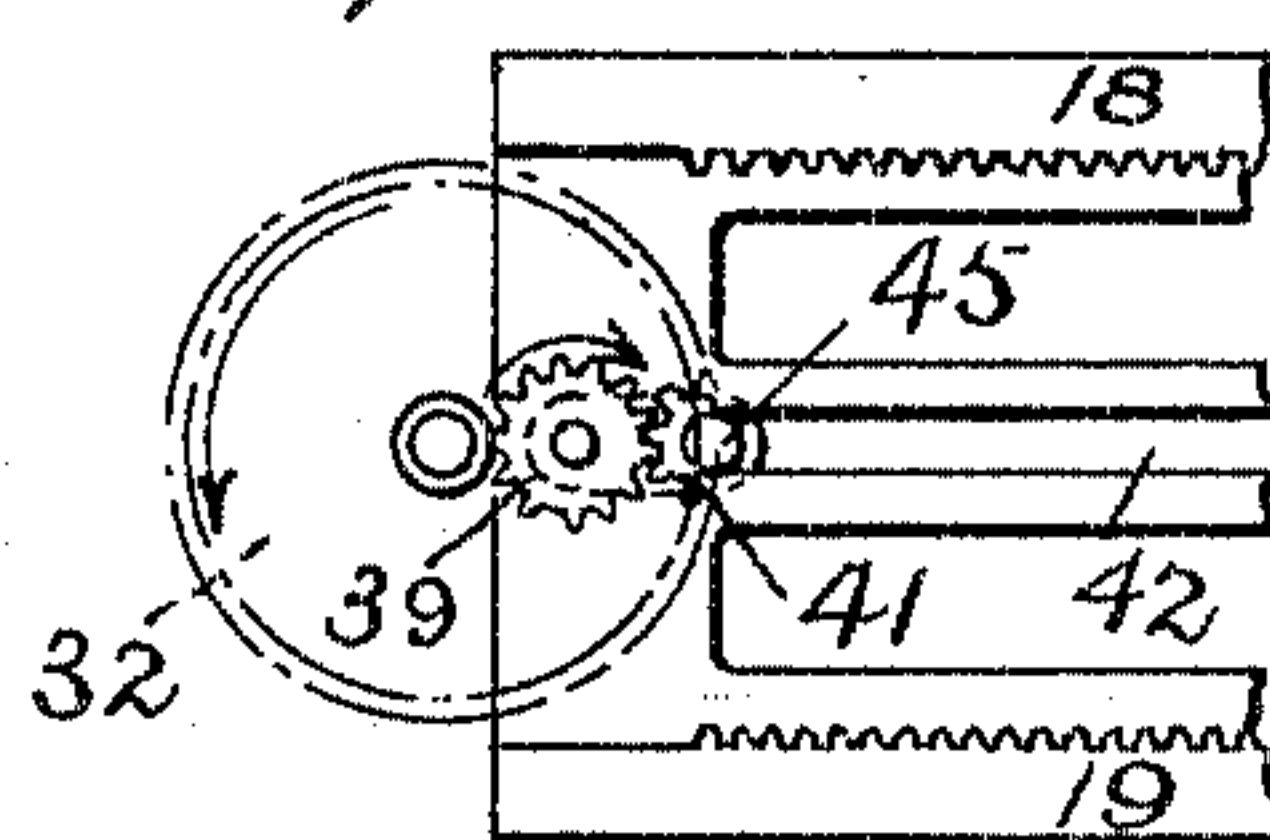


Fig. 9.

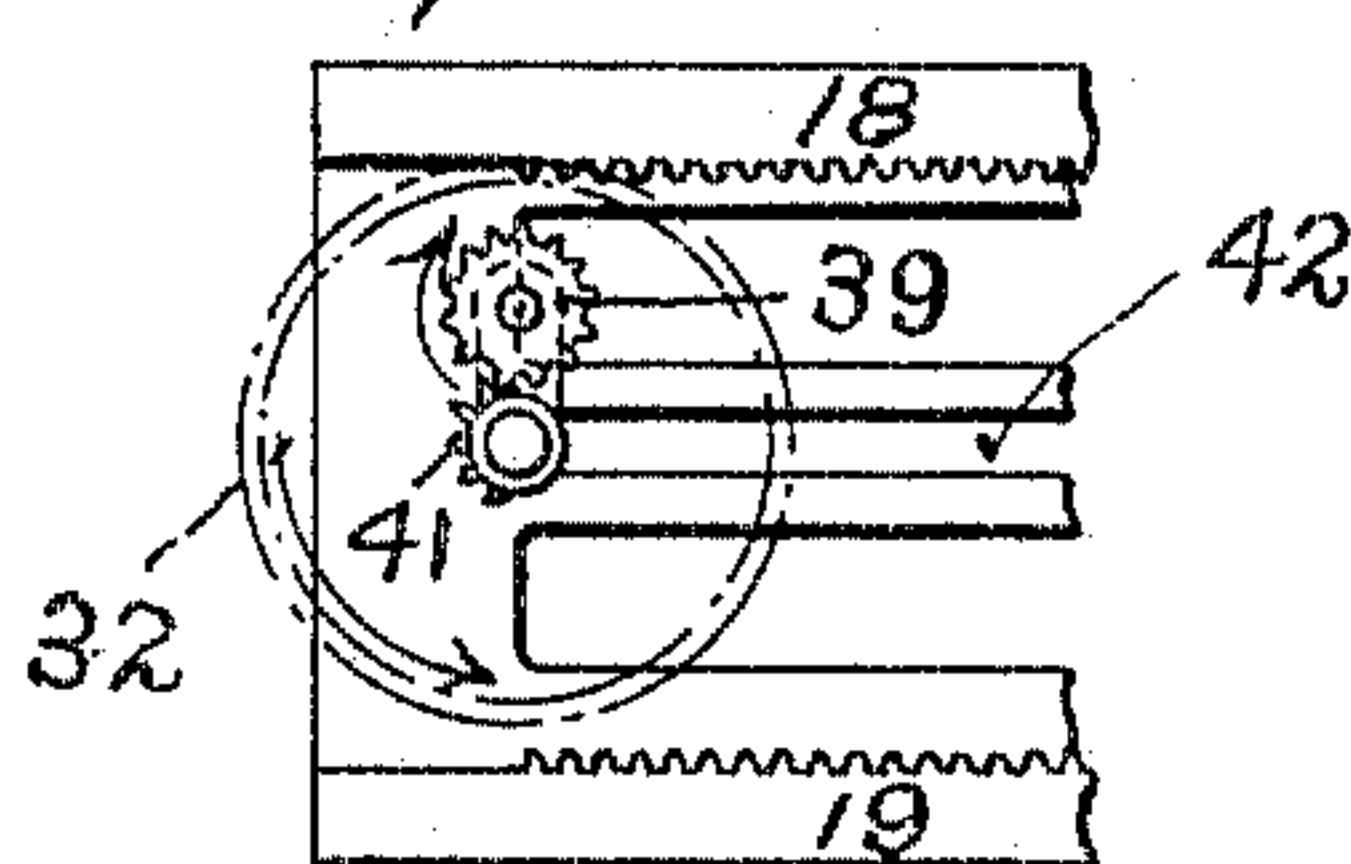


Fig. 10.

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UNITED STATES PATENT OFFICE.

WINFIELD S. HUSON, OF PLAINFIELD, NEW JERSEY, ASSIGNOR TO THE CAMPBELL PRINTING PRESS & MANUFACTURING COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

MECHANICAL MOVEMENT.

SPECIFICATION forming part of Letters Patent No. 780,188, dated January 17, 1905.

Application filed October 1, 1897. Renewed May 23, 1904. Serial No. 209,316.

To all whom it may concern:

Be it known that I, WINFIELD S. HUSON, a citizen of the United States, residing at Plainfield, in the county of Union and State of New Jersey, have invented a new and useful Improvement in Mechanical Movements, of which the following is a specification.

The aim of this invention is to provide a new and improved mechanical movement especially adapted for converting rotary motion into rectilinearly-reciprocating motion.

The movement has been especially designed as a device for reciprocating the beds of printing-presses, although the same may be used for other purposes.

Referring to the drawings, which form part of this specification, Figure 1 is a sectional elevation of my improved mechanical movement. Fig. 2 is a cross-sectional view, on an enlarged scale, through the driving-gear. Fig. 3 is a sectional view through the driving-gear of a part I term the "wrist-pin." Fig. 4 is a sectional elevation of the opposite side of the structure from that illustrated in Fig. 1; and Figs. 5 to 10, inclusive, are diagrammatic views illustrating the operation of the device, Figs. 5 to 7, inclusive, illustrating the manner in which the motion of the movable member is reversed at the left-hand limit of its travel, and Figs. 8 to 10, inclusive, being diagrammatic views illustrating the relative position of the parts in reversing the movable member at the right-hand limit of its travel.

There are many mechanisms now well known for imparting the main forward-and-backward reciprocation to a moving member; and my invention consists in combining with such mechanism a peculiar reversing mechanism. This reversing mechanism consists of a pinion mounted on a revolving part, which pinion is geared to rotate on its axis in a direction opposite to that in which the same is bodily revolved by the part and of a curved rack, around which said pinion runs to impart the reversing movement to the bed. A suitable gearing for imparting this particular motion to the reversing-pinion consists in arranging another pinion to turn with the reversing-pin-

ion and meshing this second pinion into a stationary internal gear. Suitable means are also provided, as hereinafter described, to keep the revolving reversing-pinion in mesh with the curved rack during the reversing movement. In most instances it is contemplated using the main driving-gear as the revolving part on which to place the revolving reversing-pinion.

Referring to the drawings and in detail, 10 represents the side frames of the machine, which side frames are connected by a suitable girder 11.

12 designates a moving member or bed which is fitted to slide on the framework of the machine in any of the ways common in printing-press machinery.

13 designates in dotted lines the position of the impression-cylinder.

Depending from the bed 12 is a frame 14, which has suitable end brackets 15, which are provided on their facing edges with suitable grooves 16. Fitted in these grooves 16 are suitable sliders 17, secured to which is a top rack 18 and a bottom rack 19. Fastened on each one of the sliders is a short rack 21, engaging which is a pinion 22, mounted on a shaft 23, which is journaled in lugs or bearings 24, projecting from the frame 14. Mounted on the shaft 23 are arms 25, which carry a long working shaft 26. Engaging this shaft 26 is a yoke 27, which is mounted on a yoke-shaft 28, which latter is journaled in a suitable bearing 29. The shaft 26 extends substantially the length of the bed and as the bed reciprocates slides back and forth in the yoke 27. The yoke 27 is operated by a suitable cam, not necessary to show or describe, to raise and lower the sliders 17, and thereby the racks 18 and 19.

30 designates a suitable bearing, which may be secured to the girder 11, fitted in which bearing is a shaft 31, which carries a driving-gear 32, set in position to engage either the rack 18 or 19, depending upon the position thereof. On the end of the said shaft 31 is secured a collar 33.

Meshing with the driving-gear 32 is a driv-

ing-pinion 34, mounted upon a shaft 35, which may constitute the driving-shaft of the machine. This mechanism constitutes a main driving mechanism, the racks 18 and 19 being set slightly farther apart than the diameter of the driving-gear 32. The driving-gear 32 will alternately engage said racks to impart the main reciprocation to the bed.

36 designates an internal gear, which is secured to the framework of the machine—as, for example, to the bearing 30.

Journalled in the main driving-gear 32 is a wrist-pin 37, which has secured thereon a pinion 38, which latter meshes with the internal gear 36. On the other end of the wrist-pin 37 is secured a reversing-pinion 39, preferably provided with circular working shoulders 40 40 on each side of its gear-teeth, which shoulders are of a diameter equal to the pitch-diameter thereof.

Secured to the frame 14 are two semicircular curved racks 41, set in line to engage the reversing-pinion 39, which curved segments have semicircular bearers 410 of a diameter equal to the pitch-diameter of the segments. A groove 42 is formed in the frame 14 between said curved segments, as shown, and the ends of said groove are made concentric with said curved segments or semicircular racks.

Depending from the wrist-pin 37 is a link 43, secured in the end of which is a stud 44, which carries a roller 45. The position of the stud 44 is such that the same will come substantially concentric with the main driving-gear, and as the bed makes its main reciprocation this roller will rest idly in the groove 42 in the frame 14; but during the reversing operation the same will bear in the bearings 40 formed in the curved segments and on the end of the groove 42 and will keep the reversing-pinion 39 in accurate engagement with the semicircular rack 41.

The pinion 38 and the reversing-pinion 39 are made in pitch-diameter one-quarter of the pitch-diameter of the main driving-gear A. The wrist-pin 37 is set to have a radius of one-half the pitch-diameter of the main driving-gear 32. The pitch-diameter of the semicircular racks 41 is a quarter of the main driving-gear A. The pitch-diameter of the internal gear 36 is three-quarters that of the main driving-gear.

The operation of the parts thus far described is as follows: The movable member is given its forward-and-backward movement by the main driving mechanism before described. Just as the main driving-gear 32 leaves either rack 18 or 19 the reversing-pinion 39 will engage one of the curved segments 41. For example, as illustrated in Fig. 5, the movable member is represented as running at full speed and the main driving-gear 32 as just running out of mesh with the upper rack 18. The movable member has now

reached the point where its movement must be slowed down or retarded. The reversing-pinion 39 now runs into mesh with the curved rack 41. The momentum of the movable member will force the teeth of the curved rack 41, carried by the movable member, against the teeth of the reversing-pinion 39, the force being transmitted in a line which at first will be substantially at right angles to the radius of the engaging teeth, or tangential to the pitch-circle of the reversing-pinion. As the pinion runs down the curved rack the force produced by the momentum of the movable member acts less and less directly on the sides of the teeth until the point is reached which is illustrated in Fig. 6, where the change of movement of the bed takes place, (which is at a time when the reversing-pinion 39 is half-way down the curved rack 41.) At this point the link carrying the roller 45 has been brought into the line of movement of the movable member, so that whatever momentum the movable member may have at this point will be taken upon the roller 45, which has seated itself at the end of the slot 42. As the rotation of the driving-pinion 32 continues the link carrying the roll 45 will first act to start the movable member in the opposite direction, and as the reversing-pinion runs down the curved rack 41 from the position illustrated in Fig. 5 to the position illustrated in Fig. 6 the engaging teeth at first extend in the direction the force is applied, or, in other words, the force acts at first in a direction radial to the pitch-circle of the pinion, and when the accelerating operation is complete the force is being applied directly against the sides of the teeth, as illustrated in Fig. 7, at which time the movable member has been brought to its full working speed in the opposite direction and the main driving-gear 32 runs into mesh with the lower rack 19. In the same manner in retarding the movement of the movable member at the right-hand end of its travel the momentum of the movable member is first resisted by the mesh of gearing between the reversing-pinion 39 and the curved rack 41 until the motion of the movable member has been retarded and the link carrying the roll 45 has been brought into line with the line of motion of the movable member, as illustrated in Fig. 8, after which the roll 45 will act to start the bed in the opposite direction, and the mesh of gearing between the pinion 39 and rack 41 will act to accelerate the motion of the bed in the opposite direction up to full working speed, as illustrated in Fig. 10. In the particular mechanism shown the main driving-gear 32 is what is known as a "three-revolution" pinion—that is, it is a driving-gear which makes one complete revolution during the main forward motion, a half-revolution to secure the reversal at the right-hand end of travel of the movable member, one complete revolution during

the backward movement, and a half-revolution during the reversal of the movable member at the left-hand end of the travel. During a cycle of operation, however, the main driving-gear 32 may of course be proportioned to make a different number of revolutions from that herein shown—that is to say, it may, for example, be a five or seven revolution pinion, as desired.

The details herein shown and described may be greatly varied by a skilled mechanic without departing from the scope of my invention as expressed in the claims.

Having thus fully described my invention, what I claim, and desire to secure by Letters Patent of the United States, is—

1. The combination of a moving member, a mechanism for giving the same its main reciprocation, a reversing mechanism comprising a revolving part, a pinion carried thereby, means for rotating said pinion, a curved rack carried by the moving member which said reversing-pinion is adapted to engage, and means for keeping the pinion in mesh with the curved rack during the reversing operation.

2. The combination of a moving member, a mechanism for giving the same its main reciprocation, and a reversing mechanism comprising a rotating part, a pinion thereon, means for rotating the pinion, a curved rack mounted at each end of the moving member which said revolving, rotating pinion is adapted to engage, and means for keeping the pinion in mesh with one of the curved racks during the reversing operation at either end of the travel of the moving member.

3. The combination of a moving member, a mechanism for giving the same its main reciprocation, and a reversing mechanism comprising a revolving part, a reversing-pinion rotatably mounted thereon, connected gearing for rotating said reversing-pinion, a curved rack carried by the moving member with which said revolving, rotating pinion is adapted to engage to reverse the bed, and means for keeping the pinion in mesh with the curved rack during the reversing operation.

4. The combination of a moving member, a mechanism for giving the same its main reciprocation, a reversing mechanism comprising a revolving part, a pinion mounted to rotate thereon, connected gearing for rotating said pinion, a curved rack mounted at each end of the moving member, and means for holding the pinion in mesh with one of the said curved racks during the reversal of the moving member at either end of its travel.

5. The combination of a moving member, a mechanism for giving the same its main reciprocation, and a reversing mechanism comprising a revolving part, a wrist-pin journaled therein, a pinion mounted on said wrist-pin, an internal gear for rotating said pinion in a direction opposite to its revolution, a curved rack

carried by the moving member, and means for holding the pinion in mesh with the curved rack during the reversal of the moving member.

6. The combination of a moving member, a mechanism for giving the same its main reciprocation, and a reversing mechanism comprising a revolving part, a wrist-pin journaled therein, pinions mounted on said wrist-pin, a stationary internal gear engaging one of said pinions, a curved rack carried by the moving member with which the other pinion is adapted to engage, and means for holding the said last-named pinion in mesh with the curved rack during the reversal of the moving member.

7. The combination of a moving member, a mechanism for giving the same its main reciprocation, and a reversing mechanism comprising a revolving part, a wrist-pin journaled therein, pinions mounted on said wrist-pin, a stationary internal gear engaging one of said pinions, a curved rack mounted at each end of the moving member with which the other of said pinions is adapted to engage, and means for holding said pinion in mesh with one of the said curved racks during the reversal of the moving member at either end of its travel.

8. The combination of a moving member, a mechanism for giving the same its main reciprocation, a reversing mechanism comprising a revolving part, a wrist-pin mounted to rotate therein, a reversing-pinion carried by said wrist-pin, means for rotating said wrist-pin, a curved rack carried by the moving member with which said pinion is adapted to engage, and means for keeping the pinion in mesh with the curved rack during the reversal of the moving member.

9. The combination of the moving member, a mechanism for giving the same its main reciprocation, and a reversing mechanism comprising a revolving part, a pinion mounted to rotate therein, means for rotating said pinion, a curved rack carried by the moving member with which said pinion is adapted to engage, and means for keeping the pinion in mesh with said curved rack, comprising a pivoted link having a stud engaging a slot in the moving member.

10. The combination of a moving member, a mechanism for giving the same its main reciprocation, and a reversing mechanism comprising a revolving part, a pinion mounted to rotate therein, means for rotating said pinion, curved racks carried by the bed with which said pinion is adapted to engage, and means for keeping the pinion in mesh with said curved racks during the reversal of the moving member at either end of its travel, comprising a pivoted link carrying a stud which engages a slot in the moving member.

11. The combination of a moving member, a mechanism for giving the same its main reciprocation, comprising racks carried by the moving member, and a main driving-gear, a wrist-pin journaled in the main driving-gear,

a pinion mounted on said wrist-pin, means for rotating said pinion, a curved rack carried by the bed with which said pinion is adapted to engage, and means for holding said pinion in mesh with the curved rack during the reversal of the bed.

12. The combination of a moving member, a mechanism for giving the same its main reciprocation comprising racks carried by the moving member, and a main driving-gear, a wrist-pin journaled in said driving-gear, a pinion of one-quarter the size of the main driving-gear mounted on said wrist-pin, means for rotating said pinion, a curved rack carried by the moving member of the same diameter as said pinion, and means for holding the pinion in mesh with the curved rack during the reversal of the movement of the moving member.

13. The combination of a moving member, a mechanism for giving the same its main reciprocation, comprising racks carried by the bed, a main driving-gear, a wrist-pin journaled in said main driving-gear, pinions of one-quarter the size of the main driving-gear mounted on said wrist-pin, an internal gear

of three-quarters the size of the main driving-gear engaging one of said pinions, a curved rack mounted on the moving member and of the same diameter as the said pinions, and means for holding one of said pinions in mesh with the curved rack during the reversal of the moving member.

14. The combination in a mechanical movement of the moving member, a mechanism for giving the same its main reciprocation, and a reversing mechanism comprising a revolving part, a pinion mounted to rotate thereon, means for rotating said pinion, said pinion having working shoulders, a curved rack carried by the moving member and having working shoulders, and means for holding the pinion in mesh with the curved rack during the reversal of the moving member.

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

WINFIELD S. HUSON.

Witnesses:

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