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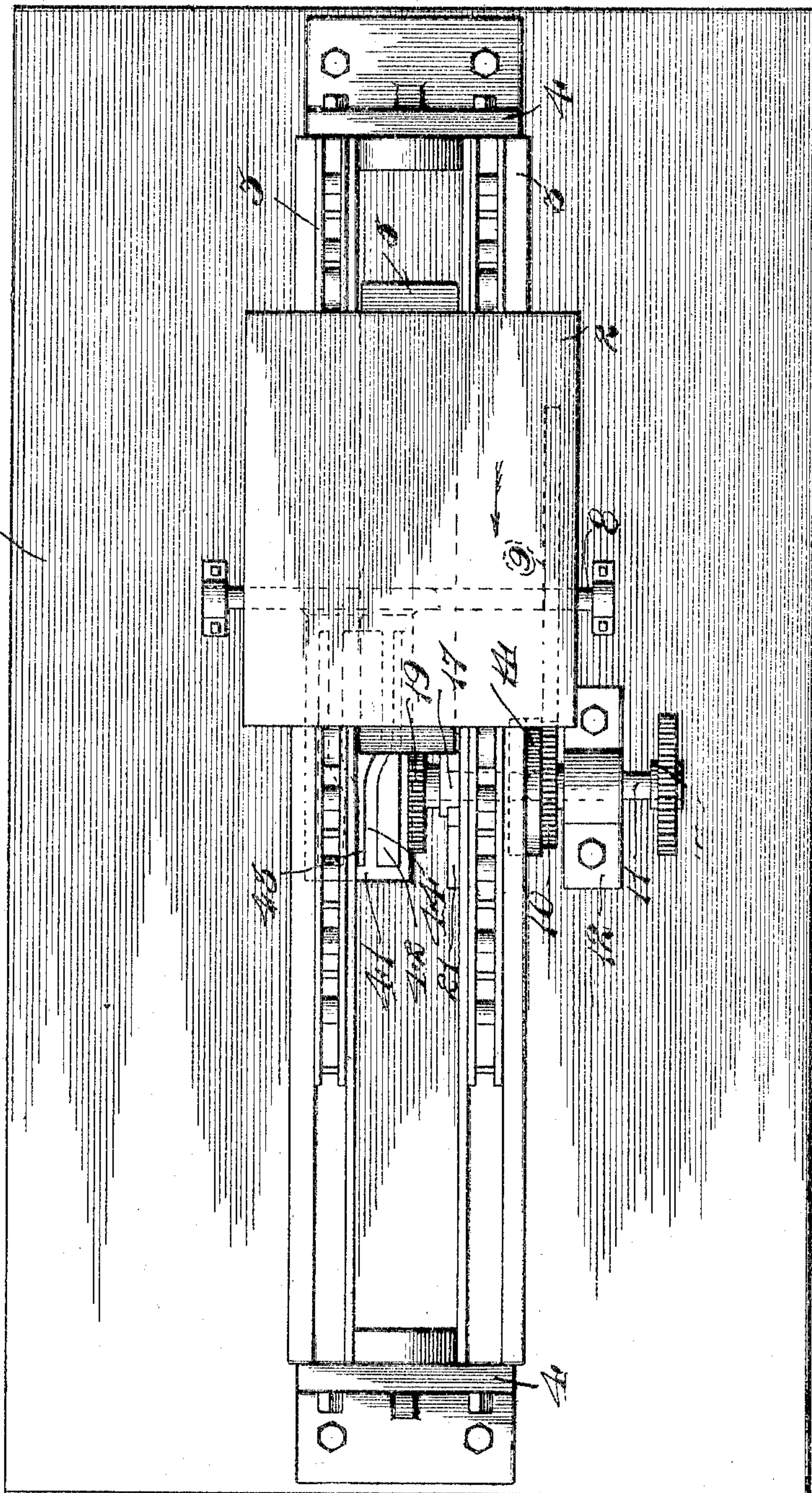
S. HALVORSEN.

MECHANISM FOR OPERATING PRINTING PRESS BEDS OR THE LIKE.

APPLICATION FILED DEC. 7, 1903.

4 SHEETS—SHEET 1.

Fig. 1.



Witnesses:
G. V. Domarus.
J. C. Lee

Inventor:
Sverre Halvorsen.
by A. Miller Bagfield
Attorney.

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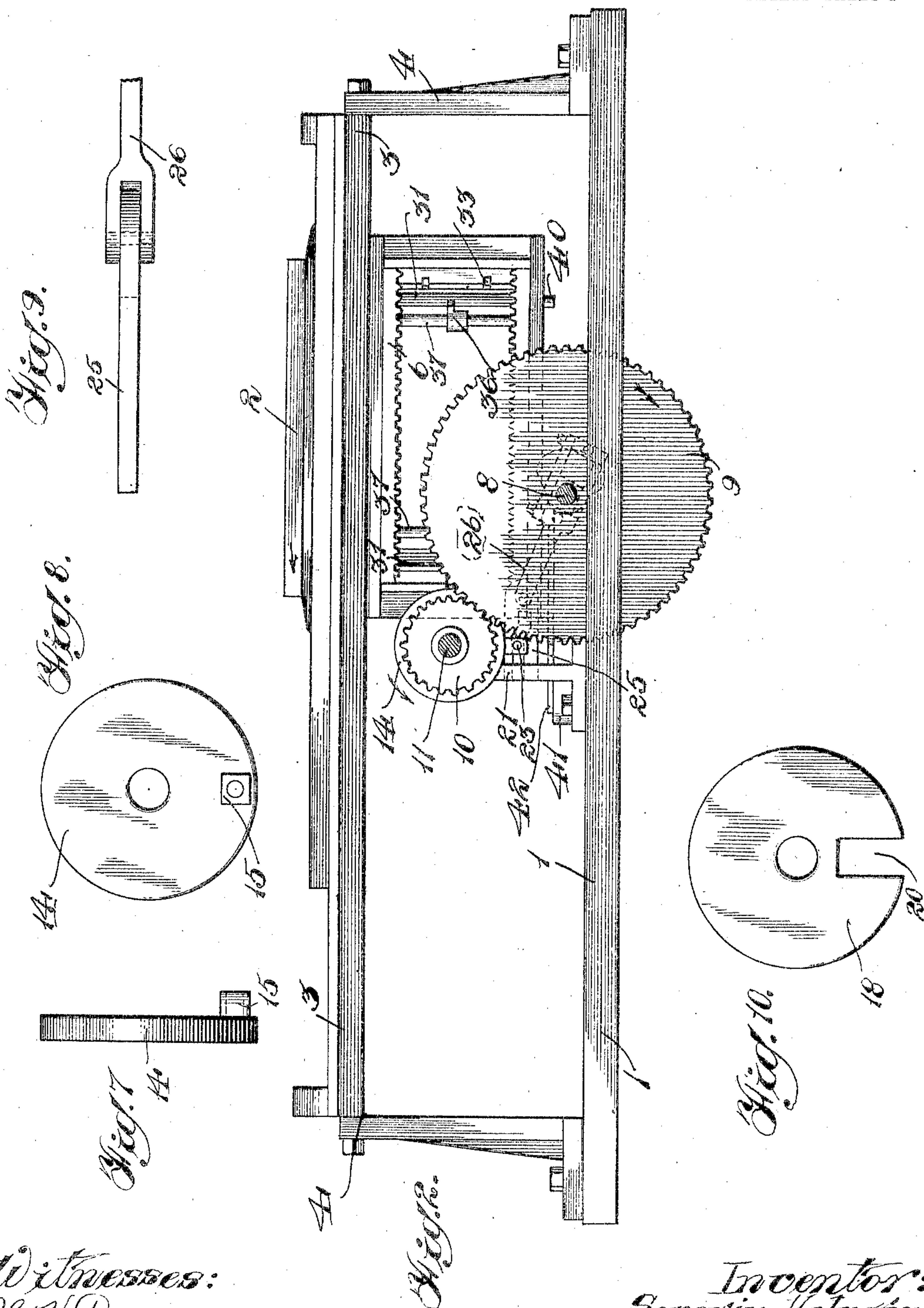
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G. V. Domarus.
J. C. Lee.

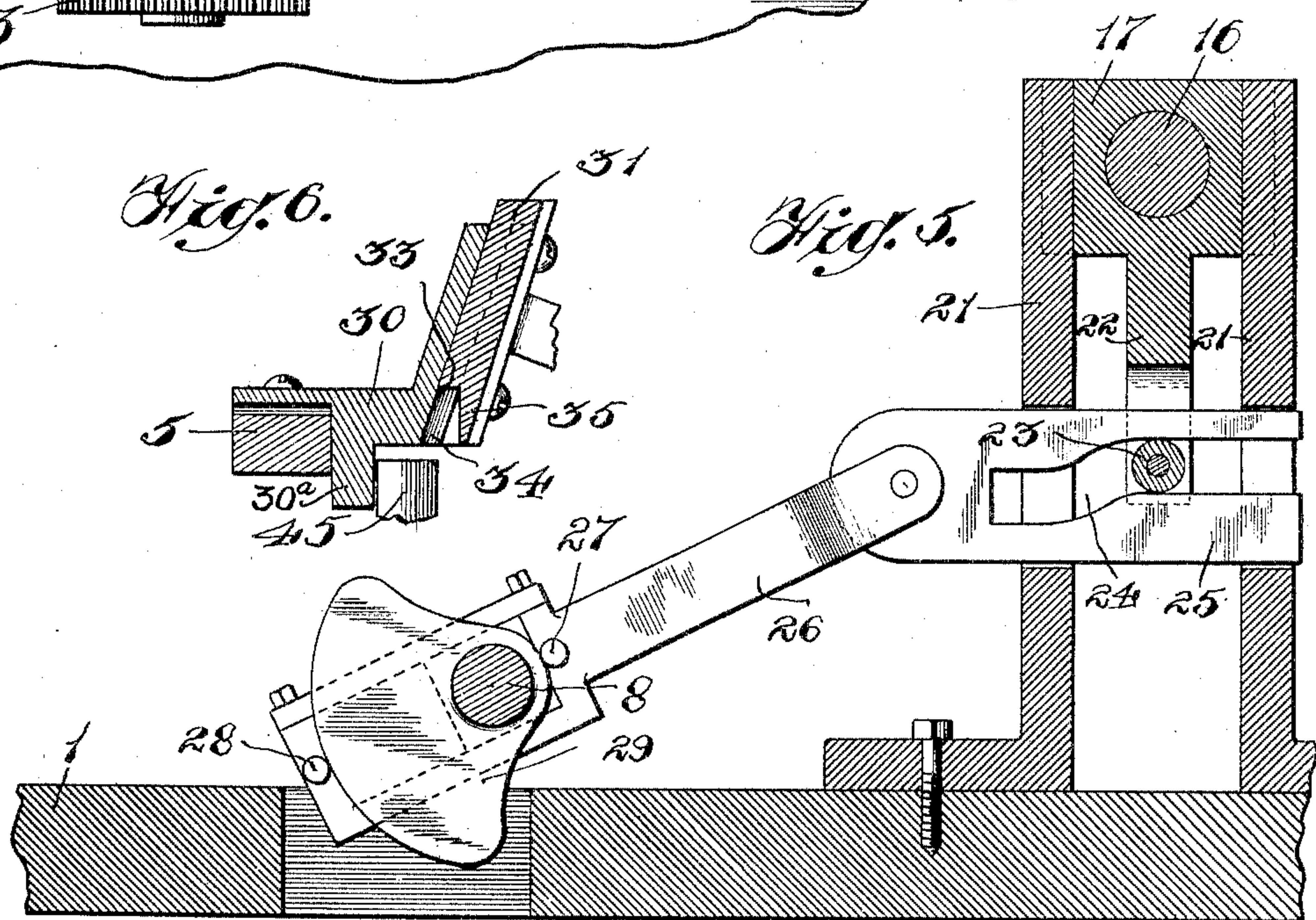
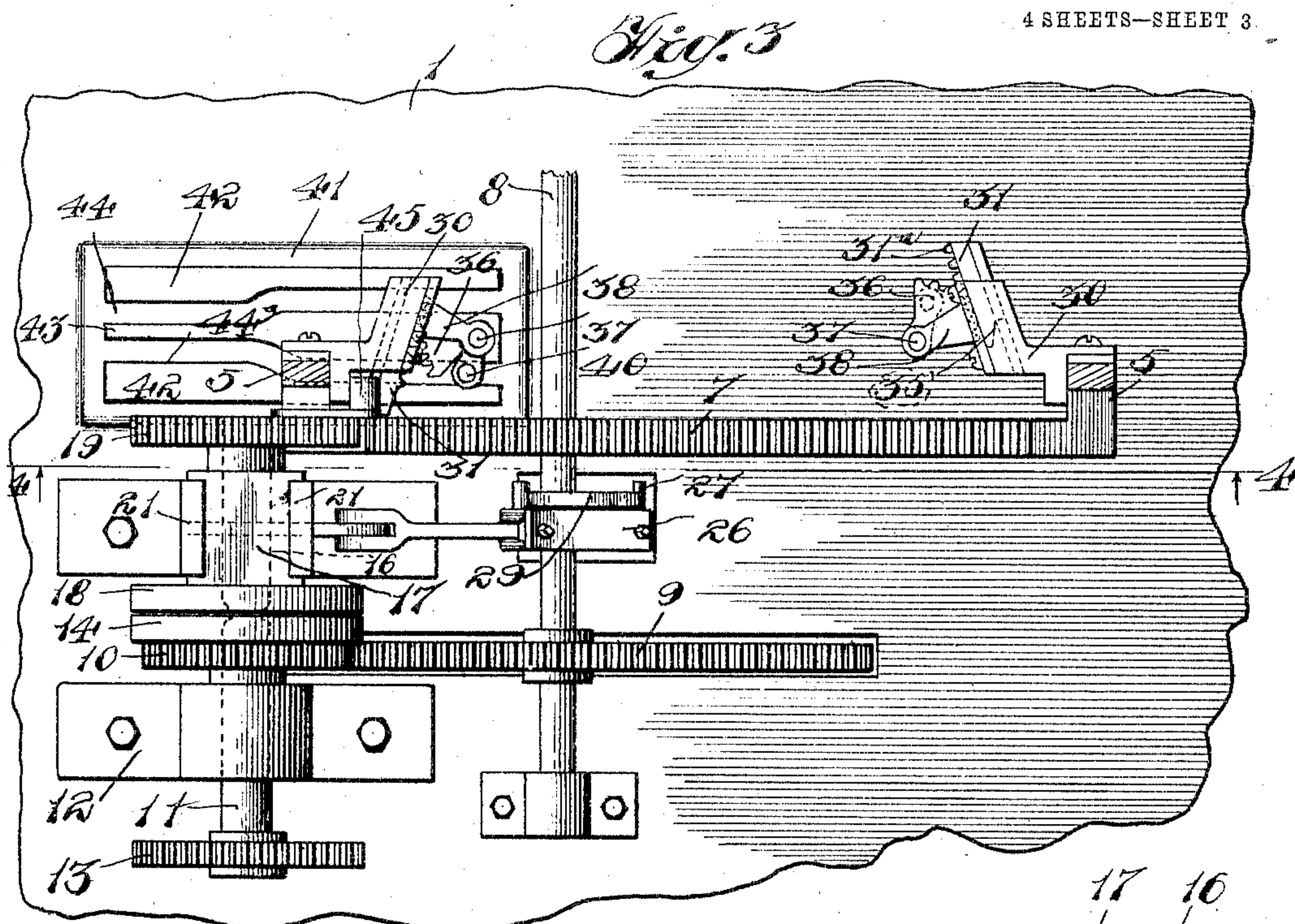
Inventor:
Severin Halvorsen:
by A. Miller Regfield
Attorney:

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4 SHEETS—SHEET 3.



Witnesses:
G. J. Donnanus
J. C. Lee

Inventor:
Severin Halvorsen:
by A. Miller Regild
Attorney:

No. 780,168.

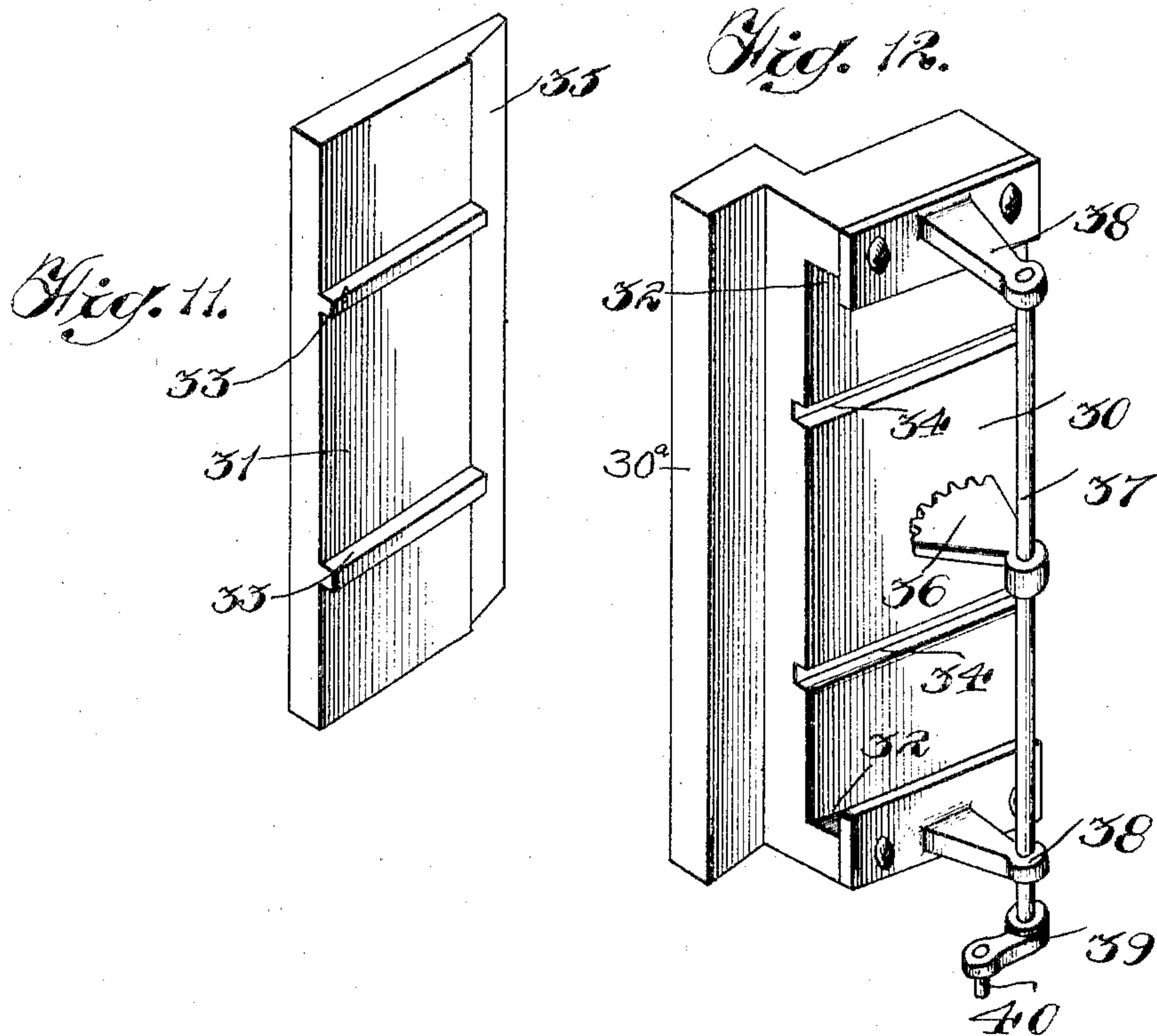
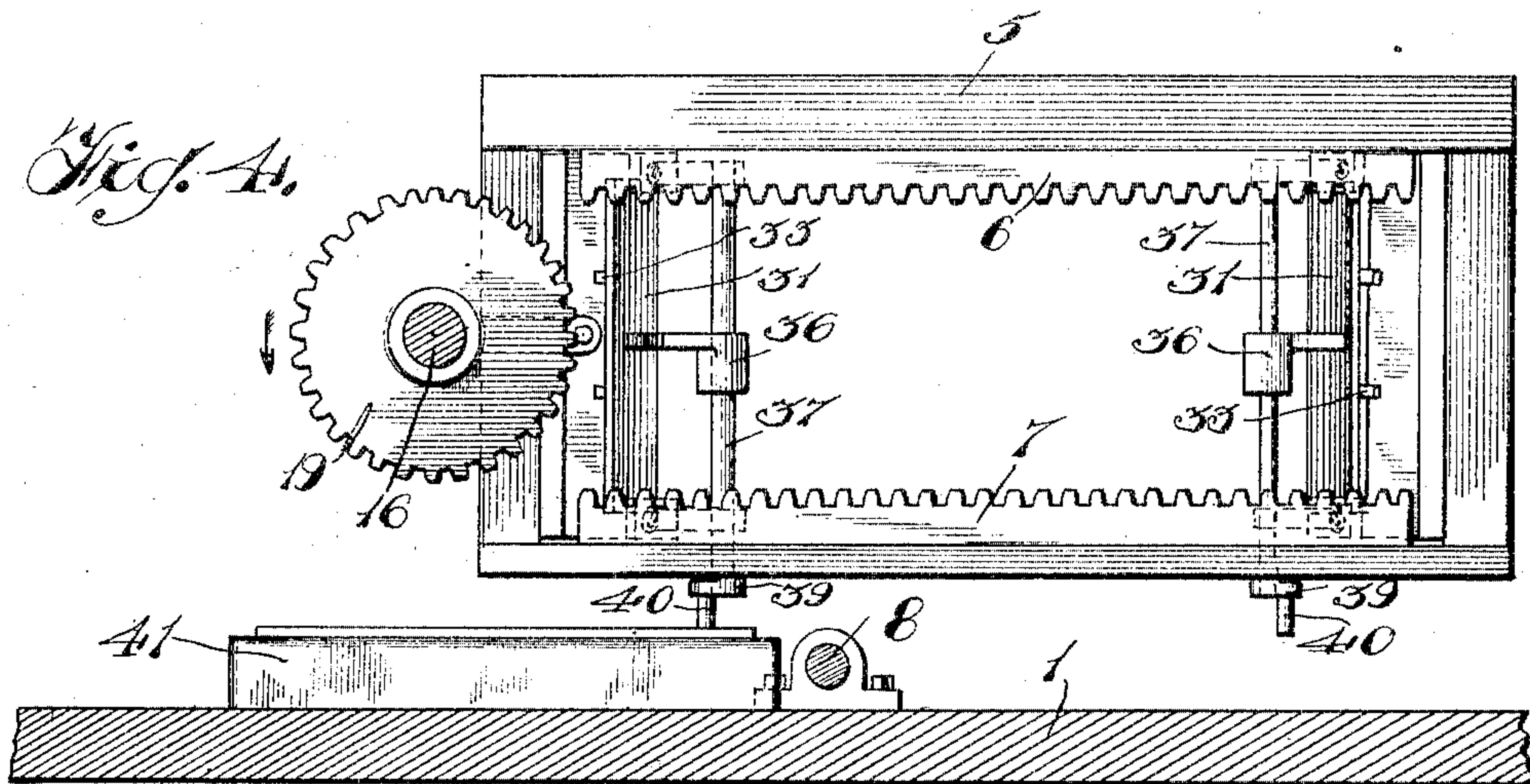
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4 SHEETS—SHEET 4.



Witnesses:
C. V. Domarus.
J. C. Lee.

Inventor:
Severin Halvorsen.
by A. Miller Sigurd
Attorney.

UNITED STATES PATENT OFFICE.

SEVERIN HALVORSEN, OF CHICAGO, ILLINOIS.

MECHANISM FOR OPERATING PRINTING-PRESS BEDS OR THE LIKE.

SPECIFICATION forming part of Letters Patent No. 780,168, dated January 17, 1905.

Application filed December 7, 1903. Serial No. 184,170.

To all whom it may concern:

Be it known that I, SEVERIN HALVORSEN, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Mechanism for Operating Printing-Press Beds or the Like, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

My invention relates to mechanism for operating reciprocating beds—such, for example, as the reciprocating beds of printing-presses.

The principal object of the invention is to provide a simple, practical, and effective mechanism of this sort which will prevent lost motion in the reciprocating member.

In the accompanying drawings I have shown the invention as applied to the reciprocating bed of a printing-press; but it will be understood that it is applicable as well to other reciprocating bodies.

In the drawings, Figure 1 is plan view of the reciprocating bed of a printing-press and mechanism for reciprocating the same involving my invention. Fig. 2 is a side elevation of the same. Fig. 3 is a plan view of a portion of said mechanism on a larger scale, the bed and upper parts of the reciprocating mechanism being removed for convenience of illustration. Fig. 4 is a vertical section taken on line 4 4 in Fig. 3. Fig. 5 is a vertical section of a portion of the mechanism, and Figs. 6, 7, 8, 9, 10, 11, and 12 are views of details of construction.

In the drawings, referring first to Figs. 1 and 2, there is shown a base 1, which is understood to be the usual base of any common form of printing-press having a horizontally-reciprocating bed carrying a printing-frame which is moved back and forth under and away from a rotating cylinder carrying the paper on which the form makes an impression. The reciprocating bed is indicated at 2 and is understood to carry the form in any desired or common manner, the form and rotary cylinder not being shown. The bed 2 is mounted to reciprocate on suitable guideways

3 3, mounted upon and secured to vertical standards 4 4. The bed 2 carries a longitudinally-disposed frame 5, which is suspended from and located between the guides or rolls 3 3, as shown in Fig. 1. A pair of racks 6 55 and 7 are mounted, respectively, on the top and bottom of the frame 5, as shown in Figs. 2 and 4. A rotary driving-shaft 8 is mounted on the base 1 crosswise of the guides or rails 3 3, and this shaft 8 is provided with a large gear 9, which meshes with a gear 10, mounted on a shaft 11, journaled in a bearing 12 on the base 1. The shaft 11 carries a gear 13, which is ordinarily called the "driver," for rotating the cylinder, which latter is not shown. At the opposite end of the shaft 11 is mounted a disk 14, carrying a square projection or crank 15, Figs. 7 and 9. A second short shaft 16 is mounted in a sliding block 17 and carries at one end a disk 18 and at the other end a pinion 19. The disk 18 has a slot 20, Fig. 10, adapted to receive a square projection 15 on the disk 14. The gear 19 is adapted to mesh with the racks 6 and 7 on the frame 5, carried by the bed 2. The sliding block 17, carrying the shaft 16, is mounted for vertical reciprocation in guideways 21 21, Figs. 3 and 5, and has its lower end 22 made in the form of a yoke, between the forked portions of which is mounted a roller 23. The roller 23 is adapted to enter a slot 24 in a sliding cam-piece 25, which slot 24 extends longitudinally of the piece 25 and is made with a bend or irregularity, as shown in Fig. 5. The cam-piece 25 is arranged to slide in the upright guideways 21 21 and is connected with a link 26, which is provided with a pair of pins 27 28, adapted to cooperate with a cam 29 on the shaft 8, so that the rotation of the cam 29 causes the link 26 to shift the cam-piece 25 longitudinally, and thereby raise and lower the block 17 and shaft 16. The frame 5, carried by the reciprocating bed, is provided also with a pair of gripping devices, each conveniently consisting of a shoe 30, Fig. 12, secured to one of the end pieces of the frame 5, and a sliding locking-plate 31, Fig. 11, arranged to slide in guideways 32 32 at the ends of the shoe 30 and conveniently provided with ribs 33 33, adapted to work in slots or grooves 34 34 in the shoe 30. 100

Each shoe 30 is mounted at an inclination or angle to the path of travel of the bed, as shown in Fig. 3, and the front edge of the locking-plate 31 is constructed with a beveled edge 35, which with the projecting rib or flange 30^a of the shoe 30, Figs. 6 and 12, forms co-operating jaws which, it will be seen, are opened and closed by a sliding movement of the plate 31 relatively to the shoe 30 and whereof the jaw 35, formed by the plate 31, retracts in opening and advances in closing, due to the fact that it is mounted for an inclined sliding movement. A rack 31^a is mounted on the outer or rear face of the locking-plate 31, and a toothed segment 36, meshing with the rack 35, is carried by a shaft 37, mounted in standards 38 38 on the shoe 30. The shaft 37 is provided at its lower end with a crank-arm 39, having a pin 40. A cam-plate 41 is mounted on the base 1 and provided with cam portions 42 42 and 43, forming cam-grooves 44 and 44^a, Fig. 3. The grooves 44 and 44^a are adapted to receive the pins 40 40 on the shafts 37 37 of the aforementioned gripping devices. The gear 19 is provided with a pin carrying a thimble 45, Fig. 3, which thimble is adapted to be engaged or gripped between the jaws formed by the locking-plates 31 and shoes 30 of the said gripping devices.

The operation of the device is as follows: The shaft 8 being rotated in the direction indicated by the arrow in Fig. 2 causes the gear 9 to continually rotate the short shaft 11. The shaft 11 in turn rotates the shaft 16 by means of the connection between said shafts, consisting of the disks 14 and 18, the projection 15 on the disk 14, and slot 20 in the disk 18. The gear 19 by being in engagement with one or the other of the racks 5 and 6 will cause the movement of one or the other of said racks and a corresponding advancement or retraction of the reciprocating bed 2. When the bed 2 is reciprocated to such an extent that the end of the rack engaged with the gear 19 reaches said gear, or shortly before such time, the pin 40 on the shaft 37 of one of the gripping devices will be engaged by one of the cam-grooves 44 44^a, with the result that the sliding locking-plate 31 of such device will be shifted forwardly and will grip the thimble 45 between itself and the shoe 30, as shown in Fig. 3, in which figure the gripping device at the left-hand side of the frame 5 is shown with its pin 40 working in the cam-groove 44^a. This action of the gripping devices causes the thimble 45 to be firmly clasped or gripped, so that the continued rotation of the shaft 16 causes the bed 2, by reason of the connection between said gripping device and the thimble 45, to be thrust or moved farther in the direction in which it was going, even though the gear 19 has become disengaged with the rack with which it was coöperating. The bed 2 is thus thrust to

the full end of its stroke, the thimble 45 acting as a crank, and when by the continued rotation of the shaft 16 the thimble 45 begins to move in a reverse direction the bed is correspondingly reversed and drawn in the opposite direction. During this period of movement of the bed by the crank action of the thimble 45, however, the cam 29, Fig. 5, on the shaft 8 has operated the slide 25 to such an extent as to shift the position of the sliding bearing 17 so that when the bed is returned by the thimble 45 and gripping device to such position that it will engage one of the racks 6 7 the gear 19 will be so shifted in position as to engage the other rack—that is to say, the one which was not formerly engaged by such gear. This action will take place at both ends of the path of travel of the sliding bed, the thimble 45 being first engaged by one of the gripping devices, so that when the gear 19 passes out of mesh with one of the racks on the reciprocating bed the bed will be advanced to the end of its stroke and then returned and the gear placed in mesh with the other rack. In Figs. 1 and 2 the reciprocating bed 2 is shown at the right end of its path of travel and about to begin a movement to the left, as indicated by the arrows in said figures, and in Figs. 3 and 4 the coöperating mechanism is shown in a corresponding position. In such position it will be seen the bed has been retracted—that is, moved—to the right by the gear 19, and this gear and rack have become disengaged and the bed has been moved to the end of its path of travel by the thimble 45 and left-hand gripping device. The shaft 16 has then been elevated, so that now the gear 19 is in a position to mesh with the rack 6 on the return movement or retraction of the bed. This is shown plainly in Fig. 4. In this position the bed is about to pass under the cylinder, so as to receive the impression. The shifting connection between the shafts 11 and 16 insures the continual rotation of the latter, even though it be shifted vertically to mesh with first one and then the other of the racks on the reciprocating bed.

It will be seen that by the arrangement thus described the gripping of the thimble 45 is performed in such a manner that there is no lost motion on the part of the bed, and, furthermore, there is a quick and clean-cut gripping action without wear and injury to either the thimble or gripping device. This will be seen to be so because the inclined edges 35 35 of the locking-plates 31 31 form, with the co-operating faces of the shoes 30 30, parallel jaws which are adapted to extend alongside opposite sides of the thimble 45, and the inclined direction of motion of these sliding plates 31 31 causes these parallel jaws to clasp both sides of the thimble 45 simultaneously along the entire length thereof.

It will be understood that changes and modifications can be made in the construction here-

in set forth without departing from the spirit of my invention.

What I claim is—

1. The combination with the reciprocating bed and means for reciprocating the same, of a crank, gripping devices carried by the bed, each consisting of a pair of jaws mounted parallel with one another and also mounted so as to maintain the parallel relation in opening and closing, and one of said jaws being mounted to advance and retract at an oblique angle relatively to the direction of movement of the reciprocating bed, and means for closing said jaws to cause the same to engage the crank near the ends of the path of travel of the bed.

2. The combination with a reciprocating bed and means for reciprocating the same, of a crank, gripping devices carried by the bed, each consisting of a pair of parallel jaws, one of which is mounted to move toward and away from the other at an inclination by which said jaw is given an opening and a closing and also a retracting and advancing movement toward and away from the reciprocating bed, and means for moving the movable jaws of said gripping devices to cause the engagement of said crank thereby near the ends of the path of travel of the bed.

3. The combination with a reciprocating bed, of a pair of racks carried thereby and arranged in the same plane, a gear adapted to mesh with said racks, said gear being mounted for reciprocation between said racks to engage either one of the same, means for reciprocating the said gear near the ends of the path of travel of the bed, a rotary crank, gripping devices carried by the bed, comprising substantially parallel jaws adapted to receive and grip said crank and mounted to advance in closing and to retract in opening, and means for causing the closing of said jaws near the ends of the path of travel of the bed, substantially as described.

4. The combination with the reciprocating bed, of a pair of racks carried thereby, a rotary shaft provided with a gear adapted to mesh with said racks, a reciprocating bearing carrying said shaft, means for reciprocating said shaft near the ends of the path of travel of the bed so as to permit the engagement of said gear with one and then the other of said racks, gripping devices comprising shoes secured to the bed and sliding locking-plates arranged to slide on said shoes at an oblique angle relatively to the direction of movement of said bed, and having faces adapted to cooperate with gripping-faces on said shoes to form gripping-jaws, means for closing said jaws near the ends of the path of travel of the bed, and a crank carried by said rotary shaft, said crank being adapted to be engaged by the gripping-jaws near the ends of the path of travel of the bed.

5. The combination with the reciprocating

bed of a pair of racks 6 and 7 carried thereby, gripping devices also carried by the bed, said gripping devices comprising shoes 30 having inclined guideways, gripping-plates 31 arranged to slide in said guideways, shafts 37 having crank-pins 40 and having toothed segments adapted to mesh with racks on the plates 31, a rotary shaft 16 carrying a gear 19 adapted to mesh with the racks 6 and 7, a vertically-reciprocating journal 17 carrying the shaft 16, vertical guideways 21, 21 in which the journal 17 is adapted to work, a slide 25 having a slot 24 adapted to receive a roller 23 on the journal 17, a link 26 connected with the slide 25, a rotary shaft 8 carrying a cam 29 arranged to operate the link 26, a rotary shaft 11 having a disk 14 provided with a projection 15, a disk 18 having a slot 20 mounted on the shaft 16, gears 9 and 10 on the shafts 8 and 11 respectively, and cams 42, 42 and 43 forming cam-grooves 44 and 44^a adapted to receive the crank-pins 40, 40 on the shafts 37, 37, substantially as described.

6. The combination with the rotary shaft 16, of a reciprocable journal carrying the same, a disk 18 carried by the shaft 16 and having a slot 20, and a rotary shaft 11 carrying a disk 14 having a projection 15 adapted to work in the slot 20, substantially as described.

7. The combination of a reciprocating member provided with shoes 30, 30, sliding plates 31, 31 arranged to work in inclined guideways on said shoes, rock-shafts 37, 37 provided with toothed sectors 36, 36, meshing with racks 31^a, 31^a on said plates, and cams 42, 42 and 43 providing grooves 44 and 44^a adapted to receive and operate crank-pins 40, 40 on the shafts 37, 37.

8. In apparatus of the class specified, a gripping device comprising a pair of jaws, means for mounting one of said jaws whereby it can be moved at an inclination to the other jaw while maintaining a parallel relation therewith, and means for closing said movable jaw upon the other jaw.

9. In apparatus of the class specified, the combination of a gripping device comprising a fixed member, and a sliding member, which members are adapted to form cooperating jaws, guideways whereby the sliding member can be moved at an inclination to the fixed member while the jaws formed by said members are maintained in a parallel relationship, and means for causing a sliding movement of the sliding member relatively to the fixed member to close said jaws, substantially as described.

10. In apparatus of the class specified, the combination of a gripping device comprising a pair of members one of which is arranged for sliding movement relatively to the other, said members being adapted to form gripping-jaws which are closed by said sliding movement, guideways for said sliding member, whereby the same can slide toward and away

from the other member in an inclined direction while the jaws of said members are maintained parallel, and means for sliding said slidable member relatively to the other one, 5 substantially as described.

11. In apparatus of the class specified, the combination with the reciprocating member, of a pair of gripping devices each comprising a pair of members whereof one is slidable 10 relatively to the other, said members being adapted to form gripping-jaws, guideways for said slidable member, whereby the same can be slid toward and away from the other member in an inclined direction, mechanism 15 for causing a sliding movement of the movable member of one of said gripping devices to close said jaws near the ends of the path of travel of said reciprocating member, and a device adapted to be engaged by said jaws 20 when the same are closed, substantially as described.

12. The combination with the reciprocating member, of means for reciprocating the same, a pair of gripping devices carried by said 25 member, each of which devices comprises a pair of members one of which is slidable relatively to the other, which said members are adapted to form jaws, guideways for said slidable member, whereby the same can be 30 slid toward and away from the other member in an inclined direction, mechanism carried by said reciprocating member for causing a sliding movement of said sliding members relatively to their cooperating members, 35 means for operating said mechanism near the ends of the path of travel of said reciprocating member, and a crank adapted to be gripped

by said jaws near the ends of the path of travel of said reciprocating member, substantially as described. 40

13. In apparatus of the class specified, a gripping device comprising a shoe having inclined guideways, a sliding locking-plate adapted to slide in said guideways, and means for sliding said plate relatively to said shoe, 45 substantially as described.

14. In apparatus of the class specified, a gripping device comprising a shoe having inclined guideways, a sliding locking-plate arranged to slide in said guideways and provided 50 with an inclined face or edge 35, and means for sliding said locking-plate relatively to said shoe, substantially as described.

15. In apparatus of the class specified, a gripping device comprising a shoe having inclined guideways, a sliding locking-plate arranged to slide in said guideways and provided with an inclined face or edge 35, and a 55 rock-shaft carried by the shoe and provided with a toothed segment adapted to mesh with a rack carried by the sliding plate. 60

16. The combination with the sliding bearing 17 carrying a roller 23, of a transversely-movable slide 25 having a groove 24, a link 26, a rotary shaft 8 having a cam 29, and pins 65 27 and 28 on the link 26 for engaging the cam 29.

In witness whereof I hereunto subscribe my name this 5th day of December, A. D. 1903.

SEVERIN HALVORSEN.

Witnesses:

A. MILLER BELFIELD,
I. C. LEE.