(No Model.) 3 Sheets—Sheet 1.

W. S. HUSON.

MECHANICAL MOVEMENT.

No. 475,772. Patented May 31, 1892.

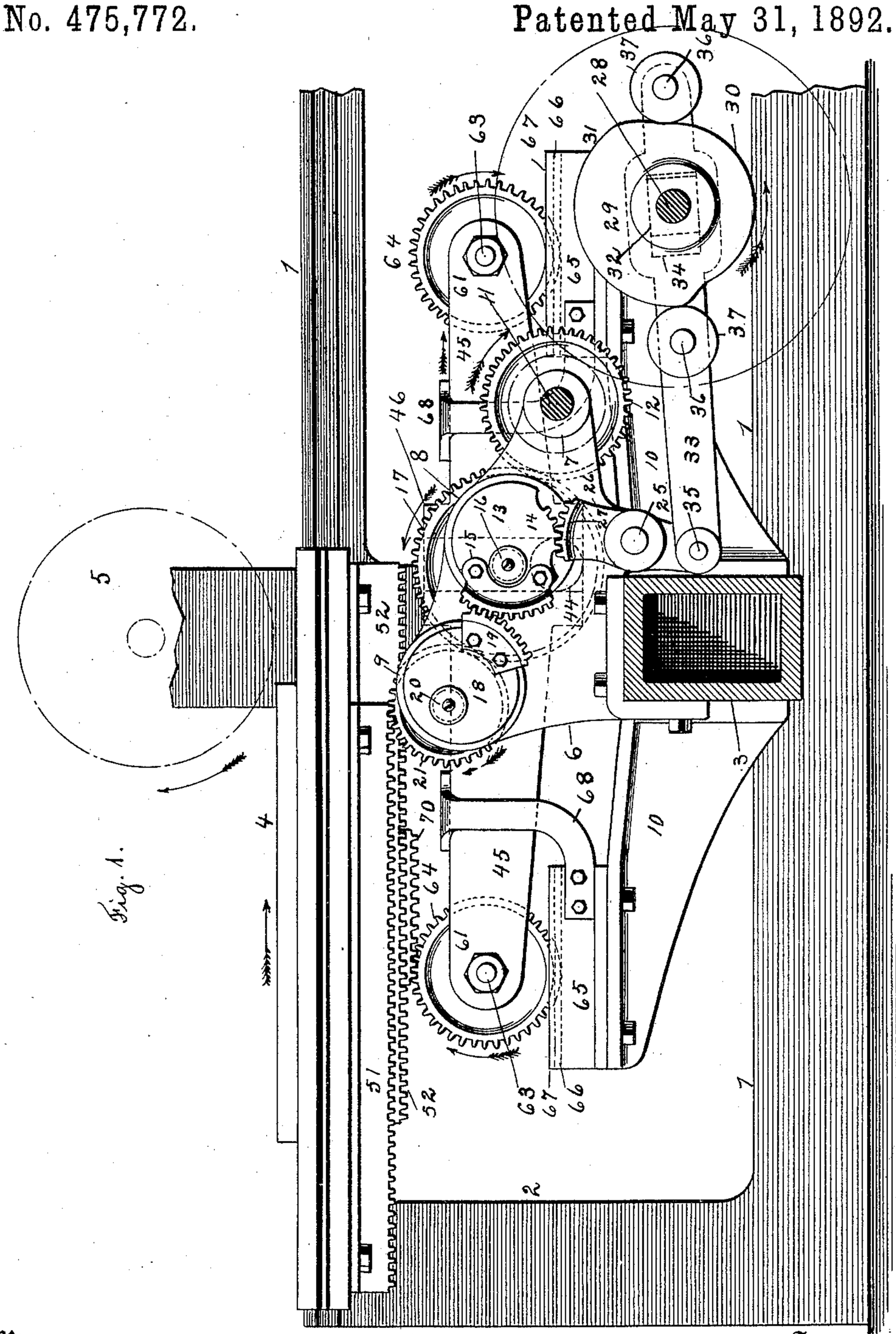

Fig. 1.

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(No Model.) 3 Sheets—Sheet 2.

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MECHANICAL MOVEMENT.

No. 475,772. Patented May 31, 1892.

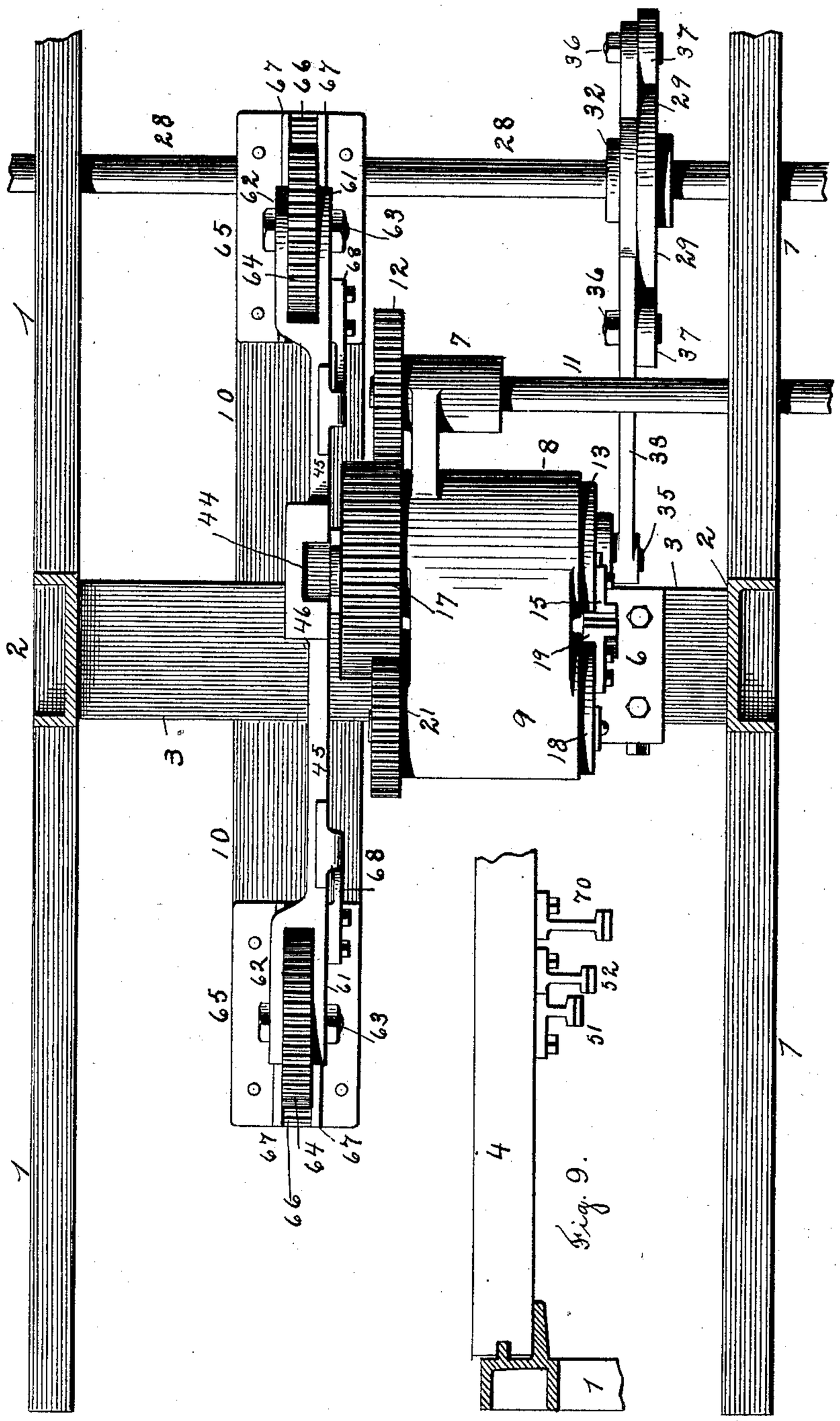

Fig. 2.

Fig. 9.

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3 Sheets—Sheet 3.

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MECHANICAL MOVEMENT.

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Fig. 3.

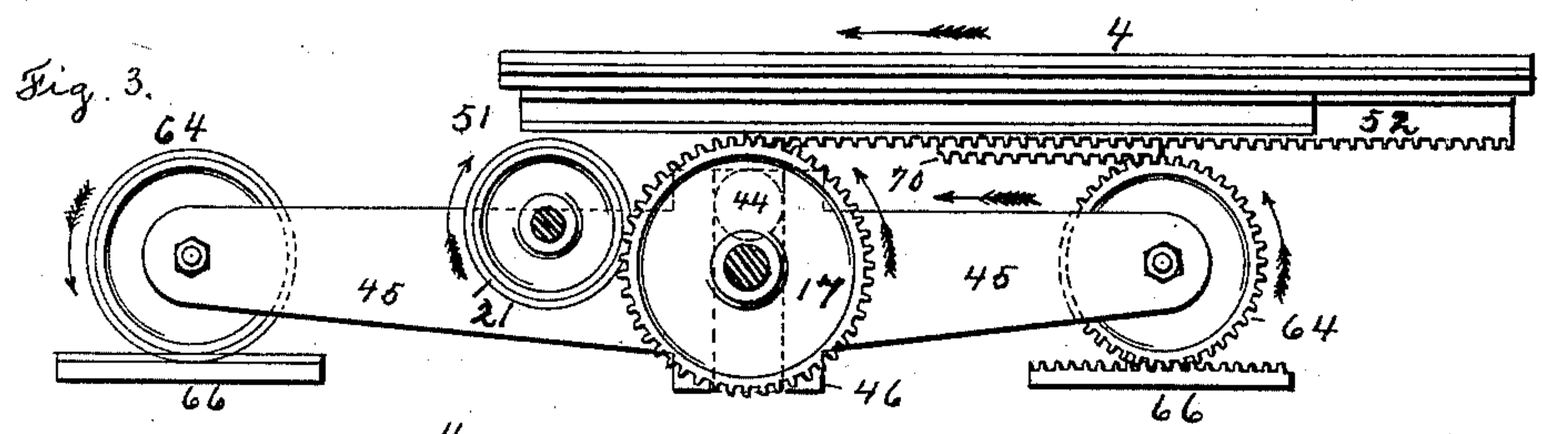


Fig. 4.

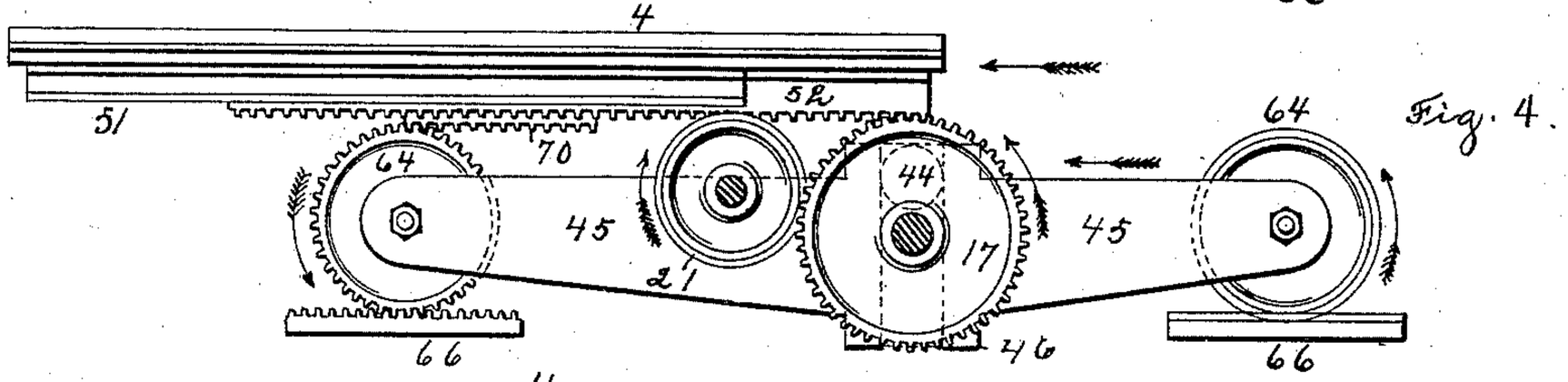


Fig. 5.

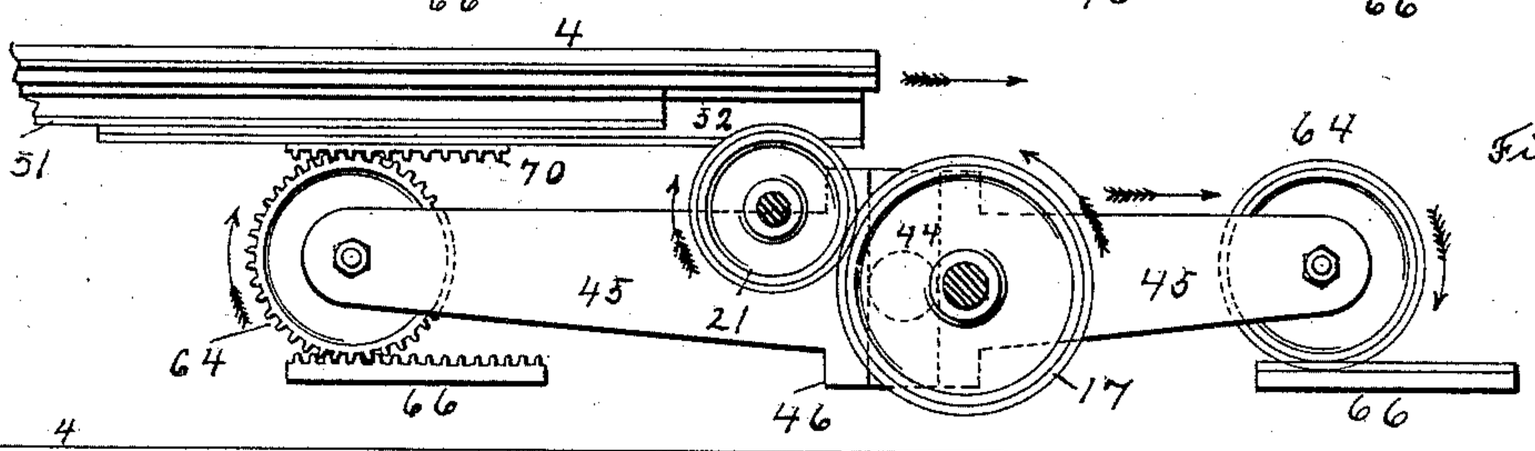


Fig. 6.

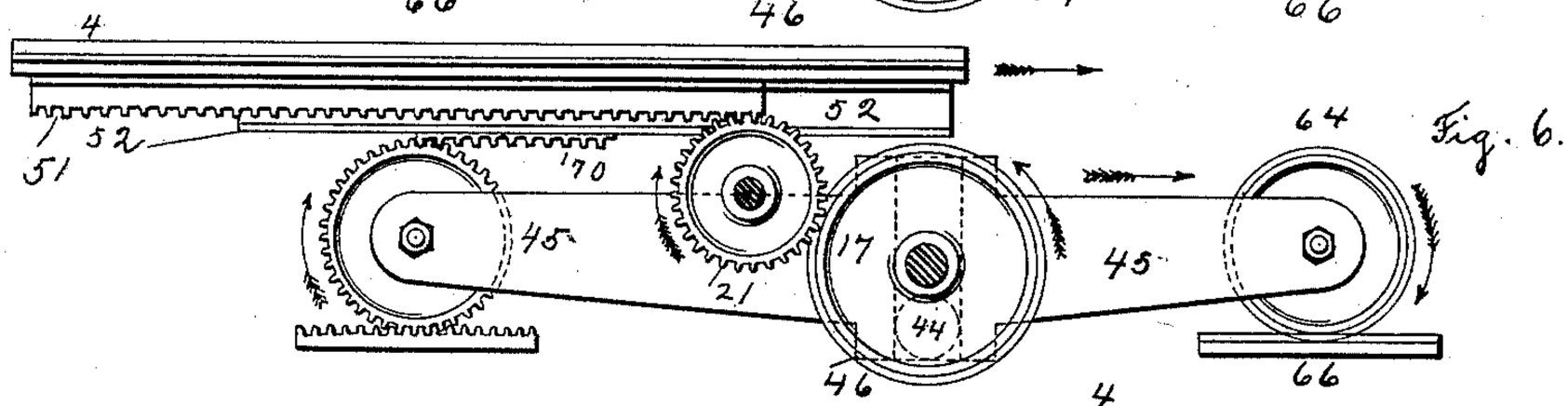


Fig. 7.

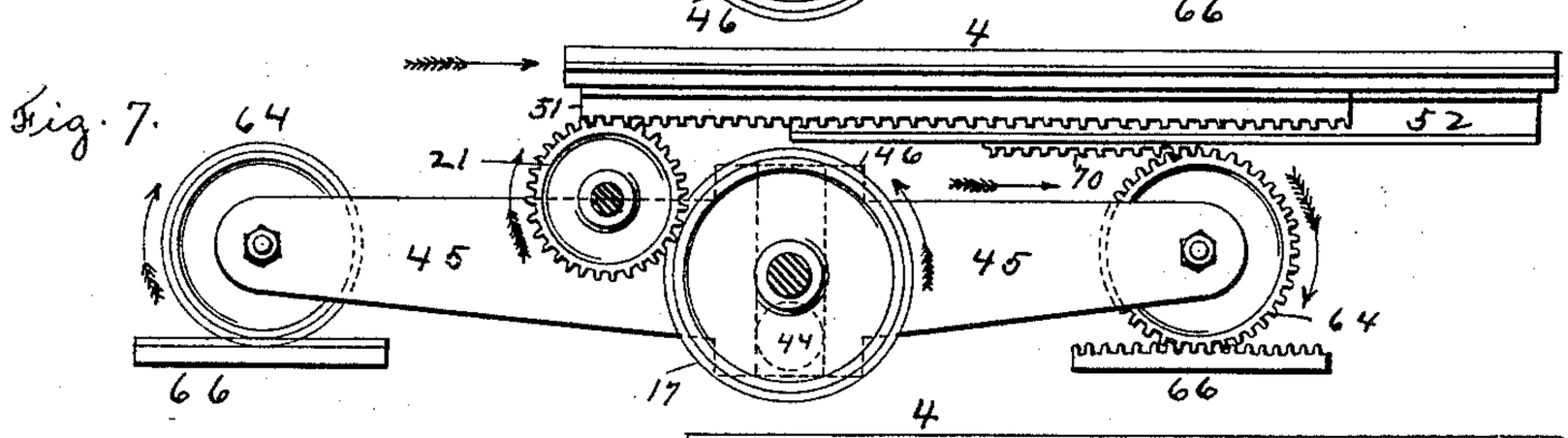
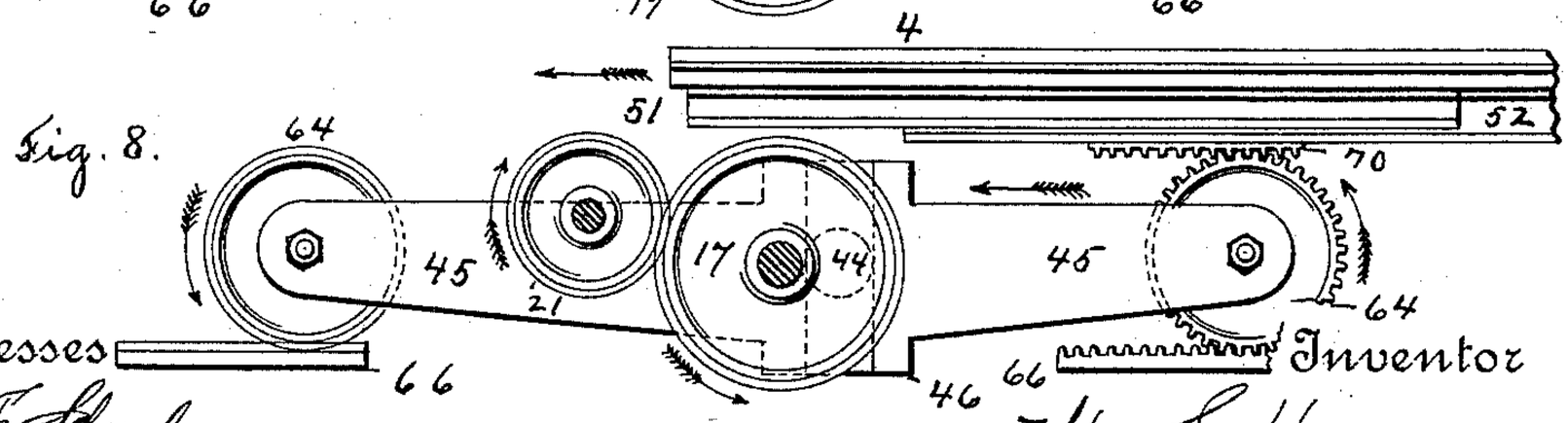


Fig. 8.



Witnesses
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UNITED STATES PATENT OFFICE.

WINFIELD S. HUSON, OF TAUNTON, MASSACHUSETTS, ASSIGNOR TO THE CAMPBELL PRINTING PRESS AND MANUFACTURING COMPANY, OF NEW YORK, N. Y.

MECHANICAL MOVEMENT.

SPECIFICATION forming part of Letters Patent No. 475,772, dated May 31, 1892.

Application filed April 6, 1892. Serial No. 428,017. (No model.)

To all whom it may concern:

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

The aim of this invention is to produce a new and improved mechanical movement for converting rotary motion into rectilineally-reciprocating motion, and the movement is especially designed for use in connection with the reciprocating beds of printing-presses, though of course the same may be applied and used in any location and for any purpose in which the same is adapted.

This invention is a modification or further carrying out of the device shown, described, and claimed in my companion application, Serial No. 427,151, filed March 31, 1892, hereinafter referred to as "Case A," and also of the device shown, described, and claimed in my companion application, Serial No. 428,016, filed April 6, 1892, and which will hereinafter be referred to as "Case B."

In this case I show a device for obtaining the same results as that contemplated in my other two cases—viz., of giving to the reciprocating member a direct backward-and-forward movement and of adding another mechanism that will give to the moving member a reversing movement by which the same will be gradually stopped and started again in the opposite direction without jar. I will hereinafter refer to these mechanisms as the "direct" and as the "reversing" mechanisms, respectively.

I use in the device shown in this case the same mechanism for obtaining the direct movement as that used in Case B, before referred to, but a new and different reversing mechanism, which, while obtaining the same result as the reversing mechanism shown in Cases A and B—viz., a movement substantially the resultant of a crank connection—is different in construction and operation.

Referring now to the drawings, Figure 1 is a sectional side elevation of my improved device. Fig. 2 is a sectional plan. Figs. 3 to 8, inclusive, are diagrams, on a reduced scale, illustrating the various positions assumed by the gearing in operation, and in these diagrams only the gearing is shown with teeth that at that particular moment is acting to move the reciprocating member; and Fig. 9 is an end view of the bed, illustrating the position of the racks.

In detail, 1 represents the framing, 2 the vertical braces, and 3 a horizontal tie-beam.

The moving member or bed 4 is arranged so as to be capable of a sliding movement back and forth, and the same may be mounted in the usual manner that printing-press beds are mounted, and which is not necessary to show and describe in this case. If the movement is applied to a two-revolution single-cylinder printing-press, 5 represents the position which the impression-cylinder would occupy.

A bracket, as 6, is secured to the tie-beam 3, and the same has the bearings 7, 8, and 9. Brackets 10 are also fastened to the tie-beam and extend each side thereof, as shown. Journaled in the bearing 7 is the driving-shaft 11, and the same may be continuously rotated in one direction by any of the usual mechanisms, and on the end of the shaft 11 is fastened the pinion 12.

In the bearing 8 of bracket 6 is mounted the eccentric bushing 13, which has formed on the outside rim thereof the teeth 14, and on the bushing 13 is secured the toothed segment 15. Journaled in the said eccentric bushing is the shaft 16, and on the end of the shaft is secured the gear 17.

In the bearing 9 of bracket 6 is journaled another eccentric bushing 18, and to the same is secured the toothed segment 19, which meshes with segment 15, whereby the two bushings 13 and 18 are geared together and will oscillate oppositely. In the eccentric bushing 18 is journaled a shaft 20, and on the end of this shaft is fastened the gear 21, which meshes with gear 17 and is driven thereby. Gear 21 is less than half the face of gear 17, so that the latter will project beyond the gear 21, as shown in Fig. 2.

A stud 25 is secured in bracket 6, as shown, and on this stud is hung the lever 26, having teeth 27, which mesh with teeth 14 on bush-

ing 13, whereby as the lever 26 is vibrated the bushings 13 and 18 will be oppositely oscillated and the gears 17 and 21 alternately oppositely raised and lowered.

Journaled or mounted in the framing 1 is the shaft 28, which carries the cam 29, which has the surfaces 30 and 31, each surface part of a circle of a relatively-different radius struck about the center of the shaft 28, and the surfaces 30 and 31 are connected by easy inclines, as shown. A block, as 32, is mounted on shaft 28, and the link 33, having slot 34, is fitted on this block, and the link 33 is connected to lever 26 by pin or stud 35. Secured to the link on opposite sides of the cam are the studs 36, and mounted on these studs are rollers 37, which engage the surfaces 30 and 31 of the cam 29. Fastened to the moving member or bed are the rack 51, adapted to engage gear 21, and the rack 52, adapted to engage gear 17, and these racks are made of the same length, but are made to project beyond each other a distance substantially equal to the distance between the centers of gears 17 and 21.

The cam 29 is arranged to turn once for each complete reciprocation of the moving member, and the operation of this complete mechanism, which is the direct mechanism of my Case B, is exactly the same as that of the device shown in said Case B, and the same gives the positive or direct movement hereinafter described in the operation of the complete mechanism.

Fastened or secured to the face of the gear 17 is a wrist-pin, which has a roller or block 44, and engaging this wrist-pin is the yoke 46, which has the extending arms 45, as shown. These arms are bifurcated at their ends, as shown, as at 61 and 62, and passing through these arms or prongs are the studs 63, upon which are journaled the gears 64. On the arms 10 of the bracket 6 are secured the guide-pieces 65, and in the bottoms of these pieces are arranged short racks, as 66, into which gears 64 mesh and on which they ride. The sides of the guide-pieces 65 are extended up, as at 67, on each side of the rack, so that said sides 67 will form lateral guides of the gears 64. Bolted to the guide-blocks are the brackets 68, which extend over and hold and guide the yoke-arms 45. Fastened to the moving member or bed is the short rack 70, which is placed at about the middle of the bed and with which the gears 64 are adapted to engage. It is evident now that as the gear 17 revolves the wrist-pin will be rotated, and hence the yoke 46 will be vibrated back and forth a distance equal to the diameter of the circle on which the wrist-pin is set at every revolution of said gear 17. As the yoke 46 vibrates the gears 64 will ride back and forth on their racks 66, and will thereby turn back and forth.

The relation of the gears 64 to the radius of the wrist-pin is proportioned so that as the gears 64 are moved at their fastest speeds—that is, when the crank is at its full throw, as in Fig. 1—the speed imparted to the bed will be the same as that imparted by the direct mechanism. Hence the gears 64 will take the bed at the same speed which the same is moving by means of the direct driving-gear, and will move the bed a distance beyond at a speed gradually decreasing from the maximum to zero, then will move the bed in the other direction the same distance at a speed gradually increasing from zero to the maximum, and will transfer the bed back to the direct driving mechanism at the same speed at which the direct mechanism would drive the bed. Thus the reversing mechanism imparts to the bed a movement the equivalent of a crank movement.

Referring to the diagrams for a detailed explanation of the operation, Fig. 3 represents the bed or moving member as just commencing its direct movement to the left, the gear 17 raised to engage the rack 52, and the gear 21 lowered to clear rack 51. Now during the next complete rotation of gear 17 the bed will be moved to the left at a uniform speed a distance equal to the pitch circumference of gear 17, or until the parts assume the position shown in Fig. 4. The left-hand gear 64 will now just engage the left-hand end of the rack 70 and as the wrist-pin is at its highest point will continue the motion to the left, starting at the same speed at which the bed is moved by the direct mechanism. During the next quarter-revolution of the gear 17 the bed will be moved to the left a distance equal to a pitch radius of gear 17 at a speed gradually decreasing from the maximum to zero. This motion is derived from two sources—first, the direct movement of gear 64 to the left, and, second, the rotation of gear 64, due to its travel on the rack 66—and the parts are so proportioned that the whole movement will be equal to a pitch radius of gear 17, whereby the initial speed will necessarily be the same as that derived from the direct mechanism. This last-described movement will bring the bed to a state of rest at its extreme of travel to the left or to the position shown in Fig. 5. Now during the next quarter-revolution of gear 17 the bed will be moved to the right a distance equal to a pitch radius at a speed gradually increasing from zero to the maximum, and this motion is the converse of that described in the previous quarter-revolution of gear 17. During this last half-revolution of gear 17 the eccentric bushings will have been operated to raise gear 21 and lower gear 17, so that now the gear 21 can engage rack 51, as shown in Fig. 6. Now during the next revolution of gear 17 the bed will be moved directly to the right a distance equal to a pitch circumference of gear 17, the gear 21 acting simply as an intermediate from gear 17 to give the bed the movement to the right. This last-described movement will bring the parts to the position shown in Fig. 7. Now the bed will be moved

still farther to the right by the right-hand gear 64 a distance equal to a pitch radius of gear 17 at a speed gradually decreasing from the maximum to zero during the next quarter-revolution of gear 17, or until the bed comes to a stop at the right-hand limit of its travel or to the position shown in Fig. 8. Now during the next quarter-revolution of gear 17 the bed will be moved to the left at a speed gradually increasing from zero to maximum the same distance which it was previously moved to the right by gear 64—viz., a pitch radius of gear 17. During the last half-revolution of gear 17 gear 17 will have been raised and gear 21 dropped, and this will bring the parts to the position shown in Fig. 3, or where the movement was supposed to be started from. Thus the complete movement of the bed is a pitch circumference of gear 17 plus a pitch diameter.

By lengthening the rack the movement of the bed could be made one or more pitch circumferences of gear 17 plus a pitch diameter. Thus three or any larger odd number of revolutions of gear 17 may be converted into one complete reciprocation of the bed. This gearing and proportion could, of course, be greatly varied without departing from the scope of my invention. The movement described is admirably adapted for the "bed movement" of a printing-press, as a bed operated by such a movement will be easily reversed without jar, whereby the same can be run at a very high speed.

The details and arrangements of parts 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, is—

1. The combination of the reciprocating member or bed and means for reciprocating the same, a reversing mechanism adapted to reverse the movement of the bed independent of the means for reciprocating the same, said reversing mechanism comprising a traveling gear and connections to move the same, a stationary rack on which said gear rides, and a rack attached to the bed, with which said gear is adapted to mesh, substantially as described.

2. The combination, with the reciprocating member or bed, of the gearing for giving the same a direct forward-and-backward movement, of the reversing mechanism adapted to reverse the movement of the bed, comprising the revolving wrist-pin, a frame connected to be vibrated by said wrist-pin, gears carried at the ends of said frame, stationary racks on which said gears ride, and a rack mounted on said bed, with which the gears are adapted to engage to reverse the movement of the bed, substantially as described.

3. The combination, with bed 4, the gear 17, and means whereby said gear is adapted to give a direct forward-and-backward movement to said bed, of a reversing mechanism adapted to reverse the movement of the bed, comprising a wrist-pin carried by the gear 17, the yoke 46, which said wrist-pin is adapted to reciprocate, the gears 64, carried or vibrated by said yoke, stationary racks 66, on which the gears 64 ride, and a rack 70, attached to the bed, with which said gears 64 are adapted to engage to reverse the movement of the bed, substantially as described.

4. The combination, with bed 4, having racks 51 and 52, of intermeshed gears 17 and 21, means for alternately oppositely raising and lowering said gears, whereby a direct reciprocating movement may be imparted to the bed, of a yoke 46, having arms 45, a wrist-pin carried by gear 17 and engaging said yoke, and thereby imparting a reciprocating movement to the same, the gears 64, mounted in said arms 45, and the stationary racks 66, on which said gears ride, and the racks 70, mounted on the bed, with which said gears 64 are adapted to engage to reverse the movement of the bed, substantially as described.

5. The combination, with bed 4, having racks 51 and 52, of the intermeshed gears 17 and 21, means for alternately oppositely raising and lowering said gears, whereby a direct reciprocating movement may be imparted to the bed of a yoke 46, having arms 45, a wrist-pin carried by gear 17 and engaging said yoke, and thereby imparting a reciprocating movement to the same, the gears 64, mounted in said arms 45, and the stationary racks 66, on which said gears ride, the side guide 67, adapted to keep the gears 64 in mesh with said racks 66, and the rack 70, fastened to the bed, with which said gears are adapted to engage to reverse the movement of the bed, substantially as described.

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

WINFIELD S. HUSON.

Witnesses:
LOUIS W. SOUTHGATE,
J. F. HALEY.