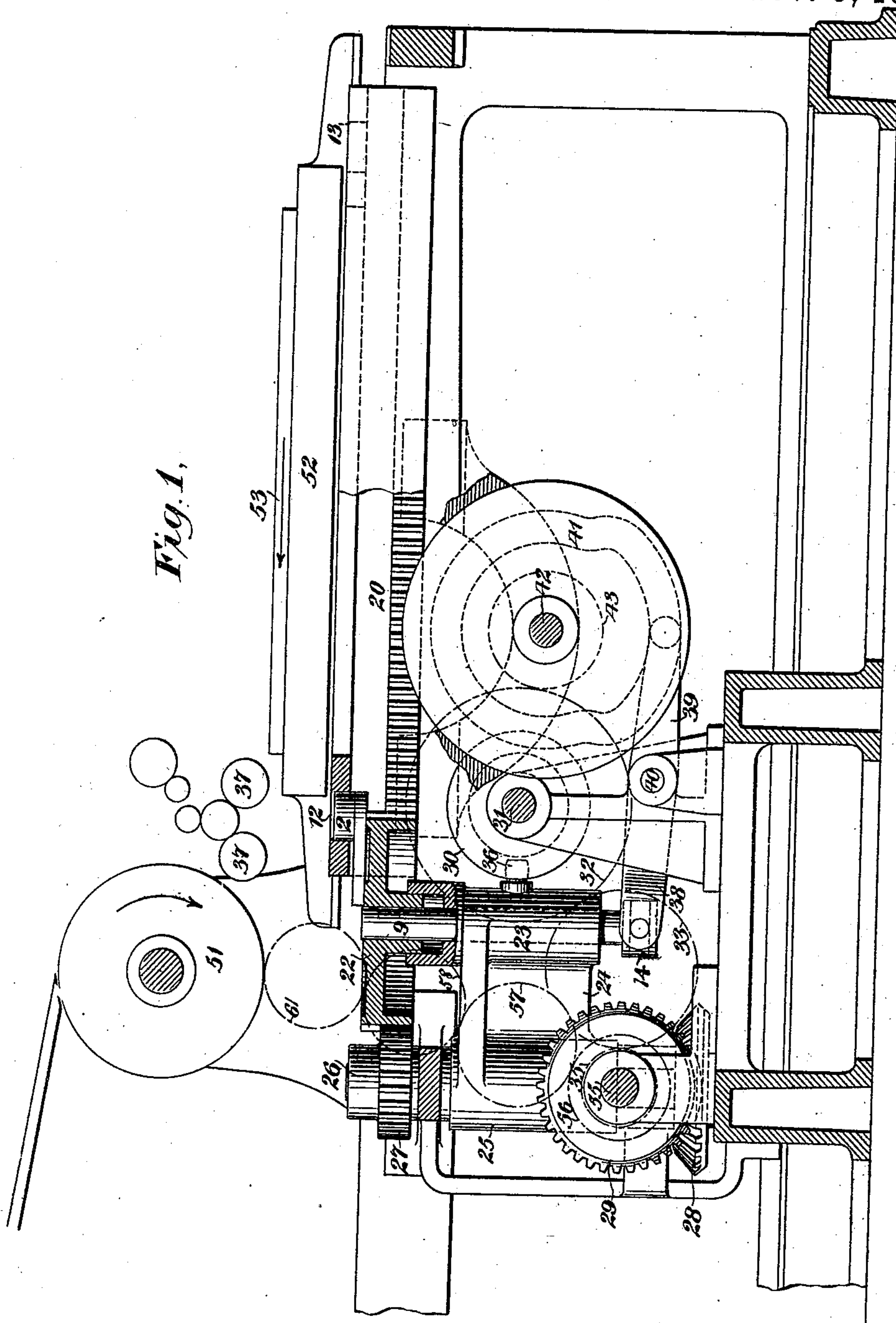


(No Model.)

6 Sheets—Sheet 1.

E. P. SHELDON.
BED MOTION FOR CYLINDER PRINTING MACHINES.
No. 549,261. Patented Nov. 5, 1895.



Witnesses:
Edward Thorpe
J. M. Borer

Inventor:
Edward P. Sheldon
By Philip Munster & Phelps
Atty's.

(No Model.)

6 Sheets—Sheet 2.

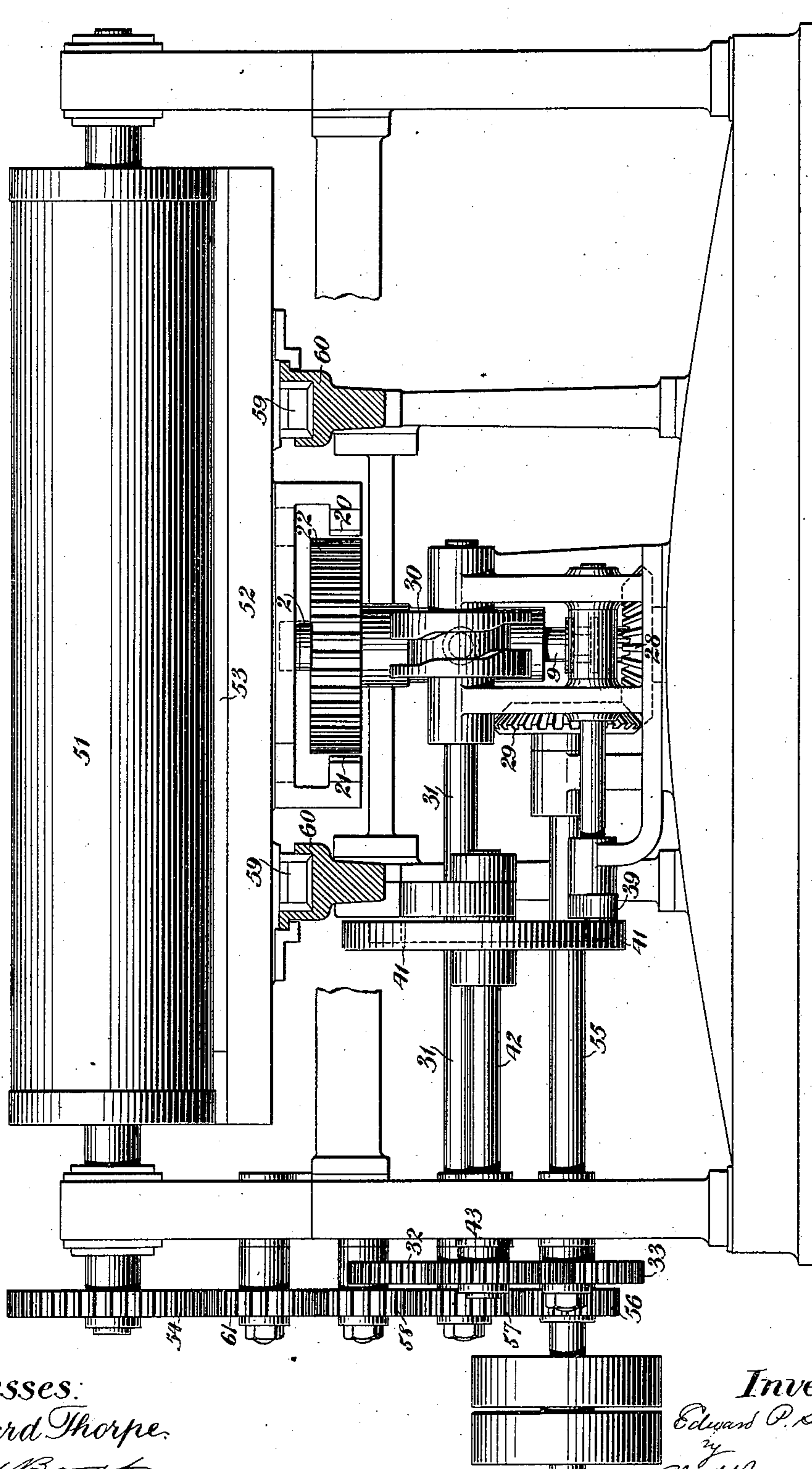
E. P. SHELDON.

BED MOTION FOR CYLINDER PRINTING MACHINES.

No. 549,261.

Patented Nov. 5, 1895.

Fig. 2.



Witnesses:
Edward Thorpe.
J. M. Borst

Inventor:
Edward P. Sheldon
by
Philip M. Munn & Philip
Atty's

(No Model.)

6 Sheets—Sheet 3.

E. P. SHELDON.

BED MOTION FOR CYLINDER PRINTING MACHINES.

No. 549,261.

Patented Nov. 5, 1895.

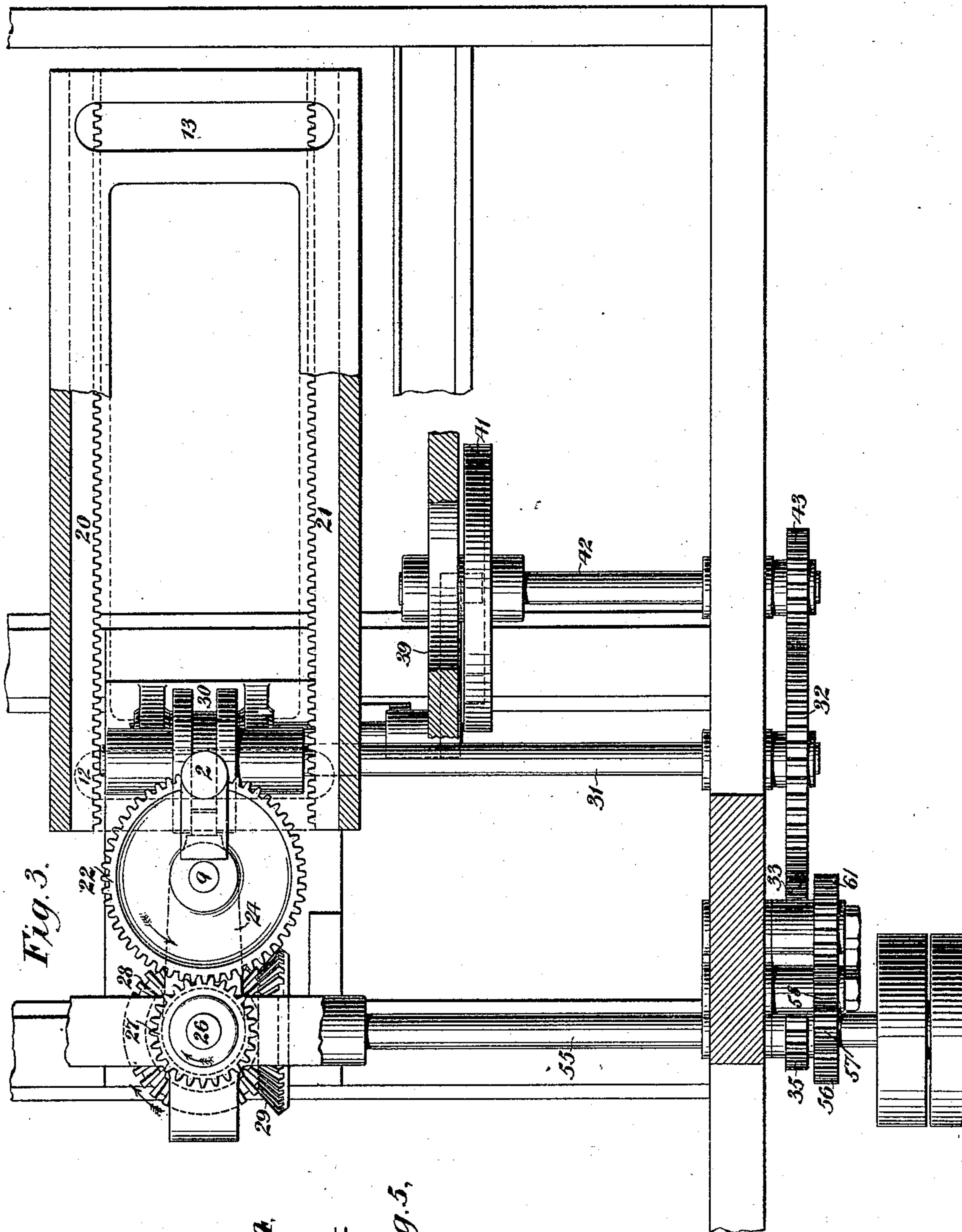


Fig. 4.

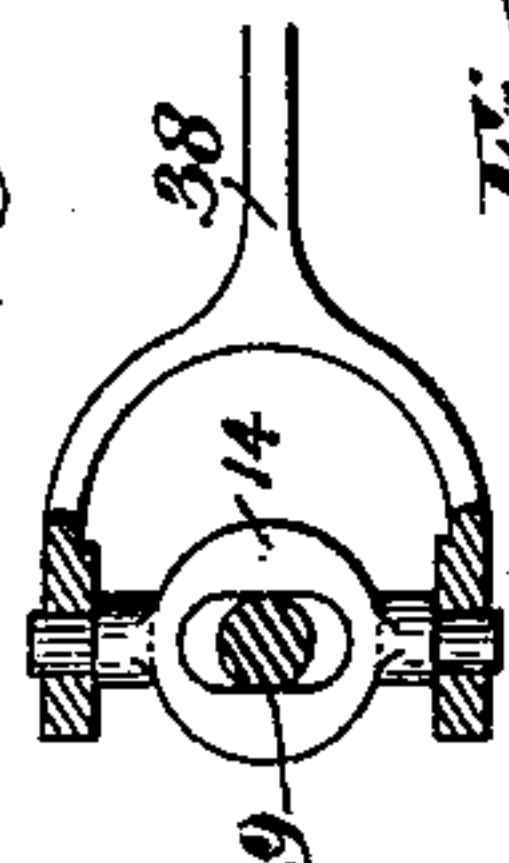
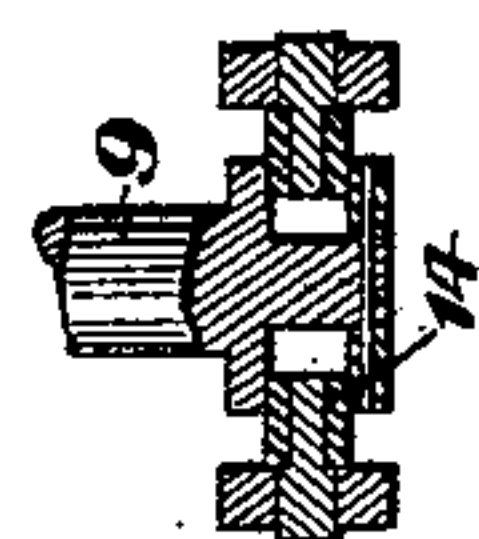


Fig. 5.



Witnesses:
Edward Thorpe
J. M. Borst

Inventor:
Edward P. Sheldon
By Philipp Munster & Phelps
Attys.

E. P. SHELDON.

BED MOTION FOR CYLINDER PRINTING MACHINES.

No. 549,261.

Patented Nov. 5, 1895.
Fig. 6,

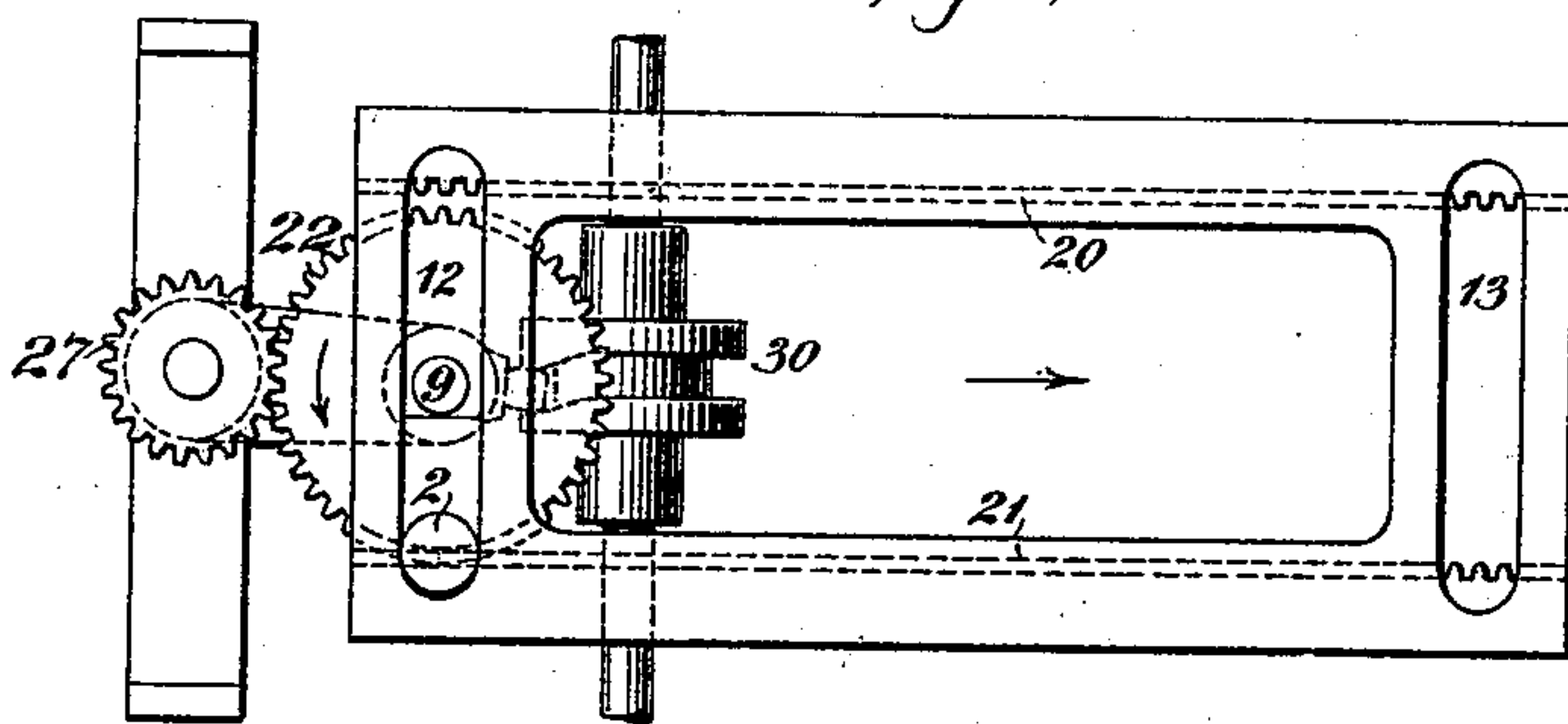


Fig. 7,

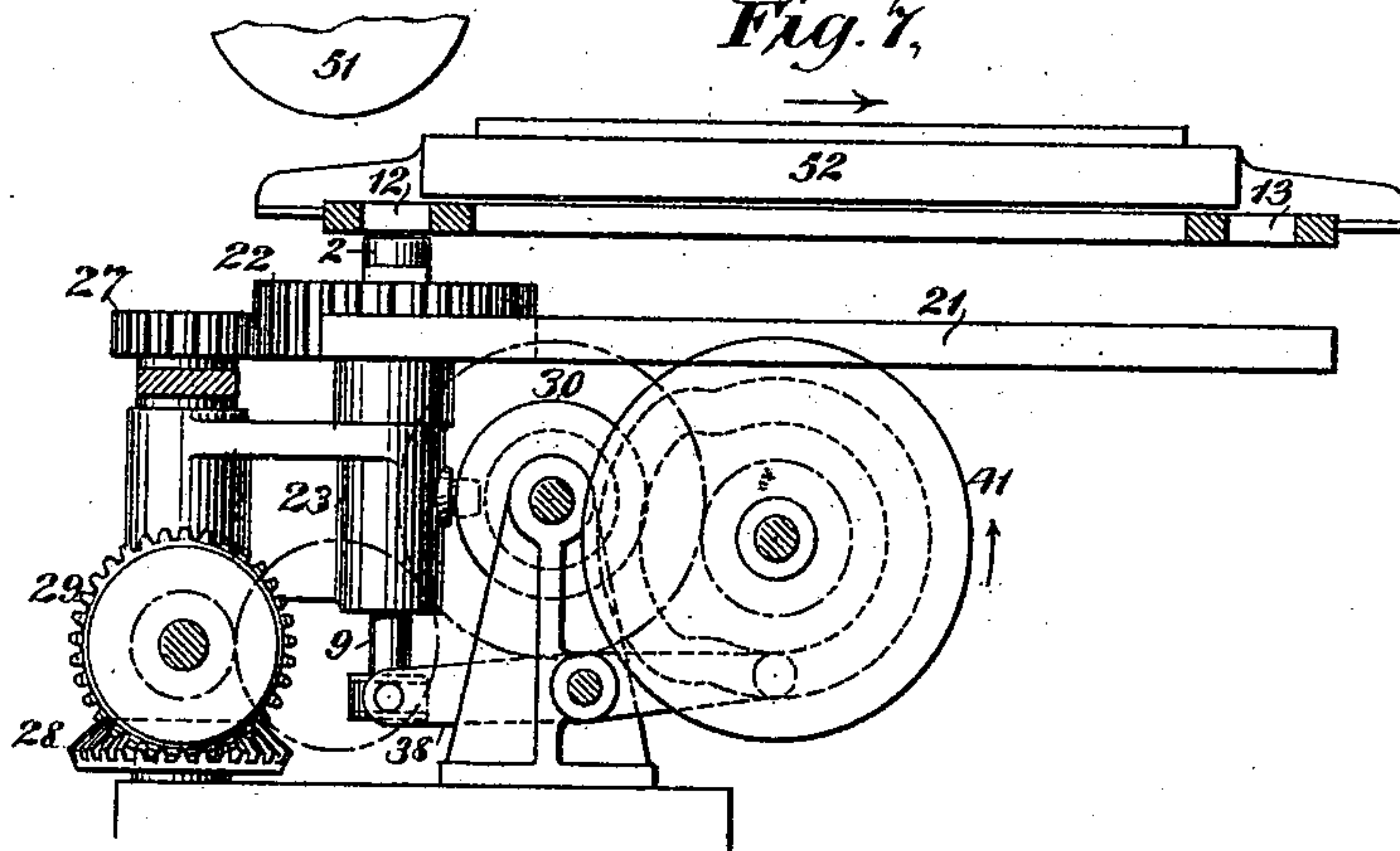


Fig. 8,

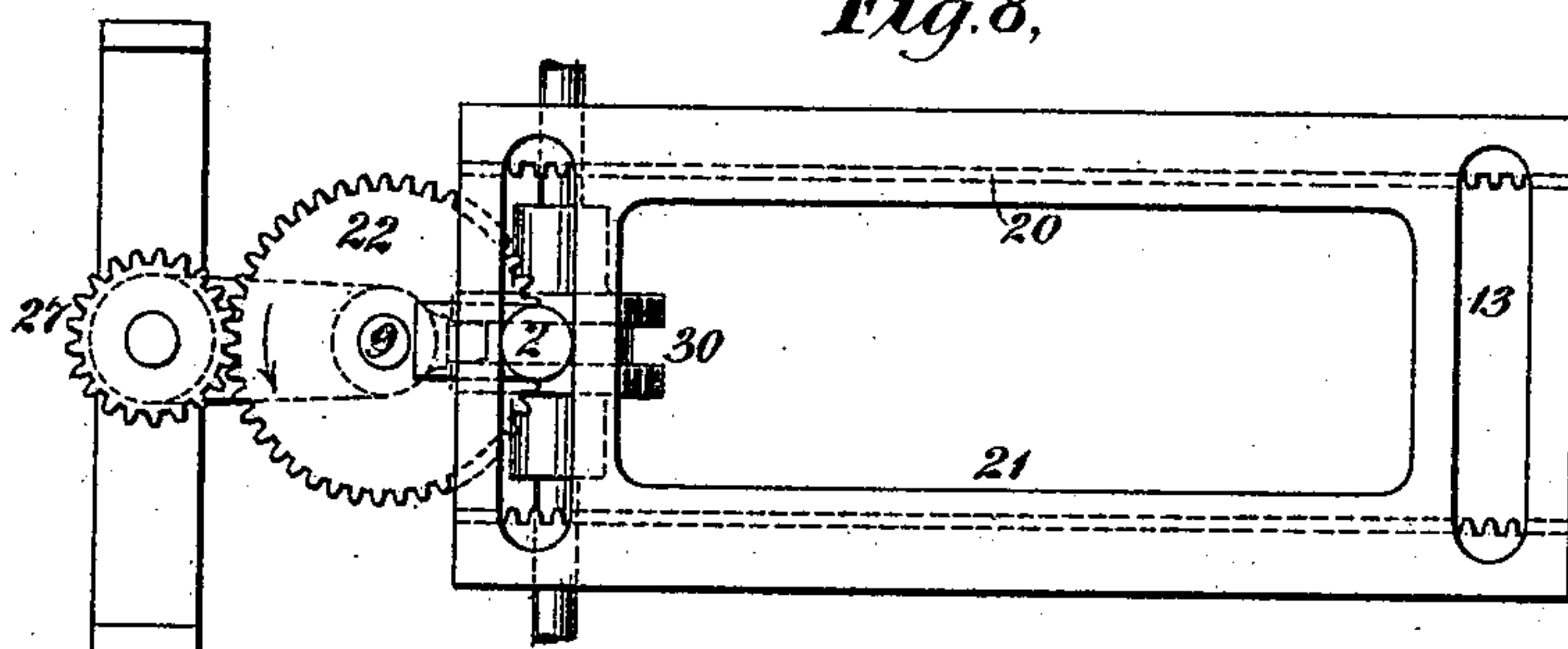
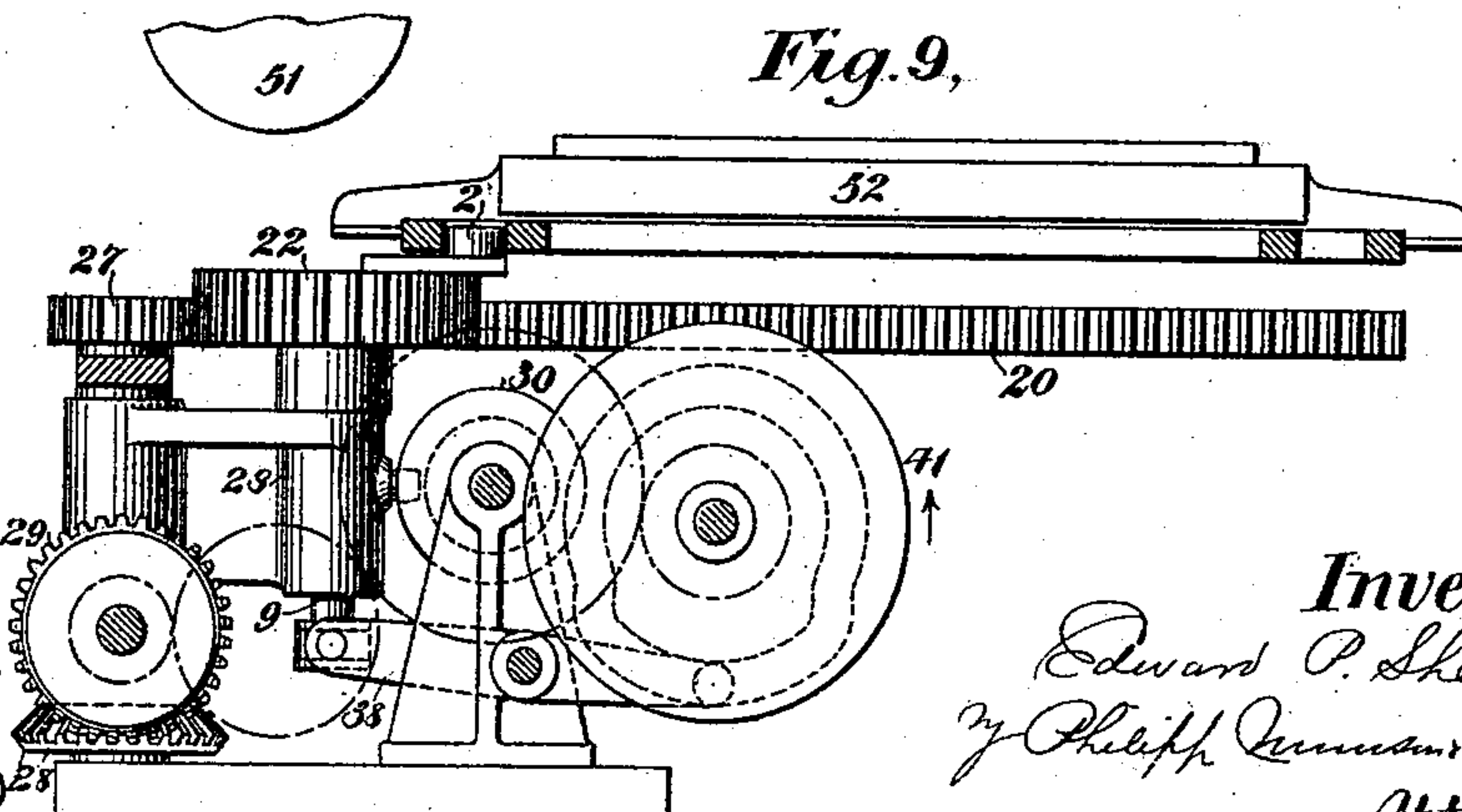


Fig. 9,



Witnesses:

Edw. Thorpe.

J. B. Bond.

Inventor.

Edward P. Sheldon

J. Philip Linnam & Phelps

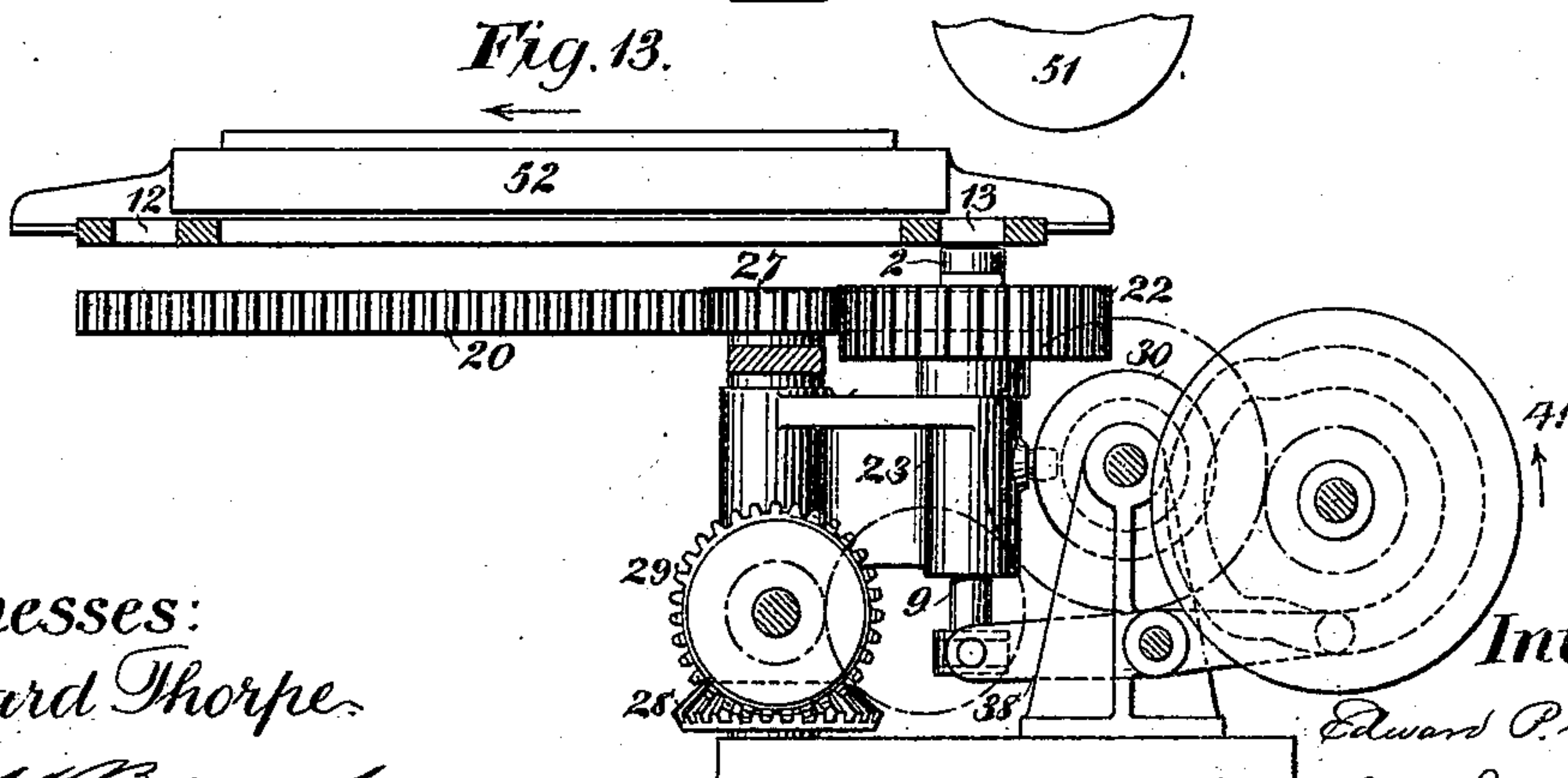
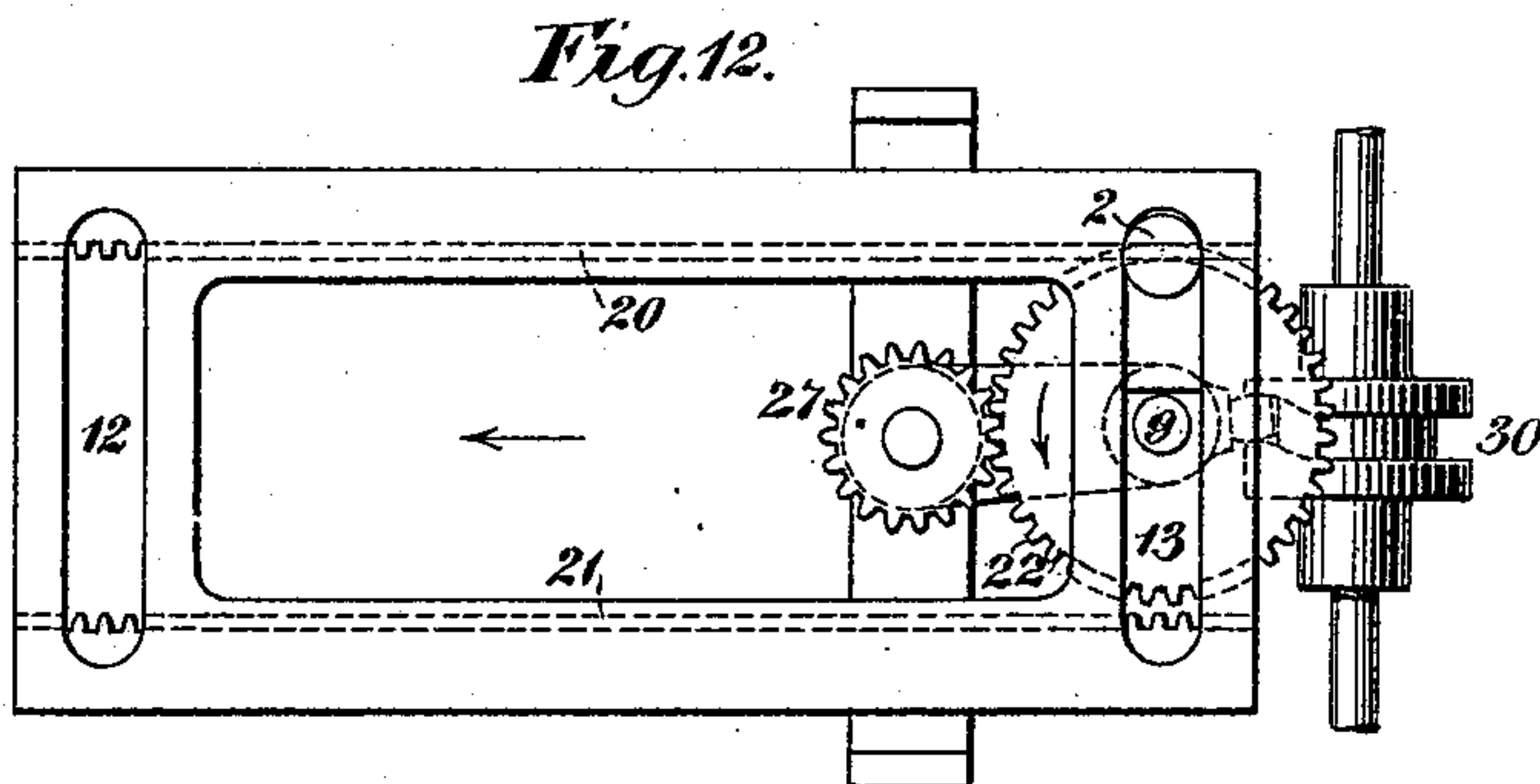
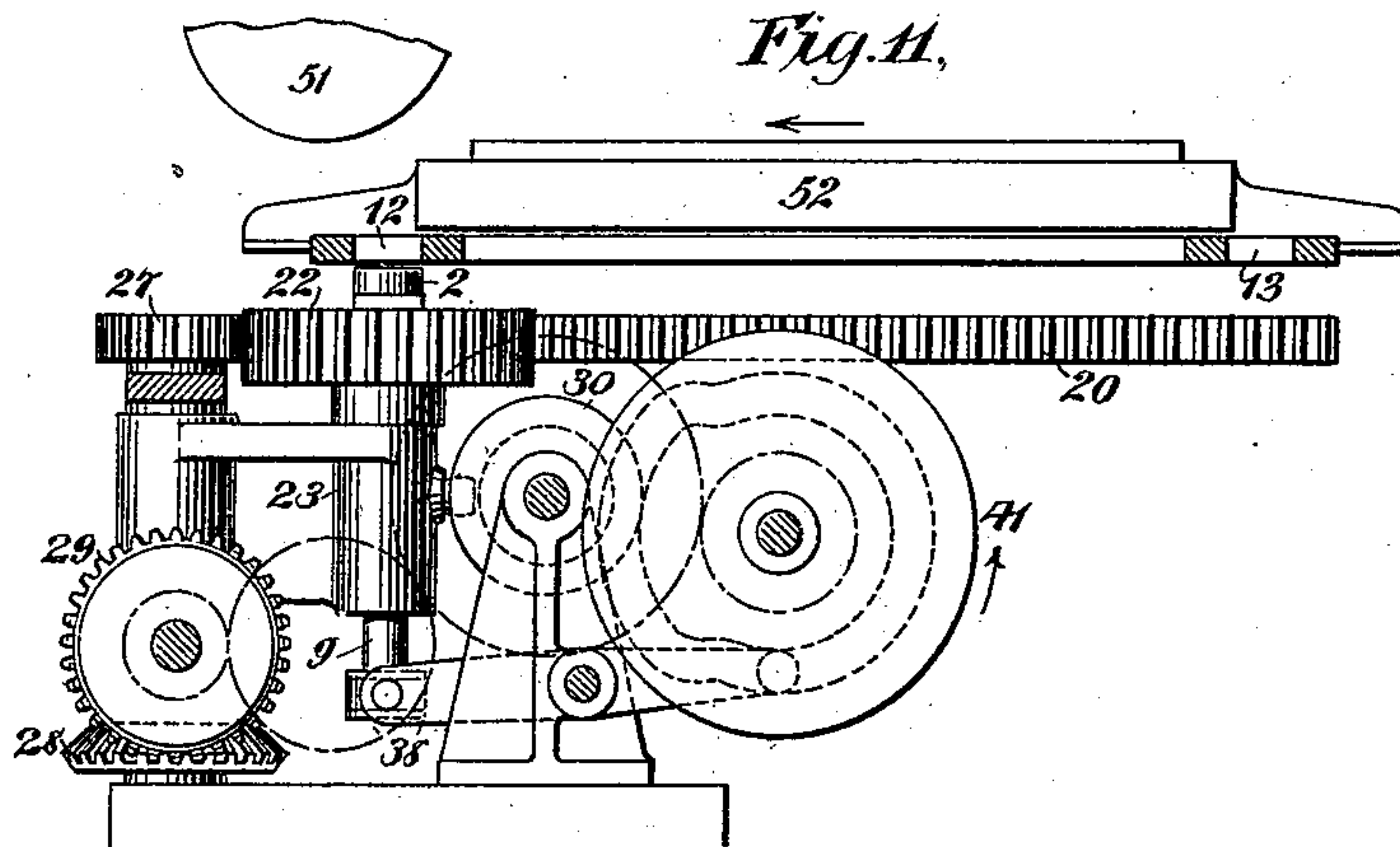
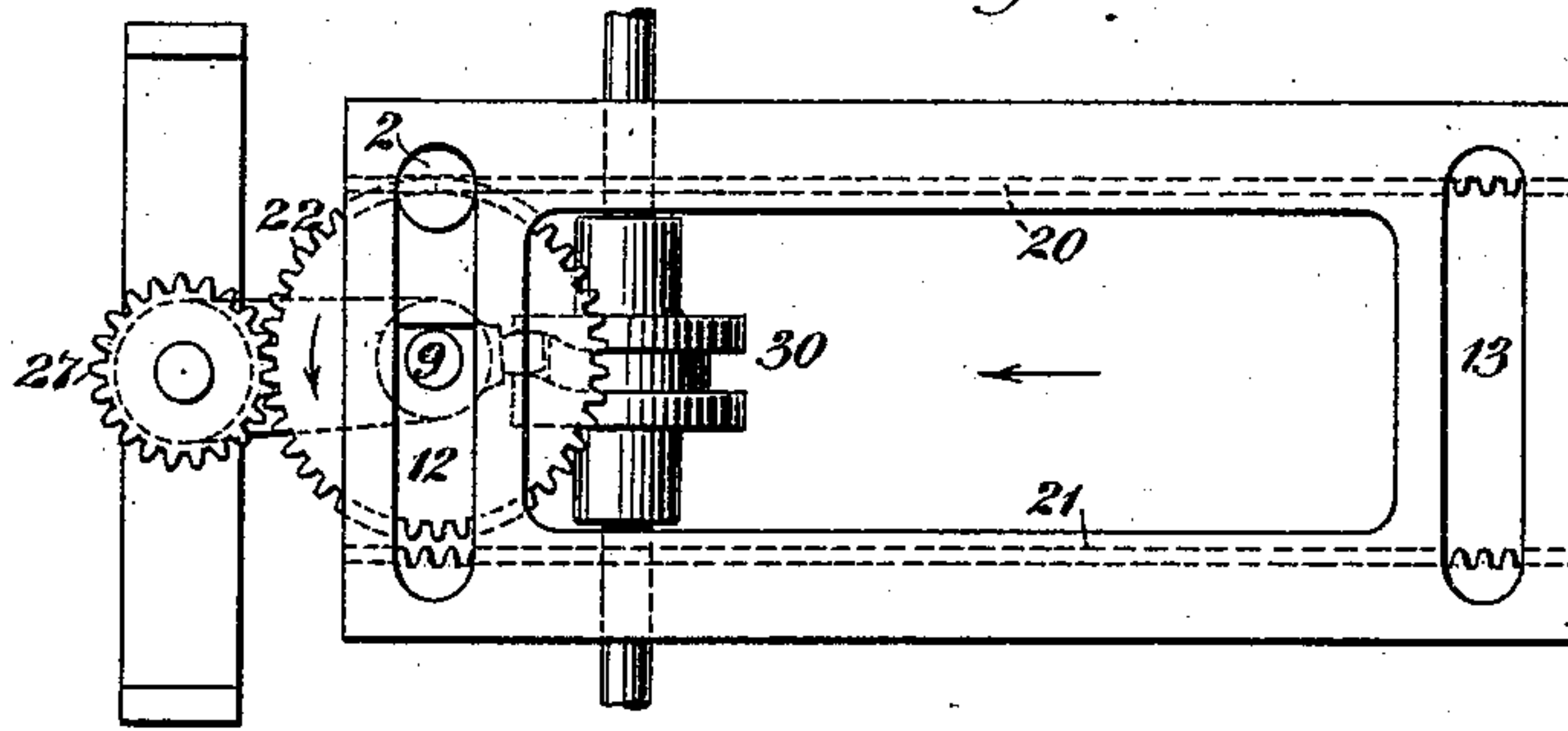
Att'ys.

E. P. SHELDON.

BED MOTION FOR CYLINDER PRINTING MACHINES.

No. 549,261.

Patented Nov. 5, 1895.
Fig. 10,



Witnesses:

Edward Thorpe

[Signature]

Inventor.

Edward P. Sheldon

[Signature]
By *[Signature]* Attys.

(No Model.)

6 Sheets—Sheet 6.

E. P. SHELDON.

BED MOTION FOR CYLINDER PRINTING MACHINES.

No. 549,261.

Patented Nov. 5, 1895.

Fig. 14.

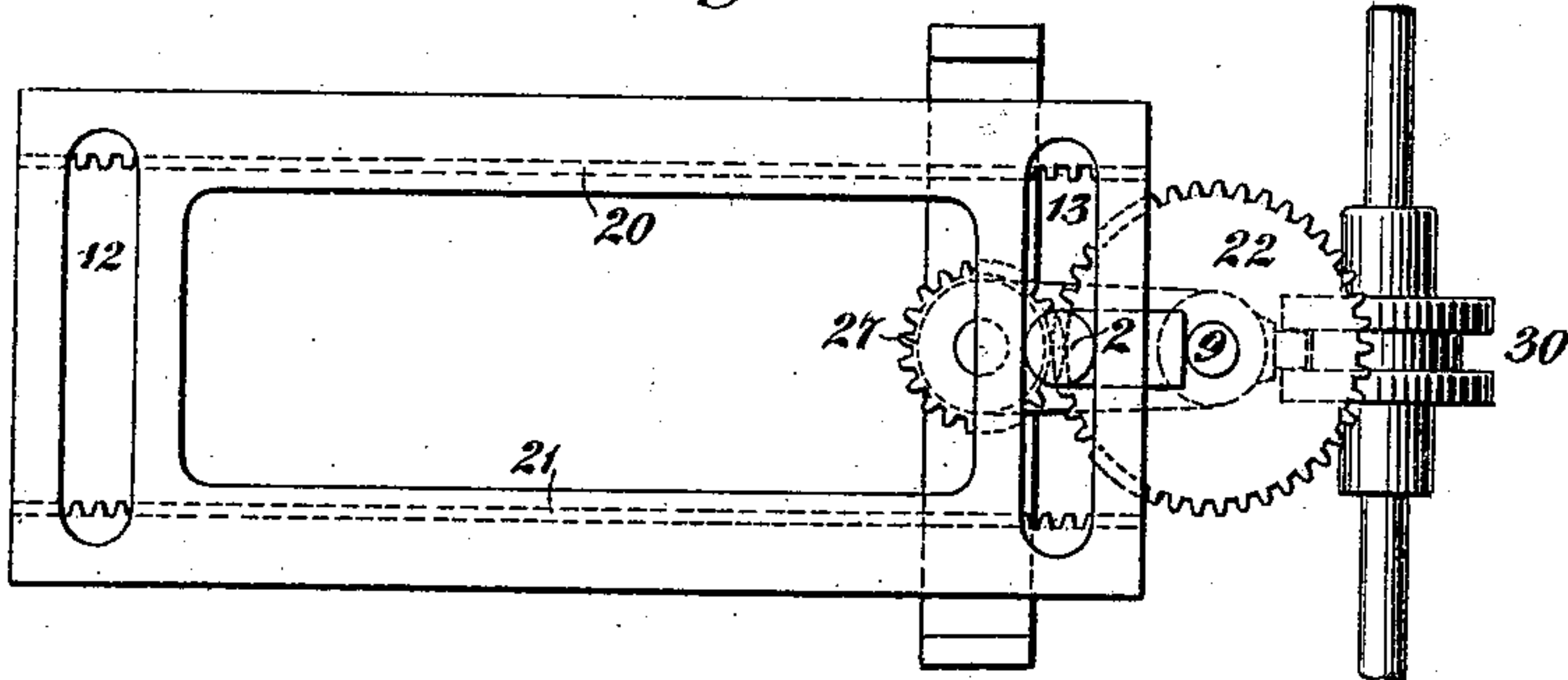


Fig. 15.

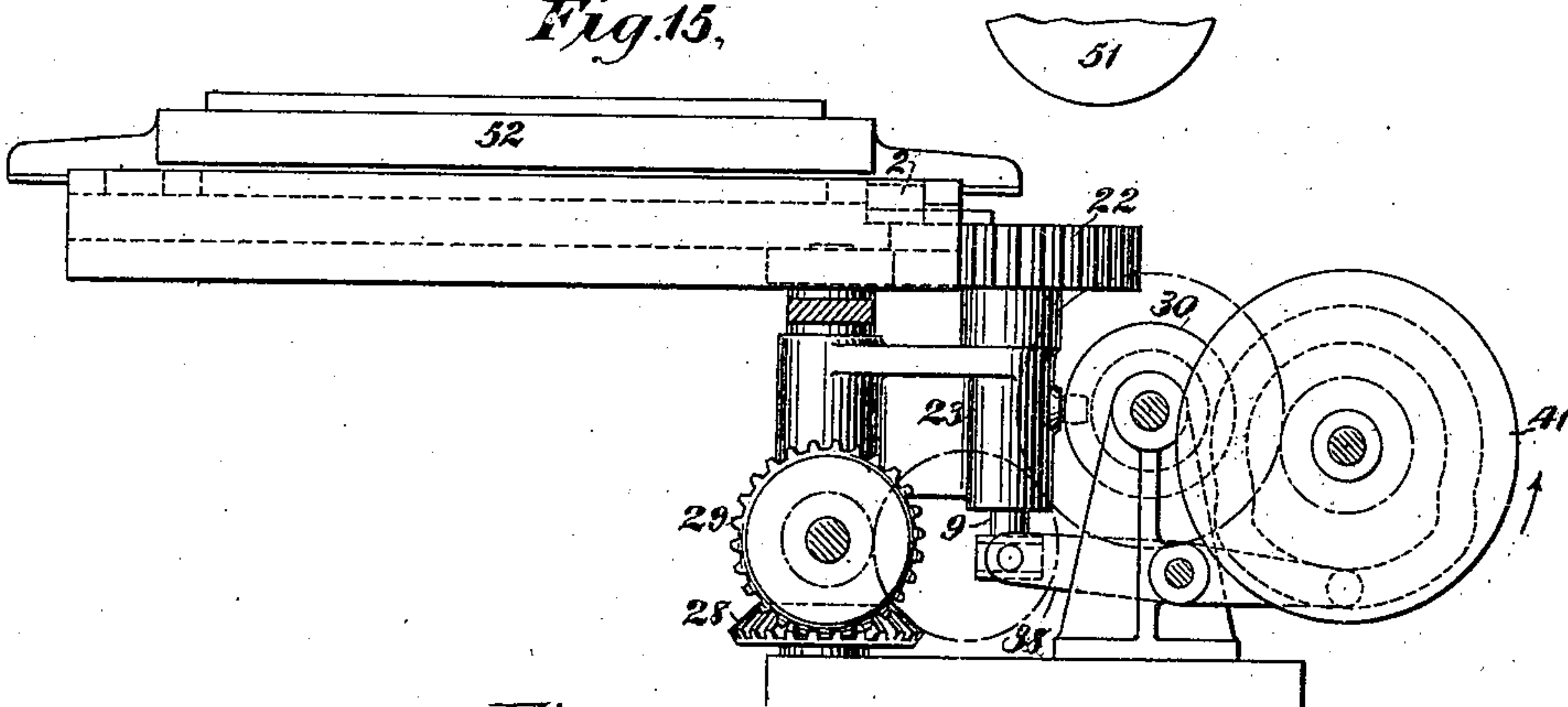


Fig. 16.

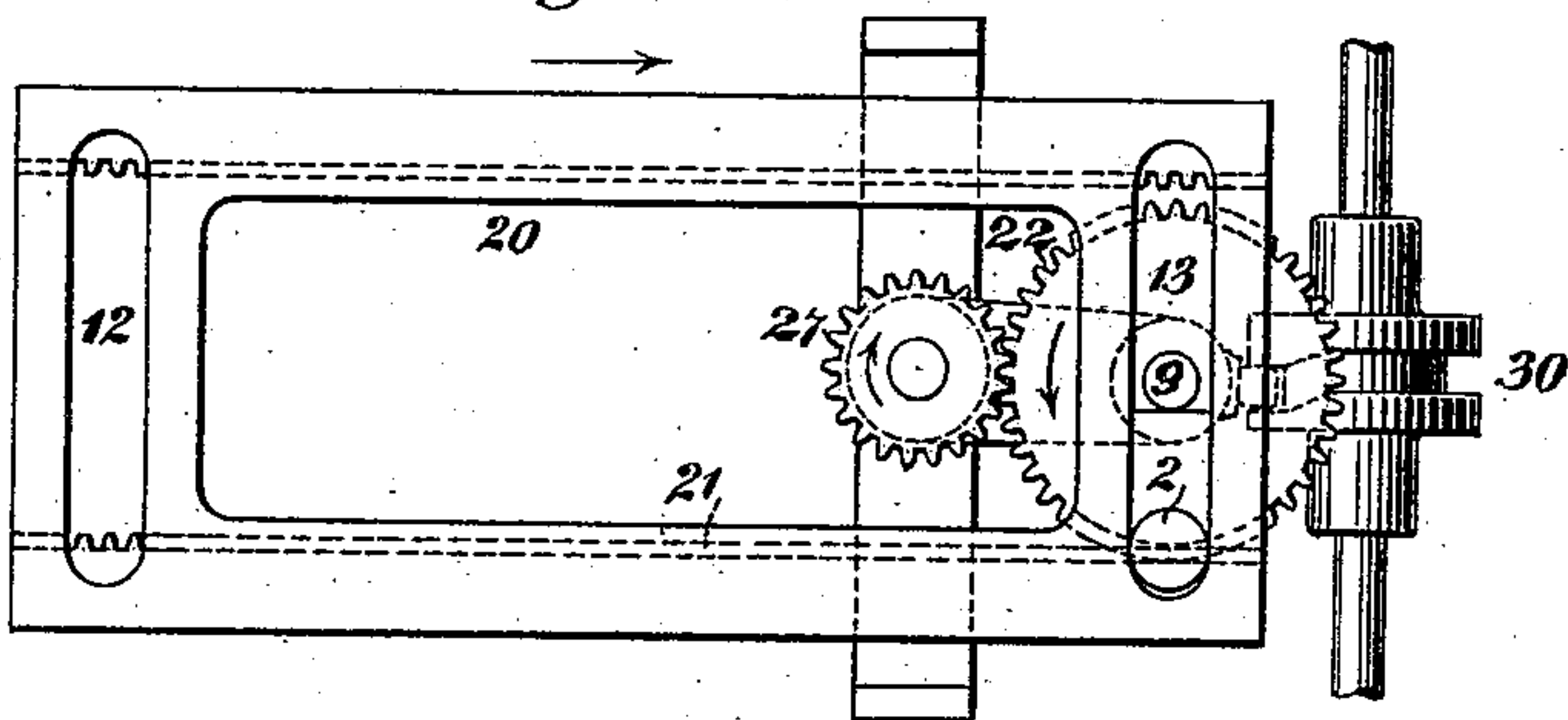
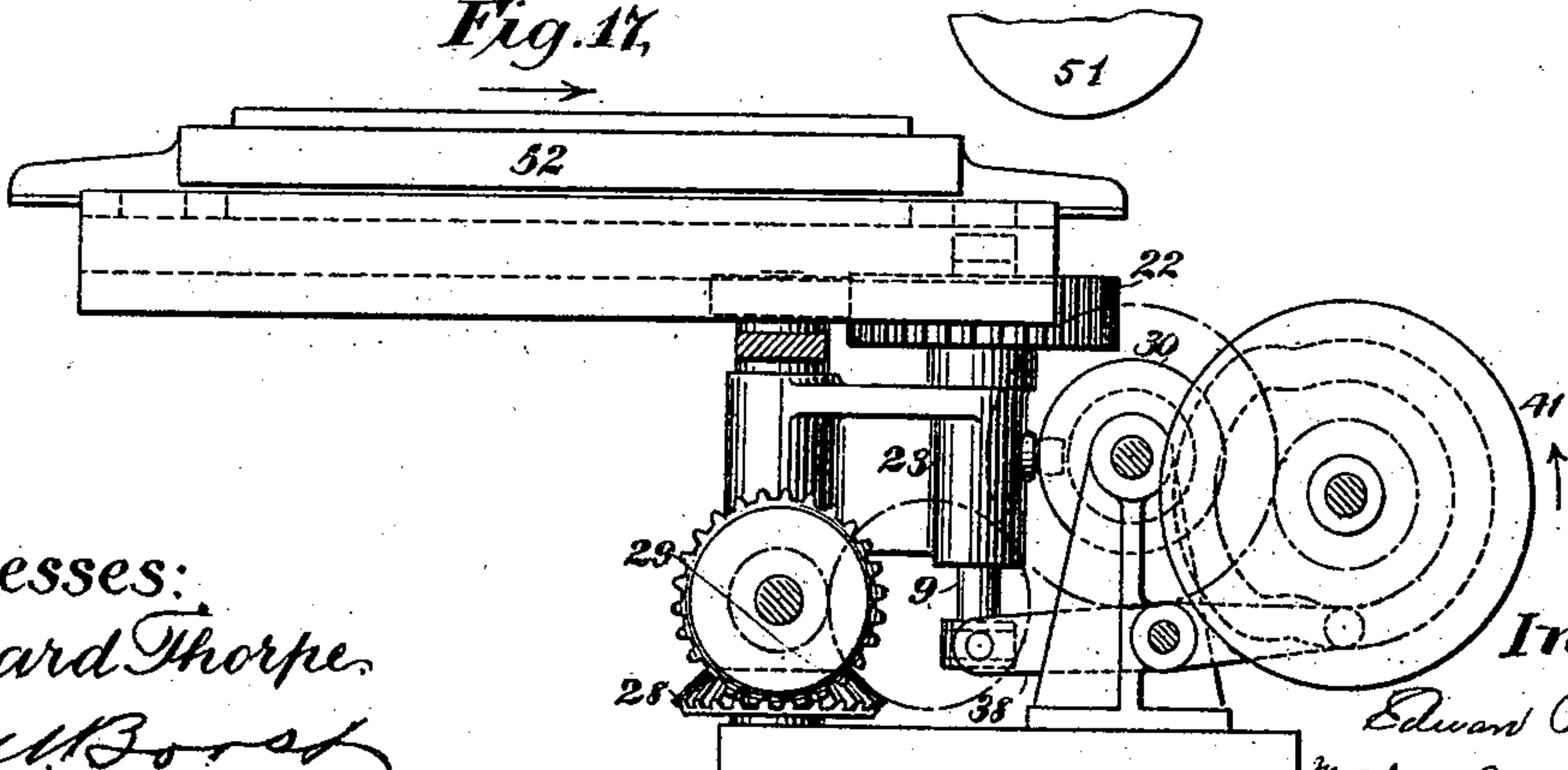


Fig. 17.



Witnesses:

Edward Thorpe.

J. M. B. B.

Inventor:

Edward P. Sheldon

Philip J. B. B.

UNITED STATES PATENT OFFICE.

EDWARD P. SHELDON, OF BROOKLYN, ASSIGNOR TO ROBERT HOE, THEODORE H. MEAD, AND CHARLES W. CARPENTER, OF NEW YORK, N. Y.

BED-MOTION FOR CYLINDER PRINTING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 549,261, dated November 5, 1895.

Application filed April 3, 1895. Serial No. 544,245. (No model.)

To all whom it may concern:

Be it known that I, EDWARD P. SHELDON, a citizen of the United States, residing at Brooklyn, county of Kings, and State of New York, have invented certain new and useful Improvements in Bed-Motions for Cylinder Printing-Machines, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

This invention relates more particularly to the means for imparting rectilinear reciprocations to the beds of cylinder printing-machines. In such machines the type or printing form is carried upon the reciprocating bed and an impression is taken therefrom by means of a rotating co-operating impression-cylinder which carries upon its surface the paper to be printed, the impression being made while the bed is moving in one direction, called its "printing run," and the cylinder rising and rotating idly while the bed makes its opposite movement, known as its "non-printing run." Such printing-machines may have one, two, or more impression-cylinders and their reciprocating beds carry one, two, or more complete printing-forms, and while the greater part of their reciprocatory movement is accomplished at a high normal speed, ordinarily by a rack-and-pinion mechanism, various means are employed for reversing such movement at each end of its run in both directions by slowing it down to a state of rest and then starting it in the opposite direction and accelerating it to the high normal speed. A perfect printing operation is accomplished in such printing-machines when the reciprocating bed and impression-cylinder move in perfect unison, and this is provided for by a rack carried by the bed and a bed-driving pinion engaging therein, and since the non-printing run will be accomplished by like means a second rack is provided for that purpose, and the alternate meshing of the bed-driving pinion to enable it to drive in opposite directions is commonly and well obtained by either moving the said pinion horizontally or vertically out of one rack and into the other or by moving the racks in like manner. As the pinion in co-action with these racks performs the office of

moving the bed only during the greater part of its movement in each direction, it follows from the nature of these mechanisms that they will drive at a high speed; but since upon the completion of the movement of the bed in either direction it must be reversed by being retarded from its maximum speed to a state of rest, and then not only be started in a contrary direction, but be accelerated to its maximum speed, it follows that this reversing operation must not only be quickly made in order to maintain a high speed, but be accomplished with the least possible strain upon or jarring of the parts, while the shifting movement of rack and pinion must in like manner be also performed. To maintain a high normal speed of operation, it is requisite that the bed, when it has made the major part of its run in each direction, shall be quickly slowed down to a state of rest and be started in the reverse direction and as rapidly accelerated to such normal speed.

The object of the present invention is to provide a mechanism for rapidly performing such reversing operations which shall be devoid of any complication of parts intermediate the bed and the crank whereby its reversal is accomplished, by which construction lost motion and consequent strain or wear and resulting jarring of the machine, which interferes with perfect printing, are reduced to the minimum.

The present invention consists in retarding the movement of the bed in one direction until it comes to a state of rest, and then starting it in the contrary direction and accelerating it to its normal speed of movement by means of a crank carried by the bed-driving pinion and periodically entered directly into and withdrawn directly from a yoke carried by the bed, together with automatic means for concertedly moving said driving-pinion out of and into gear with the bed-racks; and said invention also includes various constructions and combinations of parts, fully hereinafter described and explained in connection with the general description and specifically set forth in the claims.

A practical embodiment of the invention is shown in the accompanying drawings as applied to an ordinary single-cylinder printing-

machine; but the invention is equally applicable to the many classes of cylinder printing-machines and to other machines which include a reciprocating member, as is fully set forth in Patent No. 477,045, granted June 14, 1892.

In the said drawings, Figure 1 is a side view of a portion of a cylinder printing-machine as seen from the gear side, one side frame being removed to expose the interior parts and the position of some of the gearing being indicated by dotted lines. Fig. 2 is an end elevation of the same, both side frames being in place. Fig. 3 is a plan view of the principal parts, taken just beneath the reciprocating bed, portions being in section in order to illustrate others which would otherwise be obscure. Figs. 4 and 5 are respectively a sectional plan and a central sectional elevation of the raising and lowering attachment for the bed-driving-pinion shaft. Fig. 6 is a diagrammatic plan, and Fig. 7 a similar side elevation, of the bed and its actuating mechanisms in the position which they have when the bed in making its right-hand or non-printing movement has completed the major part of the same through the operation of the rack-and-pinion mechanism and requires to be reversed. Figs. 8 and 9 are similar views showing the positions of the parts when the bed-reversing crank has made a quarter-revolution, during which the bed has finished its right-hand movement and reached a state of rest and is thereafter to make its left-hand or printing movement. Figs. 10 and 11 are similar views showing the positions of the parts when the bed-reversing crank has made a further quarter-revolution, during which the bed has been started in its left-hand or printing movement and has not only been reversed but accelerated to the high normal speed of the driving-pinion. Figs. 12 and 13 are similar views showing the positions of the parts when the bed, having completed the major part of its printing movement, driven by the rack-and-pinion mechanism, requires to be reversed. Figs. 14 and 15 are similar views showing the position of the parts when the reversing-crank in making a quarter-revolution has completed the run of the bed in the printing direction and brought it to a state of rest and is thereafter to make its right-hand movement. Figs. 16 and 17 are similar views showing the positions of the parts when the bed-reversing crank has made a further quarter-revolution, during which the bed has been started in its right-hand or non-printing movement and has not only been moved but accelerated to the high normal speed of the driving-pinion. The printing-press illustrated as embodying the present improvements consists of a single impression-cylinder 51, which co-operates in performing the printing operation with a reciprocating type-bed 52, upon which is carried a type form. The shaft of the cylinder 51 is mounted, as usual, in journals supported by side frames, said shaft being

provided at one end with a wheel 54, through which it is rotated from the driving-shaft 55 by means of a wheel 56 on the latter and intermediates 57 58 61.

The type-bed 52 moves upon sliders 59, that run in horizontal ways 60, as is usual. The main or central part of the reciprocation of the bed is accomplished by means of two racks 20 21, suitably secured to its under side, which racks face each other and are set such a distance apart that the bed-driving pinion 22 may be moved into engagement with either of them and when engaged with one rack will be free from the other. This bed-driving pinion 22 is of such size that it makes three revolutions to one complete reciprocation of the bed, it being geared with one rack during one revolution while driving the bed through the major part of its travel in one direction and being engaged with the opposite rack during another revolution while driving the bed through the major part of its movement in the opposite direction, and a one-half revolution of it is performed at each end of the run of the bed when it is free from the racks, during which time the said bed is controlled by the reversing mechanism, which slows it down and arrests its movement in one direction and then starts and accelerates its movement in the opposite direction. Such three-revolution pinion is preferred, as it has been found in practice to be desirable; but the bed-driving pinion may have any other appropriate number of revolutions to each reciprocation of the bed. This bed-driving pinion 22 is mounted so as to be capable of sliding vertically, it being mounted fast at the upper end of a shaft 9, that is sustained and guided in an elongated bearing 23, that forms a part of a swinging bracket 24, the center of whose motion is an elongated bearing 25, that swings upon a vertical shaft 26, secured in the framework parallel with the shaft 9. The primary function of this pinion 22 is to drive the bed through the principal or central portion of its movement in opposite directions by alternately meshing with the racks 20 21, and it is constantly driven by means of a pinion 27, mounted fast upon the shaft 26. The shaft 26 is rotated by means of beveled gears 28 29 from the main driving-shaft 55. In Fig. 1 the arrow associated therewith indicates the direction in which the impression-cylinder constantly revolves and the arrow associated with the bed the direction in which the same moves when performing the printing operation. In making the major portion of its travel in this direction the bed is driven by means of the pinion 22 while meshed with the rack 20, and it is driven throughout the major part of its run in the contrary or non-printing direction while the bed-driving pinion 22 is meshed with the rack 21, as in Fig. 16. In order that this pinion 22 may be alternately swung into meshing engagement first with one and then with the other of these racks for this

purpose, the swinging bracket 24, supporting the shaft 9 of this pinion, is regularly and timely vibrated by means of a cam 30, the peripheral groove of which is suitably shaped, as appears in Fig. 2. To accomplish this result, the cam 30 is mounted upon a shaft 31, suitably journaled in central brackets and in one side frame and continuously rotated by means of a wheel 32 and an intermediate 33 from a pinion 35 on the main driving-shaft 55, the proportion of which wheel 55 to that of 32 being as one is to three. A toe 36, fast to the inner end of the bracket 24, enters into the peripheral groove of the cam 30, which latter is so shaped and rotated that it moves the swinging bracket 24 in one direction to bring the pitch-line of the pinion 22 into the plane of the pitch-line of the rack 20, and thus not only causing the engagement of the rack and the pinion, but retaining the pinion so engaged with the rack during one revolution of it while driving the bed in one direction, the cam then swinging the bracket so as to withdraw the pinion 22 from the rack 20 and carry its pitch-line into the plane of the pitch-line of the rack 21, so that it may enter said rack and remain meshed therewith during another revolution of said pinion while driving the bed in the contrary direction, the cam then again swinging the bracket to repeat the movement first described. The pinion 22 by thus engaging the rack 20 accomplishes the driving of the reciprocating bed through the major part of its movement in one direction to perform the printing operation, and by engaging with the rack 21 accomplishes the driving of the bed through the major part of its movement, which is then its non-printing operation, during which latter movement the type-form carried by the bed receives its first inking (being inked a second time as it moves in the contrary direction) by a mechanism from which the form-rollers 37 deposit the ink over the whole printing-surface, and the swinging bracket 24 is moved in such timely relation with respect to the movements of the bed that the pinion 22 is smoothly engaged with and disengaged from said racks, as will presently appear. Such a bed-driving rack-and-pinion mechanism would be capable of running at a very high rate of speed if the reversing movement of a bed driven at such high speed could be readily made; but it is necessary to overcome its momentum in one direction in order to stop it and its inertia in the opposite direction in order to restart it at both ends of its run, in order to accomplish its reversal and thus enable it to be reciprocated and be mainly driven by the rack-and-pinion mechanism. One of the objects of this invention is to perform this reversing operation not only in the quickest manner possible in order that a very high rate of speed may be maintained, but to so accomplish the reversing that there shall be neither jar to the ma-

chine nor undue strain exerted upon its parts either in arresting its momentum or in overcoming its inertia. To this end the reversing operation is performed by a crank-pin 2, which is secured to the face of the driving-pinion 22 in such position that its path agrees with the pitch-line of the pinion. This crank-pin 2 operates in a yoke 12, secured at one end of the bed, and in a yoke 13, secured at the opposite end of the bed. (See Fig. 6.) In traversing this yoke from one end thereof, as in Fig. 6, to its center, as in Fig. 8, the crank-pin 2 will make a quarter-revolution and progressively slow down the said bed to a state of rest, and in traversing said yoke from the center, as in Fig. 8, to the opposite end thereof, as in Fig. 10, the crank-pin 2 will make a quarter-revolution and progressively start and accelerate the bed to a speed equal to the high speed at which the crank-pin is traveling. At the beginning and ending of this operation the bed is being driven by the pinion 22, and hence the crank-pin must come into action in the one case as the pinion becomes inactive and in the other go out of action as the pinion become active. To accomplish this the said crank-pin must be entered into one end of the said yoke while the bed, its yoke, and driving-pinion are traveling at the high speed of said crank-pin, and must be withdrawn from said yoke at the other end thereof at a like speed when the bed, yoke, pinion, and crank-pin are concertedly moving. In order to so enter and withdraw the crank-pin from the yoke, it is automatically raised and lowered at timely intervals by a vertical movement imparted to the driving-pinion 22, which is made wide enough to admit of such movement while constantly geared with the pinion 27. The shaft 9, carrying the pinion 22, is raised and lowered by means of a lever composed of arms 38 39, projecting from a rock-shaft 40, the arm 38 bearing against the lower end of the shaft 9 and the arm 39 having a stud or bowl that runs in the groove of a cam 41. This cam 41 is mounted upon a shaft 42 and driven at an appropriate speed by means of a pinion 43, which engages with the wheel 32. While another construction for performing this action might be adopted, that shown is a practical one, and since the driving-pinion 22, as we have seen, not only rises and falls, but in addition to this vertical movement is moved to and fro or swung laterally, the arm 38 must be so connected thereto as to provide for this compound movement. The lower end of the shaft 9 is reduced therefore, so as to pass through and revolve in a collar 14, that is hung by pivots in the branching ends of the arm 38, and this collar 14 is provided centrally with an elongated slot, in which the reduced part of said shaft plays as it is moved laterally. The said collar is secured to the end of the shaft 9 by means of a bottom plate, as shown. By this construction the

shaft 9 may rotate freely and yet be vibrated horizontally and moved up and down without disengagement of the parts.

The movement of the bed and its reversal at each end of its stroke will be best understood by a consideration of Figs. 6 to 17, in connection with which its operation will now be described. These views are taken from the gear side of the machine, and reference to the ends of the yokes 12 13 will be made with respect to the gear side of the machine.

In Figs. 6 and 7 the mechanisms are in the positions which they have attained when the bed, having completed the major part of its outward or non-printing movement, driven by the pinion 22 and rack 21, requires to be reversed by being gradually slowed down from its highest speed and brought to a state of rest, as in Figs. 8 and 9, and then started in the opposite direction and accelerated to its highest speed, and thereafter driven at that speed during the major part of its run in the printing direction, or that of the arrows in Figs. 10 and 11, and then be again reversed by being slowed down to a state of rest, as in Figs. 14 and 15, and started and accelerated in the contrary or non-printing direction, as in Figs. 16 and 17.

In Figs. 6 and 7 the bed 52 is wholly within the control of the pinion 22, which, meshed with the rack 21, will have driven the bed during the major part of its non-printing run in the direction of the arrow at the high speed of and during one complete rotation of the said driving-pinion, at the end of which rotation, which is the position of the parts shown in Figs. 6 and 7, the pinion 22 is about to leave the rack 21, at which time the crank-pin 2 then disconnected from, but coinciding in position with, the nearer end of the yoke 12, and while the crank-pin, the rack and pinion, and, of course, the bed are moving at the same surface speed, said crank-pin is raised directly upward into said yoke by the appropriate and timely action of the cam 41 and begins its traversing movement in said yoke simultaneously with the disengagement of the pinion 22 from the rack 21. In traversing this yoke 12 from its nearer end, as in Fig. 6, to its center, as in Fig. 8, the said crank-pin will operate to gradually slow down the movement of the bed until it reaches the center of the yoke, when it will momentarily stop the same by completely arresting its movement, and while said crank-pin moves from a central position in said yoke, as in Fig. 8, to the farther end of the said yoke, as in Fig. 10, it will gradually start and accelerate the bed in the direction of the arrow to the high speed which it has when driven by the pinion 22, and during this traversing movement of the crank-pin from one end of the yoke 12 to the other end thereof the cam 30 will operate to swing the pinion 22 laterally, so as to bring its pitch-line into coincidence with that of the rack 20, which rack

it engages while the crank-pin 2 is closely approaching the farther end of the yoke 12 and being withdrawn vertically therefrom by the timely depressing movement of the cam 41, through which the pinion 22 is lowered to withdraw said crank-pin, as in Fig. 11. When the withdrawal of the crank-pin 2 from the yoke 12 has been accomplished, the pinion 22 will have entered into mesh with the rack 20, and the bed will then be wholly within the driving control of the pinion 22, which pinion will now, while making a complete revolution, drive the bed through the major part of its movement in the direction of the arrow in Fig. 12, which is its printing run. When the pinion 22 reaches the other end of the rack 20 and is about to run out of the same, as in Fig. 12, the crank-pin 2 will then coincide in position with the farther end of the yoke 13, as in Fig. 13, and while the crank-pin, together with the rack and pinion and the bed, is moving at a uniform speed said crank-pin will be raised directly into the farther end of said yoke by the timely operation of the cam 41. Now while said crank-pin is traversing therefrom to the center of the yoke, as in Fig. 14, it will gradually slow down and momentarily arrest the movement of the bed in the position it has at the extreme end of its run in the printing direction, and while the crank-pin 2 is moving from the center of the yoke 13 to the nearer end thereof, as in Fig. 16, it will gradually start the said bed and move it with a constantly-accelerated speed in the direction of the arrow in said figure until the high speed of the driving-pinion 22 is attained, and during this traversing movement of the crank-pin from the farther end of the yoke to the nearer end thereof the cam 30 will swing the pinion 22 laterally, so as to bring its pitch-line into coincidence with that of the rack 21, which it engages while the crank-pin 2 is closely approaching the nearer end of the yoke 13 and being withdrawn therefrom by the action of the cam 41, which lowers the pinion 22. Upon the withdrawal of the crank-pin 2 from the yoke 13 the pinion 22 will have engaged the rack 21 and the bed will then be wholly within the driving control of said pinion, as in Fig. 16, which will now, while making a complete revolution, drive the bed through the major part of its movement in the direction of the arrow or cause its non-printing run. When this pinion reaches the other end of the rack 21 and is about to run out of the same, as in Fig. 6, the positions will have been reached at which this description of the reciprocation of the bed was taken up. To facilitate the entrance of the crank-pin 2 into the yokes and its withdrawal therefrom, its upper end may be slightly beveled to aid these movements, or the ends of said yokes may be slightly enlarged or cut away for the same purpose.

The mechanisms as illustrated herein are

arranged to work in connection with facing-racks arranged in the same horizontal plane. Of course this plan necessitates the mounting of the driving-pinion 22 to run in a horizontal plane; but while the relation of these mechanisms will be maintained the planes in which they are situated may be varied without departing from the invention embodied herein.

By the improvements herein described, whereby a yoke fixed to and carried by the bed is directly engaged and driven in its reversing operation by a crank, much simplicity in the mechanisms is obtained and great strength of parts secured, thus not only reducing liability of vibration of the parts because of their small number, but by avoiding intermediate engaging links between the crank and the bed, whence jarring would be produced, providing solidity of structure, removing liability of wear, and affording a great degree of strength against the strain to which the heavy parts necessary to be moved subject the rest of the machine.

What is claimed is—

1. The combination with a moving bed provided with a yoke at one end thereof, of a revolving reversing crank, and means for entering the crank pin directly into and withdrawing it directly from said yoke while the yoke and pin are moving at a like speed of travel, substantially as described.

2. The combination with a reciprocating bed provided with a yoke at opposite ends thereof, of a revolving crank and means for entering the crank pin directly into and withdrawing it directly from said yokes alternately while the yokes and pin are moving at like speeds of travel, substantially as described.

3. The combination with a moving bed provided with a yoke at one end thereof, of a revolving crank, and means causing the crank pin to enter directly into one end of the yoke, then traverse the same and operate to retard and stop the movement of the bed in one direction and start and accelerate it in a contrary direction and then to be directly withdrawn at the other end of the yoke, substantially as described.

4. The combination with a reciprocating bed provided with a yoke at each of the opposite ends thereof, of a revolving crank, and means causing its pin to enter directly into one end of the yoke, traverse the same and operate to retard and stop the bed in one direction and start and accelerate it in a contrary direction and then be directly withdrawn from the other end of the yoke, at each end of the run of the bed, substantially as described.

5. The combination with a bed provided with a yoke at one end thereof and with two racks and a pinion for driving the same, of a crank pin revolving with the pinion and means causing the pinion to leave one rack and the crank pin to enter directly into one end of the yoke, then traverse the same and operate to retard and stop the movement of

the bed in one direction and start and accelerate it in a contrary direction, and then to be directly withdrawn from the other end of the yoke as the pinion engages the other rack, substantially as described.

6. The combination with a bed provided with a yoke at each of the opposite ends thereof and with two racks and a pinion for driving the same, of a crank pin revolving with the pinion and means causing the pinion to leave one rack and the crank pin to enter directly into one end of the yoke, traverse the same and operate to retard and stop the movement of the bed in one direction, and start and accelerate it in a contrary direction, and then to be directly withdrawn from the other end of the yoke as the pinion engages the other rack, at both ends of the run of the bed, substantially as described.

7. The combination with a bed 52 provided with a yoke, as 12, and means for moving the bed in one direction, of a crank, its actuating shaft and means for raising and lowering said shaft to accomplish the entrance of the crank pin into and its exit from said yoke, substantially as described.

8. The combination with a bed 52 provided with a yoke, as 12, and with a rack, as 20, and cooperating pinion 22 for moving the bed in one direction, of a crank, its actuating shaft carrying said pinion 22, means for raising and lowering said shaft to enter the crank pin into and withdraw it from said yoke, and with means for swinging said pinion laterally to cause its engagement with and disengagement from said rack, substantially as described.

9. The combination with a bed 52 provided at each end with a yoke as 12, and with means for reciprocating the bed, of a crank, its actuating shaft and means for raising and lowering said shaft to accomplish the entrance of the crank pin into and its exit from said yokes, substantially as described.

10. The combination with a bed 52 provided with a yoke at each end thereof and with racks as 20, 21, and a cooperating pinion 22 for moving the bed in opposite directions, of a crank, its actuating shaft carrying said pinion, means for raising and lowering said shaft to accomplish the entrance of the crank pin into and its exit from said yoke, and with means for swinging said pinion laterally to cause its engagement with and disengagement from said racks, substantially as described.

11. The combination with a bed 52 provided with a yoke as 12, and means for moving the bed in one direction, of a crank, its actuating shaft, a lever 38 and cam 41, whereby said shaft is raised to accomplish the entrance of the crank pin into and its exit from said yoke, substantially as described.

12. The combination with a bed 52 provided with a yoke as 12, and with a rack as 20, and cooperating pinion 22 for moving the bed in one direction, of a crank the actuating shaft whereof carries said pinion 22, a lever 38 and

cam 41 operating to raise and lower the shaft to accomplish the entrance of the crank pin into and its exit from said yoke, and a swinging frame 23 supporting said shaft and a cam 5 30 for moving said frame laterally to cause the engagement with and its disengagement from said rack, substantially as described.

13. The combination with a bed 52 provided with a yoke as 12, and with a rack as 20, and 10 cooperating pinion 22 for moving the bed in one direction, of a crank, the actuating shaft whereof carries said pinion 22, a lever 38 and cam 41 for raising and lowering the shaft to 15 its exit from said yoke, a swinging frame 23 supporting said shaft and a cam 30 for swinging said frame laterally to cause the pinion to engage with and disengage from said rack, substantially as described.

14. The combination with a bed 52 provided 20 with a yoke as 12, at its opposite ends and with two racks and cooperating pinion 22 for reciprocating the bed, of a crank, its actuating shaft carrying said pinion, a lever 38 and 25 cam 41 whereby said shaft is raised and lowered to enter the crank pin into and withdraw it from said yokes, and a swinging frame 23 that supports said shaft, and a cam 30 for moving the same laterally to cause the pinion to engage with and disengage from said 30 racks alternately, substantially as described.

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

EDWARD P. SHELDON.

Witnesses:

H. T. MUNSON,
A. L. KENT.