

W. S. HUSON.  
BED MOVEMENT FOR PRINTING PRESSES.

APPLICATION FILED MAY 12, 1902.

NO MODEL.

3 SHEETS—SHEET 1.

Fig. 1

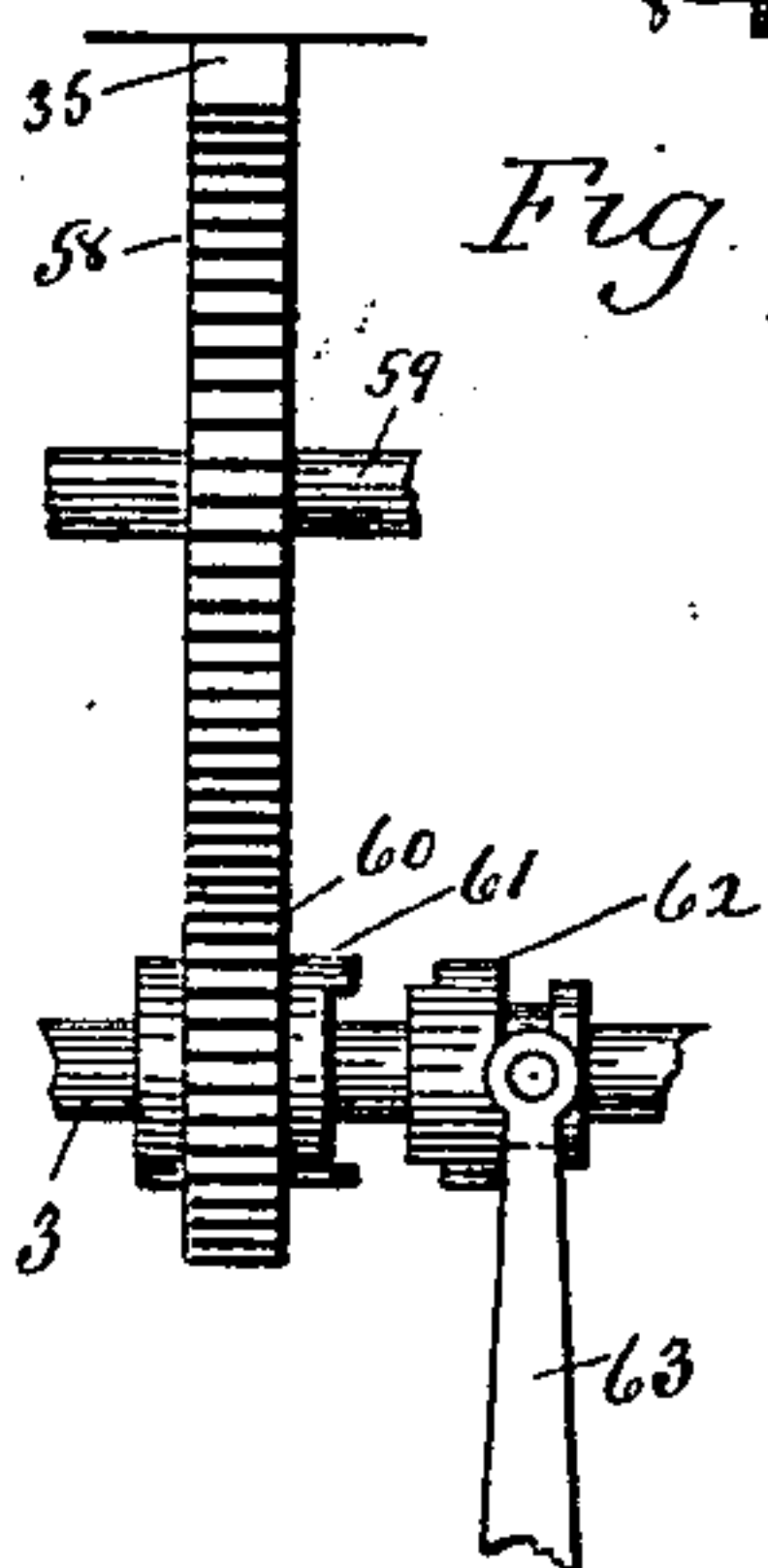
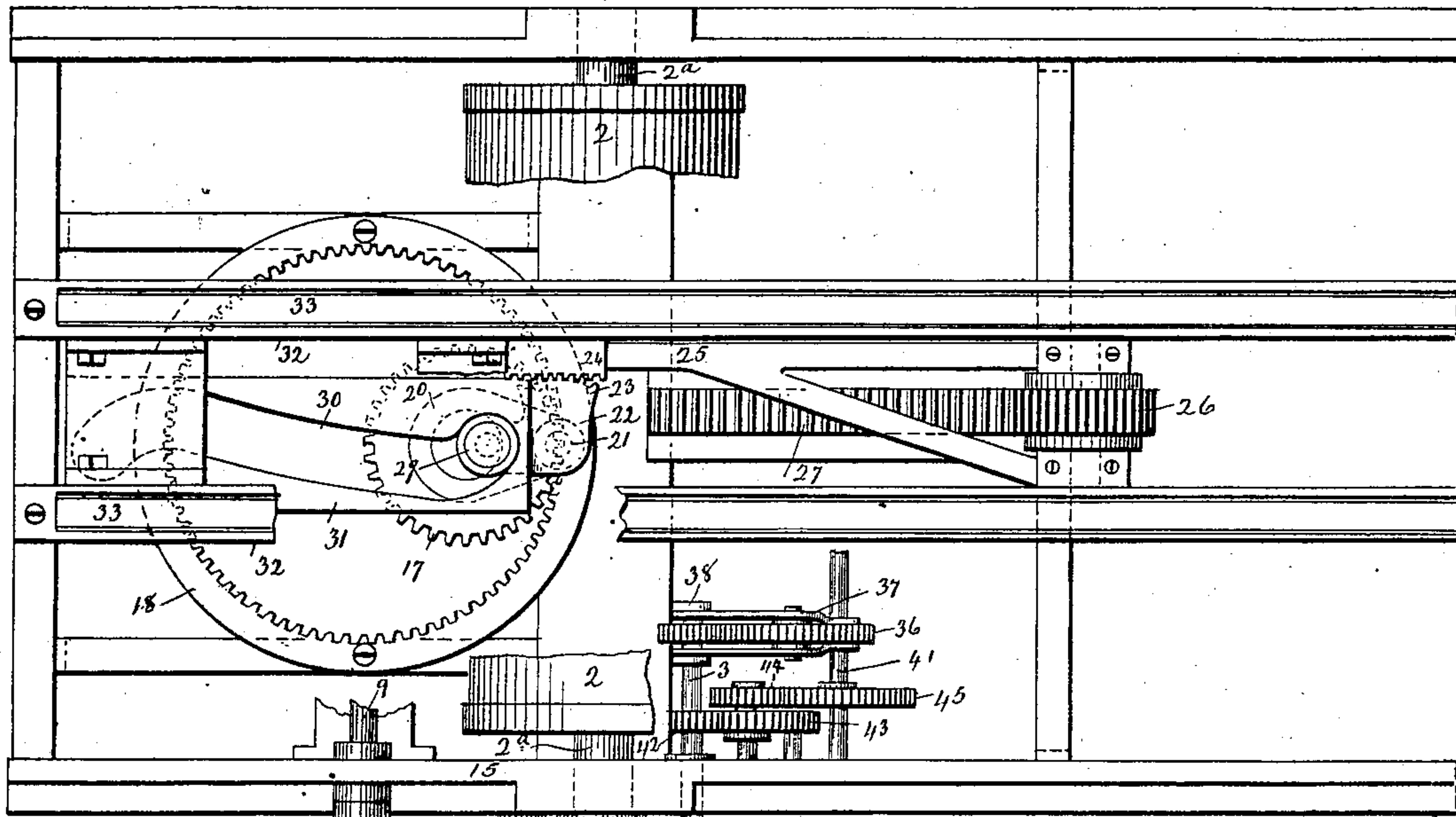


Fig. 9

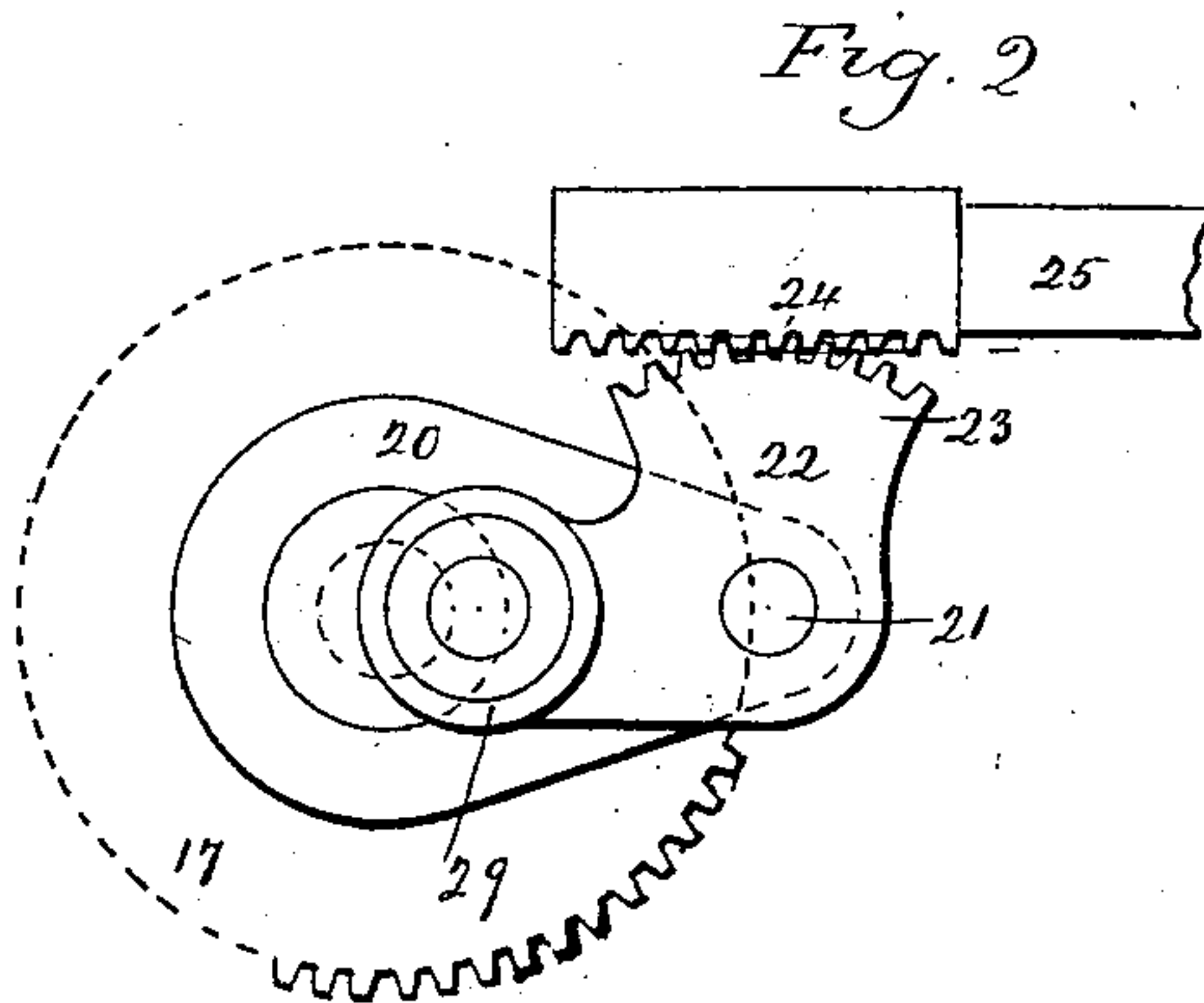


Fig. 2

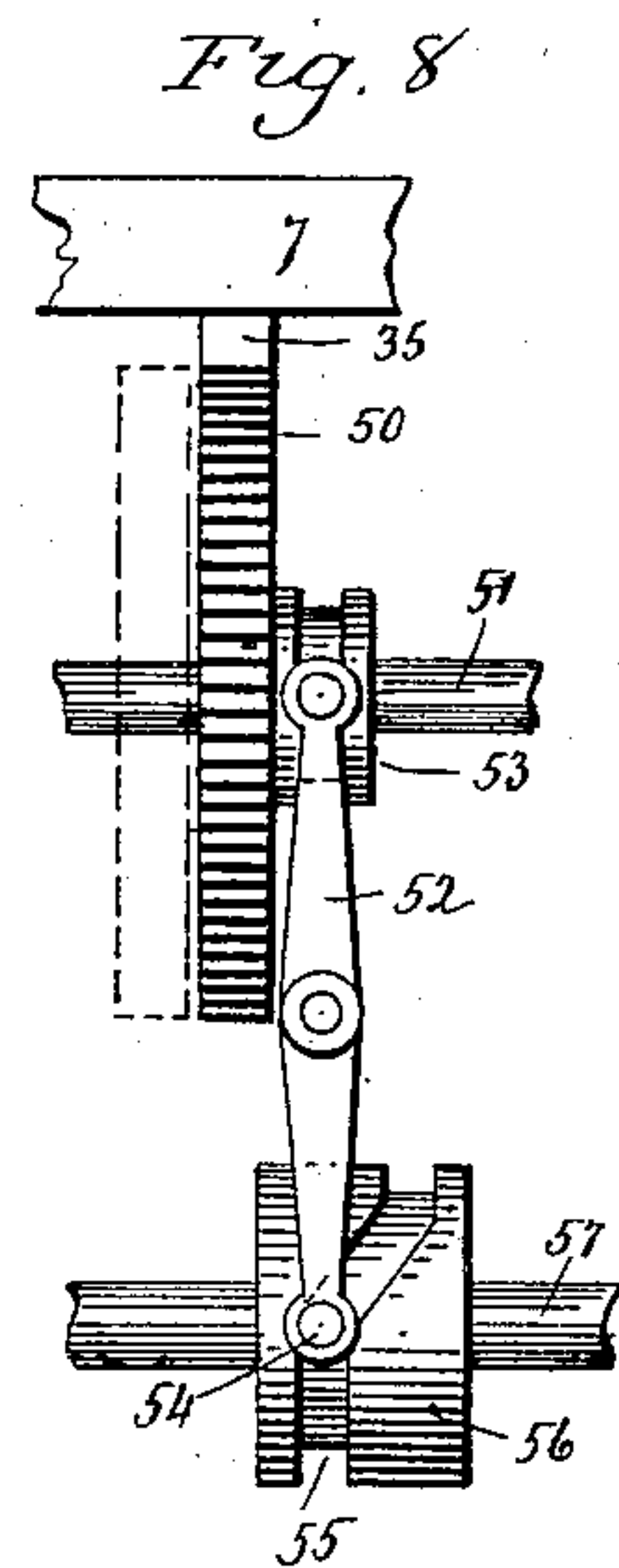


Fig. 8

Witnesses.  
J. H. Shumway  
Clara L. Weed.

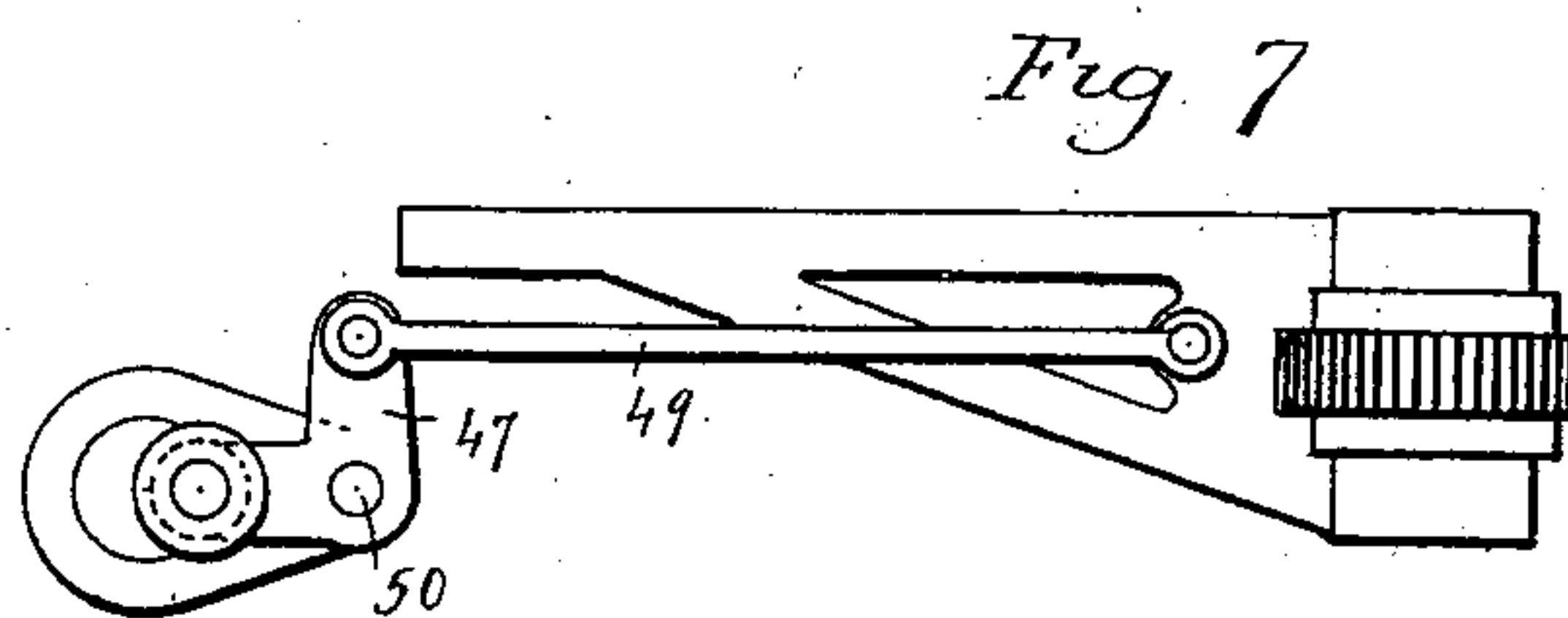
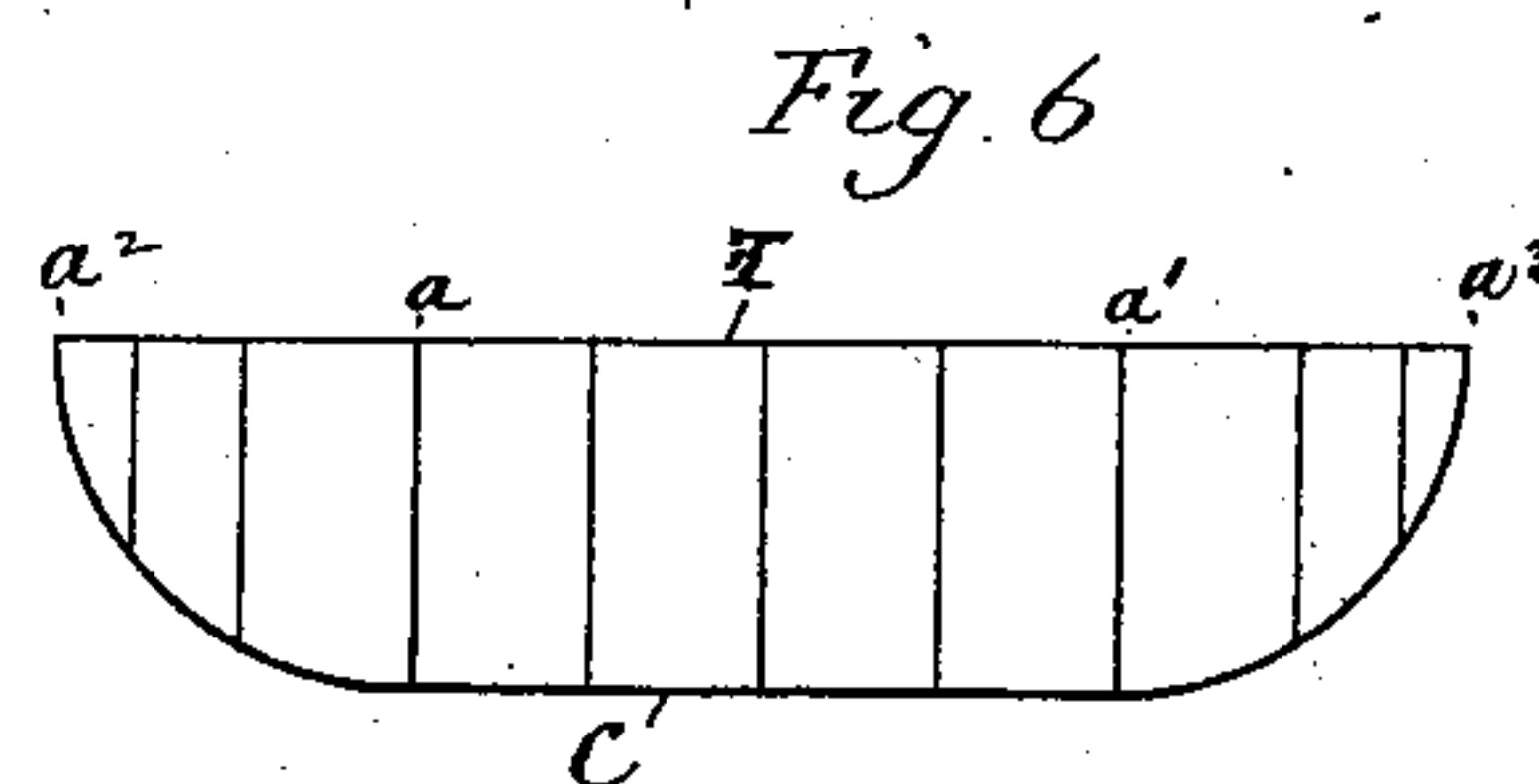
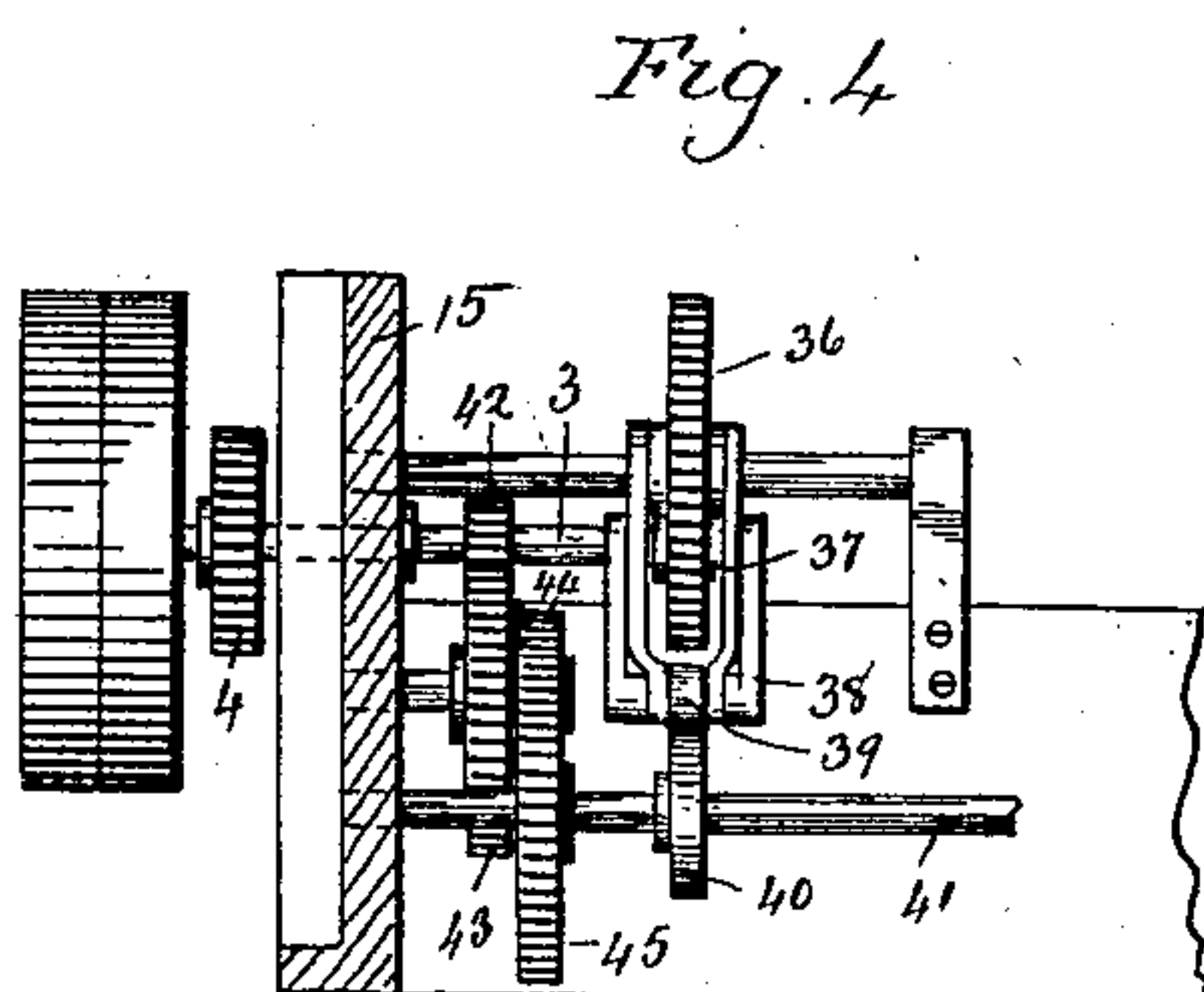
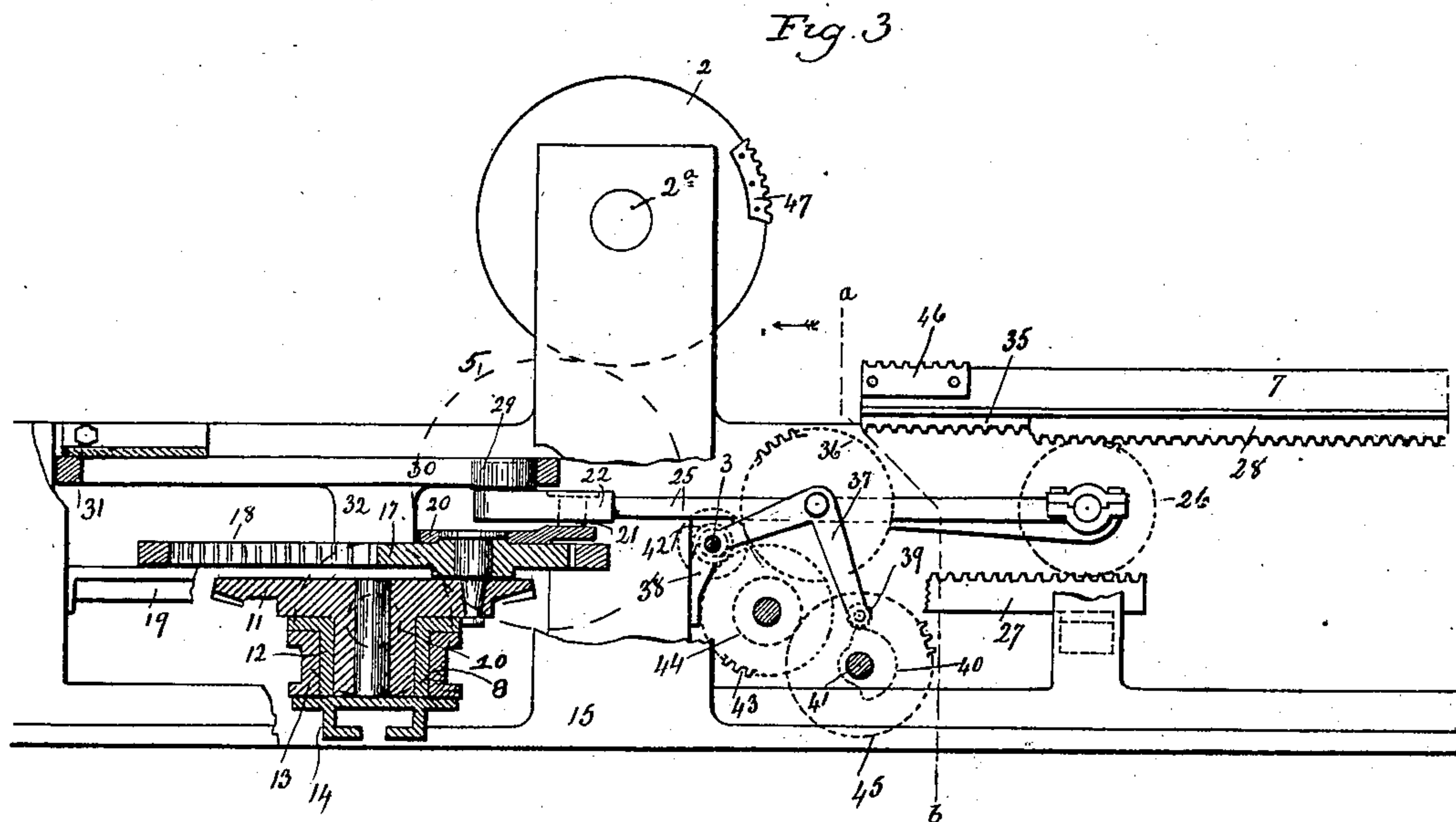
Winfield S. Huson,  
Inventor.  
By Atty Seymour & Co.

W. S. HUSON.  
BED MOVEMENT FOR PRINTING PRESSES.

APPLICATION FILED MAY 12, 1902

NO MODEL.

3 SHEETS—SHEET 2.



Witnesses  
J. K. Shumway  
Clara L. Weed.

Winfield S. Huson  
Inventor.  
By Atty. Seymour & Co.

No. 725,714.

PATENTED APR. 21, 1903.

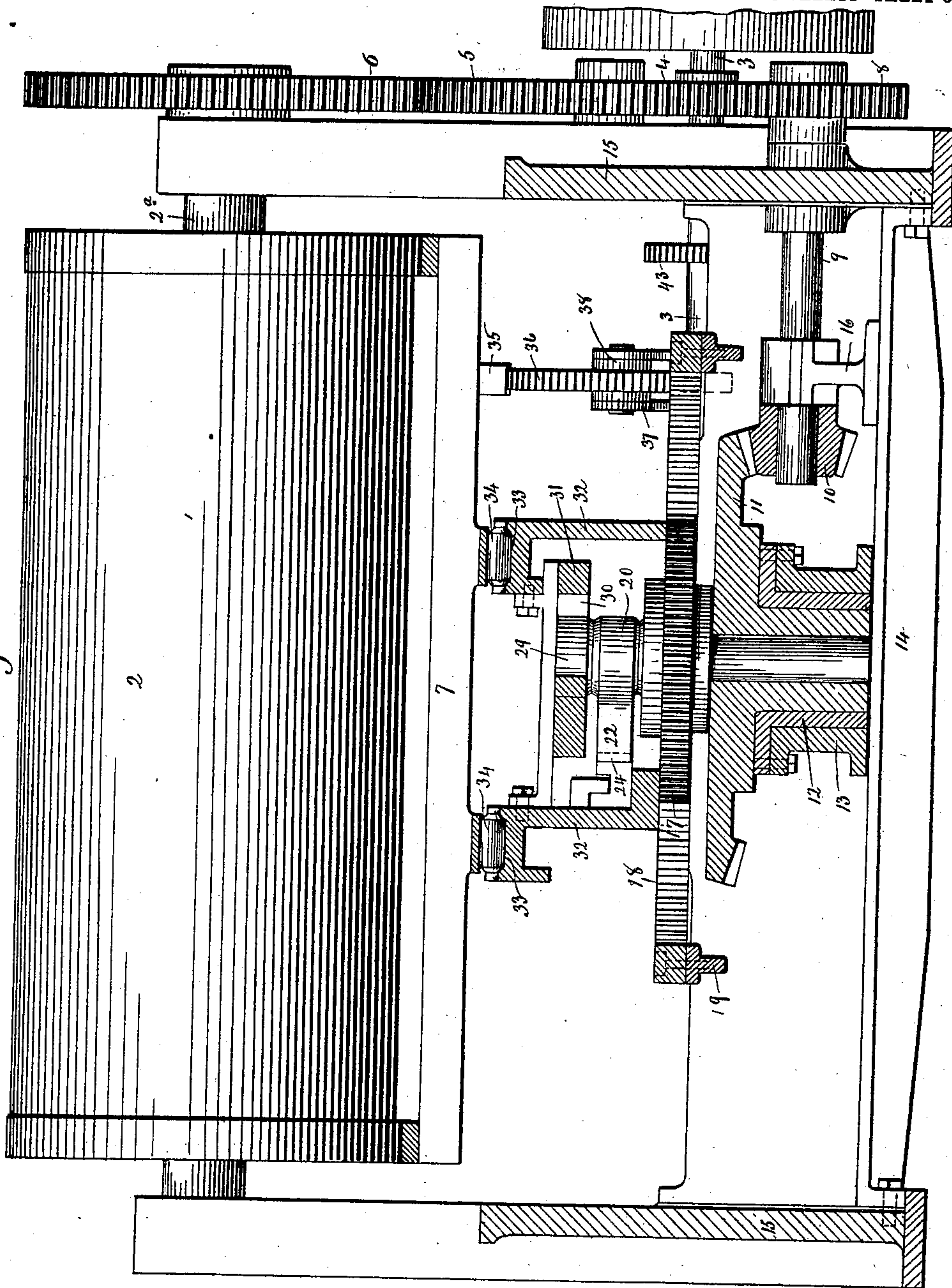
W. S. HUSON.  
BED MOVEMENT FOR PRINTING PRESSES.

APPLICATION FILED MAY 12, 1902.

NO MODEL.

3 SHEETS—SHEET 3.

Fig. 5.



Witnesses  
J. H. Hummery  
Clara L. Weed.

Winfield S. Huson.  
Inventor.  
By Atty. Seymour & Co.



# UNITED STATES PATENT OFFICE.

WINFIELD S. HUSON, OF DERBY, CONNECTICUT, ASSIGNOR TO THE  
WHITLOCK PRINTING PRESS MFG. CO., OF DERBY, CONNECTICUT,  
A CORPORATION.

## BED-MOVEMENT FOR PRINTING-PRESSES.

SPECIFICATION forming part of Letters Patent No. 725,714, dated April 21, 1903.

Application filed May 12, 1902. Serial No. 106,993. (No model.)

*To all whom it may concern:*

Be it known that I, WINFIELD S. HUSON, of Derby, in the county of New Haven and State of Connecticut, have invented a new and useful Improvement in Bed-Movements for Printing-Presses; and I do hereby declare the following, when taken in connection with the accompanying drawings and the figures of reference marked thereon, to be a full, clear, and exact description of the same, and which said drawings constitute part of this specification, and represent, in—

Figure 1, a plan view of one form which my improved bed-movement for printing-presses may assume; Fig. 2, an enlarged broken view designed in particular to show the converter-sector and its immediately-related parts; Fig. 3, a view of the machine, partly in side elevation and partly in vertical section; Fig. 4, a broken detail view on the line *a b* of Fig. 3 and showing the auxiliary train for assisting the sun-and-planet-gear train in driving the type-bed during the operation of printing; Fig. 5, an enlarged view of the machine, partly in elevation and partly in vertical cross-section, through the fixed ring 18 and looking toward the impression-cylinder 2; Fig. 6, a diagrammatic view for the illustration of the differential movement of the type-bed as required for printing and for reversing; Fig. 7, a detail broken view of one of the modifications which the bed-movement may assume; Fig. 8, a detail view showing a modification of the auxiliary train; Fig. 9, a similar view of another modification of the said auxiliary train.

My invention relates to an improvement in bed-movements for printing-presses of that class which have their impression-cylinders driven at a uniform rate of speed, the object being to provide simple, durable, and efficient means for conforming the speed of the reciprocating type-bed to the speed of the surface of the cylinder during the entire period of printing and for differentiating the speed of the bed at the ends of its stroke as required for the reversal of its motion.

With these ends in view my invention consists in a bed-movement for printing-presses

having certain details of construction and combinations of parts, as will be hereinafter described, and pointed out in the claims.

In carrying out my invention as herein shown the impression-cylinder 2 is driven at a uniform speed from the main driving-shaft 3 of the press by means of a train of gears comprising a main driving-pinion 4, mounted on the said shaft, an intermediate gear 5, into which the said pinion meshes, and a gear 6, mounted upon the shaft 2<sup>a</sup> of the said cylinder 2 and meshed into by the said intermediate gear 5. The reciprocating type-bed 7 is also driven from the main driving-shaft 3, the main driving-pinion 4 aforesaid meshing into the said intermediate gear 5, which meshes into a gear-wheel 8, mounted upon a driven shaft 9, carrying at its inner end a bevel-pinion 10, which meshes into a heavy bevel-gear 11, mounted vertically in a bushing 12, carried by the central girder 13 of the press. In order to reinforce the said central girder 13, I employ a cross-girder 14, extending under it at a right-angle and supported at its ends in the side frames 15 of the press. The girder 14 also carries a bracket 16, supporting the inner end of the said shaft 9.

Upon the bevel-gear 11 and eccentric to the center thereof I mount a planet-gear 17, which meshes into an internally-toothed fixed ring 18 of twice its diameter, constituting the sun-gear of a "sun-and-planet-gear" train, and bolted to a suitable skeleton frame 19, forming a part of the frame of the press.

To the upper face of the planet-gear 17 I secure a crank-pin carrier in the form of a plate 20, extending outwardly over the edge of the said gear and having mounted in it a crank-pin 21, which is located in the plate, so that its axial center intersects the pitch-line of the gear, which, in effect, constitutes a crank for the pin and might be termed a "crank-gear" as well as a "planet-gear." This crank-pin carries an oscillating converter-sector 22 in the form of a bell-crank lever, one arm of which is provided with a segmental rack 23, meshing into a straight rack 24, mounted in the adjacent end of the carriage or "truck" 25, the opposite end of



which has mounted in it the so-called "traversing" or "railway" gear 26, which meshes into a fixed rack 27, located below it and supported in the frame of the press. The traversing or railway gear 26 also meshes into a rack 28, secured to the lower face of the reciprocating type-bed 7, which therefore partakes of the motion of the said carriage. As the planet-gear 17 is just half the diameter of the sun-gear 18, the crank-pin will move back and forth in a straight line and would, except as hereinafter provided for, move the carriage back and forth in a straight line at a rate of speed corresponding to the speed of the crank-pin, which varies in speed in different portions of its stroke after the manner of all crank-motions. In order, however, to modify this motion, which would otherwise be transmitted to the type-bed, and to secure therefor throughout the major portion of its stroke a rate of motion exactly conforming to the speed of the surface of the cylinder 2 during the period of printing, I locate upon the other arm of the converter-sector 22 an antifriction-roller 29, which travels in a doubly-curved cam-like path or cam 30, formed to receive it in a converter 31 in the form of a plate, which is bolted to the trough members 32 of the press-frame, the said trough members being formed with the usual troughs 33, receiving antifriction-rollers 34, upon which the reciprocating type-bed 7 rests. The said antifriction-roller 29 moves back and forth in the said path 30 and causes the sector 22 to oscillate upon the crank-pin 21 as upon a center and impart what I may term a "secondary" or "differential" movement to the carriage 25, which on this account will have its movement modified and transformed from a pure crank-movement into a movement of equalized speed during the major portion of its stroke and of differential speed at the ends of its stroke. It follows from the foregoing that the curvature of the path 30 will determine the degree of oscillation of the converter-sector, and therefore the differential movement of the type-bed. Therefore in designing the press the speed of the major portion of the movement of the type-bed will be made to correspond to the speed of the cylinder, and the stopping and starting or reversing speed of the type-bed at the ends of its stroke will be determined with reference to the rate at which the type-bed is to be reversed, &c. The curve of the path 30 will be laid out accordingly.

To illustrate the movement of the cylinder 2 and the type-bed 7, I have introduced a velocity-diagram, appearing as Fig. 6 of the drawings. In this diagram the line C represents the path of the type-bed and the line T the surface speed of the cylinder. By properly laying out the doubly-curved cam-like path 30 I am enabled, through the medium of the converter-sector 22, to move the type-bed between the points  $a$  and  $a'$  at exactly the speed at which the surface of the im-

pression-cylinder moves, to slow it down from the point  $a$  to the point  $a^2$ , where it comes to a stop, to start it up and move it from the point  $a^2$  to the point  $a$ , to slow it down from the point  $a'$  to the point  $a^3$ , where it comes to a stop, and to start it up and move it from the point  $a^3$  to the point  $a'$ . It will thus be seen that the movement of the type-bed may be divided into three phases—viz., a central or major or printing movement and two end movements, which are utilized in bringing the bed to a stop and reversing it at each end of its stroke. It will be understood that the movement of the bed between the points  $a$  and  $a^2$  and  $a'$  and  $a^3$  in either direction will never be faster than the movement of the bed between the points  $a$  and  $a'$  in either direction. By differentiating the movement of the bed as described in different portions of its stroke, so as to give it, as it were, a long rapid uniform printing stroke and short reversing strokes, I am enabled to operate the bed at a higher speed than I otherwise could. The end strokes of the bed are, in effect, crank-motion strokes, while the central portion of the stroke of the bed is a crank-motion stroke modified or transformed into a stroke of uniform speed throughout its entire length.

As herein shown, I have provided the press with auxiliary mechanism for assisting the sun-and-planet-gear train in driving the type-bed during the operation of printing. This auxiliary mechanism is not essential to my improved press, though I prefer to employ it, nor is such auxiliary mechanism limited to use with the sun-and-planet-gear train above described, as it may be used in other situations. It comprises a supplemental rack 35, fixed to the lower face of the type-bed 7 in position to be engaged by a vertically-movable gear-wheel 36, mounted in a bell-crank-like fork 37, having the ends of the two members of its short arm swiveled upon a bracket 38, through which the main driving-shaft 3 passes, so that the said fork 37 will swing on a center concentric with the said shaft. The long arm of the fork 37 extends downwardly and carries an antifriction-roller 39, coacting with a cam 40, mounted upon a cam-shaft 41, which is driven from the main driving-shaft 3, so as to revolve the cam once for every complete movement back and forth of the type-bed by means of a pinion 42, mounted on the said main driving-shaft 3 and meshing into a large intermediate gear 43, carrying a pinion 44, which in turn meshes into a gear 45, mounted directly on the cam-shaft 41. The said cam 40 is shaped so that it lifts the gear 36 into engagement with the rack 35 at the beginning of the printing movement of the type-bed and maintains it in such engagement until such movement is completed, when the cam allows the gear to drop away from the rack 35 and remain in retirement until the bed starts upon its succeeding printing movement. It will be therefore understood that the power transmitted to the



type-bed through the gear 36 is confined to the printing movement of the bed. It will thus be seen that the auxiliary driving mechanism just described coacts with the main or sun-and-planet driving mechanism at a time when the most exacting work is imposed upon the same.

The type-bed 7 is also provided with the usual registering-rack 46, which coacts with a registering-segment 47, mounted upon the cylinder 2, to bring the bed and cylinder into exact registration at the beginning of the printing operation. These are well-known adjuncts of printing-presses and do not need detailed description.

Instead of connecting the converter-sector 22 with the truck or carriage by means of the racks 23 and 24 I may employ the modified construction shown in Fig. 7, in which the bell-crank converter-sector 47 is connected with a carriage or truck by means of a pitman 49, the pivotal connection of which with the converter-sector 47 permits the crank-pin 50 to be connected with the planet-gear at some other point than on the pitch-line thereof, in which case the pin will travel through a slightly-curved path instead of in a straight line. That movement of the pin, however, will be compensated for by the pivotal connection between the lever 47 and the pitman 49 and could not be compensated for were racks employed without their getting out of proper mesh.

Instead of lifting the gear-wheel into engagement with the rack 35 I may employ a construction like that shown in Fig. 8, in which a gear-wheel 50, mounted upon a shaft 51, is slid thereupon into and out of mesh with the said rack 35 by means of a lever 52, connected at its upper end with the hub 53 of the said wheel 50 and provided at its lower end with an antifriction-roller 54, running in the cam-groove 55, formed in a cam 56, carried by a shaft 57, corresponding to the cam-shaft 41, before mentioned. It will be understood that the cam 56 is constructed and arranged so as to cut the wheel 50 into operation at the beginning of the printing movement of the bed and to cut it out of operation at the conclusion of the printing movement of the bed.

In the modified construction shown by Fig. 9 the supplemental rack 35 is constantly meshed into by a gear-wheel 58, turning idly upon a shaft 59 and meshed into by a pinion 60, turning idly upon the main shaft 3 and provided with a clutch-head 61, which is engaged by a corresponding clutch-head 62, rotating with but splined upon the said main shaft 3 and cut into and out of action with the clutch-head 61 by means of a lever 63, driven from a cam, (not shown,) but corresponding to the cam 56, before mentioned. It will be understood that at the beginning of the printing movement of the bed 7 the lever 63 moves the clutch-head 62 into engagement with the clutch-head 61, whereby the power of the main shaft 3 is communicated directly to the

gear 58, in mesh with the rack 35. At the conclusion of the printing movement of the bed the lever 63 again acts and this time to disconnect the head 62 from the head 61, whereby the power of the shaft 3 is cut off from the pinion 60 and the gear 58, which are thereafter moved idly by the rack of the type-bed.

In view of the modifications shown and described and suggested and of others that may obviously be made I would have it understood that I do not limit myself to the constructions shown and described, but hold myself at liberty to make such departures therefrom as fairly fall within the spirit and scope of my invention.

Having fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a bed-movement for printing-presses, the combination with a bed, of a crank-pin moving in a reciprocating path, an oscillating converting device applied directly to the said crank-pin with which it reciprocates and on which it is oscillated, and connection between the said converting device and the type-bed, whereby the said device by its oscillation on the said pin modifies the action thereof so as to move the bed in the central portion of its throw at a rate uniform with the movement of the impression-cylinder and at a different rate at the ends of its throw.

2. In a bed-movement for printing-presses, the combination with a bed, of power connections for reciprocating the said bed including a crank-pin, a converting device applied directly to the said pin with which it reciprocates, and on which it is oscillated, connection between the said converting device and the said bed, and a converter containing a doubly-curved path which effects the oscillation of the said device upon the crank-pin, whereby the movement of the pin is modified so that the bed will be moved in the central portion of its throw at a rate uniform with the movement of the impression-cylinder, and at a different rate at the ends of its throw.

3. In a bed-movement for printing-presses, the combination with a bed, of power connections for reciprocating the said bed including a crank-pin, a converter-sector oscillating upon the said pin and having rack connection with the bed, and a converter which oscillates the converter-sector to modify the motion derived by the bed from the crank-pin so that the bed is moved in the central portion of its throw at a rate uniform with the movement of an impression-cylinder, and at a different rate at the ends of its throw.

4. In a bed-movement for printing-presses, the combination with a bed, of a carriage connected with the bed and provided with a rack, and power connections for reciprocating the said bed including a crank-pin, an oscillating converter-sector mounted upon the said pin and provided with a segmental rack meshing into the rack of the carriage, and a



converter coacting with the said sector to modify the movement derived by the carriage from the crank-pin.

5 In a bed-movement for printing-presses, the combination with a bed, of power connections for reciprocating the said bed including sun-and-planet gears, a crank-pin carried by the planet-gear, an oscillating converter-sector carried by the crank-pin, connection between the said sector and the said bed, and  
10 a converter oscillating the converter-sector to modify the motion derived by the bed from the said pin.

6. In a bed-movement for printing-presses, 15 the combination with a bed, of power connections for reciprocating the said bed to move the same in the central portion of its throw at a rate uniform with the movement of an impression-cylinder and at a differentiated rate  
20 at the ends of its throw, and a supplemental bed-driving mechanism including a rack carried by the bed, a gear arranged independently of the impression-cylinder for coaction with the said rack, and means for cutting the

said gear into operation at the beginning of the printing movement of the bed and cutting it out of operation at the conclusion of the printing movement of the bed. 25

7. In a bed-movement for printing-presses, the combination with a bed, of power connections for moving the said bed in the central portion of its throw at a rate uniform with the movement of an impression-cylinder, and at a different rate at the ends of its throw, a supplemental bed-driving mechanism operating to assist the movement of the bed during the central portion of its throw and including a rack applied to the lower face of the bed, and power connections leading to the said rack from the driving-shaft of the machine. 30 35 40

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

WINFIELD S. HUSON.

Witnesses:

GEORGE D. SEYMOUR,  
FREDERIC C. EARLE.