

No. 688,690.

Patented Dec. 10, 1901.

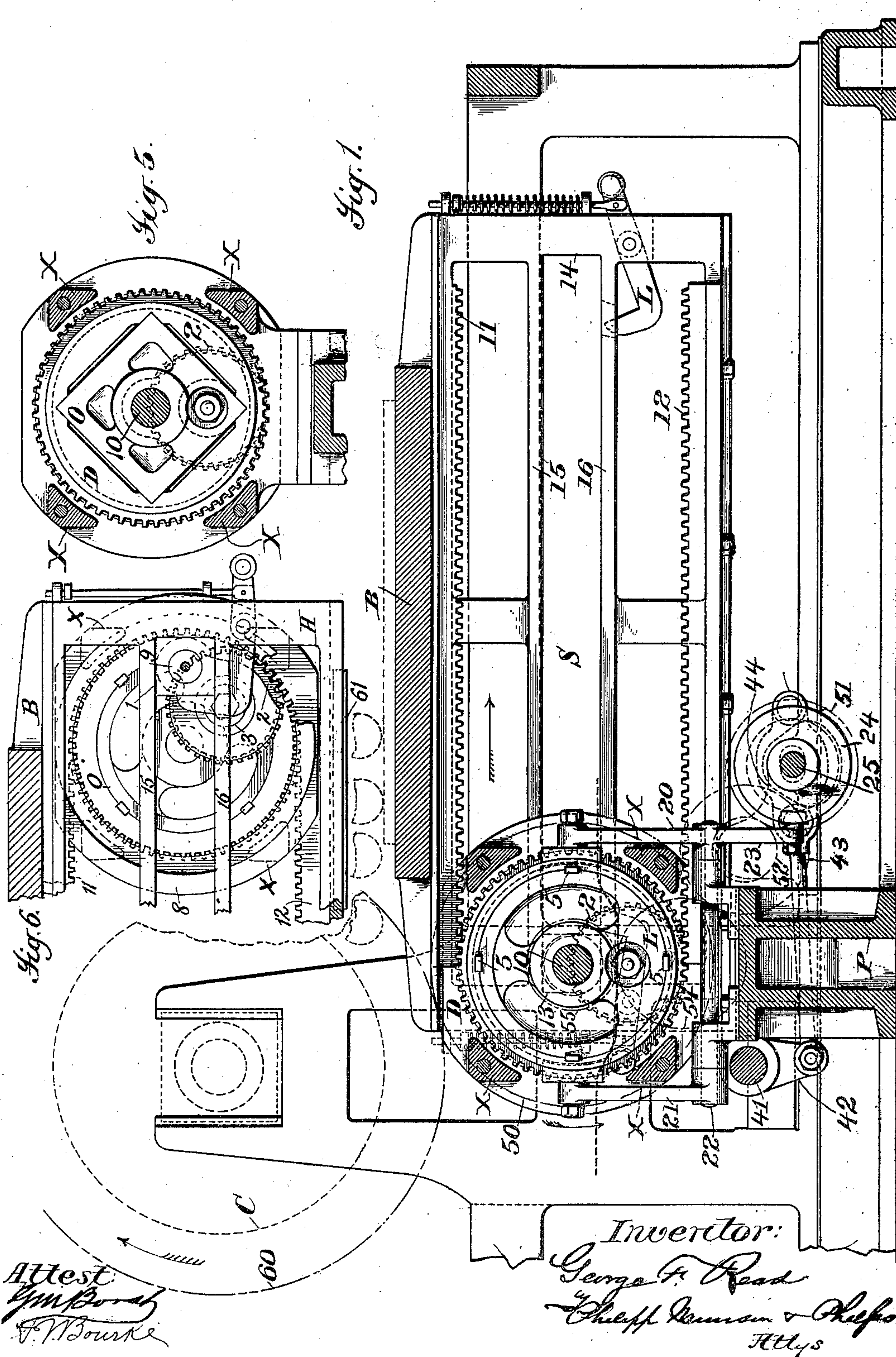
G. F. READ.

BED MOTION FOR CYLINDER PRINTING MACHINES.

(Application filed Mar. 21, 1896.)

(No Model.)

3 Sheets—Sheet 1.



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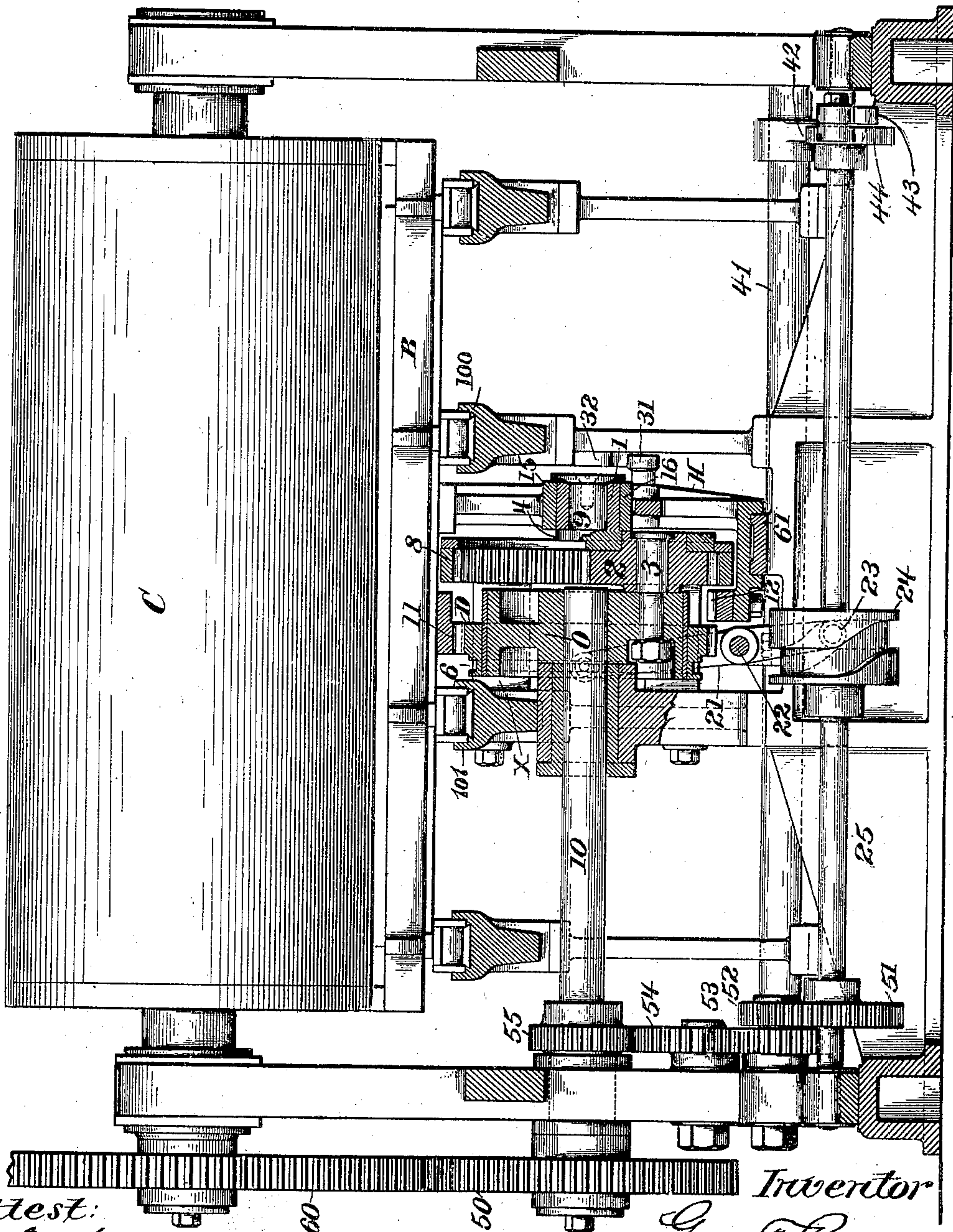
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Fig. 2.



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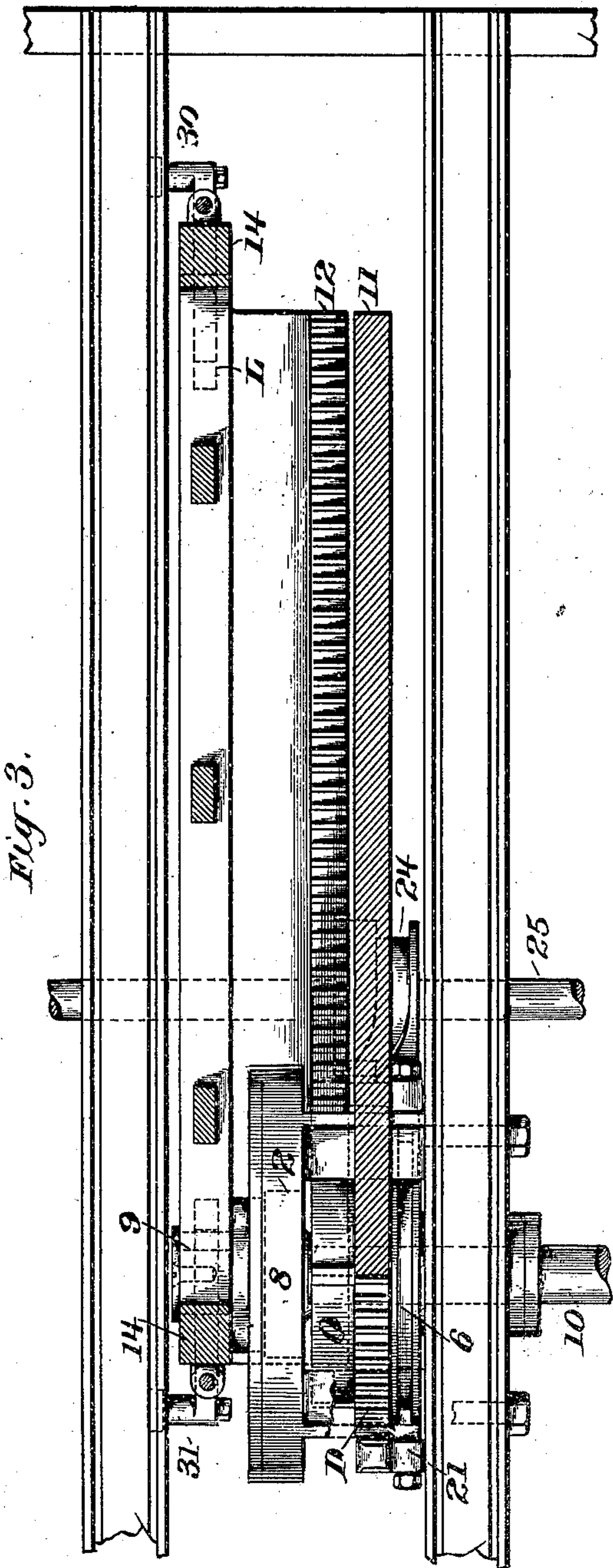
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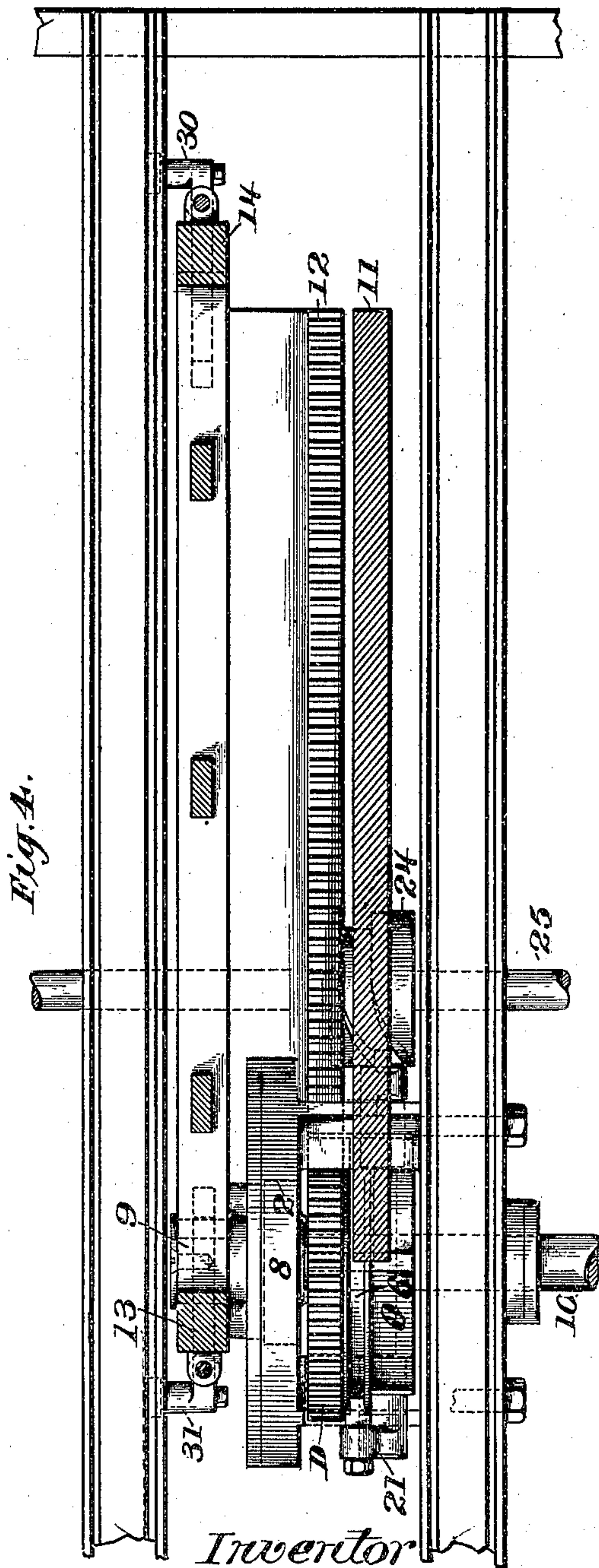
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(No Model.)

3 Sheets—Sheet 3.



Attest:
J. M. Bourke
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Inventor
George F. Read
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UNITED STATES PATENT OFFICE.

GEORGE F. READ, OF BROOKLYN, NEW YORK, ASSIGNOR, BY DIRECT AND MESNE ASSIGNMENTS, TO ROBERT HOE AND CHARLES W. CARPENTER, OF NEW YORK, N. Y., COPARTNERS DOING BUSINESS UNDER THE FIRM-NAME OF R. HOE AND COMPANY.

BED-MOTION FOR CYLINDER PRINTING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 688,690, dated December 10, 1901.

Application filed March 21, 1896. Serial No. 584,255. (No model.)

To all whom it may concern:

Be it known that I, GEORGE F. READ, a citizen of the United States, residing at Brooklyn, county of Kings, and State of New York, have
5 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.
10 The present improvements relate to that class of bed-motions more especially adapted for use in connection with bed-and-cylinder printing-machines in which the bed is driven throughout the major portion of its reciprocation by its bed-driving wheel gearing with
5 one or the other of two driving-racks with which the bed is provided and in which the reversal of said bed at each end of its stroke is accomplished, preferably, by means of a
20 crank connection that is caused to travel in a right line and to gradually slow down and stop the movement of the bed in one direction and to start and accelerate the same in the opposite direction; and the invention consists more particularly in a means for accomplishing the couple between the bed-driving
25 wheel and bed-driving racks by sliding the rim of the bed-wheel to and from said racks, which are for the purpose set in different
30 planes with respect to the driving-wheel.

For the purpose of illustrating this invention the embodiment of it herein illustrated is that of an ordinary single-cylinder bed-reciprocating printing-machine, the drawings
35 showing, in—

Figure 1, a side elevation thereof, partly in section; Fig. 2, an end elevation thereof as seen from the rear. Figs. 3 and 4 are plan views with the bed removed, being taken on
40 a section-line which cuts the upper rack 11; and Fig. 5 is a facial elevation of the bed-driving crank-wheel, the removed part being shown as severed on a line through the internal wheel-supporting frame. Fig. 6 is a sectional side elevation of the bed-driving wheel
45 and reversing mechanism.

This invention may be applied generally to reciprocating beds, but is more especially adapted for use in connection with and is es-

pecially designed to form a part of the bed-motion of bed-and-cylinder printing-machines, 50 and although illustrated here in connection with that type of bed-and-cylinder printing-machines which has but one impression-cylinder it is capable of use with any of the various 55 forms of that class of printing-machines, the one illustrated being selected simply for convenience in explaining the present invention. The printing-machine shown consists generally of a single impression-cylinder whose 60 journals are seated upon spring-supports and made capable of rising and falling by means of a lifting mechanism, sufficiently illustrated to indicate its character by the presence in the drawings of the toggle rock-shaft 41, its rock- 65 arm 42, connecting-rod 43, and cam 44 on shaft 25, only one set of which devices is shown at the right-hand end of Fig. 2. This type of printing-machine is common in the art of printing.

In the machine illustrated the cylinder C is 70 mounted, as usual, in proper journals in the framework and is driven from a main shaft 10 by means of a wheel 50, fast thereon, which gears with the cylinder-wheel 60. Beneath 75 this reciprocates the bed B, as usual, and it is driven by the improved motion now to be described. One main element of this bed-motion is a bed-driving wheel D, which preferably is made of such a diameter that although 80 it moves with the same surface speed as the cylinder it makes three turns to one of the cylinder. This wheel coöperates with bed-racks, of which there are two, 11 and 12, one 85 above and one below, which are hung from the bed, so as to occupy different vertical planes with respect to the driving-wheel, although their pitch-lines are respectively in the same horizontal plane as the pitch-line of the bed-wheel D, at the top and bottom portions thereof. The hanger H, carrying the 90 lower rack 12, also provides centrally by means of two side bars 15 16 a longitudinal way S, having at each of its ends abutments 13 14, said hanger H being guided on a rail 95 61, supported by the framework.

The bed-driving wheel D is hung upon the main shaft 10, and when the machine is in op-

eration it runs continuously. In this instance it is a compound wheel, forming a crank and gear or pinion thereon, and has a body or crank O, which presents a periphery of a width slightly greater than double that of the movable toothed rim which it carries, and the said movable toothed rim is of such a width that while engaged with one rack, as in Fig. 2, it may be disengaged from the other rack, and vice versa. It is provided with means suitably arranged and timed, so that said rim may be appropriately moved from one rack to the other longitudinally of the shaft 10 or axis of the body or crank O and the gear and is splined onto the body or crank O, so as to rotate therewith. This shifting means consists of a collar 6, fast to said movable rim, in the groove of which collar pins extending from levers 20 21 protrude, which levers 20 21 are fast to a rock-shaft 22, thus forming a yoke that is rocked by a rock-arm 23, that is provided with a bowl that enters the grooved cam 24, fast on the counter-shaft 25, driven through gears 51, 52, 53, 54, and 55 from the main shaft 10. The bed-driving wheel D carries a stud or wrist-pin 3, the center of which is exactly midway between the center of the driving-shaft 10 and the pitch-line of said wheel D, and upon this stud 3 revolves a pinion 2, whose pitch-circle diameter is one-half that of the wheel D, the teeth of which pinion 2 engage with those of an internal or annular gear 8, of the same pitch-circle diameter as the bed-wheel D, which internal or annular gear is fixed securely to the framework by brackets X. This arrangement of the crank-wheel D, carrying with it the pivot of the pinion 2, therefore causes that pinion 2 meshed with the internal gear 8 to revolve around its stud 3, and as there are twice as many teeth in the internal gear 8 as there are in the pinion 2 one revolution of the bed-wheel D will cause the pinion 2 to make two complete revolutions about the stud, and any point in the pitch-circle of the pinion 2 will consequently move in a straight line a distance equal to the diameter of the internal gear 8 and at the same velocity as would be derived from a crank of the same radius as that of the driving or crank wheel D. A crank-pin 9 is therefore secured to the side of the pinion 2, with its center coincident with a point in its pitch-circle and in such position that it will move in a central horizontal line back and forth. This crank-pin 9 is secured to the pinion 2 by means of an arm 4, which carries it, said arm being fast to the pinion, and said crank-pin being preferably provided with a square box 1, inclosing it. This crank-pin 9, with or without its inclosing box, fits within the longitudinal guideway S, formed between the bars 15 16, which guideway S has a length between its abutments 13 14 equal to the length of stroke the bed B makes during the main part of its reciprocatory movement, and the hanger H is provided near the said abutments at each end

with a locking-lever L, pivoted thereto and spring-seated, so that each lever may, whenever the crank-pin 9 or its inclosing box is in contact with the abutment at the end of the guideway S, be raised to lock the parts together or lowered to release them, these movements being accomplished by suitable rock-arms 30 31, (see Figs. 3 and 4,) which run in longitudinal camways 32, the normal position of which levers is their open position. As shown in Fig. 1, the bed B, then moving in the direction of the arrow shown, while geared with the rack 12, has made the major part of its non-printing run, driven by the wheel D, and has arrived at the point where the rack 12 is to leave the wheel D and the bed is to be reversed by the action of the crank-pin 9 solely. When the rack 12 has run out of engagement with the driving-wheel D, the rim of said wheel is moved laterally by the cam 24 out of line with the rack 12 and into line with the rack 11, the further movement of the bed being wholly within the control of the crank-pin 9, which then rests against the abutment 13, to which it is then locked by the latch L. The reversing movement is accomplished wholly by the crank-pin 9, which by reason of the construction and operation of the gearing travels in a right line with a movement that is first equal to the maximum speed of the bed and then gradually slows down and brings the bed to a state of rest, at which time the crank-pin having made its greatest extent of movement in the direction of the arrow slowly begins its movement in the opposite direction, thereby gradually starting the bed and accelerating it until its maximum speed has been again attained, at which time the toothed rim of wheel D will gear with the rack 11, and the further driving movement of the bed will be wholly accomplished by the wheel D and said rack 11. While thus driven the crank-pin 9 will again make an idle movement as the bars 15 16 pass over it, and when the bed has made the major part of its printing movement in the direction opposite to that of the arrow, driven by the rack 11, the abutment 14 will contact with the crank-pin 9 and begin the reversing movement at the other end, while the said wheel D simultaneously moves out of alinement with the rack 11 and into alinement with the rack 12. The means shown in the drawings and above described for operating the bed when the wheel D is released from the racks 11 12 and acting to gradually slow down the bed to a state of rest and gradually accelerate the bed to its maximum speed in the opposite direction is described and claimed in my other applications, Serial No. 571,328, filed December 7, 1895, and Serial No. 584,045, filed March 20, 1896.

In Figs. 1 to 4, inclusive, the toothed rim of the wheel D is fixed to its body by means of splines 5, which operate in the usual manner as guides and stays. In Fig. 5, however,

there is illustrated another structure, in which the body O is polygonal, and its projecting corners provide the guideways for the movement of the wheel D, which is provided with 5 corresponding seats.

I am aware that the moving of a bed-driving wheel laterally, so as to engage alternately with racks placed in different vertical planes, is not new; but making the wheel in 10 two parts, the central or body portion of which may remain fixedly secured to the shaft and carry the crank-pin 9, while the rim only has a lateral movement, is an essentially novel construction.

15 Although when the toothed rim is engaged with the racks to drive the bed there is great stress upon the splines or faces of the polygon, which would make it impracticable to move the rim laterally at that time, it will be ob- 20 served that the lateral movement is not made until the racks have run out of engagement with the driving-wheel and when there is no power being communicated through it to drive the bed, and consequently but little friction 25 upon the sides of the splines. By this construction of the bed-driving wheel D—that is, providing it with a movable toothed rim—great stability of the parts is attained, for the reason that the main body of said wheel re- 30 mains undisturbed in its bearings. The structure also enables the parts to be brought into a narrower compass than when the wheel is mounted to rotate horizontally and made to move up and down, which enables the cen- 35 tral bed-runners 100 101 to be brought so near to the center of the bed as to form strong sustaining parts therefor.

What is claimed is—

1. The combination of the bed, two facing 40 racks in different planes carried by the bed, a wheel having a rim and a body of greater thickness than said rim, the rim being adapted to move longitudinally of the axis of the wheel on said body from engagement with 45 one of said racks to engagement with the other of said racks, and means for giving such movement to the rim, substantially as de- scribed.

2. The combination with a bed having two 50 facing-racks in different planes and separated a distance equal to the diameter of the bed-driving wheel, and a bed-driving wheel provided with a movable toothed rim and means for moving the same longitudinally of the 55 axis of the wheel from one rack to the other, of a pinion pivoted eccentrically to said bed-driving wheel, and a bed-driving member carried by said pinion and cooperating with abutments on the bed, substantially as de- 60 scribed.

3. The combination of the bed, two facing racks in different planes carried by the bed, a wheel having a rim and a polygonal body 65 of greater thickness than said rim, the rim being adapted to move longitudinally of the axis of the wheel on said polygonal body and from engagement with one of said racks to

engagement with the other of said racks, and means for giving such movement to the rim, substantially as described. 70

4. The combination with the bed-racks lo- 75 cated in adjacent vertical planes, of a rotatable shaft having an enlargement on one end, a sliding gear actuating said racks, means independent of the gear for controlling the bed during the reversing operations, and means 80 for shifting the gear from one rack to the other during such reversing operations, said gear being made in ring form and being slidably mounted upon the enlargement of said shaft, 85 substantially as specified.

5. The combination with the bed-racks lo- 90 cated in adjacent vertical planes, of a sliding ring-gear, an enlargement or hub on the gear-shaft on which enlargement the gear is 85 splined, a yoke operating in a groove formed at the side of the gear, and means for oper- ating said yoke in sliding the gear, substan- 90 tially as specified.

6. The combination with the bed-racks lo- 95 cated in adjacent vertical planes, a sliding ring-gear, an enlargement or hub on the gear-shaft upon which enlargement said gear is mounted and to which it is splined, a bearing 95 for said shaft, and means for shifting the gear, substantially as described.

7. The combination of a bed, a shaft, a ro- 100 tating crank carried by the shaft, a pinion supported on and rotated by said crank, means cooperating with the pinion for recip- 105 rocating the bed, means for shifting said pinion parallel to the axis of the crank, and mechanism actuated by said crank for reversing the movement of the bed, substantially as de- scribed.

8. The combination of a pair of racks in dif- 105 ferent planes, a rotating crank, a pinion supported on and rotated by said crank, and means for shifting said pinion on the crank and parallel to the axis thereof, to alternately 110 engage the racks.

9. The combination of a rotating crank pro- 115 vided with a wrist-pin, a main pinion supported on and rotated by said crank, a pair of racks located in different planes and adapt- 115 ed to be alternately engaged by said pinion, and means for shifting the pinion on the crank so as to alternately engage the racks, with means whereby the wrist-pin is enabled 120 to slow down and reverse the bed while the pinion is being shifted from one rack to the other.

10. In a bed-movement, the combination of a pair of racks, a revolving crank and mech- 125 anism operated thereby for reversing the movement of the rack-frame at each end of the stroke, an annular or ring pinion slidably mounted upon and supported by said revol- 130 ving crank, and means for shifting the pinion from engagement with one rack into engage- ment with the other, during the period of re- verse.

11. The combination of a rotatable shaft having a large hub or crank-disk on one end,

a rack-frame provided with parallel racks disposed in different planes, an annular or ring pinion slidably mounted on but rotating with said crank-disk, means independent of the racks and pinion for reversing the movement of the rack-frame at each end of its stroke, and means for shifting the pinion upon the disk from engagement with one rack into engagement with the other during the period of reversal.

12. In a bed-motion for printing-presses, the combination with the racks, of a rotatable shaft having an enlargement, a gear supported on and sliding on the enlargement of said shaft from one rack to the other, and free from extraneous friction, a wrist-pin supported from the shaft by means independent of the gear, means engaged by the wrist-pin and whereby it is enabled to slow down and reverse the bed, and means for sliding the gear, substantially as described.

13. In a bed-motion for printing-presses, the combination with racks arranged in adjacent planes, of a shaft mounted in stationary bearings, having a large hub on its inner end, a gear supported on, keyed to, but sliding on said hub from one rack to the other, means independent of the gear for slowing down and reversing the bed, and means for sliding the gear on the hub from one rack to the other, substantially as specified.

14. In a printing-press, the combination with the cylinder and bed, of racks attached to the bed in adjacent planes, an actuating-

shaft having a large hub, a gear supported on, keyed to, and sliding upon said hub from one rack to the other, means independent of the gear for slowing down and reversing the bed, while the gear is disengaged from the racks, and means for sliding said gear from one rack to the other, substantially as specified.

15. The combination with the bed-racks arranged in adjacent planes, a rotatable longitudinally-immovable shaft having a large hub on one end, a gear mounted on the said hub and sliding from one rack to the other, said gear being independent of the shaft-bearing, and means for slowing and reversing the bed, substantially as described.

16. The combination with the bed-racks arranged in adjacent planes, and the cylinder, of a longitudinally-immovable driving-shaft having a large hub on one end, a gear supported on, keyed to and sliding on said hub and engaging the racks alternately, said gear being independent of the shaft-bearing, means for shifting the gear, and means for slowing and reversing the bed while the gear is disengaged from the racks, substantially as specified.

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

GEORGE F. READ.

Witnesses:

F. W. H. CRANE,
E. L. SPEIR.