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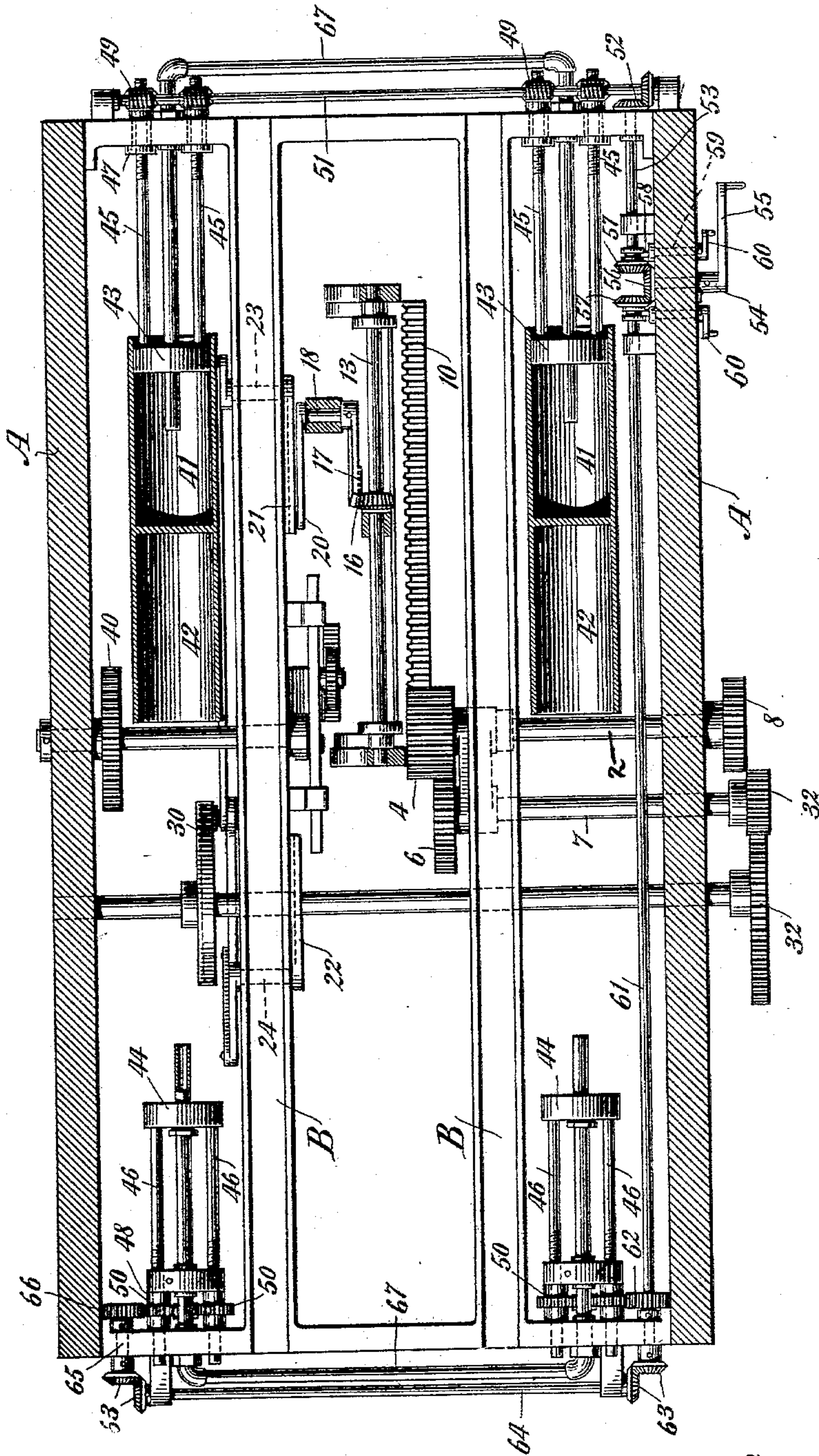
W. SCOTT.

BED MOTION FOR CYLINDER PRINTING MACHINES.

No. 562,923.

Patented June 30, 1896.

Fig. 1.



Witnesses  
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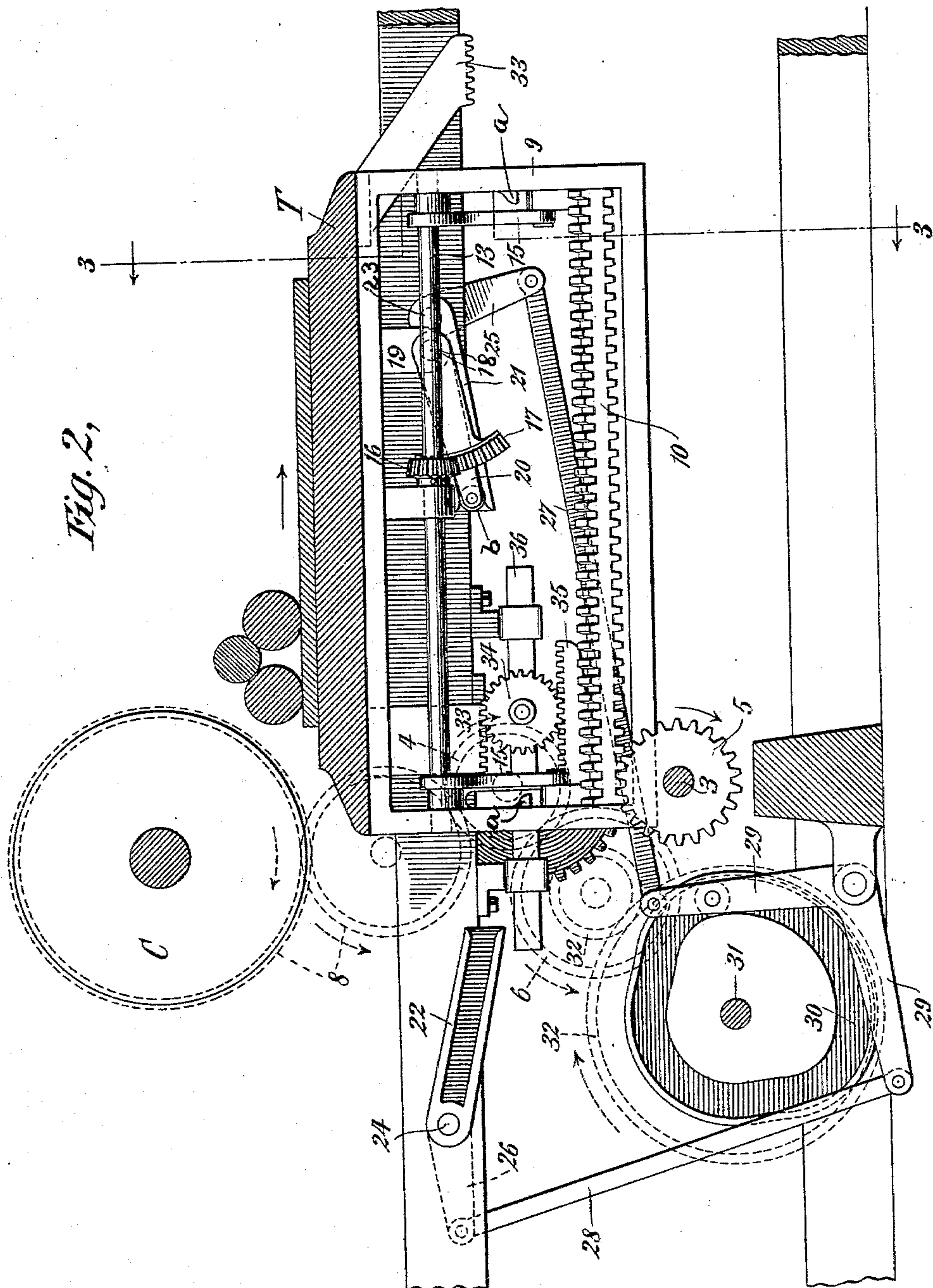
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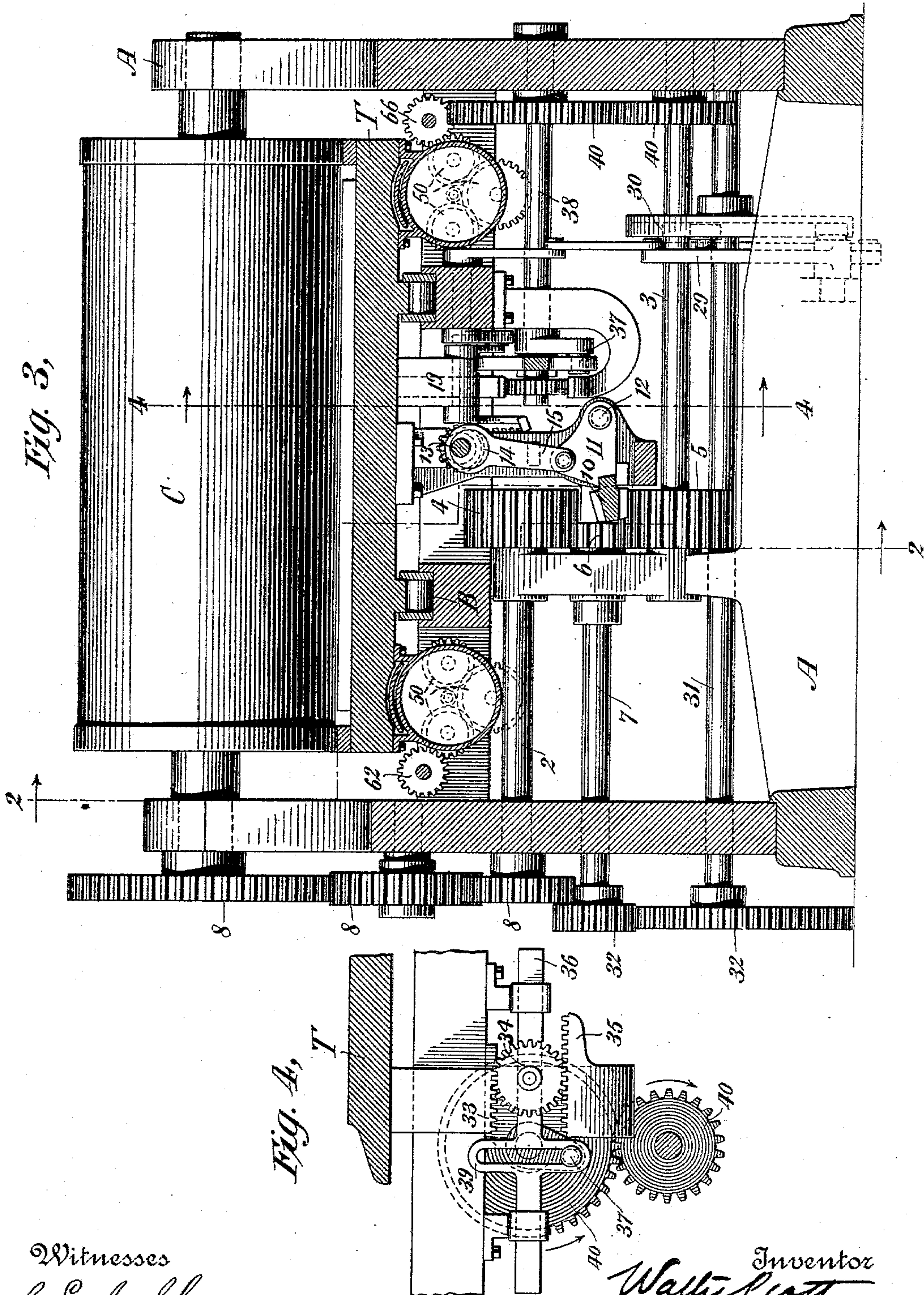
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# UNITED STATES PATENT OFFICE.

WALTER SCOTT, OF PLAINFIELD, NEW JERSEY.

## BED-MOTION FOR CYLINDER PRINTING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 562,923, dated June 30, 1896.

Application filed June 18, 1894. Serial No. 514,865. (No model.)

*To all whom it may concern.*

Be it known that I, WALTER SCOTT, a citizen of the United States, and a resident of Plainfield, in the county of Union and State of New Jersey, have invented certain new and useful Improvements in Bed-Motions for Cylinder Printing-Machines, of which the following is a specification.

This invention relates, primarily, to means for giving a reciprocatory motion to the beds of cylinder printing-machines, but it is equally applicable in other classes of machinery wherein there is employed a reciprocating member, as planers, &c. There are several classes of such printing-machines, the invention being applicable to all of them. One of these classes includes cylinders which revolve continuously, being lifted during the return or non-printing stroke of the bed, or having a depressed part which is opposite the bed during such stroke. A second class of these machines includes a cylinder which is at rest during the return stroke of the bed, but which moves in unison with the bed during the forward or printing stroke thereof, and which is either lifted during such return stroke or has a flat or depressed portion to come opposite the same during the return stroke. In another class there is an oscillating impression-cylinder, commonly driven by a rack on the bed, which takes impressions in several ways, as during one stroke only of the bed, being lifted during the other stroke, or it may take impressions during both strokes. There is another class of such machines wherein a number of impression-cylinders coact with one bed in a variety of ways, but as these are well-known to makers and users of this class of machines it is not necessary to here specify them. The aim of the maker in all these cases is to obtain and maintain an exact equality of speed of the printing and impression surfaces during the printing and a quick reversal of the motion of the bed, with smoothness of motion of all parts. Such is the end of this invention.

This invention includes combinations of devices hereinafter described, and more particularly pointed out in the claims concluding this specification.

The preferred form of the invention is

shown in the accompanying drawings, forming part of this specification, in which—

Figure 1 is a sectional plan view taken below the bed through the air-cylinders and showing the pistons therefor, the rack, part of the driving mechanism for the same, and part of the mechanism for operating the rack, and the mechanism for adjusting the air-check devices to vary the pressures. Fig. 2 is a sectional side elevation on the planes indicated by the line 2 2 in Fig. 3, the view being taken in the direction of the arrows, showing the driving mechanism for the bed and the mechanism for operating the rack. Fig. 3 is a sectional end view taken on the line 3 3 in Fig. 2 in the direction of the arrows, showing the mechanisms above named. Fig. 4 is a sectional side elevation, on the line 4 4 in Fig. 3, of a mechanism for completing, stopping, and reversing the motion of the bed after it passes from the control of the driver-gears.

Referring to the drawings, the reference A marks a suitable framework, in which the moving parts of the machine are mounted; the reference B marks the channels or guides upon which the bed moves; the reference T marks the bed, and C an impression-cylinder. Journaled in the framework A are the shafts 2 and 3, upon which are mounted driver-gears 4 and 5, shown as being one above another in a vertical plane and as being connected by an intermediate gear 6 of lesser width, which intermediate gear is upon the shaft 7, also journaled in the framework. The impression-cylinder C is shown as being connected with the shaft 2 by means of a train of gearing 8. The power is applied in any suitable place, as to the shaft 7. The frame 9, secured to the bed, forms the support for the rack 10, which is pivoted by means of the arms 11 to the said frame, as at 12, and is given an up-and-down motion by means of the rock-shaft 13, the eccentrics 14 thereon, and the eccentric-straps 15, which are pivotally connected to the arms 11, one at each end of the rack. The motion of the rack is limited by suitable stops *a*. The rock-shaft 13 is journaled in the frame 9 and is provided with a gear 16, which coacts with the gear-segment 17. This segment 17 is carried by the rock-shaft 18, journaled in a lug 19, pro-



jecting downward from the bed. The shaft 18 is provided with an arm 20, having an antifric-  
 tion-roller *b*, which coacts periodically with  
 the pivoted slot-bars or cams 21 22 on the  
 5 framework, and so operates the shaft 18, seg-  
 ment 17, and gear 16 on shaft 13 to move the  
 rack-bar 10 up and down, the slot-bars being  
 moved while the friction-roller *b* on arm 20 is  
 within the slot. These slot-bars 21 22 are  
 10 operated by means of their shafts 23 24,  
 cranks 25 26, links 27 28, elbow-lever 29, and  
 cam 30. This cam 30 is shown as a closed  
 cam and is borne by the shaft 31, journaled  
 in the framework A, and is driven from the  
 15 shaft 7 hereinbefore named by the train of  
 gearing 32, being so timed that the lever 29  
 and the parts operated thereby are moved  
 from one extreme of their motion to the other  
 while the bed is completing, stopping, and  
 20 reversing its motion, as hereinafter set forth.

For completing, stopping, and reversing the  
 motion of the bed any suitable device known  
 or commonly used for that purpose may be  
 used in connection with the driving mechan-  
 25 ism hereinbefore described, and one such  
 mechanism is herein shown, which consists of  
 a mutilated rack 33 upon the bed, the rolling  
 gear 34, the fixed rack 35, the slide-bar 36,  
 which carries the said rolling gear, the crank-  
 30 pin 37 on the shaft 38, engaging a slot 39 in  
 the said bar 36, and the gearing 40, connecting  
 the shaft 38 with the shaft 3 hereinbefore  
 named.

Taking the parts in the positions in which  
 35 they are shown in the drawings, they are mov-  
 ing in the direction indicated by the arrows  
 thereon. The bed is approaching the limit  
 of its motion to the right in Fig. 2. The anti-  
 friction-roller *b* of the arm 20 has just entered  
 40 the slot-bar 21. The rack 10 is about to roll  
 out of mesh with the driver-gear 5. The roll-  
 ing gear 34 has just meshed with the left-  
 hand portion of the mutilated rack 33. Dur-  
 ing the further motion of the parts the roll-  
 45 ing-gear 34 drives the bed to the right in Fig.  
 2 until the crank-pin 37 begins to move up-  
 ward and to the left in Fig. 4, while at the  
 same time the cam 30 operates the slot-bar 21  
 to raise the arm 20, rocks the shaft 13, and  
 50 lifts the rack-bar 10 from the position in which  
 it engages the driver-gear 5 into the position  
 in which it engages the gear 4. As the pin  
 37 moves upward and to the left (see Fig. 4)  
 the bed is started in the reverse direction, the  
 55 rack 10 rolls into mesh with the gear 4, and  
 the gear 34 rolls out of mesh with the muti-  
 lated rack. The slot-bars 21 and 22 move up-  
 ward or downward simultaneously, as the  
 case may be, during the time the bed reverses  
 60 its motion at each end, and operate the arm  
 20 and other parts. As the bed approaches  
 the limit of its motion to the left in Fig. 2  
 the antifric-tion-roller *b* on arm 20 enters the  
 slot of bar 22 and the rolling gear 34 meshes  
 65 with the right-hand end of the mutilated rack  
 33. During the reversal of the motion of the  
 bed at the left (which is similar to that at the

right) the slot-bar 22 moves the arm 20 down-  
 ward and the pin 37 moves from its extreme  
 upper position to the left and downward in 70  
 Fig. 4 to complete, stop, and reverse the mo-  
 tion of the bed.

The gears 4 and 5 may be of the same or  
 unequal sizes, so that the motion of the bed  
 may be uniform in each direction, or it may 75  
 be faster in one direction than in the other.  
 Changes may be made in other parts; also,  
 more than one arm 20 may be employed and  
 one cam or slot-bar for coaction therewith, as  
 in my prior application, filed February 27, 80  
 1894, Serial No. 501,696.

This invention also includes an improve-  
 ment in air-checking devices for reciprocating  
 beds, one form of which will now be de- 85  
 scribed. Pairs of air-cylinders 41 42 are fast  
 upon the bed, and pairs of pistons 43 44 on  
 the framework coact therewith in checking  
 the bed. The pistons are moved by rods 45  
 46, to which they are fast, and are supported  
 by rods or pipes 67. The rods 45 46 are 90  
 screw-threaded at the ends where they pass  
 through the framework and engage with the  
 internal threads of the swiveled sleeves 47 48.  
 These sleeves are turned in any suitable man- 95  
 ner to move the rods and pistons in either di-  
 rection, as by the worm-gearing 49 at the right  
 or the spur-gearing 50 at the left in Fig. 1.  
 The worms of the gearing 49 are borne by the  
 shaft 51, which extends transversely of the  
 framework and which is driven by means of 100  
 the bevel-gearing 52 from the shaft 53, jour-  
 naled longitudinally of the framework.

The shaft 54, extending from the side of the  
 framework and provided with a crank 55, con- 105  
 nects with the shaft 53 by means of the beveled  
 gears 56 57. The gear 57 is or may be splined  
 upon its shaft 53 and may be moved thereon  
 by means of the eccentric-pin 58 on the shaft  
 59, which is provided with a handle 60 for  
 turning it. When gears 56 and 57 are in mesh, 110  
 the positions of the pistons 43 may be varied  
 by turning the crank 55. In like manner the  
 positions of the pistons 44 may be varied by  
 operating the gearing 50, which is connected  
 with the bevel-gears 56 above named by means 115  
 of the shaft 61, the gear 57 thereon, gears 62,  
 bevel-gearing 63, shaft 64, shaft 65, and gear  
 66. The gear 57 upon the shaft 61 is splined  
 thereon and may be moved by means of the  
 arm 60 and connections, as above described. 120  
 By this construction both of shafts 53 and 61  
 may be operated simultaneously or either may  
 be disconnected at will from the gear 56 and  
 the pistons operated thereby be left unmoved,  
 while the others are adjusted to vary the air- 125  
 check for the corresponding end of the ma-  
 chine.

For the purpose of equalizing the pressure  
 in the pairs of air-cylinders, and so securing 130  
 evenness of motion, it is preferred to connect  
 said pairs by means of a suitable air-duct or  
 connection. One means for so connecting  
 these parts is shown in the drawings, wherein  
 the bent pipes 67 are fixed in the framework,



one at each end of the machine, the ends of each pipe passing loosely through and supporting the pistons 43 and 44 and being open-ended. Any inequality of pressure in the air-cylinders is at once equalized by means of the air-duct or connection. This construction permits of the adjustment of the pistons without a corresponding motion of the air-pipes or equalizers.

Many changes may be made in details of this invention without departing from the spirit thereof.

Having thus fully described my invention, what I claim as new, and desire Letters Patent for, is—

1. The combination of a reciprocatory bed or member, a rack thereon movable relatively thereto, two driver-gears in one plane with and coacting with said rack alternately to move the bed throughout the greater extent of its motion in each direction, and means for completing, stopping and reversing said motion of said bed, substantially as described.

2. The combination of a reciprocatory bed or member, two driver-gears in one plane, a rack on said bed and movable relatively thereto, a rock-shaft on said bed, connections from said shaft to said rack, means for operating said shaft to cause said rack to coact alternately with said drivers to move the bed throughout the greater extent of its motion in each direction, and means for completing, stopping and reversing said motion, substantially as described.

3. The combination of a reciprocatory bed or member, a movable rack thereon, a rock-shaft and connections on said bed for moving said rack, an arm connected with said shaft for operating it, means on the framework for operating said arm, two driver-gears alternately operating to move said bed throughout the greater extent of its motion in each direction, and means for completing, stopping and reversing said motion, substantially as described.

4. The combination of a reciprocatory bed or member, a movable rack thereon, a rock-shaft and connections on said bed for moving said rack, an arm connected with said shaft, slot-bar mechanism on the framework for operating said arm and shaft, two driver-gears alternately operating to move said bed throughout the greater extent of its motion in each direction, and means for completing, stopping and reversing said motion, substantially as described.

5. The combination of a reciprocatory bed or member, a rack pivotally attached thereto, a rock-shaft and connections thereon for moving said rack, slot-bar mechanism on the framework and connections for moving said shaft, two driver-gears alternately engaging said rack to operate said bed throughout the greater extent of its motion in each direction, and means for completing, stopping and reversing said motion, substantially as described.

6. The combination of a reciprocatory bed or member, pairs of air-cylinders, pistons for said cylinders, and air connections between and through pairs of pistons, whereby the pressures in the pairs of air-cylinders are equalized, substantially as described.

7. The combination of a reciprocatory bed, air-cylinders, pistons therefor, and means for simultaneously moving the members of the air-check which are on the framework at each end thereof to vary the checking function, and means for disconnecting at will the mechanism for moving said members at either end of the frame, substantially as described.

8. The combination of a reciprocatory bed, pairs of air-cylinders, pairs of pistons therefor, the members of the air-check which are on the framework being adjustable to vary the air-check, and fixed air connections between the pairs on the framework, whereby the pressures are equalized, substantially as described.

9. The combination of a reciprocatory bed, air-cylinders, pistons therefor, the members of the air-check which are on the framework being adjustable, a crank on the framework, and connections having disconnectible parts whereby said crank may simultaneously move the said adjustable members or either thereof at will, substantially as described.

10. The combination of a reciprocatory bed, a pair of air-check members carried thereby at one end thereof, and a pair of coacting air-check members at one end of the frame of the machine, with a support for and carrying each member of the latter pair, and gearing for simultaneously moving said rods to adjust the positions of the members carried thereby and vary the checking action, substantially as described.

11. The combination of a reciprocating bed, an air-check for coaction therewith at one end of the framework, a support on the framework carrying the last-named member, two screw-threaded rods for moving said second member, swiveled screw-threaded sleeves engaging said rods, and gearing for operating said sleeves, whereby the checking may be varied, substantially as described.

12. The combination of a reciprocating bed, a pair of air-check members at one end thereof, and a pair of coacting members at one end of the framework for checking the motion of the bed, with supports for said second members, two screw-rods for operating each air-check member last named, swiveled screw-threaded sleeves engaging said rods, and gearing for operating said sleeves, whereby the air-check may be varied, substantially as described.

13. The combination of a reciprocating bed, an air-check member thereon, a coacting air-check member at one end of the frame, a support for said second member, two screw-rods for operating the air-check member last named, swiveled screw-threaded sleeves engaging said rods, gear-wheels rigid with said sleeves, and mechanism for operating said



wheels, whereby the air-check may be varied, substantially as described.

14. The combination of a reciprocating bed, a pair of air-check members thereon at one end thereof, and a pair of air-check members at one end of the frame for coaction therewith, with supports for said second members, two screw-threaded rods for operating each air-check member on the frame, swiveled screw-threaded sleeves engaging said rod, gear-wheels rigid with said sleeves, and mechanism for simultaneously operating said wheels to move the air-check members on their supports and so vary the air-check, substantially as described.

15. The combination of a reciprocating bed, an air-check member thereon, an air-check member at one end of the frame for coaction therewith, a support for said second member, two screw-rods for operating the air-check member on the support, swiveled screw-threaded sleeves engaging said rods, worm-gears on said sleeves, worms for turning said gears, and mechanism for operating the worms, whereby the air-check may be varied, substantially as described.

16. The combination of a reciprocating bed, a pair of air-check members thereon at one end thereof, and a pair of air-check members at one end of the frame for coaction therewith, with supports for said second pair, screw-rods carrying the latter members, and gearing for simultaneously moving said rods to vary the air-check, substantially as described.

17. The combination of a reciprocating bed, a pair of air-check members at one end thereof, a pair of coacting air-check members supported at one end of the frame, rods for moving the last-named pair, gear-wheels and connections for moving said rods, a transverse shaft on the frame having means for operating said wheels and means for operating said shaft, substantially as described.

18. The combination of a reciprocating bed, a pair of air-check members at each end thereof, a pair of coacting air-check members supported at each end of the frame, rods for op-

erating the last-named pairs, gear-wheels and connections for moving said rods, transverse shafts at each end of the frame for operating said wheels, and means for simultaneously operating said shafts, substantially as described.

19. The combination of a reciprocating bed, an air-check member at each end thereof, a co-acting air-check member supported at each end of the frame, rods for operating the latter members, gear-wheels and connections for moving said rods, a transverse shaft or rod at each end of the frame, and means for simultaneously operating said shafts and having disconnectible parts whereby either shaft may be operated without operating the other, substantially as described.

20. The combination of a reciprocating bed, an air-check member at each end thereof, a co-acting air-check member supported at each end of the frame, rods for operating the latter members, worm-wheels and connections for moving said rods, a transverse shaft at each end of the frame, having worms for operating said worm-wheels, and means for simultaneously operating said shafts, substantially as described.

21. The combination of a reciprocating bed, an air-check member at each end thereof, a co-acting air-check member supported at each end of the frame, rods for operating the latter members, worm-gears and connections for moving said rods, a transverse shaft or rod at each end of the frame, having worms for operating said worm-gears, and means for simultaneously operating the said shafts and having disconnectible parts whereby either shaft may be operated without operating the other, substantially as described.

Signed at New York, in the county of New York and State of New York, this 26th day of May, A. D. 1894.

WALTER SCOTT.

Witnesses:

JAMES J. GRADY,  
R. W. BARKLEY.