

**No. 664,216.**

**Patented Dec. 18, 1900.**

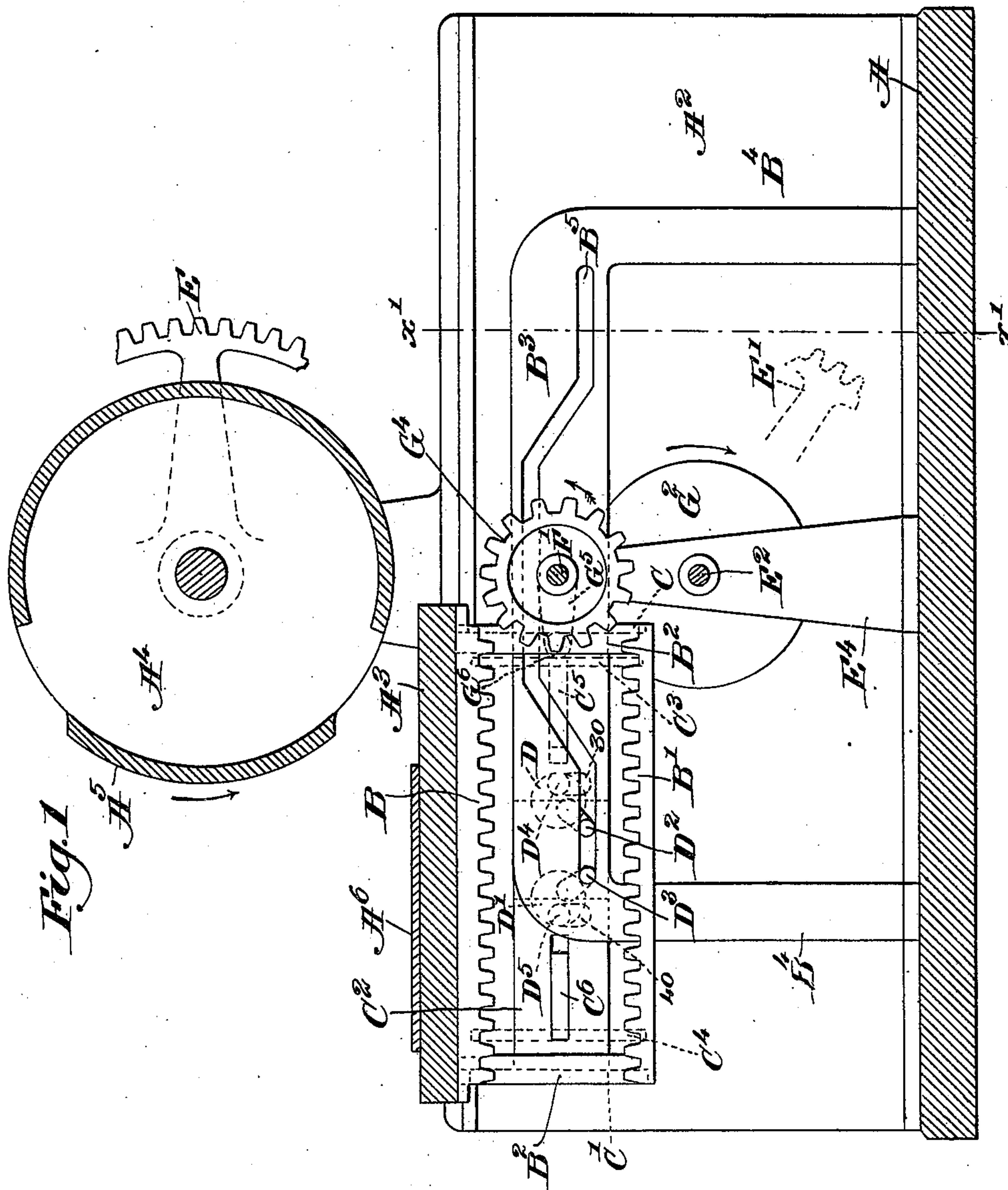
**W. K. HODGMAN.**

**BED MOTION FOR PRINTING PRESSES.**

(Application filed Nov. 16, 1837.)

(No Model.)

**3 Sheets—Sheet 1.**



*Witnesses:*

A. E. Harmon.  
Edward F. Allen.

*Inventor:*

Willis K. Hodgman  
by Lerley Gregory.  
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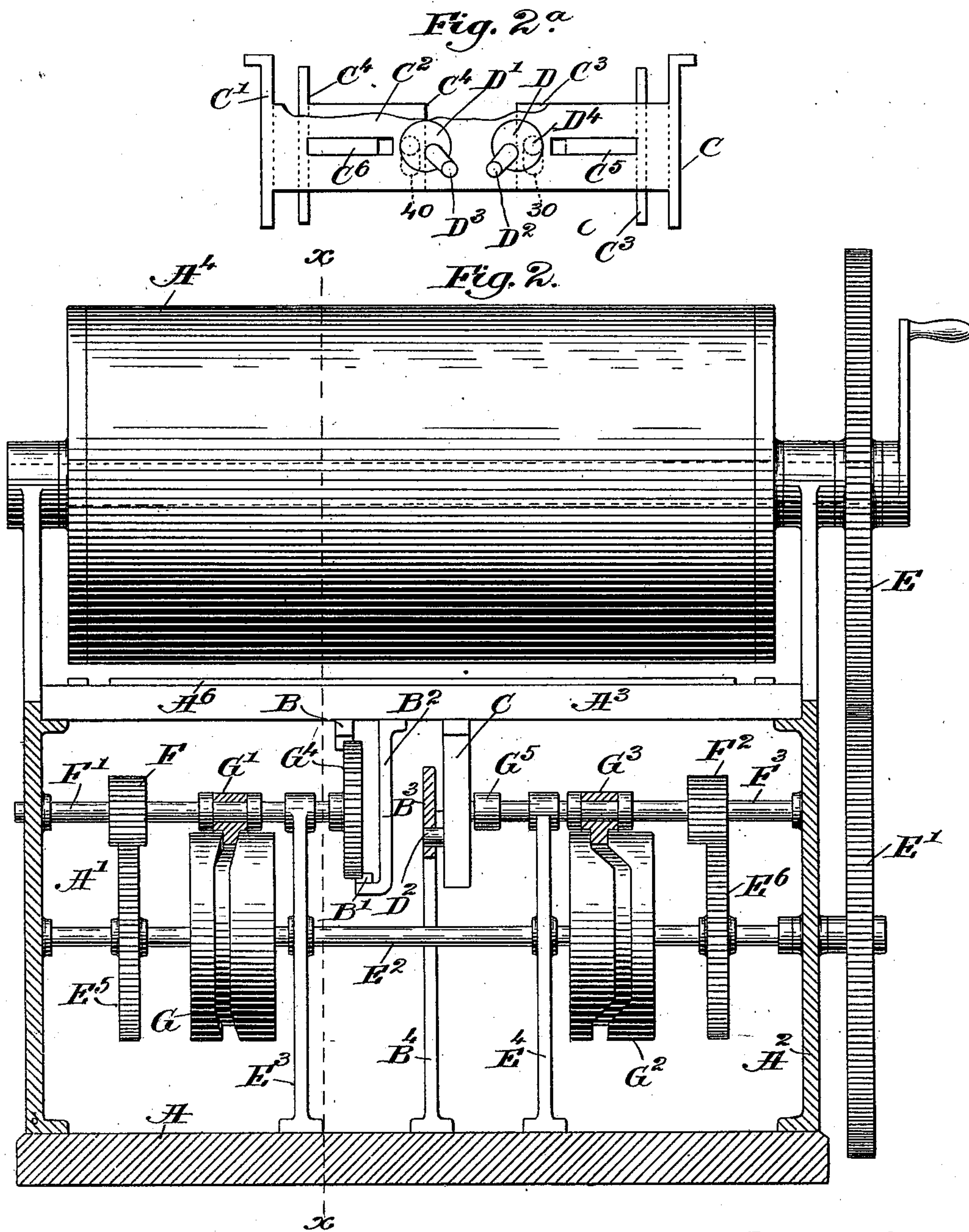
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(Application filed Nov. 16, 1897.)

(No Model.)

**3 Sheets—Sheet 2.**



Witnesses:

A. B. Harmon,  
Edward F. Allen.

*Inventor.*

Willis K. Hodgman.  
by Brasley Gregory.  
Atty's.







# UNITED STATES PATENT OFFICE.

WILLIS K. HODGMAN, OF TAUNTON, MASSACHUSETTS.

## BED-MOTION FOR PRINTING-PRESSES.

SPECIFICATION forming part of Letters Patent No. 664,216, dated December 18, 1900.

Application filed November 16, 1897. Serial No. 658,768. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIS K. HODGMAN, a citizen of the United States, residing at Taunton, in the county of Bristol and State of Massachusetts, have invented a new and useful Bed-Motion for Printing-Presses, of which the following is a specification.

My invention relates to that class of bed-motions used in printing-presses wherein the "form" is carried by a bed having a reciprocating movement under the impression-cylinder, and it is applicable to any bed-motion for a printing-press wherein the bed is driven by mechanism independent of the reversing mechanism during a greater portion of each stroke and wherein the speed of both of the said mechanisms is substantially equal at the time the control of the bed passes from one to the other.

The object of my invention is to provide a practical and durable reversing mechanism for reversing the direction of the bed at each end of its stroke, and I have attained this object by the mechanism illustrated in the accompanying drawings, in which I have shown my invention as applied to a printing-press wherein the bed is driven by a gear which alternately meshes with two parallel racks carried by the bed during the greater portion of each stroke and is out of mesh with both of the said racks during the period when the movement of the bed is being reversed.

Figure 1 is a vertical longitudinal section of a printing-press embodying my invention on the line  $xx$ , Fig. 2. Fig. 2 is a transverse vertical section of the same on the line  $x'x'$ , Fig. 1. Fig. 2<sup>a</sup> is a detached view, partly broken out, of that portion of the reversing mechanism carried by the bed. Fig. 3 is an elevation of certain parts of the reversing mechanism. Fig. 4 is a sectional view on line 5 6, Fig. 3. Figs. 5, 7, and 9 are elevations of certain parts of the reversing mechanism; and Figs. 6, 8, and 10 are top views of Figs. 5, 7, and 9, respectively. Fig. 11 is an elevation showing a different construction of certain parts of the reversing mechanism than is shown in the other figures.

Similar characters refer to similar parts throughout the several views.

The foundation A and side frames A' and A<sup>2</sup> constitute the framework of the press.

The bed A<sup>3</sup> slides on tracks which project from the inner sides of the side frames A' and A<sup>2</sup>. The impression-cylinder A<sup>4</sup> is journaled in the vertical standards on the side frames and makes one revolution to each complete stroke of the bed, the impression-surface A<sup>5</sup> running the form A<sup>6</sup> during the forward stroke. The rack B is fastened to the under side of the bed A<sup>3</sup>, and so, also, is the rack B', by means of vertical hangers B<sup>2</sup> B<sup>2</sup>. The bar B<sup>3</sup> is supported on legs B<sup>4</sup> B<sup>4</sup>, which are fastened to the foundation A and has an irregular slot B<sup>5</sup> running lengthwise of it. The shoes C and C' form a part of the bar C<sup>2</sup> and are fastened to the under side of the bed A<sup>3</sup>. The shoes C<sup>3</sup> and C<sup>4</sup> slide on the bar C<sup>2</sup>, having tongues C<sup>5</sup> and C<sup>6</sup>, respectively, which enter slots in the said bar and serve to keep them square. The disk cranks D and D' have bearings in the bar C<sup>2</sup>, and on the same side of each are mounted, respectively, the crank-pins D<sup>2</sup> and D<sup>3</sup>, which travel in the irregular slot B<sup>5</sup> when the bed A<sup>3</sup> is in motion, and when running the inclined portions of said irregular slot cause the disk cranks to rotate. The crank-pin D<sup>4</sup>, Figs. 1 and 4, is mounted on the opposite side of the disk crank D from the crank-pin D<sup>2</sup> and travels in the vertical slot 30 (see dotted lines, Fig. 1) in the shoe C<sup>3</sup> and acts to slide the said shoe, moving it relatively to the shoe C when the disk crank D is rotated. The crank-pin D<sup>5</sup> is mounted on the opposite side of the disk crank D' from the crank-pin D<sup>3</sup> and travels in the vertical slot (shown in dotted lines, Fig. 1) in the shoe C<sup>4</sup> and acts to slide the said shoe, moving it relatively to the shoe C' when the disk crank D' is rotated. The gear E is mounted on one end of the cylinder-shaft and meshes with a gear E' of equal size, which is mounted on one end of the shaft E<sup>2</sup>, journaled in the side frames A' A<sup>2</sup> and the stands E<sup>3</sup> E<sup>4</sup> and causes said shaft to make one turn to each complete stroke of the press. Mounted on the shaft E<sup>2</sup> are two gears E<sup>5</sup> and E<sup>6</sup>. The gear E<sup>5</sup> meshes with the gear F, mounted on the shaft F', which is journaled in the side frame A' and stand E<sup>3</sup> and causes the shaft F' to make three turns to each complete stroke of the press. The gear E<sup>6</sup> meshes with the gear F<sup>2</sup>, mounted on the shaft F<sup>3</sup>, which is journaled in the side frame A<sup>2</sup> and



stand  $E^4$  and causes the shaft  $F^3$  to make three turns to each complete stroke of the press. The shaft  $F'$  is moved endwise at certain times by the grooved cam  $G$ , mounted on the shaft  $E^2$ , and the loose sleeve  $G'$ , which is located on the shaft  $F'$  between two collars and has a pin which enters the groove in the cam  $G$ . The shaft  $F^3$  is moved endwise at certain times by the grooved cam  $G^2$ , mounted on the shaft  $E^2$ , and the loose sleeve  $G^3$ , which is located on the shaft  $F^3$  between two collars and has a pin which enters the groove in the cam  $G^2$ . The gear  $G^4$  is mounted on the inner end of the shaft  $F'$  and alternately meshes with the racks  $B'$  and  $B$  during the forward and backward strokes of the bed, respectively, and is out of mesh with both said racks during the period when the bed is being reversed. On the inner end of the shaft  $F^3$  is mounted the crank  $G^5$ , with crank-pin  $G^6$ , which latter is rotated out of the path of the shoes  $C$   $C^3$  and  $C' C^4$  at substantially all times, excepting when the bed is to be reversed, when it is rotated in the path of the said shoes and alternately engages them to reverse the bed at the end of each stroke.

In Figs. 1 and 2 I have shown the press with the bed  $A^3$  at the beginning of its forward stroke, the gear  $G^4$  being out of mesh with the racks  $B$   $B'$  and half-way between the path of each and being moved by the cam  $G$  into the path of the rack  $B'$ , the crank-pin  $G^6$  (see Figs. 3 and 4, as well as Figs. 1 and 2) being in the path of and engaging the shoes  $C$  and  $C^3$  to cause the bed to move in the direction dictated by the said crank-pin.

In Figs. 5 and 6 I have shown the crank-pin  $G^6$  in its position after the shafts  $F'$  and  $F^3$  have made a quarter-turn from the position of the press just described and the crank-pin  $G^6$  still engages the shoes  $C$  and  $C^3$  and has control of the movement of the bed  $A^3$ , but is now to allow the control of the said bed to pass to the gear  $G^4$ , (not shown in Figs. 5 and 6,) which is in mesh with the first tooth of the rack  $B'$ . The crank-pin  $G^6$  is now to be moved out of the path of the shoes  $C$   $C^3$  and the shoe  $C^3$  is now to be slid away from the crank-pin  $G^6$ , so as to prevent a jam between them which would otherwise occur before the crank-pin  $G^6$  could be moved entirely out of the path of the shoe  $C^3$  because of the differential movement of the crank-pin and the bed, the latter gaining on the former, as both are moving in the same general direction. This differential movement of the crank-pin and bed is compensated for or accommodated by the movement of the shoe behind the crank-pin away from the shoe in front of the crank-pin, the movement of the rear shoe oppositely to the movement of the bed being equal to or slightly greater than the lag of the crank-pin relatively to the bed and the front shoe moving therewith.

In Figs. 7 and 8 I have shown the crank-pin  $G^6$  in its position after the shafts  $F'$  and  $F^3$  have made one-twelfth of a turn from the

position of the press just described and the gear  $G^4$  (not shown) has moved the bed and with it the shoe  $C$ , so that the crank-pin  $G^6$  no longer engages the said shoe, and the shoe  $C^3$  has been slid away from the crank-pin  $G^6$  by means of the disk crank  $D$ , and the shaft  $F^3$  has been moved by the cam  $G^2$  and with it the crank  $G^5$  and crank-pin  $G^6$ , so that the latter is part way out of the path of the shoes  $C$   $C^3$ .

In Figs. 9 and 10 I have shown the crank-pin  $G^6$  in its position after the shafts  $F'$  and  $F^3$  have made one-twelfth of a turn from the position of the press just described and the said crank-pin has been moved out of the line of the shoes  $C$  and  $C^3$  and is free to rotate clear of them as the forward stroke of the bed is continued. It will now be readily understood that as the press continues to operate and one-sixth of a turn of the shafts  $F'$  and  $F^3$  before the gear  $G^4$  meshes with the end tooth of the rack  $B'$  the shoe  $C^4$  will commence to move toward the shoe  $C'$  and the crank-pin  $G^6$  will commence to move into the path of the said shoes, so as to engage them, when the gear  $G^4$  has reached the said end tooth of the said rack and operate to reverse the bed and deliver it back to the control of the gear  $G^4$ , which in the meantime has moved into the path of the rack  $B$  and is ready to continue the back stroke of the press, and so on as the press continues to operate.

In Fig. 11 I have shown a different method of moving the crank-pin into and out of the path of the shoes, and on referring to the said figure it will be understood that the crank  $G^5$  has no lateral motion and the crank-pin  $G^6$  is slid into and out of the path of the shoes by means of the cam  $H$ , which is loosely mounted on the shaft  $F^3$  and is caused to make one turn to each complete stroke of the press by the gear  $H'$ , mounted on the shaft  $E^2$  and meshing with the gear  $H^2$  on the cam  $H$ . The fixed and movable shoes at the ends of the bar  $C^2$  constitute parallel guideways, with which the crank-pin coöperates to effect the reversal of movement of the bed. The means for compensating for the differential movement of the crank-pin and bed is controlled by the movement of the bed, as will be obvious, the movement of the latter, in connection with the cam member  $B^3$ , causing the rotative movement of the disk cranks governing the operation of the shoes, which are movable relatively to the bed. It will be noted that when the reversing crank-pin is acting on the sliding shoe to effect movement of the bed the controlling disk crank is on center, in that position most effective to resist the strain put upon it. The separation of the two shoes with which the crank-pin is coöperating allows ample time for the movement of the latter laterally to either be withdrawn from or moved between them, as the case may be, without any undue wear of the parts or liability of jamming.

Having described my invention, what I



claim, and desire to secure by Letters Patent, is—

1. The combination with a moving bed provided with a guideway at one end thereof, of a revolving reversing-crank, means for moving the crank-pin into and out of the path of said guideway, and means to compensate for the differential movement of the crank-pin and bed when traveling in the same direction, and while the former is in the path of the guideway, substantially as described.

2. The combination with a moving bed provided with a guideway at one end thereof, of a revolving reversing-crank, means for moving the crank-pin into and out of the path of said guideway, means to compensate for the differential movement of the crank-pin and bed when traveling in the same direction, and a controlling device for said compensating means, governed by the movement of the bed, substantially as described.

3. The combination with a reciprocating bed provided with a guideway at opposite ends thereof, of a revolving reversing-crank, means for moving the crank-pin into and out of the path of said guideways alternately, and means to compensate for the differential movement of the crank-pin and bed when traveling in the same direction, and while the former is in the path of the guideway, substantially as described.

4. The combination with a moving bed provided with a fixed shoe and a sliding shoe at one end thereof, to form a guideway, of a revolving reversing-crank, means to move the crank-pin laterally into and out of the path of the guideway, and means to move the sliding shoe toward or from the fixed shoe, to vary the width of the guideway, and thereby compensate for the differential movement of the crank-pin and bed when traveling in the same direction.

5. In a bed-motion for a printing-press, a reciprocating bed provided with two racks, a driving-gear adapted to alternately mesh with said racks and to be entirely disengaged therefrom during the reversing period, a fixed and a relatively-movable shoe carried by said bed, a revolving reversing-crank, means to move said crank-pin into or out of the path of said shoes, between them, during complete disengagement of said gear and racks, and means to move the movable shoe toward or from the fixed shoe when the crank-pin and bed are traveling at different speeds, to thereby compensate for such differential movement, substantially as described.

6. The combination with the bed of a printing-press, provided with a guideway at one end thereof, of reciprocating mechanism for the bed, a revolving reversing-crank separate from said reciprocating mechanism, and having a pin arranged to move into and out of said guideway to effect reversal of movement of the bed, and means to compensate for the differential movement of the crank-pin and bed when the former is in the guideway and

traveling in the same direction as the bed, substantially as described.

7. The combination with a moving bed provided at one end with a fixed and a relatively-movable shoe, to form a guideway, of a revolving reversing crank-pin, means to move the crank-pin into and out of the guideway, and means to actuate the said movable shoe at substantially the speed of the crank-pin during the period of differential movement of the crank-pin and bed, while traveling in the same direction, substantially as described.

8. The combination with a moving bed provided at one end with a guideway, of a revolving reversing crank-pin arranged to enter the guideway and retard and stop the movement of the bed in one direction and start and accelerate it in the opposite direction, and means to vary the width of the guideway at the entrance and departure of the crank-pin, while the bed and crank-pin are moving in the same direction at different speeds, substantially as described.

9. The combination with a moving bed provided at one end with a guideway, of means to reciprocate the bed, revolving reversing crank-pin separate from said means and arranged to enter the guideway and retard and stop the movement of the bed in one direction and start and accelerate it in the opposite direction, and a common driving-shaft for the said bed-reciprocating means and the crank-pin, substantially as described.

10. The combination with a bed, of reciprocating mechanism therefor, revolving crank-pin separate from said mechanism to control and reverse the movement of the bed at each end of its stroke, and a common driving-shaft for said reciprocating mechanism and crank-pin, substantially as described.

11. The combination with a bed, of reciprocating mechanism therefor, separate reversing mechanism to control and reverse the movement of the bed at each end of its stroke, and a common driving-shaft for said reciprocating mechanism and reversing mechanism, substantially as described.

12. In a bed-reversing mechanism for a printing-press, a fixed shoe and a sliding shoe carried by the bed and means for moving said sliding shoe toward and away from the fixed shoe at certain times, a rotatable crank with crank-pin and means for moving said crank-pin into and out of the path of the said shoes, substantially as shown for the purpose specified.

13. In a bed-reversing mechanism for a printing-press, a fixed shoe and a sliding shoe carried by the bed and means for moving said sliding shoe toward and away from the fixed shoe at certain times, a laterally-movable rotatable crank with crank-pin and means for moving said crank laterally so as to bring the said crank-pin into and out of the path of the said shoes, substantially as shown for the purpose specified.

14. In a bed-movement for a printing-press,



- a bed with two parallel racks attached, a gear to alternately mesh with said racks, a fixed shoe and a sliding shoe carried by the bed, means for moving said sliding shoe toward and from the said fixed shoe at certain times, a laterally-movable rotatable crank with crank-pin, means for moving said crank so as to bring the said crank-pin into and out of the path of the said shoes, substantially as described.
- 5 and from the said fixed shoe at certain times, a rotatable crank with crank-pin, means for moving said crank-pin into and out of the path of the said shoes, substantially as described.
- 10 15. In a bed-movement for a printing-press, a bed with two parallel racks attached, a gear to alternately mesh with said racks, a fixed shoe and a sliding shoe carried by the bed, means for moving said sliding shoe toward and from the said fixed shoe at certain times, a laterally-movable rotatable crank with crank-pin, means for moving said crank so as to bring the said crank-pin into and out of the path of the said shoes, substantially as described.

WILLIS K. HODGMAN.

Witnesses:

GEORGE WATTS,  
E. A. HODGMAN.