Aug. 4, 1931. F. BARNEY 1,816,816

PRINTING PRESS BED MOVEMENT

Filed Jan. 3, 1928 3 Sheets-Sheet 1

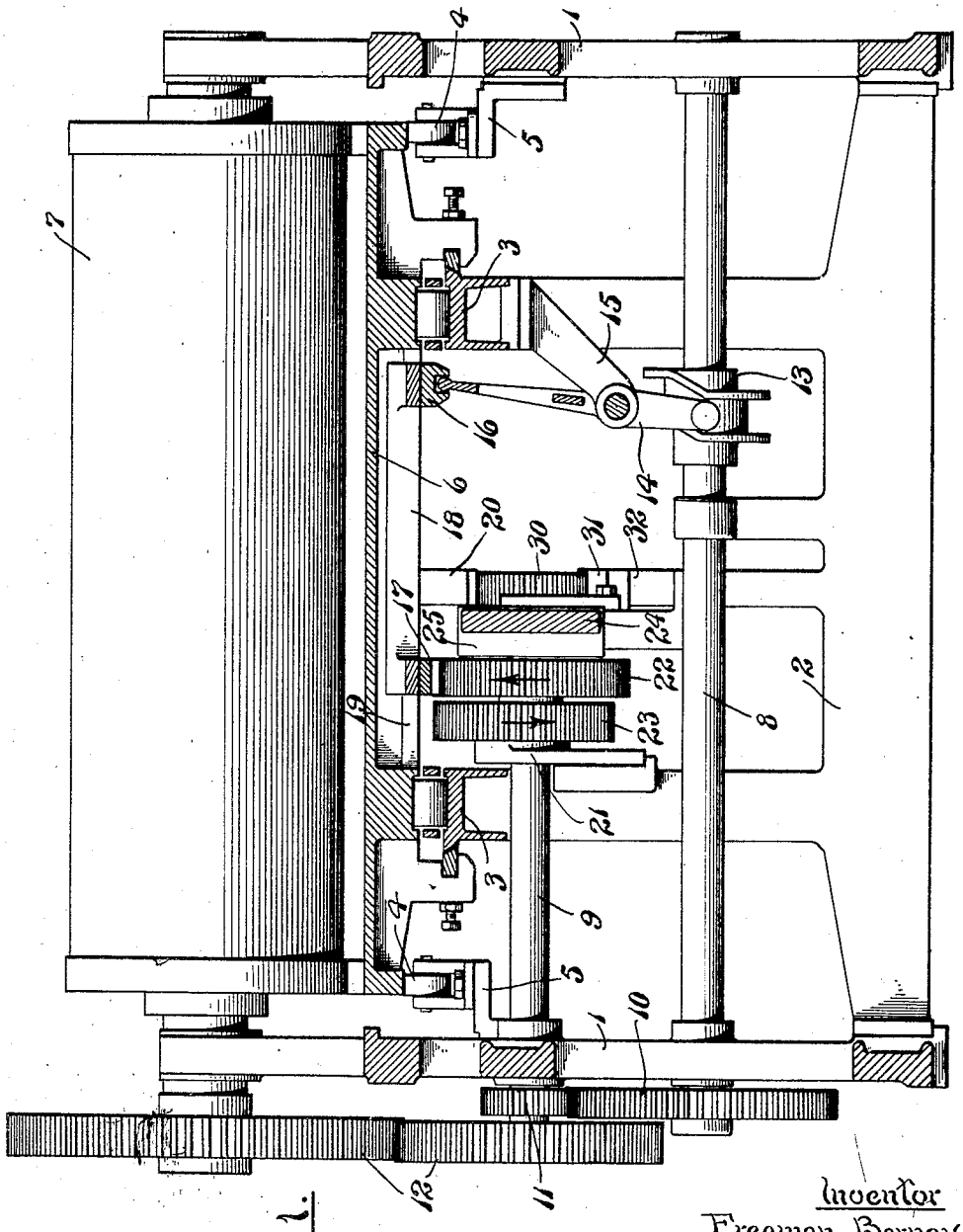


Fig. 1.

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PRINTING PRESS BED MOVEMENT

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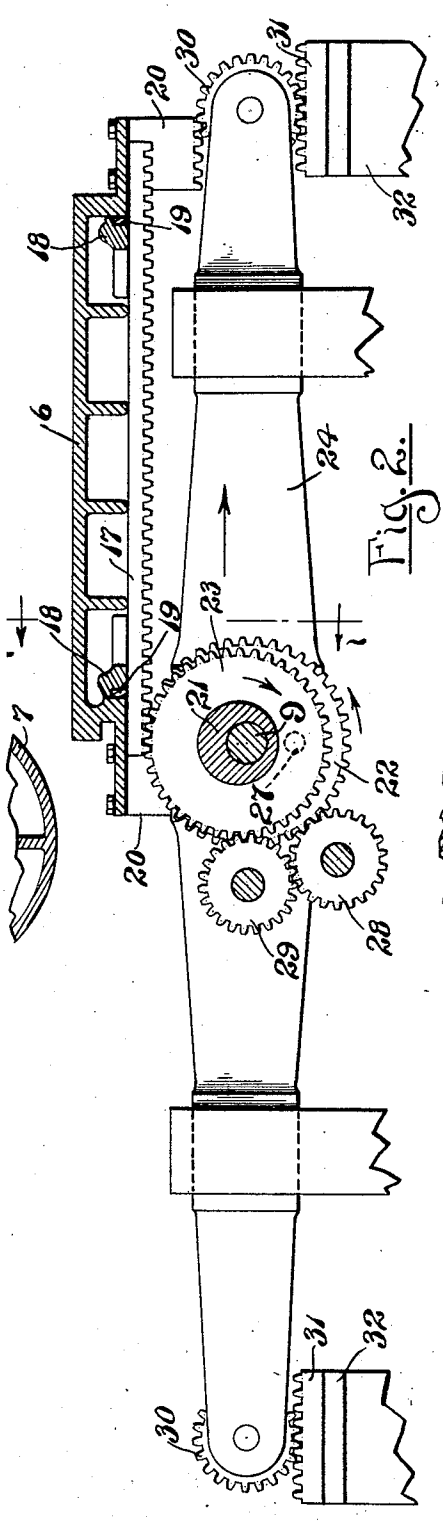


Fig. 2.

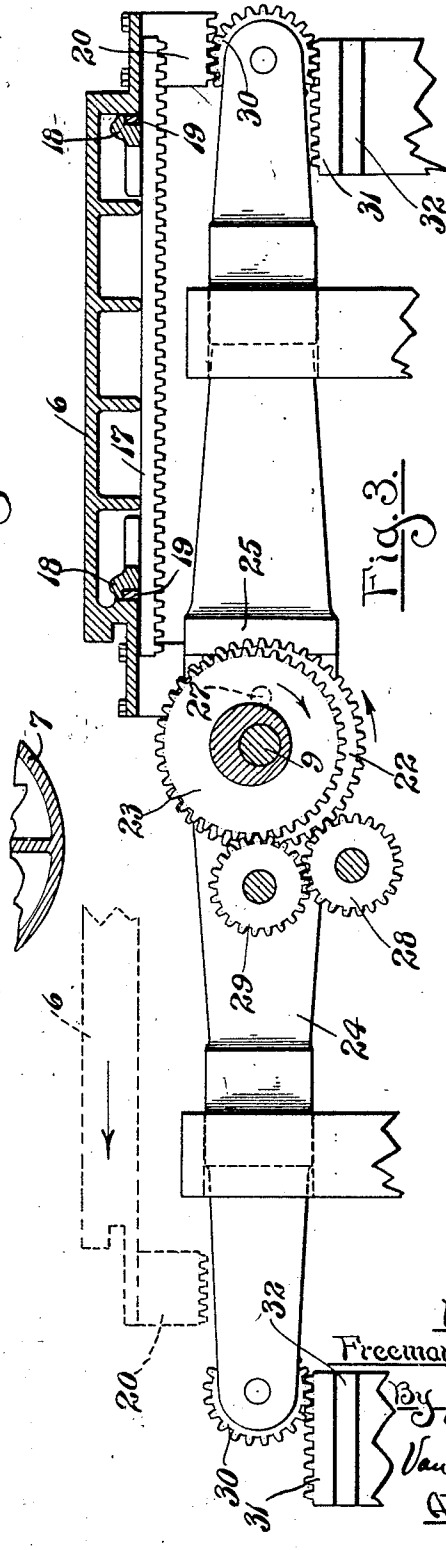


Fig. 3.

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PRINTING PRESS BED MOVEMENT

Filed Jan. 3, 1928 3 Sheets-Sheet 3

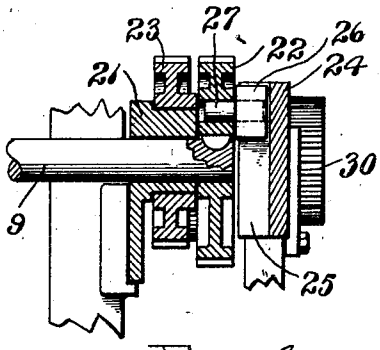


Fig. 4.

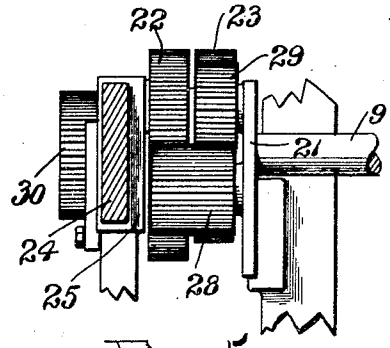


Fig. 5.

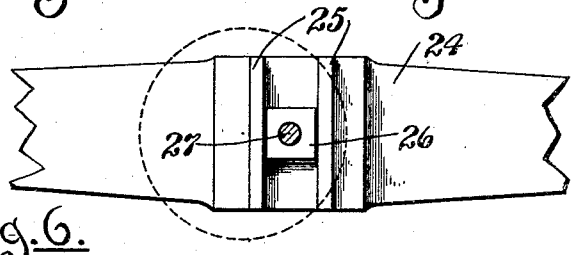


Fig. 6.

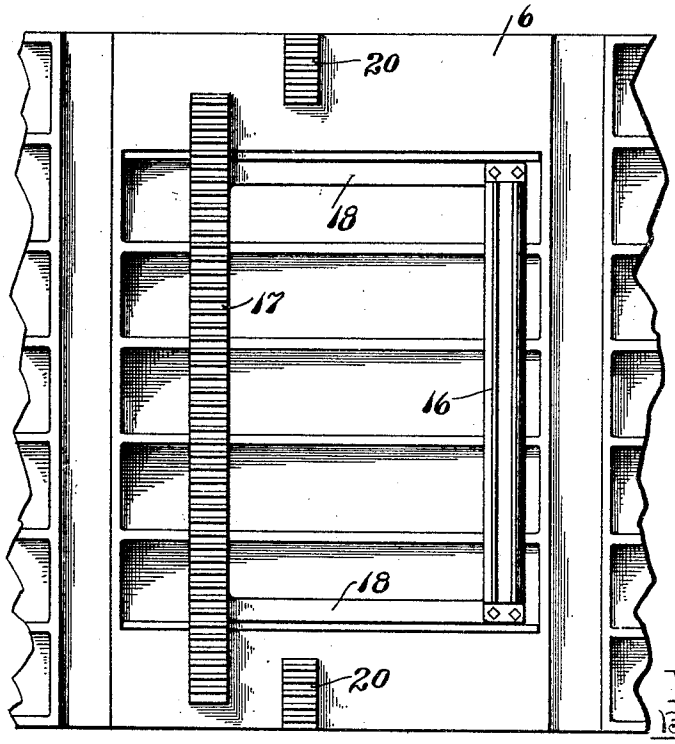


Fig. 7.

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1,816,816

UNITED STATES PATENT OFFICE

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PRINTING PRESS BED MOVEMENT

Application filed January 3, 1928. Serial No. 244,137.

This invention relates to a printing press bed movement and is primarily concerned with a novel construction for reciprocating a bed in a printing press under the cylinder whereby the bed may have a uniform speed of movement while passing underneath the cylinder and then, when it passes at either end beyond the cylinder, it may be progressively slowed down in movement to a stop, reversed and progressively accelerated in the opposite direction to the maximum uniform speed which it has all of the time that it is passing under the cylinder. My invention is concerned with novel constructions and organizations and arrangements of mechanism for effectively attaining the ends stated in a simple and practical manner.

For an understanding of the invention and the constructions embodying the same, reference may be had to the following description taken in connection with the accompanying drawings, in which,

Fig. 1 is a vertical transverse section through the printing press on the plane of line 1—1 of Fig. 2.

Fig. 2 is a fragmentary, longitudinal, vertical section showing the bed as it is reaching the end of its sustained uniform movement under the cylinder and is about to be slowed down prior to reversal and starting back in the opposite direction.

Fig. 3 is a section similar to that shown in Fig. 2 illustrating the position of the parts when the bed has been brought to a stop and is ready for return movement.

Fig. 4 is a fragmentary vertical section through a detail of the gearing mechanism used to operate the printing press bed.

Fig. 5 is a fragmentary rear elevation thereof.

Fig. 6 is a fragmentary side elevation of a reciprocating beam mounted below the printing press bed and which is operated for effecting the end and reverse movements of the bed, and

Fig. 7 is a fragmentary under plan view of the printing press bed.

Like reference characters refer to like parts in the different figures of the drawings.

The frame of the printing press includes spaced apart side members 1 connected by cross members 2. Tracks or ways 3 are carried horizontally on and between the cross members of the frame while rollers 4 are carried on suitable brackets 5 secured to the inner sides of the sides 1 of the frame serving to carry a horizontal bed 6 which may be moved back and forth over said rollers and ways as is evident, the bed reciprocating underneath the cylinder 7.

A shaft 8 is rotatably mounted on and between the sides 1 of the frame. A second shaft 9 lies in a plane above the shaft 8 and is carried in suitable bearings on the frame of the machine. A gear 10 on the end of shaft 8 meshes with a pinion 11 on the shaft 9, while other gears 12 on the cylinder shaft and shaft 9 are in mesh suitably timing the rotative movements of the cylinder and said shafts.

A grooved cam 13 is fixed on and rotates with the shaft 8. One end of a rocking lever 14 is engaged with the cam 13. The lever 14 is mounted for rocking movement at a point between its ends on a suitable bracket 15, and at its upper end extends toward the bed 6 and is received in a longitudinal groove formed in the under side of a bar 16 forming one member of a frame slidably mounted on the under side of the bed. The opposite side of the frame is provided with a rack 17 parallel to the grooved bar 16. Rack 17 and bar 16 are connected by two slide bars 18 rigidly secured thereto and slidably mounted on the under side of the table, said bars 18, as shown in Figs. 2 and 3, having overhanging upper portions slidably engaged with fixed bars 19 rigidly secured to and transverse of the table 6. It is evident that with the rotation of the shaft 8 lever 14 is rocked about its pivot and the frame comprised of the rack 17 and bars 16 and 18 is slidably reciprocated a limited distance or enough to carry the rack 17 from one to the other of two extreme positions. A movement of the rack 17 from one position to the other and back to first position occurs with each rotation of the shaft 8. At each end of the bed 6, spaced a short distance from the rack bar 17 and extending downwardly from the bed are short racks 20

the purpose of which will hereafter appear.

The shaft 9 at its inner end portion has a bearing in a bracket 21 fixed to the frame. Said shaft 9 passes through the bearing and is equipped with a gear 22 keyed thereto alongside of which is a gear 23, somewhat smaller in diameter, loosely and eccentrically mounted with respect to the axis of the shaft 9 on the bracket 21 so that the upper sides of the two gears 22 and 23 are in the same horizontal plane. A horizontal beam 24 is slidably mounted on the frame alongside the gear 22. It is equipped substantially midway between its ends at one side with two spaced apart vertical guides 25 defining a vertical groove in which a block 26 is slidably mounted. A pin 27 carried by the gear 22 passes into said block 26. The axis of the pin 27 is located halfway between the axis of the shaft 9 and the pitch circumference of the gear. A pinion 28 having a face equal substantially to the combined faces of the gears 22 and 23, is in mesh with the gear 22 and a second pinion 29 is in mesh both with the pinion 28 and the gear 23. The pinions 28 and 29 are both carried by the bracket 21 and are of the same pitch diameter so that the gear 23 is driven from the gear 22 with the same peripheral speed.

At each end of the beam 24 an idler gear 30 is rotatably mounted, lying in the same vertical plane with racks 20 but below said racks so that said gears mesh at their upper sides with the racks when moved into engagement therewith. Below the racks 20 are other racks 31 carried on supporting posts 32 forming a part of the frame of the machine with which said gears 30 may mesh at their lower sides.

In the operation of the press, assuming the rack 17 to be in engagement with the gear 23, as shown in Fig. 2, the rack 17 with the bed 6 attached thereto has moved to the right and has completed its movement under the cylinder 7 reaching a point where the rack 20 at the right hand end of the bed is about to engage the adjacent gear 30. The pin 27 on the gear 22 moving in a counterclockwise direction from the position shown in Fig. 2 to that shown in Fig. 3 moves the beam 24 to the right during the time that the gear 22 is moved through an arc of 90° with a consequent continued movement of the bed 6 farther to the right or until the position shown in Fig. 3 is reached. This movement which, with the pin 27 in the position shown in Fig. 2, started at the same speed that the bed had been uniformly moving under the cylinder 7, is progressively slowed down so that when the pin 27 reaches the position shown in Fig. 3 the movement has slowed down to a point where beam 24 is at rest and the table 6 has stopped and is ready to reverse its movement, which occurs immediately upon continued movement of the pin 27 in a counterclockwise direction. The return movement is slow at first and progressively increased until, when the rack 17 comes to the gear with which it is to engage the bed and rack are moving with a speed equal to the peripheral speed of said gear.

It is during the time that rack 17 is disengaged from both gears 22 and 23 that the shifting accomplished by the rocking lever 14 takes place or at the end of the travel of the bed 6. Gears 22 and 23 rotate in opposite directions and the alternate engagement of rack 17 therewith effects the reciprocation of the bed 6. While the slowing down, stopping and reversing of the table movement with its accelerations after reversal has been described with reference to one end of the movement of the table, the same action occurs with the construction at both ends and the operation thereof is identical. The gears are so designed and their timing is such that the shifting of the rack bar 17 into position to mesh with either gear 22 or 23 occurs at the end of the table movements and when the rack 17 is out of engagement with either gear.

The construction described is very practical and effective. The slowing down and stopping of the table prior to its reversal in movement is a very practical and serviceable feature of the invention. The construction used is relatively simple and durable and effective in service and operation. The appended claims define the invention which is to be considered comprehensive of all forms of structure coming within their scope.

I claim:

1. In a construction of the class described, a supporting frame, a horizontal table mounted thereon for reciprocatory movements, a driven shaft, a gear mounted thereon, a second gear loosely mounted over said shaft alongside said first gear, the upper sides of said gears lying in the same horizontal plane, means for driving said gears at the same peripheral speed but in opposite directions, a rack movably mounted on the lower side of said table, means for shifting said rack into two different positions in alinement respectively with said gears, said shifting of the rack occurring substantially at the ends of the movement of the table in each direction, a slidably mounted beam, a pinion rotatably mounted at each end of the beam, short racks connected onto and depending from each end of the table in the same vertical plane with said pinions, additional racks at each end of the support below and engaging with said pinions, and means connecting said beam with the first of said gears whereby said beam is reciprocated on rotation of the gears.

2. In a printing press, a supporting frame, a horizontal table mounted thereon for reciprocatory movements, a driven shaft, a

gear fixed to said shaft, a second gear loosely mounted on said shaft, the upper sides of said gears being in the same horizontal plane, means for driving the second gear from the first gear at the same peripheral speed and in an opposite direction, a frame slidably mounted on the lower side of said table, said frame including a rack located lengthwise of the table, means for automatically shifting said frame at or about the ends of the reciprocatory movements of the table whereby the rack is moved from one position at which it engages with one gear to another position to engage with the other gear, a slidably mounted beam located below the table, a pinion rotatably mounted at each end of the beam, rack supports at each end of the beam with which said pinions engage, a rack section connected to and depending below the table at each end thereof in the same vertical plane with said pinions, a pin extending from one of said gears, a block into which the pin extends, and vertical guides on the beam between which the block is mounted for vertical slidable reciprocatory movements.

3. In a printing press, a supporting frame, a horizontal table mounted thereon for reciprocatory movements, two gears driven at the same peripheral speed and in opposite directions located alongside each other and with their upper sides in the same horizontal plane, a rack movably mounted on the table for movement from a position where it will engage with one of said gears to another position where it will engage with the other of said gears, a slidably mounted horizontal beam located below said table alongside one of said gears, a pinion mounted at each end of the beam, horizontal racks supported on the frame with which said pinions engage, rack sections, one at each end of the table attached thereto and depending therefrom located in the same vertical plane with said pinions, vertical guides on the side of said beam next to its adjacent gear, a pin extending from said gear at a distance from the axis of rotation thereof, received in said guides whereby the beam is continuously reciprocated at varying speeds of movement when the gear is rotated at continuous speed, and means for shifting the first rack from a position where it is in line to engage with the other gear at the ends of the movements of said table.

4. In a printing press, the combination of a frame, a horizontal table slidably mounted thereon, two gears of different diameters, means for revolubly mounting the gears with their upper edges in the same horizontal plane below the table, a pinion in mesh with one of said gears away from its upper edge, another pinion having the same pitch diameter as the first mentioned pinion and meshing therewith and also with the other of said gears, means for driving one of said gears, a rack movably mounted on the lower side of the table, and means for shifting the rack in alignment with either of the gears.

5. A printing press comprising the elements of claim 4 and also having the face of the pinion which engages the larger gear substantially equal to the sum of the widths of the two gears plus the clearance therebetween.

6. In a printing press, a supporting frame, a horizontal table mounted thereon for reciprocatory movements, two different sized gears located underneath said table, two idler pinions therebetween whereby they are driven in opposite directions, a rack slidably mounted on the under side of the table for shifting movement from a position where it may engage with the other gear whereby said table is moved while the rack is engaged with either of said gears at a uniform and constant speed of movement, and means operated by one of said gears with which said table is connected after said rack has disengaged from a gear when moved in one direction to further move said table in the same direction at a progressively diminishing speed until the table stops and then move it in the opposite direction at a progressively increasing speed until the maximum uniform speed of movement of the table is reached and the first rack engages with a gear to continue said movement at uniform speed.

7. A device as set forth in claim 6 but further characterized by the fact that the idler pinions are of the same size whereby the peripheral speed of the gears is maintained constant.

In testimony whereof I affix my signature.

FREEMAN BARNEY.