(No Model.) 2 Sheets—Sheet 1.

B. HUBER.

PRINTING PRESS.

No. 593,662. Patented Nov. 16, 1897.

Fig. 2.

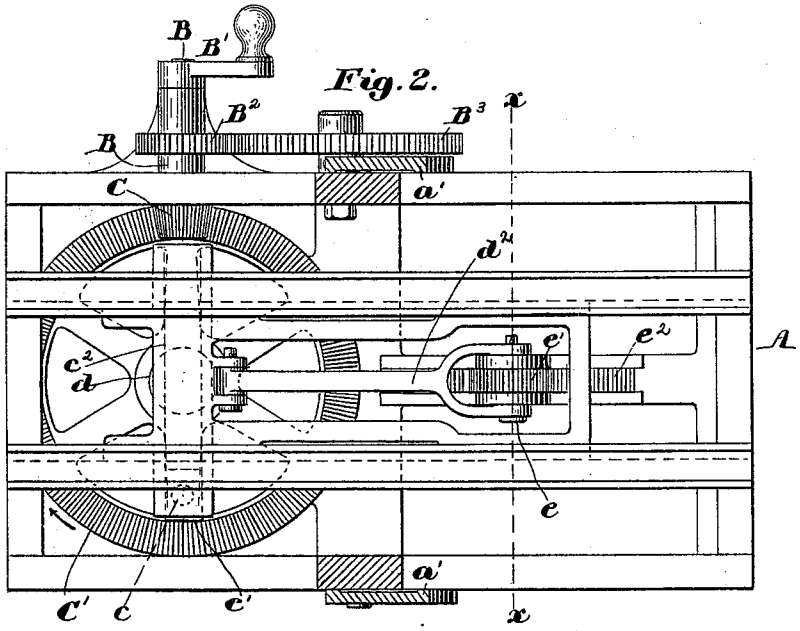
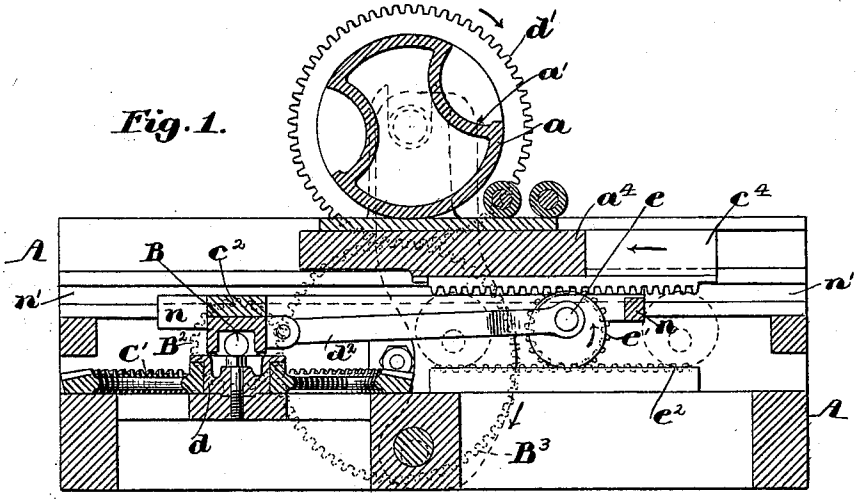


Fig. 1.



Witnesses:
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by Crosby & Gregory
Attys.

(No Model.) 2 Sheets—Sheet 2.

B. HUBER.

PRINTING PRESS.

No. 593,662. Patented Nov. 16, 1897.

Fig. 4.

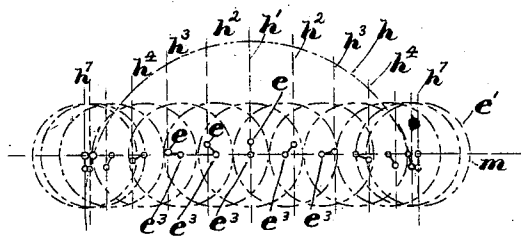
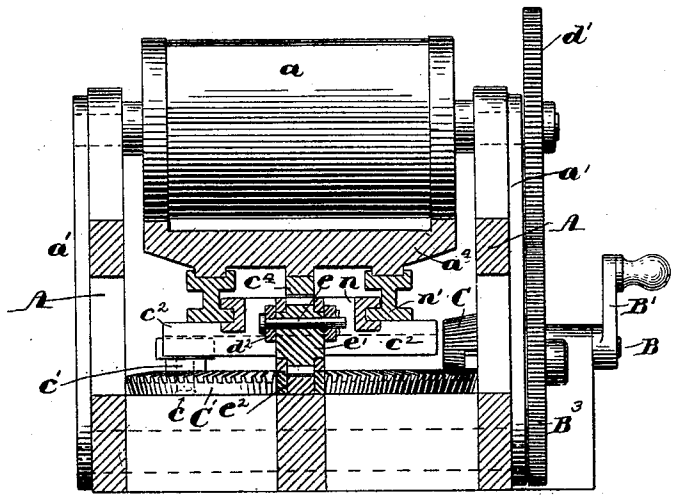


Fig. 3.



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UNITED STATES PATENT OFFICE.

BERTHOLD HUBER, OF TAUNTON, MASSACHUSETTS, ASSIGNOR TO THE HUBER PRINTING PRESS COMPANY, OF SAME PLACE.

PRINTING-PRESS.

SPECIFICATION forming part of Letters Patent No. 593,662, dated November 16, 1897.

Application filed April 19, 1897. Serial No. 632,756. (No model.)

To all whom it may concern:

Be it known that I, BERTHOLD HUBER, of Taunton, county of Bristol, State of Massachusetts, have invented an Improvement in Printing-Presses, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

This invention has for its object to improve the cylinder and bed driving mechanism of that class of printing-presses wherein the cylinder is rotated and the bed is reciprocated.

An earlier patent, No. 417,826, granted to me December 24, 1889, shows and describes a bed driven by a regular crank motion and of course at a variable speed, and that invention had for its object to make the speed of the cylinder conform to the varying speed of the bed. In this present invention I have made provision for rotating the cylinder continuously in one direction at a uniform rate of speed instead of at a variable speed, as in said patent, and to do this I have devised means to reciprocate the bed coöperating with this continuously and uniformly rotating cylinder during the period of printing at substantially the same surface speed as the surface speed of said cylinder, or, in other words, the printing-bed is moved during the period of printing at the established speed of the continuously uniformly moving cylinder. In my invention I employ a shaft having suitable gears which engage teeth on and rotate the cylinder, said shaft also having teeth to engage and rotate a separate crank, the cylinder and crank being rotated continuously in one direction at a uniform speed. This crank and its crank-pin are made the movers of the reciprocating bed, it being provided, as shown, with a rack which is engaged by the teeth of a pinion having an eccentric stud, said pinion also engaging a stationary rack, over which it is rolled by connections, to be described, between said eccentric stud and the crank-pin of said crank.

I am the first, so far as I am aware, to rotate the cylinder continuously at a uniform speed and to rotate, by the device employed to rotate the cylinder, a crank, using a crank-pin of the crank to impart movement to a reciprocating bed, said bed having imparted to it during the period of printing a speed substantially the same as the surface speed of the continuously-rotating cylinder.

Figure 1, in longitudinal section, shows a sufficient portion of a printing-press with my improvement applied to enable my invention to be understood. Fig. 2 is a plan view of the parts shown in Fig. 1 with the bed and cylinder removed. Fig. 3 is a section in the line x, Fig. 2, looking to the left, the said figure, however, showing the bed and cylinder, which are omitted from Fig. 2; and Fig. 4 is a diagram by which to define the movement of the parts to be described.

The cylinder a, mounted in suitable bearings in a vertically-movable standard a', the gear d' on the said cylinder, the bed a^4, having attached to it a rack c^4, and the framework A, supporting the movable standard a' and having guideways for the bed, are and may be all as designated by like letters in United States Patent No. 417,826, dated December 24, 1889.

Let it be supposed that B represents a shaft mounted in said framework, it having applied to it a handle B′ or any suitable driving pulley by which the said shaft may be rotated by power. The shaft B has a toothed gear B^2, which engages an intermediate gear B^3, which engages the gear d' on the impression-cylinder a and rotates the same continuously at a uniform rate of speed, determined by the shaft B. The shaft B also has, as herein shown, an attached bevel-gear C, which engages and rotates a toothed crank C′, it being also shown as having bevel-teeth, said crank having a crank-pin c, (shown by dotted lines in Fig. 2,) which enters loosely a block c', which is fitted to slide in a groove in a cross-head c^2, the rotation of the crank C′ causing the crank-pin sliding in the cross-head to reciprocate the same, the said cross-head in its movement sliding in suitable guideways n' of the frame. The hub of the crank C′ is mounted to turn about a suitable pivot d, extended therethrough. The cross-head has a suitable ear, to which is joined by a suitable pin a link d^2, said link having in its right-hand end, as herein shown, a hole which is fitted over an eccentric stud e, projected from one side of a toothed pinion e', the teeth of

said pinion at its upper side engaging the teeth of the rack c^4, which is connected with the bed a^4, while the teeth on the lower edge of the pinion e' engage the teeth of a suitable rack e^2.

It will be understood that the cylinder a has imparted to it a continuous uniform rotary movement, and that by means of the crank and pinion e', actuated by the crank-pin and the connections, the bed a^4 is made to move at the surface speed of the cylinder during the period of printing, and the printing period having been completed the cylinder is raised, but without discontinuing its rotative movement, while the bed a^4 travels on its back or return stroke into its starting position.

It will be understood that the crank-pin c in its rotation, acting in the groove of the cross-head, moves the cross-head variably, owing to the dead-points of the crank C', and that should the link d^2 be connected directly to the center of the pinion e' the said pinion would partake of the same variable motion as the cross-head, and such variable motion would not enable the bed a^4 to be operated during the period of printing at a surface speed uniform with that of the cylinder, and consequently I have arranged the stud e of the pinion e' at one side of its center, so as to compensate for the lack of uniformity in speed which would be due to the movement of the cross-head.

Viewing Figs. 1 and 2, it will be seen that the crank-pin of the crank stands in the cross-head at a point where the movement of the cross-head due to the crank-pin is that to give to the cross-head its fastest speed, and it will be noticed that the bed and the cylinder are in the period of printing, and that the bed is being moved in the direction of the arrow, near the right-hand end of it, by the pinion e', which, as the latter is drawn to the left, viewing Fig. 1, by the cross-head, causes said pinion in engagement at its under side with the stationary rack e^2 and engaging at its upper side the rack c^4 to move the bed, the toothed pinion e' at this time imparting its slowest movement to the bed. As the pinion e' approaches the left hand of the stationary rack e^2 the eccentric stud e thereof passes downwardly below the center of the said pinion and arrives in the position shown by the dotted circle at the left of the pinion e' in Fig. 1. Then the cylinder is raised and the cross-head in its movement carries the pinion e' backwardly to the right, moving the rack c^4 and bed with it until the pinion and its stud arrive in the position shown by the circle at the right of the pinion e' in Fig. 1.

Referring now to the diagram Fig. 4, let the large circle h represent the path of the crank-pin c and the vertical lines $h' h^2 h^3 h^4$ certain positions which the cross-head will occupy in equal divisions of time during the travel of the crank-pin, and let the small circles m represent the pinion e', the dots e the studs, and e^3 the centers of rotation of the pinions e'.

Referring now to the diagram and to the line h', showing the stud e directly above the center e^3, which is the position shown in Fig. 1 of the press, with the cylinder and bed at the period of printing, it will be seen, viewing the lines $h^2 h^3 h^4$, representing the movement of the cross-head, that said lines represent varying distances, and the studs e also represent varying distances, but the centers e^3 are uniformly spaced, showing that they move over uniform distances, and that consequently the rack and bed must move at a substantially uniform speed from about the line h^4 to h^4, which completes the period of printing, and it is only during the period of printing that the bed and cylinder are in printing juxtaposition, so that they must and do then move substantially at the same rate of speed, the speed established in the cylinder. The variable speed of the bed is apparent only while the studs e pass through the spaces from h^4 to h^7, but at that time the printing-cylinder rotating continuously in one direction is not in printing juxtaposition with the form on the bed.

I do not claim an intermittingly rotatable cylinder—that is, a cylinder which is moved in one direction by and with the bed—the speed of the cylinder being defined and established by the speed of the bed, the cylinder being stopped after the printing period and the bed returning.

In a press wherein the cylinder is rotated entirely by or through the movement of the bed it is immaterial whether the cylinder runs at a uniform speed throughout its movement, and when the cylinder is moved from a variably-moving bed the cylinder partakes of the same variable movements as the bed.

In this my invention the cylinder, it having imparted to it the established speed and being moved continuously at a uniform speed, may be moved, if desired, without actuating the bed by disconnecting the cross-head from the crank-pin or by shifting the bevel-gear C out of mesh with the crank, but when the bed moves the cylinder the cylinder cannot be rotated independently of the bed for any reason.

In this invention it will be understood that the cylinder is revolved continuously in one direction and that the bed is reciprocated by or through a crank rotated in unison with the bed. If the cylinder were driven only by or through the movement of the bed, there would not be needed the provision for movement of the bed in unison with the cylinder, for the reason that the bed being the driver of the cylinder in one stroke of the bed the registration could not get out of proper harmony.

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

1. In a printing-press, the following instrumentalities, viz: a cylinder, a crank, means to rotate said cylinder and crank continuously in one direction, a bed having an attached rack, a second stationary parallel rack, a pinion engaging both of said racks and having an eccentric stud, and connections between the crank-pin of said crank and the eccentric stud of said pinion, whereby said pinion is enabled to reciprocate said bed at a surface speed substantially in unison with the surface speed of the said continuously-rotating cylinder, substantially as described.

2. In a printing-press, the following instrumentalities, viz: a cylinder, a crank, means to rotate said cylinder and crank continuously in one direction, a bed having an attached rack, a second stationary parallel rack, a pinion engaging both of said racks, and having an eccentric stud, and connections between the crank-pin of said crank and the eccentric stud of said pinion, the throw of said crank and the diameter of said pinion being such as to effect nearly a full rotation of said pinion during both the forward and the back stroke of said crank, substantially as described.

3. In a printing-press, a cylinder, a crank, means to positively rotate said cylinder and crank continuously in one direction, a cross-head having a groove entered by a crank-pin of said crank, a bed having a rack, a second stationary parallel rack, a traveling pinion engaging both of said racks and having an attached eccentric stud, and connections between said cross-head and the eccentric stud of said pinion whereby the said traveling pinion in engagement with the said racks, will, when moved, reciprocate said bed for the greater period of its stroke at a substantially uniform speed with relation to said cylinder, substantially as described.

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

BERTHOLD HUBER.

Witnesses:
W. K. HODGMAN,
FRED M. ATWOOD.