(No Model.)

B. HUBER & W. K. HODGMAN.

PRINTING PRESS.

No. 544,809. Patented Aug. 20, 1895.

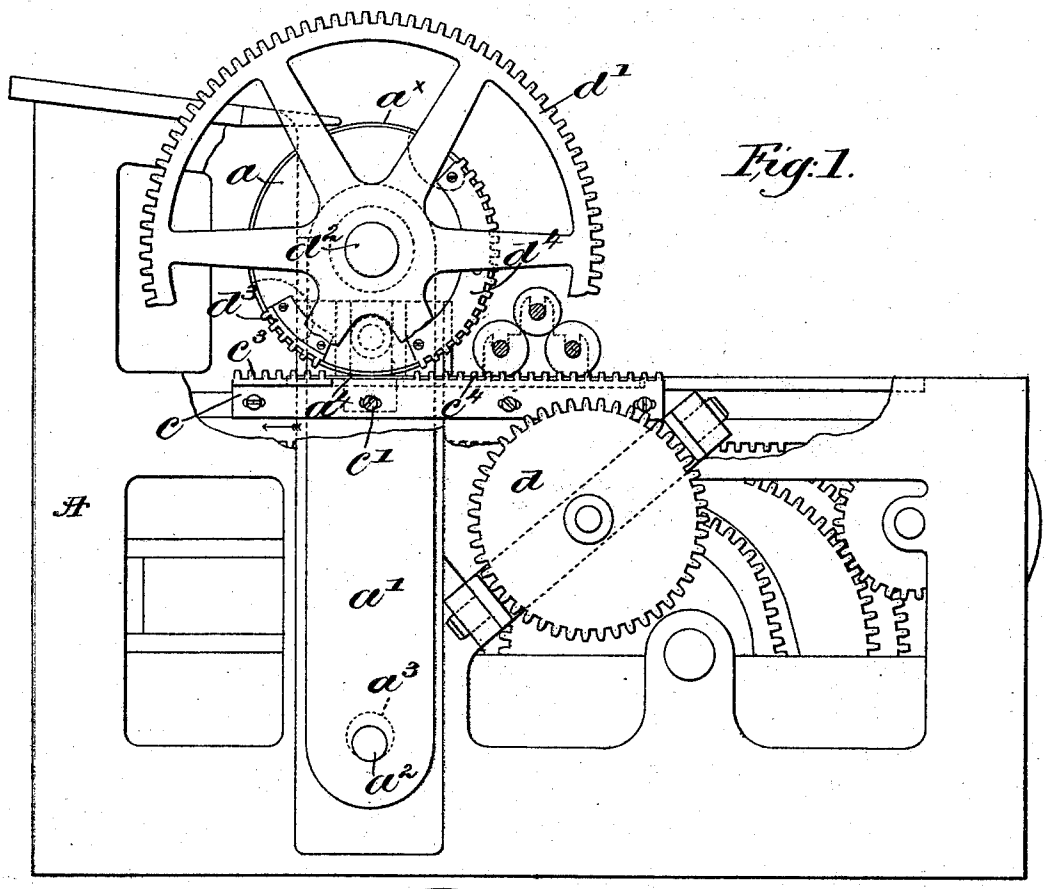

Fig. 1.

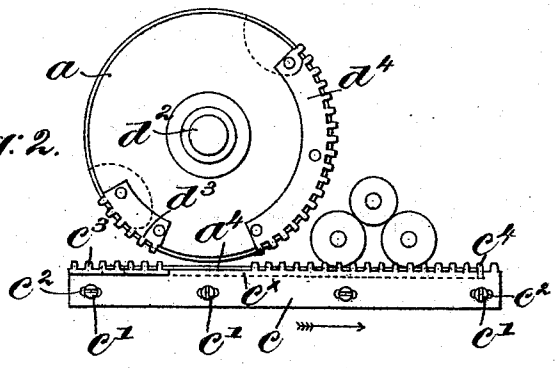

Fig. 2.

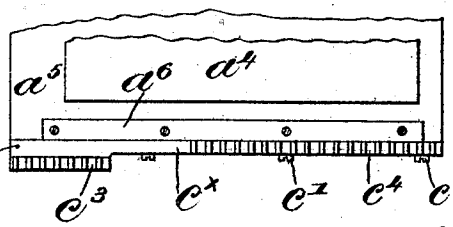

Fig. 3.

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UNITED STATES PATENT OFFICE.

BERTHOLD HUBER AND WILLIS K. HODGMAN, OF TAUNTON, MASSACHUSETTS, ASSIGNORS TO THE HUBER PRINTING PRESS COMPANY, OF SAME PLACE.

PRINTING-PRESS.

SPECIFICATION forming part of Letters Patent No. 544,809, dated August 20, 1895.

Application filed January 14, 1895. Serial No. 534,772. (No model.)

To all whom it may concern:

Be it known that we, BERTHOLD HUBER and WILLIS K. HODGMAN, 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 relates to the class of "two-revolution printing-presses," so called, in which the impression-cylinder is continuously rotated and makes two revolutions while the reciprocating bed or form-carrier makes one complete stroke, the impression-cylinder and form being slightly separated during the return of the latter. In such presses it is most essential to the production of good work that the registering shall be accurate—that is, different parts of the form must arrive opposite the same points on the cylinder at each impression—and we have attained such accuracy of register, especially at the points where the printing begins and ends, by positively moving the cylinder and bed or form-carrier in unison at such points or adjacent thereto.

In accordance therewith our invention consists, in a two-revolution printing-press, of a rotatable impression-cylinder, circumferentially-separated toothed segments thereon laterally offset one from the other, a reciprocating form-carrier, longitudinally-separated racks thereon adjacent the head and tail of the form and respectively located in the paths of the said segments, the racks and their co-operating segments being so located relatively to the center of the stroke that either segment will, in the back stroke of the form-carrier, move through a toothless space transversely adjacent to the rack lying in the path of the other segment, substantially as will be described.

Other features of our invention will be hereinafter described, and particularly pointed out in the claims.

Figure 1, in side elevation and partly broken out, represents a sufficient portion of a two-revolution printing-press to be understood with our invention applied thereto, with the parts in the center of the printing-stroke. Fig. 2 is a detail view in elevation of the cylinder and bed or form-carrier slightly separated and in the center of the backward or non-printing stroke; and Fig. 3 is a plan view, broken away, of the bed and form, showing one arrangement of the register-racks thereon.

The frame A, of suitable shape to provide bearings for the operating parts, the impression-cylinder a, journaled in standards a', resting at their lower ends upon the eccentric portions a^2 of a rock-shaft a^3, suitably operated to keep the cylinder in contact with the form a^4, supported by the bed or carrier a^5, during the forward stroke of the bed and to raise the cylinder from contact with the form during the return or backward stroke of the bed; the gear d, in mesh with and driving the gear d' on the cylinder-shaft d^2, and the mechanism for rotating the gear d and reciprocating the bed a^5 are and may be substantially as shown in United States Patent No. 417,826, dated December 24, 1889, and form no part of this invention.

The bed a^5 is provided with a bearing a^6, upon which runs the cylinder-bearing $a^\times$ during the printing-stroke of the press. A bar c is herein shown as secured to one side of the bed a^5 by suitable set-screws c', extended through longitudinal slots c^2 in the bar into the bed, the bar having rack-teeth c^3 formed thereon at its upper edge adjacent the head of the form a^4 and a second series of rack-teeth c^4 adjacent the tail of the form, offset one from the other, to travel in separate parallel paths during the reciprocation of the bed. The rack c^4 is considerably longer than the rack c^3, and the two are separated longitudinally by a blank space $c^\times$. A toothed segment d^3 is secured to the impression-cylinder a in the same vertical plane as and to at times mesh with the rack c^3 on the bed, and a second toothed and longer segment d^4 is secured to the said cylinder in the vertical plane of and to at times mesh with the rack c^4, the segments being circumferentially separated and so located as to mesh with their co-operating racks at the beginning and ending of the printing, whereby the cylinder and bed will be positively moved in unison at such times. By this means an accurate register is attained, and it is impossible for one or the other to slip as the form begins or is finishing

the printing, the points where inaccuracy is otherwise most likely to occur.

In Fig. 1 the segment and rack d^3 and c^3 have just become disengaged, the bed moving in the direction of the arrow, and the segment d^4 and rack c^4 are just about to engage to remain in mesh during the remainder of the printing, the cylinder and bed being thus locked together during the forward stroke for the whole length of the form, except at the center of the stroke, where the bar c is cut away or plain at $c^\times$. As the cylinder a continues to revolve after the impression is made it is slightly lifted from the bed as the latter begins its backward stroke, and the segment d^3 sweeps around outside of the rack c^4 in a toothless space, so that there is no possibility of engagement therewith, and obviating the shortening of the teeth of either.

In Fig. 2 the bed is at the center of its backward stroke, and during the remainder of the stroke in the direction of the arm the segment d^4 on the cylinder passes over the plain portion $c^\times$ of the bar c and inside of the path of movement of the rack c^3. By this arrangement of offsetting the racks and segments to move in different paths a very slight separation of the impression-cylinder and the form during the non-printing stroke of the bed is sufficient. At the end of the second revolution of the cylinder the segment d^3 is in position to engage its rack c^3 for the next impression. The bars c are longitudinally adjustable on the bed by means of the slots c^2 and the set-screws c', as may be necessary.

Our invention is not restricted to the form of press herein shown, as it may be applied to any two-revolution bed and cylinder printing-press, and instead of making the racks upon a single bar each rack may be separately attached to the bed without departing from the spirit and scope of our invention. The relative lengths of the racks and co-operating segments may be altered so long as the engagement one with the other locks the cylinder and bed at the beginning and ending of the printing.

It will be obvious that the end of the printing need not necessarily occur at the end of the form, for the length of the matter to be printed will vary according to circumstances, and the length of the back segment and rack is sufficient to permit such variation in the position of the end of the printing as will occur in practice.

Each rack is extended toward and as near to the center of the stroke as possible without engaging its co-operating segment in the back stroke of the form-carrier, and this point we denominate the "clearance-point," and have so designated it in the claims.

In the back stroke of the form-carrier the racks and segments are moving in opposite directions past the clearance-points, and were it not for the proper location of these points the teeth would engage and be stripped.

The inner end of a rack moves away from its clearance-point as the co-operating end of its segment reaches it, or vice versa, as shown in Fig. 2, in the back stroke of the form-carrier.

We claim—

1. In a two-revolution printing press, a rotatable impression cylinder, circumferentially separated toothed segments thereon laterally offset one from the other, a reciprocating form-carrier, longitudinally separated racks thereon adjacent the head and tail of the form and respectively located in the paths of the said segments, the racks and their co-operating segments being so located relatively to the center of the stroke that either segment will, in the back stroke of the form-carrier, move through a toothless space transversely adjacent to the rack lying in the path of the other segment, substantially as described.

2. In a two-revolution printing-press, a rotatable impression cylinder, a co-operating reciprocating form-carrier, separated racks on said carrier located in different parallel vertical planes adjacent the head and tail of the former and extended therefrom toward the center of the stroke to the clearance point, and circumferentially separated segments on the cylinder and respectively located in the paths of movement of said racks, to co-operate therewith singly in the forward stroke at the beginning and ending of the printing, the inner end of a rack moving away from the clearance point as the co-operating end of its segment reaches it, or vice versa, in the back stroke of the form-carrier, substantially as described.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

BERTHOLD HUBER.
WILLIS K. HODGMAN.

Witnesses:
EDWARD P. COLEMAN,
FREDK. M. ATWOOD.