

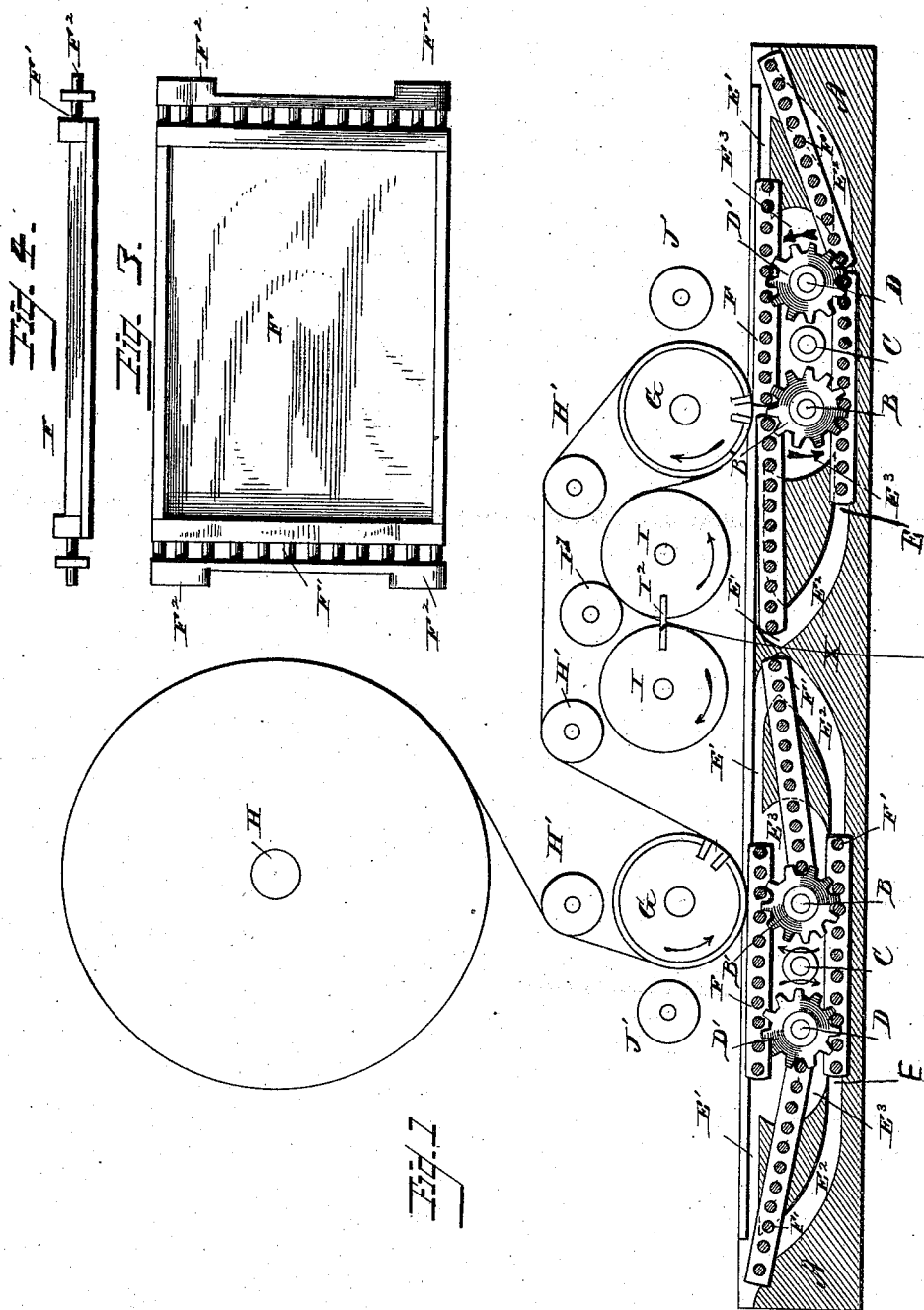
(No Model.)

J. G. NORTHRUP.
PRINTING MACHINE.

2 Sheets—Sheet 1.

No. 305,469.

Patented Sept. 23, 1884.



WITNESSES
"Wm. Spiden
Wm. Dwall

INVENTOR;
Joel G Northrup.
By E B Stocking
Attorney

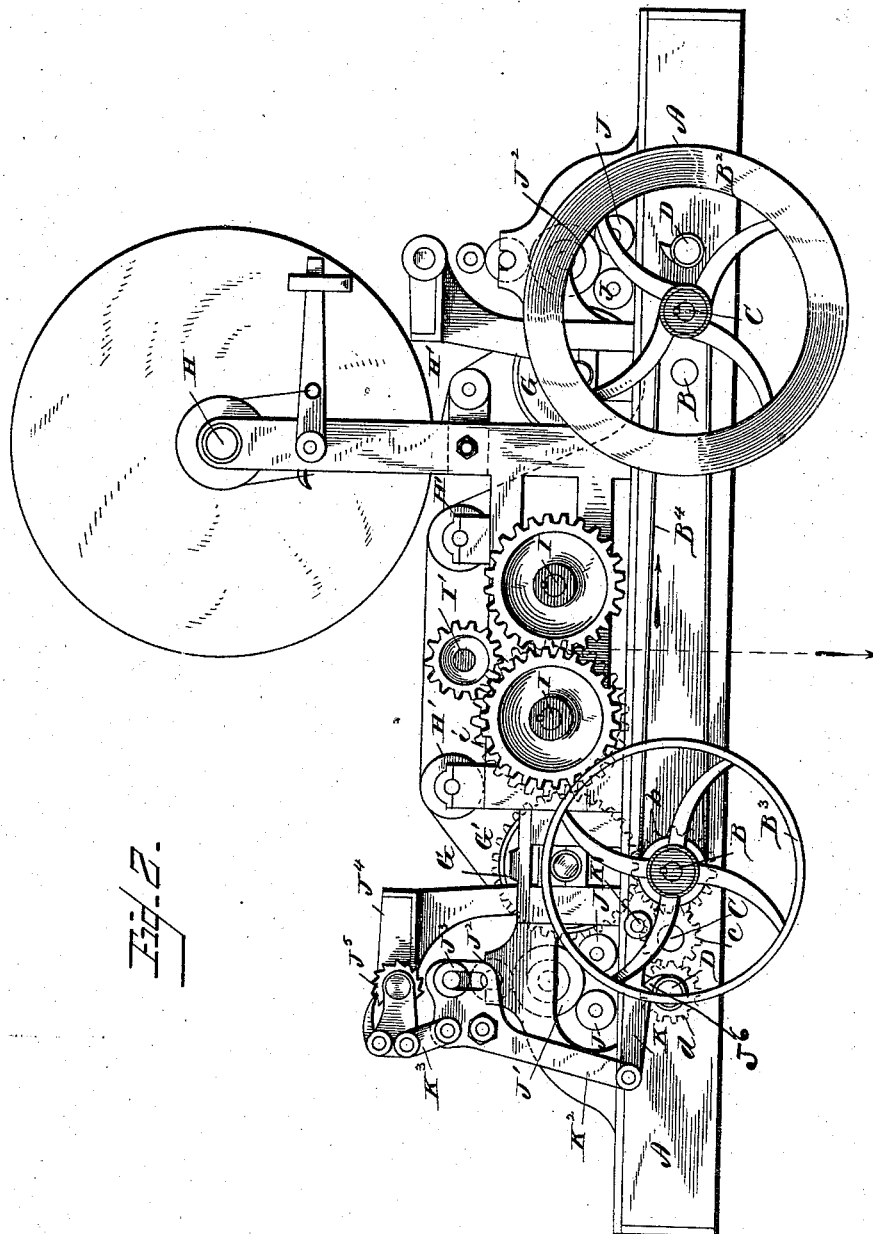
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"Wm. L. Speiden.
Wm. A. Swall.

INVENTOR

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UNITED STATES PATENT OFFICE.

JOEL GRANDISON NORTHRUP, OF MARCELLUS, NEW YORK.

PRINTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 305,469, dated September 23, 1884.

Application filed June 16, 1883. (No model.)

To all whom it may concern:

Be it known that I, JOEL G. NORTHRUP, a citizen of the United States, and a resident of Marcellus, county of Onondaga, and State of New York, have invented certain new and useful Improvements in Printing-Machines, of which the following is a specification.

The object of the invention is to provide a printing-machine which shall embody means for employing flat forms or printing-surfaces, continuous rotary web feeding and severing mechanism, and an impression cylinder or cylinders, so that the acknowledged perfection of work of flat printing-surfaces may be utilized in connection with the acknowledged rapidity of operation of rotary web guiding, conducting, and severing mechanisms.

The invention consists in certain features of construction, hereinafter described, and specifically set forth in the claims.

Referring to the drawings, Figure 1 is a longitudinal vertical section of the frame and the type-beds, with the web supporting, guiding, and severing mechanisms shown in end elevation. Fig. 2 is a complete elevation of the side of the machine opposite that shown in Fig. 1. Fig. 3 is a plan, and Fig. 4 an end elevation, of one of the type-beds.

Like letters indicate like parts in all the figures.

The frame-work of the press comprises an open rectangular frame, having suitable standards for the bearings of the rolls journaled therein, and said frame may be provided with any suitable means for its support upon a floor or foundation. Within each of the side rails of the frame are channels or ways $E E' E^2 E^3$. The ways $E E'$ are horizontal and located near the bottom and top of the frame, respectively, while the ways $E^2 E^3$ are curved or inclined, and unite the ends of the ways $E E'$.

It will be noticed that the mechanism at either end of the machine is a duplicate of that at the other, so that a particular description of one end will, in a measure, suffice for both. The arrows indicate the direction of movement of the parts which at each end of the machine is opposite to the direction of the movement of the similar parts at the other end. The middle (lengthwise) of the machine may

be located at the solid portion X, Fig. 1, which is between the two sets of mechanisms employed.

Referring to Fig. 1, B C D represent three shafts extending across the frame and journaled therein. The shafts B and D each carry two pinions, $B' D'$, one at each side of the frame, so that they run closely to its inner walls, and these pinions are of such a diameter that their teeth project into the planes of the upper and lower parallel tracks, $E E'$, and of the inclined or curved vertical tracks $E^2 E^3$. The shaft B carries outside of the frame a pinion, (not shown,) which meshes with the gear G' of the impression-cylinder G, (see dotted lines G' , Fig. 2,) and the shafts C and D carry outside of the frame meshing gears, so that, motion being imparted to the shaft B by belt-pulley B^2 , Fig. 2, the three shafts B, C, and D and the impression-cylinder are rotated. The belt B^2 serves to communicate motion to the duplicate mechanism at the opposite end of the machine. The shafts B C D, the impression-cylinders G, and one of the severing-rolls I have upon their ends, at the side of the machine opposite that shown in Fig. 2, a system of intermeshing gears, b, c, d, G' , and i , as shown by dotted lines in said figure.

Referring to Figs. 3 and 4, which are respectively a plan and an end elevation of one of the type-beds employed in this machine, it will be seen that the bed proper, F, has a rack, F' , at each side thereof, extending the whole length of the bed, and projecting lugs F^2 at each of its corners. These racks are open—that is to say, are adapted to be operated by a gear or pinion working either above or below the bed. The lugs F^2 are adapted to ride in the ways $E E' E^2 E^3$.

Referring to the right-hand portion of Fig. 1, it will be seen that the devices thus far described will operate as follows: A series of beds, F, will be successively carried in the horizontal ways over the shafts D, C, and B, as the gears $D' B'$ rotate in the direction indicated by the arrows, and when the forward end of each of the beds reaches the inner end of the track E' the rear end of said bed will be carried down by the gears B' , through the inclined way E^3 , into the lower horizontal way, 100

E, and will be moved in the opposite direction by the lower teeth of the gear B', while the opposite end of the same bed will be drawn down the way E². In the meantime a succeeding bed has been carried up the inclined way E² at the other end of the frame into the upper track, E', while its inner end is raised by means of the gear D' up the inclined way E³ until the lugs F² in the ways are brought into the upper way, E', and it is then carried forward in the same manner as just described with reference to the preceding bed. In this manner a series of forms on the beds may be continuously operated or carried, so that, in connection with suitable impression mechanism, successive impressions may be taken from the forms. In this instance G represents the impression-cylinder, (which, as aforesaid, is positively geared to the form-operating shaft B by means of the gear G',) around which the paper is conducted from the web-shaft H by guide-rollers H', arranged to deliver the web first about one of the impression-cylinders G at one end of the machine, where one side of the web is printed by a succession of forms, and thence around or about the impression-cylinder at the opposite end of the machine, where the opposite side of the web is printed by another succession of forms, the relative arrangement and location of the cylinders and forms being such that the matter printed upon each side of the web will accurately register. From the second cylinder the web is conducted over one of the web-severing rolls I, and between it and a drawing-roll, I', running in contact therewith, and in this instance positively gearing therewith. As the web passes between the knives I² of the severing-rolls it is separated into sheets, which may be delivered by any ordinary fly or conducted into any suitable folding mechanism.

J¹ J² J³ represent the inking-rolls, mounted in any suitable manner over the frame of the machine, at such a distance that as the beds pass toward the impression-cylinders the types, forms, or printing-surfaces thereon are supplied with ink from a fountain, J⁴, the roll of which is intermittently rotated by a pawl and ratchet, J⁵, operated through the means of a cam, J⁶, on the end of the shaft D, which cam at each revolution of the shaft raises the lever K, pivoted at K' to the frame of the machine, and pivotally connected to a rock-arm, K², carrying the transfer-rolls J² J³. A link, K³, mounted on the rock-arm K², serves to operate the pawl of the ink-fountain roller. This mechanism is duplicated at each end of the machine, so that the duplicate sets of forms are suitably supplied with ink.

It will be noticed that the gears B' and D' have complete, accurate, and positive control of each of the beds while it is co-operating with the impression-cylinder, and in the usual

arrangement of printing-surfaces, type, or forms upon the bed there are vacant spaces between the advancing and following ends of the bed and said forms where there is no pressure, so that before the impression is begun said gears have positive control of the forms. The teeth of the gears B' D' and of the rack are so proportioned that the pressure falls upon the body portion of the gear between the teeth, and no undue pressure is brought to bear upon the said teeth, and the result is a solid foundation and a positive and smooth movement of the bed, whereby perfect impressions are secured.

I am aware of my Patent No. 2,793, granted September 30, 1842, and of subsequent patents embodying the principle of operating beds somewhat in the manner herein shown, and I do not, therefore, broadly claim flat type beds operated by racks and pinions.

Having described my invention and its operation, what I claim as new is—

1. The combination of a series of type-beds, as F, having racks and lugs, the frame having ways and transverse shafts carrying pinions meshing with said racks, and a rotary impression-cylinder positively geared to one of the bed-operating shafts, substantially as specified.

2. A printing-press comprising a frame having arranged at each end thereof a series of flat type-beds having racks and lugs, transverse shafts having pinions meshing with said racks at the upper and the lower sides thereof, a rotary impression-cylinder arranged at each end of the machine to operate with the corresponding series of beds, and means, substantially as shown and described, for inking each series of forms, and for conducting a web from one of said impression-cylinders to the other, substantially as specified.

3. A printing-press provided at each of its ends with a series of flat type-beds having racks and lugs, transverse shafts having pinions for operating the beds, as described, a rotary impression-cylinder and independent ink supplying and distributing devices arranged to operate with each independent series of beds, a single web-shaft, a series of guide-rollers arranged to conduct the web from one cylinder to the other, and web-severing devices, substantially as shown and described.

4. The combination of the frame A, having the ways E E' E² E³, the shafts B D, the gears B' D', the intermediate shaft, C, the type-beds F, having the racks F' and lugs F², the rotary impression-cylinder G, the web-guides H', the drawing-roller I', and the severing-rolls I, the whole constructed and arranged substantially as described.

JOEL GRANDISON NORTHRUP.

Witnesses:

JAMES DELAMERE MATHER,
JAMES HENRY MATHER.