

(No Model.)

2 Sheets—Sheet 1.

A. E. DOWELL. PRINTING PRESS.

No. 562,715.

Patented June 23, 1896.

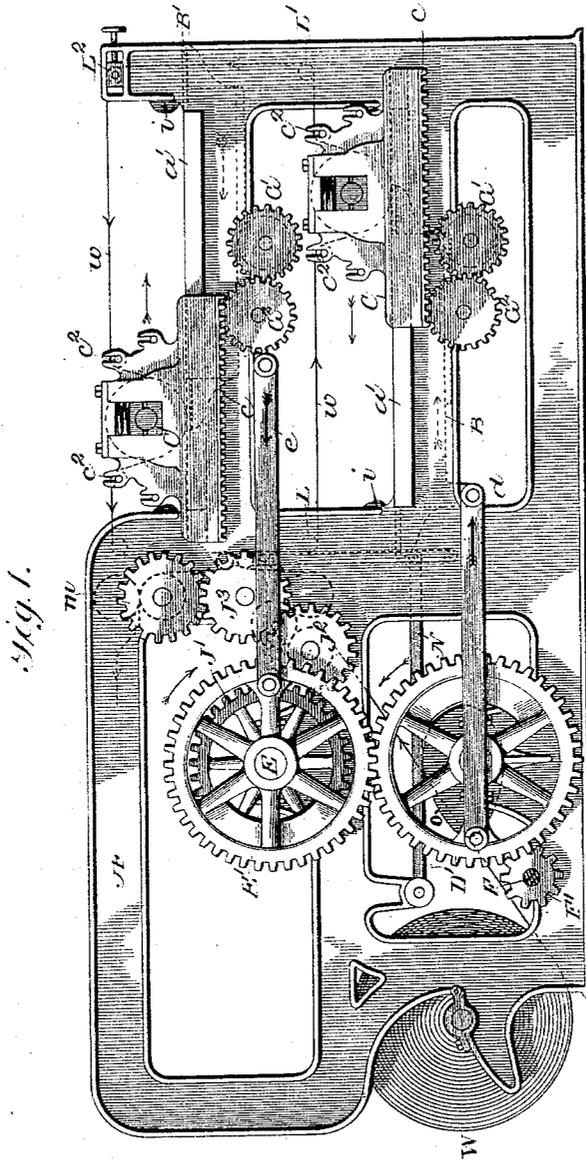


Fig. 1.

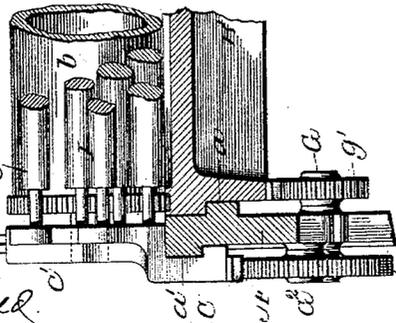


Fig. 3.

WITNESSES

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Fig. 2.

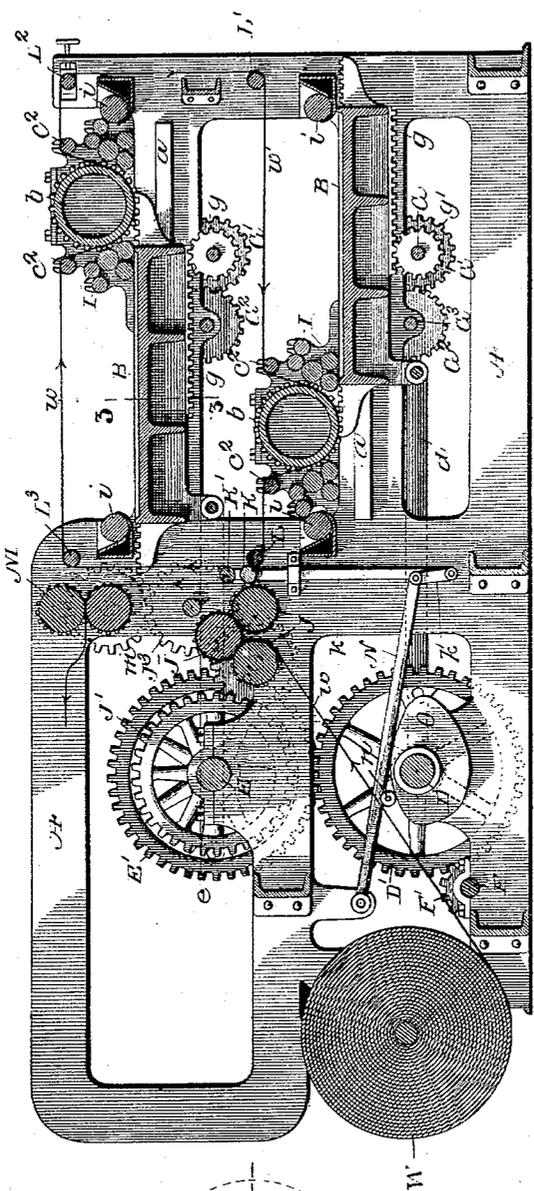
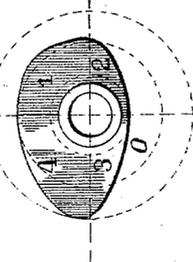


Fig. 4.



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UNITED STATES PATENT OFFICE.

ARTHUR E. DOWELL, OF WASHINGTON, DISTRICT OF COLUMBIA.

PRINTING-PRESS.

SPECIFICATION forming part of Letters Patent No. 562,715, dated June 23, 1896.

Application filed May 9, 1895. Renewed April 4, 1896. Serial No. 586,192. (No model.)

To all whom it may concern:

Be it known that I, ARTHUR E. DOWELL, of Washington, District of Columbia, have invented certain new and useful Improvements in Printing-Presses; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form part of this specification.

This invention relates to web-printing machines, and is an improvement upon the web-press shown in my application for patent filed April 9, 1895, Serial No. 545,081, in that it doubles the capacity of such press, and is also an improvement upon the press shown in my application filed April 29, 1895, Serial No. 547,531, in that it dispenses with any web-compensating mechanism between the beds, and simplifies the looping-roller movements.

The objects of this invention therefore are, first, to employ oppositely-reciprocating beds, and oppositely-reciprocating cylinders coacting with said beds (but also moving oppositely to the beds) in a web-press; second, to provide a simple means for feeding the web through such a press, so that impressions can be taken thereon at both forward and backward strokes of both beds and cylinders, and, third, to make the beds operate the cylinders or vice versa.

The invention is summarized in the claims and not confined to any specific form of press or relative arrangements and locations of beds and cylinders.

The press shown in the accompanying drawings illustrates and embodies my invention, and is constructed as follows:

Figure 1 is a side elevation of the press. Fig. 2 is a longitudinal vertical central section through the same. Fig. 3 is a detail transverse section on line 3 3, Fig. 2. Fig. 4 is a detail diagram of approximately the looping-roller-shifting cams.

The type-beds B B' are mounted on ways *a a* on the main frame, in any suitable manner, so that they can reciprocate back and forth, and to shorten the press these beds are shown arranged one above the other, but obviously the beds might be located end to end in the same plane, as are the beds in my

above-mentioned applications, or otherwise, as desired, the relative location of the beds being a matter of choice with the press-builder. The ways *a a* are on the inside of the main side frames A of the press, and on the exterior of the frames are guides *a'* for the carriages C C', in which are journaled the impression-cylinders *b b'*, (respectively coöperating with beds B B',) as well as the systems of inking-rolls I I at each side of each impression-cylinder.

The beds are reciprocated in opposite directions and the cylinders reciprocate oppositely to the beds with which they coact. These parts may be so reciprocated by any convenient or desired means. As shown, bed B is reciprocated by pitmen *d*, connected to wrist-pins on crank gear-wheels D', mounted on a shaft D, journaled transversely of the main frame, and bed B' is reciprocated by pitmen *e*, connected to wrist-pins on crank gear-wheels E', mounted on a shaft E, also journaled in the main frame. Gears D' E' intermesh, so that the beds will be reciprocated equally but oppositely. The gears D' may mesh with pinions F' on a main drive-shaft F, to which power is applied.

To the under side of bed B near its edges are secured racks *g*, meshing with pinions *g'* on a transverse shaft G, journaled on the main frame and having outer pinions G', meshing with pinions G², journaled on a shaft G³ on the frame, and meshing with racks *c*, secured to the carriages C, as shown. By this means when bed B is moved in one direction, carriage C with cylinder *b* and inking-rolls is moved in the opposite direction, and the gearing is preferably of such size that the carriage has a slightly-greater linear travel than the bed. Carriage C' with cylinder *b'* and its inking-rollers is similarly operated from bed B', as shown.

The inking-rollers I receive ink from fountains *i i* at opposite ends of each bed, located at the proper points to supply ink to the system of ink-rollers I, as indicated in the drawings.

The web *w* is led in from roll W between the feed-rolls J, up over a looping-roller K, down under a stationary roller L, forward under the cylinder *b*, (passing over guide-rollers

c^2 on the carriage C at each side of the cylinder,) forward to a stationary roller L' , up over a register-adjusting roller L^2 , back under cylinder b' , (passing over guide-rollers c^2 on carriage C' at each side of the cylinder,) back over a roller L^3 , down under a looping-roller K' up to the delivery rolls M.

The feed-rolls J are driven by gears $J' J^2$ from shaft E, so as to feed in sufficient web for two impressions for each reciprocation of the beds and cylinders; and rolls M feed out an equal amount of web in the same interval, and may be driven by gears J^3 and m from gear J^2 . This gearing may be arranged to suit the press-constructor.

The looping-rollers $K K'$ are both journaled in vertically-reciprocating bars k , connected at their lower ends by links k' to the free ends of levers N, pivoted at their rear ends on the main frame, and having friction-rollers n engaging cam O on shaft D. These cams are substantially of the form indicated in Fig. 2, and are calculated to give the requisite movements to rollers $K K'$ to cause them to compensate or vary the regular feed and delivery of the web, according to the irregular demands of the printing mechanisms.

In a press of the character described the web has to move with the beds during printing, and therefore at one stroke will move in the direction that the web would travel in passing through the press from the feed to delivery, and at the next stroke would move exactly contrary, so that the web would be actually pulled back from the delivery toward the feed-rolls; that is, on one stroke the beds feed the web properly forward and assist the feed and delivery rolls, but on the return stroke the beds feed the web backward contrary to the action of the feed and delivery rolls.

If arranged as a single-acting press, and the cylinders were thrown off during their stroke contrary to the natural travel of the web, the feed and delivery-rolls could be driven at irregular speeds and take care of the web, or the movements of the looping-rollers would be simple, as they would simply have to compensate for the irregular movement of the beds during impressions. This kind of press, however, is covered in my first-mentioned application.

As I prefer to print on both forward and backward strokes, the movements of the web are more complicated; and therefore assuming, for simplicity of illustration, that the sheets to be printed are to be twenty inches long, and that one-quarter of a revolution of the crank-wheels is all that is required to move the beds the proper distance (ten inches) during the taking of impressions, (for the cylinders moving twelve inches in the opposite direction would pass clear over a twenty-inch form,) the operation of the press is approximately as follows:

Beginning with the parts in the position

shown in Fig. 1, the first stroke of bed B is outward, and of bed B' inward, as indicated by the arrows, and thus both beds will assist in feeding the web forward to the delivery-rolls; and in this case at the moment of starting up the press the looping-rollers $K K'$ would be midway of the limits of their travels, as indicated in dotted lines, Fig. 1. During the first strokes of the beds therefore a perfected impression is made on the web, and ten inches of web is pulled forward with and by the beds at a slightly-irregular feed. This irregularity of feed is compensated for by the rollers $K K'$, which are so shifted by cam O as to keep the web taut between the feed and delivery rolls and beds, and at the same time compensate for the irregular feed of the web by the beds. During this interval therefore the rollers n traverse the first quarter 1 of the cam O, and the looping-rollers $K K'$ simply dance, ten inches of web being meanwhile fed in by rolls J and out by rolls M. After the completion of the first and before the beginning of the second impression the feed and delivery rolls J and M feed in and draw through the press ten inches of web, and the looping-rollers $K K'$ are lowered five inches, causing an additional ten inches of web to pass through the press from roller L to roller L^3 , rollers n in this interval traversing the second quarter 2 of the cams O, the parts then reaching the positions indicated in Fig. 2. During the return strokes of the beds, or second impression, ten inches of web is pulled back through the press between rollers L^3 and L, as demanded by the beds, and at the same time ten inches of web is fed in by rolls J and fed out by rolls M. Therefore rollers $K K'$ are raised ten inches during this return stroke, so that roller K' gives up enough web from its loop to both supply the back feed of the beds and also the demands of the delivery-rolls, and roller K rises and takes up both the ten inches of web fed in by the rolls J and ten inches of web fed back by the beds. During this back stroke therefore the roller n traverses the third quarter 3 of cam O. At the end of the return stroke or impression, and before the beginning of the next forward impression, the feed-rolls J feed in ten inches of web and rolls M pay out ten inches of web, and rollers $K K'$ are dropped five inches, so that twenty inches of web passes through the press between rollers $L L^3$ while the rollers n are traversing the fourth quarter 4 of the cam O. This cycle of operations is repeated during the operation of the press, and thus perfected impressions are made on the web during both the forward and backward strokes of the beds and cylinders.

The mechanism for reciprocating the carriages C would be useful for operating the inking-rolls of ordinary reciprocating-bed presses.

It may be found in practice that no positive mechanism will be needed for operating

the looping-rollers, and obviously the invention is not restricted to looping-rollers for compensating devices.

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

1. In a printing-press the combination of a pair of oppositely-reciprocating beds, and a pair of reciprocating cylinders each coacting with and moving oppositely to one of the beds; with means for feeding a web between the beds and cylinders and compensating it for the movements of the beds so that impressions are made thereon simultaneously from the forms on both beds, substantially as described.

2. In a printing-press the combination of a pair of oppositely-reciprocating beds, and a pair of oppositely-reciprocating cylinders cooperating with, and moving oppositely to, the beds; with means for feeding a web successively between the cylinders and beds, and compensating it for the movements of the beds whereby a perfected impression is produced on the web during both strokes of both beds, substantially as and for the purpose specified.

3. In a printing-press the combination of a pair of oppositely-reciprocating beds and a pair of oppositely-reciprocating cylinders, coacting with, but moving oppositely to, the beds, substantially as described; with mechanism whereby the portion of the web within the press is shifted back and forth according to and as required by the movements of the beds, and is fed forward in the intervals between impressions, substantially as and for the purpose described.

4. In a printing-press the combination of a pair of oppositely-reciprocating beds, and oppositely-reciprocating cylinders cooperating with said beds; and mechanism for continuously feeding a web to and from the press; with a web-looping roller between the feed and first bed and cylinder, and a web-looping roller between the delivery and second bed and cylinder, and means for controlling the movements of the looping-rollers whereby impressions are made on the web during both

the forward and backward strokes of the beds and cylinders, all substantially as and for the purpose described.

5. In a printing-press the combination of a pair of independent oppositely-reciprocating beds, a pair of independent oppositely-reciprocating cylinders, cooperating with said beds and reciprocating oppositely thereto; a continuous-web feed, and continuous-web delivery; with a looping-roller between the feed and printing mechanism; and another looping-roller intermediate the printing mechanism and the delivery, and means for controlling the movements of the looping-rollers substantially as and for the purpose described.

6. In a printing-press the combination of a reciprocating bed, and oppositely-reciprocating cylinder, with web feeding and delivering devices, a pair of connected looping-rollers, respectively between the printing mechanism and feed, and between the printing mechanism and delivery, and cams and levers for operating said rollers, whereby the portion of the web in the embrace of the printing mechanism is shifted back and forth with, and according to, the movements of the bed, and impressions made on the web at both operations thereof, substantially as and for the purpose described.

7. In a printing-press the combination of a reciprocating type-bed, a rack thereon, a horizontal shaft, journaled in the main frame, having a pinion meshing with said bed-rack; and a second pinion on its outer end, and a third pinion on a stub on the main frame meshing with said second pinion; with a reciprocating-cylinder carriage, and a rack-bar secured thereto meshing with said third pinion, all substantially as and for the purpose set forth.

In testimony that I claim the foregoing as my own I affix my signature in presence of two witnesses.

ARTHUR E. DOWELL.

Witnesses:

JAMES R. MANSFIELD,
T. H. ALEXANDER.