UNITED STATES PATENT OFFICE.

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TWO-REVOLUTION RECIPIROCATING FLAT-BED PRINTING PRESS.

1,137,383.


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To all whom it may concern:

Be it known that I, Albert L. Colburn, a citizen of the United States, residing at New Haven, in the county of New Haven and State of Connecticut, have invented a new and useful Improvement in Two-Revolution Reciprocating Flat-Bed Printing Presses; and I do hereby declare the following, when taken in connection with the accompanying drawings and characters of reference marked thereon, to be a full, clear, and exact description of the same, and which said drawings constitute part of this application, and represent, in—

Figure 1 a broken view in side elevation of a two-revolution reciprocating flat-bed printing press embodying my invention, the type-bed being shown at the limit of its forward excursion. Fig. 2 a broken plan view thereof. Fig. 3 a broken view of the press in front elevation, showing a pivotal bed-rack in its printing position. Fig. 4 a corresponding view showing the pivotal bed-rack in its clearance position for the return motion of the type-bed.

My invention relates to an improvement in two-revolution reciprocating flat-bed printing presses, the object being to simplify presses of this character and increase their speed.

With these ends in view, my invention consists in a printing-press of the character described, having certain details of construction and combinations of parts as will be hereinafter described and pointed out in the claims.

In carrying out my invention as herein shown, the driving-shaft 2 provided with a fly-wheel 3 and fast and loose pulleys 4 and 5, is journaled at its outer end in a two-part box 6 at the upper end of a standard 7, while its inner end is journaled in the frame 8 of the press. Near its inner end, the said shaft 2 is provided with a driving pinion 9 meshing into the bed-driving main gear 10 which is mounted upon the outer end of a main shaft 11 provided at its inner end with a short crank 12 carrying a long crank-pin 13 to the end of which is rigidly secured a secondary crank 14 carrying a crank-pin 15. The said pin 13 carries the rear end of a lower connecting rod 16 the forward end of which is connected by a pin 17 with the lower end of the relatively short type-bed lever 18. The said pin 15 also carries the rear end of an upper connecting rod 19, the forward end of which is connected by a pin 20 with the said lever 18 about midway the length thereof. The upper end of the said lever 18 is connected by a pin 21 to the reciprocating flat-type-bed 22 which may be of any approved construction as to its form and mode of mounting.

By preference, especially in large presses, I employ a secondary shaft 23 located in line with the main-shaft 11 aforesaid and provided at its inner end with a supplemental crank 24 receiving and supporting the outer end of the crank-pin 15. The secondary shaft 23 aforesaid is provided with a gear wheel 25 meshed into by a gear wheel 26 mounted upon an idle shaft 27 carrying a gear wheel 28 meshing into a gear wheel 29 on the shaft 11, the power of which is thus utilized for driving the secondary shaft 23 carrying the crank 24, whereby the strains upon the various cranks 12, 14 and 24, are equalized. If desired, the crank 24 may be dispensed with.

By means of the double crank construction above described, reference now being had to the cranks 12 and 14, the lever 18 is provided, as it were, with a movable fulcrum at the point 17, whereby I am enabled to keep the type-bed 22 well toward the floor, as compared with ordinary presses of this type in which the type-bed lever is not provided with a movable fulcrum, and therefore must be made relatively longer than the lever 18.

The two-revolution cylinder 30, which may be of any approved construction and provided with any of the means ordinarily employed for raising and lowering such a cylinder, is driven by the meshing of the driving pinion 9 into a concentric gear 31 secured to an irregular gear 32, the said gears 31 and 32 turning loosely upon a stud 33. The said irregular gear 32 meshes into a corresponding irregular gear 34 fixed upon the adjacent trunnion 35 of the cylinder 30, which is furnished with a cylinder gear 36.
intermittently meshed into the register-rack 37 of the type bed 22.

For clearing the teeth of the rack 37 from the gear 38 to permit of the return movement of the bed 22, the rack is thrown out of the path of the said gear. For this purpose I employ, as herein shown, a cam 38 mounted upon the main-shaft 11 and co-acting with an arm 30 located at the rear end of a rockshaft 40 extending parallel with the press frame 8 and journaled at its ends in brackets 41, 41, secured thereto, as clearly shown in Fig. 2. The said rock-shaft 40 carries two upstanding arms 42, 42, rigidly secured to it and at their upper ends adapted to receive the respective trunnions 43 of an oscillating coupling-piece 44 which, as shown, is T-shaped in cross-section. The longitudinal rib 45 of the said coupling-piece or bar 44 is straddled, as it were, by the slotted lower end of a sliding coupling-arm 46 rigidly secured to and depending from the forward end of a rock-shaft 47 journaled at its ends in brackets 48, 48, secured to the type-bed 22 at the ends thereof. The rack 37 is rigidly secured at its ends to the upper ends of rack-carrying arms 49 rigidly secured to the rock-shaft 47 near the ends thereof.

It will be understood that the cylinder 30 is continuously revolved in the direction of the arrow a, and that it completes two revolutions for each complete movement of the type-bed 22 back and forth. In the printing or rearward excursion of the type-bed 22, the register-rack 37 is lifted into its upward or printing position in which it is shown in Fig. 3, and is maintained in this position throughout the printing period. However, on the return or forward movement of the type-bed, before the rack 37 has been carried far enough to mesh into the gear 36, the cam 38 acts to cause the rack to be lifted into its clearance position in which it is shown in Fig. 4, and in which its teeth are carried out of line with the teeth of the gear 36 which continues to revolve with the cylinder 30 as already stated. Then on the return motion of the bed 22 after the rear end of the rack 37 has entirely cleared the gear 36, the said cam 38 operates to swing the rack back into its printing position in readiness for the next printing excursion of the bed.

In the construction shown, I have employed three cranks 12, 14 and 24, and have explained that if desired the crank 24 may be dispensed with, in which case the secondary shaft 23, gear wheels 25, 26, 28 and 29 and the shaft 27 will also be dispensed with, whereby the driving of the bed will be devolved upon the cranks 12 and 14 which are rigidly connected by the crank-pin 18 as already described and as shown in Fig. 2. The elimination of the parts above enumerated will only be done in presses of small size requiring comparatively little power to run them. In larger presses requiring more power, the crank 24 and the other parts above enumerated will be retained since they will be required to properly distribute the power required to drive the type-bed. I may now explain, also, that the crank 14 may, if desired, be omitted in which case the crank 24 and the other parts just above enumerated will be retained in connection with the crank 12. It is to be noted that the crank 24 is equal to the combined effective length of the cranks 12 and 14.

I claim:

1. In a two-revolution reciprocating flat-bed printing press, the combination with a cylinder, of means for rotating the same, a type-bed, a lever pivoted at its upper end to the said type-bed, a connecting rod pivoted at one end to the lower end of the said lever, a connecting rod pivoted at one end to the said lever and at a point between the pivotal connection thereof with the type-bed and the pivotal connection thereof with the other connecting rod, a main shaft, and crank connections between the said main shaft and the opposite ends of the said connecting rods, whereby the type-bed is horizontally reciprocated back and forth.

2. In a two-revolution reciprocating flat-bed printing press, the combination with a cylinder, of means for rotating the same, a type-bed, a lever pivoted at its upper end to the said type-bed, a connecting rod pivoted at one end to the lower end of the said lever, a connecting rod pivoted at one end to said lever at a point about midway the length thereof, two cranks connected with the opposite ends of the said rods, and a main shaft upon which the said cranks are mounted, whereby the said type-bed is reciprocated back and forth.

3. In a two-revolution reciprocating flat-bed printing press, the combination with a reciprocating type-bed, of a lever for operating the same, a driving shaft, a crank thereto upon, a pin carried by the said crank, a connecting rod extending between the said pin and the lower end of the lever, a crank carried by the said pin, and a connecting rod extending between the crank last mentioned and the lever at a point midway the length thereof.

4. In a two-revolution flat-bed printing press, the combination with a reciprocating type-bed, of a lever having its upper end pivoted to the said bed for operating the same, a connecting rod connected at one end with the lower end of the said lever, a connecting rod connected at one end with the said lever about midway the length thereof, a driving shaft mounting cranks respectively.
connected with the opposite end of the said rods, a supplemental crank connected with the rod which is pivoted to the lever about midway the length thereof, and a secondary shaft located in line with the main shaft and mounting the said supplemental crank.

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

ALBERT L. COLBURN.

Witnesses:

M. P. NICHOK,

C. L. WEEB.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D.C."