

J. H. EARL.
PRINTING MACHINE.

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UNITED STATES PATENT OFFICE.

JOHN H. EARL, OF CHICAGO, ILLINOIS.

PRINTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 384,432, dated June 12, 1888.

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To all whom it may concern:

Be it known that I, JOHN H. EARL, of Chicago, county of Cook, and State of Illinois, have invented certain new and useful Improvements in a Printing-Machine, of which the following is a full, clear, and exact description that will enable others to make and use the same, reference being had to the accompanying drawings, forming a part of this specification.

The object of this invention is to provide a machine for printing from an endless roll of paper and then rewinding the same in the process of printing.

The improvement is more especially intended for printing names, characters, and designs on wrapping-paper used for commercial purposes in doing up packages of merchandise.

Figure 1 is a side elevation of a machine embodying my improved features. Fig. 2 is a longitudinal section of the winding-shaft in the plane 2, Fig. 1; Fig. 3, a transverse section of the same in the plane 3, Fig. 2; and Fig. 4 is a detached detail of construction.

Referring to the drawings, A represents the different parts of the supporting-frame, A' the roll of paper to be printed, A² the bearings supporting the same.

B is the type-roller, upon the periphery of which is mounted the usual curved electro-plate, which in this case will cover only a part of the surface of the type-roller, so as to leave a blank space on the paper between each impression, the diameter of the type-roller determining the distance between each imprint. The type-roller is journaled in one end of the auxiliary frame B', and is so arranged as to be readily removed and another roller substituted, as may be required. The auxiliary frame B' is pivotally connected to the main frame.

B² is the ink-fountain attached to the opposite end of the frame B', the ink being transferred to the type-roller by means of the system of inking-rollers *a*, *a'*, *a²*, *a³*, *a⁴*, and *a⁵*, all having suitable journal-bearings in the frame B', which is mounted on the pivot-shaft *b*, journaled in the two sides of the supporting-frame A, whereby the frame B' may be tipped up to throw the type-roller out of contact with the impression-roller B³, journaled in the main frame-work.

Both sides of the machine are alike, Fig. 1 illustrating either side.

The inking-roller *a²* is arranged to have alternate contact with the companion rollers on each side of the same, so as to interrupt and prevent too free a flow of ink to the type-roller. This movement is accomplished by providing the frame B' with the elongated slot *b'*, so that the roller *a²* may have a lateral adjustment, the arm *b²*, attached to the journal-shaft of said roller, and the lever *b³*, one end of which is connected to the lower end of the arm *b²*, while the opposite or loose end has frictional contact with the irregular-shaped rolling-cam *b⁴*, mounted on the shaft *b⁵*, carrying the impression-roller, whereby a slight lateral movement is given to the roller *a²* at each revolution.

Motion is transmitted to the inking-rollers *a* and *a²* by means of the belt *b⁶*, running over a suitable pulley mounted on the inking-roller *a*, as indicated in dotted lines. The type-roller is rotated by having contact with the band of paper B' and the impression-roller, and in turn transmits motion to the inking-rollers *a⁵*, *a⁴*, *a³*, and *a²*. The intermediate inking-roller, *a²*, receives a rotary movement first from one end of the inking apparatus and then the other as the position of the same is alternately changed. The web or band of paper is first led under the roller C, then around and over the roller C', and next passes around the impression-roller, then over the roller C², and is finally rewound on the winding and driving shaft C³, which is provided on one end with the band-pulleys C⁴ C⁵, carrying the driving-belt C⁶, connected with the motive power. By this arrangement it will be observed that the web of paper in the process of being printed forms a band for transmitting the required motion to the printing and inking mechanism, the several rollers which the paper is brought in contact with serving to impart the required tension and to keep the same in a taut and smooth condition.

The method of rewinding the paper on the driving or power shaft is also an important feature, for the reason that the roll of paper in being rewound is constantly enlarging in diameter with each layer of paper, which has the effect of gradually increasing the speed of the printing mechanism in the same proportion as the work progresses, thus securing a uniformity in the operation of the machine

that would not be possible were the power transmitted directly to the printing or impression roller and the paper rewound upon an independent shaft.

5 The winding and driving shaft C² is provided longitudinally with the elongated recess *d* (see Figs. 2 and 3) for the insertion of the wedges D D'. As illustrated in Fig. 2, the wedges are in position to receive the paper, 10 the edge of the outer wedge, D, projecting a little beyond the surface of the shaft, while one end of the inner companion wedge, D', projects far enough from the end of the shaft to be grasped for the purpose of withdrawing 15 the same endwise. The object of this construction is to facilitate the removal of the roll of paper from the winding shaft after the same has been printed. The projecting edge of the wedge D prevents the paper from having a close contact with that part of the shaft, 20 and readily permits of the roll being removed by withdrawing the wedge D', when the companion wedge will drop into the recess *d* and leave the roll of paper free on the shaft, which 25 would not be the case were the paper allowed to be closely rewound upon the shaft without the interposition of the wedges. The tension-band *d'* passes around the pulley *d*², mounted upon the shaft from which the paper is printed, 30 and indicated in dotted lines. The ends of this band are permanently secured in the shaft *d*², journaled in the frame A, as shown in Figs. 1 and 4.

35 The hand-wheel *d*⁴ is mounted on the outer end of the shaft *d*³ and affords means for rotating said shaft in adjusting the tension. The inner end of the shaft *d*³ carries the ratchet-wheel *d*⁵. (See Fig. 4.) The pawl *d*⁶ engaging with the ratchet-wheel serves to lock these

parts in the position to which they may be 40 adjusted. The object of this tension device is to prevent the roll of paper A' being unwound from running away, as the rolls are not always of a true cylindrical form.

Having thus described my invention, what I 45 claim as new, and desire to secure by Letters Patent, is—

1. In a printing-machine, the combination, with the main frame, of the auxiliary frame B', pivotally connected to said main frame and 50 provided with the slot *b*¹, the inking-roller *a*², the arm *b*², the lever *b*³, the cam-piece *b*⁴, and the shaft *b*⁵, whereby the inking-roller *a*² is made to have alternate contact with the companion inking-rollers located on each side of 55 the same, substantially as set forth.

2. In a printing-machine, the combination, with the inking apparatus, of the type-roller B, the printing or impression roller B³, the roller C', and the belt *b*⁶, said rollers B B³ and 60 belt *b*⁶ being rotated by the passage of the web to be printed, whereby the ink-rolls have a uniform speed with the printing-rolls, as set forth.

3. In a printing-machine, the combination, 65 with the winding and driving shaft C², of the inking and printing mechanism, the system of carrying or guide rollers, as described, and the bearings supporting the roll of paper to be printed from, whereby the web of paper pass- 70 ing through imparts the required motion to all the working parts of the machine alike, substantially as set forth.

JOHN H. EARL.

Witnesses:

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