(No Model.)

# J. T. HAWKINS.

## PRINTING MACHINE.

No. 423,153 **Patented Mar. 11, 1890.**

Fig. 2.

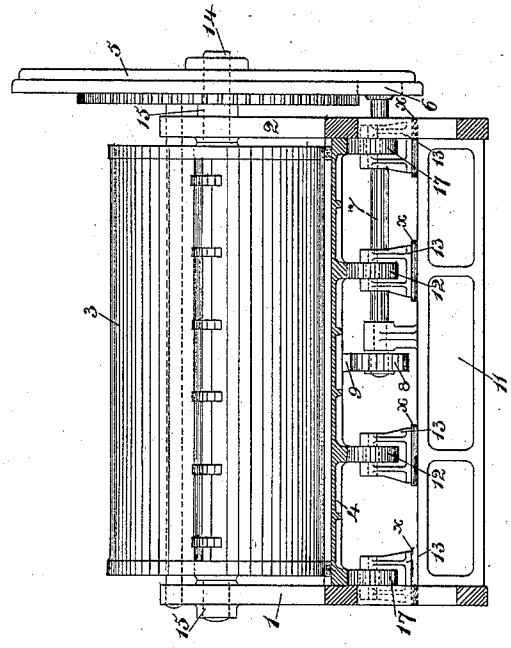
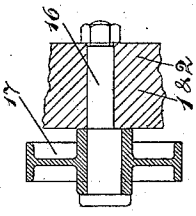


Fig. 3.



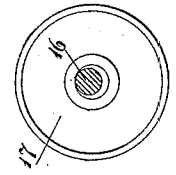
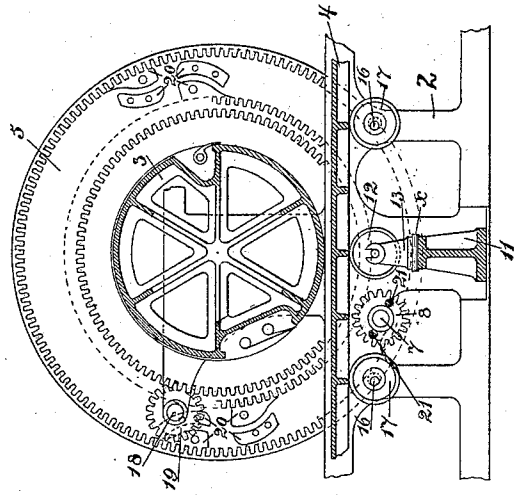


Fig. 1.



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# UNITED STATES PATENT OFFICE.

JOHN T. HAWKINS, OF TAUNTON, MASSACHUSETTS.

## PRINTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 423,153, dated March 11, 1890.

Application filed March 20, 1888. Serial No. 267,797. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN T. HAWKINS, of Taunton, in the county of Bristol and State of Massachusetts, have invented new and useful Improvements in Printing-Machines, which invention is fully set forth and illustrated in the following specification and accompanying drawings.

The object of this invention is to simplify and cheapen sundry parts of a cylinder printing-press having such reversing mechanism as is shown in Patent No. 56,701, issued July 31, 1866.

It is also its object to provide for making changes in the adjustment of the impression by adjusting the bed to the cylinder instead of adjusting the cylinder to the bed, as heretofore done, and to limit the amount of covering to be placed upon the impression-segment of the impression-cylinder to only such as will insure equality of surface velocity between the bed and cylinder in the operation of securing the required pressure between the bed or form and said cylinder to make the impression upon the sheet to be printed.

It is also a further object to avoid certain unmechanical features in the above-mentioned machine, more fully hereinafter explained.

In the patented machine above mentioned it is essential that the relations as to distance between the centers existing between the large segmental gear and the outer reversing-pinion be very accurately maintained, and therefore any vertical adjustment of the impression-cylinder to or from the bed for purposes of varying the impression requires a corresponding movement of said reversing-pinion, and to insure this the construction is as follows: The cylinder-shaft is carried in vertically-adjustable boxes, while the outer end of the reversing-shaft is carried in a hanger connected to one of said sliding boxes by a link, thus maintaining a constant relation between the aforesaid large segmental gear and the outer reversing-pinion. As, however, the bed-rack pinion on the inner end of the reversing-shaft engages a rack (but not shown in said patented drawing) on the under side of the bed whose vertical position is unchangeable, a variation in the vertical position of the outer reversing-pinion affects the parallelism of the reversing-shaft with the bed and interferes with the proper and theoretically correct operation of the inner reversing-pinion and the rack which it engages, and after wear of the parts and consequent considerable lowering of the type-bed and equivalent lowering adjustment of the impression-cylinder to meet it this disturbance becomes considerable and sufficient to interfere with the proper working of the parts.

This invention will first be described in detail, and then particularly set forth in the claims.

In the accompanying drawings, Figure 1 is a longitudinal vertical section of so much of this general form of printing-machine as is necessary to clearly illustrate the same. Fig. 2 shows the machine in end elevation, partly in section. Fig. 3 shows, upon enlarged scale, details of construction hereinafter described.

In said figures the several parts are indicated by reference-numbers, as follows:

1 and 2 indicate the main frames. 3 indicates the impression-cylinder; 4, the type-bed; 5, the large segmental gear; 6, the reversing-pinion which engages the spur-segments of the segmental cylinder-gear; 7, the reversing-shaft, and 8 the bed-rack pinion, both the parts 6 and 8 being secured to the reversing-shaft 7. A rack 9 is attached to the under side of the bed 4, engaging the bed-rack pinion 8. The inner end of the reversing-shaft 7 is journaled in a bracket 10, secured to the main cross-stay 11, and said shaft's outer end is journaled in a fixed position in the frame 2. The force of the impression is received upon four or more rollers 12, immediately under the center line of the impression-cylinder. The rollers 12 are journaled in brackets 13, secured to the upper face of the cross-stay 11, which brackets are vertically adjustable by means of packing inserted between their bases and the upper surface of the cross-stay 11—such as paper or other suitable material—as indicated by the lines marked *x* under the respective brackets 13. The cylinder-shaft 14 is journaled directly in the frames 1 and 2, or in concentric bushes 15, readily changeable when worn, and said shaft has no vertical or other

adjustment. Journaled on studs 16 in the frames 1 and 2 are rollers 17 to receive the weight of the bed when run out from under the cylinder in either direction. A driving-pinion 18 engages the continuous segment of the cylinder-gear 5, through which motion is communicated to the whole mechanism by means of the shaft 19, to which said pinion is secured. The reversing-pinion 6 has secured in it at opposite points and projecting from its face toward the large wheel 5 two pins 21, which are preferably constructed with anti-friction rollers on their projecting ends, and these pins or their rollers engage the curved groove formed by the cams 20, causing reversal of the direction of the reversing-shaft 7 and its alternate engagement of the internal and external spur-segments of the large wheel 5, as is fully described in the patent numbered 56,701, above mentioned. It is obvious that in this construction the vertical adjustment of the rollers 12 need only be made to compensate for the wear of the parts, that when the proper height of the upper surface of the bed is fixed by the adjustment of the rollers 12, so that type-high forms will receive the necessary pressure with the proper amount of covering on the printing-segment of the cylinder, the pressure upon the form can only be varied from its proper limit by too little or too much cylinder-covering. In either of these cases the surface velocity of the cylinder will not coincide with the velocity of the bed. In this construction, therefore, putting the proper amount of covering upon the cylinder gives the proper pressure, or, conversely, obtaining the desired pressure by placing the necessary thickness of covering on the cylinder decides the proper amount of covering to be carried on the cylinder in order to have uniform velocity of bed and cylinder, and these conditions can always be maintained by keeping the brackets 13 and their rollers 12 packed up to compensate for any wear of parts. The outer rollers 17, having merely the weight of the bed to support when run out toward the extremities of its motion, and being preferably slightly lower than the rollers 12, are journaled on eccentric-studs, by means of which their height may be varied, as shown in the several figures of the drawings, but more clearly upon an enlarged scale in Fig. 3.

Having thus fully described my said improvement, I do not claim any part of the above-described mechanism as a means of converting rotary into rectilinear motion or its equivalent, as claimed in the patent above mentioned; but as of my invention I claim—

1. In a cylinder printing-machine, the combination of an impression-cylinder, as 3, running in fixed or non-adjustable bearings, as 15, and a type-bed, as 4, supported upon a series of vertically-adjustable rollers under the line of the impression, whereby the bed is so adjusted to the cylinder that clothing the cylinder with the proper amount of covering to give the necessary pressure will fix the virtual diameter of the printing-segment of said cylinder, thereby insuring equal velocities between said bed and cylinder without vertical adjustment of said cylinder and consequent disturbance of the proper relations of parts connected therewith, substantially as set forth.

2. In a cylinder printing-machine, the combination of the following elements: an impression-cylinder, as 3, journaled in fixed or non-adjustable bearings in the main frames, a type-bed, as 4, supported upon a series of rollers journaled in vertically-adjustable brackets under the line of the impression, a segmental gear-wheel, as 5, secured to the axis of the cylinder and containing an external and internal spur-segment and two sets of suitably-formed cams, as 20, a reversing-shaft, as 7, journaled at its outer end in a fixed bearing in one of the main frames and at its inner end in a suitably-fixed bracket or bearing, as 10, said shaft carrying on its outer end a spur reversing-pinion, as 6, engaging said internal and external spur-segments and carrying pins or rollers, as 21, engaging said cams, and said shaft carrying upon its inner end a pinion, as 8, engaging a rack, as 9, secured to the under side of said type-bed, all combined, arranged, and operating substantially as and for the purposes set forth.

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