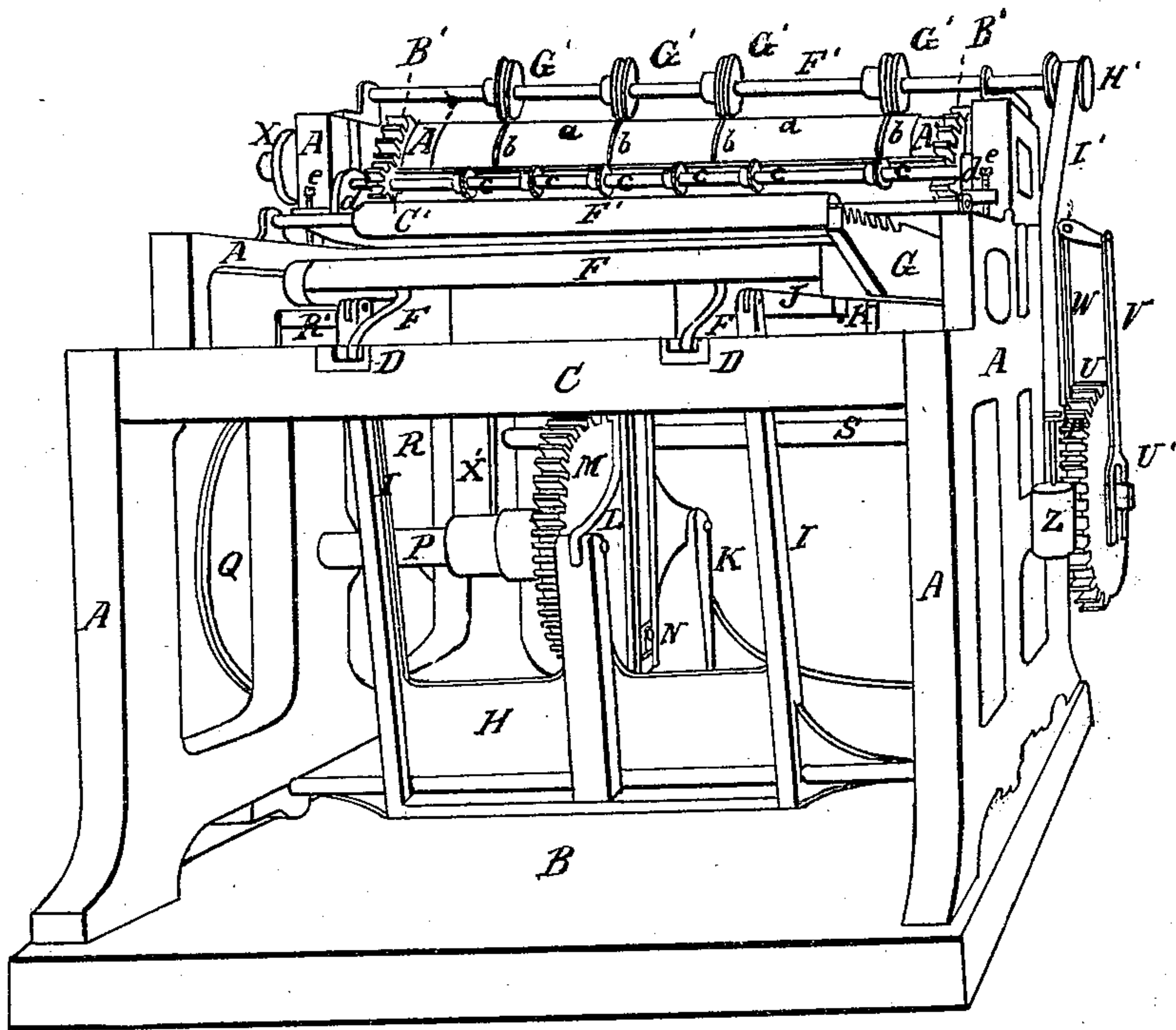


*S. D. Tucker. Sheet 1, 2 Sheets*  
*Printing Press.*  
*N<sup>o</sup> 85,493. Patented Dec. 29, 1868.*

*Fig. 1.*



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No 85,493. Patented Dec. 29, 1868.



Inventor,  
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# UNITED STATES PATENT OFFICE.

STEPHEN D. TUCKER, OF NEW YORK, N. Y.

## IMPROVEMENT IN PRINTING-PRESSES.

Specification forming part of Letters Patent No. 85,493, dated December 29, 1868.

*To all whom it may concern:*

Be it known that I, STEPHEN D. TUCKER, of the city, county, and State of New York, have invented certain new and useful Improvements in Machines for Printing and Numbering Railway Coupon-Tickets and similar articles; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, and the figures and letters of reference thereon.

Figure 1 is a perspective view of the machine; Fig. 2, a side elevation with a portion of the frame broken away to exhibit more plainly the interior parts. Fig. 3 is a rear view of the upper portion of the machine; and Figs. 4 and 5 are views of the mechanism controlling the reverse motions of the impression-cylinder.

Similar letters of reference indicate like parts in the several drawings.

My invention consists, first, in an arrangement and combination of mechanism for operating the type-bed; second, in the construction and arrangement of the impression-cylinder; third, in the combination and arrangement of mechanism for entering and delivering the sheets; fourth, in the combination of the sheet-flier with a reciprocating rotating impression-cylinder; fifth, in the combination of the puncturing-rollers with a reciprocating rotating impression-cylinder; sixth, in the employment of cords for conducting the sheets to and holding them on the impression-cylinder and taking them from the type; seventh, in the combination, with a reciprocating rotating impression-cylinder and type-bed, of the numbering-wheels; eighth, in the combination, with the numbering-wheels, of the inclined planes for operating them; ninth, in operating the numbering mechanism through the medium of the reciprocating type-bed and the inclined planes; tenth, in the combination, with the numbering-wheels, of the springs for forcing the pawls into their respective notches, so as always to insure proper rotation of the wheels, in combination with a reciprocating type-bed.

To enable others skilled in the art to make and use my invention, I will describe its construction and operation.

The several parts constituting the frame of

the machine consist of the base B, side frames A A, and end bars C C. These, firmly united together, form the supports and bearings for the various mechanisms.

To the end bars C C are secured at each end two bars, D D, grooved to receive the guide-pieces F F secured to the under side of the type-bed E.

The reciprocating movement of the type-bed E is effected by means of the rocking levers H H, having bearings in the lower part of the side frames, the arms I I of these levers connected with the bed by the rods J J pivoted to them and to the under side of the bed at K, and the gear M and wrist-pin N, working in the slot in the yoke L, which is pivoted to the levers H H.

The driving-shaft S is provided with bearings in the side frames A. On its ends is secured the pinion T, which meshes with the gear U and the fly-wheel R or pulley, by which motion is imparted to the machine. On this shaft, near its center, is secured a pinion, O, which transmits motion to the gear M. The shaft of this gear has its bearings in the hanger X', bolted to the under side of the left guide-bar D, and in the center standard of the side frame. This shaft also gives motion to the cam Q that is secured to its outer end. The form of this cam Q is represented in Fig. 4. Its office is to operate and control the lever Y pivoted to the side frame A.

The gear U is constructed with cam-grooves U' U' on both faces, in which the rollers of the forked arms V W work. Through their medium motion is transmitted from the driving-shaft to the shafts J' K', which operate respectively the feeding-table and sheet-flier.

The rack G, secured to the side of the bed E, communicates motion to the segment-gear B' on the right-hand end of the impression-cylinder, and also, by means of said cylinder, operates the puncturing-wheels c c c through the agency of the gear on the other end of the cylinder and the pinion C' on the shaft D'.

The puncturing-wheels are held in place on the shaft D' by set-screws, and are arranged to be adjusted at any required distance apart in order to agree with the different divisions of the ticket to be printed, between which the punctures are to be made.

The bearings d of the shaft D' are pivoted



to the inner side of the frames, and are provided with adjusting-screws *e e*, by which the puncturing-wheels can be adjusted at any required distance from the impression-cylinder. The ends of these screws are held against the part of the side frames immediately beneath them by the springs which are secured to the inner side of each frame, and press against the upper part of the bearings, as shown in Fig. 1.

On the longer end of the cylinder-journal is secured a wheel, X, provided with two teeth, *l l*, which engage with the forked end *m* of the lever Y. By these parts the reverse motions of the impression-cylinder are controlled, and the cylinder made to change its position in relation to the bed E once for each entire movement of the bed, either backward or forward.

The teeth on the gear B', which engages with the rack G, are cut away on a portion of the circumference to permit the rack, at the proper intervals, to slide beneath the gear without giving motion to it.

The numbering mechanism O' is constructed of a series of wheels, with the numerals on their face, and operated by the pawls *i i*, the same as is now in general use in numbering-machines. This mechanism is secured to a plate, N', attached to the rear end of the type-bed.

Although but one series of numbering-wheels is shown in the drawings as attached to the machine, it is necessary, for the proper working of the machine, that there should be as many series of wheels secured to the plate N' as there are coupons or tickets to be numbered.

The plate N' is designed to be detachable from the machine, to facilitate the operation of changing the mechanism for different sizes of coupons or tickets to be numbered, several plates being arranged, with different numbers of series of wheels secured to each, so that one plate can be removed and another attached in its place with facility.

The numbering-wheels are operated by the rod P', that is held in slotted bearings T' T' on the sides of the type-bed. The ends of this rod are provided with rollers S' S', which work on the inclined planes R R secured to the inside of the frames A.

At each backward movement of the type-bed the numbering-wheels are rotated immediately after the impression has been given, and before they reach the inking-roller F', by the action of the inclined planes R' R', which raise the rod P', on which the ends of the pawls *i i i* rest.

On the end bar C, at the rear of the machine, is secured a plate, Q', holding a series of springs, *h h h*. They are placed in line with the numbering-wheels, and are employed to insure the pawls being forced into their respective notches in the wheels.

On the shaft E', that is held in bearings on the top of the frame, is arranged a series of

cord-pulleys, G' G' G', to which one end of each of the cords *b b b* is secured, while the other ends are attached to adjustable eyes sliding in a groove in the impression-cylinder, and held in place by clamping-screws. These cords are kept taut by the weight Z attached to the end of the band I'. They perform the offices of conducting in the sheet to receive the impression, holding it securely in place on the cylinder, and drawing it off the form and delivering it to the sheet-flier.

The feeding-table is provided with a gage-plate, K, adjusted by means of two set-screws, and it is so moved by the shaft J that it approaches the cylinder at the proper time to introduce the sheet to the cords, and then recedes to allow the sheet-flier to receive the sheet from the cylinder.

By the employment of the mechanism above described, that imparts motion to the impression-cylinder, the cylinder is caused to change its position with reference to the type-bed, so that the sheet on the cylinder to be printed shall be brought in contact with the form of type when the cylinder and bed are moving in one direction, but shall escape the form and receive the impression from the numbering-wheels when moving in the opposite direction.

The inking apparatus for inking the form and numbering-wheels being similar to the devices in general use in printing-machines, no explanation of the same is necessary.

The operations of the different mechanisms constituting the machine will be as follows: On motion being given to the fly-wheel R in the direction of the arrow shown in Fig. 2 of the drawings, the pinion on the center of the driving-shaft will operate the gear M, and a forward movement of the bed upon which the form of type has been previously laid will take place. At the same time, the rack G of the type-bed, engaging with the segment gear of the impression-cylinder, will communicate a rotary movement to it. When the cylinder has arrived at its proper position to receive the sheet the feeding-table L', upon which the sheet is laid, is moved forward in the arc of a circle through the medium of the pinion on the end of the driving-shaft, and the gear engaging with it that operates the cams U' U' and their followers, and the sheet is introduced to the cylinder, being caught and held against it by the cords. As the motions of the type-bed and cylinder are continued, the form of type is carried from under the inking apparatus F' and brought in contact with the sheet on the cylinder, to which the impression is then given. By the use of the segment gear on the impression-cylinder the rack then becomes disengaged from it, and the type-bed is drawn back for a short distance, while the cylinder remains stationary. As the rack is disengaged from the segment-gear one of the teeth of the wheel X is caught by the end *m* of the lever Y, and the cylinder is then held at rest until the bed moves back far enough to prevent the form from again coming in contact with the



sheet when the motion of the cylinder is reversed, and also to bring the numbering mechanism attached to the type-bed in proper position to imprint the numbers in the spaces left on the sheet to receive them. The cam Q then causes the lever Y to turn the cylinder back sufficiently to cause the segment gear to again engage with the rack, and the impression-cylinder is revolved in the opposite direction by the continued back motion of the type-bed. The numbers are then impressed on the sheet. The sheet is then carried by the further motion of the cylinder into position to be received by the sheet-flier. Immediately after the impression from the numbers has been given, and before they approach the inking apparatus, the inclined planes R' R' act upon the rod P', and cause it to operate the pawls of the numbering-wheels.

As the type-bed ceases its backward motion, preparatory to being again moved forward, the lever y repeats its movements, to hold the cylinder at rest and throw the segment-gear in contact with the rack, so that the type-bed resumes its former position in relation to the impression-cylinder before the form of type is brought in contact with the sheet.

The feeding-table is so operated that a second sheet is fed into the cylinder as it commences to revolve toward the form of type, and immediately after the first sheet has been taken by the sheet-flier.

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

1. The wrist-pin N, slotted yoke L, rocking levers H H, arms I I, and rods J J, for operating the type-bed, substantially as described and specified.

2. Giving the impression-cylinder a reciprocating rotating movement, in co-operative relation with the type-bed, so that the sheet to be printed shall come in contact with the form of type while the cylinder and bed are traveling in one direction, and escape the

form and come in contact with the numbering-wheels when traveling in the reverse direction, substantially as described and specified.

3. The feeding-table, so constructed and operated that it shall approach to enter the sheet between the cords and the cylinder and recede to allow the sheet to be delivered to the sheet-flier, in combination with a reciprocating rotating cylinder and type-bed, substantially as described and specified.

4. The combination of the sheet-flier, constructed and operated substantially as described, with a reciprocating rotating impression-cylinder, as described and specified.

5. The combination of the puncturing-rollers c c with a reciprocating rotating impression-cylinder, substantially as described and specified.

6. The arrangement of cords b b b, pulleys G G G, and weight Z, for conducting the sheets to and holding them against the cylinder and taking them from the form of type, substantially as described and specified.

7. The combination, with a reciprocating rotating impression-cylinder and reciprocating type-bed, of the numbering-wheels, substantially as described and specified.

8. The combination, with the numbering-wheels, of the rod P' and inclined planes R' R', substantially as described and specified.

9. Operating the numbering-wheels by the reciprocating movements of the type-bed and the inclined planes, substantially as described and specified.

10. The combination, with the numbering-wheels and reciprocating type-bed, of the springs h h h, for forcing the pawls i i i into their respective notches, so as always to insure perfect rotation of the numbering-wheels, substantially as described and specified.

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