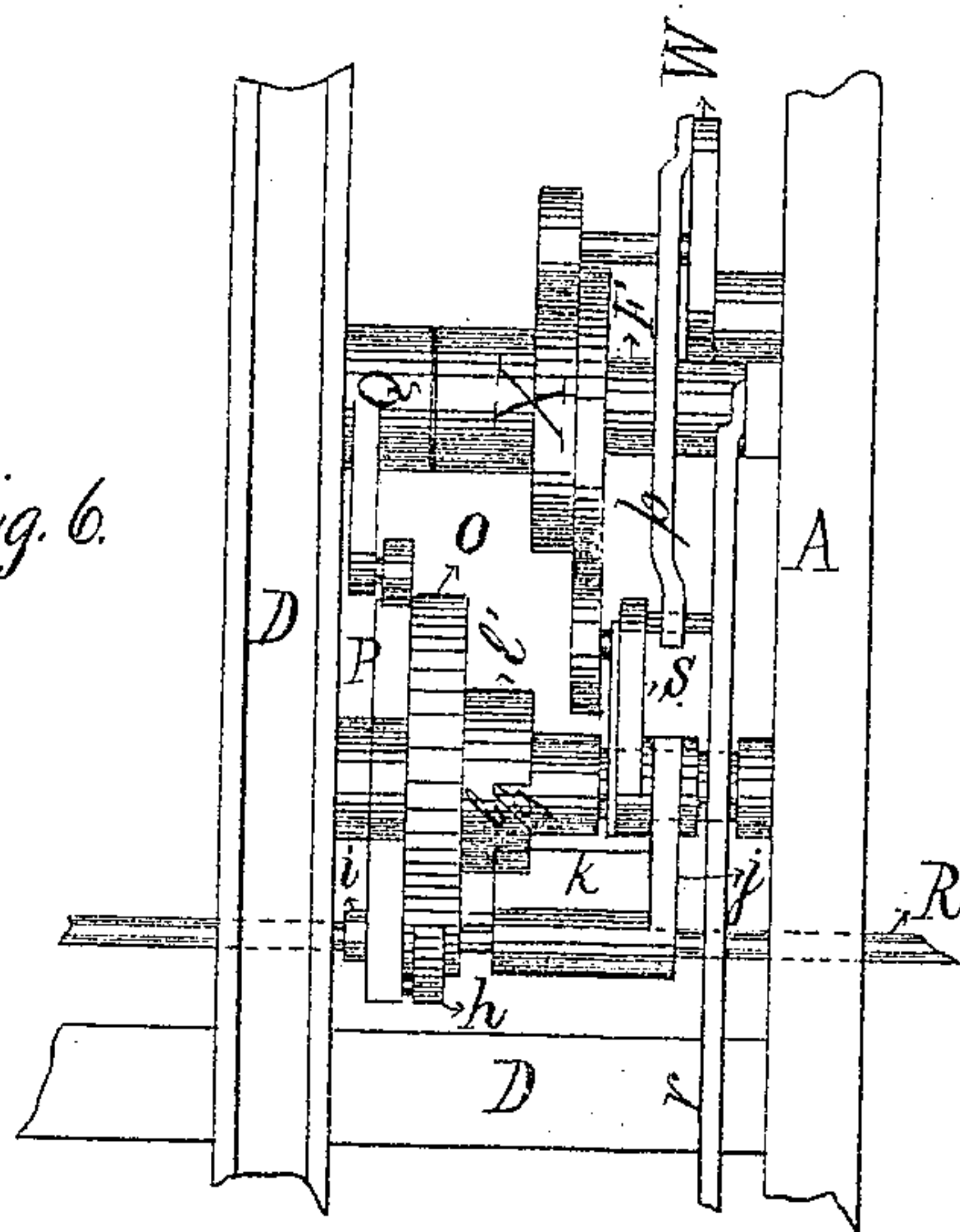
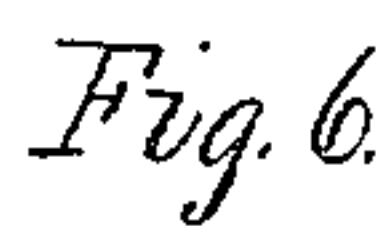
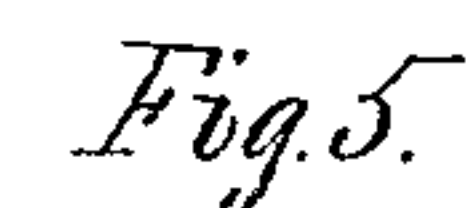


Patented June 2, 1874.



*Inventor:*

Charles Montagne





# UNITED STATES PATENT OFFICE.

CHARLES MONTAGUE, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO CYRIL C. CHILD, OF SAME PLACE.

## IMPROVEMENT IN ROTARY PRINTING-PRESSES.

Specification forming part of Letters Patent No. **151,501**, dated June 2, 1874; application filed March 19, 1873.

*To all whom it may concern:*

Be it known that I, CHARLES MONTAGUE, of Boston, Massachusetts, have invented certain Improvements in Printing-Presses, of which the following is a specification:

The nature and object of my invention consist of certain improvements in printing-presses, whereby improved operation, convenience, and durability are obtained.

The first part relates to a device for automatically suspending the impression of a cylinder-press. The second part relates to a device for automatically controlling the motion of the fly.

Figure I is a side elevation of my printing-press, showing my inventions. Fig. II is a plan view with bed and cylinder removed. Fig. III is a vertical section on line *z z*, Fig. II. Fig. IV is an elevation of ratchet-wheel. Fig. V is a vertical section, showing the fly from inside of press on line *z z*, Fig. II. Fig. VI is an enlarged plan view of a portion of Fig. II.

A is the frame. D are the ways, on which is a track or groove, in which the bed B is reciprocated back and forth under impression-cylinder C. E is a support for main shaft F. On the inner end of shaft is gear I, which is revolved by a pinion-gear on a shaft parallel to main shaft, on which is a balance-wheel with handle. On the main shaft, outside the frame of press, is fastened mechanism for conveying to and giving a motion to the impression-cylinder C that shall cause it to revolve in unison with the bed while an impression is being taken. At the bottom of support E is pin G, on which lever H is vibrated back and forth through crank-pin J, communicating a reciprocating motion to bed, to which it is attached by a sliding bar, *s*. Vibrating lever H is chambered to admit between its parallel sides three friction-rolls. One rolls on and is operated by crank-pin J, while rolls *b* and *b'* are held in frame K by bearings for their journals; or one or both may roll on shafts passing through them and resting in bearings of frame K, the bearing of one having a good working fit, while those for the

other are elongated to provide means of adjustment through set-screws.

Frame K may be in one or two pieces, and of any shape that does not interfere with the operation of the rolls and holds them in their relative positions.

Pivoted on a stud, at the rear center of ways D, is a shackle-bar, U, from the ends of which extend rods *r* and *r'*, connecting the shackle-bar with the lower ends of the arms Y, which support cylinder C, while the connecting-rod *r* on the balance-wheel side of the press also connects the shackle-bar with a lever, S. Levers W and S, also connected together at one end by a rod, *p*, are hung on studs attached to frame A in such positions that they can be operated on by a cam, X, on main shaft F, the cam operating on the levers alternately, and through them and their connections imparting a vibratory movement to shackle-bar U, and the lower ends of the supporting-arms of the cylinder C. In the frame A are cam-slots *t*, in which the arms of cylinder C rest, and of such form that, when vibratory motion is imparted to the lower ends of the cylinder-arms through the shackle-bar U, levers W and S, and the connecting-rods, a small amount of vertical motion is imparted to the cylinder C, which is depressed during the period of the movement of the bed necessary for giving the impression in the process of printing, and elevated during the remainder of its movement to permit the return of the bed, after an impression has been made, without bringing the form of type in contact with the surface of the cylinder.

Lever S and its stud are so constructed that the lever can be moved laterally out of the path of its operating-cam X on main shaft F, and the vertical movement of the cylinder thereby suspended. This mechanism constitutes in itself no part of this invention, but is shown and described in connection with the device for automatically suspending the impression.

O is a ratchet-wheel, revolving on a shaft or stud parallel with the main shaft P, and on nearly the same horizontal line, which has



thirty-six teeth; but a different number may be used. On one side is a round projecting surface, on the edge of which, at equal distances apart, are three notches or short cams,  $g\ g'\ g''$ , with the three spaces between the notches,  $l\ l'\ l''$ . Loose on the same shaft is a lever, P, at one end of which is a pawl,  $h$ , so located as to engage with a tooth in ratchet-wheel O, and the other end of lever P is in the path of revolution of arm Q on the main shaft F, during the revolution of which the lever P is made to operate so as to produce a partial revolution of ratchet-wheel O. The lever P is balanced, so that after it has been operated by arm Q, it returns to its original position, which is determined by the adjustable stop  $i$ , connected with lever P, the stop  $i$  arresting the negative motion of lever P by coming in contact with rod R, on which it rests. Stop  $i$  is provided with a series of holes, by which it may be fastened to lever P in such position that, in the return of the lever after its operation, pawl  $h$  will engage with ratchet-wheel O at such position that the ratchet-wheel will be revolved through the space of two, three, four, or six teeth, according to the adjustment of the stop  $i$ . On rod R is a forked arm,  $j$ , the forked end of which straddles sliding lever S, which operates in connection with the shackle-bar U, and other mechanism, hereinbefore described, to raise or depress the cylinder for the purpose of making an impression, said lever being so hung on its stud that it may be moved out of line of its operating-cam, and its operation thereby prevented. On arm  $j$  is a projection,  $k$ , of such form that it will fit into the notches  $g\ g'\ g''$ , and the projection  $k$  is so located as to be admitted into said notches or pressed against the annular spaces  $l\ l'\ l''$  between them, a spring,  $v$ , connected with rod R operating to provide a constant pressure of arm  $j$  toward the ratchet-wheel O and cams  $g\ g'\ g''$ . Arm  $j$ , instead of being connected with rod R, may be supported on a stud similarly located, on which it would have a sliding movement; or it may be dispensed with, and a projection similar to  $k$  be attached to lever S, and operated on directly by ratchet-wheel O.

The operation of this mechanism is as follows: Arm Q on main shaft F operates the lever P, and the pawl  $h$ , engaging with a tooth on ratchet-wheel O, causes its partial revolution. Assuming the projection  $k$  on arm  $j$  to be admitted in one of the notches  $g\ g'\ g''$ , the partial revolution of lever P forces the projection out of the notch in which it rests, and leaves it resting against one of the spaces  $l\ l'\ l''$ , the operation also projecting sliding lever S out of line of its operating-cam, whereby the operation of the mechanism for depressing the cylinder to make an impression is suspended, while the other parts of the press continue their operation. The next revolution of arm

Q on main shaft F operates lever P, and ratchet-wheel O causes projection  $k$  to enter another notch,  $g\ g'\ g''$ , and permits the lever S to return to a position in line with its operating-cam, whereby at the proper time the cylinder is depressed by its proper mechanism to produce an impression. The adjustment of stop  $i$  in the series of holes in the lever P arrests the return of said lever, after its operation, at such position that a variable amount of rotation is given to ratchet-wheel O, and when so adjusted, the projection  $k$  retains lever S out of line of its operating-cam during the space of two, three, or five completed revolutions of main shaft F, causing the operation of the impressional function of the press one-half, one-third, one-fourth, or one-sixth of the time, and affording inversely the same proportion of extra rolling of the form of type.

The mechanism for operating the vertical motion of the cylinder to produce an impression is not a part of this invention, the mechanism described in connection with this device being that embodied in the application of Montague, Child, and Paine, filed March 19, 1873, and this device may be adapted to operate on any mechanism for the purpose described.

T is a standard with a toe-piece, and is attached at its lower extremity to the frame of the press by a pin, on which it can oscillate. At the top of the standard is attached a latch,  $m$ , which engages with the shackle-bar U on the balance-wheel side of the press, and is operated by shackle-bar U to project the top of the standard in the direction of the fly whenever the shackle-bar operates. To latch  $m$  is attached rod  $m'$ , on which a spiral spring operates to press the latch constantly against the under side of shackle-bar U. Rod  $m'$  is kept in parallel position to standard T by the projecting lip  $m''$ , and is of sufficient length to bring it in contact with a toe,  $m'''$ , which projects from the bottom of the fly whenever the standard T is forced toward the fly, and the latter operates. In the practical operation of these parts, the shackle-bar U, in its motion to depress the cylinder, engages with latch  $m$  after the impression has been completed. Shackle-bar U operates to raise the cylinder, and forces latch  $m$  and standard T toward the fly, thereby so moving the toe-piece as to prevent its being an obstruction to the operation of the piece  $m'''$  and the fly, which, at the proper time, delivers the sheet. As the fly operates, the toe-piece  $m'''$  comes in contact with rod  $m'$ , and disengages the latch from shackle-bar U, and a spring,  $n$ , causes the standard to return to its original position, awaiting another motion of shackle-bar U. As the fly returns, the toe-piece  $m'''$  moves the toe-piece of the standard sufficiently to pass it, and is then obstructed from another operation until shackle-bar U has operated the standard, as before stated.



Whenever the impression is suspended in operating the press, the sheet previously printed is in process of delivery at the time of suspending the impression, and any mechanism which arrested the operation of the fly at that time would fail to deliver the sheet last printed. This device, obtaining its operation entirely from the movement which raises the cylinder after an impression has been made, secures the operation of the fly only when a sheet is presumably presented for delivery.

The operation of the device hereinbefore explained is as follows: Motion imparted to the balance-wheel is communicated by a pinion-gear on its shaft to crank-gear I, which, through crank-pin J, operates a lever, H, the lever being chambered to admit said crank-pin, and the space in the chamber being filled by three friction-rolls, the largest of which revolves on the crank-pin, and is in contact with one side of the chamber, while the other two rolls, connected together by a frame, K, are in contact with the other side of said chamber, and also with the large roll. The operation of the crank-pin in the chamber of lever H imparts to the lever a rocking motion, and to the bed a reciprocating rectilinear motion of unequal speed.

On the outside end of the main shaft is fastened a disk, L, and loose on the same shaft is a gear, M, said disk and gear being connected together by two links, which are pivoted to the gear and disk and to each other, while the pin *e*, which connects the two links, also passes through an open space in gear M, and enters a groove, *f*, in the plate N, which groove serves as a guide or cam, by which, in the rotation of disk L with the main shaft, the points at which said links are pivoted to the disk and gear M are made to approach or recede from each other during the rotation of each, and the rotary motion of gear M is thereby made unequal in speed, while that of disk L is equal. By means of suitable gearing, the variable speed of rotation of gear M is imparted to the cylinder, providing a rotary motion at varying speed, which corresponds with the irregular speed of the bed. On the main shaft is fastened a cam, X, which operates on a lever, S, and, through suitable connections, to impart to the arms which support the cylinder a small amount of motion, said arms being supported in cam-slots in the frame, by which the cylinder is depressed at the proper time to receive an impression, after the completion of which said cam also operates, through the same connections, to return said arms and cylinder to the original position, and raise it beyond possibility of contact with the bed on its return movement. The lever S, through which the cylinder is depressed, as described, is pivoted on a stud attached to the frame, on which it is also laterally movable, and may be moved out of the path of cam X on the main shaft, in which case the depression of the cylinder

and the impressional function of the press will be suspended until the return of said lever to its former position. On a stud connected with the frame is a ratchet-wheel, O, containing thirty-six teeth, and operated by a lever pivoted on the same stud, the pawl of which engages with the teeth of the ratchet-wheel, the lever being operated by a crank, Q, fastened to the main shaft. On one side of ratchet-wheel O is an annular flange, in which are notches, and in which notches, or against the surface of the flange between them, a projection, K, on arm *j*, attached to rod R, is pressed, rod R being also connected by the same arm to lever S. In the intermittent rotation of the ratchet-wheel the projection *k* on arm *j* is admitted in one of the notches on ratchet-wheel O, and the lever S thereby assumes such lateral position as to be operated on by cam X, and through the connections the cylinder is depressed and an impression made. The next operation of the main shaft causes a partial rotation of ratchet-wheel O, and the projection *k* of arm *j* is forced out of the notch, and is left resting against the annular flange, while, through its connection with rod R and lever S, the lever is forced laterally out of the path of the cam, and the operation of the impression thereby suspended. A stop connected with the lever which operates the ratchet-wheel O is so adjustable that the ratchet-wheel may receive more or less rotation, the adjustments being so calculated that the impression may be suspended automatically, as described, so as to permit an impression one-half, one-third, one-fourth, or one-sixth of the time, the operation of rolling the form being increased inversely in the same proportion.

The operation of the grippers and rolling the form may be accomplished by any well-known mechanism.

After the impression has been made, the sheet is carried by tapes to the fly, which, at the proper time, operates to deliver it upon a stand behind the press. In connection with the fly is a standard, T, pivoted at its lower end on a stud, and having a toe-piece, which meets a toe-piece, *m'''*, on the fly when the latter is in position to receive a sheet, and operates to retain the fly when the impression is discontinued. At the upper end of the standard a latch, *m*, projects inward, and engages with shackle-bar U, the operation of which, in lowering the cylinder to the impression, causes the motion of the standard, and forces its toe-piece out of the position in which the operation of the fly is prevented. At the proper time the fly operates, when the toe-piece of the fly releases latch *m*, and allows the return of the standard to its original position, awaiting another motion of the shackle-bar U. But if the impression is suspended, either by the automatic device just described, or by hand, the operation of shackle-bar U is suspended at the time when the standard T and its toe-piece

have been moved to allow an operation of the fly, which delivers the sheet last printed, but suspends the operation of the fly thereafter until another impression has been taken.

Having fully set forth and described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. Ratchet-wheel O, having annular flanges  $l$   $l'$   $l''$  and notches  $g$   $g'$   $g''$ , and lever P, pawl  $h$ , and projection K, in combination with lever S and spring  $v$ , for automatically suspending the impression, substantially as described.

2. For arresting the operation of the fly, standard T, latch  $m$ , rod  $m'$ , and spring, lip  $m''$ , toe-piece  $m'''$ , and spring  $n$ , in combination with shackle-bar U, substantially as described.

Boston, November 11, 1873.

CHARLES MONTAGUE.

Witnesses:

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