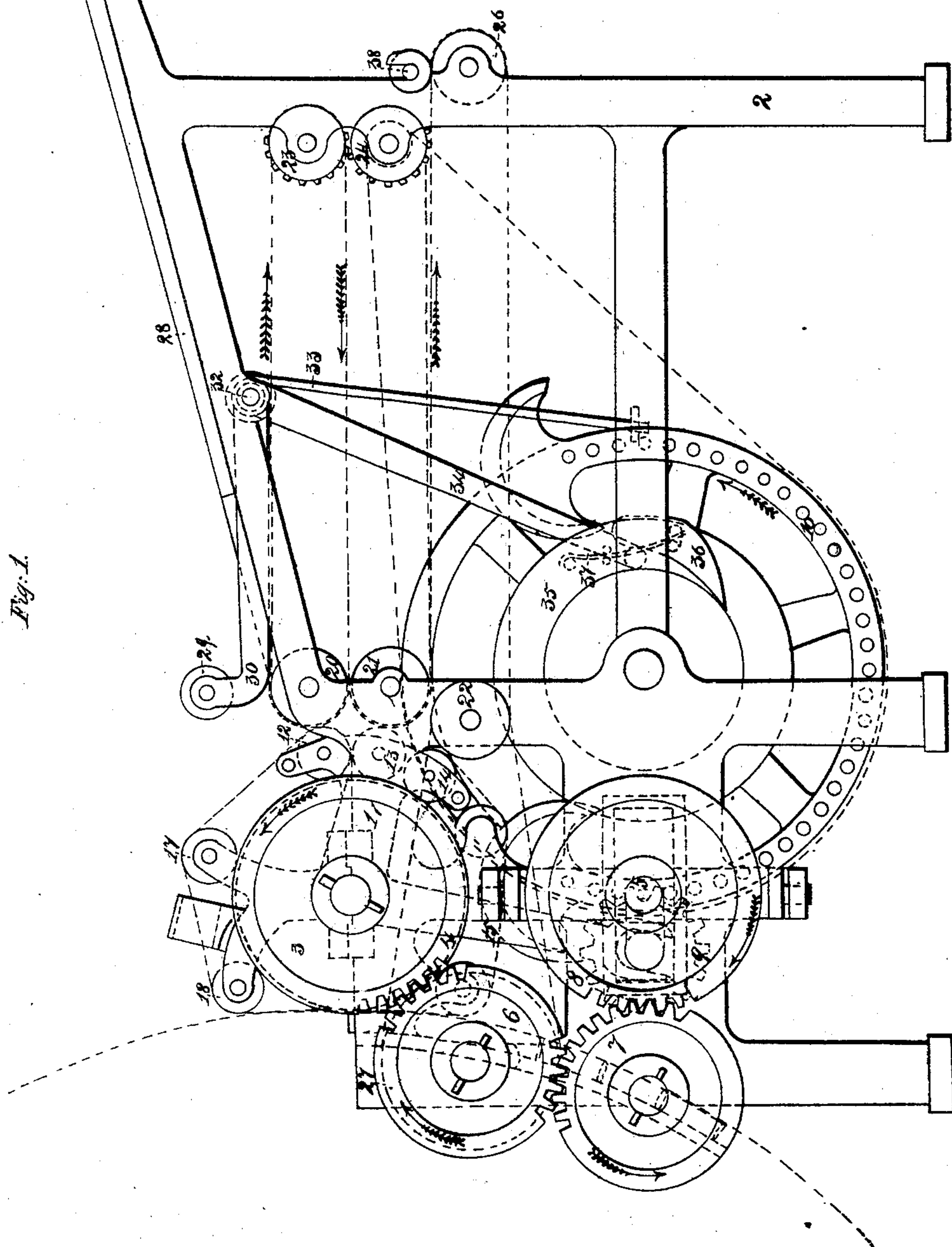


*R. M. Hoe* Sheet 1. 3 Sheets  
*Printing Press*

*N<sup>o</sup> 24875.*

*Patented Jul. 26. 1859.*

*Fig. 1.*

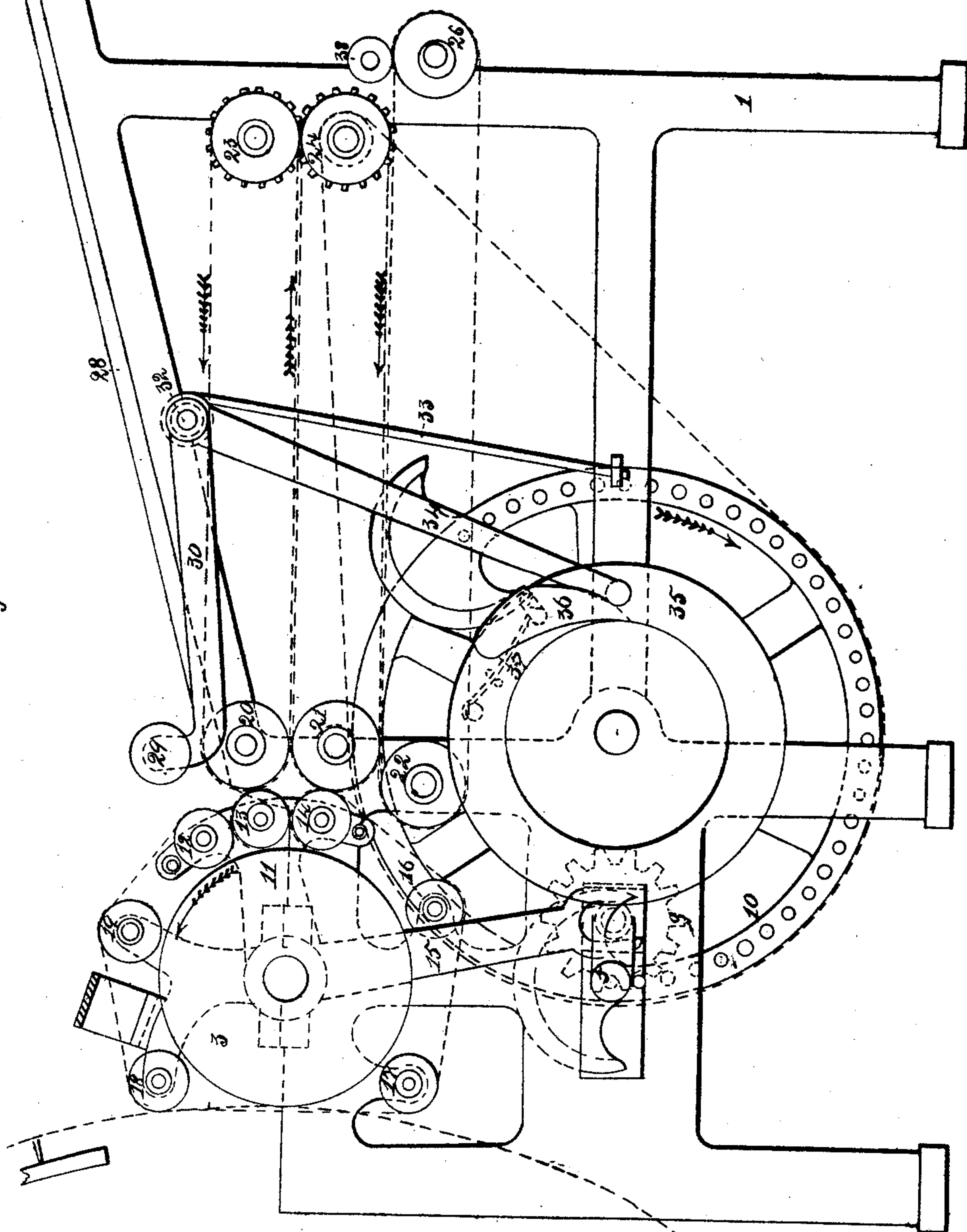




*R. M. Hoe Sheet 3. of 3 Sheets*  
*Printing Press*  
*Patented Jul. 26. 1859.*

*Nº 24875.*

*Fig. 3.*





# UNITED STATES PATENT OFFICE.

RICHARD M. HOE, OF NEW YORK, N. Y.

## PRINTING-MACHINE.

Specification of Letters Patent No. 24,875, dated July 26, 1859.

*To all whom it may concern:*

Be it known that I, RICHARD M. HOE, of New York, in the county of New York, the State of New York, have invented a new and useful Improvement in Printing-Machines for Printing Both Sides of the Paper Before it Leaves the Machine; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

The drawings represent the invention as attached to a type revolving or rotary printing machine.

Figure 1 is a side elevation of the improvement, Fig. 2 is an end elevation and Fig. 3 is a longitudinal section of the same.

The same figures refer to similar parts in all the drawings.

1 and 2 are two side frames upon which is mounted the impression cylinder 3 of a type revolving printing machine, 4 is a toothed wheel fixed on one end of the shaft of this cylinder, and drives the vibrating shaft 5 by means of the intermediate wheels 6 and 7 and the wheel 8. This latter wheel is fixed on one end of the shaft 5 and is of the same size as the driving wheel 4, so that the cylinder 3 and the vibrating shaft 5 revolve simultaneously and in equal periods of time. On the opposite end of this vibrating shaft is fixed a pinion 9 of one half the diameter of the cylinder 3 and of course runs at one half its velocity. This pinion gears into and drives the mangle wheel 10 with a backward and forward motion.

A swinging frame 11 is fixed loosely around the shaft of the cylinder 3, between the ends of the cylinder and the side frames, and in this frame are three tape rollers 12, 13 and 14. The frame and rollers it contains are made to rise and fall at certain times by means of the arm 15 which is part of the frame. The lower end of this arm spans the vibrating shaft 5 near the pinion 9 and as the shaft vibrates, as the pinion changes from the inside to the outside of the mangle wheel 10, it carries the arm and swinging frame 11 with it and thus causes the rollers 12, 13 and 14 to fall about their own diameter (see Fig. 1), and as the mangle wheel arrives at the end of its course, the pinion 9 changes from the outside to the inside, and the frame and rollers rise to their original position (see Fig. 3).

Two sets of endless tapes are connected to

the cylinder 3, one set lying directly on the other. Both sets enter between the rollers 12 and 13 pass around the cylinder and out again between the rollers 13 and 14, the inner set passing around the roller 13 up to the place of starting while the outer set turn down around the rollers 16 and 17 and up between the cylinder and form (shown in Figs. 1 and 2, and then over the rollers 18 and 19 to the place of starting also. The object of these tapes is to conduct the sheet of paper in between the rollers 12 and 13, around the cylinder 3 and out again between the rollers 13 and 14. Directly behind these rollers are three other tape rollers 20, 21, and 22. They are a little larger than the rollers 12, 13 and 14 and their size and position is such that a radial line from the cylinder 3 passing between the rollers 12 and 13 will pass over the roller 20 (see Fig. 3) and a similar line passing between the rollers 13 and 14 will likewise pass between the rollers 20 and 21.

A series of endless tapes pass around the rollers 20 and 23 and a similar series around the rollers 21 and 24, and the motions of the two series are made to coincide by the two rollers 23 and 24 being geared together and the whole driven by a band from the mangle wheel 10 running over a pulley 25 on the outer end of the shaft of the roller 24. This roller is twice the diameter of the pulley 25 and of course will move with twice its velocity, but as the mangle wheel 10 moves with only half the speed of the periphery of the cylinder 3, it follows that the velocity of the rollers 20, 21, 23 and 24 and their series of endless tapes is identical with that of the periphery of the cylinder 3, and also that they have a backward and forward motion corresponding to that of the mangle wheel 10 by which they are driven.

Another series of endless tapes pass around the rollers 22 and 26, but these always run in the direction of the arrow, with the same velocity as the cylinder 3, and are driven by a band from a pulley 27, fixed to the intermediate wheel 6, to a smaller pulley on the outer end of the shaft of the roller 22. An inclined feed board 28 is placed just behind the upper tape roller 20 about level with it.

A drop roller 29 runs in two arms 30 and 31 fixed to the shaft 32, and drops at the proper time on the tape roller 20, and pinches the sheet of paper that is placed



between them. This drop roller is held up by means of a spring 33 coiled around the shaft 32, and attached to the side frame 2. It is drawn down at the proper time by an arm 34 fixed on the shaft 32, extending downward and having a projecting pin on one side at the lower end.

A disk 35 is fixed on the shaft of the mangle wheel 10 and has on one of its sides a small curved inclined plane 36 that turns on a pivot at one end, while the point merely rests on a projecting shoulder on the disk. The machine plane is held in this position by a pin that projects from its inner side through a slot in the disk far enough to allow a spring 37 on the opposite side to pass on it. When the mangle wheel commences to run in the direction of the arrow the pin on the side of the arm 34 runs up the inclined plane (see Fig. 3) (thus draws down the drop roller on the paper) passes over it and by the action of the coiled spring 33, falls back to its original position.

When the mangle wheel and disk run in the opposite direction, the pin on the arm runs under the inclined plane (see Fig. 1) lifts it and runs past. Thus it will be seen that it is only when the disk is turning in the direction of the arrow that it operates on the drop roller 29 (see Fig. 3). Now if a sheet of paper be placed in position on the feed board 28, with its front edge under the drop roller 29, and the impression cylinder 3 be turned in the direction of the arrow, then as soon as the pinion 9 has changed from the outside to the inside of the mangle wheel 10, (see Fig. 3) and thus drives it in the direction of the arrow and at the same time by the vibration of its shaft 5 raised the swinging frame 11 and tape rollers 12, 13 and 14 to their highest position, the inclined plane 36 will run under the pin in the arm 34 and cause the drop roller to fall and pinch the sheet of paper between itself and the tape roller 20. As this roller is driven by the mangle wheel it runs at the present time toward the cylinder and thus the sheet is carried in between the tape rollers 12 and 13 and consequently between the two sets of endless tapes already described that pass around the cylinder 3. These tapes conduct the paper onto the cylinder, and so around in contact with the form of types for printing the first side of the sheet (shown in Fig. 3). It then issues with the tapes from between the rollers 13 and 14 and enters directly between the rollers 20 and 21 into their series of endless tapes, which are yet running in the right direction and are in a proper position to receive it. But by the time the back end of the sheet has entered between the rollers 20 and 21, the pinion 9 having arrived at the end of its course, changes from the inside to the outside of the mangle wheel

10, which reverses the motion of this latter, as also of the rollers 20, 21, 23 and 24 and their series of endless tapes, which of course commences giving the sheet a retrograde motion toward the cylinder 3, at the same time the vibration of the shaft 5 has caused the swinging frame 11 and the three rollers 12, 13 and 14 it contains, to drop (see Fig. 1) so that the sheet of paper as it issues from between the rollers 20 and 21, enters again between the rollers 12 and 13 and consequently between the two sets of endless tapes that pass around the cylinder 3. It will now be seen that the sheet of paper is entering between the same rollers 12 and 13, as when first taken from the feed board, but by having passed around with the impression cylinder 3 it has become turned over, so that as the cylinder continues to revolve the second or unprinted side of the sheet of paper must now be brought in contact with the form of types for printing the second side, and it again issues from between the rollers 13 and 14. But as the swinging frame 11 is now in its lowest position, the sheet instead of entering between the rollers 20 and 21 as before, now enters between the rollers 21 and 22 which are directly in front of it and running in the right direction to receive it.

When the front end of the paper arrives at the roller 26 (which always runs in that direction) it is caught between it and the small roller 38 and is conducted off to be flown. In the mean time another sheet has been placed in position on the feed board, and as the pinion 9 has again arrived at the end of its course, it changes from the outside to the inside of the mangle wheel and thus again reverses the motion of the rollers 20, 21, 23 and 24 and their series of endless tapes. At the same time the vibrating shaft 5 has raised the swinging frame 11 and the rollers 12, 13 and 14 it contains, to their original position (see Fig. 3) the drop roller 29 descends and the sheet enters between the rollers 12 and 13 as before.

Of course it is perfectly immaterial to the working of this improvement whether the first and second sides of the sheet of paper be printed from the same or different forms of type.

I claim—

Stopping the sheet of paper as it issues after its first side is printed and imparting to it a retrograde motion, thus returning it backward or in reverse order to the impression cylinder for the purpose of printing the second side by the means, substantially as above described.

RICH'D. M. HOE.

Witnesses:

ANDREW DELACY,  
GEO. D. SARGEANT.