

(No Model.)

2 Sheets—Sheet 1.

H. LEE.
PLATE PRINTING MACHINE.

No. 479,516.

Patented July 26, 1892.

FIG. 1.

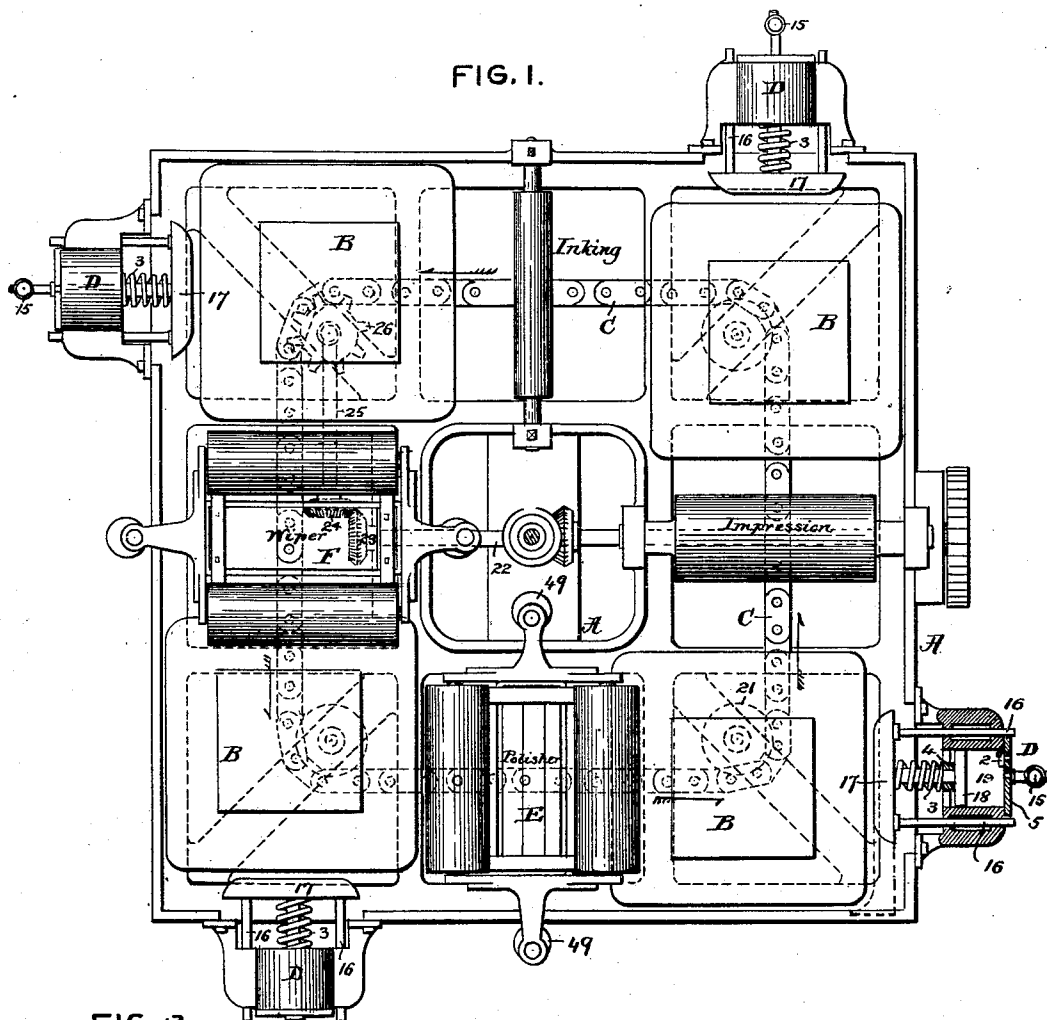


FIG. 2.

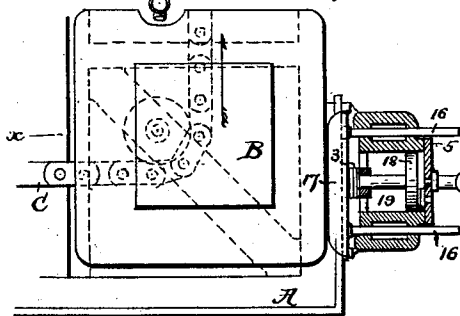
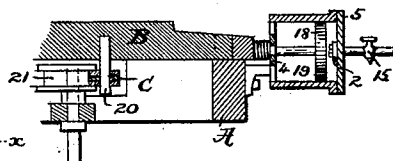


FIG. 2^x



ATTEST.

ATTEST.
J. Henry Kaiser.
Victor J. Evans.

INVENTOR.

Homer Lee

H. LEE.
PLATE PRINTING MACHINE.

No. 479,516.

Patented July 26, 1892.

FIG. 3.

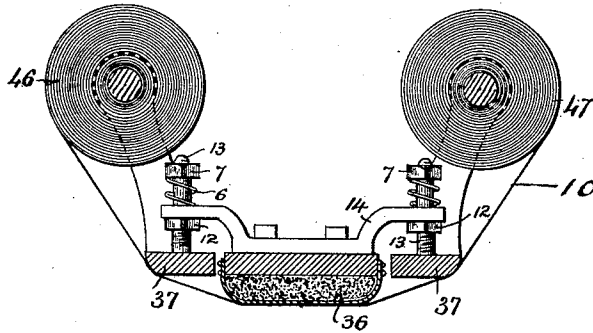


FIG. 4.

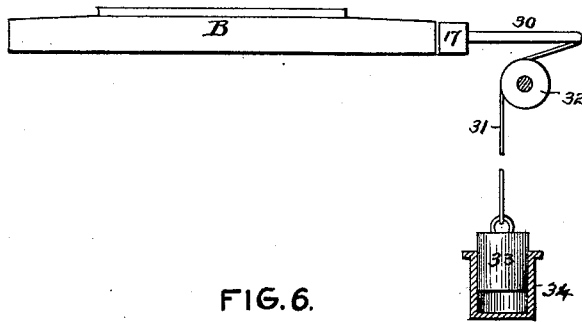


FIG. 6.

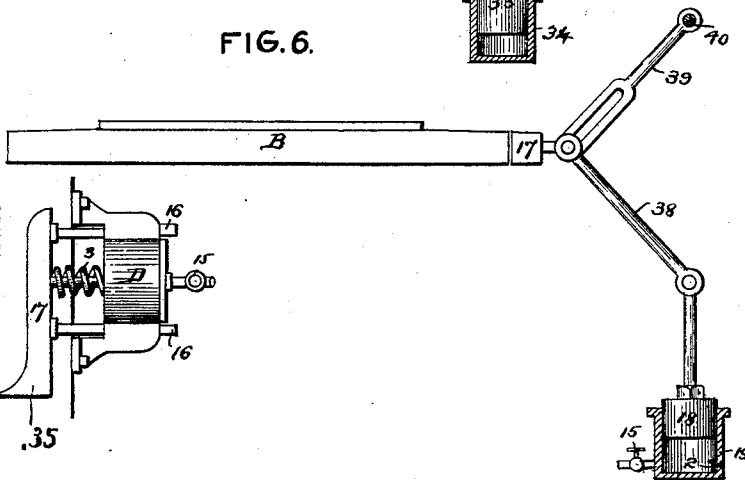
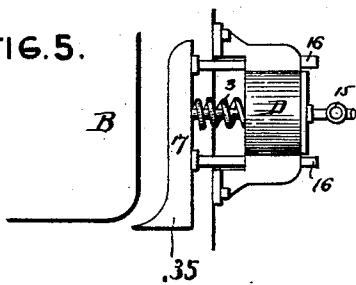


FIG. 5.



ATTEST.

J. Henry Kaiser
Victor J. Evans.

INVENTOR.

Howes Lee

UNITED STATES PATENT OFFICE

HOMER LEE, OF NEW YORK, N. Y.

PLATE-PRINTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 479,516, dated July 26, 1892.

Application filed September 13, 1887. Serial No. 249,585. (No model.)

To all whom it may concern:

Be it known that I, HOMER LEE, a citizen of the United States, residing at the city, county, and State of New York, have invented certain new and useful Improvements in Plate-Printing Machines, fully described in the following specification and represented in the accompanying drawings.

This invention relates generally to plate-printing-machines and particularly to that class of machine wherein the bed or plank travels horizontally in a quadrangular or other polygonal path.

In this class of machines it is common to employ two or more beds or planks, which are moved in the polygonal path by an endless chain that is turned at the corners or termini of each path by passing suitable supporting-rollers. Each bed as it is carried by the chain from one roller to the other travels in a right line, and the roller at the end thereof suddenly changes the direction of its travel into another right line at an angle to the first named. This sudden change of direction imparted to the traveling bed causes a shock to be imparted to the machine at each of its corners, which, augmented by the number of beds employed, becomes exceedingly injurious to the machine.

The object of the present invention, among other things, is to provide this class of machines with means whereby the shock occasioned at each corner by the change in direction of the travel of the bed or beds is obviated or reduced to the minimum.

To this end it consists in certain novel combinations of parts and details of construction too fully hereinafter described to need particular mention here.

In the drawings, Figure 1 is a plan view of a plate-printing machine of the kind heretofore referred to, certain parts being in section. Fig. 2 is a similar view of a portion of the same, showing one of the beds in a slightly-different position. Fig. 2* is a vertical section taken on the line *x x* of Fig. 2. Fig. 3 is an elevation, partly in section, of the automatic plate-polisher. Figs. 4 and 6 are detail sectional elevations of modified forms of the cushioning apparatus, and Fig. 5 is a detail plan of a bunter or guide for the bed.

The machine taken for illustration consists

of a suitable frame A, of rectangular form, provided on its upper surface with a way for the support and passage of one or more traveling plate-carrying beds B, which have motion imparted to them by a traveling endless chain or belt C, to which each bed is connected by studs or other device 20. The travel of the plate-carrying bed being in a polygonal path, the endless chain is supported by suitable rollers 21, so that it is guided at each of the angles in the path from one direction into another at an angle thereto, and thus the chain and bed travel together. Motion is given to the endless chain C from a driven shaft 22 through bevel-pinions 23 24, intermediate shaft 25, and another pair of bevel-pinions (not shown) to the sprocket-wheel 26, by which said chain is engaged.

Located adjacent to the end of the travel of the bed B in one direction, so that it is met just at the time and point it is about to change its direction of travel, there are provided cushioning apparatuses D, against which the moving bed contacts, its momentum in one direction considerably reduced or wholly stopped, but adapted to move past the cushioning apparatus as its change of direction is effected.

The cushioning apparatus may be of any of the known forms, so long as no part thereof is carried by the bed in its travel in the polygonal path described. As herein shown, however, it consists of a cylinder 19, suitably bolted to the side of the machine-frame and containing a piston, the rod of which projects into the path traveled by the bed and provided on its end with a contacting-piece or buffer 17, against which the bed contacts and of such shape as to allow it to readily draw away or slide along its face on the commencement of its travel in another direction. This contacting-piece 17 is provided with rods 16, which enter openings in the side of the cylinder, and thus guide the piece in its reciprocations and prevent it from turning or becoming out of alignment with the bed. The cylinder at its outer end has a head 5, carrying a vent-cock 15, by which the air within the cylinder may be relieved, rendering its cushioning effect variable, and the head also carries a valve 2, opening inwardly and adapted to permit air to be drawn in as the piston

moves in one direction and to close and prevent the escape of air when it moves in the opposite direction by the force of the bed. The contacting-piece and its piston may be returned to their initial position, as in Fig. 1, by a spring 3, arranged around the piston-rod between the piston-rod guide 4 and the rear of the contacting-piece 17; but of course springs might equally well be mounted on the guide-rods 16 or between the piston and cylinder-head. In many instances probably no spring will be necessary to return the contacting-piece to its normal position, the air confined in the cylinder being sufficient for this purpose. The corners of the bed B and the ends of the contacting-piece 17 may be rounded, as shown, so that as the bed is sliding by the end of the piece its return to the normal position will not be so sudden. The air-cylinder 19 need not be carried by the machine-frame or in direct relation to the movement of the contacting-piece. Thus in Fig. 6 the cylinder 19 is fixed in a vertical position on the floor or other support, the piston-rod being connected by a connecting-rod 38 with the contacting-piece 17 and with a rod 39, the upper end of which is hung in a fixed pivot 40. This piston-rod being properly guided in a vertical line, a movement of the piece 17 will tend to straighten the rods 38 39 and force the piston downwardly into the cylinder.

From the foregoing it will be seen that the cushioning apparatus arranged independent of the bed is adapted to reduce the momentum of the bed as it arrives at the end of its movement in one direction and yet permit it to slide past it without in any manner affecting the cushioning apparatus as it moves into its changed direction.

Other means than an air-cylinder as a cushioning apparatus may be employed with equal effect. Thus equilibrium of the bed's motion may be controlled by causing it to lift a weight. Such a structure is represented in Fig. 4, wherein the contacting-piece 17 is provided with an arm 30, connected by a cord 31, properly guided by a pulley 32, to a weight 33, the arrangement being such that when the bed contacts with the piece 17 and moves it outwardly its motion will be retarded by the act of lifting the weight 33. The effect of the weight may be increased by providing a fixed pocket 34 just large enough for the weight to pass into it. The closeness of the fit between the two will cause the air above it to resist the lifting movement of the weight and cause such movement to be more gradual. Its return movement also will be noiseless.

A good effect will be produced by combining both the air-cushioning cylinder and the weight to one contacting-piece, the weight in which case would exert its energy before the maximum resistance is offered by the air being compressed in the cylinder. The return of the contacting-piece would also be insured

in the absence of the spring 3 or in event of its becoming weak.

The contacting-piece 17, instead of being a simple buffer, may be so shaped as to also serve as a guide tending to change the direction of travel of the bed. The modified form of such piece is indicated by dotted lines, Fig. 1, but best seen in Fig. 5, wherein the curved end 35 occupies such relation to the moving bed and the arc its outer corner describes in passing the corners of the machine that in abutting against said piece and its curved portion it will tend to force it to change its travel in the desired direction, as will be readily understood.

While the inking and wiping apparatus may, so far as that portion of my invention just described is concerned, be of the usual form, I prefer to employ as an addition to the wiping devices now employed an automatic plate-polisher, as E, Figs. 1 and 3. This polisher consists of a pad or series of pads 36, of suitable material, mounted in a frame 37, that is provided with extending arms 38, that are mounted on studs carried eccentrically on crank-disks 49. By the revolution of these disks in unison there will be imparted to the polisher-frame and polisher an elliptical reciprocating movement laterally across and in contact with the plate carried by the bed passed under the polisher. The plate having been previously wiped by the wiper F, so that the bulk of the ink on its surface will have been removed, the polisher will serve to polish the plate thoroughly, while its polishing-surface will not be such as to remove the ink from the engraved lines in the plates, while it will leave the surface clean. The polishing effect may be aided by supplying the surface of the polisher with whiting, or the latter might be applied to the surface of the plate by hand or automatically in position for the polisher to take it.

The polishing-pad may be spring-seated, as shown in Fig. 3, wherein the pad is provided with arms 14, embracing screw-threaded rod 13, projecting from the frame 37. The downward movement of the pad is regulated by nuts 12, upon which the arms 14 rest, said arms being borne upon by springs 6 and their pressure regulated by nuts 7. The pads, when the polisher is made up of a series of them, may by this means be adjusted at different distances above the surface to be wiped or polished and the pressure be made to increase as the plates advance, according to the character of the work being done.

It is preferable to provide a cloth or other flexible material 10, passed under the polishing-pad, so that its surface may be from time to time or constantly changed. Such a cloth is represented as mounted on a roll 46 and carried under the pad 36 to and around a roll 47. Motion may be imparted to the roll 47, so as to intermittently or continuously unwind the cloth from the roll 46 and rewind it upon said

roll 47. The wiper F and polisher E, it will be seen, are reciprocated across the surface of the plate in directions at right angles to each other. This is a very important feature in the mechanical wiping and polishing of engraved plates, as by such structure the mechanical wiping and polishing is effected approximately in the same manner as a plate is wiped in the hand manipulation—that is to say in hand-wiping where the plate is movable the plate will be first wiped or cleaned by a movement across its face in one direction, and, being free, the hand-printer then invariably turns the plate so that it may be wiped directly across the first-named direction, or at right angles thereto. So, too, in the structure illustrated the plate will receive substantially the same wiping treatment automatically by mechanical means.

What I claim is—

1. The combination, with the polygonal bed or plank, of the pneumatic cushioning apparatuses having valves for varying their effect and each located at the end of the different planes of movement of the plank to contact with a different one of the sides of the plank as it travels in a polygonal path, substantially as described.

2. In a printing-machine wherein the bed or plate travels in a polygonal path, the combination, with the bed, of a buffer located at the point of the change in the direction of the bed and having a curved guiding-face, substantially as described.

3. The combination, in a plate-printing machine, of a traveling bed carrying the plate, an inking apparatus, a wiper for removing the ink from the surface of the latter, and a moving polisher arranged at an angle to the longitudinal axis of the wiper, substantially as described.

4. The combination, in a plate-printing machine, of a traveling bed carrying the plate, an inking apparatus, a wiper having a moving cloth for removing the ink from the surface of the plate, and a polisher arranged at

an angle to the longitudinal axis of the wiper, substantially as described.

5. The combination, in a plate-printing machine, of a traveling bed carrying the plate, an inking apparatus, and a plurality of moving wipers with their longitudinal axes arranged at different angles with respect to each other, substantially as described.

6. In a plate-printing machine, the combination, with two independent mechanical wipers, of a moving bed or plank carrying a plate moving under and in contact with each of said wipers and means for causing the plank to change its presenting or forward end after passing one wiper and before reaching the other, substantially as described.

7. In a plate-printing machine, the combination, with a moving bed or plank carrying a plate, of two mechanical wipers and means for moving the wipers in paths across the surface of the plate at an angle to each other, substantially as described.

8. In a plate-printing machine, the combination of two elliptically-moving wipers and a mechanically-moving plate with means for causing the plate after passing under one of said wipers to change its direction at right angles to its first movement before passing under the other wiper, substantially as described.

9. In a plate-printing machine, the combination of two mechanically-moved wipers having progressively-moved cloths and a mechanically-moved plate with means for causing the plate after passing under one of said wipers and cloths to change its direction at right angles to its first movement before passing under the other wiper and cloth, substantially as described.

In witness whereof I have hereunto set my hand in the presence of two subscribing witnesses.

HOMER LEE.

Witnesses:

R. P. CARROLL,
JAMES SMITH.