2 Sheets—Sheet 1.

E. HEWITT.

Plate-Printing Machine.

No. 216,273. Patented June 10, 1879.

Fig: 1.

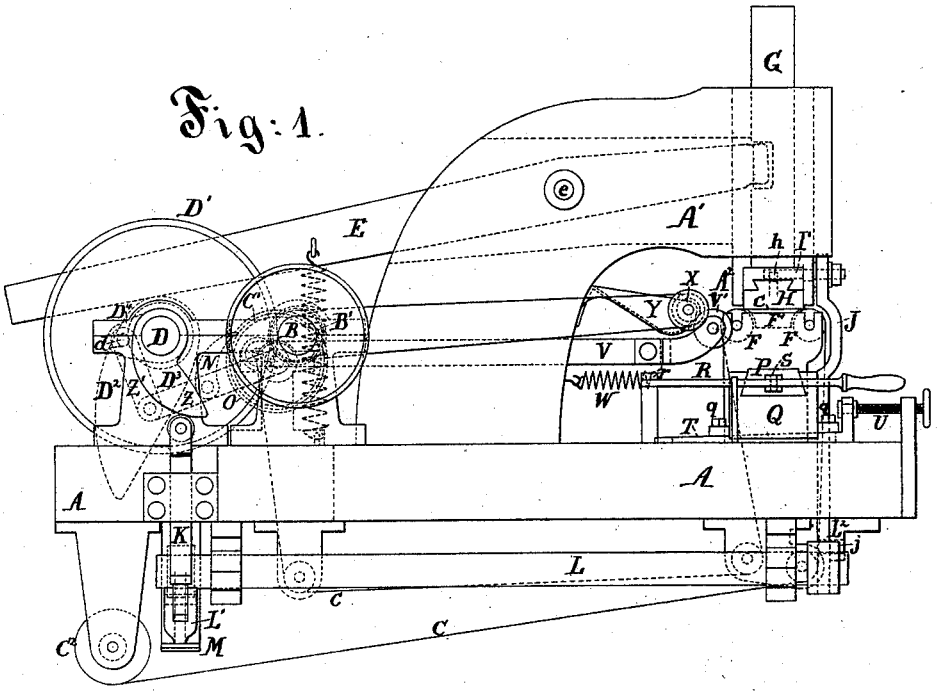
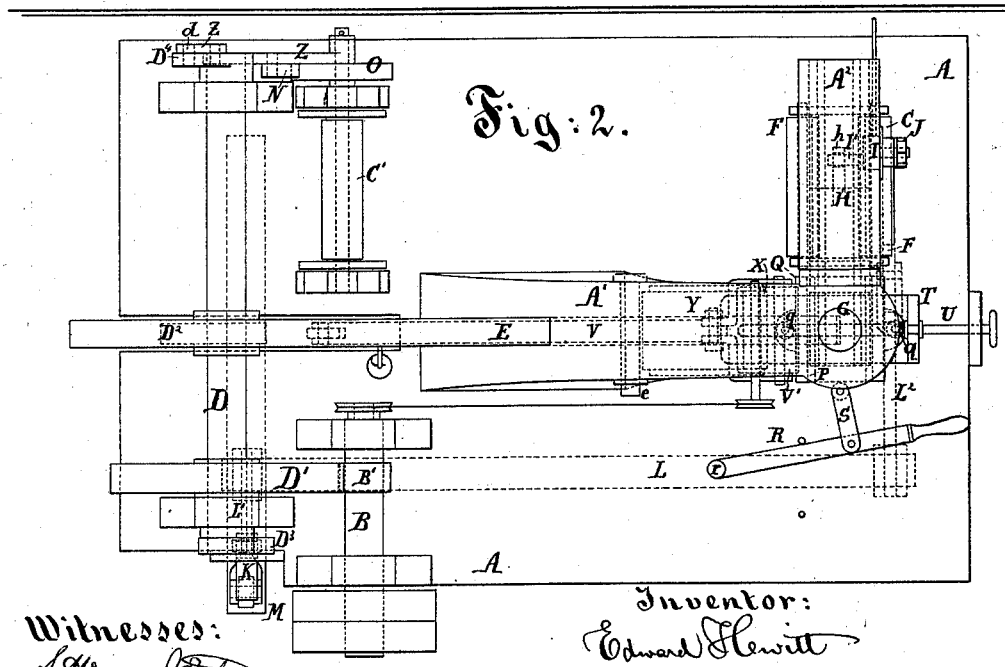


Fig: 2.



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Inventor:
Edward Hewitt
by his attorney
O. D. Shelton

2 Sheets—Sheet 2.

E. HEWITT.

Plate-Printing Machine.

No. 216,273. Patented June 10, 1879.

Fig: 3.

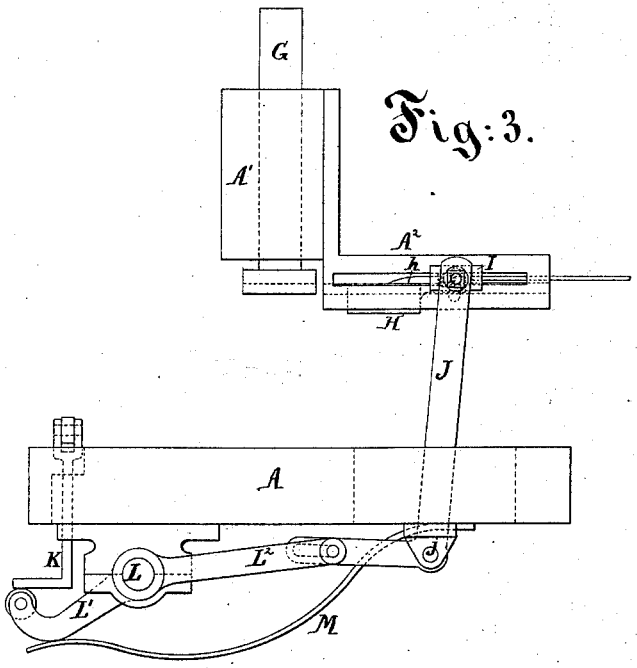
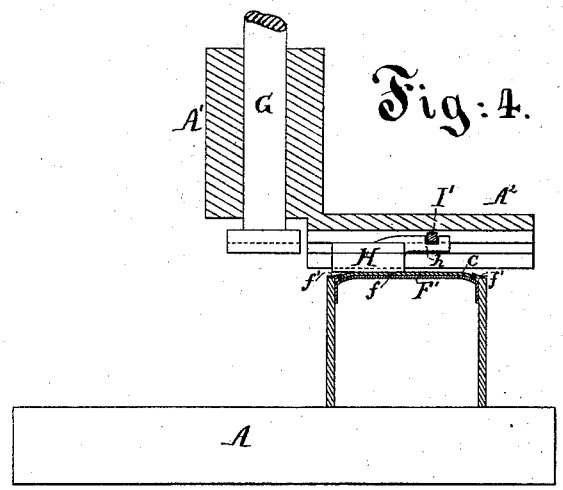


Fig: 4.



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UNITED STATES PATENT OFFICE.

EDWARD HEWITT, OF NEW YORK, N. Y.

IMPROVEMENT IN PLATE-PRINTING MACHINES.

Specification forming part of Letters Patent No. **216,273**, dated June 10, 1879; application filed October 19, 1877.

To all whom it may concern:

Be it known that I, EDWARD HEWITT, of the city, county, and State of New York, have invented certain new and useful Improvements relating to Machines for Die and Plate Printing, of which the following is a specification.

My machine is of the class in which the die or plate is liberally inked and wiped automatically, and is, by the further operation of the machine, powerfully pressed upon the paper or other material which is to be printed. The wiping is effected by a long strip of paper or analogous material, which is moved to present clean surfaces.

I have devised improvements in the means of operating the die or plate for the impression, in the means for inking, in the means for wiping and for moving the paper as a part of the operation, and for adjusting the pressure by delicately and uniformly elevating or depressing the counter-die while holding its surface exactly true or parallel.

The following is a description of what I consider the best means of carrying out the invention.

The accompanying drawings form a part of the specification.

Figure 1 is a general side elevation. Fig. 2 is a corresponding plan view. Fig. 3 is a partial front elevation, showing the means for moving the die or plate for the wiping. Fig. 4 is a section corresponding to Fig. 3, showing the spring-support for the wiping-paper.

Similar letters of reference indicate like parts in all the figures.

The machine is represented as applied for printing with a small thick plate, or what may be properly termed a "die," and I will so designate it; but it will be understood that the machine may be made large and adapted to carry thin plates properly attached, so as to effect what is known as "plate-printing."

A is a fixed frame-work, supported by legs or other efficient means. (Not represented.) The main driving-shaft B, operated by a belt, (not represented,) gives motion through a small gear-wheel, B′, to a large gear-wheel, D^1, fixed on a stout shaft, D, which carries a cam, D^2, performing important duties.

E is a stout lever turning on a center, *e*, and vibrated by the cam D^2, to give a strong up-and-down motion to a slide, G, traveling in vertical ways in the horn or upper portion of the framing. This slide G is dovetailed transversely in its enlarged lower end, and adapted to hold and carry the die H, and to allow its withdrawal by a lateral motion.

P is a counter-die dovetailed in a stout adjustable bed or die-holder, Q, so that it may be readily withdrawn by a lateral movement whenever it is desired to omit an impression without stopping the machine. R is a lever turning on a center, *r*, connected to the sliding counter-die P by a link, S. This lever is conveniently situated to be readily operated by hand.

T is a wedge bearing firmly on the framing A, and supporting the die-holder Q by acting against a correspondingly-inclined surface, so that a slight movement of the wedge T will raise or lower the holder Q, and consequently the counter-die P, while holding it rigidly level. U is a screw taking hold of the upturned end of the wedge T by means of collars, as represented, and serving to adjust the wedge T, and consequently the height of the counter-die Q, with great delicacy.

Bolts *q*, engaging through lugs on the die-holder Q, serve to hold the latter against horizontal displacement while the wedge is being moved. They may also be tightened when the parts are rightly adjusted to hold the whole very firmly. The wedge is formed with a long slot, and the bolts *q* stand therein.

I will designate the main upper portion or head of the framing by A^1, and a hollow extension on one side thereof as A^2. This part A^2 guides the die H as it is traversed laterally out and back to be wiped.

The die H is formed with an arm, *h*, having a considerable notch in its upper face, which engages with an arm, I′, from the slide I, which latter has a broad bearing on the face of the framing A^2, and traverses in a slot therein formed, as plainly shown in Fig. 3.

J is a bell-crank lever turning on a fixed center, *j*, and operating the slide I by engaging its slotted upper arm with a pin from the front of the slide.

The lever J is reciprocated at the proper time by a series of connections from the shaft

D, as follows: The cam D^3, which is held strongly in the desired position on the shaft D, depresses a slide, K, which rocks the horizontal shaft L by acting on a roller on the arm L^1, in opposition to the force of a stout spring, M. Another arm, L^2, fixed on the shaft L, engages by a pin on its end in a slot in the lower arm of the lever J. It follows that the movement of the slide I, and consequently of the die H, away from the carrier G is effected by a positive motion received from the cam D^3, while the return motion is effected by the force of the spring M.

The engagement of the die H with the slide I being effected by an open notch in the top of the arm *h* allows the die to be disengaged by its depression and to be again engaged on its elevation. The powerful motion of the lever E disengages the die H, and carries it down firmly attached to and forming in effect a part of the slide G. The impression is made under these conditions with the die H, which has been previously properly inked and wiped. After completing the impression, the return or upward movement of the slide G causes the arm *h* of the die H to again engage by means of its notch with the arm I′ of the slide I. So soon as the upward motion of the die stops, and a sufficient time for inking has been allowed, as will presently appear, its lateral motion, due to the movement of the lever J, commences. This lever, receiving motion through the train of connections from the shaft D, acts on the horizontal slide I, and moves it briskly away from the vertical slide G. The die H, being engaged by its notched arm *h*, is compelled to accompany the slide I, and it moves out, and with the return of the slide I moves again back, the dovetail seat for it in the bottom of the slide G allowing of its ready withdrawal and return.

The lower or working face of the die H is wiped upon the paper C during the whole of this movement. The paper C runs over a pair of rollers, F, at the proper elevation, and as the work proceeds is moved by being taken up intermittently on the drum C^1 and given off as required from the drum C^2. Suitable guide-rollers are provided, as shown, to conduct it properly through the intervening spaces, and allow the operating mechanism to be at sufficiently distant points to be out of the way.

The intermittent motion of the paper is so timed that the paper rests motionless while the impression is being produced, but commences to move at or before the die comes in contact with it to be wiped. Sufficient friction is imposed on the delivering-drum C^2 to insure that the paper C shall be always drawn tight.

The wiping-paper C is supported between the rollers F by a table, F′, which may be of thin steel or other suitable material, so as to be slightly elastic. It is important that the paper be held up by a slightly-yielding surface; but I attain the yielding character mainly from a layer of felt or other elastic material, as shown by *f* in Fig. 4, which is glued or otherwise firmly held on the table F′. The paper C is drawn tight across this felt, and as the die rubs strongly over it effectually wipes the smoothly-polished surface, leaving, as in other die and plate printing, only the ink which fills the graven lines.

I have, in my experiments, attached the felt *f* to the thin metal table F′ by sewing or stitching through a series of small holes made in the latter.

In order to better guide the wiping-paper C, and to also hold down its edges, so that they shall never be struck and rucked up by the die H, I provide guides or fingers *f′*, which cover and hold down each edge of the wiping-paper. (See Fig. 4.)

I can vary the extent of the travel of the paper C at will. The motion is derived from a slotted crank or disk, D^4, carried on the shaft D. The pin *d* is adjustable in the radial slot therein, and communicates, through the link Z′, a vibrating motion to the lever Z, which is pivoted loosely on the shaft of the roller C^1, and communicates motion to the roller through a pawl, N, and a ratchet-wheel, O. The pawl N may be held down by a spring. (Not represented.)

The extent of the motion of the paper C may be varied by shifting the pin *d* out and in. The time of the motion may be varied by changing the position of the crank or disk D^4 on the shaft D. The character of the motion is excellently adapted to effect the wiping thoroughly, because, being derived from a crank, it is moderate at the beginning and ending, and is most active at the middle of the motion. The middle and most active period of the motion of the paper is while the die H is stopping and reversing its motion. During this period the paper moves actively and cross-wipes the die.

The inking of the die H is effected immediately before its wiping by rolling with a roller, V′, carried in a horizontally-moving slide, V, which is pushed outward at the proper time by the same cam, D^2, which induces the pressure. The die H does not immediately on its rising start off on its lateral movement to be wiped. It pauses a moment before doing so. During this interval the slide V moves outward, carrying the roller V′ across the under face of the die H, and is immediately returned by the tension of the spring W.

The ink is supplied to the roller V′ by a "doctor-roller," X, which supplies the ink from a fountain, Y, being turned by a constant and tolerably rapid motion.

The drawings show an open belt, which would turn the doctor-roller in the reverse of the ordinary direction. I prefer a cross-belt, turning the roller in the ordinary direction; but however that may be, it is important that the roller shall turn rapidly, so as to keep its surfaces very freshly coated, and to supply the ink in liberal quantities and in a fresh condition to the inking-roller V′.

Modifications may be made in the details by any good mechanic.

I attach importance to the fact that the same cam, D^2, which operates the main lever E also operates the inking, because I am thereby certain that in case of any misplacement of the cam the inking will be correspondingly changed in time, and will avoid breakage; but instead of returning the inking-roller by a spring, as shown, I can return it by a cam or other positive motion. I have in my experiments operated successfully returning the inking-roller by the aid of two eccentrics—one on each side of the cam D^2.

Instead of applying the ink by a roller, I can apply it by a brush or any other means which will afford a sure, uniform, and sufficiently liberal supply. It is especially important with some of the varnishes used in die-work in colors that the inking apparatus shall be of such a character as will not only receive and give up the ink rightly, but may be readily cleaned with turpentine or other suitable solvent.

In effecting the wiping motion, instead of returning the die H to its seat in the dovetailed groove in the slide G by the force of a spring, M, I can effect the return motion by positive mechanism.

I have in my experiments used wheels with what is sometimes known as "skip-gear," to set the motion free after moving the slide I, and consequently the die H, outward, and provide other means for communicating a positive return motion to the lever J, and consequently to the die H, during the period while the skip-gear is inoperative. This affords the advantage that I may control and modify the time of the return motion of the die as required.

An adjustable stop may be provided to determine very accurately the position of the counter-die P when it is allowed to remain to receive the impression. A corresponding adjustable stop may be provided to determine the position at which the moving die H is left in the slide G on the termination of its return movement.

If it shall be desired in any case to work with the die or plate hot, the parts may be heated by providing a set of gas-burners to play upon the die or die-carrier during the period while it is being inked. I propose in such case to so modify the operating mechanism as will cause it to stand longer in that position and acquire the proper heat.

I claim as my invention—

1. In a die and plate printing machine, the slide G, reciprocated as shown, dovetailed across at its lower face, in combination with the die H, and with mechanism, substantially as described, for withdrawing the die and returning it after being wiped, as herein specified.

2. The die H and connecting mechanism, substantially as described, and the slide V, carrying inking-roller V′, in combination with the cam D^2, which operates the die and roller in succession, as specified.

3. In a die and plate printing machine, the combination of the slide or die-carrier G and wiping means, substantially as specified, with the die H, having a notched arm, *h*, and the reciprocating slide I, having an engaging-arm, I′, all adapted to serve substantially as and for the purposes herein specified.

4. In a die and plate printing machine, the strip of wiping-paper C, moved intermittently across a slightly-yielding support, in combination with a die, H, and with the means, G and I, for moving the die laterally and vertically at the proper times, as herein specified.

5. In a die and plate printing machine, the counter-die P, capable of easy lateral motion, in combination with the slide G, having a motion to only a definite extent, so as, by the removal of the counter-die, to cause the die H to be arrested in mid-air, as herein specified.

6. An ink-tank having a revolving ink-drum, with an ink-roll revolving in contact therewith, said roll being adapted to be moved to the surface of the die by means of a cam, in combination with a wiping and stamping mechanism, substantially as described.

In testimony whereof I have hereunto set my name in presence of two subscribing witnesses.

EDW. HEWITT.

Witnesses:

PHILLIPS ABBOTT,

CHAS. C. STETSON.