J. T. HAWKINS.

Reciprocating Printing-Machine.

No. 221,459. Patented Nov. 11, 1879.

Fig. 2.

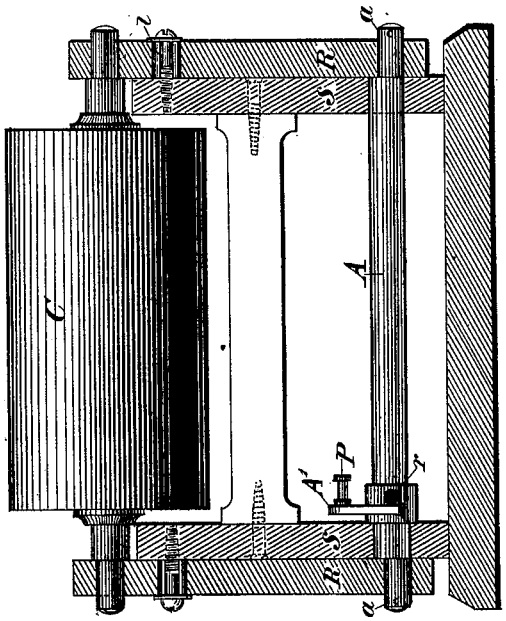
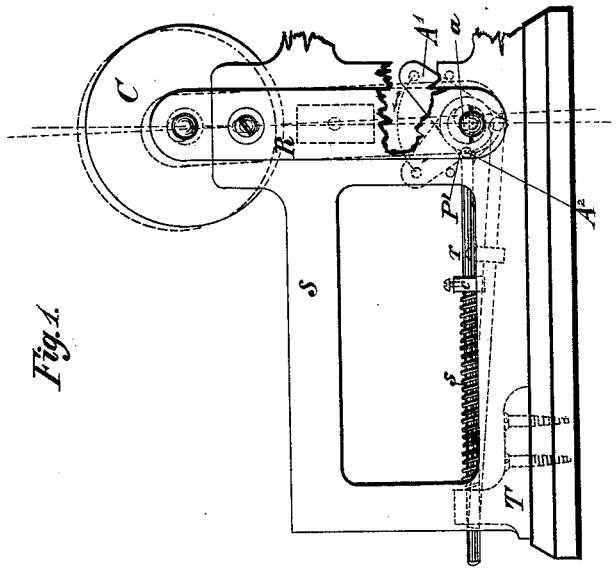


Fig. 1.



Witnesses:

Leo Ropenberg.

J. W. Hodges

Inventor:

John T. Hawkins

Eby & R. Voorhees

Attorney.

UNITED STATES PATENT OFFICE.

JOHN T. HAWKINS, OF BROOKLYN, NEW YORK.

IMPROVEMENT IN RECIPROCATING PRINTING-MACHINES.

Specification forming part of Letters Patent No. **221,459**, dated November 11, 1879; application filed March 24, 1879.

To all whom it may concern:

Be it known that I, JOHN T. HAWKINS, of Brooklyn, in the county of Kings and State of New York, have invented a new and useful Improvement in Printing-Presses, which improvement is fully set forth and illustrated in the following specification and accompanying drawings.

The object of this invention is to make use of the weight of the impression-cylinder of a printing-press as an aid in effecting an impression when the press is in operation in the process of printing.

A further object is to dispense with cumbrous weights for counterbalancing the cylinder.

The invention consists of a certain arrangement or combination of a spring, a rod, and a rock-shaft, whereby the aforesaid objects are attained, the details of which arrangement are hereinafter fully described, reference being had to the accompanying drawings, in which—

Figure 1 is a side elevation, and Fig. 2 is a vertical transverse section, of a part of the frame of a printing-press embodying the improvement constituting this invention.

In certain forms of cylinder printing-presses it is necessary to raise the impression-cylinder from contact with the "form" while the bed of the press is performing its retrograde movement, the respective surfaces of the cylinder and form at such time moving in contrary directions.

In order to effect this elevation of the cylinder it is necessary to relieve the mechanism by which it is raised of the weight of the cylinder itself. A common method of thus raising and lowering the cylinder is by means of a rock-shaft having eccentric journals on its ends, which journals work in and operate the parts containing the cylinder-bearings, the said rock-shaft being given a partial rotation by any approved mechanism. In this form of press it is usual to counterbalance the weight of the cylinder by means of heavy weights arranged to produce the desired effect through properly-proportioned levers and fulcrums. When the cylinder is operated in this manner the momentum of the moving mass, consisting of the cylinder and counterbalance-weights and their connecting mechanism, must be overcome twice during each impression, and as the raising and lowering of the cylinder must be done during the short time occupied in reversing the bed at the ends of its stroke, and while the cylinder is not over the form, the movement of the parts is correspondingly rapid and their combined momenta great in proportion, and as the weight of the cylinder is counterbalanced in all positions the downward pressure required for the impression must be imparted to the cylinder without the aid of its weight; consequently the use of the cylinder's weight in aiding to effect an impression is lost.

The improvement now to be described utilizes the weight of the cylinder thus lost, and at the same time dispenses with the counterbalance-weights.

The construction and operation of the invention are as follows: The cylinder C is journaled in the movable side pieces, R, which side pieces are secured to the side frames, S, by means of screws or bolts passing through slots *l*, and also by being closely fitted upon the eccentric journals *a a* of the rock-shaft A, which shaft has its main journals in the side frames, S, forming bearings for said journals.

The rock-shaft A has an arm, A′, provided with a pin, P, to which pin is connected any suitable moving mechanism of the press for causing the elevation and lowering of the cylinder C at the proper times. The rock-shaft A is also provided with another arm, A^2, which carries a pin, P′, to which pin is connected the forked end of a rod, *r*, whose other end is passed through a stop-guide, T, secured to the frame S.

Upon the rod *r* is a helical spring, *s*, which reacts against its stop T. The rod *r* is also provided with an adjustable collar, *c*, by means of which the tension of the spring *s* is regulated.

In the drawings the cylinder C is shown in its lower position, in which position it effects an impression in the process of printing, the position of the pin P′ then being such, Fig. 1, that the centers of P′ and of the rock-shaft A and the axis of the rod *r* are in the same plane, in which respective positions the spring *s* can exert no effective pressure; hence the weight of the cylinder C must and does rest upon the type or form. By moving the arm A′ to the left one-fourth of a revolution, the pin P′, the cylinder C, and its supports R will severally

occupy the positions shown in dotted lines in Fig. 1, and the spring *s* then has its greatest power to support the weight of the cylinder C in its most elevated position. Thus, while the parts mentioned are moved for the purpose of raising the cylinder, the effect of the spring *s* to support the weight of the cylinder increases in the same proportion as the effective weight of the cylinder upon the eccentric journals *a a* tends to rotate the rock-shaft A in the contrary direction, so that the effect of the spring *s* is practically the same as counterbalance-weights in supporting the weight of the cylinder C at all points while the cylinder is required to be in motion, yet the spring releases the weight of the cylinder when the same reaches its lower position, and thus permits the cylinder to rest its whole weight fully upon the form, by reason of the entire absence of spring support to the cylinder when it is completely lowered.

The spring, as introduced into this combination, thus enables the combination to effect a result additional to and not possessed by any combination embodying the use of counterbalance-weights—viz., the alternate use and disuse of a counter-balance, in addition to the other advantages derived from the use of said spring, as hereinbefore mentioned.

It is evident that a duplicate rod and spring and connections may be applied to the other end of the rock-shaft A, if desired.

Any suitable means, if desired, may be provided for limiting the traverse of the arm A′, the stops for such purpose shown in the drawings being merely shown for the purpose of illustration; but such devices are not essential to the proper working of my improvement, and form no material part of the invention.

The spring *s* is made sufficiently long, in proportion to the amount of compression received, to offer practically a constant resistance.

Of course it is understood, *ex necessitate*, as the hypothesis upon which this specification rests in demonstrating or setting forth this invention, that said invention has no relation to any class of printing-press wherein an impression-cylinder is not in anywise counterbalanced.

Having thus fully described this my said improvement in printing-presses as of my invention, I claim—

In combination with the impression-cylinder of a printing-press and its movable bearings and a rock-shaft for raising and lowering the same, a rod provided with an adjustable spring, connected to said shaft, and operating substantially as described, whereby the weight of said cylinder is both counterbalanced and unbalanced, substantially as and for the purposes set forth.

JOHN T. HAWKINS.

Witnesses:

GEORGE OWEN,

SYDNEY G. OWEN.