2 Sheets—Sheet 1.

E. J. FROST.

Converting Motion.

No. 216,032. Patented June 3, 1879.

Fig. 1.

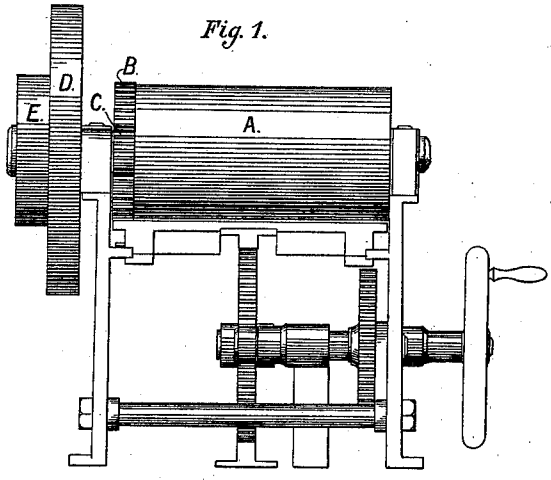
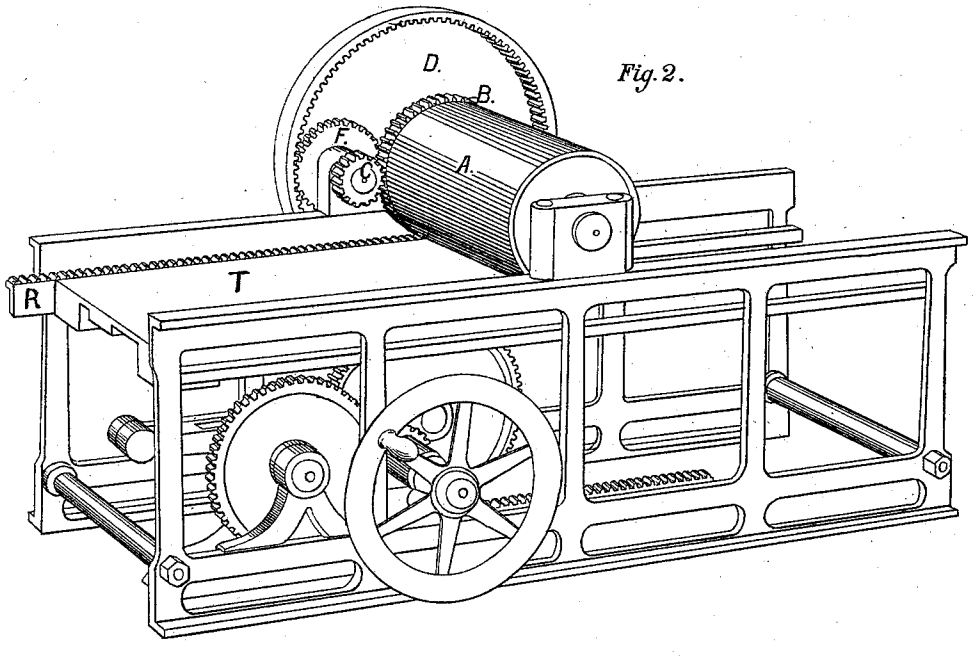


Fig. 2.



Witnesses: Fanny Stewart
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N. PETERS, PHOTO-LITHOGRAPHER, WASHINGTON, D. C.

2 Sheets—Sheet 2.

E. J. FROST.

Converting Motion.

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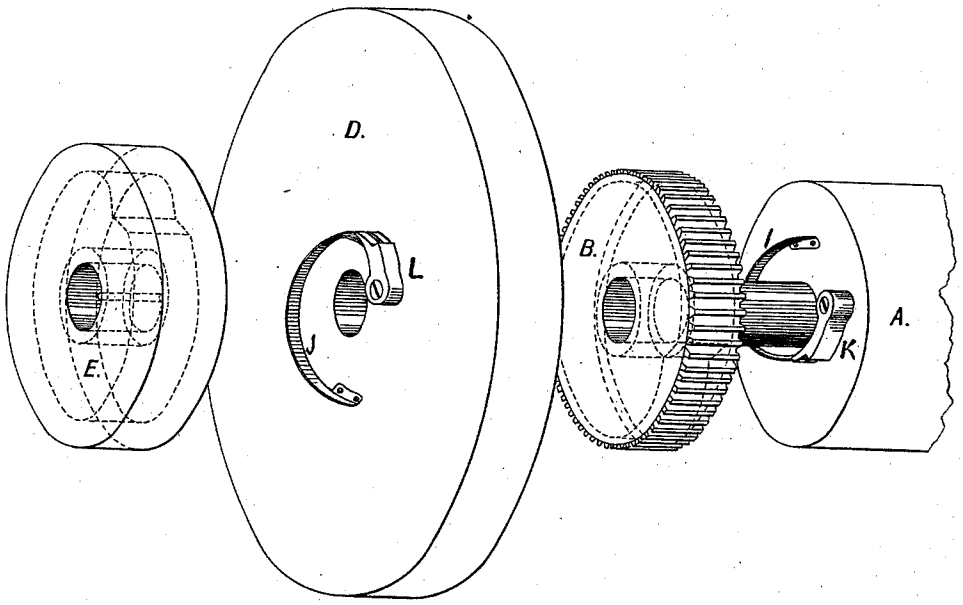
Fig. 3.



Witnesses: Fanny Stewart
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UNITED STATES PATENT OFFICE.

EDWARD J. FROST, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR OF TWO-THIRDS OF HIS RIGHT TO JOSEPH R. CARPENTER AND ROBERT EVANS PETERSON, OF SAME PLACE.

IMPROVEMENT IN CONVERTING MOTION.

Specification forming part of Letters Patent No. **216,032**, dated June 3, 1879; application filed November 21, 1878.

To all whom it may concern:

Be it known that I, EDWARD J. FROST, assignor to JOSEPH R. CARPENTER, ROBT. EVANS PETERSON, and EDWARD J. FROST, all of the city of Philadelphia, in the State of Pennsylvania, have invented a new and useful Improvement in Mechanical Powers, which can be used advantageously in Converting Motion, of which the following is a specification, the drawings accompanying which have been made with reference to the application of such power to a printing-press, as best adapted for its illustration.

The invention relates to the gearing and attachments for driving the cylinders of printing-presses and similar machines.

Heretofore the cylinders of printing-presses have been driven by means of gear-wheels receiving their motion from a driving-shaft, which also imparts motion to the table of the press usually by means of a star gear-wheel and an adjustable rack secured to the table of the press. It will thus be seen that the movements of the cylinder and the reciprocating table are independent of each other, although both are driven from the same shaft.

Heretofore, to secure a unity of motion between the impression-cylinder and type or impression table, a segment of a gear-wheel was secured to the impression-cylinder and a corresponding rack to the table. The objection to this method is that the unity is only partially secured, and the register is unreliable.

The object of my invention is to provide a system of gearing for printing-presses and other machinery, whereby the cylinder may be caused to revolve continuously in the same direction, the motion being obtained from the vibrating table of the press, thereby securing unity of motion and perfect register.

The invention consists of the arrangement of gear-wheels in different planes of revolution in connection with a mechanism whereby motion is transferred from one to another, so that while the gear-wheel on the cylinder-shaft (operated by the horizontal rack on the table) rotates backward and forward alternately in conformity with the alternate movements of the table of the press, the cylinder-shaft itself (operated by additional gear-wheels regulated by a ratchet) revolves steadily in one direction only.

It also consists in the particular construction and arrangement of the gearing mechanism.

In the accompanying drawings, in which similar letters of reference indicate like parts, Figure 1 is a front elevation of a device embodying my invention. Fig. 2 is a perspective of a device embodying my invention; and Fig. 3 is a detail view showing necessary parts of my invention, viz: the end of a cylinder and shaft with ratchet attached, the gear-wheel belonging thereto, the large gear-wheel with interior cogs, and a ratchet on the back around the shaft-hole and the outer case or covering of said ratchet.

In Figs. 1 and 2 the frame-work and gearing with lever attached below the cylinder, and not marked with letters of reference, represent the ordinary frame and gearing of a cylinder printing-press, which I do not claim as new, but which, in that or any suitable form, may be used in connection with my invention.

T represents the reciprocating table of a printing-press carrying a suitable form of types or plates, from which is received the impression. R represents a rack attached to said table, engaging and rotating pinion B, which runs loosely upon the shaft of the impression-cylinder. Attached upon the inner surface of pinion B is a lug, arranged to engage with dog or pawl K, attached upon the end of impression-cylinder A. This lug engages when B is turning in one direction. Pinions C and F are also arranged with suitable bearings, both being rigidly attached to the same shaft, one engaging with internal gear, D, the other with pinion B. It will be seen that the motion or direction of pinion B is the reverse motion of internal gear-wheel, D, and that both are continually running in opposite directions.

Upon the impression-cylinder shaft is also rigidly fixed flange E, upon the inner face of which is a lug, and upon the corresponding face of internal gear D is a corresponding pawl, L, arranged in a reverse order from the lug

and dog or pawl on impression-cylinder A and pinion B.

It will thus be seen that when the table is moving in one direction one set of latches or pawls engage with impression-cylinder and cause it to rotate in a certain direction. When, upon the reverse movement of the table, this set of latches cease to rotate the impression-cylinder, the other set, being the reverse, engage with the impression-cylinder and cause it still to rotate in the same direction. It is easily understood that by this combination of pawls and dogs or latches and gears the reciprocating motion of the type-table produces a rotary motion of the impression-cylinder, causing it to rotate in one direction continuously, enabling the sheets to be discharged therefrom without retarding its speed, the impression being taken during the movement of the table in one direction, and the sheet discharged while it returns, during which movement the type plates or stones pass under suitable inking devices, preparing them for the next impression.

The advantages derived in printing from these movements of impression-cylinder and table are, first, the securing of a perfect register, since the motion imparted to impression-cylinder is derived from the type-table, and there is thus secured a perfect unison of movement between the impression-cylinder and type-table during the impression; secondly, the continuous rotation of the cylinder in the same direction by the return movement of the table, thus securing a continuous movement of said cylinder by the table alone without requiring an independent movement for its rotation, and making it impossible for any derangement or breakage, which often must occur when two independent movements are applied to rotate said cylinder.

Having described my invention, what I claim is—

1. The rack R, rigidly attached to the table T, in combination with the pinion B and wheel E, each containing a pawl-and-ratchet movement, by which the shaft of the cylinder A is continuously rotated in the same direction, substantially as set forth and described.

2. The combination of cylinder A and gearing, as aforesaid, the gear-wheels B, C, F, and D, the springs and pawls I, J, K, and L, the flange E, all as and for the purposes substantially as described.

EDWARD J. FROST.

Witnesses:

H. A. CARPENTER,

J. B. PETERSON.