

(No Model.)

J. THOMSON.

DEVICE FOR IMPARTING COMBINED ROTARY AND RECIPROCATING
MOVEMENT.

No. 378,344.

Patented Feb. 21, 1888.

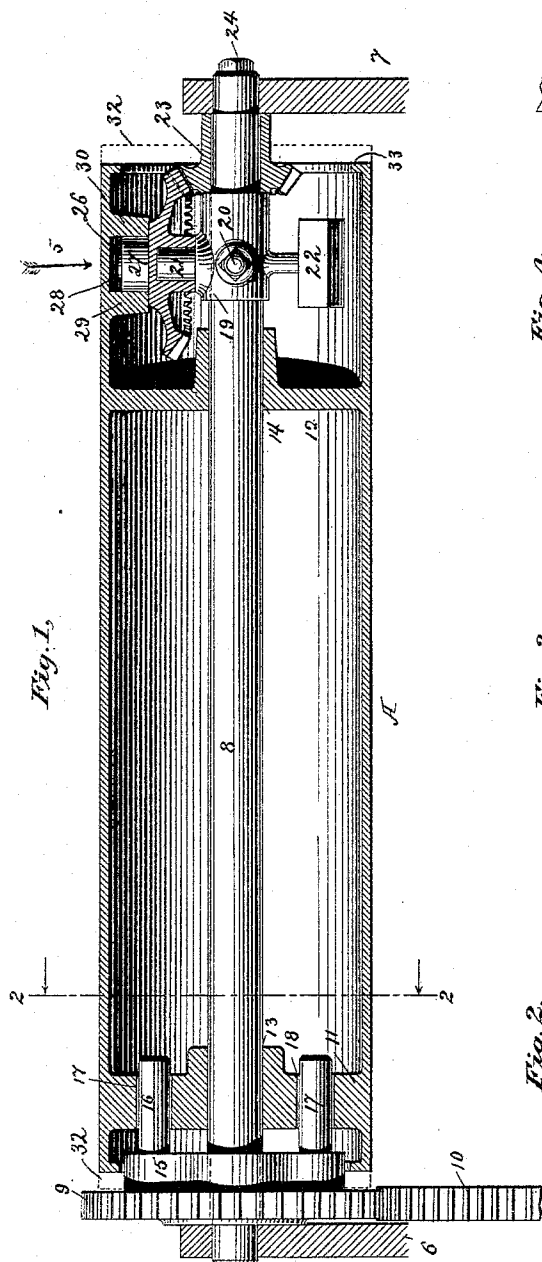


Fig. 1.

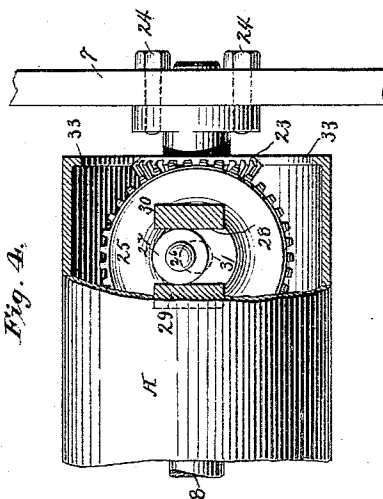


Fig. 4.

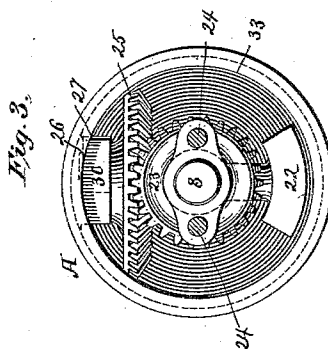
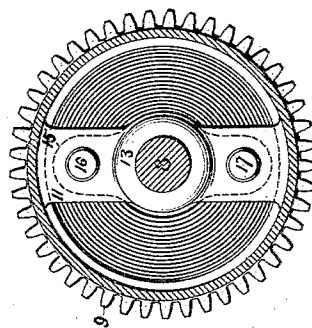


Fig. 3.

Fig. 2.



Witnesses

Geo. W. Buck.
C. E. Ashley

Inventor:

John Thomson.

UNITED STATES PATENT OFFICE.

JOHN THOMSON, OF BROOKLYN, NEW YORK, ASSIGNOR TO THE COLT'S
PATENT FIRE ARMS MANUFACTURING COMPANY, OF HARTFORD,
CONNECTICUT.

DEVICE FOR IMPARTING COMBINED ROTARY AND RECIPROCATING MOVEMENT.

SPECIFICATION forming part of Letters Patent No. 373,344, dated February 21, 1888.

Application filed October 12, 1857. Serial No. 252,175. (No model.)

To all whom it may concern:

Be it known that I, JOHN THOMSON, a citizen of the United States, and a resident of Brooklyn, Kings county, New York, have invented certain new and useful Improvements in Devices for Imparting Combined Rotary and Reciprocating Movements, of which the following is a specification.

This invention relates to mechanical movements, and the object thereof is to impart a combined rotary and reciprocating motion to any device where such may be desirable. The particular advantage of the device, however, consists in the ability to change either the extent of the reciprocating action or the speed thereof with respect to the rotary motion. I regard the device as particularly applicable in the production of the irregular forms by the control of "formers," as used in lathes and milling-machines, and also for ink-mills and distributing-cylinders of printing-presses.

In the drawings herewith presented, illustrating my invention, I have chosen to represent the same as applied to a hollow cylinder—such, for instance, as might be used in a printing-press.

Figure 1 of said drawings is a vertical longitudinal section through the cylinder, exposing the internal apparatus in elevation and section. Fig. 2 is a transverse section on the line 2, viewed in the direction of arrows. Fig. 3 is a right-hand end elevation with the standard removed; and Fig. 4 is a detached view of a portion of cylinder, a section of which is broken away, the view being in the direction of arrow 5 of Fig. 1.

The general description and operation of the device are as follows:

Mounted in standards, as 6 7, and free to rotate therein, is a shaft, 8, on one end of which is fixedly mounted a gear-wheel, 9, which is presumed to mesh with a main or primary driving-gear, as 10. Within the cylinder A are two arms or webs, 11 12, in which are formed journal-bearings 13 14 for the shaft 8. The cylinder A is connected so as to have rotary movement with the shaft and a longitudinal reciprocating movement on the shaft by any suitable means. That shown, which I have

found exceedingly strong and efficient, consists in the boss 15, which is formed as a part of the secondary gear 9, having two driving-pins, 16 17, which are fixedly mounted thereon and which project forward within the cylinder and have free engagement with the bearings 17 18, formed in the arm 11. On the opposite end of the shaft a sleeve, 19, is secured, as by the set-bolt 20, upon one side of which is formed a stud, 21, and from the other side of which projects a counter-weight, 22. There is also freely mounted upon the shaft 8 a bevel-gear, 23, but which is fixed against rotation to the standard 7, as by the bolts 24.

Mounted upon the stud 21 of the sleeve is a bevel-gear adapted to engage the fixed gear 23. On the outer surface of the gear 25 is formed a cam-stud or wrist-pin, 26, which carries a friction-roller, 27. When a stud is used, it is set eccentric to the axis of the gear 25, and may be adjustably mounted, so as to regulate the amount of reciprocation of the cylinder. The said roller acts in the slot 28, formed by the lugs 29 30, which project from the inner surface of the cylinder. Rotary motion being imparted to the gear 9, the result will be as follows: The driving-pins cause the cylinder to rotate with the said gear, as also the shaft, the sleeve, and bevel-gear 25, and, as the bevel-gear 23 is fixed against rotation, this causes the gear 25 to partake of rotary motion upon its own axis, as well as to be carried in a circular path with the shaft and cylinder. Strictly defined, it is an epicycle gear-train. Such motion of the gear 25 causes the stud or wrist-pin 26 to follow the path indicated by dotted line 31 of Fig. 4, thereby driving the cylinder back and forth upon the shaft, as indicated by dotted lines 32, Fig. 1. To change the extent of the reciprocation of the cylinder, it is simply necessary to increase or decrease the distance of the stud or wrist-pin 26 from the center of the gear 25. To change the number of reciprocations of the cylinder to each complete rotation thereof, it is simply required to properly proportion the relation of the gears to obtain the desired result. For instance, the arrangement shown in the drawings gives for one complete rotation of the cylinder approxi-

mately seventy - three one-hundredths of the complete throw of the crank or stud 26.

Where severe duty is required another stud may be formed on the sleeve in lieu of the counter-weight, and an additional gear with wrist-pin and friction-roller may be mounted thereon the duplicate of gear 25, the cylinder also having another slot diametrically opposite from that shown in the drawings. In other words, the cylinder would then be reciprocated by a pair of gears, and so arranged the action would be in its theoretically most perfect form.

As a whole, the operation of the device here illustrated and described is exceedingly smooth at very fast rates of action and is simple and easy to construct.

The general arrangement and disposal of the parts hereshown—that is, self-contained within the cylinder—are also favorable for many purposes, as no extra space outside is occupied by the device. When so arranged, to avoid any annoyance from the working out of oil which may accumulate, I form the cylinder with an inwardly-projecting flange, 33, which thus acts to prevent the oil from escaping therefrom to the limit of the depth of the said flange.

If it is desirable to discontinue the reciprocating actions at any time, it is only necessary to remove the stop-bolts 24, in consequence of which the gear 23 will be free to rotate with the shaft and cylinder, the gear 25 being thus not revolved upon its own axis.

It is evident that the circular motion of the cylinder or roll might be obtained by a key or feather fixed in the shaft operating in a slot in the bearings; but the pins are the more preferable form of construction, in that a much greater area of bearing surface is obtained, and that, being farther from the center, the pressure thereon is very much less, besides which they are more convenient to lubricate and cheaper to construct.

While I have shown my invention as applied to one particular form of mechanism, it is evident that the principles thereof may be applied to many and various forms by those skilled in the art without material change.

What I claim is—

1. The combination, with a rotary shaft, of a cylinder mounted so as to rotate therewith and free to reciprocate longitudinally thereon, a stationary gear, a gear carried by the shaft meshing with said stationary gear, and an eccentric connection between said gear and the cylinder, substantially as described.

2. The combination, with a rotary shaft, of a cylinder mounted so as to rotate therewith and free to reciprocate longitudinally thereon and provided with engaging-lugs, a stationary beveled gear surrounding said shaft, a beveled gear carried by the shaft meshing with the stationary gear, and a pin mounted eccentrically on said gear, substantially as described.

3. The combination, with a revolving shaft and a cylinder freely mounted thereon, of a boss or hub, as 15, fixed on the shaft and provided with driving-pins, as 16 17, thereby causing the rotation of the cylinder, while at the same time permitting it to be reciprocated upon the shaft and driving-pins, substantially as described.

4. The combination, with a rotary shaft and a reciprocating cylinder mounted thereon, said cylinder being provided with engaging-lugs, of a fixed gear, a sleeve carried by the shaft and provided with a bearing-pin, and a gear mounted on said bearing-pin and having an eccentric stud, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JOHN THOMSON.

Witnesses:

J. S. BARKER,
F. L. FREEMAN.