(No Model.)

J. THOMSON.

INTERMITTING CIRCULAR FEED MOTION.

No. 360,740. Patented Apr. 5, 1887.

Fig. 2.

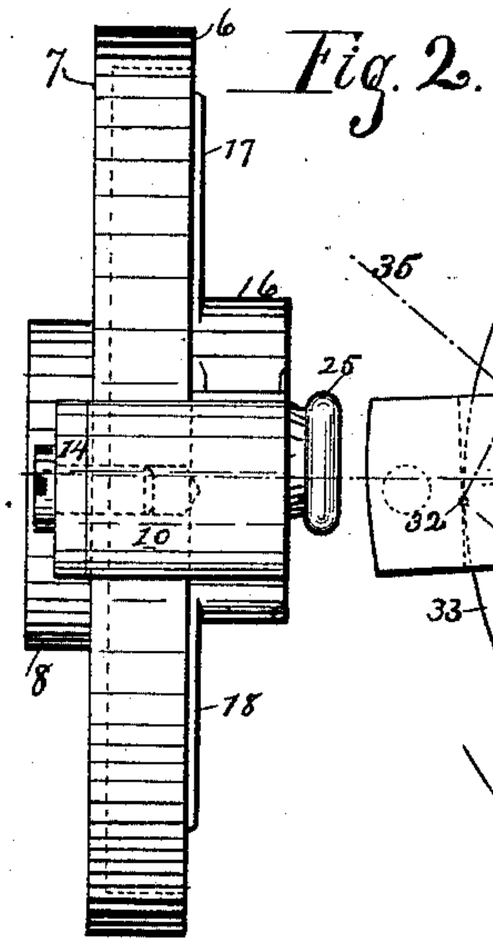


Fig. 1.

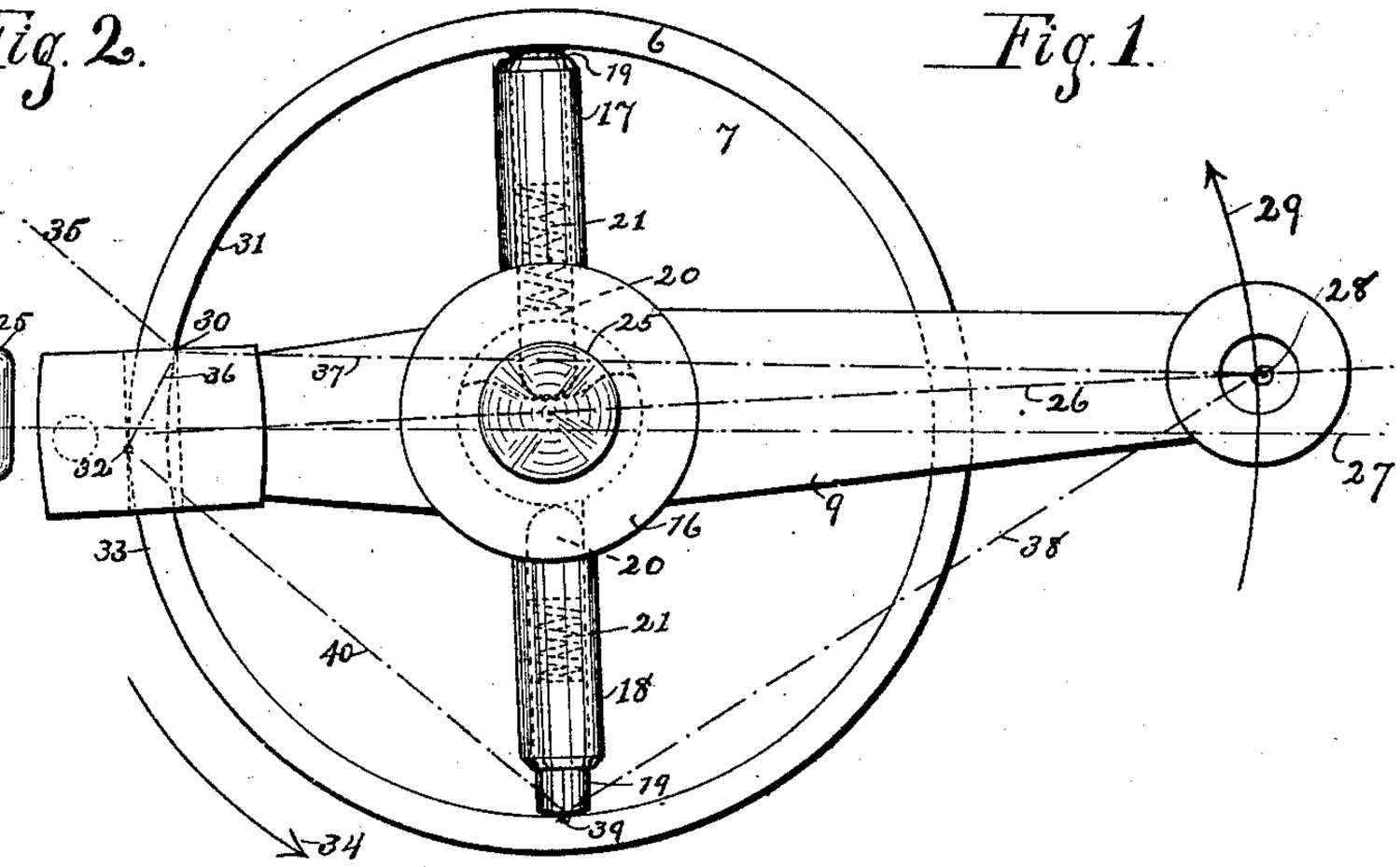


Fig. 3.

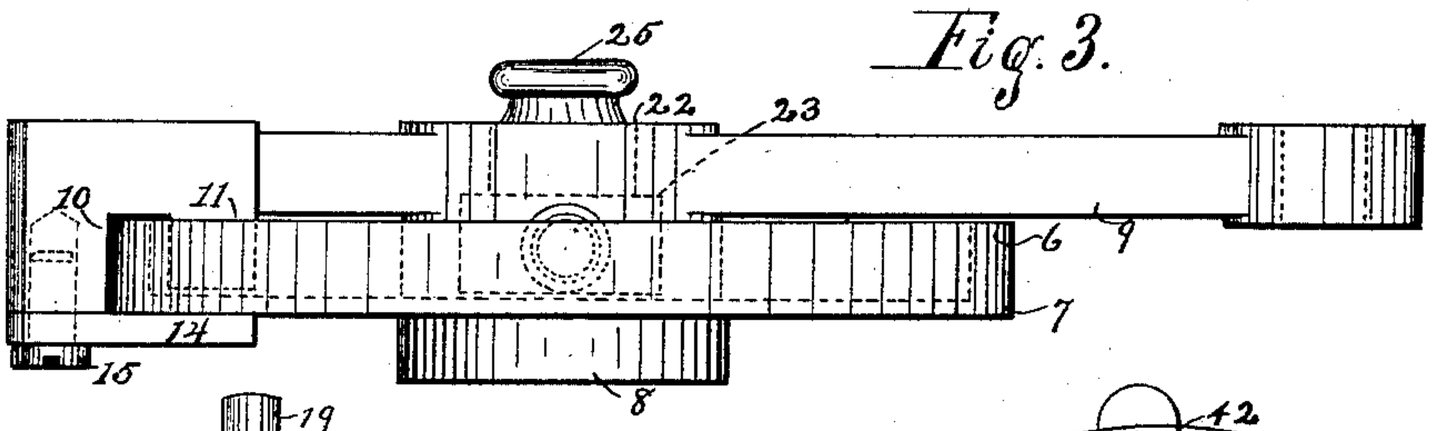


Fig. 4.

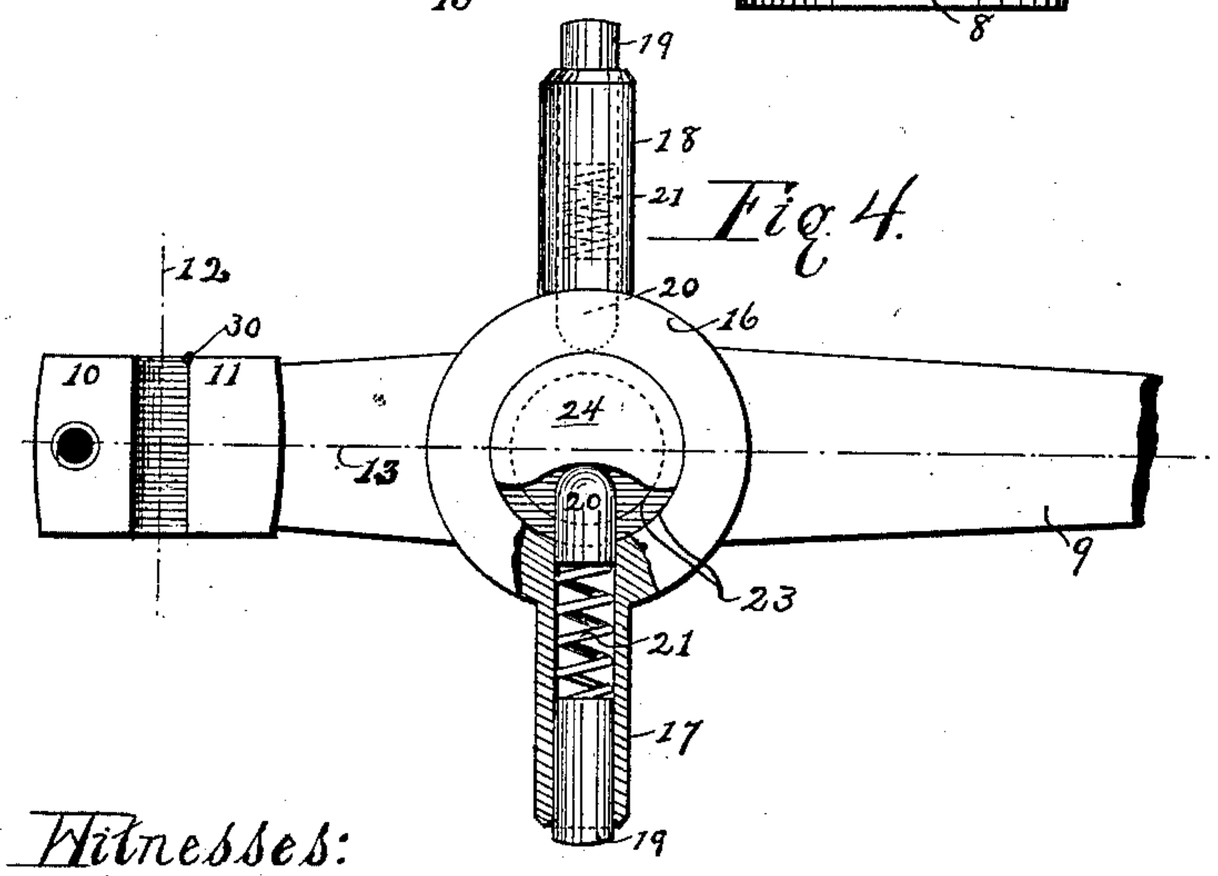
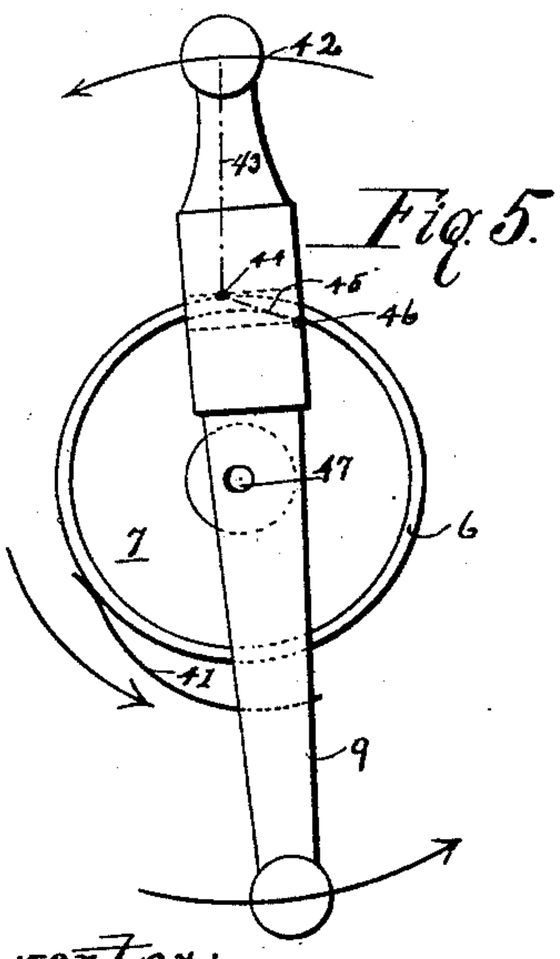


Fig. 5.



Witnesses:
William Thomson,
F. L. Freeman

Inventor:
John Thomson

UNITED STATES PATENT OFFICE.

JOHN THOMSON, OF BROOKLYN, N. Y., ASSIGNOR TO THE COLTS PATENT FIRE ARMS MANUFACTURING COMPANY, OF HARTFORD, CONN.

INTERMITTING CIRCULAR FEED-MOTION.

SPECIFICATION forming part of Letters Patent No. 360,740, dated April 5, 1887.

Application filed June 8, 1886. Serial No. 204,524. (No model.)

To all whom it may concern:

Be it known that I, JOHN THOMSON, a citizen of the United States, residing in the city of Brooklyn, Kings county, State of New York, have invented certain new and useful Improvements in Intermitting Circular Feed-Motions, of which the following is a specification.

This invention relates to mechanical movements; and the object thereof is to impart intermitting or step-by-step circular motion by means of the reciprocating vibratory action of a lever.

In the drawings, Figure 1 is a front elevation, and Figs. 2 and 3 side elevation and plan, illustrating my invention. Fig. 4 is a detached view in partial section of the driving-lever and its parts, and Fig. 5 is a front elevation showing modifications to illustrate the principles involved.

The construction, operation, and advantages derived therefrom are jointly and severally pointed out as follows:

The number 6 refers to a flange formed on the disk 7, the latter having a hub or bearing, 8, upon which the disk may be adapted to revolve in any suitable manner; or the disk may be part of a shaft, wheel, or apparatus to which step-by-step motion is desired to be imparted. Passing entirely across the flange and disk is the drawing-lever 9, having two jaws, 10 11, adapted to engage the flange inside and outside. The space formed by and between the jaws is preferably at a right angle to the center of the lever, as indicated by center lines, 12 13, and is sufficiently wide to freely engage the flange. The lever is prevented from displacement by the clip 14, secured by the screw 15 to the lever-jaw 10, the clip projecting under the disk on the opposite side from the flange, but permitting free circular action of either the disk or the lever. The lever has a boss, 16, which projects down to the face of the disk on the flange side of the disk, and radiating from the boss at right angles to the lever are two arms, 17 18. These arms are bored to form cylinders, in which are arranged the outer bearing-plugs, 19, the inner followers, 20, and between each pair of plugs—that is, one bearing-plug and one follower—is interposed a light spiral spring, 21, the springs acting by extension. The boss is bored through at 22, and counterbored, as at 23, on the lower or inner side, forming thereby a recessed bearing for the cam 24. The cam projects out through the front of the lever, having a head or button, 25, for manually changing its position. The object of the recess is to prevent the accidental withdrawal of the cam. Now, by properly turning the cam, (see Fig. 4,) these conditions are produced with respect to the driving-lever, the jaws, and the flange: In the position shown one spring is compressed and the other partly or entirely relaxed; hence, therefore, the lever is forced over until the lost motion in the jaws is taken up by the contact of the jaws upon the inner and outer surfaces of the flange. A half-turn of the cam would reverse the position of the lever—that is, the center line, 26, of the lever would be carried over to the opposite side of the center line, 27, of the disk—while a quarter-turn of the cam in either direction would compress the relaxed spring, so that both springs would be under equal tension, in which instance the lines 26 27 coincide and there is practically no contact between the jaws and the flange.

In the position indicated in Figs. 1, 2, and 3 of the drawings it will be seen that upon applying force to the lever at 28 in the direction of arrow 29 the transmission of the force is directly to the inner edge, 30, of the jaw and the inner side, 31, of the flange, the resistance to the dynamic effect of said force being from the edge 30 to the contact 32 between the outer surface, 33, of the flange and the inner surface of the outer jaw, 10. The consequence of this is that the lever is clamped to the disk as if both were one part, wherefore the disk is caused to rotate in the direction of arrow 34. In this action the limitation to the driving-power of the lever is the strength of the jaws and the flange to resist torsion or to crumble, and is irrespective of friction, the effect being due entirely to the manner of applying the initial force, and is mathematically demonstrated by the resultant angle 35 of the lines 36 37, in which is presented the apparent anomaly of force acting in a direction opposite to its dynamic effect. The proof of this lies in the reverse action of the lever, which, if

unobstructed, would simply take up the lost motion of the jaws and drive the disk as before, but in the opposite direction. Herein appears the function of the springs, which act to keep the jaws in constant contact. Thus, when the force at 28 is reversed in a direction opposite to the arrow, the transmission is first by line 38 to the contact-point 39 of plug 19, and by line 40 to present resistance-point 32, whence the lever simply slides freely without driving the disk. By reversing the action of the cam and the springs the driving action of the lever would be reversed. By turning the cam to equally compress both springs the jaws would be neutral to the flange, and hence not drive in either direction.

An important contingent advantage of this construction is that the "feed" of the disk can be reduced to infinitesimal degrees in consequence of the faces of the jaws being held to absolute contact with the flange during the reverse or idle motion of the lever, thereby entirely eliminating lost motion.

In Fig. 5 an arrangement is shown of the lever when desired to drive in one direction only without discontinuance, consisting of the simple tongue-spring 41, acting between the flange and the lever to hold the jaws properly in contact; but for all purposes it is not essential that a spring or springs be used, as a simple plug or pin, as 47, will give satisfactory results. This figure furthermore demonstrates by comparison the advantage of first transmitting the initial force to the edge of the disk opposite to the application of the force.

It will be seen that if force be applied at 42, which is the usual mode of application in "silent feeds," "nipping-levers," "friction-ratchets," &c., the transmission is first by line 43 to point of contact 44, thence by line 45 to point of resistance 46, the direction of the applied force being in a like direction with the desired motion of the disk. Hence, if the resistance of the disk against rotation is greater than the friction developed between the points 44 46, the jaws will slip upon the flange.

The device as herein represented may be constructed quite as cheaply as the usual ratchet-and-pawl arrangements, while it is more durable, silent in operation, may be readily disengaged, or instantly changed to feed in either direction. It is particularly applicable to the feed-motion of planers, winding-rolls, ink-fountains of printing-presses, and analogous purposes.

The contact-surfaces of the flange and jaws should be finished smooth and true. It is not necessary that the driving-face of the jaw be sharp, as shown in the drawings, as a broad surface contact will act equally well, and for severe duty would be preferable.

I claim—

1. The combination of a flanged disk and a driving-lever having jaws adapted to engage the flange, and means, substantially as described, for holding the jaws in proper relation to the flange, the adaptation and arrangement being such that the driving-power is applied to the lever on the opposite side of the disk from that of the engagement of the jaws, substantially as described.

2. In combination, the flanged disk, the driving-lever having jaws adapted to engage the flange, and a spring or springs arranged to hold the said lever and jaws in proper relation to the flange, for the purpose specified.

3. The combination, with the flanged disk and driving-lever having jaws, of the radial arms having springs and sliding plugs, and a cam arranged to act upon said springs, in the manner and for the purpose herein set forth.

4. The combination of the flanged disk and a driving-lever having jaws embracing the flange, the arrangement being such that force applied at the end of the lever is directly transmitted to the inner side of the flange, substantially as described.

5. The combination of the flanged disk and a driving-lever having jaws embracing the flange on one side of the center of the disk, the driving-arm of the lever extending over the flange on the opposite side of the center, the force being transmitted directly to the inner side of the flange, substantially as described.

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

JOHN THOMSON.

Witnesses:
WILLIAM THOMSON,
OLIVER N. PAYNE.