(No Model.)

G. WALSH & J. BOOTHROYD.

MECHANICAL MOVEMENT.

No. 351,228. Patented Oct. 19, 1886.

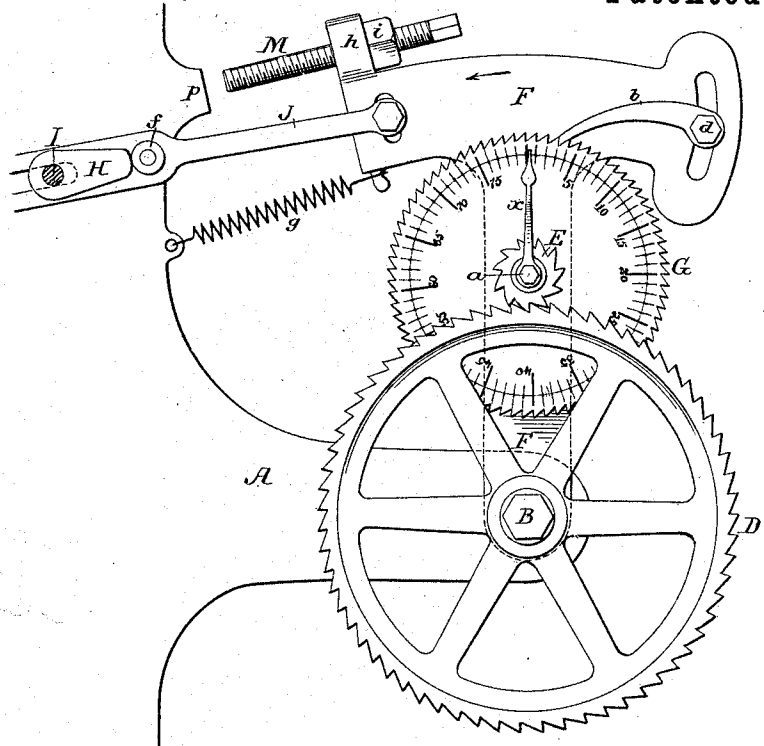


FIG. 1.

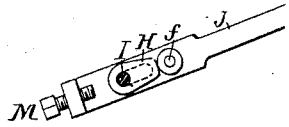


FIG. 5.

FIG. 4.

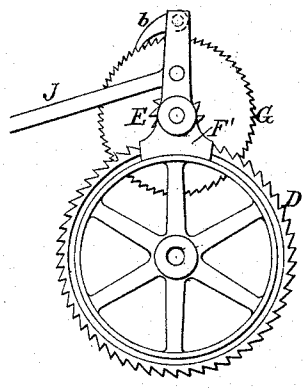


FIG. 2.

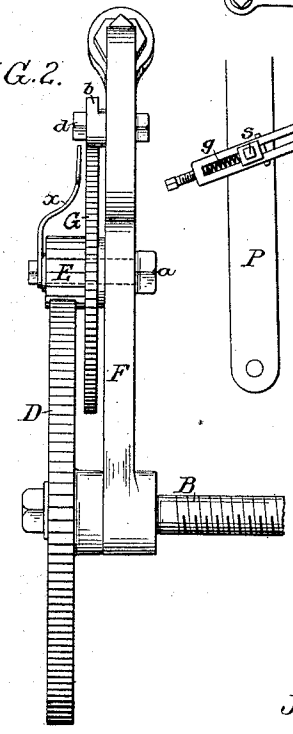
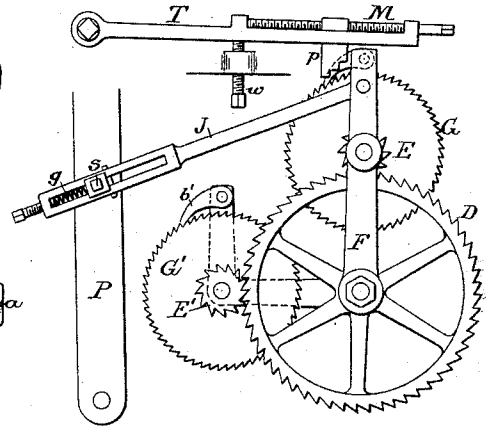


FIG. 3.



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UNITED STATES PATENT OFFICE.

GEORGE WALSH AND JOSEPH BOOTHROYD, OF PHILADELPHIA, PA.

MECHANICAL MOVEMENT.

SPECIFICATION forming part of Letters Patent No. 351,228, dated October 19, 1886.

Application filed March 4, 1886. Serial No. 193,963. (No model.)

To all whom it may concern:

Be it known that we, GEORGE WALSH and JOSEPH BOOTHROYD, both citizens of the United States, residing in Philadelphia, Pennsylvania, have invented a certain new Mechanical Movement, of which the following is a specification.

Our invention relates to that class of mechanical movements whereby a uniform rotating, vibrating, or reciprocating movement is transformed into a movement which can be varied in extent, the object of our invention being to permit very slight variations in the extent of movement imparted. This object we attain in the manner hereinafter set forth, reference being had to the accompanying drawings, in which—

Figure 1 is a face view of a device embodying our invention; Fig. 2, a side view of the same; and Figs. 3, 4, and 5, views illustrating other forms of the device.

In the device shown in Figs. 1 and 2, A represents a portion of the frame, which may be that of any desired machine in which our improved mechanical movement is to be employed, this frame having a bearing for a shaft, B, which, in the present instance, is a screw-shaft, but which may be any shaft requiring a movement at one time greater or less than at another time. To the end of this shaft is secured a ratchet-wheel, D, with which engages a ratchet-pinion, E, free to turn on a stud, *a*, secured to and projecting from an arm, F, hung to and free to vibrate on the shaft B. A ratchet-wheel, G, forms part of or is secured to the pinion E, this ratchet wheel being of greater diameter than the pinion, and having a much larger number of teeth, and with the teeth of the ratchet-wheel engages a pawl, *b*, hung to a bolt, *d*, adjustable in a slot in the upper end of the arm F. Forward movement is imparted to the arm in the present instance by means of a cam, H, on a shaft, I, to which a uniform rotating movement is imparted, this cam acting upon an anti-friction roller, *f*, on a guided rod, J, connected to the arm F, the backward movement of said arm being effected by means of a spring, *g*. A set-screw, M, is adapted to a threaded opening in a stud, *h*, on the arm F, and is secured in position, after adjustment, by means of a jam-nut, *i*, the end of this set-screw serving, by contact with a lug, *p*, on the frame, to limit the movement of the arm F in the direction of the arrow, Fig. 1. It will therefore be seen that the extent of movement imparted to the arm F on each rotation of the shaft I depends upon the adjustment of the set-screw M, the arm being moved forward to the same extent on each rotation of the shaft, but the backward movement of the arm, under the influence of the spring *g*, being limited in extent by contact of the set screw with the lug *p*. As the arm moves forward the teeth of the pinion E engage with the teeth of the ratchet-wheel D and cause a forward movement of the latter and of the shaft B, the pinion being prevented from rotating by the engagement of the pawl *b* with the teeth of the ratchet-wheel G; but as the arm F is drawn backward the pinion E travels on the teeth of the ratchet-wheel D, movement of the pinion on its axis in this direction being permitted by the pawl.

Owing to the fact that the ratchet-wheel G has a much greater number of teeth than the pinion E, very slight differences in the movement of the arm F and shaft B are permitted. For instance, supposing that there are eight teeth in the ratchet-wheel G for each tooth in the pinion E, the set-screw may be so adjusted as to permit an increase or cause a decrease in the movement of the arm F equivalent to a movement of the ratchet-wheel G to the extent of but one tooth, the change in the movement imparted to the ratchet-wheel D being consequently equal to but one-eighth of a tooth, as will be readily understood.

In Fig. 3 we have shown a modified form of our device, in which the arm F is vibrated from a vibrating frame, P, a stud, *s*, on which is adapted to a slot in a rod, J, connected to the arm F, said stud acting on a pin in the slot so as to impart a uniform forward vibrating movement to the arm, but acting on a spring, *g*, on the backward movement, so that the movement of the arm F in this direction can be arrested at any desired point. A stop-block, *p*, forms a nut adapted to a threaded stem, M, free to turn in bearings in an arm, T, so that the said stop-block can be adjusted to provide a stop for the arm F at any desired point. The stop-block is also stepped, as shown, either of these steps acting as a stop for the arm F, in accordance with the vertical

adjustment of the arm T by means of a set-screw, *w*. In this case back movement of the ratchet-wheel D is prevented by a retainer in the form of a ratchet-pinion, E′, the shaft of which has a ratchet-wheel, G′, to which is adapted a pawl, *b*′, carried by the fixed frame, this ratchet pinion and wheel being counterparts of the ratchet-pinion E and wheel G of the device.

In Fig. 4 is shown another form of our improved device, in which, in place of the arm F as a carrier for the ratchet pinion and wheel, we have shown a frame, F′, having flanges adapted to annular grooves in the wheel D, so as to be vibrated on an axis concentric with that of the said wheel.

Other means than those shown in Figs. 1 to 3 for imparting a movement of varying extent to the carrier may also be adopted without departing from the essential feature of our invention. For instance, the carrier may have a rod acted on by a cam, H, similar to that shown in Fig. 1, this cam striking a roller, *f*, on the rod to move it in one direction, but coming in contact with an adjustable set-screw, M, on the rod to move it in the opposite direction. A device of this character is shown in Fig. 5.

It will be evident that a spur or bevel wheel may be used in place of the ratchet-wheel D, and spur or bevel pinions in place of the ratchet-pinions E and E′.

The stud *a* (shown in Fig. 1) has at the outer end a pointer, *x*, which serves, in connection with graduations on the face of the wheel G, to indicate at a glance the extent of movement of said wheel on each vibration of the arm F, and thus serve as a guide for the proper adjustment of the stop screw.

Our improved mechanical movement is available for operating the feed-screws of drills, planing-machines, lathes, spinning-mules, and other machinery, or, in fact, for operating any shaft the variations of movement of which it is desirable to accurately govern.

We claim as our invention—

1. A mechanical movement in which are combined the following elements, namely: a toothed wheel, D, a carrier having a pinion gearing into said wheel D, a wheel connected to but of greater diameter than said pinion, a retainer, *b*, for said wheel, devices for operating the carrier, and a screw-stop whereby the extent of movement of the carrier is determined, all substantially as specified.

2. A mechanical movement in which are combined the following elements, namely: a toothed wheel, D, a carrier having a driving-pinion gearing into said wheel, a second pinion serving as a retainer for the wheel D, wheels connected to but of greater diameter than the driving and retaining pinions, retainers *b b*′ for said wheels, devices for operating the carrier, and a screw-stop whereby the extent of movement of the carrier is determined, all substantially as specified.

3. A mechanical movement in which are combined the following elements, namely: a toothed wheel, D, a carrier having a pinion gearing into said wheel D, a wheel connected to but of greater diameter than the pinion, a retainer, *b*, for said wheel, a carrier-operating device acting through the medium of a spring, and an adjustable stop for determining the extent of movement of the carrier, all substantially as specified.

4. A mechanical movement in which are combined the following elements, namely: a toothed wheel, D, a carrier having a pinion gearing into said wheel D, a wheel connected to but of greater diameter than said pinion, and having a graduated face, a retainer, *b*, for said wheel, a pointer moving with the carrier, and means for imparting to said carrier a movement of variable extent, all substantially as specified.

5. A mechanical movement in which are combined the following elements, namely: a toothed wheel, D, a carrier having a pinion gearing into said wheel D, a wheel connected to but of greater diameter than said pinion, a retainer, *b*, for said wheel, means for operating the carrier, and a stepped stop for determining the extent of movement of the carrier, all substantially as specified.

6. A mechanical movement in which are combined the following elements, namely: a screw-shaft having a toothed wheel, D, a carrier having a pinion gearing into said wheel D, a wheel connected to but of greater diameter than said pinion, a retainer, *b*, for said wheel, and means for imparting to the carrier a movement of variable extent, all substantially as specified.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

GEORGE WALSH.
JOSEPH BOOTHROYD.

Witnesses:
WILLIAM T. DAVIS,
HARRY SMITH.