(No Model.)

O. C. WHITE.

MECHANICAL MOVEMENT.

No. 279,897. Patented June 19, 1883.

Fig. 1.

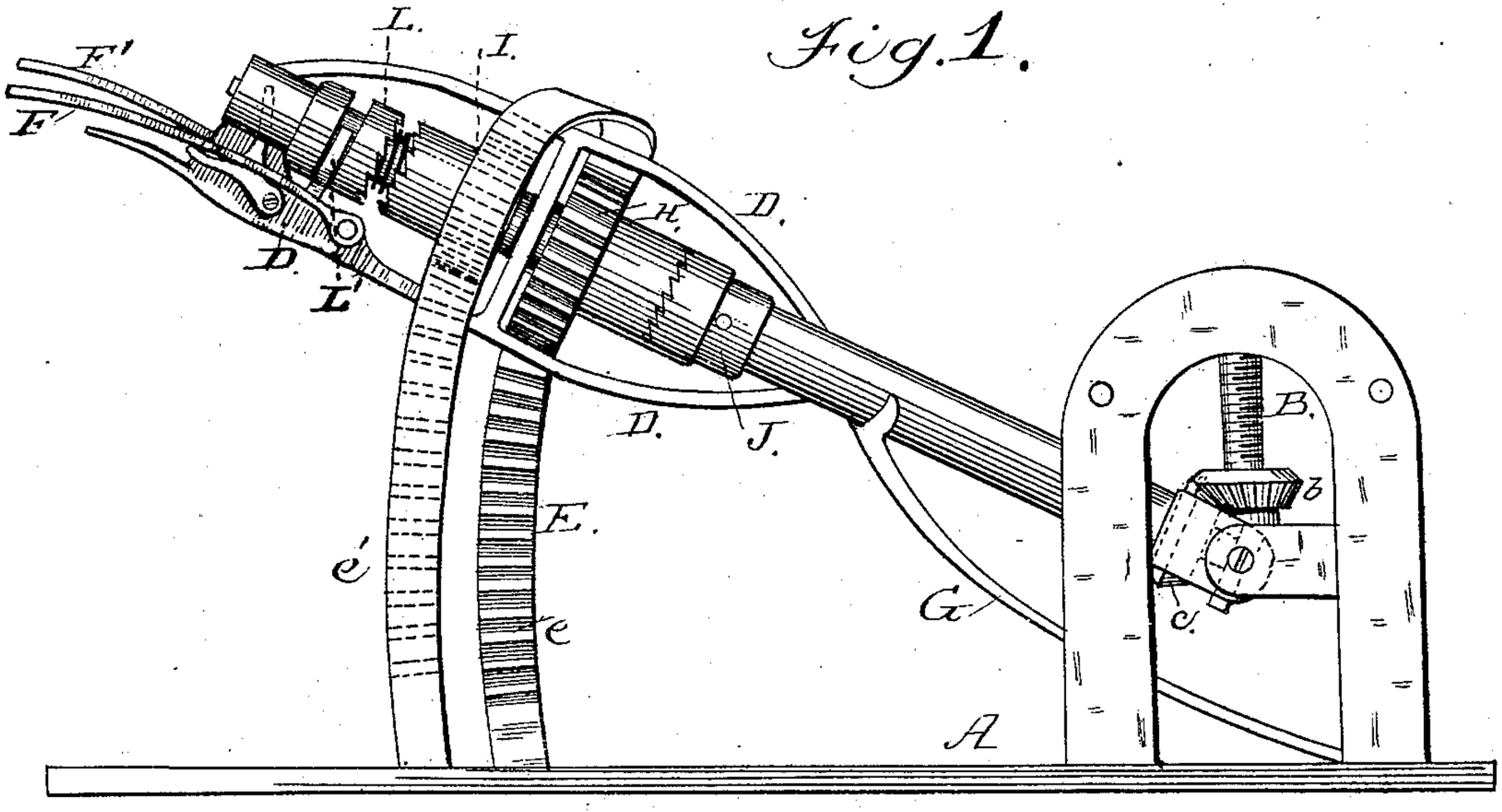


Fig. 2.

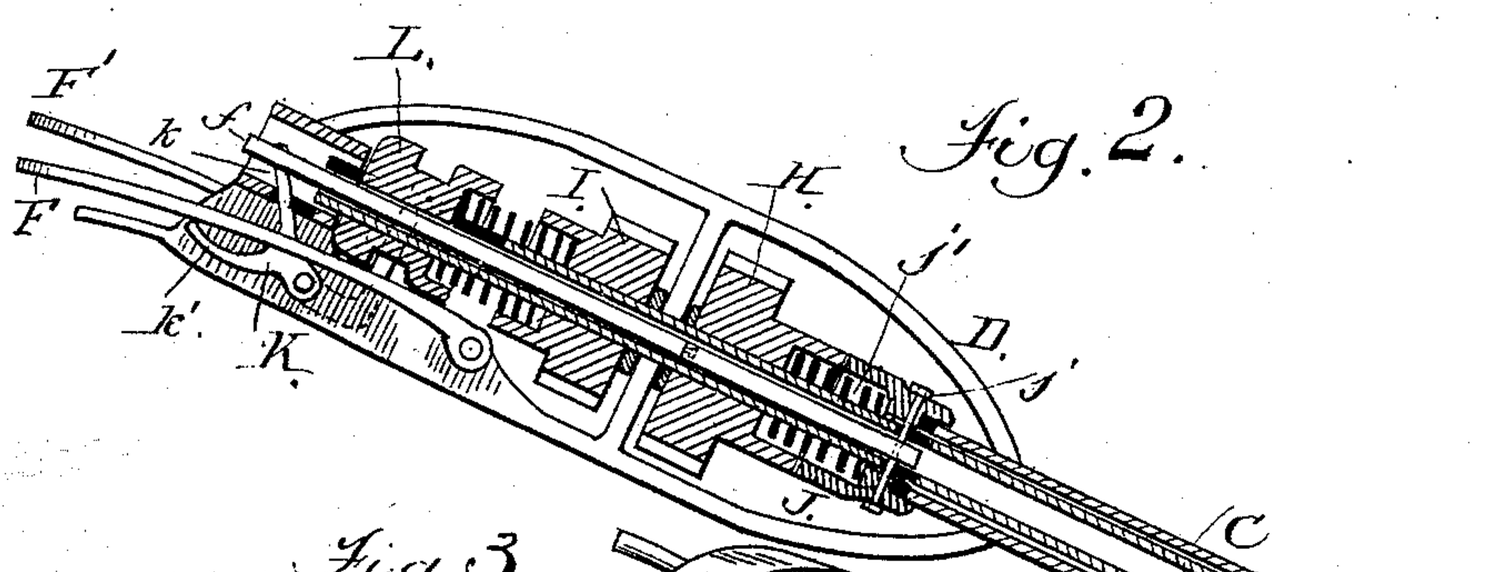
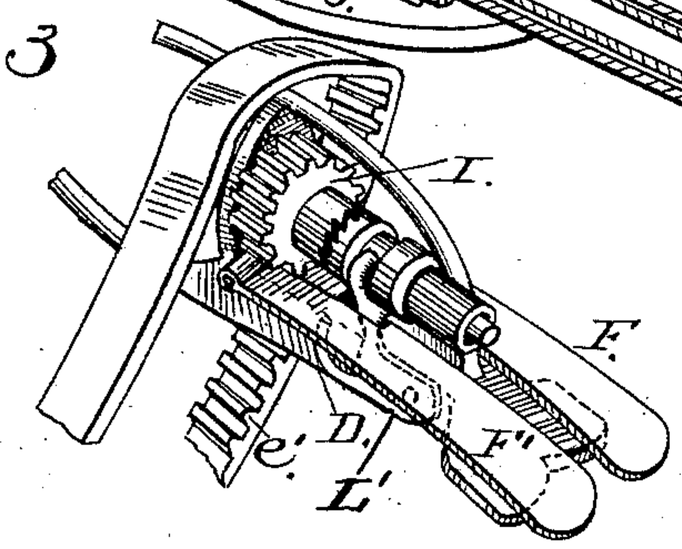


Fig. 3



Attest;

Wesley Fowler.

Wm. J. Peyton.

Inventor;

Otis C. White,

by his attys

Baldwin, Hopkins & Peyton.

UNITED STATES PATENT OFFICE.

OTIS C. WHITE, OF HOPKINTON, MASSACHUSETTS.

MECHANICAL MOVEMENT.

SPECIFICATION forming part of Letters Patent No. 279,897, dated June 19, 1883.

Application filed April 12, 1883. (No model.)

To all whom it may concern:

Be it known that I, OTIS C. WHITE, of Hopkinton, in the county of Middlesex and State of Massachusetts, have invented a certain new and useful Mechanical Movement, of which the following is a specification.

My invention relates to mechanical movements whereby reciprocating motion is converted into rotary motion; and its object is to provide an improved and efficient device for this purpose, more particularly designed for operation by manual power for various purposes in the arts—such, for instance, as elevating or shifting bodies or objects.

The improvements claimed by me are particularly recited at the close of the specification. Some of my said improvements may be used without the others, and in devices differing, as a whole, from that which I will particularly describe herein.

In the accompanying drawings, Figure 1 is a view in elevation of my improvements embodied in the best way now known to me. Fig. 2 is a longitudinal section thereof, and Fig. 3 is a view of part of the apparatus from the side opposite that shown in Fig. 1.

A suitable base or frame, A, is provided with bearings for a turning shaft, B, which is to be intermittently rotated to raise or move bodies or weights, or for other purposes. In this example the shaft B is a vertical screw-shaft, and is provided with a bevel-pinion, *b*, by which it is rotated or driven intermittently. Gearing or meshing with said pinion *b* is a similar pinion, *c*, mounted on the end of (in this instance) a hollow shaft, C, which has its bearings in a vibratable or rocking lever-frame, D, hinged or jointed at one end to a portion of the frame or base A. This rocking frame D is fitted in this example, at its outer end, to move vertically (around its pivotal connection) within a double curved rack-post, E, and the end of said rocking frame beyond said rack-post is provided with two independent pivoted treadles or foot-rests, F F′, by which the rocking frame is forced downward when pressure is applied by the foot of the operator. A spring, G, acts upon the rocking frame D and tends to keep it normally at its highest elevation within the rack-post E, in readiness for a depression by the foot of the operator.

Loosely mounted upon the hollow shaft C are two pinion-wheels, H I. The pinion-wheel H meshes with the rack *e* of one member of the double rack-post E, while the pinion-wheel I meshes with the rack *e′* of the other member of said post. Should the rocking frame D be depressed without pressure upon either of the pedals F F′, the pinions H I would simply revolve in opposite directions loosely around the shaft C without any effect upon said shaft; but if pressure is applied to either of the pivoted pedals alone to depress or rock the outer end of the frame D downward, said shaft C will be revolved by means of clutch mechanism operated through the instrumentality of the pedals which couple the pinions to the shaft, and consequently rotates it as the pinion in clutch with the shaft is rotated by moving the frame D downward or depressing it.

Two clutches are employed, one for each pedal. One of said clutches, J, (which are ratchet-clutches in this instance,) is mounted upon the shaft C, and is connected therewith, so as to be incapable of independent rotary movement, while movable endwise thereon, by means of a pin, *j*, passing through the clutch-sleeve and through longitudinal slots in the shaft, as clearly shown in Fig. 2. On the outer edge of the clutch-sleeve ratchet-teeth are formed, so as to oppose and engage similar teeth on the inner end of the hub of the pinion H. The clutch-teeth of the clutch J and pinion H are normally separated or disengaged, and maintained in this position by an interposed spring, *j′*. Contained within the hollow shaft C is an endwise-movable rod, *f*, one end of which is connected to the clutch J by the pin *j*, while its opposite end is connected to one arm, *k*, of a forked pivot-piece, K, the other arm, *k′*, of which pivot-piece lies under the pedal F, so that when said pedal is depressed said pivot-piece will be rocked to draw out the rod *f* and throw the clutch J into driving connection with the pinion H. The other of said clutches—the one L—like the clutch J, is mounted on the shaft C so as to be movable

endwise, but be incapable of independent turning movements thereon, and is provided with clutch-teeth the reverse of those of the clutch J, opposed to and adapted to engage similar teeth on the outer end of the hub of the pinion I. This sliding clutch L is acted upon by a spring to normally disengage it from the pinion I, and is thrown in gear with or clutched to said pinion by a pivoted yoke, L′, one end of which is connected to the clutch, and the other of which projects beneath the pivoted pedal F′, so that when pressure is applied to said pedal to move the lever-frame D downward the shaft C and pinion I will be connected together by a driving-connection.

By the organization I have described I make provision for revolving the shaft C, and consequently its driven shaft B, in one direction by the downward thrust of the foot when placed on one pedal, and for revolving said shafts in the opposite direction when pressure is applied upon a second pedal, whereby the object to be moved or elevated may be forced in one direction or the other, as desired. For instance, suppose the screw-shaft B is to be rotated, to elevate a weight, by suitable conections with said shaft. Pressure is applied by the foot of the operator to the proper one of the pedals F F′—say F. This causes the clutch J to engage the pinion H, and as said pinion is revolved by its downward movement over the rack *e*, the shaft C, and consequently the shaft B, will be revolved. When the downward stroke is made, the pressure is relieved, the clutch J separates from the pinion H, and the frame is moved upward by the spring G. No action upon the shaft C is effected by the pinion H on the back stroke, as will be obvious, as it has been unclutched from said pinion. No action by the pinion I upon the shaft C is effected either during the forward or back stroke of the lever-frame D, as said pinion I turns loosely about said shaft C until actuated by its own pedal F′. The reciprocating movements of the frame D will be continued until the weight or object has been moved to the desired point. When a reverse movement is to be effected, the operator exerts his force through the pedal F′, which will cause a reverse rotation of the shafts C and B by means of the rotation of the pinion I by its rack *e′*, the pinion H being inactive, as will be obvious from the above description.

It will thus be seen that by a single rocking or reciprocating lever-frame and double-pedal connections I may impart a rotary motion to a driven shaft in either direction, and this is very desirable for many useful purposes in the arts. The movement is very simple and effective. One of the uses to which I intend applying my new movement is for the purpose of elevating and lowering the bodies of dentists' chairs, the advantages of a good pedal movement for this purpose being well understood.

Some of the prime advantages of my improvements are that comparatively great power may be readily applied with but little exertion; that a full revolution may be imparted to the driven shaft by a single stroke of the lever-frame under the action of the foot; and that the operation of the driven-shaft, though intermittent, may be comparatively rapid, the lever being automatically raised for a new stroke after the pressure causing the downward movement is released.

This invention is not limited to details, and many changes may be made without departing from it. For instance, the clutches may be operated without inclosing any part of the connecting mechanism in a hollow driving-shaft, the connections between the pedals and clutches being external ones. So, also, the driving shaft may be a solid shaft. Again, the driven shaft may be horizontal or occupy other positions than a vertical position, and in some instances the driven shaft itself may be omitted and the power applied directly through the driving-shaft. So, also, friction or other gears may be substituted for the rack-and-pinion gearing, as will be obvious. Again, the frame in which the driving-shaft is mounted may be stationary, and the double rack be mounted on a pivoted lever carrying the double pedals, this latter modification being embodied in a dentist's chair, for which I have made an application of even date herewith. Other changes may be made to suit particular circumstances, under which my improvements, or some of them, are designed to work.

Having thus fully described my invention, what I claim herein is—

1. The combination of a rack-post or its equivalent with a driving-shaft and gearing to impart motion to said shaft by the movement of the gearing over said post, substantially as described.

2. The combination of the rack-post or its equivalent, the driving-shaft, gearing to impart motion to said shaft by movement over said post, and a clutch arrangement whereby motion may be given said shaft in either direction.

3. The combination of the rack-post or its equivalent, the driving-shaft, gearing mounted on said shaft by which to turn it, the pivoted lever-frame having a double-pedal arrangement, and clutch mechanism whereby the depression of said lever-frame by one of its pedals turns the driving-shaft in one direction and by the other pedal turns said shaft in the opposite direction.

4. The combination of a driving-shaft with a pedal-lever to rotate said shaft, said lever carrying pedals to determine the direction of rotation of said shaft.

5. The combination of the driven shaft, the driving-shaft having a gear-connection with the driven shaft, the pivoted pedal-lever frame in which said driving-shaft is mounted, gearing carried by said shaft to give it rotation in

opposite directions, the rack-post with which said gearing meshes, clutch mechanism carried by said frame, and a double-pedal arrangement carried by said frame to operate the clutch mechanism and determine the direction of rotation to be given to the driving-shaft.

In testimony whereof I have hereunto subscribed my name this 11th day of April, A. D. 1883.

OTIS C. WHITE.

Witnesses:
WM. J. PEYTON,
EUGENE V. BROWN.