A. S. NOONAN.

MECHANICAL MOVEMENT.

APPLICATION FILED OCT. 14, 1918.

1,322,333. Patented Nov. 18, 1919.

Fig. 1.

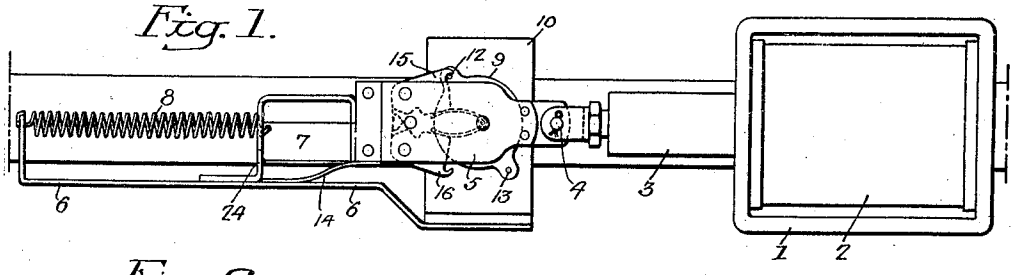


Fig. 2.

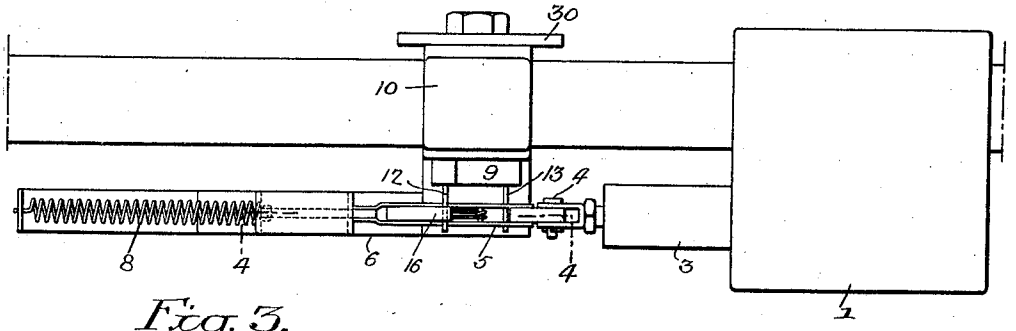


Fig. 3.

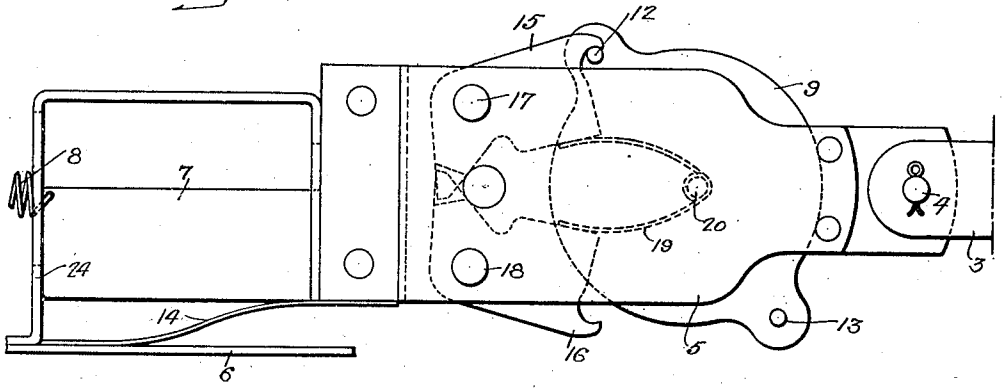
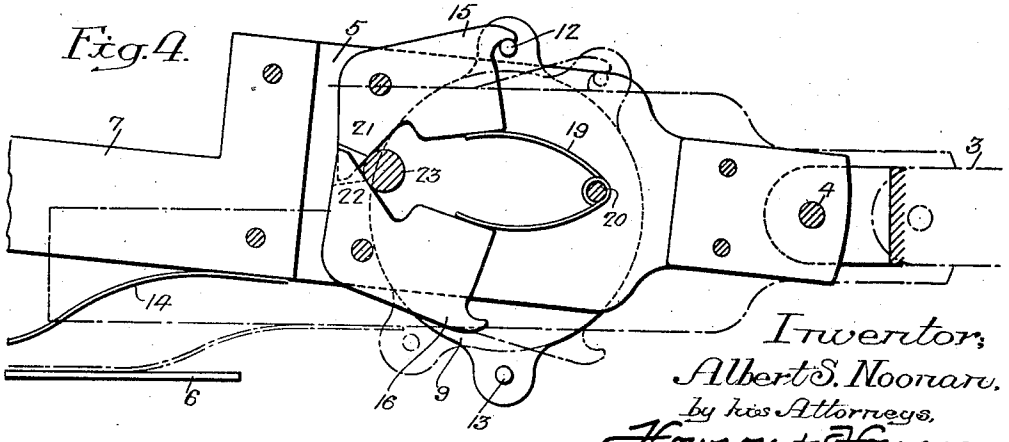


Fig. 4.



Inventor;
Albert S. Noonan.
by his Attorneys,
Howson & Howson

UNITED STATES PATENT OFFICE.

ALBERT S. NOONAN, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO FOSS-HUGHES COMPANY, OF PHILADELPHIA, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

MECHANICAL MOVEMENT.

1,322,333. Specification of Letters Patent. Patented Nov. 18, 1919.

Application filed October 14, 1918. Serial No. 257,972.

To all whom it may concern:

Be it known that I, ALBERT S. NOONAN, a citizen of the United States, residing in Philadelphia, Pennsylvania, have invented Mechanical Movements, of which the following is a specification.

One object of my invention is to provide a novel, relatively simple and substantial combination of parts whereby an element reciprocating in a straight line, shall be caused to oscillate a rotatably mounted second element; the arrangement of parts being such that the first element is caused to transmit power to the second element when moving in one direction only.

It is further desired to provide a mechanical movement whereby alternate movements of an element, such as the core of a solenoid, reciprocating in a straight line, shall swing an oscillatory member in opposite directions; the invention particularly contemplating a novel combination of parts whereby the successive movements of a core into a solenoid will turn the movable element of a valve through a predetermined angle alternately in opposite directions.

These objects and other advantageous ends I attain as hereinafter set forth, reference being had to the accompanying drawings, in which,

Figure 1 is a side elevation of the mechanism constituting the preferred form of my invention;

Fig. 2 is a plan of the apparatus shown in Fig. 1;

Fig. 3 is an elevation on a larger scale than Fig. 1, further illustrating the construction of the reciprocating frame or plate; and

Fig. 4 is a vertical section on the line 4—4, Fig. 2, illustrating the operation of my invention.

In the above drawings 1 represents a supporting frame work for a solenoid 2 having a core 3. This latter is connected by a pin 4 to a frame 5 in the shape of a hollow plate slidably supported on a guideway 6 in the present instance, through a spring 14 and having a rear extension 7. Connected between the latter and a projection at the end of the guideway is a spring 8 tending to hold the frame 5 in or return it to such a position that the solenoid core 3 is in its outermost position.

In the present instance the device which it is desired to operate by means of the solenoid is the movable element 9 of a valve 10. Without describing the construction of the valve in detail, it may be noted that in the present instance its ports are so arranged that when the block or oscillatory element 9 is in one extreme position, motive fluid such as air under pressure, is directed from a suitable source through a certain pipe to one end of a cylinder and is permitted to exhaust from the opposite end of said cylinder through a second pipe, while when said element occupies its second extreme position air is exhausted from the cylinder through the first pipe and is delivered from the source to the cylinder through the second pipe.

For the purpose of transmitting the desired movement from the solenoid core 3 to the oscillatory member 9, one end of this latter is provided with two pins 12 and 13 projecting from its outer face. The frame or hollow plate 5 has mounted between its side members two pawls 15 and 16 supported on pivots 17 and 18, so that their concave outer ends project above the upper and lower longitudinal edges of the frame, in which positions they tend to remain under the action of a suitable spring 19 mounted on a pin 20, between said side members.

The amount of the outward projection of the pawls 15 and 16 is determined by the form and position of their tails 21 and 22 which strike a second pin 23 extending between the side members of the frame as shown in Fig. 3. Said pawls are free to swing toward each other into the hollow of the frame against the action of the spring 19 and their projecting ends are recessed or concaved so that they may be described as having ends overhung. A stop 24 is provided on the guideway 6 to limit the outward movement of the frame 5 and core 3 under the action of the spring 8 and said frame is so supported that it may move vertically under certain conditions. The two pawls 15 and 16 are so formed and mounted that when the valve member 9 is in either of its extreme positions, its pins 12 and 13 lie within the path of movement of the overhung portions of said pawls.

With the various parts in the positions shown in Figs. 1 and 3, if the circuit of the solenoid be completed, its core 3 is drawn into it against the action of the spring 8,

moving the frame 5 with the two pawls 15 and 16 toward and past the adjacent end of the movable valve element 9. As said core movement begins, the concave end of the pawl 15 strikes the pin 12, rotating the valve element into the position shown in Fig. 4 and thereafter continuing its movement until said element occupies the position shown in dotted lines in said figure. This continued movement is possible by reason of the fact that as the overhung end of the pawl 15 strikes the pin 12, it not only rides up on the same but by reason of the rotation of the valve element 9, causes the frame 5 to be bodily swung upward and then down about the pivot 4 as a center, causing the lower pawl 16 to pass over the lower pin 13 as the valve element 9 is turned, until as above noted, the parts occupy the positions shown in dotted lines in Fig. 4.

When the core 3 has been moved into the solenoid to the limit of its stroke, and the latter has been deënergized by cutting off the current flow thereto, the spring 8 acts to draw the frame 5 and core 3 outwardly into their normal positions shown in Fig. 1, causing the lower pawl 16 to slide over the pin 13, and move into the hollow plate or frame 5 in so doing, against the action of the spring 19.

When next the solenoid is energized to draw in the core 3, the overhung or concave end of the lower pawl 16 at once comes into engagement with the lower pin 13, with the result that the valve element 9 is swung or turned in the valve structure in a direction opposite that first occurring. During this movement, the plate or frame 5 does not rise above its guideway 6 as in the first case, owing to the engagement of the concave end of the pawl 16 with the pin 13. Upon the deënergization of the solenoid the spring 8 again returns the core with the plate 5 to their outer positions, whereupon the upper pawl 15 moves into the hollow of the plate in passing under the pin 12.

From the above description it will be seen that I operate the valve element positively regardless of the direction in which it is turned and perform the necessary work only when the core is moving into the solenoid under the action of the magnetic field set up when the latter is energized. It will further be noted that with the above described arrangement of parts, the valve element 9, except while it is being actually operated by the solenoid, is mechanically free of the same and of its associated parts, thereby rendering possible its convenient operation by hand in the event of there being a failure in the current supply for the solenoid.

In order to permit of such hand operation I fix to the movable valve element 9 a member 30 having oppositely projecting portions for the attachment of ropes or cables whereby said element may be manually actuated from a distance without in any way interfering with or requiring disconnection of the electric operating apparatus.

I claim:

1. The combination of an oscillatory member having two projections; a reciprocatory member movable in a line substantially at right angles to the axis of oscillation of said first member; and two devices carried by the reciprocatory member in position to alternately engage the projections of the oscillatory member upon successive movements in the same direction of said reciprocatory member.

2. The combination of an oscillatory member having two projections on opposite sides of its axis of oscillation; a reciprocatory member; and two spring actuated dogs in positions to alternately engage said projections to move the oscillatory member in opposite directions upon successive strokes in one direction of the reciprocatory member.

3. The combination of an oscillatory member having two projections extending parallel to and on opposite sides of its axis; a member guided to reciprocate at right angles to the axis of the oscillatory member between said projections; two dogs pivotally mounted to project adjacent the opposite edges of said reciprocatory member; a spring for moving said reciprocatory member in one direction; and a motor for moving said member in the opposite direction to cause its pawls to alternately engage said projections to move the oscillatory member.

4. The combination of an oscillatory member having two projections substantially parallel with and on opposite sides of its axis; a bar reciprocable in a line at right angles to said axis; two spring pressed dogs carried by said bar and each having a projecting concave end extending in position to engage one of the projections when the oscillatory member is in a predetermined position; with means for actuating said bar.

5. The combination of an oscillatory member having portions extending parallel with its axis; a reciprocatory member guided to move in a line at right angles to the axis of the oscillatory member and also free to move in a plane at right angles to said axis; two spring actuated dogs each having a concave end and pivotally mounted on said reciprocatory member in position to coact with one of the projections thereof under predetermined conditions; with means for actuating said reciprocatory member.

In witness whereof I affix my signature.

ALBERT S. NOONAN.