E. W. ALBERS.

MECHANICAL MOVEMENT.

APPLICATION FILED AUG. 19, 1915.

1,200,447.

Patented Oct. 10, 1916.

2 SHEETS—SHEET 1.

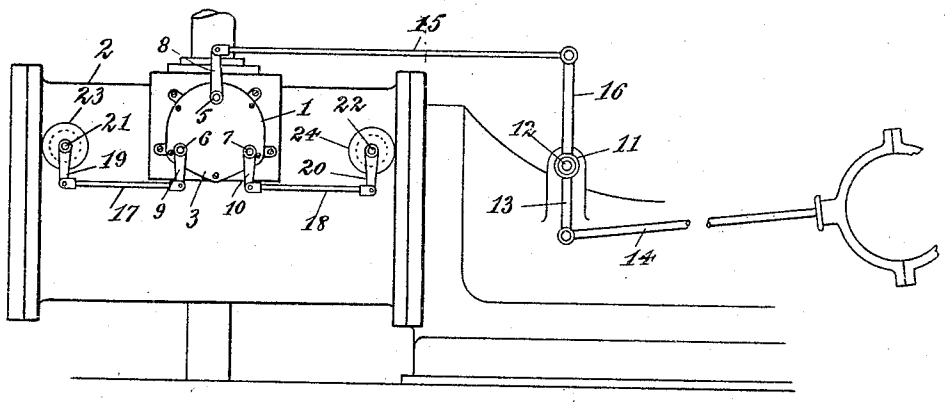


Fig. 1

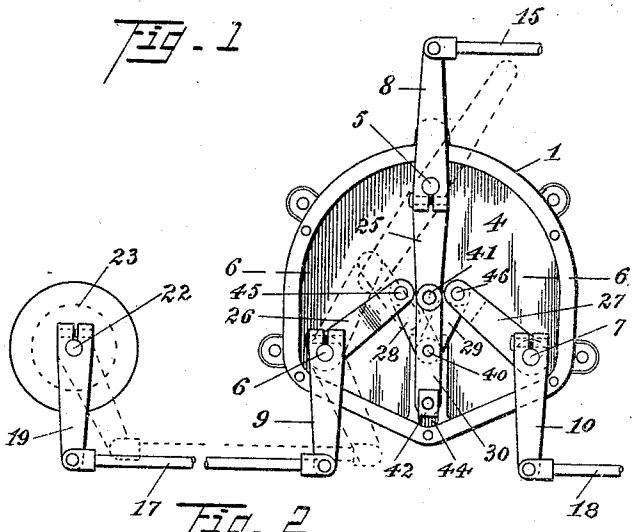


Fig. 2

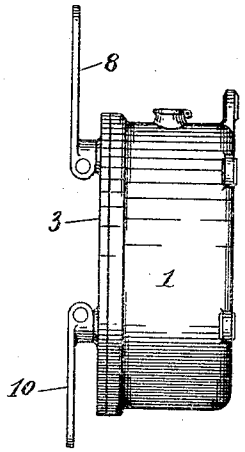


Fig. 3

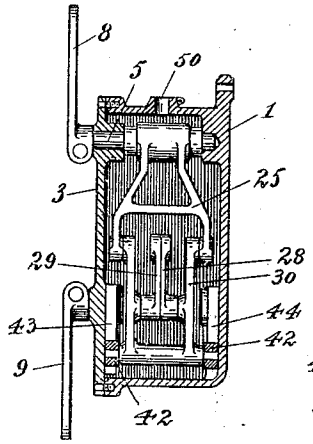


Fig. 4

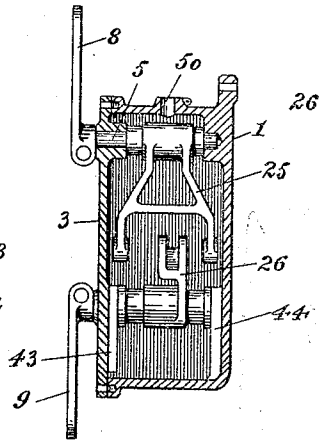


Fig. 5

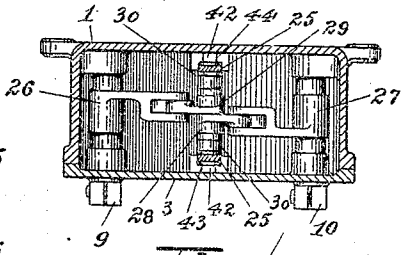


Fig. 6

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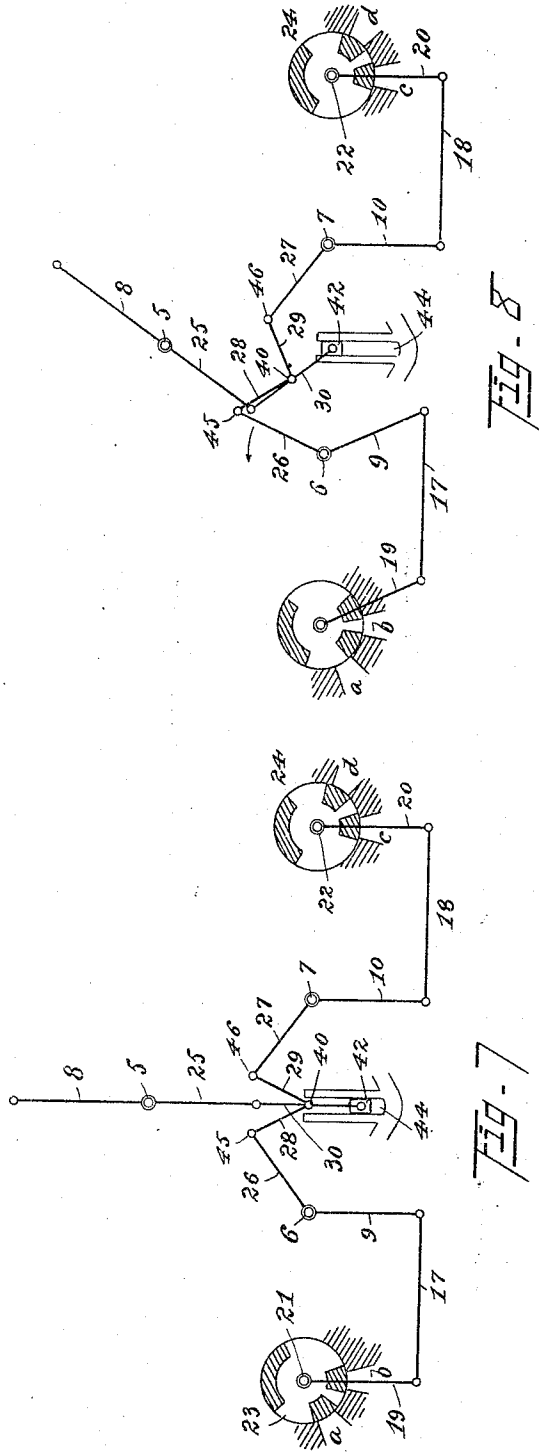


Fig. 8

Fig. 7

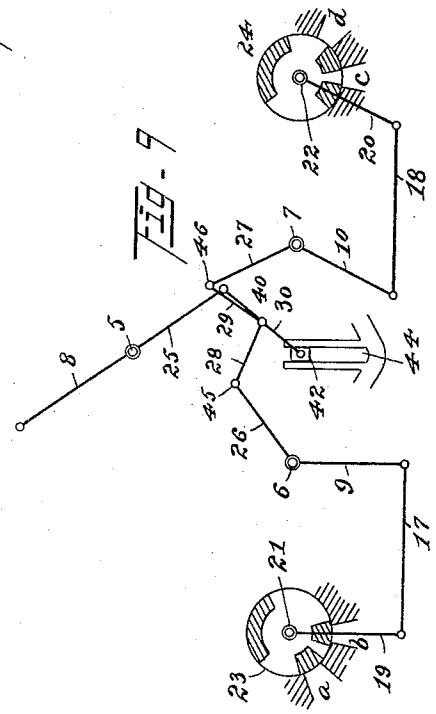


Fig. 9

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UNITED STATES PATENT OFFICE.

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MECHANICAL MOVEMENT.

1,200,447. Specification of Letters Patent. Patented Oct. 10, 1916.

Application filed August 19, 1915. Serial No. 46,329.

To all whom it may concern:

Be it known that I, EDWIN W. ALBERS, a citizen of the United States, residing at Dover, in the county of Cuyahoga and State of Ohio, have invented a certain new and useful Improvement in Mechanical Movements, of which the following is a specification.

This invention relates to a mechanical movement whereby a unitary actuating member, through a series of connecting, co-acting elements, imparts a reciprocating motion alternately to two movable members, one of said movable members remaining at rest during the movement of the other, and vice versa.

While the present invention is applicable to various mechanical constructions, it is particularly adaptable to engine valve operating mechanism, and is an improvement on a certain mechanism a patent for which was allowed to me on June 30th, 1915, Serial No. 15,279, therefore the objects of this invention so far as its application to engine valve operating mechanism is concerned, are the same as those mentioned in my former patent, and in general are similar as they provide a simple and durable means for accomplishing the required result in a positive manner.

The present invention provides the arrangement and combination of a system of co-acting levers, connecting links, and guides, actuated by a single operative member, whereby a quick movement is imparted to one of two objective movable elements while the other objective element is held absolutely at rest, and on the reverse movement of the operative member the action on the objective movable members is reversed.

The improved mechanism is very efficient in mechanical devices where it is required to operate certain elements in timed relation to each other, and in which it is desirable that one of the elements is at rest during the movement of the corresponding element as is the case in the operation of the valves of the Corliss and other types of engine construction.

In the accompanying drawings which form a part of this specification, the invention is illustrated as embodied in a stationary engine and will be described as so employed, although it will be understood that the application of the improved mechanical movement is more general in its scope.

In the drawings Figure 1 is a side elevation of a portion of a horizontal steam engine showing the improved mechanism positioned on the side of the cylinder. Fig. 2 is an elevation of the improved mechanism in a suitable housing, the cover of which is removed. Fig. 3 is a side elevation of the housing and exterior operating elements. Figs. 4 and 5 are central, vertical sections through the housing, with certain of the interior operative elements left out of each to avoid confusion in the description. Fig. 6 is a transverse section on line 6—6, Fig. 2. Figs. 7, 8 and 9 are diagrammatic illustrations of the movements of the various elements in operation of oscillating the valves of a steam engine.

Similar characters of reference are used to designate similar parts in the drawings and specification.

As before stated the present invention is an improvement on my former invention and therefore the detailed description of some of the elements and their coöperation will be found similar to that of my other application; however the distinguishing features will be apparent.

In the embodiment of the invention as illustrated, the function performed consists in the oscillation of the intake valves in timed relation to the action of the piston and with this in view, it will be assumed that the eccentric is properly timed to co-act with the piston and other elements in the performance of their functions.

Referring now to the drawings 1 is a casing, preferably made in one casting and adapted to be conveniently attached to the cylinder 2, and provided with a cap 3, to be bolted or otherwise fixed thereon, and form an oil-tight chamber 4. Journaled in the cap 3 and casing 1 are shafts 5, 6 and 7. Keyed or otherwise rigidly attached to the shafts 5, 6 and 7 respectively are crank members 8, 9 and 10. A lever 11 is fulcrumed at any convenient point on the engine frame, as at 12 Fig. 1. The member 13 of the lever 11 is connected with the eccentric rod 14, while a link 15 connects the member 16 with the crank 8. Links 17 and 18 connect the cranks 9 and 10, respectively with cranks 19 and 20 which are rigidly attached to the stems 21 and 22 of the respective intake valves 23 and 24.

Referring now particularly to Figs. 2, 4, 5 and 6, the mechanism confined within the

chamber 4, and its co-action with the external elements will be described. The shaft 5 has a crank member 25 fixed thereto, and the shafts 6 and 7 have cranks 26 and 27 fixed thereon. The crank 25 is movably connected with the cranks 26 and 27 by a toggle made up of links 28 and 29 connected, respectively with the cranks 26 and 27, the links 28 and 29 having a connection in common, through the shaft 40, with a rocker frame 30 which is connected with the crank 25 at 41. Mounted on the rocker frame 30 are blocks 42, 42 which are adapted to slide longitudinally in grooves 43 and 44. The grooves 43 and 44 are formed in the cover 3 and the housing 1 respectively, they are in alinement with the shaft 5 and equi-distant laterally from the shafts 6 and 7 and form guides or controlling means for the operating elements.

The factor of improvement of the present invention is comprised in the rocker frame 30, its connections and co-acting functions with the other elements. In my former allowed application the member 25 has a universal connection with the links 28 and 29 through the medium of a third link. In the present invention the member 30 provides the joint connection with the links 28 and 29, through the medium of its extended portion having the blocks 42, 42 mounted thereon, the said blocks having a longitudinal sliding movement in the grooves 43 and 44. A guide is provided, thereby insuring a positive control of the toggle movement in the operation of the mechanism, the axial line of the blocks 42 moving in a direct line while the universal connection 40 travels in a parabola either to right or left according to the movement of the actuating lever 8. The guided longitudinal movement of the blocks 42 retains one of the movable connections 45 or 46 in a fixed position during the movement of the other. This will readily be understood if it is noted that the movements of the levers 25, 26, and 27 are in arcs having their centers at the fixed points of oscillation 5, 6, and 7 respectively, but the points of connection and oscillation 41, 40, 45, and 46 being movable, will cause the universal oscillating point 40 to move in a parabola, this movement being controlled by the arc movement of the point 41 and the longitudinal movement of the blocks 42 produces the result above mentioned.

In my former application, above referred to, which is for improvement in engine valve operating mechanism, the operation of the parts is the same as the similar parts in the present invention, and the result is the same, but when the mechanism is used specifically for operating engine valves, the resistance caused by friction and the pressure on the valves, will cause the elements to perform the desired functions without the coöperation of the controlling members. The present invention however provides a combination mechanical movement that is more efficient and general in its uses and while it is particularly adaptable to the operation of engine valves, its functions are positive and not dependable on fluid pressure or friction.

A more lucid understanding of the operation of the improved mechanical movement will be had by reference to the diagrammatic figures of the operation of the intake valves of an engine, in which Fig. 7 shows the relative position of the co-acting parts in their neutral position, or with both intake valves closed, assuming that *a*, *b*, *c* and *d* are the live steam ports in the cylinder. When the crank 8 is moved to the position shown in Fig. 8, through the coaction of the eccentric, the lever 11 and the link 15, there is a positive thrust on the crank 26 in the direction of arrow, this carries the crank 9 to the position shown and opens the valve 23 through the medium of the link 17 and crank 19, the several members oscillating on their movable connections and on the fixed pivotal points 5, 6, and 21. The arc movement of the point 41, the parabolic movement of the point 40 and the longitudinal movement of the blocks 42 makes the connection 46 a fixed point of oscillation for the link 29 during the above described action, and retains the valve 24 in the closed position. When the crank 8 has traveled its predetermined arc, governed of course by the eccentric, it is returned to the neutral position gradually closing the valve 23, and as it continues its movement to the position shown in Fig. 9 the valve 24 is opened, the point 45 becoming a fixed pivotal center for the link 28 and retaining the valve 23 in closed position.

The mechanism can be inclosed as shown and the chamber 4 loaded with oil through an oil hole 50 and the working parts entirely submerged.

Having now described my invention, what I claim and desire to secure by Letters Patent is.

1. A combination mechanical movement for imparting motion to two alternately movable members, comprising an actuating shaft and two parallel secondary shafts mounted in fixed bearings, an actuating lever fixed to the actuating shaft, rocker-arms fixed to each of the shafts, a secondary rocker member having an oscillating connection with the rocker-arm on the actuating shaft, links connecting the secondary rocker member with the rocker-arms on the secondary shafts, means for guiding the secondary rocker member in alinement with the actuating shaft, secondary levers on the secondary shafts, and connecting means from the secondary levers to the members to be alternately moved.

2. A combination mechanical movement for imparting motion to two alternately movable members, comprising an actuating shaft and two parallel secondary shafts mounted in fixed bearings, an actuating lever fixed to the actuating shaft, rocker-arms fixed to each of the shafts, a secondary rocker member having an oscillating connection with the rocker-arm on the actuating shaft, links connecting the secondary rocker member with the rocker-arms on the secondary shafts, guide blocks mounted on the secondary rocker member and slidable in guide grooves in alinement with the actuating shaft, secondary levers on the secondary shafts, and connecting means from the secondary levers to the members to be alternately moved.

EDWIN W. ALBERS.

Witness:
O. C. BILLMAN,
L. F. GRISWOLD..

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."