

W. ROBINSON.
MECHANICAL MOVEMENT.

No. 491,295.

Patented Feb. 7, 1893.

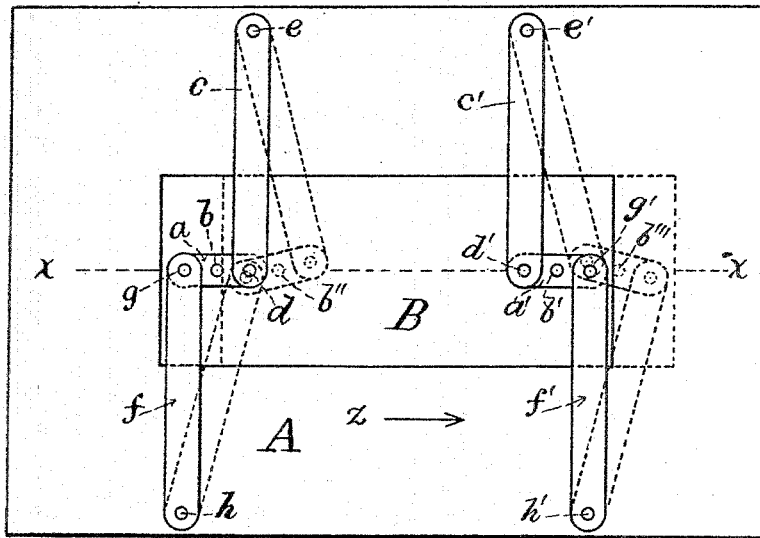


Fig. 1.

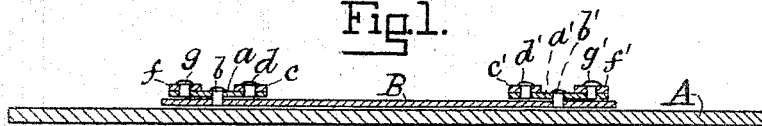


Fig. 2.

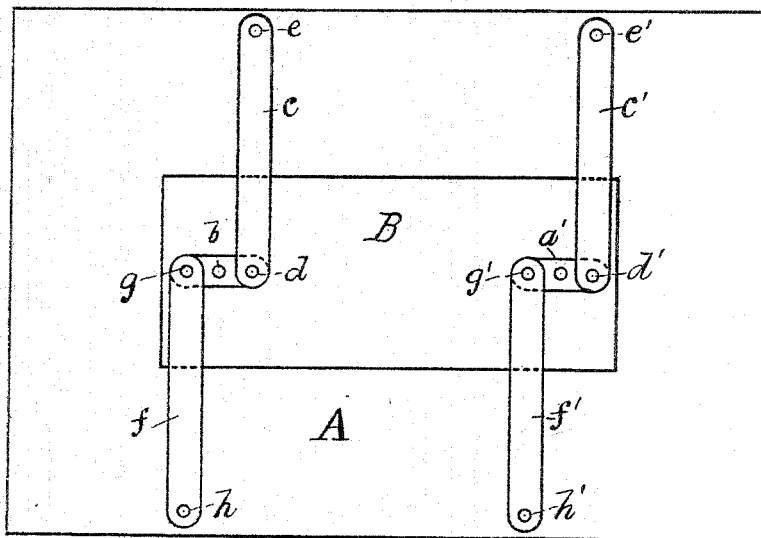


Fig. 3.

WITNESSES

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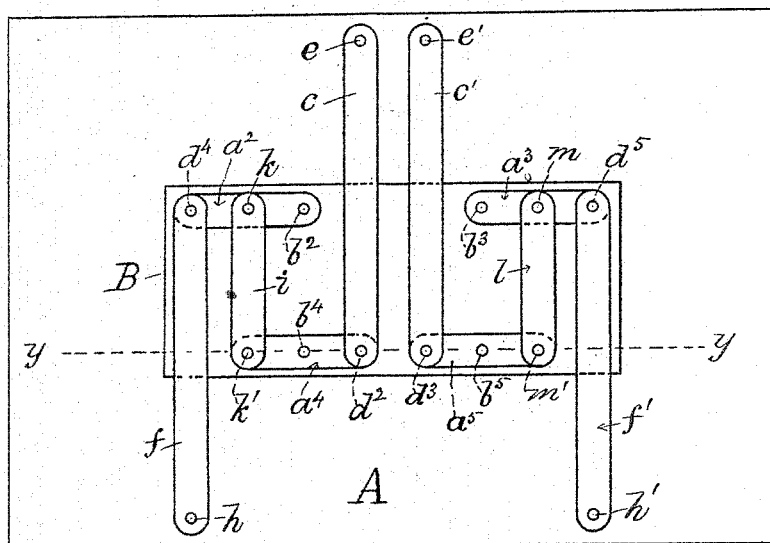


Fig. 4

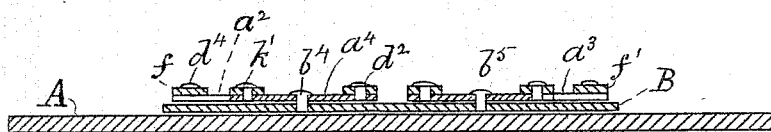


Fig. 5

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MECHANICAL MOVEMENT.

SPECIFICATION forming part of Letters Patent No. 491,295, dated February 7, 1893.

Application filed June 23, 1892. Serial No. 437,765. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM ROBINSON, a citizen of the United States, residing at Boston, in the county of Suffolk and State of Massachusetts, have invented a new and useful Mechanical Movement, of which the following is a specification.

The object of my invention is to produce a device constructed in such a way as to cause an exact parallel motion in the parts; in other words, to cause one body to travel in a right line relatively to another body, in a simple and effective manner, through the intervention of a suitably arranged system of pivoted links or bars, and without the intervention of rollers or friction bearings.

The nature of my invention will be understood from the description which follows, reference being had to the accompanying drawings which form a part of this specification, in which

Figure 1 is a view illustrating my invention; Fig. 2 is a section through the line x, x , Fig. 1; Fig. 3 is the same as Fig. 1 except in the relative positions of some of the connecting bars; Fig. 4 shows a modification in the system of link connections, and Fig. 5 is a section through the line y, y , Fig. 4.

Similar letters of reference indicate corresponding parts in all the figures.

A is a base, and B is a traveler free to move in a right line across, or relatively to, the said base A. The traveler B is provided with the links a, a' , pivoted thereto as shown at b, b' . The pivotal points b, b' , should be as far apart as possible. The links or bars c, c' , have one end pivoted to the inner ends of the links a and a' , as shown at d, d' , while the opposite ends of said links or bars c, c' are pivotally connected to the base A, as shown at e, e' . The bars c, c' are parallel to each other. In like manner the parallel links or bars f, f' have one end pivotally connected to the outer ends of the links a, a' , as shown at g, g' , while the opposite ends of said bars f, f' are pivoted to the base A, as shown at h, h' . The apparatus is now operative, and its action is as follows: If force or power be applied to the traveler B or to either of the bars c, c' or f, f' sufficient to cause the traveler B to move in the direction of the arrow z , for instance, then the bars c, c', f, f' , links a, a' , and traveler B,

assume, respectively, the positions shown in dotted outline, Fig. 1. An inspection of this figure will show that when the traveler B moves relatively to the base A, as described, the pivotal points d, d' , and g, g' , of the bars c, c' , and f, f' describe arcs of circles, changing the positions of said pivotal points relatively to the right line x, x , while, at the same time, the links a, a' , are turned on their central pivotal points b, b' . It is evident however that the outline pivotal points b'', b''' are in the same straight line x, x , as their originals, the normal pivotal points b, b' ; that is, that the traveler B has traveled exactly in a straight line relatively to the base A. When the traveler B is moved from its normal position in a direction opposite to that just described it still travels in a straight line.

The arrangement of parts shown in Fig. 3 is exactly the same as in Fig. 1, except that the bars c', f' , are interchanged relatively to the ends of the link a' . The operation is exactly the same as that described in connection with Fig. 1.

In Fig. 4, the traveler B is provided with four links a^2, a^3, a^4, a^5 , pivoted thereto, respectively, as shown at b^2, b^3, b^4, b^5 . The links a^2, a^4 are pivotally joined together by the connector i as shown at k, k' , and the links a^3, a^5 , are, in like manner, pivotally joined together by the connector l , as shown at m, m' . Thus the links a^2, a^4 , are always kept parallel to each other, and operate, conjointly, in the same manner as, and virtually as an equivalent of, the single link a , Fig. 1. In like manner the links a^3, a^5 , are kept always parallel to each other and together operate in the same manner as the single link a' Fig. 1. The bars c, c', f, f' have their outer ends pivotally connected to the base A as shown and described in connection with Fig. 1. But the bars c, c' have their inner or opposite ends pivoted respectively, to the ends of the links a^4, a^5 , as shown at d^2, d^3 , while the opposite ends of the bars f, f' are pivotally connected to the links a^2, a^3 , as shown at d^4, d^5 .

It will be seen that when power is applied to move the traveler B the system of links and levers just described controls the movements of said traveler B so effectually that it must necessarily move in a straight line.

The apparatus shown in Fig. 4, though not

so simple as that illustrated in Fig. 1, is, nevertheless, advantageous where space is limited for the longitudinal accommodation of the controlling bars c , c' and f , f' . It is also advantageous in this, that the links a^2 , a^3 , a^4 , a^5 , collectively, have four pivotal bearing connections with the traveler B, whereby the latter is held more firmly and strongly in position than where but two such bearing points are used, as in Fig. 1.

When the traveler B is especially long or heavy it may be supported or controlled by a series of three or more sets of pivoted links and bars similar to those already described, the number to be used depending entirely on the requirements of the particular apparatus to which my invention is applied.

My invention may be used in connection with, or in the construction of, any mechanical apparatus where it can be used to advantage; for instance, it may be used in supporting and determining the direction of, heavy percussion or other drills; in supporting and directing in a straight line, axial and other armatures and magnetic apparatus of various kinds; also in connection with the operation of car trucks arranged to travel across the car body; in supporting valves and pistons of steam engines, and in a multitude of other situations which might be mentioned. I do not, therefore, limit the application of my invention to any particular mechanism or machine; but I desire to claim it broadly in any connection where it may be found applicable and useful.

Having thus described my invention what I claim as new and desire to secure by Letters Patent, is:—

1. A mechanical movement consisting essentially of a base, a traveler, two or more links pivotally connected to said traveler, and a series of bars having one end pivotally connected to said base and the opposite ends pivotally connected to said links, substantially as described.

2. A parallel motion apparatus consisting essentially of a base, a traveler, links pivotally connected to said traveler, parallel bars having one end pivotally connected to said base and the opposite ends pivotally connected to said links, whereby the swinging movement of said parallel bars will cause said traveler to move in a straight line relatively to said base, substantially as described.

3. In combination, substantially as de-

scribed, a base or fixture, a traveler or body arranged to move relatively to said base, two or more links pivotally connected to said movable body, and two or more sets of bars having their inner ends pivotally connected to said links, one set of said bars having their outer ends pivoted to said base or fixture on one side of said traveler and the other set of said bars having their outer ends pivoted to said base on the opposite side of said traveling body, whereby the position and direction of movement of said traveling body, relatively to said base, are controlled by said links and pivoted bars.

4. In combination, substantially as described, a base or fixture, a movable body arranged to travel relatively to said base, two links pivotally connected to said movable body, two parallel bars, each having its outer end pivotally connected to said base at one side of said movable body and its opposite end to one of said links, and two additional parallel bars, each having its outer end pivotally connected to said base at the opposite side of said movable body and its inner end to the opposite or free end of one of said links, whereby said bars and links control the position of said movable body and directs its movement in a straight line.

5. In combination, substantially as described, the base A, the traveler B, the links, a , a' , pivoted to said traveler B, the parallel bars c , c' , each having one of its inner ends pivotally connected to one end of one of said links, and its outer end to said base A, and the parallel bars f , f' , each having one of its inner ends pivotally connected to one of the opposite or free ends of one of said links a , a' , and its outer end to said base A, the series of bars c , c' , and f , f' , extending in opposite directions from said links a , a' .

6. In combination, substantially as described, a base, a traveling body movable relatively to said base, a series of links flexibly connected to said traveling body and two series of controlling bars flexibly connected to said base and to said links, said bars controlling the movements of said links and through them the position and direction of movement of said traveling body.

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Witnesses:

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