C. M. GREY.

MECHANICAL MOVEMENT.

APPLICATION FILED NOV. 8, 1910.

1,022,670. Patented Apr. 9, 1912.

Fig. 1.

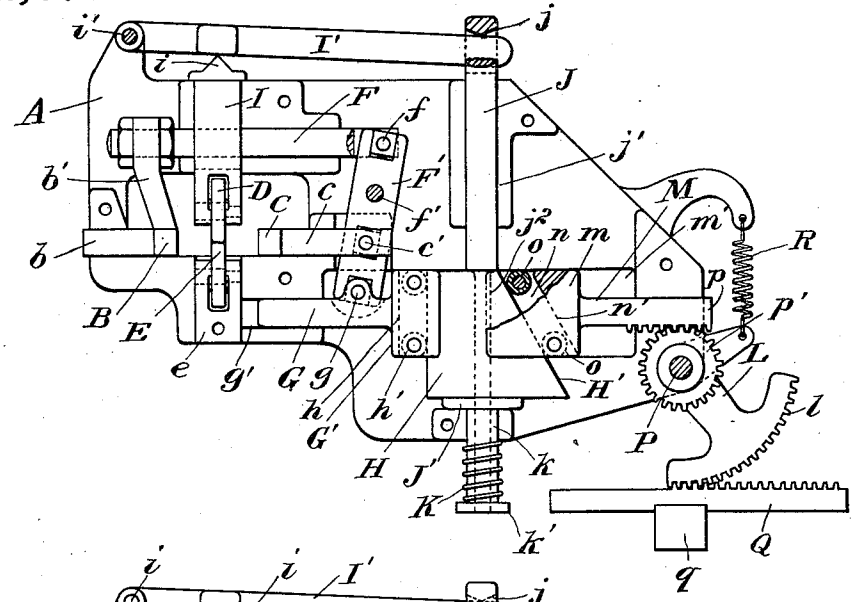


Fig. 2.

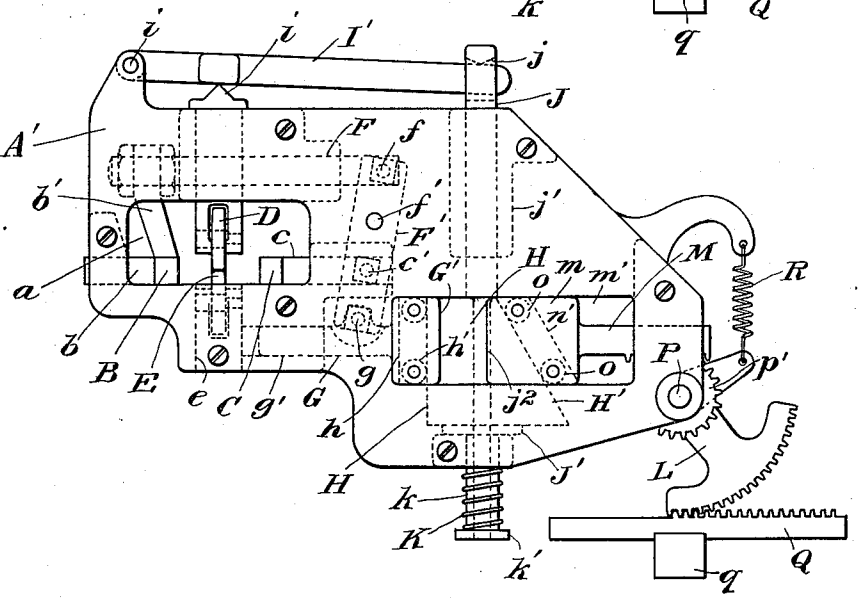
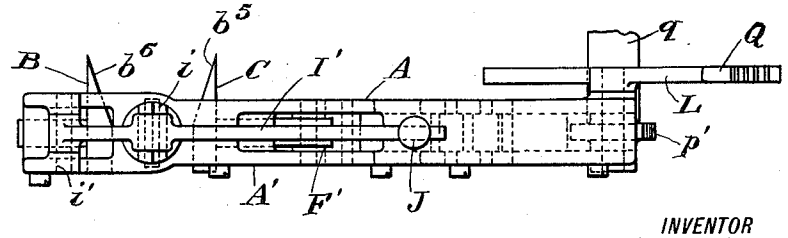


Fig. 3.



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MECHANICAL MOVEMENT.

1,022,670. Specification of Letters Patent. Patented Apr. 9, 1912.

Application filed November 8, 1910. Serial No. 591,267.

To all whom it may concern:

Be it known that I, CHARLES M. GREY, a citizen of the United States, residing in East Orange, county of Essex, and State of New Jersey, have invented a certain new and useful Mechanical Movement, of which the following is a specification.

This invention is a mechanical movement adapted for use in many arts.

Among the uses to which the invention may be applied are coin machines of various kinds, such as coin counting machines, coin assorting machines, coin or check controlled vending machines of many different varieties, telephone pay stations, etc. The movement is useful, also, in various locks.

Broadly stated, the invention is a mechanical movement embodying movable members dependent for their operation upon one or more, preferably two, dimensions of an operating member, such as a coin, a check, a key, or any analogous part, means actuated by said members whereby the movement thereof is aggregated or combined, and a transmitting member operable by said means, the total movement of said transmitting member being equal to the sum of the movement of the movable members.

The invention embodies other novel features of construction and combinations of devices as will be hereinafter described.

In the accompanying drawings I have illustrated one practical embodiment of the invention, but the construction shown therein is to be understood as illustrative, only, and not as defining the limits of the invention.

Figure 1 is a side elevation of a mechanical movement embodying the invention, a side plate of a housing being removed, and certain parts being broken away and in section. Fig. 2 is an elevation with the side plate in position. Fig. 3 is a plan view.

A designates a main framework or housing of any suitable design, said framework operating to support the various working parts of the mechanism. As shown, the framework has a removable side, A′, and said frame is constructed to accommodate substantially all the operative parts between or within its members. Within a slot, *a*, of said framework is positioned a group of primary operating members adapted to be actuated by an operating device of a suitable nature, the dimensions of which (thickness and width) vary. Said group of devices comprises, in the embodiment shown, coöperating jaws, B, C, and contacting shoes or rollers, D, E. The jaws are, preferably, beveled on their opposing faces, at b^5, see Fig. 3, and they are retained normally in a coöperative relation, the space between the jaws being less than the diameter of a coin or check or the width of an operating member. Shoes, D, E, are, preferably, rollers positioned centrally in the space between the jaws, said rollers being normally in contact at their peripheral edges. Jaw, B, is rigid with a shank, *b*, which is slidably mounted in the frame, said jaw being rigid, also, with an upwardly extending arm, *b*′. In the upper end of this arm is fastened a rod, F, extending horizontally through a part of the framework, the other end of said rod being attached by a pin, *f*, to the upper end of an upright lever, F′. Said lever is fulcrumed intermediate its ends by a pin, *f*′, in the framework. Jaw, C, is rigid with a slide, *c*, the latter being supported in a suitable guide of the housing for endwise movement therein. Said slide is connected by a pin, *c*′, to lever, F′, the pivots, *f*, *c*′, being equidistant from the fulcrum, *f*′, of said lever, F′, whereby jaws, B, C, are adapted for simultaneous movement in opposite directions and to an equal extent. The two jaws are thus connected to a member, such as lever, F′, common to both of them, and said lever is adapted to be moved by the conjoint operation of the jaws. As shown, the fulcrum of the lever is at a point to produce two lever arms unequal in length, the longer lever arm being connected by a pin, *g*, to a slide, G. Said slide is movable in a guide, *g*′, of the housing, said slide being provided at one end with a head, G′. The head is slotted vertically, as indicated by dotted lines at *h*, the walls of the slot being perpendicular to the longitudinal axis of the slide, and within the slot, at the back wall thereof, are positioned antifriction rollers, *h*′.

H, is a wedge block positioned within the housing for slidable movement in horizontal and vertical directions therein, said wedge block having an inclined face, H′. The rear edge of the wedge block is vertical, and said wedge block is positioned for its rear part to occupy the vertical slot, *h*, in slide, G, whereby rollers, *h*′, are adapted to ride upon the vertical rear edge of the wedge block during the vertical play thereof. The

wedge block is retained in coöperative relation to slide, G, by fitting said wedge block in the slot of head, G′, thus precluding any sidewise disalinement of the coöperating slide and block. It will be manifest that movement of the wedge block in a horizontal direction is due to the movements of slide, G, and lever, F′, said lever being operated in the first instance by the lateral or spreading movement of the jaws, the extent of which is dependent upon the diameter of a coin or check or upon the width of a primary operating member. Movement of the wedge block in a vertical direction, dependent upon the thickness of a coin, check or other operating member, is effected by the separation of shoes, C, D, operating the following devices. Shoe or roller, D, is journaled for free rotation in the lower forked end of a vertically positioned bar, I, the latter being guided for sliding movement in a vertical direction within the housing. The upper end of said bar is shown as being provided with a knife edge bearing, *i*, upon which rocks a lever, I′, the latter being fulcrumed by a pin, *i′*, to housing, A. The lever, I′, engages with slide, I, at a point quite close to fulcrum, *i′*, and a long arm of said lever, I′, is loosely fitted in a slot, *j*, of a lifting rod, J, the latter being slidable in a guide, *j′*, of the housing. Said lifting rod passes loosely through a vertical slot, j^2, provided in wedge block, H, and said rod is provided with a collar, J′, positioned for engagement with the lower horizontal face of the wedge block. The lower part of the lifting rod operates within a guide, *k*, depending from the housing, said lower extremity of the lifting rod being provided with a foot piece, *k′* upon which acts a spring, K, the latter being coiled upon guide, *k*, so as to be retained in position thereby. The vertical slot, j^2, permits wedge block, H, to slide in a horizontal direction relative to lifting rod, J, when said wedge block is acted upon by slide, G, the latter being operated by lateral movement of the jaws. Now, the lateral movement of the jaws is due to the insertion of an operative member between them, and such movement is dependent upon the diameter or width of such member; but the insertion of said operating member actuates, also, the shoe, D, such movement of the shoe being dependent upon the thickness of the member whereby bar, I, lever, I′, and lifting rod, J, are lifted. The elevation of rod, J, brings collar, J′, forcibly into contact with the bottom edge of wedge block, H, thereby raising it relative to slide, G, but without removing it from coöperative relation thereto, for the reason that said wedge block slides within the slot provided in the head of said slide, the vertical rear edge of the wedge block riding upon antifriction rollers, *h′*. It is apparent that the wedge block is movable in a horizontal direction, and to a certain predetermined extent, by the lateral movement of jaws, B, C, which movement is transmitted through and multiplied by lever, F′, acting upon the block through slide, G. Furthermore, the wedge block is movable in a vertical direction, and to a certain predetermined extent, by the lateral movement of shoe, D, relative to shoe, E, which movement of shoe, D, is transmitted through, and multiplied by, lever, I′, acting upon rod, J, for lifting the wedge block. Accordingly, the wedge block combines or aggregates the movements of the two independent sets of primary operating members which are moved according to the different dimensions of an insertible piece, such as a coin or key. Thus, the separation of the jaws secures a movement of the wedge block for a certain predetermined distance, and the movement of shoe, D, relative to shoe, E, imparts an additional movement to the wedge block, or vice versa. Furthermore, lever, F′, when operated by the lateral movement of the jaws acts to impart to the wedge block an increased throw or movement in a horizontal direction as compared to the movement of the jaws relative to each other; and, similarly, lever, I′, acts to impart to the wedge block an increased throw in a vertical direction as compared with the movement of shoe, D, relative to shoe, E. In other words, levers, F′, and I′, act to multiply the relative movements of the jaws and shoes, respectively, thus increasing the extent of the travel imparted to the wedge block, such proportionately increased travel of the wedge block being desirable in order to move a transmitting member, L, through a wide radius of action for the proper operation of translating or subsequently effective mechanism of any suitable nature.

Coöperating with the wedge block, and operated thereby during either the horizontal or vertical movements thereof, or both of them, is a slide, M. Said slide is shown as having a head, *m*, fitted in a slot, *m′*, of the housing, to guide the slide in a horizontal path. The head is forked, or provided with a vertical slot, *n*, one wall, *n′*, of which is inclined at an angle corresponding to face, H′, of the wedge block, and within the slotted part of said head are anti-friction rollers, *o*, positioned to ride upon the inclined face, H′, of said wedge block. The slide, M, can move only in a horizontal path, relative to the wedge block, and said slide is retained in coöperative relation to said wedge block at all times by the forked or slotted head, *m*, embracing the wedge block, said slotted head sliding in the guide afforded by slot, *m′*, of the housing. It is apparent that a vertical movement of the

wedge block, due to the action of lifting rod, J, and lever, I′, results in inclined face, H′, of the wedge block riding upon rollers, *o*, thus moving slide, M, in a horizontal direction. The movement of slide, G, in a horizontal direction by lever, F′, acts to impart sliding movement in a like direction to the wedge block and to slide, M, whereby the wedge block and slide, M, are moved for a distance equal to the sum of the movements of levers, F′, I′, which levers depend for their action upon the dimensions of an insertible operating member adapted to be positioned between the jaws and the shoes.

Slide, M, is provided with teeth, *p*, forming a rack, said rack meshing with a gear, *p′*, the latter being fixed to a shaft, P, journaled in frame, A. To this shaft is rigidly secured the transmitting member, L, herein shown as a toothed sector. This sector operates any kind of translating mechanism or subsequently effective mechanism, such as a lock works, vending mechanism, coin counting mechanism, coin assorting mechanism, telephone pay station mechanism, etc. As shown, the transmitting member meshes with a rack, Q, slidable in a guide, *q*, said rack operating the translating or subsequently effective mechanism.

Shoe, E, is shown as a roller, journaled in a bracket, *e*, fixedly attached to housing, A. As described, said shoe coöperates with shoe, D, carried by the vertically movable bar, I, but while shoe, E, is shown and described as occupying a stationary position relative to shoe, D, it is obvious that said shoe, E, may be movable.

Spring, K, acts normally to depress lifting rod, J, lever, I′, and bar, I, for the purpose of holding shoe, D, forcibly into contact with shoe, E. A spring, R, is employed for retaining jaws, B, C, in such positions that the space intervening them is less than the diameter of a coin or check, or than the width of an insertible operating member. As shown, spring, R, is connected to operate upon transmitting member, L, whereby the tension of the spring holds slides, M, G, and block, H, in contact, and said slide, G, acts on lever, F′, to move the jaws into predetermined relation.

The operation will be apparent from the foregoing description taken in connection with the drawings. An operating member, of a kind suitable for use in connection with the mechanism, is inserted, by hand or otherwise, into the space between jaws, B, C, and shoes, D, E, whereby the jaws are moved away from each other for a distance representing the diameter or width of said insertible member and shoe, D, is lifted relative to shoe, E, for a distance equal to the thickness of said insertible member. The relative movement of the jaws turns lever, F′, and shifts slide, G, to move block, H, horizontally and for a predetermined distance, whereas the elevation of shoe, D, raises bar, I, lever, I′, and rod, J, thereby causing collar, J′, to move block, H, vertically and to a predetermined extent. Said block, H, is a common element acted upon by the group of primary members, B, C, D, E, and the block operates upon member, M, to impart thereto a movement which is the sum of the aggregate movement of all the primary members multiplied in a fixed ratio by the leverage of levers, F′, I′, whereby an increased radius of action is imparted to transmitting member, L.

While I have shown and described the novel mechanical movement as embodying a system of levers adapted to multiply the respective movements of the parts of primary operating members, it is to be understood that the invention is not restricted to multiplication of the relative movements of said primary members, for the reason that the movement may have its parts so organized and combined as to divide, add, or subtract in definite ratio. Furthermore, instead of employing a lever system for transmitting the movements of the primary operating members to a single element by which said movements are combined or aggregated, I may substitute therefor a system of wedges or a differential gear, as exemplified in the mechanisms disclosed in a prior application for coin handling apparatus filed by me on October 17, 1910, Serial No. 587,357.

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

1. In a mechanical movement, movable cooperating members, means whereby said members are rendered relatively movable upon the introduction of an operating device, a transmitting member, and mechanism operated by said coöperating members for actuating said transmitting member.

2. In a mechanical movement, movable cooperating members, means whereby said members are dependent for their relative movement upon multiple dimensions of an operating device, a transmitting member, and means operated by said coöperating members for actuating said transmitting member.

3. In a mechanical movement, relatively movable coöperating members, means whereby said members are dependent for their relative movement upon one dimension of an operating device, other relatively movable members dependent for their relative movement upon another dimension of said operating device, a transmitting member, and mechanism whereby the movement of the first and second named coöperating members are applied to actuate the transmitting member.

4. In a mechanical movement, a member, means whereby said member is dependent for its movement upon one dimension of an operating device, a second member, means whereby the same is dependent for its movement upon another dimension of such operating device, a transmitting member, and mechanism dependent for its operation on the conjoint movement of said movable members for actuating the transmitting device.

5. In a mechanical movement, coöperating members, means whereby said members have movement relative to each other and are dependent for such movement upon one dimension of an operating device, other cooperating members, means whereby said members have movement relative to each other and are dependent for such movement upon another dimension of the operating device, a transmitting member, and mechanism dependent for its operation upon the conjoint relative movements of the first and second named coöperating members for actuating said transmitting member.

6. In a mechanical movement, coöperating members, one of which is movable relative to the other, means for operating said movable member upon the introduction of an operating device, a transmitting member, and means dependent upon multiple dimensions of such operating device for multiplying the movement of said movable member and communicating such multiplied movement to the transmitting member.

7. In a mechanical movement, coöperating members, means whereby said members have movement relative to each other and are dependent for such movement upon multiple dimensions of an operating device, a transmitting member, and mechanism intermediate the transmitting member and the coöperating members whereby the relative movements of said coöperating members are multiplied and applied to operate the transmitting member.

8. In a mechanical movement, coöperating members, means whereby said members have movement relative to each other and are dependent for such movement upon the multiple dimensions of an operating device, a transmitting member, and mechanism whereby the relative movement of said cooperating members are applied to impart variable movement to the transmitting member.

9. In a mechanical movement, coöperating members, means whereby said members have movement relative to each other and are dependent for such movement upon a dimension of an operating device, other cooperating members, means whereby said members have movement relative to each other and are dependent for such movement upon another dimension of the operating device, a transmitting member, and mechanism whereby the separate movements of the first and second named coöperating members are aggregated and the movement thus resulting is applied to operate the transmitting member.

10. In a mechanical movement, coöperating members, means whereby said members have movement relative to each other and are dependent for such movement upon a dimension of an operating device, other cooperating members, means whereby said members have movement relative to each other and are dependent for such movement upon another dimension of the operating device, a transmitting member, and mechanism intermediate the transmitting member and the first and second named coöperating members whereby the variable movements of the first and second named coöperating members are multiplied and the proportionately increased movement thus resulting is applied through said mechanism to operate the transmitting member.

11. In a mechanical movement, coöperating members one of which is movable relative to the other and dependent for such movement upon one dimension of an operating device, other coöperating members one of which is movable relative to the other and dependent for such movement upon another dimension of the operating device, a transmitting member, means whereby said coöperating members may be relatively moved by such operating device, and mechanism operated by the movements of said members for actuating the transmitting member.

12. In a mechanical movement, coöperating members having a relative movement dependent upon one of a plurality of dimensions of an operating device, other coöperating members having a relative movement dependent upon another dimension of said operating device, a transmitting member, means whereby said coöperating members may be relatively moved by such operating device, means actuated by a relative movement of one set of coöperating members, other means actuated by the relative movement of the other set of coöperating members, and a device common to both of said actuating means, for communicating their added movement to the transmitting member.

13. In a mechanical movement, coöperating members having a relative movement dependent upon one dimension of an operating device, other coöperating members having relative movement dependent upon another dimension of the operating device, means whereby said coöperating members may be relatively moved by such operating device, a transmitting member, and mechanism separate parts of which coöperate re-

spectively with the first and second named coöperating members and whereby the variable movements of said coöperating members are combined and the resulting movement applied to operate the transmitting member.

14. In a mechanical movement, coöperating jaws, means whereby said jaws have movement relative to each other and are dependent for such movement upon a dimension of an operating device, a lever, means for operatively connecting said lever to the respective jaws, a transmitting member, and means intermediate the lever and the transmitting member for imparting movement to said transmitting member, the extent of which movement varies in accordance with the movement of the jaws relative to each other.

15. In a mechanical movement, coöperating members one of which is movable relative to the other, a lever, means for operatively connecting said lever with said movable member, a transmitting member, and a movable connecting member operated by said lever and coöperating with the transmitting member for imparting thereto variable movement governed by multiple dimensions of an operating device, the extent of which varies proportionately to the movement of one member relative to the other.

16. In a mechanical movement, two sets of coöperating members, means whereby said members are dependent for their movement upon different dimensions of an operating device, a wedge block, means operated by the individual coöperating members and adapted to impart movement to said wedge block, and a transmitting member coöperating with said wedge block.

17. In a mechanical movement, two sets of movable coöperating members, means whereby said members are dependent for their movement upon different dimensions of an operating device, a transmitting member, a wedge block coöperating therewith, and lever mechanism coöperating with the wedge block and controllable by the separate movement of the two sets of coöperating members.

18. In a mechanical movement, a plurality of coöperating members having relative movement and dependent for such movement upon one dimension of an operating device, other coöperating members having relative movement and dependent for such movement upon another dimension of the operating device, means whereby said members may be relatively moved by such operating device, a transmitting member, means operated by the movements of the first and second named coöperating members for aggregating such movements and applying the same to the transmitting member, and a translating device actuated by said transmitting member.

19. In a mechanical movement, a plurality of coöperating members, means whereby said members may be relatively moved, said movement being dependent upon one dimension of an operating device, other coöperating members having relative movement and dependent for such movement upon another dimension of the operating device, a transmitting member, means for aggregating the separate movements of the first and second named coöperating members and applying the aggregated movement to impart variable movement to the transmitting member, and a translating device operated by the variable movement of the transmitting member.

20. In a mechanical movement, a plurality of coöperating members disposed to admit the passage of an operating device therebetween, means whereby said members have relative movement and are dependent for such movement upon a dimension of such operating device, a transmitting member, and mechanism operated by said coöperating members by the passage of the operating device therebetween for actuating said transmitting member.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

CHARLES M. GREY.

Witnesses:
H. I. BERNHARD,
J. MOTHERSHEAD.