C. F. KNOWLTON & F. F. ELLIOT.

MECHANICAL MOVEMENT.

APPLICATION FILED MAR. 30, 1909.

1,028,886.

Patented June 11, 1912.

3 SHEETS—SHEET 1.

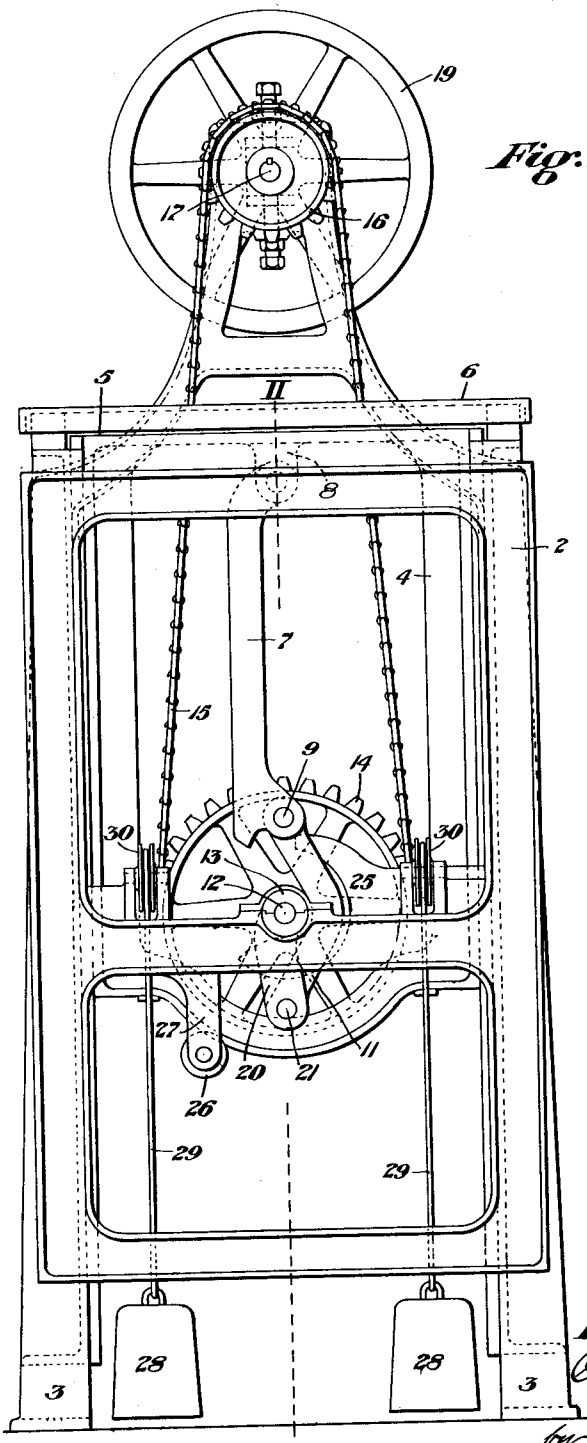

Fig. 1.

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3 SHEETS—SHEET 2.

Fig. 2.

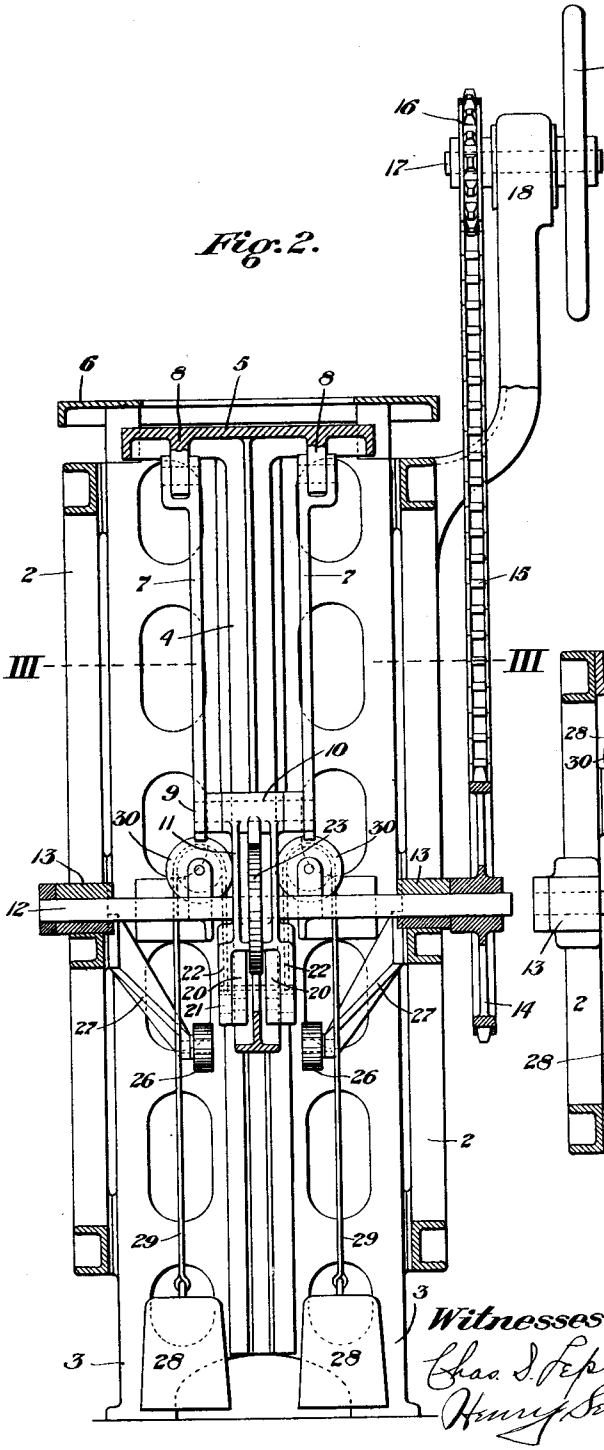
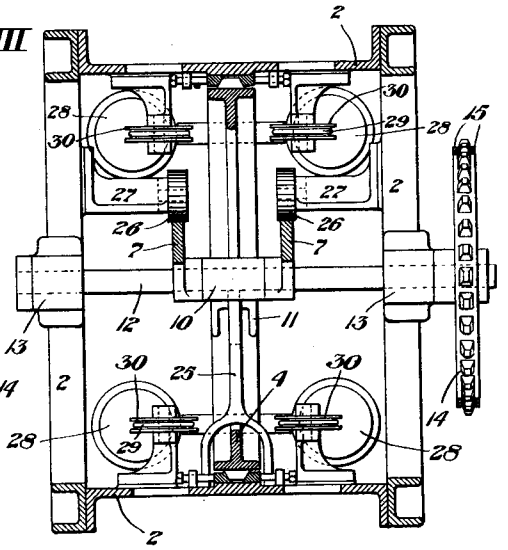


Fig. 3.



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3 SHEETS—SHEET 3.

Fig. 8.

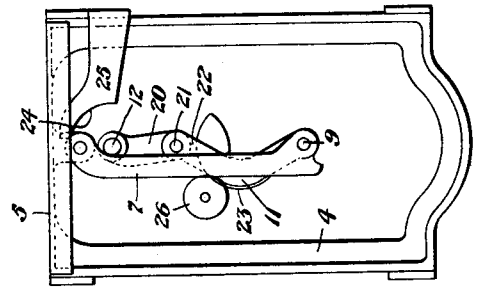


Fig. 7.

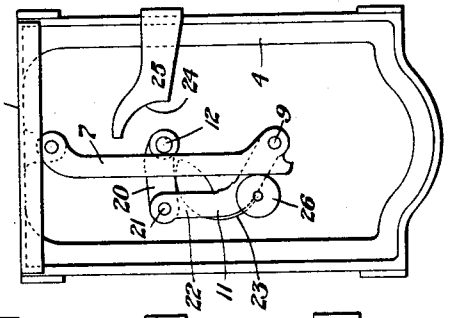


Fig. 10.

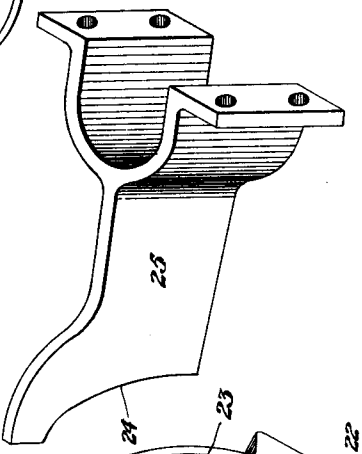


Fig. 6.

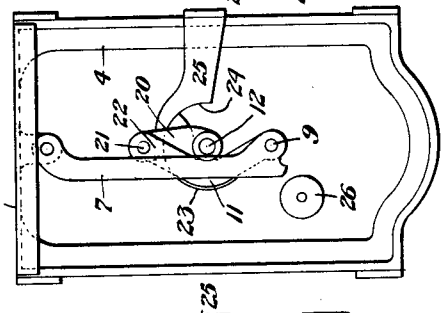


Fig. 5.

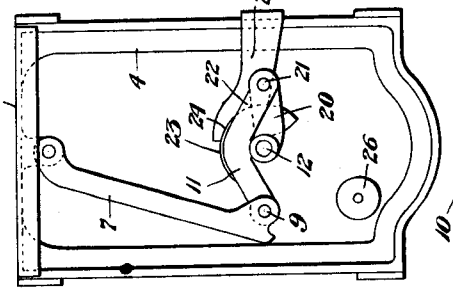


Fig. 9.

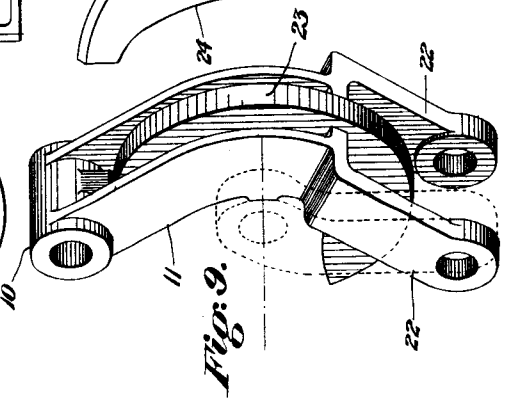
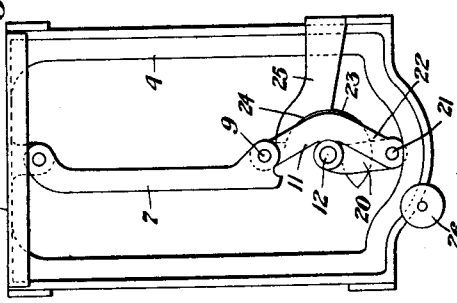


Fig. 4



Witnesses:
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by Chas. Clark
their attorney

UNITED STATES PATENT OFFICE.

CHARLES F. KNOWLTON, OF PITTSBURGH, AND FRANK F. ELLIOT, OF ROSS TOWNSHIP, ALLEGHENY COUNTY, PENNSYLVANIA, ASSIGNORS TO THE OSBORN MANUFACTURING COMPANY, OF CLEVELAND, OHIO, A CORPORATION OF OHIO.

MECHANICAL MOVEMENT.

1,028,886. Specification of Letters Patent. Patented June 11, 1912.

Application filed March 30, 1909. Serial No. 486,812.

To all whom it may concern:

Be it known that we, CHARLES F. KNOWLTON and FRANK F. ELLIOT, citizens of the United States, residing at Pittsburgh, N. S., and Ross township, respectively, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Mechanical Movements, of which the following is a specification, reference being had therein to the accompanying drawing.

Our invention consists of an improvement in mechanical movements.

The apparatus is particularly designed for use in molding machines and has for its object to provide means for withdrawing the pattern downwardly from the flask which will effect the vertical movement of patterns of excessive length by operating mechanism of compact construction, so designed as to impart continuous movement to the pattern carrier and pattern for the full length of the draw with a relatively shorter crank travel, through operating and connecting elements, and by the apparatus hereinafter more fully described.

In molding apparatus it is desirable that the pattern shall be steadily and continuously drawn from the flask, and for economy of space and continuous direct application of the power, the drawing mechanism shall be as compact as possible. These objects are secured in our invention.

Referring to the drawings:—Figure 1 is a view in front elevation of a machine embodying the invention, the pattern plate being shown at its uppermost position. Fig. 2 is a similar view in side elevation partly in section, centrally through Fig. 1, on the line II. II. thereof. Fig. 3 is a horizontal sectional view on the line III. III. of Fig. 2. Figs. 4 to 8 inclusive, are diagrammatic detail views of the operative mechanism for continuously lowering the pattern plate and its supporting frame. Fig. 9 is a detail view in perspective of the multiplying crank link. Fig. 10 is a similar view of the controlling bearing therefor.

2 represents the main frame of the machine of generally rectangular form having supporting pedestals 3 at each corner, by which it is supported upon the foundation. Said frame 2 is of any suitable construction, adapted to support the working parts and provide a hollow interior clearance for the vertically movable pattern carrying frame 4, indicated more in detail in Figs. 4 to 8 inclusive. Said frame 4 is also of rectangular skeleton form carrying at its upper end the pattern plate 5 to which it is secured and which is to be drawn downwardly from within the mold, which is supported upon the usual stationary stripping plate 6 located upwardly above and supported upon the main frame 2 in any suitable manner.

The pattern frame 4 is slidingly mounted within suitable bearings in frame 2 of any suitable construction for maintaining it in vertical alinement with the flask supported upon the stripping plate, and is lowered by links or pitmen 7, 7. Said links are pivotally secured at their upper ends to downwardly extending lugs 8 forming a part of the pattern plate 5 or of frame 4 as desired, and at their lower ends are also pivotally secured at 9 to the terminals 10 of the multiplying crank link 11.

12 represents the operating shaft of the machine, mounted in suitable bearings 13 at each side, having suitable actuating mechanism, as a sprocket wheel 14, geared by sprocket chain 15 with the driving wheel 16 mounted upon shaft 17 in bearing 18 extending upwardly at one side of the main frame, shaft 17 being secured at its outer end to a hand-operating wheel or lever 19, of any suitable construction. By this means the shaft 12 and its connected mechanism is operated at any desired speed.

If desired, shaft 12 may be operated by any other suitable means or mechanism, as by a motor geared with it from below or otherwise through suitable gearing.

Keyed or otherwise secured to shaft 12 at each side of the vertical center of crank link 11, are crank arms 20, 20, which arms are pivotally secured at 21 to the downwardly extending bifurcated terminals 22, 22, of the multiplying crank link 11, at each side of its middle annular bearing body portion 23. The center of shaft 12 is thus the pivotal center of cranks 20. Said middle portion 23 is of partly circular form, described from a center conforming to the center of shaft 12, and constitutes a controlling bearing for link 11, insuring its rotation around the center of shaft 12 during the lowering of the pattern, by engagement against the corre-

spondingly curved face 24 of a bracket 25 extending inwardly from the frame 2, to which it is secured. That is to say, the sectional cylindrical portion 23 of the multiplying crank link is in constant bearing engagement with the curved face 24 of bracket 25, during the lowering operation, whereby the said link is braced and caused to impart a constant lowering travel to links 7 and the pattern supporting frame 4.

26 represents bearing rollers for links 7 mounted upon studs extending inwardly from brackets 27. As crank arms 20 rotate, the pattern frame being in the uppermost position and bearing 23 being in contact with the face 24, a centralizing journal mounting is thus provided for the multiplying crank link 11, whereby, as it is actuated by crank arms 20, it is swung around the center of shaft 12, drawing links 7 downwardly to the position shown in Fig. 6 of the drawings. At such position crank arms 20 will have made a one-half revolution from their lowermost to their uppermost position and have reversed the multiplying crank link under control of the bearing 24, lowering the pattern frame and pattern to the same extent of the one-half revolution of shaft 12. Further continued revolution of the shaft and movement of crank arms 20 carries links 7 downwardly, the multiplying crank links 11 now acting merely as a free connecting link as indicated in Fig. 7, the lower ends of links 7 coming into bracing contact with rollers 26. Continued rotation of shaft 12 will impart, through link 11, continuous downward travel of the pattern support, links 7 being braced by rollers 26, until the support and pattern are dropped to their lowermost position, as indicated in Fig. 8. It will be observed that such travel is exactly double that of the full travel of the crank arms 20 from the uppermost to the lowermost position, and is accomplished through the operation of the multiplying crank link and its controlling bearing.

The weight of the pattern carrier and its parts is overbalanced by counter-weights 28 depending by cords or flexible connections 29 passing over sheaves 30 and secured at their other ends to the lower portion of the frame 4 of the pattern carrier. By this arrangement, as the pattern frame is lowered as above described, the weights will be raised to a position whereby their gravity may accomplish the lifting of the pattern frame, upon reversal of the rotation of shaft 12 through an entire revolution, bringing the operating parts to their original position as shown in Fig. 4. In such raising operation, the links 7 will ride upwardly against rollers 26 and the multiplying crank link will operate in a reverse direction, finally arriving at its original position and engaging the bracket 27, the terminal of which provides a limiting stop for the upper end of the multiplying crank link, positively arresting its movement and fixing the position of the parts for operation.

It will thus be seen that with the construction described, we accomplish the full desired travel for lowering of the pattern with a crank travel of but one-half thereof and through mechanism which is compactly associated together within the contracted space provided. The several parts are of simple construction, strong and well adapted for the purpose, and insure certainty and reliability of operation.

The advantages of a molding apparatus in which the pattern may be withdrawn for its full length by such a mechanism will be readily appreciated by all those familiar with this class of machinery and avoids the necessity of providing space for operative mechanism the length of travel of which is co-extensive with that of the pattern.

The invention may be changed or varied in different details or features of construction or its proportions may be so designed as to suit varying conditions of use, but all such changes are to be considered as within the scope of the following claims.

What we claim is:—

1. Means for imparting motion to the moving element of a machine consisting of a completely revoluble actuating crank having a less throw than the whole movement desired, and a link connected with the crank and the moving element and arranged to be swung bodily around the pivotal center of the crank.

2. Means for imparting motion to the moving element of a machine consisting of a completely revoluble actuating crank having a less throw than the whole movement desired, a link connected with the crank and the moving element, and means controlling the link whereby it is carried by the crank around the pivotal center thereof.

3. Means for imparting motion to the moving element of a machine consisting of a completely revoluble actuating crank, a link connected with the crank and moving element respectively, and means controlling the movement of the link whereby it is bodily swung by the crank around the pivotal center thereof.

4. Means for imparting motion to the moving element of a machine consisting of a completely revoluble crank, a link connected with the crank and moving element respectively, and means controlling the movement of the link whereby it is bodily swung by the crank around the pivotal center thereof for one half revolution of the crank and away therefrom during the other half revolution.

5. Means for imparting motion to the moving element of a machine having a pit-

man consisting of a completely revoluble actuating crank, a link connected with the crank at one of its ends and at the other to the pitman, means controlling the movement of the link whereby it is bodily swung by the crank around the pivoted center thereof, and means controlling the movement of the pitman, substantially as set forth.

6. Means for imparting motion to the moving element of a machine consisting of a completely revoluble crank, a multiplying crank link having a part-circular bearing portion, a bearing therefor, and means connecting the crank link with the moving element, substantially as set forth.

7. The combination with a moving element, of a shaft, a crank secured to said shaft and completely revoluble around the center thereof, a connected multiplying crank link connected to said crank, means controlling the rotation of said crank link around the shaft as a center, and means connecting said link with the moving element, substantially as set forth.

8. The combination with a moving element, of a shaft, a crank secured to said shaft and completely revoluble around the center thereof, a connected multiplying crank link connected to said crank, means controlling the rotation of said crank link around the shaft as a center, a connecting rod secured to the crank link and moving element, and a controlling bearing roller therefor, substantially as set forth.

9. In a machine, the combination of a frame, a vertically reciprocating moving element therein, counterweights for the moving element, an actuating shaft provided with a crank, a multiplying crank link connected with the crank and having an annular bearing portion, a stationary bearing device arranged to engage said bearing portion, and means connecting the crank link with the moving element, substantially as set forth.

10. In a machine, the combination of a frame, a vertically reciprocating moving element therein, counterweights for the moving element, an actuating shaft provided with a crank, a multiplying crank link connected with the crank and having an annular bearing portion, a stationary bearing device arranged to engage said bearing portion, a pitman connecting the crank link with the moving element, and a controlling roller therefor, substantially as set forth.

11. In a machine, the combination of a frame, a vertically reciprocating moving element therein, counterweights for the moving element, an actuating shaft provided with a crank, a multiplying crank link connected with the crank and having an annular bearing portion, a stationary bearing device arranged to engage said bearing portion, means connecting the crank link with the moving element, and means for actuating the shaft, substantially as set forth.

12. Means for imparting movement to a body consisting of a shaft and a crank having a throw less than the whole movement desired, a multiplying crank link having an annular bearing portion and connected at one end to the crank, a bearing bracket arranged to engage said bearing portion, and means connecting the other end of the crank link with the body, substantially as set forth.

In testimony whereof we affix our signatures in presence of two witnesses.

CHARLES F. KNOWLTON.
FRANK F. ELLIOT.

Witnesses:
C. M. CLARKE,
H. M. WILLIS.