

Dec. 6, 1960

R. RAMIREZ

2,962,788

BRICK MAKING APPARATUS

Filed June 26, 1957

3 Sheets-Sheet 1

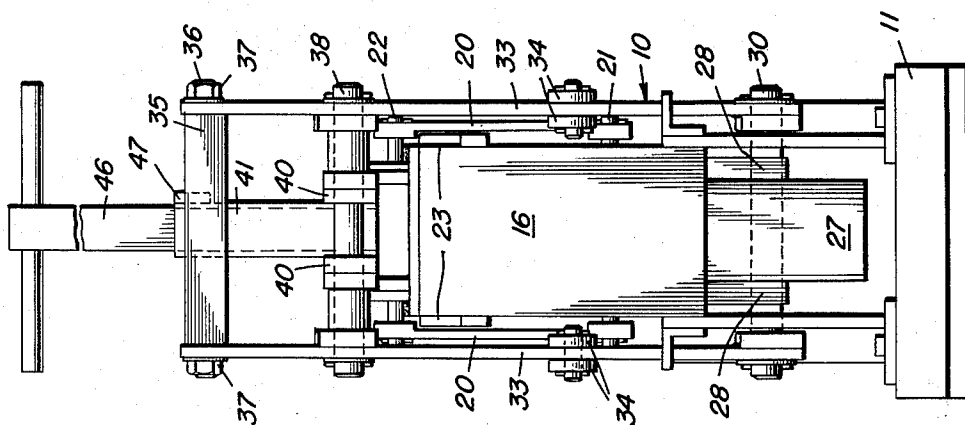


Fig. 2.

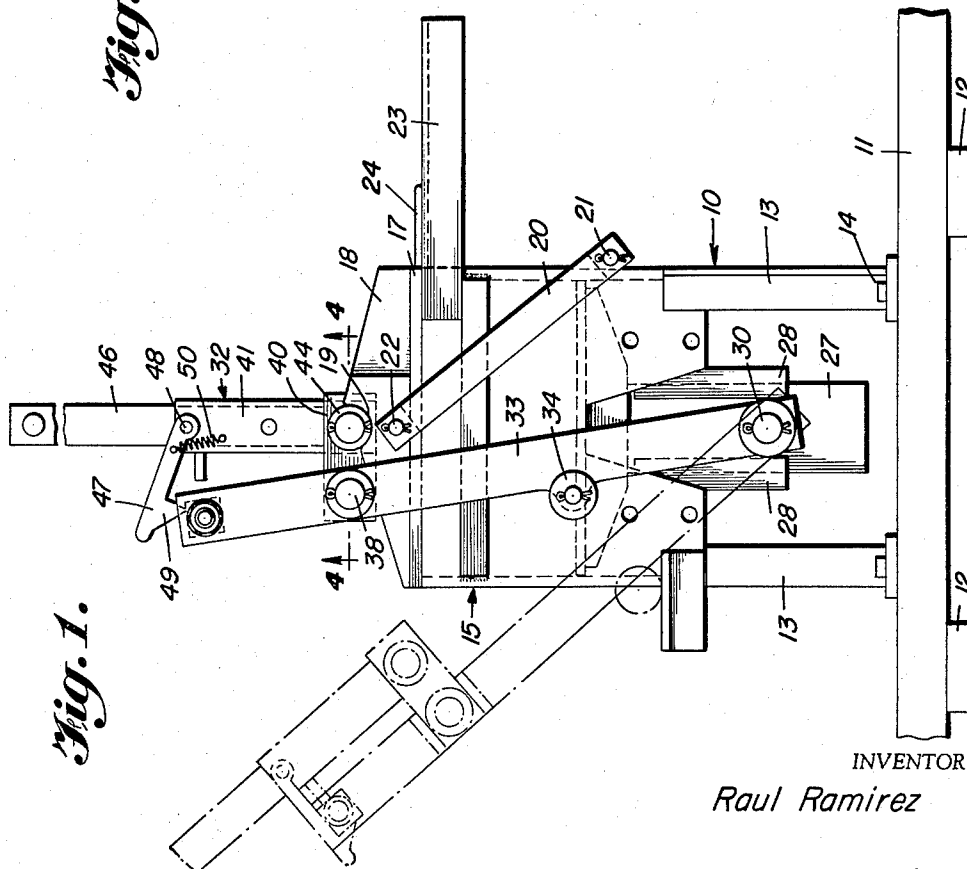


Fig. 1.

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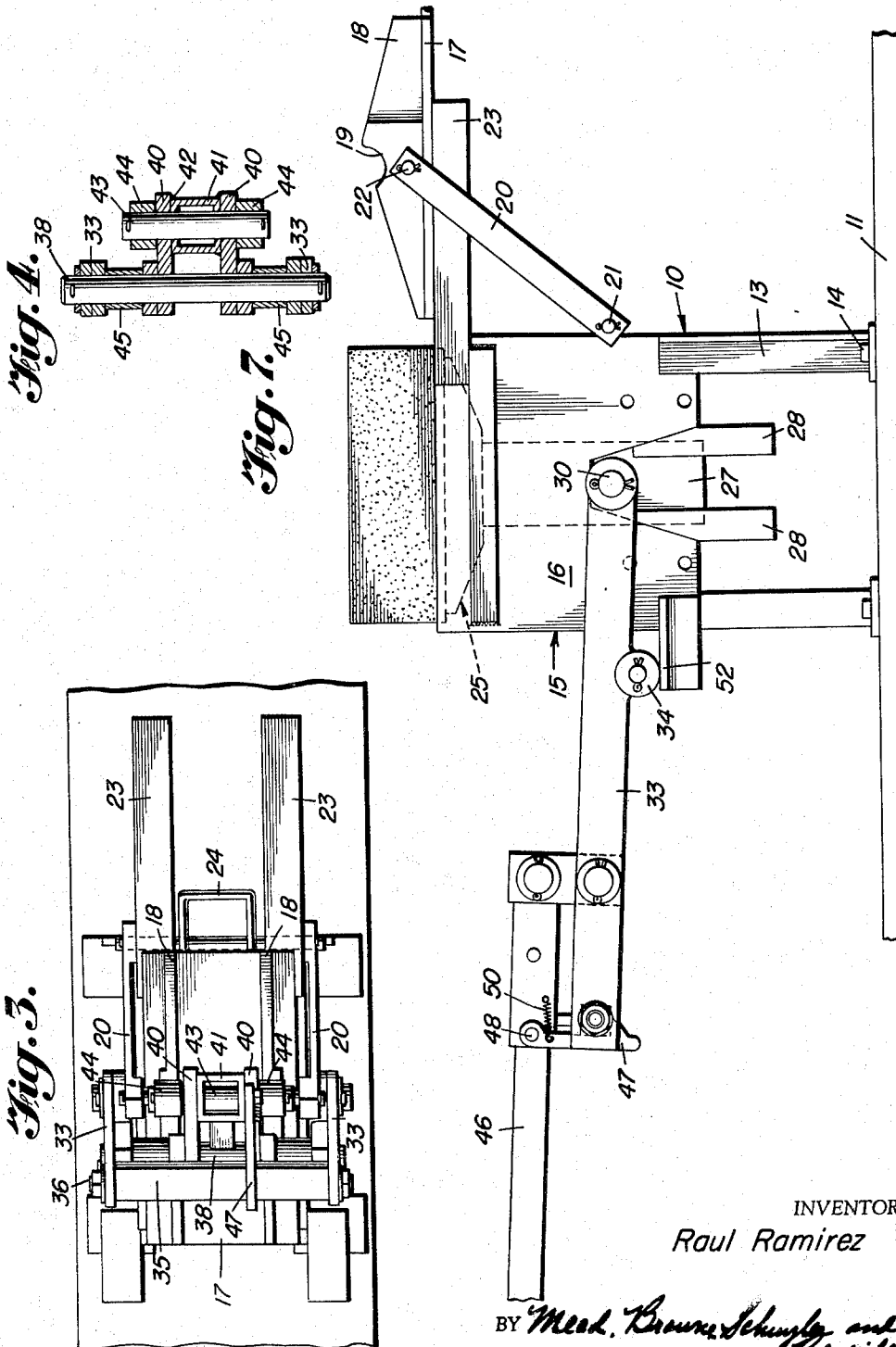
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3 Sheets-Sheet 2



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3 Sheets-Sheet 3

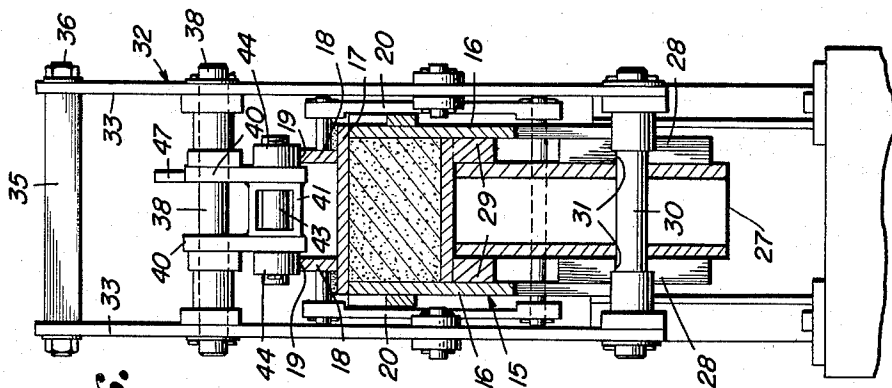


Fig. 6.

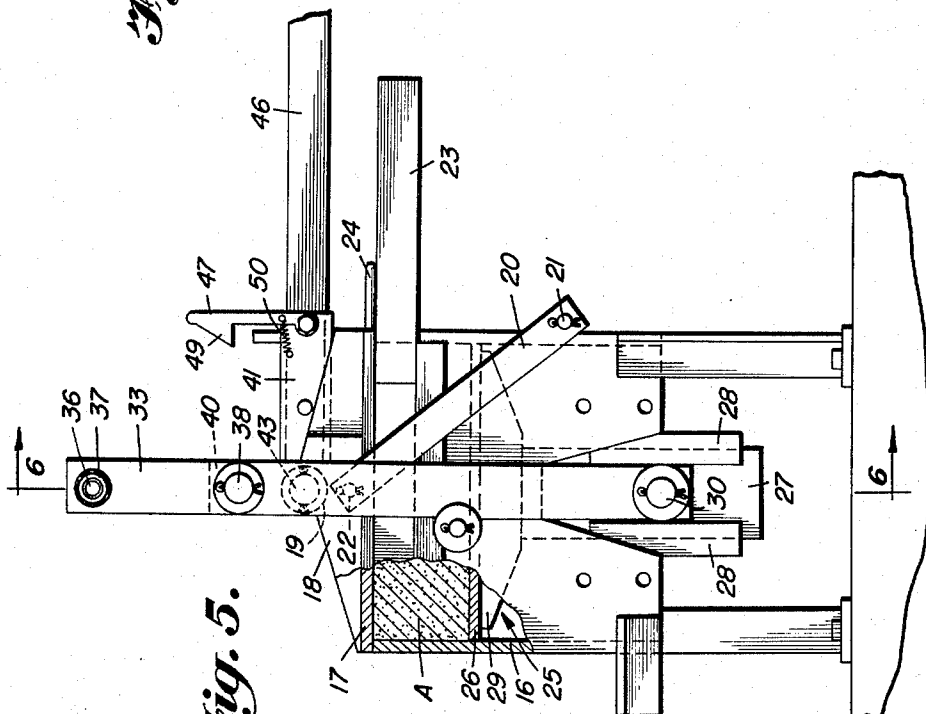


Fig. 5.

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2,962,788

BRICK MAKING APPARATUS

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9 Claims. (Cl. 25—87)

The present invention relates to a brick making apparatus and more particularly to an apparatus for compressing brick-forming ingredients into a brick or block of suitable size for use in building construction.

The present invention proposes a simple, inexpensive, hand-operable apparatus for the manufacture of building blocks. While the apparatus of the present invention may be utilized to manufacture bricks or the like from a wide variety of material, it has been developed for particular use with soil-containing blocks. Preferably, the apparatus is utilized with soil containing about 70% sand and 30% clay, in a wide variety of grain sizes, to which has been added from 5 to 10% of cement and just enough water to ensure that the mix retains its form when pressed in the palm of the hand and released. This material is readily compacted by utilization of the machine of the present invention into a block or brick of convenient size for utilization in building construction. Blocks of various sizes, contours, and shapes may be produced, the same machine being utilizable with discs or rams of various shapes to provide roofing tile, floor blocks, and wall blocks or brick.

Generally, the device of the present invention comprises an open-ended body of rectangular outline adapted to be closed at one end by a cover provided with a socket or bearing seat and closed at the other end by a piston movable toward the cover to compress the brick-making ingredients such as soil, cement and water, as heretofore described, therebetween.

The compression of the materials is carried out through the medium of an articulated lever which includes a first or yoke portion which is pivoted adjacent its lower end to the piston and which is pivoted adjacent its upper end to a bell crank forming the second portion of the lever. This bell crank portion of the lever includes an elongated handle, a bearing engaging the socket of the body cover, and a pivotal connection to the yoke.

In operation, the ingredients are placed within the body, the cover is moved to overlie the body, and the lever is positioned so that the bell crank socket bearing engages the cover socket. Next, the elongated handle of the bell crank is depressed, thus elevating the yoke about the bell crank socket bearing to force the piston toward the body cover to compress the block-forming materials therebetween. During this compression stroke, the yoke and the bell crank portions of the handle are relatively movable.

Next, the bell crank is returned to its initial position, the articulated lever portions are jointly moved to remove the bell crank bearings from the cover socket, and the lever moves as a unit in a direction opposite to its compression movement. When the lever clears the cover, the cover is opened, and the lever elevates the piston, by movement of the lever about a second fulcrum, so as to eject the block from the body.

The compressed block is now cured, as by being allowed to air dry for an extended period of time, to form a finished block.

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It is, therefore, an important object of the present invention to provide a new, inexpensive, hand-operable brick or block making machine.

Another important object of the present invention is the provision of new and improved apparatus for the compression of brick-forming ingredients by the subjection of the ingredients to mechanical pressure applied through an articulated lever.

It is a further object of this invention to provide a block-making apparatus wherein block-forming ingredients are compressed between a cover and a piston by movement of a bell crank lever reacting against the cover.

Still another important object is the provision of a block-making machine wherein a bell crank lever fulcrumed on the cover of a container for the block-forming ingredients is utilized to elevate a piston-carrying yoke to compress the ingredients between the piston and the cover.

It is yet another object to provide a brick-making machine wherein a novel actuating lever mechanism is provided for actuating a compression piston, the lever being articulated with the portions thereof separately movable to compress the block-forming ingredients and the articulated portions being co-movable to eject a finished block from the apparatus.

Other objects, features and advantages of the invention will become apparent from the following specification taken in conjunction with the accompanying drawings wherein:

Figure 1 is a side elevational view of an apparatus of the present invention;

Figure 2 is an end elevational view of the apparatus of Figure 1, with certain parts shown in an adjusted position;

Figure 3 is a plan view of the apparatus of Figures 1 and 2;

Figure 4 is a sectional view taken along the plane 4—4 of Figure 1;

Figure 5 is a view similar to Figure 1, with parts broken away and in section, illustrating an adjusted position of the apparatus;

Figure 6 is a sectional view, with parts shown in elevation, taken along the plane 6—6 of Figure 5; and

Figure 7 is a view similar to Figure 1 illustrating another adjusted position of the apparatus.

As shown in the drawings:

In Figures 1-3, reference numeral 10 refers generally to an apparatus of the present invention supported upon a base 11 of convenient size and shape. This base 11 may be desirably formed of a wooden plank supported above ground level by transverse lower cleats 12.

The apparatus 10 comprises a plurality of rectangularly disposed upstanding supporting legs 13 formed of angle iron or the like and secured to the base 11 by suitable means, as by bolts and nuts 14. Surmounting the legs 13 and secured thereto by suitable means, as by welding, is a generally rectangular open-ended body 15, the vertically extending walls 16 of which may be formed of steel plate or the like welded or otherwise affixed together.

The open upper end of the body 15 is adapted to be closed by a cover plate 17, this cover plate being provided with a pair of laterally spaced upstanding ribs 18 having notches or sockets 19 formed therein, the notches 19 of the two plates being transversely aligned, as best shown in Figure 6 of the drawings.

To facilitate adjustment of the cover 17, the cover is carried by a pair of transversely spaced links 20 each of which is pivoted at either end to the body 15, as at 21, and to the cover 17, as at 22. The cover is movable, through the links 20 between a closed position surmounting the body 15 (Fig. 1) and an open position at which

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the interior of the body is exposed (Fig. 7), the body carrying a pair of transversely spaced supporting rails 23 to support the cover in its open position, as best shown in Figure 7. Secured to the cover plate 17 and projecting therefrom intermediate the rails 23 is a U-shaped handle 24 by means of which the cover may be conveniently moved to either of its two positions.

Slidably disposed within the body 15 to be guided by the walls 16 thereof is a vertically movable piston indicated generally at 25. This piston comprises an upper piston plate 26 of substantially the same contour as the body and sized to be snugly received between the walls 16 thereof. Depending from the plate 26 and secured thereto, as by welding, is a depending tubular piston extension 27. The piston extension 27 is guided for reciprocal vertical movement by a pair of vertical guide elements 28 carried by the lateral side walls 16 and depending therefrom. Additional guiding support for the piston plate 26 is provided by a pair of depending piston side plates 29 joined to the piston plate 26 and to the piston extension 27.

The piston extension is traversed by a laterally extending wrist-pin 30 extending through apertures 31 in the side walls of the piston extension 27 and serving to pivotally interconnect the piston extension 27 and an articulated handle construction indicated generally at 32.

More specifically, the wrist-pin 30 serves to pivotally interconnect the piston extension 27 and a pair of upwardly projecting yoke arms 33, each of the arms carrying rollers 34 intermediate its length, for a purpose to be hereinafter more fully described, and the arms 33 being joined at their upper ends by a transversely extending latch bar 35 through which projects a bolt 36 secured by nuts 37. The arms 33, the wrist-pin 30 and the latch bar 35 thus define an open, rectangular yoke adapted to straddle the body 15.

The arms 33 are also interconnected by means of a transverse pivot pin 38 adjacent the latch bar 35 and generally parallel thereto. Also disposed upon this pivot pin 38 are a pair of lever arms 40 which form one portion of a bell crank lever, the other portion of the lever being defined by a central socket arm 41.

The lever arms 40 and the socket arm 41 interposed therebetween are rigidly secured together, as by welding 42 (Fig. 4), and cooperably define a bell crank lever. The cooperable arms 40 and 41 are traversed by a fulcrum pin 43 which carries fulcrum rollers 44 lying outside the confines of the arms 40. To rigidify the bell crank construction, the pin 38 is surrounded by filler spools 45 interposed between the arms 33 and the arms 40 (Fig. 4).

The socket rollers 44 are adapted to be received by the sockets 19 formed on the upstanding webs 18 of the cover plate 17, as best illustrated in Figures 1, 2 and 3. Inserted into the hollow socket arm 41 is an elongated handle 46 which can be removed from the socket arm to accommodate transport of the apparatus. The socket arm also carries a latch arm 47 pivoted thereto, as by bolt 48, and carrying a depending latch projection 49 adapted to engage the rectangular latch bar 35 under the influence of a coiled tension spring 50.

The operation of the articulated lever construction will be readily appreciated. With the latch 47 depressed so that its projection 49 contacts the rectangular bar 35, and with the cover plate 17 in its closed position, as illustrated in Figures 1, 2 and 3, the handle 46 is moved in a counterclockwise direction to a position just clear of the cover plate 17, as shown by the broken lines in Figure 1. Counterclockwise movement of handle 46 with the latch 47 depressed causes the lever to move as a whole, and this movement of the handle 46 thereby causes yoke arms 33 to move in a counterclockwise direction. The cover plate 17 is then swung to its open position as illustrated in Figure 7 by means of the handle 24, and

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brick making ingredients A (Figure 5) are inserted on the piston plate 26 within the body 15. The cover plate 17 is then closed and the handle 46 together with yoke arms 33 are returned to the position shown in Figures 1, 2 and 3. Return of handle 46 will cause the socket rollers 44 to enter the cover sockets 19, the extended handle 46 lying substantially vertical, the bell crank arms 40 lying substantially horizontal, and the yoke arms 33 occupying their angular position of Figure 1.

Next, the latch 47 is elevated against the tension of the spring 50 to release the handle 46 for movement relative to the yoke arms 33. Upon clockwise movement of the extended arm 46 from its position illustrated in Figure 1, the bell crank lever composed of the socket arm 41 and the bell crank arms 40 will be rotated until the arm 41 lies substantially horizontal and the arms 40 lie substantially vertical and in alignment with the yoke arms 33, as illustrated in Figure 5. By this movement of the handle 46, the pivot pin 38 is rotated about the fulcrum pin 43, drawing the yoke arms 33 vertically and elevating the piston plate 26 toward the cover plate 17, thereby compressing the brick-making ingredients A confined within the body 15 and interposed between the cover plate 17 and the piston plate 26.

This vertical movement of the piston will be guided by the piston side plates 29, the piston extension 27 and the piston extension guides 28. The degree of compression obtained is dependent upon the length of the bell crank arms 40, and the leverage obtained is dependent primarily upon the length of the elongated handle 46. By using an extended handle 46, substantial leverages can be obtained and a significant compression pressure can be exerted by the upward movement of the piston plate 26 upon the ingredients A.

Following the compression of the block, the elongated handle 46 is returned to its substantially vertical position of Figure 1, followed by additional movement to the left or counter-clockwise, as viewed in Figure 1. This counter-clockwise movement of the handle will disengage the fulcrum rollers 44 from the fulcrum sockets 19 on the cover plate 17, and the cover may then be swung to its open position as illustrated in Figure 7 of the drawings. After the cover has been opened, the arm extension 46 may then be swung in a counter-clockwise direction to the position illustrated in Figure 7 of the drawings. As the arm is swung to its position of Figure 7, and the arm is freed of the cover, the rollers 34 intermediate the length of the yoke arms 33 will engage laterally extending fulcrum plates 52 carried by the cover side plates 16. Also, during this disengagement of the arm from the cover, the latch 47 will be cammed upwardly to its position of Figure 1 so that the depending catch projection 49 can engage the catch bar 35, and subsequent movement of the handle extension 46 will move the bell crank (comprising the arms 40 and 41) and the yoke (comprising the arms 33) as a unit.

Once the rollers 34 have contacted the fulcrum extension 52, further counter-clockwise movement of the arm assembly will elevate the piston extension 27 and the piston plate 26, so that the compressed block is elevated through the open top of the body 15 as best illustrated in Figure 7 of the drawings. This vertical movement of the piston 25 thus occurs about the variable fulcrum provided by the bearing plates 52 and the rollers 34.

Thus, it will be seen that the present invention provides a new, novel, inexpensive, easily manually operable brick or block-making apparatus wherein block ingredients are compressed between a removable cover plate and a reciprocal piston by actuation of the bell crank lever and yoke assembly. The bell crank lever and yoke assembly actually forms an articulated handle or lever which is fulcrumed at the cover during the compression stroke of the piston and which is fulcrumed at a different point during ejection movement of the piston.

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Assuming that the compressed block has been formed from ingredients consisting of soil, from 5 to 10% cement, and water, the compressed block should be cured for an extended period of time, on the order of 10 to 20 days prior to its use as a building block. However, with the exception of the final cure, all of the manipulative steps necessary to form a finished block take place within the apparatus of the present invention, this apparatus being effective to compact, compress, and eject the block or brick.

While I have described and illustrated an embodiment of my invention, I wish it to be understood that I do not intend to be restricted solely thereto but that I do intend to cover all modifications thereof which would be apparent to one skilled in the art and which come within the spirit and scope of my invention.

What I claim as my invention is:

1. A block-making apparatus comprising an open-ended body adapted to receive block-making ingredients, a cover for closing one end of said body, a piston inserted into the other end of said body, and an articulated lever including a first yoke portion pivoted adjacent one end to said piston and a second bell crank portion having one arm pivoted adjacent the free end thereof to said yoke portion adjacent said cover and having another elongated arm angularly related to said one arm, said second portion of said lever having a pivot bearing intermediate said arms for contacting said cover and rigidly holding the same against said body, movement of said elongated arm about said bearing tensioning said yoke to draw said piston toward said cover and to maintain said cover in said rigid relationship with said body, thereby compressing the ingredients in said body.

2. A block-making apparatus comprising an open-ended body, a cover for closing one end of said body, a piston inserted into the other end of said body, and means for actuating said piston toward said cover to compress block-forming ingredients interposed therebetween, said means including a bell crank lever fulcrumed at said cover, a tension link having one portion thereof directly connected to one end of said bell crank lever and having another portion thereof directly connected to said piston, and an elongated manually operable handle at the other end of said bell crank lever, arcuate movement of said handle actuating said bell crank lever about said fulcrum and drawing said piston toward said cover to compress said brick-making ingredients therebetween, said fulcrum exerting a positive force against said cover during said arcuate movement to maintain said cover and said body in rigid relationship.

3. A block-forming apparatus comprising a body having open upper and lower ends, a cover selectively movable to open and close one end of said body, a piston inserted into the other end of said body, and piston actuating means having a first element pivotally connected to said piston and having a second element including two diverging arms thereon intersecting to form a pivot bearing fulcrumed at said cover, one of said arms being pivotally connected adjacent the free end thereof to said first element, movement of said second element about said fulcrum drawing said first element and said piston vertically toward said cover while maintaining said cover in rigid relationship with said body, and said first and second elements being jointly movable about a second fulcrum to eject compressed ingredients from said body when said cover is open.

4. A block-forming apparatus comprising a body having open upper and lower ends, a cover adapted to close one end of said body, a piston inserted into the other end of said body, and an articulated lever having a first element pivotally connected to said piston and having a second element including two diverging arms thereon, the diverging end of one of said arms being pivotally connected to said first element, means on said cover cooperable with said second element to define a first fulcrum

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about which the second element is movable to actuate said piston toward said cover and to exert a positive, direct force through said first fulcrum to press said cover firmly against said body, and additional means cooperating with said first element to define a second fulcrum about which said first element is movable to eject compressed ingredients from said body when said cover is open.

5. In a block-making apparatus, opposed vertically spaced cover and piston elements closing the ends of a hollow body, and means for actuating said piston toward said cover to compress block-forming ingredients interposed therebetween and to hold said cover and said body in rigid relationship with each other, said means including an articulated handle having a lever fulcrumed at said cover and an elongated tension link connected adjacent one end thereof to said lever and connected adjacent the other end thereof to said piston, movement of said handle tensioning said link to draw said piston toward said cover to compress said brick-making ingredients therebetween, said fulcrum exerting a positive force against said cover during said movement to maintain said cover in said rigid relationship with said body.

6. In a block-making apparatus of the type including opposed cover and piston elements adapted to close opposite ends of a hollow body, in combination, an elongated yoke having one end thereof pivotally connected to said piston and having the other end thereof extending beyond said cover, and an operating member including a first arm portion pivotally connected to said yoke intermediate the ends thereof adjacent said cover and including a second arm portion rigidly affixed to said first arm portion and extending at an angle with respect thereto, the intersection of said arm portions defining a pivot bearing rotatably positioned on said cover, rotational movement of said operating member about said bearing imparting motion to said yoke in a direction to tension the same and thereby draw said piston toward said cover to compress block-making ingredients therebetween.

7. In a block-making apparatus of the type including opposed cover and piston elements adapted to close opposite ends of a hollow body, in combination, an elongated yoke having one end thereof pivotally connected to said piston and having the other end thereof extending beyond said cover, an operating member including a first arm portion pivotally connected to said yoke intermediate the ends thereof adjacent said cover and including a second arm portion rigidly affixed to said first arm portion and extending at an angle with respect thereto, the intersection of said arm portions defining a first bearing rotatably positioned on said cover, and a second bearing adapted to cooperate with said yoke between the pivotal connection of said first arm portion and said one end of said yoke, movement of said operating member in one direction imparting rotational motion to said operating member about said first bearing and imparting motion to said yoke in a direction to tension the same and thereby draw said piston toward said cover to compress block-making ingredients therebetween, movement of said operating member in another direction imparting rotational motion to said operating member and to said yoke about said second bearing to cause said yoke to draw said piston through said body and thereby eject compressed ingredients from said body when said cover is open.

8. In a block-making apparatus of the type including opposed cover and piston elements adapted to close opposite ends of a hollow body, in combination, an elongated yoke having one end thereof pivotally connected to said piston and having the other end thereof extending beyond said cover, an operating member including a first arm portion pivotally connected to said yoke intermediate the ends thereof adjacent said cover and including a second arm portion rigidly affixed to said first arm portion and extending at an angle with re-

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spect thereto, the intersection of said arm portions defining a first bearing rotatably positioned on said cover, a second bearing adapted to cooperate with said yoke between the pivotal connection of said first arm portion and said one end of said yoke, and means on said second arm portion for engaging said yoke adjacent said other end thereof, movement of said operating member during disengagement of said means from said yoke imparting rotational motion to said operating member about said first bearing and imparting motion to said yoke in a direction to tension the same and thereby draw said piston toward said cover to compress block-making ingredients therebetween, movement of said operating member during engagement of said means with said yoke imparting rotational motion to said operating member and to said yoke about said second bearing to cause said yoke to draw said piston through said body and thereby eject compressed ingredients from said body when said cover is open.

9. In a block-making apparatus of the type including opposed cover and piston elements adapted to close opposite ends of a hollow body, in combination, an elongated yoke having one end thereof pivotally connected to said piston and having the other end thereof extending beyond said cover, an operating member including a first arm portion pivotally connected to said yoke intermediate the ends thereof adjacent said cover and including a second arm portion rigidly affixed to said first arm portion and extending at an angle with respect thereto, the intersection of said arm portions defining a first bearing adapted to cooperate with said yoke between the pivotal connection of said first arm portion and said one

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end of said yoke, and a latch on said second arm portion and engageable with said other end of said yoke, movement of said operating member during disengagement of said latch from said yoke imparting rotational motion to said operating member about said first bearing and imparting motion to said yoke in a direction generally longitudinal thereof to tension the same and thereby draw said piston toward said cover to compress block-making ingredients therebetween, said first bearing exerting a positive force against said cover during said movement to maintain said cover in rigid relationship with said body, movement of said operating member during engagement of said latch with said yoke imparting rotational motion to said operating member and to said yoke about said second bearing to cause said yoke to draw said piston through said body and thereby eject compressed ingredients from said body when said cover is open.

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