No. 813,117. PATENTED FEB. 20, 1906.

C. M. RUNYAN.

MOLDING MACHINE.

APPLICATION FILED NOV. 3, 1904.

4 SHEETS—SHEET 1.

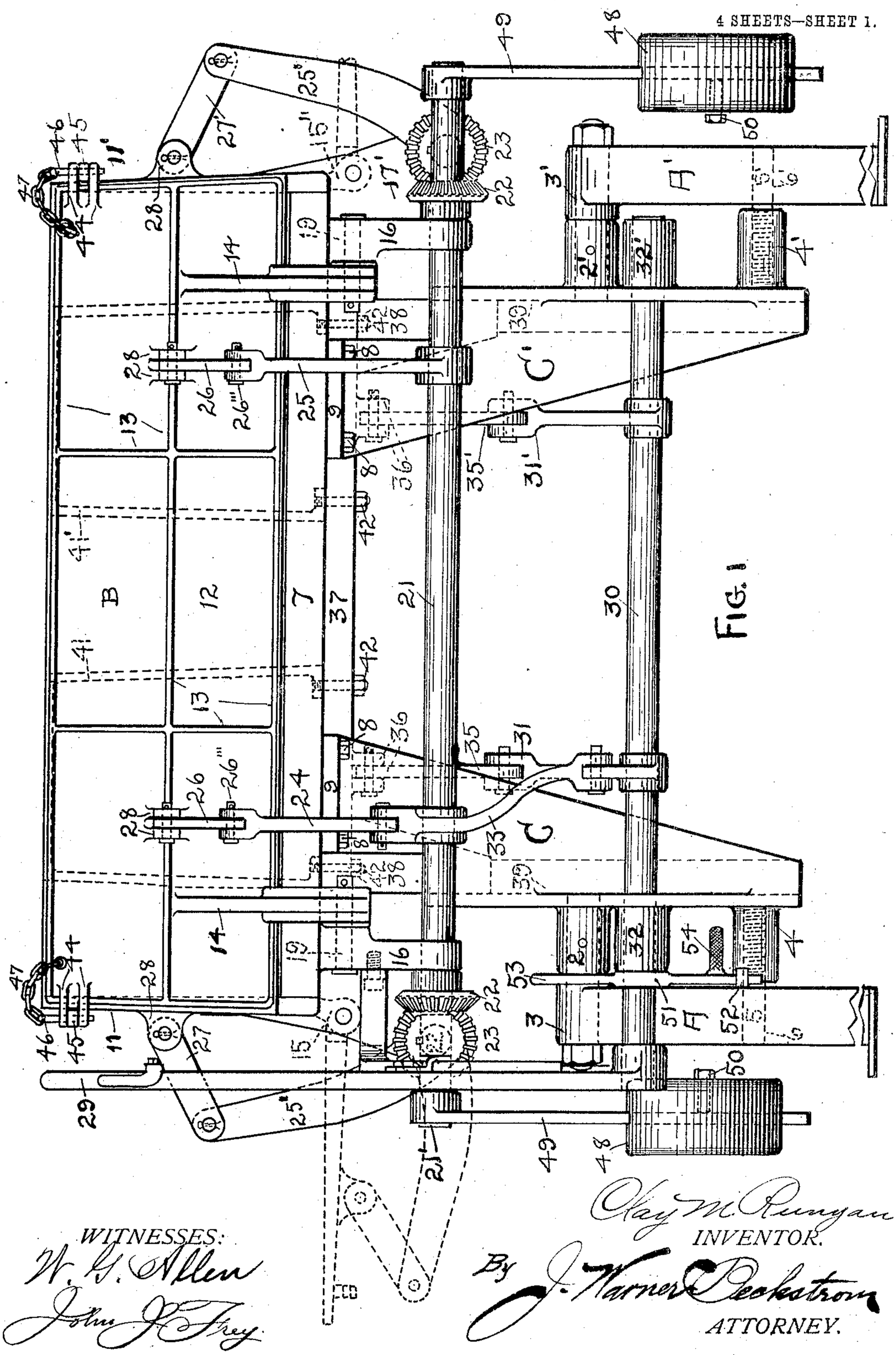

FIG. 1.

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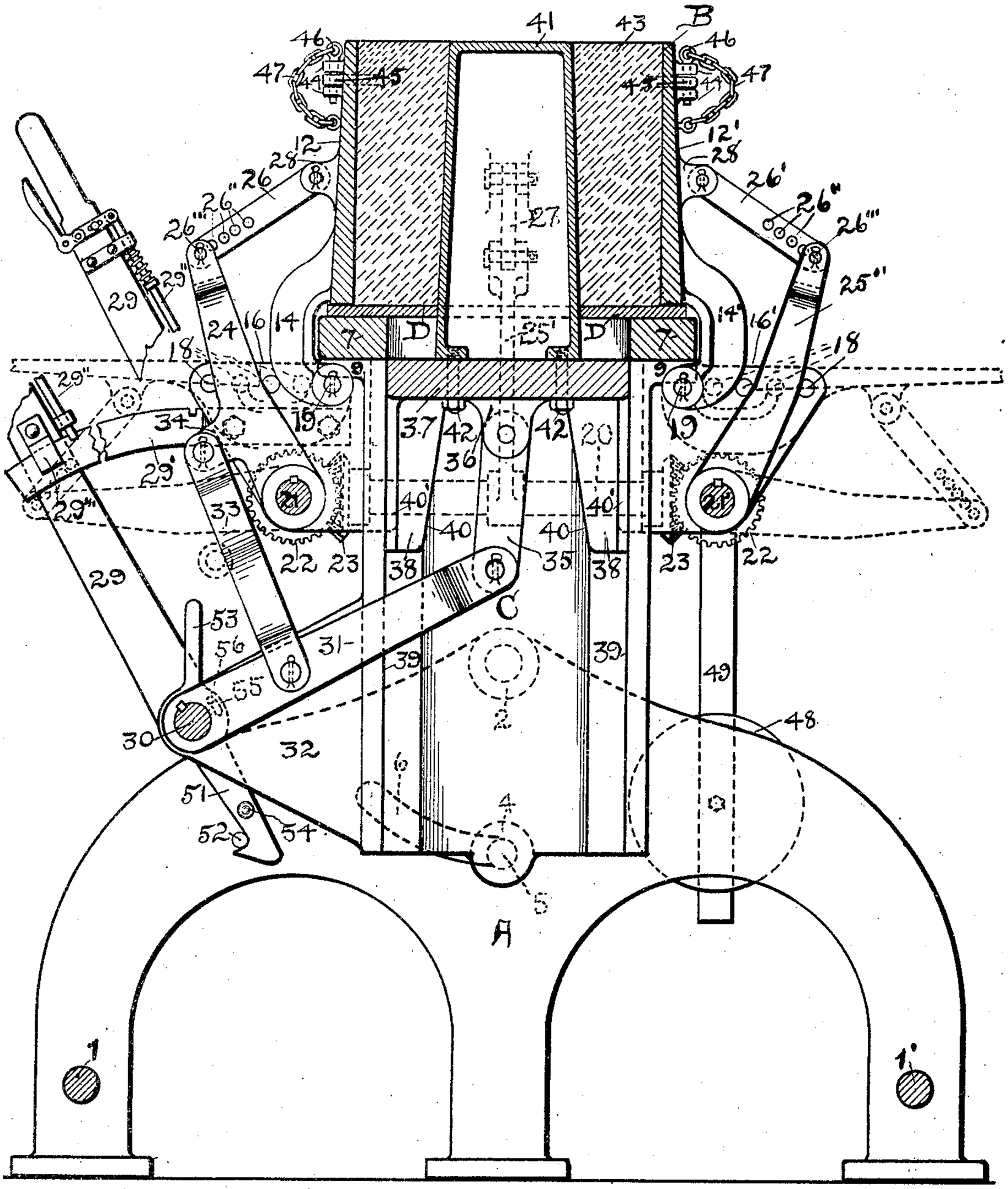
4 SHEETS—SHEET 2.

FIG. 2



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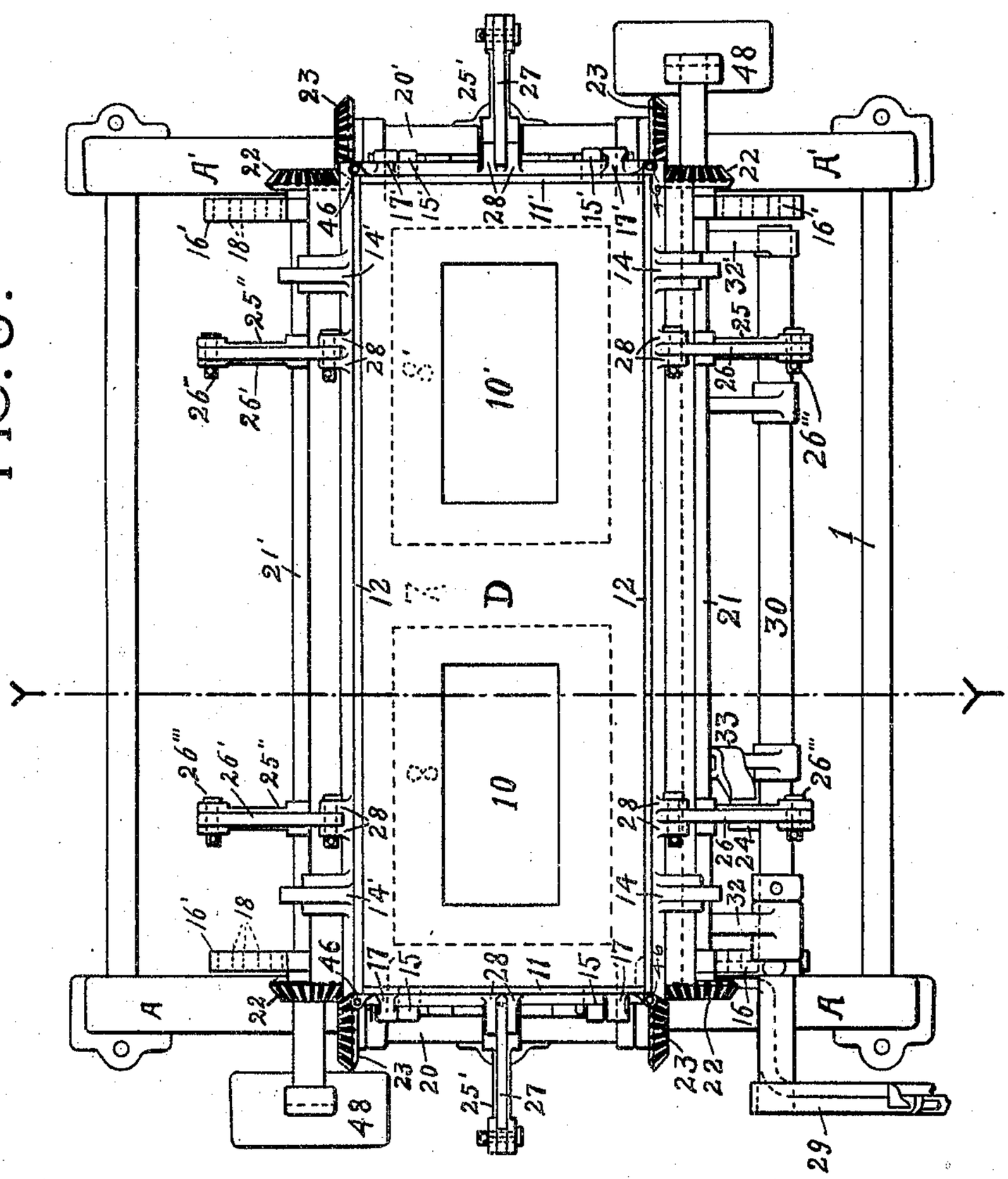
4 SHEETS—SHEET 3.

FIG. 3.



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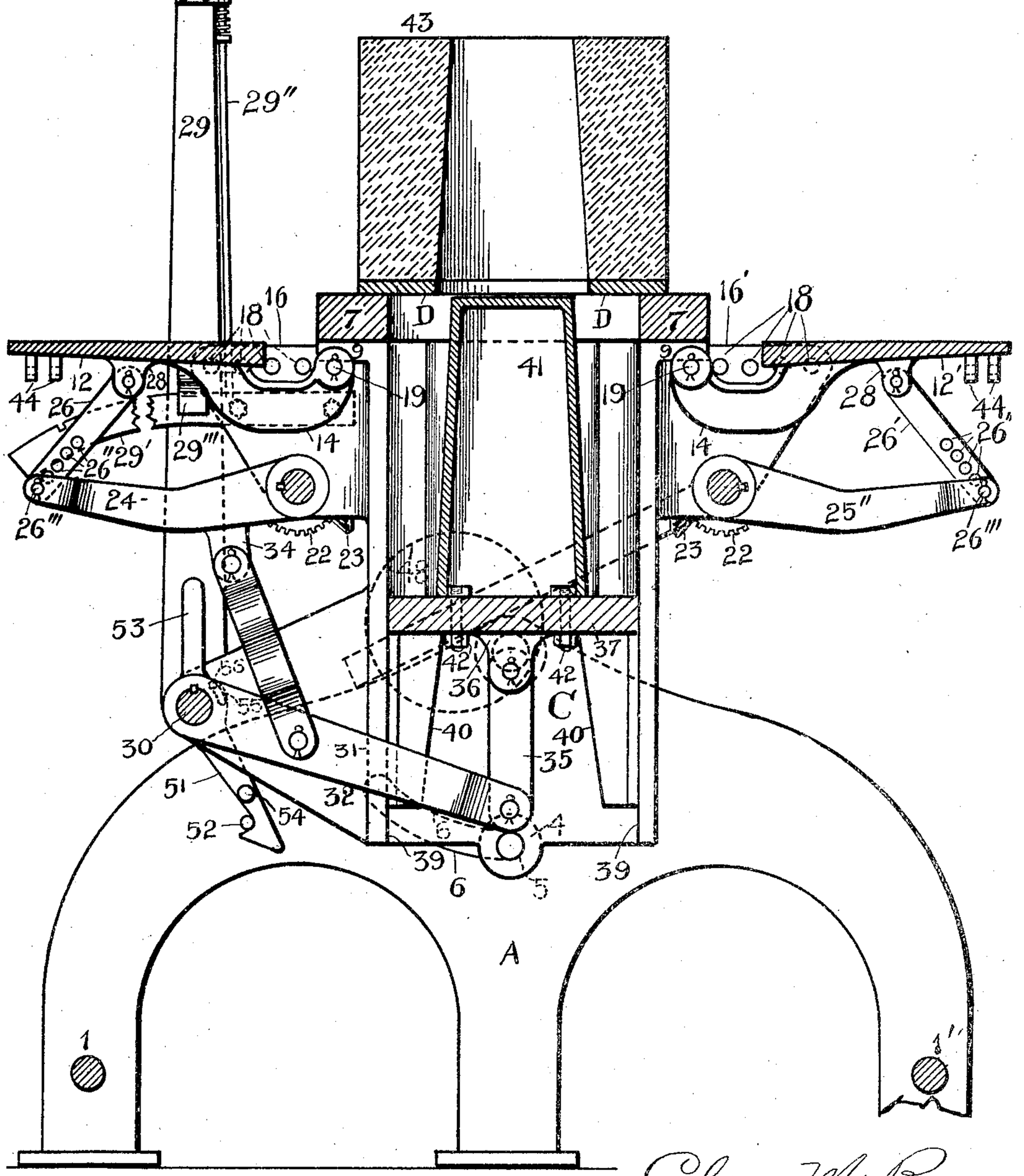
4 SHEETS—SHEET 4.

FIG. 4



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CLAY M. RUNYAN, OF ELYRIA, OHIO.

MOLDING-MACHINE.

No. 813,117. Specification of Letters Patent. Patented Feb. 20, 1906.

Application filed November 3, 1904. Serial No. 231,301.

To all whom it may concern:

Be it known that I, CLAY M. RUNYAN, a citizen of the United States, residing at Elyria, in the county of Lorain and State of Ohio, have invented certain new and useful Improvements in Molding-Machines, of which the following is a specification.

This invention relates to molding-machines, and has particular reference to machines of the type used for molding building-blocks out of concrete, cement mixtures, &c.

The general objects of the invention are to provide powerful and rapidly-operable means whereby the sides of a mold may be removed from the molded block simultaneously, to provide means whereby said sides and the core or cores may be removed simultaneously, and to improve the operation and control in general, as will appear hereinafter.

With the above objects in view my invention consists, generally speaking, in a mold box or chamber having pivotally-movable sides and means for lowering all of its sides simultaneously.

My invention further consists in the combination, with a mold box or chamber having hinged sides, of one or more cores and means for moving said core or cores in and out of the core-box simultaneously with the movement of its sides.

The invention further consists in the combination, with a mold-box and a core therefor, of a removable bottom for said box and means for simultaneously removing said sides and core from the cast and the bottom supporting same, so that the cast may be carried away upon said bottom.

The invention further consists in the combination, with a stationary base for the machine, of the core-box, cores, and their operating mechanism and means for tilting said box, cores, and mechanism into variable angles of inclination.

The invention further consists in the combination, with the mold-box and its actuating mechanism, of means for counterbalancing the weight thereof upon the operator's lever.

The invention further consists in the combination, with a mold-box and its operating mechanism, of means for varying the size of said box without changing its mode of operation.

The invention further consists in the combination, with a cast-tray and a support therefor, of means for providing said tray, with a single movement of the operating-lever, with sides and ends to form a mold-box and means for simultaneously projecting a core through the bottom of said tray; and the invention further consists in the novel details of construction and combinations of parts hereinafter described in detail, illustrated in the drawings, and incorporated in the claims.

In the drawings, Figure 1 is a side elevation of a machine embodying my invention, part of the base broken away. Fig. 2 is a vertical section taken substantially on the line Y Y of Fig. 3. Fig. 3 is a top plan view with the cast removed. Fig. 4 is a vertical section taken substantially on the line Y Y of Fig. 3, showing the mold-box in an opened position and the cores lowered.

Referring to the drawings, in which like reference characters designate corresponding parts in the several figures, A A′ are stationary feet or base portions connected by rods 1 and 1′. The mold-box B and its operating mechanism are supported upon upright channel-brackets C C′, having bosses 2 2′ pivoted to bearings 3 3′ on the feet A A′. The lower ends of said brackets have bosses 4 4′, serving as threaded sockets for stop-pins 5 5′, movable in curved slots 6 6′ in the feet A A′. The ends of these slots form stops for the pins 5 5′ and limit the arc of rotation of the superstructure to the lengths of said slots. On top of the brackets C C′ is mounted a bed-plate 7, fastened by means of bolts 8 passing through horizontal flanges 9 on the brackets and having threaded engagement with complementary apertures in the bed-plate. The bed-plate 7 is of skeleton form, providing openings 8 8′. (Shown by dotted lines in Fig. 3.) Mounted loosely on top of the bed-plate is a cast-tray or mold-bottom D, in which are core-openings 10 10′. As shown in Figs. 2 and 3, the openings through the bed-plate are larger than those in the bottom D to permit the employment of mold bottoms or trays with core-openings larger than the average size. The sides and ends of mold B consist of end wing-plates 11 11′ and side wing-plates 12 12′, preferably provided with strengthening-ribs 13, though this is immaterial for the purpose of my invention. These wing-plates are hinged to the bed-plate 7 by means of lugs 14 14′ on plates 12 and 12′ and lugs 15 15′ on

plates 11 11′, pivoted to bearing-brackets 16 16′ and 17 17′, projecting laterally from the bed-plate 7. In each of the bearing-brackets 16 16′ is a series of holes 18 for the hinge or pivot pins 19, connecting lugs 14 14′ with the bearing-brackets 16 16′. By moving pivot-pins 19 into different holes the wing-plates 12 and 12′ may be moved toward or from each other to change the width of the mold-box B, and to enable adjustment of the mold-box to a width less than the width of the bed-plate 7 the lugs 14 and 14′ are arched over the edges of the bed-plate or made of gooseneck form, as shown in Fig. 2.

The bearing-brackets 16 16′ and 17 17′ are made of sufficient depth to allow room in them for bearings of four shafts 20, 20′, 21, and 21′, carrying on their ends miter-gears 22 and 23 in mesh with each other and transmitting equal motion to the four shafts, as well as causing the parallel shafts to rotate in opposite directions. Motion is transmitted from the four shafts to the wing-plates 11, 11′, 12, and 12′ through a lever 24 and corresponding arms 25, 25′, and 25″, all keyed fast to their respective shafts 20, 20′, 21, and 21′. The upper ends of said lever and arms are pivoted to links 26 26′ and 27 27′, pivoted at their opposite ends between pairs of lugs 28 on the wing-plates. The links 26 are each provided with a series of holes 26″ for adjustable pivot-pins 26‴, adjustable in conformity with adjustments of pivot-pins 19. The four shafts 20 20′ and 21 21′ are rotated by means of a hand-lever 29, keyed fast to a shaft 30, working on a quadrant 29′ and provided with the usual latch-lever 29″, guide 29‴, notches, &c., the details of which are well-known and form no part of this invention. The shaft 30 has keyed fast or otherwise securely fastened thereto a pair of arms 31 31′, and said shaft is mounted in bearings consisting of wings or projections 32 32′ on channel brackets or supports C C′. Motion is transmitted from shaft 30 to the four shafts 20, 20′, 21, and 21′ through a link 33, pivoted between the ends of arm 31 and to a lug 34 on the lever 24. The inner ends of arms 31 31′ are pivoted to the lower ends of links 35 35′, pivoted at their upper ends between pairs of lugs 36 36′ on the under side of a reciprocating core-table 37. The latter is provided at its corners with guides 38, slidable in ways 39, formed by the corners of the channel-brackets C C′. Each guide 38 is substantially of the form of an angle-iron, with flanges or wings 40 and 40′. On the core-table 37 are mounted a pair of cores 41 41′, fastened by means of studs or bolts 42. These cores are nearly rectangular in cross-section and slightly tapered, as shown. While I have shown two cores and suitable apertures therefor, it is obvious that any suitable number or only one may be employed without departing from the spirit of my invention. While the mold-box is being packed and tamped with plastic material 43 the wing-plates are preferably locked together at the corners by means of pairs of apertured lugs 44 on wings 12 12′, which straddle single apertured lugs 45 on the end wing-plates 11 11′. Pins 46, interlocking said lugs, are preferably provided with chains 47, secured to the wing-plates to prevent accidental loss of the pins between molding operations. Other means for locking the corners together may be preferable, and I therefore do not wish to be limited to the lugs and pins.

When the wing-plates and cores are down, a considerable weight is thrown upon the hand-lever 29. To counterbalance this weight, I provide counterweights 48, mounted upon arms 49, fixed upon the ends of shafts 21 21′. A set-screw 50, having threaded engagement with each weight and bearing against the arm 49, provides means for adjusting the weight along the arm to vary its leverage as necessity may require. The arms 49 are adjusted so that the weights 48 will be elevated when wing-plates are lowered, and vice versa.

In molding concrete or cement blocks for buildings it is often desirable to make one face of the block of a finer quality of material than that used in the body of the block. To conveniently accomplish this, I provide for making said face temporarily the bottom of the mold, or substantially so, so that when the facing material is thrown into the mold-box gravity will hold it against the wing-plate until the backing material is supplied and tamped in sufficient quantity to hold the facing material. I accomplish this by tilting the mold-box in the following manner: 51 is a latch loosely mounted on shaft 30 and normally engaging a pin 52 on the base A. This latch and pin hold the mold-box and its operating mechanism pivoted to the base at 2, 2′, 3, and 3′ against tilting to the right, Fig. 2, while the pins 5′ and 5, bearing against the lower end of slots 6 and 6′, prevent tilting to the left. The mechanism and mold-box are therefore held vertically against movement in either direction. By grasping the handle 53 of the latch 51 the latter may be disengaged from the pin 52, which will permit the upper portion of the machine to swing to the right until the pin 5′ comes in contact with the upper end of slot. The latch is also provided with a tread-piece 54, by means of which the operator may kick the latch out of engagement with the pin. Through the hub of the latch is a slot 55, into which works a pin 56, screwed into the hub of the bearing, and forms a stop for the latch, limiting the amplitude of its swing to the desired length. The lower end of the latch is beveled, as shown, so as to

automatically engage the pin 52 when the machine is swung from an inclined to its upright position.

The operation of my invention is as follows: Assuming that a building-block or cast is to be formed with a face of better or finer material than the body of the block and that the machine is in the position shown in Fig. 2, the operator will first release the catch 51, either by pushing back with his foot the tread-piece 54 or grasping with his hand the lever 53 and pulling it forward. The mold-box B, together with its pivotal supports, levers, and arms, is then tilted backward to the right to make the wing-plate 12′ the lowermost side. A layer of facing material 43 is then placed within the mold on top of plate 12′ and sufficient of the coarser material 43 to hold the facing material in place when the mold is righted. The mold is then returned to the position shown in Fig. 2 by simply pulling it forward, the latch 51 automatically engaging the pin 52. The mold is then filled with concrete or plastic material 43 and properly packed and tamped. Pins 46 are then removed to disengage the corners of the mold, the hand-lever 29 pushed toward the mold to swing the arms 31 and 31′ downward and pull the core 41 downward out of the cast 43. Simultaneously shaft 21 will be rotated by means of lever 24, connected with arm 31 through link 33. The motion of shaft 21 being connected with shafts 20, 20′, and 21′ through miter-gears 22 and 23, all of said shafts will be rotated, and as arms 25, 25′, and 25″, as well as lever 24, are fast upon said shafts, said lever and arms will swing downward, and with them will be lowered the wing-plates 12, 12′, 11, and 11′ into a substantially horizontal position, completely exposing the cast 43 on all sides, as on a table. The tray D, upon which the cast rests, is then lifted off the base-plate 7 and placed upon the drying-rack or storage-place for the casts while they set or harden. Another tray D is then placed upon the base-plate 7 and the wing-plates and core restored to the positions shown in Fig. 2 by simply reversing the movement of lever 29. Another cast or building-block is then made in the same manner as above described, and so on. By removing the pivot-pins connecting arms 31 31′ with links 35 35′ the core-table and its cores may be lifted out of the machine and the latter used for molding solid blocks, window-caps, door-caps, sills, &c., by simply substituting bottom boards or trays which have no core-openings in them. Another simple manner for adapting my machine for molding solid structures, such as described, which does not involve removing the core-table and its slide-guides requires merely the removal of the keys shown in Figs. 2 and 4, which interlock shaft 30 with the arms 31 31′ when the cores are in the position shown in Fig. 4. The cores would then be disconnected and the wing-plates alone operable by the lever mechanism. It is obvious that any other suitable means for interlocking shaft 30 with the arms 31 31′ may be employed with special reference to the greatest possible convenience and celerity with which the machine may be converted from a solid block to a hollow-block machine or from a hollow-block to a solid-block machine in the manner described. If it is desired to make building-blocks of larger size, pins 19 are removed and the lugs 14 and 14′ pivoted farther apart. This will necessitate a readjustment also of the pivots connecting lever 24 and arms 25, 25′, and 25″ with links 26 26′ and 27 27′ in suitable holes 26″ and the provision of a tray D of correspondingly-increased width. The openings 8 in the base-plate 7 are of such relative size that cores 41 large enough for a block extending to the outermost holes 18 may be substituted, which would be accomplished by simply removing the screws 42, fastening cores 41 to the core-table 37. A single machine constructed in accordance with my invention is therefore adjustable to mold blocks of practically every standard size from maximum to minimum thickness.

While I have shown the off-bearing plate or tray D confined between the wing-plates, it is obvious that it may pass underneath the lower edges of the wing-plates into the bends of the members 14 and 14′. This would obviate the necessity of providing a plurality of sizes of trays, and, say, a twelve-inch tray could therefore be used for ten and eight inch blocks, &c., thereby ordinarily effecting a saving to the user of the machine of from three to six hundred dollars, as it would not be necessary to carry more than one size of trays. Instead of swinging over the bed-plate 7 the wing-plates would then swing over the tray D, so as to clear the edges of the tray, all of which is clearly obvious without special illustration. It is obvious that the end wing-plates 11 and 11′ may be provided with the same means for later adjustment which are provided for wing-plates 12 and 12′, and as numerous other modifications may be made in the embodiment of my invention without departing from the spirit thereof I do not wish to confine my invention to the specific construction herein shown and described.

What I claim as new, and desire to secure by Letters Patent, is—

1. The combination with a mold having relatively movable sides, of a mechanism for moving said sides, said mechanism including a hand-lever, and a weighted counterbalancing-lever, or several thereof, coöperating with said hand-lever to move said sides and mechanism in one direction.

2. The combination with a mold provided with relatively movable sides and an apertured bottom or tray, of a core movable into and out of said mold, an operating mechanism which includes a series of levers and lever-connecting links, which levers and links are separable to render said either sides or said core inoperative.

3. The combination with a mold provided with rotatable sides, or rotatable sides and ends, and a core movable into and out of said mold, of a mechanism for simultaneously actuating said sides, or sides and ends, and the core, a hand-lever for controlling said mechanism, and means for making said core inoperative while said mechanism is operative as to said sides, or sides and ends.

4. The combination with a mold provided with relatively movable vertical sides and a reciprocating core movable into and out of said mold, of a mechanism for simultaneously actuating said sides and core, a hand-lever for moving said mechanism, means for counteracting overbalance of weight imposed upon said lever, and means for rendering said core inactive while said mechanism moves said sides.

5. In a molding-machine, the combination with a mold provided with rotatable sides and ends and a reciprocating core, of means for simultaneously actuating said sides, ends and core, a lever for moving the operating mechanism, and means for counteracting the overbalance of weight imposed upon said lever.

6. In a molding-machine, a mold consisting of pivotally-movable wing-plates and an off-bearing plate or tray, a support provided with pivot-bearings for said wing-plates and slideways for core-guides, a core mounted upon guides slidable in said slideways, means for adjusting the pivots of said wing-plates toward and from each other to vary the size of the mold, a hand-lever and operating mechanism controlled thereby, and means whereby one movement of said lever simultaneously lowers said wing-plates and core, said mechanism being adjustable to accommodate same to variations in the size of the mold.

7. In a molding-machine, the combination with a mold comprising pivotally-movable wing-plates and a removable tray, of a core mounted for sliding reciprocal movement, a support carrying pivot-bearings for said wing-plates and slideways or tracks for the core-table and its guides, a stationary base upon which said support is mounted for pivotal movement so that it may be adjusted, together with the mold and its actuating mechanism, into either an upright or tilted position, and an actuating mechanism having bearings carried by said support.

8. In a molding-machine, the combination with a mold comprising pivotally-movable wing-plates and a removable tray, of a core-table having slideway-guides thereon, a pivotally-movable support provided with slideways for said guides and pivot-bearings for said wing-plates, a stationary base upon which said support is mounted, a hand-lever and operating mechanism having bearings in said support, and means whereby one movement of said lever simultaneously lowers said wing-plates and core substantially below said tray, while the opposite movement of said lever returns said wing-plates and core to normal position.

9. In a molding-machine, the combination with a mold comprising pivotally-movable wing-plates and a removable tray, of a core mounted for sliding reciprocal movement, a support carrying pivot-bearings for said wing-plates and slideways or guides for said core, a stationary base upon which said support is mounted adjustably for a tilted or an upright position, a hand-lever and operating mechanism provided with bearings in said support, and means whereby one movement of said lever simultaneously lowers said wing-plates and core below the plane of the upper surface of said tray, while the opposite movement of said lever restores said wing-plates and core to normal position.

10. In a molding-machine, a mold consisting of pivotally-movable wing-plates and an apertured bottom or tray, said support provided with pivot-bearings for said wing-plates and slideways for core-guides, a core mounted upon guides slidable in said slideways, means for adjusting the pivots of said wing-plates toward and from each other to vary the size of the mold, a hand-lever and operating mechanism controlled thereby, and means whereby one movement of said lever simultaneously lowers said wing-plates and core below the normal horizontal plane of said tray, said mechanism being adjustable to accommodate same to variations in the size of the mold.

11. In a molding-machine, the combination with a mold provided with rotatable sides and ends and a reciprocating core, of means for simultaneously actuating said sides and ends and the core, means for expanding or contracting the size of said mold, a lever for moving the operating mechanism, and means for counterbalancing the weight of the actuating mechanism imposed upon said lever.

12. In a molding-machine, the combination with a mold provided with normally-vertical sides pivoted for rotation above the bottom of said mold, of a core normally within said mold, means for adjusting said mold to occupy either a vertical or an inclined position, means for simultaneously tilting said sides toward the plane of the bottom of said mold and for restoring said sides to normal position, means for lowering said core synchro-

nously with the tilting of said sides and for raising said core when said sides are restored to normal positions, means for expanding or contracting the size of said mold and for adjusting the actuating mechanism to such expansion or contraction, a lever for moving the operating mechanism, and means for counterbalancing the weight of the operating mechanism thrown upon said lever.

13. In a molding-machine, the combination with a support having pivot-bearings, of wing-plates hinged on their bottom edges to said bearings and normally forming the sides of a mold, a series of linked levers for actuating said plates and links between said levers and plates, the latter links provided with a series of spaced-apart pivot-holes, said bearings provided with a similar series of holes, whereby the hinges of said plates and the link-pivots between said levers and plates may be adjusted laterally.

14. In a molding-machine, the combination with a bed-plate having lugs projecting laterally therefrom, of a mold having wing-plates hinged on their bottom edges to said lugs and adapted to form the sides of a mold, said lugs having a series of holes spaced apart for receiving adjustably the pivots of the hinges of said plates.

15. In a molding-machine, the combination with a base consisting of leg-frames having slots therein, of supporting-brackets having bosses and rigid pins, the former pivoted to said leg-frames and the latter movable in said slots, a bed-plate mounted on said brackets, and a series of wing-plates, hinged at their bottom edges to said plate, adapted to form the sides of a mold.

16. In a molding-machine, the combination, with a base, of channel-brackets pivoted to said base and normally supported in a vertical position, a bed-plate mounted on said brackets, hinge-bearings projecting laterally from said plate, a mold having sides hinged to said bearings, a shaft journaled in said bearings, an operating-lever for rotating said shaft, and a series of levers and links between said shaft and sides for transmitting rotary movement from the former to the latter.

17. In a concrete-block machine, a stationary support, brackets having journals mounted in bearings in said support, slots in said support, pins upon said brackets movable in said slots and limited in their movements by the ends of said slots, a base-plate mounted on said brackets, a cast-tray on said plate, wing-plates, hinged at their bottom edges to said base-plate, adapted to form the sides of a mold, a horizontal shaft journaled in bearings in said brackets, a notched quadrant projecting from said bed-plate, a hand-lever provided with a latch adapted to engage said quadrant at either end of the throw of said lever, and connecting arms, levers and links between said shaft and wing-plates whereby rotary movement is transmitted from the former to the latter.

18. In a concrete-block machine, a stationary base, a mold-support pivotally mounted on said base and provided with means for locking it in a fixed position, a mold having wing-plates hinged to said support, a cast-tray loosely mounted on said support substantially between said wing-plates, said cast-tray provided with core-openings, a core-table provided with guides slidable on bearings in said support, a plurality of cores mounted on said table, a lever, and means for moving simultaneously said wing-plates and core-table.

19. In a concrete-block machine, a stationary base, a mold-support pivotally mounted on said base and provided with means for locking it in a fixed position, a mold having wing-plates hinged to said support, a mold-bottom loosely mounted on said support, and adapted to serve as a tray for a cast, said bottom provided with core-openings, a core-table provided with guides slidable on bearings in said support, a plurality of cores mounted on said table and movable through said core-openings, a series of rotary shafts mounted in bearings in said support, means for transmitting movement from one shaft to the other and to said wing-plates, arms rigidly mounted upon several of said shafts, counterweights adjustably mounted on said arms, and a lever for actuating said shafts.

20. In a molding-machine, the combination of a bed-plate, with wing-plates or mold sides; a tray, or off-bearing plate; hinge members pivoted below said tray and arranged to support said wing-plates or mold sides above said tray, said hinge members being constructed to permit the edges of said tray to extend beyond the vertical plane normally occupied by the pivots of said hinge members, and means for adjusting said pivots laterally of said plane to vary the size of the mold.

21. In a molding-machine, the combination with a mold having pivotally-movable wing-plates or sides; with a bottom, tray, or off-bearing plate; a bed-plate arranged to support said bottom below said wing-plates and above the pivots about which said wing plates or sides are movable, and means for adjusting said wing-plates or sides toward and from each other over the face of said bottom, tray, or off-bearing plate.

22. In a molding-machine, the combination with a mold-box or mold, the sides of which are rotatively mounted on adjustable pivots to vary the size of the mold; of a bottom arranged in a plane below the plane of the lower edges of, and above the pivots for, said sides, when same are in their closed or normal position, and hinge members upon

which said sides are rotatable, said hinge members being in the form of goosenecks 14 which are curved outwardly in the plane of said tray to permit the employment of a tray of greater width than the minimum distance between the pivots of said hinge members, whereby the size of the mold may be varied without disturbing said bottom.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

CLAY M. RUNYAN.

Witnesses:
W. G. ALLEN,
JOHN J. FREY.