

No. 783,516.

PATENTED FEB. 28, 1905.

W. S. GODWIN.  
MOLDING MACHINE.

APPLICATION FILED JAN. 27, 1903.

10 SHEETS—SHEET 1.

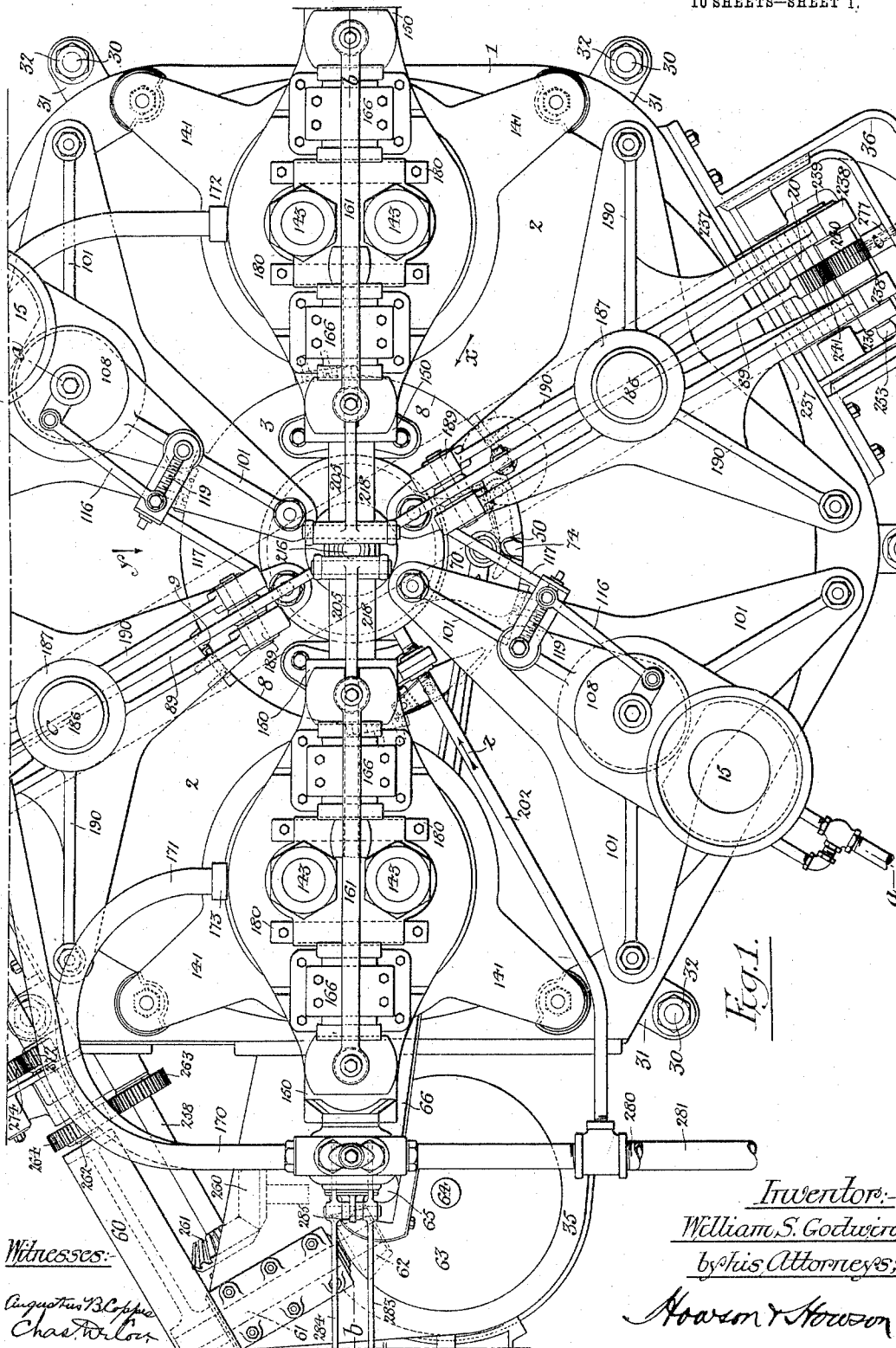


Fig. 1.

Witnesses:

Augustus B. C. P. P.  
Charles W. C.

Inventor:-  
William S. Godwin,  
by his Attorneys:

Howson & Howson

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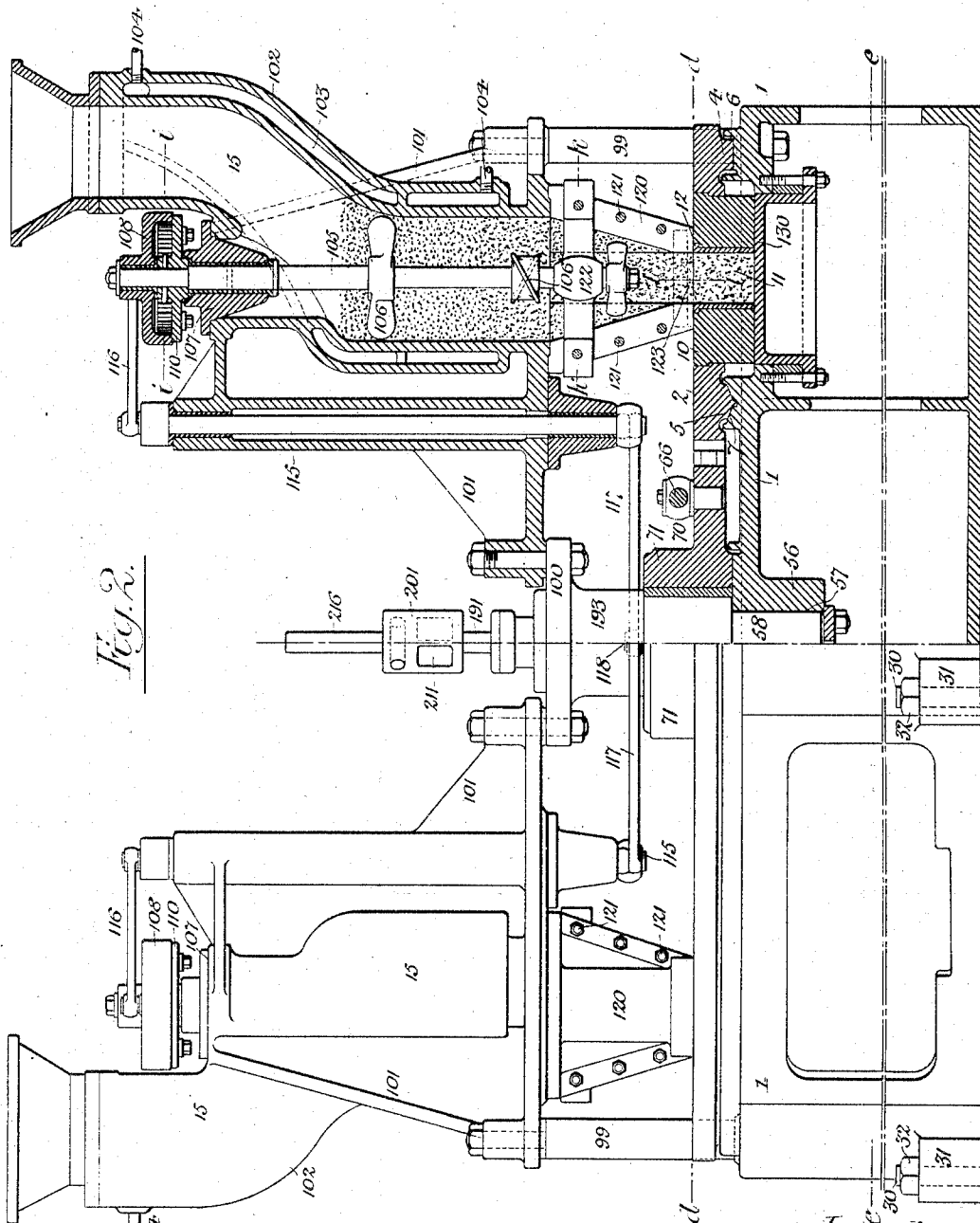


Fig. 2.

Witnesses:  
Augustus B. Cooper  
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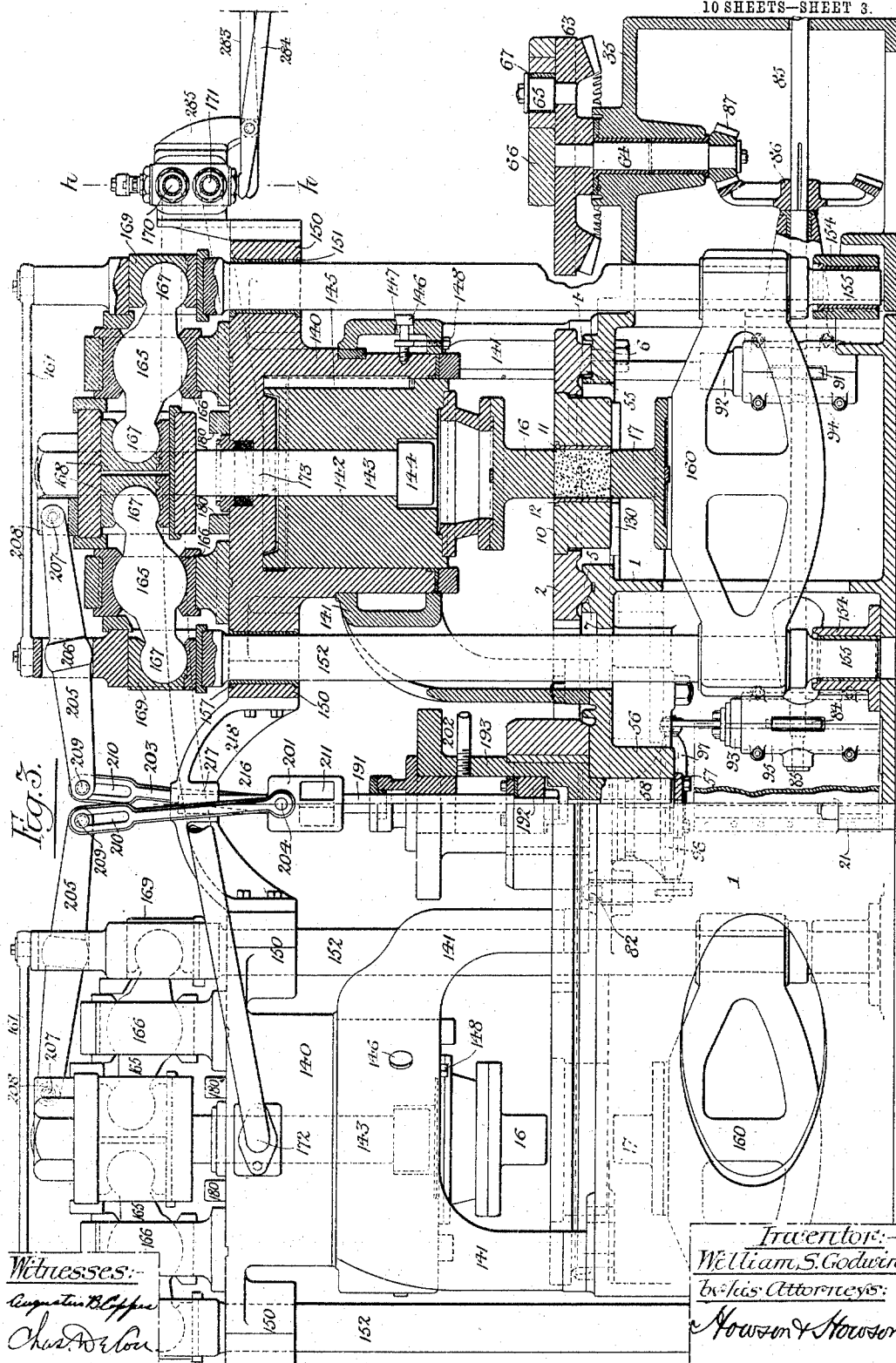
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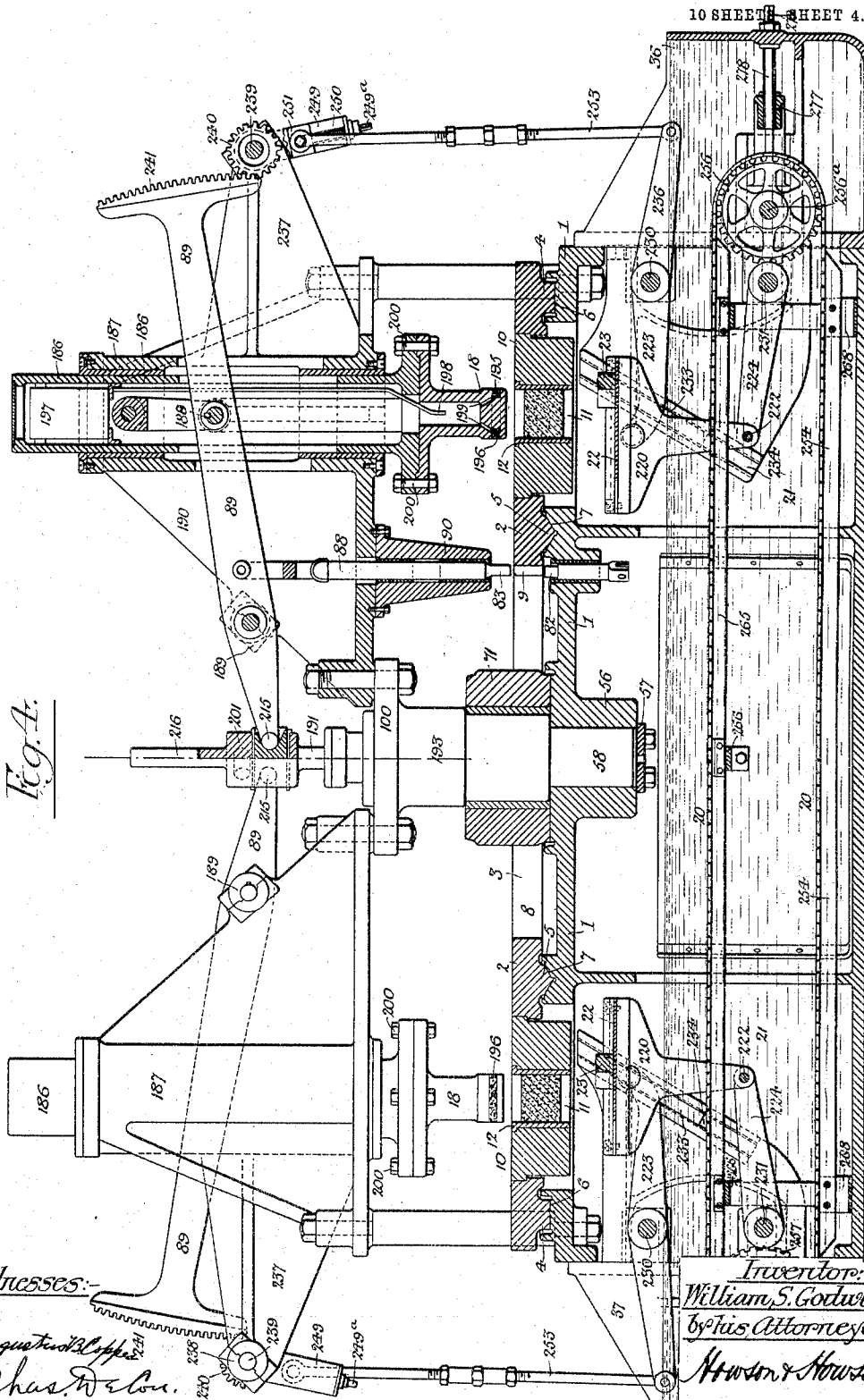
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10 SHEETS—SHEET 4.



Witnesses:

Augustus B. Apple  
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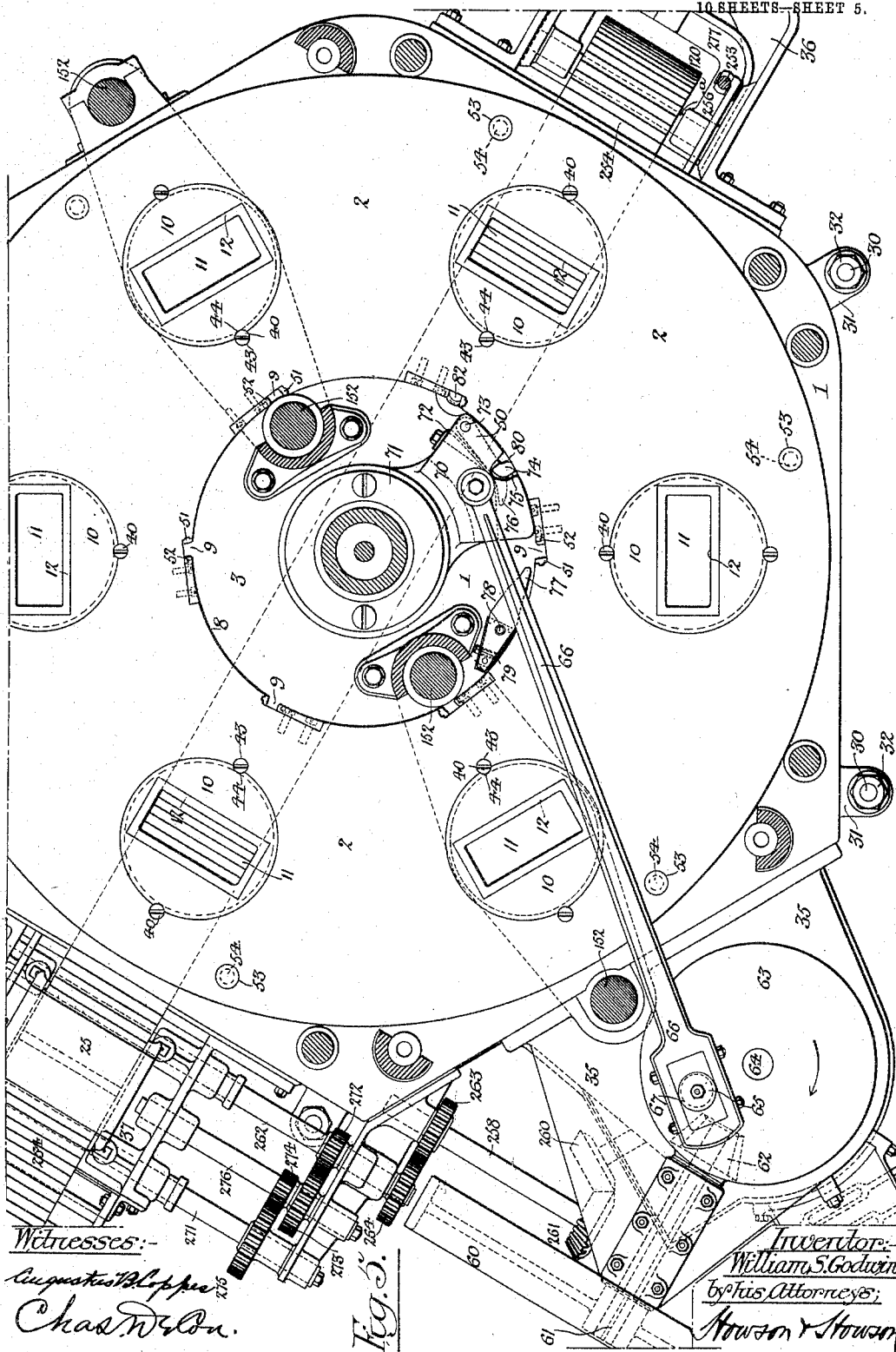
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10 SHEETS—SHEET 5.



Witnesses:

Augustus P. Pappas  
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Fig. 5.

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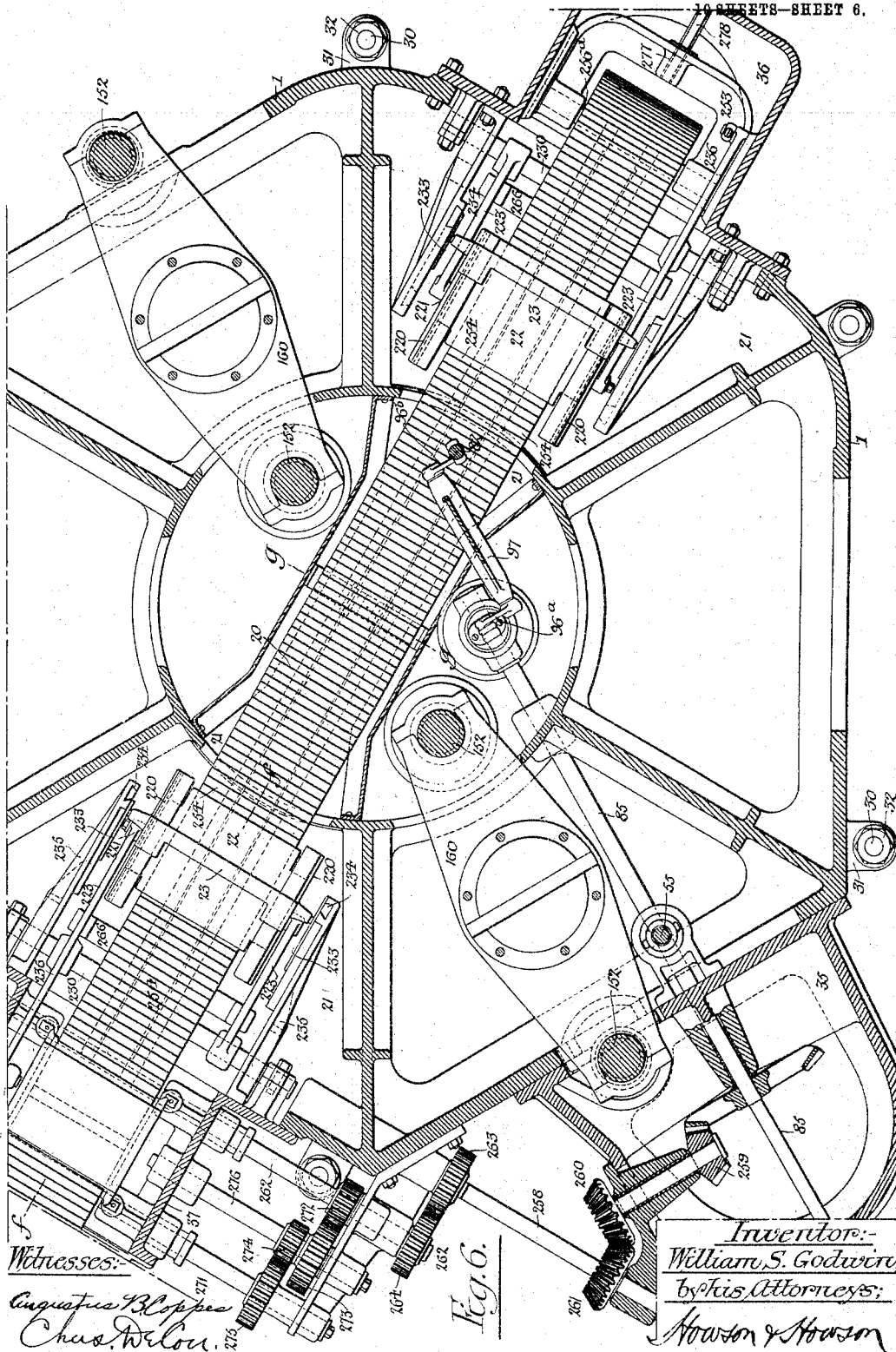
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10 SHEETS—SHEET 6.



Witnesses:

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Fig. 6.

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10 SHEETS—SHEET 7.

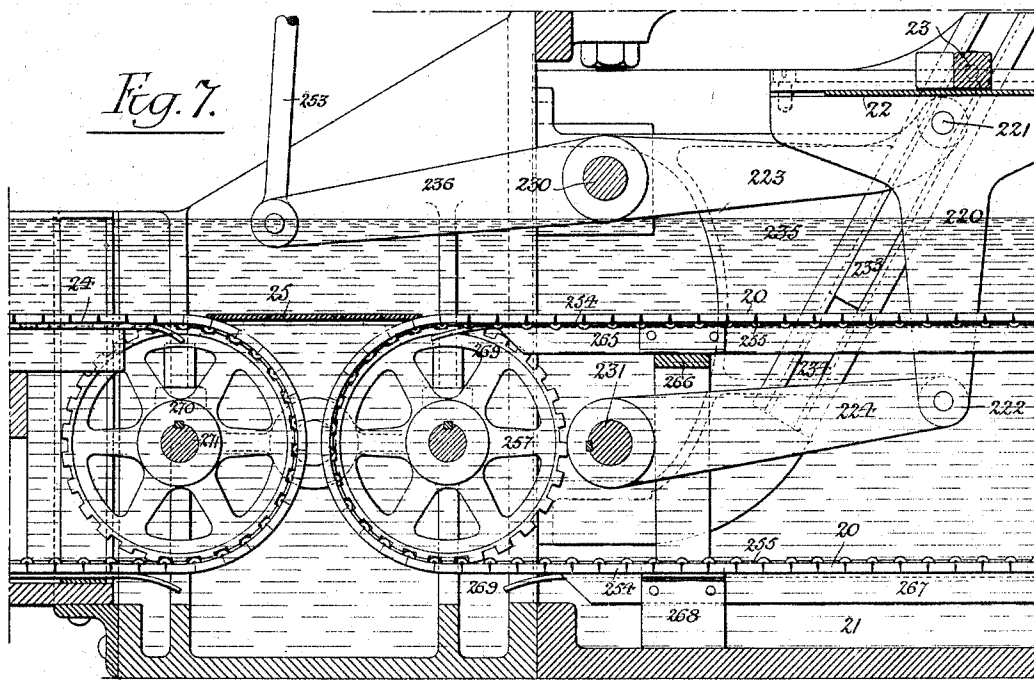


*Fig. 8.*

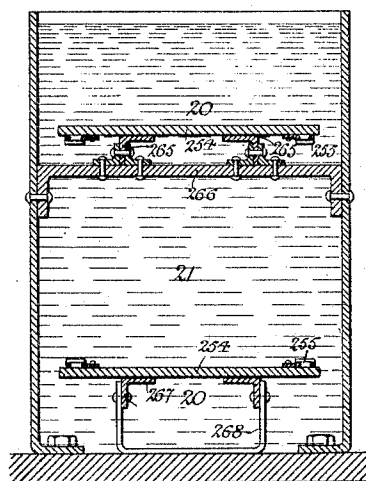
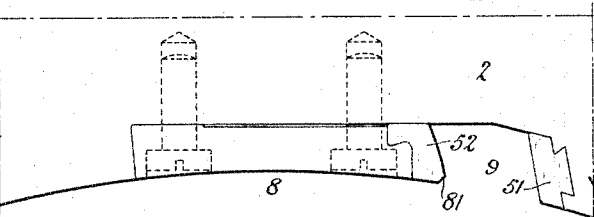


*Fig. 21.*

Witnesses:-  
Augustus R. Clapp  
Chas. W. Con.



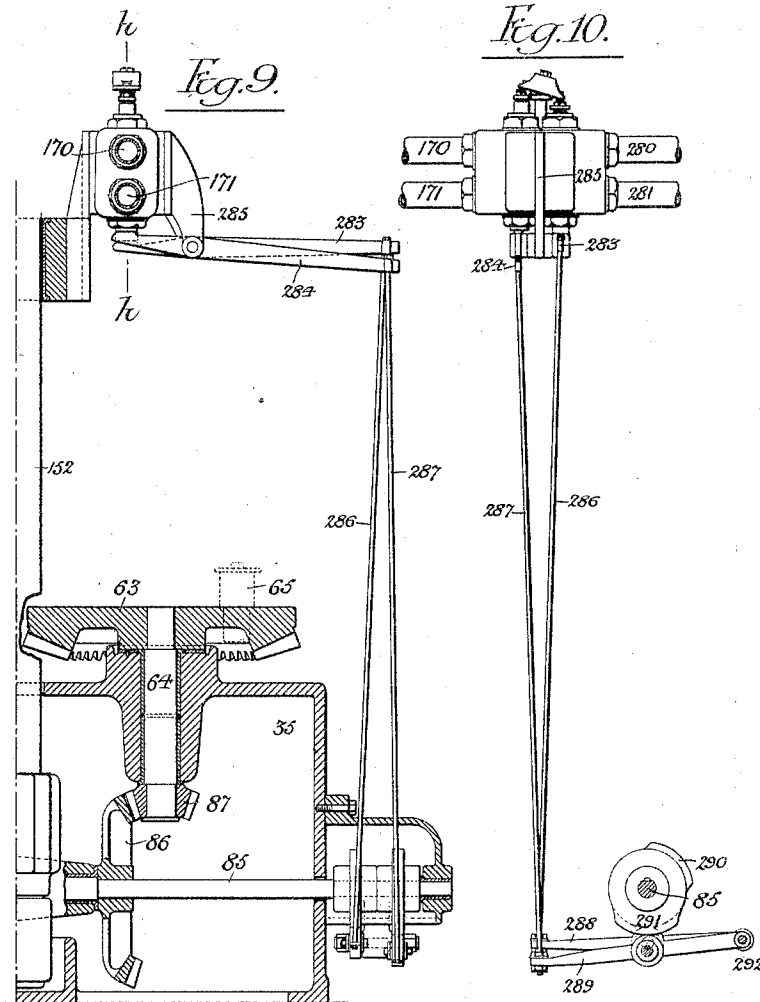
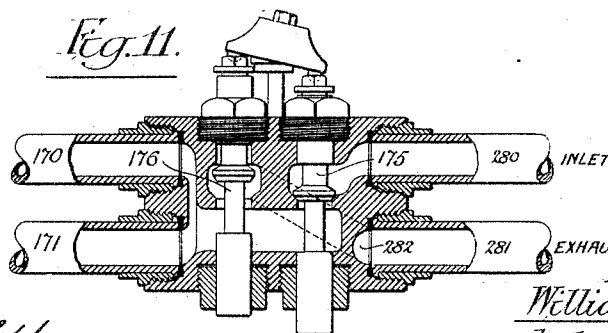
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10 SHEETS—SHEET 8.



Witnesses:-

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10 SHEETS—SHEET 9.

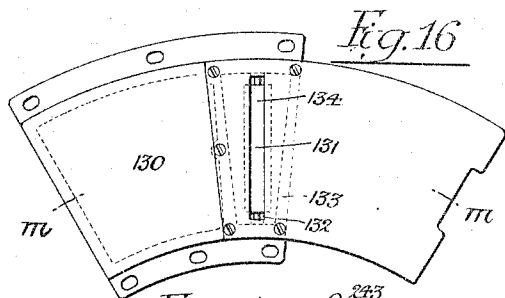
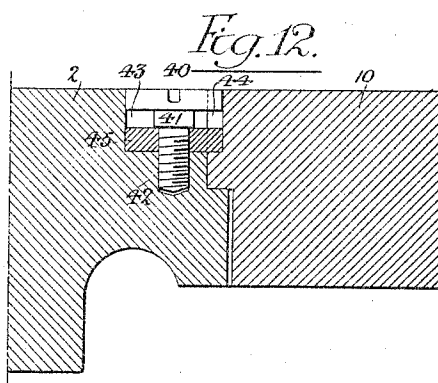
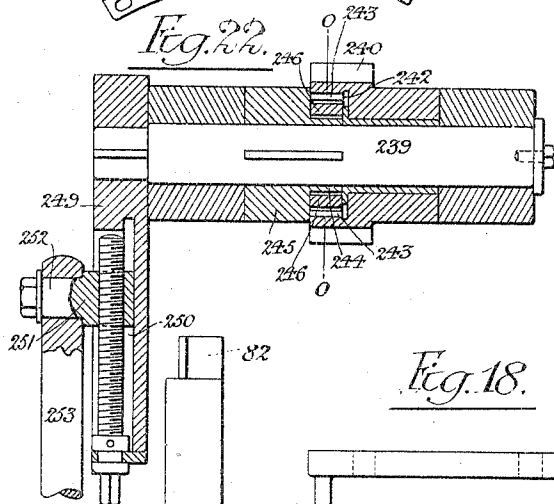
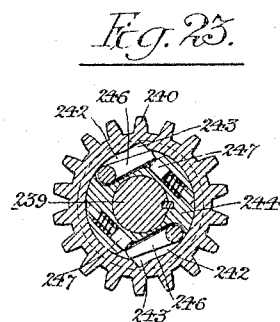


Fig. 18.

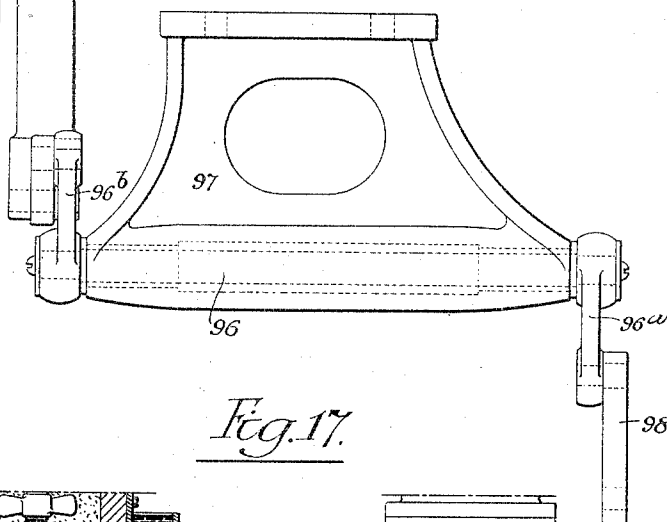
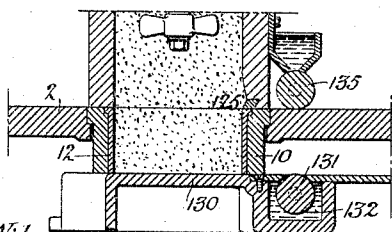
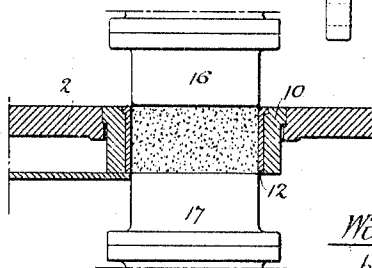


Fig. 17.



Witnesses:  
Augustus B. Cooper  
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APPLICATION FILED JAN. 27, 1903.

10 SHEETS—SHEET 10.

*Fig. 13.*

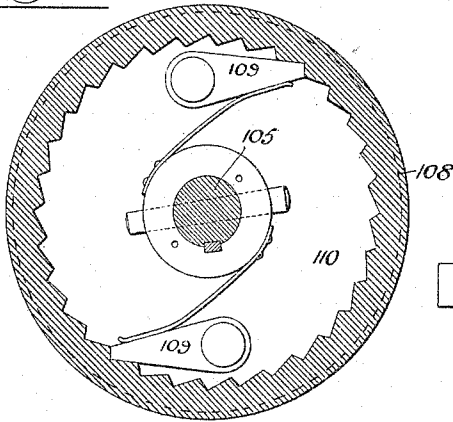


*Fig. 14.*

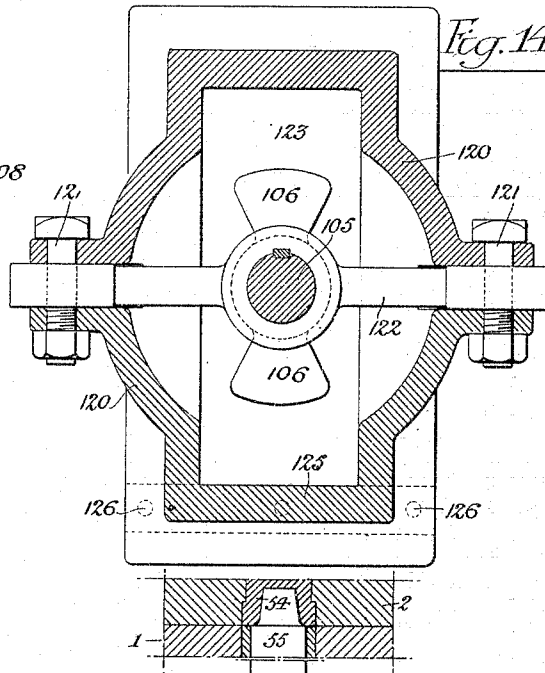


*Fig. 19.*

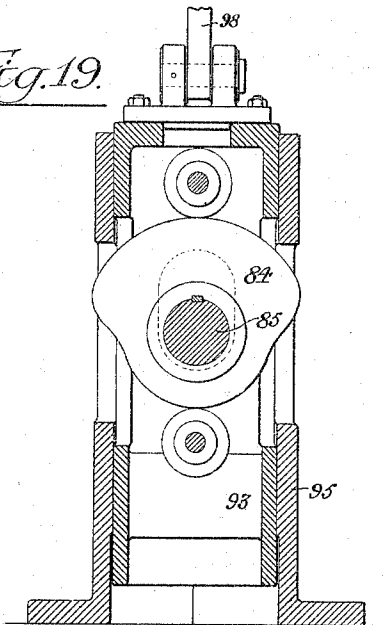


*Fig. 20.*

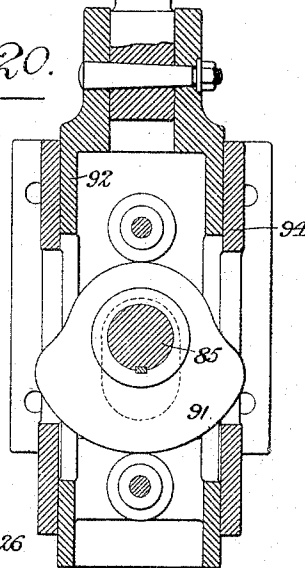
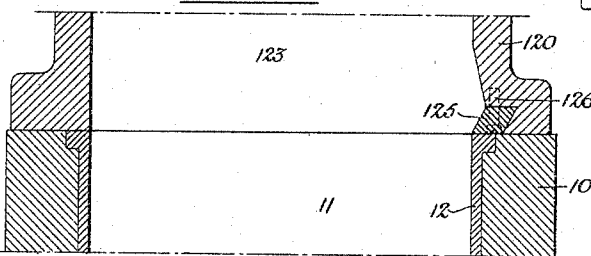


*Fig. 15.*



Witnesses:-

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*by his Attorneys;*

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# UNITED STATES PATENT OFFICE.

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## MOLDING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 783,516, dated February 28, 1905.

Application filed January 27, 1903. Serial No. 140,716.

*To all whom it may concern:*

Be it known that I, WILLIAM S. GODWIN, a citizen of the United States, residing in Philadelphia, Pennsylvania, have invented certain Improvements in Molding-Machines, of which the following is a specification.

My invention relates to machines for molding bricks, blocks, tiles, or briquets of various kinds of material, more particularly asphalt; and it consists of certain improvements in machinery of this character designed for the purpose of accurately filling the molds with the proper amount of material, pressing the bricks, blocks, &c., and delivering and cooling the same.

Other features of my invention will be fully pointed out hereinafter, reference being had to the accompanying drawings, in which—

Figure 1 is a plan view, partly broken away, of a machine made in accordance with my invention. Fig. 2 is an elevation looking in the direction of the arrow *x* and partly in section on the line *a a*, Fig. 1. Fig. 3 is an elevation looking in the direction of the arrow *y* and partly in section on the line *b b*, Fig. 1. Fig. 4 is an elevation looking in the direction of the arrow *z* and partly in section on the line *c c*, Fig. 1. Fig. 5 is a sectional plan view taken on the line *d d*, Fig. 2. Fig. 6 is a sectional plan view taken on the line *e e*, Fig. 2. Fig. 7 is a sectional elevation taken on the line *f f*, Fig. 6, illustrating a detail of my invention. Fig. 8 is a cross-sectional view taken on the line *g g*, Fig. 6. Fig. 9 is a sectional elevation of a portion of the machine not shown in Fig. 3, illustrating the valve-operating mechanism. Fig. 10 is an end elevation of this operating mechanism. Fig. 11 is an enlarged sectional view of the valve controlling the pressure, taken on the line *h h*, Figs. 3 and 9. Fig. 12 is an enlarged sectional view showing the manner of securing the molds to the table carrying the same. Figs. 13, 14, and 15 are sectional views taken on the lines *i i*, *k k*, and *l l*, respectively, Fig. 2, illustrating details of the feed-hopper and its mechanism. Fig. 16 is a plan view of the lubricating mechanism for the under side of the material in the molds. Fig. 17 is a sectional view of the same, taken on the line *m*

*m*, showing also the lower part of the feed-hopper, the lubricating means for the upper side of the material in the molds, and the upper and lower compressor-plungers. Fig. 18 is an elevation of a detail of the mechanism for locking the table against movement during the intervals of rest. Figs. 19 and 20 are views of the cams and slide members for operating the pins to lock the table from the under side during such intervals of rest. Fig. 21 is a plan view illustrating a detail of the table-driving mechanism, and Figs. 22 and 23 are details of another part of the mechanism.

The machine forming the subject of my invention is provided with a rotatable table carrying a series of molds within which the several operations necessary to form the bricks, blocks, &c., under process of manufacture are accomplished, said table being moved intermittently immediately after the formation of one set of blocks for the purpose of forming a new set of blocks.

The machine forming the subject of my present invention is duplex in form—that is to say, similar operations are carried on at two points at all times, viz: At each stoppage of the movable table two of the molds are being filled with material to form the bricks, blocks, &c., two previously-filled molds are having their contents pressed, and two other molds in which the blocks have been formed are in position to have their contents ejected. I do not wish to limit myself to a duplex machine, however, as I may employ a single set of the operating mechanisms, and under some conditions I might employ more.

The movable table rests on a rigid bed-plate or base and is intermittently moved through an arc of sixty degrees by crank movement. The molds carried by the table are thus brought simultaneously beneath the feed-hoppers, the compressing-plungers, and the ejector-plungers, so that the operations of filling the molds, pressing the material, and ejecting the finished blocks are going on at the same time. These operations are performed consecutively in duplicate in the present machine, so that two molds are being filled, two blocks are being pressed, and two finished blocks are delivered at each stoppage of the table. On

leaving the molds the finished blocks are received by special mechanism which automatically lowers them onto an endless carrier arranged within a cooling-chamber, which carrier delivers them at one side of the machine. Automatic locking and safety devices are so arranged that the machine will be stopped in case of disarrangement of any one of its elements. Provision is also made for running one half of the press independently of the other, if desired.

For a clearer understanding of the details of my machine and the mode of operation I have divided the description into several heads which may be enumerated as follows: first, general arrangement; second, bed-plate, rotatable table, and molds; third, main driving mechanism and details of same; fourth, table driving and locking mechanism and details of same; fifth, hopper and details of same; sixth, hydraulic cylinders, pressing-plungers, and details of same; seventh, ejector mechanism and details of same; eighth, auxiliary hydraulic cylinder and details of same; ninth, block-handling device and details of same; tenth, conveyer and conveyer-support and driving means; eleventh, details of guides, valves, levers, pipes, &c.

*General arrangement.*—The mechanism forming the subject of my invention as embodied in my improved machine is, as before stated, duplex in form, each part of the block-forming mechanism being the same on each side of the machine, and so far as these parts of the machine are concerned I will refer to and describe one part only.

Referring now to the drawings, 1 represents the base of the machine, formed, preferably, of a single casting, upon which is supported in any suitable manner the rotatable table 2. This table in the present instance comprises an annular member having an open center 3. On the under side of the table, at the outer edge of the same, is an annular rib 4, forming a rail, and on the inner edge an annular rib 5, forming a rail. The rail 5 is V-shaped, and both of these rails are adapted to similarly-shaped ways or tracks 6 and 7, carried by the top of the base, each of which tracks is provided with means for affording sufficient lubrication of the rails, insuring easy movement of the table.

The rotatable table 2 is arranged to be driven from the open center 3 of the same, the wall 8 of said center having a series of recesses 9 set at regular intervals around the same, with which recesses a driving member is adapted to engage, whereby said table may be moved as desired for a predetermined distance. Carried by this table 2 are the mold members 10, having recesses 11, in which the bricks, blocks, &c., are formed, such recesses being lined with wear-resisting bushings 12.

Carried by the bed-plate and suitably mounted above the rotatable table are the hoppers

15 for containing the material to be formed into bricks, blocks, &c., and these hoppers carry suitable means providing for the heating, stirring, and feeding of the material in proper quantities to the recesses of the molds. Arranged in advance of these feed-hoppers are the pressure-plungers 16 and 17, operated by suitable means and designed to compress the material which has been fed into the recesses 11 of the mold members. Beyond these pressure-plungers are the ejector-plungers 18, which are operated simultaneously with the pressure-plungers and serve to eject or discharge the finished blocks from the molds. These several structures are arranged around the machine at equidistant points, and their centers are all on the same circumferential line.

Arranged within the bed-plate or base of the machine and passing entirely through the same to a suitable point beyond is a traveling conveyer or endless belt 20, adapted to receive the finished blocks and remove them to any predetermined point beyond the machine. Provision is made for a tank, trough, or other receptacle 21, arranged within the base of the machine, such tank to be filled with a cooling medium, water being preferred, so that said blocks may be cooled immediately after leaving the molds in their passage onto the endless conveyer 20. The finished blocks are received on take-off tables 22, which carry sliding members 23, such sliding members being operated as the take-off tables are lowered, whereby the blocks may be pushed or scraped off onto the endless conveyer.

Between the feeding-hoppers, where the molds are filled with the material to be pressed into the bricks, blocks, &c., and the pressure-plungers lubricating means are provided for the surfaces of such material in order to prevent the pressure-plungers sticking to the same and to insure the ready entrance and withdrawal of the latter into and from the molds.

The endless conveyer 20 is driven at a high rate of speed, so that there is never more than two blocks upon the same at any one time, and these blocks are delivered to the slow-running conveyer 24, that extends away from the machine, a bridge-piece 25 or other suitable means being provided to insure the ready passage of the blocks from one conveyer to the other. Special means are arranged to drive these conveyers from the main driving mechanism, the latter conveyer with the aid of speed-reducing gears.

Locking means are provided to hold the table rigid during its intervals of rest when the operations of the machine are taking place, and special means are provided to operate this locking mechanism from the main driving mechanism.

*Bed-plate, rotatable table, and molds.*—The bed-plate or base 1 is preferably made of a

single casting and is intended to be firmly secured to a solid foundation. For this purpose the anchor-bolts 30 are provided, passing through apertured lugs 31, carried by said base, which bolts are secured by suitable nuts 32. The base is preferably six-sided, in view of the six operations of the machine, although it may be of other suitable shape, and carried by one of these sides is a casing or frame 35, containing and supporting the main driving mechanism. The extensions 36 and 37 of the tank or trough in which the conveyer mechanism is located are also secured to other sides directly opposite each other.

The rotatable table is moved step by step between the operations of filling the molds, pressing the bricks or blocks, and ejecting the finished articles. It is highly desirable that the mold members carried by this table should be held against displacement either lateral or vertical, and I accomplish this by the means shown in Fig. 5 and in detail in Fig. 12. These means comprise a screw 40, having a shoulder 41, said screw arranged to enter a threaded aperture 42 in the table. The table and mold members are each provided with semicircular recesses 43 and 44 to receive the head of the screw, and interposed between the shoulder 41 of the same and the bottom of the joint recess is a washer 45, which may be of any suitable material. This washer prevents the rise of the mold member, and the head of the screw, as well as the washer, prevents lateral movement of the same. The table is moved at regular intervals by special mechanism to be hereinafter described, and the recesses 9, formed in the inner wall 8 of the table, are arranged to be engaged by a suitable pawl 50, by which means the table is moved. These recesses are provided with hardened blocks 51 and 52 to resist the wear of the pawl. The table is also provided with apertures 53, having hardened bushings 54 to receive a locking-pin 55, passed from beneath the table to hold the machine firmly at rest during the time the several operations of the machine are going on.

The bed of the machine is thickened at the center, forming a hub 56, which is recessed at 57, such hub serving as a seat for a central stem 58, forming part of mechanism to be more fully described hereinafter, such stem being held in place by suitable retaining means.

*Main driving mechanism and details of same.*—The mechanism for effecting the work of the machine is actuated by means of the main driving-pulley 60, mounted on the short shaft 61, arranged within the casing or frame 35, such pulley being driven by belting from any suitable source of power. At the opposite end of this shaft 61 a bevel-pinion 62 is carried, which meshes with a gear-wheel 63, carried on a vertical shaft 64, and the top of this gear-wheel 63 serves as a face-plate, hav-

ing a pin 65, providing an attachment for the connecting-rod 66, which serves to drive the table. An eccentric bushing 67 is interposed between the pin 65 and the aperture in the connecting-rod for the same, and by this means the movement or throw of the connecting-rod may be accurately determined and adjusted. Means are provided for locking the bushing when in the desired adjusted position.

As before noted, the mold-carrying table is provided on its internal wall with recesses 9, and the pawl 50 is adapted to engage these recesses, said pawl being controlled by the connecting-rod 66. This pawl is carried by an arm 70, having a hub 71 mounted on the central stem 58, and a spring 72 is provided, carried by said arm, which serves to press the pawl out and cause it to engage the recesses formed in the wall of the table when the latter is to be moved. The pawl is clearly shown in the plan view, Fig. 5, and one of the recesses 9 of the table, with which said pawl is adapted to engage, is shown in Fig. 21, which view also shows the hardened bushings 51 and 52 at each side of said recess. The pawl is pivoted at 73, being adapted to a recess in the end face of the arm 70, and is provided with an enlarged projection 74 to engage the recesses 9, the arm 70 being further recessed at 75 to accommodate the same, and a cam projection 76, extending beyond the projection 74 for a purpose to be described. In Fig. 5 the pawl is shown midway between two of the recesses 9, the pawl being held in against the tension of the spring 72 by reason of its engagement with the wall 8. The connecting-rod 66 is so disposed with relation to the pawl and the movement of the table that one-half a revolution of the face-plate, to which the said rod is connected, will give the table the required movement, being in the present instance one-sixth of a full revolution. This movement begins gradually, reaches the maximum speed at half the required distance of movement, and gradually decreases in speed toward the end of such movement. During the first part of the movement the bushing 51 is engaged, while during the latter part of the movement as the table gathers its speed the bushing 52 engages the pawl as the speed of the latter is decreasing. As soon as the table reaches the limit of its movement the pawl is to be disengaged, and this is accomplished by means of the cam 77, carried by the bed-plate of the machine and disposed so as to engage the cam projection 76 and move the same out of its engagement with the recess 9. This cam is pivoted at 78 and is adjustable by means of the screw 79, so that the time of disengaging the pawl can be accurately determined.

The means just described serve to disengage the pawl on the forward stroke when moving the table. When the table is stopped,

however, the movements of the pawl continue until such time as the table is to be again moved, and during the return movement of the pawl at this time means must be provided for keeping the pawl out of engagement with the recess 9. To accomplish this, the corner of the pawl projection 74 is beveled at 80, and the corner of the bushing 52 is beveled at 81, so that as the pawl passes the recess on its backward strokes these two beveled faces will engage and keep the pawl out of said recess. This mechanism is so timed that the pawl will be moved three times before it enters the recess 9. During the non-engaging movements the pawl will be brought opposite the recess it is to engage for the next movement of the table, but will be held out by a pin 82, that is brought into engagement with the recess from the under side of the machine each time the machine stops, and by a pin 83, that is brought into engagement with this recess from the upper part of the machine. These pins and their operating mechanism will be fully described hereinafter. Motion is also imparted to the hoppers 15 for the purpose of operating the feeding mechanism contained therein and to the valve controlling the pressure apparatus, to the ejector mechanism, to the locking devices for the table, to the block-lowering mechanism, and to the conveyer-belts from this driving-pulley simultaneously.

*Table driving and locking mechanism.*—As before noted, the table is driven by means of the engagement of the pawl 50 with the recesses 9, arranged on the inner circumference of the rotatable table. Should the operations of the machine become disarranged, however, I have provided means for preventing the rotation of the table until all of the parts are in position to permit such movement. Beneath the table and arranged to engage the recess adjacent to the moving pawl is a vertically-moving pin 82, which is normally in engagement at this point and which is intermittently displaced during the operation of the machine, thereby permitting the engagement of said pawl. The engagement and disengagement of this pin is accomplished by means of a cam 84, carried on a shaft 85, which receives its movement through the medium of bevel-gears 86 and 87 from the main driving-shaft of the machine. At regular intervals, therefore—that is to say, when the pawl is to move the table—this pin 82 is moved away from its engagement with the recess 9 by the action of the cam 84, permitting the entrance of the operating-pawl 50, which is moved in by its spring 72.

In addition to the pin 82, engaging the recesses 9 and extending from the under side of the machine, I employ another pin, 83, for the same purpose, arranged to engage said recesses from the upper side of the machine. This pin 83 is carried by a rod 88, pivotally mounted on one of the levers 89, controlling

the ejector-plungers 18 and passing through a guide-bearing 90. The lever 89 is depressed with the ejector-plunger, and as the rod 88 is connected to said lever the pin 83 will be depressed and engage one of the recesses 9 as the pin 82 is brought into engagement with said recess from the under side of the machine. This action will prevent movement of the mold-carrying table until the ejector-plungers have returned to their normal position and the pressure-plungers have also returned to their normal position. In addition to this locking mechanism for the table the latter is apertured at 53 around its outer edge, such apertures having hardened bushings 54, adapted to receive a locking-pin 55, controlled by a cam 91, also mounted on the shaft 85. This cam is so arranged and its movement so timed that the locking-pin will be depressed away from the table as soon as the latter is to be moved and will return said pin in place when the table stops for the operation of the block-forming mechanism.

The pins 55 and 82 are connected to slide-pieces 92 and 93, arranged within the casings 94 and 95, located within the bed-plate or base of the machine, and the cams 84 and 91 engage these slide-pieces. The pin 55 is connected directly to its slide-piece. The pin 82, however, is moved through the medium of the rock-shaft 96, carried by the bracket 97, hung to the bed-plate and clearly shown in Fig. 18. One end of this rock-shaft has an arm 96<sup>a</sup>, which is connected to the slide-piece 93 by means of a link 98, while the opposite end of said shaft 96 has an arm 96<sup>b</sup>, which is connected directly to the pin 82.

*Hopper and details.*—The hoppers 15 are fully shown in Fig. 2, in which view one half represents the hoppers in outside view and the other half shows the hoppers in section. These hoppers are supported by pedestals 99, carried by the outer edge of the base 1 of the machine, and by an annular flange 100 at the center of the machine, supported by the stem 58. They are suitably stayed by the ribs 101, so as to be rigidly held during the operation of the machine, and these ribs are bolted to the pedestals 99 and the flange 100. The hoppers are provided with hollow walls or jackets 102, and communicating with the space 103, formed by these jackets, are the pipes 104, serving to convey steam or hot water for the purpose of keeping the contents of the hoppers in proper condition to be fed to the molds. Suitably mounted within the hoppers are the shafts 105, carrying stirring-blades 106, whereby the contents of the hoppers may be kept as loose as possible in order to be readily fed to the molds carried by the bed-plate. These shafts pass through special bearings 107, secured to the top of the hoppers, and carry at their upper ends an internally-toothed wheel 108, which upon rotation serves to drive the shafts. In order to effect

this driving movement, spring-controlled pawls 109 are carried by a plate 110, secured to the upper part of said shaft 105, and upon the movement of the wheel 108, which rotates around the shaft 105, these pawls are engaged and the shaft is rotated. Motion is imparted to the internally-toothed wheels 108 from vertical shafts 115 through the medium of the upper connecting-rods 116 and the lower connecting-rods 117, the latter being connected at 118 to and receiving their movement from the hub 71 of the arm 70, carrying the actuating-pawl 50 for the rotatable mold-carrying table, which latter is operated from the main driving mechanism, as before described. The upper connecting-rods are adjustable by means of the screws 119.

The movement of the rotatable table carrying the molds is intermittent, and movement of the feeding-shafts within the hoppers is intermittent, such shafts being only rotated during the stoppage of the table, so that a positive filling of the molds will be insured every time said molds are brought into position beneath said hoppers; but no agitation of the material will take place during the movement of the table.

Arranged at the lower part of the hoppers is a casing 120, made in halves, which may be removed at any time in case any serious obstruction is met with at the lower portion of said hopper. This casing is secured together by suitable bolts 121, and it serves the further purpose of supporting the lower bearing 122 for the shaft 105. This casing has an opening 123, corresponding to the size and shape of the brick, block, &c., under operation, and these casings are interchangeable, so that others having openings of different size and shape may be substituted therefor. In Fig. 14 I have shown a sectional plan view of this casing.

To keep the table clean and insure the free movement of the same beneath the hoppers and to cut the material within the molds away from that in the hopper and prevent wear on the latter, the casing 120 is provided with a knife 125 at one end of the same, which is the first part in contact with the table as the latter moves. This knife is diamond-shaped in cross-section and is interchangeable, so that when one edge is worn it may be reversed. This knife is held in place by means of the screws 126.

When the molds are being filled from the hoppers 15, the rotatable table 2 is in such position that these molds are directly over an adjustable auxiliary table 130, carried by the bed-plate or base of the machine. This table, which is provided with an extension 130<sup>a</sup>, secured in place by suitable screws, is clearly shown in Figs. 16 and 17, is in the form of a segment of a circle, and is suitably secured to the bed-plate so as to lie very close to the under side of the mold members carried by

the rotatable table 2. At one end of this auxiliary table an oiling-roller 131 is arranged, mounted in a suitable well or receptacle 132, which has a top 133, provided with a slot 134, which allows for a slight projection of the roller 131, carrying a film of oil. Another roll, 135, is arranged above the table to lubricate the upper surface of the same.

*Hydraulic cylinders, pressing-plungers, and details of the same.*—As soon as the molds have been filled the table is given an intermittent rotative movement, which carries said molds to the point beneath the pressure-cylinders 140, and in Fig. 3 I have shown a section and side elevation of the machine, showing these cylinders. During the movement of the table 2 the material in the molds is supported by the auxiliary table 130, which extends from the filling-point to the pressure-plungers, the lower plungers forming a continuation of such auxiliary table, so as to insure the support of the material.

Carried by the upper part of the bed-plate are the bracket-supports 141, in which the pressure-cylinders 140 are mounted. Each of these cylinders carries a suitable piston 142, at the lower end of which the pressure-plunger 16 is secured by any suitable means. Each piston has a pair of piston-rods 143 projecting through the same and secured thereto, said rods having enlarged heads 144 and reduced portions at the opposite ends secured by suitable nuts.

I prefer to employ two piston-rods in connection with each piston controlling the pressure-plungers in order to prevent any twisting or rotative movement of the piston, as such movement would displace the plungers and damage the machine. In addition to the two rods thus employed these pistons are further held against rotative movement within their cylinders by means of the keys 145. To lock the cylinders in their bracket-frames 141, I provide a series of bolts 146, passing through apertures 147 in said bracket-frame, being threaded into the cylinders 140. These bolts are held against movement by means of the shackle-bolts 148.

The cylinder-casing is extended at both sides at the point 150, and guides are here formed carrying bushings 151 for the passage of the standards 152, which extend from the bed-plate of the machine up through and above said cylinder-casing, one of said standards being on the inside while the other is on the outside of the base structure. The lower ends of these standards are reduced and are adapted to guides 154, carried by the base of the machine, such guides having bushings 155. Carried by these standards 152 at the lower part of the same are the cross-pieces or tie-bars 160, each of which carries upon its upper face the lower plunger 17, between which and the upper plunger 16 the blocks are pressed. At the top the standards are con-

connected together by the tie-rods 161. The piston 142 is connected to the standards 152 by means of rocking blocks 165, mounted in bearings 166 on the upper part of the cylinder-casing. The ends 167 of these blocks are adapted to bearings 168 and 169, the former being carried by the piston-rods 143 and the latter by the standards 152. Each of these sets of bearings slides up and down as the piston 142 is raised and lowered. The effect of this construction is such that as soon as pressure is admitted to the cylinder 140 between the interior of the same and the piston 142 said piston will be caused to descend and carry with it the piston-rods 143, and these in turn will carry down the inner ends of the rocking blocks 165, raising the outer ends of the same and with them the standards 152, which serve the purpose of carrying the lower plungers into the spaces of the mold.

Pressure is admitted to the main cylinders from the pipes 170 171, the pipe 170 communicating with its cylinder at 172, while the pipe 171 communicates with its cylinder at 173. Valves 175 and 176 control the admission of the compressing medium, and as soon as the desired pressure has been attained, bringing the plungers 16 and 17 to their proper position with relation to each other, the rest of the pressure will be automatically cut off.

To insure the compressing of blocks to the same size after the machine has been once set, I mount spacing-pieces 180 directly above the cylinder 140, which pieces are engaged by the bearings 168 as the pistons 142 descend, and said bearings are thereby stopped and with them the pistons and the pressure-plungers. To regulate the amount of pressure or insure that it will be cut off at the proper time, and thus keep uniform the size of the block, distance-pieces of different heights may be employed.

*Ejector mechanism and details of same.*—This mechanism is shown in Fig. 4 and consists simply of vertically-moving plungers 18, arranged to push the blocks from the molds in which they have been formed as soon as said molds are brought into position beneath the same. Fig. 4 shows a view, partly in section and partly in elevation, of this mechanism. The ejectors are carried by a sliding member 186, which is mounted within a suitable slideway or casing 187, carried by the bed-plate of the machine and the central flange 100. These plungers are operated by the levers 89, which are pivoted at 188 to the same and pivotally mounted in bearings 189, carried by the flanges 190 of the casings 187. These levers 89 are moved by means of the piston-rod 191, connected to the piston 192, which is mounted in the auxiliary cylinder 193, having the central stem 58, adapted to the hub 56 of the bed-plate of the machine. The operation of the piston and piston-rod mounted in this cylinder will be shortly described.

Each of the ejector plunger-heads is provided with a dovetail groove 195, extending around the outer face of the same, and in this groove fibrous packing 196 is placed for the purpose of lubricating the walls of the openings 11 of the mold members, such lubrication taking place as the ejector-plungers work in and out of the same. The ejector-plunger and slide-piece carrying the same are hollow, providing room for a receptacle 197 for oil or other lubricant which is fed from said receptacle through a pipe 198 to the hollow plunger 18 and thence through openings 199 to the grooves 195, carrying the fibrous packing. The ejector-plungers are removably secured to the sliding member 186 by means of the bolts 200 in order that plungers of different size and shape may be substituted therefor.

*Auxiliary hydraulic cylinder and details of the same.*—At the center of the machine is mounted an auxiliary cylinder 193, carried by the central stem 58, which is mounted in the hub 56, formed at the center of the bed-plate, and this cylinder is provided with a piston 192, to which the piston-rod 191 is connected. The piston-rod 191 carries a block 201 at the upper part of the same, which is connected to the main piston-rods 143 and is also in operative engagement with the levers 89. Fluid for effecting necessary pressure enters this auxiliary cylinder through the pipe 202, and this pressure is constantly maintained. This piston 192 is connected with the main piston through the medium of the links 203, pivoted at 204 to the block 201 and the levers 205, which are pivotally mounted at 206 in the upper part of the standards 152. These levers are connected at 207 to the cap-piece 208, carried by the piston-rods 143, and at the opposite end 209 they engage the slotted ends 210 of the links 203. As noted before, the pressure is constant upon the piston 192; but as the area of this piston is so much less than the area of the main pistons the pressure when admitted to the latter will overcome the pressure on the piston 192 and the latter will be drawn up through the means just described when the pistons 142 descend. When, however, the compression of the blocks has been completed and pressure is cut off from the main pistons 142, the constant pressure upon the piston 192 will cause the latter to descend and through the connections just described will raise the main pistons to their normal positions. In addition to this work the block 201 provides seats 211 for the ends 215 of the levers 89, and when the piston 192 is raised in the manner just described these levers are operated to depress the ejector-plungers 18. This piston-rod 191 is provided with an extension 216, adapted to a slide-bearing 217, carried by the spacing-piece 218, connected to the inner extensions 150 of the cylinders 140.

*Block-handling device and details of the same.*—This mechanism is clearly shown in

Figs. 4 and 7. Mounted within the bed-plate of the machine and arranged within the tank 21 of the same are the take-off tables 22, which are arranged to receive the blocks from the molds and carry them onto the endless conveyer 20. These take-off tables are so arranged as to receive the blocks as soon as they are ejected from the molds and carry them down to the conveyer, onto which they are pushed by the sliding members 23. The take-off tables 22 are adjustable and are carried by the side brackets 220, which are secured at 221 and 222 to the levers 223 224, the latter being carried by the shafts 230 231, such shafts being suitably mounted in the base-frame of the machine. The sliding members 23 are provided with end projections 232, carrying the slide-pieces 233, adapted to cam-grooves 234, carried by brackets 235, suitably secured to the base of the machine. As the take-off tables 22 are lowered the slide-pieces are moved down said cam-grooves, and this action moves the sliding members 23 forward to scrape the blocks off onto the conveyer 20.

Movement is imparted to the take-off tables 22 in the following manner, the levers 223, to which said take-off tables are pivoted, having arms 236, which are connected to and moved from the levers 89 by special mechanism constructed and arranged as follows, the details of which are shown in Figs. 22 and 23: Brackets 237 extend from the plunger-guide 187, and journaled in end bearings 238 of these brackets is a short shaft or spindle 239, carrying a pinion 240, meshing with the racked end 241 of the lever 89. This pinion is loose on the spindle 239, and a ratchet mechanism is employed to cause it to transmit its movement to said spindle at regular intervals. The pinion is provided with a recessed portion 242, having notches 243 in the opposite walls of the same, and arranged to fit this recess 242 is a projection 244, carried by a hub 245, keyed to the spindle 239, such hub having pawls 246 pivoted thereto, which pawls are arranged to engage the notches 243. The projection 244 is recessed to accommodate these pawls, and they are held in engagement with the walls of the recess of the pinion by means of plunger-pins 247, which are engaged by springs 248. The connection between these parts is such that the pinion 240 will be given a movement of about one-half a revolution by the racked end 241 of the lever 89 before the pawls will be engaged to move the hub 245, and the further movement of the pinion will move the hub and operate the mechanism for depressing the take-off tables 22. The spindle 239 is reduced at one end, which carries an arm 249, having a slotted portion 250. An adjustable block 251 is arranged in the slotted portion of the arm, and this block is provided with a pin 252, to which the adjustable link or connecting-rod 253 is connected, the opposite end of which rod is pivoted to the arm

236. The block 251 is adjustable within the slotted arm 249 by means of a screw 249<sup>a</sup>. These parts are so connected together, therefore, that when the lever 89 is moved to force the ejector-plungers into the molds the racked end 241 of the same will move the pinion 240, and one-half of such movement will be idle, the take-off tables 22 remaining in the position shown in Figs. 4 and 7 until the blocks have been pushed onto the same. At this time the pinion will have been engaged by the pawls, and the further movement of the same will turn the hub and with it the spindle 239. As this spindle carries the connection attached to the arm 236, the latter will be raised and the levers 223 will be lowered, carrying down the take-off tables 22. Upon the return movement of the levers 89 the reverse action will take place—that is to say, the friction of the pawls will hold the pinion to turn the hub and all of its connected parts during the first half of the movement of said pinion, and through the connection just described the take-off tables 22 will be returned to their normal position ready to receive a new set of blocks. The rest of the movement of the pinion will be idle, returning to its normal position with the pawls 246 bearing the relation to the notches as illustrated in Fig. 23. It will be noticed in this connection that the notches are just forward of the ends of the pawls in order that the initial half rotative movement of the pinion will be entirely free.

*Conveyer, conveyer-supports, and driving means.*—The conveyer 20 is made up of a series of slats 254, carrying sprocket-chains 255, to which they are firmly secured, which chains are adapted to pass over sprocket-wheels 256 and 257, the latter being driven from the main driving-shaft. This movement is accomplished by means of the counter-shaft 258, which receives its movement through the medium of the bevel gear-wheel 86 on the shaft 85 and the bevel-pinions 259, 260, and 261. The sprocket-wheels 257 are carried by a shaft 262, which receives its movement from the counter-shaft 258 by means of the pinions 263 and 264. This conveyer is supported on the upper run by the angle-pieces 265, carried by the cross-braces 266, and on the lower run by the angle-pieces 267, carried by yoke members 268, suitably disposed within the base of the machine. The ends of these angle-pieces are curved at the points 269, so that the chain will ride on the same in approaching and leaving such supports without any damage, and the curved portions of the upper supports extend, preferably, to the center of the sprocket-wheels 257.

The slow conveyer is constructed in a manner exactly similar to the fast conveyer 20, extends beyond said conveyer 20 directly in line with the same, and passes over the driving sprocket-wheels 270 and over idler-wheels (not shown) at the opposite end of the same.

The wheels 270 are mounted on the shaft 271, which receives its movement from the shaft 262 through the medium of the reducing-gears 272, 273, 274, and 275, the wheels 273 and 274 being mounted on the counter-shaft 276. The sprocket-wheels 256 for the fast conveyer 20 are carried by the shaft 256<sup>a</sup>, mounted in the slide-bearings carried by a yoke-piece 277, whereby they may be adjusted to take up any slack, an adjusting-screw 278 being provided for this purpose, having the squared end 279 for engagement by a suitable wrench or spanner. Both conveyers 20 and 24 are driven continuously, although the other operations of the machine are intermittent.

*Details of guides, valves, levers, pipes, &c.—*

In all cases throughout the machine anti-friction-bushings are provided for all of the slide-ways or guideways, and in the case of the molds and the recesses engaged by the driving-pawl hardened bushings or blocks are provided.

The main-valve structure for controlling the inlet and exhaust of the compressing medium for the pressure-plungers is shown in Fig. 11, 280 representing the pressure-inlet pipe and 281 the exhaust-pipe. The inlet is controlled by the valve 175, while the exhaust is controlled by the valve 176, and in the present instance this valve is shown as being open, the fluid under pressure passing from both pipes 170 and 171 into the by-pass 282 and thence around the valve 175 to the exhaust-pipe 281. The auxiliary cylinder 193 is supplied with pressure from the same source supplying pressure to the main cylinders, and the pipe 202 is provided for this purpose, connecting with the main supply-pipe at a point beyond the main controlling-valve, as shown in Fig. 1.

The valves 175 and 176 are controlled by the levers 283 and 284, pivotally mounted in the bracket 285, hung from the valve-casing, and operated by the rods 286 and 287. These rods are in turn connected to the levers 288 and 289, which are controlled by the cams 290 and 291, respectively, mounted on the shaft 85, said levers being pivotally mounted at the point 292.

I claim as my invention—

1. A molding-machine, comprising a base, a rotatable table carried thereby, molds carried by said table, a feed-hopper mounted above the table and adapted to feed material to the molds successively as they are brought into position beneath the same, compression-plungers mounted in advance of said feeding mechanism, an ejector-plunger mounted in advance of the compression-plungers, means for giving the table a step-by-step movement, a spring-controlled pawl for locking the table automatically at the end of each step-by-step movement, means for operating the feeding, block forming and ejecting mechanism at each stoppage of the table, and means for auto-

matically releasing the table and carrying it forward after the operation of the several mechanisms.

2. The combination in a molding-machine, of the mold-carrying table, a series of molds arranged therein, the molds and table being recessed on opposite sides at adjacent points to retain a locking device, and a headed screw adapted to said recesses for locking the molds in place against rotative movement.

3. The combination in a molding-machine, of the mold-carrying table, a series of molds arranged therein, said molds having central polygonal openings and circular flanges surrounding the same and adapted to fit similarly-shaped seats or sockets in the table, the flanges and table being recessed on opposite sides at adjacent points to retain a locking device, a headed screw adapted to said registering recesses for locking the molds in place against rotative movement, and a washer combined with said headed screw and held in place by the same.

4. In a molding-machine, the combination of the horizontal mold-carrying table having an open center, the inner wall of the same being provided with recesses, a spring-controlled pawl adapted to enter said recesses, a connecting-rod attached to said pawl, and means for giving said connecting-rod a movement of varying speed.

5. In a molding-machine, the combination of the horizontal mold-carrying table having an aperture, bushed recesses on the inner face of the same, a lever, a spring-controlled pawl adapted to enter said recesses, a connecting-rod attached to and serving to operate the lever, means for regulating the extent of movement of said rod, and means for giving the same a movement of varying speed.

6. In a molding-machine, the combination of the rotatable mold-carrying table, means for moving the same, and means for intermittently locking said table, such means contacting with the moving or driving element and preventing the engagement of the same with the table.

7. In a molding-machine, the combination of the rotatable mold-carrying table, having an open center, means for moving the same from the inner opening, and vertically-moving pins for intermittently locking said table, said pins contacting with the moving or driving element and preventing the engagement of the same with the table,

8. In a molding-machine, the combination of the rotatable mold-carrying table open at the center and having engaging faces on the inner wall formed by said opening, a pawl for engagement therewith, means for moving said pawl, and means for preventing at specified times, the engagement of said pawl.

9. In a molding-machine, the combination of the rotatable mold-carrying table having an open center, the inner wall of said table hav-

ing a series of recesses, a pawl adapted to enter said recesses, means for moving said pawl and an automatically-operated pin adapted to enter one of said recesses and prevent, except at  
5 specified times, the engagement of the pawl.

10. In a molding-machine, the combination of the mold-carrying table having an open center, with recesses in the wall formed by said open center, a pawl adapted to engage  
10 said recesses, means for moving said pawl, pins entering the recesses and preventing the engagement of the pawl therewith, and means for operating said pins.

11. In a molding-machine, the combination  
15 of the mold-carrying table having an open center, with recesses in the wall formed by said open center, a pawl adapted to engage said recesses, hardened bushings for the engaging faces of said recesses, means for moving  
20 said pawl, pins arranged to enter the recesses and prevent the engagement of the pawl therewith, and means for operating said pins.

12. In a block-molding machine, a rotatable table, driving mechanism, a pivotally-mounted  
25 pawl for engaging said table whereby it may be moved, a connection between said pawl and the driving mechanism, said table being provided with recesses to receive the pawl, and means for automatically disengaging said pawl at the  
30 end of its stroke.

13. In a block-molding machine, a rotatable table, driving mechanism, a pivotally mounted  
pawl for engaging said table whereby it may be moved, a connection between said pawl and the  
35 driving mechanism, said table being provided with recesses to receive the pawl, and an adjustable cam for automatically disengaging said pawl at the end of its stroke.

14. In a block-molding machine, a rotatable  
40 table having an open center with recesses formed in the wall of the same, means for driving said table comprising an arm carrying a spring-controlled pawl adapted to enter the recesses, and an adjustable cam for automatically releasing the pawl as the table nears the  
45 end of its stroke.

15. In a block-molding machine, a rotatable table having an open center with recesses formed in the walls of the same, means for driving  
50 said table comprising an arm carrying a spring-controlled pawl adapted to enter the recesses, a cam projection carried by the pawl, and a cam adapted to engage therewith and automatically release the pawl as the table  
55 nears the end of its stroke.

16. In a molding-machine, the combination of the mold-carrying table having an open center with a series of recesses formed in the inner wall of the same, an auxiliary piston, a lever connected thereto, and a pin controlled  
60 by said lever and adapted to enter the recesses of the mold-carrying table.

17. In a molding-machine, the combination of the mold-carrying table having an open center with a series of recesses formed in the

inner wall of the same, an auxiliary piston, means for moving the same, a lever connected thereto, a sliding pin controlled by said lever and adapted to enter the recesses of the mold-carrying table, and means for raising and lowering  
70 said pin.

18. In a molding-machine, the combination of the mold-carrying table having an open center, means for moving the same comprising a  
75 pawl adapted to engage recesses formed in the inner wall of said table, a pin adapted to enter said recesses to hold the pawl out at certain intervals, a rock-shaft for operating said pin, and means for operating said rock-shaft.

19. In a molding-machine, the combination  
80 of the mold-carrying table having an open center, means for moving the same comprising a pawl adapted to engage recesses formed in the inner wall of said table, a pin adapted to enter said recesses to hold the pawl out at certain  
85 intervals, a rock-shaft for operating said pin, a link connected to the opposite end of said rock-shaft, a slide carrying said link, and a cam for operating said slide.

20. In a block-molding machine, the combination of the rotatable table, the main driving  
90 mechanism, a counter-shaft, means for moving the table intermittently, means for locking the table during the stoppages of the same, including a pin arranged to accomplish this  
95 purpose, a rock-shaft carrying said pin, a bracket supporting the said rock-shaft, an arm depending from the opposite end of the same, and a cam mounted on said counter-shaft and arranged to operate said arm.  
100

21. In a block-molding machine, the combination of the rotatable table, the main driving  
105 mechanism, a counter-shaft driven therefrom, means for moving the table intermittently, means for locking the table during the stoppages of the same, including a sliding pin arranged to accomplish this purpose, a rock-shaft carrying said pin, a bracket supporting the said rock-shaft, an arm depending from the opposite end of the same, a slide connected  
110 to said arm, and a cam mounted on said counter-shaft and arranged to operate said slide.

22. In a molding-machine, the combination of the base, a circular mold-carrying table supported by the same and having a series of apertures, annular tracks formed on said base, said  
115 table being mounted on said tracks, a locking-pin arranged to enter the apertures in the table, and means for operating said pin at certain intervals with respect to the movement of  
120 the table.

23. In a molding-machine, the combination of the base, a circular mold-carrying table supported by the same and having a series of apertures formed therein, annular tracks formed  
125 on said base, said table being mounted on said tracks, a locking-pin arranged to enter the apertures in the table, a counter-shaft, driving means for the same, and a cam carried by said counter-shaft for operating said pin at certain  
130

intervals with respect to the movement of the table.

24. In a molding-machine, the combination of the mold-carrying table having a series of  
5 apertures at the outer edge of the same, a pin mounted below the table in line with and arranged to enter one of said apertures at the regular stoppages of the table, a vertically-moving slide-piece carrying said pin, a shaft  
10 in line with said slide-piece, and a cam carried by said shaft for operating said slide-piece.

25. A molding-machine, comprising a base portion, a rotatable table mounted thereon,  
15 main driving means, a gear-wheel connected to said driving means, an arm carrying a pawl adapted to move the table, and means for moving said arm from the gear-wheel whereby the initial movement of the table will gradually increase up to the point of half of its  
20 movement and gradually decrease in speed from such point to the end of its movement, substantially as described.

26. A molding-machine, comprising a base portion, a rotatable table mounted thereon,  
25 main driving means, a gear-wheel connected to said driving means and forming a face-plate, a link connected to the same, an arm connected to said link and carrying a pawl adapted to move the table, and means for moving said  
30 arm from the gear-wheel whereby the initial movement of the table will be slow, gradually increasing up to the point of half of its movement and then gradually decreasing in speed from such point to the end of its movement.

35 27. The combination in a molding-machine of the hopper, a support for the same, an independent discharge-section for said hopper made in halves suitably secured together and arranged below said support, a stirrer-shaft  
40 mounted in said hopper, and a bearing for said shaft carried by said discharge-section, the latter being detachably mounted with respect to the hopper and having its inner walls tapered toward the discharge-opening.

45 28. The combination in a molding-machine, of the hopper, a support for the same, a discharge-section arranged below said support and detachably mounted with respect to the hopper, a shaft within said hopper carrying  
50 stirring-blades, and bearings for said shaft, the lower bearing for said shaft being mounted in the discharge-section.

29. The combination in a molding-machine, of the hopper, a shaft mounted therein carrying  
55 stirring-blades, pawls carried by the upper end of said shaft, a ratchet-wheel mounted above the hopper, and means for moving the ratchet-wheel whereby said pawls may serve to turn the shaft.

60 30. The combination in a molding-machine, of the hopper, a vertical shaft within the same, stirring-blades carried by said shaft, pawls carried by the upper end of said shaft, a ratchet-wheel mounted above the hopper, and  
65 eccentric connected to said ratchet-wheel, and

means for moving said eccentric whereby the ratchet-wheel may be operated to turn the shaft.

31. In a molding-machine, the combination of the hopper, an independent discharge-section  
70 mounted between the same and the table, and a hardened knife-edge set in one of the walls of the discharge-section and serving to scrape off the surplus material inserted in the  
75 molds.

32. In a molding-machine, the combination of the hopper, an independent discharge-section mounted between the same and the table,  
80 and a reversible knife-edge set in one of the walls of the discharge-section and serving to scrape off the surplus material inserted in the molds.

33. In a molding-machine, the combination of the discharge-section of the hopper and a  
85 knife-edge carried by the same to scrape off the material in the molds, said knife-edge being diamond-shaped whereby when one edge becomes worn it may be reversed and fit its seat in the discharge-section.

34. In a block-molding machine, the combination of the rotatable table carrying the  
90 molds, the feed-hopper, an auxiliary table arranged beneath said hopper and serving as a bottom for the mold directly beneath the same, and a lubricating device carried by said auxiliary table and acting on the under side of  
95 the material within the mold.

35. In a block-molding machine, the combination of the rotatable table carrying the  
100 molds, the feed-hopper, an auxiliary table arranged beneath said hopper and serving as a bottom for the mold directly beneath the same, a lubricating device carried by said auxiliary table and acting on the under side of the material within the mold, and a lubricating device  
105 carried by the lower portion of the hopper and acting on the upper part of the material within the mold.

36. The combination in a molding-machine, of the compressing means comprising a fixed  
110 cylinder, a piston mounted therein and carrying a compressor-plunger, standards adjacent to said cylinder, a compressor-plunger carried by said standards, and levers connecting said piston and the standards whereby the plunger  
115 carried by the latter will be raised as the piston-plunger is depressed.

37. The combination in a molding-machine, of the fixed cylinder, a piston mounted therein, a plurality of piston-rods connected to said  
120 piston, standards adjacent to said cylinder, a compressor-plunger carried by said standards, levers connecting said piston and the standards whereby the plunger carried by the latter will be raised as the piston-plunger is depressed, and means for supplying motive fluid  
125 to the piston.

38. The combination in a molding-machine, of the fixed cylinder, a piston therein, a compressor-plunger carried thereby, means for in-  
130

roducing motive fluid to move said piston, a pair of vertically-moving standards mounted adjacent to said cylinder, levers connecting said piston and the standards, a cross-bar carried by the standards, and a compressor-plunger mounted thereon, the movement of the piston serving to raise the standards and bring the plunger carried by the same into contact with the material in the mold.

39. The combination in a machine of the character described, of the main cylinder, a piston therein, means for introducing motive fluid to move said piston, a compressor-plunger connected to the same, a pair of vertically-moving standards mounted adjacent to said cylinder, rocker-blocks connecting said piston and the standards, a fixed central bearing for said rocker-blocks, a cross-bar carried by the standards, and a compressor-plunger mounted thereon, the movement of the piston serving to raise the standards through the medium of the rocker-blocks and bring the plunger carried by the same into contact with the material in the mold.

40. The combination in a molding-machine, of the main piston, a compressor-plunger carried thereby, means for introducing pressure on one side of said piston to lower the same, an auxiliary cylinder, a piston therein, a connection between both piston-rods, said auxiliary cylinder having a piston of less area than the main piston receiving a constant pressure, and means for cutting off the pressure to the main piston whereby the auxiliary piston will be permitted to work and raise the main piston through its operative connection with the same.

41. The combination in a molding-machine, of the main piston, a compressor-plunger carried thereby, means for introducing pressure on one side only of said piston to lower the same, an auxiliary cylinder, a piston therein, a lever connected to both piston-rods, said auxiliary cylinder having a piston of less area than the main piston receiving a constant pressure of motive fluid, and means for cutting off the pressure to the main piston whereby the auxiliary piston will be permitted to work and raise the main piston through the medium of said lever.

42. In a block-molding machine, the combination of the rotatable table, the molds carried thereby, compressor-plungers adapted to enter said molds, pistons carrying said compressor-plungers, said pistons operating by hydraulic pressure, means for controlling the supply of pressure to said pistons, an auxiliary cylinder having a piston receiving constant pressure upon one side of the same, and connection between said auxiliary piston and the compressor-pistons whereby the latter will be raised as soon as the pressure is cut off the same.

43. In a block-molding machine, the combination of the rotatable table, the molds carried thereby, compressor-plungers adapted to enter

said molds, pistons carrying said compressor-plungers, said pistons operating by hydraulic pressure, valves controlling the pressure for said piston, means for cutting off the supply of pressure to said pistons, an auxiliary cylinder having a piston receiving constant pressure upon one side of the same, and levers connecting said auxiliary piston and the compressor-pistons whereby the latter will be raised as soon as the pressure is cut off the same.

44. In a molding-machine, the combination of the main cylinders, pistons therein, a source of pressure-supply, pipes leading from the same to said cylinders, valves controlling the flow through said pipes, a driving-shaft, a counter-shaft driven therefrom, cams carried by said counter-shaft, and a series of links and levers controlled by said cams and arranged to operate the valves alternately.

45. In a molding-machine, the combination of the mold-carrying table, pressure-plungers for acting upon material within said molds, means for moving said plungers, an auxiliary piston, and provision for cutting off the pressure from the main piston thereby placing the auxiliary piston into position to raise said main piston to its normal position.

46. In a molding-machine, the combination of the mold-carrying table, pressure-plungers for acting upon material within said molds, means for moving said plungers, an auxiliary cylinder, a piston therein receiving pressure on one side only, provision for cutting off the pressure from the main piston and thereby placing the auxiliary piston into position to raise said main piston to its normal position, and a connection between said pistons.

47. In a molding-machine, the combination of the main piston, a cylinder for the same, a pressure-platen carried by said piston, guide-bearings mounted on the cylinder, standards passing through said guide-bearings, and rocking blocks carried by said cylinder in engagement with the piston-rod and standards whereby the latter will be raised when the piston is lowered.

48. In a molding-machine, the combination of the main piston, a cylinder for the same, a pressure-platen carried by said piston, guide-bearings mounted on the cylinder, standards passing through said guide-bearings, rocking blocks carried by the upper part of the cylinder, and bearings carried by the piston-rod and standards whereby the latter will be raised when the piston is lowered.

49. In a molding-machine, the combination of the main cylinder, bracket-supports for the same, and locking-pins carried by said bracket and entering the cylinder and serving to prevent rotative movement of the same.

50. In a molding-machine, the combination of the main cylinder, bracket-supports for the same, locking-pins carried by said bracket and entering the cylinder and serving to prevent

rotative movement of the same, and retaining members for said locking-pins.

51. In a molding-machine, the combination of the main bed or base, a standard carried by the same, an ejector-plunger mounted in said standard, an auxiliary-piston cylinder, and means operatively connected to said auxiliary piston whereby the ejector-plunger is lowered as the said piston is raised.

52. In a molding-machine, the combination of the main bed or base, a standard carried by the same, an ejector-plunger mounted in said standard, an auxiliary piston, and a pivoted lever connected at one end to the auxiliary piston and on the opposite side of its fulcrum to the ejector-plunger whereby said ejector-plunger is lowered as the said piston is raised.

53. In a molding-machine, the combination of the ejector-plunger, a support for the same in which said plunger is adapted to slide, a mold-carrying table, an auxiliary cylinder, a piston therein, a connection between said piston and the ejector-plunger, whereby when said piston is raised, the ejector-plunger will be lowered, and a locking-pin adapted to engage with the table and lower slightly in advance of the ejector-plunger.

54. In a molding-machine, the combination of the ejector-plunger, a support for the same in which said plunger is adapted to slide, a mold-carrying table, an auxiliary cylinder, a piston therein, a pivoted lever connected to said piston and the ejector-plunger, means for operating said piston whereby when said piston is raised, the ejector-plunger will be lowered, and a locking-pin adapted to engage with the table and lower slightly in advance of the ejector-plunger.

55. In a molding-machine, the combination of the compression-plungers, means for operating the same, an independent ejector-plunger, an auxiliary cylinder, a piston therein, and a connection between said piston and the ejector-plunger whereby the latter will be moved when said piston is raised and lowered, such action taking place simultaneously with the movement of the compression-plungers.

56. In a molding-machine, the combination of the ejector-plunger, the auxiliary cylinder, a piston therein, and a lever controlled by said auxiliary piston and connected to the ejector-plunger whereby the latter will be lowered when the piston in the auxiliary cylinder is raised, and vice versa.

57. In a molding-machine, the combination of an ejector-plunger, a mold-carrying table, a take-off table to receive the blocks from the molds, means for moving said plunger, and a connection between said means and the take-off table whereby the latter will be lowered as the ejector-plunger delivers the block.

58. In a molding-machine, the combination of the ejector-plungers, the mold-carrying table, take-off tables to receive the blocks forced from the molds, means for moving said plun-

gers and connections between said means and the take-off tables whereby the latter will be lowered as the ejector-plungers deliver the blocks.

59. In a molding-machine, the combination of the ejector-plungers, the mold-carrying table, take-off tables to receive the blocks forced from the molds, levers for moving said plungers and connections between said levers and the take-off tables whereby the latter will be lowered as the ejector-plungers deliver the blocks.

60. In a molding-machine, the combination of the mold-carrying table in which the blocks are formed, ejecting means for said blocks, a fast conveyer for said blocks arranged beneath the bed-plate of the machine, a slow conveyer beyond the fast conveyer, means for transferring the blocks, and a cooling-tank through which said conveyers pass.

61. In a molding-machine, the combination of the mold-carrying table, means for ejecting the blocks from the same, a lever for operating said ejecting means, a vertically-moving table arranged to receive said blocks, and means for lowering said table carrying the blocks, said means being operatively connected to the lever for actuating the ejecting means.

62. In a molding-machine, the combination of the mold-carrying table, means for ejecting the finished blocks from the same, a lever for operating said ejecting means, a vertically-moving table arranged to receive said blocks, means for lowering said table carrying the blocks, said means being operatively connected to the lever for actuating the ejecting means, a conveyer for the blocks, and means for pushing the blocks off the table onto the conveyer as said table is lowered.

63. The combination in a molding-machine, of the mold-carrying table in which the blocks are formed, means for ejecting said blocks, a vertically-moving table adapted to receive said blocks, means for lowering said table, an endless conveyer, a slide coacting with the table for scraping the blocks from the same and onto the endless conveyer.

64. The combination in a molding-machine, of the mold-carrying table in which the blocks are formed, means for ejecting said blocks, a vertically-moving table adapted to receive said blocks, means for lowering said table, an endless conveyer to receive the blocks, a slide coacting with the table for scraping the blocks from the same and onto the endless conveyer, projections carried by said slide and cams for acting against said projections as the table is raised and lowered.

65. The combination in a molding-machine, of the mold-carrying table in which the blocks are formed, ejecting means for said blocks, a vertically-moving table adapted to receive said blocks, a lever for operating said table, a lever for operating the ejecting means, and an operative connection between said members.

66. The combination in a molding-machine, of the mold-carrying table in which the blocks are formed, ejecting means for said blocks, a vertically-moving table adapted to receive said blocks, a lever for operating said table, a lever for operating the ejecting means, an operative connection between said members whereby the table will be lowered as the ejector finishes its movement and a conveyer for receiving the blocks from said table.

67. The combination in a molding-machine, of the mold-carrying table in which the blocks are formed, ejecting means for the same, a vertically-moving table upon which said blocks are received, pivoted supports for said table, a sliding member carried by said table, cam-grooves arranged alongside said table, and projections on said sliding member engaging said grooves whereby the sliding member will be moved forward to scrape the blocks off the table as the latter is depressed.

68. In a molding-machine, the combination of the mold-carrying table in which the blocks are formed, ejecting means for said blocks, a fast conveyer for receiving said blocks directly from the mold-table, said conveyer being connected to and operated directly below the latter, a slow conveyer arranged beyond the machine and adapted to receive the blocks from the fast conveyer, means for transferring the blocks from the molds to the fast conveyer, and means for transferring said blocks from the fast conveyer to the slow conveyer.

69. In a block-molding machine, the combination of the block-forming mechanism, means for delivering the blocks, a conveyer to receive said blocks, main driving mechanism, means for driving said conveyer from said main driving mechanism at a speed in excess of the latter, a conveyer arranged to receive the blocks from the conveyer disposed within the base, and means connected with the main driving mechanism for driving this conveyer at a slower rate of speed.

70. In a block-molding machine, the combination of the block-forming mechanism, means for delivering the blocks, a conveyer to receive said blocks, main driving mechanism, means for driving said conveyer from the main driving mechanism at a speed in excess of the latter, a conveyer arranged to receive the blocks from the conveyer disposed within the base, means connected with the main driving mechanism for driving this conveyer at a slower rate of speed, and a series of rollers interposed between the conveyers for the passage of the blocks from one conveyer to the other.

71. The combination in a molding-machine, of the mold-carrying table in which the blocks are formed, an auxiliary table arranged below the same, a receptacle carried by said latter table, and a lubricating-roller mounted within said receptacle, and adapted to contact

with the material to be pressed carried by the molds.

72. The combination in a molding-machine, of the mold-carrying table in which the blocks are formed, the feed-hopper, an auxiliary table arranged below the mold-carrying table and beneath the mold being filled with material, an extension carried by said table and extending from the feeding-point to the compressing-point, a receptacle for lubricant carried by said table, an apertured plate covering the same, and a roller mounted in said receptacle and projecting through the apertured plate, said roller serving to lubricate the under surface of the material in the mold as it passes to the compressors.

73. The combination of the compressor-piston, the valves for controlling hydraulic pressure for the same, the main driving-shaft, a counter-shaft driven therefrom, pivoted levers carried by the valve-casing for operating said valves, cams carried by the counter-shaft, pivoted levers in engagement therewith, and links connecting said levers with the valve-levers.

74. In a molding-machine, the combination of the mold-carrying table having recesses, a pawl adapted to engage therewith to move the table, a connecting-rod for operating said pawl, a pin upon which said rod is pivotally mounted, and an eccentric bushing for said pin.

75. In a molding-machine, the combination of the mold-carrying table having recesses, a pawl adapted to engage therewith to move the same, a connecting-rod for operating said pawl, a face-plate to which said rod is connected, a pin carried by said face-plate, an eccentric bushing for said pin and means for adjusting and securing said bushing.

76. In a molding-machine, the combination of the mold-carrying table having recessed portions, a pawl adapted to engage therewith, means for driving said pawl, means for causing it to engage the recesses, and means formed on the face of the recesses for engagement with the pawl whereby the latter will be kept free of the recesses on the return movements of the same.

77. In a molding-machine, the combination of the mold-carrying table having recesses, a pawl adapted to engage said recesses, means for driving said pawl, means for causing it to engage the recesses, hardened bushings carried by the recesses, one of said bushings having a beveled face, and a projecting portion carried by the pawl and having a beveled face, said members adapted to engage on the return movements of the pawl whereby the latter will be prevented from entering the recesses.

78. In a molding-machine, the combination of the tables for receiving the pressed blocks, means for moving the same, sliding members carried by said tables which are operated as

the tables are moved, cam-guides, and slide-pieces carried by said sliding members and adapted to the cam-guides.

79. In a molding-machine, the combination  
5 of the ejector-plungers, a lever for moving  
the same, the tables for receiving the blocks,  
a spindle, a pinion on said spindle, the end of  
the lever being racked to engage said pinion,  
a connection between said spindle and the  
10 table to receive the blocks, and pawl mechanism  
for engagement by said pinion whereby  
the spindle may be turned.

80. In a molding-machine, the combination  
of the ejector-plungers, a lever for moving  
15 the same, the tables for receiving the blocks,

a spindle, a pinion on said spindle, the end of  
the lever being racked to engage said pinion,  
a hub keyed to said spindle, a lever connected  
to the tables to receive the blocks, a connection  
between said hub and this lever, and pawl 20  
mechanism carried by the hub and automatically  
engaged and disengaged by the pinion  
to effect the lowering and raising the tables.

In testimony whereof I have signed my name  
to this specification in the presence of two sub- 25  
scribing witnesses.

WILLIAM S. GODWIN.

Witnesses:

MURRAY C. BOYER,  
JOS. H. KLEIN.