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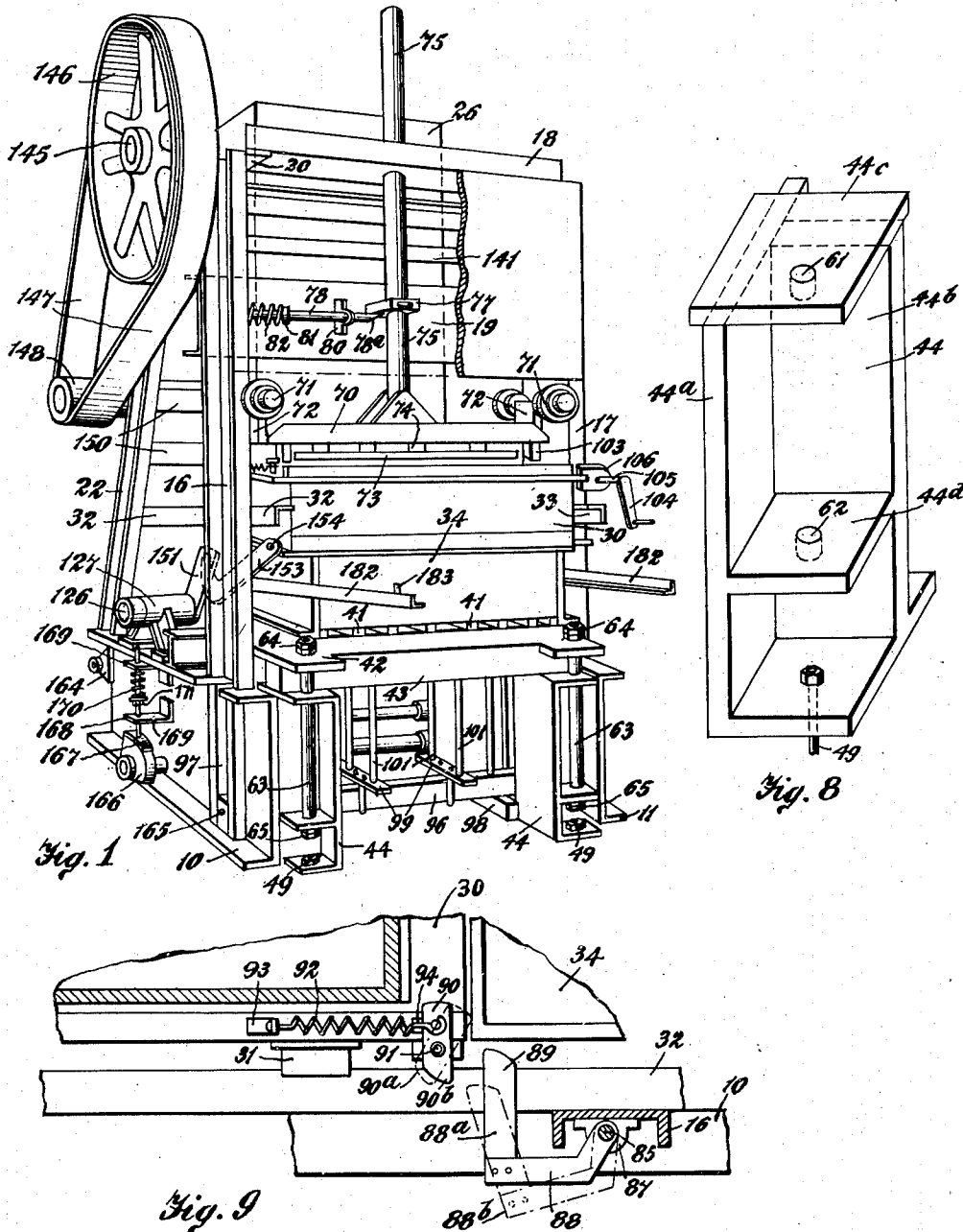
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2,275,676

CONCRETE BLOCK MACHINE

Original Filed Aug. 28, 1937

9 Sheets-Sheet 1



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9 Sheets-Sheet 2

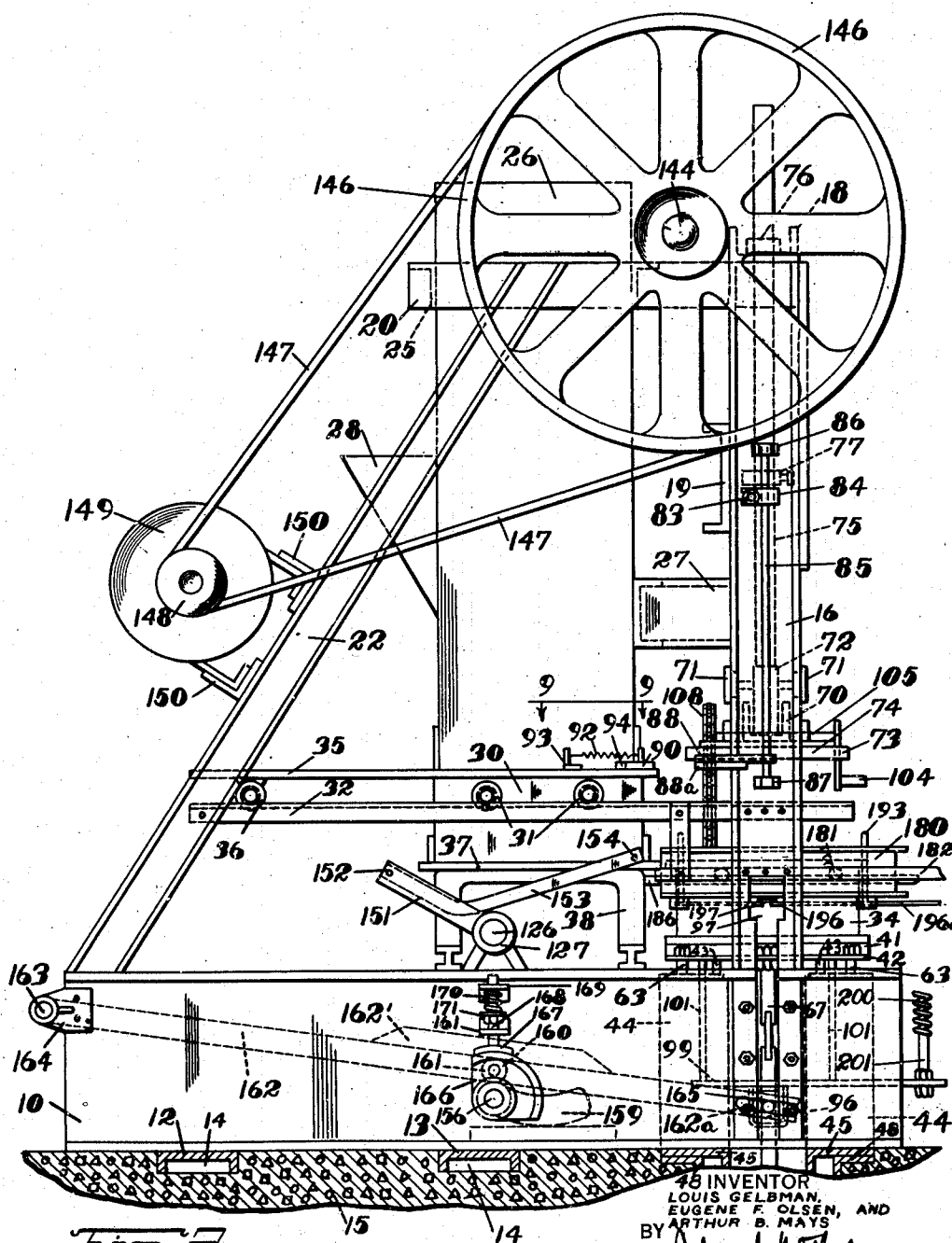


Fig. 2

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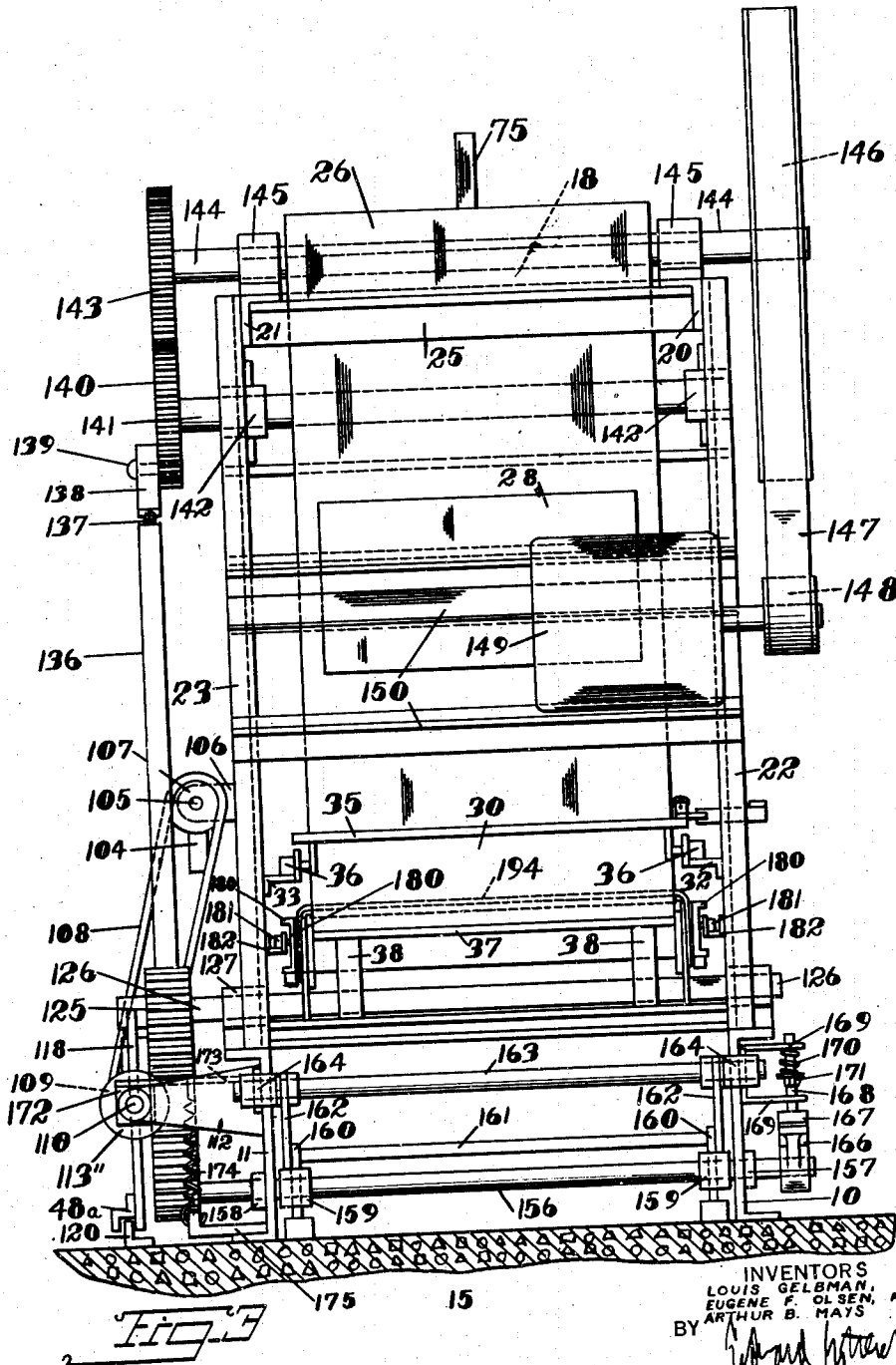
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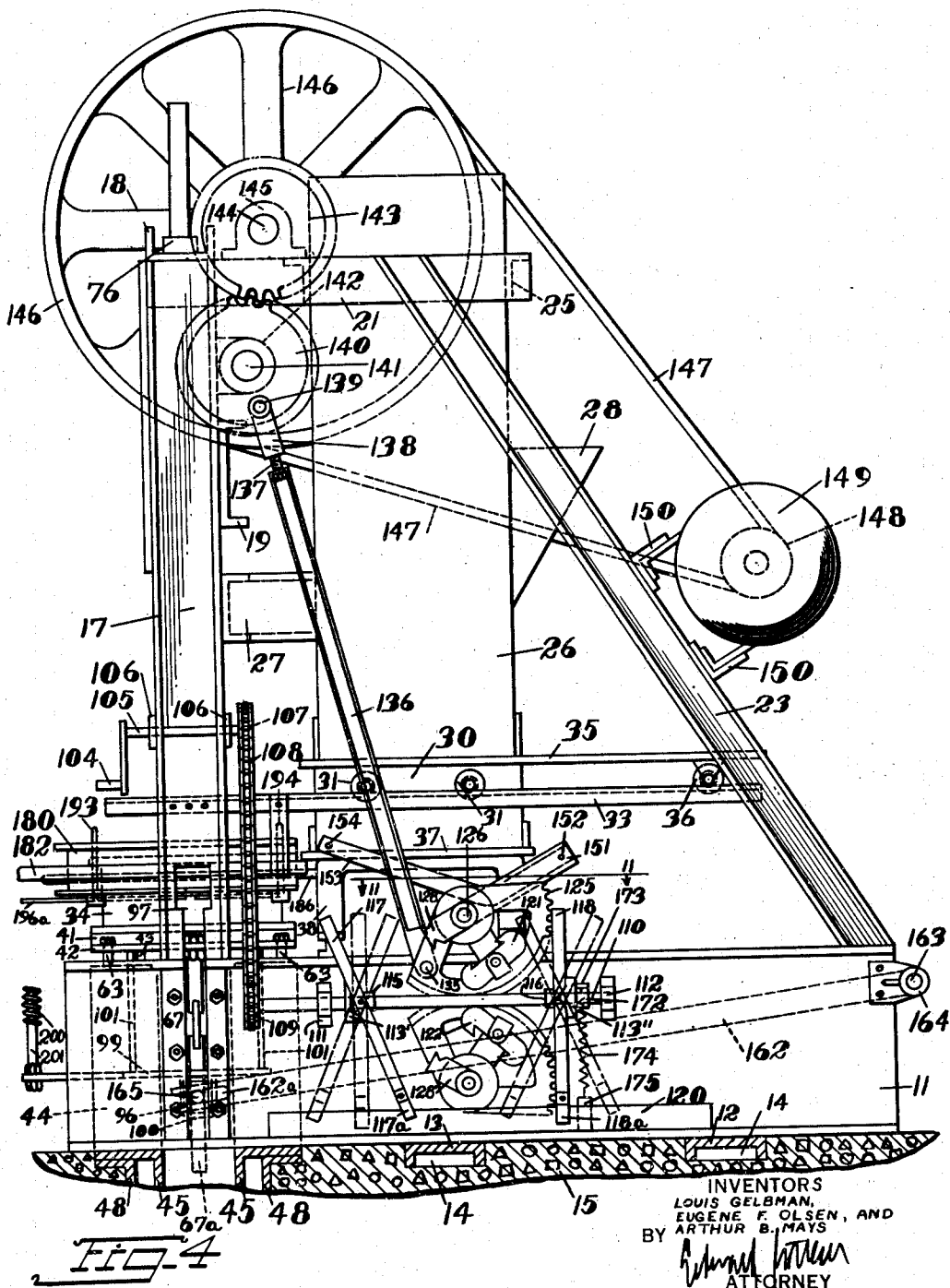
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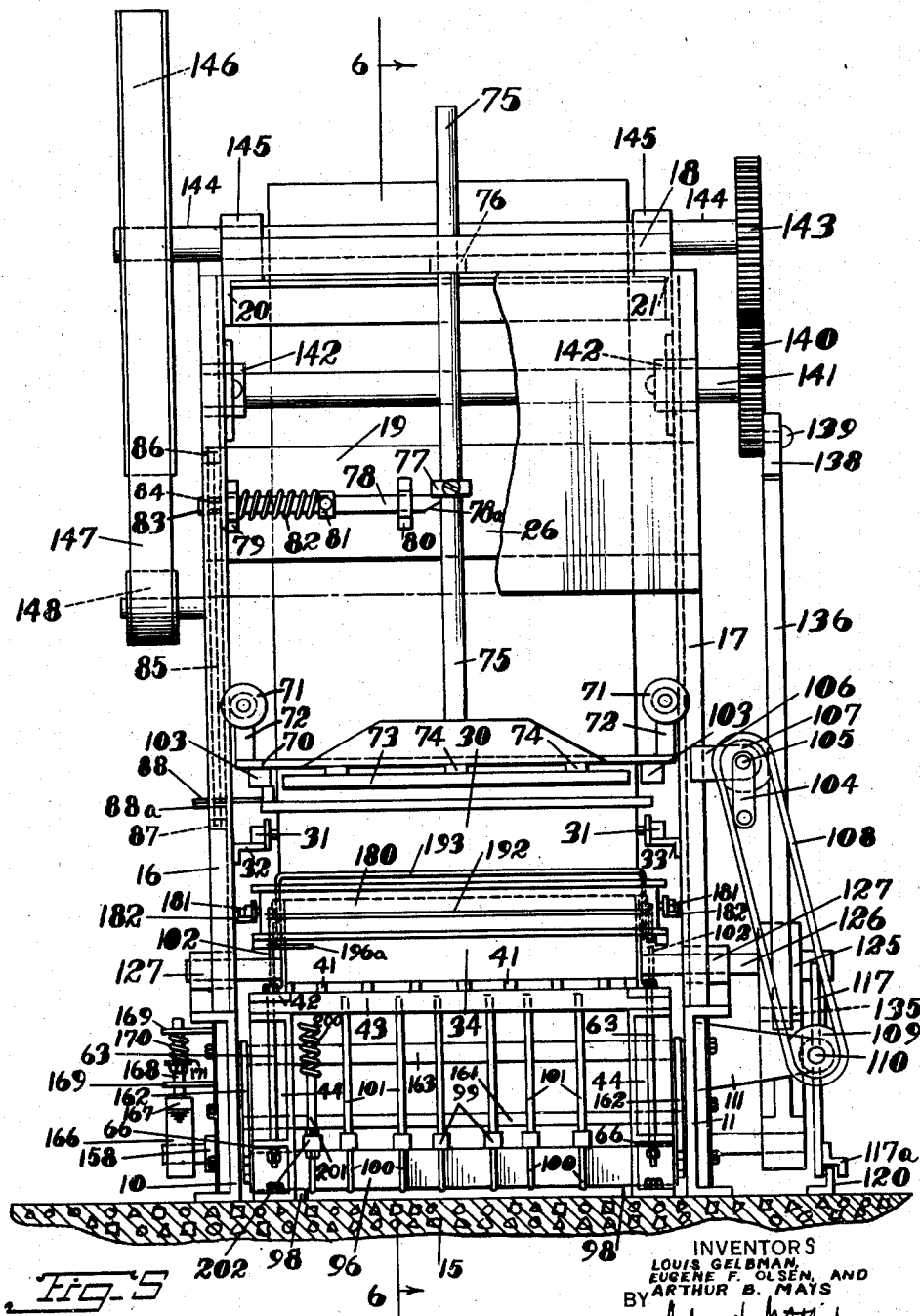


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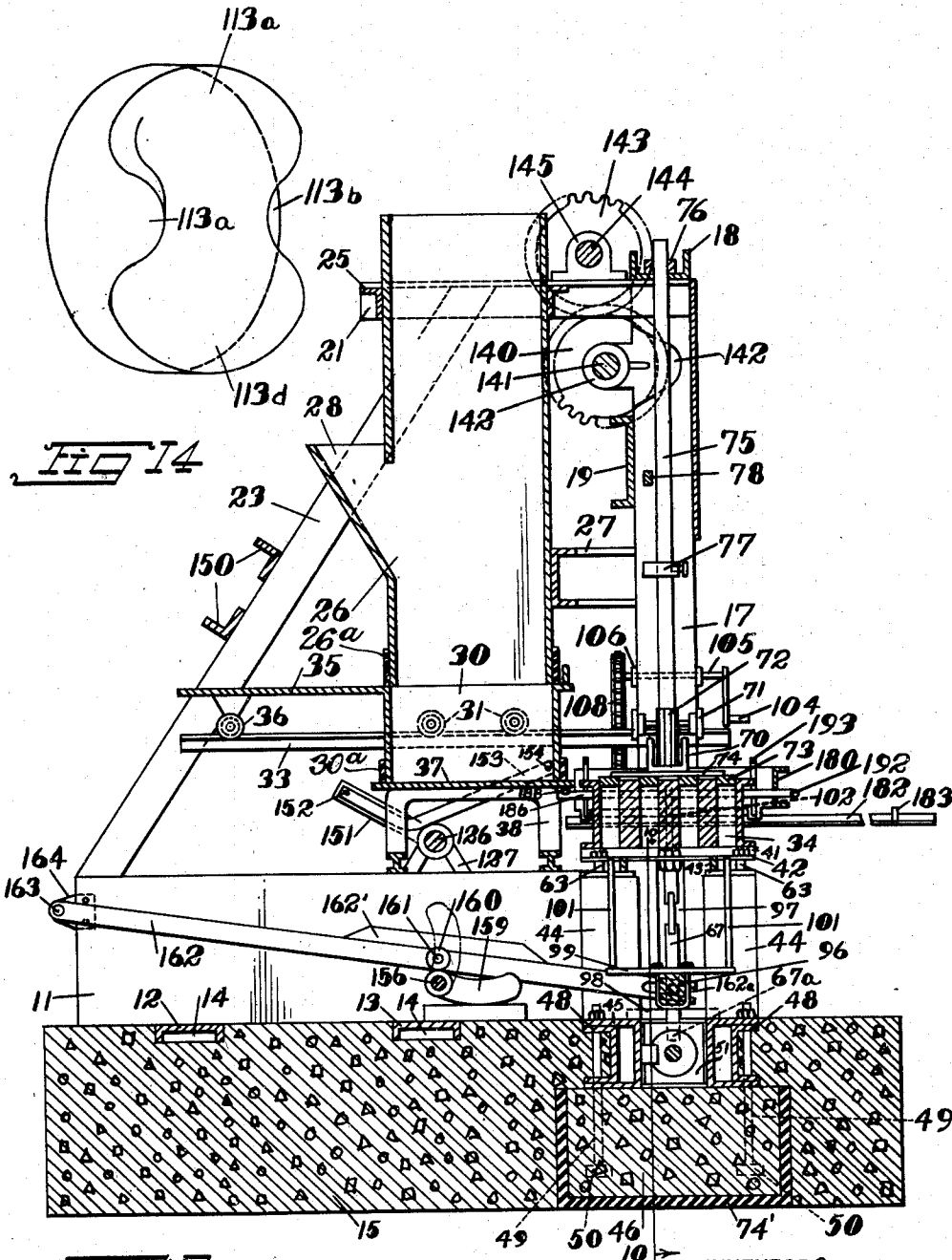
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CONCRETE BLOCK MACHINE

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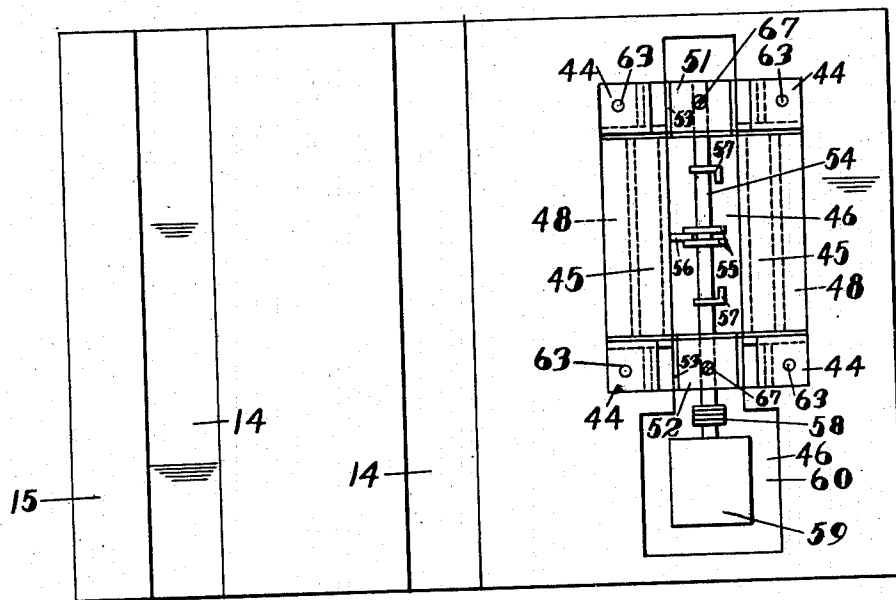


Fig. 7

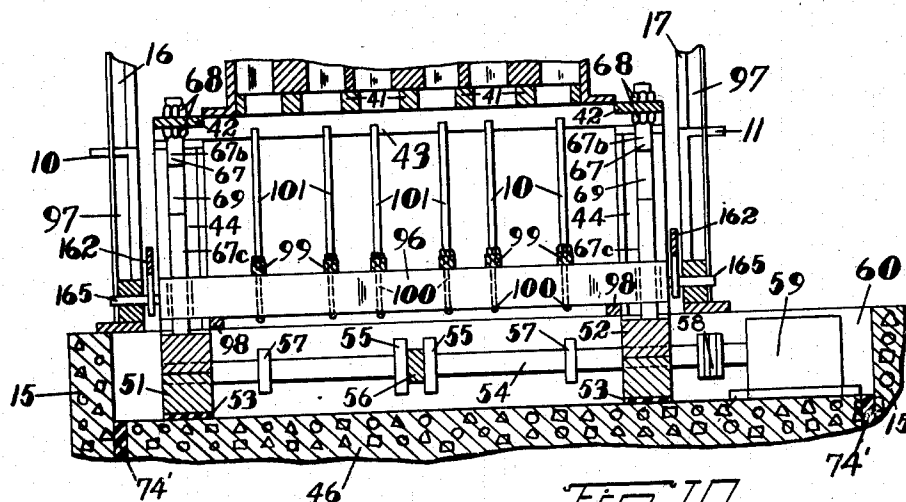


Fig. 10

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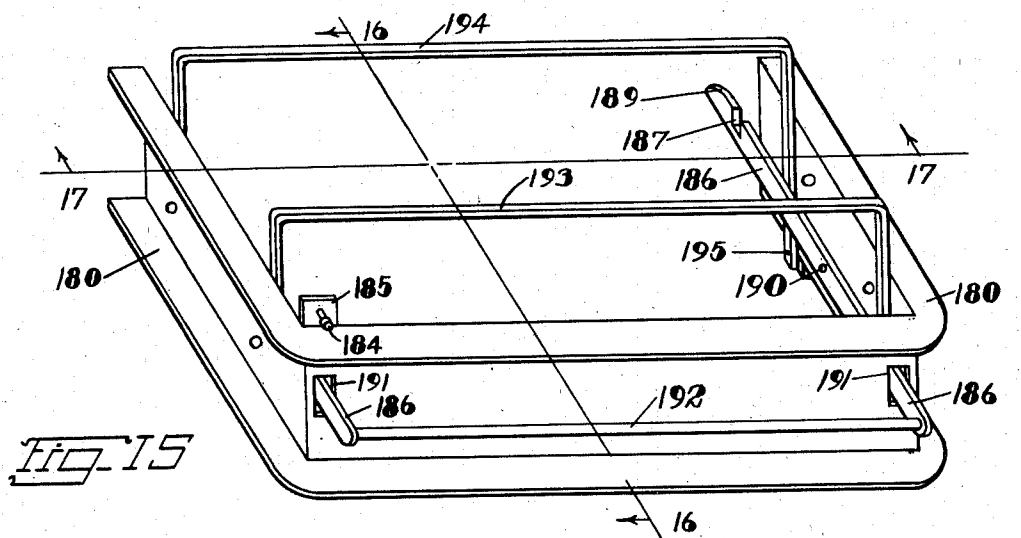
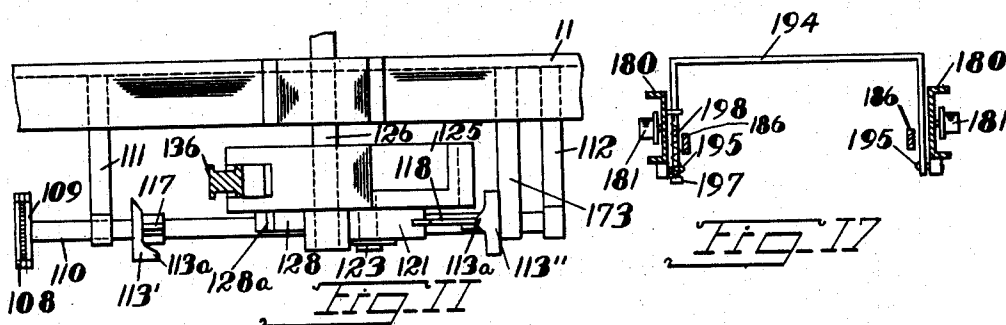
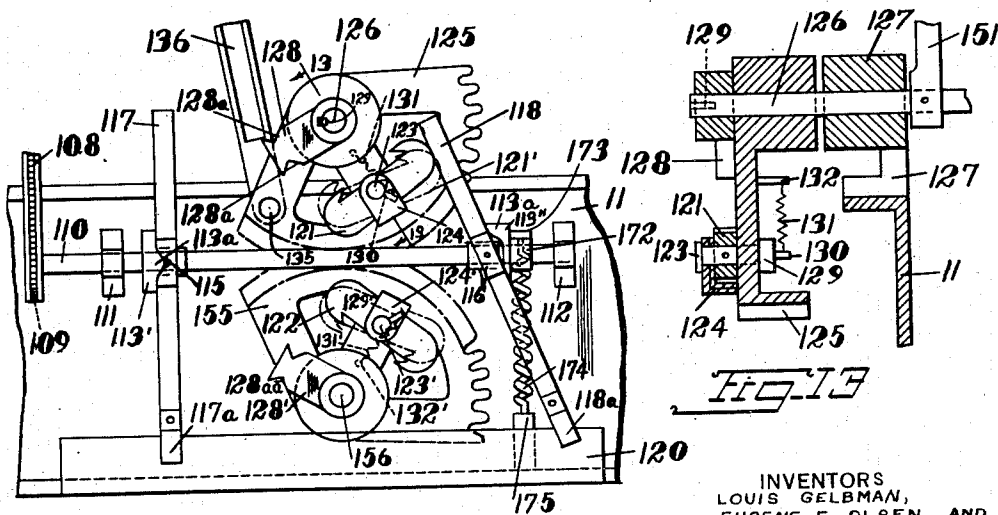


Fig. 18

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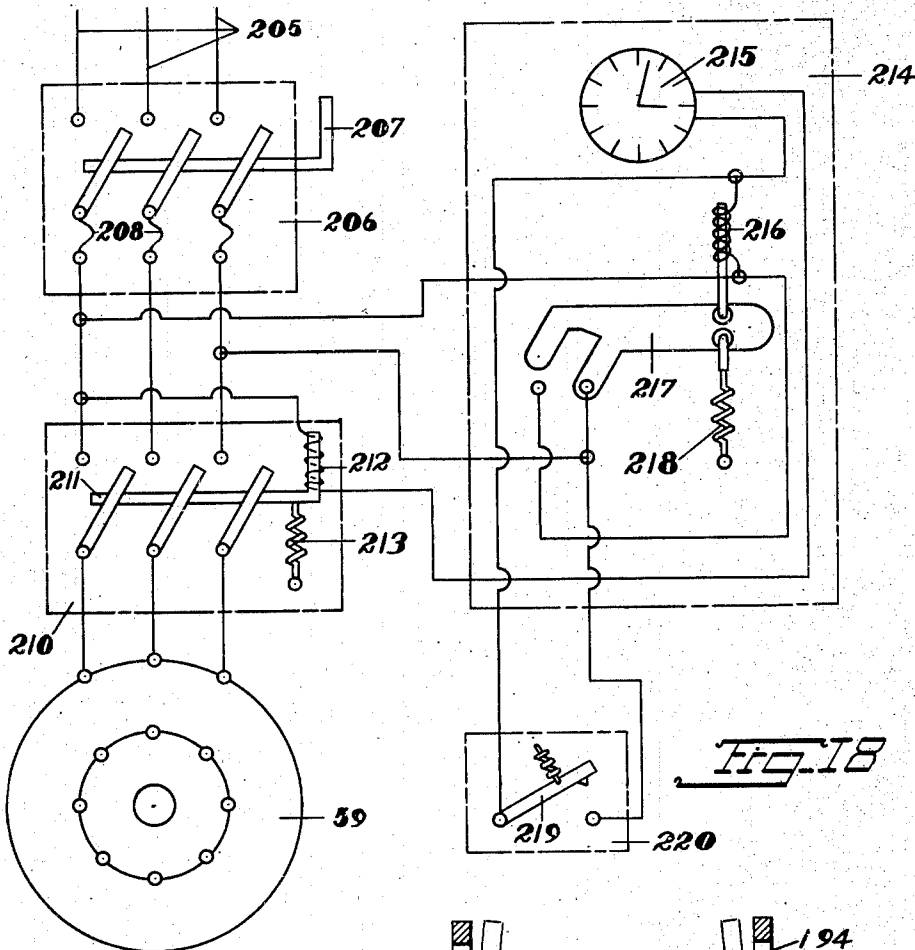
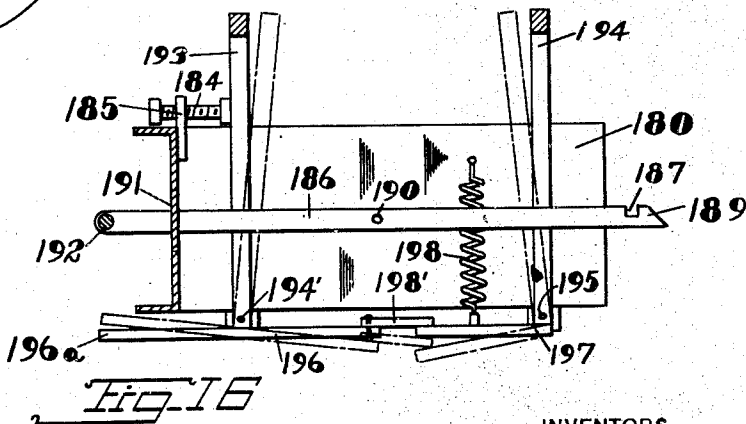
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UNITED STATES PATENT OFFICE

2,275,676

CONCRETE BLOCK MACHINE

Louis Gelbman, Yonkers, N. Y., and Eugene F. Olsen and Arthur B. Mays, Adrian, Mich., assignors, by mesne assignments, of eleven-twentieths to Hamlin F. Andrus, and nine-twentieths to Louis Gelbman, both of Yonkers, N. Y.

Application August 28, 1937, Serial No. 161,370
Renewed April 21, 1939

19 Claims. (Cl. 25-41)

This invention relates to new and useful improvements in a method and machine for making building blocks.

The invention proposes the construction of a building block machine which packs the mold by the vibration system. After many years of experimentation and building of devices we have become aware of many deficiencies in the operation of building block machines working on the vibration principle, and methods for making blocks embodying this principle. One of the chief defects of the vibration principle resides in the fact that with the application of vibration the concrete material in the mold of the machine will be packed more densely in the bottom of the block than at the top. This is easily understandable now that we point it out, since when the mold is vibrated the material in the top portion of the mold is free to jiggle, or jolt or move around, and consequently it could not possibly pack as hard as the material within the lower portion of the mold which is held firmly by the material above it.

The method we have discovered for eliminating the defect pointed out in the previous paragraph consists essentially in providing a mold of a higher dimension than that required for the finished block. It is proposed to pack material into this mold by the vibration method. It is then proposed that after the mold has been packed by the vibration method to strike off the excess material at the top of the mold to insure a commercially uniform amount of material to be in the mold. It is then proposed that pressure be applied on the material in the top of the mold to compress the upper portion of the material in the mold and make the top portion of the block just as dense as the bottom portion and just as smooth, and perhaps smoother.

In carrying out the method it is proposed to limit the amount to which the material in the mold may be compressed to make blocks of uniform height. It is proposed to permit compression to a point which corresponds closely with the lowest level to which the packed material will compress by reason of resistance of the material itself.

A further object of this invention resides in constructing a block machine which is capable of carrying out the process heretofore mentioned.

Still further the invention proposes the construction of a specific type of means for applying the pressure on the material in the top of the mold as the compression of the vibration

packing. It is proposed to characterize this specific pressure applying means by a pressure head which is adapted to normally be held in a raised position and which is released immediately after the excess material has been struck off the top of the mold so that it comes down to bear on the material in the top portion of the mold. This pressure head may merely supply the required amount of pressure. But a preferred arrangement of the invention consists in simultaneously vibrating the mold while the pressure head is in operation so that the vibrations assist the pressure head in completing the packing of the block. With this arrangement the weight of the pressure head and the amount of pressure necessary to be exerted by it is materially reduced.

Furthermore, the invention contemplates the provision of a stripper mechanism adapted to strip the finished block from the mold, and it is proposed to arrange the stripper mechanism to simultaneously operate a means for lifting the pressure head back to its original position.

Another defect of the vibration type of block machine which we have discovered from our years of experimenting is that the vibrations have a tendency of rattling the machine to pieces. Attempts have been made to insulate the vibrations from destroying the machine but this has proved to be quite a difficult problem in actual practice. A method has finally been evolved which has proved satisfactory and this invention contemplates the teaching of this method. This method is characterized by the fact that the vibration unit is set in the foundation of the block machine rather than above the foundation and on a portion of the machine. It is proposed to construct the vibration unit in a particular manner so that vibrations in all directions, except the vertical, are immediately absorbed and dissipated into the foundation, while the vertical vibrations are transmitted upwards by a stiff but relatively flexible member to the mold of the block machine.

Specifically, it is proposed to utilize a pair of flat leaf springs arranged in a particular manner for transmitting the useful vibrations up to the mold.

Furthermore, the invention contemplates supporting the mold in a particular manner to obtain the full effects of the jolting ability of the vibrating unit and at the same time limiting vibrations from reaching other portions of the block machine.

With respect to the vibration unit itself it is

proposed to use a rotary vibrator and to use a specific principle in converting the rotary vibration into a reciprocating vibration in one direction or one plane only, namely, the vertical of the mold.

The invention still further proposes the construction of a novel take-off device adapted to remove the block from the block machine when stripped from the mold. Specifically, it is proposed to construct a take-off device capable of removing several blocks at one time. It is proposed to construct the block machine so that it makes, say, three blocks at one time, and it is proposed to arrange the take-off to accommodate these three blocks. The dominant feature of the take-off resides in the fact that it comprises substantially a U-shaped frame extending around the front and the sides of the mold and that it is slidably supported to be drawn outwards and that it is provided with front and rear arms pivotally mounted in a specific manner and adapted to be engaged beneath blocks stripped from the mold of the machine and support these blocks while drawn out from over the mold. Furthermore, the specific construction and operation of the various parts of the take-off are also deemed novel.

For further comprehension of the invention, and of the objects and advantages thereof, reference will be had to the following description and accompanying drawings, and to the appended claims in which the various novel features of the invention are more particularly set forth.

Fig. 1 is a perspective view of a block machine constructed according to this invention.

Fig. 2 is a side elevational view of the machine looking from the left hand side.

Fig. 3 is a rear elevational view of the machine.

Fig. 4 is a side elevational view of the machine looking from the right hand side.

Fig. 5 is a front elevational view of the machine.

Fig. 6 is a sectional view taken on the line 6—6 of Fig. 5, to which a section of the foundation has been added.

Fig. 7 is a plan view of the foundation illustrated with the vibration unit mounted thereon.

Fig. 8 is a perspective view of one of the corner members used in supporting the mold.

Fig. 9 is a fragmentary horizontal sectional view taken on the line 9—9 of Fig. 2.

Fig. 10 is a fragmentary sectional view taken on the line 10—10 of Fig. 6.

Fig. 11 is a fragmentary elevational view looking in the direction of the line 11—11 of Fig. 4.

Fig. 12 is an enlarged detailed view of a portion of Fig. 4.

Fig. 13 is a fragmentary sectional view taken on the line 13—13 of Fig. 12.

Fig. 14 is a perspective view of one of the cams shown in Fig. 12.

Fig. 15 is a perspective view of the take-off device.

Fig. 16 is a sectional view taken on the line 16—16 of Fig. 15.

Fig. 17 is a sectional view taken on the line 17—17 of Fig. 16.

Fig. 18 is a schematic wiring diagram of the device.

The block machine according to this invention, and adapted to carry out the method of the invention, includes a frame consisting of a pair of spaced channel member 10 and 11 extending from the front of the machine to the rear and held together at the bottom sides by a longitudinally

extending pair of small channel members 12 and 13. These channel members 12 and 13 are adapted to engage into longitudinally extending recesses 14 formed in the top portion of a concrete foundation 15 for the block machine. At the front there are a pair of vertical channel members 16 and 17 mounted upon the top sides of the members 10 and 11 respectively. The members 16 and 17 are braced together at the top by a channel member 18 secured across the top ends thereof. At a slight distance from the top the channel members 16 and 17 are braced together by a channel member 19 secured across the back sides. From the top portions of the channel members 16 and 17 there extend rearwards a pair of angle members 20 and 21. These angle members are attached at their front ends to the inner faces of the channel members 16 and 17. These rearward extending angle members 20 and 21 are braced by a pair of channel members 22 and 23 attached at their upper ends to the outer faces of the angle members 20 and 21, respectively, and extending downwards and at their lower ends secured upon the top faces of the channel members 10 and 11.

The angle member 25 is secured between the extremities of the angle members 20 and 22 and assists in supporting a concrete supply chute 26. This chute is further supported by a channel member 27 which is bent substantially in U-shape and which has the back portion of the U-formation secured to the front side of the chute 26 and which the front extremities of its arms secured to the vertical channel members 16 and 17. At the rear side the chute 26 is formed with a hopper shaped member 28 engaged over an opening in the side thereof so that the interior of the chute may be examined and packing up and blocking of the lower portion remedied whenever required. A feeder drawer 30 is positioned beneath the chute 26 and is slidably supported by a pair of rollers 31 on each side engaging upon tracks 32 and 33 mounted horizontally of the machine between the front vertical channel members 16 and 17 and the rear inclined members 22 and 23. These tracks are adapted to support the said drawer 30 so that it may move forward from its position beneath the chute 26 to a position between the front vertical channel members 16 and 17 and above a mold 34 for the concrete blocks to be made by the machine. The feed drawer 30 at its rear is provided with a horizontally extending plate 35 supported by rollers 36 which also engage the tracks 32 and 33. This plate 35 is adapted to close the bottom of the chute 26 when the feed drawer moves to its front position. Rubber strips 26a are attached upon the bottom edge portions of the chute 26 and engage against the top of the feed drawer 30 and the plate 35 to prevent leakage of concrete material between the chute and the feed drawer. Rubber strips 30a are attached along the bottom edge portions of the feed drawer 30 and abut the stationary plate 37. When the feed drawer 30 is moved to its front position over the mold 34 these rubber strips 30a engage the top of the mold 34. The strips 30a serve to eliminate or reduce leakage of concrete material between the feed drawer 30 and the stationary plate 37 and the mold 34. It is pointed out that the rollers 31 engaging the tracks 32 and 33 serve to support the feed drawer 30 so that its bottom edge does not come into direct contact with the top of the mold 34. The rubber strips 30a are depended upon to close the small space between the bottom

edge of the feed drawer 30 and the mold 34. Consequently, vibrations from the mold 34 will not be transmitted to the feed drawer 30. This is an advantageous construction, for should the vibrations be transmitted, the feed drawer cut off plate 35 would vibrate and would vibrate the concrete material in the chute 26. This will cause packing of the concrete in the chute, which is objectionable. The feed drawer 30 comprises merely four vertical walls so that it has an open top and an open bottom. A stationary plate 37 is located beneath the open bottom of the feed drawer 30 in the retracted position of the feed drawer and is supported by a pair of spaced inverted U-shaped support members 38 which have the ends of their arms attached upon I beams 39 and 40 mounted across the top portions of the channel members 10 and 11. The front edge of the plate 37 is immediately adjacent the top edge of the mold 34 (see Fig. 6) so that the material from the feed drawer is transferred to the top of the mold. The mold 34 is supported upon several bars 41 extending from the front to the rear and adapted to support conventional pallets dropped into the mold during the operation of the block machine. These bars are attached to a base plate 42 which is provided with a pair of transversely spaced and longitudinally extending ribs 43 freely resting upon the tops of four corner members 44. These corner members are rested upon the ends of two transversely spaced longitudinally extending channel members 45, which in turn are anchored to a concrete block 46 insulated from the foundation 15. Interposed between the sides of the concrete block 46 and the foundation 15 there are sheets of resilient material 74' such as sheet rubber or sheet cork, or similar material.

The channel members 45 are arranged so that their top faces are substantially flush with the top face of the foundation 15. Each of the channel members 45 have their flanges reinforced by narrow flange channel members 48 engaged between the edge portions of the flanges thereof and secured thereto. The channel members 45, 48 extend the full width of the block machine between the channel members 10 and 11. The channel members 45-48 are anchored into the concrete block 46 by anchorage bolts 49 which pass through the arms of the channel members 45, 48 and extend into the block 46 and at their bottom ends are provided with large anchorage heads 50.

Between the channel members 45 the vibration unit is mounted. This vibration unit consists of a pair of spaced bearings 51 and 52 (see Fig. 7) vertically slidably mounted between the channel members 45. These channel members are placed with their flanges directed away from each other and with their backs towards each other. It is between the backs of these channel members that the bearings 51 and 52 are arranged. Resilient pads 53 are interposed between the front and rear faces of each bearing and beneath the bottom face of each bearing which is to be separated from the concrete block 46. It should be clear that the bearings 51 and 52 are adapted to slide vertically upwards and downwards and transmit vertical vibrations, but are insulated from vibrations in all other directions. A shaft 54 is rotatively mounted in the bearings 51 and 52 and at the center is provided with a thrust bearing consisting of a pair of spaced flanges 55 between which there engages a tongue 56 mounted upon the rear channel member 45. This

thrust bearing holds the shaft 54 from longitudinal motion, but permits vertical motion and also rotation. A pair of offset weights 57 are mounted on the shaft 54. One end of the shaft 54 extends from the bearing 52 and is joined by a flange coupling 58 with a motor 59 mounted in a pit 60 formed in the foundation 15. The arrangement is such that when the motor 59 operates the shaft 54 will be rotated and the offset weights 57 will tend to cause the shaft 54 to vibrate in a rotary direction. Since the shaft 54 is rotative in the bearings 51 and 52 which are limited to slide only in the vertical direction, the rotary tendency of vibration will be changed to a reciprocating vibration arranged in the vertical plane.

Each of the corner support members 44 is of the construction shown in Fig. 8. Essentially, each corner support 44 comprises a vertical transverse wall 44a from the central portion of which there extends a longitudinally vertical wall 44b. A transverse head portion 44c is disposed on the upper ends of the walls 44a and 44b. Spaced slightly up from the bottom ends of the walls 44a and 44b there is a transverse partition 44d. The various parts of each of these support members 44 preferably should be integral. Each of the support members 44 are rigidly secured upon the channel members 45 arranged so that the open area between the walls 44a and 44b are disposed outwards. This may be seen by an examination of Fig. 7.

In the space between the walls 44a and 44b the top member 44c and the partition 44d of each support member 44 is formed with superimposed openings 61 and 62. Through each pair of superimposed openings a bolt 63 passes. Each of these bolts also extends upwards and through corresponding openings in the base plate 42. The bolts 63 have a pair of lock nuts 64 at their top ends and a similar pair 65 at their bottom ends, and these lock nuts are so adjusted so that normally there is a slight space 66 between the bottom pair of nuts 65 and the partitions 44d. This space 66 controls the amplitude of vibration of the mold 34. If desired this space may be increased or decreased by proper adjustment of the nuts 64 and 65 of each of the bolts 63. The ribs 43 normally rest on the head portions 44c of the support member 44, but as the mold vibrates these rib portions 43 rise off the head portions 44c to positions at which the nuts 65 strike the portions 44d. This is the upward motion of the vibration of the mold. The downward motion is arrested when the ribs 43 strike the head portions 44c of the support members 44.

The mold 34 is a multiple mold arranged to make three blocks at a time. The mold is so arranged that these blocks will be positioned with the long sides extending from the front to the back of the machine.

The vibration unit is connected to the mold support plate 42 in the following manner: There are a pair of vertical rods 67, the bottom ends 67a of which are screwed into threaded openings in the tops of the bearings 51 and 52. The upper ends are rigidly attached by bolts 68 to the plate 42. The rods 67 are made from top and bottom sections 67b and 67c, respectively. Flat, relatively stiff leaf springs 69 are welded between the inner ends of the sections 67b and 67c. These flat leaf springs are arranged with the broad sides parallel to the vibrator shaft 54. Vertical vibrations from the bars 51 and 52 will be transmitted by the rods 67 to the mold support plate 42 and

thus to the mold 34 which is directly attached on the plate 42.

Above the mold 34 there is a pressure head. This pressure head comprises a carriage 70 extended between the vertical channel members 16 and 17 and slidably connected therewith by rollers 71. These rollers 71 engage the front and rear faces of each of the channel members 16 and are mounted on brackets 72 which in turn are mounted on the carriage 70. A plate 73 is attached to the bottom of the carriage 70 and this plate is shaped and cut out so as to fit into the top of the mold, for example, as shown in Fig. 6. The plate 73 is supported by the carriage 70 by several transverse bars 74. A rod 75 is attached to the carriage at its top and extends upwards through a bearing 76 mounted upon the channel member 18 which is supported across the channel members 16 and 17. This rod 75 assists in guiding the pressure head. Furthermore, a collar 77 is mounted on the rod 75 and is cooperative with a catch device for holding the pressure head in its raised position. This catch device comprises a bolt 78 slidably supported by bearings 79 and 80 mounted on the front face of the channel member 19. A collar 81 is mounted on a bolt 78. A spring 82 acts between the collar 81 and one of the bearings, the bearing 79, for normally urging the bolt 78 into operative position. The front end of the bolt 78 is provided with a bevel edge 78a which is adapted to force the bolt inwards as the pressure head is raised and the collar 77 engages against it. But once the collar passes the bolt moves forwards and engages beneath the collar and so supports the pressure head in its raised position. The rear end of the bolt 78 extends through an opening in the channel member 16 and this end is provided with a head 83. A radial finger 84 engages beneath this head and is mounted upon a vertical rod 85 which is turnably supported by bearings 86 and 87 mounted on the channel member 16. A radial finger 88 is mounted on the rod 85 and has a longitudinally directed portion 88a formed with a front beveled edge 89. This finger 88a is cooperative with a pivotally mounted pintle 90 mounted on the feed drawer.

The bolt 90 is pivotally supported intermediate of its ends by a pivot 91. A spring 92 acts between the inner end of the bolt 90 and a bracket 93 mounted on the edge portion of the feed drawer 30. A block 94 is arranged adjacent the rear portion of the bolt 90 to limit pivoting in one direction only. The bolt may pivot as indicated by the dot and dash lines 90a in Fig. 9. The bolt 90 has a cam front end 90b adapted to cooperate with the cam end 89 of the arm 88a. The arrangement is such that when the feed drawer moves forwards the bolt 90 strikes the finger 88a and the bolt merely is pivoted to the dot and dash line position. Nothing happens except that the bolt is immediately urged back to its original position while the feed drawer is in its extended position. When the feed drawer moves back to its rear position, as hereinafter more fully described, the bolt 90 will again strike the finger 88a, but this time the cam surfaces 90b and 89 engage each other and this time the arm 88 will be pivoted to the dot and dash line position 88b. This pivoting of the arm turns the rod 85 and the peg 84 slightly pulls out the bolt 78 which releases the collar 77 and permits the pressure head to fall downwards upon the material in the mold.

Beneath the mold 34 there is a stripper device which consists of a bar 96 extending longitudinally of the machine and having its ends slidably engaging into a vertical opening or track 97 formed in the channel members 10 and 11 and continuing up into the channel members 16 and 17. This bar 96 is therefore limited to vertical sliding. This bar 96 in its lowered position normally rests upon a pair of spaced bars 98 which rest on the top of the foundation 15. Supported on the bar 96 there are a plurality of transverse bars 99 held by U-shaped holding bolts 100. On the bars 99 there are supported a plurality of stripper bars 101. These stripper bars 101 are arranged vertically thereof and are adapted to extend upwards against the pallet in the mold 34 for stripping the concrete block from the mold as hereinafter more fully described. Also on the bar 96 there are a pair of bars 102 arranged near the ends thereof and which are slightly longer than the stripper bar 101. These bars 102 extend upwards along the outer sides of the mold 34 and are adapted to strike against bosses 103 formed on the carriage 70 of the pressure head. These bars 102 are adapted to lift the pressure head back into its raised position when the blocks are stripped from the mold as hereinafter more fully described.

A mechanism is provided for operating the feed drawer and the stripper device in proper sequence for making the blocks. This mechanism is controlled by a handle 104 arranged on the front of the machine where the operator is capable of operating it. The handle 104 is mounted on a shaft 105 rotatively supported in bearings 106 mounted on the channel member 17. The inner end of the shaft 105 is provided with a sprocket 107 engaged by a chain 108 which extends downwards and engages a sprocket 109 on a horizontal shaft 110 extending parallel to and mounted on the channel member 11 by a pair of spaced bearings 111 and 112. Mounted on this shaft 110 there are a pair of cams 113' and 113''. These cams are of identical construction except that they are placed in a different relative position on the shaft 110. They are placed so that the projecting portions 113a are 90° from each other. Each of the cams may be understood from a close inspection of Fig. 14. Each cam has the projecting portion 113a diametrically opposite to which there is a recessed portion 113b and at right angles between the raised and recessed portions there are level portions 113c and 113d.

A pair of collars 115 and 116 are rotatively mounted on the shaft 110 and pivotally mounted on these collars there are the arms 117 and 118. These arms are arranged immediately adjacent the cams 113' and 113''. The lower ends of these arms are provided with forked portions 117a and 118a respectively, which engage a track 120 mounted between and upon the channel members 12 and 13. The forked ends of the arms and the track 120 serve to limit the arms 117 and 118 from rotating and limit them to pivoting in a vertical plane as controlled by the cams 113' and 113''. These cams are adapted to pivot each arm to three possible positions. These positions are indicated in Fig. 4. They comprise a truly vertical position, a position extended at an inclination forward, and one extended at an inclination rearwards. Since the cams 113' and 113'' are set apart 90° the arms 117 and 118 will be in different positions. There are four pos-

sible combinations because of the four operating areas of the cams, and these combinations will be hereinafter more fully described.

The arms 117 and 118 are adapted to control two dogs 121 and 122. The dog 121 is pivotally mounted intermediate of its ends by a pintle 123 on a bracket 124. This bracket 124 is on a segmental gear 125 which in turn is loosely mounted on a shaft 126. The shaft 126 is mounted in bearings 127 mounted on the channel members 10 and 11. Consequently, the shaft 126 extends between or across these channel members 10 and 11. On the outer end of the shaft 126 there is an arm 128 which is secured to the shaft 126 by a key 129. This arm 128 extends towards the dog 121 and its outer end portion is formed with niches 128a in the diametrically opposite sides thereof arranged to be engageable by the end portions of the dog 121. The dog 121 has its end portions formed with an inward directed tooth on each end thereof. These inward directed teeth are adapted to engage the niches 128a when the dog is in proper position.

The dog 121 is fixed on the pintle 123 which is rotatively mounted through the bracket 124 and also through the segmental gear 125. On the inner end the pin 123 has a radial arm 129 from which a pin 130 projects. An expansion spring 131 connects with this pin and with another pin 132 mounted on the segmental gear 125 but closer to the center thereof. The dog 121 is adapted to assume two possible positions; one position with one end tilted upwards, and another position with this end tilted downwards. These positions are controlled by the dog striking the edge portions of the bracket 124. These positions are held by the spring 131. The holding is accomplished by reason of the radial arm 129. This radial arm is adapted to pass the dead center of possible motion of the dog. When past the dead center to one side, the dog is held in one position. When past the dead center on the other side the dog is held in the other position. The dot and dash lines 121' in Fig. 12 indicate the second position of the dog, while the full lines indicate the other position.

The segmental gear 125 at one side is provided with a pintle 135 which pivotally supports one end of a brace 136. This brace is connected with an adjustment bolt 137 which connects with a bracket 138 mounted by a pintle 139 pivotally and eccentrically upon a gear 140 which is supported on a shaft 141. This shaft is supported in bearings 142 mounted on the inner faces of the vertical channel members 16 and 17. The gear 140 meshes with another gear 143 on a shaft 144 rotatively supported in bearings 145 mounted on the top faces of the angle members 21 and 22. The other end of the shaft 144 is provided with a large pulley 146. An endless belt 147 engages over this pulley and over a pulley 148 on an electric motor 149. This electric motor is supported upon a pair of spaced angle members 150 which are attached across the channel members 22 and 23. Thus it will be seen that when the motor 149 rotates the rotations will be transmitted indirectly to first reciprocate the brace 136 and then to oscillate the segmental gear 125. But since this segmental gear is free on the shaft 126 the oscillation will not be transmitted to the shaft.

Immediately adjacent the inner faces of the bearings 127 there are a pair of radial arms 151 fixedly mounted on the shaft 126. The outer ends of these radial arms are connected by pin-

ties 152 to L-shaped arms 153. These L-shaped arms have their short arms extending substantially parallel to the radial arms 151 and have their long arms extending forwards and connected by pintles 154 to the front portions of the said drawer 30. The arrangement is such that when the radial arms 151 are turned through approximately 90° the arms 153 will move the feed drawer 30 forwards. Conversely, when the arms 151 are turned back to their original position the feed drawer 30 will be moved rearwards back to its original position.

The dog 122 is mounted upon a bracket 124' identical to the bracket 124. This bracket 124' is mounted on a segmental gear 155 which is loosely mounted on a shaft 156. This shaft 156 is mounted in bearings 157 and 158 mounted on the channel members 11 and 10 respectively. A radial arm 128' is keyed to the outer end of the shaft 156 and this radial arm is provided with niches 128a' upon opposite sides similar to the niches 128a. The dog 122 is fixedly mounted on a pintle 123' which pivotally extends through the segmental gear 155 and which on its inner end is provided with a radial arm 129' connected with an expansion spring 131' supported at its other end on a pin 132' mounted on the segmental gear 155. The arrangement of the dog 122 is very similar to the dog 121. That is, it may pivot to 2 positions, one of the positions shown in full lines in Fig. 12 and the other shown by the dot and dash lines. It will maintain either of these positions because of the action of the spring 131'.

A pair of cams 159 is mounted at two locations on the shaft 156 and cooperate with rollers 160 which are mounted on a connecting rod 161. This connecting rod connects together intermediate points of a pair of arms 162. Each of these arms 162 extend along the inner faces of the channels 10, 11. The rear ends of the arms 162 are connected with a shaft 163 which is turnably supported in bearings 164 mounted upon the rear portions of the channel members 10 and 11. Intermediate of their ends the arms 162 are reinforced with braces 162' which are merely additional arm sections welded or in any other manner secured to the arms 162. The purpose of these braces is merely to reinforce and stiffen the arms. The front ends of the arms 162 are formed with forked portions 162a which engage rod portions 165 mounted on the bar 96. The arrangement is such that when the cams 159 turn through 90°, as indicated by the dot and dash lines in Fig. 6, the arms 162 will be pivoted to cause the front ends of the arms to raise the bar 96 and so indirectly raise the stripper mechanism which is mounted on this bar.

In order to hold the stripper mechanism raised a brake mechanism is associated with the shaft 156. This brake mechanism comprises a brake body 166 mounted on the shaft 156 and engaged by a brake shoe 167 which is mounted on a slidable brake rod 168 slidably supported in brackets 169 mounted on the channel member 10. A spring 170 acts between the bracket 169 and a collar 171 on the rod 168 for normally urging the brake shoe 167 against the brake body 166. The pressure of this spring is sufficient to hold the shaft 156 against accidental turning.

The shaft 110 is also held against accidental turning. This is accomplished by a square block 172 mounted on the shaft 110 and engaged by a flexible rod 173. This flexible rod at its inner end is supported upon the channel 11. Intermediate of its ends it is urged downwards by a

spring 174 which at its lower end is connected to a bracket 175 mounted on the bottom flange of the channel 11. The action of the spring 174 is to hold the block 172 against rotation. Since the block has four sides it will serve to hold the shaft 110 in the four positions in which it is turned as hereinafter more fully described.

The block take-off mechanism for the machine is as follows: There is a U-shaped frame 180 which is provided with rollers 181 upon its sides and these rollers engage upon tracks 182 which are arranged directly beneath the tracks 32 and 33 and which are also mounted upon the channel members 16 and 17. These tracks 182 extend forward from the front of the machine so that the frame 180 may be drawn outwards from its "in" position around the mold. The frame 180 is adapted to extend across the front of the mold and across the two sides. At the inward position the frame 180 will be connected with the feed drawer by reason of a pair of arms 186. These arms at their inner ends are formed with cutouts 187 forming a hook adapted to hook on to the pegs 188 mounted upon lugs projecting from the feed drawer 30. The inner ends of the arms 186 are formed with cam surfaces 189 which are adapted to automatically cause the engagement of the pegs 188 with the cutouts 187 as hereinafter more fully described.

The arms 186 extend parallel along the inner faces of the side arms of the U-shaped frame 180 and are pivotally connected therewith by pintles 190. The front ends of the arms 186 extend out through slots 191 in the front of the U-shaped frame 180. The extended ends of the arms 186 are connected together by a handle bar 192. The arrangement is such that the handle bar 192 may be manipulated to disengage the arms 186 from the pegs 188 and may also be used as a handle for drawing out the U-shaped frame 180.

A front arm 193 and a rear arm 194 extend across between the side arms of the U-shaped frame 180. The front arm 193 is of U-shape and the side arms thereof extend downwards and at their lower ends are pivotally connected by pintles 194' mounted on lugs attached to the bottom sides of the frame 180. The rear arm 194 is also of U-shape and also has its side arms extending downwards and are pivotally attached by pintles 195 to lugs also mounted on the side arms of the U-shaped frame 180. One of the ends of each of the arms 193 and 194, the right hand ends as illustrated in Fig. 15, have fingers 196 and 197 respectively extended towards each other. The finger 196 has an overhanging tip 198' which completely extends over the end of the finger 197. The finger 197 is urged upwards by a spring 198 connected between it and the side arm of the frame 180. The action of the spring 198 is restrained by the fact that a portion of the arm 193 abuts against an adjustment screw 184 which is mounted on a lug 185 mounted on the frame 180. This adjustment screw may be adjusted to hold the arms 193 and 194 in their correct normal positions.

The finger 196 has a front extension 196a. This extension is directly over a spring 200 (see Fig. 2) mounted on a rod 201 adjustably supported on another rod 202 which is mounted on one of the bars 99 of the stripper device. The arrangement is such that when the stripper device is moved to the upward position the spring 202 will strike the finger extension 196a and pivot the arms 193 and 194 inwards a slight amount sufficient to engage

beneath the pallets of blocks which have been stripped from the block machine.

The electrical wiring of the device is shown in Fig. 18. There is a three-line source of power 205 which enters a control box 206 which has a handle 207 by which a three pole switch may be opened and closed. In each line there is a fuse 208. The three lines continue to a magnetic switch box 210 which has a three pole switch 211 adapted to be closed by a solenoid 212. This switch is normally urged open by a spring 213 and when the solenoid is energized will close. This switch 211 controls the electric motor 59 which operates the vibrator unit of the device. The solenoid 212 is connected with a time switch box 214. More specifically, the solenoid 212 is in a circuit which connects a time switch 215 in series with a holding solenoid 216 of a mercury control switch 217 arranged to control the circuit of the solenoid 212. The mercury switch 217 is urged into an open position by a spring 218. It is adapted to be closed by the solenoid 216. The control solenoid 216 is in circuit with a hand operated switch 219 which is arranged in a box 220 mounted on the front of the block machine, preferably immediately adjacent the control handle 104. The wiring may readily be followed. The arrangement consists in the fact that normally the switches 211, 217 and 219 are open. Of course, the control switch 207 must be closed at all times. To operate the vibrator of the block machine the switch 119 is just momentarily closed by touching it. This will close the circuit through the solenoid 216 which immediately becomes energized to close the mercury switch 217. When the mercury switch closes a holding circuit through the solenoid 216 is also closed so that the mercury switch 217 remains closed even though the hand switch 219 is immediately released and opens.

When the switch 217 is closed the circuit through the solenoid 212 is closed and the switch 211 is closed by the solenoid which then closes the motor circuit and the motor 59 operates. The motor 59 will continue to operate until the time switch 215 opens. It may be set for various desired times. A desirable time, according to the particular design of the machine which is now in operation, is five seconds. After this period the circuit is broken by the switch 215. This immediately breaks the holding circuit of the solenoid 216 and then the spring 218 immediately opens the switch 217. The circuit is thus broken through the solenoid 212 and the spring 213 opens the switch 211. The parts are now in their original positions and the cycle is ready to be repeated.

The operation of the device is as follows:

The normal position of the device is one in which the feed drawer 30 is in the retracted position as shown in Fig. 4. The pressure head 70, 71, 72, etc., is in the raised position and held raised by the bolt 78. The stripper device 96, 101, etc., is in the lowered position. The take-off frame 180 is in the inward position, as for example shown in Fig. 2. The motor 149 is continuously operating and consequently driving the pulley 146 which indirectly causes the link 136 to reciprocate and so continually oscillates the segmental gear 125. This segmental gear 125 meshes with the segmental gear 155 which is therefore also being continually oscillated.

The operator of the machine drops pallets into the mold 34. If the mold is constructed for making three blocks it is necessary that three pal-

lets be dropped into the mold. Then the operator turns the handle 104 through 90°. This 90° rotation is transmitted by the shaft 105, the sprocket 107, the chain 108, the sprocket 109 to the shaft 110. The shaft 110 is turned 90° and held in this new turned position by the square block 172 and the resilient leaf 173 engaged against it.

The normal position of the arms 117 and 118 are those in which the arm 117 is in the vertical and the arm 118 has its top end leaning rearwards, that is, towards the right in Fig. 4. When the shaft 110 was turned through 90° the cams 113' and 113'' correspondingly turned. This immediately pivoted the arms so that the vertical arm 117 now has its top end leaning rearwards to the right, while the arm 118 is now in the vertical position. The arms will be in the vertical position when the straight portions 113c and 113d of the cams are at the top and at the bottom. Each arm will lean one way when the projecting portion 113a is at the bottom, and lean the other way when it is at the top.

In the new position of the arms 117 and 118 the top end of the arm 117 will strike against the dog 121 the next time the segmental gear 125 turns clockwise. This will pivot the dog 121 and catch the radial arm 128a, and then as the segmental gear 125 turns anti-clockwise the radial arm 128a will be turned anti-clockwise and so turn the shaft 126 anti-clockwise through approximately 90°. Thereafter the dog 121 will not touch the radial arm and the segmental gear 125 will continue oscillating without doing anything.

When the shaft 126 turned 90° it moved the radial arm 151 and the connecting arms 153 forwards and so moves the feed drawer 30 forwards to a position over the mold. As soon as the handle 104 was turned through the 90° the operator also is required to close the switch 219 which will set the vibrator into motion. As the feed drawer advances, or during a portion of the time that it advances, or after it has reached its position over the mold, depending merely on the adjustment of the machine, the vibrator will be operating. When the vibrator operates the motor 59 rotates driving the shaft 54 and causing vertical jolts to be transmitted by the bearings 51 and 52 through the medium of the rods 67 to the mold.

Concrete or the like material from the chute 26 which was deposited in the feed drawer was thus moved over the mold and packed into the mold by the vibrations of the mold. After the vibrator ceases because of the operation of the switch 215, the operator turns the handle 104 through another 90°. This will indirectly cause the shaft 110 to turn another 90° and will cause the arm 117 to become vertical and simultaneously cause the arm 118 to lean towards the front of the machine, that is towards the left of Fig. 3. The upper end of the arm 118 therefore will strike the dog 121 the next time that the oscillating segmental gear 125 reaches its anti-clockwise position, and then the dog will catch the arm 128a and the next swing of the gear 125 clockwise will turn the arm 128a back to its original position. This indirectly moves the feed drawer 30 back to its position beneath the chute 26.

As the feed drawer moves back to its original position beneath the chute, at the moment that it is completely back, the bolt 90 will trip the radial arm 88 and turn the rod 85 which indi-

rectly draws the bolt 78 from the collar 77 and the pressure head drops downwards. The operator then again closes the switch 219, and for five seconds or other period of time (as the time switch is set) the vibrator will operate.

An important feature of the machine must now be clearly understood. When the feed drawer moved back to its original position it struck off all excess material from the top of the mold. A quantity of material to make a commercially desirable block was now left in the mold, but the top of this block was not packed sufficiently. The mold is so designed that it is higher than the required height of the block. Now when the pressure head falls down and vibrations continue, the top of the block will be packed and smoothed out and thus completed. This is a very important feature of the operation of the machine. The pressure head is limited in its downward motion by the bosses 103 striking the tops of the rods 102. These rods may be adjusted to a position so that the pressure head sinks a predetermined amount into the mold and so forms blocks of universal height. The operator then turns the handle 104 another 90° and this indirectly turns the shaft 110 90°. This indirectly causes the arms 117 and 118 to shift so that the arm 117 is now leaning forward, its front end towards the left in Fig. 4, and so that the arm 118 is in the vertical position. This is the full line position shown in Fig. 4.

In this position the lower end of the arm 117 will strike the dog 122 the next time that the segmental gear 155 moves to its complete anti-clockwise position. This pivots the dog 122 and then when the segmental gear 155 turns clockwise the dog 122 engages the arm 128' and turns the shaft 156 90° clockwise. This moves the cams 159 to their vertical positions lifting the rollers 160 and thus pivoting the levers 162. The front ends of the levers 162 move upwards and so move upward the stripper mechanism. As the stripper mechanism moves upwards the bars 102 will lift the pressure head back to its original position where it will be immediately caught and held by the operation of the bolt 78. Furthermore, the rods 101 will engage against the pallets and strip the blocks from the mold so that the pallets and the blocks are now held a short position above the top of the mold. At this instant the spring 200 will strike the finger extension 146a and cause the arms 193 and 194 to pivot together and beneath the edges of the pallets which are being supported above the mold.

The operator now turns the handle 104 another 90° back to its original position. This immediately indirectly moves the arms 117 and 118 so that the arm 117 is vertical and the arm 118 has its bottom end directed towards the front of the machine, that is, the left in Fig. 4. The lower end of the arm 118 adjusts the dog 122 which in turn then engages the radial arm 128' and when the segmental gear 125 turns anti-clockwise will turn the shaft 156. As soon as the shaft 156 starts turning, which of course starts lowering the stripping mechanism, the pallets supporting the blocks will rest heavily on the arms 193 and 194 and so hold them in their inward position. Then as the stripper mechanism descends, even though the spring 200 disengages from the finger extension 146a, the arms 193 and 194 will continue to support the stripped block. The operator then unhooks the take-off frame 180 by pulling upwards on the bar 192 which pivots the rear ends of the arms

positions they are sufficiently spaced to permit the stripped blocks and the pallets to pass up between them. The operation now is continued by the operator turning the handle 104 90°. The feed drawer comes out but this time the feed drawer hooks on to the take-off frame 180, the pegs 188 riding up on the cams 189 and setting into the hooks 187. The operation of the machine continues as previously described, except for the fact that when the feed drawer 39 moves back to its position beneath the chute 26 it pulls the take-off frame 180 back to the position originally described. While we have illustrated an invention with some details, it is to be understood that in practice it may be modified in many ways without departing from the scope of the invention.

While we have illustrated the fact that the invention with some of the position originally realized that in prior art and in may be interpreted as bringing the take-off position back to its position originally

[illegible][illegible][illegible]

over said mold being adapted to idle past said operator finger and when said feed drawer moves off said mold being adapted to engage said operator finger and cause the pressure head to drop upon the material in the mold, said bolt being pivotally mounted, a block mounted on said mold limiting pivoting of the bolt in one direction, resilient means for holding the bolt against the block whereby the bolt may pivot away from the block when the feed drawer moves to a position over the mold and so idle past said operator, and when the feed drawer moves over the mold the bolt strikes the block and so is restrained from moving causing the operator finger to be moved.

9. In a building block machine, a mold, a feed drawer for supplying an excess amount of material to said mold when moved over the mold, means for moving said feed drawer over said mold, means for moving said feed drawer off said mold, means for vibrating said mold to pack concrete or the like material into said mold, a pressure head for resting on the material in said mold to pack the top portion of said material in the mold and normally supported above said mold, means for dropping said pressure head upon the material on the mold controlled with an operator finger, a bolt movably mounted on said feed drawer and when said feed drawer moves over said mold being adapted to idle past said operator finger and when said feed drawer moves off said mold being adapted to engage said operator finger and cause the pressure head to drop upon the material in the mold, said means for dropping the pressure head comprising, means for vertically slidably supporting the pressure head, a keeper connected with the pressure head, a bolt engaging the keeper for supporting the pressure head, and means for pulling out said bolt controlled by said operator finger.

10. In a building block machine, a mold, a feed drawer for supplying an excess amount of material to said mold when moved over the mold, means for moving said feed drawer over said mold, means for moving said feed drawer off said mold, means for vibrating said mold to pack concrete or the like material into said mold, a pressure head for resting on the material in said mold to pack the top portion of said material in the mold and normally supported above said mold, means for dropping said pressure head upon the material on the mold controlled with an operator finger, a bolt movably mounted on said feed drawer and when said feed drawer moves over said mold being adapted to idle past said operator finger and when said feed drawer moves off said mold being adapted to engage said operator finger and cause the pressure head to drop upon the material in the mold, said means for dropping the pressure head comprising means for vertically slidably supporting the pressure head, a keeper connected with the pressure head, a bolt engaging the keeper for supporting the pressure head, and means for pulling out said bolt controlled by said operator finger, comprising resilient means urging the bolt into operative position, a head on said bolt, a rotative rod, a radial finger projecting from said rod and engaging said head, and said operator finger being mounted upon said rod.

11. In a building block machine, a mold, a feed drawer for supplying an excess amount of material to said mold when moved over the mold, means for moving said feed drawer over said mold, means for moving said feed drawer off said mold, means for vibrating said mold to pack

concrete or the like material into said mold, a pressure head for resting on the material in said mold to pack the top portion of said material in the mold and normally supported above said mold, means for dropping said pressure head upon the material on the mold controlled with an operator finger, a bolt movably mounted on said feed drawer and when said feed drawer moves over said mold being adapted to idle past said operator finger and when said feed drawer moves off said mold being adapted to engage said operator finger and cause the pressure head to drop upon the material in the mold, said means for dropping the pressure head comprising means for vertically slidably supporting the pressure head, a keeper connected with the pressure head, a bolt engaging the keeper for supporting the pressure head, and means for pulling out said bolt controlled by said operator finger, comprising resilient means urging the bolt into operative position, a head on said bolt, a rotative rod, a radial finger projecting from said rod and engaging said head, and said operator finger being mounted upon said rod, said bolt having a pivoted front end adapted to coact with said collar to cause the bolt to be moved when the pressure head is lifted back to its raised position so that the bolt engages beneath the collar to again hold the pressure head raised, and means for lifting said pressure head.

12. In a building block machine, a mold, a feed drawer for supplying an excess amount of material to said mold when moved over the mold, means for moving said feed drawer over said mold, means for moving said feed drawer off said mold, means for vibrating said mold to pack concrete or the like material into said mold, a pressure head for resting on the material in said mold to pack the top portion of said material in the mold and normally supported above said mold, means for dropping said pressure head upon the material on the mold controlled with an operator finger, a bolt movably mounted on said feed drawer and when said feed drawer moves over said mold being adapted to idle past said operator finger and when said feed drawer moves off said mold being adapted to engage said operator finger and cause the pressure head to drop upon the material in the mold, said means for dropping the pressure head comprising means for vertically slidably supporting the pressure head, a keeper connected with the pressure head, a bolt engaging the keeper for supporting the pressure head, and means for pulling out said bolt controlled by said operator finger, comprising resilient means urging the bolt into operative position, a head on said bolt, a rotative rod, a radial finger projecting from said rod and engaging said head, and said operator finger being mounted upon said rod, said bolt having a pivoted front end adapted to coact with said collar to cause the bolt to be moved when the pressure head is lifted back to its raised position so that the bolt engages beneath the collar to again hold the pressure head raised, and means for lifting said pressure head, comprising stripper mechanism for ejecting a block from said mold, and rods mounted on said stripper mechanism and adapted to lift said pressure head, and acting as stops to limit downward motion of the pressure head when the latter is dropped.

13. In a building block machine, a mold, means for stripping a block from said mold, a U-shaped frame extending around the front and sides of said mold and slidably supported to be drawn

out from around said mold, a front and a rear arm pivotally mounted on said frame and adapted to extend beneath said block when stripped from said mold, and means for urging said arms into operative positions after said block has been stripped from said mold, stationary tracks mounted on the sides of said block machine and rollers mounted on the sides of said frame and engaging said tracks and comprising the means for slidably supporting said frame.

14. In a building block machine, a mold, means for stripping a block from said mold, a U-shaped frame extending around the front and sides of said mold and slidably supported to be drawn out from around said mold, a front and a rear arm pivotally mounted on said frame and adapted to extend beneath said block when stripped from said mold, and means for urging said arms into operative positions after said block has been stripped from said mold, said arms being of inverted U-shape having their top ends extending transversely of the mold from side to side.

15. In a building block machine, a mold, means for stripping a block from said mold, a U-shaped frame extending around the front and sides of said mold and slidably supported to be drawn out from around said mold, a front and a rear arm pivotally mounted on said frame and adapted to extend beneath said block when stripped from said mold, and means for urging said arms into operative positions after said block has been stripped from said mold, said arms being of inverted U-shape having their top ends extending transversely of the mold from side to side, and having their sides pivotally mounted upon the sides of said U-shaped frame.

16. In a building block machine, a mold, means for stripping a block from said mold, a U-shaped frame extending around the front and sides of said mold and slidably supported to be drawn out from around said mold, a front and a rear arm pivotally mounted on said frame and adapted to extend beneath said block when stripped from said mold, and means for urging said arms into operative positions after said block has been stripped from said mold, said arms being of inverted U-shape having their top ends extending transversely of the mold from side to side, and having their sides pivotally mounted upon the sides of said U-shaped frame, fingers upon the sides of said arms and the fingers on the same sides of the front and rear arms extend towards each other and having overhanging tips whereby when one finger is moved it automatically moves the other finger and so causes the front and rear arms to move in unison.

17. In a building block machine, a mold, means for stripping a block from said mold, a U-shaped frame extending around the front and sides of said mold and slidably supported to be drawn out from around said mold, a front and a rear arm pivotally mounted on said frame and adapted to extend beneath said block when stripped from said mold, and means for urging said arms into

operative positions after said block has been stripped from said mold, said arms being of inverted U-shape having their top ends extending transversely of the mold from side to side, and having their sides pivotally mounted upon the sides of said U-shaped frame, fingers upon the sides of said arms and the fingers on the same sides of the front and rear arms extend towards each other and having overhanging tips whereby when one finger is moved it automatically moves the other finger and so causes the front and rear arms to move in unison, a spring for urging the fingers in one direction, and an adjustable stop for limiting the action of said spring.

18. In a building block machine, a mold, means for stripping a block from said mold, a U-shaped frame extending around the front and sides of said mold and slidably supported to be drawn out from around said mold, a front and a rear arm pivotally mounted on said frame and adapted to extend beneath said block when stripped from said mold, and means for urging said arms into operative positions after said block has been stripped from said mold, said arms being of inverted U-shape having their top ends extending transversely of the mold from side to side, and having their sides pivotally mounted upon the sides of said U-shaped frame, fingers upon the sides of said arms and the fingers on the same sides of the front and rear arms extend towards each other and having overhanging tips whereby when one finger is moved it automatically moves the other finger and so causes the front and rear arms to move in unison, a spring for urging the fingers in one direction, and an adjustable stop for limiting the action of said spring, one of said fingers having an extension, a vertical rod on said means for stripping the block, a spring on the top of said rod and engageable with said fingers extends to operate the front and rear arms.

19. In a building block machine, a mold, means for stripping a block from said mold, a U-shaped frame extending around the front and sides of said mold and slidably supported to be drawn out from said mold, a front and a rear arm pivotally mounted on said frame and adapted to extend beneath said block when stripped from said mold, means for urging said arms into position after said block has been stripped from said mold, a feed drawer for supplying material to said mold, and a catch device operative on said feed drawer and said U-shaped frame to connect these parts and pick up the U-shaped frame in extended position thereon and draw it back to a position around said mold, comprising a member having a front bar section and side arms pivotally mounted on the side arms of said U-shaped frame, hooks upon the side arms of said catch device, and elements on the feed drawer engageable with said hooks.

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