March 6, 1928. 1,661,414

H. E. DUNN

CEMENT BLOCK RAMMER

Filed July 12 1926 4 Sheets-Sheet 1

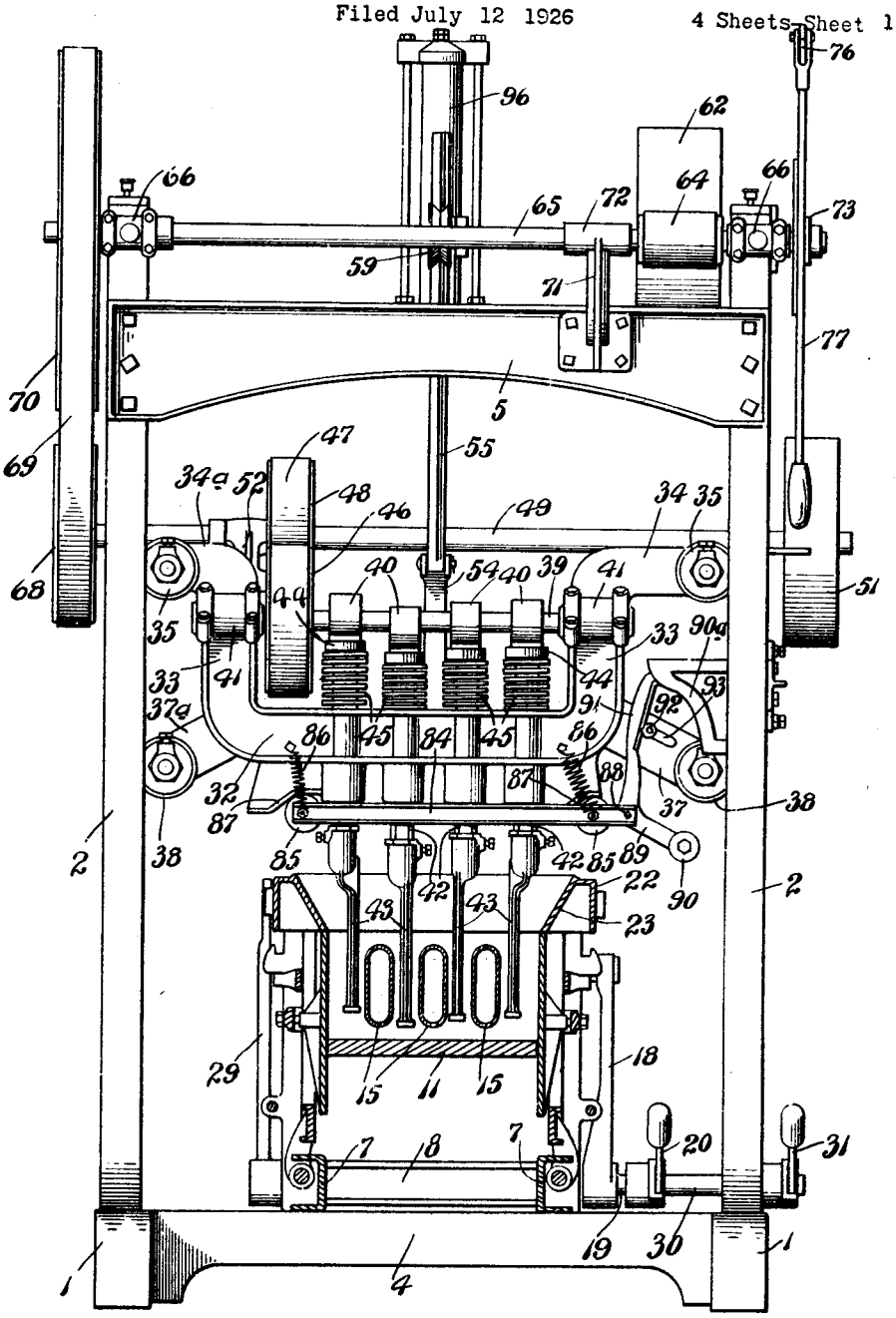


Fig. 1.

Inventor
Harry E. Dunn
By
Frank E. Livingston, Jr.
Attorney.

March 6, 1928.

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H. E. DUNN

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4 Sheets-Sheet 2

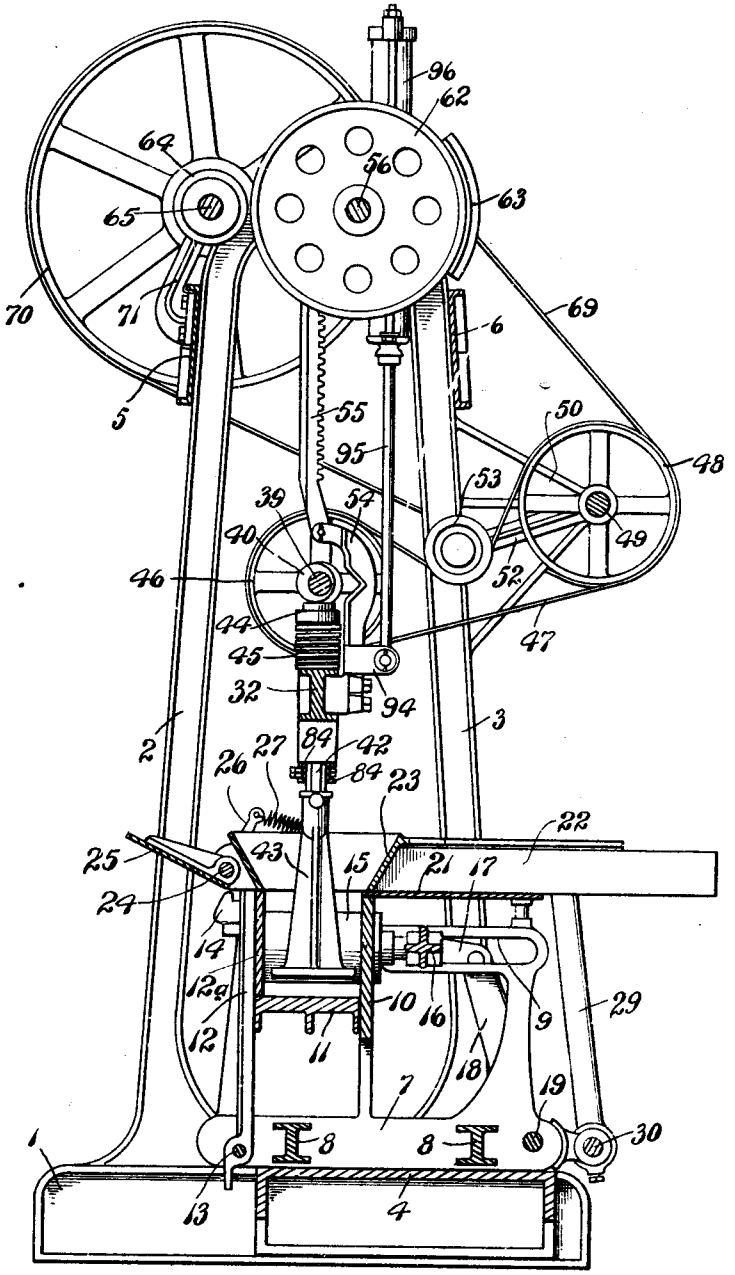


Fig. 2.

Inventor
Harry E. Dunn

By
Frank E. Livermore, Jr.
Attorney

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H. E. DUNN

CEMENT BLOCK RAMMER

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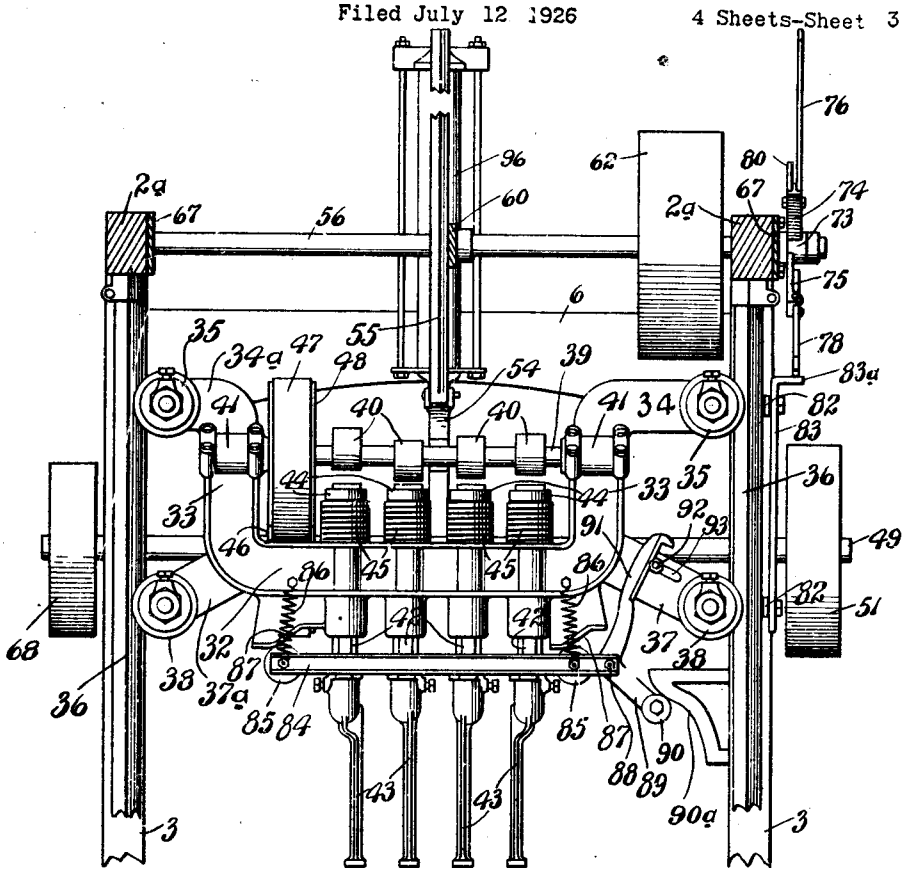


Fig. 3.

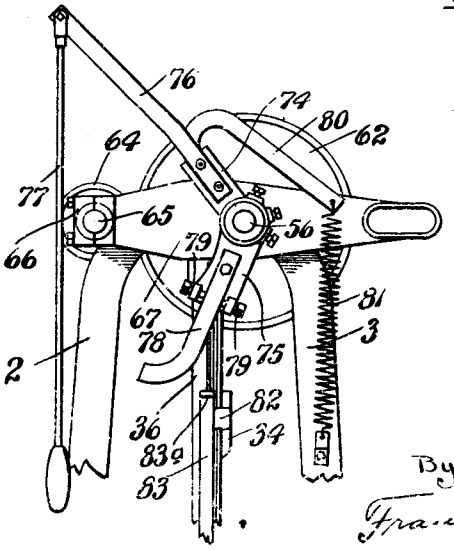


Fig. 4.

Inventor
Harry E. Dunn.

By
Frank E. Livernash, Jr.
Attorney.

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H. E. DUNN

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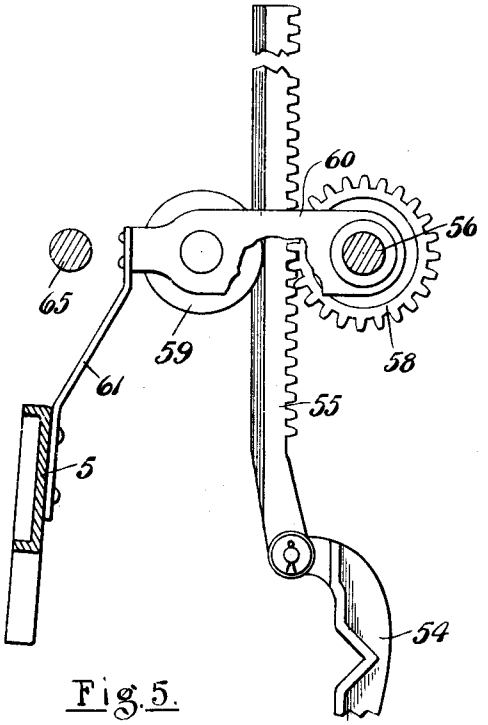


Fig. 5.

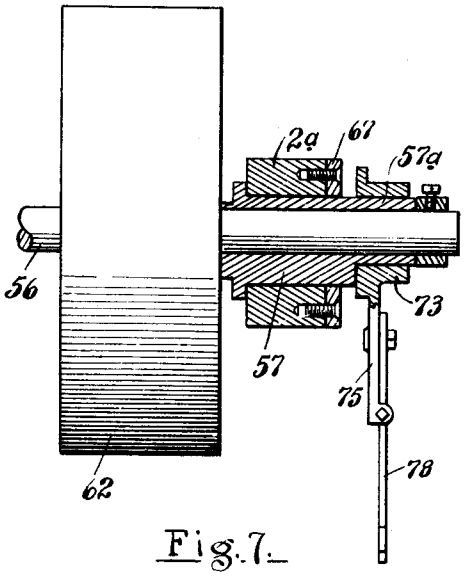


Fig. 7.

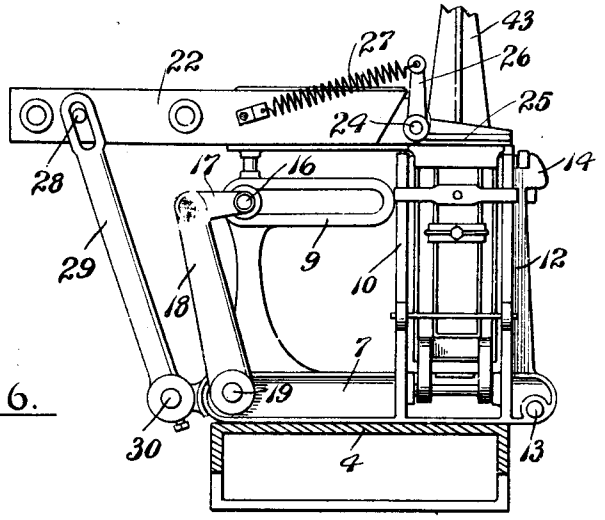


Fig. 6.

Inventor
Harry E. Dunn
By
Frank E. Livernace Jr.
Attorney.

Patented Mar. 6, 1928. 1,661,414

UNITED STATES PATENT OFFICE.

HARRY E. DUNN, OF HOLLAND, MICHIGAN.

CEMENT-BLOCK RAMMER.

Application filed July 12, 1926. Serial No. 121,754.

This invention relates to a machine for ramming cement blocks. It has for its primary object and purpose the production of a machine in which cementitious material may be rammed in a form so as to condense the material to proper density, the form being of the required shape to produce a cement building block, though of course it is to be understood that the machine is capable of serving its functions whether ramming material to produce a building block or other cement or concrete structure of desired form. A further object of the invention is to provide a machine of this character in which the cementitious material may be continuously rammed until the form is filled after which the upper surface of the block may be properly smoothed by the machine and thereafter the entire ramming apparatus lifted out of the way, automatically stopped from operation and held in an elevated position so as to permit removal of the block formed from the form or mold, the release and descent of the ramming apparatus to lower operative position being accomplished by a very simple manual operation when it is desired to make the succeeding block in the form. These and various other objects and purposes together with novel construction for attainment of the same will be apparent as an understanding of the invention is had from the following description, taken in connection with the accompanying drawings, in which,

Fig. 1 is a front elevation of the machine, the form used therewith being shown in vertical section.

Fig. 2 is a vertical section through the machine between its ends.

Fig. 3 is a fragmentary vertical section taken longitudinally of the machine at the upper part thereof and showing the ramming apparatus in upper inoperative position.

Fig. 4 is a fragmentary end elevation of the upper portion of the machine illustrating the manually operable means for causing the elevation of the ramming apparatus and the automatic stopping thereof when it has attained a predetermined upper position.

Fig. 5 is a fragmentary enlarged section taken at the upper part of the machine illustrating a detail of the mechanism which is operated to lift the ramming apparatus.

Fig. 6 is a side elevation of the mold or form used, and

Fig. 7 is a fragmentary enlarged vertical section illustrating the eccentric mounting of one end of one of the shafts of the machine, which mounting may be manually operated to cause the elevation of the ramming apparatus or to cause its release for movement to lower operative position.

Like reference characters refer to like parts in the different figures of the drawings.

In the construction of the machine, a supporting frame is provided for the mechanism having two spaced apart base members 1 from which vertical ends extend upwardly, each including a front post 2 and a rear post 3, the same being integrally connected at their upper ends by the bends 2^a. Between the lower base members 1 a cross connecting base channel 4 is disposed. Near the upper end of the frame other cross members 5 and 6 are located and secured, the former between the front posts 2 and the latter between the rear posts 3.

On the lower cross channel 4 which is of considerable width, the form or mold for making a building block is located. This mold includes a frame having spaced apart sides 7, connected by cross bars 8, the sides at their upper portions being formed with slotted horizontal members 9 located back of the form or mold proper. The immediate form or mold in which the block is made includes a rear rigid vertical side 10, a bottom 11 and a front side 12 pivotally mounted at its lower end on the rod 13 and also suitably pivotally mounted ends, the front side 12 being equipped with an inner facing 12^a, as shown in Fig. 2, which lies directly over the bottom 11. Said front side 12 and the ends are adapted to be releasably held in vertical position so as to close the form, suitable

hooks 14 being provided with which latch bars, as shown in Fig. 6, may engage to hold the same in operative position. When a block is formed these ends and front side may be released and turned outwardly so as to free the block for removal from the form.

In the rear vertical side 10 of the form or mold, suitable openings are made for the passage of a plurality of cores 15 which are connected to a cross head 16 slidably mounted at its ends in the longitudinal slots of the members 9, previously described. Links 17 are connected to the ends of the cross head 16 and at their opposite ends are connected to arms 18 which, at their lower ends are secured to a rock shaft 19 mounted at the lower part of and between the sides 7 of the frame. An operating handle or lever 20 is connected to the shaft 19 and extends forwardly to the front of the machine where it may be readily reached and operated to move all of the cores simultaneously into position in the form or, after a block has been completed, to move the cores rearwardly, withdrawing and disconnecting the cores from the block.

A horizontal plate 21 is positioned at the upper rear portion of the form and back of the rear side 10 thereof, on which a hopper member 22 is slidably mounted. Said member at its front end is provided with an entrance hopper 23 having downwardly and inwardly inclined sides; and at the front of the hopper member a horizontal shaft 24 is mounted on which a plate 25, as shown in Fig. 2, is secured. This plate normally extends forwardly and upwardly, arms 26 being secured at the ends of the shaft 24 and acted upon by springs 27 to elevate the plate to the position shown in Fig. 2. Pin 28 projects laterally from the rear end of the hopper member 22 engaging with which is the slotted upper end of a bar 29, the lower end of which is fixed to a rock shaft 30 located in substantially the same horizontal plane with and a short distance back of the shaft 19. Shaft 30 is also provided with an operating lever 31 which extends toward the front of the machine so that it may be readily grasped to move the hopper member back and forth over the plate 21. In Fig. 2, said hopper member is shown with the hopper 23 directly over the open upper end of the form or mold proper but, with the ramming apparatus hereafter described, elevated to an upper position, the hopper member may be moved back so that the hopper 23 is located over the plate 21 whereby cementitious material may be placed in said member and against the plate 21 so that on forward movement of the hopper to the position shown in Fig. 2, the cementitious material will drop into the form proper having the bottom 11, sides 10 and 12 and ends as described.

Above the form or mold proper the ramming apparatus is mounted. In the construction of said ramming apparatus, a frame for carrying the same is provided having a lower member 32 with upturned vertical ends 33 each of which at its upper end is turned outward horizontally to make the arms 34 and 34ª, at the ends of which grooved rollers 35 are mounted to bear against the square vertical guides 36 located between the front and rear posts 2 and 3 of the end members of the main frame. Said guides 36 are positioned so that inner corners of the same fit into the grooves of the rollers 35. Additional arms 37 and 37ª extend from the supporting frame adjacent the ends of the lower member 32 which are likewise equipped with grooved rollers 38, also traversing the guide rods 36.

A horizontal shaft 39 equipped in its length with a plurality of spaced apart eccentrics 40, is mounted between the spaced apart vertical sides 33 of the frame and rotatably mounted at their ends in bearings 41 carried by said sides. Below each eccentric 40 a vertical ramming bar 42 is slidably mounted through the lower member 32 of the supporting frame for the ramming apparatus, each of said bars at its lower end being equipped with a ramming foot 43 and at its upper end with a head 44, there being a strong coiled spring 45 disposed around each of the bars 42 between its head 44 and the lower member 32 of the frame. It is evident that the normal tendency of the springs is to elevate the bars with their attached ramming feet 43. On the shaft 39 a pulley 46 is secured which is driven by a belt 47 passing around the same and also around a drive pulley 48 on a drive shaft 49 mounted back of the frame on brackets 50 which are either cast integral with the frame or permanently secured thereto. The drive shaft 49 is equipped with a pulley 51 so that it may be belt driven from any suitable source of power. An arm 52 is loosely mounted on the shaft 49 and at its free end carries a pulley 53 bearing against the upper side of the belt 47 so as to keep the same at requisite tension at all times.

With cementitious material in the form, the tamping feet 43 are periodically forced downward by the rotation of the eccentrics 40 and their engagement against the heads 44, springs 45 lifting the ramming bars and feet attached thereto between the periods of downward movement of the same. The cementitious material in the form is rammed and condensed under the lower ends of the tamping feet and as it becomes properly rammed the entire ramming apparatus moves upwardly, being free to do so. Additional cementitious material may be added to the mold if necessary until it is completely filled and the material proper-

ly rammed. When this occurs the lower ends of the ramming feet 43 are located at or above the upper edges of the sides and ends of the mold and by means of mechanism, hereafter described, the entire ramming apparatus may be lifted so as to carry the ramming feet above the hopper which is then moved rearwardly. The lower edges of the hopper strike the upper side of the block flat, any excess cementitious material being carried by the hopper back over the plate 22. Then when the hopper member is in its rear position, as shown in Fig. 6, the ramming feet 43 will be located above the plate 25. The ramming apparatus may be released so as to come down to a lower position in order that the ramming feet may strike against said plate 25 thereby smoothing the upper surface of the block after which the ramming apparatus is elevated to an upper position where it is out of the way, stopped from operation and held in such elevated position during the time that the block which has been made is being taken from the mold.

The construction by means of which the carriage and the ramming apparatus mounted thereon, is elevated so as to carry the lower ends of the ramming feet 43 above the upper side of the hopper, will now be described. A bracket 54 is rigidly attached to the lower member 32 of the carriage to which a vertically positioned rack bar 55 is pivotally connected at its lower end being located directly over the center of the carriage. A shaft 56 is mounted at the upper end of the machine, one end thereof passing through a bearing sleeve 57 which extends through the bend or curved portion 2^a at the top of one end of the frame of the machine. The shaft 56 passes through said bearing off-center thereof so that the bearing sleeve 57 in effect is an eccentric, rotation of which will change the position of the shaft 56 for purposes hereafter described. On the shaft 56 a gear wheel 58 is secured meshing with the rack 55. The rack is held in engagement with the gear wheel by a grooved wheel 59 which is carried by link 60 mounted at one end on the shaft 56 and at the other end attached to a bar 61 which is connected to the cross member 5 of the frame, as shown in Fig. 5. A brake wheel 62 is fixed to shaft 56 near which it passes through eccentric sleeve 57. This wheel in normal position is adapted to bear against a fixed brake 63 located back of the wheel and carried in any suitable manner by the frame of the machine. In front of the brake wheel 62 a small drum 64 is mounted upon a second shaft 65 which parallels the first shaft and is mounted in bearings 66 formed at the front ends of plates 67, best shown in Fig. 4, permanently secured to the upper ends of the end members of the frame of the machine. A drive wheel or pulley 68 is carried on the drive shaft 49 and through an endless belt 69 which passes around it and a wheel 70 fixed on the shaft 65, drives said shaft 65 and the drum 64 continuously during all the time that the machine is in operation. A bracket 71 is rigidly connected to the cross member 5 of the frame of the machine, as shown in Fig. 1, and at its upper end is equipped with a half bearing 72 which engages against the front side of shaft 65 closely adjacent the drum 64 to support and reinforce the shaft 65 and hold it against springing when pressure is brought against the drum 64, as will hereafter appear.

A collar 73 is fixed to the outer end of the eccentric bearing sleeve 57, said collar having one arm 74 extending upwardly and forwardly and a second arm 75 extending downwardly and forwardly. A bar 76 is connected with the arm 74 and at its free end a depending rod 77, terminating in a hand hold, is pivotally connected so as to be grasped by the operator of the machine when it is desired to turn the bearing sleeve 57. A second bar 78, forwardly curved at its lower end, is adjustably secured to the arm 75 passing between two adjusting screws 79, as shown in Fig. 4. A third bar 80 is connected to the inner side of the arm 74 and is then bent to the rear and has a strong coiled spring 81 secured thereto at its end, the opposite end of the spring being attached to the adjacent part 3 of the frame of the machine. Brackets 82 extend outwardly from the arms 34 and 37 of the carriage supporting the ramming mechanism to which a vertical bar 83 is permanently secured, its upper end being formed with an outturned horizontal lip 83^a.

When the hand hold at the lower end of the member 77 is grasped and a downward pull exerted thereon, it causes a rotation of the sleeve 57 and a movement of the bar 78 in a counter clockwise direction (referring to Fig. 4) a spring 81 yielding. The rotation of the sleeve 57 shifts the position of shaft 56 and of the brake wheel 62 thereon, moving said wheel forward so that it bears against the continuously rotating small drum 64. Shaft 56 is thus rotated whereupon the gear wheel 58 rotating with the shaft elevates the rack bar 55, thus elevating the vertically movable carriage and the ramming mechanism carried thereby. The carriage may be elevated to any desired position and immediately upon release of the member 77 the spring 81 rotates the bar sleeve 57 back to its normal position, bringing the brake wheel 62 into contact with the fixed brake 63 whereby the ramming mechanism is retained in upper position and cannot drop by gravity to a lower position. If the operator inadvertently does not re-

lease his hold on the member 77 the out turned lip 83a of bar 83 comes against the curved lower edge of the bar 78 and automatically turns the sleeve 57 back to its normal position and insures that the carriage, carrying the ramming apparatus, will not be elevated too high so as to cause any damage to the machine. The ramming apparatus is held in upper position until the block has been removed from the form. When it is desired to lower the ramming mechanism member 77 is grasped and pulled downwardly so as to rotate the sleeve 57, but not far enough to bring the brake wheel into contact with the drum 64. This releases the brake wheel from the brake and frees the carriage so that it may drop to lower operative position.

When the ramming apparatus is elevated to upper position, shaft 49 being driven continuously and the shaft 39 being continuously driven from said drive shaft, it is desirable that means be provided to stop the operation of the rammers while they are not actually performing their ramming operation upon the cementitious mixture. I have provided means for this which acts automatically when the carriage with the ramming apparatus thereon, is elevated to a predetermined position, which will now be described.

Below the lower member 32 of the carriage two bars 84 preferably of channel form are mounted, one in front and the other back of the rods 42, being spaced apart and equipped with rollers 85 adjacent each end thereof. Springs 86 connect the bars 84 with the lower member 32 of the carriage and serve to raise said bars until stopped by their engagement against the under side of said member 32. At the under side of the member 32 and near each end thereof, downwardly extending cam members are formed having inclines 87 located at an angle to the horizontal and both extending in the same direction.

At one end of the bars 84 and mounted on a pin 88 is a bell-crank lever having an arm 89 extending downwardly and outwardly and equipped at its outer end with a roller 90 which, as the carriage is elevated, comes into engagement with the cam edge of a bracket 90a attached to the adjacent end of the main frame of the machine. The other arm 91 of the bell-crank lever extends upwardly alongside of the arm 37 of the carriage, previously described, and bears at one side against a fulcrum member 92 adjustably mounted in a slot 93 in the arm 37.

As the carriage moves upwardly and roller 90 rides against the cam edge of bracket 90a, the bell crank lever is turned about the fulcrum 92, this moving both bars 84 to the left from the position shown in Fig. 1 to that shown in Fig. 3, causing the rollers 85 to ride down the inclines 87 and thus move the bars downwardly whereupon they engage against the upper ends of the ramming feet 43 holding all of the same in a position slightly lower than any position that they occupy when in actual operation so that all of the heads 44 are located so that the rotation of the eccentrics 40 causes no contacts of said eccentrics with the heads 44, the ramming members remaining stationary. The shaft 39 may continue to rotate but there will be no operation of the ramming members until the ramming apparatus is lowered so as to disengage the roller 90 from the bracket 90a whereupon the springs 87 will elevate the bars 84 and again bring the heads 44 against their operating eccentrics 40.

If desired, a shock absorbing check device may be used in connection with the ramming apparatus so that its dropping to lower operative position from an elevated position will not be detrimental to the machine in any manner from shock or jar produced. An arm 94 extends rearwardly from the lower member 32 of the carriage to which a piston rod 95 is connected and extends upward into a cylinder 96 carried by the main frame of the machine and having a construction in connection with a piston at the upper end of the rod 95 for checking too rapid descent of the carriage and ramming apparatus located thereon. This addition to the mechanism is not imperative but may be used, it being a well known type of pneumatic check used in many relations for speed checking purposes.

The ramming machine described is practical and sure in its operation, is easily controlled through the one operating member 77, while the operation of the form and the hopper in connection therewith is controlled by the levers 20 and 31. The ramming feet 43 pass between the cores 15 and between said cores and the ends of the form so that the cementitious mixture is thoroughly rammed and condensed when the machine is operating. The automatic disconnection of certain parts of the ramming mechanism when the same are not needed is a feature of utility adding to the life of the machine. Many variations in minor detail of construction may be resorted to without departing from the invention defined in the appended claims, and the invention is to be considered as comprehensive of all forms of structure coming within the scope of said claims.

I claim:

1. In a machine of the class described, a supporting frame having vertical spaced apart ends, a carriage mounted between the ends of said frame and adapted to move up and down thereon, a plurality of ramming

elements mounted on said carriage, a shaft rotatably mounted on the carriage having a plurality of eccentrics thereon, one for each ramming member and bearing against the upper end thereof, springs normally tending to lift the ramming members and force their upper ends against said eccentrics, and means for driving said shaft.

2. In a machine of the class described, a support, a plurality of ramming members mounted thereon for vertical reciprocatory movements, a shaft located across and above the upper ends of said ramming members, a plurality of eccentrics on the shaft, one at the upper end of each ramming member, means for driving the shaft, and springs, one for each ramming member acting thereon to lift each ramming member so as to force the upper end thereof against its eccentric.

3. In a machine of the class described, a main frame having spaced apart vertical ends, each end being equipped with vertical guide bar, a carriage disposed between ends of the frame and having rollers at its ends engaging with said guide bars, a horizontal shaft rotatably mounted on the carriage, a plurality of eccentrics on the shaft, means for driving the shaft, a plurality of ramming elements mounted on said carriage below the shaft and vertically slidable thereon, one of said ramming elements being located below each eccentric, and springs, one for each ramming member, acting to move the same upwardly so as to bring the upper ends thereof against their respective eccentrics.

4. In a machine of the class described, a main supportng frame having vertical spaced apart ends, a carriage mounted between and movable on said ends of the machine to different vertical positions, ramming apparatus carried by said carriage, means to operate said ramming apparatus, means for lifting the carriage with the ramming apparatus carried thereby to an upper position including a shaft, means to drive the shaft, a brake wheel on said shaft, mechanism operated by the rotation of the shaft to lift said carriage, and a brake with which said brake wheel is adapted to engage to hold the said carriage and ramming apparatus in its upper elevated position.

5. In a machine of the class described, a supporting frame having spaced apart vertical ends, a carriage mounted on and between said ends for vertical movements, ramming apparatus carried by said carriage, a shaft located at the upper end of the main frame, means for continuously driving said shaft, a drum on said shaft, a second shaft mounted at the upper portion of the machine, a brake wheel on the second shaft, means connecting the second shaft with the carriage whereby on rotation of the second shaft in one direction the carriage and ramming apparatus will be elevated, a brake against which the brake wheel normally bears, and manually operable means for shifting said second shaft so as to move the brake wheel away from the brake and against said drum thereby driving said second shaft to elevate said carriage and ramming apparatus.

6. In a machine of the class described, a main frame having spaced apart vertical ends, a carriage mounted on and between said ends for vertical movements, ramming apparatus mounted on said carriage, a continuously driven shaft mounted at the upper end of the main frame, a drum on said shaft, a second shaft mounted at the upper end of the frame, a brake wheel on the second shaft normally located in close proximity to but a short distance from said drum, a brake against which the brake wheel normally bears, a sprocket wheel on the second shaft, a rack connected with the carriage and engaging with said sprocket wheel, means for mounting one end of said second shaft whereby it may be shifted toward the continuously moving shaft to disengage the brake wheels from the brake and engage it against said drum, and means for manually operating said last mentioned means to cause said shifting of the second shaft toward the continuously moving shaft.

7. In a machine of the class described, a main supporting frame having spaced apart vertical ends, a carriage mounted on and between said ends of the frame for vertical movements, ramming apparatus mounted on the carriage, a continuously driven shaft mounted at the upper end of the frame, a drum on said shaft, a second shaft substantially paralleling the first shaft also mounted at the upper end of the frame, a brake wheel on the second shaft located in close proximity to but normally disengaged from the drum, connections between the second shaft and carriage whereby on rotation of the second shaft in one direction the carriage will be elevated, a rotatably mounted sleeve through which one end of the second shaft passes with the axis of said shaft located to one side of the axis of the sleeve whereby rotation of the sleeve in one direction will shift the second shaft toward the continuously driven shaft and bring said brake wheel into engagement with said drum, manually operable means connected to said sleeve for rotating the same to cause said shifting of the second shaft toward the continuously driven shaft, and a spring connected with said sleeve normally tending to rotate the same in the opposite direction so as to maintain the brake wheel against said brake.

8. In a construction of the class described, a main supporting frame having spaced apart vertical ends, a carriage mounted on

and between said ends of the frame, ramming apparatus mounted on said carriage, means for elevating said carriage to an upper position, manually operable means for causing the operation of said elevating means, means for retaining and holding the carriage in any position to which it may be lifted upon release of said manually operable means, and means for rendering said carriage lifting means inoperative upon attainment by the carriage of a predetermined upper position.

9. In a machine of the class described, a supporting frame having spaced apart vertical ends, a carriage mounted on and between said ends of the frame for vertical movements, ramming apparatus carried by said carriage, means for operating said ramming apparatus, means for elevating the carriage and ramming apparatus to an upper position, means for manually causing the operation of the said elevating means to elevate the carriage, means for holding the carriage to any position to which it may be elevated upon release of said manually operable means, and means for automatically stopping the operation of the ramming apparatus upon elevation of the carriage with said ramming apparatus to a predetermined upper position.

10. In a machine of the class described, a main supporting frame having spaced apart vertical ends, a carriage disposed between and mounted on said ends of the main frame for vertical movements, a shaft mounted on said carriage, means for driving the shaft, a plurality of eccentrics on said shaft, a plurality of ramming members mounted on said carriage for vertical movements, one below each eccentric, springs normally lifting the ramming elements so as to force the upper ends thereof against the eccentrics, means for elevating said carriage with its attached ramming apparatus to an upper position, and means operated by the movement of said carriage to upper position for engaging said ramming members and moving the same downwardly and holding them in positions such that the upper ends of the ramming members will be below the paths of movements of said eccentrics and out of engagement therewith.

11. In a machine of the class described, a main supporting frame having spaced apart vertical ends, a carriage mounted on and between said ends for vertical movements, a shaft horizontally mounted on the carriage, a plurality of ramming members slidably mounted on and passing through the lower part of the carriage, said members being mounted for vertical movement, a plurality of eccentrics on the shaft, one for each ramming member, a head at the upper end of each ramming member, a strong coiled spring disposed between each head and the adjacent lower portion of said carriage whereby said heads normally bear against the eccentrics, bars located horizontally below the lower side of the carriage, one at each side of the ramming members, springs holding said bars against the carriage, cams on the carriage and rollers on said bars whereby on lengthwise movement of said bars in one direction the same will be moved downwardly and engage with the ramming elements to move the same in a downward direction, means for elevating the carriage and attached ramming apparatus and means mounted on said bars and engaging with means on said main frame on elevation of the carriage to a predetermined upper position to cause said bars to move lengthwise and engage with and hold the ramming elements out of operative engagement with their respective eccentrics, substantially as described.

12. In a machine of the class described, a main supporting frame having spaced apart ends, a carriage mounted on and between said ends of the frame for vertical movement, ramming apparatus including a plurality of vertically movable ramming members mounted on said carriage, a form adapted to receive cementitious material located between the sides of the frame below said ramming apparatus, said ramming members at their lower ends being designed to enter said form, a hopper member mounted for horizontal movement at the upper side of the form and having an entrance hopper through which the ramming members may pass into the form, a plate back of the form over which said hopper moves when the same is drawn back thereover and a second plate pivotally mounted on said hopper member in front of said hopper which comes directly over the cementitious material held in said form when the hopper member is drawn backwardly, substantially as described.

13. In a machine of the class described, a supporting frame having vertical spaced apart ends, a carriage on and between said ends for vertical movements, ramming apparatus mounted on the carriage including a plurality of vertically reciprocable ramming members, means for operating said ramming members, a form for receiving cementitious material located between the ends of said frame and underneath the ramming apparatus, the lower ends of said ramming members entering the form and ramming the cementitious material therein, a hopper member movably mounted at the upper side of the form, means for moving the same from front to rear position and vice versa, and a plate pivotally mounted on said hopper member at the front end thereof, said plate coming directly over the cementitious material held in the form when the hopper member is moved to its rear position, the

plate being in position to be forced against the cementitious material by the ramming apparatus and thereby smooth the upper surface of the same on operation of the ramming members against said plate.

14. A construction containing the elements in combination defined in claim 13, combined with spring means acting on said plate to normally tilt the same to an inclined position whereby it extends at an angle to the horizontal, substantially as described.

In testimony whereof I affix my signature.

HARRY E. DUNN.