Dec. 13, 1960 J. E. KOVACH 2,963,762

AGGREGATE FEED AND STRIPPER APPARATUS FOR CONCRETE BLOCK MACHINES

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Fig. 1

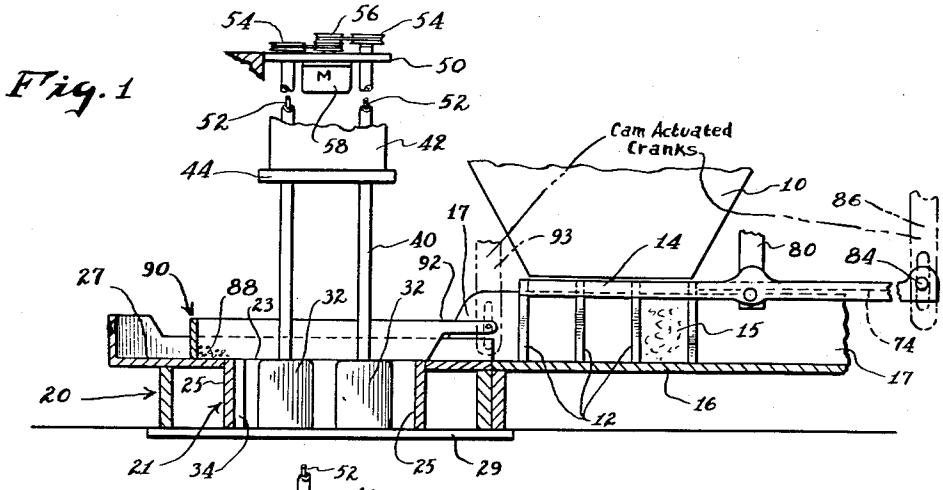


Fig. 2

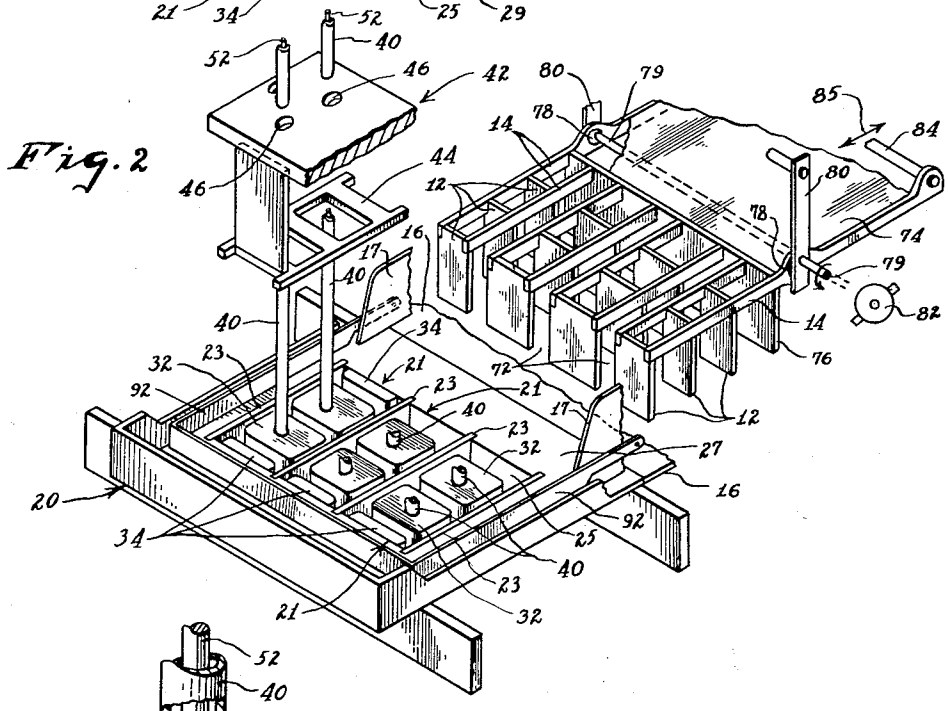
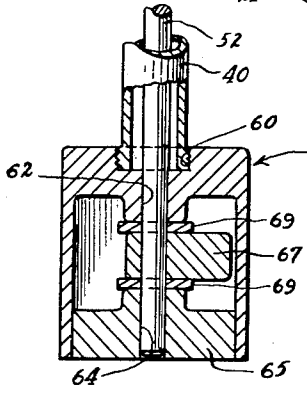


Fig. 3



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AGGREGATE FEED AND STRIPPER APPARATUS FOR CONCRETE BLOCK MACHINES

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Original application Feb. 10, 1955, Ser. No. 487,437, now Patent No. 2,839,810, dated June 24, 1959. Divided and this application July 9, 1957, Ser. No. 670,726

4 Claims. (Cl. 25—41)

This invention relates to improvements in machines for making concrete units, such as blocks or pipes. The invention is concerned more especially with the molds of such machines and with the apparatus for feeding aggregate from a hopper to the molds.

It is an object of the invention to provide improved means for filling the mold of a concrete unit-making machine, and for cutting off the aggregate at the right height across the top of the mold. In accordance with one feature of the invention, the aggregate is advanced from a feed hopper to the mold by means of grid plates which serve the purpose of the conventional feed drawer.

Another object of the invention is to provide an improved construction for a concrete unit-making machine at the mold box. One feature relates to the control of excess aggregate around the top edge of the mold; and another feature relates to the supporting of cores within the mold from columns which extend through the stripper head of the machine. This construction eliminates the necessity for the conventional core bar and makes it possible to charge the mold more uniformly across its full width, and makes possible the use of stripper shoes which do not have to be split to accommodate the core bar and which produce a more perfect block or other unit, and the invention will be described as applied to a concrete block machine.

Another object of the invention is to provide apparatus for molding more uniform blocks by having vibrator mechanism within the cores. This is a particularly effective way for settling the aggregate uniformly and quickly within the molds; and with the core supporting columns of this invention, the driving mechanisms for the vibrators can extend down through hollow columns. The hollow columns provide free air to the cores so other means of venting the core is not necessary to eliminate vacuum caused during withdrawal of cores from the concrete.

This application is a division of my copending patent application, Serial Number 487,437, filed February 10, 1955, now Patent 2,839,810, granted June 24, 1959.

Other objects, features and advantages of the invention will appear or be pointed out as the description proceeds.

In the drawing, forming a part hereof, in which like reference characters indicate corresponding parts in all the views;

Figure 1 is a diagrammatic view, mostly in section, showing the improved feeding, molding and vibrating apparatus of this invention;

Figure 2 is a diagrammatic, perspective, exploded view of a portion of the apparatus shown in Figure 1; and

Figure 3 is an enlarged, sectional view through one of the core molds showing vibrator mechanism within the core molds.

The apparatus shown in Figure 1 includes a hopper **10** for holding aggregate from which the blocks are to be molded. A plurality of grid plates **12** are connected at

their upper ends to bars **14**. Aggregate **15** falls down through the mouth at the bottom of the hopper **10** and into the spaces between the grid plates **12**. At their lower ends, the grid plates **12** extend close to the top surface of a stationary plate **16** on which the aggregate rests, and these plates **12** serve as hoe blades for pushing the aggregate back and forth across the plate **16**, as will be more fully explained in connection with the operation of the apparatus. There are stationary sides **17** extending upwardly from the side edges of the plate **16** for preventing transverse displacement of aggregate located between the grid plates **12**.

The block-making machine has a mold box **20**. Within the mold box **20** there are three molds **21**, best shown in Figure 2. These molds, which provide cavities into which the aggregate is charged, have side walls **23** including common walls separating adjacent mold cavities from one another. End walls **25** of the molds **21** are of the same height as the side walls **23** of the molds, and there is a top plate **27** extending away from the top edges of the molds **21** in all directions at a level flush with the plate **16** on which the aggregate rests.

A plain pallet **29** is held against the open bottom of the molds **21** during the time that the molds are being filled and while the aggregate is being settled in the molds. The pallet receivers for bringing the pallet into position under the mold and subsequently removing it during the stripping operation is not illustrated in the drawing because this mechanism is well known in the art and no showing of it is necessary for a complete understanding of this invention.

There are cores **32** located in the various molds **21**. There are two of these cores **32** in each of the molds shown in Figure 2; and in the front end of each mold there is an additional core **34** which provides a recess in the end face of the block. There is another end core **34** at the back end of the third mold shown in Figure 2, but the other two molds make blocks which have no recess at the back end of the mold, such blocks being used for corners in cinder block walls. There might be more or less than two cores in each cavity.

The end cores **34** are rigidly secured to the end walls of the molds; but the other cores **32** are supported by means which do not interfere with the molding and stripping of the blocks. In machines of the prior art, the cores corresponding to the cores **32** have been supported by bars extending lengthwise across the top of each mold. These core bars have had several disadvantages. One is that the core bar is in the path of the aggregate dropping into the space between the cores and the end walls of the mold; and another disadvantage is that the core bars have been in the way of the stripper head and have required that stripper head be made with split shoes for extending down on opposite sides of the core bar. This has made the part of each block, which is under the core bar, out of reach of direct contact of the stripper shoe during a block molding operation.

This invention eliminates the necessity of core bars by having each core **32** connected to a column **40** which extends upwardly through an appropriate opening in a stripper head **42**. Figure 2 shows these columns **40** extending through the core openings of a stripper shoe **44** at the lower end of the stripper head **42**, and shows the stripper head with openings **48** through which the columns **40** extend.

For clearer illustration, Figure 2 shows only one stripper shoe **44** for the left-hand mold **21**, but it will be understood that the stripper head **42** has similar stripper shoes **44** located over each of the other molds **21**. Also for clearer illustration, only two of the cores **32** are shown attached to columns **40** extending up through the

stripper head, the columns for the cores in the middle and right-hand molds being broken off.

The stripper head **42** reciprocates up and down with respect to the mold box in a manner well understood in the art, but the columns **42** remain at fixed levels and they are so held by a frame **50** located above the stripper head **42**. This frame **50** is merely representative of some fixed support on the main frame of the block-making machine.

When the cores **32** are to be equipped with the core vibrator feature of this invention, there is a drive shaft **52** extending downwardly through each of the hollow columns **40**, and there are pulleys **54** at the upper ends of the drive shafts **52**. These pulleys **54** are driven by belts from a driving pulley **56** on the armature shaft of an electric motor **58** carried by the frame **50**. These pulleys **54** and **56**, together with the motor **58**, are merely representative of power means for rotating the drive shafts **52**.

Figure 3 is a diagrammatic illustration of the vibrator mechanism within one of the mold cores **32**. Each column **40** is screwed into a counter bore **60** at the top of the mold core **32**; and the drive shaft **52** extends downwardly through a bearing **62** within the core. The lower end of the drive shaft **52** extends into another bearing **64** in a bottom wall **65** of the core **32**. On the drive shaft **52**, between the bearings **62** and **64**, there is an eccentric weight **67** secured to the drive shaft, and in the construction illustrated, there are thrust bearings **69** both above and below the eccentric weight **67**.

When the drive shaft **52** is rotating, the eccentric weight **67** causes vibration of the core **32**, and there is enough elasticity in the column **40** to permit the limited movement necessary for the vibration in directions transverse of the longitudinal axis of the column **40** and drive shaft **52**. Other kinds of vibrators can be located within the core **32**.

The feeding of the aggregate to the molds **21** is accomplished by advancing the plates **14** toward the left in Figure 1 so that the grid plates **12** push the aggregate across the stationary plate **16** and across the top plate **27** of the mold box and over the molds **21**. The depth of the spaces between the grid plates **12** is sufficient to supply the necessary depth of aggregate for filling the molds **21** with some excess of aggregate remaining up between the grid plates **12** after the molds are filled.

There are spaces **72** between the groups of grid plates **12** to provide clearance for the supporting columns **40**. As the grid plates **12** move from under the hopper **10** (Figure 1) to the left and over the mold **21**, a plate **74**, extending between the outside bars **14** (Figure 2), passes under the hopper mouth so that no aggregate can fall from the hopper behind the grid plates **12**.

The outside bars **14** are connected by a back plate **76** extending for the full distance between the outside bars **14**, and the inner bars **14** on opposite sides of the spaces **72**, are connected at their back ends to the plate **76**. Thus all of the grid plates **12** are supported from this plate **76**.

The outside bars **14** are supported on eccentrics **78** secured to a shaft **79** which rotates in bearings at the lower ends of supporting links **80**. This shaft **79** is rotated by a motor **82**, indicated diagrammatically in Figure 2. The motor **82** runs continuously while the grid plates are feeding aggregate to the mold and while the grid plates are located above the mold. This rotation of the eccentrics produces an orbital movement of the bars **14** and grid plates **12**. The grid plate assembly is reciprocated back and forth across the molds **21** by power applied to a shaft **84** in the directions indicated by the double arrow **85**. A cam-actuated crank **86**, shown in phantom in Figure 1, is a diagrammatic showing of the power means of the machine for operating the grid plates **12** on their feed stroke.

During the time that the grid plates **12** are located over the molds **21**, the motor **82** agitates the grid plates **12**, as previously explained, and the motor which rotates the drive shaft **52**, in the columns **40**, causes vibration of the mold cores **32**. This agitation and vibration causes the aggregate to settle in the molds to produce a block of uniform texture and strength.

The aggregate feed assembly which includes the agitator grid plates **12** is moved back and forth by power applied to the shaft **84** in the same way as a feed drawer is operated back and forth in conventional block making machines which use a feed drawer for conveying aggregate from a hopper to a mold box. In contrast to the usual mold charging apparatus with a single strike off bar, all of the grid plates **12** of this invention, except those farthest back, strike off excess material from above the mold as the grid plates **12** move back to position to receive a new charge of aggregate from the hopper.

When the aggregate feed has moved back to its original position under the hopper **10**, the stripper head **42** descends and brings the stripper shoes **44** into contact with the blocks. It is usual to continue the vibration of the mold for a short time after the stripper shoes are in contact with the top of the block, and with the present invention this vibraion includes the vibration of the cores **32** as already described. The machine can have other vibrating mechanism similar to that commonly employed for vibrating a mold, but it is not necessary with the vibrating cores of this invention since they serve to settle the material and to compact it against the sides of the mold. The vibration applied from inside the block by the cores **32** urges the aggregate outwardly against the smooth sides of the mold to produce a better block than is obtained when the sides of the mold are being vibrated.

The stripping of the block from each mold **21** is accomplished in much the same manner as with conventional plain pallet machines, except that the pressure applied to the top of the block is the pressure from a one-piece stripper shoe **44** instead of a split shoe such as is commonly used because of the core bar extending longitudinally across the top of each mold for holding the cores in place on machines of conventional construction.

In the operation of the apparatus of this invention, some quantity of aggregate, indicated in Figure 1 by the reference character **88**, is often pushed across the part of the top plate **27** in front of the mold **21**. In order to prevent accumulation of this aggregate, and eventual interference with the operation of the feeding apparatus, there is a frame **90** forming a fence around the upper edges of the molds **21** and some distance back from the molds along the surface of the top plate **27**. This frame has sides **92** which serve as continuations of the sides **17** for preventing transverse displacement of the aggregate during the reciprocating movement of the grid plates **12**, but the sides **92** of frame **90** move through a limited stroke. The entire frame **90** is pulled back by an operating crank **93** actuated by the same cam means of the machine as operate the crank **86**, and at a time in the cycle when the mold is empty and a new pallet **29** has been moved into position for the next charging operation. The transverse portion of the frame **90** in front of the mold serves as a blade for pulling aggregate back to the mold. By reciprocating the frame **90** back far enough to dump the aggregate **88** into the mold, and then advancing the frame **90** to its original position, the surface of the top plate **27** is kept free of aggregate built up with successive cycles of operation.

The preferred embodiment of the invention has been illustrated and described, but changes and modifications can be made and some features can be used in different combinations without departing from the invention as defined in the claims.

What is claimed is:

1. In a plain pallet concrete block molding machine having a reciprocating aggregate feeder that moves horizontally between a position to one side of a mold box and another position directly over the mold box, the

improvement which comprises a plurality of independent cores positioned in the mold box below the path of travel of the reciprocating aggregate feeder, supports extending upward from the cores to a level substantially higher than the reciprocating aggregate feeder, each of said supports being of substantially smaller width than the cores transverse of the direction of reciprocating movement of the aggregate feeder, a frame supporting the upper ends of the core supports, a stripper located below the frame and through which the core supports extend, the stripper being movable from a position above the path of the aggregate feeder and downward into contact with aggregate in the mold box, the stripper having a shoe extending across the full width and length of the mold cavity and extending across the space between the cores and into contact with aggregate between the core supports in the direction of the reciprocating movement of the aggregate feeder, the mold cores and their supports being hollow, and vibrators located within the cores and driven by motion transmitting connections leading downwardly through the mold core supports for driving the vibrators from motor means located at the upper ends of the supports.

2. In a plain pallet block-molding machine comprising a mold box having a mold cavity therein closed at its lower end by a pallet and having cores within the mold cavity, the cores extending downwardly substantially to the top surface of the pallet and being free of any connection to the pallet and to the mold, and the cores extending upwardly to the approximate level of the top of the mold and having top surfaces thereon, a stripper head that extends across the top of the mold, hollow supports for the cores extending upwardly through openings in the stripper head, the hollow supports extending upwardly from the top surfaces of the core and each support being of a cross-section much less than the area of the top surface of the core that it supports, vibrators within the cores, and means extending through the hollow supports and terminating above the pallet for operating the vibrators.

3. The block-molding machine described in claim 2

and in which the mold box has side walls forming a mold cavity and the supports for the respective cores have drive shafts extending therethrough, the vibrator in each core comprising an eccentric connected with one end of the drive shaft, and motor means at the ends of the supports remote from the cores for imparting rotation to the drive shafts.

4. The block-molding machine described in claim 2 and in which the mold box has walls forming a plurality of mold cavities and the pallet closes the bottom of all of the mold cavities, the cores in all of the mold cavities being free of the walls and pallet, a stripper head movable up and down with respect to the mold cavities, a different stripper shoe on the stripper head above each of the mold cavities, each stripper shoe extending across the full width and length of the mold cavity beneath it, a separate support for each mold core, the supports extending upwardly through openings in the stripper shoes and stripper head and the supports being long enough to leave the stripper head free to move up and down throughout its full range of movement, a fixed frame to which the upper ends of the mold supports are connected, a motor carried by the fixed frame, and motion-transmitting connections by which the motor operates the vibrators located in the cores.

References Cited in the file of this patent

UNITED STATES PATENTS

1,029,560	Pauly	June 11, 1912
1,029,561	Pauly	June 11, 1912
1,267,189	Curry et al.	May 21, 1918
2,532,049	Wittke	Nov. 28, 1950
2,544,453	Gaudin	Mar. 6, 1951
2,652,613	Warren	Sept. 22, 1953
2,667,679	Jackman	Feb. 2, 1954
2,686,950	Zevely	Aug. 24, 1954
2,717,435	Livingston et al.	Sept. 13, 1955

FOREIGN PATENTS

887,414	France	Aug. 16, 1943