Oct. 9, 1962 V. P. RUSSELL 3,057,033

EQUIPMENT FOR MANUFACTURING STRUCTURAL BLOCKS

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Fig. 1.

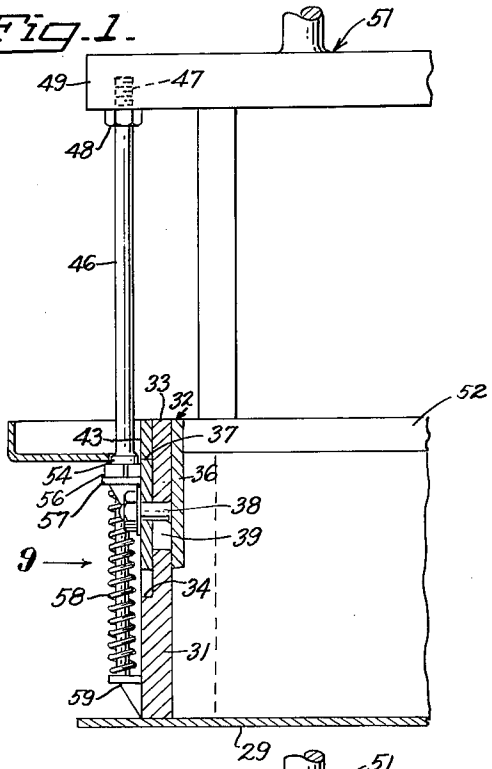
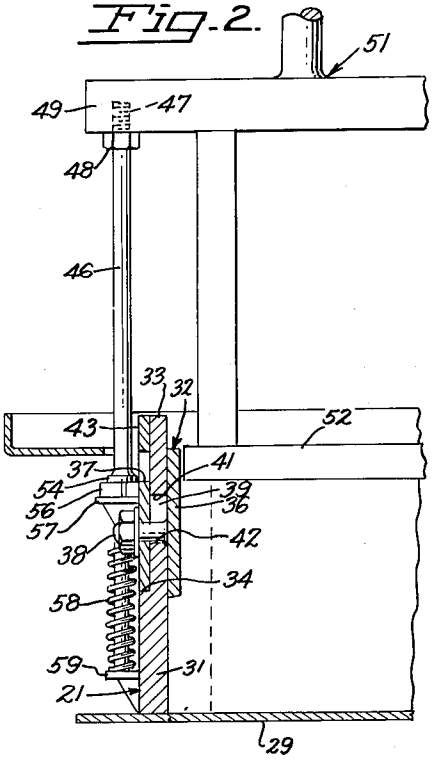


Fig. 2.



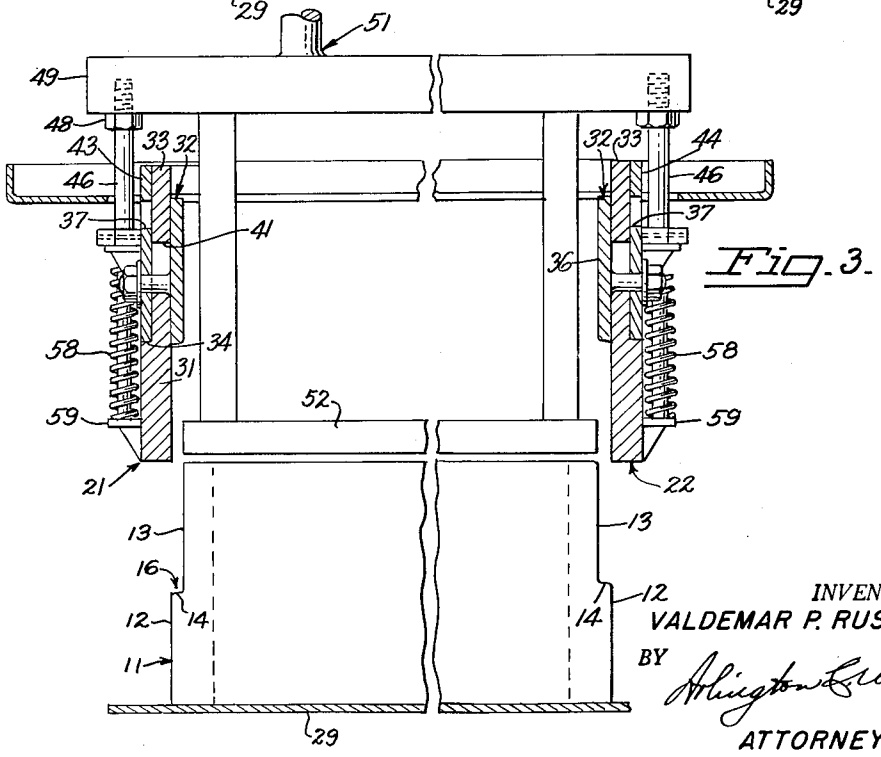


Fig. 3.

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Fig. 4.

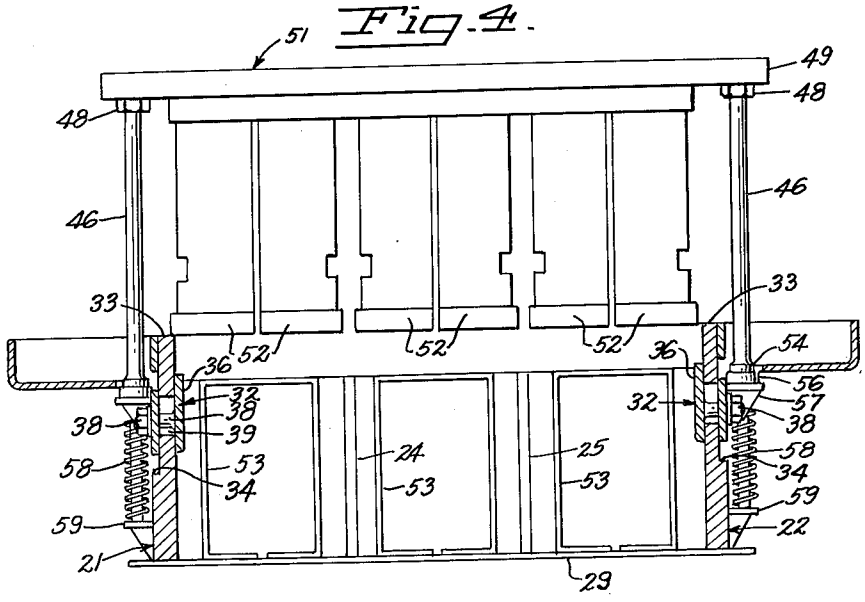
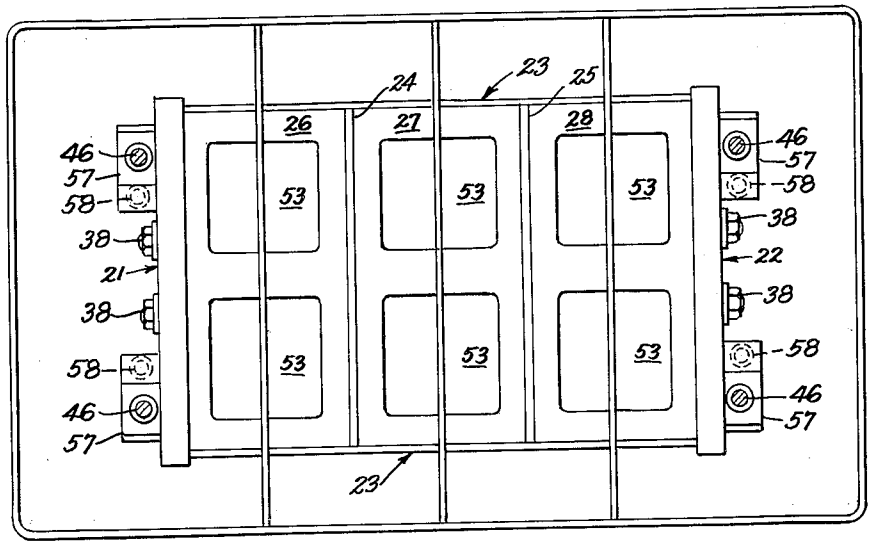


Fig. 5.



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Fig. 6.

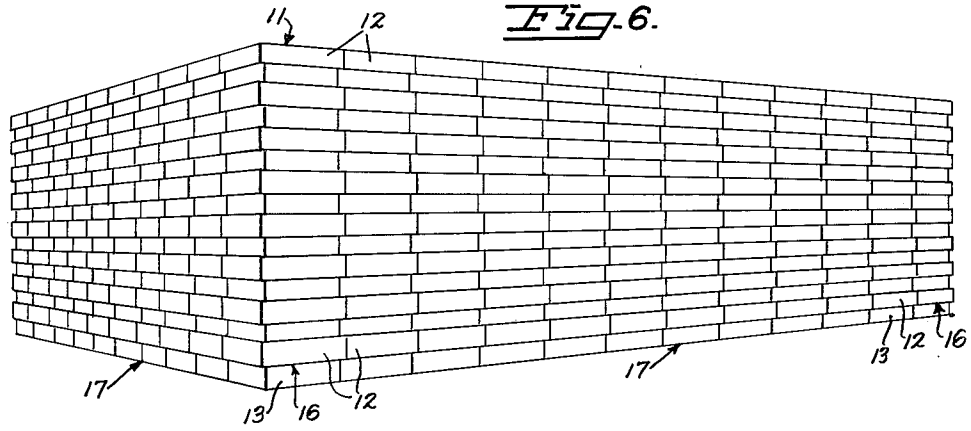


Fig. 8.

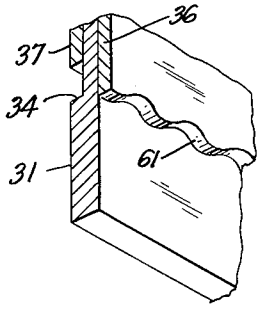


Fig. 7.

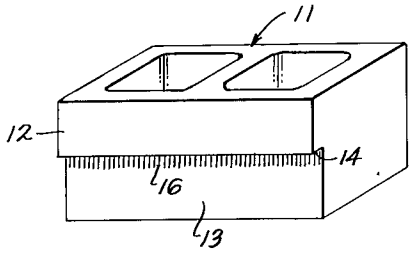
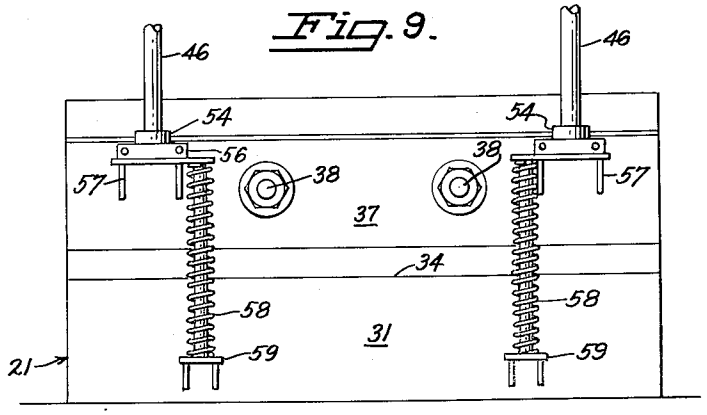


Fig. 9.



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United States Patent Office

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3,057,033

EQUIPMENT FOR MANUFACTURING STRUCTURAL BLOCKS

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Filed Mar. 29, 1960, Ser. No. 18,310
7 Claims. (Cl. 25—41)

The invention, in general, relates to the construction art and more particularly relates to an improved concrete block machine for the production of the unique structural block of the present invention.

It has long been the common practice in the construction of walls and partitions from hollow concrete masonry units to utilize mainly a standard size of block having the over-all dimensions of 8" x 8" x 16". Also, depending upon the locale of the particular building or dwelling to be constructed, as well as depending upon, to some extent, the type and design of adjacent buildings or dwellings, some architectural treatment has heretofore been attempted in order to provide an improved aesthetic effect and to present different design motifs than can be afforded by a flat finished wall utilizing only the standard concrete masonry unit of the dimensions of 8" x 8" x 16". Accordingly, some designers of building walls or partitions and the like have either reduced the height of the block from the standard size or have increased the height to provide either an 8" x 4" x 16" block or an 8" x 12" x 16" block. However, these variations from the standard size masonry unit have many disadvantages, particularly that of the appreciably increased costs of mortar, material and labor, as well as added design expenses.

An important object of the present invention is to provide a concrete block machine for producing a unique masonry unit wherein its face is materially altered from the face of a standard building masonry unit and a flat face is avoided.

A still further object of my present invention is to provide an improved machine for manufacturing masonry units of the indicated nature which is additionally characterized by the fact that existing concrete block machines require only slight alteration to meet the requirements for building the unique block of my present invention.

Other objects of the invention, together with some of the advantageous features thereof, will appear from the following description of my invention as illustrated in the accompanying drawings. It is to be understood, of course, that I am not to be limited to the precise construction of the building block machine shown, as my invention, as defined by the appended claims can be embodied in a plurality and variety of forms of the block machine illustrated.

Referring to the drawings:

FIG. 1 is a fragmentary front elevational view, partly in section, of the left-hand side of a preferred embodiment of my invention in a block manufacturing machine, this view omitting the feed box and showing the stripper head positioned slightly above the mold box.

FIG. 2 is a view similar to FIG. 1 but with the stripper head lowered into vibratory and compressing position.

FIG. 3 is a view similar to FIG. 1 but showing both left and right-hand sides of the machine and with the stripper head in a block ejection position.

FIG. 4 is a front elevational view of the stripper head and mold block of my improved block manufacturing machine with these elements in positions just prior to compression of the concrete mix in the mold compartments.

FIG. 5 is a plan view of the units shown in FIG. 4 but with the stripper head removed.

FIG. 6 is a perspective view of a wall containing various units of the preferred embodiment of the invention in a masonry block at various places in the wall.

FIG. 7 is a perspective view of a preferred embodiment of my present invention as exemplified in a unique masonry block.

FIG. 8 is a detail of a modified liner compressing face illustrating one possible variation in design of the masonry unit of my present invention.

FIG. 9 is an end elevational view looking in the direction of the arrow **9—9** of FIG. 1.

In its preferred form, the improved masonry unit formed by my present invention preferably comprises a concrete hollow block having a face of which approximately one-half thereof projects forwardly of or overhangs the remaining one-half of the face.

A preferred form of my improved equipment for manufacturing my unique building block preferably comprises a supported mold box for receiving wet concrete mix in compartments thereof; said mold having a depressible and replaceable pallet serving as a bottom thereof, a stripper head movably supported above said mold box and adapted to be lowered to a position so as to compress the concrete mix delivered into the compartments of said mold box, together with means for vibrating said mold box and said stripper head to settle and compress the concrete mix in said compartments, the two-section liner secured to opposite ends of said mold box; said liner sections being relatively movable, and means secured to said stripper head and connected to said two-section liners for effecting the compression of the concrete mix in some of the compartments of said mold box to a greater extent than that compressed by said stripper head so as to provide a face on some of the concrete blocks formed in said mold box having approximately one-half thereof projecting beyond the other one-half thereof.

As is probably well known, block manufacturing machines presently in use include a mold box divided into a purality of compartments into which concrete mix is deposited by a horizontally mounted feed box which is advanced and retracted for depositing its load into the mold box and for receiving an additional load for the successive deposition of the concrete mix into the several compartments of the mold box during the operation of the machine. In addition, such machines also include a stripper head which overlies the mold box at an elevation sufficiently high to clear the path of the feed box; the stripper head being movable in a vertical path and being moved in timed relationship with respect to the feed box, so that the stripper head engages the concrete mix in the compartments of the mold box and compresses the same to the desired extent under supplied vibration from vibratory mechanism, not shown. This type of block manufacturing machine has been devised and has been utilized for many years to manufacture standard sizes of concrete masonry units; namely, sizes of 8" x 8" x 16" or concrete masonry units of one-half of the height or dimensions of 8" x 4" x 16" or masonry units of greater height, such as 8" x 12" x 16".

In accordance with the present invention and in order to manufacture my unique concrete masonry unit, as above indicated, I have provided modifications in a conventional block manufacturing machine so that, utilizing a three compartment mold box, there can be manufactured at the end of each cycle of operations one standard masonry block of the dimensions of 8" x 8" x 16" and two masonry units **11** of my present invention. The projecting portion **12** provided on each of my improved and unique building blocks overhangs a portion **13** which, through the medium of the formed shoulder **14** on each block, affords a shadow line **16**. Shadow line **16**, of course, is more pronounced on sunny days

where the unique building block of my invention is incorporated in a building wall 17, see FIG. 6 of the annexed drawings, upon which the light rays of the sun may be directed.

The modifications which I preferably make in a conventional concrete block manufacturing machine partly consist of securing end liners, generally designated by the reference numerals 21 and 22, as end closures for the mold box 23 of such a machine; the mold box 23 conveniently being standard in size in that it is provided with a pair of partitions 24 and 25 to divide the mold box into three compartments 26, 27 and 28 of equal size, see FIGS. 4 and 5, and also being provided with a depressible, replaceable pallet 29 which serves as a bottom closure for the mold box while it is being filled and during the period that the introduced concrete mix is settling and is compressed.

The end liners 21 and 22 extend throughout the depth of the mold box 23 and preferably comprise two relatively movable sections 31 and 32 wherein the section 31, in each end liner 21 and 22, is fixedly secured to the sides of the mold box and the other section 32 of each end liner is mounted on the fixed section 31 for movement thereon and relative thereto. As shown, the fixed section 31 of each end liner is formed with a reduced upper end 33 and, to this end, the lower portion of each fixed section 31 is cut away, preferably on a straight line, to provide a straight shoulder 34 thereon approximately midway of its height; that is to say, midway of the height of the mold box 23. Moreover, the movable section 32 of each end liner 21 and 22 of the mold box is made with an inner plate 36 and an outer plate 37, spaced from the inner plate and joined to the inner plate by screw-bolts 38. The space between the two plates 36 and 37 of each of the movable sections 32 of the end liners 21 and 22 is slightly greater than the width of the reduced upper portion of the fixed sections 31 of the end liners and the sections are so assembled and arranged that the inner and outer plates 36 and 37 of the movable sections 32 of the end liners slide upon the inner and outer faces, respectively, of the upper portion of the fixed sections 31 of such end liners.

In order to permit of the requisite relative movement between the two sections 31 and 32 of the end liners 21 and 22 of the mold box 23, as well as to permit the joinder of the inner and outer plates 36 and 37 of the movable sections 32 by the bolts 38, the reduced upper portions 33 of the fixed sections 31 of such end liners are cut away to provide a through opening 39 which defines upper and lower abutments or stops 41 and 42 for the joiner bolts 38 connecting the two plates 36 and 37 of these movable sections 32. As illustrated particularly in FIGS. 1 to 3, inclusive, of the drawings, I provide a pair of end strips 43 and 44 on the outside of the upper portions 33 of the fixed sections 31 of the end liners 21 and 22 and provide these end strips adjacent to the top of the mold box 23; such end strips 43 and 44 being of the same thickness as the shoulders 34 on the lower portion of the fixed sections 31 and having lateral dimensions approximately equal to the width of the opening 39. Thus, when the upper sections 32 of the end liners 21 and 22 are moved downwardly to their extreme positions, the lower ends of the outer plates 37 of the movable sections 32 abut the shoulders 34 on the fixed sections 31 and downward movement is thereby stopped. At the same time, the bolts 38 engage the bottom stops 42 defined by the openings 39 in the reduced upper portions of the fixed sections 31 of the liners. On the reverse movement of the movable sections 32, i.e., when they are moved to their extreme upper limits, the bolts 38 engage the upper limits 41 of the opening 39 and the upper ends of the outer plates 37 also engage and are stopped by the lower ends of the end strips 43 and 44.

In accordance with the present invention, I provide

means for moving the movable sections 32 of the end liners 21 and 22 between their extreme positions, recurrently, in order that they will be in their proper positions for manufacturing my unique concrete masonry units 11. These means are depicted clearly in FIGS. 1–3, inclusive, of the drawings, as well as in FIG. 10 and serve to hold the movable sections 32 in their lowermost positions throughout the vibratory cycle of the block manufacturing machine to insure that the shoulders 14 and the overhang portions 12 of the improved masonry units 11 are properly formed in the concrete mix in the two end compartments 26 and 28 of the mold box 23, while at the same time a standard 8" x 8" x 16" masonry block is formed in the center compartment 27 of the mold box 23. To this end, I preferably provide a pair of push rods 46 which are arranged in spaced relationship to one another, as shown in FIG. 8 of the annexed drawings so that one push rod of each of the pairs of push rods is disposed adjacent to an end liner of the mold box 23; such push rods 46 being conveniently adjustably attached by means of a threaded section 47 thereon and a lock nut 48 to the base plate 49 of the stripper of the machine. For lack of space, the entire stripper and stripper head of the machine are not shown in the drawings but the stripper is shown in fragmentary view and is designated generally by the reference numeral 51 and only one of the stripper shoes 52 is shown. It is, of course, to be understood that the stripper includes three stripper shoes 52 in the case of a three compartment mold box 23 in order to strip or remove the three formed masonry units from the cores 53 of the mold box. The base 54 of each of the push rods 46 is retained, during the vibration cycle of the machine, within a split-collar 56; each of which collars is attached through the medium of a bracket 57 to an outer plate 37 of a movable section 32 of each of the end liners 21 and 22 of the mold box 23. Since the push rods 46 are attached to the stripper base plate 49, they maintain pressure through the collars 56 and brackets 57 on the movable sections 32 of the end liners when the stripper is lowered and in vibratory compression position. At the end of each vibration cycle of the machine, the split-collars 56 open through the action of cams and suitable linkage, all not shown, to permit the push rods 46 to raise with the stripper head 51. Suitable compression springs 58, anchored at their one ends to the bottom of the brackets 57 and at their other ends to brackets 59 secured to the outer surfaces of the lower, fixed sections 31 of the end liners 21 and 22, serve to return the movable sections 32 of the end liners to their initial "up" positions at the completion of a downstroke of the vibration cycle and thus to positions for action upon the succeeding batches of concrete mix deposited into the mold box recurrently by the feed box, not shown.

By virtue of the foregoing additions to a concrete block manufacturing machine, it is possible to produce two concrete masonry units 11 of my present invention upon the completion of each set of three masonry units on each complete cycle of operations of the block manufacturing machine. The end liners 21 and 22, secured to the opposite ends of the mold box 23, and particularly the inner plates 36 of the movable sections 32 of such added end liners, depress the concrete mix deposited in the end compartments 26 and 28 of the mold box 23 to an appreciably greater extent than the stripper shoes 52 of the stripper head since the lower ends of these inner plates 36 of the movable sections 32 of the end liners project in advance of the stripper shoes. During the vibration cycle of the machine, the push rods 46 hold these inner plates 36 under pressure sufficiently to compress the concrete mix and form the shoulders 14 on the units 11 with the result that approximately one-half of the face thereof, or a portion 12 of each completed unit 11 projects beyond the remaining one-half portion 13 of each of the completed units. It is to be appreciated that the lengths of the inner plates 36 of the movable sections

32 of the end liners 21 and 22, as well as the sizes of the openings 39 and the positions of the shoulders 34 of the fixed sections 31 of these end liners can be altered at will so that the projecting portion 12 of each completed masonry unit 11 can be approximately three-quarters of the entire face thereof, or approximately one-quarter of the face thereof, or any other proportion of such face, thus providing variations in the positions of the shadow line 16 and permitting the placement of such shadow line 16 at any desired point on the face of each block. Moreover, the thicknesses of the inner plates 36 of the end liners 21 and 22 on mold box 23 can be increased or decreased at will so that a deeper shoulder or a shallower shoulder 14 can be formed in the faces of the produced blocks 11, thus providing a wider or narrower overhanging or projecting portion 12, as desired, with respect to the remaining portion 13 of each of the blocks.

In addition to the foregoing improved features incorporated in my improved masonry unit manufacturing machine, I provide a modified embodiment of the end liners 21 and 22 so that the shadow lines presented by these improved masonry units when installed in a building wall may be varied to meet desired design motifs. To this end, the shoulder forming faces 61, constituting the bottoms of the movable elements 36 of such end liners, are die-cut or otherwise fashioned so as to present a patterned surface, rather than a flat surface, on the bottom of each of these inner surfaces 36 of such end liners, such as a pattern of a sine curve, as indicated in FIG. 5 of the annexed drawings or a serrated configuration or a zig-zag pattern, as desired. With this modified surface on the lower ends of the inner plates 36 of the movable elements 33 of the mold box end liners 21 and 22, pattern variations can be effected in the surface of the shoulders 14 of each of my improved concrete masonry units at the time it is manufactured with the result that variable-pattern shadow lines 16 may be presented in a building wall containing my improved masonry units.

It is to be understood that the appended claims are to be accorded a range of equivalents commensurate in scope with the advance made over the prior art.

I claim:

1. In a machine for manufacturing concrete masonry blocks including a compartmentized mold box wherein quantities of wet concrete mix are recurrently disposed and depressed and from which concrete blocks are ejected, a first means movably supported above and movable into the compartments of said mold box for depressing the concrete mix in each compartment a predetermined extent, and a second means supported adjacent to the outer portions of the end compartments of said mold box in overlying relation thereto and connected to said first means for movement in unison therewith and in advance thereof for depressing a portion of the concrete mix in opposite end compartments of said mold box to a greater extent than compressed by said first means thereby to provide a shoulder on the face of the concrete blocks formed in said end compartments of said mold box and thus to provide a face on each of said formed concrete blocks having a portion thereof projecting beyond the remaining portion thereof.

2. In a machine for manufacturing concrete masonry blocks including a compartmentized mold box wherein quantities of wet concrete mix are recurrently disposed and also including a stripper head movably mounted above said mold and adapted to be lowered into compressing engagement with the concrete mix disposed in the compartments of said mold, a two-section liner secured to opposite ends of said mold box; one section of said two-section liner on each end of said mold box being movable with respect to the other section of said two-section liner and the movable section of said two-section liner at each end of said mold box having an inner face and an outer face with the inner face of said movable section overlying a portion of an end compartment of said mold box, the inner faces of the movable section of said two section liners having straight bottoms, and means secured to opposite ends of said stripper head and connected on the down stroke thereof to the movable sections of said two-section liners for compressing a portion of the concrete mix in the opposite end compartments of said mold box adjacent to said liners to a greater extent than by said stripper head and thereby to provide a face on each of the formed concrete blocks at the opposite ends of said mold box which has one portion of the face projecting beyond the remaining portion thereof and the junctures of said projecting portion and said remaining portion being defined by a straight line and a substantially straight continuous shadow line is presented on said faces of said formed concrete blocks.

3. In a machine for manufacturing concrete masonry blocks as defined in claim 2, wherein the bottoms of the inner faces of said movable sections of said two-section liners are die-cut in a predetermined pattern so that the shadow line produced and presented by said faces of said formed concrete blocks varies from a straight line shadow.

4. In a machine for manufacturing concrete masonry blocks as defined in claim 2 and wherein the bottoms of the inner faces of the movable sections of said two-section liners are delineated with a pattern different than a straight line so as to provide a shadow pattern different than a line shadow.

5. In a machine for manufacturing concrete masonry blocks as defined in claim 2, and including screw-bolts joining said one section of each of said two-section liners to the other section of each thereof for enabling the attachment of shorter or longer other sections to said one sections thereby limiting or enlarging the extent to which the said second means will depress the concrete mix in said opposite end compartments of said mold.

6. In a machine for manufacturing concrete masonry blocks which includes a mold box having a plurality of compartments including two end compartments for recurrently receiving batches of wet concrete mixes to be compressed and also including a vertically reciprocable stripper head supported above said mold box and means for reciprocating said stripper head to compress said batches of concrete mix in the compartments of said mold box on the down stroke of said stripper head, the combination of a two-section liner on each end and closing the ends of said mold box; each two-section liner consisting of a stationary liner section secured to said mold box and a movable liner section movably mounted on said stationary liner section; said movable liner section being vertically disposed and being movable vertically, a plate on the lower end of each of said movable liner sections and projecting below the same, and a push rod on each end of said stripper head in alignment with the movable liner section of said two-section liner on each end of said mold box for engaging said movable liner section on the down stroke of said stripper head and moving said plates on said movable liner sections appreciably ahead of said stripper head thereby providing a face on each of the formed concrete blocks compressed in said end compartments of said mold box which has one portion projecting beyond the remaining portion of the face.

7. In a machine for manufacturing concrete masonry units which includes a mold box for receiving wet concrete mix in a plurality of compartments in straight line series and which also includes a stripper head movably supported above said mold box and adapted to be lowered into a position so as to compress the concrete mix contents of the compartments of said mold box; said mold box and said stripper head being adapted to be vibrated for settling and compressing the concrete mix in the compartments of said mold box, the combina-

tion of a two section liner on each end of said mold box comprising a lower section fixedly secured to and closing an end of said mold box, and an upper movable section mounted on said lower section for movement relative to said lower section between upper extreme and lower extreme limits, an inner plate on each of said upper sections of said liners arranged for overlying an outer portion of the end compartments of said mold box, an outer plate on each of said upper sections of said end liners, and spring-loaded push-rods connected between said stripper head and said outer plates of said upper sections of said end liners for effecting the movement of said inner plates of said upper sections of said end liners in advance of said stripper head upon each lowering of the stripper head onto the concrete mix in said compartments thereby to compress a portion of the concrete mix in the opposite end compartments of said mold box adjacent to said liners to a greater extent than by said stripper head and thereby to provide a face on each of the formed concrete blocks at opposite ends of said mold box which has one portion of the face projecting beyond the remaining portion thereof.

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