Feb. 14, 1928. 1,659,174

D. F. SHOPE

BLOCK MAKING MACHINE

Filed Sept. 21. 1925 4 Sheets-Sheet 1

Fig. 1.

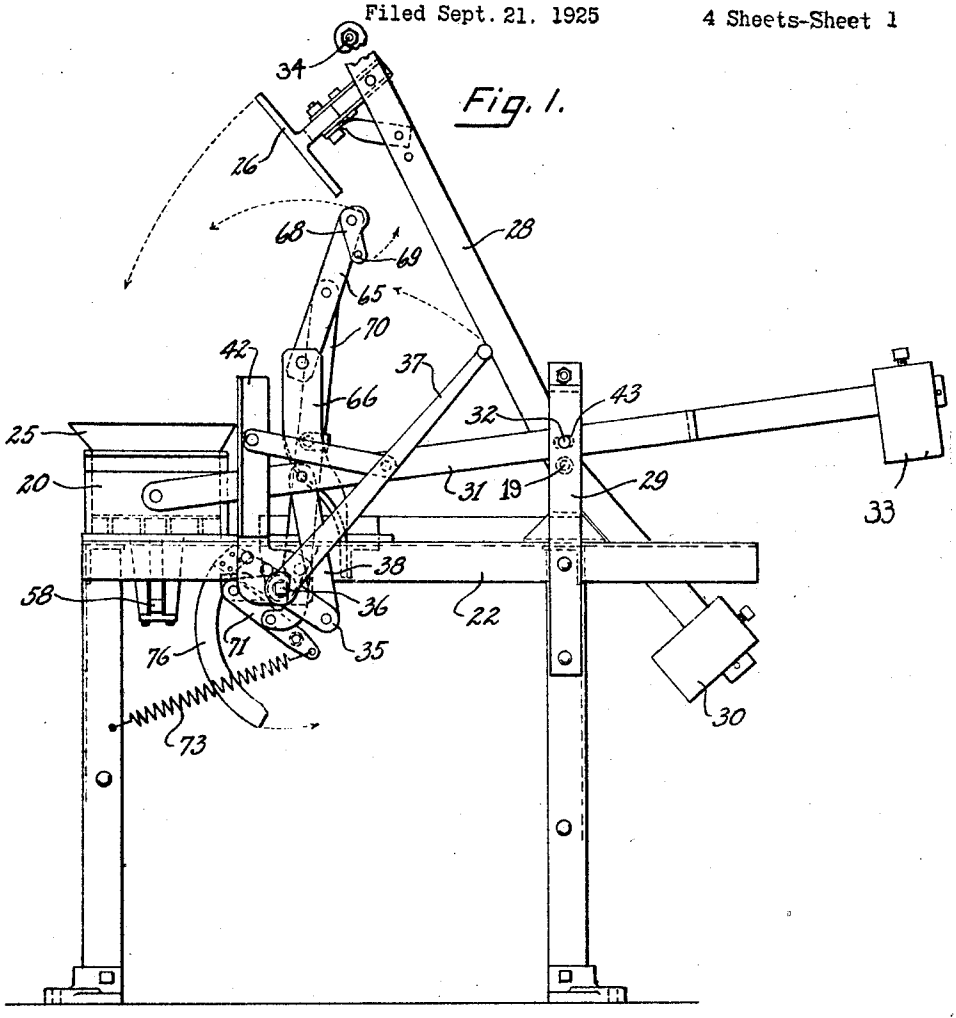


Fig. 2

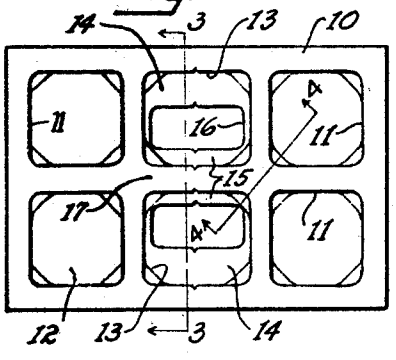


Fig. 3

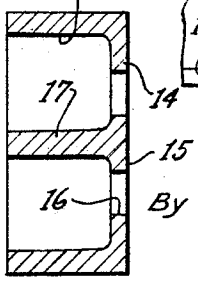
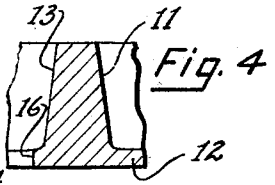


Fig. 4



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BLOCK MAKING MACHINE

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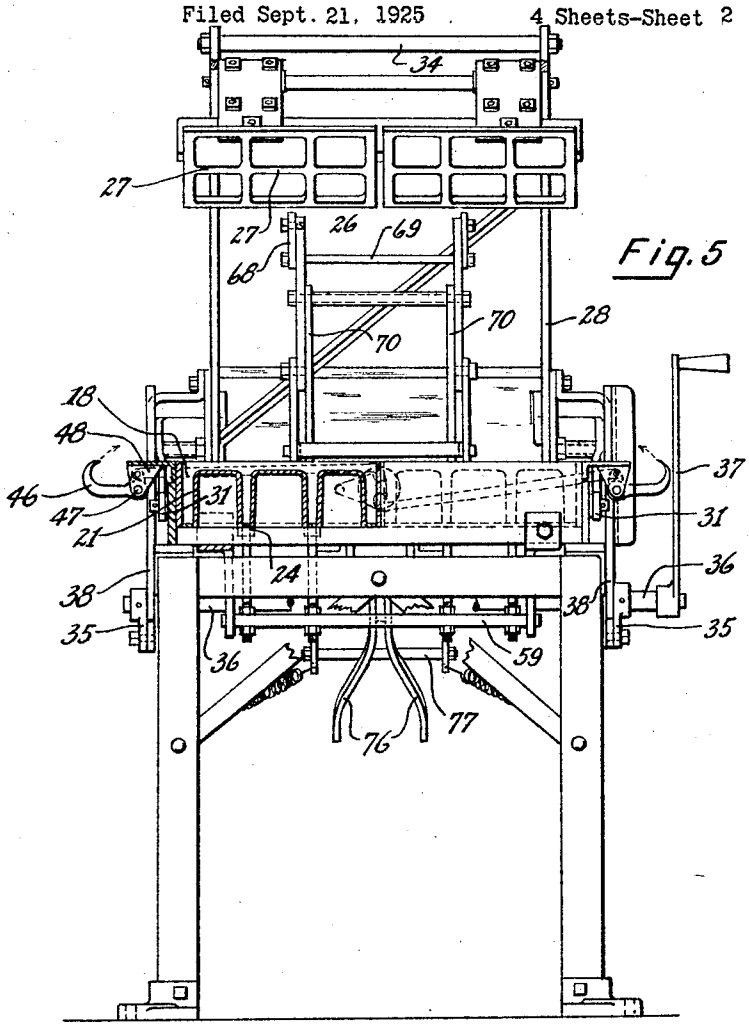


Fig. 5

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BLOCK MAKING MACHINE

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Fig. 6

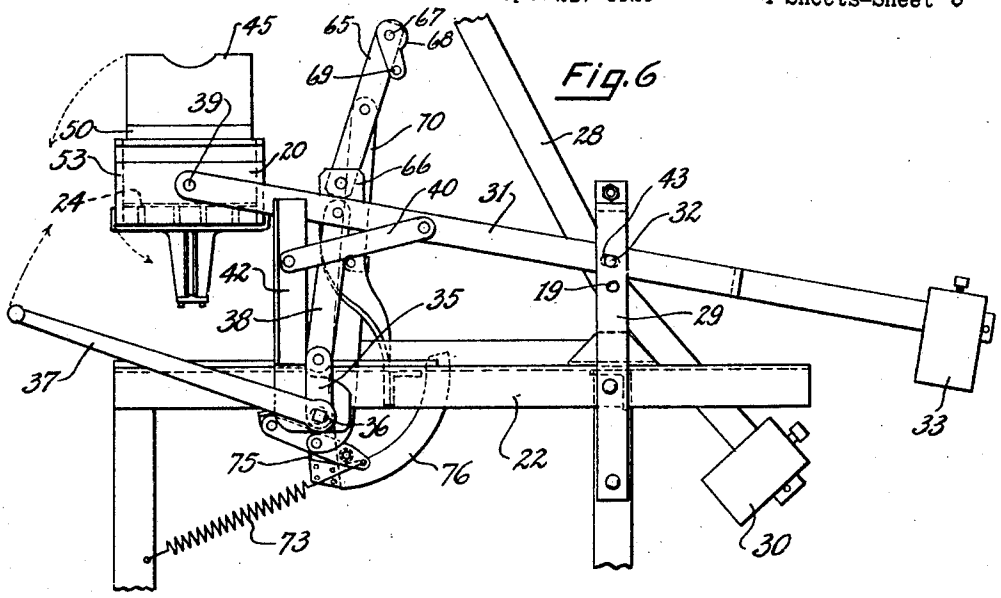
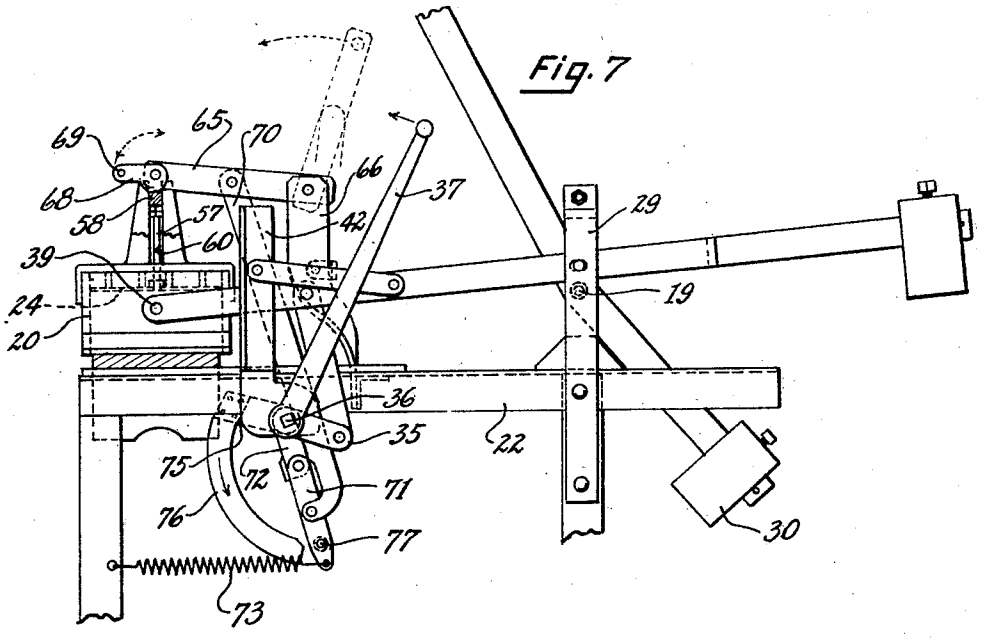


Fig. 7



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BLOCK MAKING MACHINE

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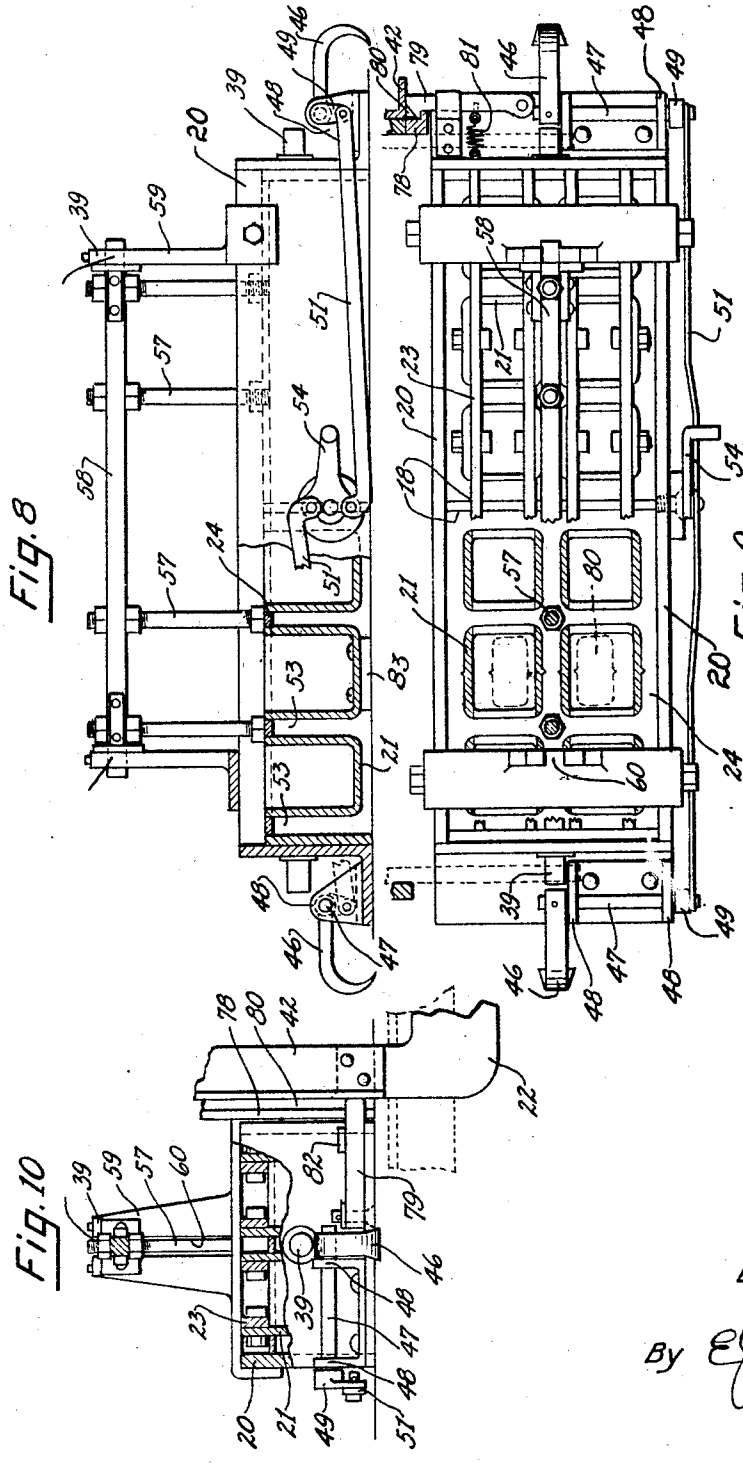


Fig. 8

Fig. 9

Fig. 10

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Patented Feb. 14, 1928. 1,659,174

UNITED STATES PATENT OFFICE.

DAVID F. SHOPE, OF PORTLAND, OREGON.

BLOCK-MAKING MACHINE.

Application filed September 21, 1925. Serial No. 57,550.

This invention relates to machines for making tiles, blocks, or the like, particularly those which are hollow. It has for its purpose providing improvements in machines for making tiles; the object being to provide means for conveniently and expeditiously making tiles of any shape that may be desired. A particular object of the invention is to provide for making such tiles which have openings or hollows projecting into one side part way or entirely through the tiles.

Of the accompanying drawings, Fig. 1 is a side elevation of a tile making machine which embodies the features of my invention; Figs. 2, 3, and 4 show plan and sectional views of a tile which may be made on the machine; Fig. 5 is a front elevation of the machine; Figs. 6 and 7 are side elevations of portions of the machine, showing certain elements in changed positions; Figs. 8, 9, and 10 are enlarged detail views, more or less in section, of the mold inverted, and other mechanism for forming the tiles, Fig. 8 being a side elevation, Fig. 9 a plan view and Fig. 10 an end view.

Although tiles or cement blocks of various shapes may be made on the machine which I have provided, yet the machine as illustrated is adapted to making tiles such as are illustrated in Figs. 2, 3, and 4. The tiles 10 have openings or hollows 11 which are transverse and which are sealed at one end by means of webs 12. The tiles also have certain openings or hollows 13 which are transverse and which are partly sealed at the same end, by means of webs 14 and 15. Openings 16, however, are formed in these webs so that the hollows 13 extend entirely through the tiles. The openings 16 are provided partly for the purpose of allowing a hand hold in handling the tiles. The workman can pass his fingers and thumb through these openings and grasp the central web 17, and the flanges 15 will prevent his hand from slipping from the tile.

Two tiles or blocks are made at one time by the machine. For making the tile molds 18 are provided which have cores 21 for forming the hollows in the tiles. The molds are supported in a mold box 20, and the cores are rigidly fixed together and to the mold box by means of bars 23. The bottom of the mold comprises a webbed member 24 described hereinafter. In operation the molds are positioned as indicated in Fig. 1 with the cores 21, Fig. 5, projecting upwardly. A hopper 25 is placed on the upper side of the mold, and held in any suitable manner, and a sufficient amount of cementitious material from which the tiles are to be made is placed in the molds and hopper. The material is then tamped in any suitable manner.

For the purpose of tamping I prefer for each tile a tamper 26 which comprises a plurality of webs 27, corresponding in position and shape with the spaces 53 between the cores and the walls of the mold. The outer ends of the tampers are rigidly fixed to bars 28 which are pivoted to a rod 19, the rod being fixed to uprights 29 fixed to the framework 22 of the machine; and the tampers are counter-balanced by means of an adjustable weight 30. A handle 34 is provided for conveniently operating the tampers. In carrying out the tamping operation the operator pulls the tampers downwardly, in a well known manner, and manually tamps the material in the molds, the weight 30 and the massiveness of the rest of the mechanism making this possible.

After the tamping is completed the tampers are elevated out of the way and held in their raised positions in any suitable manner. The hopper 25 is then removed and the surplus material scraped off and the upper surfaces of the tiles are finished in any way which may be desired.

A pallet 45 is then clamped, top down, on the upper side of the mold, the object being to provide means for inverting the molds with the pallet thereon, and then to elevate the molds and cores and leave the finished tiles resting on the pallet. The pallet may be clamped to the molds in any suitable manner. I prefer for the purpose to use the hooks 46 which are fixed to rods 47. These rods are rotatably mounted in brackets 48 fixed to the ends of the mold box 20. Fixed to the projecting ends of these rods are arms 49. By operating these arms the hooks may be turned upwardly over the ends 50, Fig. 6, of the pallet. To conveniently operate these arms I provide links 51, one end of each link being pivoted to an arm 49 and the other ends of the links being pivoted to an arm 54 pivoted to the mold box 20. By operating this arm the links 51 may be thrown inwardly or outwardly and the hooks raised or lowered as may be desired.

The molds, together with the tiles formed therein and the pallet, are then elevated. The mechanism for elevating the molds com-

prises two bars 31 to which the ends of the mold box 20 are pivoted. These bars are pivoted by bars 32 to uprights 29, and the molds and tiles are counter-balanced by means of an adjustable weight 33.

In order to conveniently elevate the molds I provide the following mechanism. Two arms 35 are fixed to a bar 36, the bar being journalled in the frame of the machine. Also fixed to this bar is an operating arm 37 adapted to rotate the bar 36 and thus to turn the arms 35 upwardly or downwardly as may be desired. Links 38 are pivoted to the respective bars 31 and arms 35, it being understood that this mechanism is entirely duplicated on the two sides of the machine, with the exception of the operating arm 37. As will be seen, when the arm 37 is pulled from the position shown in Fig. 1 to the position shown in Fig. 6, the molds will be elevated by means of the respective pairs of arms 35 and the links 38 acting together as a toggle; and by throwing the toggle beyond center, (Fig. 6), the bars 31 will be locked in the raised position.

When the molds and pallet are raised they are then inverted by merely turning the mold box manually on the trunnions 39. The box is then lowered until the pallet is supported by the framework, and the pallet is released from the mold box by operating the arm 54 and turning upwardly the hooks 46. The molds and cores are then, by suitable means, raised away from the finished tiles, leaving the tiles sitting on the pallet.

The mechanism which I prefer for removing the molds and cores from the tiles, comprises in general means for holding the tiles downwardly on the pallet and means for simultaneously raising the molds, with their cores, upwardly until entirely free from the tiles. This mechanism comprises the web-shaped member 24 which forms the bottom of the mold, and which now acts as a stripping member for stripping the tiles from the molds. This member is supported by means of rods 57 fixed to a bar 58 which is slidably mounted in the slots 60 of the uprights 59 which are fixed to the mold box 20. Thus it will be seen that the entire mold and box is movable vertically with reference to the web member 24. Blocks 39 prevent the ends of the bar 58 from passing out of the slots 60 when the molds are being filled and tamped. The molds are removed from the tiles by again elevating the mold box with the molds by means of the lever 37. But in order to hold the web member 24 firmly down on the tiles, I prefer to lock the bar 58 in position by the following described mechanism.

This mechanism comprises a pair of levers 65 each pivoted by one end to an upright 66, the uprights being fixed in any suitable manner to the frame 22. Pivoted to these levers are cams 68, the outer ends of which are connected by a bar 69. In operation, when the molds are to be removed from the tiles, the free ends of the levers 65 are thrown downwardly until the ends rest on the crossbeam 58, and links 70 hold the levers in place, the lower ends of these links being pivoted to links 71 and these links in turn being pivoted to links 72 rotatably mounted on the rod 36. The bar 69 is then pulled downwardly and the cams 68 press the web member 24 firmly on to the upper surfaces of the tiles. When the levers 65 are pulled down springs 73 pull the lower ends of the links 77 forwardly to the position indicated in Fig. 7, and thus locks the lever 65 down.

The arm 37 is then operated to elevate the mold box and force the molds away from the tiles, it being understood that the web member 24 remains at rest and holds the tiles firmly down on the pallet, and thus acts as a stripping plate as the molds rise. It is desirable to raise the molds exactly vertically, as otherwise the cores may injure the tiles, as ordinarily this separating process is carried out before the tile material has set and hence when it is in a semi-dry condition. For this purpose a link 40 is provided which pivotally connects the bar 31 and the framework by means of a standard 42 fixed to the frame. This link, as the mold is raised, tends to offset the curvilinear movement of the mold as it rises, and the arrangement is such that the link properly positions the mold when elevated. The bars 31 have slots 43 through which the bar 32 passes, and these slots allow a longitudinal movement of the bar 31 in conformity with the action of the link 40.

To insure vertical movement of the molds I provide a guide 78 at one end of the mold box. This guide is held vertically by the upright 42. A guide latch 79 is pivoted to the end of the box and is adapted to coact with the guiding groove 80 as the mold rises, and thus to insure vertical movement of the molds. When the mold box is raised before being inverted, the latches project outwardly and hence do not coact with the guides. But when the box is inverted these elements come into coaction, the latch being held resiliently in position by a spring 81, and a stop 82 preventing upward movement of the latch. The guide 78 extends upwardly only a limited distance so that the latch is free as soon as the mold has risen above the tile.

When the mold box, by the operation of the arm 37, is raised slightly above the upper surface of the tiles, the ends of the bar 58 reach the bottoms of the slots 60 and the levers 65 are then released. This is accomplished in the following manner: An arm 75 is fixed to the rod 36 and is rotated by this rod as the arm 37 is operated. Fixed to the arm 75 are curved members 76. As the

operating arm 37 is pulled downwardly from the position shown in Fig. 7, to elevate the mold box, the members 76 are forced downwardly against and under the rod 77 which connects the outer ends of the links 71, and thus forces these outer ends rearwardly, unlocking the links 71 and 72, and carrying the lower ends of the links 70 upwardly, thus elevating the levers 65 out of the way. The mold box is then elevated sufficiently to remove the pallet with the tiles resting thereon. After the pallet has been removed the mold is inverted and lowered again to receive a new charge of material.

In this manner the molds and cores may be easily removed from the tiles, and it is immaterial whether they are solid or hollow, and also whether the hollows go entirely through the tiles. By extending the center cores by means of a detachable projection 83, the hollows formed extend through the tiles. By removing the projection the hollows will be sealed at one end. By having the sides of the cores converge somewhat outwardly they are easily slipped away from the tiles; and the web 24 acting as a stripper prevents breaking off of the upper edges or corners of the tiles.

Although I have described with some particularity various details of the operating mechanism, yet modifications therein may be made by those skilled in the art without departing from the spirit of my invention as disclosed by the following claims:

I claim as my invention:

1. In a tile making machine comprising a frame, a mold, means for inverting said mold, means for elevating said mold, and means for guiding said mold vertically as it is elevated, said elevating and guiding means comprising two substantially horizontal arms pivoted together and pivoted to the frame, one of said arms being pivoted to the mold.

2. In a tile making machine, a mold, means for inverting said mold, means for elevating said mold, and means for guiding said mold vertically as it is elevated, said means comprising a vertical guide and guide coacting means fixed to one end of said mold and projecting towards one side thereof.

3. In a tile making machine a frame, a mold, means for elevating and lowering said mold, comprising an arm pivoted to said mold and slidably pivoted to said frame, means for inverting said mold, and means for insuring vertical movement of said mold when said mold is elevated, said latter means comprising a vertical guide fixed to said frame and coacting with said mold, and an arm pivoted to said frame and said mold arm, and adapted to slide said mold arm horizontally as said mold is raised.

4. In a tile making machine, a mold, means for elevating and lowering said mold, means for inverting said mold, and means for insuring vertical movement of said mold when said mold is inverted, said latter means comprising a vertical guide and guide coacting means resiliently brought into coaction with said guide.

5. In a tile making machine, a mold, means for elevating and lowering said mold, means for inverting said mold, and means for insuring vertical movement of said mold when said mold is inverted comprising a vertical guide positioned inwardly from said mold, and guide coacting means projecting outwardly from said mold before said mold is inverted.

6. In a tile making machine, a mold, means for elevating said mold, means for locking said mold in its elevated position, and common means for operating said elevating and locking means and for unlocking said mold.

7. In a tile making machine, a mold comprising a bottom arranged to slide inwardly, means for supporting said bottom, means for inverting said mold and said supporting means, means for preventing upward movement of said supporting means, means for elevating said mold, and means for releasing said preventing means as said mold is elevated.

8. In a tile making machine, a mold, means for elevating said mold, said means comprising a bar mounted for rotatory and longitudinal movement, and means for moving said bar longitudinally as it rotates.

9. In a tile making machine, a mold, means for elevating said mold, and means for guiding said mold vertically as it rises, said latter means comprising a vertical guide and a latch pivotally associated with said mold and adapted to coact with said guide when said mold is inverted.

10. In a tile making machine, a mold, means for elevating said mold, and means for guiding said mold vertically as it rises, said latter means comprising a vertical guide and a latch pivotally associated with said mold and adapted to coact with said guide when said mold is inverted, said latch being resiliently held in operative position with reference to said guide.

11. In a tile making machine, a mold, means for elevating said mold, comprising a slidably mounted lever pivoted to said mold, and means for inverting said mold, said latter means comprising trunnions fixed to the ends of said mold, and means for sliding said lever horizontally as said mold is being raised.

12. In a tile making machine, a mold, means for elevating said mold, and means for inverting said mold, said means comprising trunnions fixed to the ends of said mold and a pair of levers pivotally associated with said trunnions, said levers being ar-

ranged for limited longitudinal movement.

13. In a tile making machine, a mold, means for elevating said mold, and means for locking said mold in its elevated position, said means comprising a pair of pivoted links.

14. In a tile making machine, a mold, a bottom movably mounted in said mold, means for inverting said mold, means for locking said bottom in position, and means for unlocking said locking means as said mold is raised.

15. In a tile making machine, a mold, a bottom movably mounted in said mold, means for inverting said mold, means for locking said bottom in position, and means for unlocking said locking means as said mold is raised, said locking means comprising a pair of pivoted links.

16. In a tile making machine, a mold, means for elevating said mold, said mold having a bottom movably mounted therein, means for inverting said mold, means for locking said bottom in position, and means for unlocking said locking means as said mold is raised.

17. In a tile making machine, a mold, means for elevating said mold, said mold having a bottom movably mounted therein, means for inverting said mold, means for locking said bottom in position, and means for unlocking said locking means as said mold is raised, and common operating means for elevating said mold and for unlocking said locking means.

18. In a block forming machine a mold, cores projecting upwardly from the bottom of said mold, sides for said mold, the upper end of one of said cores being substantially flush with the top of said sides, said upper end being detachable, and the upper end of another of said cores being materially lower than the upper edges of the sides.

In testimony whereof, I hereunto set my hand.

DAVID F. SHOPE.