May 15, 1928. 1,669,682

F. J. STRAUB

BLOCK MAKING MACHINE

Filed Nov. 16, 1926 2 Sheets-Sheet 1

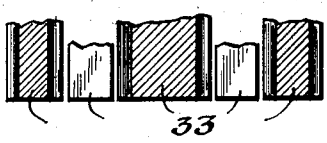
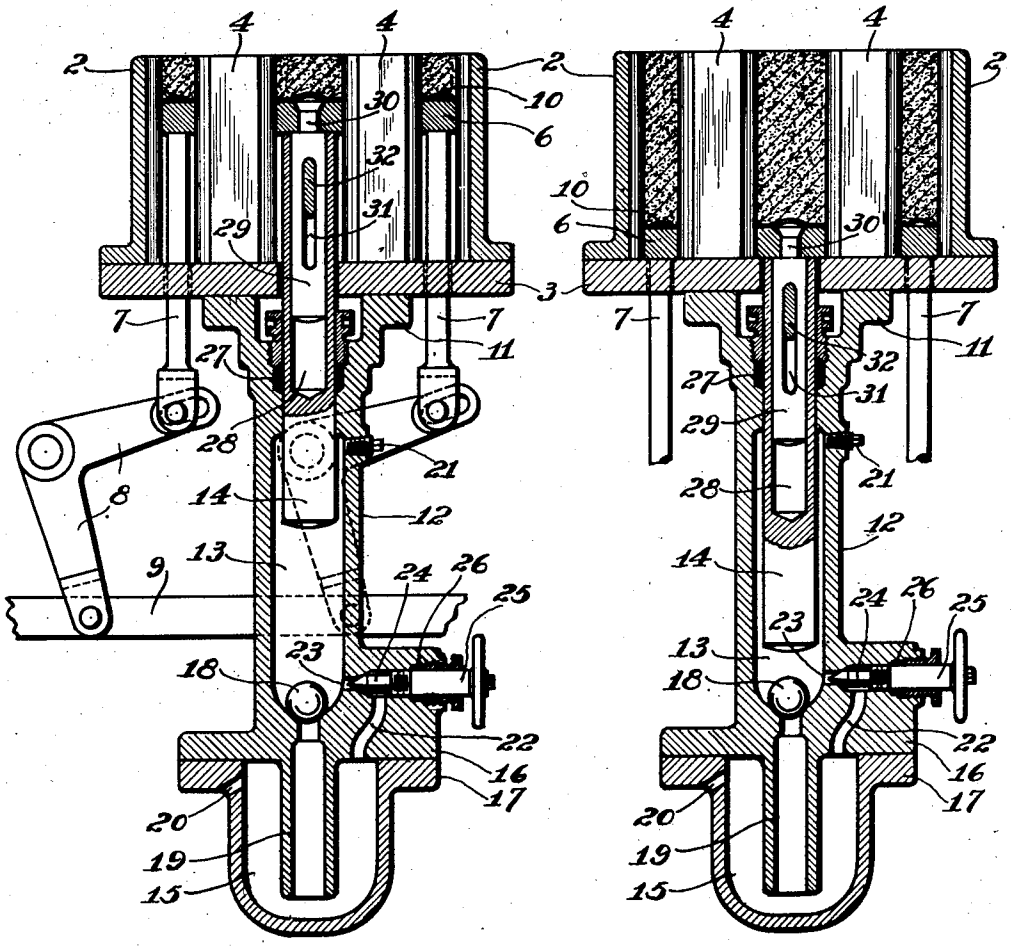


Fig. 1.

Fig. 2.



WITNESSES

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Fig. 3.

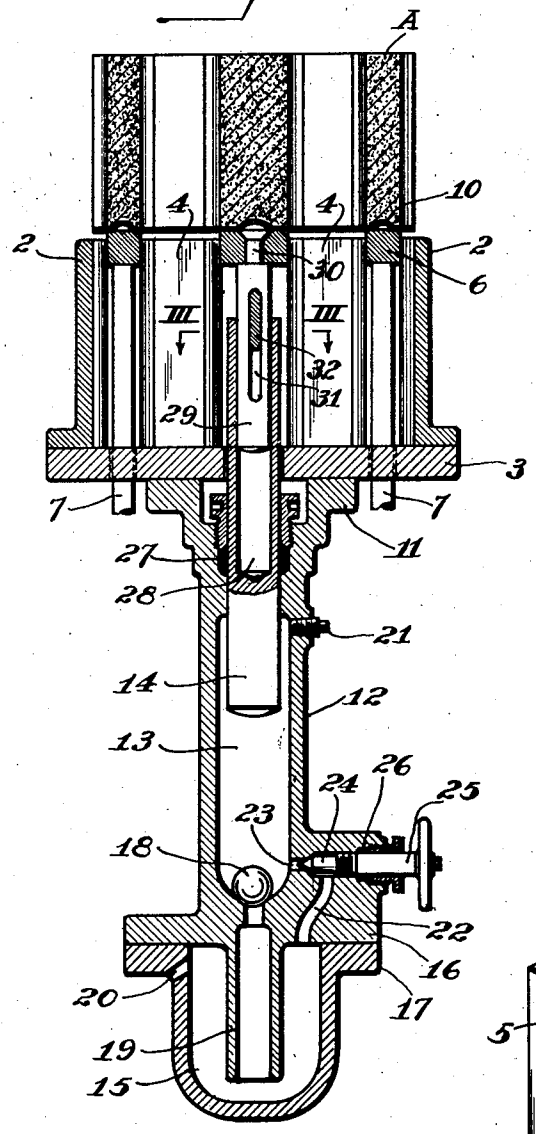


Fig. 4.

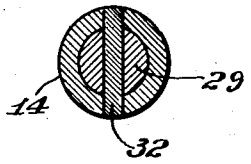
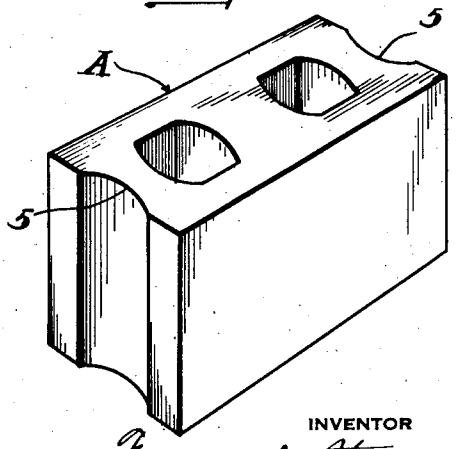


Fig. 5.



WITNESSES

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Patented May 15, 1928. 1,669,682

UNITED STATES PATENT OFFICE.

FRANCIS J. STRAUB, OF NEW KENSINGTON, PENNSYLVANIA.

BLOCK-MAKING MACHINE.

Application filed November 16, 1926. Serial No. 148,679.

My invention refers to improvements in block-making machines for the manufacture of concrete building blocks and similar articles. Ordinarily, the usual practice is to compress the aggregate within a forming mold by means of vertically operating gravitating tamps, which fall upon the aggregate as it is charged into the mold, and upon the temporarily stationary bottom plate or pallet rest.

Such practice is objectionable for several reasons.

Where the preliminary charge of aggregate in the bottom of the mold is of any material depth, or with rapid filling, the lifting of the tamps for the necessary length of stroke to first tamp the lowermost strata is excessive and slow, and that portion of the block is apt to be too close and spongy.

Another objection incident to the long travel of the tamps through the whole depth of the mold, is the destructive action due to the wear of the tamps against their inner sides, while the aggregate itself exerts a considerable frictional abrasion against the mold and cores, resulting in rapid wear.

Such operation is objectionable in that the variation in the total drop of the tamps results in a material difference in uniformity of density of the block, while the wear on the mold in time is so great as to seriously impair its dimensions, resulting in uneven and unsymmetrical blocks.

In my present invention I secure uniformity of compression with a practically uniform stroke of the tamps both as to time and distance, by a preliminary filling and tamping at the top of the mold, and maintaining the tamping at such portion throughout the whole operation.

This is effected by gradually lowering the mold bottom, i. e., the pallet and its rest, as the loose aggregate is delivered and tamped, the entire tamping being done within an upper limited zone, against the downwardly receding block in process.

In the drawings, showing portions only of a complete block molding and compressing machine,—

Fig. 1 is a vertical sectional view of a molding machine and the pallet supporting and lowering mechanism at the commencement of the operation;

Fig. 2 is a similar view showing the molding cavity completely filled;

Fig. 3 is a similar view showing ejection of the finished block;

Fig. 4 is a detail cross section on the line IV—IV of Fig. 3, showing connection between the lowering plunger and the stem of the pallet support;

Fig. 5 is a perspective view of one of the formed blocks.

In the drawings, the usual walls 2 of the mold are fixedly mounted upon a base plate or core bridge 3, which maintain the upwardly extending cores 4 for formation of the inner and endmost openings 5 of the block A.

A vertically movable plate or pallet rest 6 normally fits within the mold, with clearance openings surrounding the cores for free movement. Such plate is raised and lowered in any adaptable manner, as by posts 7 actuated upwardly and downwardly by any suitable means, as levers 8 and pitman 9, for graduated lowering during formation of the block and upward discharge or ejection thereof.

The usual pallet 10, also having clearance openings for the cores, rests loosely on the core bridge 3 for supporting and removal of the formed block, in the usual way.

Secured underneath the core bridge 3 by flanges 11 is a vertically arranged cylinder 12 having a plunger receiving cavity 13 for plunger 14 and a lower fluid holding reservoir 15 connected with the base of the cylinder by flanges 16, 17.

A ball valve 18 closes a valve seat between plunger cavity 13 and an upwardly conducting supply conduit 19 projecting downwardly into reservoir 15 below the level of fluid therein, as shown.

The reservoir 15 is provided with any suitable filling connection for a suitable liquid, as oil, and has an air vent opening 20 to prevent vacuum on upstroke of the plunger.

The cylinder 12 is also provided with a lateral opening at its upper portion providing for escape of air when first filled with liquid, and closed by a plug 21.

A slow or regulated flow by-pass port 22 leads through valve-controlled port 23 back from the interior of cylinder 12 to reservoir 15 for regulated lowering of the plunger and the pallet rest 6.

Port 23 is controlled by needle valve 24 of stem 25, threaded in the base of the cylinder with suitable packing 26, as shown.

Plunger 14 extends upwardly through the upper end of cylinder 12 surrounded by suitable packing 27 and is provided with a central bore 28 for reciprocating movement therein of a plunger 29.

Said plunger is fixedly connected centrally to the pallet rest plate 6 by a riveted shouldered terminal stud 30, so that as the plate rises and falls, it carries the inner plunger with it.

The plunger 29 is provided with a longitudinal cross slot 31 through which extends a transverse key 32 fixedly held in the cylindrical wall of plunger 14. By such construction the plate 6 has a limited range of movement independent of plunger 14, so that on upward movement of plate 6 key 32 will first move through the slot 31 until it engages its upper end.

Thereafter the plunger 14 will be lifted as in Fig. 3, with a clearance between the top of the suspended plunger and the bottom of plate 6, until plate 6 has arrived at the top of the mold, for discharge of the block.

On the other hand, when plate 6 is reversed in lowering for the next operation, it will move downwardly to the same extent, through the excess length of the slot, until the bottom of the plate abuts against the upper end of the outer plunger, as in Fig. 1.

Such preliminary lowering of the pallet plate and pallet 10 is just sufficient to provide the necessary depth in the mold for the first application and tamping of the aggregate, after which the lowering of the pallet plate is retarded by the throttled flow of liquid.

On upward movement of plunger 14 valve 18 will be unseated, allowing the fluid in conduit 19 to pass freely upward from the reservoir, following the plunger by suction. On reverse movement of the plunger, valve 18 will seat, and downward movement of the plunger will be comparatively slow, under regulated control of port 23.

During such lowering the aggregate is supplied, with continued tamping by the usual tamps 33, until the plate 6 is lowered to the bottom of the mold, as in Fig. 2.

Likewise, it will be observed, the tamping action is maintained only at the top portion of the receding body of aggregate, the tamps rising and falling with substantial uniformity, and making impact with the aggregate at and immediately below the top of the mold only. The advantages of the invention may also be secured by tamping the aggregate immediately above the top of the mold.

The result of such operation is that the block is tamped uniformly and evenly throughout its entire depth, with a substantially uniform lift and drop of the tamps, and avoiding the objections noted.

The density of the block may be easily regulated by controlling the speed of downward movement of plunger 14 as described, so that blocks of uniform consistency may be readily and continuously made.

Thus with slow lowering and numerous tamping strokes, very dense blocks may be made, while less dense or more porous blocks may be made with a more rapid rate of lowering.

The operation will be readily understood from the foregoing description. A finished block having been ejected and carried away on its pallet, another pallet is placed on plate 6 which lowers until arrested by contact against the top of plunger 14.

Thereafter the relatively slow and regular lowering of the pallet plate carries the block downwardly as it is increasingly formed and tamped, with final removal of any loose surplus and pressure of the top surface, as in usual practice.

The formed block is then quickly raised and removed, when the operation is repeated.

It will be understood that the invention may be utilized with any similar or standard form of block making machine, independent of the particular shape, dimensions, or other limitations of the block or the aggregate used.

By varying the opening of port 23, the lowering of the plunger 14 may be easily and accurately regulated, either for fast or slow movement. Thus in case of a very wet mix the valve 24 may be opened for free escape of oil, with corresponding quick lowering of the aggregate within the mold, while with a drier mixture, the speed may be correspondingly slow, as desired.

Also that various changes or modifications may be made by the skilled mechanic in detail construction or otherwise, without departing from the invention as hereinafter claimed.

What I claim is:

1. In block making apparatus, a forming mold having a vertically movable bottom plate, and means embodying resistance mechanism centrally below the plate for gradually lowering it as aggregate is furnished to the mold.

2. In block making apparatus, a forming mold having a vertically movable bottom plate, and means centrally below the plate for interposing a graduated resistance to the plate under pressure of the aggregate in the mold.

3. In block making apparatus, a forming mold having a vertically movable bottom plate, means for lifting the bottom plate, and valve controlled fluid resistance mechanism for interposing lowering resistance to the plate and aggregate thereon under impact of compressing mechanism.

4. In block making apparatus, a forming mold having a vertically movable bottom plate, a fluid containing plunger casing provided with circulation controlling valves, a plunger therein, and means connecting the plunger with the bottom plate.

5. In block making apparatus, a forming mold having a vertically movable bottom plate, a fluid containing plunger casing provided with circulation controlling valves, a plunger therein, and means connecting the plunger with the bottom plate providing for a limited relative movement of the plunger and plate.

6. In block making apparatus, a forming mold having a vertically movable bottom plate, a fluid containing plunger casing provided with circulation controlling valves, a plunger therein, and a stem secured to the bottom plate having limited telescoping movement with relation to the plunger.

7. In block making apparatus, a forming mold having a vertically movable bottom plate, means for elevating the bottom plate, a plunger casing having a bottom reservoir and intervening valve controlled ports, a plunger therein, and a relatively movable stem secured to the bottom plate and having slotted connection with the plunger.

8. The combination in a block molding machine, of a mold casing, a supporting core bridge therefor, a vertically movable pallet rest within the mold, means for lifting the pallet rest, a series of gravitating tamps operable within the upper portion of the mold, a plunger casing extending below the core bridge and provided with valve controlled fluid circulation ports, a plunger in the casing, and a relatively movable stem secured to the pallet rest and having slotted connection with the plunger providing for a limited amount of independent movement of the pallet rest.

9. In molding apparatus as described, the combination with an upper plunger casing, of a lower fluid containing reservoir, a central conduit leading from the bottom of the casing into the reservoir having an intervening check valve, and a valve controlled bypass port leading from the base of the casing to the reservoir around the check valve.

In testimony whereof I hereunto affix my signature.

FRANCIS J. STRAUB.