March 22, 1938. F. J. STRAUB 2,111,701

BLOCK MAKING APPARATUS

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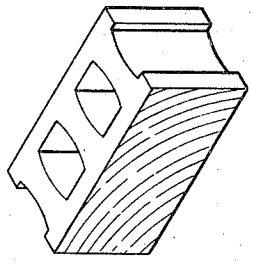


Fig. 3.

Fig. 2.

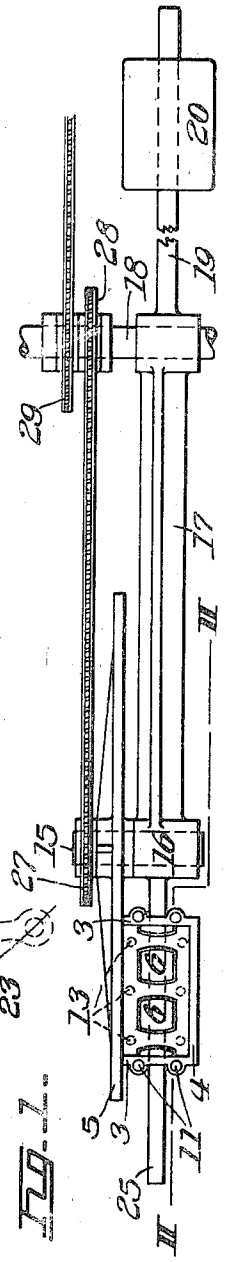


Fig. 1.

INVENTOR.
Francis J. Straub
BY C. M. Clarke
ATTORNEY

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Fig. 5.

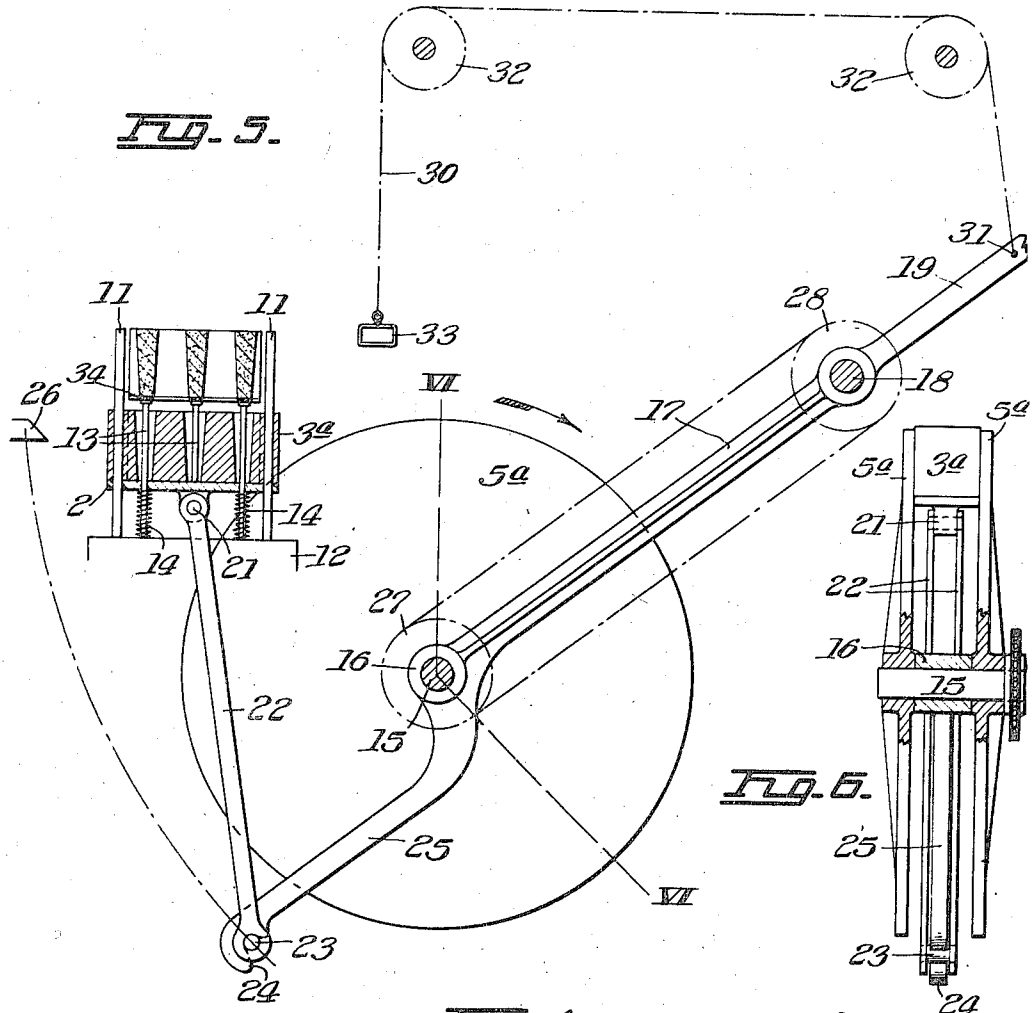


Fig. 6.

Fig. 4.

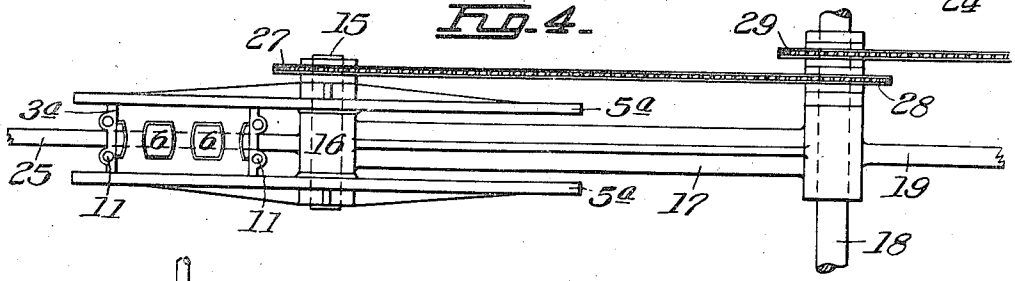
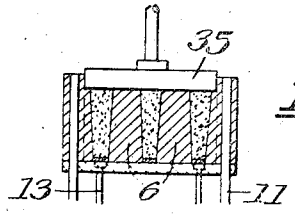


Fig. 7.



INVENTOR.
Francis J. Straub
BY
C. M. Clarke
ATTORNEY

March 22, 1938. F. J. STRAUB 2,111,701

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Fig. 8.

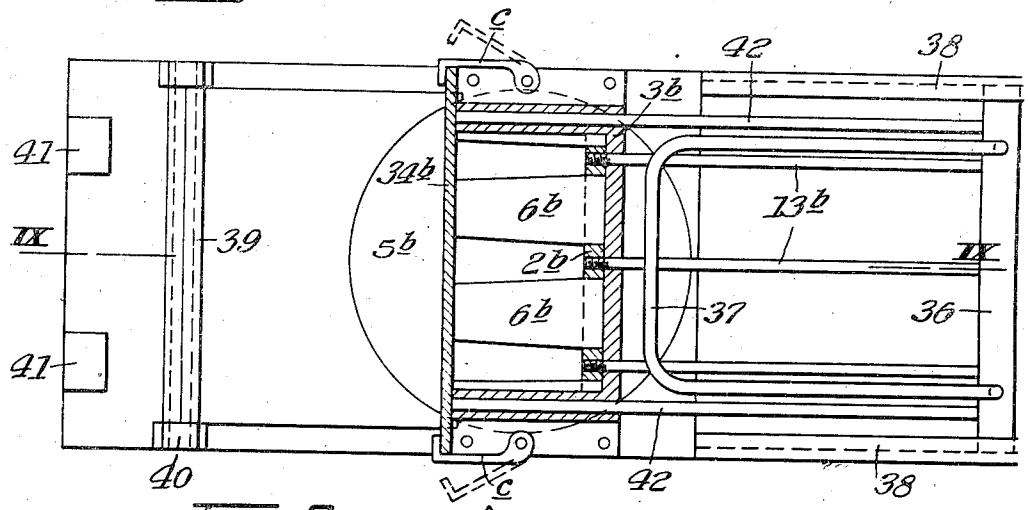
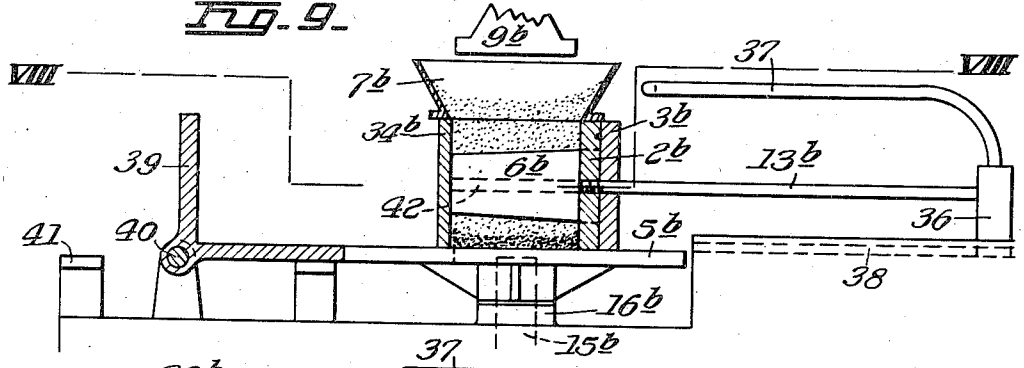


Fig. 9.



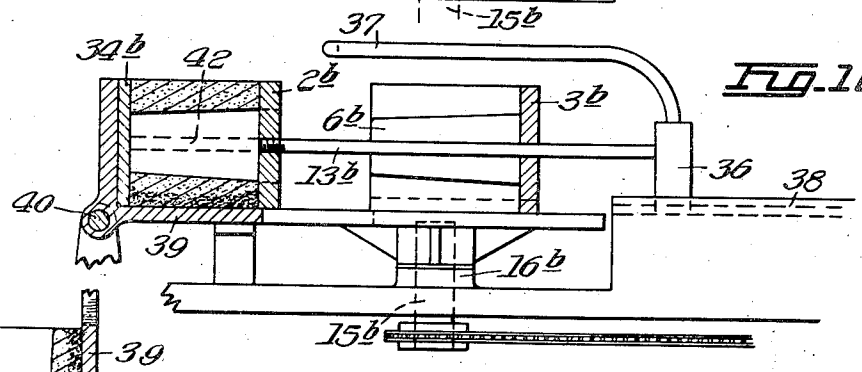


Fig. 10.

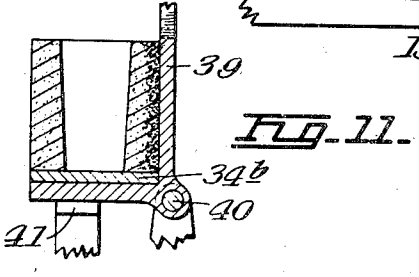


Fig. 11.

INVENTOR.
Francis J. Straub
BY
C. M. Chase
ATTORNEY

Patented Mar. 22, 1938 2,111,701

UNITED STATES PATENT OFFICE

2,111,701

BLOCK MAKING APPARATUS

Francis J. Straub, New Kensington, Pa.

Application August 19, 1936, Serial No. 96,850

11 Claims. (Cl. 25—41)

My invention relates to the art of making concrete building blocks, and particularly to means for imparting surface treatment thereto while the aggregate is still plastic.

In the manufacture of such blocks, made of a suitable aggregate such as sand and gravel, cinders, etc. mixed with cement and water and subjected to tamping or pressing operations, it is desirable in some cases to secure a smooth or approximately smooth outer surface. In my prior Patents Nos. 1,651,420, 1,682,359, 1,692,355 and 1,987,721, and in application Ser. No. 60,073, are disclosed means and the method of so treating one or more sides of a block. Such treatment to that extent has proven generally satisfactory insofar as horizontal or vertical reciprocably applied trowelling or smoothing is involved, with a degree of accompanying densification and local surface segregation of the finer particles of the mix.

In connection with the manufacture and use of such blocks, it has long been desirable to provide a block with at least one side so surfaced for exposure in a wall. A further desirable result is in producing lines of direction, whether very minute or more prominent, in a curving direction as to the block when in location, for surface ornamentation.

That is to say, in a smoothing or trowelling treatment of a block face in plastic form, while an approximately smooth surface is possible, it is also true that minute grooves or lines of direction are developed co-extensive with the original direction of movement of the smoothing face or faces.

After considerable experiment I have now devised a machine which is capable of functioning in the desired manner to simultaneously smooth one or more faces of a block while in the tamping mold, during the tamping or pressing operation, and final ejection, so as to accomplish the desired results and product, such machine forming the subject matter of this application.

In connection with the further description reference will be made to the accompanying drawings showing preferred forms of apparatus which may be employed, in which:

Fig. 1 is a plan view of the mold of a block forming machine and a smoothing disk applied to and forming one side of the mold;

Fig. 2 is a view in side elevation thereof, partly in section on the line II—II of Fig. 1;

Fig. 3 is an isometric view of the resulting block;

Figs. 4 and 5 are views like Figs. 1 and 2, showing the mold box provided with a pair of opposite disks providing the smoothing side walls of the mold, in lowered position;

Fig. 6 is a partly vertical section on the line VI—VI of Fig. 5;

Fig. 7 is a longitudinal vertical section through a mold box showing application of a pressing plate in place of compressing tampers;

Fig. 8 is a plan view, partly in section, on the line VIII—VIII of Fig. 9, showing a modified construction providing for lower face smoothing;

Fig. 9 is a longitudinal vertical section on the line IX—IX of Fig. 8, with the hopper and tamps indicated;

Fig. 10 is a similar view showing the formed block ejected from the mold horizontally;

Fig. 11 is a sectional detail view of the tipping frame of said figures, tilted for removal of the block.

For the formation of the block of any desired rectangular shape and dimensions, I utilize a more or less conventional housing box comprising a bottom wall or plate **2**, end walls **3**, and as in Figs. 1 and 2, a side wall **4**, the opposite side of the mold box omitting such wall and being closed by the smoothing or trowelling disk **5**.

The block to be formed may be solid, or cored as in Fig. 3, in which case the cores **6** are secured to and move vertically with the bottom plate **2**. Aggregate is delivered to the mold box in the usual manner by a hopper **7** slidable on platform **8** and is compressed by tampers **9** following established conventional practice, or by other suitable compressing means.

In filling and tamping position the mold box is temporarily supported in erected position by any suitable means as an adjustable bar or plate **10**. Guide rods **11** extend from a base **12** through the mold box for maintaining it in position during vertical adjustment. Similar rods **13** extend from the base through the bottom wall **2** for ejection of the block when the mold box is lowered, and rods **13** are surrounded by springs **14** for re-erecting the mold box for the next operation.

In the machine as disclosed I show the rotatable disk **5** carried by its shaft **15** in bearing **16** of a swinging lever arm **17** pivoted on a shaft **18** and having an extension arm **19** provided with a counterweight **20**.

The bottom plate of the mold box is connected at **21** with a link or links **22** having a terminal pin **23** adapted to be engaged by hook **24** of lever arm extension **25** upon lowering the disk **5**, as in dotted lines Fig. 2.

Lever arm 17 and the rotatable disk 5 are maintained in normally operative position as in Fig. 2 by the counterweight and any suitable limiting stop, as abutment 26.

Disk 5 is adapted to lie closely against the open side of the mold forming a retaining wall therefor, and to be rotated by suitable gearing as pulleys or sprockets 27, 28, a driving gear 29 and connected chains, as will be readily understood.

I show in Figs. 4, 5 and 6 a similar construction utilizing a pair of disks 5a arranged at opposite sides of the mold box 3a and forming a pair of rotating side walls therefor. Otherwise the construction and operation is the same as above described, the disks being located at each side of bearing 16, with corresponding indicating numerals. I show also in Fig. 5 one means for tilting the disk lever 17 as by a flexible connection 30 secured to lever extension 19 as at 31 passing over sheaves 32, 32, and provided with a depending pull terminal 33, whereby the disk or disks may be lowered out of operative relation to the face or faces of the molded block.

Such lowering of the disk or disks effects a continuous wiping and smoothing action on the face or faces, passing therebeyond and in conformity with the lowering of the mold box by engagement of hook 24 with terminal 23, leaving the formed and faced block in elevated position as shown. Thereafter the block is removed from the block ejecting rods 13 with its usual pallet 34, whereupon the mold box is then erected for placement of the next pallet and a new charge of aggregate, with corresponding erection of the disk or disks, for another operation.

In such treatment the compressed aggregate in molded form is smoothed on one or both sides by the disk or disks, providing the trowelled surface or surfaces and with the annularly developed minute score marks over the side face or faces, as indicated in Fig. 3. It will be understood of course that the compression of the aggregate may be effected by a presser plate or head 35 as in Fig. 7, extending slightly into the upper edge portion of the mold box as commonly practiced.

In either case the density of the formed block necessarily depends on the applied force, but with either such application the aggregate is desirably substantially uniform throughout from top to bottom. The smoothing action of the disk is preferably by its peripheral portion as indicated in the principal figures of the drawings, and its wiping action tends to not only smooth and trowel the surface but to additionally impel, segregate and distribute the finer particles of the mix not only over the entire surface but at the side and end edge portions of the block, leaving a definite finished corner or corners.

In Figs. 8 to 11 I show a modified construction in which the mold box 3b rests by its open side on the face of a horizontally arranged disk 5b mounted by its downwardly extending spindle 15b in a suitable bearing 16b forming a portion of the foundation framework of the machine. In such construction the cores 6b extend horizontally through the mold box cavity through a carrying and pushing plate 2b, whereby the formed block may be separated from the cores and projected laterally from the mold box. The aggregate is delivered by hopper 7b and tamps 9b compress the aggregate transversely between the cores, the operation otherwise being substantially the same as in usual practice. If desired, a preliminary facing charge of finer material may be first placed in the box, as indicated in the drawings.

Pusher plate 2b in operative position is located inwardly of the wall of mold box 3b and a separable opposite wall or pallet 34b is removable with the molded block from plate 2b, when the formed block and pallet are projected laterally from the mold, as in Fig. 10. During compression the pallet plate forms one wall of the mold box and is retained by any suitable means, as locking hooks c.

For the purpose of thus removing the block I provide any suitable construction as a series of rods or bars 13b connected with pusher plate 2b and a rear cross bar framing 36 having a suitable operating handle or frame 37. Such manipulating mechanism is slidably mounted as by bar 36 on a rear trackway 38 of the foundation. By such means the discharge of the block may be effected by the operator.

Rods 42 also extend forwardly from bar 36 through suitable bearings in the ends of the mold box and abut against pallet 34b, maintaining it in proper spaced relation.

At a suitable position beyond the mold box is provided a tilting angle shaped bracket 39 pivoted at 40 to suitable supports for outward tilting whereby to reverse the block with its plate or pallet 34b into position for removal, the angle bracket resting temporarily on a suitable abutment support 41. In such position it will be understood that the plate 2b and the cores have been withdrawn.

In such installation, disk 5b is preferably located approximately centrally underneath the mold box, as indicated, and provides a substantial support during the tamping or pressing treatment. As the block is formed the disk 5b is in rotation and imparts the smoothing or trowelling treatment to the contacting face of the block, such treatment continuing during the ejection, and leaving the surface of the block in the desired condition with a somewhat different minute curving line effect depending on the proportions of the disk, speed of rotation, surface finish, etc.

If desired, the face of the block may be treated by any suitable coloring material, as in my prior Patent No. 1,692,355.

The construction and mode of operation of the machine will be readily understood and appreciated by all those familiar with the block making art and it provides means for securing the desirable effects of not only consistency of product but also the desirable smooth and ornamental finish to the block face or faces.

The invention is especially novel and useful in providing means for a wiping and trowelling treatment across the face of the block in a consistently curving path.

What I claim is:

1. In combination with an open top mold box adapted to receive plastic aggregate and compressing means therefor operable through the top, one of the face forming walls of the box being omitted, a rotatable facing disk forming the closing wall therefor, means maintaining closing and compression resistance between the mold box and disk during compression, and means effecting separation between the mold box and contents and the disk, said means embodying a connection between the mold box and disk.

2. In combination with an open top mold box adapted to receive plastic aggregate and compressing means therefor operable through the

open top, one of the face forming walls of the box being omitted, a rotatable facing disk forming the closing wall therefor when the filled box is in a position subject to compression, means for rotating the disk while in confining relation to the block in formation, and means effecting separability between the mold box and its contents and the disk upon completion of densification of the aggregate, said means embodying a connection between the mold box and disk.

3. In combination with an open top mold box adapted to receive plastic aggregate and compressing means therefor through the open top, one of the face forming walls of the box being omitted, a rotatable facing disk forming the closing wall therefor, means for rotating the disk while in confining relation to the block in formation, and means for effecting edgewise separation of the mold box and disk.

4. In combination with an open top mold box having an open side, a rotatable facing disk providing a closing wall at the open side, a vertically movable frame therefor, means associated therewith for rotating the disk, and means cooperating with the movable frame for lowering and raising the mold box.

5. In combination with an open top mold box having a bottom and an open side and a depending lowering device, a rotatable facing disk forming a closure for the open side, a vertically movable frame therefor having a portion engageable with the lowering device, means for rotating the disk, and means for erecting the mold box after lowering it.

6. In combination with an open top mold box having opposite open sides, a pair of rotatable smoothing disks forming closures therefor having operative connection with the mold box and a movable frame therefor adapted to move the disks across the faces of the block in formation, and means associated therewith for rotating the disks together.

7. In combination with an open top mold box having a bottom and an open side and a depending lowering device, a rotatable facing disk forming a closure for the open side, a vertically movable lever arm therefor having a hook terminal engageable with the lowering device, a counterweighted arm, means for rotating the disk mounted on the lever arm, a lifting element connected with the counterweighted arm, and means for erecting the mold box after lowering it.

8. In combination with an open top and bottom mold box having a rear wall, and a horizontally arranged rotatable smoothing disk closing the open bottom thereof, an inner pusher plate and an outer closing pallet wall forming confining faces for the block in formation, a tipping support therefor, and pusher rods extending through the rear wall and connected with the inner pusher plate.

9. In combination with an open top and bottom mold box having a rear wall, and a horizontally arranged rotatable smoothing disk closing the open bottom thereof, an inner pusher plate and an outer closing pallet wall forming confining faces for the block in formation, pusher rods extending through the rear wall and connected with the inner pusher plate, guide rods extending through opposite ends of the mold box and abutting the pallet wall, and holding latches for the pallet.

10. In combination with an open top and bottom mold box having a rear wall, and a horizontally arranged rotatable smoothing disk closing the open bottom thereof, an inner pusher plate and an outer closing pallet wall forming confining faces for the block in formation, pusher rods extending through the rear wall and connected with the inner pusher plate, and a tilting receiving bracket for the formed block beyond the mold box.

11. In combination, a horizontal smoothing disk having a supporting bearing and rotating means, an open bottom and top mold box on the disk having a rear wall and end walls and an open front, a closing pallet for the open front, filling and compressing means for the mold box, a rear trackway, block discharging means mounted on the trackway and extending through the rear wall of the mold box, and a pivoted angle-shaped receiving bracket in front of and flush with the surface of the disk and a support therefor when tipped with the block for removal on the pallet.

FRANCIS J. STRAUB.