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J. H. MATHIS
BUILDING BLOCK MACHINE

Filed Feb. 5, 1923

4 Sheets-Sheet 1

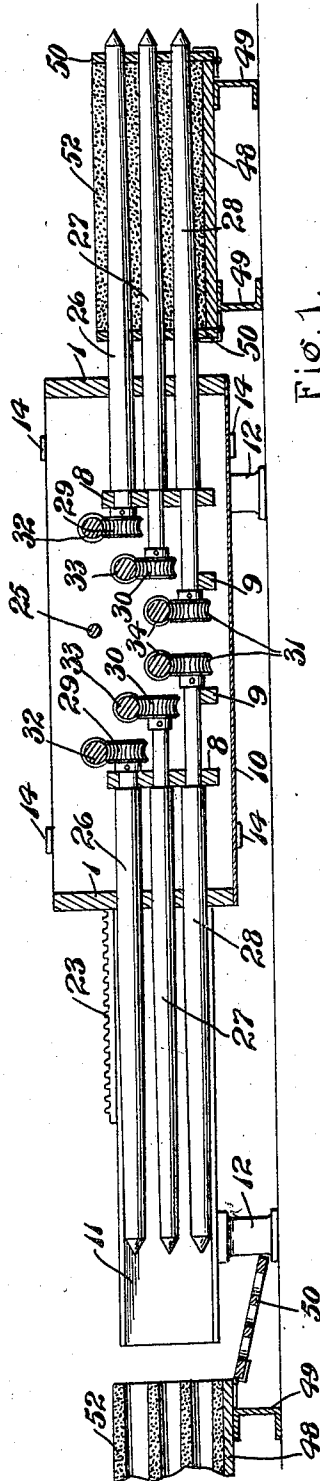


Fig. 1.

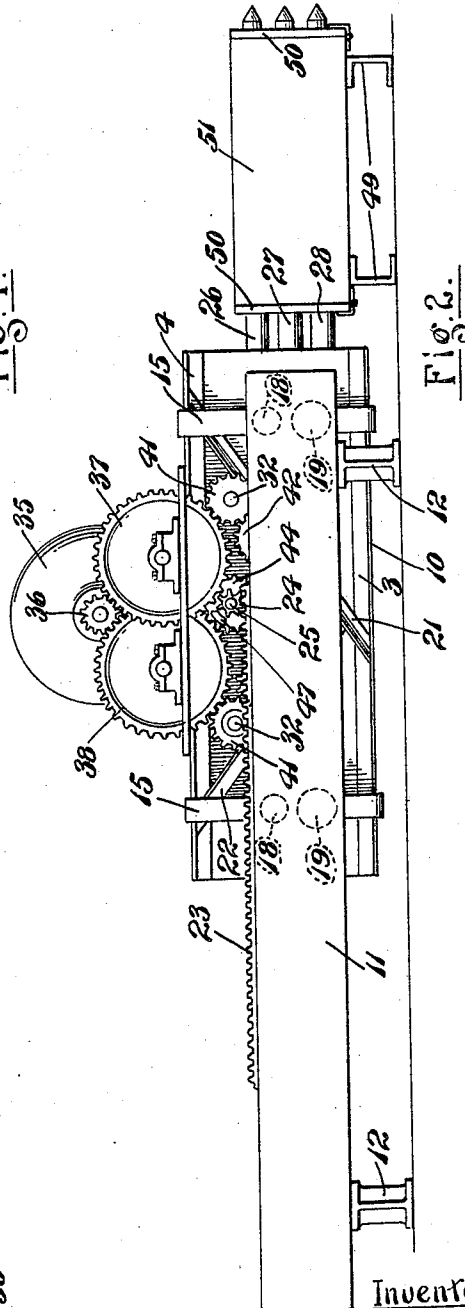


Fig. 2.

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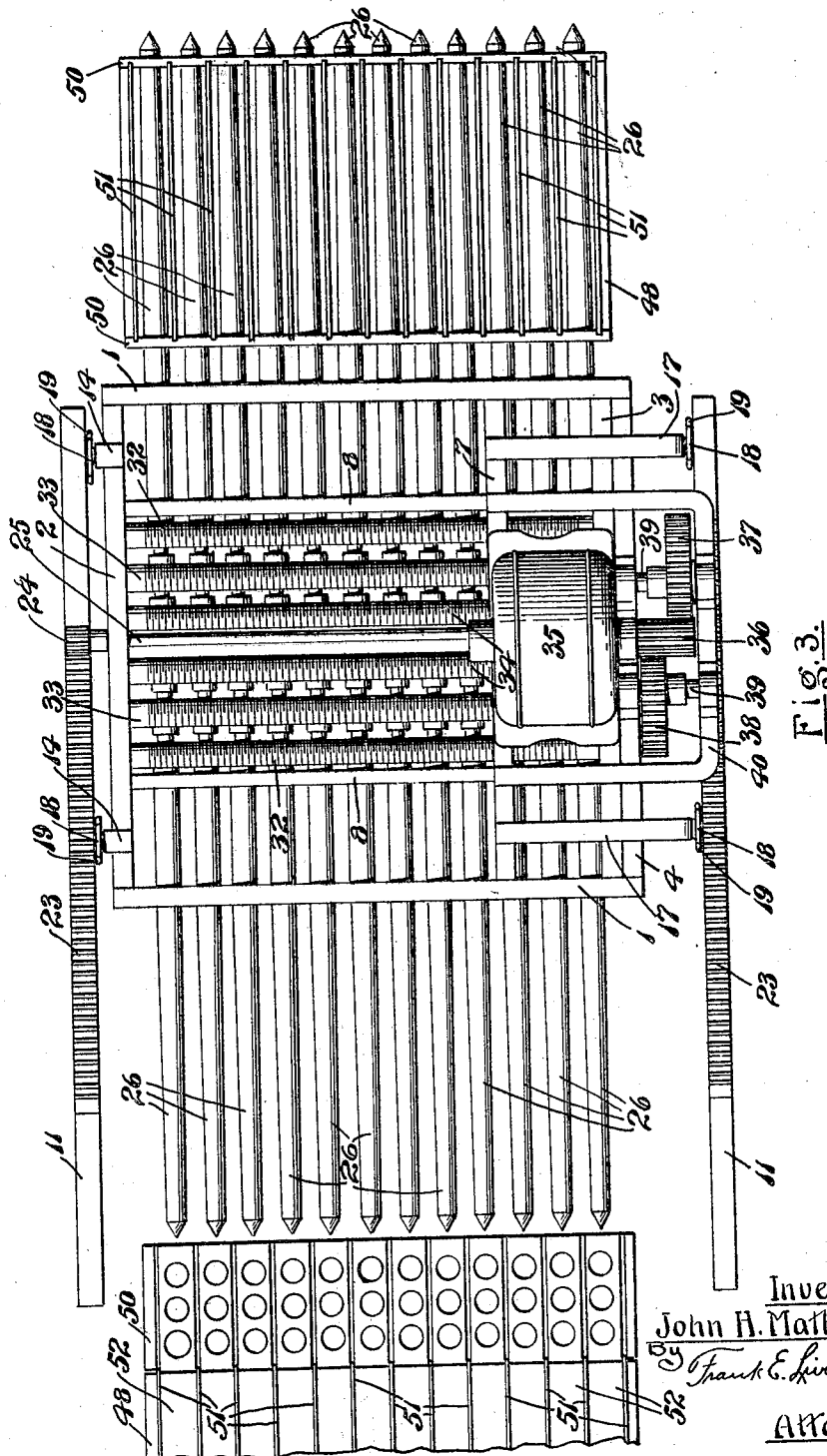
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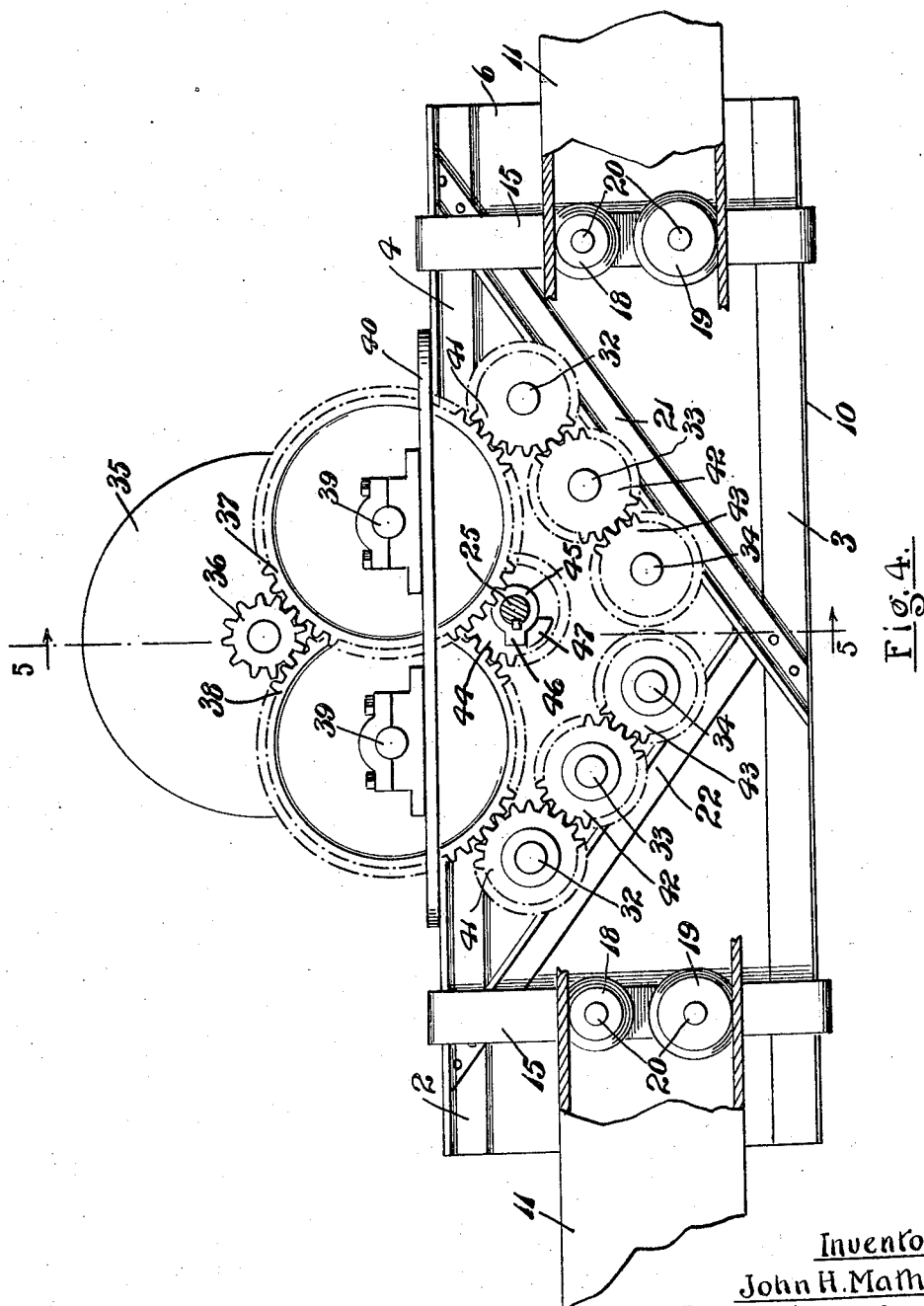
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4 Sheets-Sheet 3



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UNITED STATES PATENT OFFICE.

JOHN H. MATHIS, OF BEVERLY, IN WYOMING TOWNSHIP, MICHIGAN.

BUILDING-BLOCK MACHINE.

Application filed February 5, 1923. Serial No. 617,147.

To all whom it may concern:

Be it known that I, JOHN H. MATHIS, a citizen of the United States of America, residing at Beverly, in Wyoming Township, in the county of Kent and State of Michigan, have invented certain new and useful Improvements in Building-Block Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to a machine for use in the manufacture of building blocks, particularly those which are made of plaster of Paris stucco, a cementitious material which is easily placed in a mould or form in a fluid or semi-fluid state and which rapidly sets or hardens. Building blocks of this type, in order to save material, are formed with a number of longitudinal openings therethrough, the form being equipped with cores extending lengthwise and in spaced apart relation to each other, the cementitious material flowing around the same when introduced into the form. After the material has partly set it is necessary to remove the cores in order to thereafter take the blocks from the form.

It is a primary object and purpose of the present invention to make a machine which is adapted to be used with two forms, one at each side of the machine, said machine having two sets of cores projecting therefrom in opposite directions, one at each side of the machine which, in one position, are designed to pass through the form so as to make the same ready for the reception of the cementitious material, and in another position are withdrawn entirely from the form so that the same may be operated for the removal of the building blocks therefrom, and the replacement of the parts of the form in place to again receive the cores. The machine is designed so that when a set of cores at one side is in operative position with respect to the form at said side, the other set of cores is withdrawn from the form at the other side. A further object of the invention is to make the machine and equip it with a power means for moving it back and forth to the two positions which it occupies when in operative position with respect to the two forms, and with further means driven, if desired, by the same power, for rotating the cores and breaking the same

from the material of the blocks which has set around the cores, whereby the withdrawal of the cores from the blocks is easy and without liability of breaking or rupturing a block from the cores sticking thereto. These objects and purposes, together with many others not at this time particularly stated, and many novel features of construction and arrangements of parts for attaining the same will be apparent as understanding of the invention is had from the following description, taken in connection with the accompanying drawings, in which,

Fig. 1 is a central longitudinal section through the machine made in accordance with my invention.

Fig. 2 is a side elevation of the machine.

Fig. 3 is a plan view thereof.

Fig. 4 is a fragmentary enlarged elevation of the central portion of the machine, parts being broken away and shown in section for a better disclosure of the mechanism.

Fig. 5 is a vertical transverse section, substantially on the plane of line 5—5, of Fig. 4.

Fig. 6 is a fragmentary end view illustrating the gearing means for moving the machine back and forth between its two positions and the means used for delaying said movement until the cores have been started in their rotative movement and broken away from the blocks, and

Fig. 7 is a vertical section through said mechanism for permitting said delay of movement of the machine.

Like reference characters refer to like parts in the different figures of the drawings.

In the construction of the machine, a carriage frame is provided having spaced apart vertical ends 1, at one end of which bars 2 of angle iron, located one above the other, are positioned and secured to said end members 1 in any desired manner, while at the other ends of said members 1, upper angle iron bars 3 and 4, and a lower bar 3 are used for completing the frame and securing the end members 1 rigidly in position with respect to each other. Plates 5 and 6 between the upper and lower bars 2 and 3 are used to close the openings between them. A bar 7 of angle-iron parallels the upper bars 2 and 3 and members 8 and 9 of different heights are disposed in parallel relation to each other and to the members 1, as best shown in Fig. 1. A bottom plate 10 of sheet metal

closes the under side of the carriage frame and it is on this frame that the major portion of the mechanism of the machine is mounted.

5 The carriage frame is disposed between two horizontally disposed channel members 11, one at each side of the machine and paralleling the same. These channel members are supported by suitable blocks 12 so
10 as to be elevated a distance above the ground or other floor over which the machine is mounted. At one side of the machine, two spaced apart vertically disposed bars 13 are secured, the ends being bent inwardly at
15 right angles, as at 14 over the horizontal flanges of the upper and lower bars 2 and 3 at said side of the machine. Likewise, at the opposite side, similar vertical bars 15 are similarly disposed, having parts 16 bent
20 inwardly at their lower ends to pass under the flange of the bar 3 at said side, and at their upper ends having longer parts 17 turned inwardly to pass over the upper bars 4, 3 and 7. These vertical bars 13 and 15
25 are permanently attached to the different bars, and on each bar an upper roller 18 and a lower roller 19 are rotatably mounted on a stud 20, attached to and projecting from the bars 13 and 15, the upper rollers coming
30 directly under the upper flanges of the channels 11 and the lower rollers 19 riding on the lower flanges thereof.

As a means of reinforcing and strengthening the sides of the carriage frame, and to
35 furnish supports for the journals of certain screw shafts, as will hereinafter appear, diagonally disposed angle bars 21 and 22 are secured between the upper and lower bars 2 and 3 at the opposite sides of the
40 carriage frame. A rack 23 is attached to and lies above the upper flange of each channel member 11, with which racks pinions 24 secured at the ends of an equalizing shaft 25 are in mesh. It is apparent that
45 the carriage frame and any mechanism carried thereon may be moved back and forth on the channel members 11 as supporting tracks therefor, and that the movement must be equalized at both sides through the equal-
50 izing mechanism consisting of the shaft 25, pinions 24 and racks 23.

A series of spaced apart cores 26 pass through the end members 1 and have bearings therein, and at their inner ends have
55 bearings in the members 8 (see Fig. 1). These cores are horizontally disposed in the same horizontal plane. Directly below the cores 26, a second series of cores 27 are similarly located, and below the cores 27, a
60 third series of cores 28 are positioned. The inner ends of the cores 27 extend inwardly farther than the cores 26 above, and the lowermost series of cores extend still farther inward to pass over the members 9 which
65 serve as reinforcing supports for the inner

ends of the cores. Worm wheels 29, 30 and 31 are fixed at the inner ends of the cores 26, 27 and 28, respectively. It is apparent that all of the worm wheels 29 are in the same vertical plane and are located at the
70 same height. The same is true of the worm wheels 30 and 31 with respect to any other worm wheel 30 and 31 in a series at its end of the machine. Worm threaded shafts 32, 33 and 34 are rotatably mounted between the
75 sides of the frame, the shaft 32 engaging with all of the worm wheels 29, shaft 33 with all of the wheels 30 and shaft 34 with all of the wheels 31, as shown in Fig. 1. This mechanism is duplicated at each end of
80 the machine, the cores projecting outwardly at each end, and, preferably being slightly tapered outwardly, as shown.

At one side of the machine, an electric motor 35 is located above the frame, resting
85 on and being secured to the upper bars 3, 4 and 7. Its shaft has a wide faced pinion 36 attached thereto which meshes with and drives two gears 37 and 38, located one back of the other and mounted on short idle shafts
90 39 which are carried in suitable bearings on the bar 4 and on an auxiliary supporting bracket 40 which is permanently fixed on the carriage frame around the motor, as shown. The gears 38 and 37 mesh with
95 pinions 41 fixed on the adjacent ends of the worm shafts 32. Pinions 41 in turn mesh with other pinions 42 on the ends of the worm shafts 33, and said pinions 42 mesh with other pinions 43 on the shafts 34 (see
100 Fig. 4). Accordingly when the motor is driven, all of the shafts 32, 33 and 34, and all of the cores 26, 27 and 28 are driven in unison though not in the same direction as the direction of rotation of the cores is
105 immaterial.

On the adjacent end portion of the shaft 25 a gear 44 is loosely mounted on a sleeve 45 which is keyed to the shaft, said gear
110 being in engagement with and driven by the gear 38. A lug 46 extends radially from the inner end of the sleeve 45 and a cooperating lug 47 projects from a side of the gear 44 whereby when the motor is started, lug 47
115 makes nearly a complete revolution before it engages against the lug 46 to drive the shaft 25. It is evident, accordingly, that the cores are started in rotation immediately with the starting in motion of the motor 35 and that shortly thereafter, the shaft 24 is
120 started in motion with a consequent bodily movement of the machine along the channel tracks 11, and that those cores which are inserted through the blocks have their connection to the blocks broken before the ma-
125 chine begins to move to withdraw the cores from the blocks, as will now be set forth.

At each end of the machine a block form is located. The particular specific construction of the form is not very material and
130

other constructions than those shown herein may be used. As shown, the form comprises a bottom 48 which is carried on permanent supports 49 and at opposite sides of the said bottom, vertical side members 50 are hingedly connected. These members have a plurality of openings therethrough so that the series of cores 26, 27 and 28 may pass through, as shown at the right in Figs. 1, 2 and 3. A plurality of equally spaced partitions 51 complete the form and the same are located vertically between the members 50 being seated at their lower edges in grooves in the bottom 48 and at their ends in grooves on the inner sides of the members 50. This construction of form is readily capable of being knocked down and rebuilt into operative form, it being merely necessary to drop the hinged members 50, as shown at the left in Fig. 1, whereupon the partitions 51 are free for removal. This type of form provides a plurality of block spaces in each of which a block may be made when the cementitious mixture is run therein.

The two forms are spaced apart a distance such that when the core carrying machine is in one position with the cores at one end of the machine extending through the one form, as shown in Figs. 1, 2 and 3, the cores at the opposite end of the machine are entirely withdrawn from the other form and far enough away that the adjacent member 50 has plenty of clearance to drop for the disassembly of the form for the removal of the blocks 52 which have been made therein. With the cores extending through the one form, said form may be filled with the cementitious material until the form is full. The material is allowed to set and harden for a short time and then the motor 35 is started. The first result is to drive the screw shafts 32, 33 and 34, with a consequent rotation of the cores which immediately, at the start of rotation, break loose from the cementitious material if there is any sticking thereto. As soon as the cores are free from the material of the blocks, the carriage as a whole is moved through the rotation of the shaft 25 on the channel tracks 11 so as to withdraw the cores in the one form where the cementitious material has been placed, and insert the cores at the opposing end through the other form which has had the blocks previously made therein removed and the form reassembled so as to be in position to receive the cores. The filling process for the second form may then be carried out as with the first form, and in the meantime during such filling and while the material is setting, the blocks may be removed from the first form and it be reassembled for the passage of the cores thereinto when the machine is moved back away from the second form. The motor 35 is reversible and the

core carrying machine is moved in either direction as desired.

This machine is very practical and with it building blocks may be made very rapidly. I have shown the machine with three cores for each block, as is the design with certain sizes of blocks. Some blocks are made with four openings lengthwise thereof, and in such case the machine merely has to be designed with four series of horizontally located cores and additional screw shafts used to operate the additional series of cores. Large quantity production is had with this machine which is comparatively simple, durable in service and practically operative in all respects. The appended claims define the invention and I consider myself entitled to all forms of construction coming within their scope.

I claim:

1. In a machine of the class described, a carriage, means for mounting the carriage for movement back and forth between two positions, a plurality of cores projecting from opposite ends of the carriage, and means for driving all of the cores to rotate the same about their longitudinal axes simultaneously, substantially as described.
2. In a machine of the class described, a carriage, means for mounting the carriage for movement back and forth between two positions, a plurality of rotatably mounted cores projecting from opposite ends of the carriage, means for rotating all of the cores simultaneously, and means for moving the carriage during the time the cores are rotating.
3. In a machine of the class described, a carriage, a track at each side thereof, rollers on the carriage running on the tracks, a plurality of cores rotatably mounted on the carriage and projecting outwardly therefrom at each end of the carriage between and substantially paralleling the tracks, two forms located one at either end of the carriage, the cores at an end of the carriage being adapted to pass through the form at said end of the carriage when the carriage is in one position and with the cores at the opposite end of the carriage entirely disassociated with the other form, means for simultaneously driving all of the cores, and means for moving the carriage on the tracks, substantially as described.
4. In combination, two spaced apart forms, a core carrying carriage mounted for movement between the forms toward one form and away from the other, or vice versa, cores projecting from the carriage toward each form, and means for moving the carriage, said cores being adapted to pass through the adjacent form when the carriage is in one position, substantially as described.
5. In a machine of the class described, a

carriage frame, a plurality of cores extending from the frame at the opposite ends thereof, tracks supporting the frame and on which said frame is movably mounted, a
5 motor carried by the frame, means for driving all of the cores from the motor, and means for moving the frame on the tracks and equalizing the movement of both sides of the frame in its movement over the
10 tracks.

6. In combination, two spaced apart forms, spaced tracks located between the forms, a carriage mounted on the tracks, means for moving the carriage on the tracks toward either form, cores projecting from
15 the carriage toward each form, and means for rotating the cores.

In testimony whereof I affix my signature.

JOHN H. MATHIS.