

R. A. HENLEY.  
 APPARATUS FOR MAKING FIREPROOF BLOCKS.  
 APPLICATION FILED JULY 18, 1908.

1,001,952.

Patented Aug. 29, 1911.

4 SHEETS—SHEET 1.

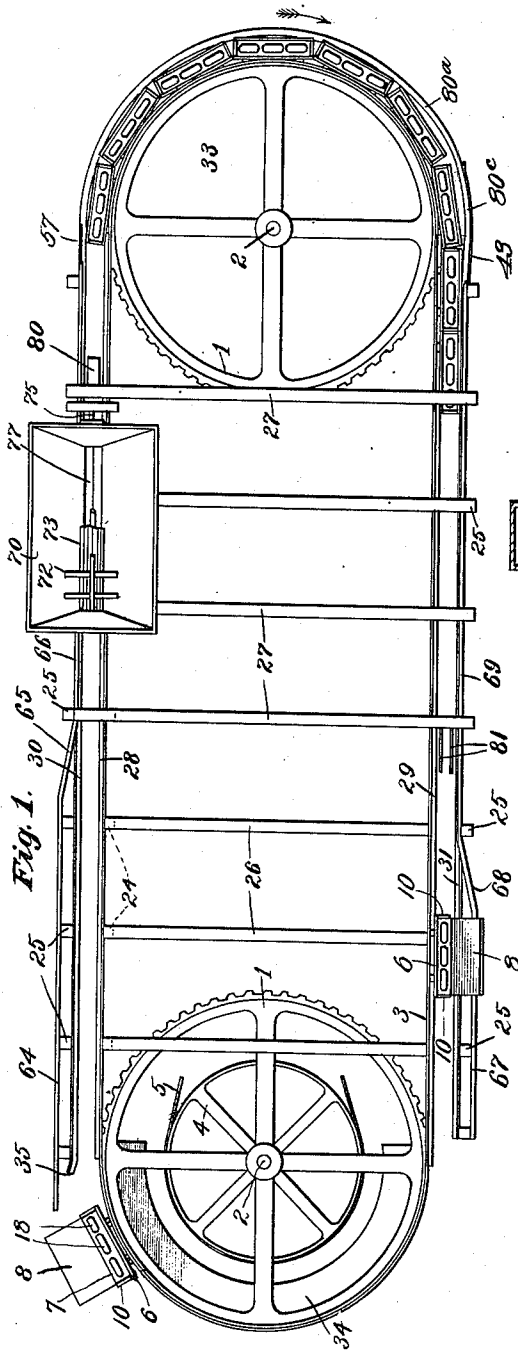


Fig. 1.

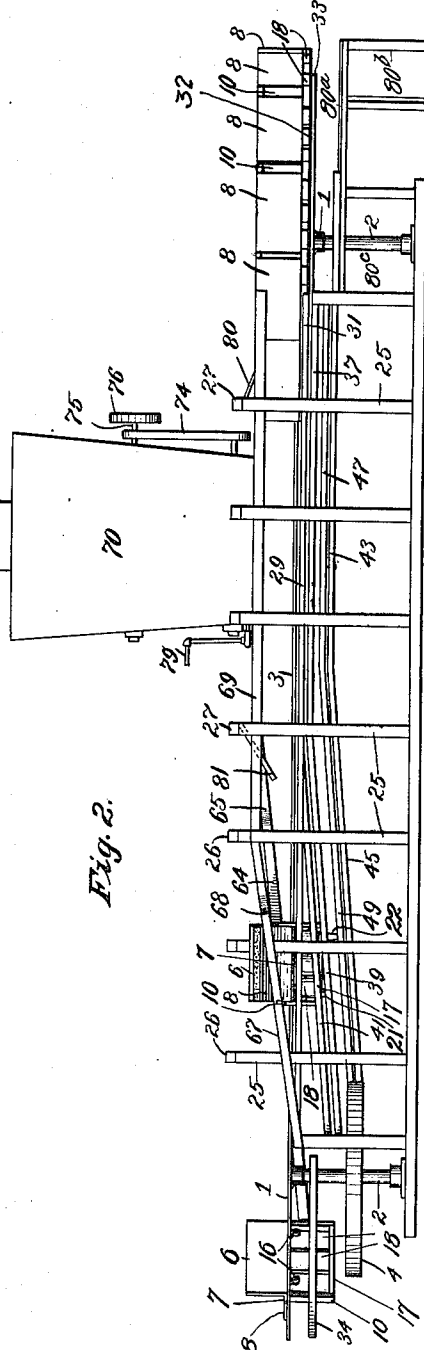


Fig. 2.

Witnesses:

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 Roy A. Henley.  
 George J. Thompson Atty.

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4 SHEETS-SHEET 2.

Fig. 4.

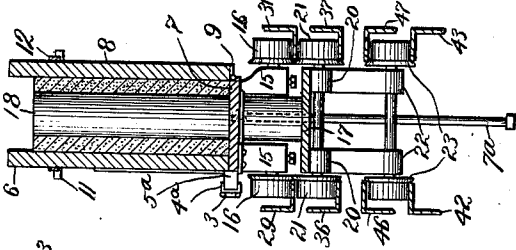


Fig. 3.

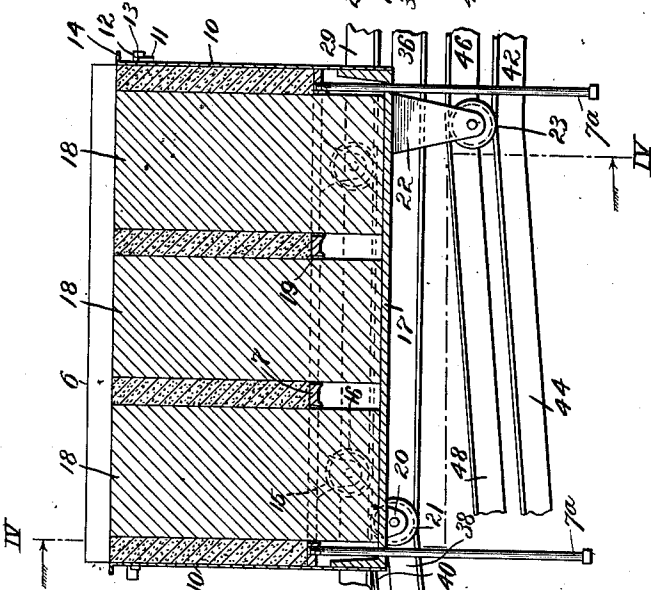
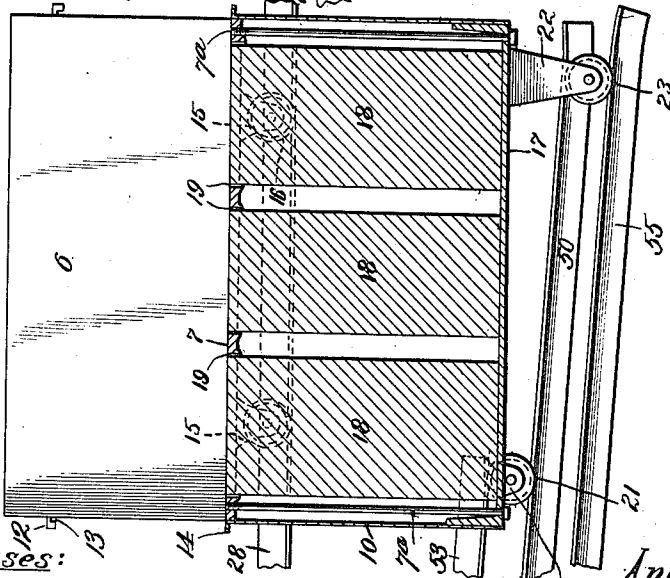


Fig. 5.



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4 SHEETS—SHEET 3.

Fig. 8.

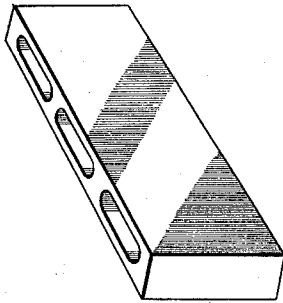


Fig. 7.

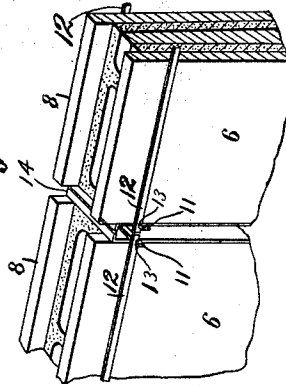


Fig. 9.

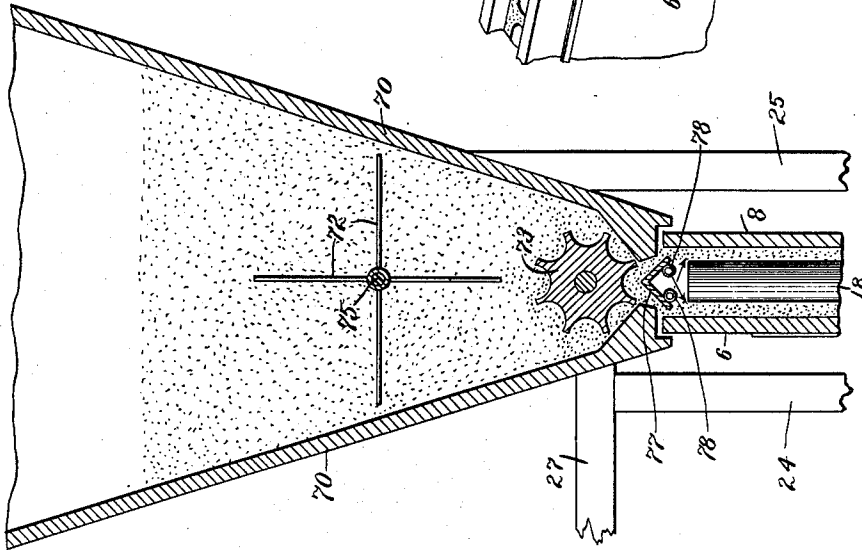
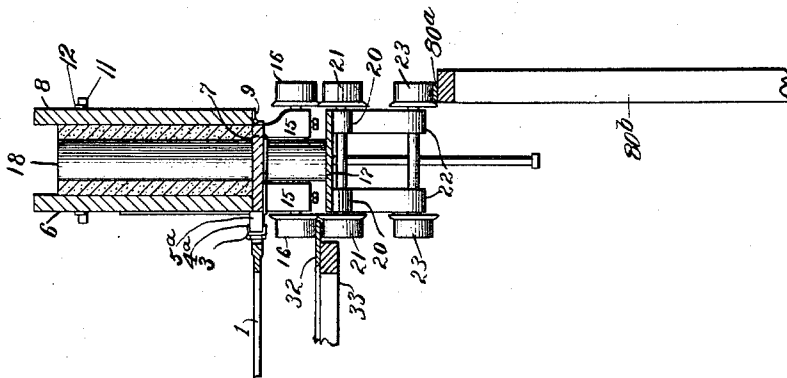


Fig. 6.



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4 SHEETS—SHEET 4.

Fig. 10.

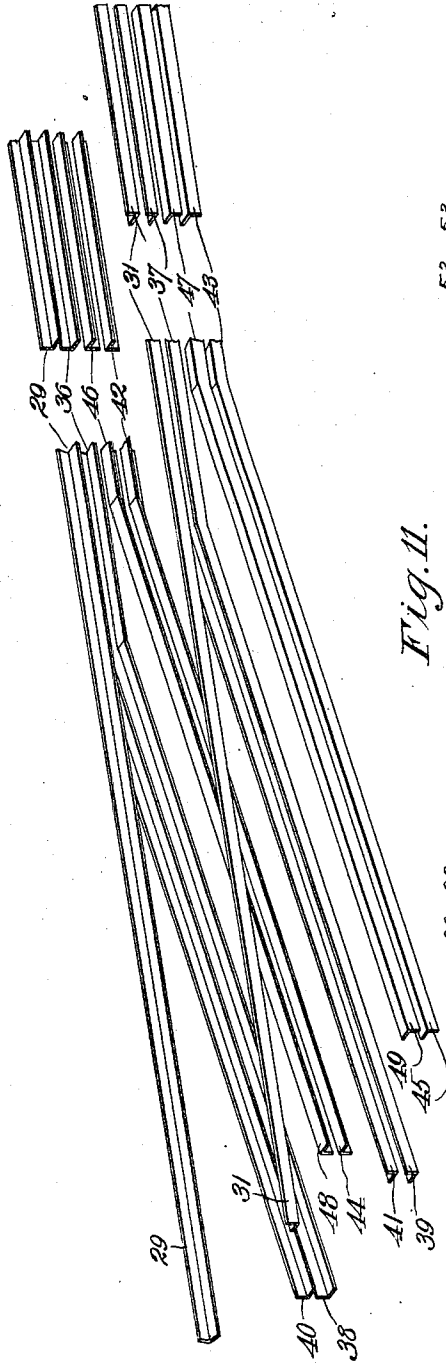
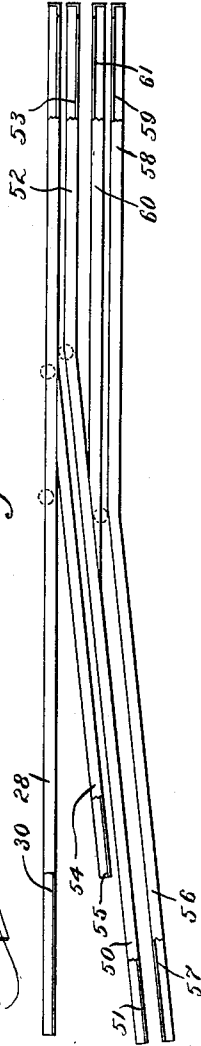


Fig. 11.



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# UNITED STATES PATENT OFFICE.

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## APPARATUS FOR MAKING FIREPROOF BLOCKS.

1,001,952.

Specification of Letters Patent. Patented Aug. 29, 1911.

Application filed July 18, 1908. Serial No. 444,277.

### *To all whom it may concern:*

Be it known that I, ROY A. HENLEY, a citizen of the United States, residing at Lawrence, in the county of Douglas and State of Kansas, have invented certain new and useful Improvements in Apparatus for Making Fireproof Blocks, of which the following is a specification.

This invention relates to apparatus for making fireproof blocks, and has for its object to evolve a method of and apparatus for making such blocks expeditiously and hence at a minimum cost.

With this general object in view, the invention consists in the novel method of and organization of parts for making the blocks as hereinafter described and claimed; and in order that it may be fully understood reference is to be had to the accompanying drawings, in which—

Figure 1, is a plan view of apparatus embodying the invention. Fig. 2, is a side view of the same. Fig. 3, is an enlarged central vertical section of one of the forms containing a molded block and also discloses a portion of the track rails upon which the form travels with its block and the rails for effecting the withdrawal of the cores and end walls from the form to permit the block to be removed from the latter. Fig. 4, is section on the line IV—IV of Fig. 3. Fig. 5, is a sectional view like Fig. 3, but with the cores and end walls withdrawn and the block omitted, and also shows the left-hand ends of certain track rails whereby the core and end walls are reelevated. Fig. 6, is a view similar to Fig. 4, but taken when the form is occupying a different point in its travel. Fig. 7, is a sectional perspective view showing a pair of the forms containing the molded blocks and arranged in the relative positions they occupy just previous to the withdrawal of the core from the block. Fig. 8, is a detail perspective view of one of the blocks. Fig. 9, is a central vertical section taken transversely through the hopper, the water-spraying pipes, and a form below the hopper and said pipes. Fig. 10, is a broken perspective view of the full set of rails at the side of the machine where the forms travel preliminary to and during the withdrawal of the cores and end walls from engagement with the blocks in the forms. Fig. 11, is a side view of part of

the full set of rails at the side of the machine where the forms travel during the re-elevation of the core and end walls to their original positions.

In the said drawings, 1 indicates a pair of horizontally arranged sprocket wheels mounted upon similar vertical shafts suitably journaled, and supporting and connected by an endless chain 3, one of the shafts being shown as equipped with a wheel 4 to be driven by a belt 5 or otherwise. Certain links of the chain are formed with outwardly projecting ears 4<sup>a</sup> pivotally receiving lugs 5<sup>a</sup> projecting from the inner or permanent side walls 6, of an endless train of forms.

7 indicates the bottom of each form and the outer or movable side wall hinged as at 9 to the bottom and adapted preliminary to the removal of its block, hereinafter referred to, to swing down to a horizontal position to permit such block to be removed and form a shelf or table to facilitate such removal.

10 indicates the end walls of the form, the same lapping the opposite ends of and terminating short of the upper edges of the side walls, and secured to said end walls and projecting inwardly and outwardly therefrom are latch bars 11 to interlock with latch bars 12 secured to the side walls for the purpose of holding the door or movable side wall 8, reliably closed, the bars 12 preferably having downwardly-opening notches 13 to receive the latch bars 11, as shown most clearly in Figs. 3 and 7, and in order to close the slight space showing between each pair of forms and provided to accommodate the projecting ends of the latch bars 12, (see Fig. 7), the end walls are provided at their upper ends with flanges 14, which abut together or fit sufficiently close together to prevent the waste of any noticeable part of the material used in making the block, as hereinafter referred to.

15 indicates bearings depending from the bottom of each form and equipped with flanged wheels 16 occupying the same horizontal plane. The end walls 10 are carried by and project upwardly from a frame 17 underlying bottom 7 and provided with one or more cores 18 projecting slidably up through openings 19 in bottom 7, said cores terminating in the plane of the upper

- ends of the end walls. Near its front end the core-carrying frame is provided with depending bearings 20 equipped with flanged wheels 21, and near its rear end with bearings 22 which depend to a lower plane than bearings 21, and are equipped with flanged wheels 23.
- 24 indicates a series of uprights arranged just inward by preference of the portions of the chain which connect the sprocket-wheels, and 25 is a series of uprights arranged outward of and parallel with the series of uprights 24. The uprights 24 near one end of the machine, are preferably connected by cross bars 26, cross bars 27 connecting most of the remaining uprights 24 and the transversely aligned uprights 25 and bridging the space between said series of uprights at a suitable distance above the chain.
- 28 and 29 indicates a pair of parallel track rails over which the wheels 16 at the inner sides of the forms travel at times, said rails being secured in any suitable manner to the uprights 24.
- 30 and 31 indicate track rails disposed outward of and parallel with rails 28 and 29 respectively, and said rails 30 and 31 are preferably secured in any suitable manner, to the inner sides of uprights 25, in the same horizontal plane as rails 28 and 29. In the same horizontal plane and forming practically a semicircular connection of substantially the same diameter as the sprocket wheels, for the inner rails 28 and 29, is a rail 32, supported by preference, on a horizontal table 33 which is supported in any suitable manner, this semicircular rail being adapted to form a support for the loaded forms as they are carried around the adjacent sprocket wheel by the chain, in the direction indicated by the arrow, Fig. 1. If desired a similar semi-circular rail (not shown) may connect the opposite ends of rails 28 and 29, though said rail may be dispensed with as the forms, when rounding the sprocket wheel at such end, are empty and therefore are easily supported by the chain, though at such end a substantially semi-circular table 34, is secured below the sprocket wheel for the purpose of maintaining the forms in a substantially vertical position while rounding said sprocket wheel in their passage from rails 29 and 31 to rails 28 and 30, it being further noted that the receiving end of rail 30 is preferably flared outward as at 35 to guard against any possibility of the forms abutting against its end instead of riding upon it.
- 36 and 37 indicate rails underlying rails 29 and 31 to form tracks for wheels 21, said rails 29 and 31 extending from a point near the right-hand sprocket wheel for a suitable distance to the left and then extending downward at 38 and 39 respectively, at a suitable angle for a distance equal to that between the bottom 7 of the form and the top of the cores, a pair of inclined rails 40 and 41 overlying and paralleling said inclined portions to engage the upper sides of wheels 21 at the front end of the core-carrying frame for a purpose hereinafter explained, the said rails 40 and 41 terminating at their upper ends in the horizontal plane of the undersides of rails 29 and 31 as shown in Figs. 3 and 10.
- 42 and 43 indicate a pair of rails in the vertical plane of rails 36 and 37 respectively and below the same and extending parallel with said rails from the right hand end of the latter to within a distance of where said rails begin to pitch downward, corresponding to the distance between the vertical planes of wheels 21 and 23, from which point said rails 42 and 43 are pitched downward at 44 and 45 parallel with inclined rails 38 and 39, the rails 42 and 43 and their pitched portions 44 and 45 forming tracks for the wheels 23. Interposed between rails 36 and 42 and 37 and 43 respectively, are rails 46 and 47, said rails being parallel with rails 42 and 43 and above the same a distance equal to the diameter of wheels 23, and said rails 46 and 47 are pitched downward as at 48 and 49, parallel to the portions 44 and 45 of rails 42 and 43.
- 50 and 51 indicate rails underlying rails 28 and 30 respectively as tracks for wheels 21, said rails being pitched upward to the right and merging into horizontal rails 52 and 53 respectively, disposed a distance below rails 28 and 30 slightly exceeding the diameter of said wheels, and to guard against said wheels jumping upward off said pitched rails 50 and 51, a pair of parallel pitched rails 54 and 55 overlie rails 50 and 51 and terminate at their upper ends in the plane of the bottom of rails 28 and 30, respectively.
- 56 and 57 indicate pitched rails underlying and paralleling rails 50 and 51 respectively and spaced therefrom a distance slightly exceeding the diameter of wheels 23 and adapted as tracks for said wheels the upper ends of rails 56 and 57 having continuations 58 and 59 paralleling rails 52 and 53. The junction point of the rails 56 and 58 and 57 and 59 respectively occurs a distance to the left of the junction point of the rails 50 and 52 and 51 and 53 equal to the distance between the wheels 21 and 23 so that as the former wheels pass from the pitched tracks 50 and 51 onto the horizontal tracks 52 and 53 the wheels 23 will pass from the pitched tracks 56 and 57 onto the horizontal tracks 58 and 59, and to hold the wheels 23 reliably down upon tracks 58 and 59, while tracks 28 and 30 are holding wheels 21 down upon track rails 52 and 53, respectively, I provide a pair of rails 60 and 61 vertically over and parallel with

rails 58 and 59, a distance about equal to the diameter of said wheels 23, as shown clearly in Fig. 11.

As hereinbefore explained the rails 28 and 30 form tracks for wheels 16, the pitched rails 50 and 51 and horizontal rails 52 and 53 form tracks for wheels 21, and rails 56 and 57 and their horizontal continuations 58 and 59 form tracks for wheels 23, the said wheels traveling upon said tracks when the forms are traveling to the right, the rails 54 and 55 as above explained serving to hold wheels 21 upon track rails 50 and 51, until said wheels reach rails 28 and 30, when the latter subserve the same purpose. The rails 50 and 51 not only serve as tracks as explained for the wheels 21 but also serve to hold the wheels 23 down upon the track rails 56 and 57 until they reach rails 58 and 59 when they pass under the guard rails 60 and 61 as will be readily understood. It will also be noted in this connection that the track rails at the opposite side of the machine from the rails just above referred to are all equipped with overlying or guard rails except rails 28 and 30 and that such guard rails in no case form tracks for any of the wheels, it being further noted that their pitched portions are intended to positively and reliably compel said core and end-wall carrying frame wheels to move downward as the weight or gravitative tendency of such frame cannot be depended upon to accomplish such purpose because of the tendency of said end walls and cores to stick to the blocks in the forms.

When each form travels around the left-hand sprocket wheel, where by preference there are no underlying tracks, the frame 17 is prevented from dropping and thus completely disconnecting the core and end walls from the form, by means of the headed rods 7<sup>a</sup> depending from the bottom 7 through the frame 17, the said rods being of such length that when the core is withdrawn from the form, the frame engages the headed lower ends of the rods in order that the latter may form a support for the core and end-wall carrying frame when the wheels thereof are not supported by their track rails. During the travel of each form around the last-named sprocket wheel, its hinged or outer wall occupies its opened or horizontal position and to automatically close it, I provide an inclined rail 64 which is pitched in the same general direction as the adjacent pitched portions of the rails but at a preferably slightly sharper angle, so that as the form rounds the left-hand sprocket wheel its opened or horizontal wall will ride over the adjacent or depressed end of rail 64, which by preference is secured to certain of the uprights 25, as shown in Fig. 1, said rail gradually elevating and closing said hinged wall as the form travels to the

right. When the said wall has nearly closed, it has attained a position where the rail 64 extends inwardly as at 65, the portion 65 continuing the upward inclination of the body of the rail. Said portion 65 merges into a horizontal portion 66 which overlies and parallels the underlying rail 30 so that as the hinged wall reaches the portion 66 of said rail it is completely closed, it being understood that this closure is completely effected just before the pitched track rails have completely reelevated the core and the end wall carrying frame so that the said end walls will still move upward, after the hinged wall is completely closed, a sufficient distance to cause the bars 11 to enter notches 13 and thus automatically relock the hinged wall in its vertical position.

67 indicates an inclined rail of substantially the same type and arrangement as rail 64 but located at the opposite side of the machine and said rail 67 is connected by a portion 68 which extends inwardly and to the right and connects with a horizontal portion 69 overlying rail 31, it being noticed by reference to Figs. 1 and 2, that the portion 68 is disposed to the left of the upper end of the adjacent pitched track rails so that when a form is traveling to the left upon said rails its core and end walls shall have been moved downward to effect the unlocking of bars 11 from bars 12, before it is possible for the hinged wall of said form to either swing outwardly or to be pulled outwardly, the said wall being adapted after it starts to swing outwardly automatically or is pulled outwardly as suggested, to be gradually lowered, by the rail 67 until eventually it has attained the fully opened or horizontal position hereinbefore referred to, at which time the form is adjacent to the left hand sprocket wheel by preference, at which point the block hereinafter referred to, is removed.

Shortly after the forms traveling to the right have been completely closed, as hereinbefore described, they are charged with the material employed in making the blocks, which material may be poured into the form in a plastic state if desired. My preferred method of charging the forms, particularly when a plaster block is to be produced, that is, a block into which nails can be driven and for use primarily as partitions for buildings, is to discharge dry plaster in powdered form mixed by preference with wood fiber to facilitate nailing into the block when completed, into the form and at the same time discharge sufficient water into such form to mix with the powdered material and cause the same to build up solidly from the bottom 7 to the top of the core or cores. In effecting this object I preferably mount a hopper 70, in any suitable manner above the path of the forms, which hopper is

adapted to contain a suitable charge of the material as shown in Fig. 9, being charged preferably by means of a chute 71, and to prevent such material packing in the hopper

5 I preferably provide it with a rotating agitator 72. To guard against the discharge orifice at the bottom of the hopper from becoming clogged, I preferably arrange a fluted roller 73 just above the orifice and

10 gear the same by means of a belt 74 to the shaft 75 of the agitator, said shaft being equipped with a belt wheel 76 by which it is rotated at the desired speed, through the medium of a belt, not shown.

15 Underlying the fluted roller and by preference carried by the hopper in any suitable manner, not shown, is an inverted-V shaped spreader 77, to divide each charge of material discharged from the hopper by one

20 of the corrugations of the fluted roller, and deflect said divided portions down into the form at opposite sides of the core thereof, said spreader also forming a support for the underlying perforated water-supply pipes

25 78, supplied by means of a pipe 79, the water preferably being discharged from the pipes in intersecting planes as shown by the arrows in Fig. 9, down into the form at opposite sides of the core.

30 The orifice of the hopper is preferably of such length that it will supply material to a plurality of forms simultaneously as the latter pass under it so as to give ample time to completely fill the forms, and shortly

35 after each form passes beyond and to the right of the hopper the material is pressed down into the form by means of a preferably resilient trowel 80 which is secured to one of the cross bars 27 and extends down-

40 wardly and to the right therefrom, this trowel not only serving to pack the material in the form but to scrape off any material above the plane of the cores, so that every block shall be of the same height. After

45 passing the trowel, the forms travel to and around the right-hand sprocket wheel, it being understood by reference to Figs. 1 and 2 that I have provided a substantially semi-circular track 80<sup>a</sup> connecting tracks 59 and

50 43 as a support for the outer wheels 23 of the frames 17 as the forms round the said right-hand sprocket wheel, this track 80<sup>a</sup> cooperating with track 32 in relieving the chains of the weight of the forms and the

55 blocks molded therein, the said track 80<sup>a</sup> being supported upon standards 80<sup>b</sup> as shown, or otherwise, it being further noticed by reference to said figures that the upwardly projecting strengthening arms

60 with which tracks 43 and 47 are provided, are dispensed with on track 80<sup>a</sup>. It will be further noticed by reference to Fig. 1, that the track 43 is preferably bowed outward slightly at 80<sup>c</sup> at a point directly in front

of shaft 2 of the right-hand sprocket wheel 65 in order to accommodate the forms as they successively swing around into alignment with the forms traveling directly to the left at the side of the machine opposite from the hopper, it being also noticed that before the

70 forms reach the top of the pitched portions of the track at such side, the material will be "set" preliminary to the removal of the block from the form and in view of the fact that a suctional relation exists between the

75 block and its walls, 6 and 8, it is desirable to admit air between said block and said walls preliminary to the opening of the hinged side-wall, this being accomplished by means of a pair of blades 81, secured to

80 one of the cross bars 27 and extending downwardly and to the left therefrom a suitable distance in the planes of the inner sides of said walls, it being understood that before

85 the forms attain a position beneath such blades, the core-carrying frame has been moved downward a sufficient distance to dispose the upper ends of the end walls below the plane of said blades, to cut between the

90 block and the side walls of the form and thus facilitate, first the opening of the hinged wall in a manner hereinbefore described, and eventually the removal of the

95 block from the bottom and inner or permanent wall of the form, it being understood as hereinbefore explained that the block is removed shortly after the hinged wall has been opened to its horizontal position.

From the above description it will be apparent that I have produced apparatus for

100 expeditiously producing blocks for building or other purposes, the core openings of the block facilitating the drying and providing if desired, hot or cold air or smoke flues, and while I have described and illustrated

105 the preferred apparatus for carrying the process or method into effect, I wish it to be understood that I reserve the right to make all changes properly falling within the spirit and scope of the invention.

110 Having thus described the invention what I claim as new and desire to secure by Letters-Patent, is:—

1. In an apparatus of the character described, a pair of horizontal sprocket

115 wheels, an endless sprocket chain connecting said wheels, a series of vertical forms each consisting of a perforated permanent bottom and one side wall carried by said chain, end

120 walls and cores susceptible of reciprocatory movement, the cores engaging the perforations of the bottom, a side wall hinged to the opposite side of the bottom from the

125 first-named side walls, a bar carried by the hinged side wall and bars carried by the end walls and adapted for engagement with the first-named bar to lock the hinged side wall in its elevated or closed position.

2. In an apparatus of the character described, a pair of horizontal sprocket wheels, an endless sprocket chain connecting said wheels, a series of vertical forms each consisting of a perforated permanent bottom and one side wall carried by said chain, end walls and cores susceptible of reciprocatory movement, the cores engaging the perforations of the bottom, a side wall hinged to the opposite side of the bottom from the first-named side wall, a bar carried by the hinged side wall and bars carried by the end walls and adapted for engagement with the first-named bar to lock the hinged side wall in its elevated or closed position, means for operating said sprocket wheels, and means for imparting downward movement to the end walls and cores and causing the disengagement of the locking bars carried by the former from the bar carried by the hinged side wall to permit the latter to be opened.

3. In an apparatus of the character described, a pair of horizontal sprocket wheels, an endless sprocket chain connecting said wheels, a series of vertical forms each consisting of a perforated permanent bottom and one side wall carried by said chain, end walls and cores susceptible of reciprocatory movement, the cores engaging the perforations of the bottom, a side wall hinged to the opposite side of the bottom, from the first named side wall, a bar carried by the hinged side wall and bars carried by the end walls and adapted for engagement with the first-named bar to lock the hinged side wall in its elevated or closed position, means for operating said sprocket wheels, means for imparting downward movement to the end walls and cores and causing the disengagement of the locking bars carried by the former from the bar carried by the hinged side wall to permit the latter to be opened, and means for swinging the hinged side wall back to its closed position after each opening movement thereof.

4. In an apparatus of the character described, a pair of horizontal sprocket wheels, an endless sprocket chain connecting said wheels, a series of vertical forms each consisting of a perforated permanent bottom and one side wall carried by said chain, end walls and cores susceptible of reciprocatory movement, the cores engaging the perforations of the bottom, a side wall hinged to the opposite side of the bottom from the first-named side wall, a bar carried by the hinged side wall, bars carried by the end walls and adapted for engagement with the first-named bar to lock the hinged side wall in its elevated or closed position, means for operating said sprocket wheels, means for imparting downward movement to the end walls and cores and causing the disengagement of the locking bars carried by the

former from the bar carried by the hinged side wall to permit the latter to be opened, means for swinging the hinged side wall back to its closed position after each opening movement thereof, and means to reelevate the cores and the end walls and thereby cause the bars carried by the latter to reengage the bar carried by the hinged side wall and lock the latter in its closed positions.

5. The combination with a traveling chain of a form consisting of a permanent bottom and a permanent side wall carried by the chain, a hinged side wall carried by the bottom, vertically movable end walls terminating short of the upper ends of the side walls, means whereby the end walls when elevated prevent opening movement of the hinged wall, and a pair of blades occupying the vertical plane of the inner sides of the side walls and adapted to cut between the same and a block molded within the form and admit air between the block and side walls.

6. The combination with a traveling chain of a form consisting of a permanent bottom and a permanent side wall carried by the chain, a hinged side wall carried by the bottom, vertically movable end walls terminating short of the upper ends of the side walls, means whereby the end walls when elevated prevent opening movement of the hinged wall, a pair of blades occupying the vertical plane of the inner sides of the side walls and adapted to cut between the same and a block molded within the form and admit air between the block and side walls, and means for imparting downward movement to the end walls to expose the ends of the block and permit the hinged side wall to be opened.

7. The combination with a traveling chain of a form consisting of a permanent bottom and a permanent side wall carried by the chain, a hinged side wall carried by the bottom, vertically movable end walls terminating short of the upper ends of the side walls, means whereby the end walls when elevated prevent opening movement of the hinged wall, rollers carried by the end walls, inclined tracks for engagement with said rollers to effect downward movement of the end walls, and oppositely inclined tracks to engage said rollers and effect the relevation of the end walls.

8. The combination with a traveling chain of a form consisting of a permanent bottom and a permanent side wall carried by the chain, a hinged side wall carried by the bottom, vertically movable end walls terminating short of the upper ends of the side walls, means whereby the end walls when elevated prevent opening movement of the hinged wall, rollers carried by the end

walls, inclined tracks for engagement by  
said roller to effect downward movement of  
the end walls, oppositely inclined tracks to  
engage said rollers and effect the relevation  
5 of the end walls, and means to support the  
end walls in the interim between their de-  
pression and relevation.

In testimony whereof I affix my signature,  
in the presence of two witnesses.

ROY A. HENLEY.

Witnesses:

H. C. RODGERS,  
G. Y. THORPE.