Aug. 10, 1926. 1,595,369

A. F. WASMER

GYPSUM TILE MOLDING MACHINE

Filed Oct. 31, 1925 2 Sheets-Sheet 1

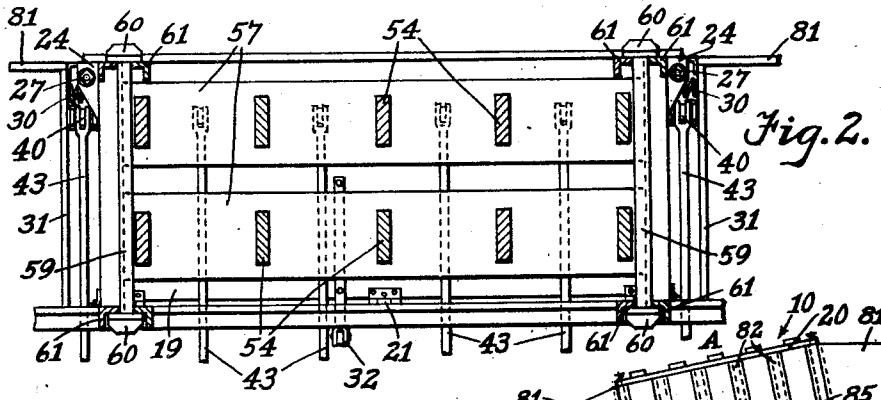


Fig. 2.

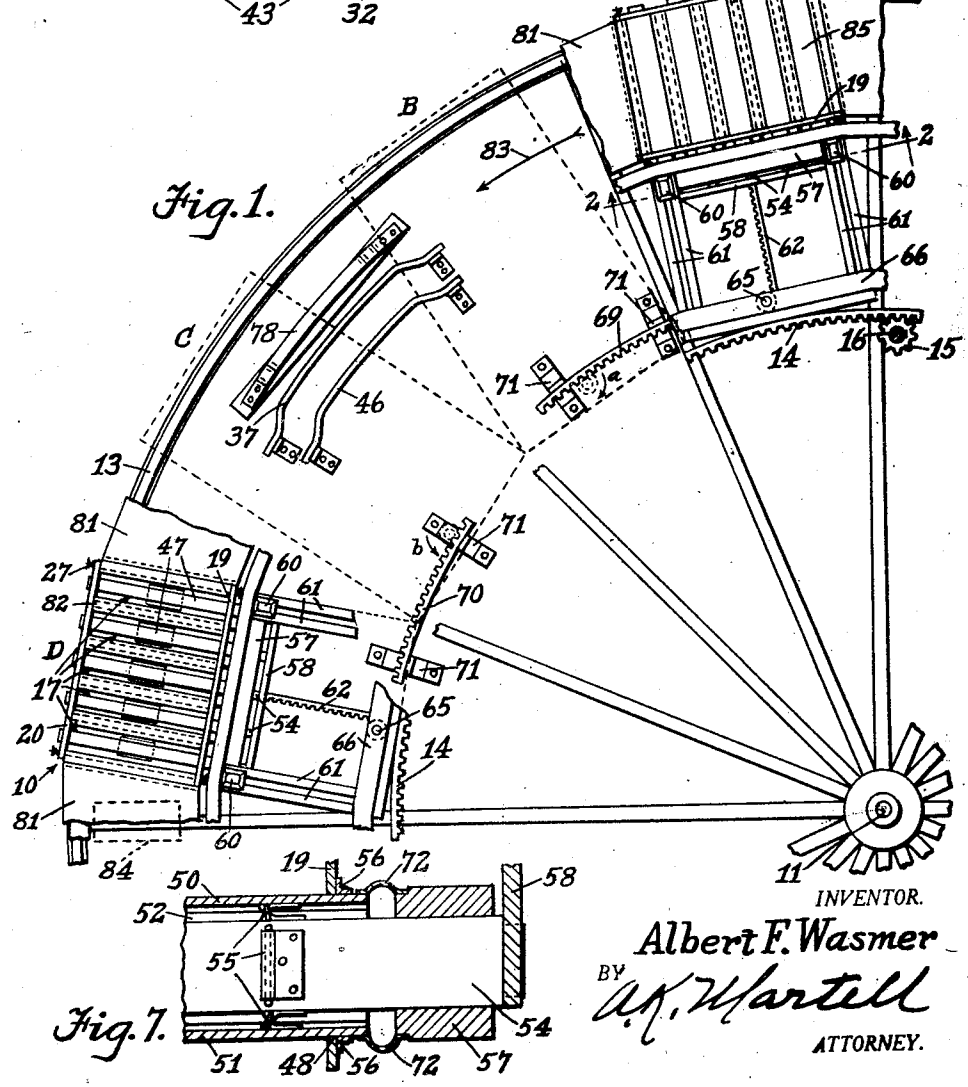


Fig. 1.

Fig. 7.

INVENTOR.

Albert F. Wasmer

BY

A. F. Wartell

ATTORNEY.

Aug. 10, 1926. 1,595,369

A. F. WASMER

GYPSUM TILE MOLDING MACHINE

Filed Oct. 31, 1925 2 Sheets-Sheet 2

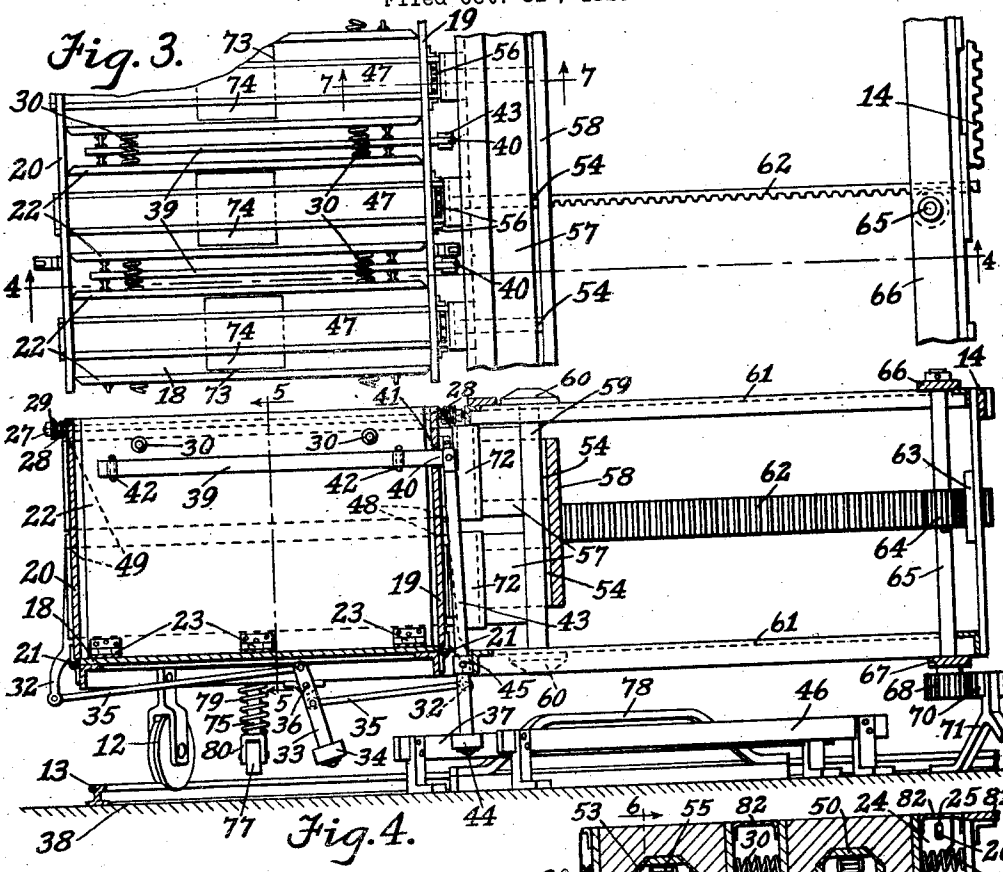


Fig. 3.

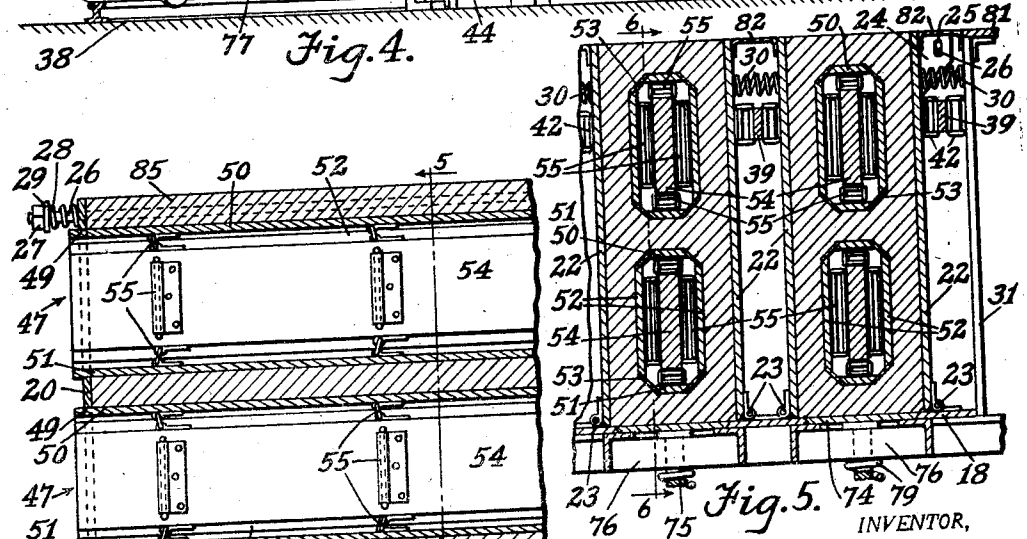


Fig. 4.

Fig. 5.

Fig. 6.

INVENTOR,

Albert F. Wasmer

BY

A. K. Martell

ATTORNEY.

Patented Aug. 10, 1926. 1,595,369

UNITED STATES PATENT OFFICE.

ALBERT F. WASMER, OF LOS ANGELES, CALIFORNIA, ASSIGNOR OF ONE-HALF TO MYRTLE EDWARDS, OF LOS ANGELES, CALIFORNIA.

GYPSUM-TILE-MOLDING MACHINE.

Application filed October 31, 1925. Serial No. 65,989.

My invention relates to tile molding machines and more particularly to a tile molding machine adapted for making tile out of quickly setting material, such as gypsum.

The primary object of my invention is to provide a machine for molding hollow tile which is continuous in its operation.

A further object is to provide a tile molding machine which is equipped with a plurality of molds having hinged walls and collapsible cores whose operation facilitates the withdrawal of the cores from the casts and also facilitates the removal of the casts from the molds.

A further object is to provide a molding machine of the character described, the mold walls of which are automatically expanded and the mold cores of which are automatically collapsed and withdrawn from the casts.

Other objects and advantages will appear hereinafter, and while I show herewith and will describe a preferred form of construction, I desire to be understood that I do not limit my invention to such preferred form, but that various changes and adaptations may be made therein without departing from the spirit of my invention as hereinafter claimed.

The preferred form of my invention is illustrated in the accompanying drawings which compose a part of this specification and in which—

Fig. 1, is a plan view of a section of my tile molding machine, portions of which are broken away to show underlying parts.

Fig. 2, is an enlarged transverse sectional view of one group of the molds shown in Fig. 1, taken on line 2—2 of that figure.

Fig. 3, is an enlarged plan view of the three middle molds of one section of my tile molding machine.

Fig. 4, is a longitudinal sectional view of a mold section, taken on line 4—4 of Fig. 3, showing some of the operating parts in side elevation and also showing, in perspective, the approximate positions of actuating parts fixed to the floor under the machine.

Fig. 5, is an enlarged transverse sectional view of the two right hand molds of a group, taken on lines 5—5 in Figs. 4 and 6, casts being shown in the molds.

Fig. 6, is a fragmentary longitudinal sectional view of the outer end of one of the molds taken on line 6—6 of Fig. 5.

Fig. 7, is a fragmentary sectional view showing details of the inner end of one of the mold cores, the section being taken approximately on line 7—7 of Fig. 3.

Referring in detail to the drawings, the general plan of the machine as indicated in Fig. 1 is a series of mold sections 10, connected in a circular framework about a vertical shaft 11 which serves as a central support and pivot, the peripheral part of the framework being supported on wheels 12, which are adapted to travel on a circular track 13, whose center coincides with shaft 11. A circular rack 14 is fastened to the framework concentric with track 13 and a driving pinion 15, keyed on a vertical shaft 16 which is adapted to be driven by a motor (not shown), meshes with circular rack 14.

Each of the mold sections of the machine has a group of five molds 17 having a common bottom plate 18 and common inner and outer end-plates 19 and 20 respectively, the end-plates being hinged to the framework as at 21 so that they close tightly against the bottom plate when in their normal position. Each mold of the various sections is provided with separate side plates 22 which are hinged to bottom plate 18, as at 23, and which together with the end plates form the walls of the molds. End-plates 19 and 20 have end extensions at their upper edges forming lugs 24, and apertures 25 are made in these lugs through which rods 26 extend longitudinally at the sides of each section between said end plates 19 and 20. The ends of rods 26 are threaded to receive nuts 27 and helical springs 28 are held under compression on rods 26 between lugs 24 and washers 29 which are in contact with nuts 27. These springs serve to hold end plates 19 and 20 in contact with the ends of side plates 22. Similar helical springs 30 are held under compression between side plates 22 of adjacent molds, there being spaced upright bars or plates 31 fixed adjacent the outer plates of each section against which one end of the outer springs 30 rests.

Lever arms 32 are fastened to end-plates 19 and 20 so as to project below their lower edges at approximately the middle point thereof and a lever arm 33 having a roller

34 pivoted on its lower end is pivotally attached to the framework under each mold section in radial alignment with lever arms 32. Connecting rods 35 are pivotally attached to lever arm 33 at equal distances from its pivot 36 and to each of the two lever arms 32 so that when its lower end is moved outwardly lever 33 operates through the connecting rods 35 to turn end-plates 19 and 30 slightly on hinges 21 and spread their upper edges apart against the action of springs 28. In order to produce this operation of lever 33 a bent rail 37, serving as a cam, is fixed to the floor 38 under the machine in such a position as to engage rollers 34 during a certain part of their course as they travel about central shaft 11.

Flat bars 39, extending longitudinally between adjacent side plates 22 of adjacent molds below springs 30, with their inner ends 40 projecting through apertures 41 provided in end plates 19, are attached to side plates 22 by link hinges 42 in such a manner that when they are shifted longitudinally toward the center of the machine the side plates of each mold are turned slightly on hinges 23 and are pulled apart at their upper edges against the action of springs 30. Vertical lever arms 43, having their upper ends pivotally attached to projecting ends 40 of bars 39 and their lower ends equipped with rollers 44, are pivoted as at 45 to the framework of the machine. A bent rail 46 similar to rail 37, but somewhat shorter, is fixed to the floor 38 in the path of rollers 44 and serves as a cam to operate levers 43 as said rollers 44 are engaged by it.

Collapsible cores 47 are adapted to be inserted into the mold longitudinally through apertures 48 in end-plates 19 and to extend through apertures 49 in end-plates 20. These cores are arranged in connected groups of ten for each section, two for each mold, one above the other, the whole group being adapted to operate simultaneously. Each core is made of four parallel plates, an upper plate 50, a lower plate 51 and two side plates 52, all of which are narrower than the corresponding dimensions of the core when expanded, and the adjacent edges of the plates are connected by strips 53 of flexible or elastic material which closes the joints while permitting a slight movement of the side plates and the upper and lower plates toward and away from each other. A draw-bar 54 extends longitudinally through each core between the four plates and is hinged to them by link hinges 55 at spaced intervals of its length which hold the plates in parallel relation to each other and to bar 54 and which, when the bar is shifted, operate to spread the plates farther apart or to draw them closer together, while they are held so that they cannot move endwise. Cleats 56 are fastened to the outer sides of plates 50, 51 and 52 near their inner ends which limit the movement of the core plates outwardly by coming in contact with end plate 19. By "inner ends," as here used, is meant the ends nearest the center of the machine and by "outwardly" is meant away from the center of the machine.

The inner ends of draw-bars 54 pass through bearing blocks 57, one for the upper and one for the lower series of cores in each mold section, and are fixed to a common frame or plate 58 by means of which they may all be shifted simultaneously in said bearing blocks. The bearing blocks in each section are fixed at their ends in spaced relation to each other between two upright bars 59 equipped with shoes 60 on their upper and lower ends which slide on upper and lower guide bars 61 on both sides of the section. A rack 62, adapted to slide in a bearing 63 fixed to the inner end of the framework of each mold section, has its outer end fixed to the center of frame 58 and a pinion 64 keyed to a vertical shaft 65 adjacent bearing 63, meshes with this rack. Shaft 65 is journaled in upper and lower tie-bars 66 and 67 respectively, which are fastened to the inner ends of the mold sections around the machine, the lower end of shaft 65 projecting far enough below tie-bar 67 to receive a second pinion 68 which meshes with arcuate racks 69 and 70 mounted on brackets 71 fixed to the floor 38, in spaced relation to each other and to cam rails 37 and 46. Covering strips 72 of flexible or elastic material, preferably rubber, are fastened to the inner ends of core plates 50, 51 and 52, and to bearing block 57, as shown in Fig. 7, to prevent mortar or other material from falling therebetween.

Bottom plates 18 have apertures 73 cut therein at approximately the center of each mold and lifting-plates 74 are fitted in these apertures so as to be flush with the bottom plates. Each of said lifting-plates 74 has fixed to its under side a vertical bar 75, preferably square in cross section, which is adapted to slide vertically in a bearing 76 fixed in the under framework. The lower end of each vertical bar 75 is equipped with a roller 77 which is adapted to engage an upwardly bent rail 78 fixed to floor 38 adjacent cam rails 37 so as to raise lifting-plates 74 a predetermined distance above bottom plate 18. A helical spring 79, mounted on bar 74 so as to be compressed between bearing 75 and fork 80 in which roller 77 turns, tends to restore lifting-plate 73 to its normal lowered position.

Spacing plates 81, co-extensive with the length of the molds, are fixed to bars 31 between adjacent mold sections, flush with the upper edges of the mold plates, to prevent matter from falling between the sections,

and strips 82 of flexible or elastic material, such as leather, canvas, or rubber, are fastened to the upper edges of side plates 22 of adjacent molds, as shown in Fig. 5, to prevent matter from falling therebetween while allowing an appreciable amount of motion thereof toward and away from each other.

The operation of the machine may be understood most readily by reference to Figs. 1 and 4, it being understood that the complete machine is being driven through the operation of pinion 15 on rack 14 to produce rotation thereof about its center in the direction indicated by arrow 83, and that there is a mixing machine with a feeding hopper in the position indicated by the dotted rectangle 84 under which the molds pass as the machine turns. The rate of rotation is so regulated that the material in the molds, between the time they have passed the hopper and the time they have arrived in the position of section A, will have sufficiently hardened or set to form a cast that may be handled without breaking. As they move into the position of section B, indicated by dotted lines, pinion 68 comes into engagement with rack 69 which turns shaft 65 and pinion 64 in the direction indicated by arrow *a*. Pinion 64 operates on rack 62 to withdraw all the cores of the section. At the beginning of the withdrawing action draw bars 54 slide sufficiently in bearing blocks 57 to cause hinges 54 to swing into positions which pull plates 50, 51 and 52 away from the cast 85 thus facilitating the complete withdrawal of the cores therefrom. After the cores have been completely withdrawn the continued motion of the machine brings first rollers 34 into engagement with cam rail 37 and then rollers 44 into engagement with cam rail 46, thus actuating lever arms 32 and 43 to open the upper edges of the end plates of the section and the side plates of the individual molds respectively. Further rotation of the machine brings rollers 77 into engagement with cam rail 78 whereby lifting plates 74 are raised and the cast lifted out of the mold far enough to be readily grasped and removed therefrom.

As the rotation continues and the molds assume the position of section *c*, indicated by dotted lines, rollers 77, 44 and 34 move successively out of engagement with cam rails 78, 46 and 37 respectively and springs 79, 30 and 28 operate to restore lifting plates 73, side plates 22 and end plates 18 respectively to their normal positions. Immediately after such restoration pinion 68 is engaged by rack 70 which causes shaft 65 and pinion 64 to turn in the direction indicated by arrow *b* in Fig. 1, which is opposite to that caused by rack 69, and operates rack 63 to return cores 46 into the molds. Just before pinions 68 move out of engagement with rack 70 cleats 56 come in contact with end plate 19 and hold core plates 50, 51 and 52 from further outward movement while draw-bars 54 slide through bearing blocks 57 and cause hinges 55 to open so as to swing said core plates outwardly from the draw-bar until they fit snugly in apertures 48 and 49 of end-plates 19 and 20 respectively. The molds, which have now arrived at the position of section D, are in condition to pass under the hopper at 84 and be refilled. It will be seen that the machine is designed to operate continuously and that the movements of its mold walls and cores are entirely automatic.

Having thus illustrated and described my invention, I claim:

1. A tile molding machine comprising a series of mold sections connected in a circular framework adapted to rotate about its center under the feed hopper of a mixing machine, a plurality of molds in each of said mold sections, collapsible cores in each of said molds and means for automatically withdrawing said cores from said molds and re-inserting them therein as the machine is caused to rotate.

2. A tile molding machine comprising a series of mold sections connected in a circular framework adapted to rotate about its center under the feed hopper of a mixing machine, a plurality of molds in each of said mold sections, hinged plates forming the walls of said molds, collapsible cores in each of said molds, means for automatically spreading the upper edges of said wall plates apart and means for automatically withdrawing said cores from said molds and re-inserting them therein as the machine is caused to rotate.

3. A tile molding machine comprising a series of mold sections connected in a circular framework adapted to rotate about its center under the feed hopper of a mixing machine, a plurality of molds in each of said mold sections, hinged plates forming the walls of said molds, collapsible cores in said molds, automatically operated means for spreading the upper edges of said wall plates apart, automatically operated means for withdrawing said cores from said molds and re-inserting them therein, and automatically operated means for lifting the cast out of said molds as the machine is caused to rotate.

4. A tile molding machine comprising a series of mold sections connected in a circular framework adapted to rotate about its center under the feed hopper of a mixing machine, a plurality of molds in each of said mold sections, hinged plates forming the walls of said molds, springs holding said wall plates in closed relation to each other, levers attached to said wall plates with their lower ends projecting below said

framework, cams fixed in the path of said levers whereby they are operated to open said wall plates during a part of the machine's rotation, collapsible cores in said molds, automatically operated means for collapsing and expanding said cores and for withdrawing said cores from the molds and reinserting them therein, a lifting plate in the center of said molds and automatically operated means for raising said lifting plate to a predetermined height during a part of the machine's rotation coincident with the opening of said wall plates and the withdrawal of said cores.

5. In a tile mold for making hollow tile a collapsible core comprising pairs of oppositely disposed plates in spaced relation to each other a draw-bar extending longitudinally between said pairs of plates, said draw-bar being hinged at intervals of its length to all of said plates so as to hold the two plates of each pair in variable parallel spaced relation to each other, and strips of flexible material attached to adjacent edges of said plates so as to close the joints between them.

6. In a tile mold for making hollow tile a collapsible core comprising two pairs of oppositely disposed plates in spaced relation to each other, a draw-bar extending longitudinally between said pairs of plates, double jointed hinges connecting said draw-bar to said plates at intervals of its length, whereby the plates of each of said pairs are held in variable parallel spaced relation to each other and the plates of one pair are held in right angled relation to those of the other pair, and strips of flexible material fastened to adjacent edges of said plates so as to close the joints between them.

ALBERT F. WASMER.