

Nov. 25, 1930.

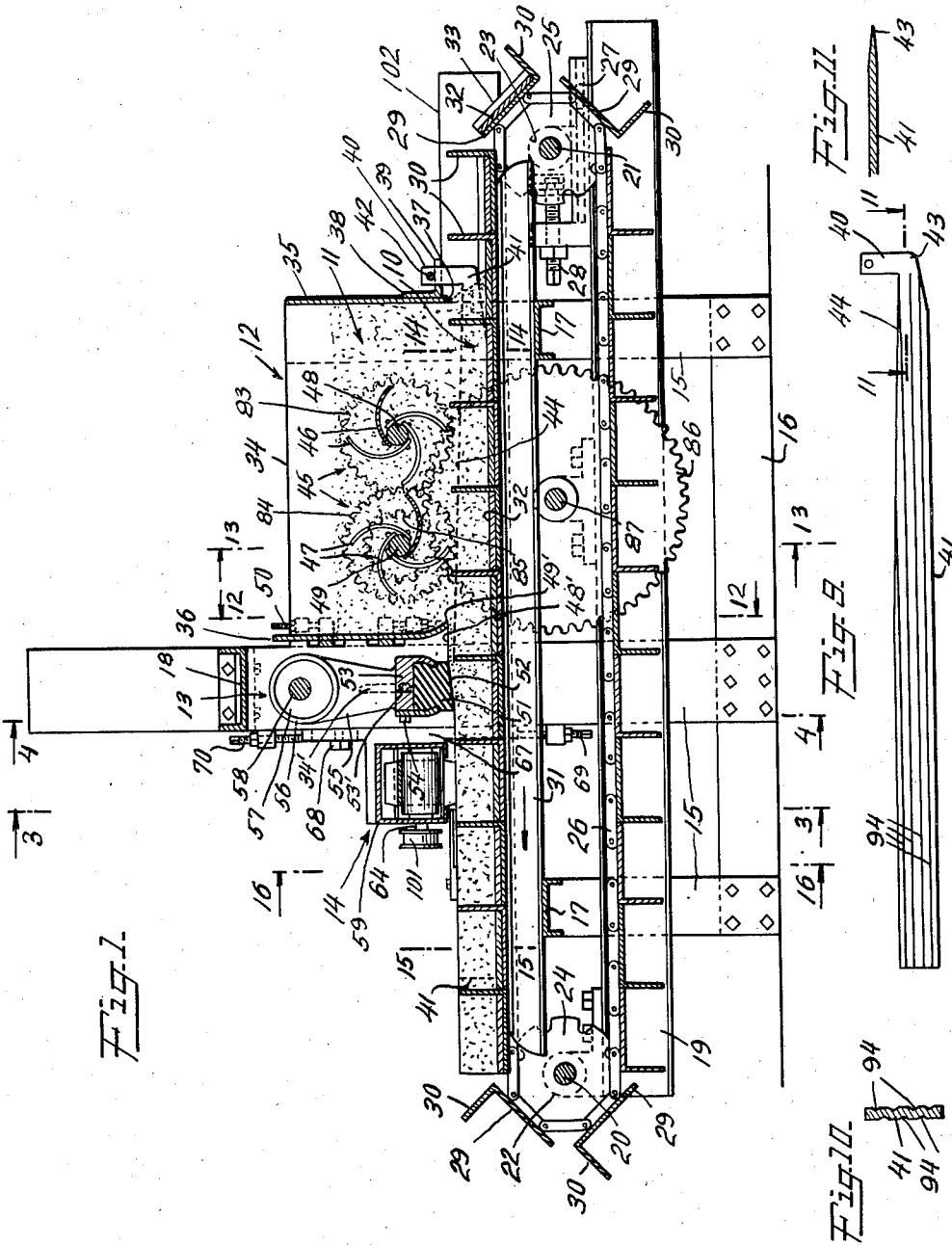
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1,782,413

CONCRETE BRICK MANUFACTURE

Filed April 23, 1926

4 Sheets-Sheet 1



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CONCRETE BRICK MANUFACTURE

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4 Sheets-Sheet 2

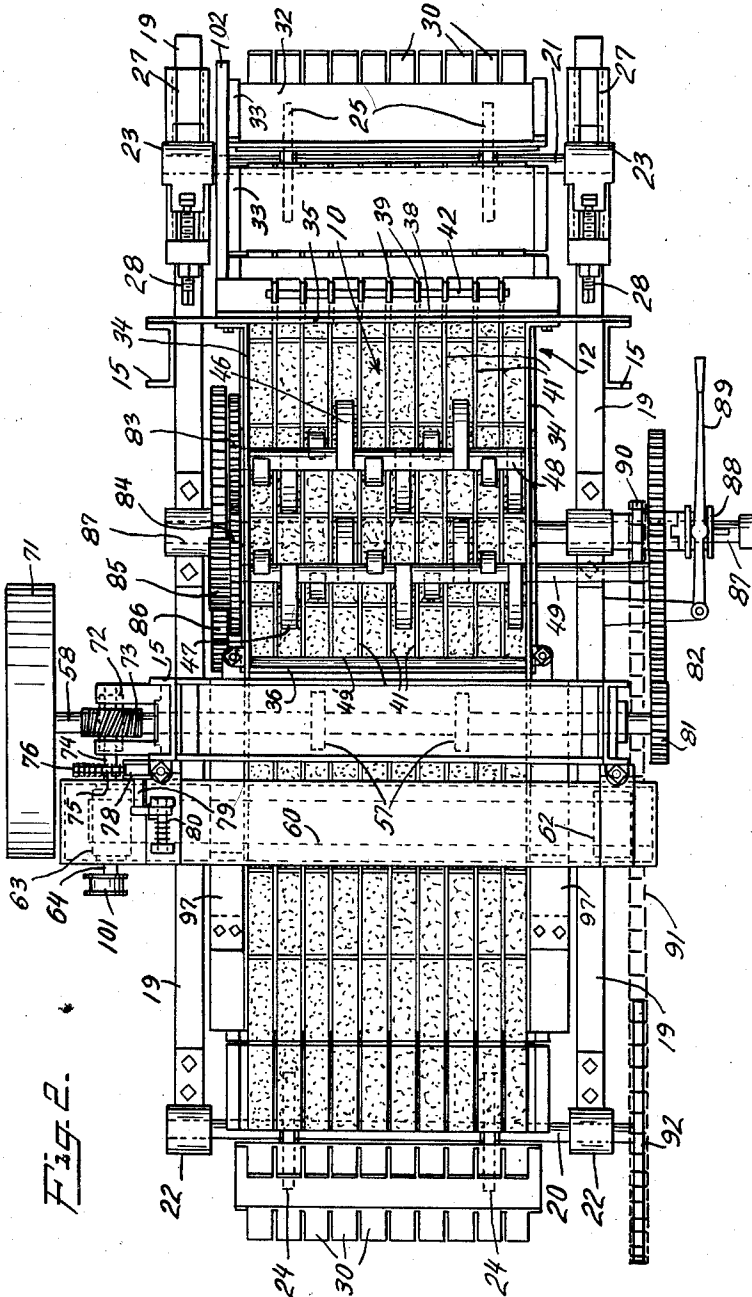


Fig. 2.

Fig. 3.

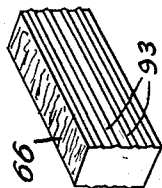


Fig. 7.

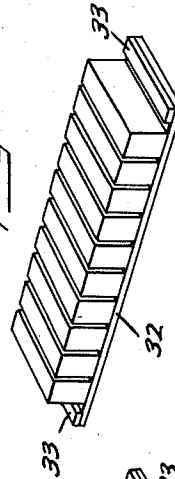


Fig. 6.



Fig. 5.



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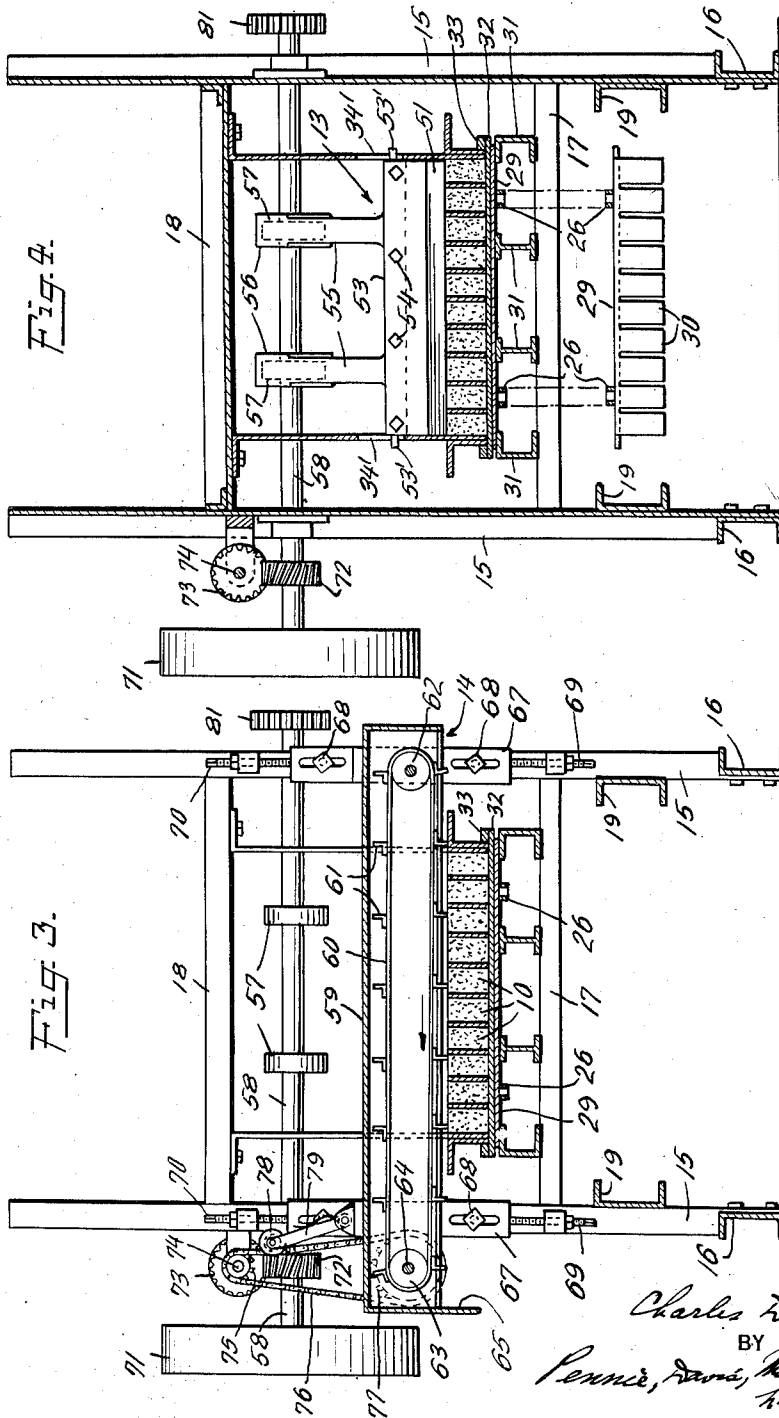
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CONCRETE BRICK MANUFACTURE

Filed April 23, 1926

4 Sheets-Sheet 3



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CONCRETE BRICK MANUFACTURE

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4 Sheets-Sheet 4

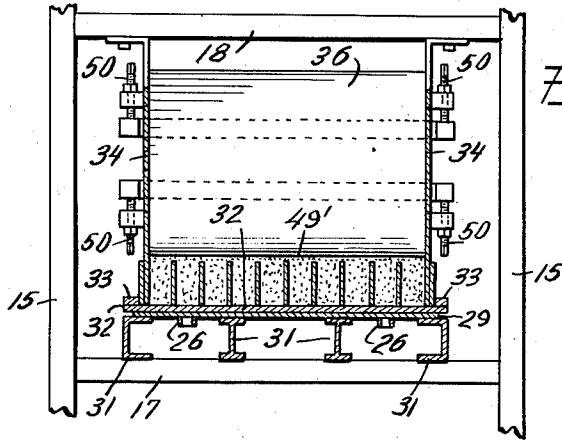


Fig. 12.

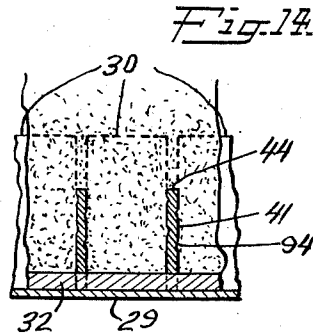


Fig. 14.

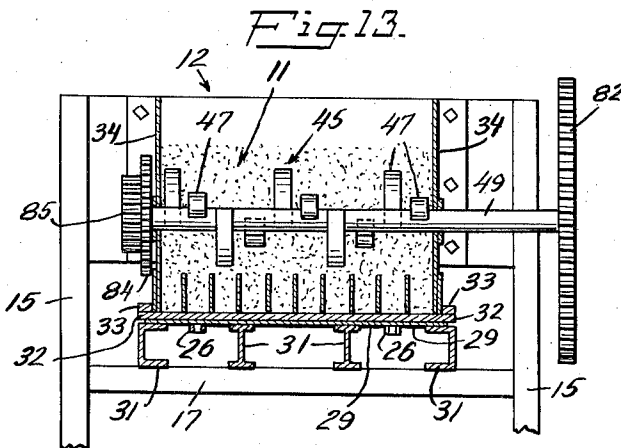


Fig. 13.

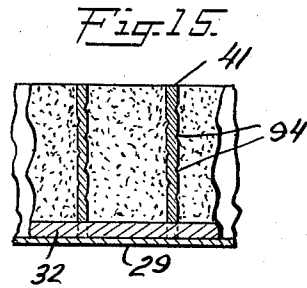


Fig. 15.

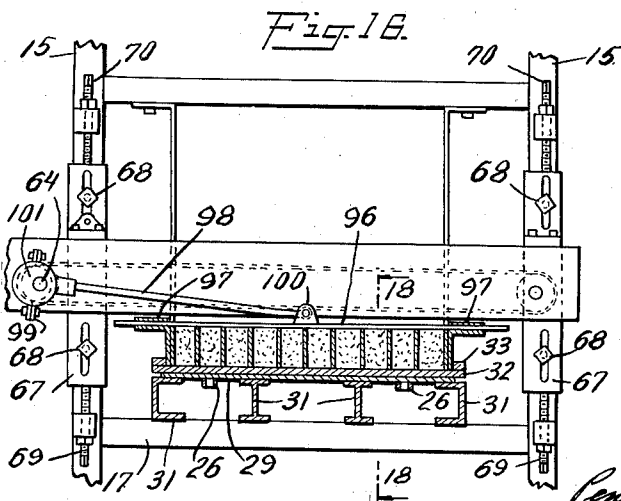


Fig. 16.

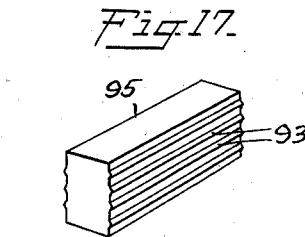


Fig. 17.

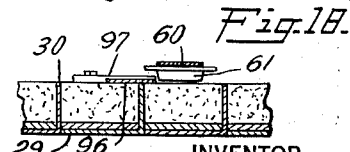


Fig. 18.

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CONCRETE-BRICK MANUFACTURE

Application filed April 23, 1926. Serial No. 104,047.

The present invention relates to concrete brick manufacture and has for its object the provision of an apparatus of improved construction for making bricks from appropriate mixtures of cement, water and a suitable aggregate material such for example as sand.

The apparatus which I employ for making concrete bricks is of the class in which molding forms moving over a supporting bed are filled with the molding material which is then compressed within the forms to pack the same. Such machines operate to continuously produce molded bricks and in the respects mentioned the present apparatus is similar to that of the prior art.

In structure the molding forms of the present invention comprises pallet holders having upstanding backs and secured to an endless chain driven by appropriate gearing to cause the pallet holders to move successively over the bed of the machine and beneath a mass of molding material. Pallets are placed upon the pallet holders just prior to their entrance beneath the mass of material and these pallets bridge the spaces between adjacent upstanding backs of the pallet holders so that the bottom and two walls of each molding form are constituted by one of the pallets and two adjacent upstanding backs of the pallet holders. The width of these pallets is equal to the length of a brick and the length of the pallets is equivalent to the combined thicknesses of a plurality of bricks, the number depending upon the width of the machine. The upstanding backs of the pallet holders are provided with spaced slots and as the elongated molding forms constituted by the pallets and the holders enter beneath the mass of molding material, slicing or separator bars enter these slots and serve to subdivide the elongated forms into a plurality of subdivisions each of the shape and dimensions of the brick which it is desired to make. The upper surfaces of these slicer bars slope gradually throughout the mass of molding material for a purpose which will appear later.

The apparatus of the present invention provides for a hopper within which the molding material is contained and the side walls of this hopper have straight edges so that the

upper surfaces of the pallets are made to slide in contact with these straight bottom edges. The moving molding forms thus constitute the bottom of the hopper and close this bottom and its sides to prevent spilling of the material.

As the material which gradually collects within the molding forms in their progress through the hopper is moved along the side surfaces of the stationary slicing bars which form the side walls of the individual brick molds, the material is dragged into the rear corners of the molds so as to completely fill them and the forward portion of the mold is filled by the flexible rotating arms. There is a tendency for the material as it slides along the sides of the slicing bars during and subsequently to the tamping operation, to adhere somewhat to these stationary bars. This roughens the sides of the bricks leaving depressions therein and giving the mortar an increased grip on the bricks when they are laid. By appropriately shaping the sides of the slicers, grooves or other formations are formed in the sides of the bricks.

Further in accordance with the invention the rear wall of the hopper is provided with a knife edge for cutting off the material as the forms emerge from beneath the mass. This cutting edge is adjusted so as to leave an appropriate surplus of material above the tops of the molding forms to produce the desired density in the finished brick. This surplus material is tamped into the forms by a vertically reciprocating plunger which is provided with a gently sloping face higher at its front end than at the rear so that the surplus material is packed into the forms in a step-by-step process. This plunger does not operate below the surfaces of the molding forms so that it is not necessary to vertically align the forms therewith to allow the plungers to enter them. Accordingly a single plunger is made to extend laterally across the tops of a plurality of brick molds so that a number of these molds are simultaneously tamped by a single plunger and its operating mechanism.

Further, in accordance with the improved apparatus of the present invention, means are

provided for rapidly producing a tapestry finish upon the upper exposed surfaces of the bricks while they remain in the molds. This is accomplished by means of a continuously moving transverse scraping device, the scrapers being of such form and acting upon the surfaces of the molded material at such an angle as to carry forward the lumpy particles of various size which are left by the tamping mechanism. These particles are dragged over the surface of the molded material in such a way as to cause them to scratch irregular but generally parallel lines across the edge faces of the molded bricks and thus produce what is known as the tapestry finish.

When it is desired to produce a smooth surface brick an additional device is added to the machine just beyond the scraping mechanism and the scraping mechanism is raised slightly so as to be out of contact with the surface of the molded material. This added device comprises a flat transversely reciprocated smooth plate which eradicates all of the irregularities left by the tamping mechanism. The scrapers acting directly in front and parallel with this reciprocating plate serve to continuously remove the loose material which accumulates in front of the plate.

The invention will be better understood by a study of the accompanying drawings which illustrate, by way of example, the present embodiment of the apparatus. In these drawings

Fig. 1 is a longitudinal section taken centrally through the apparatus;

Fig. 2 is a plan view of the apparatus;

Fig. 3 is a transverse section taken on the line 3—3 of Fig. 1 showing the surface finishing mechanism and means for adjusting the same;

Fig. 4 is a transverse section taken on the line 4—4 of Fig. 1 showing the tamping mechanism;

Fig. 5 is a perspective view of a pallet holder;

Fig. 6 is a perspective view of a pallet alone;

Fig. 7 is a perspective view of a pallet as it comes from the machine with a row of completely formed bricks thereon;

Fig. 8 is a perspective view of a completed brick made with tapestry edges;

Fig. 9 is a side view of a floating slicer or separator bar which shapes the sides of the bricks;

Fig. 10 is a transverse section of the slicer bar;

Fig. 11 is a fragmentary, longitudinal section taken on the line 11—11 of Fig. 9 to show the tapering front ends of the slicers;

Fig. 12 is a transverse section taken on the line 12—12 of Fig. 1 to show the apron for controlling the amount of material going into each brick and the adjusting means therefor;

Fig. 13 is a transverse section taken on the

line 13—13 of Fig. 1 showing the stirring, distributing and preliminary tamping device;

Fig. 14 is a fragmentary, transverse section taken on the line 14—14 of Fig. 1 showing the packing of the material above the tops of the slicer bars;

Fig. 15 is a similar section taken on the line 15—15 of Fig. 1 after the formation of the brick has been completed;

Fig. 16 is a view (certain parts being omitted) partly in elevation and partly in transverse section taken on line 16—16 of Fig. 1 to illustrate an additional mechanism not shown in Fig. 1 which is useful in making a modified form of brick;

Fig. 17 is a perspective view of the modified brick which has smooth edges instead of tapestry edges; and

Fig. 18 is a fragmentary section taken on the line 18—18 of Fig. 16.

Referring first to Figs. 1 and 2 of the accompanying drawings, the bricks are formed by passing forms or molds 10 having traveling bottoms and ends and stationary sides under a mass of cementitious material 11 contained in a hopper 12, a sufficient amount of material being taken from the mass 11 to completely fill the forms 10. The forms then pass beneath the tamping mechanism 13 and under the scraping devices 14 by which the excess material is removed, and the completely formed bricks arrive at the left hand end of the machine as shown in Fig. 1 ready for removal therefrom.

The apparatus is built up on a frame-work comprising the upright steel channels 15 tied together longitudinally at the bottom by channel members 16. This structure is duplicated on the two sides of the machine which are tied together by the transverse lower and upper channels 17 and 18 respectively (see Figs. 1 and 4). A pair of channel members 19 extend throughout the entire length of the machine on each side thereof and are secured to the uprights 15 somewhat above the bottom channels 16.

As may be seen in Figs. 1 and 2, shafts 20 and 21 are rotatably carried in suitable bearings 22 and 23 which are secured respectively at or near the opposite ends of channels 19. These shafts each carry two sprocket wheels 24 and 25 respectively and between each of the corresponding pairs of sprocket wheels 24 and 25 there passes an endless chain 26. The bearings 23 for shaft 21 at the right hand end of the machine are slidable in dove-tailed ways 27 by means of adjusting screws 28 for the purpose of taking up the slack in chains 26.

Secured to alternate links of each of chains 26 are the pallet holders 29 which as may be seen in Fig. 5 are rectangular metal plates provided with upstanding backs 30 securely fastened in slightly spaced relation from one

another along the rear edge of the pallet holder. As the chains 26 are driven, by mechanism which will be described later on, they move the pallet holders 29 in closely adjacent succession along the straight upper surfaces of the rails 31 which comprise steel beams of I and channel section extending longitudinally of the machine from a point adjacent the sprocket wheels 25 to a point adjacent the sprocket wheels 24. When the pallet holders have reached the left hand or rear end of the machine they pass around the sprockets 24 and return underneath the rails 31 to the front end.

As the pallet holders rise over the sprockets 25 at the front end of the machine, pallets 32 consisting of rectangular boards as shown in Fig. 6 having cleats 33 at each end are placed on the pallet holders. When the pallet holders arrive in the horizontal position adjacent one another on the tops of rails 31 the distance between the upstanding backs 30 is that corresponding to the length of the bricks to be made and the vertical distance from the upper surface of the pallet boards 32 to the tops of the backs 30 corresponds to the width of the bricks.

The hopper 12 has two vertical side walls 34, a front wall 35, and a vertically adjustable rear wall or apron 36, the walls being made of steel plates. The front wall 35 stops short along a transverse horizontal line which just clears the tops of the upstanding backs 30 of the pallet holders and forms a mouth for the entrance of these holders at the bottom of the hopper. An angle 38 is fastened to wall 35 just above mouth 37 and this angle has its horizontal portion slotted as indicated at 39 for the purpose of receiving the upright shanks 40 of a plurality of slicer or separator bars 41, which are held in these slots by a rod 42 extending through holes in the shanks. These separator bars extend from this point through the hopper 12 and some distance beyond the scraping mechanism 14, their function being to divide the pallet boards 32 lengthwise into subdivisions corresponding to the thickness of the bricks, the spacing of the bars corresponding to the width of standard bricks.

The slicer or separator bars 41 are held in stationary position by their shank fastenings just described and are thus mounted in a floating position inasmuch as they are held only at their head ends and rest upon the moving surfaces of the pallet boards 32 within the slots in upstanding backs 30 of the pallet holders, the direction of movement of the pallet boards being such as to always hold the shanks 40 within the slots of angle 38.

As the elongated forms comprising the pallet holders with their pallet boards move toward the mouth 37 of the hopper the forward ends of the separators 41 enter the slots

of backs 30, subdividing the elongated form into a plurality of forms 10 of brick size. The leading ends of the separators are sharpened as shown at 43 in Fig. 11 to facilitate their entrance into the slots. The material 11 flows down into the forms 10 constituted as will be understood from the above description by the pallet boards 32, the walls of the backs 30 and the surfaces of the separators 41. It should be mentioned before proceeding further that the pallet boards 32 supported on the pallet holders 29 constitute the bottom of the hopper 12 and in order to prevent leakage of the material 11 at the sides of the hopper these sides 34 are thickened along their bottom edges by means of narrow metal strips as shown in Figs. 12 and 13. The rails 31 are positioned at an elevation to carry the pallet boards 32 in closely adjacent sliding relation to the bottom edges of the side plates 34 and the strips just mentioned. Moreover, the cleats 33 on the ends of the pallet boards are positioned so as to make a fairly close fit with the outer surfaces of these strips.

The mixture of sand, cement and water constituting the material 11 is in comparatively dry condition as distinguished from a freely flowing slurry and its particles are sufficiently adherent to make it a plastic. Accordingly the complete filling of the forms 10 presents something of a problem. To facilitate the complete filling and to secure a certain slight degree of packing the upper surfaces 44 of the separator bars 41 taper gradually from their forward ends throughout the hopper 12 and finally reach their full height just at the rear of the hopper. This allows the material 11 to flow into the various forms as unit mass as indicated in Fig. 14, the material above the sloping tops 44 of the separator bars being in one continuous mass and therefore exerting a greater degree of pressure upon the material below than would be the case if the bars 41 were of full height throughout the length of hopper 12. In other words, the material in the elongated molding form constituted by the pallet, the adjacent upstanding backs 30 and the sides 34 of the hopper 12 is gradually sliced as it collects in such elongated form into a plurality of subdivisions lying side by side throughout the length of the elongated form from one side wall 34 to the other, each of these subdivisions being of the size of a brick. The material is more or less adherent in character and of necessity the tops of the bars 41 tend to support the material and retard the entrance thereof into the molds. The material which flows down into the molds as the molds enter the hopper 12 is carried forward by the pressure exerted by the upstanding backs 30 of the pallet holders and the sloping upper surfaces 44 of the stationary bars 41 exert a slicing action upon this material, subdividing

it into portions of the required thickness for the bricks, this slicing or cutting action being gradual throughout the travel of the material in the forms 10 through the hopper.

Because of the characteristics of the material 11 above referred to, there is a tendency for it to bridge over the entire length of the hopper 12 which would result in the forms 10 being only partially filled. To overcome this tendency of the material the combined stirring, distributing and preliminary tamping devices 45 are provided, these being shown particularly in Figs. 1, 2 and 13. These devices 45 each comprise a plurality of backwardly curved flexible steel blades 46 and 47 secured to the oppositely rotating shafts 48 and 49 respectively. These shafts are driven by mechanism which will be described presently. As may be seen in the drawings, there is one blade 46 and 47 for each longitudinal row of molds and these blades are somewhat narrower than the spacing of the slicer bars 41. The relative positions of the blades 46 and 47 which operate over the same row of molds may be readily seen in Fig. 1 where these two blades are shown in section.

The rotation of the blades just described is noticeably rapid in relation to the progress of the molds 10 through the hopper 12 and the effect of these blades is to keep the material 11 constantly in a state of agitation so as to further mix the ingredients of material 11 which, however, have been previously mixed in a separate mixing apparatus (not shown) prior to being placed in the hopper 12. This continued stirring not only mixes the ingredients more thoroughly, but also prevents the bridging over above referred to. The further effect of rotating blades 46 and 47 is to scatter or distribute the material 11 into the corners of the molds 10 and as each mold is subjected to the successive actions of blades 46 and 47 the material is effectively distributed and no vacant areas are left. In addition, blades 46 and 47 exert a certain downward pressure upon the material and because of the intermittent character of their action the effect thereof is that of subjecting the material to a preliminary tamping operation which packs it to a certain degree in the molds.

After the material carried forward by the molds has passed out from the action of the blades 46 and 47 and as it takes its exit from the hopper 12 it is cut off along the surface 48' by the knife-like edge 49' of the apron 36. It will be noted that the elevation of surface 48' is slightly above the tops of the molds 10, thereby leaving a certain surplus of material to be tamped into place by the tamping device 13. The apron 36 is vertically adjustable by means of the screws 50 so that the amount of surplus material left by the knife edge 49 can be varied to suit changing

conditions in the material 11 or for manufacturing different types of bricks. The bottom of apron 36 is curved inwardly for the purpose of providing a relatively sharp edge so as to cut a comparatively smooth surface and effectively prevent the exit of lumpy material or relatively large particles which would detract from the finish of the bricks.

The material within the molds 10 is next subjected to the tamping action of device 13 which comprises a plunger 51 of appropriate yielding material such as rubber, this plunger being given a relatively rapid reciprocatory motion. The tamping surface of plunger 51 slopes gently as shown at 52 from its front edge toward the rear, is narrower than the length of the bricks, and imparts many tamping strokes to each row of bricks as they pass beneath it. The result is that the surplus material left by knife edge 49' is gradually compressed into the mold by a step-by-step tamping action, packing the material to a uniform density and leaving the top surface comparatively smooth but nevertheless with a certain amount of loose material such as grains of sand and small lumps of the mixture of sand and cement.

The plunger 51 is removably mounted in the head 53 and may be removed therefrom by loosening bolts 54 (see Fig. 4). The head 53 is suspended from a pair of connecting rods 55 which terminate at their upper ends in eccentric straps 56 for the eccentrics 57 which are mounted upon and driven by shaft 58. The head 53 is guided by pins 53' at its ends which slide in vertical slots in the plates 34' which are forward extensions of the side walls 34 of hopper 12.

As the bricks emerge from the final tamping operation under the tamping mechanism 13 just described, they are carried beneath the transverse scraping device 14 (see Figs. 1 and 3). This mechanism is contained within a housing 59 and comprises an endless belt 60 carrying a plurality of scrapers 61 secured in spaced relation thereon. The belt is stretched between pulleys 62 and 63 suitably mounted on the opposite sides of the apparatus, pulley 63 being driven by its supporting shaft 64 and producing a transverse movement in the direction of the arrow shown in Fig. 3 of the scraper 61 on the lower side of the belt. These scrapers move lightly over the surface of the freshly packed material in the molds 10 and carry all of the loose particles left by the tamping mechanism 13 crosswise of the machine, the rapidity of movement of the belt being sufficient to cause these particles to be discharged against the deflector plate 65 from which they are discharged from the apparatus.

The front face of scrapers 61 is approximately perpendicular to the surface of the molded material and consequently drags the loose particles over this surface and scratches

therein the irregular lines 66 shown in Fig. 8 which are spaced at random throughout the length of the brick or are in a generally parallel arrangement and give to the brick the so-called tapestry effect. In order to vary the depth of these lines and generally to appropriately control the operation of the scraping mechanism this entire mechanism 14 just described, is secured to upright members 67 which are held against one of the faces of uprights 15 at each side of the machine by means of bolts 68. This entire mechanism is adjustable vertically by loosening bolts 68 and then turning the adjusting screws 69 and 70, bolts 68 being again tightened after the bottom surfaces of the scraper 61 have been adjusted to the proper elevation.

The various elements of the machine are mechanically driven by the following mechanism. Power is applied to the machine by a pulley 71 secured to shaft 58 upon which the eccentrics 57 are mounted so that the rate of reciprocation of the plungers 51 depends upon the rotating speed of this shaft. Mounted upon this same shaft 58 near the pulley 71 is a spiral gear 72 which drives an intermeshing similar gear 73 mounted upon a short shaft 74 at right angles to shaft 58. This shaft 74 carries at one end a sprocket 75 carrying a chain 76 which drives shaft 64 of the scraping mechanism 14 through a somewhat larger sprocket 77. Chain 76 is of sufficient length to allow scraping mechanism 14 to be adjusted to its lowest operative position and when the mechanism is adjusted to an elevation above this position the slack in chain 76 is taken by an idler pulley 78 resiliently held against the chain by the bracket 79 and spring 80.

Shaft 58 carries at the opposite end from pulley 71 a pinion 81 adapted to mesh with gear 82 mounted on the end of shaft 49 for driving the stirring, distributing and preliminary tamping devices 45. The shaft 48 of these devices is rotated by the gear 83 which meshes with a similar gear 84, the drive having now returned again to the same side of the machine as pulley 71. Adjacent gear 84 on shaft 49 is a pinion 85 which drives a relatively large gear 86 on shaft 87 which extends crosswise of the machine being mounted below the rails 31 in bearings secured to the longitudinal frame channels 19.

On the same side of the machine with gear 82 there is a clutch mechanism 88 operative by handle 89 by which the rotation of a sprocket 90 loosely mounted on a shaft 87 can be controlled. In the position of handle 89 shown in Fig. 2 the sprocket 90 is positively driven by shaft 87 and when handle 89 is moved toward the reader the rotation of sprocket 90 is stopped. A chain 91 passes over sprocket 90 and sprocket 92 is mounted in alignment with sprocket 90 on the end of

shaft 20 through the instrumentality of which gearing the sprockets 24 and the chains 26 are driven, thus moving the pallet holders, pallets 32 and the forms or molds 10 formed thereby through the machine as has been described above in detail.

It will be understood from the description of the complete driving mechanism that the forms 10 progress at the appropriate relatively slow speed through the apparatus, that devices 45 are rotated at the proper speed to perform satisfactorily their functions in stirring, distributing and tamping, and that the final tamping mechanism 13 and the scraping device 14 are appropriately operated. Moreover, by manipulation of the clutch handle 89 the motion of the chains 26 which actuate the forms 10 may be stopped which will leave the remaining parts of the mechanism in operation.

The brick making machine as described up to this point is intended for making bricks having a tapestry finish and in addition, when slicer or separator bars 41 constructed as shown in Figs. 9 and 10 are employed the bricks produced will have longitudinal ridges 93 in their opposite side faces as shown in Figs. 8 and 17, these ridges being formed by grooves 94 which run longitudinally throughout the length of the slicers 41. If it is desired to make bricks having comparatively smooth sides, smooth slicer bars 41 are employed.

When it is desired to manufacture bricks having smoothly finished edges 95 as shown in Fig. 17 instead of the tapestry finish shown in Fig. 8, the mechanism shown in Figs. 16 and 18 is added to the brick making apparatus. This mechanism comprises a laterally reciprocated smoothing bar 96 which is held in position by means of the metal cleats 97 appropriately to act upon the upper surfaces of the brick edges as they pass from under the action of the scrapers 61. Smoothing bar 96 is reciprocated at a fairly rapid rate by a connecting rod 98 joining an eccentric strap 99 with a lug 100 placed approximately at the center of the bar. Eccentric strap 99 is actuated by an eccentric 101 which is mounted on the end of shaft 64 which drives the scraper belt 60.

Reciprocating smoothing bar 96 may be used in place of the scrapers 61, the scraping mechanism being elevated out of operative relation with the bricks by the adjusting mechanism described in connection therewith. However, it is desirable to operate both the scrapers 61 and the smoothing bar 96 in conjunction with one another inasmuch as there is always a certain accumulation of grains of sand and cement as well as lumpy material of somewhat larger size in front of the smoothing bar. By raising scrapers 61 slightly as shown in Fig. 18 these serve to remove such undesirable lumpy material

from in front of the smoothing bar without forming the tapestry effect lines 66 in the edges of the bricks. By thus continuously removing the particles accumulating in front of the smoothing bar 96 this bar is enabled to act upon the surfaces of the bricks in such manner as to produce a remarkably smooth finish on the surfaces 95 of the bricks.

The brick making machine of the present invention requires the service of only one operator and a helper. The operator stations himself in a position to reach conveniently the clutch lever 89, observes the operation of the stirring devices 45 and the functioning of the other parts of the machine as a whole and also places the pallet boards 43 upon the pallet holders 29 as they come up over the sprockets 25 at the front end of the machine. To facilitate the placing of these pallet boards in position on the pallet holders a guide plate 102 is arranged on the rear side of the machine just inside of the frame member 19. The location of this guide plate 102 is such that when the pallet boards 32 are laid on the pallet holders with one end placed against this board, the cleats of the pallets will be in proper position to move into operative relation with the bottoms of the sides 34 of the hopper 12 as previously described and as shown in Figs. 12 and 13.

The helper is stationed at the opposite end of the brick making machine and his duty consists merely in removing the completely formed pallet of bricks as shown in Fig. 7 just before the pallet holders 29 descend downwardly over sprocket wheels 24.

I claim:

1. A machine of the character described comprising a bed, mold-filling means and mold-packing means above the bed, an endless belt moving over the bed beneath the filling and packing means and carrying a plurality of pallet holders having upstanding rear walls provided with spaced slots, pallets supported on the holders and bridging the spaces between adjacent upstanding walls, a plurality of elongated stationary bars received within said slots and supported in contact with the pallets, said bars having upwardly extending shanks at their front ends the pallets and holders forming with said bars a plurality of molding forms extending both lengthwise and transversely of the apparatus, a slotted member extending crosswise in front of said mold filling means, the shanks of said stationary bars fitting within said slots, and means for retaining said shanks therein.

2. A machine of the character described comprising a bed, a hopper above the bed containing molding material and provided with side walls having straight bottom edges, an endless belt moving over the bed beneath the hopper and carrying a plurality of pallet

holders having upstanding rear walls, and pallets on the holders, said pallets and pallet holders forming a plurality of molding forms for receiving the molding material from the hopper, said pallets being provided with means near each end thereof for forming with the straight bottom edges of the hopper a substantially tight joint, the pallets thus constituting the bottom of the hopper and preventing spilling of the material at the sides thereof.

3. A machine of the character described comprising a bed, a hopper above the bed containing molding material and provided with side walls having straight bottom edges, an endless belt moving over the bed beneath the hopper and carrying a plurality of pallet holders, pallets on said holders, said pallets and pallet holders forming a plurality of molding forms for receiving the molding material from the hopper, said pallets having upwardly extending formations at each end thereof, said formations and the upper surfaces of the pallets coacting with the sides and bottom respectively of the hopper to form a substantially tight joint, the pallets thus constituting the bottom of the hopper and preventing spilling of the material at the sides thereof.

4. A machine of the character described comprising a bed, a plurality of molding forms, means for moving these forms progressively over the bed, means operable as the forms move over the bed for filling them with molding material, means for tamping the material substantially level with the tops of the forms, and scrapers traveling crosswise of the bed for collecting loose particles of lumpy material in front thereof and causing said particles to scratch irregular but substantially parallel lines in the surfaces of the molded material to impart a rough finish thereto.

5. A machine of the character described comprising a bed, a plurality of molding forms, means for moving these forms progressively over the bed, means operable as the forms move over the bed for filling them with molding material, means for tamping the material substantially level with the tops of the forms, an endless belt arranged to travel crosswise of the bed, said belt being provided with spaced projections forming scrapers for collecting loose particles of material in front thereof, and discharging them at the side of the bed.

6. A machine of the character described comprising a bed, a plurality of molding forms, means for moving these forms progressively over the bed, means operable as the forms move over the bed for filling them with molding material, means for tamping the material substantially level with the tops of the forms, a smoothing bar reciprocating laterally across the tops of the molding forms

for leveling out irregularities in the surface of the molded material, and a scraping device moving parallel to the smoothing bar for continuously removing the loose material accumulating in front of the smoothing bar, said scraping device cooperating with the smoothing device to produce a smooth surface in the molded material.

7. A machine of the character described comprising a bed, a plurality of molding forms, means for moving these forms progressively over the bed, means operable as the forms move over the bed for filling them with molding material, means for tamping the material substantially level with the tops of the forms, a smoothing bar reciprocating laterally across the tops of the molding forms for leveling out irregularities in the surface of the molded material, and means for continuously removing the loose material accumulating in front of the smoothing bar.

8. In a machine of the character described wherein a plurality of moving mold forms pass beneath and in freely exposed relation to a mass of molding material to rake said material into said forms, the combination of an apron for cutting off the material above the tops of said forms as they pass out from beneath said mass of material, and a vertically reciprocating plunger for compressing the material left above said forms by the apron into the article being molded, said apron having a cutting edge at the bottom and being curved upwardly above said cutting edge to direct the surplus material toward the top of the mass.

9. In a machine of the character described, the combination of a hopper for containing a mass of molding material, an endless conveyor forming the bottom of said hopper, and carrying a plurality of moving mold plates extending transversely of the hopper, said plates being subdivided lengthwise by slots, a plurality of stationary mold bars extending longitudinally through the hopper within said slots, the tops of said bars sloping so as to gradually increase in height from the front end of said hopper to the rear end thereof, and means for driving said endless belt so as to cause said moving mold plates to rake material from said mass into the plurality of molds formed by said stationary and moving mold plates.

10. In a machine of the character described comprising a bed, a plurality of mold forms, means for moving said forms continuously over said bed, means for filling said forms with an excess of molding material, means for cutting off said excess material evenly above the top of said forms, and a sloping faced plunger arranged to reciprocate perpendicularly to the top of said forms and force said material level therewith.

11. In a machine of the character de-

scribed comprising a bed, a plurality of mold forms, and means for moving said forms continuously over said bed, means for filling said forms with an excess of molding material, means for cutting off the excess material evenly above the tops of said forms, a plunger of less width than the longitudinal dimensions of the mold forms arranged to reciprocate above said forms to force said material level with the tops thereof, and means for bringing said plunger into contact with said material at frequent intervals as said forms move beneath the plunger.

In testimony whereof I affix my signature.
CHARLES DIETRICH.

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