Nov. 28, 1950 G. W. LANG 2,531,574

MACHINE FOR MAKING CEMENT ROOFING TILE

Filed Nov. 9, 1949 3 Sheets-Sheet 1

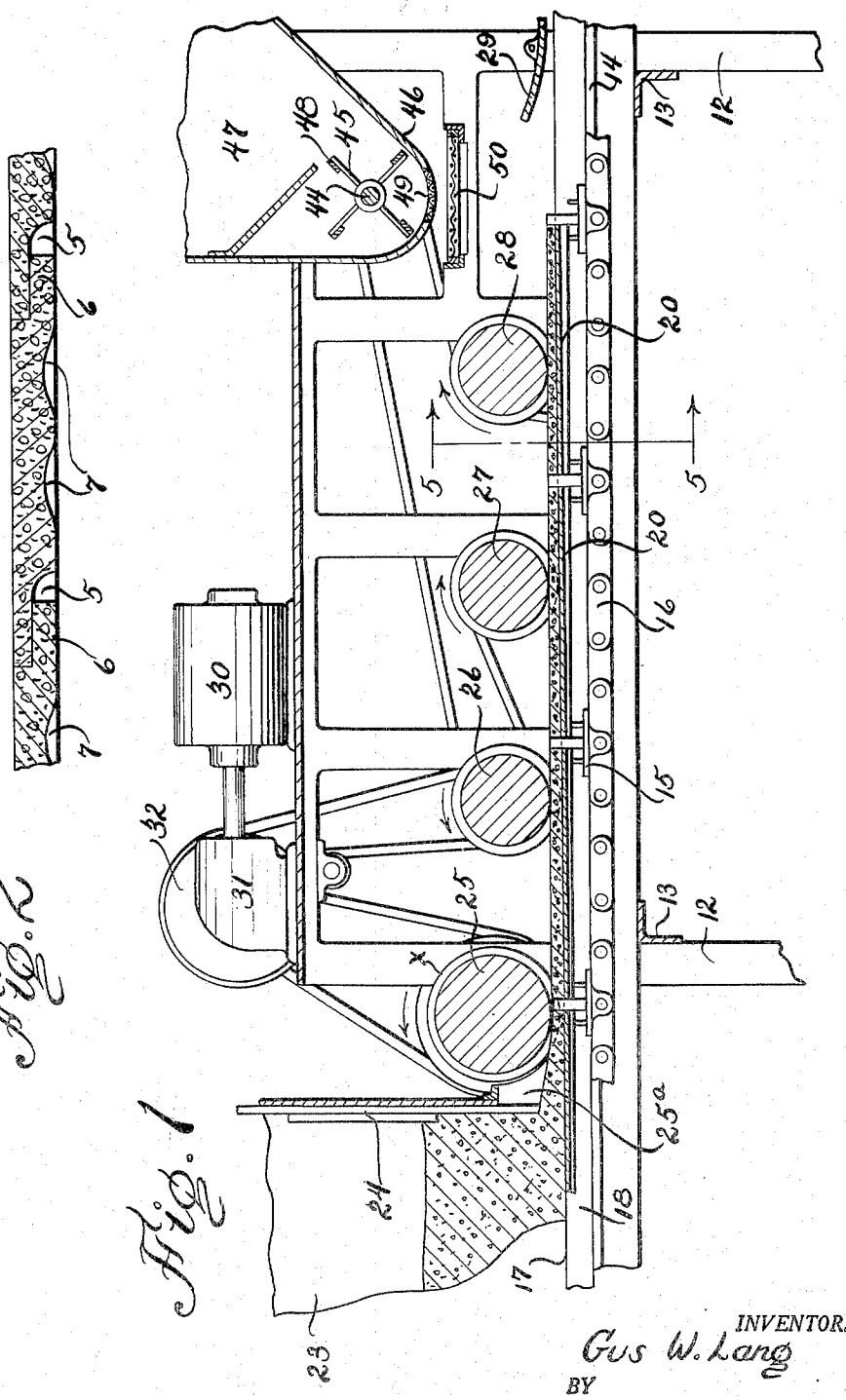


Fig. 2

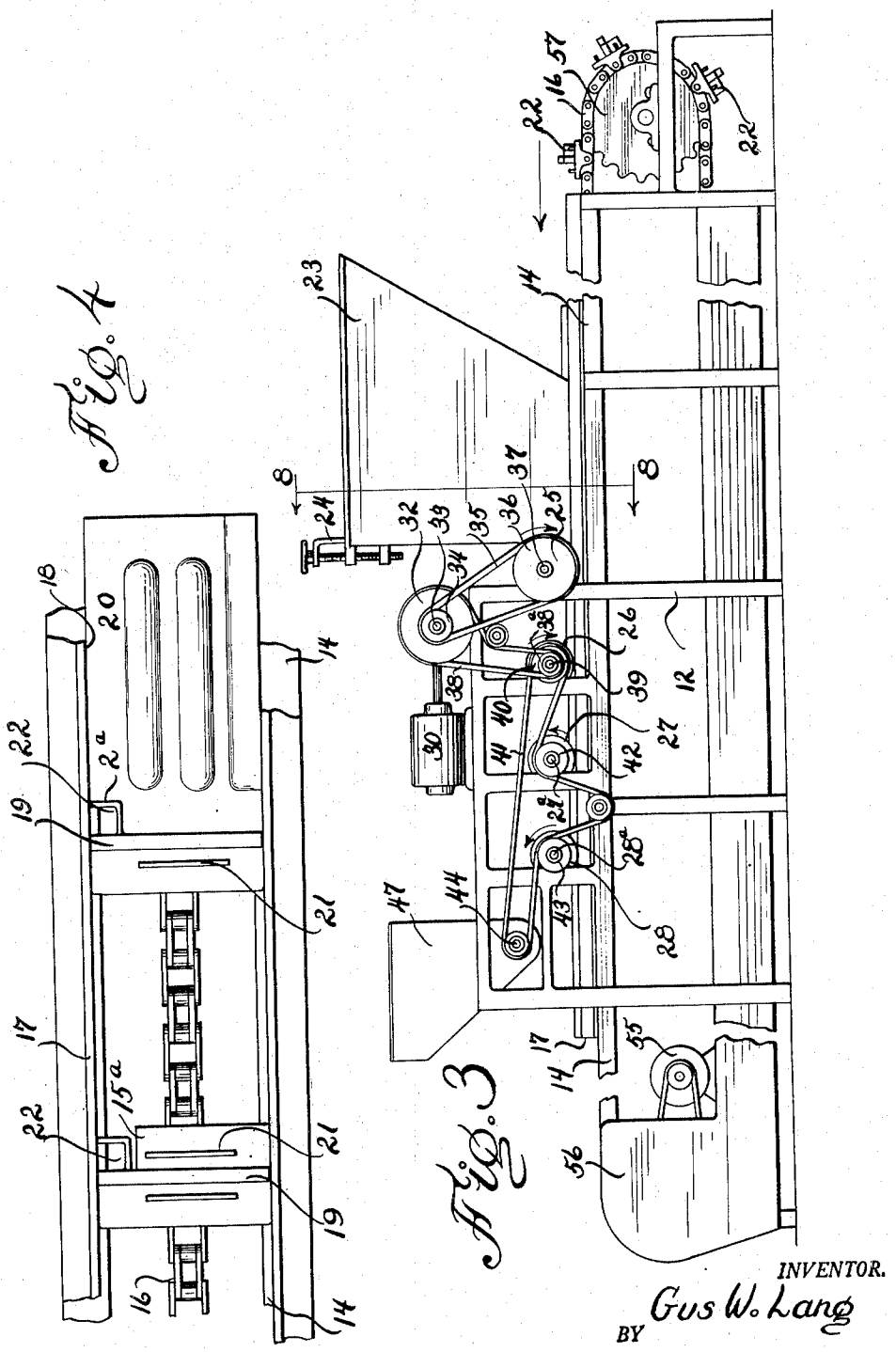
Fig. 1

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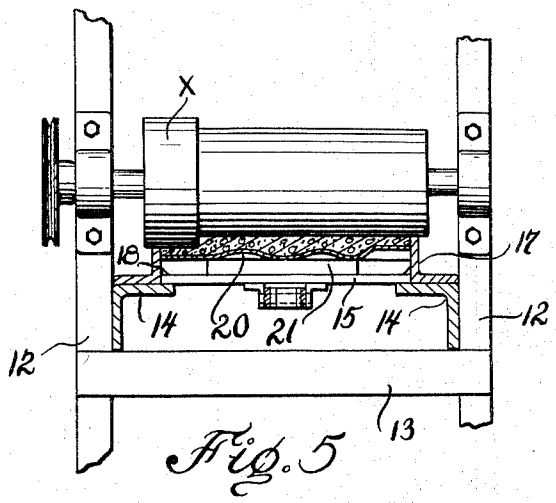


Fig. 5

Fig. 7

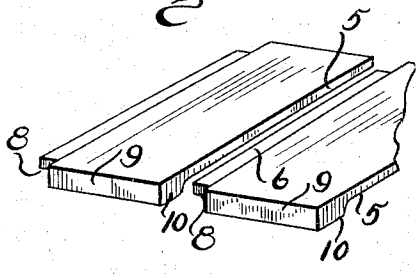


Fig 8

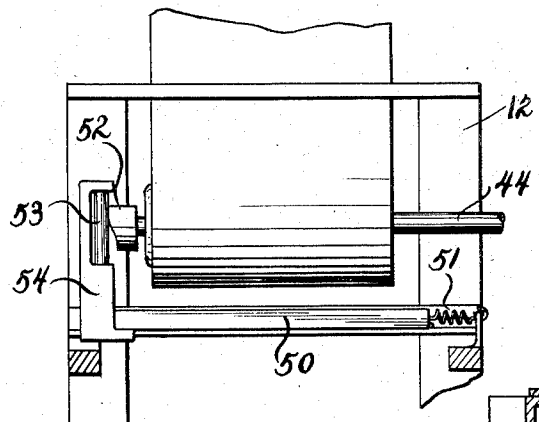
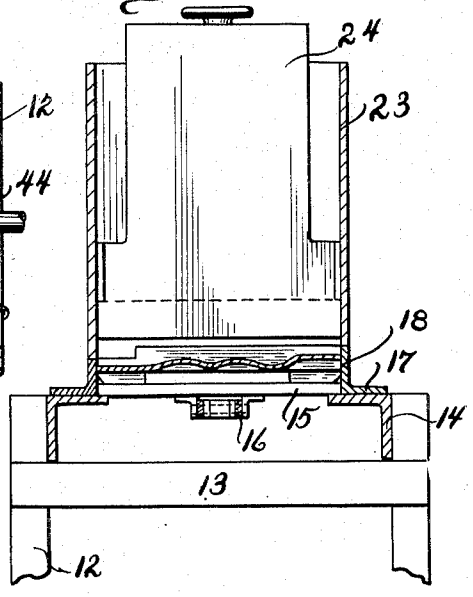


Fig. 6



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MACHINE FOR MAKING CEMENT ROOFING TILE

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Application November 9, 1949, Serial No. 126,275

3 Claims. (Cl. 25—43)

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The object of the present invention is to provide an improved machine for making hydraulic cement roofing tile. By virtue of the features which distinguish this machine over known machines of this character, I am able to turn out, at a high rate of speed, cement roofing tile of the interlocking variety and to do this under conditions which yield a much stronger and more waterproof tile than has heretofore been produced by machines of this general nature.

The invention and its advantages will be best understood by reference to the accompanying drawings, wherein:

Fig. 1 is a partial longitudinal, sectional view of the machine;

Fig. 2 is a fragmentary sectional view showing, in assembled relation, several of the tile manufactured by this machine;

Fig. 3 is a side elevation of the rear side of the machine;

Fig. 4 is a fragmentary plan view of the conveyor chain and one of the pallets which are carried under the rollers of Fig. 1 by said chain;

Fig. 5 is a sectional view on line 5—5 of Fig. 1, looking toward the rearmost roller and with the parts which lie rearwardly of said roller, omitted;

Fig. 6 is a detail of the sifting and shaking mechanism at the rear end of the machine, and hereinafter described;

Fig. 7 is a perspective view showing two of the associated but slightly separated tile, and

Fig. 8 is a transverse sectional view on line 8—8 of Fig. 3.

Like numerals designate corresponding parts throughout the several figures of the drawings.

The reason for the provision of certain features of the invention and the advantages flowing therefrom will be best understood by first considering the nature and manner of use of the tile to be produced.

Cement roofing tile is very largely used in Florida and many other sub-tropical countries where freezing weather is seldom encountered. The tile is easily and economically manufactured from a mix of hydraulic cement, water, sand, and where desired, a certain percentage of lime. Tile of this nature is more or less brittle and it is desirable that it be so constructed that it may be applied to a roof without nailing through it.

In forming a roof, the customary procedure is to cover the roof rafters with boards, to then cover the boards with a waterproof roll roofing, and to then cement the tiles to the roll roofing with a plastic roofing cement of an asphaltic or like adhesive, waterproof and relatively thick mastic.

To insure that the tile will not be easily dislodged by high winds, torrential rains, or the like, and that they will quickly assume their proper relative positions when being laid and

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will thereafter maintain their proper alignment, these tiles are shaped to be interlocking in a way which will prevent relative movement between them in any direction.

By referring to Fig. 2, it will be seen that each tile has its thickness reduced along one longitudinal edge to provide a recessed portion 5 which receives a portion 6 of reduced thickness upon the adjacent tile, and that the under faces of the tile are recessed as at 7 to provide portions in which the cementing mastic may engage.

However, by referring to Fig. 7 it will be seen that the portion of reduced thickness does not extend all the way to the end of the tile, but terminates short of the end to provide a notched out portion 8 at one end of the tile or shingle. In like manner, the recessed portion 5 terminates short of the end of the tile, leaving the tile of full thickness across its end 9 and thus leaving a hump 10 to engage in notch 8. Thus, endwise shifting of the tiles, with respect to each other, is prevented and the ends are caused to present a line of uniform thickness across the width of a roof.

Interlocking tiles of this general character have been used for years. Millions of them are made yearly in Florida. Most of them are made by hand. It is relatively easy to provide for the necessary notched out portion in a hand made tile, because the surplus cement mix which would fill the notch is readily disposed of by hand. However, it is not so easy to provide for this feature in a machine in which all relative movement of the parts must be in one direction, and since one of the important features of the present invention resides in providing these notched out interlocking parts in a rapidly moving structure, the foregoing explanation of the nature of the tile has been given.

The frame of the machine may be made up of any conventional steel shapes. The particular embodiment chosen for purposes of illustration comprises legs 12, cross braces 13 and longitudinally extending angle irons 14. The flat upper faces of the angles 14 (Fig. 8) constitute trackways upon which a series of flat plates 15 ride, said plates being secured to and traveling with the conveyor chain 16. Additional angle irons 17 are supported upon the angles 14 and their vertical inner faces 18 constitute guide rails between which the plates 15 travel and with which the ends of the plates engage.

Upstanding webs 19 are rigidly affixed to the plates 15 and extend from one guide rail to the other and constitute traveling end walls for the mold spaces within which the tiles are formed. The side walls of these mold spaces are fixed, being formed by the guide rails 18, and the cement mix is thrust along by the traveling movement of webs 19.

In the molding or forming operation, the cement mix is supported upon and shaped by relatively thin pallets 20 which rest upon upstanding blocks or other supports 21 which upstand from plates 15. By referring to Fig. 4, it will be seen that these pallets are notched out as at 2a to correspond to the notched out corner 8 of the tile. This notched out corner of the pallet accommodates a filler loop 22 which projects from and is rigid with the web 19. The presence of this loop prevents the cement mix from entering the corner space in the mold area and thus the notched out corner 8 is formed in the tile. There is one of these filler loops upon each web 19.

The purpose of making these corner filler elements 22 of loop formation is to permit the surplus cement mix material to be discharged downwardly therethrough, and to permit this downwardly discharged material to be gotten rid of, the plates 15 are cut away beneath the loops at 15a to permit this discarded mix material to fall therethrough.

As the several mold completing elements (webs 19, pallets 20, etc.) travel from left to right in Fig. 3, they pass first beneath a hopper 23 containing the mix or "mud" as it is commonly known. A conventional, vertically adjustable slide 24 limits, to a certain extent, the rate at which the mix may pass from the hopper to the first of a series of four rollers beneath which the mix passes and by which the mix is shaped, condensed, hardened and burnished, as will be presently set forth.

The first two of these rollers turn in such direction that their mix contacting surfaces travel in the direction of movement of the mix. The last two of the rollers travel in the opposite direction, so that their mix contacting surfaces travel in opposition to the direction of movement of the mix.

The first roller, 25, is disposed close enough to confining shoes 25a at the opposite sides of the machine to prevent lateral escape of the mix. This roller travels at the same rate of speed as the mix and its function is to feed into the mold spaces the proper amount of the cement mix and to initially spread the same into all parts of the mold spaces. Each roller is set just a little lower than the roller preceding it, so that as a tile passes the several rollers it is additionally compressed and condensed. Further, the rollers 26, 27 and 28 all rotate much faster than the feed roller.

The second roller, 26, is a packing, compressing and squeezing roller, and it bears upon the mix with such force that the mix is forcibly compressed and the water content is squeezed toward the surface of the tile. The third roller, 27, is termed a kick off and dressing roller, and its function is to (still under great pressure) kick back and dress off the tile. The kick back operation gets rid of any surplus material or water and corrects any tendency which the mix had to move to the right in the mold space, under the influence of rapidly revolving roller 26. This dressing off under pressure tends to start the initial drying of the tile and the stiffening of the mix.

The final roller, 28, under even more pressure and rubbing in a direction opposite to the movement of the mix, further hardens and burnishes to great smoothness the surface of the tile. By referring to Fig. 5, it will be seen that the portion 6 of reduced thickness upon the tile is formed by providing the several rollers with portions of increased diameter, as indicated at X.

From the last roller 28, the now formed tile passes beneath a sifter which sifts upon it, if desired, a powdered material which may be a pure white cement or any suitable coloring material. The tile may then travel to the point of discharge where they are removed manually, or they may be passed beneath an ironing element 29 which impacts the finishing powdered material into the tile. Where the softest, pure white effect is desired, it is best to let the tile remain untouched after it passes the sifter.

Any suitable means may be employed for driving the several rollers. The one chosen for purposes of explanation comprises an electric motor 30 which drives through a reducing gear in casing 31 to a pulley or sprocket wheel 32 on shaft 33. Roller 25 is driven from shaft 33 through pulley 34, belt 35 and pulley 36, the shaft of said roller being indicated at 37.

Pulley 32 drives through belt 38 and pulley 38a to the shaft 39 of roller 26. Another small pulley 40, on shaft 39, drives through belt 41 and pulleys 42 and 43 to the shafts 27a, 28a of rollers 27 and 28, respectively. The belt 41 also passes over and drives the shaft 44 of the sifting mechanism. This shaft 44 carries an agitator 45 located in a housing 46 at the bottom of hopper 47.

The blades 48 of the agitator move across a screen 49 and discharge the white cement or other material upon a reciprocatory screen 50. Endwise reciprocation is imparted to screen 50 by spring 51 (Fig. 6) which draws the screen frame to the right and by a cam 52 on the end of shaft 44 which acts against a roller 53 on an upward extension 54 of the screen frame to thrust said screen frame to the left, in said Fig. 6.

Any suitable means may be employed for driving the carrier chain 16, such for example as the electric motor indicated at 55 which drives through suitable reducing gearing, the casing of which is indicated at 56, to a sprocket wheel, not shown, at the left hand end of the machine of Fig. 3, which sprocket wheel corresponds to the one shown at 57 in said figure and over which chain 16 passes in the manner there illustrated.

Because hand made cement tile is so porous, and because as a result it readily absorbs water, it has been little used in climates where freezing weather may be encountered. A hydraulic cement tile soaked throughout with water and subjected to freezing temperature would break into a dozen pieces. However, the beauty and cheapness of these tile render them highly desirable, and it is an object of my invention to make it possible to use these tile in any and all climates. To that end, I incorporate in the usual cement mixture of sand, hydraulic cement and lime a suitable waterproofing ingredient.

There are literally dozens of waterproofing compositions upon the market, used for waterproofing basement walls and floors. One such is known as Aquelle, but there are many others. Where such a composition, miscible with water, is added to the cement mix, the tile is impregnated therewith throughout its entire length, breadth and thickness, and when such a mixture is highly condensed and compressed to a far greater degree than would be possible with a hand made tile, the resultant tile is rendered absolutely waterproof under atmospheric weather conditions.

The city of Coral Gables, Florida, tests building materials used in that community. It has tested cement roofing tiles made by my machine method, and it reports that these tile will with-

stand a thousand pounds more crushing pressure than the conventional hand made tile, and that they are far more waterproof.

I further contemplate the use of a waterproof white cement mixture in the hopper 47 so that an additional water resistant element may be incorporated in the finished tile.

It is clear that the principles described may be embodied in structures differing in form from those shown. Therefore, I wish it to be understood that the invention is not limited to the precise construction set forth, but that it includes whatever changes fairly fall within the terms or the spirit of the appended claims.

Having described my invention, what I claim is:

1. A machine of the character described, comprising spaced guide rails constituting a trackway, a traveling conveyor element traveling between said rails, transverse pallet carriers actuated by the conveyor element and traveling between said guide rails, means for supporting pallets each having a notched out corner, upon said carriers, each of said carriers having a filler mounted thereon positioned to enter the notched out corner of the pallet, said filler being of loop formation to permit the passage of mix material downwardly therethrough.

2. A machine of the character described, comprising spaced guide rails constituting a trackway, a traveling conveyor element traveling between said rails, transverse pallet carriers actuated by the conveyor element and traveling between said guide rails, means for supporting pallets each having a notched out corner, upon said carriers, each of said carriers having a filler mounted thereon positioned to enter the notched out corner of the pallet, and the pallet carriers being cut away beneath said fillers to permit the material which passes downwardly through the fillers to also pass downwardly through the pallet carriers.

3. A machine of the character described, comprising spaced guide rails constituting a trackway, a traveling conveyor element traveling between said rails, transverse pallet carriers actuated by the conveyor element and traveling between said guide rails, means for supporting pallets each having a notched out corner, upon said carriers, each of said carriers having a filler mounted thereon positioned to enter the notched out corner of the pallet.

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