Aug. 19, 1958 G. W. LANG 2,847,749

MACHINE FOR MAKING VALLEY TILE

Filed Sept. 2, 1953

2 Sheets-Sheet 1

Fig. 1

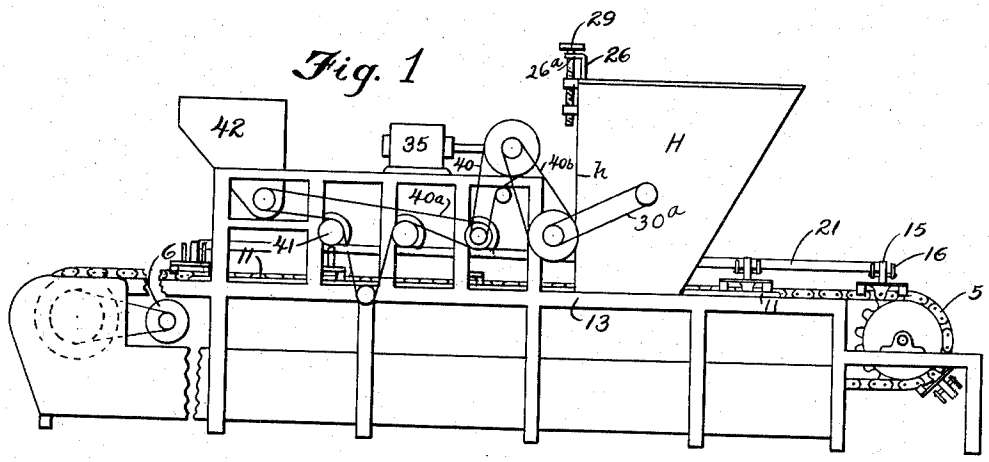


Fig. 2

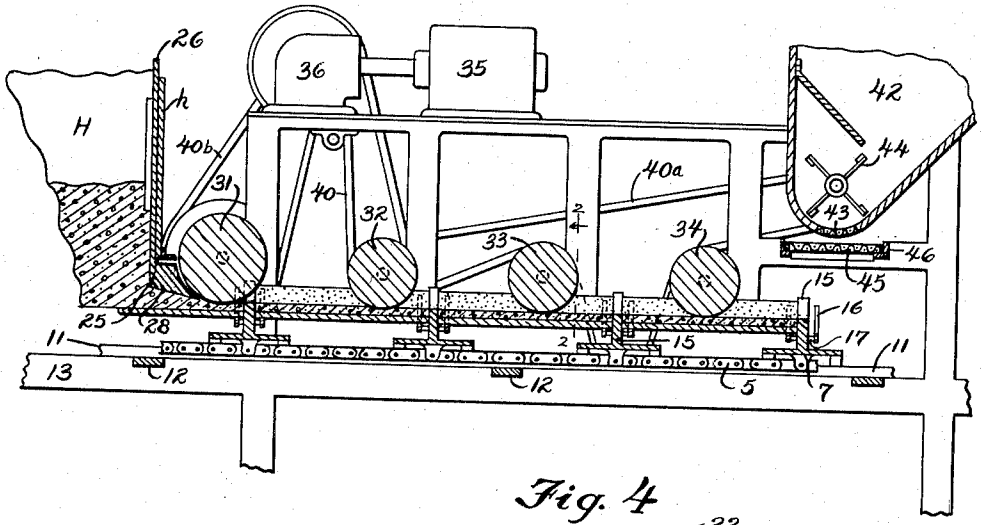


Fig. 4

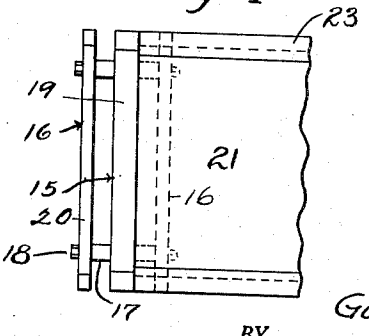
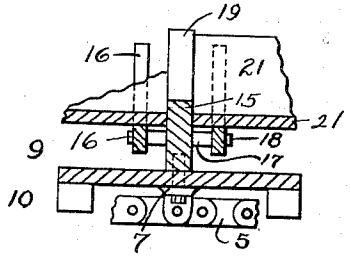


Fig. 3



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Fig. 5

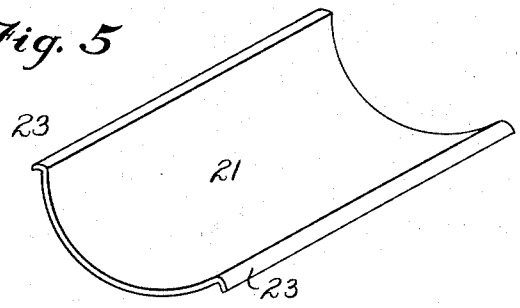


Fig. 9

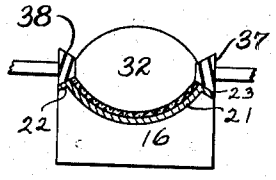


Fig. 8

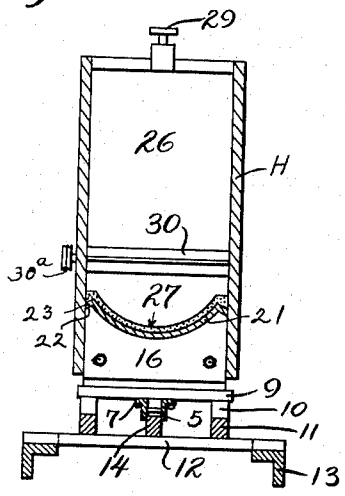


Fig. 6

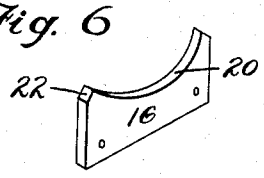


Fig. 7

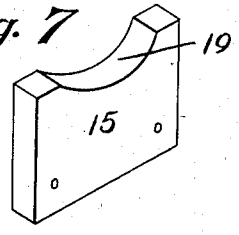


Fig. 10

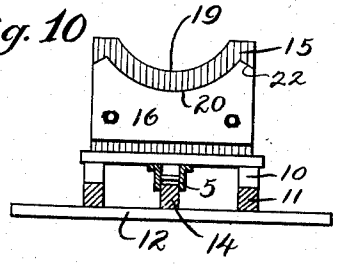
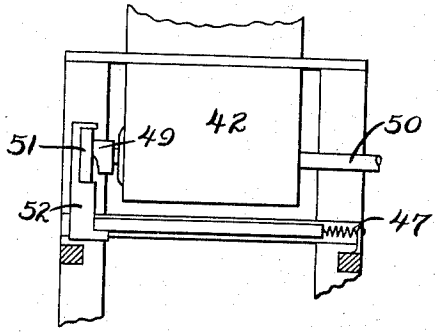


Fig. 11



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MACHINE FOR MAKING VALLEY TILE

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Application September 2, 1953, Serial No. 378,050

3 Claims. (Cl. 25—43)

The primary purpose of the machine herein described is to manufacture valley tile for use upon cement shingle roofs. It is customary, in the formation of cement shingle tile of the so called barrel type to form elongated tile, concavo convex in cross section, of ordinary gray cement and, while the tile is still wet, to sift upon the outer or convex face thereof a coating of white waterproof cement. This not only makes the tile pure white but it renders it waterproof and imparts a glaze or slickness to the convex face of the tile which aids largely in preventing dirt from adhering to the tile and preserves the pristine whiteness of the roof over a long period of time. However, the foregoing advantage has not been present in the valley tiles heretofore supplied to the trade because in valley tile it is a concave face which is presented to the weather and not a convex face as in the case of the main portions of the barrel tile roof. Since it is the valleys into which much of the water from the roof drains the following disadvantages have been present in valley tile heretofore supplied to the trade.

First, since the machines used in forming the regular barrel tile cannot coat the inner concave face of a concavo-convex tile but are adapted to coat only the convex face thereof it follows that the uncoated valley tile heretofore available when used in conjunction with pure white roofs, presents dark grey dirty looking valleys which largely destroy the beauty of a roof and create much dissatisfaction among home owners.

Second, the lack of a glossy waterproof coating upon the concave face of a valley tile permits a great deal of water absorption by the tile which tends to render them leaky. Further the moist rough surface presented by such an uncoated tile readily collects dirt in which fungus growths and even seeds of vegetation find lodgment. When fungus of moss like formation generate in roof valleys the appearance of the roof rapidly deteriorates. The reason that the weather surface of the valley tiles heretofore manufactured cannot be coated in the process of manufacture of such tile, is that the regular roof tile of concavo convex form is delivered from the machines convex side up. In this invention the valley tile is delivered from the machine concave side up and is carried beneath a sifter which deposits the coating material in the cavity presented by such concave upper face.

The invention is not limited to the manufacture of cement tile but may also be employed in clay valley tile where the inside of a concavo-convex tile may be glazed and burned in the manufacture of the clay tile, and such glazed inner concave face, in addition to being rendered smooth and hard, may also be colored or whitened by the use of proper coloring materials in the glaze. While white Portland cement is preferred as the coating material when manufacturing Portland cement tile, because the wet tile receives it and enters into a firm homogeneous bond with the grey cement, the invention includes the use of any suitable finishing material.

The method of securing the desired result will be best

understood by reference to the accompanying drawings, wherein:

Fig. 1 is a side elevation of a machine constructed to manufacture valley tile in accordance with the invention;

Fig. 2 is an enlarged, partial longitudinal sectional view therethrough;

Fig. 3 is a fragmentary vertical longitudinal sectional view through one of the pallet supporting heads showing the pallets thereon before any of the "mud" has been deposited thereon;

Fig. 4 is a plan view of part of the structure of Fig. 3;

Fig. 5 is a perspective view of one of the pallets;

Fig. 6 is a perspective view of one of the pallet supporting plates;

Fig. 7 is a perspective view of one of the pallet spacing heads;

Fig. 8 is a transverse vertical sectional view through the hopper, looking toward the shaper plate at the discharge end thereof;

Fig. 9 is a transverse sectional view upon line 9—9 of Fig. 2;

Fig. 10 is a face view of one of the pallet supporting plates bolted to one of the pallet spacing heads and without the pallet; and

Fig. 11 is a transverse sectional view of a vibrating screen hereinafter described.

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

It has long been common to manufacture cement roofing tile by machines comprising endless traveling chains adapted to support removable pallets, the chains conveying the pallets beneath a hopper for the reception by the pallets of the "mud" or cement from which the tiles are formed. Such a machine is shown, for example in the expired patent to Domine, 1,377,188 issued May 10, 1921.

In a machine such as is herein shown the chains with the pallets thereon move quite rapidly and the attendant who places the pallets upon the chain carried supports must move with great celerity if he is to keep up with the chain travel. It is important that in making a concave tile the concave pallets shall quickly seek a properly centered position upon the chain carried supports, since any cocking of a pallet out of proper position might seriously damage the machine and tie up the whole production line.

Referring now to the drawings **5** designates a traveling chain to which motion may be imparted in a conventional way by motor **6**. Some of the chain links are secured as at **7** (Fig. 8) to horizontal plates **9**. Metal blocks **10** at the corners of plates **9** rest and slide upon the well greased upper faces of longitudinally extending track rails **11**, said rails being mounted upon transverse supports **12**. These supports are, in turn, supported upon the side rails **13**, which constitute a part of the machine frame. An additional longitudinal rail **14** engages within the underside of the chain **5** and keeps the blocks **10** from lateral movement off of rails **11**.

The plates **9** carry upstanding pallet spacing heads **15** (Figs. 7 and 10) and these heads support pallet receiving plates **16**. (Figs. 6 and 10.) There is a plate **16** upon each side of head **15** and these plates are held in spaced position with respect to the heads by spacers **17** (Fig. 3) on the bolts **18** by which the plates are bound to and supported from the heads. The top faces of the heads are of concave formation to form arcuate seats **19** and the top faces of the plates are also of concave formation to form arcuate seats **20** but the arc of a seat **19** is upon a radius enough less than the radius of the arc of an associated seat **20** that when a pallet is put in place and a thickness of material is placed upon the pallet the top face of the tile to be formed will be flush with the face of seat **19**.

Fig. 10 illustrates how the arc **19** of the head **15** lies above the arc **20** of a plate **16**. The upper outer corners of plates **16** are cut away at **22** to permit the outwardly and downwardly directed flanges **23** of the pallets to engage thereover in a manner to accurately and quickly center the pallets with respect to the line of travel of the chains. Thus the flanges **23** upon the pallets and the portions **22** upon the plates **16** constitute interengaging stop members by which the pallets are prevented from lateral rocking in the arcuate seats provided by plates **16** and are thus quickly brought to centered position where the upper faces of the pallets will be concentric with a convex forming roller **32**, hereinafter described.

In Fig. 3 the pallets are shown with their bottoms resting upon the plates **16** and with their ends abutting against those portions of the side faces of said heads which project above the plates **16** far enough to not only accommodate the pallets but also a thickness of cement "mud" constituting the tile to be formed. The chain in its travel toward the left in Fig. 1 carries the pallets through the power portion of a hopper H where the required amount of a well moistened cementitious mixture of Portland cement and sand is deposited in the concave faces of the pallets. The far wall "*h*" of the hopper, that is the wall through which the pallets pass in leaving the hopper, is terminated at **25** (Fig. 2) and a false wall or apron **26** has its lower end formed upon an arc **27** (Fig. 8) said arcuate lower end being stiffened by a correspondingly shaped shoe **28** which is spaced above the upper face of the pallets a distance equal to the thickness of the tile to be formed, and thus the pallets carry out of the hopper, tile formed to the shape of the pallets and of a uniform thickness. The apron **26** is provided upon its top edge with an L-shaped extension **26***a* that is engaged by an adjusting screw **29**. (Fig. 1.) This screw serves to adjust the height of the apron and this adjustment determines the thickness of the tile being formed. Any suitable control for the material fed from the hopper, may be employed. Material placed in the hopper may be dropped directly upon the platens or it may be fed downwardly from the hopper at a controlled rate by means of a feeding and agitating spider that is indicated at **30** (Fig. 8) and is driven by a belt **30***a*.

The vertical distance between seats **19** of the heads **15** and seats **20** of plates **16** is equal to the combined thickness of the pallets and the tiles. Thus the arcuate lower edge of the apron sweeps snugly through the depressions presented by the concave upper faces of heads **19** and the tiles are completely separated by said heads. From the gate provided by the apron and shoe the formed tile passes beneath a series of compressing and forming rolls **31**, **32**, **33** and **34** by which the material of the tiles is compressed to the desired degree and the tiles are given an initial "set" before they are removed from the machine. The exact number of the rolls employed is not material. These rolls are all driven by a motor **35** through a reduction gear **36**. The novel feature of these rolls resides in their shape and the means associated therewith for trimming the otherwise rough edges of the tiles. As will be seen in Fig. 9 these rolls are of general ovaloid formation in the direction of their length and at their ends they are provided with outwardly flaring hubs **37**. The flanges of the pallets travel in close proximity to the hubs as the said flanges pass thereunder and the hubs act to strike off surplus cement from the tiles so that a tile having clean, straight and well formed edges may be produced. Since the hubs are in transverse alignment with the axes of the rollers, they consequently are in alignment with the area where the roller is exerting its greatest pressure upon the tile being formed. Thus these hubs act to confine the cementitious mixture and prevent it from being squeezed upwardly and out of confinement

at the upper edges of the tile. It should be noted that the flare of the hubs is such that at their outer end portions they travel quite close to the upper faces of the pallet flanges. Thus they close the gap between the roller proper and the flanges at this point. If desired, I may provide the flaring hubs with spiral threads **38** which aid in feeding the surplus material away from the newly formed tile. The reason for making the rollers of ovaloid form is to reduce their length to practicable limits. A spherical roller shaped to fit into as shallow a depression as the palllets shown, would have to be of such very great diameter as to be wholly impractical. The several rollers are mounted upon shafts and are driven by belts **40**, **40***a* and **40***b* and suitable pulleys **41**. In the particular form shown by way of illustration the belt **41** moves in such direction as to rotate the two rolls nearest the hopper in the direction of movement of the tile and to rotate the other two rolls in the opposite direction. However this invention is not concerned with any particular direction of rotation of the rolls, nor in any specific way of rotating them it being noted that in the Domine patent two of the rolls rotate in one direction and the third roller, in another.

After passing the last roll the tiles are conveyed beneath a dusting hopper **42** where fine white Portland cement or like suitable coating, coloring or finishing material is dusted or sprinkled down into and over the upwardly presented concave tile, closely adhering to and forming a homogeneous bond with the still damp tile. Since the white, waterproof Portland cement of commerce is much finer or more powdery than the sand and cement mixture which makes up the main body of the valley tile it follows that the layer in which the white cement finds lodgment and in which it sets up, is much denser and harder than the remainder of the tile. In a valley tile it is this hard, dense, concave face over which the water flows on its way to the downspouts. Any suitable feeder for the coating material may be employed, such, for example as that shown in the Domine patent or that illustrated in Fig. 2 of the drawings of this application where a hopper **42** for white cement is provided with a screen bottom **43** over which an agitator and scraper **44** operates. The material passing through the screen falls into a shaking screen **45** and thence on to the tile. The screen is mounted to slide in ways **46**, is moved in one direction by a spring **47** and is moved against the tension of the spring by a cam **49** on the shaft **50** of agitator **44**. Cam **49** acts against a vertical roller **51** of a block **52**, that is carried by the shaking screen. The particular way of agitating the screen forms no part of the invention, the described arrangement being shown in my own prior Patent No. 2,531,574. Electrically operated vibrators are purchasable on the open market for vibrating any desired object and I may employ such a vibrator for shaking the screen, if desired.

It is to be understood that the invention is not limited to the particular construction shown but that it includes within its purview whatever changes fairly fall within either the terms or the spirit of the appended claims.

Having described my invention what I claim is:

1. In combination a traveling conveyer, a plurality of concavo-convex pallets of uniform width throughout their length and having downwardly directed flanges at their opposite side edges, a plurality of pallet supporting assemblies covered by the conveyer, said assemblies comprising heads having concave upper faces the curvature of which conforms to the inner upper face of a concave tile being formed, said heads constituting separating means between the ends of adjacent tiles, said assemblies further comprising vertical plates, one upon each side of said heads, means for spacing said plates away from the adjacent faces of the heads, the upper outer corners of said plates being cut away upon angles such as to constitute seats for the underfaces of the downwardly

directed flanges of the pallets, said plates having concave upper faces of such radius as to receive the undersurfaces of the pallets and to support said pallets at such level that the upper face of a formed tile upon a pallet will be flush with and conform to the curvate of the concave faces of the adjacent heads, a driven roller disposed along the path of travel of the conveyer, said roller being of ovaloid form in the direction of its length and provided with flaring hubs which project outwardly and overlie and travel in close relation to the upper faces of the flanges along the outer edges of the pallets, the said roller conforming in longitudinal curvature to the concave upper faces of said heads, whereby the heads may pass beneath the roller in close relation thereto.

2. In combination a traveling conveyer, a plurality of concavo-convex pallets of uniform width throughout their length and having outwardly and downwardly turned flanges formed along each side edge thereof, a plurality of pallet supporting assemblies carried by the conveyer, said pallet supporting assemblies comprising upstanding spacing heads and supporting plates upon each side of said heads, both the heads and the plates presenting concave arcuate upper faces, the upper faces of the plates presenting arcs of like curvature as the undersides of the pallets and the upper faces of the heads presenting arcs concentric with but of lesser radius than the upper faces of the pallets, the plates being provided with seats shaped to receive the under faces of the downwardly turned portions of the flanges, said seats and flanges complementally limiting the lateral movement of and preventing any tipping of the pallets, a convex roller, the face of which is concentric with but of lesser radius than the upper faces of the pallets and spaced therefrom to a degree equal to the thickness of the tile to be formed and integral hub members upon the roller which flare outwardly to a degree to close the gap between the rollers and the flanges at the upper outer edges of the tile being formed and the flaring portions of which rollers extend outwardly far enough to overlie and roll in close relation to the upper faces of the downturned flanges of the pallets.

3. In combination a traveling conveyer, a plurality of concavo-convex pallets of uniform width throughout their length and having outwardly and downwardly turned flanges formed along each side edge thereof, a plurality of pallet supporting assemblies carried by the conveyer, said pallet supporting assemblies comprising upstanding spacing heads and supporting plates upon each side of said heads, both the heads and the plates presenting concave arcuate upper faces, the upper faces of the plates presenting arcs of like curvature as the undersides of the pallets and the upper faces of the heads presenting arcs concentric with but of lesser radius than the upper faces of the pallets, the plates being provided with seats shaped to receive the under faces of the downwardly turned portions of the flanges, said seats and flanges complementally limiting the lateral movement of and preventing any tipping of the pallets, a convex roller, the face of which is concentric with but of lesser radius than the upper faces of the pallets to be thereby spaced therefrom to a degree equal to the thickness of the tile to be formed and portions upon the ends of the rollers and rotating therewith which extend across the line of travel and rotate in such close relation to the said downturned flanges of the pallets as to close the space between roller and flange at a point in line with the roller axis.

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