

Feb. 6, 1940.

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2,189,668

PAINTING MACHINE FOR SHINGLES

Filed April 26, 1937

4 Sheets-Sheet 1

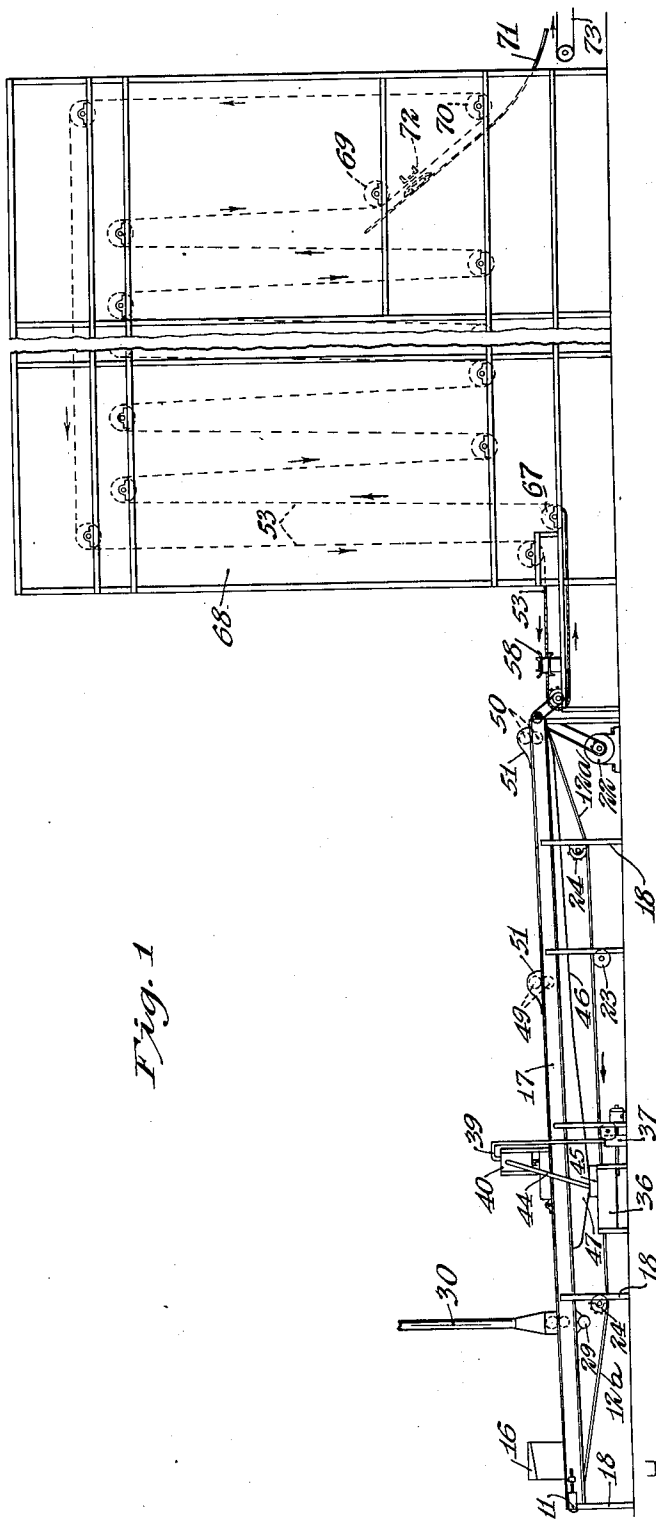


Fig. 1

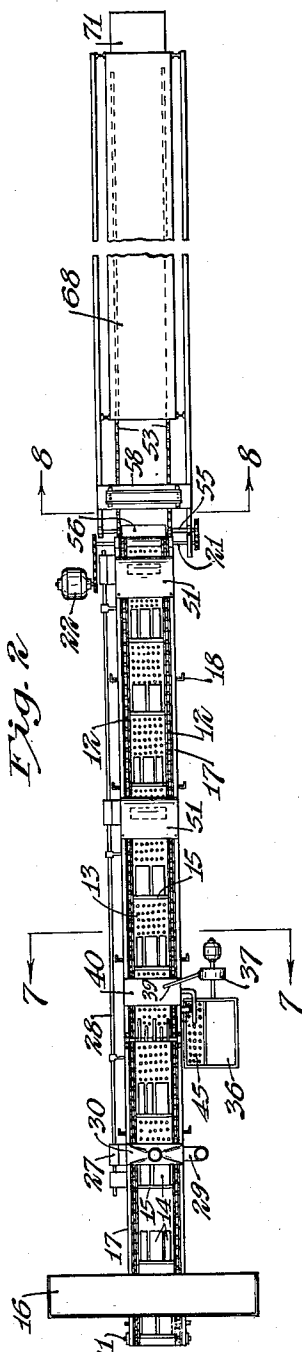


Fig. 2

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4 Sheets-Sheet 2

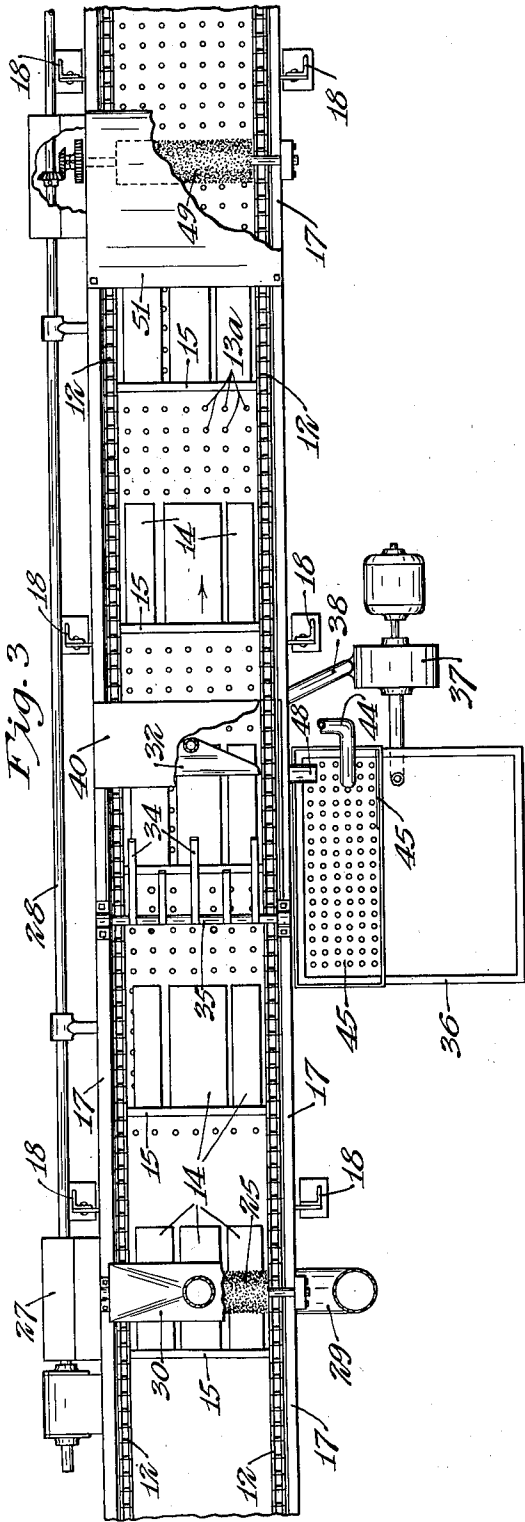
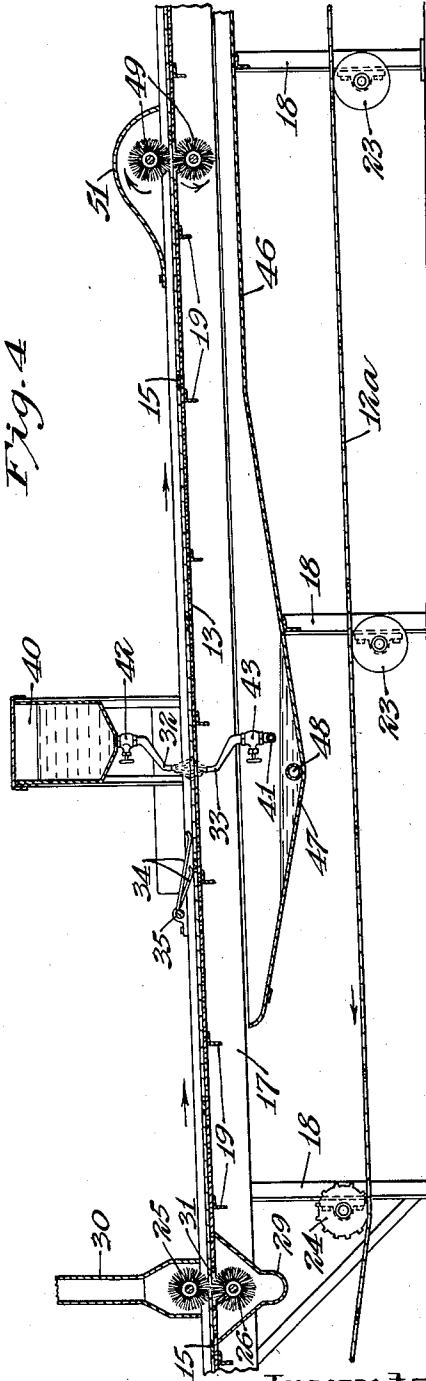


Fig. 4



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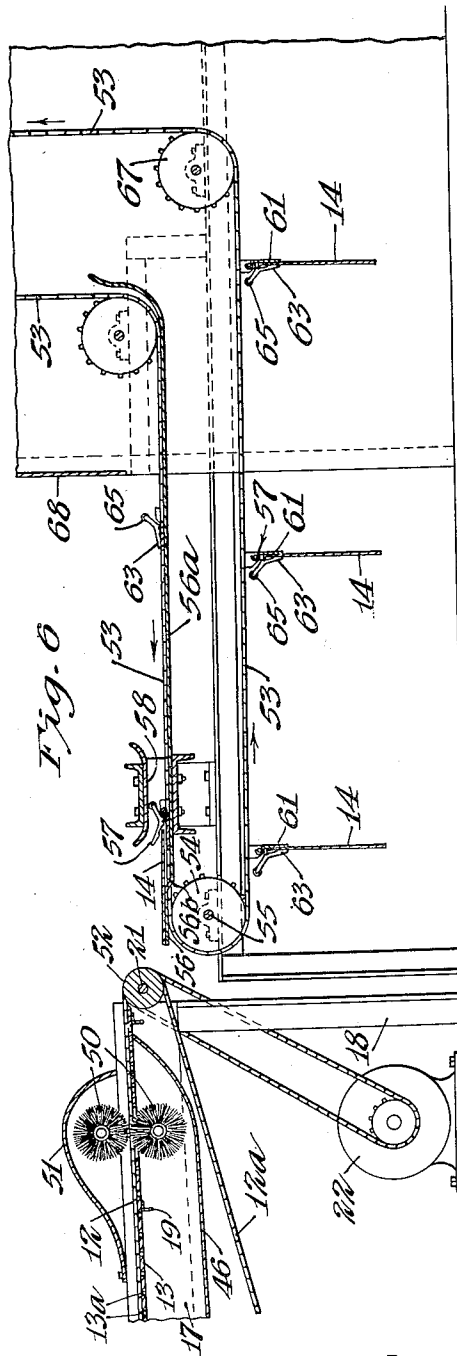
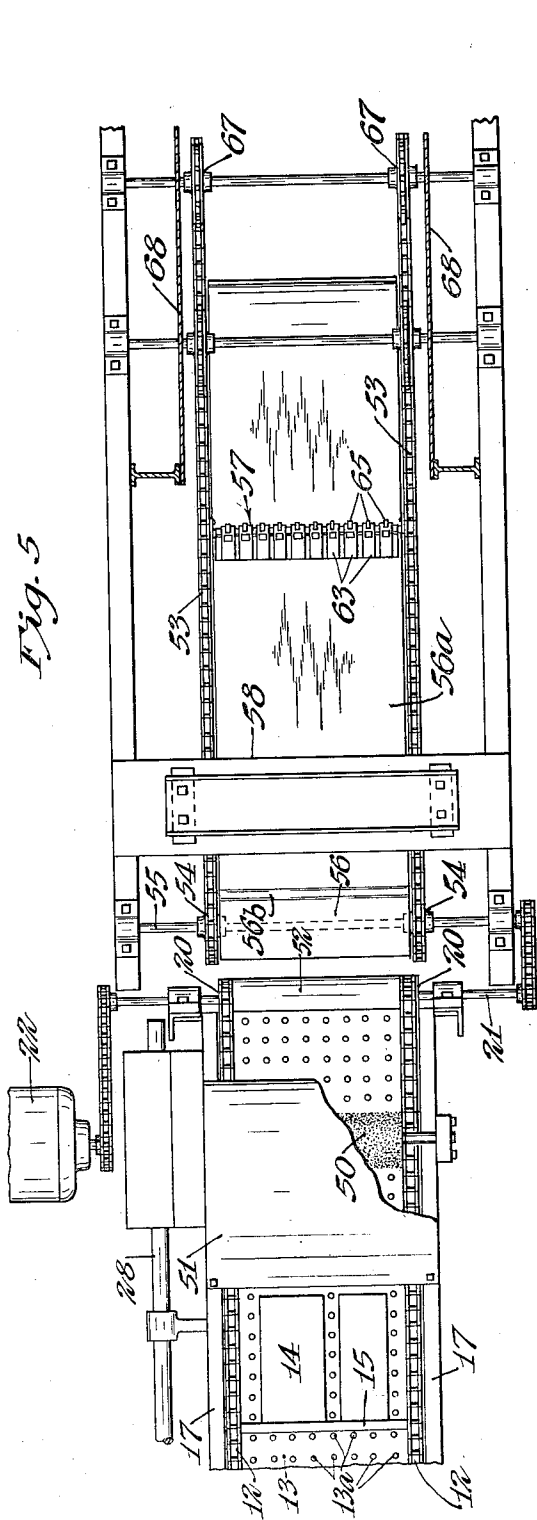
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PAINTING MACHINE FOR SHINGLES

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Fig. 8

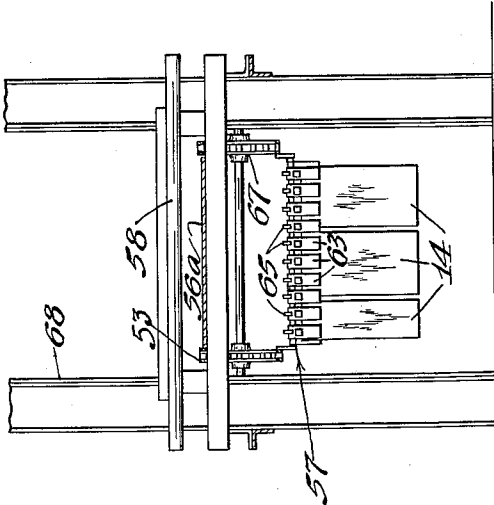


Fig. 7

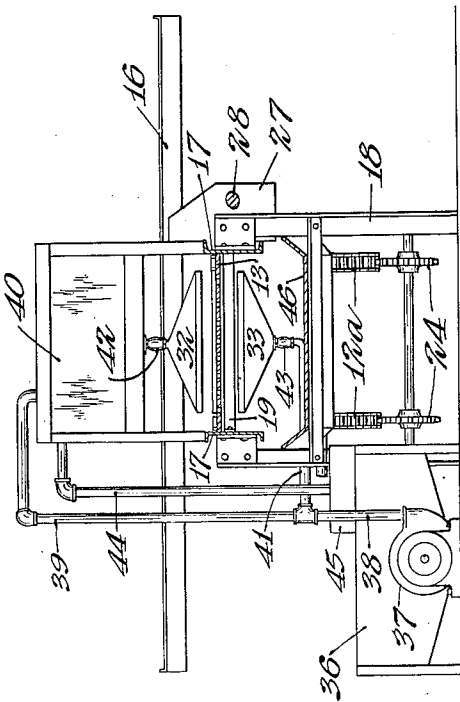


Fig. 9

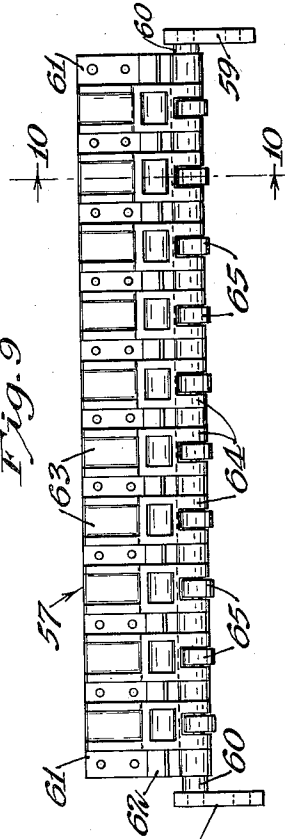
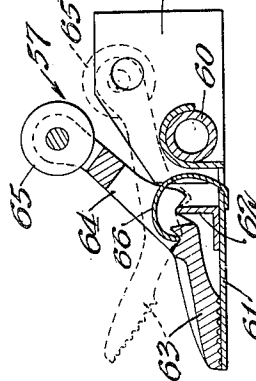


Fig. 10



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UNITED STATES PATENT OFFICE

2,189,668

PAINTING MACHINE FOR SHINGLES

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Application April 26, 1937, Serial No. 138,968

17 Claims. (Cl. 91—55)

It is an object of this invention to provide a novel machine adapted to rapidly and thoroughly clean, paint and dry wooden shingles. Liquids, either with or without pigment, may be utilized in the machine, although it is particularly designed to perform the more difficult painting operation on rough, porous and irregularly shaped surfaces.

A further object is to provide a machine of this class which utilizes paint or other coloring or preserving liquid economically while insuring adequate penetration and uniform, thorough coating of the surfaces.

Another object is to provide such a machine with novel conveyors for courses of wood shingles, each course being equal in width to the courses of shingles in the bundles, and the shingle engaging members being so designed as to maintain the several shingles, irrespective of width and whether flat or warped, under control at all times and having associated therewith mechanism for successively removing all loose particles of sawdust and the like from the shingles, then thoroughly coating and impregnating them with the liquid, then drying them and finally delivering them in courses for immediate and easy packing in bundles or containers.

Difficulties have heretofore been encountered in the automatic painting of wooden shingles because of their peculiar shape and lack of uniformity in width and porosity and because of the fact that they are sometimes warped. Such shingles, as they are received from the mills, have sawdust, splinters and other particles adhering to their surfaces in such quantities as to interfere with the circulation of the paint in the machine and to result in rough and poorly finished surfaces where machine or automatic painting of the shingles has heretofore been attempted.

The machine of the present application eliminates these difficulties and maintains the shingles under complete and continuous control during the cleaning, painting and drying operations in the machine.

In the accompanying drawings:

Figure 1 is a side elevation of our improved machine;

Fig. 2 is a plan view of the same;

Fig. 3 is a fragmentary plan view on a larger scale showing particularly the cleaning and painting mechanism;

Fig. 4 is a longitudinal, vertical section through the portion of the machine shown in Fig. 3;

Fig. 5 is a plan view showing the junction of the conveyors for the painting and drying sec-

tions of the machine, a part of the drying chamber being shown in horizontal section;

Fig. 6 is a central vertical section through the parts of the machine shown in Fig. 5;

Fig. 7 is a cross section taken on the line 7—7 of Fig. 2 and illustrating particularly the paint circulating and supplying mechanism;

Fig. 8 is a vertical section taken on the line 8—8 of Fig. 2;

Fig. 9 is a plan view showing in detail one of the shingle gripping flights for the drier section, and

Fig. 10 is a cross section taken on the line 10—10 of Fig. 9.

Receiving conveyor

At one end of the machine a horizontal shaft 11 is journaled in a suitable frame to support a pair of sprocket wheels upon which a pair of endless chains 12 are trained. These chains extend in parallel relation to each other along opposite side edges of a supporting plate 13 for the shingles. This plate extends substantially horizontally and has a smooth upper surface upon which the courses of shingles 14 are conveyed by bars 15 which are secured to the chains 12 at suitable intervals to carry the successive courses of shingles in spaced relation to each other. The bars 15 lie flat on the plate 13 to push the courses of shingles ahead of them.

A feed table 16 is mounted above the receiving end of the plate 13 to support bundles of shingles in convenient position so that the successive courses may be placed on the plate 13 in front of the bars 15. The thicker, butt ends of the shingles face the bars 15. The chains 12 run along the inner surfaces of side bars 17 and these bars extend in parallel relation to each other, being supported on legs 18 at suitable intervals. Connecting these side bars and supporting the plate 13 are angle bars 19 (Figs. 4 and 8). The upper run of each chain 12 extends from the receiving end of the plate 13 to a sprocket wheel 20 fixed on a drive shaft 21 (Figs. 5 and 6). As shown in Figs. 1 and 4, the shaft 21 is driven through a suitable connection with a motor 22. The return run 12a of each of the chains 12 is supported and guided on wheels 23 and 24.

Sawdust removing mechanism

As best shown in Figs. 3 and 4, each course of shingles in engagement with one of the conveyor bars 15 is passed between rotary brushes 25 and 26 which respectively engage the top and bottom surfaces of the shingles and have bristles sufficiently stiff to remove all adhering

particles of sawdust, dirt and similar matter. The plate 13, which supports the shingles, is provided with a transverse opening 31 through which the bristles of the brush 26 extend to reach the bottom surfaces of the shingles. The brushes are positively driven through gearing in a housing 27 and a power driven shaft 28 extending along one side of the machine. The particles removed from the shingles are drawn into suction conduits 29 and 30 and are discharged in the usual or suitable manner from a power-driven fan (not shown).

Painting mechanism

After the removal of all loose particles, the successive courses of shingles are immersed in the paint or other coloring or preserving liquid while the shingles are in continuous motion along the plate 13. This plate is formed with a multiplicity of circular openings 13a which are properly distributed, along and throughout the width of the plate along the conveyor to permit the escape of the excess liquid from the shingle surfaces. As best shown in Figs. 3, 4 and 7, the paint or other liquid is delivered to the upper surfaces of the shingles in a stream delivered by a nozzle 32 and the lower surfaces are bathed in liquid which is initially supplied from a similar nozzle 33. Liquid in excess of that required to coat each course of shingles is delivered by the nozzles 32 and 33 so that a pool of the liquid is maintained above the plate 13 and this pool extends for some distance in the direction of travel of the shingles. To insure proper submersion of each course of the shingles in this pool, we provide a series of resilient fingers 34 so distributed across the conveyor that all of the shingles will be engaged and held submerged against their tendency to float on the pool. These fingers are severally fastened at one end to a rod 35 extending horizontally across and above the conveyor, the rod being secured to the side bars 17 of the frame. The paint or other liquid is supplied from a tank 36 mounted at one side of the machine and is continuously drawn from this tank by a motor driven pump 37 having a discharge pipe 38 connected by a branch 39 to an overhead tank 40 and by a branch 41 to the nozzle 33. The nozzle 32 is supplied with liquid from the bottom of the tank 40 under control of a valve 42 (Fig. 4) and flow of liquid from the nozzle 33 is controlled by a valve 43. The tank 40 has an overflow pipe 44 arranged to return any excess liquid into a strainer 45 which drains into the tank 36. Extending beneath the entire perforated section of the plate 13 is a pan 46 arranged to collect the liquid discharged from the openings 13a and deliver it by gravity to a sump 47 having a drain pipe 48 discharging into the strainer 45.

After the greater part of the excess liquid has been allowed to drain off, the flights of shingles are passed successively between pairs of rotary brushes 49 and 50. These brushes are power-driven, in the direction indicated by arrows in Fig. 4, by suitable gearing connecting them to the shaft 28. The lower brushes 49 and 50 reach the bottom surfaces of the shingles through openings in the plate 13 and the upper brush of each pair is enclosed in a casing 51.

In order to secure uniformity in the distribution of paint on the shingles, it is important that the excess liquid be allowed to drain off wherever it tends to accumulate during the substantial period of time required for desirable penetration of the liquid into the shingles. Our arrangement of the openings 13a secures this desirable

result while the elongated plate 13 affords a smooth paint covered surface in contact with the moving shingles for the desirable time interval for uniform penetration and coating of the bottom as well as the top surfaces of the shingles.

Shingle transfer mechanism

After passing between the rotary brushes 50, the wet shingles are delivered to a second conveyor which carries them through a drying chamber 68. At the delivery end of the first conveyor, a roller 52 is mounted on the shaft 21 to support the shingles as they leave the plate 13. The second conveyor has a pair of endless chains 53 which are operated in spaced parallel relation to each other over guiding and driving sprocket wheels. The chains 53 are trained on and driven by sprocket wheels 54 supported on a horizontal shaft 55. This shaft is driven through suitable connection with the power-driven shaft 21, as shown in Fig. 5, so that the two conveyors are synchronized. The chains 53 extend horizontally and at a somewhat lower level than the plate 13 as they approach the roller 52. A table 56 extends between the chains to receive the shingles from the roller 52. To the right of one sprocket wheels 54, as seen in Figs. 5 and 6, the table 56 is formed with a slightly depressed or lower portion 56a which is connected by a short, inclined portion 56b with the elevated part of the table. The table 56 is of such extent as to cause the thin or lap ends of the shingles to be spaced slightly above the portion 56a when they come to rest after falling from the roller 52. While in this position, courses of shingles are successively gripped in the jaws of conveyor flights hereinafter described and indicated generally by the numeral 57. A fixed cam 58 momentarily opens the jaws to receive the shingles from the table 56.

Second conveyor

Details of the conveyor flights 57 are shown in Figs. 9 and 10. Each flight has a pair of hangers 59 which are severally secured to the chains 53 to support a shaft 60 in such position as to extend horizontally and at right angles to the vertical planes in which the chains travel, the shaft 60 being swiveled in the supporting hangers 59. Rigidly secured to the shaft 60 is one of the jaws 61 for gripping the shingles. This jaw extends continuously from side to side of the flight and has an angle bar 62 secured to its upper surface to form a fulcrum for a multiplicity of gripping fingers 63. Each of these fingers has a roughened face for contact with the shingles and has an integral lever arm 64 projecting obliquely therefrom to support a roller 65. A spring 66 normally retains each finger 63 in the closed or gripping position. To open the fingers, as a group, against the springs 66, a stationary cam 58 is mounted in the path of the rollers 65 at such point that the jaws are held open as each flight approaches the projecting ends of a course of shingles on the table 56. The depressed portion 56a of the table 56 supports the lower jaw 61 of the flight in such position that it passes beneath the thin ends of the shingles. Courses of shingles are thus gathered successively in the grip of the flight jaws and, as the rollers 65 are carried beyond the cam 58 the fingers 63 are closed by the springs 66. Continuing around the sprocket wheels 54, the chains 53 and flights 57 carry the shingles into the drying chamber 68, under control and in the pendant positions shown in Figs. 6 and 8. It will be understood that the shingles are gripped only

at their thin or lap ends, which are not visible when in use, and that the butt ends are untouched until the shingles have passed through the drying chamber.

Drying chamber

As will be evident from the foregoing description, the shingles are suspended with their butt ends lowermost while passing through the drier so that such paint as is free to flow tends to accumulate on these butt ends which will subsequently be exposed to the weather. This results in a desirable increase in the protection afforded by the coating. As shown in Figs. 5 and 6 and indicated diagrammatically in Fig. 1, the chains 53 carrying the courses of shingles at suitable intervals are guided upon the sprocket wheels 67 within the large drying chamber 68 and thence pass in a sinuous path alternately upward and downward within the chamber wherein a temperature ranging from about 125 to 350 degrees Fahrenheit is maintained for a sufficient period of time to dry the shingles. Finally the chains pass over sprocket wheels 69 and 70, Fig. 1, which carry the flights 57 and shingles in parallel relation to a steeply inclined discharge chute 71. Mounted in proper spaced relation to this chute is a fixed cam 72 like the cam 58, which engages the several rollers 65 and opens the gripping fingers 63 of each flight as it reaches this point. The courses of shingles are thus dropped on the chute 71 and slide out through an opening in the drying chamber. The chute, preferably, deposits the successive courses of shingles on a continuously moving conveyor 73 from which they are removed for packing in bundles or containers. The conveyor 73 is preferably of such length as to allow the shingles to cool before they are gathered in packages and the rate of cooling may be increased by enclosing the conveyor or a portion of it in a chamber which is artificially cooled.

Conclusion

Extensive practical use of the machine has demonstrated that the painted shingles when delivered from the conveyor 73 are sufficiently dry so that they do not adhere to each other when packed together in quantities in bundles or containers.

While the machine is long and the drying chamber has considerable vertical extent, all of the mechanism is narrow and a number of the machines may be operated in parallel to increase the rate of production, provide for the simultaneous manufacture of shingles of various colors and reduce labor costs.

Unusual uniformity and thorough coating with the paint or other liquid is secured by our improved machine and, its operation being continuous, rapid and economical, the machine is peculiarly adapted for the quantity production of variously colored, wooden shingles of high quality.

In the following claims the term "paint" is used broadly to include coloring, coating and impregnating liquids, either with or without pigments.

Having described our invention, what we claim as new and desire to protect by Letters Patent is:

1. In a shingle painting machine, an elongated, substantially horizontal, fixed plate arranged to slidably support and engage the shingles, means for applying paint to shingles on said plate, said plate being adapted to retain a coating of paint on its upper surface and formed with a multi-

plicity of perforations to allow the escape of excess paint and extending a substantial distance beyond said paint applying means and means for conveying shingles along said plate to rub the bottom surfaces of the shingles along said paint covered surface while allowing the excess paint to escape from said surface through said perforations.

2. In a shingle painting machine, an elongated, substantially horizontal, fixed plate arranged to slidably support the shingles, means for supplying a pool of paint in the path of shingles on said plate, said plate being adapted to retain a coating of paint on its upper surface and formed with a multiplicity of perforations to allow the escape of excess paint and extending a substantial distance beyond said paint applying means and means for conveying shingles along said plate to rub the bottom surfaces of the shingles along said paint covered surface while allowing the excess paint to escape from said surface through said perforations.

3. In a shingle painting machine, a substantially horizontal plate arranged to slidably support the shingles and to retain a coating of paint on its upper surface, said plate being formed with a multiplicity of perforations to allow the escape of excess paint, means for applying paint to shingles on said plate, means for sliding shingles along the coated surface of said plate and means for brushing the paint covered faces of the shingles while in continuous motion along said plate, said brushing means being spaced a substantial distance along said plate from said paint applying means to allow a predetermined and substantial time interval for the penetration of the paint preceding the brushing operation.

4. In a shingle painting machine, an elongated, substantially horizontal plate arranged to slidably support the shingles and to retain a coating of paint on its upper surface, said plate being formed with a multiplicity of perforations to allow the escape of excess paint, means for applying paint to shingles on said plate, means for conveying shingles along said plate, means for collecting the excess of paint from said openings and for returning the same to said paint applying means and means for brushing the faces of shingles while in continuous motion along said plate, said brushing means being spaced a substantial distance along said plate from said paint applying means to allow a predetermined and substantial time interval for the penetration of the paint preceding the brushing operation.

5. In a shingle painting machine, an elongated, substantially horizontal support for the shingles, means for supplying a pool of paint in the path of shingles on said support, said support having openings to allow the escape of excess paint and extending a substantial distance beyond said paint applying means and a conveyor for moving shingles along said support, said conveyor having a multiplicity of spaced parallel bars movable upon the upper surface of said support to thrust courses of shingles through said pool of paint.

6. In a shingle painting machine, an elongated, substantially horizontal support for the shingles, means for supplying a pool of paint in the path of shingles on said support, a conveyor for moving shingles along said support and through said pool and a plurality of resilient fingers projecting obliquely toward and along said support in the direction of movement of the shingles and into

the path of the same on said support to submerge them in said pool.

7. In a shingle painting machine, an elongated, substantially horizontal support for the shingles, means for supplying a pool of paint in the path of shingles on said support, said support having openings to allow the escape of excess paint, a conveyor for moving shingles along said support, said conveyor having a multiplicity of spaced parallel bars movable upon the upper surface of said support and each adapted to abut against the rear ends of shingles to move them through said pool of paint and a plurality of fingers arranged to engage the upper faces of shingles in engagement with said bars to submerge the shingles in said pool.

8. A shingle painting machine comprising, a substantially horizontal and elongated way affording a smooth supporting surface for courses of shingles, a conveyor for moving such courses along said way in spaced relation to each other, means for supplying paint in a pool on said way, means for submerging the shingles in said pool while in motion along said way, means for brushing the surfaces of the painted shingles during their passage along said way, a drying chamber, and a second conveyor arranged to receive the shingles from said first mentioned conveyor and to carry the same in said drying chamber, said second conveyor having means for automatically picking up and gripping the successive courses of shingles and being arranged to carry said shingles in a sinuous path through said chamber and to deliver the same in relatively dry condition at an end thereof.

9. A shingle painting machine comprising, a substantially horizontal plate affording a smooth supporting way for courses of shingles, a conveyor for moving such courses along said plate in spaced relation to each other, means for supplying paint in a pool on said plate, means for submerging the shingles in said pool, means for brushing the surfaces of said shingles during their passage along said way, a fixed, substantially horizontal support arranged to receive the courses successively from said conveyor, a drying chamber, a second conveyor having means for automatically picking up the successive courses of shingles from said support, said second conveyor being arranged to carry said shingles in a sinuous path through said chamber and to deliver the same in relatively dry condition at an end thereof.

10. In a machine of the class described, a conveyor, means for applying liquid to the surfaces of shingles on said conveyor, a fixed, substantially horizontal support arranged to receive successively from said conveyor courses of the wet shingles, a drying chamber, a second conveyor having a multiplicity of carrier flights, each provided with gripping members for shingles, means for actuating said gripping members to automatically pick up the courses of shingles successively from said support, said second conveyor being arranged to carry the shingles through said chamber and means for discharging the dried shingles from said conveyor and chamber.

11. In a machine of the class described, a fixed, substantially horizontal support arranged to receive courses of wet shingles, a drying chamber, a conveyor having a multiplicity of carrier flights, each provided with gripping members to engage shingles on said support, means for actuating said gripping members to automatically pick up successively the shingles on said support, said

conveyor being arranged to carry the shingles through said chamber and means for discharging the dried shingles from said conveyor and chamber.

12. In a machine of the class described, a table, means for delivering courses of wet shingles successively to said table with the ends of the shingles projecting from the table, a drying chamber, a conveyor having a multiplicity of carrier flights, each provided with gripping members, the shingles on said table being in the path of said gripping members, means for actuating said gripping members to automatically pick up successively the courses of shingles on said table, said conveyor being arranged to carry the shingles in a sinuous path through said chamber and means for discharging the dried shingles from said conveyor and chamber.

13. In a machine of the class described, a conveyor, means for applying liquid to the surfaces of shingles on said conveyor, a drying chamber, a second conveyor disposed to receive the wet shingles from said first mentioned conveyor and having a multiplicity of carrier flights, each provided with members arranged to automatically pick up and grip the shingles, means for actuating said gripping members to grip the wet shingles delivered by said first mentioned conveyor, said second conveyor being arranged to carry the shingles through said chamber, means for actuating said conveyors and means connecting said conveyors together for synchronizing their movement during the painting and drying of the shingles.

14. In a machine of the class described, a conveyor having a multiplicity of spaced, shingle pushing bars, means for applying liquid to the surfaces of shingles in engagement with said bars, a drying chamber, a second conveyor having a multiplicity of spaced carrier flights, each provided with gripping members for shingles, means for automatically transferring the wet shingles from said first mentioned to said second conveyor including means for actuating said gripping members to pick up the wet shingles delivered by said first mentioned conveyor, said second conveyor being arranged to carry the shingles within said chamber and means connecting said conveyors together for synchronizing their movement.

15. In a machine of the class described, a conveyor having spaced flights for moving courses of shingles in spaced relation to each other along a determined path, means for applying liquid to shingles in engagement with said flights, a drying chamber, a second conveyor having a multiplicity of carrier flights adapted to successively receive the courses of wet shingles delivered by said first mentioned conveyor, mechanical means for transferring the successive courses of shingles from said first mentioned to said second conveyor, said second conveyor being arranged to carry the shingles within said chamber and means connecting said conveyors together for synchronizing their movement.

16. In a machine of the class described, a conveyor having spaced flights for moving courses of shingles in spaced relation to each other along a determined path, means for applying liquid to shingles in motion along said path, a drying chamber, a second conveyor having a multiplicity of carrier flights adapted to successively receive the courses of wet shingles delivered by said first mentioned conveyor, mechanical means for transferring the successive courses of shingles from

said first mentioned to said second conveyor, said second conveyor being arranged to carry the shingles within said chamber, power-driven means for continuously moving the flights of both of said conveyors and means connecting said conveyors together for synchronizing their movement.

17. In a machine of the class described, a long, shingle supporting table, a conveyor having spaced flights adapted to severally push courses of shingles in spaced relation to each other along said table, means for applying liquid to shingles

on said table, a drying chamber, a second conveyor having a multiplicity of carrier flights adapted to successively receive the courses of wet shingles delivered by said first mentioned conveyor, mechanical means for transferring the successive courses of shingles from said first mentioned to said second conveyor, said second conveyor being arranged to carry the shingles within said chamber and means connecting said conveyors together for synchronizing their movement.

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