This invention relates to shingle treating and more particularly to a machine or apparatus for staining, painting or coating shingles in large quantities.

Therefore it has been customary in the preservative treatment, staining and painting or otherwise coating shingles in quantity, to dip the shingles, assembled in bundles, into a large body of liquid treating material within a container and then removing, draining and drying the so-treated shingles still bundled. There are many disadvantages in the general old method just above outlined, one of which is the necessity for providing a very large quantity of the stain, paint or coating material and in several different colors, necessitating not only a large dipping or treating tank within a machine or apparatus of proportionately large size, but also requiring excessive storage space for the treating material not in use at the particular time. There is a further disadvantage in the length of time required in soaking the shingles in the treating material and also in the draining and drying of the shingles after treatment. So, too, it is not only difficult to drain and dry the shingles in bundles, but it is also difficult to evenly distribute the treating material upon the overlapped portions of the respective shingles in the bundles. There is a still further disadvantage in the primitive method of shingle treatment above noted in that it is usually necessary in handling the bundles of shingles for the operator to plunge his hands and arms into the body of the liquid treating material within the tank or said members come in contact with the excess material in handling the treated bundle, the material by its very nature injuring the skin of the operator and often seriously poisoning his system. Furthermore, access to the treating tank is usually rather inconvenient due to the relative height of the tank.

The present invention has for its prime object to produce a machine or apparatus which is simple and compact in structure, yet is practical and highly efficient in operation and effects the treatment and drying of the shingles in an economical manner and overcomes all of the disadvantages herein above noted and at the same time attains certain advantages as will hereinafter more fully appear in the following description.

The invention consists in the novel general structure and assembly of the machine or apparatus and the particular parts and combinations and arrangements of parts thereof as hereinafter described and set forth in the appended claims, reference being had to the accompanying drawings illustrating a practical adaptation of the invention, and in which:

Figure 1 is a view showing the outer casing of the machine in vertical section with interior parts of the assembly in elevation and in section, the swiveled treating tank being shown in vertical receiving position;

Figure 2 is an end elevation of the treating tank unit removed from the outer casing, the tank being shown in its horizontal dumped position;

Figure 3 is a section taken on or about the line 3—3 of Figure 2;

Figure 4 is a detail perspective view of the shingle bundle holder detached from the treating tank;

Figure 5 is an inverted view of the treating tank, partly in plan and partly in section; and

Figure 6 is a plan view of the supporting frame for the treating tank.

Referring now to the drawings, the apparatus therein illustrated comprises an outer shell 10, which is frustra-conical in general form, said shell having a conical raised bottom 11 which is provided with a central opening 12 surrounded by an upstanding annular flange 13. An outlet opening 14 is provided in the lower side wall portion of the shell 10 at the base of the conical bottom 11, a drainage spout 15 and pipe 16 leading from said outlet opening to a supply container (not shown) for the liquid stain or paint or other coating material which is to be applied to the shingles. The shell 10 is provided at its upper end with a lid 17 which is hingedly mounted at one side, as at 18, and provided at its opposite side with a handle 19 which may be strap-like, as shown, or of any other suitable form.

As shown, the lid 17 is provided with a central opening 20 through which the angular end portion 21 of a nozzle 22 is projected downwardly into the interior of the shell 10, said nozzle 22 40 being provided with a suitable cutoff valve 23, which is merely illustrated conventionally in Figure 1. The nozzle 22 is mounted on conventional supports 24 which are suitably attached to the top side of the lid 17, and a flexible pipe 25 is attached at its end communicably with the nozzle 22 and leading from the supply container (not shown) from which the liquid material may be obviously delivered to the nozzle 22 through said flexible pipe 25 either by gravity, pump pressure 50 or other provision. In this connection it is here noted that the flexibility of the pipe 25 permits the ready opening and closing movements of the lid 17 on its hinge 18, and it is obvious that suitable counterbalancing means (not shown) may be
provided whereby the lid 17 is more easily operated and will remain at whatever position to which it is opened.

Located within the outer shell 10 is a separate treating tank unit including a supporting base 25 which rests on the floor or other surface, supporting the bottom of the shell 10 rests. This base 25 may or may not be attached to the outer shell 10, as desired. As shown, it is attached and, for the purpose intended, it is of sufficient weight and diameter to afford a stable support for the parts carried thereby and now to be described.

Mounted on the base 25 is a spider frame 27 having an independent base portion 28 which is secured centrally on said base 25. As shown, the spider frame 27 comprises vertical leg portions 29 which are formed integrally with and tend upwardly from the base portion 28, the upper end portions 30 of said frame members extending inclining upward and convergently with their extreme ends attached integrally to a bearing hub 31. A vertical spindle shaft 32 has its intermediate portion journaile in the bearing said hub 31 in which latter the shaft is supported by a thrust collar 33 which is pinned to the shaft and rests on the upper end of the hub 31, the lower end of the shaft 32 being journaile in a central bearing boss 34 provided on the upper side of the base portion 28 of the spider frame 27, while the upper end of the shaft is extended above the collar 33 and has a circular supporting bracket 35 fixedly secured thereon so as to rotate therewith and support a frame on which the treating tank is mounted, as will now be described.

While the bracket element 35 may be of any suitable form, it preferably comprises a circular plate portion which is cast or otherwise formed integrally with a hub portion 36 which is fastened upon the upper portion of the shaft 32 and is reinforced by triangular webs 37 formed integrally with the circular plate and hub portion. Extending diametrically across the top of the bracket element 35 and securely bolted thereon, as at 38, is a horizontal flat frame bar 39 having end portions 40 forming vertical upstanding end portions 40, said upper portions having axially aligned apertures therein for the reception of trunnions 41 and 42, respectively, provided at the opposite ends of a treating tank 43. The tank 43, which is a guide base of ample length for the bar 55 and said element 58 and said element 58 is spaced sufficiently from the said 54 to permit ample opening movement of the slide plate 50.

The connecting bar 55 for the two slide plates 50 is extended beyond the end of the tank 43, on which the longer trunnion 42 is mounted and provided with a transverse rounded head portion or shoe 59 which is constantly in slidable engagement with an arcuate cam plate or track member 60 which is securely attached, as at 61, to the adjacent end portion of the support bracket 44. The segment of said plate 50 is attached to the side of said plate member 48, the springs 52 constantly urging the slide plate 50 in the direction of said cam plate or track 60. The attached end portion 61 of said arcuate cam plate or track 60 is located at a distance from the adjacent end of the tank 43 whereby the slide plate is positioned to close the collar to the portion of said arcuate cam plate or track 59 which is warped away from the end of the tank and maintains the slide plate 50 to move endwise to a position
where the transverse openings 51 in said plates are in full registration with the openings 49 in the bottom 47 of the tank, at which time the tank is in the full line horizontal position as shown in Figure 2, which position is also indicated in Figure 3. In this position the liquid content of the tank, which has not been taken up by the treating action upon the bundle of shingles within the tank, is readily discharged through the open side of the tank and the now uncovered openings 45 in the bottom wall 47, which is now vertically disposed. With the tank 43 thus positioned and drained as to the free excess treating liquid, it is rotated rapidly about the axis of the spindle shaft 92 so that the liquid which has entered and collected within the open spaces between the several shingle slabs comprising the bundle within the tank is, by centrifugal force, evenly distributed upon the overlapped faces of the slabs, not only between the relatively spaced portions but also between those portions which are in closer relation and even in intimate contact with each other, and at the same time such of the liquid that is not absorbed by or taken up within the coating of the several shingles is thrown off and discharged through the open side of the tank and the uncovered openings 45 into the outer shell 15.

The length of time this whirling movement of the tank and resultant centrifugal action is carried on depends upon the character of the treating liquid and its relative density. In any event, however, a comparatively short time is necessary for the initial immersion and soaking of the shingles and the subsequent centrifugal action to thoroughly impregnate or coat the shingles and dry them sufficiently for commercial handling and distribution in the bundle. In this connection, it is here noted that not only is the impregnation or coating and drying of the shingles thoroughly and expeditiously effected by the centrifugal action but it has the further advantageous effect of practically preventing the several shingle slabs from sticking together, because during such action the slabs are constantly tending to move apart from each other so that when they have become sufficiently dry there is very little possibility, if any, of adherence between them.

As a practical means for holding the bundle of shingles in the tank 43 during treatment, a pair of angular clamping members 62 are slidably mounted in the tank 43, said members 62 being stood on end in the opposite end portions of the tank when the latter is in its vertical position as shown in Figure 1 and being movable toward and from each other by a pair of toggle links 63 which are generally arcuate, as shown in Figures 3 and 4, and have diametrically opposite straight end portions 64 which are respectively attached, as at 65, to the inner vertical edge portions of said members 62 which are directly abut and slide across the inner face of the adjacent longitudinal side wall of the tank. The opposite ends of the arcuate portions of said links 63 are pivoted attached, as at 66, to an operating and holding lever 67 at opposite sides of the axis of its pivotal attachment to said longitudinal side wall of the tank, as at 68, said lever 67 having a detent 60 which is engageable with the teeth of an arcuate rack 70 provided thereon on the upper portion of said side wall of the tank, by which provision the lever 67 may be operated to move said clamping members 62 toward or from each other, as may be necessary, and the detent then engaged with the rack 70 whereby to hold the members 62 in their adjusted positions.

The portions 71 of the clamping members 62 which extend at right angles to the portions which are slidably opposed to the longitudinal face of the tank wall are provided with a multiplicity of transverse openings 72 through which excess liquid may be thrown from the opposite ends of the clamped bundle of shingles into the space between said portions 71 of the clamps and the adjacent end walls 73 of the tank during the whirling movement of the tank, said openings 72 also affording ample open space to prevent complete obstruction of the ends of the bundle of shingles when the bundle is clamped between the members 71, whereby the liquid in the tank reaches the ends of the bundle directly through said openings.

Suitable guide means (not shown) may be provided for the bundle-clamping elements 62 other than the shuttered bottom of the tank 43 on which said elements 62 slide, but such supplemental guide means is not ordinarily required because of the particular arrangement of the link members 63 and operating lever 67 and the pivotal attachment of the lever to the central portion of the adjacent side wall of the tank. In this connection, it is noted that the peculiar connection between the operating lever and the bundle-clamping elements 62 and the attachment of the lever to the side wall of the tank, as just above stressed, makes it unnecessary to provide any additional holding means to prevent the clamping elements 62 from moving out of the tank 43 during the whirling motion of the tank in its horizontal position, particularly because the weight of the elements 62 with the bundle of shingles clamped therebetween is sufficient to resist the centrifugal force and especially as the preponderance of the weight is between the axis of rotation and the shuttered bottom of the tank.

In order to support the bundle of shingles on the clamping elements 62 in spaced relation to the shuttered bottom of the tank 43 and at the same time brace the angular plate members of the elements 62, diagonal stays in the form of flat bars 73 are provided as shown more clearly in Figure 4, the bundle of shingles being placed in the tank edgewise to rest on said braces 73 with the opposite ends of the bundle disposed in opposed relation to the angular members 71 of the clamping elements. Thus, when the operating lever 67 is actuated to bring the elements 62 in clamping relation to the ends of the bundle, the bundle is not only supported above the bottom of the tank, but the bundle is also centered between the opposite end walls of the tank so that there is ample space for the circulation of the liquid in the tank beneath the bundle as well as at the ends thereof, it being of course understood that the treating liquid may be supplied to the tank 43 in sufficient quantity to bring it to a level where it covers the top of the bundle and the bundle is thereby completely submerged in the liquid. It is here further noted that the bundle of shingles is preferably clamped and positioned in the tank 43 before the treating liquid is supplied from the source 22. In this way it is not necessary for the operator to have hands and arms to come in contact with the liquid, and, obviously, the bundle of shingles may, after treatment, be removed from the tank and handled by means of suitable tongs or other lifting and handling devices.
For convenience in manipulating the lever 87 the handle portion thereof may be extended beyond the open side of the tank, and to facilitate turning the tank on its trunnions 41 and 42, a handle member 74 is preferably provided at one end of the tank.

In the vertical position of the tank 43 for the reception, treatment and removal of the bundle of shingles, it is thus maintained by its natural equilibrium because of the preponderance of the load being below the axes of the trunnions 41 and 42. However, special provision is made for supporting the tank in the horizontal position in which it is whirled about the axis of the spindle shaft 32. As shown more clearly in Figure 2, the tank 43 in its horizontal position rests with one edge portion upon a ledge 76 provided on an upstanding end portion 75 of the transverse frame bar 77 which is supported at its inner end on the circular bracket member 35 and secured thereto, as at 78. Extending diametrically oppositely to the transverse frame bar 77 is a similar bar 79 having an up-turned outer end portion 80, said bar 79 being secured to the bracket member 35, as at 81. Secured, as at 82, on the inner end of the up-turned portion 80 of the frame member 79 is a leaf spring 83, the upper end portion of which is normally disposed inwardly away from the upper end portion of the upright frame member 86, said spring having an outwardly extended angular end portion 84 which rides over the end of the member 80 and affords a support for the adjacent end of the treating tank 43 when the tank is in its horizontal position as shown in Figure 2. In turning the tank 43 on its trunnions 41 from the vertical shingle-receiving and treating position to the horizontal dumping and whirling position, the spring element 83 is depressed by the engagement of the adjacent end portion of the tank therewith and it snaps back to its normal position in supporting relation beneath the adjacent end of the tank after the latter has reached its horizontal position. In order to release the spring element 83 from its supporting relation to the tank 43 to permit it to be swung back to the vertical position, a knob 85 is provided on the outer end of a stem 86, which is slidably mounted in an aperture provided therefor in the frame member 80 and suitably attached at its inner end to the spring element 83, by which provision a pull on the knob retracts the spring from engagement with the tank 43.

Any suitable means may be provided for driving the spindle shaft 32 and controlling the starting and stopping thereof. As shown, a loose pulley 87 is mounted on the lower portion 75 of the transverse frame bar 77 with its hub portion supported rotatably on the boss 34 extending upwardly from the base plate 28 of the spider frame 27, said loose pulley 87 being constantly driven by a belt 88 connecting it to a suitable motor or prime mover (not shown).

Fixed on the shaft 32, just above the loose pulley 87, by means of a set screw 89, or other suitable fastening means, is a driving pulley 90 onto and from which the belt 88 is shifted from and returned to the loose pulley 87 by means of a shipper member 91 provided on the rear arm 92 of a pedal lever 93 pivotally mounted, as at 94, on one of the spider frame members 27 (see Figure 1), said pedal lever being yieldably held in its normal position by a spring element 95, in which position the belt 88 is entirely free from engagement with the fixed pulley 90 and riding only on the loose pulley 87 or idler 85. In this connection, it is here noted that suitable braking means (not shown) may be provided for stopping rotation of the shaft 32 when the belt 88 is shifted off of the fixed pulley 90 onto the loose pulley 87, which means may obviously be separately manipulated and controlled by the operator or included as a part of the belt shifting means in any approved manner.

In order to prevent the shingle treating liquid from passing out through the opening 12 in the bottom 11 of the outer shell 10 through which the shaft 32 works, said opening is covered by a conical hood 96, which is mounted on the lower end portion of the hub 36 of the bracket member 35 so as to rotate with the shaft 32. The peripheral portion of the hood extends with considerable overhang beyond the annular flange 13 surrounding said opening 12, said hood 96 not only effectually shielding the liquid due to its conical form but the liquid being also thrown off by centrifugal force because of the rotation of the hood with the shaft 32.

In accordance with the present invention, as herein set forth, a shingle treating machine is provided which is simple and compact in structure, relatively low in height of its outer casing for convenience in access to and manipulation of the interior parts, and the relative construction and arrangement of the interior parts being such that the liquid treatment of the shingles and drying thereof is effected in an economical and highly efficient manner, and while the illustrated structure is a practical embodiment of the invention, it is obvious that considerable modification may be made therein without departing from the spirit and scope of the invention as defined by the appended claims. The invention, therefore, is not limited to the specific construction and arrangement shown in the accompanying drawings.

What is claimed is:

1. A shingle treating machine of the character described, comprising a horizontal supporting frame mounted to rotate about a vertical axis, a treating tank having trunnions at its opposite ends journaled on said supporting frame so that the tank is supported rotatably about a horizontal axis, said tank having an open side disposed at the top in a vertical receiving position of the tank, the opposed side of the tank constituting the bottom in such position of the tank having a plurality of openings therein, closure means for said openings, cooperative means on said supporting frame for moving and holding said closure means in closing relation to said bottom openings when the tank is in vertical receiving position and for moving said closure means to uncover the openings when the tank is rotated on its trunnions to a horizontal position on the supporting frame, and means for releasably holding a bundle of shingles in said tank.

2. A shingle treating machine of the character described, comprising a horizontal supporting frame mounted to rotate about a vertical axis, a treating tank having trunnions at its opposite ends journaled on said supporting frame so that the tank is supported rotatably about a horizontal axis, said tank having an open side disposed at the top in a vertical receiving position of the tank, the opposed side of the tank constituting the bottom in such position of the tank having a plurality of openings therein, closure means for said openings, cooperative means on said supporting frame for moving and holding said closure means in closing relation to said bottom openings when the tank is in vertical receiving position and for mov-
ing said closure means to uncover the openings when the tank is rotated on its trunnions to a horizontal position on the supporting frame, means for releasably holding a bundle of shingles in said tank, last-named means comprising a pair of opposed clamping elements between which the bundle of shingles is placed in the tank, a lever member connected to the clamping elements whereby to move them to-and-fro from each other, and means for releasably locking said lever member in its operated position.

5. In a shingle treating machine of the character described, an outer enclosing shell having a raised drainable bottom and a hinged top, said shell having a drain outlet and the hinged top having a valve-controlled nozzle mounted thereon, said nozzle having a flexible pipe connection with a source of treating liquid and arranged to discharge into the outer enclosing shell through a central opening in the hinged top, a vertical spindle shaft rotatably mounted below the bottom of the outer enclosing shell and extending upwardly into said shell through an opening in the bottom of the shell, said shaft having a hook mounted thereon to rotate therewith, said hook covering the opening in the bottom of the shell, a horizontal supporting frame mounted on the upper end of said spindle shaft to rotate therewith, a treating tank having trunnions at its opposite ends journalled on said supporting frame whereby the tank is rotatable about a horizontal axis, said tank having an open side disposed at the top when the tank is in vertical shingle-receiving position, the opposite side of the tank not being the bottom when the tank is in such position having a multiplicity of openings therein, slidable closure means on said tank, spring means urging said closure means in one direction lengthwise of the tank to uncover said bottom openings, means on said support engaged by said closure means in the vertical position of the tank whereby said closure means is moved and held in position to close the bottom openings of the tank, but said closure means is movable to uncovering position relative to said bottom openings when the tank is turned to a horizontal position on its trunnions, means on said supporting frame for releasably holding said tank against tilting movement on its trunnions when the tank is in horizontal position, and means for releasably holding a bundle of shingles in said treating tank.

4. In a shingle treating machine of the character described, an outer enclosing shell having a drainable bottom and a movable top, said shell having a drain outlet in its lower portion and the movable top having a valve-controlled nozzle thereon, said nozzle having a flexible pipe connection with a source of treating liquid and being arranged to discharge into the shell through an opening provided therefor in the top, a horizontal supporting frame mounted to rotate about a vertical axis within said shell, a rectangular tank journalled at its opposite ends on said supporting frame whereby to be rotatable about a horizontal axis, said tank having an open top side in its vertical position, the opposed bottom side of the tank in such position having a plurality of openings covered by a slidable closure element in such position of the tank, means for moving said closure element away from said openings when said tank is turned on its axis to a horizontal position, and means for releasably holding the tank against tilting movement when in its horizontal position, and adjustable clamping means for releasably holding a bundle of shingles in said tank.

5. In a shingle treating machine of the character described, an outer enclosing shell having drainage provision at its bottom, a treating tank mounted in said shell for rotation about a vertical axis and having provision for rotation about a horizontal axis, said tank being of general rectangular form and disposed vertically in its shingle and treating liquid receiving position, the top side of the tank in such position being open and the bottom side being provided with a multiplicity of openings closed by a movable closure element, means for moving said closure element to uncover said bottom openings when said tank is turned to a horizontal position about its horizontal axis, and means for releasably holding a bundle of shingles in said tank.

6. In a shingle treating machine of the character described, an outer enclosing shell having drainage provision at its bottom and means for supplying a treating liquid at its top portion, a supporting frame rotatable about a vertical axis within said shell, said frame comprising elongated longitudinal members having the upward portions and transverse members also having the upward portions but of lesser height than said first-named end portions, one of said transverse upward portions having an inturned shoulder at its end and the opposite upward portion being provided with a spring element providing a depressible shoulder, a rectangular treating tank having trunnions at its opposite ends mounted on the upward portions of the longitudinal member of the supporting frame, said tank having an open top side in the vertical position of the tank, the opposite side of the tank having a multiplicity of openings closed by a slidable closure element, means on said longitudinal frame member for holding the closure member in closing relation to the bottom openings in the vertical position of the tank, means for moving said closure member to uncover said openings when the tank is moved to a horizontal position on its trunnions, said tank in its horizontal position being supported at one side on the inturned shoulder portion of the upright of the lateral frame member and the opposite side releasably supported by the spring element on the opposite upturned end portion of said transverse frame member, and means for releasably holding a bundle of shingles in said tank.

5. In a shingle treating machine of the character described, a circular outer shell having a conical bottom provided with a central opening surrounded by an upstanding annular flange, a bearing stand below the bottom of the shell, a vertical spindle shaft journalled in said stand and provided with controllable driving means, said shaft extending upwardly through the opening in the bottom of the shell and provided with a hood rotatable therewith and covering said opening, the peripheral portion of the hood overhanging the flange surrounding said opening, said shaft having a lateral drain outlet adjacent its conical bottom, a valve-controlled treating liquid nozzle at the top of said shell, a supporting frame mounted on the upper end of said spindle shaft and a treating tank mounted on said supporting frame to be rotatable about a horizontal axis, and means in said tank for centering and holding a bundle of shingles in the tank, said tank, in an upright position, receiving the shingles and the treating liquid and being provided with outlets.
in its bottom normally covered in such position of the tank, said openings being uncovered automatically when the tank is turned and supported in a horizontal dumping position on said support.

8. In a shingle treating machine of the character described, a centrifugal shingle receiving and treating tank of general rectangular form and supported for rotation about a vertical axis, said tank being supported at its opposite ends tiltably about a horizontal axis, and clamp means for centering and holding a bundle of shingles in the tank to be treated, said means comprising an opposed pair of right angular plate elements slideable in the tank with one plate portion adjacent the side of the tank, an operating lever pivotally mounted on the side of the tank, a cooperatively opposed pair of link members connecting said operating lever and adjacent plate portions of the clamp, the right angular plate portions of the clamp elements having a multiplicity of openings therein, said last-named plate portions abutting the ends of a bundle of shingles placed edgewise in the tank between the clamping elements, and diagonal brace members connecting the lower portions of the right angular plates of the respective clamping elements, said diagonal braces supporting the bundle of shingles above the adjacent bottom wall of the tank, and said angular plate portions abutting the ends of the shingles spacing the bundle from the opposite end walls of the tank.

9. In a shingle treating machine of the character described, a supporting frame rotatable about a vertical axis, a treating tank mounted on said supporting frame and tiltably about a horizontal axis, one side of the tank constituting the bottom in the vertical position of the tank, said bottom side having a multiplicity of transverse slotted openings therein, a longitudinally slideable closure on said bottom having a multiplicity of correlated transverse openings, spring means constantly urging said closure in one direction to bring its openings into registration with the openings in the bottom of the tank, and cam means on said support for moving said closure and holding it in closing position with relation to the bottom of the tank when the tank is in vertical position and permitting the closure to move into open position by the action of the spring element when the tank is tilted to horizontal position on said support.

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