This invention relates to drums for treating pieces of work. While the invention is illustrated as embodied in a container comprising a rotary drum particularly applicable to the tanning of hides and skins, it is to be understood that the invention and various important features thereof may have other applications and uses.

It is an object of the invention to provide a container in which pieces of work may be agitated with a minimum amount of treating liquid in such manner that the latter is alternately applied to and drained from the work until substantially all of the treating material in the liquid has been utilized. It is a further object of the invention to provide a drum for the tanning of hides or skins which is simple and durable in construction and highly efficient for the purpose intended.

To these ends, and in accordance with an important feature of the invention, there is provided a rotary drum having on its external surface one or more buckets arranged to scoop treating liquid from a restricted portion of a vat or other receptacle, in which the drum is mounted for rotation, and discharge treating liquid through openings in the drum upon the pieces of work within, the restricted portion being of such dimensions as to collect all or nearly all of the limited amount of treating liquid provided for treatment of the pieces of work. In the illustrated construction, a number of buckets are disposed in alignment with each other about the external periphery of the drum so as to dip into treating liquid collected in a trough in the bottom of the vat, the trough being of a width corresponding to the width of the individual bucket, thus providing an arrangement wherein a minimum amount of treating liquid may be completely utilized by filling the trough below the drum and depending upon the buckets to carry the treating liquid upwardly away from the trough to points from which it may be discharged through openings provided for the purpose upon the work inside of the drum. By this arrangement hides or skins in the drum may be treated with a limited amount of a relatively concentrated treating liquid which is discharged from above upon the hides or skins during agitation thereof, the treating liquid being repeatedly drained from the hides or skins and then reapplied through the operation of the buckets. In this way treating liquid is quickly drained from the hides or skins as soon as it has surrendered all, or the greater part, of its treating material to the hide or skin substance and is then replaced by other treating liquid.

These and other important features of the invention and novel combinations of parts will now be described in detail in the specification and then pointed out more particularly in the appended claims.

In the drawing,

Fig. 1 is a top plan view partly in section of a tanning machine illustrating one embodiment of the invention;

Fig. 2 is a section along the line II—II of Fig. 1 looking in the direction of the arrows; and

Fig. 3 is a sectional view taken along the line III—III of Fig. 2.

In the illustrated machine, which is specially designed for tanning operations upon hides and skins, there is provided a drum 10 the cylindrical portion of which is made up of slats 12 in contact with each other at their ends but spaced throughout the greater part of the length of each slate by slots 14, the slots being of a special shape and arrangement, as will later be described herein.

Upon reference to the drawing, it will be observed that the drum 10 is mounted upon trunnions 16 and 18 carried in journals rigidly supported by frame members 20. As shown, the trunnion 18 carries a sprocket wheel 22 about which passes a chain 24 also engaging a sprocket wheel 26 carried by a shaft 28 arranged to be driven by an electric motor 30.

In the illustrated construction, the drum 10 is mounted to rotate within a vat 32 having a concave bottom, as most clearly shown in Fig. 2. When hides or skins are to be tanned, the tanning liquor may be introduced directly into the vat, since it is contemplated to utilize in tanning operations a minimum amount of tanning material, that is, an amount calculated as substantially just sufficient to tan the hides or skins introduced into the drum. In performing other operations, such as that of washing the hides or skins in the drum 10, the treating liquid will ordinarily be introduced at first into a tank 36 where it may be either heated or cooled through appropriate use of pipes 38, which may carry either hot water (or steam), when it is desired to heat the treating liquid in the tank 36, or a cooling solution when it is desired to reduce the temperature of the treating liquid in said tank 36.

As before stated, the container shown in the drawing is specially designed to secure tanning of hides or skins utilizing a minimum amount of...
tanning liquid. To this end the concave bottom of the vat 32 is provided with a trough 48 which is relatively narrow in comparison with the longitudinal dimension of the vat 32. Hence, a relatively small amount of treating liquor will fill the trough 48. Furthermore, treating liquid from the drum 10 and from other parts of the vat 32 will collect in the trough 48. For removing treating liquid from the trough 48 and discharging it upon the hides or skins within the drum 10 there is provided a plurality of buckets 42 upon the external cylindrical surface of the drum 10, each bucket being of a width corresponding closely to the width of the trough 48 so that during rotation of the drum 10 each bucket in turn passes along the trough 48 and scoops up some of the tanning liquid contained therein. It will be readily understood, upon inspection of Fig. 3, that as each bucket 42 is approaching the high point in the rotation of the drum 10, it discharges the treating liquid through one or more slots 14 into the interior of the drum, so that there is a continuous rain of tanning liquid discharged from above upon the hides or skins within the drum. In this connection it is to be noted that at least two slots 14 extend across each bucket 42 to drain treating liquid therefrom and that the speed of rotation of the drum is such that the buckets 42 carry substantial amounts of the liquid well up toward the high points in the rotation of the drum. A satisfactory speed of the rotating drum is fourteen revolutions per minute. While only one row of buckets, all in alignment with each other upon the external cylindrical surface of the drum, is shown in the drawing, it is to be understood that two or more such rows of buckets may be provided, particularly those skins in which the longitudinal dimension of the drum bears a greater ratio to its diameter than is the case with the illustrated drum.

For carrying the hides and skins upwardly from the bottom of the drum on the rising side thereof and dropping them again so as to secure agitation of the hides or skins and of the treating liquid during tanning operations, there is provided a plurality of shelves 50 upon the internal cylindrical surface of the drum, the said shelves being arranged at an acute angle to the internal surface of the drum and of such a width as to offer no obstruction to the fall of the hides or skins from each shelf in turn as it approaches the high point in the rotation of the drum. For a more complete disclosure of this feature of the drum, reference should be had to application Serial No. 643,876, filed November 21, 1932 in the name of Matthew M. Merritt. It will be observed, upon inspection of Fig. 2, that the treating liquid from each bucket 42 is discharged principally upon the hides or skins carried by one of the shelves 50. It will be understood, however, that some of the treating liquid will be carried so far up toward the high point of the drum in its rotation as to be discharged directly upon hides or skins in the bottom of the drum. Not only do the hides or skins receive tanning material while on the shelves 50 but the tanning liquid may drain from these hides or skins on the shelves 50 through openings in the shelves located at the line of contact between the shelves and the internal surface of the drum, as indicated at 57 in Fig. 2.

When it is desired to treat the hides or skins in the drum 10 with some treating liquid other than tanning material, it will usually be with the treating liquid in considerable amount as, for instance, in washing operations upon the hides or skins following tanning and/or dyeing operations. In that case the buckets 42 are supplemented by the slots 14 as carriers of the treating liquid, the slots 14 being wedge shaped in cross section with the larger end facing toward the exterior surface of the drum. Moreover each slot has the larger end in advance of its other end in the direction of rotation of the drum. The result is that in the rotation of the drum 10 each slot 14 scoops up the treating liquid through its wider opening upon the external surface of the drum and subsequently discharges the treating liquid through the more restricted opening as each slot in turn moves of said drum along said axis of the rotating drum. While the quantity of treating liquid thus carried by each of the slots is not great, the effect of the slots in the aggregate is very considerable, due to the speed of the drum and also to the agitation of the treating liquid carried along by the slotted periphery of the drum during rotation of the latter.

When the drum is in use as a treating vessel other than for tanning, it will usually be with the treating liquid in considerable amount as, for instance, in washing operations upon the hides or skins following tanning and/or dyeing operations. In that case the buckets 42 are introduced through a door, such as that indicated at 34 in Fig. 2, for the interior of the drum, the hides or skins thus introduced being of a width substantially less than the length of the drum and being of a width substantially less than the length of the drum along said axis of the rotating drum. While the quantity of treating liquid thus carried by each of the slots is not great, the effect of the slots in the aggregate is very considerable, due to the speed of the drum and also to the agitation of the treating liquid carried along by the slotted periphery of the drum during rotation of the latter.

In operating the machine in tanning operations upon hides and skins, the latter are introduced through a door, such as that indicated at 34 in Fig. 2, for the interior of the drum, the hides or skins thus introduced being of a width substantially less than the length of the drum along said axis of the rotating drum. While the quantity of treating liquid thus carried by each of the slots is not great, the effect of the slots in the aggregate is very considerable, due to the speed of the drum and also to the agitation of the treating liquid carried along by the slotted periphery of the drum during rotation of the latter.
3. In a tanning machine, a vat, a cylindrical drum rotatable in the vat, and a bucket on an external cylindrical surface of the drum arranged to discharge treating liquid into the drum, said vat having a concave bottom portion concentric with respect to the cylindrical surface of the drum and having further a portion depressed below said concave bottom for collecting treating liquid, and said bucket being positioned on the drum to take treating liquid from said depressed portion of the vat during rotation of the drum.

4. In a tanning machine, a vat having a concave bottom, a cylindrical drum rotatable in the vat, and buckets on the external cylindrical surface of the drum, said drum having slots in its periphery with a slot extending across one dimension of each of the buckets and opening into the drum, and said drum being mounted for rotation in closely spaced relation to the concave bottom of the vat so that said buckets may take treating liquid from a limited amount of such liquid in the vat and discharge it into the drum through said slots during rotation of the drum.

5. In a machine for treating hides, skins and leather, a vat having a concave bottom and a trough extending transversely of said bottom, said trough being narrow in relation to the length of said concave bottom, a cylindrical drum mounted for rotation in the vat in closely spaced relation with respect to said concave bottom, and a plurality of buckets on the external surface of the drum, said drum having openings through which said buckets discharge liquid into the drum, each bucket being of a width to fit the trough and arranged to scoop treating liquid from the trough and carry the liquid upwardly during rotation of the drum to discharge it into the drum as each bucket in turn approaches the high point in the rotation of the drum.

6. In a machine for treating hides, skins and leather, a vat having a concave bottom, a drum mounted for rotation in the vat in closely spaced relation with respect to said concave bottom, said drum having a plurality of slots opening through the peripheral portion of the drum, and a plurality of buckets on the external surface of the drum, each bucket being placed across a plurality of said slots and being arranged to dip into treating liquid in the concave bottom of the vat and carry the liquid upwardly during rotation of the drum to discharge it through said slots into the drum as each bucket in turn approaches the high point in the rotation of the drum.

7. In a machine for treating hides, skins and leather, a vat having a concave bottom, a cylindrical drum mounted for rotation in spaced relation to said concave bottom, said drum having a plurality of shelves upon its internal surface arranged to carry the hides or skins up toward the high point in the rotation of the drum to drop them to the bottom of the drum, said drum further having an opening through the cylindrical surface thereof above each shelf, and buckets upon the external cylindrical surface of the drum to dip treating liquid from the vat during rotation of the drum and to discharge the liquid through said openings upon hides or skins supported by said shelves.

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