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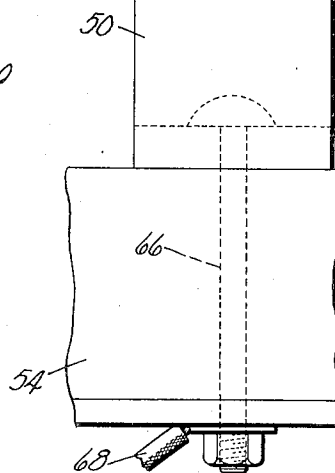
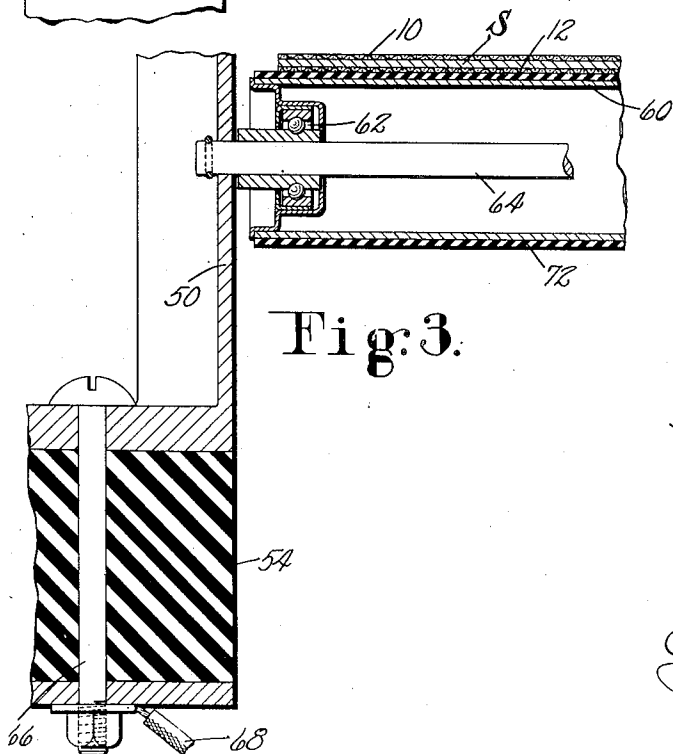
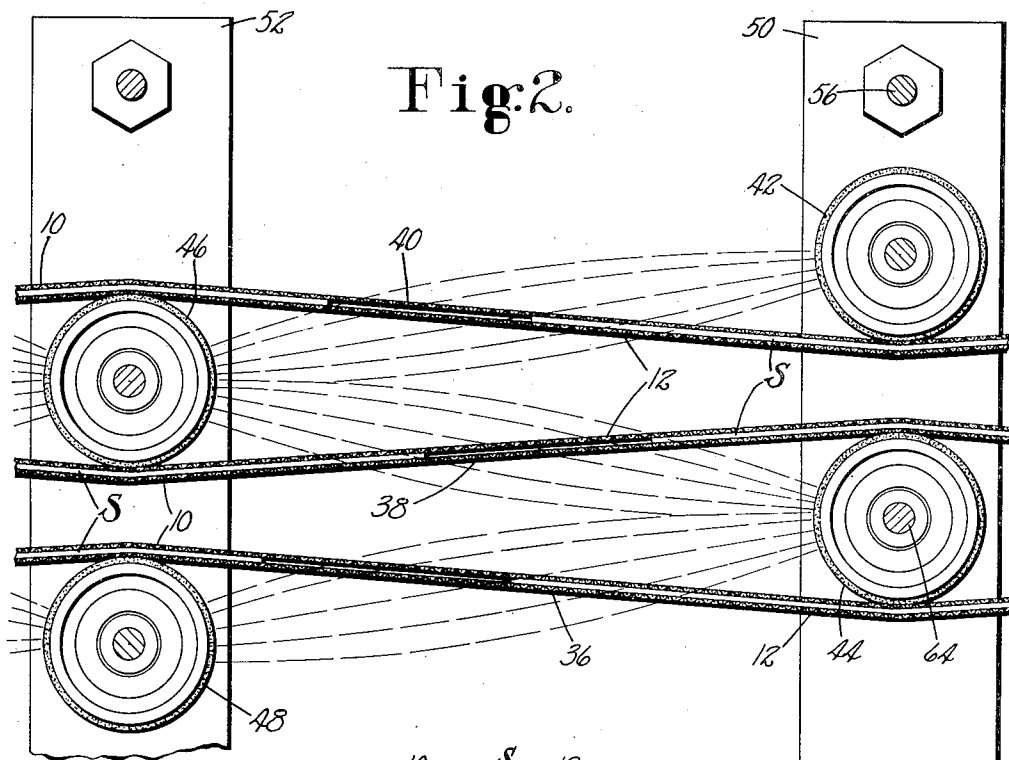
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APPARATUS FOR TREATING SHEET MATERIAL IN AN ELECTROSTATIC FIELD

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APPARATUS FOR TREATING SHEET MATERIAL IN ELECTROSTATIC FIELDS

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This invention relates to treating sheet material by means of a high-frequency electrostatic field and is herein illustrated as embodied in an apparatus for progressively subjecting skins to successive portions of said field to dry the skins.

It is well understood that leather articles and, in particular, skins may be dried, when desired, by positioning these articles in an electrostatic field, and while theoretically this may be done by merely placing the skins between two electrode plates, such an arrangement is not satisfactory because of the resultant distortion of the field and the danger of sparking if the skin is not perfectly flat. Accordingly, an object of the present invention is to provide a simple and economical apparatus for presenting skins to such a field without requiring skill upon the part of the operator and in which variations in sizes and contours of skins are immaterial.

In the illustrated embodiment of the invention, a conveyor having superposed belts is employed with the assurance that the skins will be held substantially flat as they are passed through an electrostatic field. These belts, in accordance with a plan frequently utilized in conveyors, are separated at the entrance and delivery ends, thus permitting the easy presentation of the skins to the conveyor and their removal after treatment. One important feature of the invention resides in improved apparatus utilizing insulated guide rolls spaced along the conveyor runs and alternately connected with opposite sides of a source of high-frequency current. These guide rolls are arranged alternately upon opposite sides of the coating belts and set up a series of electrostatic fields which intersect the belts and the skins which are carried between them.

These and other features of the invention will best be understood from a consideration of the following specification taken in connection with the accompanying drawings, in which

Fig. 1 is a vertical section extending lengthwise of my apparatus;

Fig. 2 is a similar section on a larger scale showing two groups of electrode guide rolls; and

Fig. 3 is a fragmentary section at right angles to Fig. 2 along the axis of one of these rolls.

It is well understood that skins and hides are never perfectly flat when they are passing through the tannery and that the marginal portions are apt to be scalloped and folded. Accordingly, provision has been made in my illustrated apparatus for gripping such skins between a belt 10 and a belt 12. The belt 10 has several runs in which it is superposed upon the belt 12 and

has a return run 14, these being determined by rolls 16, 18, 20, 22 and 24. The course of the belt 12 is determined partly by the rolls 16, 20, 22 and 24 and partly by additional rolls 26, 28, 30 and 32.

Power supplied to a chain (not shown) coating with sprockets (not shown) as on the group of rolls 16, 22 and 32 is utilized for moving the conveyor. All the rolls above mentioned are rotatably mounted upon a frame 34 which, for the sake of avoiding power losses, will ordinarily be made chiefly of a dielectric material such as wood. The arrangement shown is merely intended to be illustrative, as many other well-known conveyor arrangements could readily be employed.

As indicated in Fig. 1, the superposed belts extending from the roll 26 past the rolls 22, 24 and 16 hold these belts in skin-gripping relation while they pass through a plurality of overlying runs 36, 38 and 40. Along these runs, the belts could be carried in a series of straight-line courses which might or might not be parallel, but it is preferred to guide them along a tortuous course by means of guide rolls 42, 44, 46, 48, etc., which are arranged in overlapping vertical groups of two rolls each rotatable upon pairs of upright metal channels 50, 52 bolted at their lower ends to dielectric frame members 54 and joined at their upper ends by spacing rods 56.

The structure of any one individual roll is best shown in Fig. 3 in which it will be seen that it comprises a metal cylinder 60 carried by ball-bearings 62 upon an axle 64 which is supported in a pair of uprights 50. The uprights are attached to the frame members 54 by means of a bolt 66 to which there is joined a lead 68 extending to one side of a source of high-frequency electric current such as an oscillator 70. The other side of this source is joined by a lead 71 to other uprights alternating with those mentioned. Each roll is provided with an insulating covering 72. The guide rolls serve as supports for the superposed belts 10 and 12, between which are positioned skins S, and help to keep the runs of the conveyor belts in spaced relation and, if desired, help to keep them taut thereby setting up a tortuous relation of the belts which helps to condition the skins by causing them to be alternately bent first in one direction and then in another as they pass through the conveyor. It will be observed from an inspection of the drawings that one group such as the rolls 42, 44 is connected to one side of the high-frequency source, whereas the adjacent group 46, 48 is connected to the other side. As a consequence, electrostatic fields will be set up extending generally along the paths indicated by

the dash lines in Fig. 2 so that as a skin passes from any one guide roll to the next guide roll it intersects an electrostatic field which sets up heat in the skin and causes the drying action desired.

In the use of the apparatus, a skin will be laid upon the horizontal run of the belt 12 adjacent to the guide roll 28 and allowed to travel forward in the direction indicated by the arrow in Fig. 1 until it is gripped between that belt and the belt 10. The skin will then be carried between the guide rolls acting as electrodes as it moves along the superposed runs 36, 38 and 40 and will be subjected repeatedly to the action of electrostatic fields until it emerges upon the returning run 14 of the belt 10 from which it may be removed and set aside if the drying action is completed or, if necessary, it may be repositioned for one or more successive traverses through the apparatus.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent of the United States is:

1. In an apparatus for treating sheet material, a belt-like conveyor upon which the pieces of work may be supported, conveyor guiding means disposed alternately above and below the work-supporting portion thereof and arranged to determine the path of movement of the conveyor, said guiding means comprising insulated conductors, and means for connecting alternate guiding means to opposite sides of a source of high-frequency electric current thereby to set up an electrostatic field between the guiding means which will intersect a work-piece upon the conveyor.

2. In an apparatus for treating sheet material, a conveyor belt upon which pieces of work may be supported, guide rolls determining the path of said belt and arranged upon opposite sides thereof, and means for connecting said rolls to opposite sides of a source of high-frequency electric current thereby to set up one or more electrostatic fields intersecting pieces of work upon the belt.

3. In an apparatus for treating sheet material, a conveyor comprising superposed belts whereby pieces of work may be carried through the conveyor between said belts, insulated guide rolls arranged upon opposite sides of said coating belts and positioned to cause said belts to assume a tortuous path, and means for connecting said rolls to opposite sides of a source of high-frequency electric current thereby to set up one or more electrostatic fields intersecting pieces of work between the belts.

4. In an apparatus for treating sheet material, superposed belts between which a piece of work may be positioned, insulated metallic guide rolls arranged upon opposite sides of said belts and spaced along the length thereof, and means for connecting alternate rolls to opposite sides of a source of high-frequency electric current.

5. In an apparatus for treating sheet material, a conveyor having superposed belts between which a piece of work may be positioned, means arranged to guide said belts in a plurality of superposed runs, groups of guide rolls, each group comprising superposed rolls, said groups being distributed along the length of said belt with the rolls of adjacent groups alternately upon opposite sides thereof and having metallic

portions, those guide rolls which form one group being electrically connected to one another and collectively to one side of a source of high-frequency electric current, and means for connecting the metallic portions of an adjacent group to the other side of said source.

6. In an apparatus for treating sheet material, a frame provided with supporting rolls, endless belts drawn around said rolls with portions of the belts superposed and together arranged in overlying runs, groups of metallic guide rolls engaging said overlying runs and disposed with the rolls of adjacent groups upon opposite sides of the respective runs, means for supporting said groups of said guide rolls arranged to interconnect electrically the guide rolls of any one group, and means for connecting adjacent guide-roll-supports to opposite sides of a source of high-frequency electric current whereby a piece of work passing from one group of guide rolls to the next is subjected to an electrostatic field.

7. In an apparatus for treating sheet material, endless belts, a frame provided with supporting rolls around which said endless belts are drawn with a portion of each belt in engaging relation to the adjacent portion of the other belt, and guide rolls disposed upon opposite sides of the engaging portions to cause an article of sheet material interposed between said belts to be bent first in one direction and then the other, and means for connecting said rolls in groups to opposite sides of a source of high-frequency electric current whereby said pieces of work are subjected to electrostatic fields set up between said rolls and intersecting the belts and the work.

8. In an apparatus for treating sheet material, a conveyor comprising superposed belts whereby pieces of work may be carried through the conveyor between said belts, said conveyor being arranged in overlying runs, a guide roll engaging the under side of an upper run of the conveyor and the upper side of a next lower run of the conveyor, another guide roll beneath the latter run of the conveyor, and means for connecting said rolls to opposite sides of a source of high-frequency electric current thereby to set up an electrostatic field intersecting pieces of work between the belts.

9. In an apparatus for treating sheet material, superposed conveyor belts between which pieces of work may be supported, said superposed belts being arranged in overlying runs, metallic guide members, one under each run, said guide members being displaced laterally along the belts, and means for connecting said guide members to opposite sides of a source of high-frequency electric current thereby to set up an electrostatic field between the guide members which will intersect a work-piece upon the conveyor.

10. In an apparatus for treating sheet material, endless belts, a frame provided with supporting rolls around which said endless belts are drawn with a portion of each belt in engaging relation to the adjacent portion of the other belt to grip an interposed piece of material, guides disposed in contact with the outer surfaces of said belt which are opposed to the work-contacting surfaces thereof, and means for connecting said guides to opposite sides of a source of high-frequency electric current.

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