Feb. 25, 1947. R. L. GRIFFIN ET AL 2,416,622

PAINT SPRAYING MACHINE

Filed May 10, 1943 3 Sheets-Sheet 1

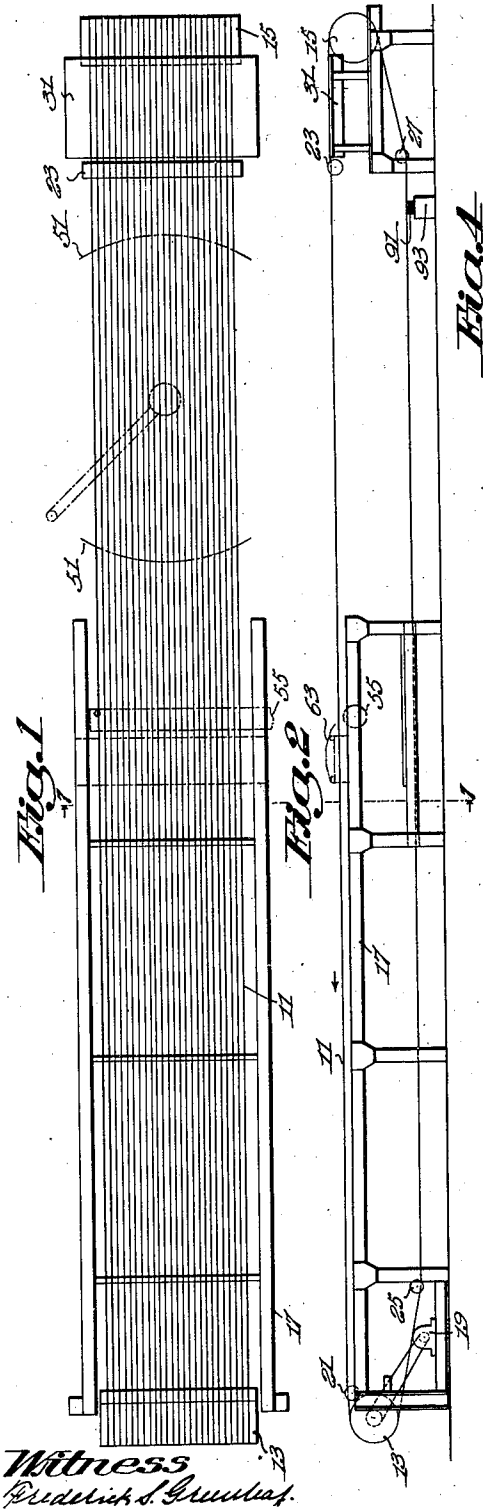


Fig. 1

Fig. 2

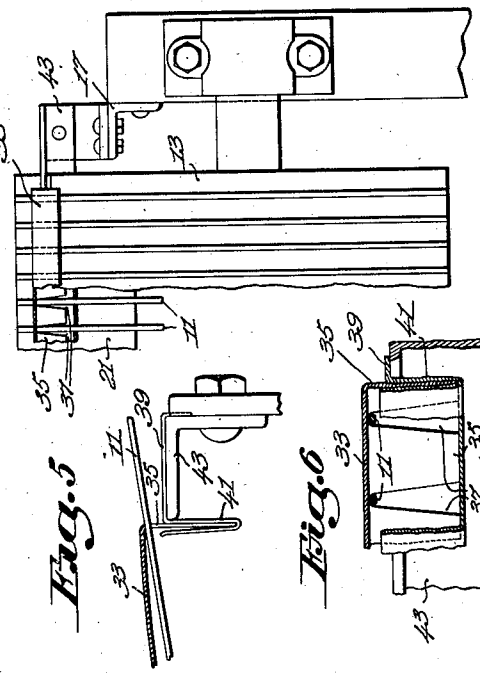


Fig. 4

Fig. 5

Fig. 6

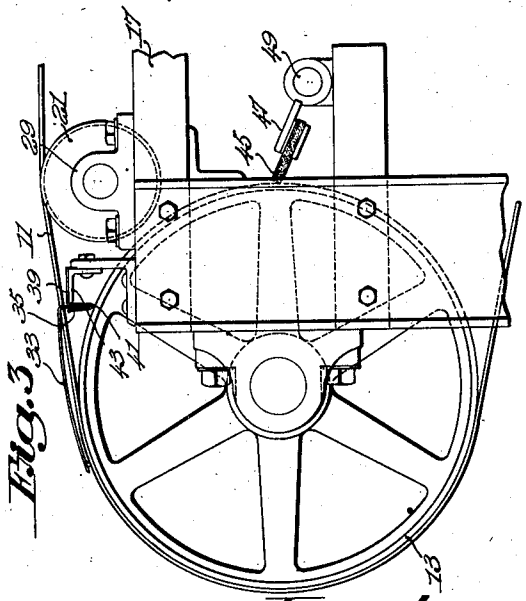


Fig. 3

Witness
Frederick S. Greenleaf.

Inventor
Roger L. Griffin
Norman F. Moore
by their attorney
Alfred N. Hildreth

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PAINT SPRAYING MACHINE

Filed May 10, 1943 3 Sheets-Sheet 2

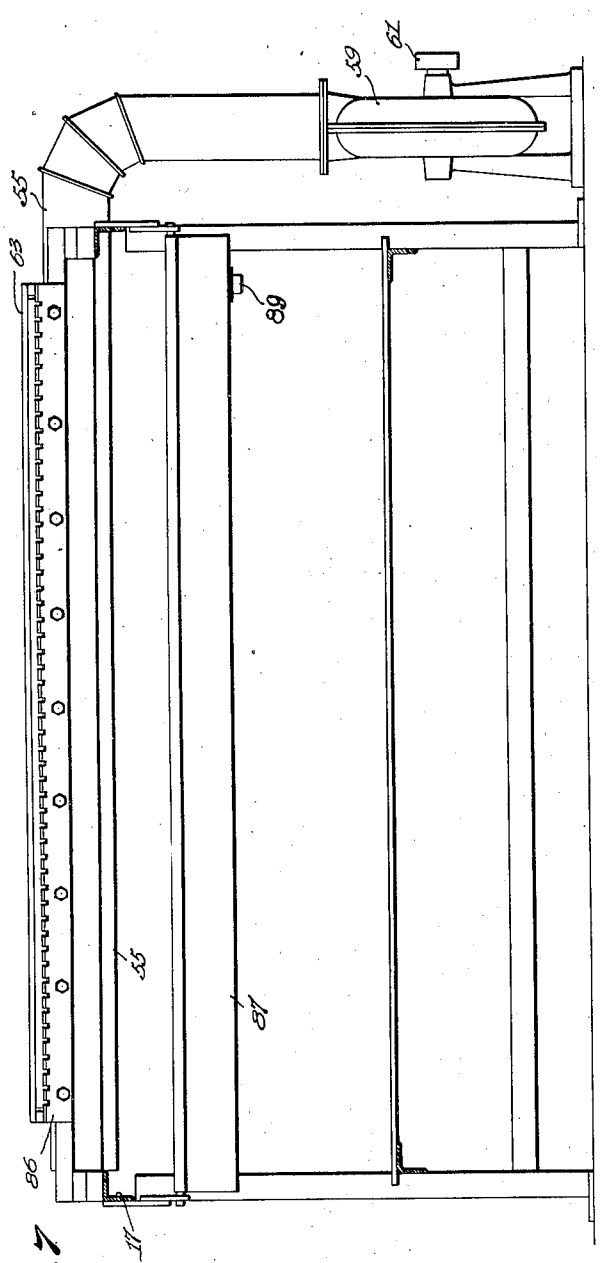


Fig. 7

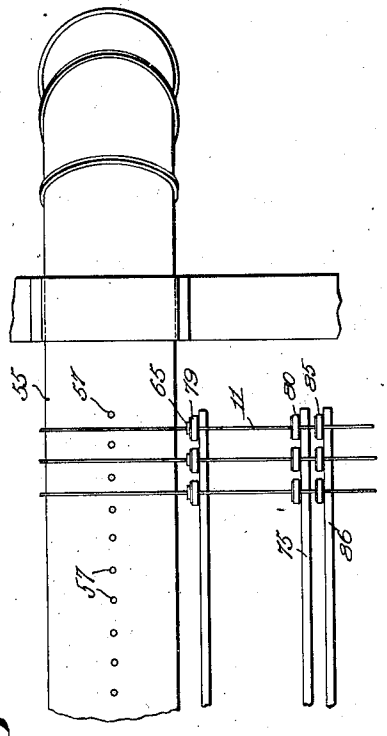


Fig. 8

Witness
Frederick L. Grumley.

Inventor
Roger L. Griffin
Norman F. Moore
by their attorney.
Alfred H. Hildreth

Feb. 25, 1947. R. L. GRIFFIN ET AL 2,416,622

PAINT SPRAYING MACHINE

Filed May 10, 1943 3 Sheets-Sheet 3

Fig. 9

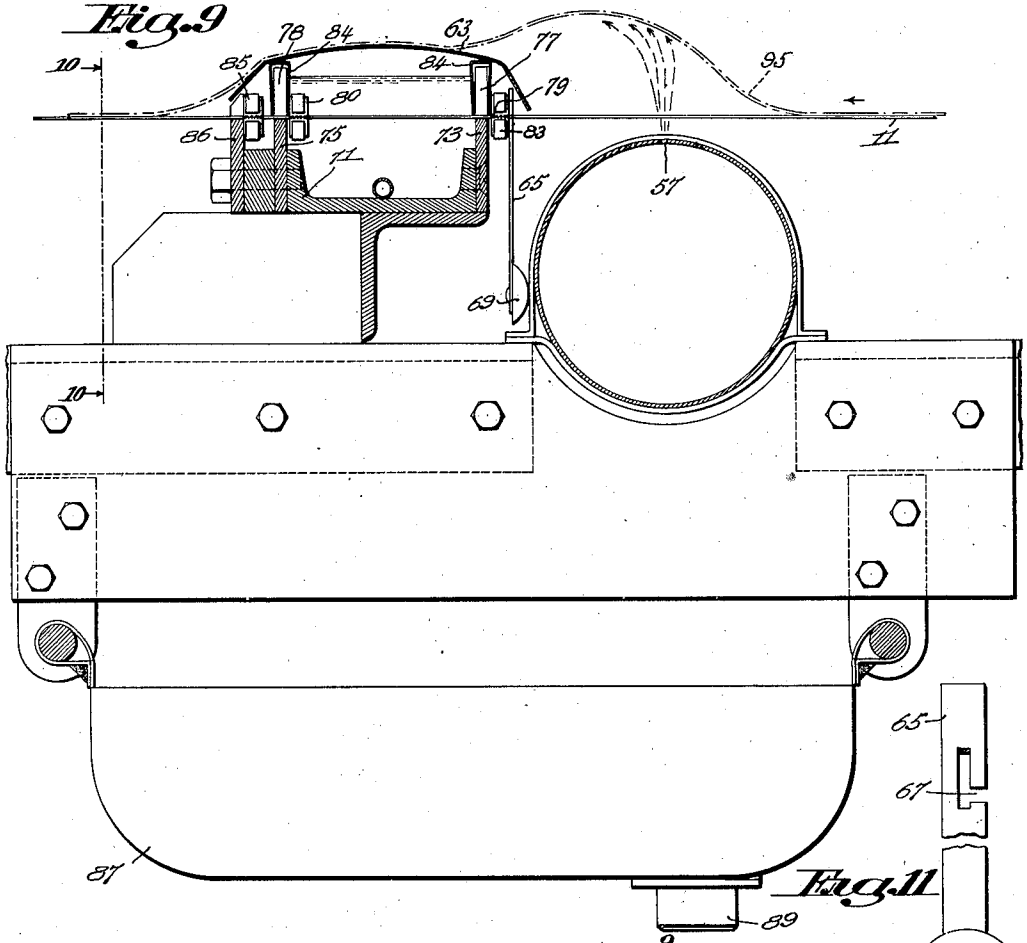


Fig. 11

Fig. 10

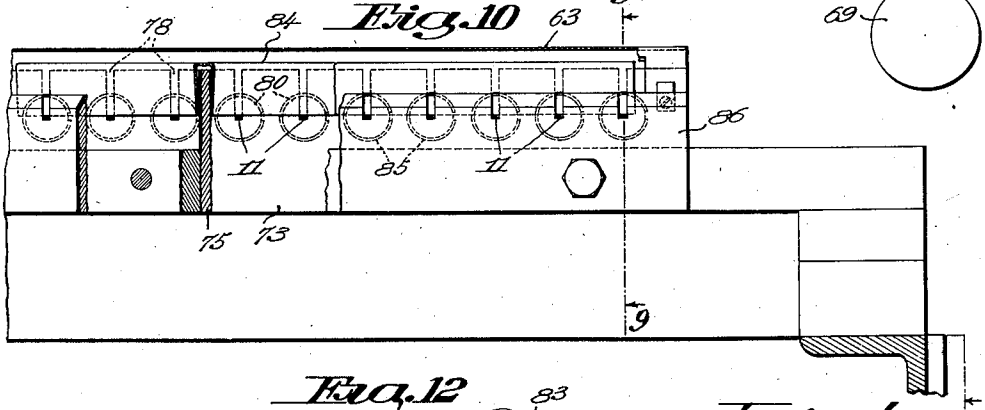
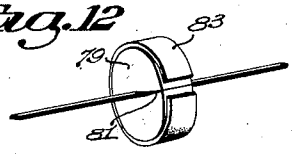


Fig. 12



Witness

Frederick L. Quimby

Inventor

Roger L. Griffin

Norman J. Moore

by their attorney

Alfred N. Goldsmith

Patented Feb. 25, 1947 2,416,622

UNITED STATES PATENT OFFICE

2,416,622

PAINT SPRAYING MACHINE

Roger L. Griffin, Marblehead, and Norman Y. Moore, Danvers, Mass., assignors to A. C. Lawrence Leather Company, Peabody, Mass., a corporation of Maine

Application May 10, 1943, Serial No. 486,308

13 Claims. (Cl. 91—18)

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The present invention relates to conveyors and more particularly to conveyors adapted for advancing articles or material past spraying devices for applying paint or analogous substances.

As spraying devices are commonly used at the present time, it is impossible to confine the spray to the work presented by the conveyor. Thus a substantial amount of spray material is necessarily applied to more or less of the conveying surface beyond the margins of the articles or work. As a result not only may the operation of the conveyor be interfered with by the presence or accumulation thereon of the spray material, but this material may be offset or transferred from the surface of the conveyor to those portions or the surfaces of the work which come in contact with the conveyor. With certain classes of work this is very objectionable as, for example, in the case of woolskins or sheepskins where a stain is applied to the flesh side of the leather as the skins are being conveyed with the wool face resting upon the conveyor. Any stain or discoloration on the light colored wool greatly impairs its marketability and value.

It is the object of the present invention to improve the construction and operation of such conveyors by insuring the complete removal from the surface of the conveyor of this waste spray material so that all likelihood or danger of its being later transferred to the work will be eliminated.

With this object in view, the invention consists in the provision of means for cleaning the work engaging surface of the conveyor after it has passed beyond the range or zone of operation of the spraying devices, the work being temporarily raised from the conveyor at such time so that the entire width of the conveyor may be subjected to the cleaning operation, after which the work is returned to the conveyor for the completion of its movement on the same.

In the specific form of the present invention illustrated in the accompanying drawings, the conveyor consists of a series of parallel, laterally spaced, endless bands, continuously driven to advance the work, such as woolskins, past the spraying devices which spray the stain to the flesh side of the skins as they rest with the wool side upon the conveyor bands. Shortly beyond the range of the spray nozzles the flat steel conveyor bands are subjected to the action of scrapers, then of washing devices, and finally of strippers for removing any of the washing liquid which may remain upon the surface of the bands. While the skins are passing the zone of operation of these devices, the skins are raised and maintained above the surface of the conveyor by an air blast from beneath, a supplementary support being provided to prevent any possibility of the skins returning to the conveyor until it had passed beyond the zone of operation of these devices. This zone of operation is relatively short so that only a small portion of the length of the skin is raised at one time, the feed of the work being continued through contact of the other portions with the conveyor.

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After the skin has been returned to the conveyor it continues its movement thereon for a sufficient duration of time to permit the stain to become sufficiently set so that the skin may be handled safely without danger of damage by the transfer of the stain material from the flesh side of one skin to the wool side of another when the skins are laid one upon another.

In the accompanying drawings which illustrate a conveyor of the above described construction and mode of operation, Fig. 1 is a top plan view and Fig. 2 a side elevation of the conveyor proper showing in somewhat diagrammatic manner the endless work supporting bands with the end reels and guide rolls for the bands; Fig. 3 is a side elevation, on an enlarged scale, showing the reel at the discharge end of the conveyor with its guide rolls for the bands, the guard above the reel, and the scraper for removing any foreign material from the surface of the reel; Fig. 4 shows, in end elevation, a portion of the discharge end of the conveyor on a still larger scale, looking toward the right of Fig. 3; Figs. 5 and 6 are details of the guard for the conveyor bands, showing its construction and method of mounting; Fig. 7 is a transverse, vertical view taken on line 7—7 of Figs. 1 and 2, and Fig. 8 is a top plan view, on an enlarged scale, of a portion of the pneumatic means for raising the skins from the bands and passing them over the devices for cleaning the bands; Fig. 9 is a longitudinal, vertical sectional view of such means and devices on the line 9—9 of Fig. 10; Fig. 10 is a transverse sectional view on line 10—10 of Fig. 9,

partially in section, showing the construction and arrangement of the water tank with its stripping devices; Fig. 11 shows on a still larger scale one of the individual dry strippers for the bands; and Fig. 12 is a perspective view of one of the strippers encircling its conveyor band.

The conveyor proper, as shown in Figs. 1 and 2, comprises a series of horizontally disposed, parallel traveling conveyor bands 11 laterally spaced from one another. These bands are preferably formed from strips of thin flat steel with the ends of such strips joined or united in any suitable manner to form an endless band.

The bands are supported at each end of the conveyor upon smooth faced reels 13 and 15 rotatably mounted on the frame 17 of the machine. Reel 13 at the discharge end of the conveyor is arranged to be driven from the motor 19 or other suitable source of power.

In order to maintain the conveyor bands in proper spaced relation and guide them onto and from the supporting reels, the guide rolls 21 and 23 are provided for the upper leg of the bands and the rolls 25 and 27 for the lower leg. All four guide rolls are formed with annular grooves in their faces, each of a width and depth to receive a conveyor band and spaced apart the desired distance. These rolls are freely rotatable in suitable bearings such as 29, carried by the frame 17 of the machine. The guide roll 21 is positioned close to the reel 13 at the discharge end of the conveyor, while the guide roll 23 is spaced from the reel 15 at the receiving end of the conveyor to permit the placing of a work table 31 between said reel and its guide roll and immediately beneath the conveyor bands.

To avoid the possibility of the operator's fingers being caught beneath the band and the reel 13 at the discharge end of the conveyor, a guard has been provided, shown in Figs. 3–6, which consists of a narrow metal plate 33, extending transversely across the conveyor bands and the end reel 13 directly above the point of contact or engagement of the bands with the surface of the reel. This plate is formed with the downturned flange 35 and is provided with the notches 37 to receive the bands 11. The guard is supported by the bracket 39, see Fig. 5, having the reversely bent depending portions 41 to receive the flange 35 of the guard with tight frictional engagement, and is itself clamped fixedly in position on the angle piece 43.

In order to remove any adherent foreign material from the face end of the reel 13, a scraping device has been provided comprising a blade 45 mounted in arms 47 upon the bearing rod 49 carried on the frame of the machine. (See Fig. 3.) The scraper blade rests upon the face of the reel 13 and as the latter rotates, scrapes off any adherent material.

Any suitable spraying device may be used above the conveyor, such as that shown in the pending application of Roger L. Griffin, Serial No. 470,064, filed December 24, 1942, issued April 2, 1946, as Patent No. 2,397,482, which is being indicated diagrammatically in Fig. 1 of the drawings by the dotted arcs 51 which indicate the path of movement of the rotating spraying nozzles. As apparent from Fig. 1, each nozzle in a full rotation passes twice over the conveyor, and during these times the nozzle is in operation, but is cut off and inoperative during those portions of its movement when it is beyond the margins of the conveyor.

Because of the irregular shape of the woolskins, and the fact that ordinarily they will be spaced from one another along the conveyor, various portions of the top surfaces of the conveyor bands are exposed to the spray material being discharged from the nozzles, and as a result such exposed parts receive a coating upon their upper or work supporting faces.

The present invention is concerned primarily with the removal of this waste spray material from the bands before it has had time to set or an opportunity to be transferred to the wool face of the skin. Briefly, such removal is accomplished by cleaning devices including the application of a suitable cleaning liquid, which devices are positioned just beyond the zone of final operation of the spray nozzles in the direction of travel of the conveyor. In connection with these cleaning devices are means for lifting and supporting the work above the conveyor bands to permit said bands to be operated upon by such devices, after which the work is returned to the conveyor to be carried to the discharge end thereof.

The raising means illustrated in the drawings are the pneumatic type wherein jets of air are discharged from beneath the conveyor bands upwardly between the same with sufficient force to raise that portion of the skin immediately above. These pneumatic means are positioned adjacent the cleaning devices for the bands so that the skin will be held raised from the bands as the latter are presented for cleaning.

To insure that the skin will be maintained above the bands until it has passed the cleaning devices, a fixed supporting plate has been provided which extends transversely across the conveyor bands and lengthwise of the same from a point adjacent the pneumatic means for a sufficient distance toward the discharge end so that the skin may not fall upon the conveyor bands until it is clear of the cleaning devices.

The pneumatic work raising means, as shown in Figs. 7, 8 and 9, comprise the transverse air pipe 55 extending transversely across the conveyor immediately below the bands 11. The upper surface of the pipe is provided with a row of air orifices 57, each of which is positioned midway between adjacent bands, as shown in Fig. 8. Air is supplied to the pipe 55 by the rotary blower 59 driven from any suitable source of power through the belt pulley 61 upon the fan rotor shaft during the operation of the conveyor. The blower is continuously operated to supply air to the pipe 55 from which it escapes upwardly through the orifice 57 at sufficiently high velocity to raise from the conveyor bands that portion of the skin immediately above the pipe.

By the time any particular portion of the skin has moved beyond the effective zone of the air blast, it has been carried over the adjacent portion of the supporting plate 63, which is convexly curved on its upper surface, and extends transversely across the conveyor bands and longitudinally thereof a sufficient distance to insure the skins clearing the cleaning devices. If the air blast is not heavy enough to support the skin for the entire distance across the cleaning devices, as it usually will do, the skin falls upon the plate and continues to be advanced through contact of its other portions with the traveling bands, being carried along the top surface of the plate and finally returning to the conveyor band beyond the cleaning devices.

During the time that the skin is raised by the air blast and supported by the plate the cleaning devices operate upon the conveyor bands.

The first of the cleaning devices is a dry stripper, shown in enlarged view in Fig. 11, and comprising a thin steel blade 65 provided with an L-shaped slot 67 and having at its lower end the weight 69. One of these dry strippers is hung upon each conveyor band 11, the horizontal portion of the L-slot permitting the stripper to be applied to the band from the side. The vertical portion of the slot is of a width giving just sufficient clearance for the free passage of the band therethrough, the sides of the slot thus removing any accumulation of material from the side edges of the band while the metal of the stripper at the top of the slot scrapes off the major part of any accumulation from the spray nozzles or from the work.

Adjacent the dry stripper in the direction of the feed is a trough or tank 71 extending transversely of the conveyor bands, with the major portion of the tank positioned beneath the bands, and the front wall 73 and the rear wall 75 extending above the same. These extended portions of the walls are slotted as shown at 77 and 78 in Fig. 10, to receive the conveyor bands 11.

The trough or tank 71 is supplied with water or other cleaning liquid to a level well above the bands so that the latter will pass through the liquid. To prevent the escape of liquid through the slots 77 and 78, packing means are provided, such as washers 79 and 80 split inwardly on a radius as at 81, and mounted in a split metallic ring 83 (see Fig. 12). These washers can be slipped onto the bands from one side or edge of the same and will press against the bands sufficiently to act as a packing to prevent leakage of the liquid from the tank. These washers are supported by the bands themselves, and are drawn against the walls of the tank by the movement of the bands with sufficient pressure to maintain close contact with the walls of the bands and prevent the escape of liquid from the tank. One of these washers, indicated at 79, is positioned on each band 11 on the outside face of the wall 73 where the band enters the tank through its slot 77, and the other washer 80 is held against the inside face of the wall 75 as the band leaves the tank through slot 78.

These washers also help to clean the bands as they wipe top, bottom, and both edges of the same, the rings 83 squeezing the washers tight around the bands and closing the slots 81 therein. The washers may be of any suitable material, but preferably are formed of neoprene, as this is unaffected by oils and it is desirable to apply very small amounts of oil to the work contacting surface of the band in the manner hereinafter described.

To seal the slots 77 and 78 above the washers 79 and 80, inverted U-shaped spring clips 84 are provided, formed of some non-corrosive metal which can be forced down over the upper portion of the walls 73 and 75, as shown in Fig. 9, with their lower ends just clearing the top of the bands. The washers 79 and 80 are sufficiently yielding to make a particularly water-tight joint, notwithstanding the slight shoulder formed by the lower edge of the clip.

For the purpose of removing any of the water or other cleaning liquid which may be upon the bands after they have passed the packing washers 80 on leaving the tank, a liquid stripper has been provided in the form of one of these washers with split ring mounting 85 suspended upon the bands and held from movement therewith by the abutment 86 slotted downwardly from its top edge.

This washer effectively wipes off any liquid or moisture from the bands, together with any small amount of spray material which may have been carried through the outlet washer 80.

Extending across the bands beneath the cleaning devices is a pan 87 carried by the frame which catches any liquid which may leak past the packing washers. The pan may be drained through the outlet 89, which can be normally closed by a valve or plug, or connected by hose or piping to some suitable waste system.

The oil or similar lubricant is applied to the lower face of the return leg of the conveyor by means of a strip of felt or other suitable width material 91, extending upwardly from an oil container 93 and bearing against the work engaging face of the bands. Only a very slight amount of oil is applied in this manner, just sufficient to give a very slight coating to the bands which will not only facilitate the removal of any waste spray material from the surface of the bands, but will also provide lubricant for the bands where they are drawn through the strippers and washers.

In the operation of the conveyor the skins are laid out by the operator over the table 31 with the fleece side down. After they are properly extended they are pushed by the operator slowly in the direction of the feed until they are picked up by the traveling bands and the rotating spacing roll 23 and carried forward to the spraying devices. A second skin is then placed on the table and the operation repeated, the skins being spaced only a few inches apart so as to avoid so far as possible the waste of spray material between adjacent skins.

As the skin comes within the first path or zone of operation of the spray nozzles they receive the first coat of the spray material, and again as they pass the second zone they receive a second coat.

Almost immediately thereafter the advancing edge of the skin is carried over the air jets and is lifted thereby, and as the skin continues to advance, the raised end portion of the skin passes over the supporting plate 63, returning to the bands after passing the cleaning devices. If the air is discharged in sufficient volume and at sufficiently high velocity, the raised portion of the skin will continue to float and it may pass over the cleaning devices without contacting the supporting plate. With lesser volumes and pressures the skin will fall upon the plate at various distances from the receiving edge, according to such volumes and pressures. Eventually the entire skin will be returned to the conveyor bands and will be carried to the discharge end of the conveyor where it will be removed by the operator.

Although a portion of the skin is out of contact with the bands as such portion passes over the cleaning devices, nevertheless its forward feeding movement continues through the contact of the leading or the following portions of the skin, or both, with the conveyor bands, as shown in Fig. 9, the skin being indicated at 95.

After the skin has been raised from the conveyor bands, the latter continue their forward movement, passing first through the dry stripper 65, then passing the washer 79, through the wall 73 of the tank, and across the same beneath the surface of the water or other cleaning liquid, thence through the washer 80, through the slotted wall 75, and finally through the water stripper 85 and slotted abutment 86, after which it receives again the skin.

In this passage through the strippers, washers,

and cleaning liquid any waste spray material which may have reached the bands between adjacent skins and beyond the outer edges of the same, is removed while still soft and before it has had an opportunity to set. Thus the bands are kept clean and the soiling or damaging of the light colored wool is effectively prevented.

While the present invention has been shown and described in one form of mechanism, it is to be understood that it is not necessarily limited thereto but may be embodied in many other different forms and arrangements, and the specific construction of the various portions of the apparatus may be varied without departing from the invention as defined in the appended claims.

Having thus described the invention, what is claimed is:

1. A conveyor having, in combination, movable means for supporting and advancing the work, driving mechanism for said means, devices for momentarily raising the work from said means and thereafter returning it thereto, and supplementary instrumentalities operating beneath the momentarily raised work to clean the supporting surfaces of the conveying means.

2. A conveyor having, in combination, a plurality of laterally spaced, endless, traveling bands to support and convey the work, supporting and driving mechanism for the bands, means positioned intermediate the ends of the conveyor for momentarily raising the work above the bands as it is carried past on the conveyor, and stripping devices through which the bands are passed for cleaning the bands beneath the raised portion of the work.

3. A conveyor having, in combination, a plurality of laterally spaced, endless, traveling bands to support and convey the work, supporting and driving mechanism for the bands, means for momentarily raising the work above the bands as it is carried past on the conveyor, and devices for applying cleaning fluid to the bands and for removing the fluid and foreign material from the bands, said devices operating beneath the raised work.

4. A conveyor having, in combination, a plurality of laterally spaced, endless, traveling bands to support and convey the work, supporting and driving mechanism for the bands, means positioned intermediate the ends of the conveyor and beneath the bands for momentarily raising the work above the bands as it is carried past on the conveyor, a tank for cleaning liquid positioned beneath the bands and adjacent the work raising means, guiding devices for guiding the bands beneath the surface of the cleaning liquid, and strippers for removing the liquid and foreign material from the bands.

5. A conveyor having, in combination, a plurality of laterally spaced, endless, traveling bands to support and convey the work, supporting and driving mechanism for the bands, means positioned intermediate the ends of the conveyor for momentarily raising the work above the bands as it is carried past on the conveyor, and scraping devices for scraping the work supporting surfaces of the bands beneath the raised portion of the work.

6. A conveyor having, in combination, a plurality of laterally spaced, endless, traveling bands to support and convey the work, supporting and driving mechanism for the bands, means for momentarily raising the work from the bands, scraping devices for scraping foreign material from the bands, said devices each comprising a weighted member having a scraping blade, said member being hung upon a band with the blade in contact with the work engaging face of the band and held from movement with the band, and being positioned to operate beneath the raised portion of the work.

7. A conveyor having, in combination, a plurality of laterally spaced, endless, traveling bands to support and convey the work, supporting and driving mechanism for the bands, means for momentarily raising the work from the bands, and devices positioned beneath the raised portion of the work for cleaning the bands, said devices each comprising a disk of compressible material slotted radially to receive a band with a tight sliding fit and held from movement with the band.

8. A conveyor having, in combination, a plurality of laterally spaced, endless, traveling bands to support and convey the work, supporting and driving mechanism for the bands, means positioned intermediate the ends of the conveyor for momentarily raising the work above the bands as it is carried past on the conveyor, and a support for supporting the raised portion of the work to permit it to travel momentarily out of contact with the bands and thereafter to rest upon them again.

9. A conveyor having, in combination, a plurality of laterally spaced, endless, traveling bands to support and convey the work, supporting and driving mechanism for the bands, means positioned intermediate the ends of the conveyor for momentarily raising the work above the bands as it is carried past on the conveyor, and a stationary work support extending transversely across the bands above the same to receive the portion of the work raised from the bands by said means and to support the same momentarily and to deliver such portion onto the bands, all while another portion of the work remains upon the bands to advance the portion out of contact with the bands.

10. The combination with spraying devices of a conveyor for supporting the work and conveying it through the field of operation of said devices, and means adjacent said field of operation for momentarily raising the sprayed work from the conveyor and cleaning the conveyor adjacent the raised work.

11. A conveyor having, in combination, a plurality of laterally spaced, endless, traveling bands to support and convey the work, supporting and driving mechanism for the bands, means positioned intermediate the ends of the conveyor and beneath the bands for momentarily raising the work above the bands as it is carried past on the conveyor, a tank for cleaning liquid for cleaning the bands, the tank being positioned adjacent the work raising means, and a work supporting plate positioned above the top of the tank to support the raised portion of the work as it is passing over the tank.

12. The combination with spraying devices of a conveyor for supporting the work and conveying it beneath said devices, means beneath the conveyor and adjacent the spraying devices for momentarily raising the sprayed work from the conveyor, and supplementary devices adjacent said means for cleaning the surfaces of the conveyor exposed to the action of the spraying devices.

13. A conveyor having, in combination, movable means having a transversely discontinuous surface for supporting and advancing the work, driving mechanism for said means, pneumatic de-

vices for directing a blast of air through the discontinuous surface of the movable means for momentarily raising the work from said means and thereafter returning it thereto, and supplementary instrumentalities operating beneath the momentarily raised work to clean the supporting surface of said movable means.

ROGER L. GRIFFIN.
NORMAN Y. MOORE.

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