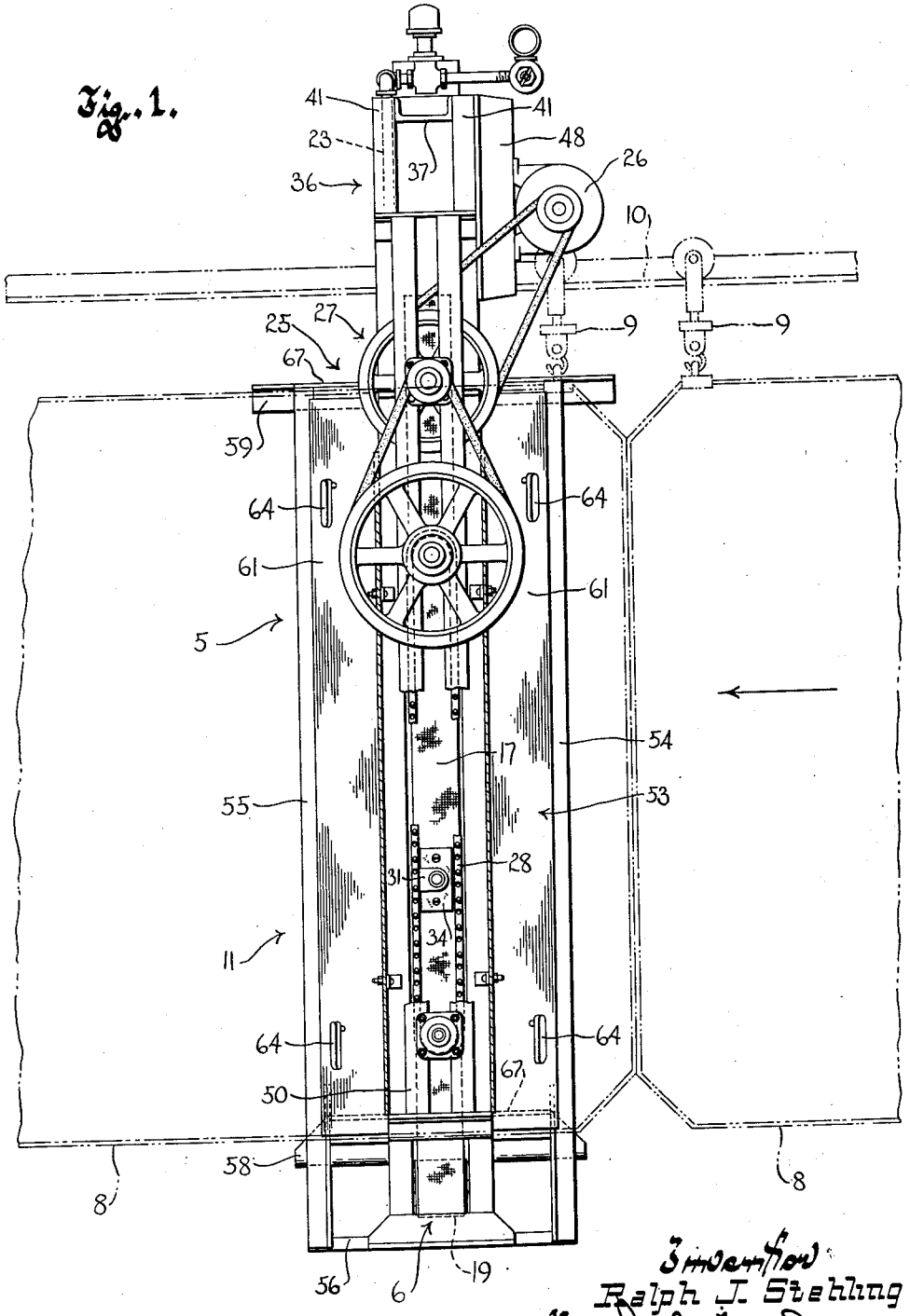
Feb. 18, 1958 R. J. STEHLING 2,823,642

PASTING PLATE PASTE SPRAYING APPARATUS

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Fig. 1.



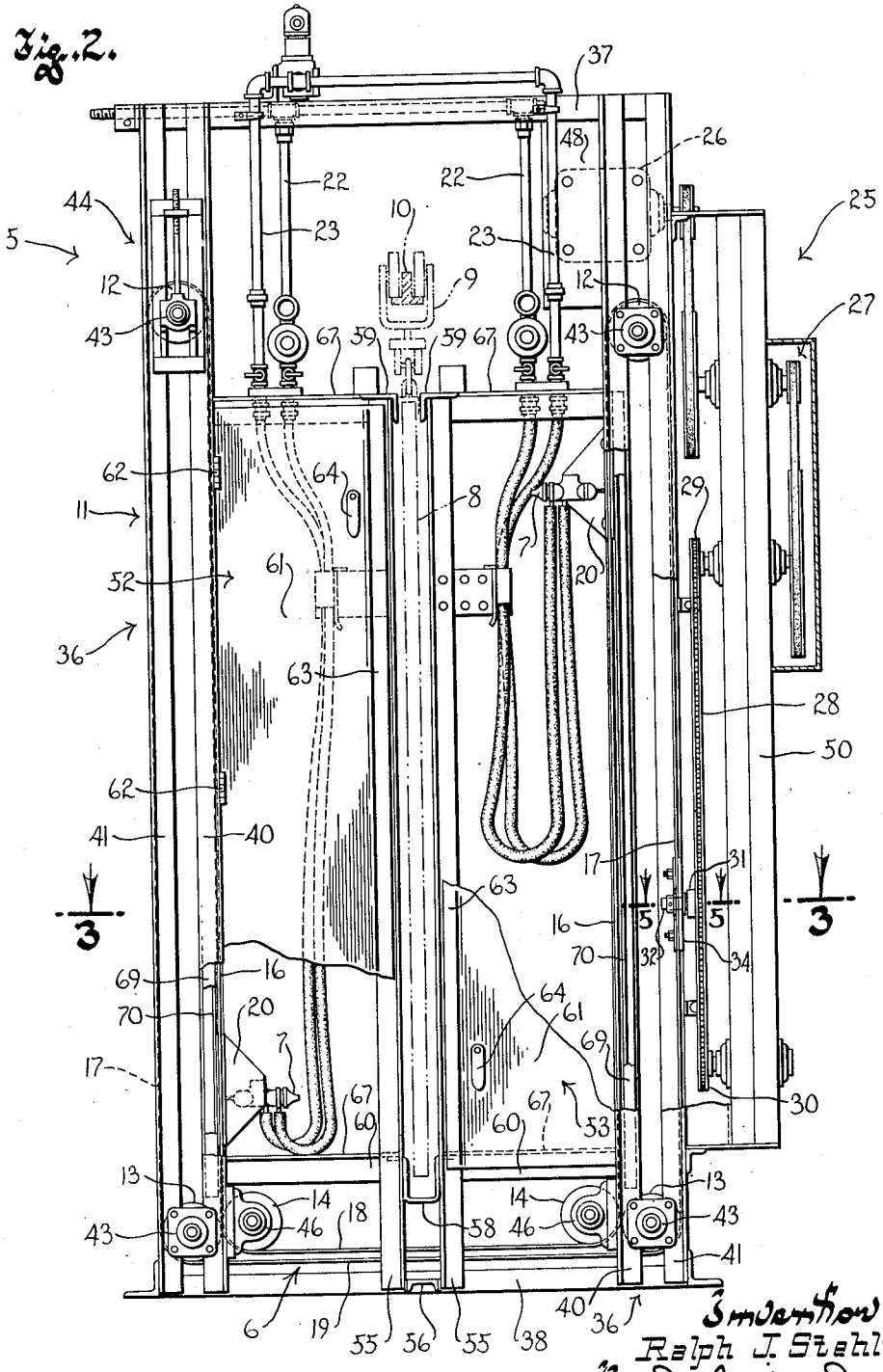
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PASTING PLATE PASTE SPRAYING APPARATUS

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Fig. 2.



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PASTING PLATE PASTE SPRAYING APPARATUS

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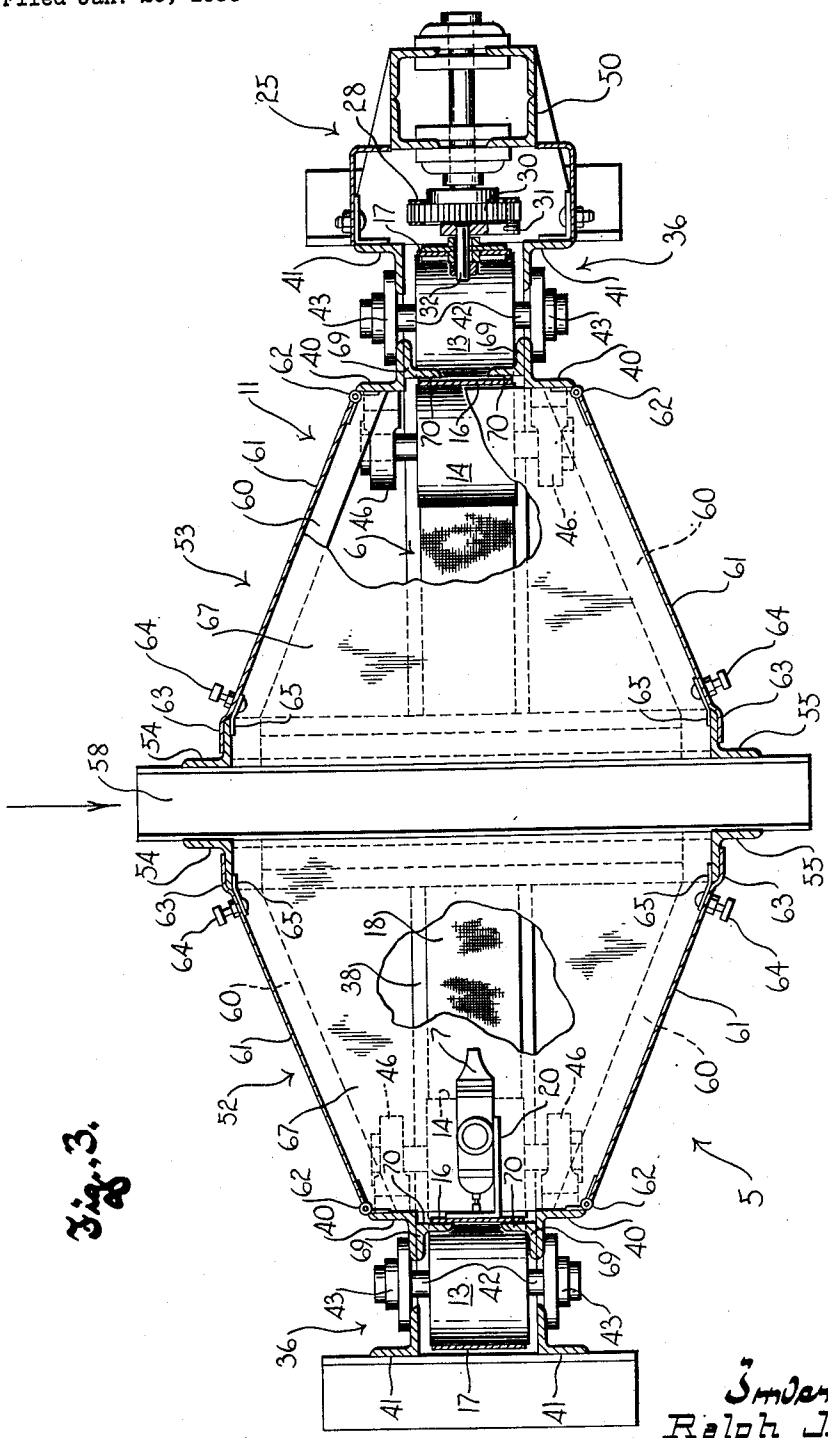


Fig. 3.

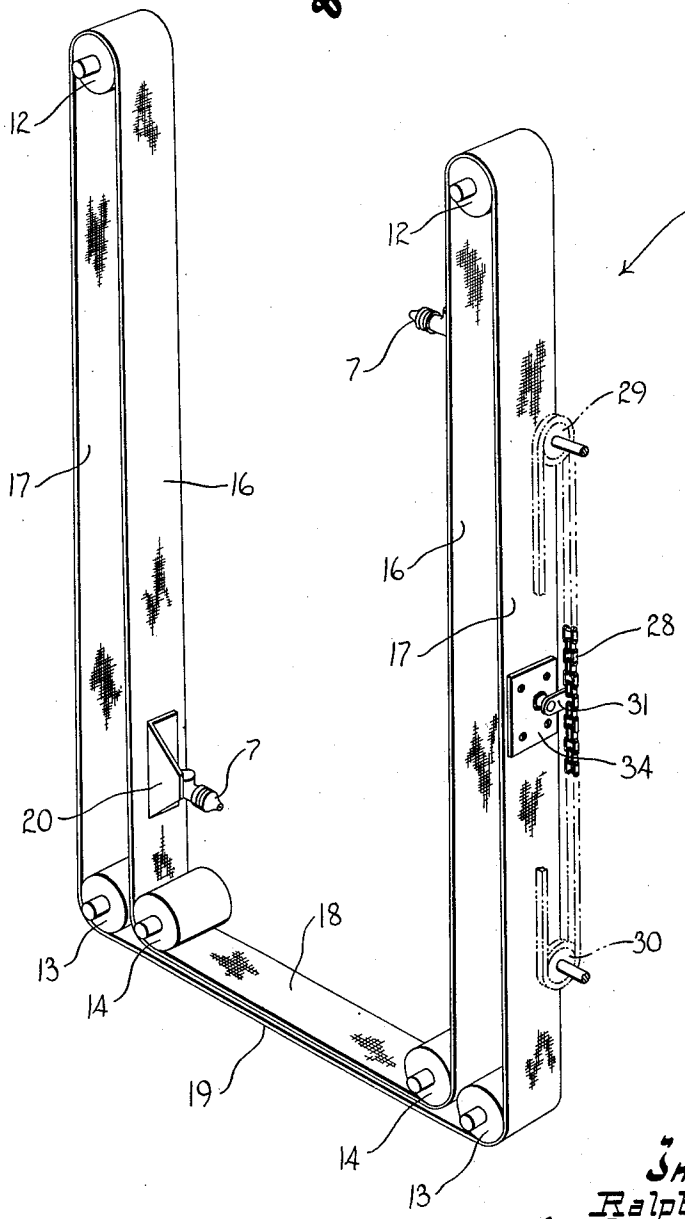
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PASTING PLATE PASTE SPRAYING APPARATUS

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Fig. 4.



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PASTING PLATE PASTE SPRAYING APPARATUS

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Fig. 5.

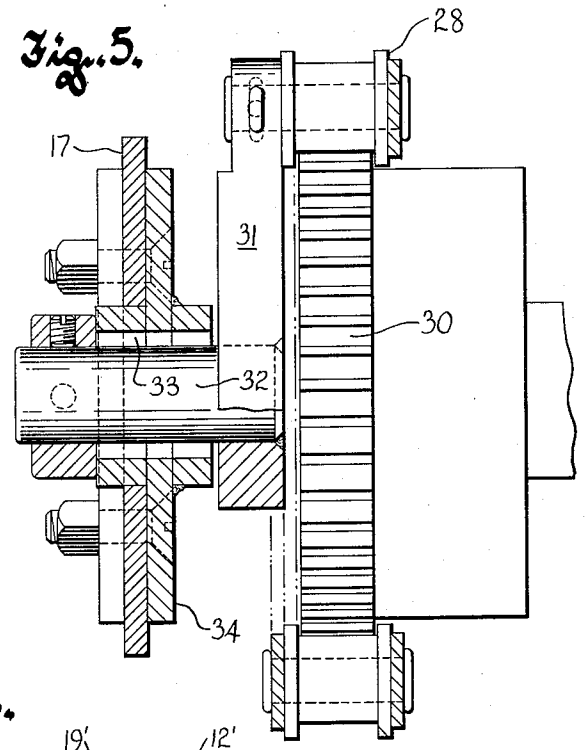
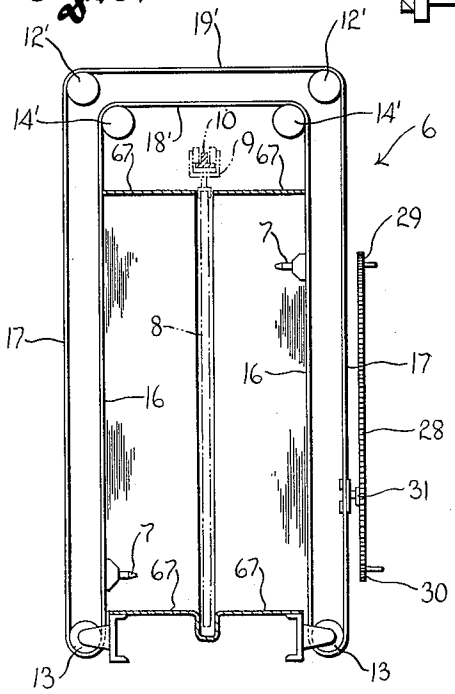


Fig. 6.



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PASTING PLATE PASTE SPRAYING APPARATUS

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Application January 20, 1956, Serial No. 560,427

4 Claims. (Cl. 118—323)

This invention relates to paste spraying apparatus and has more particular reference to improvements in apparatus for spraying paste upon pasting plates of the type used in tanneries.

In tanneries it is customary to paste the tanned skins while wet upon large flat plates to facilitate stretching and drying of the skins. These so-called pasting plates are generally large sheets of metal having porcelain enamel surfaces, or, in some instances, the plates may be large sheets of plate glass. In either event, the plates are suspended by trolleys from an overhead rail forming part of a closed circuit system, to enable the plates to be easily moved past one or more stretching stations and then into a drying chamber. After drying, of course, the skins are stripped from the plates, but before the plates can be reused they must be washed.

The washing of the plates may be effected in part in soaking apparatus such as that forming the subject matter of my copending application, Serial No. 560,409, filed January 20, 1956, and in part in scrubbing and drying apparatus such as that disclosed in the copending application of Ralph J. Stehling and Rafael A. Guardado, Serial No. 437,226, filed June 16, 1954.

After the plates have been scrubbed clean and dried, they are moved along the overhead rail to a paste applying station where both faces of the plates are coated with paste preparatory to receiving the tanned hides thereon. Paste has been deposited upon the plates in many different ways, often merely by manual brushing of the paste thereon. This earlier method, however, has recently been supplanted by paste applying appartus which includes a housing through which the washed plates are conducted while paste is sprayed upon the opposite faces thereof.

Such paste spraying apparatus as was provided heretofore has been found objectionable either for their inability to prevent the sprayed paste from contacting and accumulating upon moving parts of the apparatus inside the housing, or for their failure to effectively confine the sprayed paste in the housing of the apparatus.

For example, with one type of conventional paste spraying apparatus the spray nozzles were mounted upon carriages inside the housing of the apparatus, which carriages were guided for up and down motion along vertical rails also exposed in the interior of the housing, so that paste issuing from the nozzles would accumulate on the carriage and its guide rails until it seriously interfered with the proper up and down travel of the carriages and the nozzles thereon. Naturally, this type of apparatus had to be shut down frequently for cleaning.

In an effort to overcome this objection, attempts have been made to remove the nozzle carriage and its guide mechanism from the housing, but this resulted in the necessity for providing elongated upright openings in the laterally opposite side walls of the housing in order to accommodate the spray nozzles. This expedient was also found to be undesirable. It allowed sprayed paste to escape from the housing through the elongated nozzle receiving openings, and to accumulate on the exterior surfaces of the apparatus and other mechanism adjacent thereto. It also created conditions hazardous to the operators of the washing and paste spray apparatus as a consequence of wet paste deposited upon the floor areas surrounding the apparatus.

With these objections in mind, it is a primary purpose of this invention to provide paste spraying apparatus of the character described with improved means for effecting up and down translation of the paste spray nozzles without danger of the sprayed paste escaping from the housing of the apparatus, and which, moreover, is substantially unaffected by its exposure to paste sprayed inside the housing.

More specifically it is the purpose of this invention to provide a paste spraying apparatus of the character described wherein the paste spray nozzles are mounted upon two opposing stretches of belt means extending upwardly through the housing of the apparatus at laterally opposite sides thereof, and wherein said opposing stretches of the belt means also provide closures for the laterally opposite sides of the housing.

With the above and other objects in view, which will appear as the description proceeds, this invention resides in the novel construction, combination and arrangement of parts, substantially as hereinafter described and more particularly defined by the appended claims, it being understood that such changes in the precise embodiment of the hereindisclosed invention may be made as come within the scope of the claims.

The accompanying drawings illustrate two complete examples of the physical embodiments of the invention constructed according to the best modes so far devised for the practical application of the principles thereof, and in which:

Figure 1 is a side elevational view of the paste spraying apparatus of this invention;

Figure 2 is an elevational view of the apparatus seen in Figure 1, viewing the same from the plate discharge end;

Figure 3 is a cross-sectional view taken through Figure 2 along the plane of the line 3—3;

Figure 4 is a diagrammatic perspective view illustrating the endless belt carrier for the spray nozzles and the manner in which the belt is trained over laterally opposite sets of pulleys on the apparatus;

Figure 5 is an enlarged detailed sectional view of part of the apparatus shown in Figure 3, taken along the plane of the line 5—5; and

Figure 6 is a diagrammatic elevational view similar to Figure 4 but illustrating a modified arrangement of the endless belt.

Referring now more particularly to the accompanying drawings in which like numerals indicate like parts throughout the several views, the paste spraying apparatus 5 of this invention features a unique and simplified carrier means in the form of an endless belt 6 (see Figure 4), having the paste spray nozzles 7 mounted thereon. Paste spray issuing from the nozzles 7 is deposited on the opposite faces of pasting plates 8 as they are advanced successively through the housing 11 of the apparatus while suspended by trolleys 9 from an overhead rail 10. The plates, of course, are advanced endwise, in vertical positions, through the housing, by means not shown.

Referring to Figure 4, it will be seen that the endless belt carrier means is trained about two laterally opposite sets of upper and lower pulleys 12, 13 and 14, respectively, the sets of pulleys being arranged at opposite sides of a vertical plane which lies in the path of travel of the plates 8 through the housing of the apparatus. In each set, the pulleys 12 and 13 are arranged to rotate on axes lying in a common vertical plane parallel to the path of travel of the plates through the housing, but spaced apart a distance

greater than the vertical dimension of the plates to be sprayed. Thus, the axes of the upper pulleys 12 are located a distance above the upper edges of the plates to be sprayed, while the axes of the lower pulleys 13 are located a distance beneath the lower edges of the plates to be sprayed. The remaining lower pulleys 14 of the two sets are arranged to rotate on axes parallel to but spaced inwardly and slightly above the axes of the pulleys 13.

As best seen in Figure 4, therefore, the endless belt 6 is trained about the pulleys of the two sets thereof so as to have adjacent upright inner and outer stretches 16 and 17 extending downwardly from each of the upper pulleys 12, in parallel relation to one another and to the path of travel of the plates through the housing. The inner stretches 16 of the belt are run under the pulleys 14 and are integrally joined to one another by a transverse horizontal stretch 18, while the outer stretches 17 of the belt are run under the lowermost pulleys 13 and are integrally joined to one another by a transverse horizontal stretch 19 slightly beneath the transverse stretch 18.

Each of the paste spray nozzles 7 is mounted on a bracket 20 which is fixed to the inner face of one of the inner stretches 16 of the endless belt with the nozzles facing inwardly toward the median vertical plane of the housing, which plane, of course, lies in the path of travel of the pasting plates through the housing.

As the pasting plates are conducted through the housing while suspended from the overhead rail 10, paste and air under pressure delivered to the nozzles 7 through paste and air supply lines 22 and 23, respectively, are sprayed upon the opposite faces of the plates. During spraying, the endless belt 6 is driven alternately in opposite directions an extent such as to cause the spray nozzles 7 to be carried up and down a distance sufficient to encompass substantially the entire vertical dimension of the pasting plates by the spray issuing from the nozzles.

For this purpose, the apparatus of this invention provides a simple but highly efficient belt drive mechanism generally designated 25. The belt drive mechanism includes an electric motor 26, and speed reducing transmission mechanism 27 connected between the motor and an endless chain 28 trained over driving and idler sprockets 29 and 30, respectively. The sprockets closely overlie the exterior of one outer stretch 17 of the endless belt with their axes normal thereto and spaced vertically a distance substantially corresponding to the degree of up and down motion it is desired to impart to the spray nozzles 7.

Fixed to one of the links of the chain 28 is a drive arm 31, which extends inwardly of the stretches of the chain and has a trunnion 32 on its outer end projecting toward and drivingly connected with the adjacent outer stretch 17 of the endless belt. The axis of the trunnion 32 passes exactly midway between the vertical stretches of the chain so that it will be coaxial with the sprockets 29 and 30 when the drive arm travels thereover.

By reason of the fact that the trunnion is constrained to travel in a vertical plane normal to the adjacent stretch 17 of the belt, the driving connection between the chain and the belt may be effected merely by the reception of the trunnion in a simple bushing 33 fixed on a plate 34 which is flatwise attached to the outer face of the adjacent outer stretch 17 of the belt. Thus, the chain 28 provides a belt driving means which is constrained to travel in a fixed vertically elongated closed orbit, and the desired back and forth motion is imparted to the nozzles 7 without the necessity for resorting to such undesirable motion transmitting means as previously required the chain carried driver to engage in an elongated cross slot in the nozzle carrier.

The housing 11 of the apparatus is supported from an arch-like structure which includes two upright spaced apart columns 36 at the opposite sides of the housing and joined at their tops and bottoms by transverse channel-shaped beams 37 and 38, respectively. The columns extend upwardly a distance beyond the overhead rail 10, and the upper beam 37 provides a bridge extending transversely across the rail 10 a distance thereabove. The lower beam 38 forms part of a base frame for the housing located a distance beneath the lower edges of the plates to be sprayed.

As seen best in Figure 3, each of the columns 36 comprise a cluster of four upright spaced apart angle irons arranged in pairs at opposite sides of the end portions of the crossbeams 37 and 38. The innermost angles 40 of the pairs have one leg thereof flatwise engaging and fixed to the vertically disposed flanges of the crossbeams and projecting outwardly of the housing. The outermost angles 41 of the pairs likewise have one leg thereof flatwise engaged with and fixed to the vertically disposed flanges of the crossbeams, but these legs project inwardly of the housing. In addition to supporting the housing, the columns also provide upright supporting structure for carrying the two sets of pulleys 12, 13 and 14. Each of the upper and lower pulleys 12 and 13 of each set of pulleys, is mounted on one of the columns with the pulleys between the two pairs of upright angles which comprise the column, and with the pulley shafts 42 projecting outwardly in opposite directions through the spaces between the angles of each pair, to be rotatably received in bearings 43 carried by the angles. A belt tensioning device indicated generally by the numeral 44, however, is provided for the bearing 43 of one of the upper pulleys 12, as shown best in Figure 2, so as to enable the proper tension to be maintained upon the stretches of the endless belt.

The shafts of the two remaining pulleys 14 are rotatably journalled in brackets 46 mounted on the innermost angles 40 of the columns.

The electric motor 26 is supported by a bracket 48 from one of the columns 36, near the upper end thereof and its shaft projects outwardly therefrom to connect with the speed reducing transmission means 27, the latter being supported by an elongated upright framework 50 mounted on the adjacent column 36, but spaced outwardly a short distance therefrom to accommodate the chain 28 between it and the column. It is understood, of course, that the sprockets 29 and 30 are rotatably mounted in suitable bearings in the upright framework 50.

The housing for the paste spray apparatus of this invention is so constructed as to provide laterally opposite housing sections or chambers 52 and 53 which are in open communication with one another across the median vertical plane of the housing along which the plates to be sprayed travel through the housing. These housing sections or chambers are located beneath the overhead rail 10 and are of a height at least as great as the vertical dimension of the plates to be sprayed.

The housing sections or chambers are built around and supported by pairs of upright angles 54 and 55 disposed back to back at the front and rear, respectively, of the housing. At their lower ends the opposing legs of each pair of angles 54 and 55 flatwise embrace and are secured to the opposite sides of a longitudinal channel 56 forming part of the base framework, so that the angles of each pair thereof are spaced apart laterally short but equal distances from the median vertical plane of the housing, as seen in Figure 3.

At a small elevation above the longitudinal beam 56, the two sets of upright angles 54 and 55 also accommodate therebetween an elongated plate guiding channel 58, the laterally opposed sides of which are flatwise welded to the opposing backs of the angles and form a guide to loosely receive the lower edge portions of plates 8 passing through the housing. Longitudinally extending angles 59 arranged back to back are secured to the upper ends of the upright angles of each chamber, and the depending flanges of the angles 59 provide spaced apart guides which loosely receive the upper edge portions of plates 8 passing through the housing.

At their upper ends and also near their lower ends,

the front and rear angles 54 and 55 for each of the housing sections or chambers are joined to the innermost angles 40 of the columns 36 by angle irons 60 extending horizontally and somewhat diagonally across the front and rear of the housing. It should be noted, however, that the lower diagonal angle irons 60 are located slightly above the innermost pulleys 14.

The sides of each of the housing sections or chambers are provided by doors 61 hinged as at 62 to the outer edges of the flanges of the innermost angles 40 of each of the columns. These doors have their free edge portions overlapping the laterally outwardly projecting legs of the angles 54 and 55, as indicated at 63. The doors 61, of course, are of a size to completely close the front and rear sides of the housing and they may be releasably held closed by means of latching devices having handles 64 near the free edge portions of the doors, to actuate keepers 65 which are engagable with the inner surfaces of the laterally outwardly projecting legs of the angles 54 and 55, as shown in Figure 3. Obviously, when the keepers are released the doors may be swung open about their hinges 62 to provide access to the interiors of the housing sections or chambers 52 and 53.

At their tops and bottoms each of the chambers 52 and 53 is closed by a substantially horizontal plate 67, it being understood that the inner edges of these plates are spaced apart across the median plane of the housing to provide for passage of the pasting plates therethrough.

The spaces at the laterally opposite sides of the housing sections or chambers which exist between the innermost angles 40 of each of the columns is partially closed by the inner stretches 16 of the endless belt and partially by the flanges of angle irons 69 which are secured to the inner angles 40 of the columns along the inner faces of their laterally outwardly projecting legs. The angles 69, of course, extend vertically for the entire height of the housing sections or chambers and their flanges 70 which project toward one another overlie the outer faces of the inner stretches 16 of the endless belt to act as guides therefor.

Aside from the inner stretches 16 of the endless belt, therefore, none of the mechanism by which the nozzles are translated up and down in the paste spray chambers is exposed at the interior of the chambers. Each of the upper pulleys 12 of the two sets thereof is located a distance above the top walls 67 of the housing sections or chambers, while the lower pulleys 13 and 14 of each set thereof are located beneath the closure or floor 67 at the bottom of each chamber. Consequently, there is no opportunity for paste sprayed into the chambers to contact and accumulate upon the pulleys or upon any of the nozzle translating mechanism, except the inner faces of the inner stretches 16 of the endless belt.

It will also be noted that but one speed reducing transmission mechanism 27 and orbital drive means 28 is required to impart motion in opposite directions to the endless belt and to thus effect the desired up and down travel of the nozzles in the housing. By the arrangement of the endless belt shown best in Figure 4, it will also be noted that, while the nozzle of one chamber is travelling in a downward direction, the nozzle in the opposite chamber is travelling upwardly. In other words, the two nozzles will at all times be moved in opposite directions.

If desired, the two transverse stretches 18' and 19' of the belt means may be located above the overhead rail 10, close to the upper transverse beam of the arch-like supporting frame, as shown in Figure 6, rather than at the bottom portion of the apparatus. When these transverse stretches of the endless belt are so located, the upper pulleys 12' are mounted slightly higher than previously on their columns, and the two pulleys 14' are supported from the columns slightly inwardly of the pulleys 12' and at elevations slightly beneath the latter. In this case also, the pulleys about which the endless belt is trained lie entirely outside the spray chambers, while the outer sides of the latter are closed by the inner, nozzle carrying stretches 16 of the belt.

From the foregoing description taken together with the accompanying drawings, it will be readily apparent to those skilled in the art, that this invention provides an improved paste spraying apparatus featuring simplicity of construction and excellent protection against accumulation of paste on any of the nozzle translating mechanism, and against the escape of paste spray from the spray chambers.

What I claim as my invention is:

1. In an apparatus for spraying paste upon pasting plates as they travel edgewise in a vertical position along a defined path preparatory to having hides pasted thereon: means including spaced side walls each having vertically extending inner and outer edges, defining an upright chamber alongside said path, said chamber having a height at least equal to the vertical dimension of plates to be sprayed and having an open inner side facing a vertical plane in said path along which the pasting plates travel; the longitudinally extending inner edges of said side walls which define the open side of the chamber being close to said plane so that each plate as it moves past the chamber substantially closes said open side thereof; the outer longitudinally extending edges of the side walls being spaced apart; an endless belt of a width to span the distance between the spaced outer edges of the side walls; pulley means mounting the endless belt with a stretch thereof extending vertically and with the side edges thereof contiguous to the outer edges of said side walls so that said stretch of the belt closes the space between said outer edges and coacts with the side walls in defining said chamber; a spray nozzle mounted on said stretch of the belt facing toward the open inner side of the chamber; and drive means disposed entirely outside the chamber and connected to the endless belt to impart back and forth endwise movement to the belt to carry the spray nozzle up and down.

2. The paste spraying apparatus of claim 1 further characterized by the provision of flange means on the outer vertically extending edges of said side walls overlying the outer face of said stretch of the endless belt, to guide the motion of the belt and coact with the belt in closing the space between said outer edges of the side walls.

3. The paste spraying apparatus of claim 1 wherein said means defining the chamber includes spaced top and bottom walls joined to the side walls and wherein said pulley means is spaced above and below said top and bottom walls.

4. In an apparatus for spraying paste upon opposite faces of pasting plates as they travel edgewise in a vertical plane along a defined path: upright supporting structure at each of the opposite sides of and spaced from a vertical plane in said path along which the plates travel; pulleys rotatably mounted on each of said supporting structures and spaced vertically from one another a distance greater than the vertical dimension of the pasting plates to be sprayed; an endless belt trained over said pulleys and having elongated upright stretches opposing one another, one at each side of said vertical plane but spaced outwardly therefrom; a spray nozzle mounted on each of said opposing stretches of the belt facing inwardly toward said plane; means carried by said supporting structure defining a mist confining chamber at each side of said plane, each of said chambers having a pair of upright side walls with vertically extending inner and outer edges, the inner edges being close to but spaced from said plane and the outer edges being adjacent to the longitudinal edges of the adjacent one of said opposing upright stretches of the belt; flange means at said outer

edges of the upright walls overlying the edge portions of said stretches of the belt to guide the same and coact therewith to close the outer sides of the chambers; and means located adjacent to but outside one of said chambers, drivingly connected to said belt to impart alternate back and forth movement thereto to thereby carry the spray nozzles up and down.

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