Nov. 4, 1941. A. D. BULLERJAHN 2,261,138

MECHANISM FOR WAXING CARTONS OR THE LIKE

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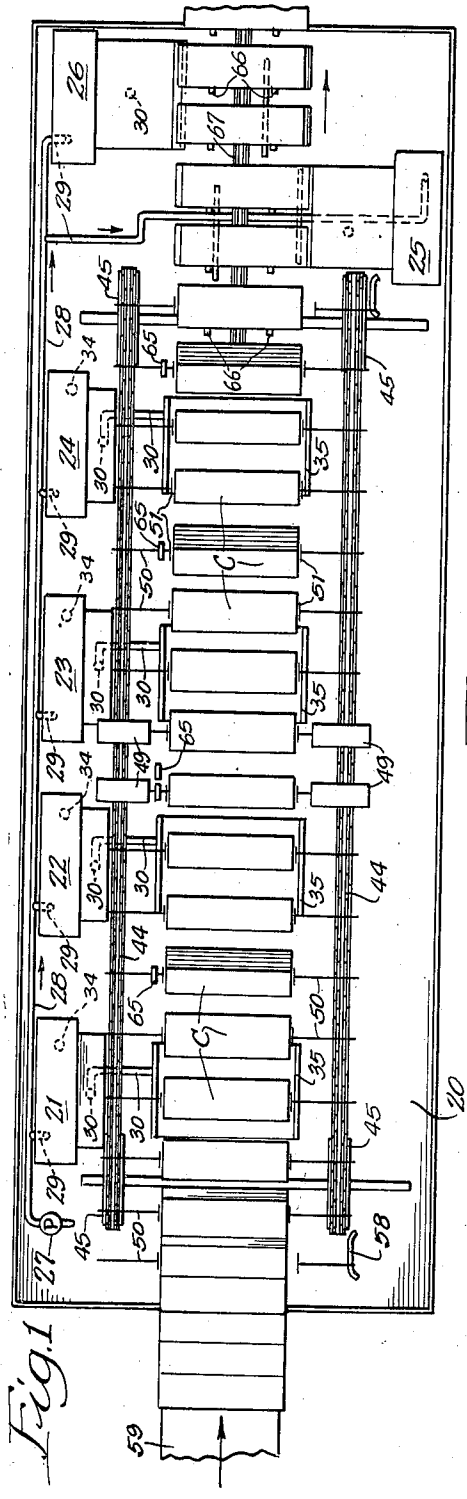

Fig. 1

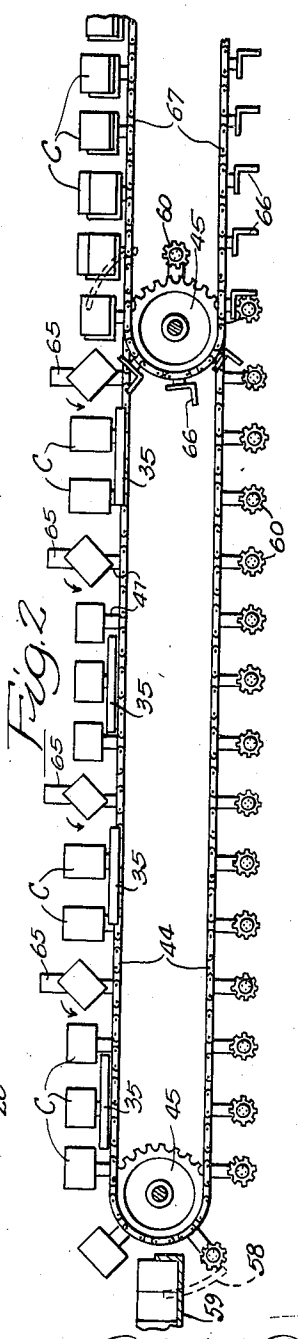

Fig. 2

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Fig. 3

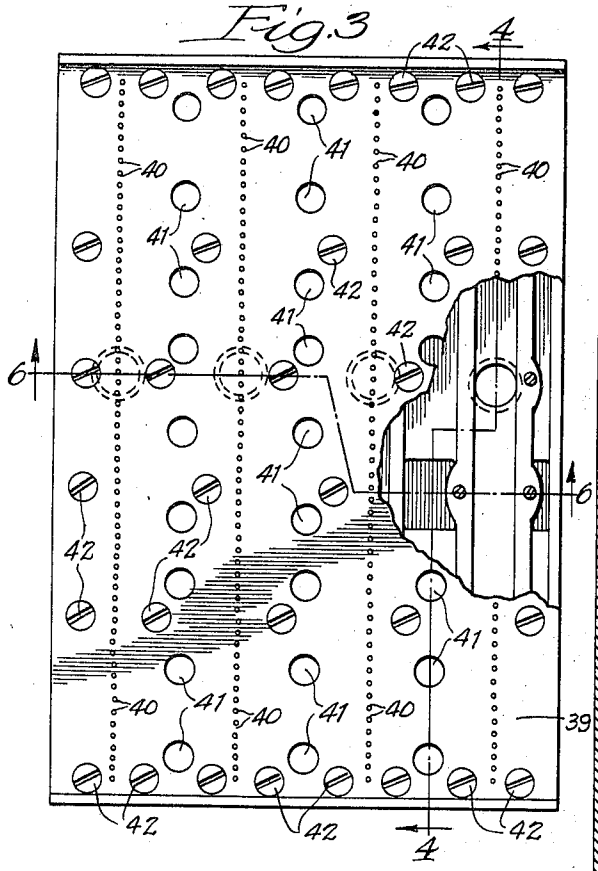


Fig. 5

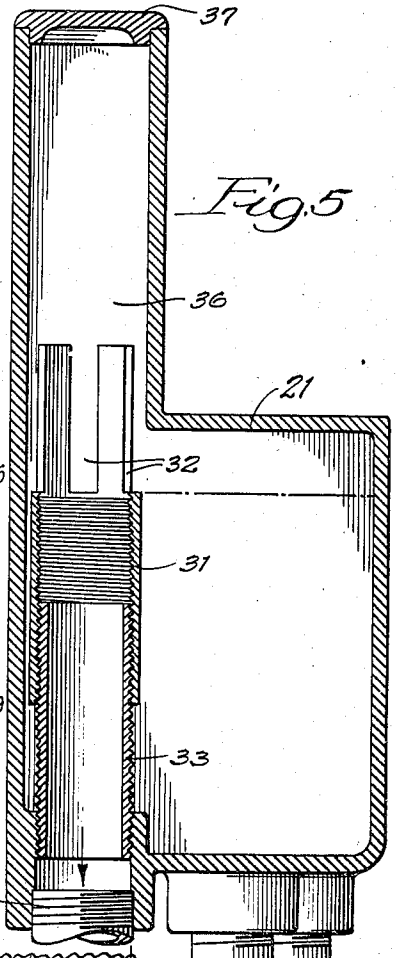
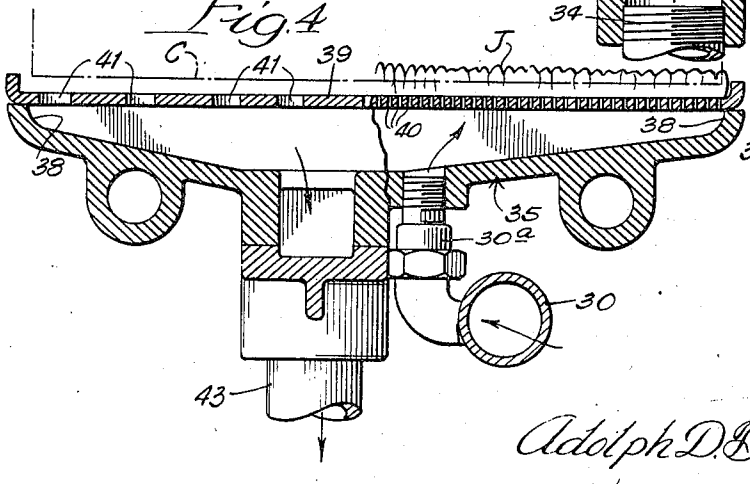


Fig. 4



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MECHANISM FOR WAXING CARTONS OR THE LIKE

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Fig. 6

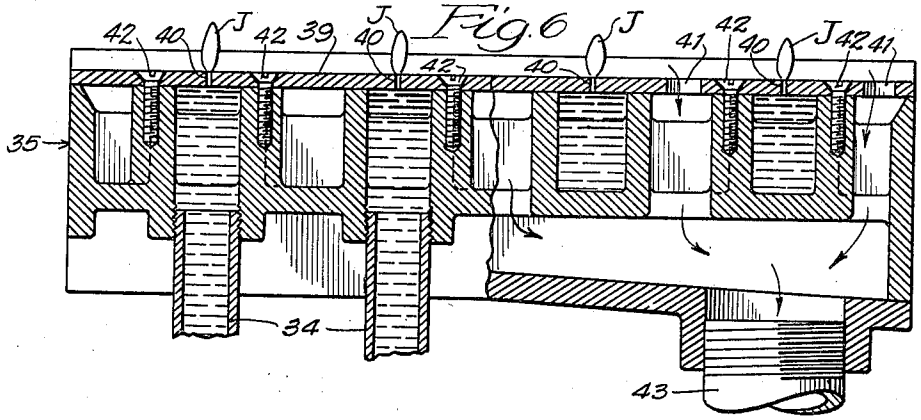
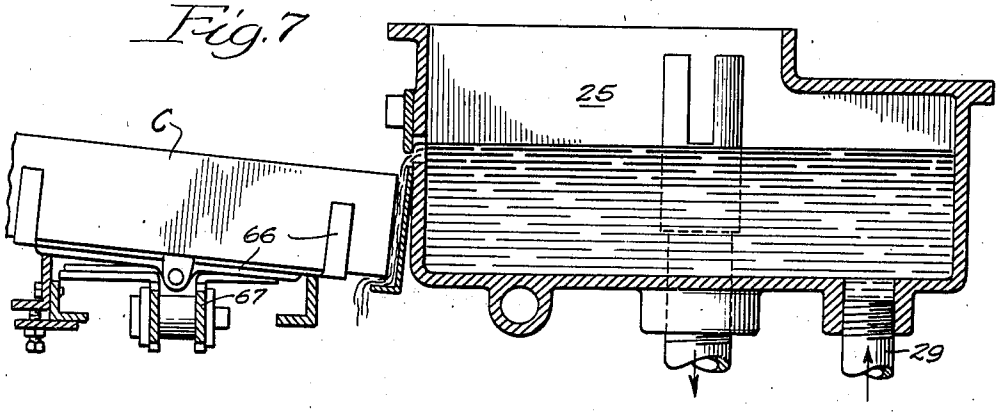


Fig. 7



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MECHANISM FOR WAXING CARTONS OR THE LIKE

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Fig. 8

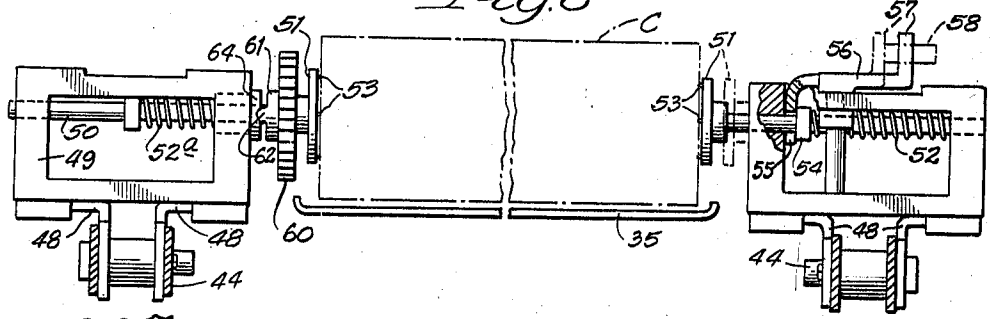


Fig. 9

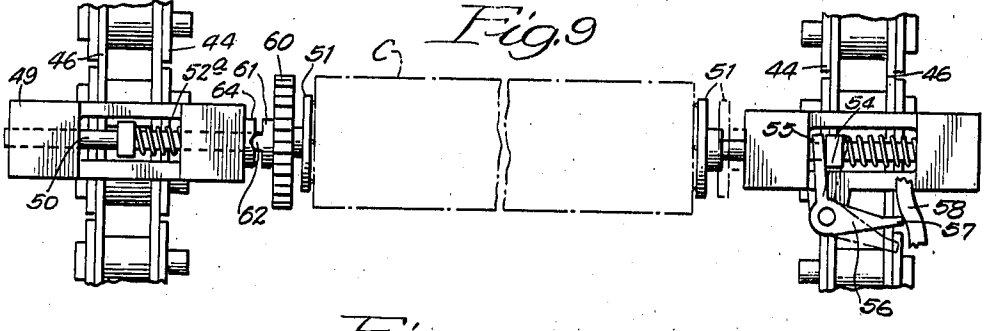


Fig. 10

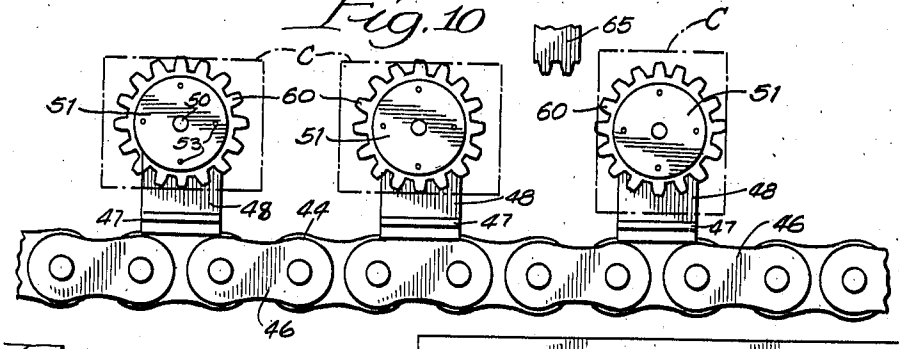


Fig. 11

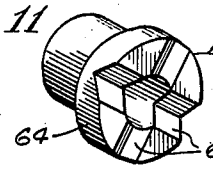
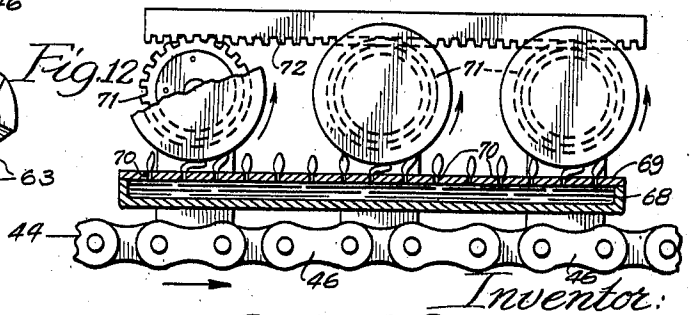


Fig. 12



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Patented Nov. 4, 1941 2,261,138

UNITED STATES PATENT OFFICE

2,261,138

MECHANISM FOR WAXING CARTONS OR THE LIKE

Adolph D. Bullerjahn, Milwaukee, Wis.

Application July 10, 1939, Serial No. 283,549

4 Claims. (Cl. 91—44)

In the sealing of perishable food products or the like it is customary to apply to the filled carton a coating of paraffine or similar sealing substance in order to prevent the ingress of moisture and maintain the contents of the package in a fresh and satisfactory condition.

In effectively sealing a carton in this manner it is necessary that the sealing substance be evenly and continuously distributed over the entire surface, including the sides and ends of the carton, and to secure uniform adhesion of the sealing substance to the carton surface, so that no air will be anywhere entrapped in the form of bubbles or voids which if present would tend to cause the coating to flake away from the surface of the carton. It is also essential that no portion of the carton surface, during the application of the coating, be contacted by mechanical means which would tend to obstruct the even application of the coating to the surface.

It has been the usual practice in the past to apply the coating to the carton by dipping or immersion in a bath of hot paraffine, but this requires the employment of grippers or the like for holding the carton during the period of immersion and often results in an uneven distribution of the coating liquid or the presence of apertures in the coating due to the entrapment of air or contact of the grippers employed to sustain the carton.

The object of the present invention is to overcome the difficulties above noted and to secure an even and uninterrupted coating throughout the entire surface of the carton by the employment of jets of coating liquid (paraffine or the like) which in the liquid state are projected against the exposed surfaces of a traveling carton in such a way as to eliminate the presence of grippers or the like in contact with those portions of the carton surface being subjected to the coating operation; and to effect an even distribution of the coating liquid by moving the carton surface through the line of jets which not only effect a uniform deposit of the coating but in effect perform the function of a mechanical wiper in evenly distributing the coating liquid in such a way as to prevent the entrapment of air with a resultant formation of bubbles or voids.

The present invention affords means for conveying the cartons in a continuous procession and exposing each of the sides in turn to the impingement of an underlying line of jets of coating liquid which is ejected upwardly into contact with the downwardly presented surface of the carton wall, so that the latter, in advancing, sweeps through the line of jets and becomes coated to the required degree, the carton being thereafter turned to present another face to a like line of jets, and so on until all of the side surfaces of the carton have been coated in the manner stated, after which provision is made for coating the infolded ends of the carton prior to its final delivery.

Although for purposes of illustration mechanical means are provided for the coating sequentially of the four sides of a rectangular carton, and for the intermittent rotation of the carton to present each of its flat sides in turn to a jet of paraffine or other coating liquid, the jet system here involved is equally applicable to the coating of a cylindrical carton, and the term carton, as employed in the present specification, is intended to cover any object, whether in the form of a container or the like, which is capable of being coated in the manner presently to be described. The apparatus is thus adapted for use in the application of paints, lacquers, or the like, or in other fields where it is desirable to apply a uniform coating in liquid form and to effect a smooth and even distribution of the coating throughout every portion of the surface presented.

For the purpose of illustrating the principles involved, mechanism is provided in the form of an endless carrier, which engages the ends of the cartons or other objects to be coated, and advances the same in processional relation above a tank which serves as a reservoir for the coating liquid (paraffine or the like) and which will usually be heated to a moderate degree to afford the necessary fluidity to permit it to be ejected in jet form, and which tank also serves as a basin into which the excess drippings fall during the progress of the cartons from end to end of the tank. Means are provided for recurrently turning the cartons during their period of advance, so that each surface in succession will be presented to a line of jets to receive its coating, the spacing of the jets and the length and speed of the conveyor being properly computed to permit any excess coating liquid to drain from the carton and to permit the adhered coating to cool and harden to the required degree before the carton progresses beyond the limits of the tank.

The special mechanism of the present invention is designed to apply a coating to the sides of the carton but in the final sealing of the ends I employ mechanism of substantially the form shown in my Patent No. 1,724,179, dated August 13, 1929, which may be advantageously asso-

ciated with the special mechanism of the present invention.

In the drawings:

Figure 1 is a plan view looking down toward the tank and showing the entire conveyor mechanism of the present invention;

Fig. 2 is a view showing the endless conveyor;

Fig. 3 is a plan view of one of the jet discharging units partially broken away to reveal the interior;

Fig. 4 is a sectional view taken on line 4—4 of Fig. 3;

Fig. 5 is a sectional elevation of one of the reservoirs for maintaining a head of coating liquid;

Fig. 6 is an enlarged sectional elevation taken on the offset line 6—6 of Fig. 3;

Fig. 7 is a sectional elevation of the mechanism for coating the ends of the cartons;

Figs. 8 and 9 are details of the gripper mechanism for the ends of the carton in association with fragments of the conveyor chains;

Fig. 10 is a detail of one of the conveyor chains with the gear mechanism for rotating the cartons;

Fig. 11 is an enlarged perspective view of one of the centering heads for the rotating gripper mechanism; and

Fig. 12 is a detail of a modified form of rotating mechanism for use with cylindrical cartons.

In the form shown, the mechanism occupies a position above an elongated tank 20, which is adapted to contain a supply of liquid paraffine, from which it is pumped into elevated reservoirs 21, 22, 23, 24, 25, 26, by means of a pump 27 which supplies liquid to a main header pipe 28 having branch pipes 29 leading to the respective reservoirs. The branch pipes in each instance lead into the base of the associated reservoir, and the reservoirs themselves are all of similar construction, as illustrated with respect to the reservoir 21 in Fig. 5, so that a description of one will apply to all.

Each of the reservoirs 21, 22, 23, 24, is provided with a tubular weir 31 having in its upper end slots 32 which afford overflow apertures for the maintenance of the proper head for the liquid. The weir is threaded onto the upper end of a pipe section 33 extending upwardly from the floor of the reservoir and registering with a pipe 34 leading back to the main supply tank. The tubular weir is adjustable within an upwardly extending stack 36 closed by a cap 37, which permits access to the interior for the purpose of regulating the effective height of the weir.

Each reservoir discharges downwardly through a pipe 30 which connects through a coupling 30a with the base of the associated jet unit 35, which is in the form of a shallow basin upturned around its margins 38, and which supports a jet plate 39 having rows of minute jet openings 40 extending transversely of the main tank and interspersed by rows of drain openings 41. The individual jet openings are very close together and in continuous alignment, so that under the pressure afforded by the head of liquid in the elevated reservoir they will permit the discharge of continuous lines of jets J which in effect afford a continuous sheet or fountain of upwardly ejected coating liquid as illustrated in Fig. 4. In the present instance four lines of jets are provided interspersed by three lines of drain openings, although obviously the number and arrangement of the jets and drain openings may be modified. The capacity of the drain openings 41 in relation to the discharge capacity of the jets is so restricted that a continuous surface of coating liquid will be maintained between the jets, which supplements the coating action of the jets themselves.

The jet plate 39 is secured to the basin by means of screws 42, or in any other suitable manner. Each jet unit basin is provided with a drain pipe 43 leading back to the main tank, and each unit is suitably supported above the liquid in the tank and at a level such as to permit the cartons or other objects requiring a coating to sweep above the surface of the jet plate and in sufficiently close proximity thereto to cause impingement of the lines of jets against the surface thus presented. Where rectangular cartons or the like are being coated it is necessary to provide four jet units suitably spaced from one another to permit cartons to be turned while traversing the gaps between the jet units as indicated in Fig. 2.

In order to convey the cartons in processional relation and to expose the four sides of the rectangular cartons successively to the jet coatings provided, endless conveyor chains 44 are employed which are carried upon suitably driven sprockets 45. The conveyor chains are located above the main tank and are composed of links 46 which at recurrent intervals serve as mountings for brackets 47, each bracket, as shown, consisting of upstanding angle bars 48 rigidly secured to the associated link of the conveyor chain, and each bracket supports a rectangular open frame 49 which carries a slidably mounted rod 50 provided at its inner end with a clamping head 51. Each clamping head on the right of Fig. 8 is normally inwardly projected by a coil spring 52, and is provided on its acting face with minute teeth 53 which engage the contiguous end of a rectangular carton C, which is held between oppositely facing duplicate clamping heads, as shown in Fig. 8.

The right hand clamping head is provided with a collar 54 which is engaged by a bifurcated end 55 of a bell crank lever 56 having at its free end an upstanding finger 57 adapted to engage a fixed cam 58 suitably positioned to retract the right hand gripping head to the dotted line position in order to permit the preliminary insertion of a carton, which as shown may be carried by any suitable conveying mechanism 59 (Fig. 2) to the gripping position and there gripped by the release of the right hand gripping head preparatory to its advancement by the conjoint movements of the endless carrier chains.

In order to effect a turning of the carton at the required moment to present another of its faces to the next coating jet, the left hand clamping head (Fig. 8) has mounted thereon a spur gear 60 having a hub 61 provided with one or more lugs or ribs 62 adapted to register with the cross grooves 63 of a centering head 64 carried by the left hand frame 49, the arrangement being such as to permit the slight yielding of the left hand clamping head required to rotate the same, with the rib 62 in contact with the grooved centering head 64 and against the pressure of a spring 52a.

In order to effect rotation of the gear 60 at the proper interval, a fixed toothed rack 65 is provided (Fig. 10), which occupies a position in the line of travel of the spur gears 60, so that as each spur gear engages the rack it will be rotated through an arc of 90 degrees, and thereafter accurately centered by the centering head 64 so that

a new carton surface will be presented for coating by the next set of jets in the series.

It will be understood that the fixed rack members 65, four in number as shown, occupy positions intermediate the jet units 35, as shown in Fig. 2, so that after each application of the coating to one of the faces of the carton, the carton will be turned into position to present the next face flatwise and in close proximity to the next jet unit, the spacing being duly computed with relation to the size of the cartons and the necessary clearance to be provided for turning them, and also with relation to the period of time desired for permitting the first coating to harden somewhat before the carton is rotated into a new position. These factors will be determined in some measure by the fluidity and other factors special to any particular coating, as well as the speed of advancement of the conveyor chains and the thickness of the coating desired.

After the four sides of a rectangular carton have been coated in the manner described, the cartons will be delivered successively into angle shaped carrier brackets 66 mounted upon a second set of carrier chains 67 driven at a uniform speed with the first set of chains and adapted to advance the cartons into position to have the ends successively sealed by sealing mechanism of the character shown in my Patent No. 1,724,179 previously referred to, and illustrated in Fig. 7.

This mechanism serves, by the overflow of the paraffine or other sealing material, to apply a full coating to the folded and interlocked ends of the carton by successive stages, one end being first presented for sealing and the other end being subsequently sealed in the manner set forth in the patent above referred to. This completes the sealing of all six surfaces of a rectangular carton, which is thereafter conveyed to the point of delivery. It is not deemed necessary, however, to describe this portion of the operation in detail since it is fully set forth in my Patent No. 1,724,179.

Where cylindrical cartons or the like are to be coated, the modification shown in Fig. 12 may be employed. In this instance, a basin 68 is employed having a jet plate 69 provided with lines of apertures 70 for the upward projection of jet sheets of coating liquid against the cylindrical surface of a carton which in this instance will be continuously rotated by the engagement of a pinion 71 meshing with a continuous rack 72, so that, as the cartons or other objects advance, the cylindrical surfaces will sweep through the lines of jets of coating until a complete rotation has been effected.

Other modifications adapted to cartons or similar objects of peculiar or unusual shape may be readily employed to meet special requirements and to insure that every portion of the side walls of the carton or other object will sweep through one or more coating jets in the manner previously described.

It will be noted from the above description that during the coating of the side walls of the carton or other object, the same is supported entirely from the ends and that there is no mechanical contact with any portion of the surface presented for coating, nor are mechanical appliances provided for sweeping or brushing the coating liquid upon the surface. At the same time the advancement of the carton itself through the upwardly ejected lines of jets effects a liquid brushing action which is highly advantageous in securing a uniform adherence of the coating liquid and in preventing the entrapment of air, since the friction occasioned by the movement of the carton surface through the upwardly projected jets performs a brushing function in a much more advantageous manner than could be obtained by the use of mechanical means having frictional contact with the carton surface.

In the case of rectangular cartons also, the surface being coated will lie in a plane closely adjacent to the jet plates, so that each surface will if desired be subjected to the successive action of several rows of jets, although it will be understood that the present invention contemplates the use of but a single row of jets as well as any multiple thereof. It will also be understood that although the mechanism is designed to successively apply a coating to each of the four sides of a rectangular carton, the principles involved may be used in the application of a coating of sealing or other material to a plane surface, so that in the claims, unless otherwise indicated, it is not the intention to limit the invention to a coating of surfaces of any particular shape or character, or to the use of sealing material as distinguished from paints, lacquers, or other coating material adapted to be applied to surfaces in general.

Furthermore, the intensity of the impingement of the liquid jets upon the surface presented, and the intensity of the brushing effect produced by travel through the impinging jets, can be easily regulated by increasing or diminishing the pressure head of the coating liquid, or by other equivalent means for regulating such pressure, so that full provision can be made for variations in the quality or thickness of the coating within wide limits and without the use of mechanical devices for directly assisting in the distribution of the coating.

I claim:

1. In a machine for coating the angularly disposed surfaces of an object, the combination of a plurality of jet supplying units spaced from one another and each apertured to upwardly discharge an elongated jet in the form of a sheet to effect a brushing action against the surface of the object being coated, conveyor means adapted to engage the end of the object to be coated and convey the same successively above and through said jets and means associated with said conveyor for intermittently rotating said object while in progress between said jets to successively bring the underlying surfaces of said object into contact with successive jets of said series, and means for supplying a coating liquid to each of said jet supplying units under pressure.

2. In a machine for coating rectangular objects, the combination of a main tank, a plurality of jet supplying units located vertically adjacent to said tank and spaced from one another and each provided with closely spaced apertures adapted in unison to upwardly eject jets which in combined relation present the form of a sheet to effect a brushing action against the surface of the object being coated, means communicating with each of said jet supplying units for supplying a coating liquid thereto, an endless conveyor provided at recurrent intervals with means for gripping the ends of said rectangular objects and adapted to carry the same forwardly above the jets in succession while downwardly presented into proximity with said jet supplying units, and means for intermittently turning said objects during their progress between said jets to bring each of said surfaces in succession into proximate relation with successive jet supplying units.

3. In a machine for coating rectangular objects, the combination of a main tank, a plurality of jet supplying units located vertically adjacent to said tank and each provided with closely spaced apertures adapted in unison to upwardly eject jets which in combined relation present the form of a sheet to effect a brushing action against the surface of the object being coated, elevated reservoir means communicating with each of said jet supplying units for supplying a coating liquid thereto, an endless conveyor provided at recurrent intervals with means for gripping the ends of said rectangular objects and adapted to carry the same forwardly above the jets in succession while downwardly presented into proximity with one of said jet supplying units, means for intermittently turning said objects during the interval while the same are moving from one jet applying unit to the next to bring each of said surfaces in succession into proximate relation with successive jet supplying units, and weir means in said reservoir means adapted to permit regulation in the intensity of the pressure head.

4. In a machine for coating rectangular objects, the combination of a main tank, a plurality of jet supplying units located above said tank and each apertured to upwardly eject a sheet of liquid transversely across the line of movement of the rectangular objects, means communicating with each of said jet supplying units for supplying a coating liquid thereto, a pair of spaced endless conveyors provided at recurrent intervals with rotatable clamping heads opposed to the heads on the companion conveyor and adapted in unison to clamp the ends of rectangular objects therebetween and adapted to carry the same forwardly above the jet supplying units to bring each of the side surfaces in succession while downwardly presented into proximity with one of said jet supplying units, and means for intermittently turning said clamping heads during the interval of passage of the rectangular objects from one jet supplying unit to the next to bring each of said surfaces in succession into proximate relation with each successive jet supplying unit.

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