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APPARATUS FOR SPRAYING LIQUID MATERIAL ON ARTICLES

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2 Sheets-Sheet 1

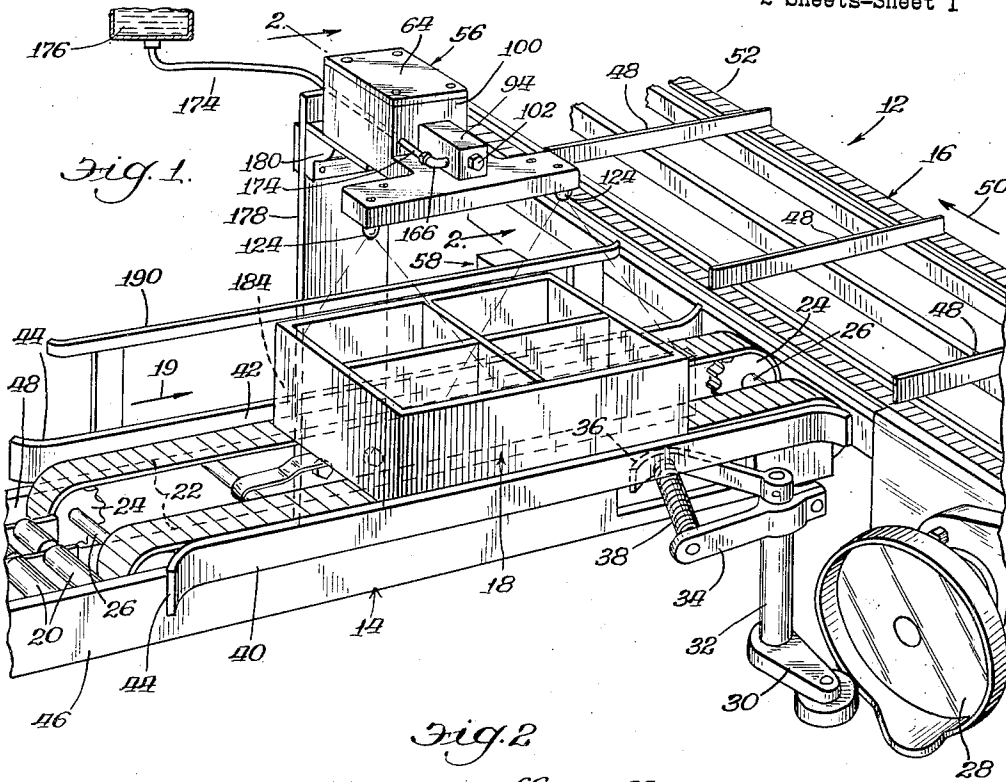


Fig. 1.

Fig. 2

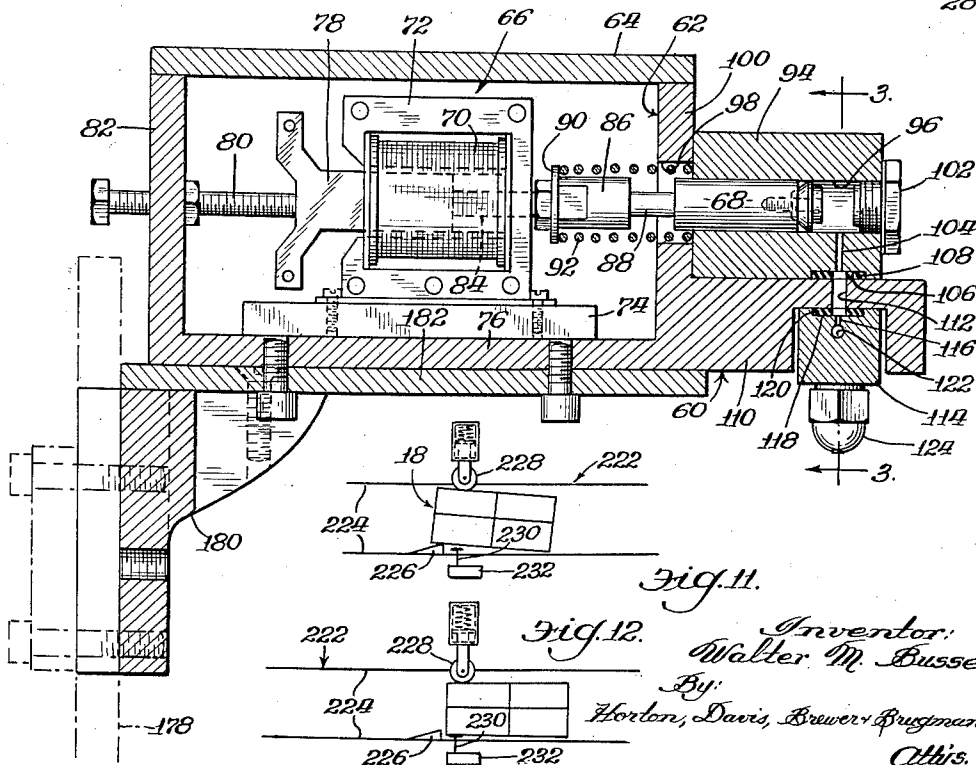


Fig. 11.

Fig. 12.

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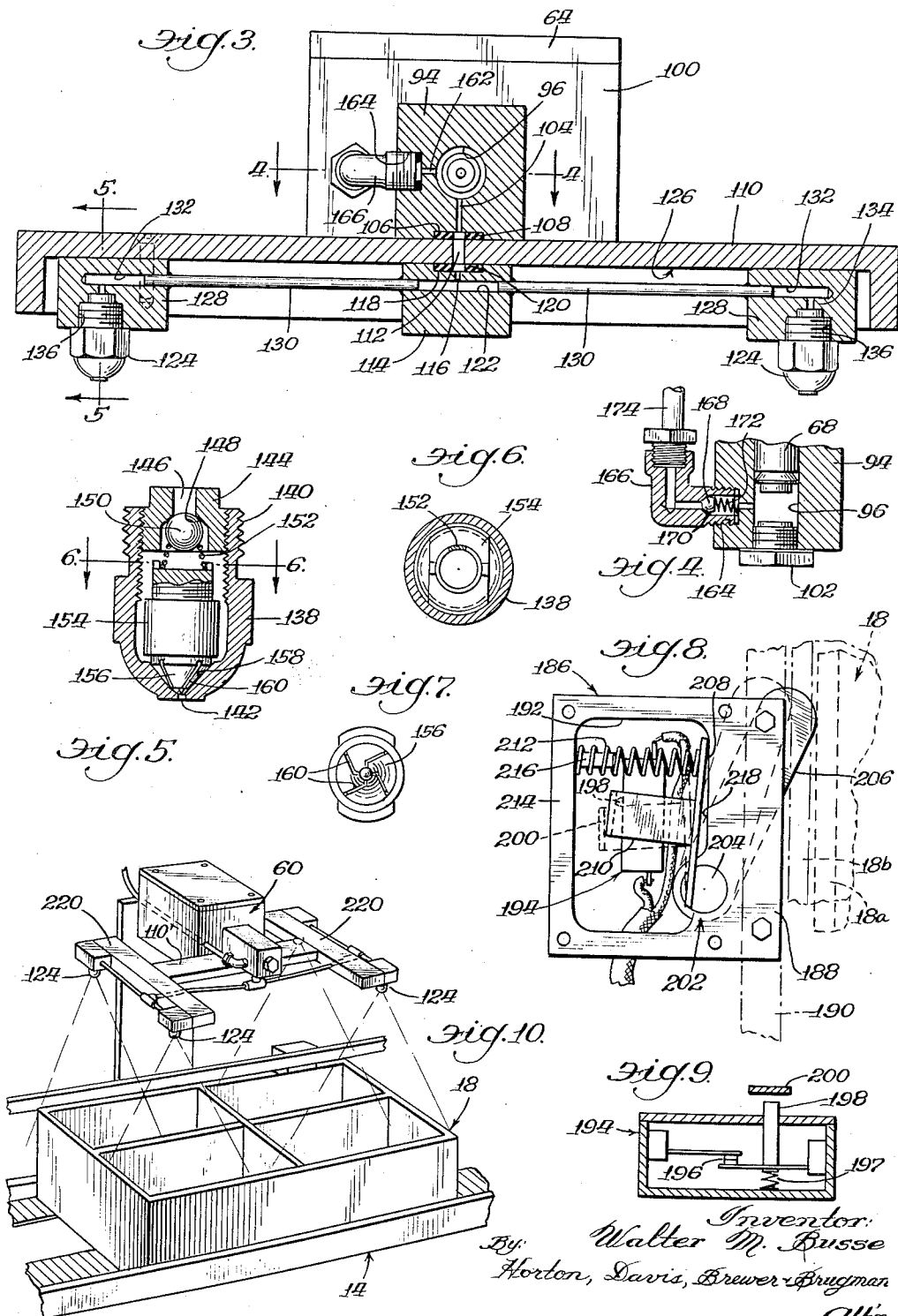
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## APPARATUS FOR SPRAYING LIQUID MATERIAL ON ARTICLES

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4 Claims. (Cl. 118-2)

The present invention relates to apparatus for applying materials such as insecticides and insect repellants, to articles.

The invention has particular adaptability to, although it is not limited to, instances in which foods, or edibles, are involved and exposed, and thus create an attraction to insects.

A particular instance of the adaptability of the invention is in the case of soft drinks. In handling of soft drinks, for example, bottled soft drinks, in any or all steps from the manufacturer to the consumer thereof, the contents of the bottles are exposed, partially and at times, to insects, either in the bottles, or in the cartons or cases in which the bottles are carried. Bottles of soft drinks, upon filling, are usually placed in cartons of suitable size for carrying in the hand. The cartons are usually placed in crates, several to a crate, and the crates thus filled are delivered from the manufacturer to various ones in the lines of distribution to the consumer, i.e., distributor, retailer, and possibly others. The consumer normally carries the goods home in the carrying carton, and upon consuming the goods in the bottles, places the empty bottles in the carton for the purpose of carrying the bottles in return to the retailer to obtain the deposit previously made thereon, a deposit being quite customarily made. Such bottles are rarely, if ever, cleaned by the consumer before being returned to the retailer, and the open bottles with residue of the soft drinks therein attract insects, particularly in view of the fact that soft drinks have high sugar content and thus have a great attraction for insects. The cartons with the empty bottles therein, together with the cases carrying the cartons are ultimately returned to the manufacturer for refilling of the bottles, and for redistribution pursuant thereto. In addition to the residue in the empty bottles as just referred to, portions of the soft drinks may be spilled or splashed on the cartons and crates, not only by the consumer but by the manufacturer and others as well, to the same disadvantageous effect as the residue in the bottles.

Accepted sanitary conditions require that the greatest precautions be taken for controlling insects in the handling of foods and edibles.

An object therefore, of the present invention, in the broadest aspect of the invention, is to provide improved apparatus for applying insect control material, such as insecticide or insect repellent, to articles, such as those used in connection with foods or edibles.

A more specific object is to provide new and improved apparatus for applying the material to the articles in the form of a spray, and in which the spray is a solid spray, that is, the particles making up the spray are all impelled directly to the articles to be treated without having a mist remaining in the air, or particles suspended in the air.

Another object is to provide novel apparatus the foregoing character in which the spraying of the material is effected by positive displacement thereof whereby to produce more effective transmission of the material onto the articles being sprayed.

A further object is to provide novel apparatus the character stated, wherein the spray is established and

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terminated in quick-acting fashion, with abrupt on-off control, whereby to prevent uncontrolled migration of the spray material, such as by dripping, between intervals of spraying in an intermittent spraying operation.

Still another object is to provide novel controls for apparatus of the foregoing character and carrying out the associated method referred to.

A further object is to provide novel arrangement for applying material, to articles in association with a conveyor utilized for conveying the articles.

Other objects and advantages of the invention will appear from the following detailed description taken in conjunction with the accompanying drawings in which—

FIGURE 1 is a perspective view of apparatus embodying the features of the present invention, in conjunction with conveyor apparatus;

FIGURE 2 is a large scale sectional view taken on line 2—2 of FIGURE 1;

FIGURE 3 is a sectional view taken on line 3—3 of FIGURE 2;

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

FIGURE 5 is a sectional view taken on line 5—5 of FIGURE 3;

FIGURE 6 is a sectional view taken on line 6—6 of FIGURE 5;

FIGURE 7 is an end view, in elevation, of an interior element of the nozzle of FIGURE 5;

FIGURE 8 is a detail view of switch mechanism and associated operating members utilized in the apparatus;

FIGURE 9 is a diagrammatic view, oriented according to FIGURE 8, showing certain elements of the switch means in the latter figure;

FIGURE 10 is a perspective view of a modified form of spraying means for use in the apparatus of the invention;

FIGURE 11 is a diagrammatic illustration of a modified form of means for actuating the spraying means; and

FIGURE 12 shows the device of FIGURE 11 with elements thereof in a different position.

Referring now in detail to the drawings, attention is directed first to FIGURE 1 which shows in perspective, apparatus embodying the features of the present invention incorporated with conveyor apparatus utilized for conveying the articles which are to be treated. The conveying apparatus illustrated may be any of a number of different kinds, such as are used in regular and conventional plants for handling articles for various purposes. The apparatus illustrated is selected purely as an example of apparatus to which the invention may be applied and is not intended to be limiting. Bottled soft drinks are customarily packaged in carrying cartons and the cartons placed in cases, several cartons to a case. In FIGURE 1, a typical conveyor apparatus, and one serving purely as an example, is indicated generally at 12 and includes in the example illustrated a first section 14 and a second section 16 disposed at an angle to the first. A case for containing soft drink cartons of the kind above referred to is indicated at 18 and insofar as the present invention is concerned may be of any desired size and shape. A plurality of cases 18 constitute the articles to be treated or sprayed in the present instance, and are conveyed or transmitted on the conveyor apparatus 12 to charging and loading stations, not shown. The apparatus of the present invention is adapted to such conveying apparatus without disturbing the other intended functions of the conveyor apparatus.

A plurality of cases or crates 18 are placed on the conveyor section 14 and they travel along the conveyor, in the direction indicated by the arrow 19, as by gravity or power driven means, or both. For example, the con-

veyor section 14 may be inclined at an angle for transmitting the crates therealong by gravity, the conveyor section including a plurality of rollers 20 over which the crates pass by gravity. The cases, if preferred, may then pass onto power driven conveyor elements such as belts 22 that are driven in conventional manner such as by sprockets 24 on shafts 26, one of the shafts 26, for example that to the right in FIGURE 1, being power driven by suitable source of power (not shown). The driving means may be of conventional character such as to drive the belts 22 in intermittent fashion.

The means for driving the conveyor means in the form of apparatus here illustrated also includes means for moving the crates for actuating the spraying means, but as will be seen hereinbelow, other kinds of means may be utilized for actuating the spraying means. The present form of actuating means includes a cam 28 which rocks a lever 30 secured to a shaft 32 which is suitably mounted in a fixed element on the frame structure of the conveyor. At the upper end of the shaft 32 is an arm 34 fixed thereto for movement therewith. Also secured to the upper end of the shaft 32 is a second arm 36 mounted for swinging movement relative to the shaft and having its extended end positioned for engagement with a crate 18 on the conveyor, as explained more fully hereinbelow. Compressed between the swinging ends of the arms 34 and 36 is a spring 38 biasing the swinging ends of the arms apart. Upon rotation of the cam 28, and engagement of a high point of the cam with the arm 30, the arm 30 is swung or rocked in clockwise direction (as viewed downwardly) and in response thereto the arm 34 is swung in the same direction. The arm 34 acting through the compression spring 38 tends to swing the arm 36 in the same direction and the swinging end of the latter engages the crate 18, the spring 38 yielding to avoid possible injury to the various parts. The specific manner in which this transverse movement of the crate controls the spray of material onto the crate, will be described in detail hereinbelow.

As the crates 18 move along the conveyor section 14 they pass between side rails or guides 40 and 42, and the latter are preferably provided with out-turned end portions 44 to facilitate movement of the crates therebetween. The guides or rails 40 and 42 normally engage the crates and maintain the latter in the intended line of movement on the conveyor section. These guides or rails may be mounted in any suitable manner for that purpose, and also for the purpose of enabling the crates to be moved sideways or transversely, as referred to above. The guide 40 may be fixed in position, as by securement to a side frame member 46 of the conveyor, but the guide 42 is mounted for yielding movement in response to the transverse movement of the crate, referred to. The guide 42 is mounted in a suitable manner as on a side frame member 48, and biased by yieldable means such as a spring (not shown), in direction against the crate, i.e., inwardly and toward the opposite guide or rail 40.

In the present example of conveyor, due to the right angular arrangement of the sections, they are driven intermittently to enable transfer of the crates from the first section to the second, the drive means being of suitable nature to effect that type of motion. In this instance, the crates 18 progress along the section 14, moving down the rollers 20 and onto the belts 22. When the crates move onto the power-driven belts, the belts carry them into the treating station or spraying station which is that occupied by the crate 18 shown in FIGURE 1. When each crate reaches the spraying station, the conveyor section 14 is brought to a halt and the respective crate brought to rest at that station. Immediately thereafter, pursuant to transverse movement of the crate which takes place at that time, the material is sprayed onto the crate. This interval of spraying endures only momentarily and thereafter abruptly ceases.

Thereupon the belts 22 are again operated and the crate 18 at the treating or spraying station is carried from the section 14 onto the section 16 of the conveyor, the latter having been brought to a halt under the operation of the driving means which has driving portions arranged for the purpose desired, and upon again moving carrying the crate in the direction of the arrow 50. The section 16 includes chains 52 having cleats or slats 54 which engage the respective crates 18 and carry the latter along the conveyor section.

The device utilized for applying the liquid material to the articles or crates 18, includes the main portion 56 and a control element 58, both of which are shown in FIGURE 1 and shown in detail in the other figures of the drawings. The main portion 56 is shown in detail in FIGURES 2 to 7, inclusive, while the control member 58 is shown in detail in FIGURES 8 and 9.

The main unit 56 includes a body 60 having an interior chamber 62 closed by a removable cover 64. The chamber 62 encloses operating or actuating means indicated in its entirety at 66 which in the instance illustrated is an electromagnet. The electromagnet here illustrated and described below is one form of operating means for the spraying means and the specific embodiment is of course intended to be only representative and not limiting. Other means for operating the spraying means may include a compressed air motor, as well as other forms. In the specific embodiment selected for illustration herein, the electromagnet 66 is utilized for driving or impelling a piston 68, and includes a coil 70, mounted in a suitable manner such as in a frame 72 which in turn is mounted on a plate 74 suitably secured to the floor or bottom element 76 of the chamber 62. The electromagnet includes also an armature 78 reciprocable in the coil and limited in retracting direction (to the left FIGURE 2) by a stop means 80 which may be in the form of an adjustable screw mounted in an end element 82 of the chamber 62. The armature 78 has a stem portion 84 extending beyond the coil and connected with an adapter 86 which in turn is secured to a shank portion 88 of the piston 68. The adapter 86 includes an enlarged portion which may be in the form of a collar or washer 90 serving as an abutment for a compression spring 92 compressed between that collar and an opposite element 94 which may be, for example, provided by a block 94 which includes a bore 96 which forms a chamber for operation of the piston 68. The piston 68 extends through an opening 98 in the respective or forward wall element 100 of the chamber 62. The forward end of the bore or cylinder 96 is closed by suitable means such as a screw 102.

Leading from the cylinder 96 is a passage 104 formed by a bore in the block 94 and leading through one surface thereof which in the present instance is the under surface, terminating in a counterbore 106. A gasket 108 is provided in the counterbore for sealing the latter with a forward extension 110 of body 60. The extension 110 similarly is provided with a passage 112 in a form of a bore which communicates with another passage in a block 114, the latter passage being indicated at 116 which leads from a counterbore 118 in which a gasket 120 is provided. The passage 116 communicates with a transverse passage 122 which as shown in FIGURE 3 leads out opposite side surfaces of the block 114.

The extension 110 of the body 60, referred to above, has substantial transverse dimension, as shown in FIGURES 1 and 3. In fact, this extension 110 has such length, i.e. in direction transversely of the body 60, as to mount nozzles 124 at opposite ends and in desired spaced relation for providing spray over the entire area of the crates 18. The extension 110 has a downwardly open recess 126 for receiving the block 114, as well as blocks 128 in which the nozzles 124 are mounted. The blocks 114 and 128 may be secured in the recess in any suitable manner.

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Tubes or pipes 130 are secured in the transverse passage 122 in block 114 (FIGURE 3) and lead to and communicate with passages 132 in the blocks 128 for communication ultimately with the nozzles 124. The tubes or pipes 130 may be secured in position in any suitable manner and preferably are soldered to provide a non-leak connection. The blocks 128 and the corresponding nozzles 124 are identical, and description of one will suffice. Each block 128 has a downwardly extending passage 134 leading from the passage 132 and communicating with a counterbore 136 in which the nozzle 124 is secured, as by a screw threaded connection. The internal construction of the nozzle is shown in FIGURES 5, 6 and 7 and includes housing 138 having screw threads 140 for securement in the counterbore 136, and an orifice 142 at its opposite or lower end. An insert 144 having a passage 146 therein is fitted in the housing, the passage including a valve 148 closed by a ball 150 forming a check valve. The ball 150 is biased to closed position by a compression spring 152 compressed between the ball and a plug 154. The plug 154 is dimensioned relative to the housing 138 to provide a passage around the plug for the material to be sprayed. The lower end portion of the plug is in the form of a conical extension 156 which preferably fits closely with the corresponding surface 158 of the housing 138. To provide passage for material between the extension 156 and the surface 158, the extension 156 is provided with a plurality of grooves 160 as shown clearly in FIGURES 5 and 7. Preferably these grooves are tangent to a base circle to provide swirling of the spray.

The inlet to the pump means constituted by the piston and cylinder 68, 96, includes a lateral passage 162 (FIGURES 3 and 4) in the block 94. This passage communicates with the cylinder 96 and a counterbore 164 in which is secured an elbow 166. The elbow 166 includes check valve means arranged for operating opposite to the check valve means in the nozzles, described above, and includes a ball 168 arranged for engaging a seat 170 for closing the passage through the elbow, and bias to valve closing position by a compression spring 172 compressed between the ball and a fixed element of the assembly which may be the inner end surface of the counterbore 164. Secured to the opposite end of the elbow 166 is a tube or pipe 174 arranged for connection with the source of supply of liquid material that is to be sprayed on the articles or crates 18. The source of supply is indicated diagrammatically at 176 in FIGURE 1 and here illustrated is a container having a quantity of the liquid therein to be applied to the crates and with which the tube or pipe 174 connects at the bottom thereof, to the end of maintaining the pipe 174 completely filled with the liquid material to be sprayed, to an effect described in detail hereinbelow, namely, the liquid material is applied to the articles in form of a solid spray in which all of the particles are relatively large and move rapidly and directly to the articles to be sprayed, without the suspension of particles in the air, such as in a mist.

The main unit 56 of the spraying device is mounted on suitable means such as a standard 178. This standard includes an element to which is secured a bracket 182 upon which the body 60 is mounted and secured. The standard 178 may be mounted on any fixed element such as a side frame 48 (FIGURE 1) of the conveyor section, the standard having clamp means 184 for that purpose. The specific details of the mounting of the standard 178 need not be entered into, it being sufficient that the spraying unit 56 be mounted at the desired location, namely at the spraying station on the conveyor.

The control unit 58 (FIGURE 1) is shown in detail in FIGURES 8 and 9 and in the embodiment of the invention illustrated includes an electric switch for controlling the actuation of the electromagnet 66. It is desired to point out that the control unit 58 may take

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other forms than electrical means, according to the character of the actuating or operating means which may assume any of different kinds of means, although in the present instance it is constituted by the electromagnet 66. For example, if compressed air is used for operating the spraying means, the control element corresponding to the present control element 58 may be in the form of a valve; also in the event compressed air or other form of motive power is used, the control unit 58 may nevertheless include an electric switch.

In the present exemplification of the control means 58, it includes a housing 186 having an element 188 for mounting it in place on the conveyor section (which may be a rail 190 (FIGURE 1)). The housing 186 has a cavity 192 in which is mounted an electric switch 194 which may be of conventional form and preferably is a normally closed switch. FIGURE 9 shows such switch diagrammatically with the contact elements 196 in closed position, being held in such position by suitable biasing means such as a spring 197, or by the inherent resilience of the switch blades themselves. The switch includes a plunger or pin 198 which extends to the exterior of the switch, and arranged for engagement by an element 200 of an actuating lever indicated in its entirety at 202. This member 202 is arranged and positioned for actuation by the article to be sprayed, i.e., crate 18, in response to transverse movement of the latter as referred to above. The member 202 includes a shaft 204 mounted in the housing 186 for rocking movement. Secured to the shaft 204, is a lever arm 206 normally extending laterally beyond the element 188 for engagement by the crate 18. Also secured to the shaft 204 is another arm 208, disposed in the cavity or recess 192 and secured to this arm 208 is a projection 210 having a down-turned end portion which constitutes the element 200 referred to above which engages the plunger or pin 198 of the switch. The arrangement of the actuating member 202 is such that the crate 18 may be moved with abruptness and considerable force without damaging switch 194 which according to the character of the controls utilized is of small dimensions and relatively fragile. Upon movement of the crate 18, transversely, as referred to above, the crate engages the lever arm 206 and moves or swings the lever arm and hence the control member 202 about the axis of the shaft 204 in counterclockwise direction (FIGURE 8) from the full line position to the dot-dash line position. The control member 202 is maintained normally in the full line position by a compression spring of relatively great strength compressed between the lever arm 208 and the opposite wall element 214 of the cavity or recess 192, where a pin 216 may be employed for retaining the spring in position. The spring 212 is of considerably greater strength than the biasing means of the switch, such as to easily actuate the switch in all cases. The spring 212 furthermore, is of great strength for the purpose of assuring movement of the operating member 202 to its full line position (FIG. 8) in all cases, the member 202 being of substantial weight and dimensions in view of the relatively rough usage to which it is subjected by engagement by the crates 18 therewith, which are relatively heavy. The operating member 202 is limited to its full line position by engagement of the lever 208 with the associated wall element 218 defining one side of the cavity or recess 192. Thus regardless of the rough usage, and heavy movements of the crates, the small and fragile switch is protected therefrom.

FIGURE 8 shows two positions of a fragment of the crate 18, namely 18a and 18b. The position 18a is that position normally assumed by the line of crates 18 in their passage along the conveyor section 14. In such position it will be seen that the operating member 202 is disposed in its full line position. When the spraying operating is to be performed, the crate 18 is moved transversely (to the left in FIGURE 8 away from the

observer in FIGURE 1) in the manner described above, and the crate is moved to the position 18b. In the latter position, the operating member 202 is disposed in its dot-dash line position, in which the element 200 is moved away from the pin or plunger 198 of the switch, and the switch is permitted to close under the action of the spring 197. Upon closure of the switch, the electromagnet 66 (FIGURE 2) is energized and the spraying operation takes place. The crate 18 remains in position 18b only momentarily and upon release of the force so moving it to position 18b, the crate is moved in the opposite direction, as described above, and the operating member 202 is moved to its full line position (FIGURE 8), allowing the switch to open.

FIGURE 10 shows an arrangement in which a greater number of spraying nozzles 124 are utilized. In the present instance four nozzles may be used as compared with two in the previous embodiment. The extension 110 of the first embodiment is represented in the present instance by an extension 110' on the body 60. At the end of the extension 110' are headers 220, extending transversely of the extension 110' and each having nozzles 124 in its ends. The four nozzles thus provided are adapted for spraying a greater area than are the two nozzles, and the present arrangement may be utilized in the case of larger crates.

The spraying operation may be performed in connection with a constantly moving conveyor, as well as with an intermittently moving conveyor. FIGS. 11 and 12 illustrate apparatus for spraying crates on a constantly moving conveyor, the spraying action taking place only momentarily while each crate is at the spraying station. The apparatus of FIGS. 11 and 12 is shown only diagrammatically and includes a conveyor 222 of a suitable kind, with the crates 18 thereon and being conveyed either by gravity or by power. The conveyor includes side rails 224 for more or less confining the crates laterally, and includes means actuated by the passage of crates on the conveyor for spraying the crates at the spraying station where the single crate illustrated is located. A laterally inwardly extending projection or camming element 226 is provided on one of the rails 224, serving to move each crate toward the opposite side of the conveyor against a spring loaded roller 228 urging the crate in the opposite direction and retaining it snug against the projection 226. As the crate moves past the projection in its progress along the conveyor, the roller 228 moves it abruptly against the plunger 230 of a switch 232 mounted in a suitable location on the conveyor. The switch 232 may be and preferably is similar to the switch 186 and associated elements described above, and on depression of the plunger, the switch is actuated and the liquid material sprayed, all in the manner described above. Continued movement of the crate along the conveyor carries the crate past the plunger with the result that the spraying action lasts only momentarily, or the short interval that the crate engages the switch plunger. The spraying action effectively covers the crate while the latter is in motion, it not being necessary for the crate to be stationary.

The liquid material which is applied to or sprayed on the articles or crates 18 may be any of a number of different kinds. For example, it may be desirable to utilize an insecticide, or an insect repellent, or even a disinfectant, the ultimate purpose being to avoid insects or germs, or both from contaminating the article, such as the crates 18 or cartons contained therein, or both. The crates 18 and cartons containing the bottle of soft drinks, in the example mentioned above, are reused a number of times and it is of course desirable that they remain uncontaminated. The material is applied to the cases or crates 18 in the form of a spray which is a "solid" spray, that is, the material issuing from the nozzle is totally liquid. There is no entrained air in the

column of liquid in the passages in the spraying device. All of the particles making up the spray are of relatively large size and impelled rapidly and directly onto the crate being sprayed, and there is no mist remaining after the spraying operation i.e. there are no particles of the liquid suspended in the air. The spray issuing from the nozzle is abruptly initiated and abruptly ended, and no portions of the liquid drip or drop on the crates or the conveyor, between intervals of spraying.

The pump means including the piston 68 is of positive displacement character. The liquid material that is drawn into the cylinder 96 is displaced or impelled through the spraying device in volume equal to the displacement of the piston stroke. The check valve means in the nozzles and in the elbow 166 are oppositely acting, as noted above, and the piston 68 draws the liquid from the line or pipe 174 and source 176 into the cylinder 96 in full volume. Since the passages i.e. the line or pipe 174 and all passages posterior thereto remain filled, a solid column of liquid is obtained throughout the system from the source 176 to the nozzles and because of the absence of air in the system, the spray driven from the nozzles is made up of such particles that are of sufficient size, and sufficient force is applied to the piston, that all of the particles of the spray are driven rapidly and directly onto the crates 18. The electromagnet 66 is quick-acting, with the additional advantage that the intervals in which the spraying operation is performed is held at a minimum. The conveyor 12 according to the usual practices in handling soft drinks, is uncovered, or without any shields or enclosing hoods; the action of the spray, and its non-mist character, eliminates the necessity for such cover or hood, and the operation can be performed in an area that is subject to any ambient atmosphere pressures without detrimental effects.

It is thought that the invention and many of its attendant advantages will be understood from the foregoing description, and it will be apparent that various changes may be made in the form, construction and arrangement of the parts without departing from the spirit and scope of the invention or sacrificing all of its material advantages, the form hereinbefore described being merely a preferred embodiment thereof.

I claim:

1. Apparatus of the character disclosed comprising conveyor means adapted for conveying articles along a line and past a treating station, means for applying liquid material to the articles at said treating station including a spray nozzle and positive displacement piston means for forcing the material through the spray nozzle in solid and continuous form to produce a downwardly directed spray issuing from said nozzle made up of particles of such size as to be impelled directly to the articles without suspension in the air, means for intermittently driving the conveyor means and bringing it to rest successively with each article respectively disposed at the treating station, means for thereafter moving each article transversely of said line to a predetermined position to insure its proper positioning directly under the spray, and means for operating the spraying means in each period in which the conveyor means is at rest.

2. Apparatus of the character disclosed comprising conveyor means adapted for conveying articles along a line and past a treating station, means for applying liquid material to the articles at said treating station including a spray nozzle and positive displacement piston means for forcing the material through the spray nozzle in solid and continuous form to produce a downwardly directed spray issuing from said nozzle made up of particles of such size as to be impelled directly to the articles without suspension in the air, means for constantly driving the conveyor means, means for moving each article transversely of said line at the treating station to a predetermined position directly under the spray, and means for operating the spray-

ing means during a short interval in which each article is at the treating station.

3. Apparatus of the character disclosed comprising a conveyor including a belt for supporting articles thereon and carrying them along a line and successively past a treating station, means for applying liquid to the articles at the treating station in the form of a downwardly directed spray, and means for moving each article at the treating station transversely relative to the belt to insure proper positioning thereof relative to said spray and operating said liquid applying means, and means for returning the article to its position in line on the belt upon cessation of the force for so moving the article transversely.

4. Apparatus of the character disclosed comprising a conveyor for carrying articles along a line and successively past a treating station, means for spraying liquid material downwardly on each article at the treating station over the horizontal area of the article, control means for said spraying means operated by each article at the treating station in response to movement of the article in direction transverse to its said line of movement, and means for so moving the articles transversely to insure proper positioning thereof under said spraying means, said control means including a switch assembly, a switch in said switch assembly having normally closed contacts, an actuating lever in said assembly having a first position and

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having an arm disposed, when the lever is in said first position, for engagement by said articles and a second arm engaging said switch and retaining the latter in open position, and means biasing the lever to its first position against the action of the contacts tending to move to closed position, said lever being movable to a second position by an article being moved transversely to a second position in which said second arm is moved away from the switch to enable the switch to close.

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