May 9, 1944. W. B. PETERSON, JR 2,348,495

APPARATUS FOR INTERNALLY COATING RINGLIKE OBJECTS

Filed June 28, 1943 3 Sheets-Sheet 1

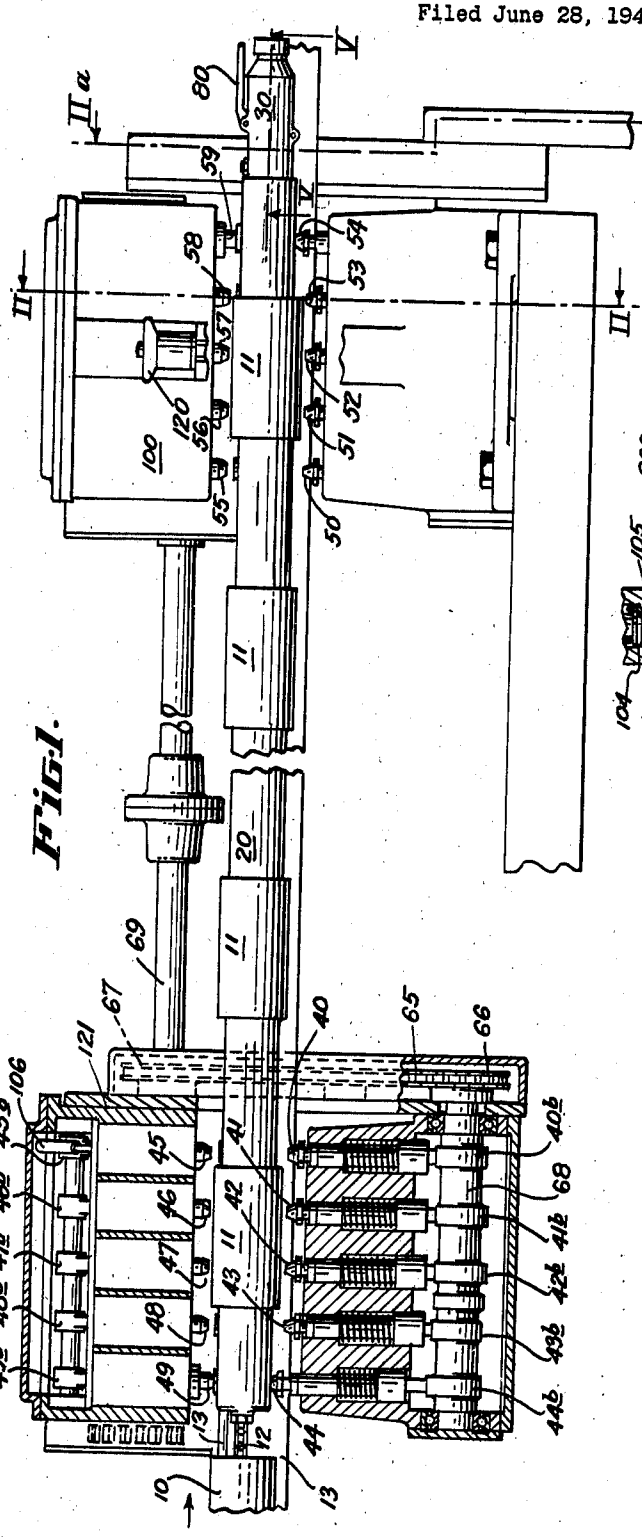


Fig. 1.

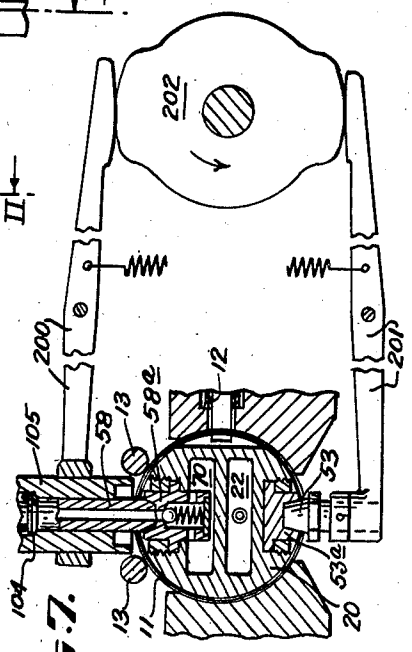


Fig. 7.

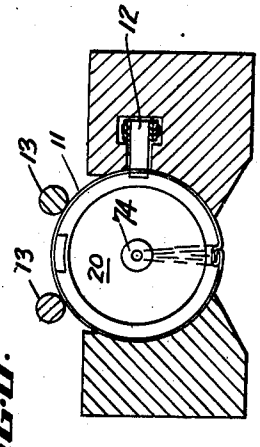


Fig. 6.

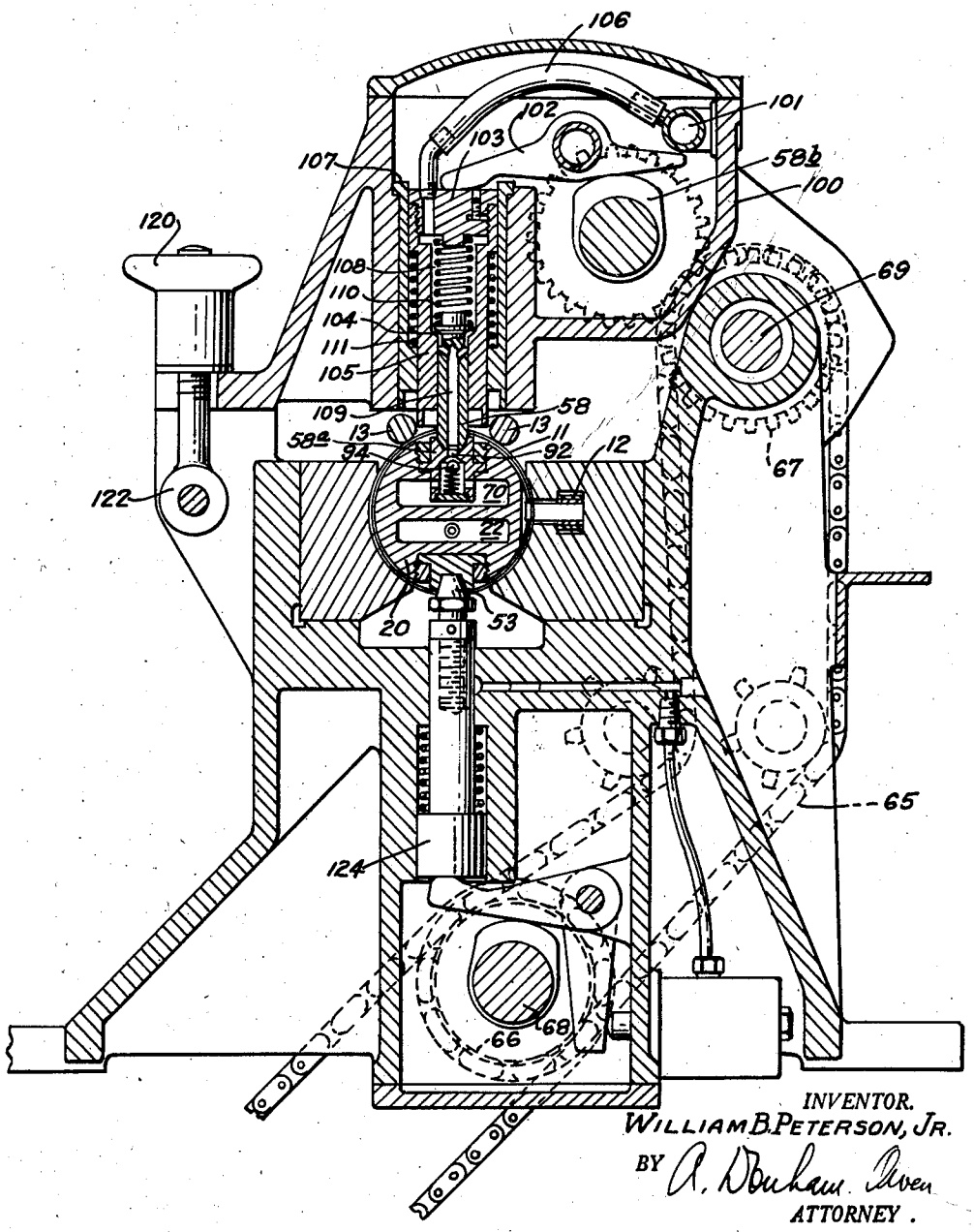
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APPARATUS FOR INTERNALLY COATING RINGLIKE OBJECTS

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Fig 2.



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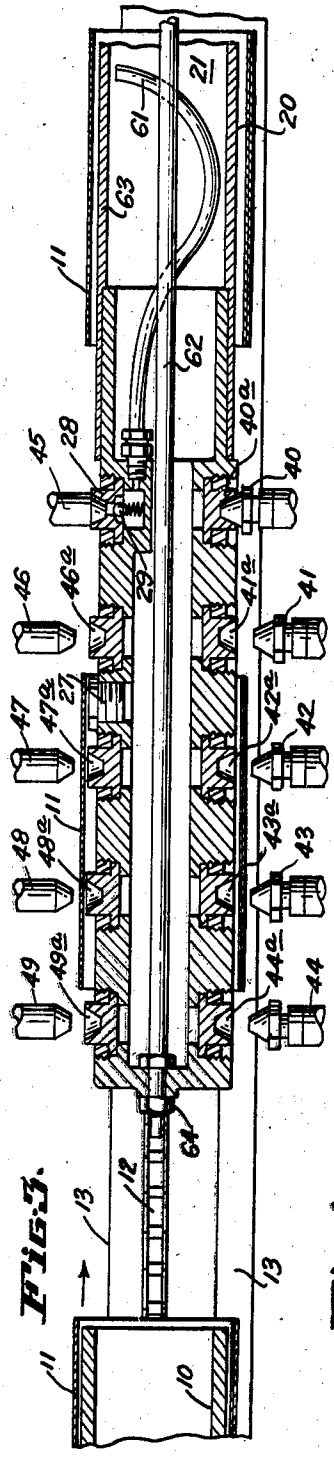


Fig. 3.

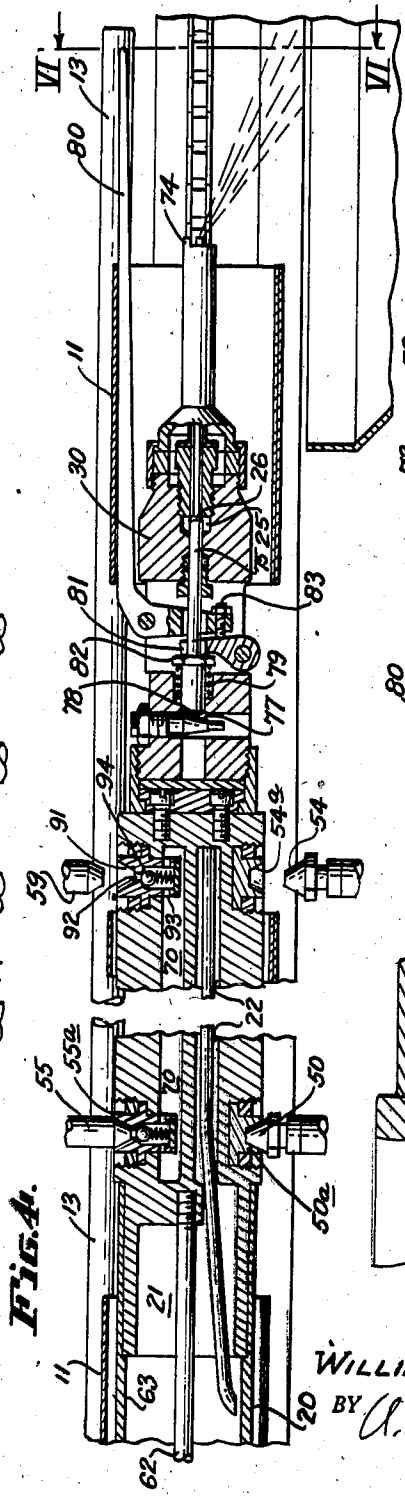


Fig. 4.

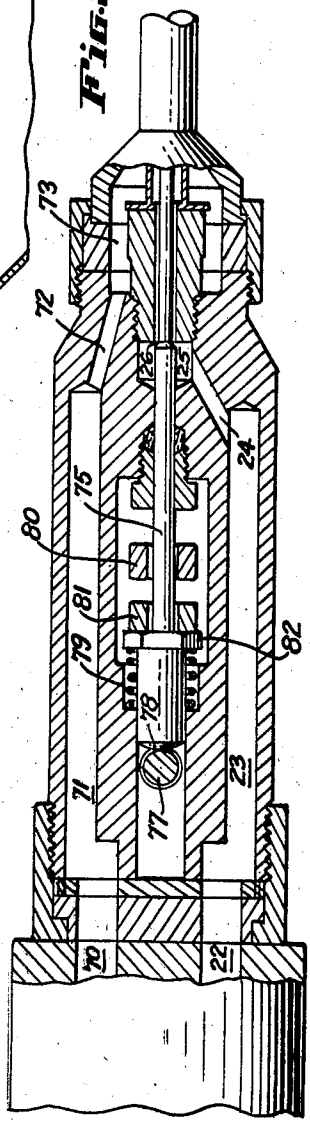


Fig. 5.

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UNITED STATES PATENT OFFICE

2,348,495

APPARATUS FOR INTERNALLY COATING RINGLIKE OBJECTS

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Application June 28, 1943, Serial No. 492,532

12 Claims. (Cl. 113—7)

My invention relates to improvements in apparatus for coating all or part of the interior of ring-like objects.

One of the objects of my invention is to provide a spraying apparatus which can be embodied in a can-making machine in such a way as to be readily removable therefrom and yet, while in place, will receive from its supporting mechanism the forces necessary to energize the sprayer.

Another object of my invention is to provide in a can body machine a removable, floating tank over which can bodies can pass and in which pressure can be maintained by means of intermittently contacting supporting members.

Another object of my invention is to provide an easily cleaned and replaceable coating sprayer for incorporation in an apparatus for making ring-like objects.

Another object of my invention is to provide a coating sprayer tank adapted to use in a can body making machine which usually runs at substantial temperatures and in which there is a minimum of connection between said tank and said body-forming machine, so that heat problems are avoided in the spraying apparatus.

Another object of my invention is to provide a floating tank adapted to be supported by intermittently engaging parts through which fluids may be introduced into the tank.

The above and other objects accomplished by my invention will become apparent from the following description. Although my invention is described in connection with a specific form of apparatus as required by statute, it is not my intention thereby to limit my invention to any particular details or form for any of the parts except as required by the appended claims.

In the drawings,

Fig. 1 is a view in elevation of my invention with certain of the parts shown in cross section;

Fig. 2 is a cross sectional view in vertical elevation taken on the line II—II of Fig. 1, except for the drive belts shown on Fig. 2, which are on the line IIA—IIA of Fig. 1;

Fig. 3 is a cross sectional view in vertical elevation of the tank and supporting elements shown in more detail than in the left hand side of Fig. 1;

Fig. 4 is a view in vertical elevation of the tank and its supporting members shown in more detail than on the right hand side of Fig. 1;

Fig. 5 is a cross sectional view of the sprayer head taken on the line V—V of Fig. 1; and

Fig. 6 is a cross sectional view taken on the line VI—VI in Fig. 4.

Fig. 7 is an alternative form of arrangement of operating and mounting the supporting tappets and fingers.

My invention is directed to solving the problems arising from the use of heat-sensitive coating materials around can making machinery which runs at high temperatures, which materials, due to their volatile nature, tend to dry quickly and to plug conduits, etc., unless cleaned or removed upon any more than usual delay in operation of the machine.

The usual can body making machine includes the forming station and the soldering station. My invention relates to that part of the machine after the can body has been soldered and provides means for coating the newly soldered seam with any desired liquid material. My invention achieves a result never possible heretofore, namely, the provision of a removable coating tank or horn which can be readily removed from the machine for cleaning, which floats in its supports without any interfering connection with the soldering horn, and which through its intermittent supports receives the fluid pressures which activate it.

In the drawings, 10 denotes the soldering horn from which can bodies 11 pass in the direction of the arrow by means of a conveyor 12. The guide channels 13 support the can bodies 11 as they pass from the soldering station on to the tank 20 for the internal coating operation.

The tank 20 comprises a hollow tank-like member, of any cross sectional shape, having one or more compartments and on one end a spraying head unit 30. This tank may be of any desired length depending upon various things, such as the amount of coating material which it is desired to keep in it, or upon the room in the plant, etc. I have found that a floating unit 20 about four feet long will hold sufficient coating materials to run from four to eight hours without refilling or removal. By floating tank is meant one which has no rigid connection with the frame or machine and floats, so to speak, on the intermittently engaging tappets or fingers.

Tank 20 is of a size small enough to clear and not scratch the inner surface of the can bodies 11. Usually these bodies are formed up of coated or enameled stock so their inside surface is already coated except for the freshly soldered seam. My invention is particularly adapted to coating this seam area, thereby completing the inner coating of the can body.

Tank 20 has no connection with the machine or frame except through the intermittently contacting tappets 40 to 49 inclusive on one end.

and 50 to 59 inclusive on the other end. While at each end I have shown five pairs of tappets or fingers to support the tank, any number may be used, depending upon the axial length of the can bodies passing over tank 20. As shown at the left hand side of Fig. 1, their number must be sufficient so that at least one opposite pair, 44, 49, for example, will be in supporting contact with tank 20, while the others 40, 41, 42, 43, 45, 46, 47, 48 are withdrawn to permit the can body 11 to pass along tank 20.

The cam means for actuating these supporting tappets will be explained presently.

Tank 20 is shown in the drawings for purposes of illustration with a chamber 21, which extends substantially its full length. On its right hand end it terminates in a shallow channel 22 (see Fig. 4) from whence there are conduits 23 and 24, into a chamber 25 closed by valve 26. This chamber 21 is the one best adapted to contain the coating material such as lacquer. It is usually introduced into the tank through a clean-out plug 27 (see Fig. 3). It may be introduced through plug 28 with the spring pressed ball check 29. Preferably the tank 20 is filled while it is out of the machine.

The opening 28 is employed primarily to introduce air pressure into chamber 21 through pipe 61. The air is used to keep the lacquer under pressure so that it flows to the spraying nozzle when valve 26 is opened. This air pressure is communicated to chamber 21 through upper supporting tappet 45, which is hollow and in its housing 121 is connected to a source of air under pressure through hose 106.

Tappet 45 contacts the mating recess in plug 28 during the interval when there is no can body 11 passing over plug 28. This intermittent connection between the source of air under pressure and chamber 21 is sufficient to keep adequate feeding pressure on the lacquer so that it is fed in constant volume to the spraying head 74.

If desired, more plugs like 28 could be used, but I have found that an intermittent restoration of the air pressure in the lacquer chamber 21 is adequate. For that reason the plugs 46*a*, 47*a*, 48*a*, and 49*a* have no openings in communication with the interior of chamber 21. On the lower side of tank 20 plugs 40*a*, 41*a*, 42*a*, 43*a*, 44*a*, likewise have no openings, but do each have a tapered face to mate with the supporting face of tappets 40, 41, 42, 43 and 44.

The rod 62, threaded into the right hand end member of tank 20, provides a convenient way for securing the tubular portion 63 of the tank to the two ends. These parts can be kept in a tight fit by means of nut 64. When it becomes necessary to clean out the tank more thoroughly than can be done through plug 27, it is a simple matter to remove nut 64, and disassemble the tube 63.

The lower supporting tappets 40 to 44, inclusive, are actuated by cams 40*b*, 41*b*, 42*b*, 43*b*, and 44*b* (see Fig. 1). The upper tappets 45 to 49 inclusive are actuated by corresponding cams 45*b* to 49*b*, inclusive, identical with cams 40*b* to 44*b*. A chain 65 connects gear wheels 66 and 67 on shafts 68 and 69 respectively, which drive these cams. In this way the operation of tappets 40 and 45 and each other opposite pair of tappets is synchronized so that they assume in proper timed sequence the support of tank 20, shown in Fig. 3 for tappets 40 and 45. Any suitable drive between shafts 68 and 69 may be employed and the same is true for any other optional form of cam or eccentric drive to actuate the supporting tappets.

The right hand or spray head end of tank 20 has provision for a chamber 70, which is in communication with conduits 71, 72 and 73, leading to the air jet in spray nozzle 74 to atomize and apply the lacquer.

Other parts of the spray head include the valve stem 75, carrying a lacquer valve 26, the amount of opening of which is determined by the cam-faced screw 77 secured in back of the ball faced end 78 of valve stem 75. A spring 79 keeps lacquer valve 26 closed unless the pivoted spraying lever 80 is depressed, thus actuating forked lever 81, which in turn bears on nut 82. A suitable adjusting screw 83 is provided in the lower end of bell crank spray lever 80 to permit the correct height adjustment on lever 80 for actuation of the latter by can bodies 11 passing along it, and held in contact with it by means of guide rods 13 forming an outside passageway for the can.

Lever 80 may be of any desired length. Preferably, it is of a length sufficient to be in contact with two can bodies at one time. In this way if the can body maker should cease operation or should miss supplying can bodies 11 to tank 20, the lacquer valve 26 will shut off with only the loss of the lacquer which would have been applied to one can when shutting off and with only a similar loss when the movement of can bodies along tank 20 is again resumed. If lever 80 is only long enough to be engaged by one can, it would mean that valve 26 would open and close every time a can body 11 passed over it. This would mean unnecessary wear on the parts. The loss of lacquer during the normal gaps between the can bodies is not sufficient to warrant the extra wear and tear on the spray head valves and parts.

In the spray head used in describing this invention the compressed air for atomization is fed continuously from the jets in 74. It is only the lacquer which is controlled by valve 26, and lever 80. Any other type of application means may be secured to tank 20 in lieu of the one shown.

To supply air under pressure continuously to spray jet 74, I provide a plurality of plugs 55*a* to 59*a*, mounted in the spray head end of tank 20. These plugs are each provided with tapered recesses 91 having a hole 92 in their bottom and outlets 93 so that air forced into the hole 92 will pass out openings 93. The spring pressed ball check 94 will check any outward flow of air from chamber 70. As shown in Fig. 1, I provide for five of these supporting and inlet plugs, although more or less may be used, depending upon the length of the can body 11.

In the lower side of this end of the tank 20 are plugs 50*a* to 54*a*. These are plain plugs with tapered sides mating with the tapered faces on supporting tappets 50 to 54 inclusive.

The cam arrangement for bringing each opposite pair of tappets 50—55, 51—56, 52—57, 53—58, 54—59 into engagement with their respective recessed plugs in tank 20 is similar to that already described in connection with the tappets shown in the left hand end of Fig. 1, and therefore will not be repeated.

Fig. 2 shows in considerable detail one form of intermittent support mechanism well adapted to provide for air tank 70 a substantially constant flow of air through intermittent contact of a plurality of support jets 55 to 59 inclusive. It also shows the detail of parts making up the support jet 45 on the lacquer end of tank 20.

Air under pressure is conveyed into cam housing or frame 100 through pipe 101 from any suitable source. Cam 58b is shown in its position of maximum lift of rocker arm 102. Tappet plunger 103 is in its position of maximum depression while tappet plunger 124 on the lower side is in its position of maximum lift. At the instant the support members 53 and 58 are supporting the spray head end of tank 20, while at the same time through upper support jet 58 air chamber 70 is receiving a flow of air under pressure from the conduit 101. It will be noted that the check valve 94 is away from its seat. The instant that support jet 58 moves upwardly away from its tapered seat in plug 58a ball check 94 will close opening 92.

As shown in Fig. 2 support jet 58 is in engagement with plug 58a and tappet plunger 103 is fully depressed so that valve face 104 has been lifted from tappet member 105, thereby placing air conduit 101 in communication with air chamber 70 through flexible tube 106 and conduits 107, 108 and 109.

Support jet 58 is slidably mounted in tappet sleeve 105 and is urged downwardly by spring 110 so that the instant cam 58b permits valve tappet 103 to move upwardly in response to spring 111, spring 110 will close valve 104 on its seat, thus shutting off further passage of air into conduit 109 and serving to maintain pressure in the supply conduit 101.

There are other forms which this arrangement can take, the purpose being to provide a quick-acting shut-off for the air supply to air chamber 70, once the connection between support jet 58 and plug 58a is to be severed and also automatically to open valve 104 and permit air to flow into conduit 109 the instant support jet 58 engages its seat in plug 58a.

To allow removal of tank 20 from the machine either at the end of the day, at the end of any operation, or at any other time, hand nuts 120 are provided in the support housings or frames 100 and 121. By loosening these nuts and swinging their studs 122 outwardly, frames 100 and 121 can be lifted sufficiently around shaft 69 to leave tank 20 clear of any obstruction on the upper side and free to be lifted out of the machine and either replaced therein or another similar element placed therein.

In Fig. 7, I have shown a modification of the tank supporting means, which in this instance includes the same tappets or fingers 40 to 49 and 50 to 59. Instead of mounting them to slide vertically in the end housings 100 and 121, they are mounted on the ends of rocker arms 200, 201 and are actuated by a double faced cam 202 which moves each pair of arms 200, 201, simultaneously. The valve arrangement 104 in Fig. 2 is also built into the tappets with air jets; for instance, by having the sleeve 105 secured in the end of arms 200. This will give valve 104 the same action it now has in Fig. 2.

Many other modifications are possible within the scope of the appended claims.

In operation my machine thus makes it possible to have a tank of coating fluid supported by intermittently engaging tappets so that soldered can bodies or other ring-like objects can be passed along the tank by a conveyor and can be sprayed on the inside with the coating material from the tank by air pressure which is substantially continuously fed into the tank through the supporting tappets.

What I claim is:

1. In an inside coating mechanism the combination of a frame, a conveying means, a hollow tank of greater length than diameter, and along which ring-like objects may be conveyed at spaced intervals, a source of air under pressure, a chamber in said tank to hold a coating medium, a second chamber in said tank to conduct air under pressure, a spray head carried by said tank and having passageways connecting it to both the aforesaid chambers, a plurality of openings in said tank with yielding valve means for keeping them closed, a plurality of frame mounted supporting means aligned with said openings, some of said supporting means also having jets therein in communication with said source of air under pressure, means for moving said supporting means intermittently into and out of contact with said tank in timed relation to said conveying means to allow ring-like objects to be conveyed onto, along and off said tank, and wherein said supporting means with jets have valves actuated upon contact of each with its respective opening in said tank, whereby air under pressure is conveyed into said tank as needed.

2. In an inside coating mechanism the combination of a frame, a conveying means, a hollow tank of greater length than diameter, and along which ring-like objects may be conveyed at spaced intervals, a source of air under pressure, a chamber in said tank to hold a coating medium, a spray head carried by said tank and having passageways connecting it to the aforesaid chamber, a plurality of openings in said tank with yielding value means for keeping them closed, a plurality of frame mounted supporting means aligned with said openings, some of said supporting means also having jets therein in communication with said source of air under pressure, means for moving said supporting means intermittently into and out of contact with said tank in timed relation to said conveying means to allow ring-like objects to be conveyed onto, along and off said tank, and wherein said supporting means with jets have valves actuated upon contact of each with its respective opening in said tank, whereby air under pressure is conveyed into said tank as needed.

3. In an inside coating mechanism the combination of a frame, a conveying means, a hollow tank of greater length than diameter, and along which ring-like objects may be conveyed at spaced intervals, a source of air under pressure, a chamber in said tank to hold said coating medium, a second chamber in said tank to conduct air under pressure, a spray head carried by said tank and having passageways connecting it to both the aforesaid chambers, a plurality of openings in said tank with yielding valve means for keeping them closed, a plurality of frame mounted supporting means aligned with said openings, some of said supporting means also having jets therein in communication with said source of air under pressure, means for moving said supporting means intermittently into and out of contact with said tank in timed relation to said conveying means to allow ring-like objects to be conveyed onto, along and off said tank, said supporting means with jets having valves actuated upon contact of each with its respective opening in said tank, whereby air under pressure is conveyed into said tank as needed, and valve means for setting said spray head in operation or shutting it off in response to the presence of ring-like objects around said hollow tank.

4. In a machine for coating the inner surface of tubular members, the combination of a frame, a floating tank with a smaller diameter than said members, a liquid applying means carried by said tank, means on said frame for suspending said tank so said members may be passed onto said tank at one end and off at the other end without interference with said means, and means for introducing air pressure into said tank through said suspending means.

5. In a machine for coating the inner surface of tubular members, the combination of a frame, a floating tank with a smaller diameter than said members, a coating head carried by said tank, means on said frame for suspending said tank so said members may be passed onto said tank at one end and off at the other end without interference with said means, means for introducing air pressure into said tank through said suspending means, and means actuated by passage of said tubular members over said tank for activating said coating head.

6. In a machine for spraying the inner surface of ring-like objects the combination of a frame, a floating tank, a spraying head carried thereby, a reservoir in said tank in communication with said spraying head, a source of air under pressure, and movable means on said frame for supporting said tank at selectively spaced points while spaced apart ring-like objects are passed over it from end to end, said means including passageways intermittently connecting said source of air pressure with said tank reservoir to supply spraying pressure to said head.

7. In a machine for spraying the inner surface of ring-like objects, the combination of a frame, a floating tank, a spraying head carried thereby, a reservoir in said tank in communication with said spraying head, a source of air under pressure, movable means on said frame for supporting said tank at selectively spaced points while spaced apart ring-like objects are passed over it from end to end, said means including a plurality of passageways, each intermittently connecting said source of air pressure with said tank reservoir to supply substantially continuous spraying pressure to said head.

8. In a machine for spraying the inner surface of ring-like objects, the combination of a frame, a floating tank, a spraying head carried thereby, a reservoir in said tank in communication with said spraying head, a source of air under pressure, movable means on said frame for supporting said tank at selectively spaced points while spaced apart ring-like objects are passed over it from end to end, said means including passageways intermittently connecting said source of air pressure with said tank reservoir to supply spraying pressure to said head, and valve means actuated by passage of said ring-like objects along said tank for activating said spraying head.

9. In a can-body maker including a body blank former, soldering mechanism and conveyor, the combination of a can sprayer which includes a tank mounted in axial juxtaposition with the saddle horn on said body former, a plurality of tappet-fingers intermittently engaging said tank to support it in a substantially fixed position while can bodies pass along it, means for operating said tappets in synchronism with said conveyor, a spray head secured to said tank, a source of air under pressure, valve means in certain of said tappets to open only when the latter is in engagement with said tank, and means for actuating said spray head.

10. In a machine for spraying the inner surface of tubular members, the combination of a frame, a floating tank with a smaller diameter than said members, a spraying head carried by said tank, means on said frame for suspending said tank so said members may be passed onto said tank at one end and off at the other end without interference with said suspending means, means for introducing air pressure into said tank through said suspending means, and means for propelling said members along said tank.

11. In a machine for spraying the inner surface of tubular members the combination of a frame, a floating tank with a smaller diameter than said members, a spraying head carried by said tank, means on said frame for suspending said tank so said members may be passed onto said tank at one end and off at the other end without interference with said suspending means, means for introducing air pressure into said tank through said suspending means, and valve means for activating said spraying head.

12. In a machine for spraying the inner surface of tubular members, the combination of a frame, a floating tank with a smaller diameter than said members, a spraying head carried by said tank, means on said frame for suspending said tank so said members may be passed onto said tank at one end and off at the other end without interference with said suspending means, said means including pairs of pivoted rocker arms each carrying at one end suspending fingers to engage said tank and at the other end being in contact with a cam which alternately moves each pair of arms into and out of contact with said tank, means for introducing air pressure into said tank through said suspending means, and valve means for activating said spraying head.

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