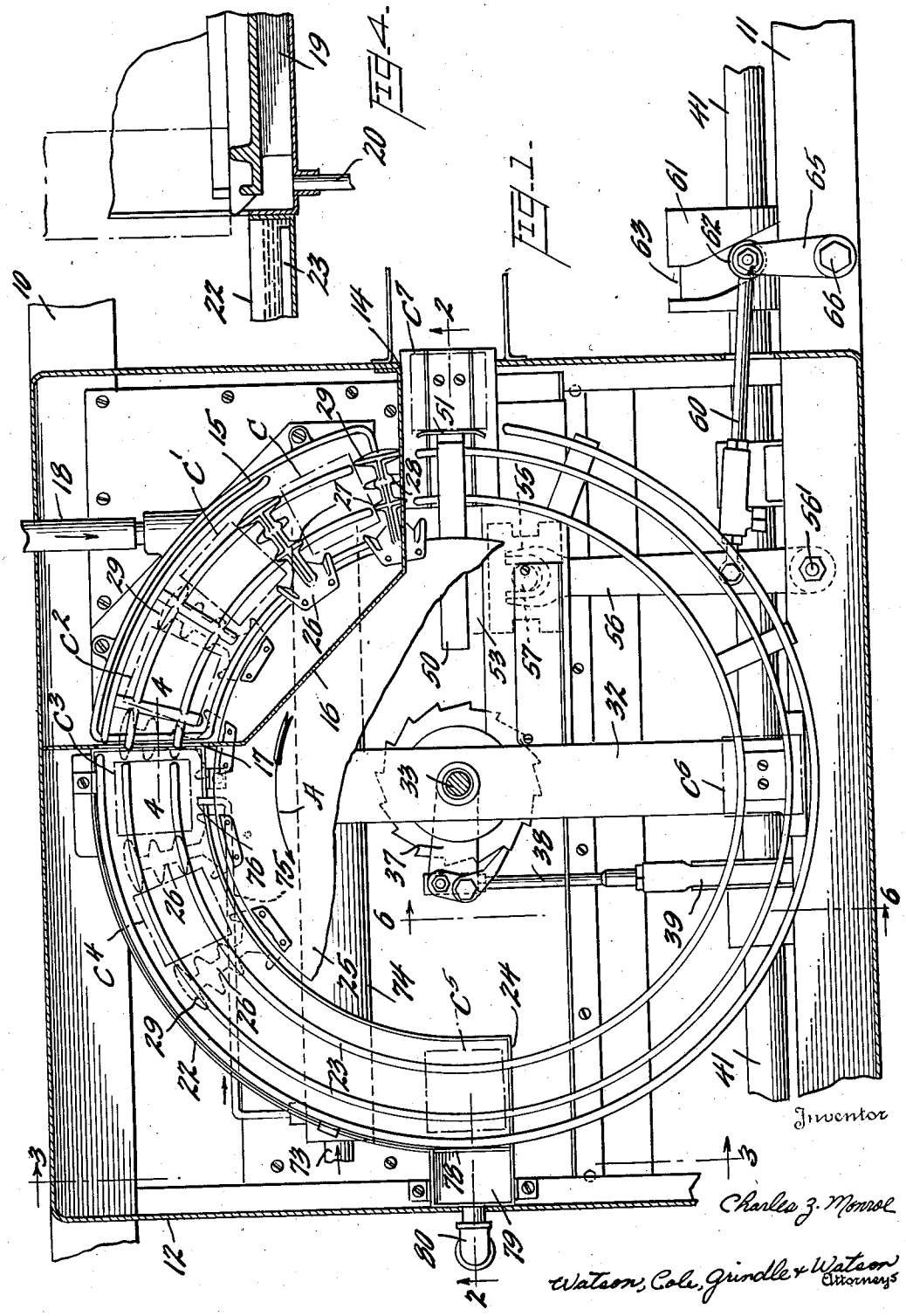
Aug. 7, 1945. C. Z. MONROE 2,381,360

MECHANISM FOR COOLING FRESHLY COATED CONTAINERS

Filed May 4, 1943 3 Sheets-Sheet 1



Inventor

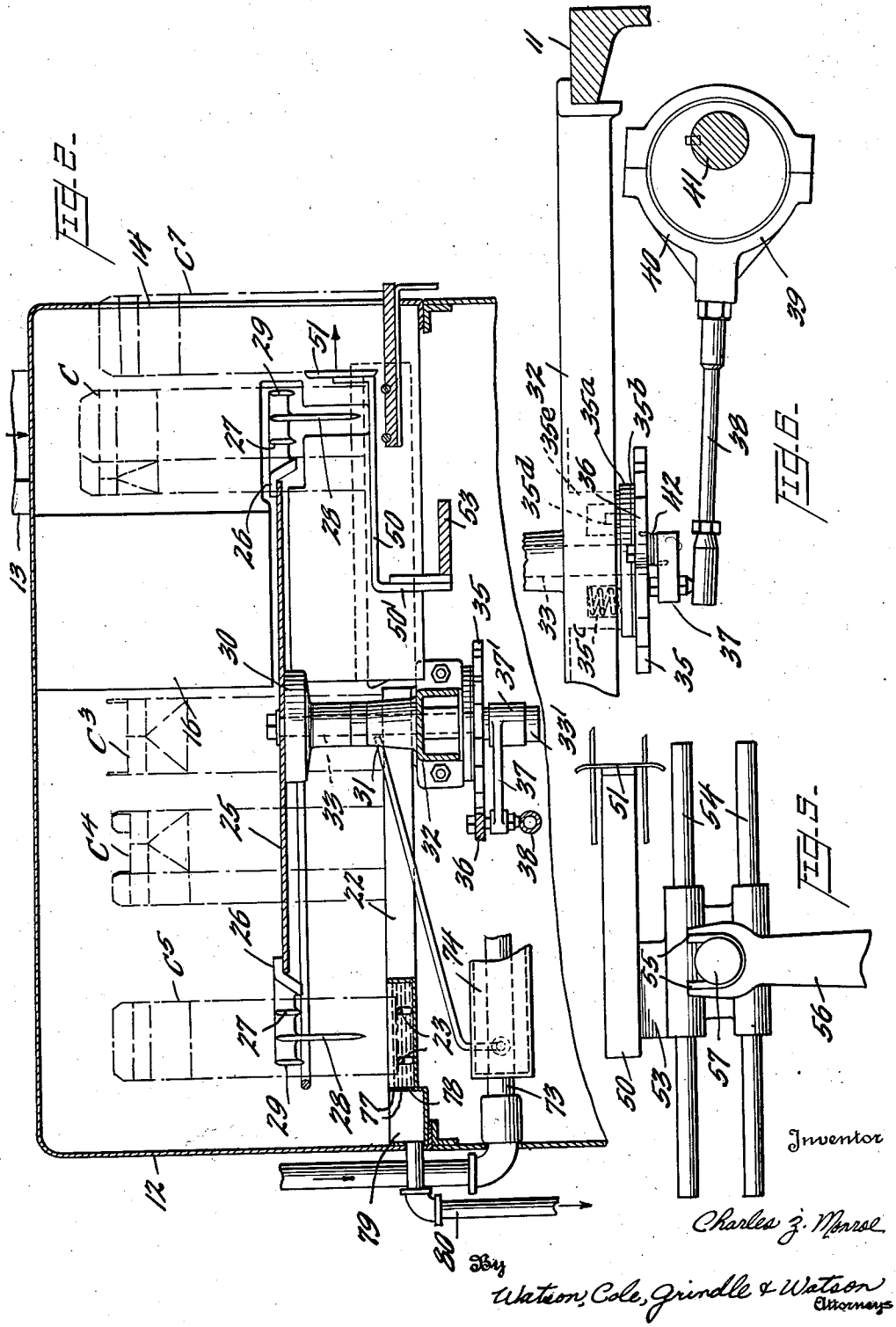
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MECHANISM FOR COOLING FRESHLY COATED CONTAINERS

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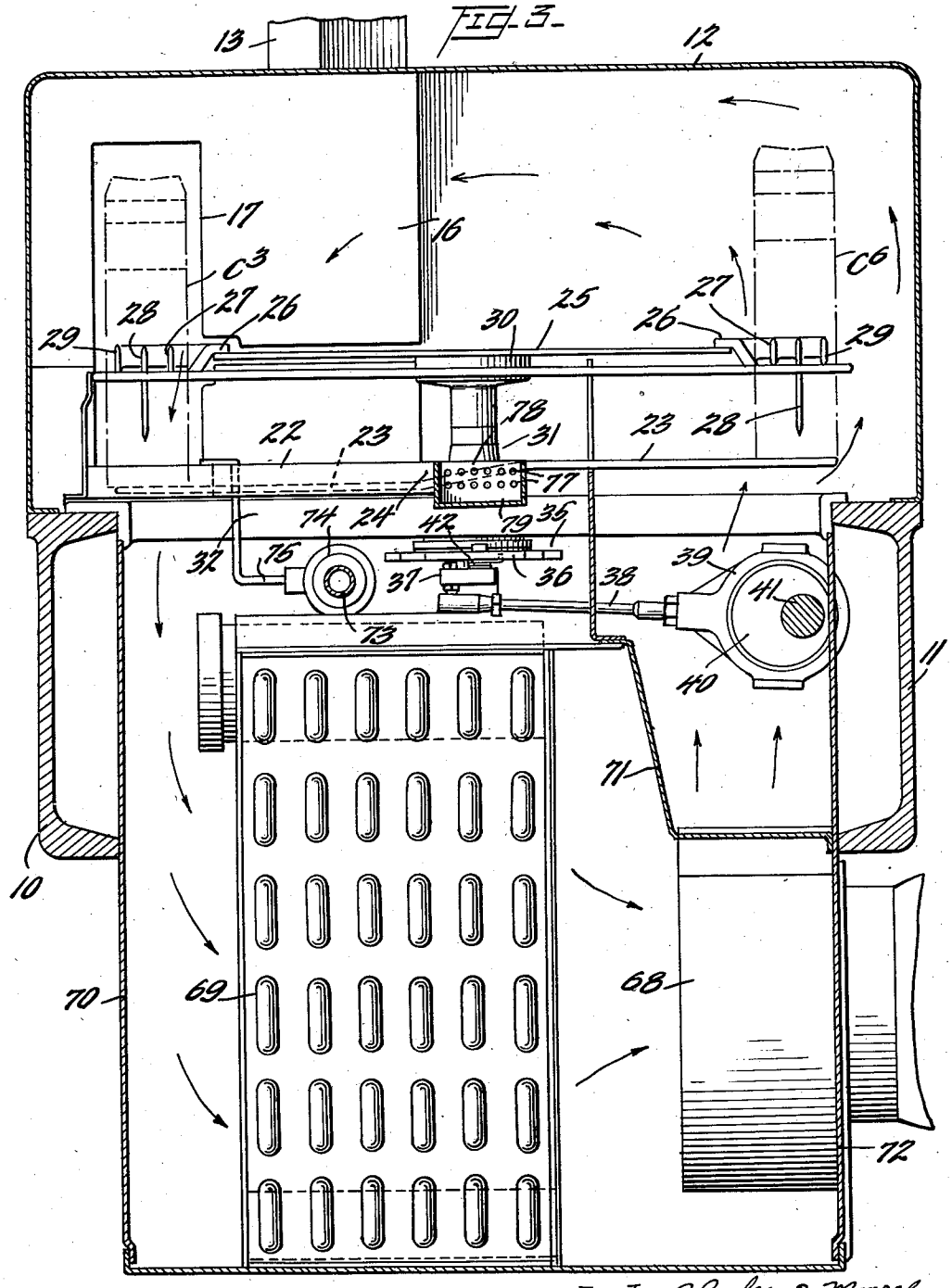


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MECHANISM FOR COOLING FRESHLY COATED CONTAINERS

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FIG. 3.



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MECHANISM FOR COOLING FRESHLY COATED CONTAINERS

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Application May 4, 1943, Serial No. 485,654

6 Claims. (Cl. 34—187)

This invention relates to apparatus for cooling or chilling freshly coated containers, and more particularly to apparatus for receiving partially completed paper containers to the surfaces of which a coating substance in molten condition has just previously been applied, effecting the cooling and solidification of such coating by the application of gaseous and liquid cooling media, and the discharge of the cooled container from the cooling zone.

Apparatus of the character described has, broadly speaking, been heretofore designed, suggested and actually placed in successful operation and it is the purpose of the present invention to provide such an apparatus which, while having the capacity to accomplish its objectives in an altogether satisfactory manner is nevertheless simpler, less costly to make, smaller in size, and less difficult to maintain in full operation, than earlier mechanisms or apparatus. The container coating cooling means of the present invention is intended for use with fully automatic machines for squaring-out collapsed tubular paper blanks, closing the bottoms of successive blanks, coating the partially completed containers, and charging, sealing and delivering the same. It has been designed especially for automatic machines of the type just above briefly referred to but which are of relatively small size as compared with many automatic paper bottle machines now in use, and having less capacity insofar as the number of complete charged and sealed containers delivered per unit of time is concerned. Within its field, however, it is of primary importance and includes a number of features which render it eminently suitable for use in the accomplishment of the objectives for which it is designed.

In the accompanying drawings one embodiment of the invention is disclosed by way of example, the container cooling mechanism shown having been primarily designed for use as a unit of a complete automatic machine for the fabrication, charging, and sealing of containers of the type disclosed and claimed in Patent No. 2,047,891, issued in the name of Henry T. Scott, dated July 14, 1936.

In the drawings:

Figure 1 is a top plan view of the container cooling apparatus with top removed in order that the working parts may be observed, and certain of the working parts having been broken away in order that others may be more clearly perceived;

Figure 2 is a section through the upper portion of the apparatus, taken on line 2—2 of Figure 1;

Figure 3 is a section on line 3—3 of Figure 1;

Figure 4 is a section on line 4—4 of Figure 1;

Figure 5 illustrates, in side elevation, certain details of a pusher mechanism for thrusting cooled containers from the apparatus; and

Figure 6 is another view of this same mechanism, being a section on line 6—6 of Figure 1.

Parallel side frame members of the larger machine of which the instant cooling apparatus preferably comprises one unit are indicated at 10 and 11 in the drawings and, from Figure 3, it will be perceived that, mounted upon the horizontal upper surfaces of these side fame members is a sheet metal housing or casing 12. Casing 12 may be rectangular in horizontal section, and it forms a chamber into which the freshly coated containers are introduced, within which these containers are chilled by contact with cooled air currents and chilled water, and from which they are successively ejected, portion of a chute or guide down which the containers pass into the housing 12, being indicated at 13 in Figures 2 and 3, and a port through which chilled containers are ejected being indicated at 14. Several of a circular series of containers which occupy successive positions within the housing 12 are indicated at C, C′, C^2, C^3, C^4, C^5, C^6, and C^7, these containers being shown in chain lines, in horizontal section in Figure 1 and in side elevation in Figures 2 and 3. The container at position C has just been introduced into the chamber 12 and the container in position C^7 has just been ejected from the chamber, the series of containers intermediate position C and C^7 being arranged in a circle about a vertical axis and being equidistantly spaced from each other.

Containers in positions C, C′ and C^2 rest upon a heated supporting trackway 15 and likewise are enclosed within a compartment divided off from the remainder of the chamber defined by the housing 12, by a dividing plate or partition wall 16, having a container discharge port 17 formed therein. The trackway 15 is maintained in heated condition by live steam conducted to the apparatus by a conduit 18 and discharged into closed chamber 19 underlying the trackway. Exhaust steam and condensate from steam chamber 19 may escape through the escape duct 20. It will be understood that a container dropped into the chamber defined by the partition wall 16 and the casing 12 will first occupy the position indicated at C in Figure 1 and it will thereafter be successively advanced, by intermittent and equal movements of advancement to the successive positions C′, C^2, etc., until it ultimately is discharged from the housing 12 to reach position C^7, from

which position it will be removed by further container engaging and advancing means which comprises no portion of the present invention.

Containers issuing from port 17 into the larger portion of the housing 12 through which cooled air currents are constantly circulating, pass off of the heated trackway 15 and drop downwardly so that lower ends of these containers are immersed in a chilled liquid such as water at a low temperature, contained in the arcuate pan 22. The containers may float or may sink through the liquid in the pan so as to rest lightly upon arcuate supporting rails 23. The terminal end of pan 22 is indicated at 24 and at this point the container supporting rails 22 incline upwardly from the bottom of the liquid-retaining pan and pass over its upper edge, thus elevating the containers successively as they leave the pan, the containers thereafter resting upon rails 23 until reaching a position opposite the discharge port 14 formed in the casing 12.

Means for advancing the series of containers shown, with an intermittent or step-by-step motion, comprises a rotatable circular plate 25 to the outer margin of which are riveted or otherwise suitably secured a series of radially extending pusher devices 26. The pusher devices 26 are equi-distantly spaced from each other and the space between each pair of adjacent pushers is sufficiently wide to permit the introduction of a container, as clearly illustrated in Figure 1. Each pusher comprises a plurality of vertically extending ribs, an inner rib 27, a central rib 28, and an outer rib 29, the ribs being of unequal depth in a horizontal plane so that the container-engaging edges of all three may simultaneously contact with a container as shown in Figure 1 of the drawings. The inner and outer ribs of each pusher are likewise relatively short, measured vertically, but the intermediate rib 28 is relatively long, projecting downwardly for a substantial distance so as to have more extensive contact with the rear panel of a container which the pusher engages. The supporting plate 25 and the series of pushers 26 will be intermittently advanced, when the machine is in operation, in the direction of the arrow A shown in Figure 1.

The means for intermittently advancing the circular series of pushers will now be described. Plate 25, to which the pushers are secured, is mounted upon a central hub 30 the lower end of which rests upon a tubular support 31 mounted upon a horizontally disposed frame member 32. A shaft 33 extends upwardly through the tubular support 31 and the hub 30 and is keyed or otherwise non-rotatably secured to shaft 33 so that, when shaft 33 is rotated, pusher supporting plate 25 will likewise be rotated, and to the same extent. Fixed upon the lower end of shaft 33 is a toothed wheel 35 or circular ratchet and a pawl adapted to successively act upon the teeth of the ratchet is indicated at 36. This pawl is supported in the horizontal plane of the ratchet 35 upon the outer end of an arm 37 the inner end of which is provided with an enlarged portion in the nature of a sleeve, indicated at 37', which encircles shaft 33, the enlarged lower end 33' of shaft 33 retaining the sleeve 37' in the position in which it is shown, this sleeve being freely rotatable upon the shaft at all times.

The outer end of arm 37 is connected by means of a link 38 with a strap 39 encircling an eccentric 40 fixed upon shaft 41, shaft 41 being revolved at uniform angular velocity in one direction at all times during operation of the machine, by a driving means not disclosed. A suitable helical spring 42, one end of which is attached to pawl 36 and the other end of which is anchored to the arm 37, acts to maintain contact between the free end of pawl 36 and the ratchet 35 at all times. It is clear that, as a result of the driving connection described, the continuous rotary movement of shaft 41 is translated into intermittent equal angular advancements of shaft 33 and the pusher carrying plate 25, each rotation of eccentric 40 resulting in advancement of the ratchet through an angular distance subtended by one tooth. Continued movement of the ratchet 35, and the circular series of pushers, after completion of each working stroke of the pawl is prevented by the application of friction. A disc 35a having a friction facing 35b bears downwardly against the upper face of ratchet 35. A spring 35c mounted on frame member 32, or a plurality of such springs, acts to maintain heavy friction contact between disc 35a and ratchet 35. Disc 35a is prevented from rotating by means of a pin indicated at 35d which projects upwardly from the plate 35a and is loosely received within an aperture formed in member 35e rigidly carried by the frame member 32.

The pusher for effecting the successive discharge of chilled containers from the casing 12 comprises a horizontally disposed member 50 having affixed to its forward or outer end the vertically disposed container-engaging pusher plate 51, the inner end of member 50 having a downturned portion 50' which is rigidly secured to a slide 53 mounted upon parallel guides 54. The parallel arms 55 of a yoke integral with the end of an operating arm 56 are positioned upon opposite sides of a pin 57 extending upwardly from slide 53, so that slide 53 will be reciprocated, with its attached pusher, as the arm 56 is rocked in the horizontal plane in which it is disposed. The opposite end of arm 56 is mounted for rotation about a fixed vertically disposed pivot indicated at 56' and rocking movement of arm 56 is effected by a driving means which comprises link 60 and cam 61, one end of link 60 being pivotally connected to arm 56 and the other end carrying a cam follower 62 which lies at all times in the groove 63 of cam 61, cam 61 being fixed upon the drive shaft 41 previously referred to. That end of link 60 which carries the cam follower 62 is supported upon the end of a horizontally extending rocker arm 65, pivotally mounted upon the frame of the machine at 66. As shaft 41 rotates the container-engaging pusher 51 will be reciprocated in timed relation to the movements of the container advancing means, which is also driven from the same shaft, and as successive containers come into position to be discharged they each will be engaged by the pusher and moved outwardly to position C', the pusher being immediately thereafter retracted.

In Figure 3 of the drawings portion of the means for circulating cooling air through the container housing 12 is illustrated, this means comprising a fan diagrammatically shown, and indicated by the numeral 68, an air cooling or refrigerating device at 69 and suitable air current confining plates or baffles at 70, 71 and 72, respectively. The fan 68 functions to circulate a current of air through the cooling means 69 and thence upwardly through the chamber 12 and over the containers, thence downwardly to the cooling means, etc., as indicated by the several arrows in Figure 3. The details of the cooling means, however, are matters of indifference in-

sofar as the present invention is concerned and any suitable means for cooling and circulating air through casing 12 may be employed. The same holds true with respect to the means for cooling and circulating water or other chilled fluid in the pan 22.

In the apparatus shown water may be introduced into the annular space intermediate a pipe 73 containing the liquid or gaseous cooling medium, and an encircling sleeve 74, so as to be cooled to a low temperature, then removed through a duct 75 and discharged into the pan 22 at a point such as that indicated by the numeral 76 in Figure 1. Overflow from pan 22 may escape through the perforations 77 in the plate 78 forming part of the pan, escaping into the relatively small receiving compartment 79 and thence flowing to a point of discharge or wastage through an outlet conduit 80.

It will be appreciated that the apparatus as described may be modified to accommodate containers which vary in size and shape and that minor rearrangements of the component elements of the invention may be made without departure therefrom.

Having thus described the invention, what is claimed as new and desired to be secured by Letters Patent is:

1. Apparatus for cooling freshly coated containers comprising, in combination, a cooling chamber having inlet and outlet ports, the inlet port being formed in the chamber top, a guide for guiding containers to said port, means for maintaining a relatively low temperature in said chamber, means rotatable about a vertical axis disposed centrally of the chamber for moving containers along a circular path from the inlet port to the outlet port, said means including a support rotatable about an axis, a circular series of pushers extending radially from the support and a circular trackway underlying the path of movement of the pushers, for supporting the bottoms of containers engaged by the pushers, and means for ejecting cooled containers through said outlet port.

2. Apparatus for cooling freshly coated containers comprising, in combination, a cooling chamber having inlet and outlet ports, the inlet port being formed in the chamber top, a guide for guiding containers to said port, means for maintaining a relatively low temperature in said chamber, means rotatable about a vertical axis disposed centrally of the chamber for moving containers along a circular path from the inlet port to the outlet port, said means including a support rotatable about an axis and a circular series of pushers extending radially from the support, a stationary trackway for supporting the bottoms of containers engaged by the pushers, and a device for ejecting cooled containers from said outlet port.

3. Apparatus for cooling freshly coated containers comprising, in combination, a cooling chamber having inlet and outlet ports, means for maintaining a relatively low temperature in said chamber, means rotatable about a vertical axis disposed centrally of the chamber for moving containers along a circular path from the inlet port to the outlet port, said means including a support rotatable about a vertical axis and a circular series of spaced pushers extending radially from the support, each such pusher being adapted to engage the rear panel of a container of rectangular cross section and to maintain that panel disposed radially of the support during its movement through the chamber, and a support for containers underlying the path of movement of the pushers for supporting the bottoms of advancing containers.

4. The combination set forth in claim 3 in which each pusher comprises a plurality of vertically extending ribs the forward container-engaging edges of which are disposed in a vertical substantially radial plane.

5. The combination set forth in claim 3 in which each pusher includes a plurality of container-engaging edges in horizontally spaced relation and disposed in a vertical plane, an intermediate edge being substantially longer than those to the sides thereof.

6. The combination set forth in claim 3 in which there is located, adjacent the cooling chamber a compartment into which containers are first received and from which they are transferred to the cooling chamber together with means for heating said compartment.

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