

Dec. 26, 1939.

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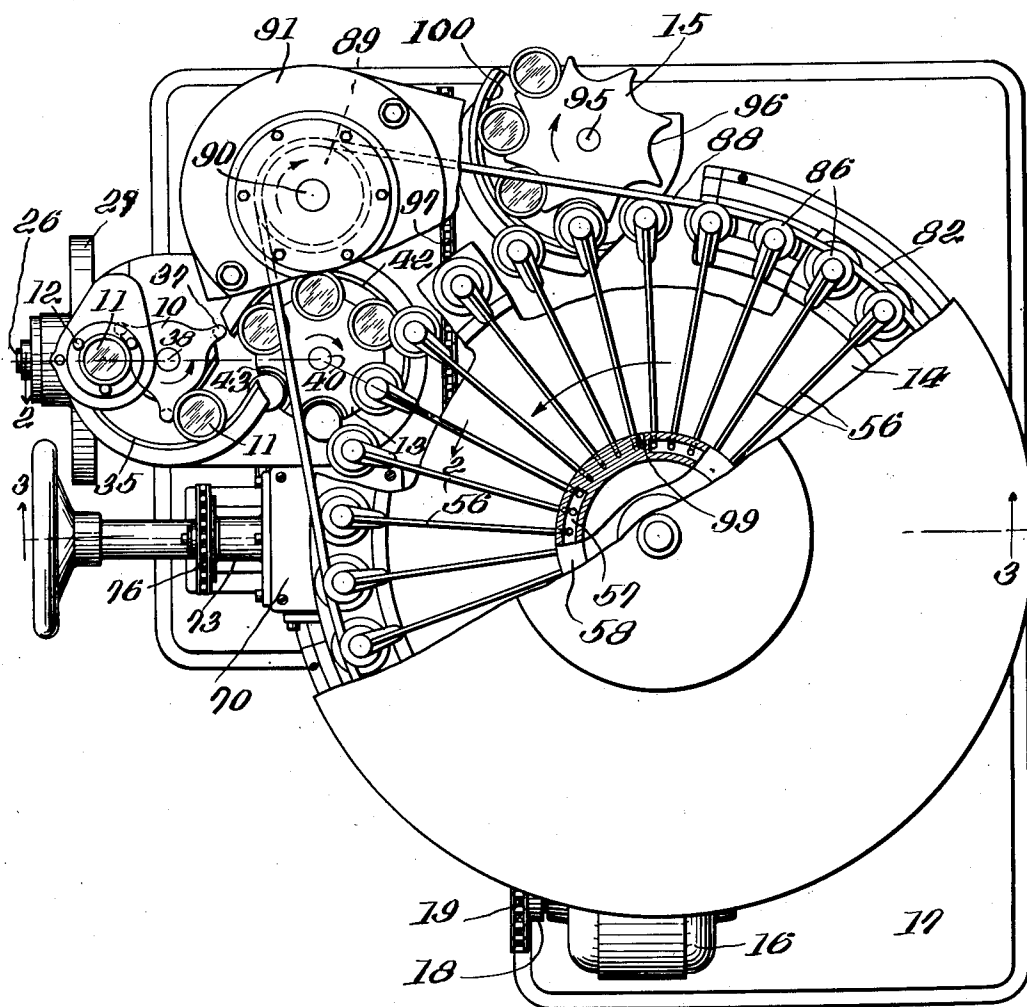
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MACHINE FOR COATING CAN ENDS

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6 Sheets-Sheet 1

Fig. 1.



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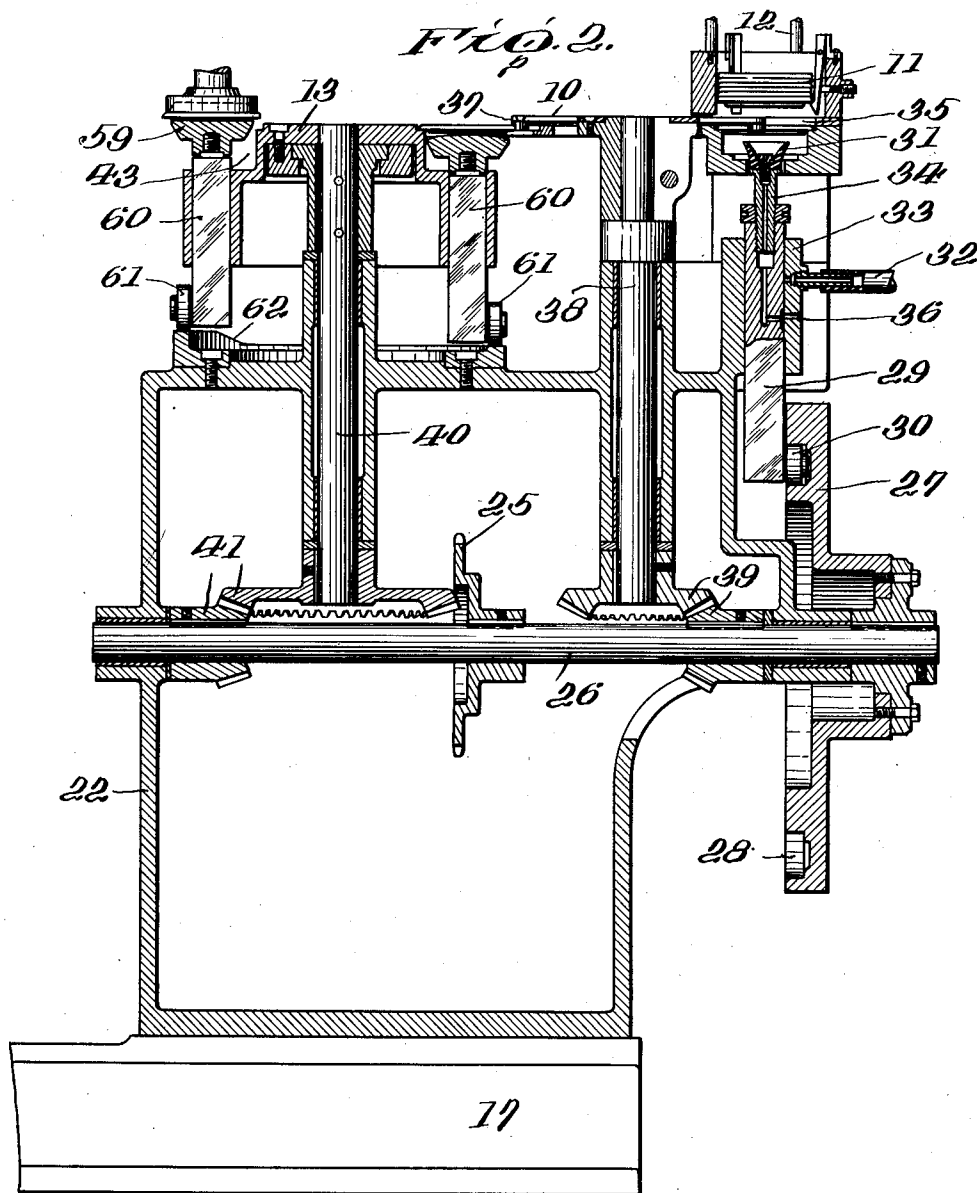
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MACHINE FOR COATING CAN ENDS

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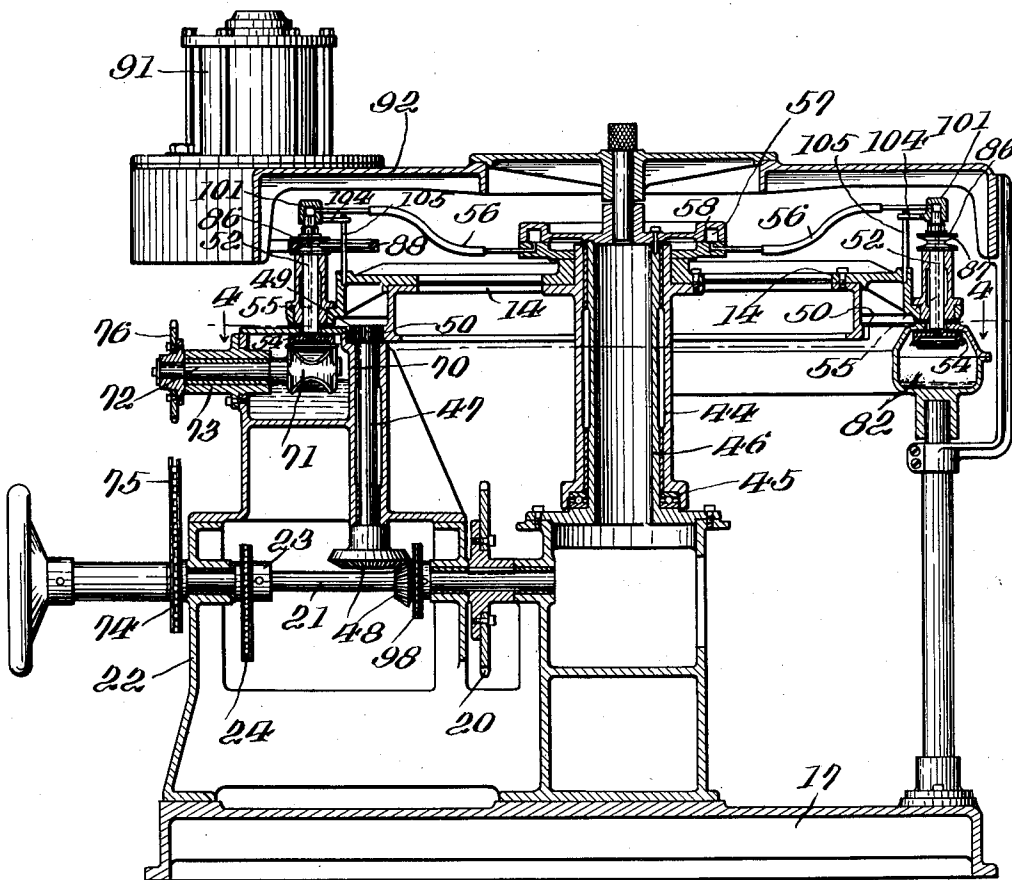
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MACHINE FOR COATING CAN ENDS

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Fig. 3.



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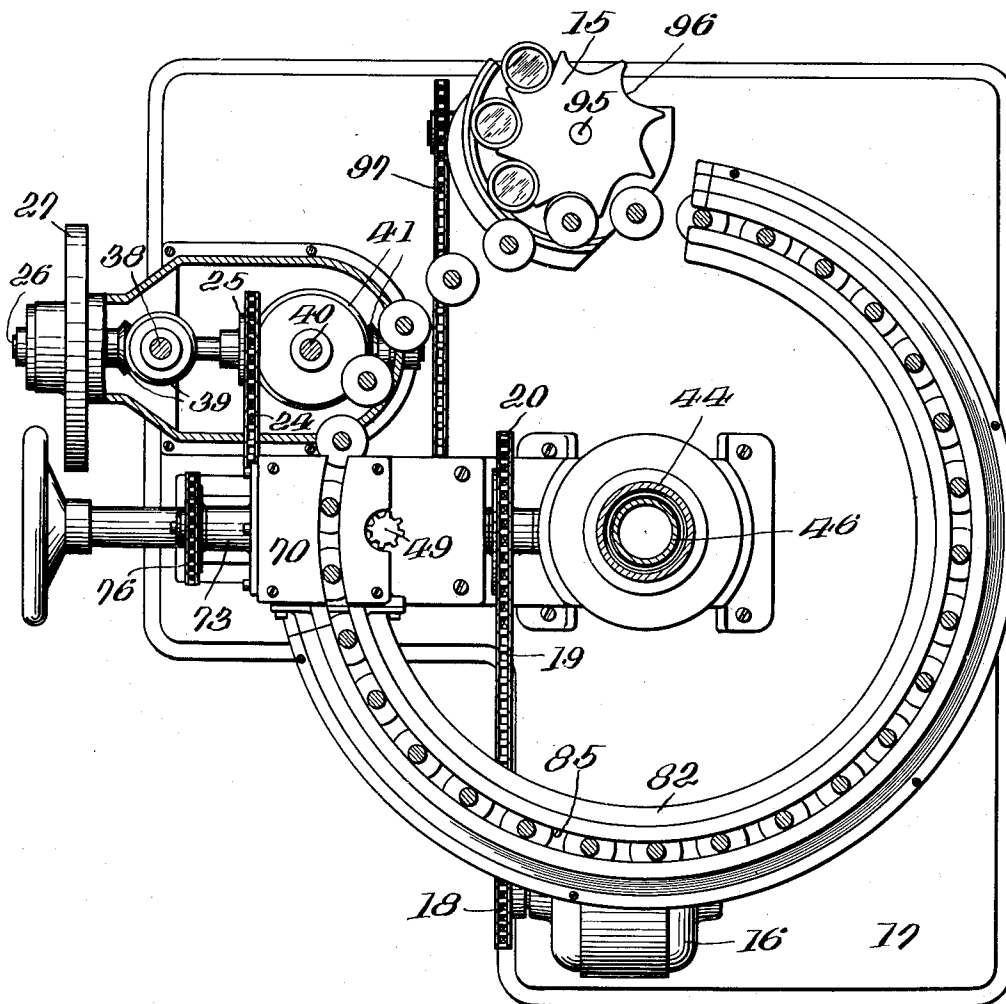
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MACHINE FOR COATING CAN ENDS

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Fig. 4.



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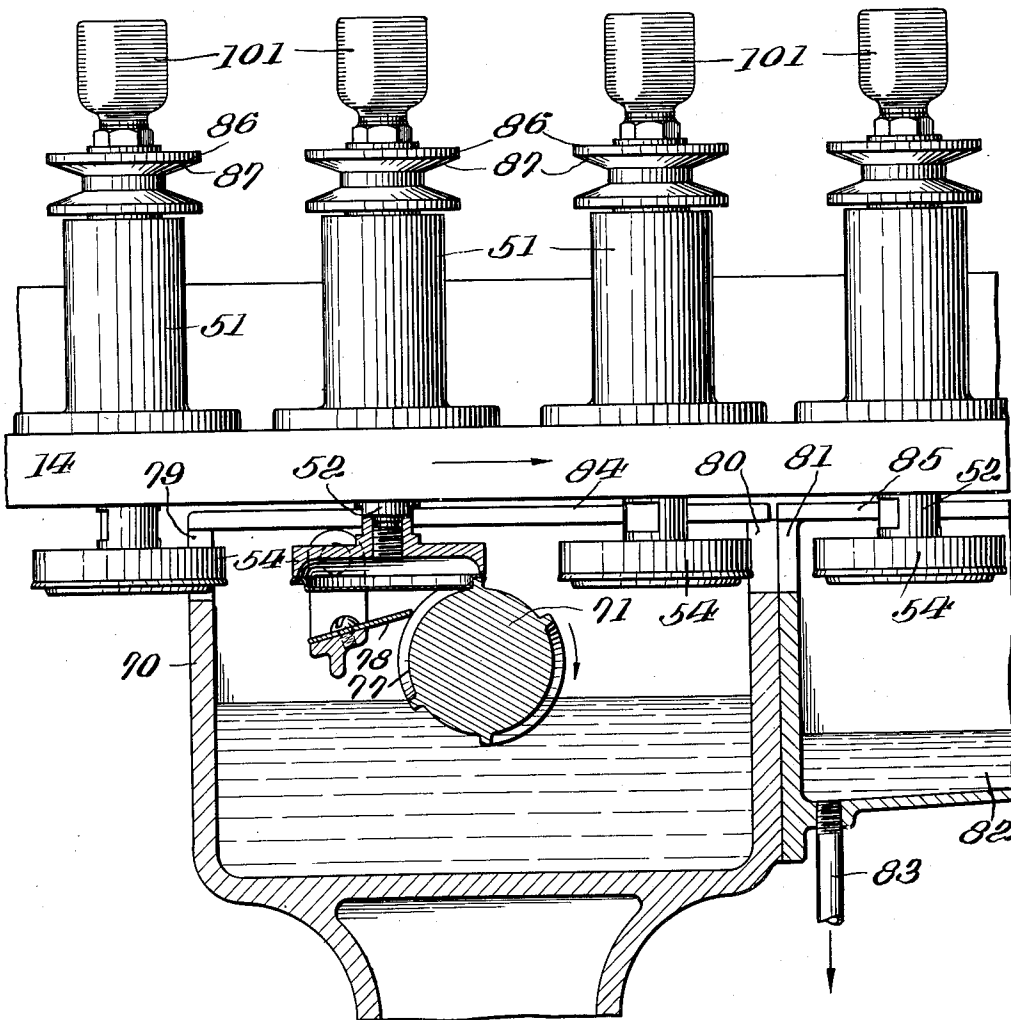
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MACHINE FOR COATING CAN ENDS

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FIG. 5.



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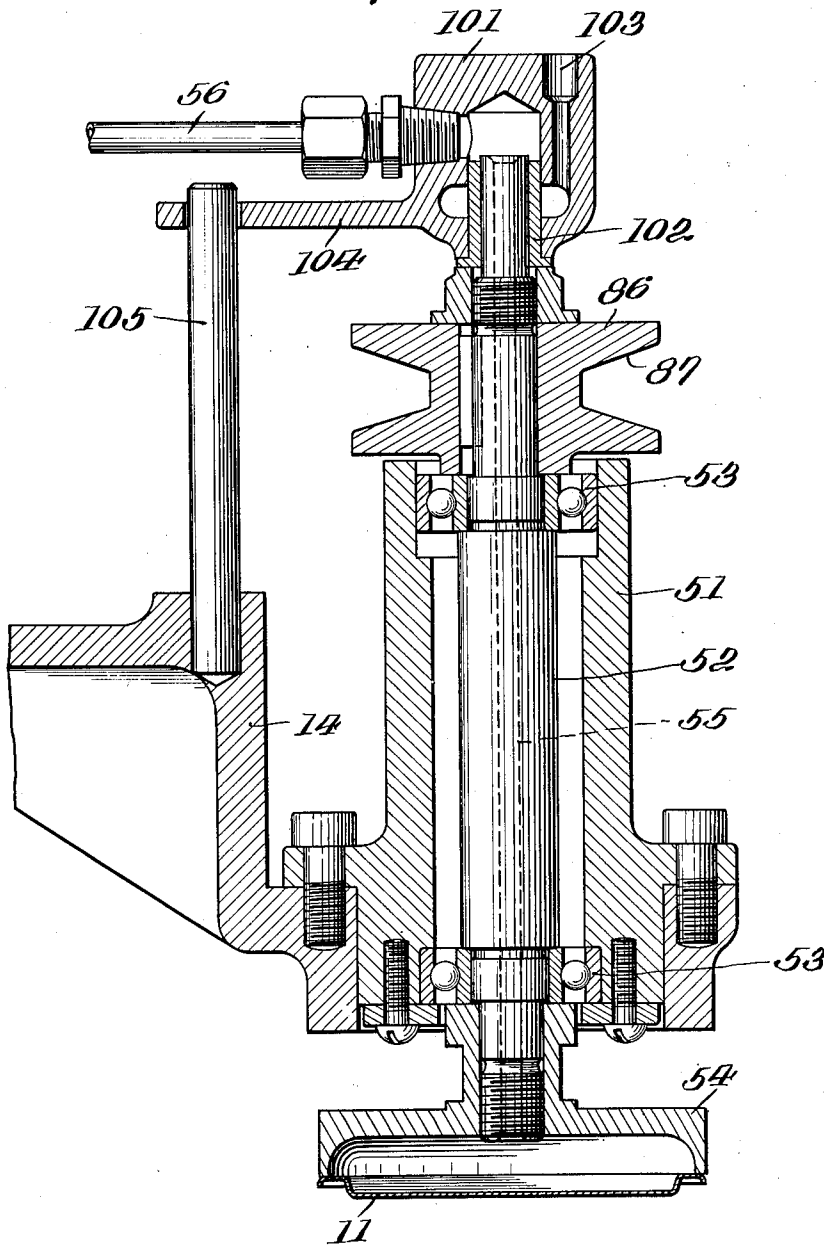
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MACHINE FOR COATING CAN ENDS

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FIG. 6.



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MACHINE FOR COATING CAN ENDS

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Application June 11, 1937, Serial No. 147,781

13 Claims. (Cl. 91—51)

This invention relates to new and useful improvements in a machine for coating a sheet metal can end, which is adapted to be secured to a can body by a subsequent operation. In the manufacture of beer cans, for example, such a machine may be used for coating the inside of the can end with enamel to prevent the contents of the can, after it is filled, from coming into contact with the metallic surface.

An object of the invention is to provide an improved machine whereby a succession of can ends may be caused to travel along a predetermined path, during which travel a uniform coating is automatically applied to the inside surface of each can end. From this machine, the can ends are delivered one by one to the drier.

A further object of the invention is to provide a machine in which the can ends are successively and progressively engaged by a suitable coating applicator without interruption of their continuous travel through the machine.

The invention consists further in various constructional features and combinations which will be more particularly explained in the accompanying drawings, in which—

Fig. 1 is a plan view of the machine with parts broken away or shown in section.

Fig. 2 is an enlarged vertical sectional view taken approximately on the line 2—2 of Fig. 1.

Fig. 3 is a vertical sectional view taken on the line 3—3 of Fig. 1.

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

Fig. 5 is an enlarged vertical sectional view taken through the coating roller, coating tank and drain tank, with a portion of the revolving main turret shown in elevation.

Fig. 6 is an enlarged vertical sectional view taken axially of one of the spinner spindles, with a can end attached to the spinner head.

In accordance with the invention, a turret 10 receives the can ends 11 one by one from a stack 12, in which they are initially placed, and delivers them to a transfer turret 13, by which they are in turn delivered to a main turret 14. While the can ends are held by the main turret 14, they receive the desired coating and are thereupon delivered to a discharge turret 15, by which they are discharged from the machine.

A motor 16 mounted on the machine base 17 carries a sprocket 18. This sprocket is connected by a chain 19 to a sprocket 20 secured to the main shaft 21 of the machine, which is mounted in suitable bearings in a casting 22 secured to the base 17. A sprocket 23 secured to the shaft 21

is connected by a chain 24 to a sprocket 25 on a shaft 26 to drive the latter, which is also mounted in suitable bearings in the casting 22.

A cam wheel 27 secured to the shaft 26 is formed with a cam groove 28 and a plunger 29, vertically disposed beneath the stack of can ends 11, carries a roller 30 which is guided in the groove 28 to control the movement of the plunger. The plunger carries a vacuum cup 31 at its upper end. A vacuum line 32 is connected into the housing 33 and, when the plunger is raised, this vacuum communicates with the duct 34 in the plunger and pulls a can end 11 from the stack into a circular guide track 35. As the plunger is lowered, the vacuum cup is vented through the port 36 in the housing, and the can end is seated in front of a finger 37 on the turret 10 and is free to be moved along the guide track 35. The turret 10 is secured to a shaft 38 which is journaled in the casting 22 and driven by bevel gearing 39 from the shaft 26.

The transfer turret 13 is secured to a shaft 40, which is journaled in the casting 22 and is driven by bevel gearing 41 from the shaft 26, in a direction opposite to the turret 10. As the can end arrives at the inner end of the track 35, it engages the end of a circular track 42 concentric with the turret 13. The can end is then pushed by the finger 37 into one of the pockets 43 formed in the turret 13 and is carried by the latter toward the main turret 14.

The main turret 14 is secured to a central hub 44, which is supported by a thrust bearing 45 for rotation about a hollow standard 46 secured to the casting 22. A vertical shaft 47 driven by bevel gearing 48 from the main shaft 21 has at its upper end a pinion 49 which engages peripheral teeth 50 on the turret 14 to drive the latter.

As shown in Fig. 6, a series of bearing members 51 are secured to the rim of the turret 14 and in each of these members a spindle 52 is supported in ball bearings 53 and carries at its lower end a spinning head 54 in the form of a vacuum cup adapted to receive a can end. The interior of the head 54, through an axial duct 55 in the spindle and a tube 56, is adapted to be brought into communication with a vacuum chamber 57 in the head 58 which is secured to the top of the standard 46 and connected in a well known manner to a source of vacuum.

A head 59 in the pocket 43 is secured to a vertically reciprocable plunger 60 carried by the turret. The bottom of this plunger carries a roller 61 which rides on a cam track 62. When the can end in the pocket 43 arrives at a position

in line between the axis of the main turret 14 and the axis of the transfer turret 13, as shown in Fig. 1, it is directly beneath one of the spinner heads 54 and the roller riding at this time on the raised portion of the track 62 has lifted the can end into contact with the spinner head. At this time, too, the inner end of the tube 56 connected with that spinning head comes into communication with the vacuum chamber 57 and the head 54 picks up the can end, as shown in Fig. 6, and carries it through and past the coating tank 70.

A coating roller 71 in the tank 70 is secured to a shaft 72, which is rotatably mounted in a suitable bearing 73 secured in the wall of the tank. For driving the roller shaft 72, a sprocket 74 secured to the shaft 21 is connected by a chain 75 to a sprocket 76 secured to the shaft 72.

The coating roller runs in a bath of the coating material and the convex surface 77 thereof is shaped to conform to the surface of the end to be coated, so that all parts of the latter make contact with the rotating roller and are completely coated. A scraper 78 is provided to scrape off all hardened fluid from the roller.

As the turret 14 rotates about its axis, the spinner heads 54, with the can ends held thereby, are successively carried through an opening 79 into the coating tank 70 into contact with the coating roller 71 and thence through openings 80 and 81 from the coating tank into a drain tank 82 which is in the shape of a trough extending in a circle about the major portion of the turret and is provided with an outlet 83. Slots 84 and 85 for the spindles 52 are provided in the tops of the respective tanks 70 and 82.

Each spindle 52 has a pulley 86 secured to its upper end and provided with a V-shaped groove 87. As the spinner head 54 leaves the coating tank 70 and enters the drain tank 82, the pulley 86 is engaged by a belt 88, which passes about a drive pulley 89 secured to the shaft 90 of a separate motor 91 mounted on the turret cover 92.

The pulley 86 engages the belt 88 only after it has passed the coating roller 71 and after the spinner head 54 has entered the drain tank 82. The spinner head then begins to rotate about its own axis and throws the excess fluid into the drain tank. A level of liquid coating material is maintained in the drain tank to prevent the surplus fluid from building up a heavy coating on the inside thereof, which might clog the machine.

The discharge turret 15 is secured to a shaft 95 and is provided with peripheral pockets 96 which receive the successive can ends as they are released by the spinner heads 54. The shaft 95 is driven by sprocket gearing 97 from a sprocket 98 on the shaft 21. When a can end carried by a spinner head 54 is moved into a pocket 96, the vacuum line is cut off from the spinner head as the inner end of the tube 56 passes beyond the end of the vacuum chamber 57 to a vent 99 (Fig. 1) and the can end, thus released from the spinner head, is moved by the rotation of the turret 15 along the circular track 100 and discharged from the machine into a suitable drier (not shown).

The upper end of each spindle 52 is connected to the tube 56 by a hood 101 which is supported by the spindle and is provided with a bushing 102 for the upper end of the spindle. This bushing is composed of material that will absorb or be penetrated by oil, which is supplied through an oil hole 103. The hood is prevented from rotating with the spindle by an arm 104 which engages a pin 105 projecting upwardly from the rim of the

turret. This prevents possible breakage of the tube 56, but permits the hood to be easily slipped off of the spindle, in case the vacuum line becomes clogged.

The spinner head 54 is of metal, preferably aluminum, and the can end has a metal to metal contact therewith. No absolutely air tight joint is necessary, since the vacuum creating means is necessarily of large capacity, so that it is capable of holding a single can end against its spinning head at the beginning or end of a run, when no other spinner head is carrying a can end.

In the operation of this machine, the spinner heads 54 are rotated by the motor 91 through the medium of the belt 88, while all the other moving parts of the machine are driven by the motor 16 through the main drive shaft 21. Each rotation of the shaft 26 and the cam wheel 27 causes a reciprocation of the vacuum cup 31, which pulls a can end from the stack to the track 35 in front of one of the fingers 37 of the turret 10. The can end then travels continuously without interruption through the machine, where its inner surface is completely coated and the excess coating removed. It is delivered by the turret 10 to the transfer turret 13 and by the latter to one of the spinner heads 54 carried by the main turret 14. While held by the spinner head, it is carried first through the coating tank 70, where a coating is applied by the roller 71, and then through the drain tank 82. Each spinner head is rapidly rotated on its own axis by the belt 88, during substantially its entire travel through the drain tank, so that all excess coating fluid is removed from the surface coated. As the can end leaves the drain tank, its spinner head ceases to rotate, the can end is released therefrom and is delivered to the turret 15, which discharges it from the machine.

While I have described in detail one construction in which the invention may be embodied, it is to be understood that this is merely for the purpose of illustration, and that the invention also includes such modifications as may be embraced within the scope of the appended claims.

Having thus described the invention, what I claim as new and desire to secure by Letters Patent, is—

1. In a machine for coating can ends, a series of spinner heads on which the can ends are individually carried, said heads being bodily movable continuously in a predetermined orbit, means rotatable about an axis substantially at right angles to the direction of bodily travel of the spinning heads for contacting with and coating each can end so carried without interrupting its travel, and independently driven means for spinning the heads carrying the can ends after the latter are coated, to remove excess liquid therefrom.

2. In a machine for coating can ends, a coating tank, a coating roller rotatable therein, a drain tank, a rotatable main turret, means carried by said turret to support the can ends and carry them first through the coating tank and then through the drain tank, means for rotating the coating roller in contact with each can end and in synchronism with the movement thereof through the coating tank, and means for spinning the head, as it carries a can end through the drain tank, to remove excess liquid from the can end.

3. In a machine for coating can ends, means for moving the can ends continuously and successively along a predetermined path, a coating roller with which each can end contacts during

such continuous movement, said roller having a surface conforming to the surface to be coated, means for positively rotating the coating roller in synchronism with the progressive movement of the can end past said roller, and independently driven means for spinning the can end, during its continuous travel and after it leaves the coating roller, to remove excess coating liquid therefrom.

4. In a machine for coating can ends, a series of spinner heads on which the can ends are individually carried, means for bodily moving said spinner heads continuously in a predetermined orbit, a roller adapted to rotate in a bath of coating material and contacting with each can end as it is carried by a spinner head without interrupting its continuous travel, means for rotating said roller in synchronism with the travel of said spinner heads, and independently driven means for spinning said heads, during their continuous travel after they leave the coating roller, to remove excess liquid from the can ends.

5. In a machine for coating can ends, a main turret, means for rotating said turret, a series of spinner heads revoluble with said turret and each provided with a vacuum cup adapted to support a can end, means for connecting a vacuum chamber with said cup to support a can end, means for coating the can end as it is carried by the vacuum cup without interrupting the movement thereof, and means for subsequently venting the vacuum cup to the atmosphere to release the can end, independently driven means to spin each head before the can end is released therefrom to remove excess liquid from the can end.

6. In a machine for coating can ends, means for moving the can ends continuously and successively along a predetermined path, a coating roller contacting with the can ends during a part of their travel, and independently driven means for spinning the can ends, after they leave the roller, to remove excess coating liquid therefrom.

7. In a machine for coating can ends, a coating tank, a coating roller therein, a drain tank, means for causing successive can ends to travel by a continuous movement first through the coating tank in contact with the coating roller and then through the drain tank, means for rotating the coating roller continuously in synchronism with the travel of the can ends, and means for spinning the can ends as they travel through the drain tank, to remove excess coating therefrom.

8. In a machine for coating can ends, a series of heads each provided with a cup adapted to support a can end by vacuum therein, means for bodily moving said heads with the can ends thereon through a predetermined path, means for applying a coating to the can ends during the first part of such movement, and means for removing surplus coating therefrom during the latter part of such movement.

9. In a machine for coating can ends, a continuously rotatable turret, a series of heads carried by said turret and movable in a circular path

as the turret rotates, each head being provided with a cup adapted to support a can end by vacuum therein, means for applying a coating to the can ends during the first part of their circular travel, and means for subsequently spinning said heads, while the can ends are still supported thereon by vacuum, to remove surplus coating from said can ends.

10. In a machine for coating can ends, a series of spinner heads each provided with means for supporting a can end, means for bodily moving said heads continuously in a predetermined orbit, a pulley secured to each of said heads, a rapidly rotating driving pulley, a belt arranged with the driving pulley in one bight and the series of traveling pulleys in the other bight, whereby each of the heads will be spun to remove excess coating from the can end carried thereby, as its pulley is engaged by said belt, and means for applying coating to the can end before its head is rotated by the belt.

11. In a machine for coating can ends, a continuously rotatable turret, a series of spinner heads carried by said turret and movable in a circular path as the turret rotates, means on each head to support a can end, a pulley secured to each head, a rapidly rotating drive pulley, a belt arranged with the drive pulley in one bight and the series of turret-carried pulleys in the other bight, whereby each of the heads will be spun to remove excess coating from the can end carried thereby, as its pulley is engaged by the belt, and means for applying coating liquid to the can end before its head is rotated by the belt.

12. In a machine for coating can ends, a series of spinner heads each provided with a cup adapted to support a can end by vacuum therein, means for bodily moving said heads continuously in a predetermined orbit, a pulley secured to each of said heads, a rapidly rotating drive pulley, a belt arranged with the drive pulley in one bight and the series of traveling pulleys in the other bight, whereby each of the heads will be spun to remove excess coating from the can end carried thereby, as its pulley is engaged by said belt, and means for applying coating to the can end while it is supported by said head and before it is rotated by the belt.

13. In a machine for coating can ends, a continuously rotatable turret, a series of spinner heads carried by said turret and movable in a circular path as the turret rotates, each spinner head being provided with a cup adapted to support a can end by vacuum therein, a pulley secured to each head, a rapidly rotating drive pulley, a belt arranged with the drive pulley in one bight and the series of turret-carried pulleys in the other bight, whereby each of the heads will be spun to remove excess coating from the can end carried thereby, as its pulley is engaged by the belt, and means for applying coating liquid to the can end before its head is rotated by the belt.

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