F. G. FOSS.

PROCESS OF DRYING CANS.

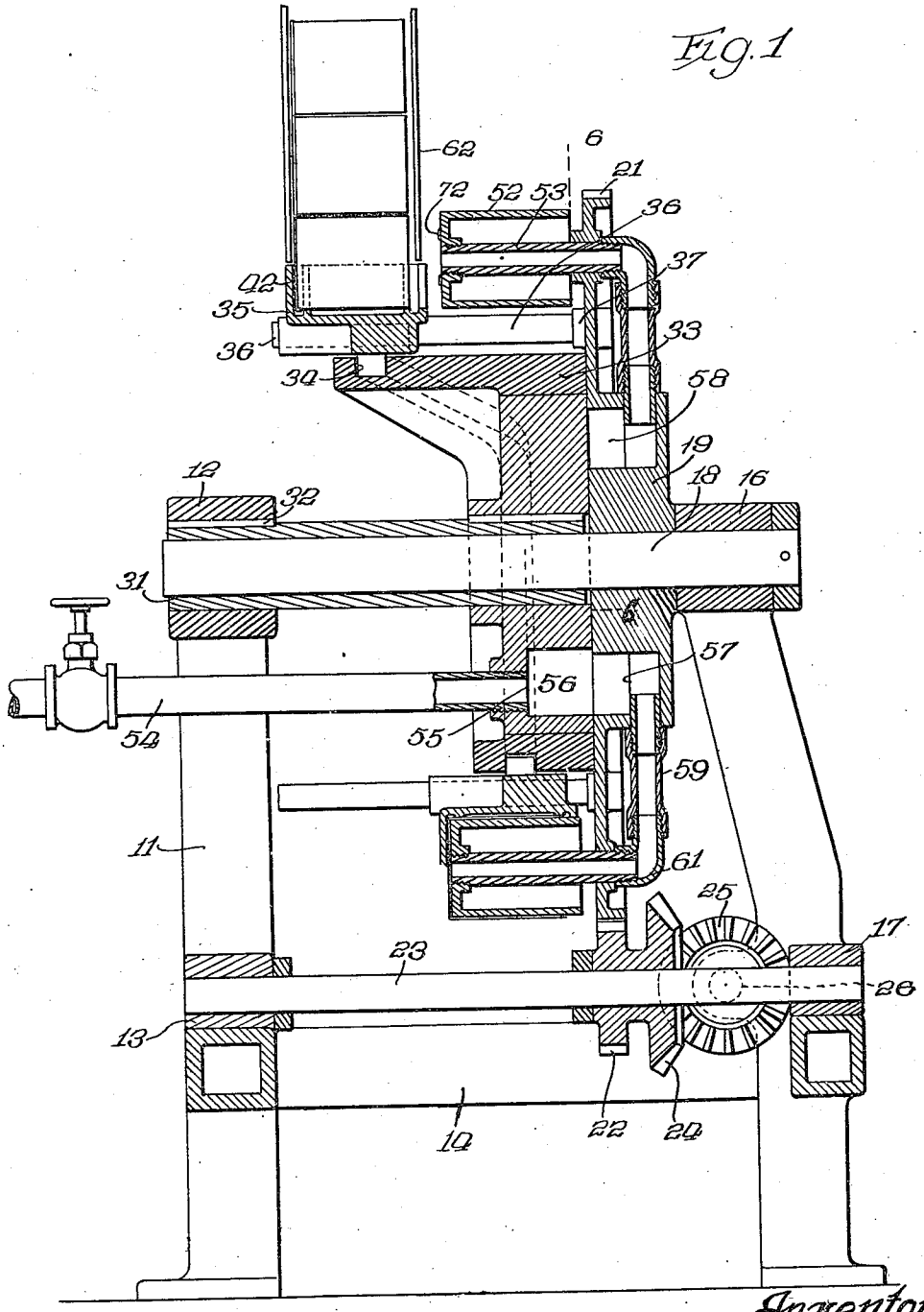
APPLICATION FILED MAR. 3, 1919.

1,375,373.

Patented Apr. 19, 1921.

4 SHEETS—SHEET 1.

Fig. 1



Inventor

Fred G. Foss.

By Dunlap, Clarke & Carpenter Atty's.

F. G. FOSS.

PROCESS OF DRYING CANS.

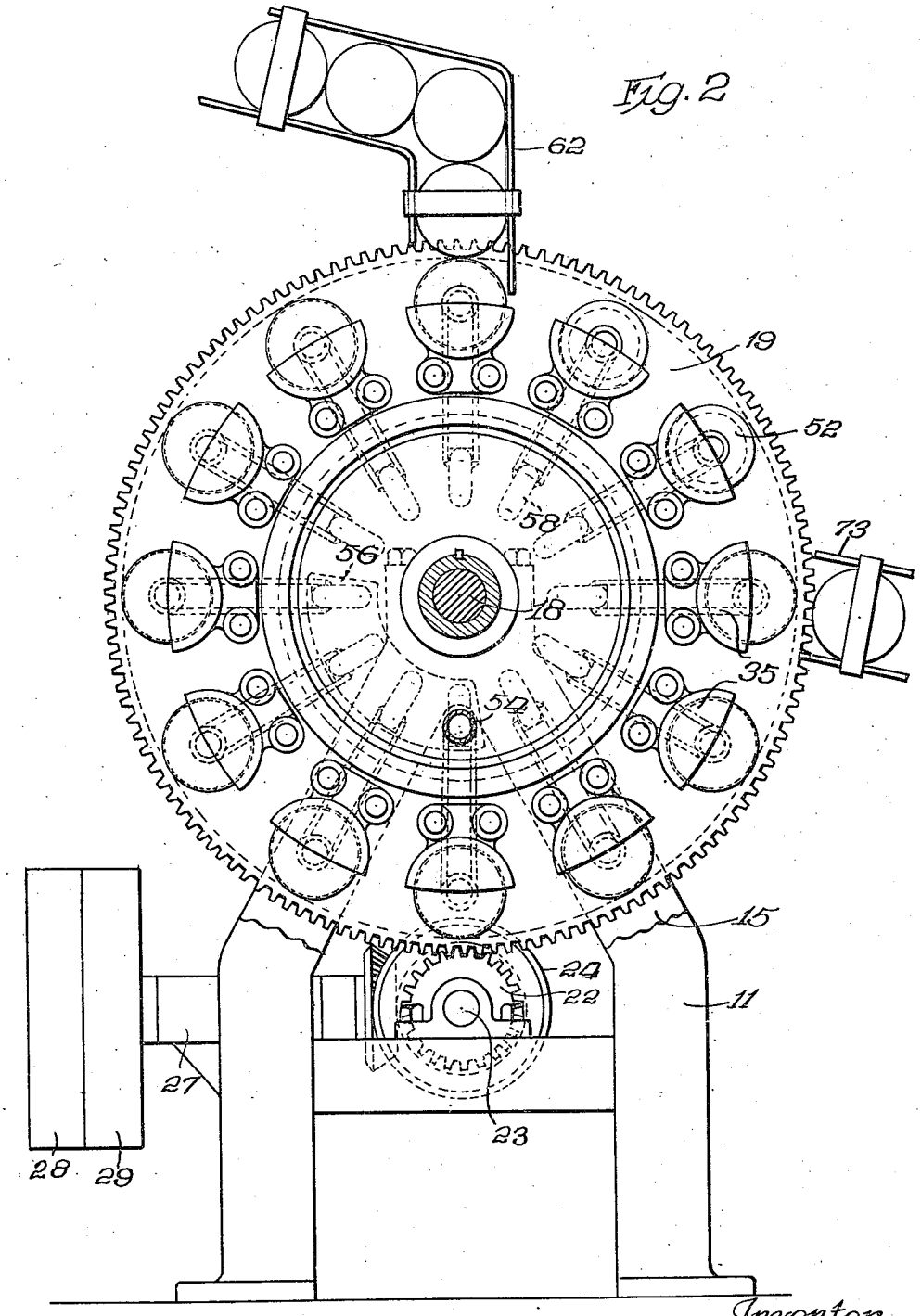
APPLICATION FILED MAR. 3, 1919.

1,375,373.

Patented Apr. 19, 1921.

4 SHEETS—SHEET 2.

Fig. 2



Inventor
Fred G. Foss
By Munday, Clarke & Carpenter Atty's.

F. G. FOSS.

PROCESS OF DRYING CANS.

APPLICATION FILED MAR. 3, 1919.

1,375,373.

Patented Apr. 19, 1921.

4 SHEETS—SHEET 3.

Fig. 3

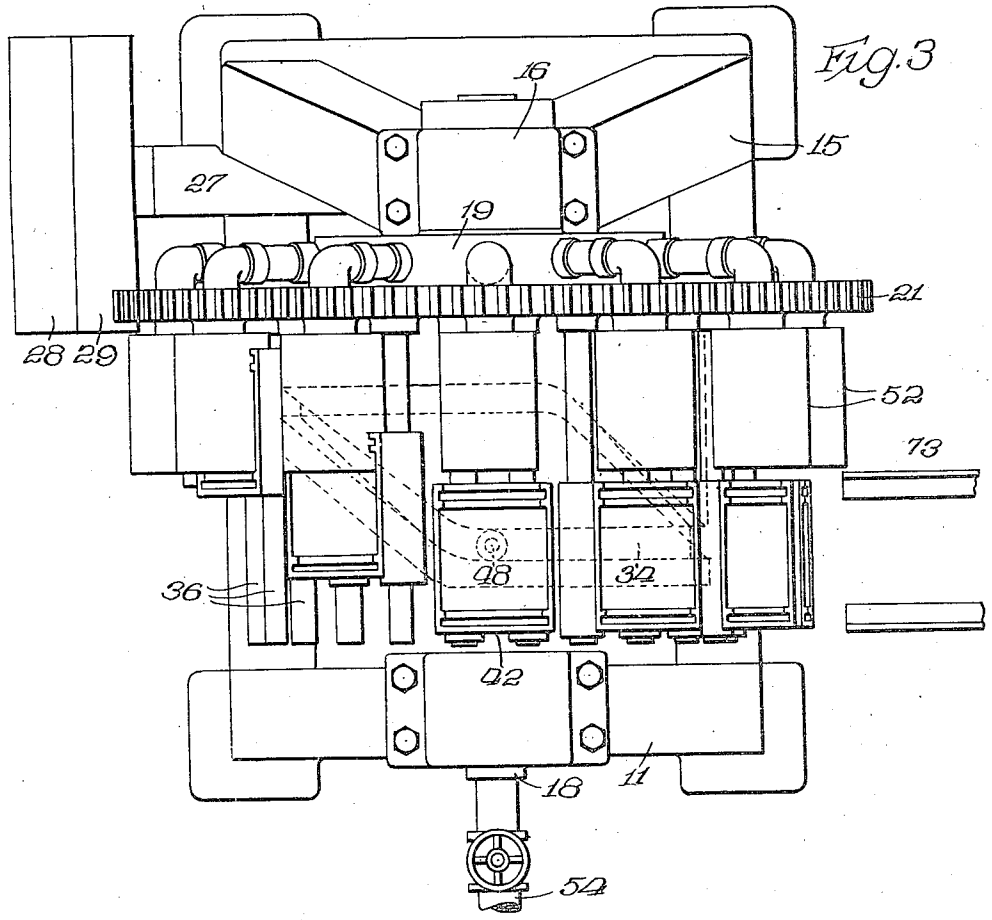
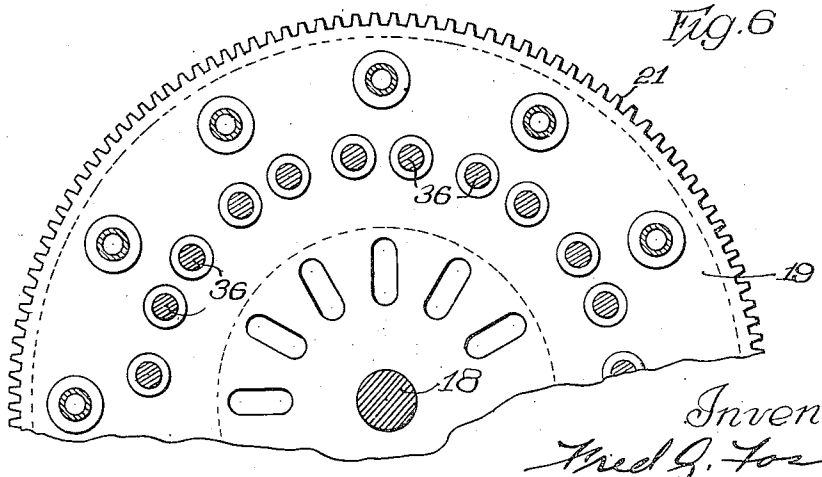


Fig. 6



Inventor

Fred G. Foss

By Munday, Clarke & Carpenter Atty's.

F. G. FOSS.

PROCESS OF DRYING CANS.

APPLICATION FILED MAR. 3, 1919.

1,375,373.

Patented Apr. 19, 1921.

4 SHEETS—SHEET 4.

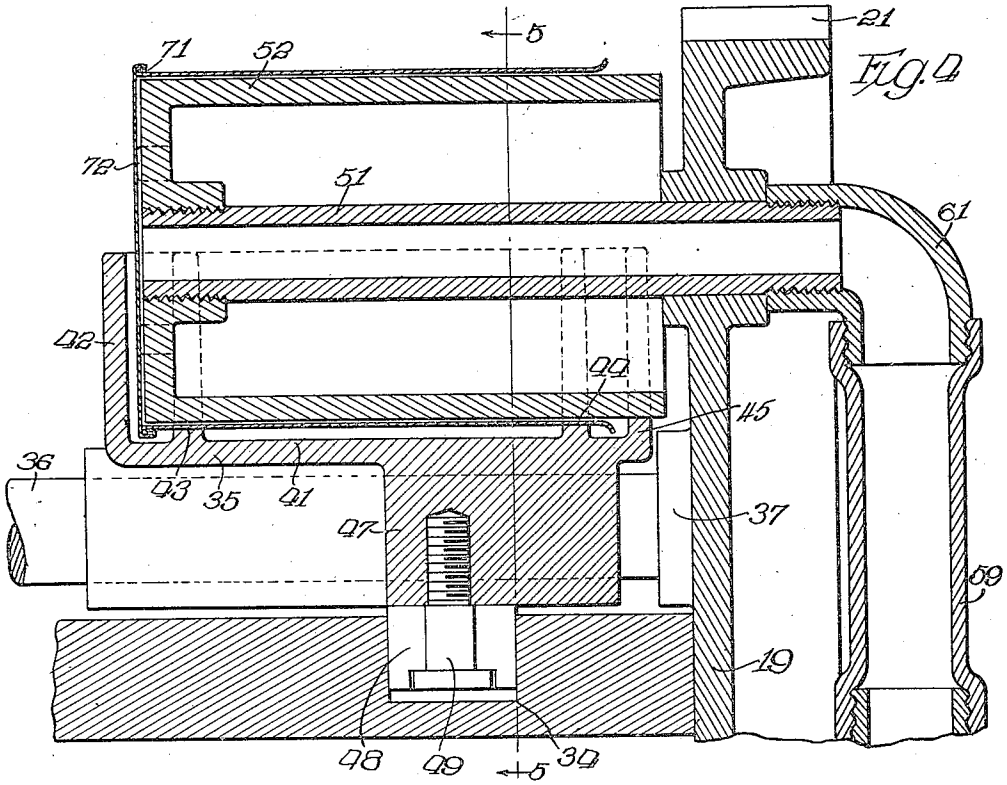


Fig. 4

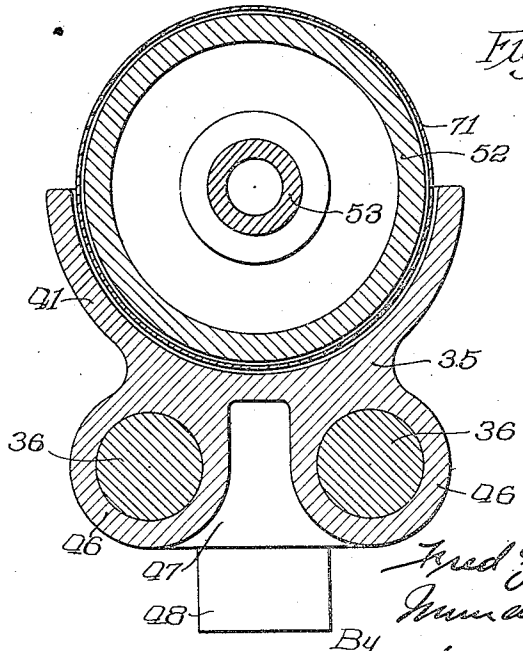


Fig. 5

Inventor
Fred G. Foss
Munday, Clarke
By Carpenter
Atty's.

UNITED STATES PATENT OFFICE.

FRED G. FOSS, OF NEWARK, NEW JERSEY, ASSIGNOR TO AMERICAN CAN COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW JERSEY.

PROCESS OF DRYING CANS.

1,375,373. Specification of Letters Patent. Patented Apr. 19, 1921.

Application filed March 3, 1919. Serial No. 280,496.

To all whom it may concern:

Be it known that I, FRED G. FOSS, a citizen of the United States, residing in Newark, in the county of Essex and State of New Jersey, have invented a new and useful Improvement in Processes of Drying Cans, of which the following is a specification.

This invention relates in general to the art of drying cans, and the invention has particular reference to the rapid drying of cans that have been cleaned or sterilized, as for example by hot or cold water or steam.

An important object of the invention is the provision of a rapid process for effecting such a drying operation and which may be practised through the use of sturdy simple machinery which may if desired be entirely automatic in its action.

A still further object of the invention is the provision of a process that will effect the rapid drying of the can without the use of high heat or other agencies likely to affect the can or other article being dried.

Numerous other objects and advantages of the invention will be apparent from the following description of the process taken in connection with the description of the apparatus shown on the accompanying drawing and which may be utilized in the practice of the invention.

Referring to the drawings,

Figure 1 is a vertical section taken through an apparatus embodying my present invention.

Fig. 2 is a side elevation of the same.

Fig. 3 is a top plan view thereof.

Fig. 4 is an enlarged partial view similar to Fig. 1 and showing the relative position of parts of the apparatus at the completion of the drying operation.

Fig. 5 is a section taken substantially on the line 5—5 of Fig. 4, and

Fig. 6 is a partial section of Fig. 1 taken at the plane indicated at 6—6 in Fig. 1.

The invention contemplates the application of a rapidly moving current of air into and out of the can and passing at some point in its travel or path in intimate contact with the sides of the surface being dried and at relatively high velocity. The air is either sucked into the can or forced out through it, and in passing a restricted portion of the side wall is moved through a constricted passageway so that its velocity at this point is high and in intimate contact with the wall, the movement being preferably parallel with the surface of the wall being dried. While the process is capable of utilization in various forms of apparatus a convenient method of practising it consists in mounting the cans in holders and producing a relative movement between the holders and plungers or bodies of dimension only slightly less than that of the can, so that when the plunger enters into the can, a small space is left between it and the adjacent can surface. The air is either drawn into or forced out through the plunger and into the space in the can between the plunger and can bottom. This causes the air to pass out or in in the form of a thin cylinder defined between the inner can surface and the outer plunger faces. The plunger is given a movement preferably into the can commensurate with the rate of drying and the drying action, and in any event the drying action is progressive since if the speed of the entrance of the plunger be greater than the complete drying at the side of the can, parts of it at least will be dried in advance of other parts. A form of apparatus of this character is disclosed for purposes of illustration in the drawings and may be described as follows:—

Reference character 11 indicates a yoke having a shaft bearing 12 at its upper end and a shaft bearing 13 therebeneath connected by cross members 14 with a companion yoke 15, also having bearings 16 and 17 in alinement with bearings 12 and 13. A shaft 18 is provided to extend through the bearings 12 and 16, and this shaft carries upon it a turret or wheel 19 which moves with the shaft. The outer circumferential edge of this turret is provided with gear teeth 21 meshing with a pinion 22 upon a shaft 23 in bearings 13 and 17. The pinion 22 is connected with a beveled gear 24 upon this shaft 23 which beveled gear in turn meshes with the companion gear 25 upon a power shaft 26 having an elongated bearing 27 upon the cross frame 14 and carrying at its outer end fast and loose pulleys 28 and 29. The power therefore applied to shaft 26 through the beveled gears 25 and 24 and then through pinion 22 imparts motion to the turret or wheel 19. Upon the shaft 18 a sleeve 31 is mounted and extends through the bearing 12, and this sleeve is held against

rotation by a spline or key 32. A cam member 33 is fixed upon the sleeve 31 and has a cam slot 34 for controlling the movement of a plurality of can holders or supports 35. Each of these can holders is mounted upon a pair of rods 36 fixed at one end at 37 in the turret or wheel 19 and extending out in parallelism with the axis of the wheel. The can holders are all substantial duplicates of each other and a detailed description of one of them will be sufficient for an understanding of the others.

Referring more particularly to Figs. 4 and 5, it will be noted that each can holder consists of a semi-cylindrical body 41 having an end web 42 at its outer end and having internal ribs 43 and 44 adapted to engage the outer surface of the can body and near the ends thereof. At the inner end each holder 41 is provided with a rib 45. The semi-cylindrical body 41 is provided with a pair of sleeves 46 formed integrally with the body and located beneath it. through which are disposed the two rods 36 extending out from the wheel 19. Between these sleeves is a boss 47 and a roller 48 is supported from this boss by a screw pin 49 extending through the roller and into a suitable threaded aperture in the boss. The roller 48 moves in the cam groove 34 and causes the can holder to move out and in with respect to the wheel, as is desired during the operation of the apparatus.

Extending out from the wheel are provided a plurality of hollow shafts or sleeves 51, one of which is located at each holder and is arranged with its central axis coincident with the axis of curvature of the cylindrical part of the holder. Each of these sleeves carries at its outer end a plunger or body 52 of the shape of the can to be placed in the holder having a size appropriate to cause it to enter into the can and leave a slight clearance or space between its outer surface and the inner surface of the can body. During the operation of the device the cans are deposited in the holders and each holder is then moved toward the wheel bringing the plunger 52 into the can, the movement continuing until the free end of the plunger approaches close to the bottom of the can.

The space between the plunger and the can body wall is utilized as an air passage and means are provided to cause air movement through this passage to effect a drying action. This air movement may be either by suction of air from the outside through the can and into the passageway 53 within the hollow shaft 51 or it may be by means of air forced through the opening 53 in the hollow shaft 51 and then out from the passage between the plunger and can. The air movement is produced by suitable suction or pressure exerted through a pipe 54 opening at 55 into an arcuate chamber 56 (Fig. 1) provided in the body of the cam member 33.

The chamber 56 is open at one side at 57 throughout its length, and in the wheel are provided pockets 58, one for each holder and plunger arrangement. Each of these pockets is indicated by a pipe 59 with the coupling 61 connected to the hollow shaft 51 of the plunger.

It is thus seen that throughout the operation of the movement during which the opening of the pocket 58 is in communication with the chamber 56 there will be created an air impelling force either into or out of the can that, as will be later described more in detail, produces the actual drying.

Referring now to Fig. 2, it will be noted that a suitable feed 62 is provided at one point in the travel of the apparatus for automatically delivering cans to the holder. In the illustrative embodiment of the invention shown on the drawing, the feeding station is located at the top of the apparatus so that the cans enter by gravity into the pockets. Immediately upon the entrance of the cans into the pockets the holder is caused to approach the plunger and by the time the plunger has entered a short way into the can the air action is started by the establishment of communication between the hollow shaft and the air chamber or chest in the cam member. The air application is thus started before the plunger has moved an appreciable distance into the can, and rapidly moving air is thus caused to pass between the portion of the can wall extending about the plunger and the plunger itself. The action of this air is effected very rapidly, drying this part of the can wall, and the forward movement of the plunger progressively dries the wall as it nears the bottom. The outer edges 71 of the plunger are preferably sharp so that the current of air when the can is substantially entirely upon the plunger, as shown in Fig. 4, will be directed into the seam at the bottom and dry this portion also.

It has been found in practice that very rapid drying may be accomplished by such an apparatus and that the rate of this drying depends upon the size of the space about the plunger. The end web 42 of the holder acts to hold the can against outward movement where the air is forced in through the shaft 51, and projections formed by pins 72 are provided in the end of the plunger to hold the cans against too close contact with the outer face of the plunger when suction is applied to draw the air in the opposite direction. The rib 45 acts as an efficient stripper for the can in withdrawing the plunger, and this rib may be formed as shown to approach in close proximity to the outer face of the plunger in order that unflanged cans and the like may be properly operated upon.

The cans are automatically discharged into a chute 73 located well around the circumference from the feed chute 62 into which the can rolls after the holder has been withdrawn from the plunger (Fig. 3).

The action of the apparatus is to concentrate a rapid flow of air in contact with a relatively small area of can surface and to advance the effective area of the can surface as the flow of air dries preceding portions.

By changing the locality, on the can-surface, of the restriction of the air current the most rapid and violent portion of the current consists of fresh and dry air, and the moisture is progressively encountered by dry air as distinguished from moisture laden air which has already acted on a moist can-surface. If desired the air may be sterilized and washed before being introduced into the can, and in any event traveling at relatively high velocity it materially helps toward the sterilization and cleaning of the can by its action upon portions of the can after they are dried.

It will be apparent that in each revolution of the turret or wheel 19 each can carried thereby is turned once around its own axis. In a partial revolution the can is turned partially around its own axis. This turning of the can causes the moisture on its surface to flow or be distributed or thinned out by motion or gravity, so that it is very rapidly taken up by the air, with corresponding hastening of the drying operation.

It is believed that the invention and many of its attendant advantages will be understood from the foregoing without further description, and it will be apparent that the process is capable of wide application, being adapted for external as well as internal drying should such external drying in particular articles be desirable, and all without departing from the spirit and scope of the invention or sacrificing any of its material advantages.

I do not claim herein the apparatus disclosed, the same being the subject of my companion application Serial No. 280,495, filed March 3, 1919.

I claim:

1. A process for drying cans and the like which comprises directing a flow of air against restrictive portions of the can surface to be dried and changing the locality of such restriction to progressively dry the entire surface.

2. A process for drying cans and the like comprising directing a flow of air rapidly past portions of the can and in a direction parallel with the surface being dried, and turning the can during such operation.

3. A process for drying cans and the like comprising restricting the air space to cause a current of air to be confined substantially to a small space circumferential of the can and also endwise thereof, and applying said current of air to successive portions of the surface being dried to progressively dry said surface.

4. A process for drying cans and the like comprising passing a current of air into and out of a can body, maintaining a portion of the path of said air to a restricted passageway in contact with the can body, and varying said passageway during the operation of said current.

5. A process for drying cans and the like comprising applying a rapidly moving current of air to a circumferential portion of the can and advancing the application of said current to successive portions of the body.

6. A process for drying cans and the like comprising applying a rapidly moving current of air to a circumferential portion of the can and advancing the application of said current to successive portions of the body lengthwise of the can.

Signed in the presence of two subscribing witnesses.

FRED G. FOSS.

Witnesses:
D. F. MENNIS,
GEORGE W. WHEELWRIGHT.