April 2, 1963 A. FISCHER ET AL 3,083,683

PROCESS AND APPARATUS FOR CLEANING AND POLISHING CONTAINERS

Filed Oct. 27, 1960

Fig. 1

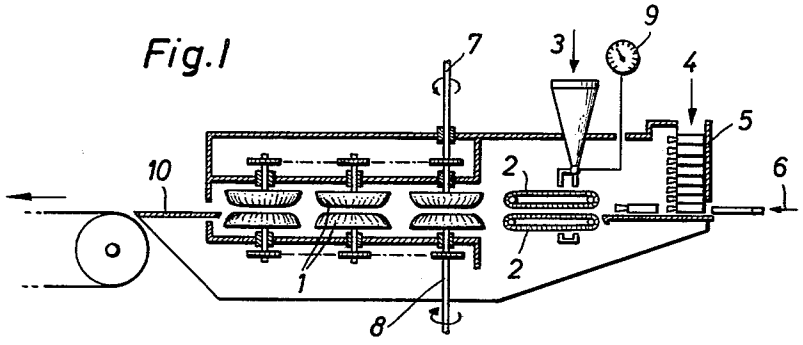


Fig. 1a

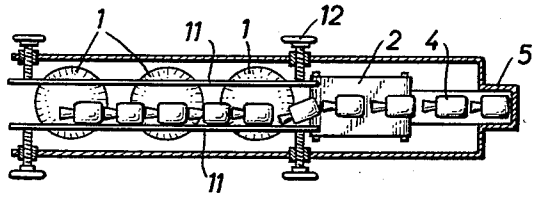
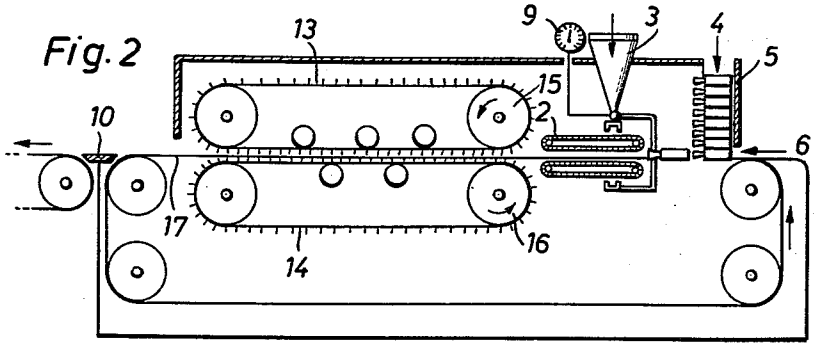


Fig. 2



INVENTORS
Andreas Fischer
Gunther Kaiser
BY Herbert Kaiser

Michael S. Striker
Attorney

United States Patent Office

3,083,683

Patented Apr. 2, 1963

3,083,683
PROCESS AND APPARATUS FOR CLEANING AND POLISHING CONTAINERS

Andreas Fischer, Memmingen, Allgau, and Gunter Kaiser and Herbert Kaiser, Krefeld-Urdingen, Germany, assignors to H. Strunck & Co. Maschinenfabrik, Koln-Ehrenfeld, Germany

Filed Oct. 27, 1960, Ser. No. 65,314
Claims priority, application Germany Oct. 30, 1959
3 Claims. (Cl. 118—106)

The present invention relates to a process and apparatus for polishing containers.

In many industries it is necessary to fill containers with various commodities and then it is necessary to label the filled containers. Of course, it is also essential to provide containers which have clean exterior surfaces, and at the present time it is customary to clean the exterior surfaces of the containers by hand. Thus, it is customary at the present time to convey the filled and labeled containers on a suitable conveyor band on opposite sides of which are located attendants who will with suitable rags and the like clean and polish the exterior surfaces of the containers.

Although attempts have been made to clean the containers automatically, in all of the known devices for this purpose the containers are cleaned by having cleaning compositions supplied thereto at an elevated temperature or by having watery or alcohol containing compositions supplied thereto, and as a result the cleaning and polishing necessarily take place before the labels are applied to the containers. Thus, the containers unavoidably become soiled during the labeling operations so that further cleaning is required.

One of the objects of the present invention is to provide a process and apparatus for cleaning and polishing containers in such a way that the above-mentioned drawbacks are avoided. Thus, according to the invention, the containers are efficiently cleaned and polished without the use of elevated temperatures, watery or alcoholic cleaning compositions.

Another object of the present invention is to provide a process and apparatus capable of efficiently cleaning containers which already have labels applied thereto without in any way injuring the labels even though the cleaning action is intense.

An additional object of the present invention is to provide a fully automatic process and apparatus capable of continuously moving the containers through the apparatus along a given path while automatically applying a polishing and/or cleaning composition to the containers and while automatically cleaning and polishing the containers.

It is also an object of the present invention to provide an automatic apparatus capable of accomplishing the above objects and at the same time composed of simple rugged elements which are very reliable in operation.

With the above objects in view, the invention includes in a container polishing process the steps of transporting the containers along a given path and polishing the containers with a polishing composition simultaneously with the movement of the containers along this path.

Also, in accordance with the present invention, there is provided an apparatus which includes a directing means for directing the containers along the given path and a pair of polishing means cooperating with the containers while they move along this path for applying to the containers a pair of polishing surfaces which respectively move in opposite directions simultaneously with the movement of the containers along the path and engaging the containers to polish the latter, a suitable polishing composition having been applied to the containers.

The novel features which are considered as characteristic for the invention are set forth in particular in the appended claims. The invention itself, however, both as to its construction and its method of operation, together with additional objects and advantages thereof, will be best understood from the following description of specific embodiments when read in connection with the accompanying drawings, in which:

FIG. 1 is a diagrammatic side elevation of one possible apparatus according to the present invention;

FIG. 1*a* is a sectional plan view of the structure of FIG. 1 taken between upper and lower polishing elements of FIG. 1; and

FIG. 2 is a diagrammatic side elevation of another embodiment of an apparatus according to the present invention.

Referring now to FIG. 1, the containers 4 which are to be polished may take the form of relatively flat containers having flat upper and lower faces, as viewed in FIG. 1, and these containers are stacked one above the other in magazine 5 shown diagrammatically at the right end portion of FIG. 1. A reciprocating ejector plunger 6 reciprocates into and out of the lower end of the magazine to eject therefrom the lowermost container in a manner causing the containers to move one after the other in succession out of the magazine 5 and to the left, as viewed in FIG. 1. The reciprocating plunger 6 is preferably driven pneumatically and serves to deliver the containers 4 one after the other to the endless bands 2 which have their inner runs, which are located near to each other, moving to the left, as viewed in FIG. 1, so that these bands 2 serve to continue the movement of the containers to the left, as viewed in FIG. 1. The endless bands 2 are driven through any suitable drive so that the lower run of the upper belt 2 and the upper run of the lower belt 2 move to the left, as viewed in FIG. 1, and these belts are made of a fabric or other material capable of absorbing a polishing composition which may be in liquid form and may be derived from the container 3. The container 3 communicates with a lower framework through which the belts 2 pass, as indicated diagrammatically in FIG. 1, and a timing mechanism 9 cooperates with a lower discharge valve of the container 3 for discharging at predetermined timed intervals predetermined amounts of the polishing composition which preferably is silicone oil, although various waxes may also be used. The structure of the invention may be placed in line directly after the labelling machine to receive the containers directly from the labelling machine, and the property of the cleaning composition whether silicone oil, wax, or the like is such that it will have no undesirable effect on the label. The polishing and/or cleaning composition is absorbed into the bands 2 and distributed through the latter onto the several containers 4 as they move successively through the gap between the bands 2. The endless belts 2 serve to deliver the containers which have thus had the polishing agent applied thereto to the directing means which serve to direct the containers to the left from the bands 2 to the plate 10 from which the cleaned and polished containers are removed in any suitable way as by the conveyor shown at the left of FIG. 1. Thus, the bands 2 not only serve to transport the containers, but in addition because the bands 2 carry the polishing composition they apply the polishing composition to the containers. The control 9 guarantees that bands 2 are provided with a supply of polishing agent to be applied to the several containers as they are transported by the bands 2. The control 9 also guarantees that too much polishing agent is not applied to the containers.

In the embodiment of FIGS. 1 and 1*a*, the directing

means which directs the containers from the bands 2 along a given path takes the form of a pair of bars 11 which are carried by the screw members 12. These screw members 12 are supported for rotary movement by nuts, respectively, which are carried by the frame of the machine and which are stationary, and at their free ends these screw members 12 carry the bars 11 while being turnable with respect thereto. Thus, the bars 11 may fixedly carry sleeves into which the free ends of the screws 12 extend, and these free ends of the screws 12 may be formed with annular grooves which receive pins carried by the sleeves and extending into these grooves so that in this way the bars are carried by the screw members and the latter are turnable with respect to the bars. Because of the threaded connection of the screw members with the frame these screw members 12 are capable of being turned so as to cause the guide bars 11 to approach each other or to move away from each other and thus the path defined between the guide bars 11 can be accommodated to different types of containers.

As the containers are guided by the directing means 11, along the path defined between the bars 11 which form the directing means, these containers are polished by a pair of polishing means. In the embodiment of FIG. 1 the pair of polishing means are each formed by a plurality of polishing discs 1. Thus, it will be seen that a plurality of lower polishing discs 1 are located below the bars 11 closely adjacent thereto while a plurality of upper polishing discs 1 are located above the bars 11 and closely adjacent thereto, so that these bars 11 are supported between the rotary polishing discs. These discs are supported for rotation about their axes, respectively, and below each upper polishing disc is a lower disc, as is apparent from FIG. 1. The right polishing discs of FIG. 1 are fixed to the drive shafts 7 and 8, respectively, which are driven from any suitable motor in the directions indicated by the arrows in FIG. 1. Thus, these shafts 7 and 8 rotate in opposite directions and of course, the discs fixed thereto rotate in opposite directions. The polishing discs may each take the form of a rigid circular plate which carries a covering of lambskin or the like. The several shafts which are fixed coaxially to the several discs respectively fixedly carries sprocket wheels and the series of upper polishing discs have their sprocket wheels connected to a chain which takes the drive from the shaft 7 and transmits it to all of the polishing discs, and the lower discs are driven in a similar way. Thus, the series of upper discs all rotate in directions different from the series of lower discs and the speeds of rotation of the upper discs which form one of the polishing means may be different from the speeds of rotation of the lower discs which form the other of the polishing means. It should be noted that the several sprocket wheels of the upper discs, for example, need not be of the same diameters so that the several upper discs can have different speeds of rotation, and the same is true of the several lower discs 1.

The movement of the several containers through the gap between the pair of polishing means along the path determined by the directing means 11 takes place automatically due to the engaging of each container by the next following container, as well as due to the action of the discs 1. The bands 2 deliver the containers one after the other to the first pair of polishing discs. In accordance with the particular directions of rotation of the discs which rotate rapidly the containers will be moved into engagement with one or the other of the guide bars 11, and since the containers are spaced from the common axis of the pair of discs they are acted upon by centrifugal force and tend to be thrown away from the axes of the rotating discs toward the one or the other of the guide bars. Since the movement of the containers by centrifugal force is prevented by the guide bars the centrifugal force cooperates with the guide bars to advance the containers one after the other continuously to

the left, as viewed in FIG. 1*a*, and thus, in this way the several containers are continuously transported to the plate 10 along which they move to the conveyor means shown at the left of FIG. 1. The speeds and directions of rotation of the discs can be varied as desired and the adjustment of the bars 11 can also be varied as desired so as to provide the best possible action in accordance with the particular containers which are being handled. Since the containers are flat in that they have narrow side edges and rather large top and bottom faces, they are polished on these top and bottom faces with the apparatus and process of the invention. It should be noted that the bars 11 need not be positioned parallel to the plane in which the axes of the several discs are located. Thus, these bars 11 may also be positioned at any desired angle with respect to this plane.

In the embodiment of the invention which is illustrated in FIG. 2, a pair of endless polishing bands 13 and 14 are provided instead of a series of rotary polishing discs, and the drive for the pulleys of these bands rotates the right hand pulleys of FIG. 2 in the directions of the arrows 15 and 16. Thus, the lower run of the band 13 will move to the right while the upper run of band 14 will move to the left, and thus the containers as they are polished by engagement with these runs will, of course, be polished by the surfaces which are moving in different directions, and, of course, separate drives may be provided for the bands 13 and 14 so as to move them at different speeds. The structure which supplies the containers one after the other to the polishing bands 13 and 14 is substantially identical with that of FIG. 1, as is apparent from a comparison of FIGS. 1 and 2. The principal difference between the embodiments of FIGS. 1 and 2, aside from the bands 13 and 14 which replace the rotary discs, is the fact that in the embodiment of FIG. 2 an additional endless band 17 is provided and is driven in any suitable way so that its upper run moves to the left, as viewed in FIG. 2. This band 17 passes beneath the magazine 5 and the band 17 is formed with a series of cutouts which conform to the configuration of the containers 4 so that these containers 4 successively move into the cutouts of the band 17 to be moved by the latter to the left through the bands 2 so as to be provided with the polishing composition and then through the gap between the bands 13 and 14 so as to be polished, and the containers finally being delivered to the plate 10 from which they are carried away in the manner described above. The plunger 6 may be incorporated in the embodiment of FIG. 2 for successively ejecting the containers to a position where they successively become located in the openings of the band 17 as the latter moves continuously, or the band 17 itself may have its successive openings successively engage the containers as they reach the bottom of the magazine to remove the latter without the use of a plunger, such as the plunger 6. The bands 13 and 14 may be made of lambskin or any other suitable material capable of providing the desired polishing.

As has been indicated above, the apparatus of the invention may be placed directly after a labelling machine to receive the labelled containers therefrom and to automatically continue the movement of the containers so that they are cleaned and polished in a fully automatic manner. The structure for applying the polishing composition to the containers may be stationary, and it is apparent where a conveyor such as the conveyor 17 is used the containers will be moved past a stationary source for the polishing composition which is applied to the containers. The speed of operation of the different polishing elements may be adjusted in a stepless fashion. In the case of the embodiment of FIG. 2 suitable stationary plates are located beneath the upper run of the band 17 to prevent the containers from falling through the openings in the band 17. Of course, the bands 2 are located close enough to the discs 1 or the bands 13 and 14 to

deliver the containers thereto without any support beneath the band **17**, but suitable supporting plates may be located between the magazine and bands **2** as well as between the polishing belts **13** and **14** and the pulley which directs the band **17** to its point closest to the plate **10**.

It will be understood that each of the elements described above, or two or more together, may also find a useful application in other types of polishing process and apparatus differing from the types described above.

While the invention has been illustrated and described as embodied in container polishing process and apparatus, it is not intended to be limited to the details shown, since various modifications and structural changes may be made without departing in any way from the spirit of the present invention.

Without further analysis, the foregoing will so fully reveal the gist of the present invention that others can by applying current knowledge readily adapt it for various applications without omitting features that, from the standpoint of prior art, fairly constitute essential characteristics of the generic or specific aspects of this invention and, therefore, such adaptations should and are intended to be comprehended within the meaning and range of equivalence of the following claims.

What is claimed as new and desired to be secured by Letters Patent is:

1. In an apparatus for polishing containers, in combination, directing means for directing containers along a given path; polishing means located adjacent said directing means and engaging each container for polishing each container as it is directed along said path by said directing means; supply means cooperating with said directing means for supplying containers in succession to said directing means to be directed by the latter along said path, said supply means having liquid-absorbing elements which engage and transport the containers to said directing means; and means for delivering to said liquid-absorbing elements of said supply means a liquid polishing composition which is absorbed by said elements and applied to the containers by contact between the latter with said liquid-absorbing elements, so that the containers will have a film of said composition thereon when the containers reach said directing means.

2. In an apparatus for polishing containers, in combination, directing means for directing containers along a given path; polishing means located adjacent said directing means and engaging each container for polishing each container as it is directed along said path by said directing means; supply means cooperating with said directing means for supplying containers in succession to said directing means to be directed by the latter along said path, said supply means including liquid-absorbing elements which engage the containers and transport the same to said directing means; and means cooperating with said supply means for supplying to said liquid-absorbing elements of the latter a liquid polishing composition to an extent sufficient to maintain said liquid-absorbing elements only moistened with said composition so as to apply the composition to the containers only to an extent sufficient to leave on the containers a film of said composition when the containers reach said directing means

3. In an apparatus for polishing containers, in combination, a pair of endless transporting bands having, respectively, a pair of parallel runs directed toward but spaced from each other and adapted to move in the same direction so that containers located between said runs of said bands will be moved thereby in said direction, said bands being made of a material which is capable of absorbing liquid; means cooperating with said bands for maintaining the same moistened with a liquid polishing composition which is applied to the containers by contact of the latter with said bands simultaneously with the transportation of said containers by the bands, whereby the containers when they move beyond the bands may be polished with the composition which has been applied thereto by contact with said bands, said bands having a receiving end for receiving containers between said parallel runs thereof and a discharge end for discharging the containers from said bands; means located at said receiving end of said bands for delivering containers one after the other to said receiving end of said bands; and means located at said discharge end of said bands for receiving containers from said bands and for polishing the containers.

References Cited in the file of this patent

UNITED STATES PATENTS

582,509	Seufert	May 11, 1897
943,247	Hediger	Dec. 14, 1909
1,053,130	Morral	Feb. 11, 1913
1,312,589	Small	Aug. 12, 1919
1,638,606	Wadsworth	Aug. 9, 1927
1,776,784	Cramer	Sept. 30, 1930
2,092,686	Wilson	Sept. 7, 1937
2,565,036	MacDonald	Aug. 21, 1951
2,868,162	Knain	Jan. 13, 1959
2,955,047	Terry	Oct. 4, 1960