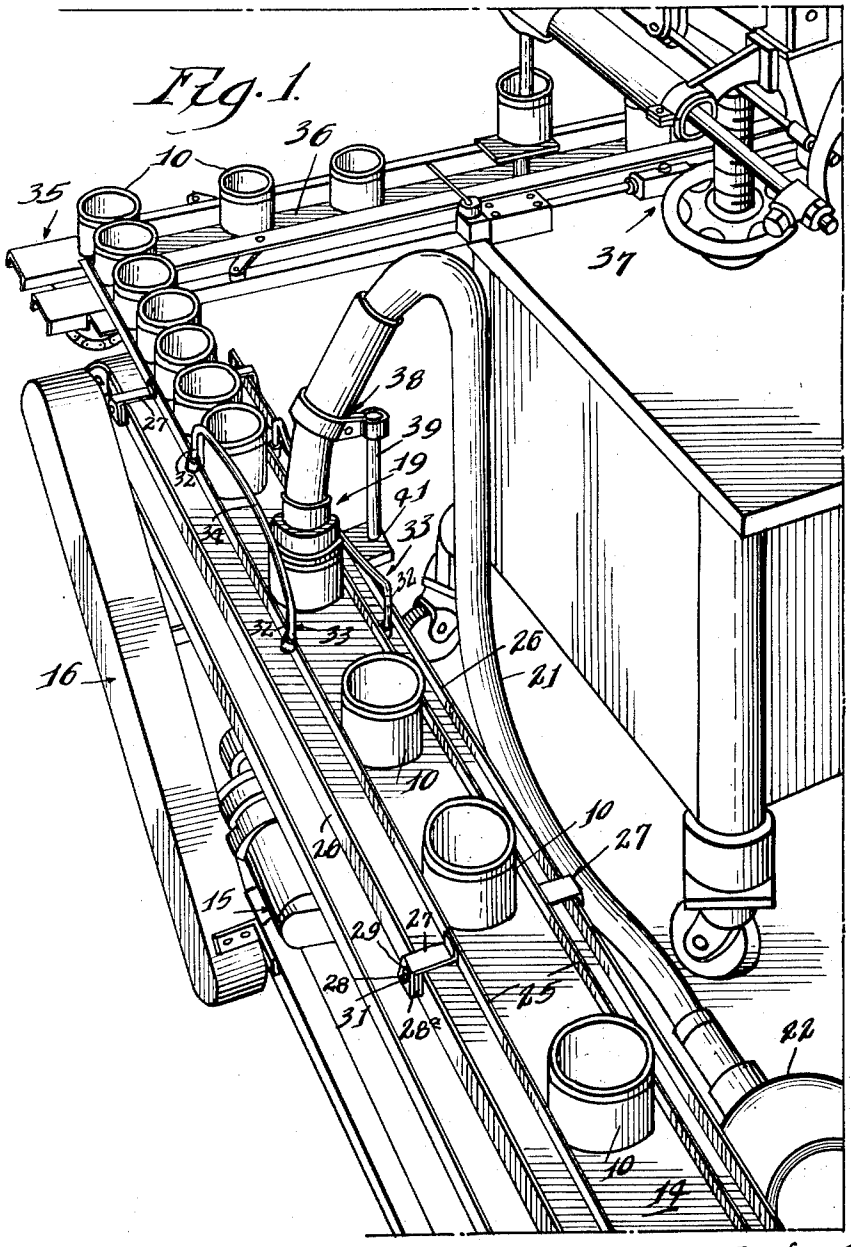
Dec. 22, 1959 W. A. WALBERER 2,917,768

AIR CLEANING MACHINE FOR CONTAINERS

Filed May 8, 1957 2 Sheets-Sheet 1

Fig. 1.



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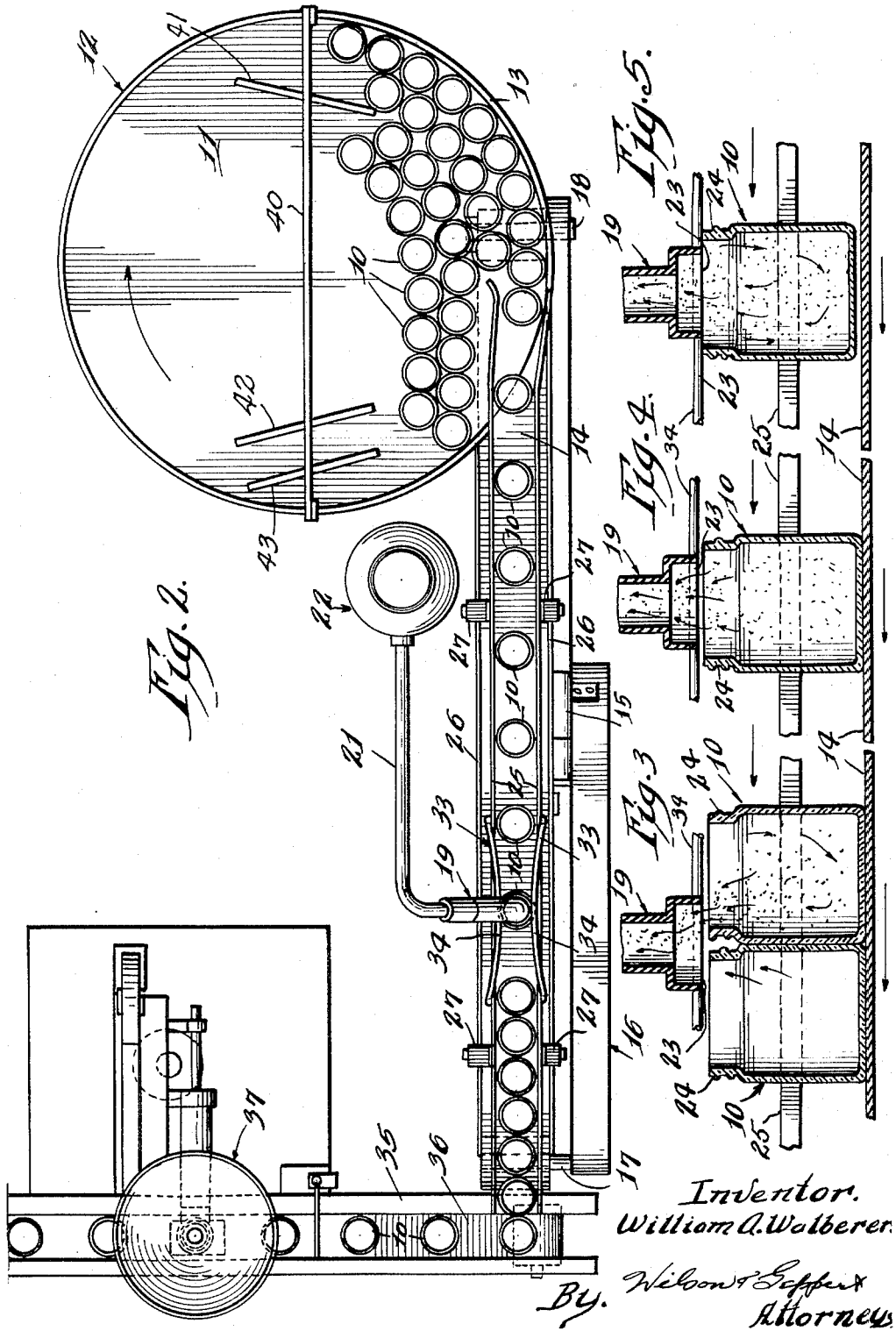


Fig. 2.

Fig. 5.

Fig. 4.

Fig. 3.

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AIR CLEANING MACHINE FOR CONTAINERS

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3 Claims. (Cl. 15—304)

The present machine comprises a novel means and manner of cleaning jars or other containers prior to filling such containers with a food product.

In the food packing industry where a food product is to be packaged in a glass jar or other container, it has been required that these new jars prior to use be thoroughly washed and dried. This has been a time-consuming and expensive operation, particularly in the delay encountered in thoroughly drying the washed jars before filling may be accomplished.

As these empty new jars are thoroughly cleansed by the manufacturer before they are packaged and delivered in cartons for use, and are removed from their cartons only prior to being filled with a food product and sealed, foreign matter that may have collected in the jars is generally lint or particles of paper and the like from the cartons.

By means of the present invention any foreign matter collected in the jars or containers prior to filling is quickly and effectively removed by suction through operation of an air cleaner in the novel manner herein disclosed.

It is, therefore, an important object of the present invention to provide a novel means for cleaning in sequence jars or containers prior to their delivery to a filling machine.

A further object is the provision of a novel means and manner of positively and quickly removing, without the previously required steps of washing and drying, any foreign matter collected in jars or containers prior to their being fed in sequence to a filling machine.

Another important object of the present invention is to provide a novel vacuum cleaning system for cleaning containers for food products by passing the open containers under or past a suction nozzle in such manner that all foreign matter is quickly and effectively removed by suction.

In the disclosed embodiment, the jars as they are received from the manufacturer thereof, are deposited upon a revolving disc of an unscrambling device and from this disc supplied to a conveyor, the speed of rotation of the disc and speed of travel of the conveyor being such that the jars are deposited on and carried by the conveyor in spaced relation. As an open-ended jar is being moved and comes under the influence of the suction nozzle, air is caused to swirl about the interior of the jar and as the jar continues its travel it is centered beneath the nozzle and elevated against spaced stops where it is held until the next jar contacts and pushes the first jar from beneath the nozzle, whereupon this succeeding jar is carried under and centered beneath the nozzle until dislodged by the next jar.

By providing the suction unit or air cleaning system with a nozzle of somewhat less diameter or cross section than the mouth of the jar, air continues to enter the jar through the annular space about the nozzle while the jar is elevated and held in centered position and is continuously exhausted therefrom. As the suction is continuously applied, air swirls about the interior of the jar and effectively removes therewith all foreign matter when exhausted.

Further objects are to provide a construction of maximum simplicity, efficiency, economy and ease of assembly and operation, and such further objects, advantages and capabilities as will later more fully appear and are inherently possessed thereby.

In the drawings:

Figure 1 is a fragmentary view in perspective of the novel suction cleaning system of the present invention, the view showing a plurality of jars or containers being conveyed to a position beneath the nozzle of the system whereby any foreign matter that may have collected in these jars is quickly and effectively removed prior to their delivery to a filling machine.

Fig. 2 is a top plan view of the complete air cleaning system located adjacent a filling machine and showing a plurality of the jars being fed from the rotating disc of an unscrambling device and delivered onto a conveyor for delivering the jars in spaced relation to a position beneath a suction nozzle and after the jars are air-cleaned conveying them to a filling machine.

Fig. 3 is a fragmentary view in vertical cross section showing two jars and the conveyor means, the jar to the left having been cleansed of foreign matter and being moved from beneath the suction nozzle by contact of the succeeding jar.

Fig. 4 is a fragmentary view in vertical cross section through a jar moved by the conveyor to a centered position beneath the suction nozzle.

Fig. 5 is a view similar to Fig. 4, but showing the centered jar lifted by suction to a position in which the upper edge of the neck engages and is held against spaced stops until disengaged by the next jar.

Referring more particularly to the disclosure in the drawings and to the novel embodiment selected as illustrative of the present invention, the jars or other containers **10** to be filled with a food product are delivered by the manufacturer in cartons from which these jars are deposited upon a rotating disc **11** of an unscrambling device **12**, and carried by this disc when rotated in a clockwise direction against an upstanding wall **13** and onto a conveyor **14**. This conveyor may be a belt or of expanded metal and driven from a motor or other power source **15** through a drive chain and sprocket wheels within the hood or cover **16** for rotating a drive shaft **17** and a driven shaft **18** at the opposite ends of the conveyor **14**.

The unscrambling device **12** includes the upstanding wall **13** extending substantially around the periphery of the device. A bar **40** extends across the device and is attached at the top of opposite sides of wall **13**. Depending from bar **40** are spacer bars **41, 42, 43** which are so arranged as to contact the jars on the rotating disc **11** and direct said jars toward the outside wall **13**. Thus the jars or containers are positioned to be fed onto conveyor **14**.

The conveyor **14** and the rotating disc **11** which is preferably also driven by the motor **15**, are operated in timed relation whereby successive jars **10** are delivered by the disc onto the conveyor **14** upon which they are moved in spaced relation toward a suction nozzle **19** on the end of a hose **21** of a suction cleaner **22**. The intake **23** of the nozzle is of smaller external diameter or cross section than the internal diameter of the opening in the neck **24** of each jar or container **10** to be filled whereby air is effectively drawn into each jar as it is moved by the conveyor beneath the suction nozzle **19** and when aligned therewith.

To align and maintain aligned the jars to be cleansed by the relatively strong suction from the suction cleaner

22, the jars carried by the conveyor in spaced relation are directed between spaced bars 25 with each bar adjustably mounted upon a side rail 26 arranged at each side of the conveyor 14. To permit such adjustment to accommodate jars of different sizes or capacities, each bar 25 is supported by spaced brackets 27 with each bracket having a depending leg 28 provided with an elongated and vertically arranged slot 29 and a bolt 31 for anchoring the leg 28 and its bracket 27 at a desired elevation above the conveyor 14.

Upon each bar 25 adjacent the suction nozzle 19 is mounted the depending ends 32 of an inverted U-shaped bracket 33 comprising a rod bent in such manner that its upper connecting portion 34 is contoured or curved inwardly to extend above and spaced from the upper edge of the neck or upper open end 24 of each jar 10 as the jar is conveyed beneath the nozzle 19. To adjust each bar 25 across or laterally of the conveyor 14, one or more spacers or shims 28a may be placed under the depending legs 28. Thus jars or other containers 10 of varying sizes both as to the diameters of their open ends and of their heights may be accommodated by the present air cleaning unit.

While it is not intended that containers differing substantially in size be simultaneously cleansed by the present invention, it is a simple matter to adjust the bars 25 after cleaning and filling containers of one size to accommodate jars of a substantially larger or smaller size. Furthermore, it is comprehended and a simple matter to change the size of suction nozzle 19 for use in cleaning containers having an opening substantially larger or smaller than disclosed.

As each of the jars 10 is fed in spaced relation by the conveyor to a position beneath the suction nozzle 19, when the neck 24 of a jar enters the suction area beneath the adjacent edge of the nozzle, the applied suction causes substantial turbulence of the air in the jar and assures the removal of all foreign matter therefrom in the manner shown in Fig. 3. Turbulence and circulation of the air continues until that jar is withdrawn from beneath the nozzle.

When the jar is centered beneath the nozzle as in Fig. 4, the applied suction lifts the jar from the conveyor 14 in the manner shown in Fig. 5, until the upper end of the neck 24 abuts the underside of the connecting portion 34 of the spaced brackets 33 and is prevented thereby from being further lifted by the suction. In this position an annular space exists for the entrance of air between the outer circumference or periphery of the nozzle 19 and the inner diameter of the neck 24 of the jar 10 so that the jar is held above and prevented from continuing its travel with the conveyor 14 until it is dislodged and again deposited on the conveyor. This occurs when the next jar travelling on the conveyor contacts the preceding jar that is beneath and held stationary by the suction nozzle, and moves this preceding jar away from its centered position beneath the nozzle, whereupon it is lowered onto the conveyor and moved thereby out of the range or proximity to the suction nozzle. Thus each jar is moved in sequence and in timed relation into alignment with the suction nozzle, is lifted up by the continuing suction and is then displaced and removed by a succeeding jar.

Each jar so cleansed is then moved promptly onto a table or support 35 and by suitable conveying means 36 is moved thereby into a position beneath any conventional filling machine 37, whereby there is a minimum delay between the cleaning of these jars and the filling operation.

The suction nozzle 19 is detachably and adjustably mounted by means of a split collar 38 upon a pedestal 39 and base or bracket 41 attached to the supporting frame of the assembly. Thus the nozzle 19 may be accurately located and quickly assembled, removed or replaced by a nozzle of the same or different size.

Having thus disclosed the invention, I claim:

1. Means for removing from the open end of jars and other containers foreign matter collected therein before delivering said cleansed containers to a filling machine, comprising a conveyor, means for receiving and delivering these containers in spaced relation to said conveyor, adjustably mounted laterally spaced bars above said conveyor for maintaining the containers in aligned relation on said conveyor and suction means including a nozzle mounted in close proximity and to apply suction to the open end of successive containers as they are moved to and across the suction opening of the nozzle, said nozzle being of smaller external dimensions than the open end of said containers with suction from the nozzle effecting a turbulent air flow in each container as said container is moved by said conveyor into and out of centered position beneath said nozzle and exhausting foreign matter collected therein, and spaced members arranged above the open end of said containers adjacent said nozzle, said members being spaced apart a distance less than the width of said containers for intercepting the upper open end of the latter when elevated by the suction of said nozzle, each container having its open end opening toward and in close proximity to the nozzle whereby suction is applied to each of said spaced containers as soon as its open end is moved into the zone of influence of said nozzle, and as each container is moved by the conveyor to centered position below said nozzle the suction lifts said centered container from the conveyor into contact with said spaced members in which centered position air is drawn into the centered container about the periphery of the nozzle, and the centered container remains elevated and stationary until it is contacted and moved out of its centered position by the next container travelling on the conveyor which moves into centered position.

2. Means for removing from the open end of jars and other containers foreign matter collected therein, consisting of conveying means for receiving and delivering these containers in spaced relation, side rails positioned at each side of the conveying means, spacer bars mounted on said side rails for aligning these spaced containers upon the conveying means with the open end of said containers opening upwardly, suction means including a nozzle mounted above said conveying means and in a position to apply suction to the open end of each container as said container is conveyed toward and beneath said suction nozzle, the external diameter of said nozzle being less than the internal diameter of the open end of said containers, said containers being so aligned and carried on said conveying means in spaced apart relation and the nozzle and open end of said containers so related that when a container is conveyed to a position below but to one side of said nozzle, the open end of said moving container enters the suction area and the applied suction draws air into said container and causes turbulence therein while said container continues to move with said conveying means until said container reaches a position centered below the nozzle where said container is intercepted and lifted from the conveying means and momentarily held stationary by the applied suction with air being drawn into the container through the annular space about the periphery of the nozzle and between the nozzle and the encompassing open end of the container and foreign matter exhausted from the latter and spaced brackets mounted on said side rails adjacent the nozzle and extending inwardly over the tops of said containers for intercepting and limiting the height to which the centered container is lifted by the applied suction, said lifted centered container being moved from its centered, elevated position upon contact therewith of the next container with the latter forcing said container from beneath the nozzle and back onto the conveying means for travel therewith.

3. In an air cleaning system for removing from jars

or other containers foreign matter collected therein, an elongated conveyor for receiving and delivering said containers in spaced relation and with the open end of said containers opening upwardly, delivery means for receiving and delivering said containers to said conveyor in spaced relation, means for operating said conveyor and delivery means in timed relation, laterally spaced side rails extending parallel to the sides of said conveyor, spacer bars on said side rails for aligning said containers on said conveyor, spaced brackets disposed adjacent the nozzle and over the open end of said containers, a suction cleaning means consisting of a suction cleaner having a suction nozzle mounted above said conveyor with said containers carried by the conveyor moved under and with their open end in close proximity to said nozzle, said nozzle being of smaller external dimensions than the open end of said containers and said suction cleaner having means for applying a continuous suction to said nozzle whereby as each container is conveyed toward and into the area of influence of the nozzle air is caused to circulate violently and turbulently in the

container, said last mentioned container being carried by said conveyor until it is brought into centered position below the nozzle, whereupon air drawn into said container about the periphery of the nozzle lifts said centered container from the conveyor against said brackets and retains it stationary and suspended in elevated and centered position below the nozzle until said centered container is dislodged by contact therewith of the next and previously spaced container moving with the conveyor, after which said dislodged container drops back onto the conveyor and is conveyed thereby out of the area of influence of the nozzle.

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