Dec. 1, 1942. A. I. RISSER 2,304,050

CONTAINER CLEANING APPARATUS

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Fig. 1.

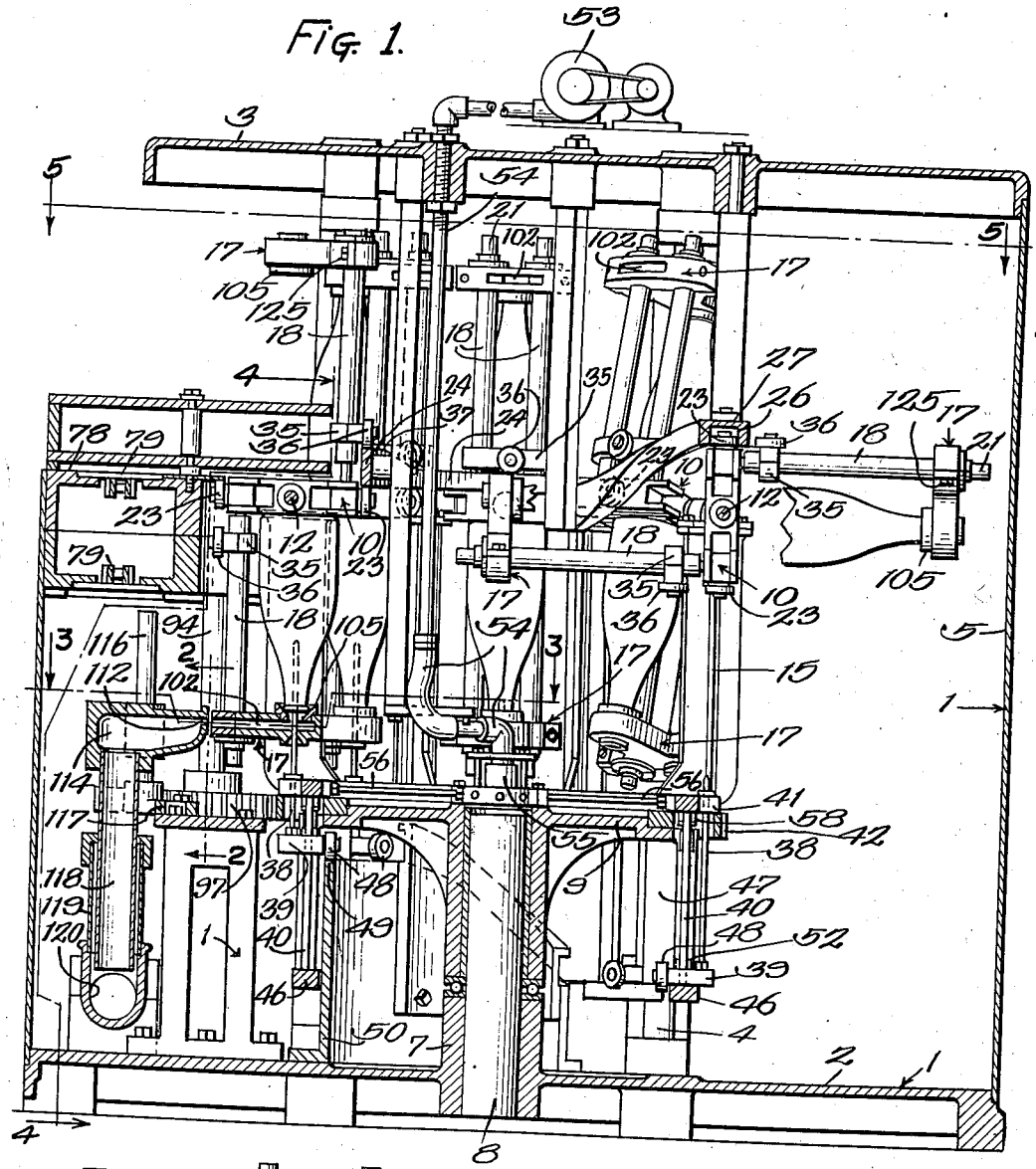
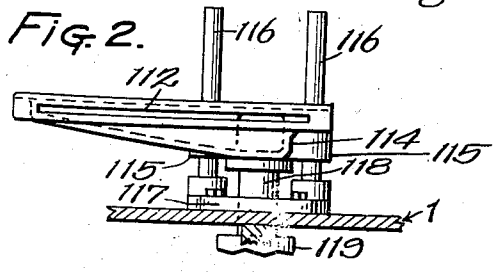


Fig. 2.



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FIG. 3.

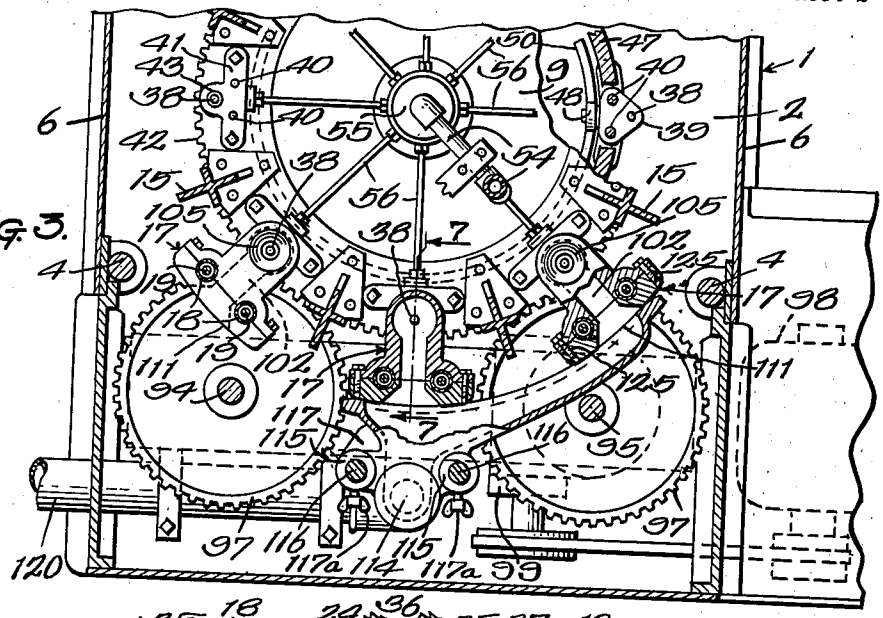
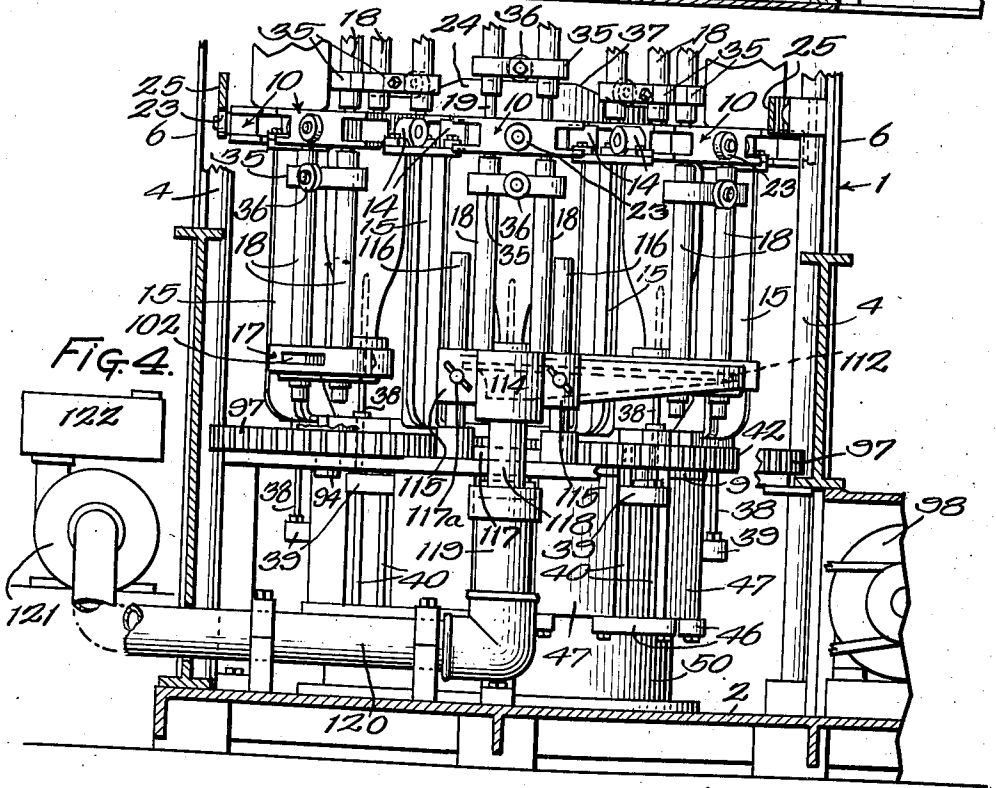


FIG. 4.



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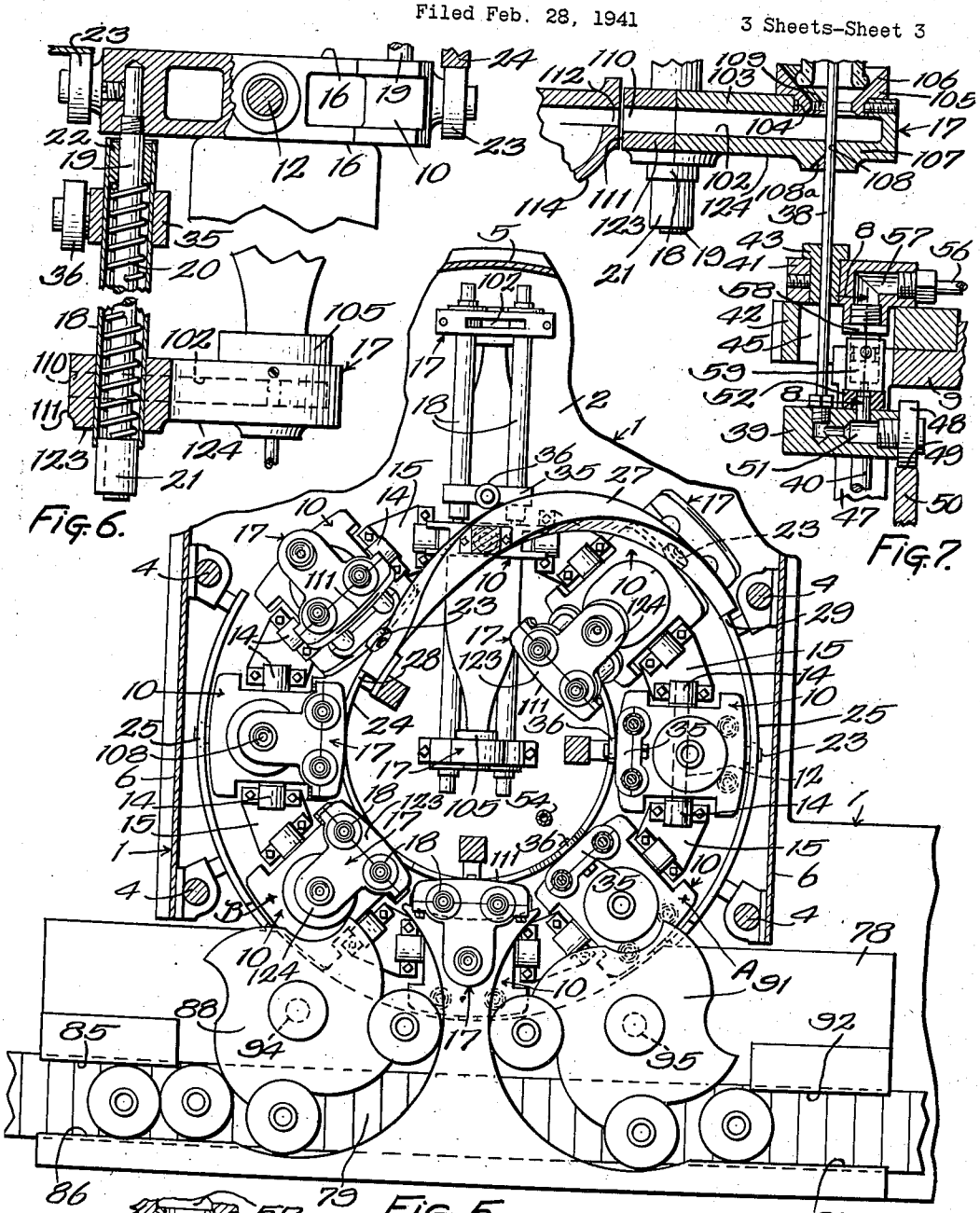


Fig. 5.

Fig. 6.

Fig. 7.

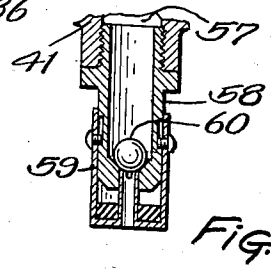


Fig. 8.

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UNITED STATES PATENT OFFICE

2,304,050

CONTAINER CLEANING APPARATUS

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Application February 28, 1941, Serial No. 381,038

4 Claims. (Cl. 15—14)

This invention relates to container cleaning apparatus, and more particularly pertains to such apparatus designed to remove dust or other foreign matter from new bottles by circulating therethrough a fluid cleaning medium, such as air, while the bottles are being conveyed in a continuous succession.

One of the main objects of the invention is to provide in connection with such apparatus the simplest and most effective means for collecting the dust or foreign matter that is being removed from the bottles to promote sanitation during the cleaning operation, and whereby the apparatus may be maintained in a clean condition in preventing same from getting out of order.

It may be stated that this invention is an improvement on the rotary type cleaning machine which constitutes the subject matter of my copending application Ser. No. 344,326, filed July 8, 1940, now Patent No. 2,280,424, wherein the bottles are received in an upright position, then inverted for a given period for the cleaning operation, and then discharged from the machine in an upright position while moving in a continuous succession.

Therefore, in order to provide the simplest means for removing dust from the bottles as they are cleaned, it is a further object to provide a unitary normally stationary suction cleaner head into cooperative relation with which the bottles are brought during the cleaning operation, and to provide the simplest possible dust conducting means for cooperating between each bottle and said suction cleaner means.

Other objects and advantages will become apparent by reference to the specification and the accompanying drawings, in which:

Fig. 1 is a vertical section of the machine as taken substantially through the center thereof, with certain parts broken away.

Fig. 2 is a detail section taken substantially on the section line 2—2 of Fig. 1.

Fig. 3 is a fragmentary plan section of the machine as taken substantially on the section line 3—3 of Fig. 1, but turned at right angles to the position it would assume as viewed from said figure.

Fig. 4 is a fragmentary vertical section of the machine as taken substantially on the section line 4—4 of Fig. 1.

Fig. 5 is a plan section of the machine as taken substantially on the section line 5—5 of Fig. 1, but turned at right angles to the position it would assume as viewed from said figure.

Fig. 6 is an enlarged detail of the lower portion of one of the bottle carriers of the invention as seen in Fig. 1, with parts broken away and brought together to reduce the size of the figure, and showing some parts in section and other parts in elevation.

Fig. 7 is another enlarged detail section, as may be taken substantially on the section line 7—7 of Fig. 3.

Fig. 8 is an enlarged detail section of the valve structure seen in Fig. 7, and taken substantially on the section line 8—8 of Fig. 7, but showing the valve in closed position.

The machine as illustrated includes a supporting frame 1 comprising a base 2, a top wall 3 supported on four uprights 4 on the base, a back wall 5 and opposite side walls 6 forming a housing having an open front end.

The base is provided with a central bearing 7 in which is fixedly secured a vertical shaft 8 upon which is rotatably mounted a supporting wheel 9 upon which are mounted for rotation a number of bottle carriers 10 equally spaced about the axis of the wheel. Each carrier 10 comprises a flat block-like head through the center of which extends a horizontal shaft 12 upon which the head is secured. The shafts 12 of the carriers are arranged tangent to a circle concentric with the wheel 9 and are mounted at the ends thereof for rotation in suitable bearings 14 mounted respectively on the top ends of upright brackets 15 arranged about the axis of the wheel and mounted thereon between the paths of rotation of the carriers about the axes of their shafts.

The flat sides 16 of each carrier head 10 at opposite sides of its axis form bottle-supporting platforms above each of which is arranged a bottle-holding head 17 mounted on the carrier head for movement to raised and lowered positions out of and into cooperative relation with the neck-end of a bottle on its respective platform to hold same in a given position thereon. To this end, as best seen in Figs. 6 and 7, each head 17 is mounted on the top portions of two laterally spaced sleeves 18 reciprocably mounted, respectively, on two uprights or rods 19 mounted on each carrier head to extend from each platform thereof near the inner edge of same when in position to support an upright bottle.

Surrounding each rod 19 is a coiled compression spring 20 which is confined under compression between a collar 21 on the top end of the rod and a collar 22 on the bottom-end of the sleeve 18 thereon, whereby the heads 17 of the carriers will be resiliently urged into clamping engage-

ment with the bottles supported on the platforms of the carriers.

The supporting wheel 9 is continuously rotated in a clockwise direction, as seen in plan, and as each carrier head is carried thereby about two thirds of a revolution about the axis of the wheel at the front of the machine, the carrier head is caused to dwell with its platforms in horizontal position, and as the carrier is carried by the wheel the remaining one third of its revolution about its axis at the rear of the machine, the carrier is rotated one half of a revolution about its horizontal axis to reverse the positions of the platforms thereof. Thus it will be seen that upon two complete revolutions of the wheel, the platforms of each carrier will be intermittently and alternately advanced into an upwardly facing position at the front of the machine where they are brought into and out of cooperative relation with means arranged to eject or discharge the cleaned bottles therefrom and then feed new bottles to be cleaned thereto.

As each carrier head is carried by the wheel around the front of the machine about a quarter of a revolution of the wheel from the station A to the station B thereof, the holding head above the top platform of the carrier head is caused to be in raised position so that a cleaned bottle may be discharged from the platform at the station A and a new upright bottle may be fed thereon at the station B for the cleaning operation.

As each carrier head arrives at the station B it is brought into cooperative relation with means designed to place an upright bottle on the upper platform thereof centrally below the holding head thereabove, which head is then lowered into clamping engagement with the neck of the bottle to hold same on the platform as the carrier leaves said station and while the bottle is inverted thereon at the back of the machine and then returned to the station A in upright position to be discharged from the carrier by means later described.

The carriers are caused to dwell on the wheel 9 as they travel around the front of the machine by each carrier head having a pair of rollers 23 arranged at opposite edges thereof adapted, respectively, to ride on the under-sides of stationary inner and outer track structures 24 and 25 arranged about the axis of the wheel. Each carrier is rotated a half turn as it travels around the rear of the machine by one of its rollers 23 being caused to operate within the cam groove 26 of a helical cam 27 cooperating between the leaving edge 28 of the inner track 24 and the leading edge 29 of the outer track 25.

The means for raising the holding heads 17 out of cooperative relation with the platforms of the carriers when same are traveling around the front of the machine from the station A to the station B, is inclusive of a cross-head 35 secured to the lower ends of each pair of sleeves 18 of each carrier head. The cross-heads 35 are operated to raise the holding heads 17 with their sleeves 18 against the tension of the springs 20 within the said sleeves by means of a roller 36 on the inner-side of each cross-head having cooperative engagement with the cam formation 37 on the top-side of the inner track 24.

During the time each carrier head is traveling from the station A to the station B, in front of the machine, the bottle supported on the under-side or platform of the head in inverted position is in cooperative relation with means supported on the wheel 9 for pneumatically cleaning the bottle. To this end, the cleaning means includes an upright cleaner nozzle 38 arranged below each carrier head so as to be central with an inverted bottle thereon. Each nozzle is supported on a cross-head 39 which is reciprocably mounted upon a pair of spaced vertical guide rods 40 depending from a supporting head or block 41 mounted upon a ring-like gear 42 concentric with and secured to the periphery of the wheel 9. Each block 41 has a removable bearing 43 within which the nozzle on the cross-head therebelow is slidably supported. The rods 40 and nozzle 38 of each block 41 extend through an opening 45 of the gear 42 with the bottom ends of the rods being supported on a cross-piece 46 suitably mounted on the bottom ends of bracket portions 47 arranged about the periphery of the wheel 9 and depending therefrom.

Each cross-head 39 is so operated that the nozzle thereon will be in lowered position when the carrier thereabove is being rotated about its axis at the rear of the machine, and whereby the nozzle will be in raised position projecting into the inverted bottle on the carrier in cleaning relation therewith as the carrier is traveling around the front of the machine from the station A to the station B. For so operating each cross-head 39, each has a cam-engaging roller 48 on the inner side thereof adapted to have cooperative engagement with the upper cam surface 49 of a semi-circular cam 50 mounted on the base concentric with the wheel 9.

When a nozzle is raised into an inverted bottle, a jet of air under pressure is released therefrom, whereby dust or other foreign matter will be blown out of the bottle through the neck thereof. To this end, as seen in Figs. 1, 7 and 8, each cross-head 39 has a passage 51 connected with the lower end of its nozzle and having an upright resilient inlet part 52. When a cross-head 39 is raised the inlet part thereof is brought into sealed communication with an air pressure pump 53. Generally, this is effected through piping 54 leading from the pump into swiveling connection with a distributor head 55 arranged centrally upon the wheel 9. From the distributor head the air under pressure is conducted through radially arranged pipes 56, each connecting with a passage 57 formed in the blocks 41 and having a depending outlet 58 arranged centrally over the inlet of the cross-head therebelow. When a cross-head is raised the inlet part 52 thereof is brought into sealed connection with the depending outlet thereabove through a cup-shaped centrally open valve-operating member 59. This member 59 is reciprocably mounted on said outlet to be raised by engagement with the inlet and is arranged to open a gravity controlled ball valve 60 disposed in the outlet to control the flow of air therefrom.

Generally, the bottle feeding and discharging means includes the following: Arranged across the front of the machine is a table 78 supporting the upper stretch of an endless conveyor 79 in the plane of the upper platforms of the carriers. The upper stretch of the conveyor, or belt, constantly moves from left to right, as seen in plan, and as the bottles to be cleaned are placed thereon at the left hand side of the machine they are carried between suitable guides 85 and 86 which cooperate with a constantly rotating star wheel 88 to place the bottles on the carriers as they approach the station B. At the station A the cleaned bottles are returned to the belt by

a constantly rotating star wheel 91 which cooperates with suitable guides 92 and 93.

The star wheels are driven in timed relation with the movement of the carriers by being supported on upright shafts 94 and 95, respectively, mounted in suitable bearings and having thereon a gear 97 meshing with the gear 42 on the wheel 9.

The wheel 9 is constantly rotated by an electric motor 98 which is in driving connection with the gear 42 on the wheel through the intermediation of a speed reducer 99 whose driving shaft is connected with the lower end of the shaft 95 of the discharging star wheel.

In accordance with the invention, the bottle positioning heads 17 are designed to centralize the bottles and the nozzles with respect to each other, and to conduct the dust from the bottles during the cleaning operation. To this end, each head 17 has a narrow passageway 102 formed therein paralleling the platforms of its respective carrier head and through which the dust is conducted from a bottle. The wall 103 of the passageway has a circular opening 104 within which is detachably mounted a bottle-centering bell 105 forming the inlet to the passage and having a conical centering seat 106 for engaging the neck-end of a bottle to hold same in position on the carrier. In the wall 107 of the passageway opposite the wall 103 is a guide opening 108 coaxial with the centering bell and within which the cleaner nozzle associated therewith is snugly received and guided centrally into a bottle as the nozzle is raised therein. To insure proper entry of the nozzle into the guide opening 108, said opening is provided with an outwardly flared centering inlet 108a. The constricted opening 109 of the centering bell is formed to freely receive the nozzle to permit the dust to pass therethrough from the bottle into the passageway and be discharged from the outlet 110 thereof during the cleaning operation. The outlet of each holding head is formed in an arcuate edge 111 of the head, with said edge arranged to be concentric with the axis of the wheel 9 when the head is supporting an inverted bottle during the cleaning operation.

During the cleaning operation the dust discharged from the outlet 110 of a holding head is drawn into dust collecting means through the intermediation of the elongated narrow suction inlet or nozzle 112 of a suction cleaner head 114. The said inlet of the cleaner head extends arcuately about the axis of the wheel 9 so that the outlet 110 of a holding head 17 will remain in registration therewith during at least the major portion of the period of the cleaning operation.

The suction head is mounted for adjustment to raised and lowered positions in accordance with the positions to which the holding heads may be adjusted in handling various sizes of bottles. For this purpose, on opposite sides of the suction head are provided upright bearing formations 115 which are adjustably mounted upon upright guide rods 116 secured on a bracket 117 suitably mounted on the frame of the machine. In each bearing formation is provided a suitable set screw 117a for holding the suction head in adjusted positions on the guide rods.

The suction head is connected with a source of suction by having a depending pipe section 118 slidably received within a stationary upright pipe section 119 which continues into a horizontal pipe section 120 connecting with the inlet of a suitable suction pump 121. Connected with the outlet of the pump is a dust collector 122, such as a cloth bag.

The holding heads are mounted on their respective pairs of tubes 18 of the carirers for adjustment therealong in the handling of bottles of various height. For this purpose, each holding head is made of two parts 123 and 124 between which the tubes are clamped within suitable bearing formations in the parts by means of screws 125 connecting same as seen in Figs. 3 and 7.

To prevent dust from escaping from the slight space that may exist between the inlet of the suction head and the outlet of one of the holding heads during the cleaning operation, the vacuum pump and the suction pump may be of such capacity as to cause the air passing into the inlet of the suction head to have a greater velocity than that of the air passing from the outlet of a holding head. To further create or amplify such a condition, the inlet of the suction head is made slightly narrower than the outlets of the holding heads so that the vacuum pump may be of a minimum capacity.

Having thus described my invention, I claim:

1. In a bottle cleaning machine, the combination with a support rotatable about a vertical axis, an upright fluid-pressure cleaner nozzle mounted on the support for vertical reciprocation and operable to raise and lower during a given portion of a cycle of rotation of the support, and a carrier rotatably mounted on the support operable to successively present bottles in inverted position over the nozzle to be entered thereby as same is raised during successive cycles of rotation of the support to clean the bottles, of means for conducting away from each bottle foreign matter removed therefrom by the nozzle including means carried by the carrier forming a passage portion with a guiding aperture in a wall thereof into and out of which the nozzle is reciprocated to be guided into the bottle.

2. In a bottle cleaning machine, the combination with a support rotatable about a vertical axis, an upright fluid-pressure cleaner nozzle mounted on the support for vertical reciprocation and operable to raise and lower during a given portion of a cycle of rotation of the support, and a carrier rotatably mounted on the support operable to successively present bottles in inverted position over the nozzle to be entered thereby as same is raised during successive cycles of rotation of the support to clean the bottles, of means for conducting away from each bottle foreign matter removed therefrom by the nozzle including a normally stationary suction cleaner head having an elongated inlet formed arcuately about the axis of the support and a member carried by the carrier having a passage with an elongated arcuate outlet adapted to register with the cleaner head inlet during said portion of movement of the support and having a guiding aperture in a wall thereof into and out of which the nozzle is reciprocated to be guided into the bottle.

3. In a bottle cleaning machine, the combination with a rotating support, a fluid pressure cleaner device mounted on the support operable during a given portion of a cycle of rotation of the support, and a carrier rotatably mounted on the support operable to successively present a number of bottles in cooperative relation with the device to be cleaned thereby during successive cycles of rotation of the support, of means for conducting away from each bottle foreign matter removed therefrom by the device including a

normally stationary suction cleaner head having an elongated narrow arcuate inlet concentric with the axis of the support and a member carried by the carrier having a passage with an elongated narrow arcuate outlet adapted to register with said suction head inlet during said portion of rotation of the support said suction head inlet being longer and narrower than the outlet of the member to prevent the foreign matter from escaping from the exposed or open portions of the inlet while in register with the said outlet of the member.

4. In a bottle cleaning machine, the combination with a rotating support, a number of fluid pressure cleaner devices arranged about the axis of the support and mounted thereon to be operable successively during a given portion of a cycle of rotation of the support, and a number of carriers rotatably mounted on the support each operable to successively present a number of bottles in cooperative relation with a device to be cleaned thereby as same is operated during successive cycles of rotation of the support to clean the bottles, of means for conducting away from the bottles foreign matter removed therefrom by the devices including a normally stationary suction cleaner head having an elongated narrow arcuate inlet concentric with the axis of the support, and a number of holding members on each carrier for holding the bottles thereon each having a passage with an elongated narrow arcuate outlet adapted to register with said suction head inlet when the bottle held thereby is in cooperative relation with the device, said suction head inlet being of a length whereby the outlets of two members of two carriers respectively will simultaneously register therewith and being narrower than the outlets to prevent the foreign matter from escaping from the exposed or open portion of the inlet between the outlets of the members while in register therewith.

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