July 16, 1963 J. C. RUNCO 3,097,658

ROTARY JAR WASHER

Filed Feb. 27, 1961

2 Sheets-Sheet 1

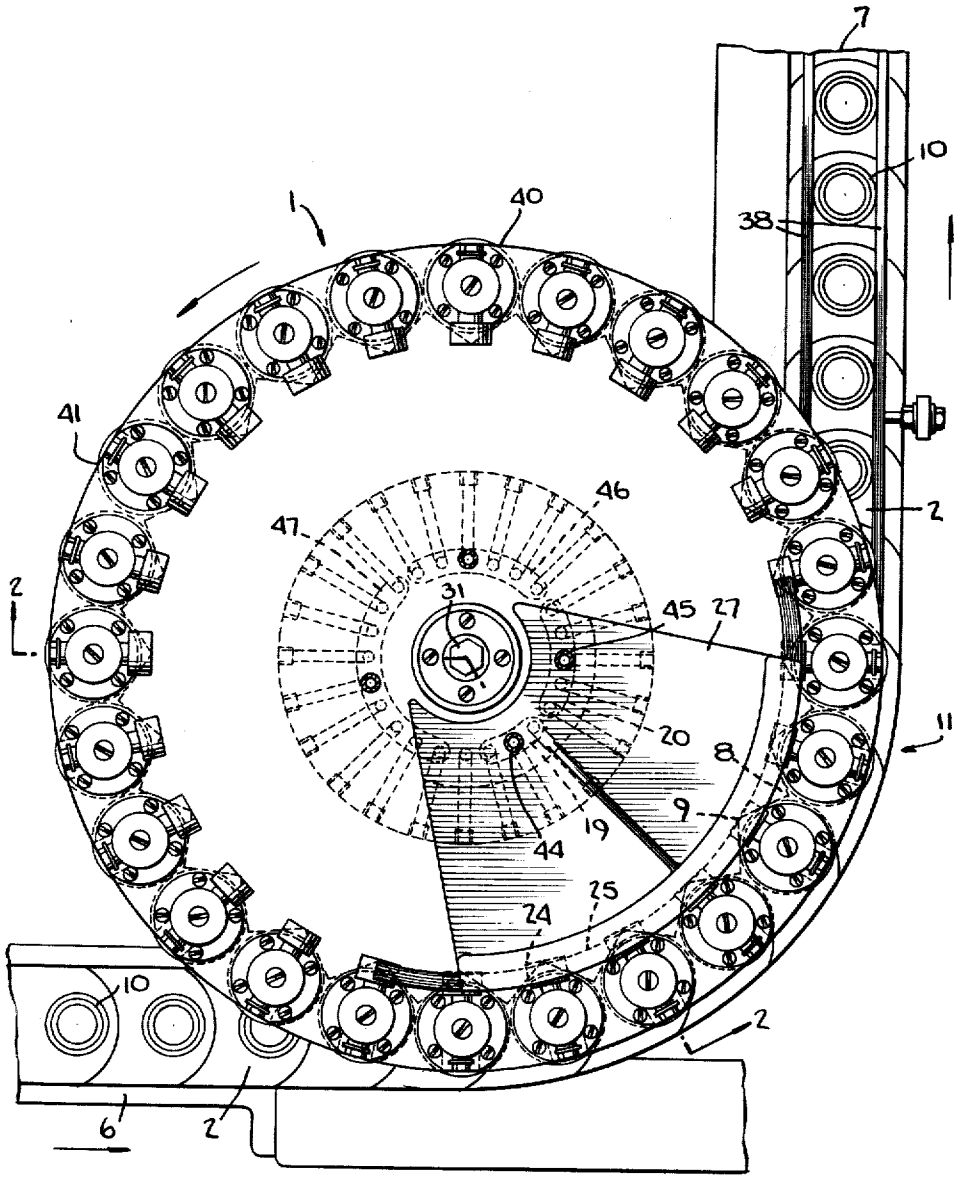


Fig. 1.

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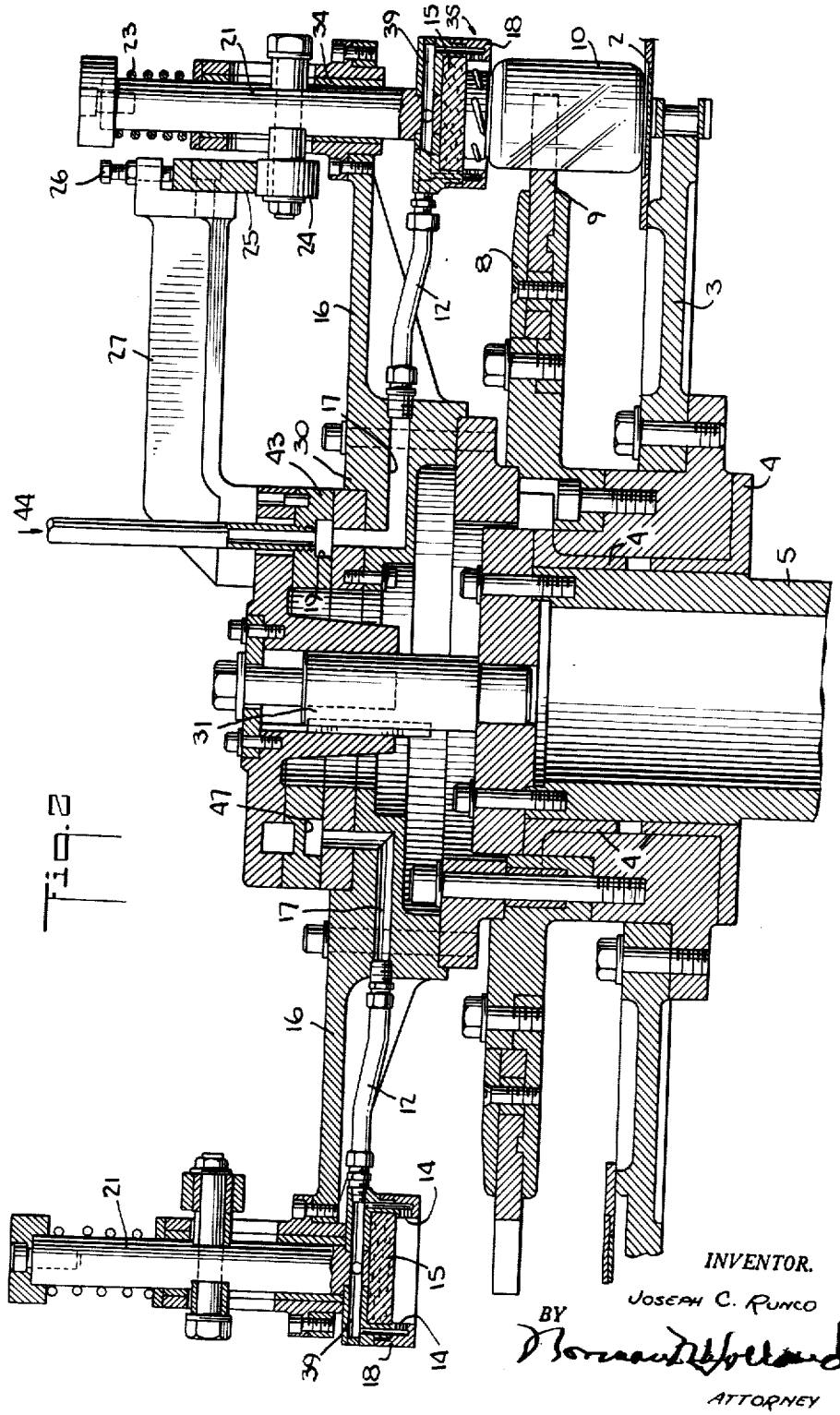


Fig. 2

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3,097,658
ROTARY JAR WASHER

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The present invention relates to a method and means for washing containers such as jars and bottles and more particularly to an automatic, high speed, rotary-type of jar washer and washing method particularly adapted for use in line with high speed packaging machinery.

During the regular automatic packaging operations for liquid or semi-liquid products in glass containers or other similar containers an occasional spillage or splashing occurs causing some of the product to flow or to be splashed onto the outside of the container near the rim. The presence of the product on the outside of the container rim is objectionable since it interferes with a tight sealing of the container by the sealing closure and as the presence of the product in this area outside the sealed portion of the container may present an unsightly appearance when the closure is removed particularly since this unprotected product may tend to spoil during storage.

It is therefore desirable that the upper portions of the filled containers be washed to completely cleanse the outsides of the containers and particularly the outer portions of the container rim including the container sealing finish and the closure engaging lugs or thread or other closure engaging members.

Since modern packaging operations and particularly food packaging operations are carried out at high speed and on automatic machines it is necessary that the washing operations also be done efficiently and at high speeds and with relatively compact apparatus which may easily be inserted in the packaging line between the container filling and the container sealing stations. Presently used washing equipment generally takes the form of straight line apparatus wherein the containers are washed as they pass along a continuous line past suitable rinsing and washing apparatus. Since it is desirable to expose each container to the washing spray for an appreciable interval of time, washing equipment of this type while useful is extremely bulky and may not be conveniently used in many packaging lines where the length of the packaging lines must be kept at a minimum. Presently used washing equipment has not satisfactorily solved the problems of convenient disposal of the wash water and of keeping the washer apparatus itself clean. The jar washer of the present invention employs a novel rotary arrangement whereby the space occupied by the washer is kept at a minimum and wherein water disposal and washer cleaning means are advantageously incorporated. The rotary washer, therefore, allows more effective application of the washing water and steam so that a much more satisfactory container cleaning is obtained. The individual sealing pads also permit the water and steam sprays to be directed around the entire circumference of the container finish.

Accordingly, an object of the present invention is to provide an improved method and means for washing jars or other containers and particularly the outside surfaces of the container tops.

Another object of the present invention is to provide an improved automatic jar washer adapted for use with high speed packaging machines which occupies a relatively small amount of space.

Another object of the present invention is to provide a high speed jar washer suitable for integration into conventional container sealing lines.

Another object of the present invention is to provide a

jar washer capable of operating at extremely high speeds while handling the jars without damage.

Another object of the present invention is to provide a high speed jar washer for use with filled containers.

Another object of the present invention is to provide a jar washer which meets high sanitary standards and wherein an efficient washing means is provided for the container sealing pads as well as for the filled containers themselves.

Other and further objects of the invention will be obvious upon an understanding of the illustrative embodiment about to be described or will be indicated in the appended claims, and various advantages not referred to herein will occur to one skilled in the art upon employment of the invention in practice.

A preferred embodiment of the invention has been chosen for purposes of illustration and description and is shown in the accompanying drawings, forming a part of the specification, wherein:

FIG. 1 is a top plan view of the jar washer according to the present invention; and

FIG. 2 is a vertical sectional view of the jar washer taken along line 2—2 of FIG. 1.

As illustrated in the drawings the containers to be washed are carried through the washing machine **1** along an arcuate path on an endless belt conveyor **2**. The arcuate portion of the conveyor **2** is supported and guided by a sprocket **3** rotatably mounted on bearings **4** on a stationary column **5** positioned at the center of the washing machine **1**. The link belt conveyor **2** and the mounting column **5** illustrated and described herein may be provided as separate items for the washing machine **1** or they may comprise elements of the associated container filling or sealing apparatus. Thus the endless conveyor **2** may be a portion of the regular conveyor used to carry the containers through the filling or through the sealing apparatus. The portions of the conveyor not illustrated on the drawing may thus comprise a suitably supported length of the conveyor connecting the input point **6** with the outlet **7** or the unillustrated portions may also run through either or both of the filling and the sealing machines so that they support and carry the containers before and after washing through these associated machines. Suitable drive sprockets are provided in the conventional manner to move the conveyor **2** and the associated sprocket **3**.

A container spacing star wheel **8** having circumferentially positioned spacing pockets **9** is positioned above and attached to the rotating sprocket **3** so that the containers **10** are spaced from one another as they pass through the washing station illustrated generally at **11**.

The container washing station **11** is located along the arcuate section of the conveyor **2** and each of the containers **10** is simultaneously temporarily sealed and washed by one of a plurality of washing heads **35** concentrically and rotatably mounted about central column **5**. Each washing head **35** is attached to the lower end of a vertical shaft **21** slidably mounted in a bearing **34** on a radial arm **16**. The radial arm **16** extends outwardly from a central hub **30** which is connected to the container star wheel **8** and conveyor sprocket **3** to rotate in synchronism therewith. A fluid distributing chamber **39** within each washing head **35** is connected to a conduit **17** in central hub **30** by means of a flexible hose **12**. One conduit **17** is provided in the rotating hub **30** for each sealing head **35** and the inner end of each of these conduits **17** communicates intermittently with water and steam distributing chambers in stationary manifold **43** as will be described below. Manifold **43** is fixedly attached to extension **31** of center column **5**.

Water and steam are preferably successively used as cleaning fluids by the washing heads **35** during their travel through the washing station **11**. As illustrated in FIG. 1,

each washing head 35 is first connected through conduit 17 and hose 12 to a water chamber 19 is manifold 43 and thereafter to steam chamber 20. Water inlet 44 connects chamber 19 to a suitable source of water under pressure and a similar inlet 45 connects chamber 20 to a source of steam under pressure.

In order to protect the contents of filled containers 10 or to prevent the entrance of water or steam into empty containers, the container tops are temporarily sealed at the washing station 11. This is accomplished by the sealing pads 15 which are detachably mounted on each washing head 35. The sealing pads 15 are preferably formed of a relatively soft resilient material such as rubber so that a tight seal is provided between the tops of containers 10 and the pads 15. Each pad 15 is moved downwardly into sealing position against the top of a container 10 in the washing station against the force of spring 23 by cam roller 24 and circular cam 25. A threaded cam adjustment 26 is provided on cam mounting bracket 27 to control the sealing force and position of the sealing pads 15. The sealing position of the pads 15 may be consequently easily adjusted for different heights of containers.

Cam 25 is positioned so that it tightly seals each container 10 as the container moves into the washing station 11 by lowering the sealing pads 15 into sealing position. After the containers are sealed, the washing heads 35 successively wash the container tops with water and steam which are directed against the container tops through orifices or nozzles 14 positioned around the inner side of circular nozzle ring 18.

The nozzles 14 as shown in FIG. 2, are located so as to face the tops of the containers 10 moving on conveyor 2 since it is particularly important that the container finish adjacent the rim and the closure engaging means be completely clean prior to the sealing operation. Thus, the nozzles 14 direct a thin, relatively high pressure jet of water onto the walls of the container while each sealing head 35 is connected to the water inlet 44 and thereafter direct a jet of steam while the sealing head 35 is connected to the steam inlet 45. An effective cleaning action results for both the tops of the containers 10 and for the lower portions as well, since the streams of water first strike the top portions directly and then flow downwardly over the side walls of the containers to cleanse these portions also in the event that they have been contaminated during the container filling or previous container handling operations. The subsequent applications of the steam after the water in the washing operation supplements the cleaning action of the water.

Since each sealing pad 15 contacts a container 10 as the container enters the washing section 11, the sealing pads themselves are exposed to the products which may have been splashed or have overflowed onto the tops of the containers. In order to insure that none of this product is reapplied to the containers by the sealing pads 15 on the next washing cycle, a separate sealing pad washing section is provided to clean each of the pads 15. In the water washing section 40 of the sealing pad washing section, the nozzles 14 in washing heads 35 direct sprays of water into the sealing heads 35 as was done in the container washing section 11, but here due to the absence of the containers, the sprays contact and thoroughly wash the entire undersides of the sealing pads. Water is supplied to the washing heads 35 from a water chamber 46 in manifold 43 similar to the above described chamber 19.

As each washing head 35 continues its rotation around column 5, steam enters the conduit 17 from steam chamber 47 and is directed against the pads 15 through nozzles 14. This steam directed across the lower surfaces of the sealing pads 15 completes their cleaning to prepare the pads for the next container washing cycle.

The washing water used in the washing machine is preferably hot water to prevent any damage to the containers which might result from their contact with cool or cold water.

The operation of the rotary washer 1 will now be summarized. Containers 10 entering the washer at input point 6 are carried by the conveyor 2 into engagement with the pockets 9 of the rotating star wheel 8. The containers 10 are now moved into the washing section 11 by the conveyor 2 and the star wheel 8 where a container sealing pad 15 mounted on a washing head 35 is first lowered into sealing position over the mouth of each container 10 under the control of cam member 25. Each container 10 is now subjected successively to water and steam sprays directed through nozzles 14 in washing heads 35. The jets or sprays of water and steam clean the container tops and sides. As each container 10 leaves the washing section 11, the washing head 35 is raised by spring 23 and the container 10 leaves the washer 1 between the guide rails 38 at exit point 7. The washed container is then carried by conveyor 2 to a container sealing machine or other processing means. Each washing head 35 continues on its circular path about column 5 while successive jets of water and steam are applied to its underside and sealing pad 15 to clean them before they return to the washing section 11 for another washing cycle on another container.

It will be seen that a novel apparatus for continuously washing containers at high speeds has been disclosed. The washer is rotary in operation and is more compact than any similar washing apparatus heretofore used. Also, a washer has been disclosed which is self-cleaning with its own elements being washed before each washing cycle without in any way interfering with the continuity of operation.

As various changes may be made in the form, construction and arrangement of the parts herein without departing from the spirit and scope of the invention and without sacrificing any of its advantages, it is to be understood that all matter herein is to be interpreted as illustrative and not in a limiting sense.

Having thus described my invention, I claim:

1. A washer for unsealed containers comprising the combination of means to move a plurality of containers in an arcuate path, a container sealer rotatably mounted above said container moving means including a plurality of spaced container sealing members and positioned so that a portion of the rotational path of said sealer is above the arcuate path of the containers on said container moving means, means to move a sealing member of said sealer into sealing contact with each of the mouths of containers on said container moving means, container washing means positioned to clean said containers while sealed by said container sealer, and sealer washing means positioned to clean each of said sealing members when it is remotely positioned from said arcuate path.

2. A rotary container washer comprising the combination of a conveyor having an arcuate and horizontally disposed run, a container positioning means mounted adjacent said arcuate run and adapted to space containers on said conveyor, a plurality of sealing pads mounted for rotation about a vertical axis and having an arcuate portion of their rotational path above the arcuate run of said conveyor, mounting means for each of said sealing pads for movably mounting said pads for vertical movement toward and away from said conveyor, cam means adjacent said conveyor and adapted to engage said sealing pad mounting means to lower each sealing pad into engagement with a container on said conveyor on the arcuate run thereof, sprayers mounted on said mounting means and positioned to wash the outer surfaces of containers on said conveyor sealed by said sealing pads, means to intermittently connect said sprayers to a source of fluide while said sealing pads are sealing the containers and means to connect said sprayers to a source of fluid when said sealing pads are remote from said arcuate run.

3. A rotary container washer comprising the combination of a conveyor having an arcuate and horizontally disposed run, a container positioning means mounted adjacent said arcuate run and adapted to space containers

on said conveyor, a plurality of sealing pads mounted for rotation about a vertical axis and having an arcuate portion of their rotational path above the arcuate run of said conveyor, mounting means for each of said sealing pads for movably mounting said pads for vertical movement toward and away from said conveyor, cam means adjacent said conveyor and adapted to engage said sealing pad mounting means to lower each sealing pad into engagement with a container on said conveyor on the arcuate run thereof, sprayers mounted on said mounting means and positioned to wash the outer surfaces of containers on said conveyor sealed by said sealing pads, means to successively connect said sprayers to a source of water and steam while said sealing pads are sealing the containers and means to connect said sprayers successively to a source of water and of steam when said sealing pads are remote from said arcuate run.

4. A rotary container washer comprising the combination of a conveyor having an arcuate and horizontally disposed run, a container positioning means mounted adjacent said arcuate run and adapted to space containers on said conveyor, a plurality of sealing pads mounted for rotation about a vertical axis and having an arcuate portion of their rotational path above the arcuate run of said conveyor, mounting means for each of said sealing pads for movably mounting said pads for vertical movement toward and away from said conveyor, cam means adjacent said conveyor and adapted to engage said sealing pad mounting means to lower each sealing pad into engagement with a container on said conveyor on the arcuate run thereof, spray outlets on said mounting means and positioned below said pads to wash the outer surfaces of containers on said conveyor sealed by said sealing pads, manifold means to intermittently connect said spray outlets to a source of fluid while said sealing pads are sealing the containers, and manifold means to connect said sprayers to a source of fluid when said sealing pads are remote from said arcuate run.

5. A rotary container washer comprising the combination of a conveyor having an arcuate and horizontally disposed run, a container positioning means mounted adjacent said arcuate run and adapted to space containers on said conveyor, a plurality of sealing pads mounted for rotation about a vertical axis and having an arcuate portion of their rotational path above the arcuate run of said conveyor, a hollow head containing each of said sealing pads for moving said pads toward and away from said conveyor, cam means adjacent said conveyor and adapted to engage said heads to lower each sealing pad into engagement with a container on said conveyor on the arcuate run thereof, spray outlets on said heads and positioned to wash the outer surfaces of containers on said conveyor sealed by said sealing pads, a manifold to intermittently connect said spray outlets to a source of fluid while said sealing pads are sealing the containers and a second manifold to connect said sprayers to a source of fluid when said sealing pads are remote from said arcuate run.

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