United States Patent

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[73] Assignee **Sturtevant Engineering Co., Ltd.**
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[33] **Great Britain**
[31] **4083/70**

[54] **MACHINES FOR PROCESSING ARTICLES**
4 Claims, 3 Drawing Figs.

[52] **U.S. Cl.** **134/120,** 134/150, 134/155
[51] **Int. Cl.** **B08b 3/04**
[50] **Field of Search** 134/117–121, 150, 155, 161

[56] **References Cited**

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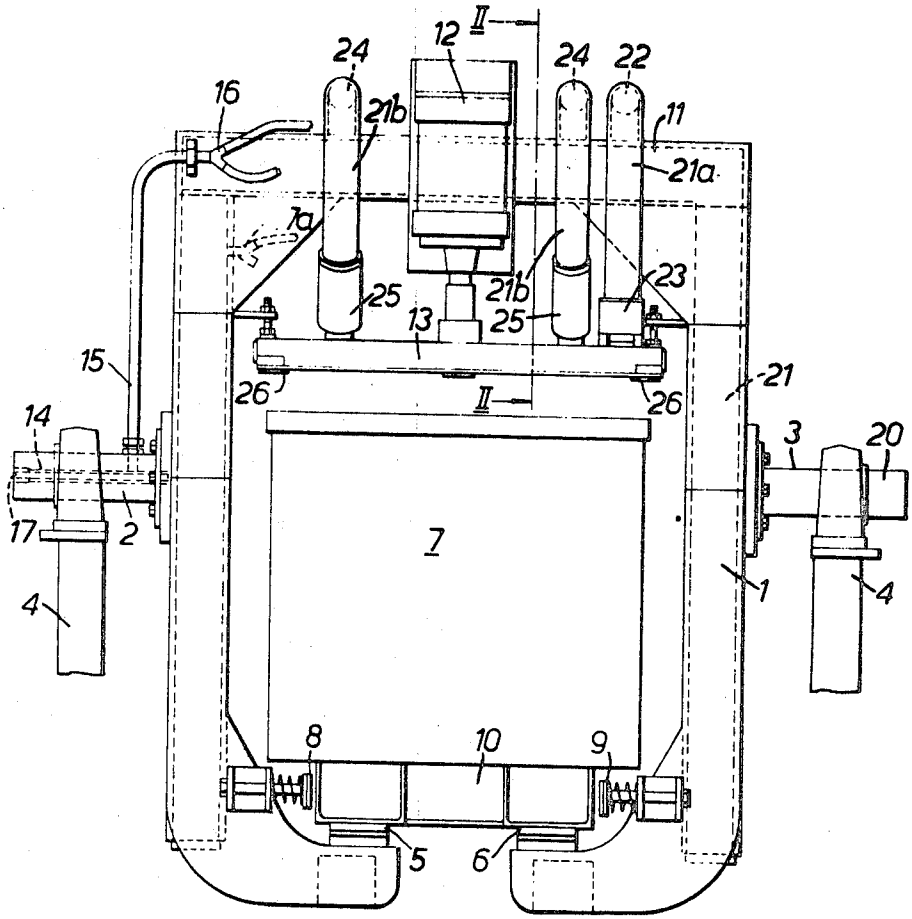
ABSTRACT: An article-processing machine which comprises a housing in which is a support for an open-topped container for articles to be processed, a member to engage the open top of the container and means to angularly displace the member container and support in the engaged condition, a feed line to the member to feed processing liquid to the container while it is in motion and a valve carried by the member to control a passage through which liquid may be discharged from the container.



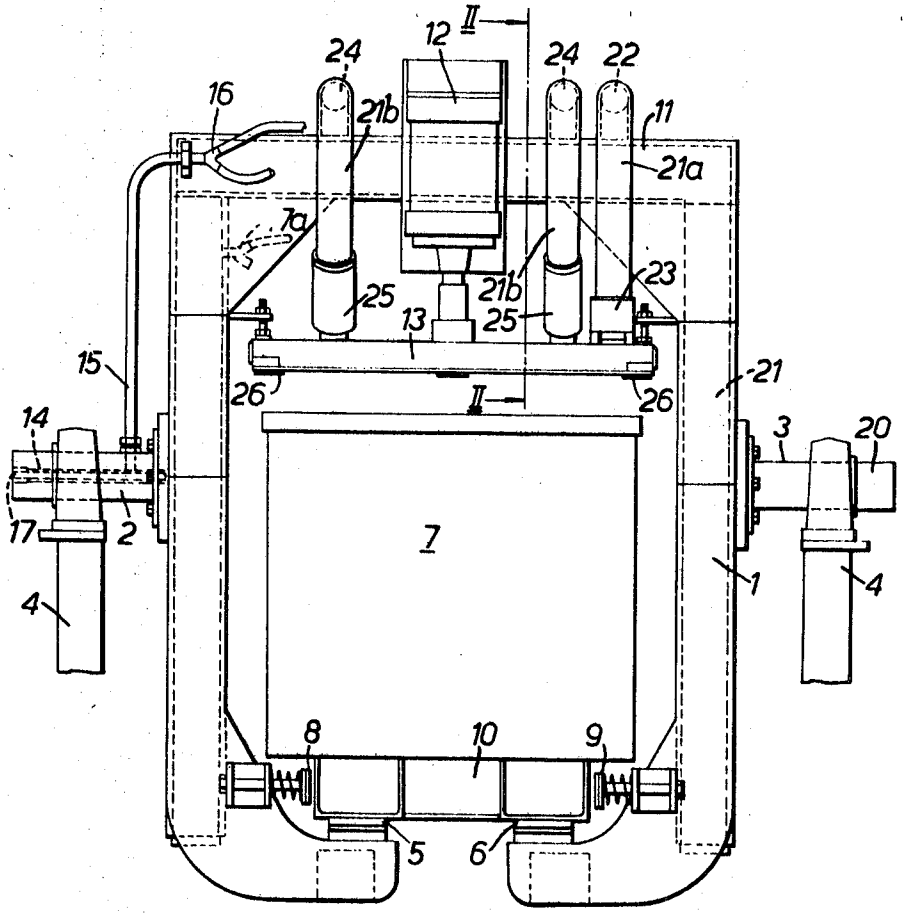

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FIG. 1.

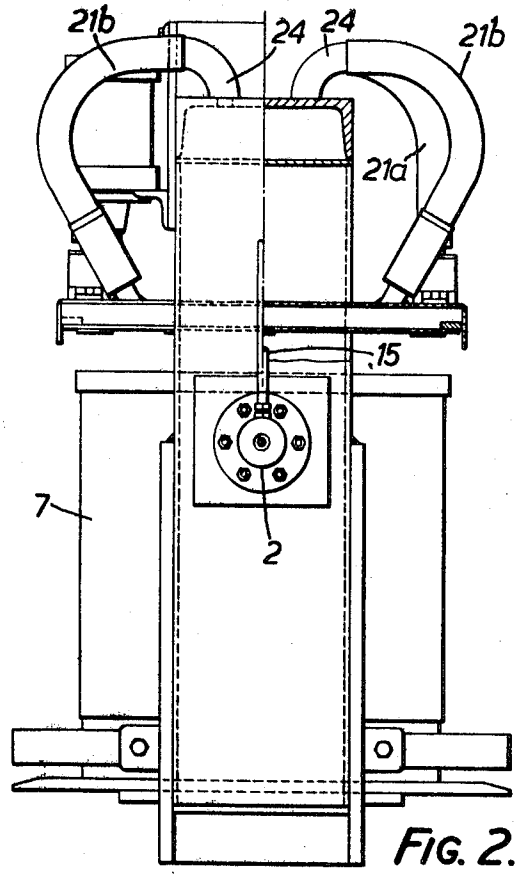

FIG. 2.

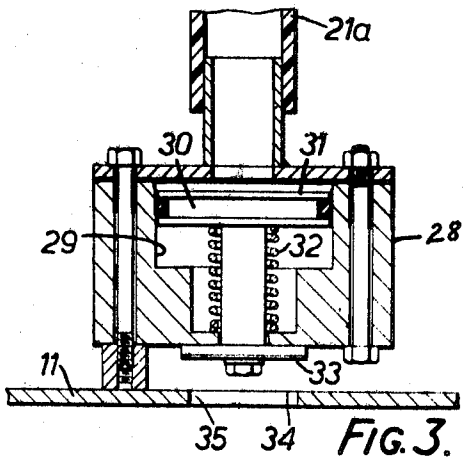

FIG. 3.

MACHINES FOR PROCESSING ARTICLES

This invention is concerned with improvements in and relating to machines for processing articles.

In United Kingdom Letters Pat. No. 1,079,698 there has been described a machine for processing articles in open containers by means of a fluid, the machine comprises a housing, conveyor means to convey each container into and out of the housing, at least one member within the housing arranged to engage the container opening to retain the articles within the container, means to rotate the engaged container and member about a substantially horizontal axis, and means to pump the fluid through the container during such rotation.

This arrangement is very satisfactory, enabling as it does, parts to be washed, rinsed and dried in the usual containers into which they are placed by an operator on completion of their production. However the washing liquid and rinsing liquid must be completely removed before the succeeding stage of the cleaning process can be carried out. In the above arrangement this is achieved by allowing the liquid to drain through a gap defined by the upper edge of the container and the container-engaging member.

It is an object of the present invention to provide an improved machine for processing articles whereby an improved liquid removal is obtained.

According to the present invention there is provided a machine for processing articles in open containers by means of a fluid, the machine comprising a housing, conveyor means to convey each container into and out of the housing, at least one member within the housing arranged to engage the container opening to retain the articles within the container, means to rotate the engaged container and member about a substantially horizontal axis, and means to pump the fluid through the container during such rotation, the container-engaging member being provided with at least one valve operable to control a passage which will communicate with the container for discharge of processing liquid.

Preferably the valve or each valve is biased in a sense to open the associated passage and is movable against said bias in response to liquid pressure in a processing-liquid feed line.

In order that the present invention may be well understood there will now be described an embodiment thereof, given by way of example only, reference being had to the accompanying drawing in which:

FIG. 1 is a schematic front elevation of a cleaning apparatus;

FIG. 2 is a side elevation of the apparatus, and

FIG. 3 is a detail showing a dump valve.

The cleaning apparatus comprises a generally rectangular frame 1 supported on trunnions 2, 3 carried by bearings 4 (FIG. 1). The foot on the frame has a pair of support plates 5, 6 to receive a box 7 of parts to be processed, a pair of buffers 8, 9 on the frame serving to center a base 10, on the particular box shown, provided for engagement by a forklift truck.

On the upper cross member 11 of the frame are two jacks 12 engaging a clamping plate member 13 movable by the jacks to engage the open mouth of the box. A fluid supply line 14 for moving the jacks in one sense runs through trunnion 2 to a tapping 15 which branches at 16 to a like end of each jack. A second fluid line 17 extends through line 14 to the frame and thence to branches 17*a* which are connected to like ends of the jacks.

A processing liquid line 20 is provided in trunnion 3 to a chamber 21 defined by the frame from which six offtakes are provided, two of which, indicated at 22, are coupled by flexible hoses 21*a* each to a dump valve 23 and four of which, indicated at 24, are coupled by hoses 21*b* each to a nonreturn valve 25.

In operation an open-topped box 7 of parts to be cleaned is loaded on to the plates 5, 6. The jacks 12 are operated to lower member 11 so that plates 26 abut the upper edges of the box. These plates are of a thickness such that a gap remains along each top edge of the box through which the smallest part to be process will not pass. Cleaning liquid is then pumped along line 20 to chamber 21 and thence through offtakes 24 and nonreturn valves 25 to the box. A drive to the trunnions is initiated to cause the frame to oscillate or rotate about the trunnion axis thereby thoroughly exposing the parts in the box to the liquid.

The liquid in chamber 21 also passes through offtakes 22 to dump valves 23. These each comprise (FIG. 3) a housing 28 mounted on but clear of member 11, having a bore 29 containing a piston 30 exposed on one face 31 to offtake pressure and oppositely biased by a spring 32. The piston carries a valve 33 which under pressure of liquid in the offtake will be pressed on to a seat 34 about an aperture 35 in the member 11.

When the cleaning stage is completed the pressure at the offtakes falls and the dump valves open. Thereby liquid can escape not only through the gap between the member 11 and the box but also through apertures 35 and thence between the housings 28 and member 11. This hastens the removal of the liquid while frame motion continues.

When rinsing liquid is fed in through line 20 the dump valves will reclose and the same sequence of events will occur. Rapid removal of rinsing liquid upon completion of the rinsing stage enables the drying stage to be initiated quickly.

Nonreturn valves 24 prevent any used liquid feeding back through offtakes 22 when pressure therein falls on completion of a liquid-processing stage.

While the invention has been described in relation to a frame providing motion about one axis only, it is equally applicable to a member such as described in copending application Ser. No. 11,270 of even date and common assignee herewith.

I claim:

1. A machine for processing articles in open containers by means of a fluid, the machine comprising a housing, conveyor means to convey each container into and out of the housing, at least one member within the housing arranged to engage the container opening to retain the articles within the container, means to rotate the engaged container and member about a substantially horizontal axis, and means to pump the fluid through the container during such rotation, the container-engaging member being provided with at least one valve operable to control a passage which will communicate with the container for discharge of processing liquid, each valve comprising a valve body, a bore therein, a piston in the bore, a line between said bore to one side of said piston and a processing liquid feed line to said member, a valve controlling passage carried by said piston and biasing means urging said piston in a sense opposite to liquid in said line and in a sense to move said valve to open said passage.

2. A machine according to claim 1 including four valves in said member.

3. A machine according to claim 1 in which said member includes a liquid inlet passage coupled to said feed line, a one-way valve being provided upstream of said inlet passage.

4. A machine according to claim 1 in which the member includes container-engaging pieces projecting from the container-directed face of the member, the member between adjacent pieces, the upper edge of an engaged container between said adjacent pieces and said adjacent pieces defining a passage for processing liquid.