United States Patent [19]

Key et al.

[11] **3,830,378**

[45] **Aug. 20, 1974**

[54] **CONTAINER HANDLING APPARATUS**

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[22] Filed: **Feb. 25, 1972**

[21] Appl. No.: **229,434**

[30] **Foreign Application Priority Data**

Feb. 25, 1971 Great Britain 5447/71

[52] **U.S. Cl.** ..... **214/1 Q,** 141/92, 198/33 AD

[51] **Int. Cl.** **B65g 47/24**

[58] **Field of Search** .. 214/1 Q, 1 QD, 1 QA, 147 R, 214/147 G, 312, 314; 198/33 AD; 141/92

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Primary Examiner—Frank E. Werner

[57] **ABSTRACT**

Apparatus for turning over containers comprises a gripping unit mounted for rotation about a horizontal axis, the unit comprising gripping means on one side of the axis to grip a container, and actuating means on the opposite side of the axis from the gripping means and arranged to actuate the gripping means.

1 Claim, 2 Drawing Figures

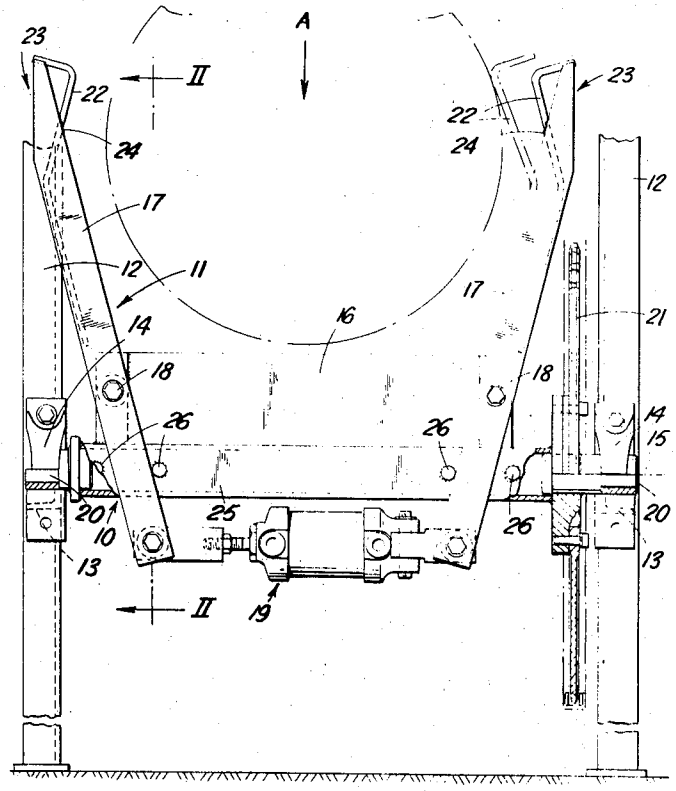
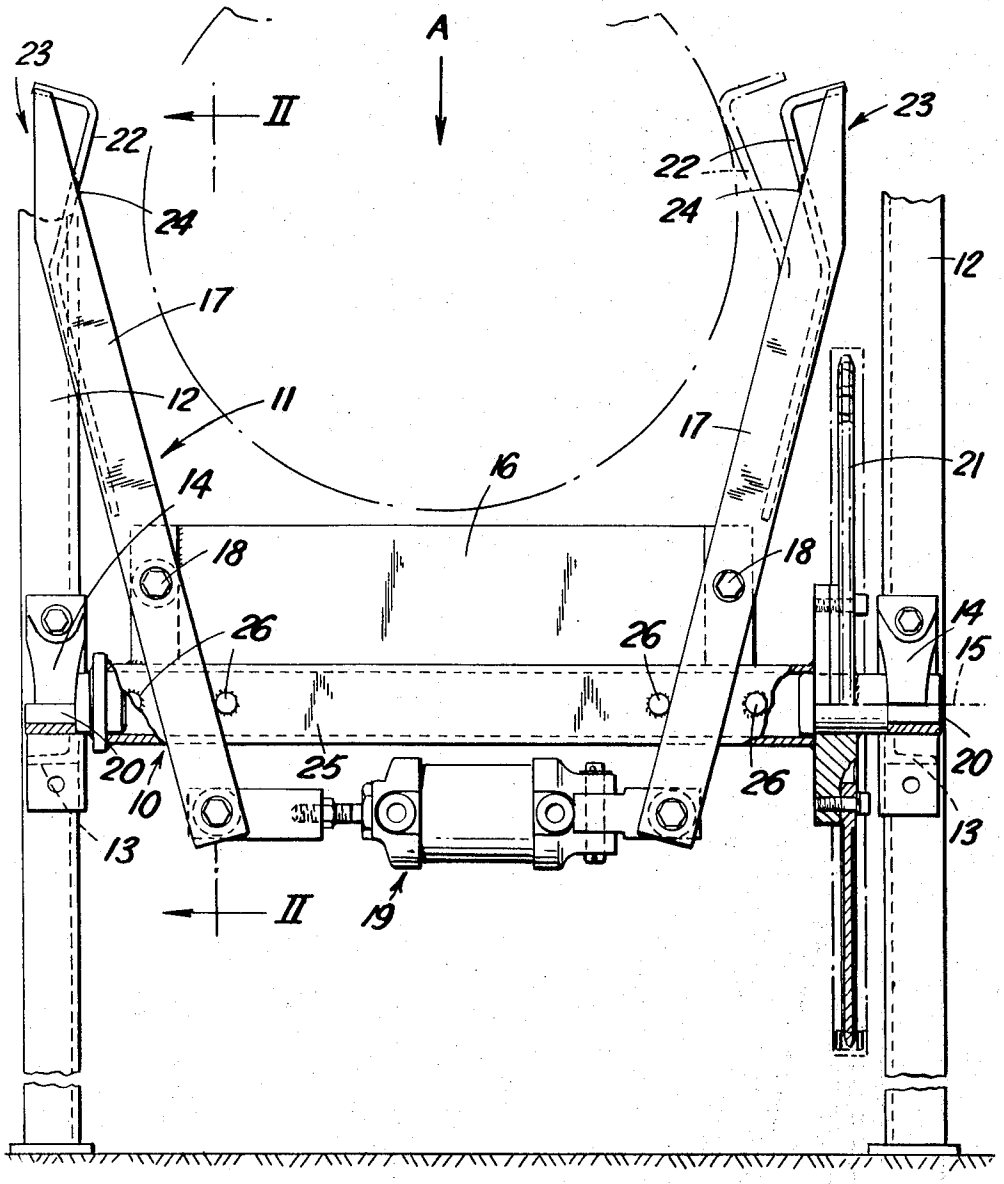


Fig. 1.



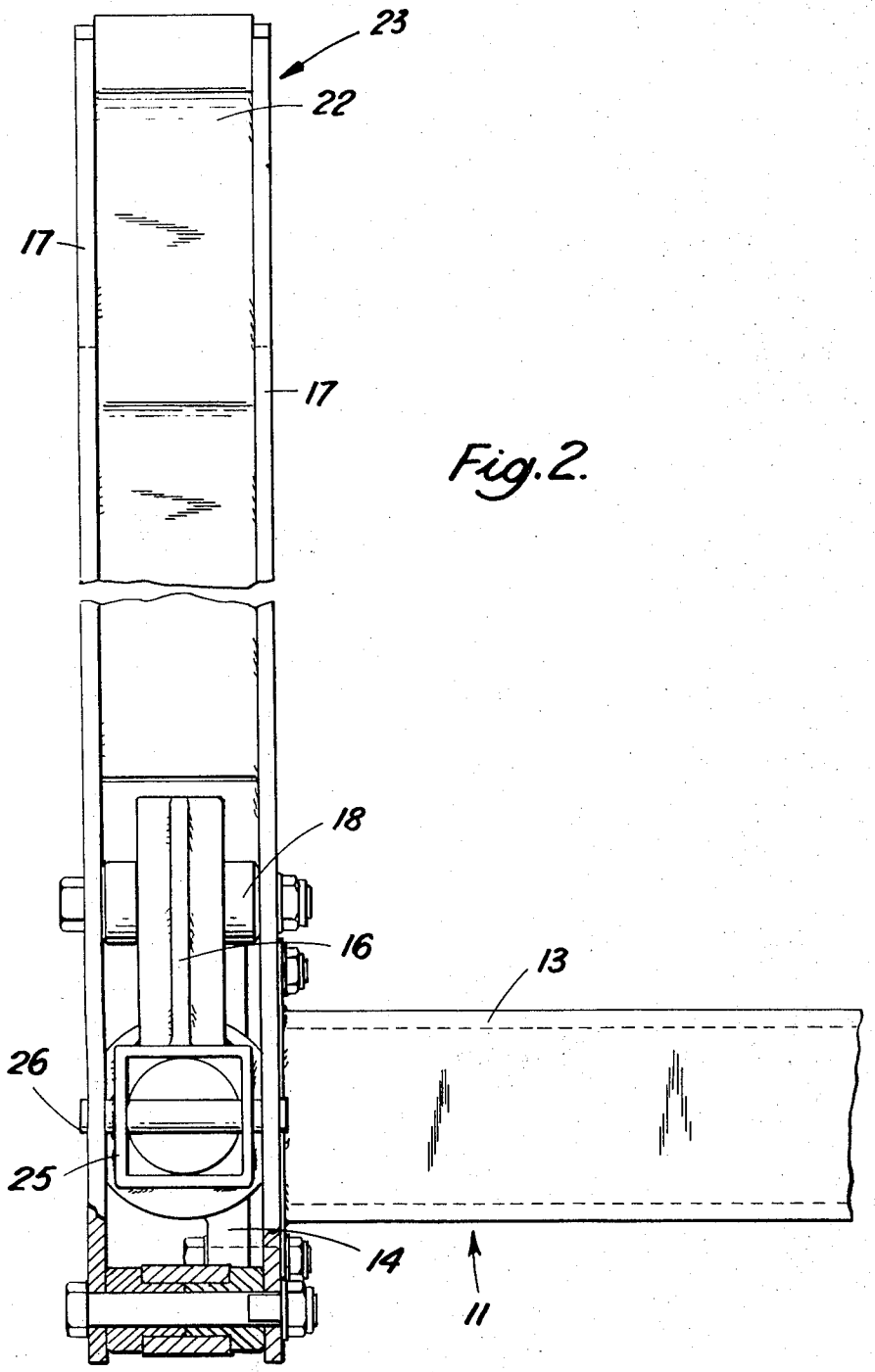


Fig. 2.

CONTAINER HANDLING APPARATUS

The invention relates to container handling apparatus and in particular to apparatus for turning over containers (e.g. containers for liquids such as beer kegs).

It is common practice when washing and filling containers for liquids, such as beer kegs, to wash them in the inverted position and fill them in the upright position. It is therefore necessary to turn the containers over from the inverted position to the upright position between washing and filling operations.

The invention provides apparatus for turning over containers, comprising a gripping unit mounted for rotation about a horizontal axis, the unit comprising gripping means on one side of the axis to grip a container, and actuating means on the opposite side of the axis from the gripping means and arranged to actuate the gripping means.

The apparatus may include means to rotate the unit about the axis.

The gripping unit may be arranged for rotation between a container receiving position in which the gripping means is at one side of a vertical plane through the axis and the actuating means is at the other side of the plane, and a container delivery position in which the gripping means is at the said other side of the plane and the actuating means is at the said one sside of the plane.

The actuating means and means to rotate the unit may be arranged to operate in synchronism such that when the gripping unit is in the receiving position the gripping means is actuated to move to a gripping position, the unit is then rotated to the delivery position, the gripping means is then actuated to move to a release position and the unit is then rotated to return to the receiving position.

When returning from the delivery position to the receiving position the unit may rotate in the opposite direction to that in which it rotates when moving from the receiving position to the delivery position.

The gripping means may comprise two end portions of two arms, the arms being arranged to pivot to move the said end portions towards and away from one another.

The other two end portions of the arms may lie on the said other side of the axis and the actuating means may comprise a piston and cylinder combination arranged between the other two end portions to pivot the two arms as aforesaid.

The means to rotate the unit may comprise a chain drive. Alternatively it may comprise a rack and pinion drive.

The apparatus may be used on a machine for washing and filling containers such as beer kegs, the apparatus being mounted between a washing station and a filling station on the machine.

The invention includes a machine for washing and filling containers for liquids, having turnover apparatus of the kind described above.

The invention also provides a machine for washing and filling containers for liquids, comprisimg a washing station, washing means at the washing station, a filling station adjacent the washing station, filling means at the filling station, and means to transfer a container from the washing station to the filling station such that the container is turned over during the transfer, the transfer means comprising a gripping unit mounted for rotation about a horizontal axis passing between the two stations, the gripping unit having gripping means on one side of the axis and actuating means for the gripping means on the opposite side of the axis from the gripping means, so that the unit may be rotated to bring the gripping means to the washing station for actuation to grip the container, and may then be rotated to turn the gripped container over as it transfers the container to the filling station where the gripping means may be actuated to release the container.

By way of example, a specific embodiment of apparatus according to the invention will now be described, with reference to the accompanying drawings, in which:

FIG. **1** is a plan view of the apparatus, and

FIG. **2** is a section on line II—II of FIG. **1**.

The apparatus comprises a gripping unit **10**, mounted on a frame **11**. The frame **11** comprises two horizontal members **12** supported by, and welded to, a series of upright channel members **13**. Each member **12** carries a bearing **14**. The two bearings are shown partly in section in FIG. **1**.

The gripping unit **10** is arranged for rotation in the bearings **14** about horizontal axis **15**. The gripping unit comprises a mounting **16**, two arms **17** pivotally connected to the mounting at **18**, and a pneumatic piston and cylinder combination **19** pivotally connected to ends of the arms **17**. The mounting **16** has two spigots **20** which locate in the two bearings respectively. The mounting carries a sprocket wheel **21** shown partly in section in FIG. **1**.

Each arm **17** comprises two strips **21** with a third strip **22** welded therebetween. The strips **22** are bent as shown in FIG. **1** to give the end portions **23** of the arms concave regions **24**. These regions **24** assure the arms can grip a container such as a beer keg between them when they are moved towards one another.

The opening and closing movements of the arm are controlled by the piston and cylinder combination **19**. The cylinder is double acting and by supplying compressed air to the appropriate part of the cylinder the arms may be pivoted to move end portions **23** towards and away from one another. The arms are shown in FIG. **1** in the open or release position.

A chain (not shown) passes around sprocket wheel **21** to transmit drive for rotation of the unit about axis **15**.

The mounting **16** has four pegs **26** mounted in a square section portion **25** thereof to limit the pivotal movement of the arms **17**.

In use the apparatus is mounted over a conveyor (not shown) arranged to carry a container to the appratus by movement in the direction of arrow A. When a container is carried betwen the arms **23** the piston and cylinder combination is operated to pivot the arms to grip the container, the gripping unit is then rotated through **180°** about the axis **15** to tip the container over the axis thereby turning it over, the arms are then opened to release the turned over container, which is carried away by the conveyor and the unit is rotated in the opposite direction to return it to the position shown in FIG. **1**.

Where the conveyor is used to feed a stream of containers to the apparatus, a hold-up device may be positioned upstream of the apparatus to ensure that con-

tainers are only carried to the apparatus when it is in the receiving position and not while it is rotating.

The positioning of the piston and cylinder combination on the opposite side of axis **15** from the gripping arm portions **23** means that a container can be arranged very close to axis **15** for rotation about the axis. This in turn means that the container can be turned over within a very small space.

The invention is not restricted to the features of the foregoing example. For example, the sprocket wheel **21** may be replaced by a pinion driven by a toothed rack. The rack may be operated by a piston and cylinder combination.

We claim:

1. Apparatus for turning over containers comprising

a gripping unit mounted for rotation about a horizontal axis, said gripping unit comprising two arms of equal length, each pivoted about an axis intermediate its ends and said two axes being parallel and spaced apart, one pair of ends of said arms constituting gripping means for gripping a container therebetween and the other pair of ends of said arms having a piston and cylinder combination connected therebetween to pivot the arms and move the gripping means together and apart, the piston and cylinder combination having its axis parallel to said horizontal axis of rotation of the gripping unit and being disposed on the opposite side thereof from the two pivoted axes of the arms.

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