DE-BUNGING APPARATUS

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References Cited
UNITED STATES PATENTS
3,174,650 3/1965 Bellato 408/67 X

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ABSTRACT

The disclosure relates to apparatus for automatically removing a bung from the side of a barrel. The barrel is firstly placed in a cradle which is in a bung receiving position; the barrel activates a switch which causes rollers to rotate the barrel on the cradle to a position where a probe senses the bung while, simultaneously, the cradle is being rocked to a midposition; clamping turrets then move into engagement with the ends of the keg and rotate the latter on the cradle until the bung is above a continuously rotating auger which is then moved into engagement with the bung to remove it; thereafter, the turrets and probe are removed and the cradle is rocked to eject the debunged barrel.

7 Claims, 5 Drawing Figures
DE-BUNGING APPARATUS

The invention relates to keg de-bunging apparatus. It is recognized that apparatus for removing bungs from the sides of kegs is not new, see for example U.S. Pat. No. 3,174,650 (Bellato) which issued on March 23, 1965.

Drained beverages are usually stored in kegs which, today, are constructed from aluminum. Kegs, allegedly of the same type, vary not only in capacity e.g. anywhere from an average of 12.9 Imperial gallons to an average of 13.1 gallons, but they can also vary as much as 1½ inches in length. Additionally, there are oval kegs, hexagonal kegs and some almost square in cross-section. Nearly all such kegs have recessed ends and a wooden bung in the side.

When empty kegs are returned to the beverage manufacturer, the bungs must be removed before the kegs pass to the sterilizer. Obviously, and because the bungs are wood and have initially been driven home with force and then have become soaked in the beverage within the keg, they are most difficult to remove.

The type of keg contemplated to be "de-bunged" by the apparatus forming the subject of the present invention has a centrally disposed tapping spigot in one end (the top or tapping end) thereof and a plurality of radially disposed indentations around the top rim. The other end (or bottom) is provided with a radially disposed well which receives any sedimentary deposits.

Because of the above differences in size and shapes of kegs, only semi-automatic de-bunging machines have, heretofore, been proposed. In other words, and once kegs have been placed in such machines in order to remove the bungs, some manual manipulation has been necessary.

It is the object of the present invention to provide a fully automatic apparatus to avoid such manual manipulation which is an extremely important factor when considering today's high wages which, in the long run, can only mean a higher priced commodity and which costs are, in the main, passed down to the consumer.

The invention is illustrated in the accompanying drawings in which:

FIGS. 1, 2 and 5 are part-sectional elevations taken from the right-hand side of the machine;

FIG. 3 is a part-sectional elevation taken from the rear of the machine; and

FIG. 4 is a similar view to FIG. 3 but taken from the front of the machine.

Referring to the drawings, the keg de-bunging apparatus includes a framework 1 having a motor 2 (FIGS. 3 and 4) located adjacent its bottom and from which drive is imparted, via a belt 3, to a gearbox 3 and from the latter to a shaft 4 and then to a pulley wheel 5 via a belt 6 to a further pulley wheel 7 fast on a shaft 8 (FIGS. 3 and 4) extending from a reduction gearbox 9 and from the latter to a main drive shaft 10.

A gear wheel 11 fast on one end of shaft 10 is in engagement with a chain drive 12 which passes over an idler gear 13 and a drive sprocket 14 fast on one end of a shaft 16 connected to an air-clutch 15, said shaft 16 carrying a pair of spaced sprocket wheels 17 (FIGS. 3 and 4).

KEG CRADLE

A pair of stub-shafts 20 each extend inwardly into the apparatus from the sides thereof and serve as the mountings for sprocket wheels 18 with chain drives 21 passing over each associated pair of sprockets 17 and 18.

Each stub-shaft 20 also carries a further pair of drive sprockets 22,23 (FIGS. 3 and 4) and a cradle sideplate 24. A pair of forward and rear cross-shafts 25,25' are mounted between the mutually opposed ends of the sideplates 24 as are a pair of forward and rear connecting rods 26,26'. Mounted on the ends of the forward cross-shaft 25 are drive sprockets 27 which obtain their drive, via chain drives 28, from the drive sprockets 22. Mounted on the ends of the rear cross-shaft 25' are drive sprockets 29 (FIG. 3) which obtain their drive via chain drives 30, from the drive sprockets 23. Each cross-shaft 25,25' also serves as the mounting for a pair of rubber drive rollers 31, preferably having serrated or roughened peripheries.

The forward connecting rod 26 is connected to the upper end of a piston 31' of a hydraulic ram 32 by means of which the entire crate assembly is rocked about the stub-shafts 20 so as to assume one of three selected positions, i.e. forwardly and downwardly to a keg-receiving position as in FIG. 1; a mid-position for keg-rotating purposes as is shown in FIG. 2; and rearwardly and downwardly to a de-bunged keg ejecting position as is shown in FIG. 5.

The forward ends of the cradle sideplates 24 serve as the mounting for pairs of auxiliary rubber rollers 35 which, when the cradle is rocked rearwardly and downwardly to eject a de-bunged keg as in FIG. 5, assume a position preventing entrance of the next keg to be de-bunged until said cradle is once again rocked back into keg-receiving position.

BUNG SENSING MEANS

Mounted within the upper part of the framework 1 is a pair of forward and rear cross-shafts 40,41 (FIG. 5) and a depending ram 42. The rear cross-shaft 41 which has a rocking movement imparted to it, as will be described hereinafter, serves as the mounting for a bung-sensing means.

Preferably the bungs are provided with a substantially central indexing indentation in their outer face, however the present invention and particularly its bung sensing means will also operate adequately even if the bungs do not have such an indexing indentation.

The bung sensing means includes a carriage indicated generally at 43 having spaced pairs of idler rollers 44 with a bung sensing probe 45 therebetween. The carriage 43 is pivotally connected to webs 46 which are, in turn, pivoted about the rear cross-shaft 41 and which have a cross-brace 47 connected to the lower end of the ram 42.

KEG CLAMPING MEANS

The outer ends of the forward cross-shaft 40 each carry a gear wheel 50 (FIGS. 1, 3 and 5). The inner face of each gear wheel 50 is connected to a hydraulic ram 51 and chain drives 52 lead from each gear wheel 50 downwardly to a further sprocket wheel 53 (FIG. 3) fast on the outer end of a further stub-shaft 54. The inner end of each stub-shaft 54, carries a turret, indicated generally at 55 (FIGS. 3 and 4) each having a series of rollers 56 and an indexing member 57.

Extending parallel with each stub-shaft 54 is an auxiliary shaft 58 (FIGS. 3 and 4). Each auxiliary shaft 58 is moved towards or away from the centre of the appa-
Augs, by means of an auxiliary rams 59. The rams 59, as well as ram 42, are rendered operative in automatically timed sequence, when a keg in the cradle trips a pivoted switch 60 (FIGS. 3 and 4) mounted on the inner face of said cradle.

**BUNG EXTRACTING MEANS**

An auger-holder 65 which is vertically supported by gearbox 3, is provided with an auger 66 (FIGS. 3 and 4) at its upper end which auger is continually rotated by said gearbox 3. The auger-holder 65 is also connected to one end of a horizontal arm 67 mounted on a vertical support 69 connected to a hydraulic ram 70.

**OPERATION**

The operation of the apparatus is such that the cradle is normally pivoted forwardly and downwardly (as is shown in FIG. 1) ready to receive an empty keg K which still possesses its bung B. When such a keg is placed on to the cradle, it will contact switch 60 which activates the machine as follows: the air-clutch 15 will be activated to rotate shaft 16 and sprocket cross-shaft 17, 18 through the chain drives 21 and hence, via stub shafts 20, 23 chain drives 30, sprockets 29 and cross-shafts 25, drive will be imparted to the drive rollers 31 upon which the keg sits by gravity and which thereby cause the keg to rotate about its central longitudinal axis and in a longitudinal plane.

Simultaneously, ram 32 is activated to rock the entire cradle assembly and rotating keg about the stub-shaft 20 towards a mid-position as is shown in FIG. 2. As this is occurring, the bung-sensing means drops downwardly to enable the idler rollers 44 to contact the side of the keg. Concurrently, the ram 42 causes said rollers 44 to exert light pressure on the side of the keg during rotation of the latter on the cradle towards a first selected position where the sensing probe 45 is located.

As soon as the probe 45 drops into the indexing indentation formed in the bung, or otherwise senses the bung when the latter is presented to it upon the afore-said rotation of the keg as is shown in FIG. 3, drive to the latter is terminated and the cradle will thereby be locked in its mid-position.

As soon as drive to the cradle has been cut off, the rams 59 are actuated to move the clamping turrets 55 into engagement with the ends of the keg, as is shown in FIG. 4, whereupon the rams 51 partially rotate gears 50 to cause the turrets, as well as the keg, to rotate so as to bring the bung directly above the continuously rotating auger 66. The indexing members 57 will then terminate drive to the turrets.

At this time, more air is applied to ram 42 to increase the amount of pressure of the rollers 44 on the sides of the keg.

The ram 70 is then automatically actuated so as to urge the arm 67 and support 69 upwardly thereby moving the auger 66 upwardly into engagement with the bung whereby the latter will be removed from the keg.

Thereafter, hydraulic pressure to the sensing means is removed and the clamping turrets are moved axially outwardly to inoperative position. The cradle is then automatically pivoted downwardly and rearwardly so that it will eject the de-bunged keg.

I claim:

1. Apparatus for removing a bung from the side of a keg, said apparatus including:
   a. means for cradling the keg with its central longitudinal axis disposed in a substantially horizontal plane and for rotating such a keg about said axis towards
   b. means for sensing said bung when said keg has been rotated to a first selected position;
   c. means engageable with mutually opposed ends of said keg when the latter reaches said first position, to clamp the keg so as to inhibit longitudinal movement on said cradle means; said clamping means thereupon actuating
   d. drive means for rotating said keg to a second selected position wherein, when the bung has been removed, said cradle means being moved to an inoperative position upon removal of said bung and said cradling means thereafter being actuated to eject said de-bunged keg from the apparatus.

2. Apparatus according to claim 1 wherein said cradle means is movable from a keg-receiving position to a mid-position for keg-rotating purposes and includes pairs of driven rollers upon which the keg rests and which rotate the latter towards said sensing means.

3. Apparatus according to claim 2 wherein said sensing means includes a pivotal carriage located above said cradle means and movable towards and away from the periphery of the keg and having idler rollers engageable with said periphery and a bung-sensing probe.

4. Apparatus according to claim 3 wherein the probe controls the drive to said drive rollers and, upon sensing the bung, deactivates said drive.

5. Apparatus according to claim 4 wherein said end clamping means includes turrets of rollers and at least one indexing member, each said turret being axially movable towards and away from engagement with its associated and adjacent end of the keg and having rotary drive imparted thereto whereby the keg will be rotated to said second position, said indexing members terminating said drive to the turrets when said keg has reached said second position.

6. Apparatus according to claim 5 wherein said bung extraction means includes a vertically mounted continuously rotating auger located beneath said keg which, when said drive to the turrets is terminated, moves upwardly into engagement with the bung to remove it from the keg.

7. Apparatus according to claim 6 wherein, when the bung has been removed, said cradle moves from said mid-position to a keg-ejecting position.