United States Patent

[11] 3,587,894

[72] Inventors **Wallace James Parker;**
William Mitchell Parker, Thornliebank
Industrial Estate, Glasgow, Scotland

[21] Appl. No **808,629**
[22] Filed **Mar. 19, 1969**
[45] Patented **June 28, 1971**

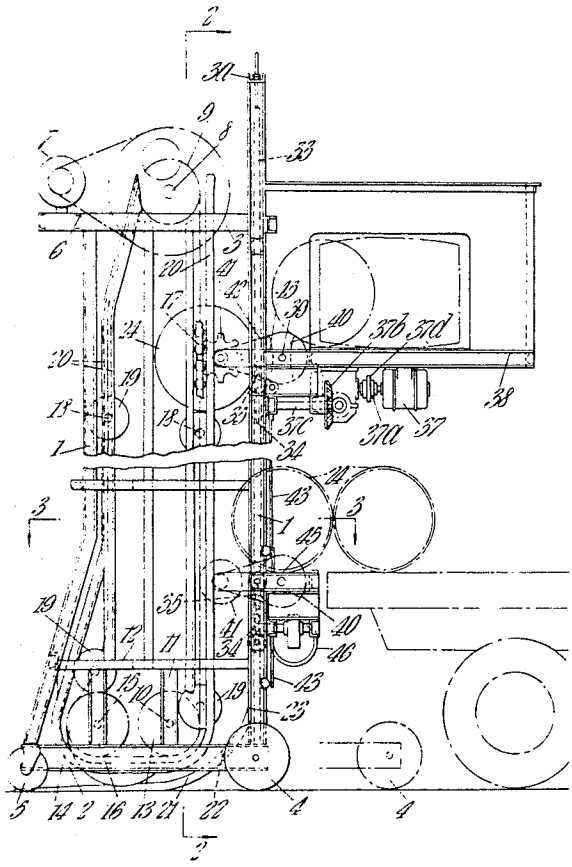
[54] **APPARATUS FOR RAISING, STACKING AND LOWERING BARRELS**
6 Claims, 8 Drawing Figs.

[52] **U.S. Cl.** **214/622,**
214/16.4, 198/168
[51] **Int. Cl.** **B65g 1/06**
[50] **Field of Search** 214/16.4,
622; 198/154, 156 (Inquired)

[56] **References Cited**
FOREIGN PATENTS
1,064,420 8/1959 Germany
1,035,237 7/1966 Great Britain

Primary Examiner—Gerald M Forlenza
Assistant Examiner - Raymond B Johnson
Attorney—Holman, Glascock, Downing & Seebold

ABSTRACT: An apparatus for stacking barrels comprises a vertical tower, power-driven elevator chains within the tower and interconnected by crossmembers, a pair of sprocket chains extending vertically at the front of the tower, a vertically movable structure supported by the tower and having an outwardly extending barrel-supporting member, means by which the structure can be positioned at any desired height, a pair of inner and outer sprocket wheels carried by the structure each sprocket chain being trained over an inner and outer sprocket wheel so that they extend downwardly from the inner sprocket wheels to retain a barrel within the tower and extend upwardly from the inner sprocket wheels to permit a barrel being rolled between them onto or from the vertically adjustable supporting member.



PATENTED JUN 28 1971

3,587,894

SHEET 1 OF 7

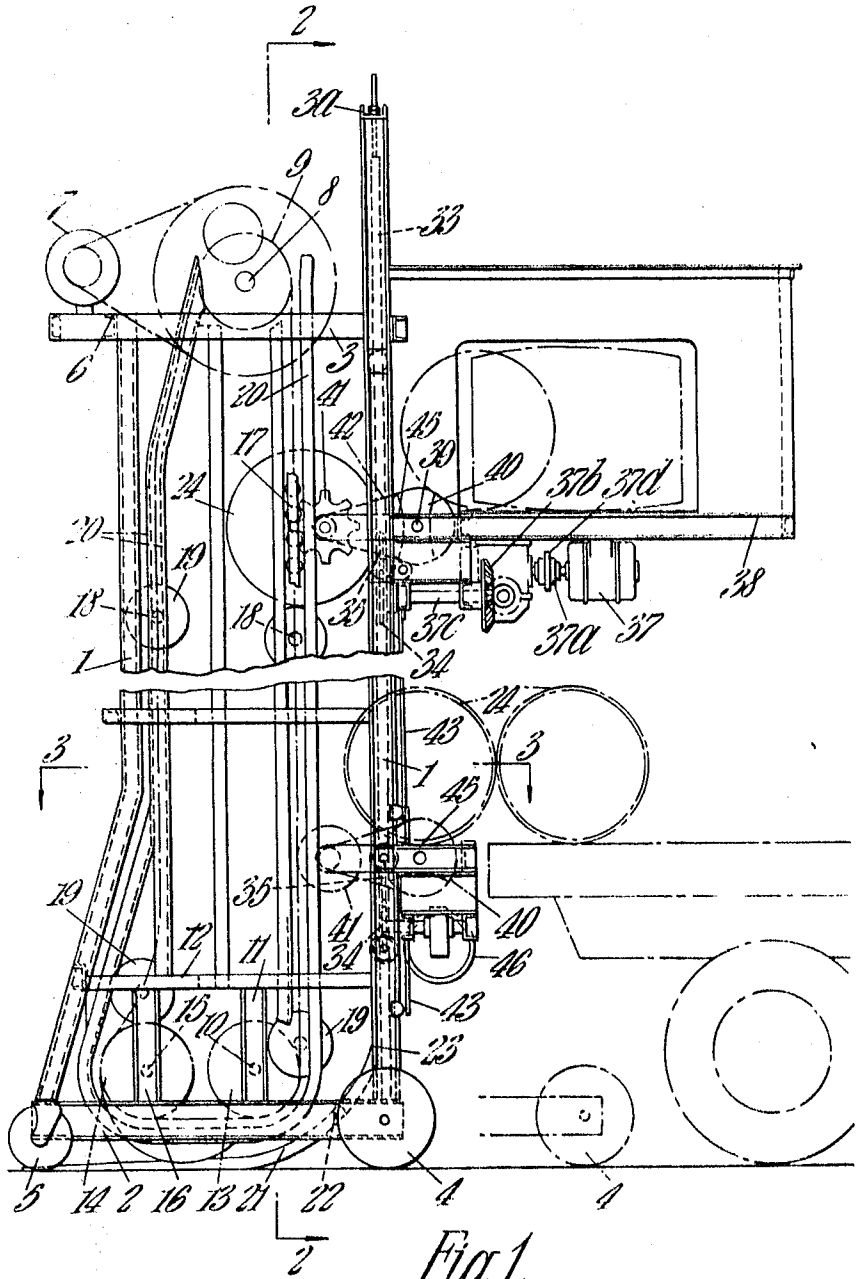


Fig. 1.

INVENTORS
WALLACE JAMES PARKER
WILLIAM MITCHELL PARKER
BY Holman, Glascock, Downing & Seibold
ATTORNEYS

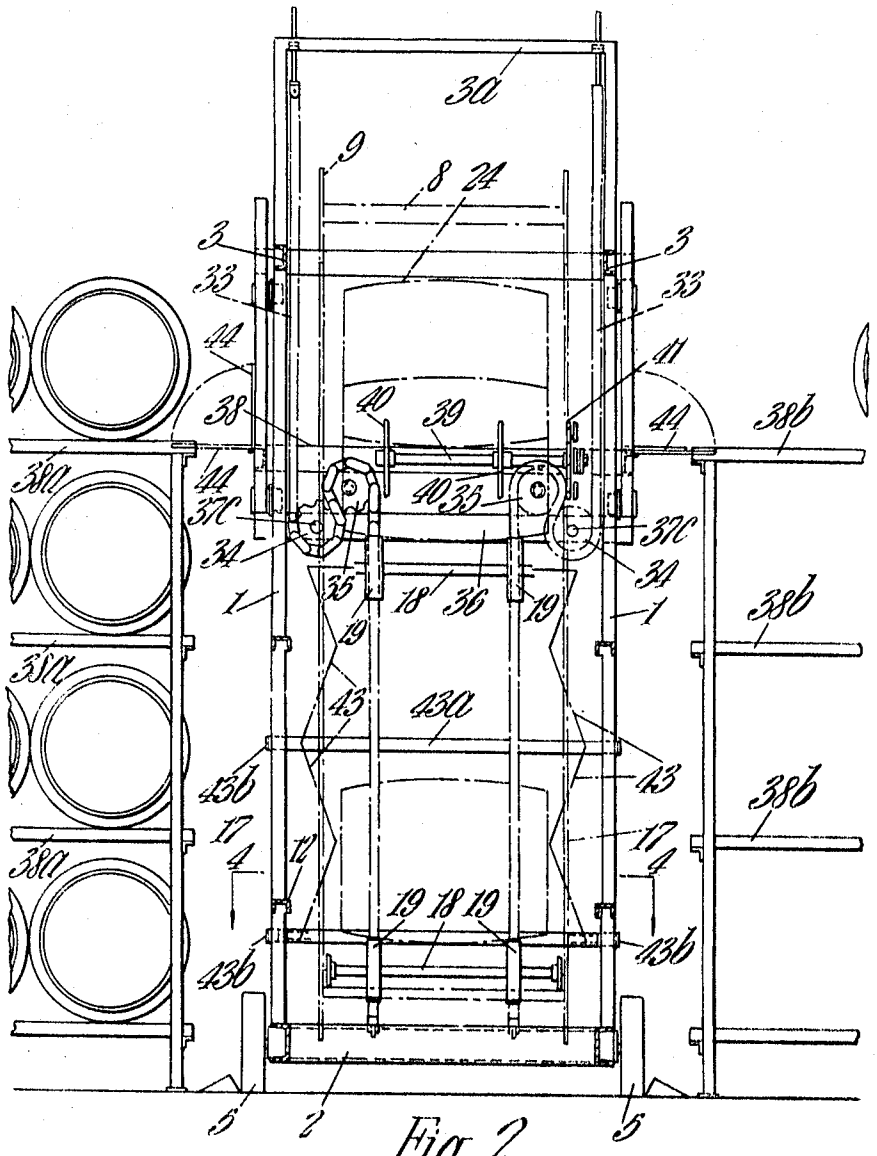


Fig. 2.

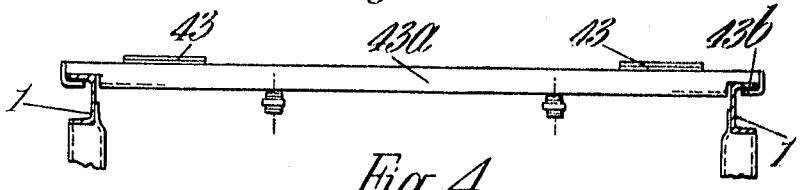


Fig. 4.

INVENTORS
WALLACE JAMES PARKER
WILLIAM MITCHELL PARKER
BY Holman, Glascock, Downing & Seebold
ATTORNEYS

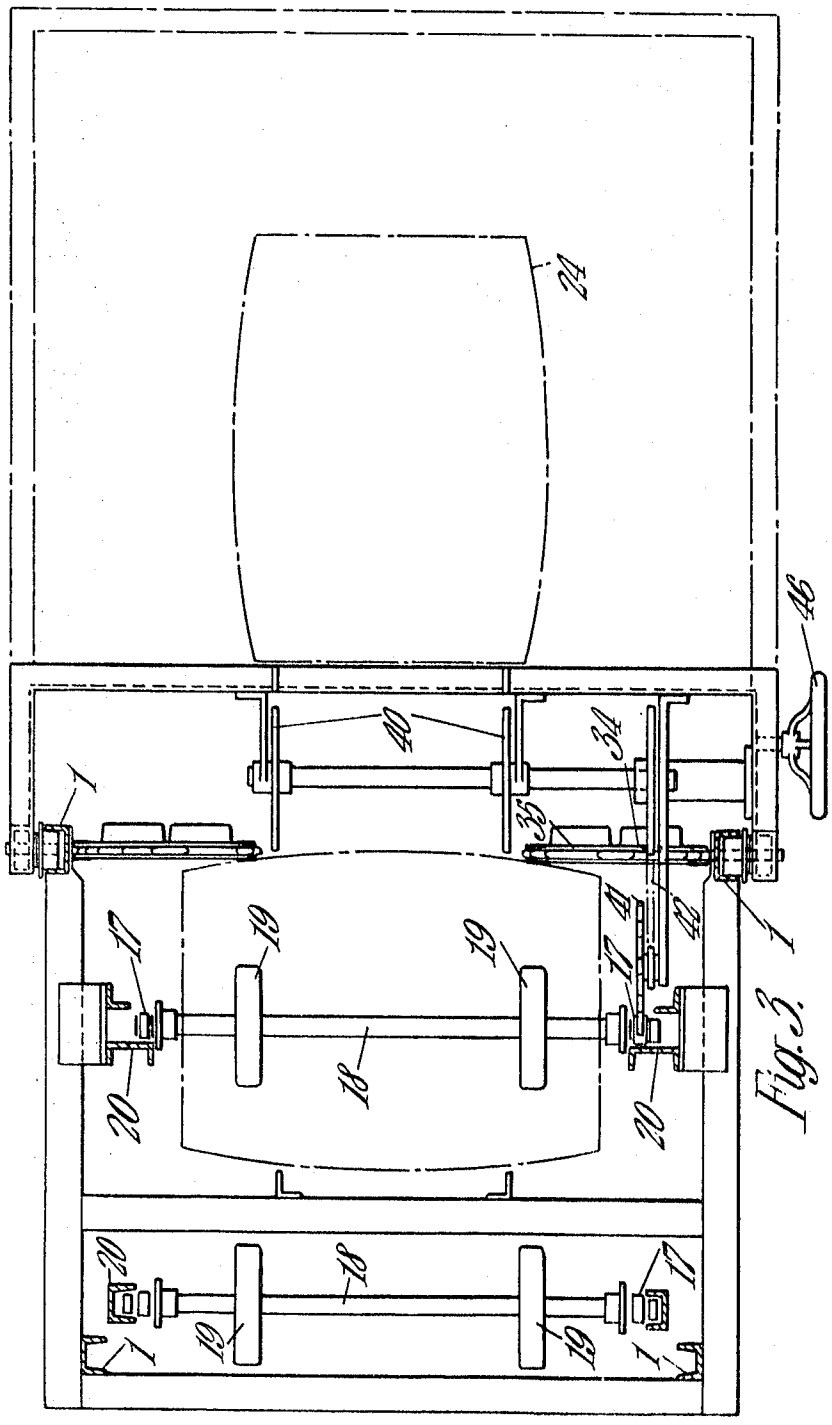


Fig. 3.

INVENTORS
WALLACE JAMES PARKER
WILLIAM MITCHELL PARKER
BY Holman, Glascock, Downing & Seibold
ATTORNEYS

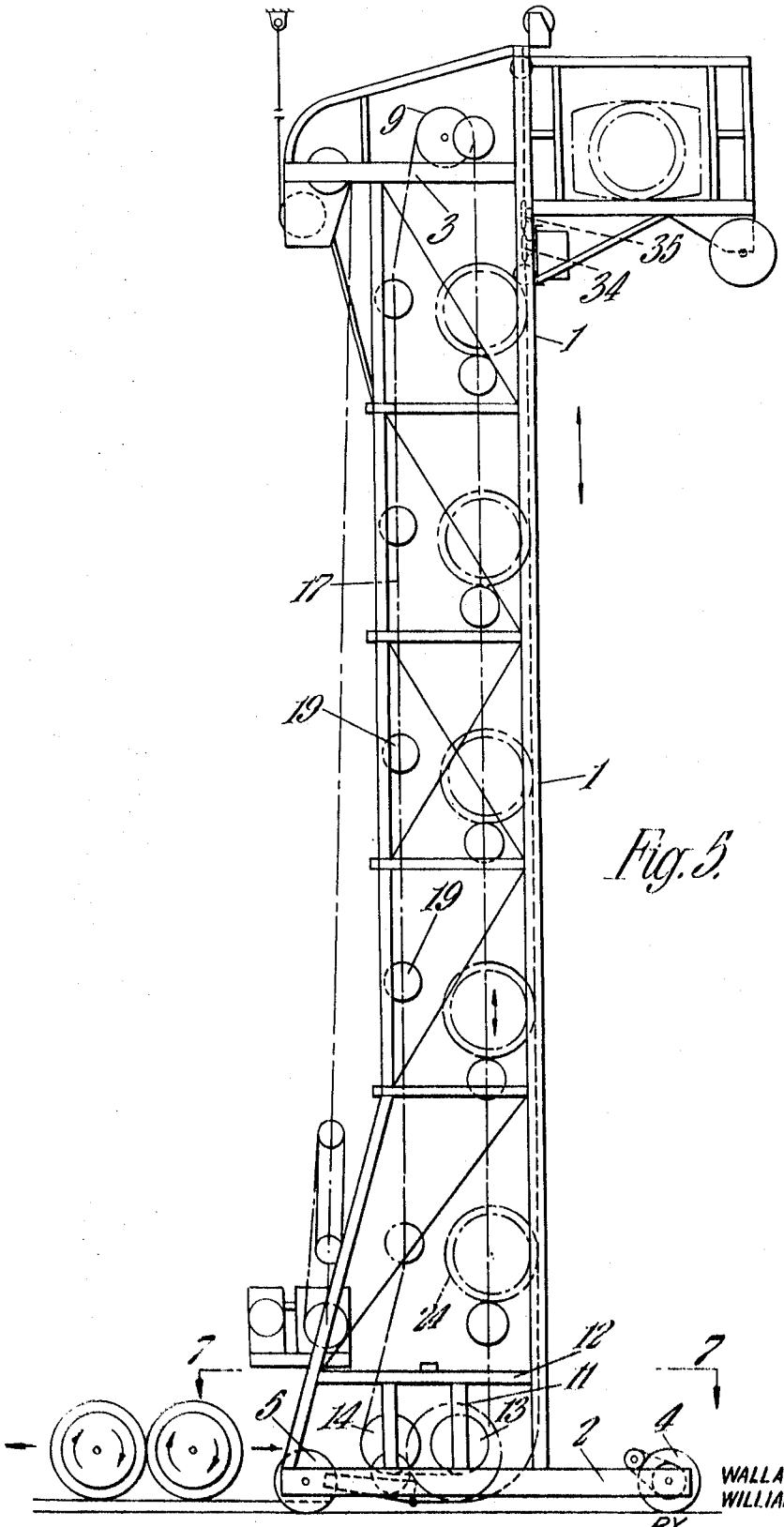
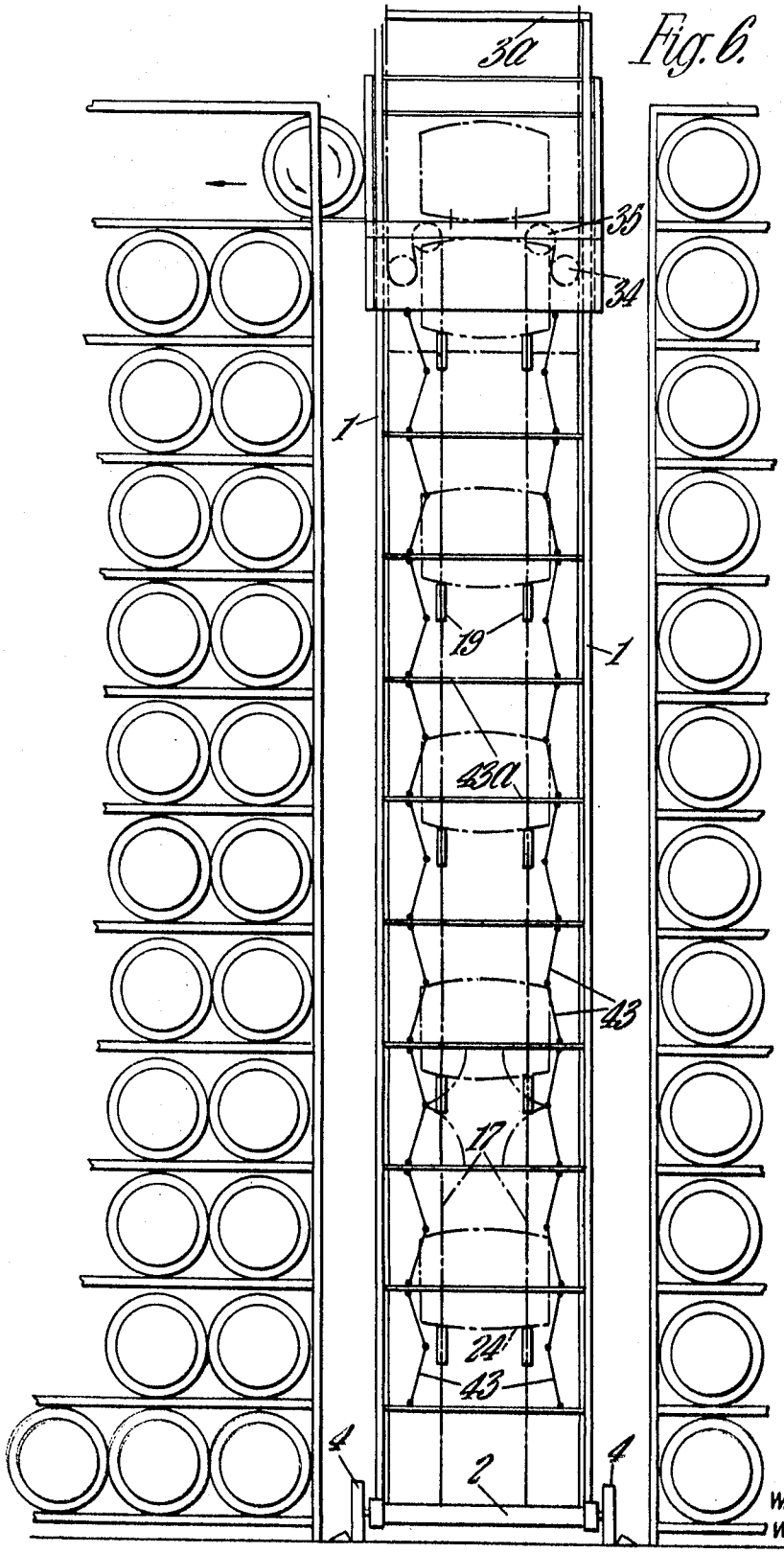


Fig. 5.

INVENTORS
WALLACE JAMES PARKER
WILLIAM MITCHELL PARKER

BY Holman, Glascock, Downing & Seebold
ATTORNEYS

Fig. 6.



INVENTORS
WALLACE JAMES PARKER
WILLIAM MITCHELL PARKER

BY Holman, Glascock, Downing & Seebold
ATTORNEYS

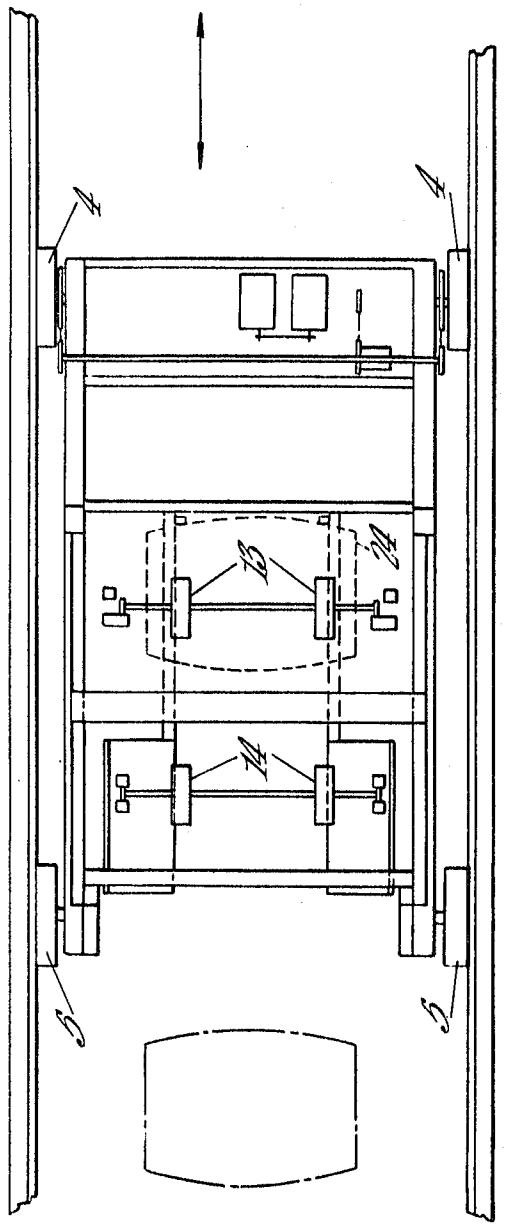
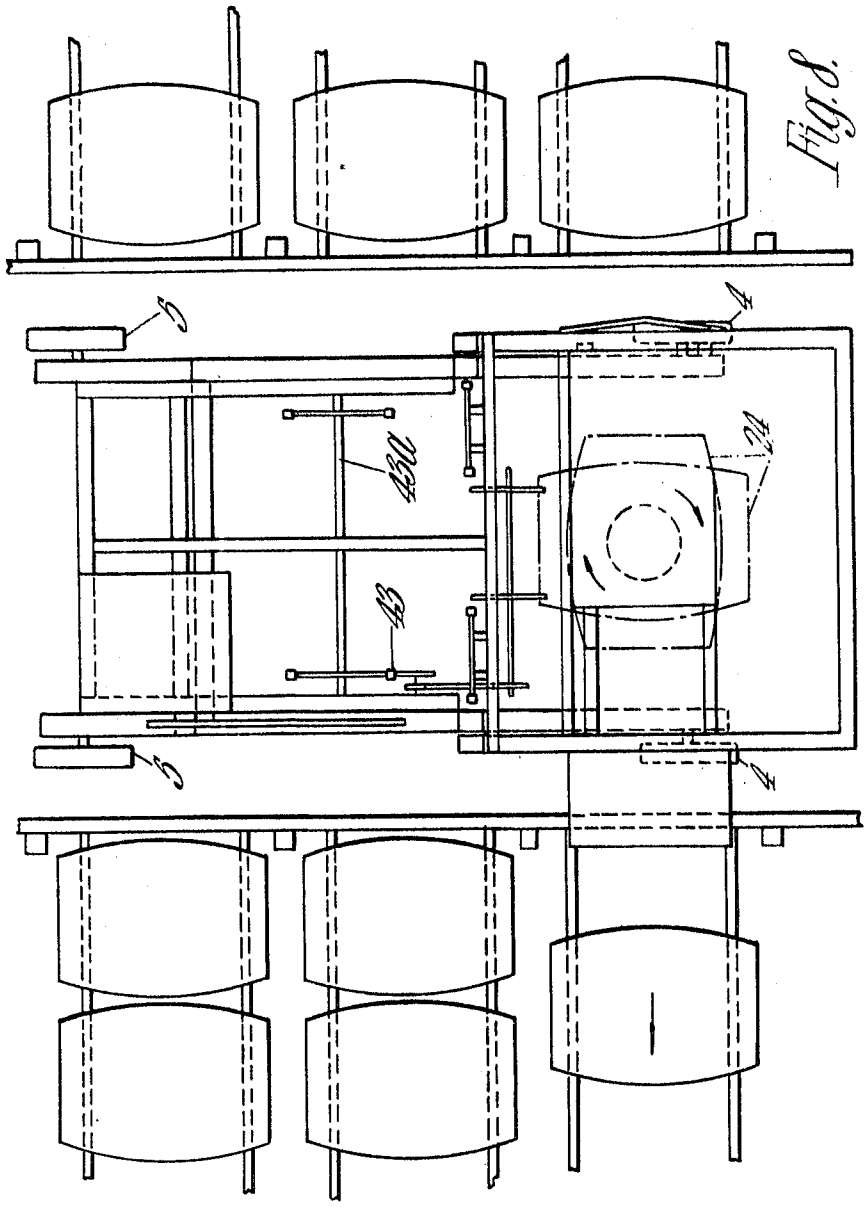


Fig. 7.

INVENTORS
WALLACE JAMES PARKER
WILLIAM MITCHELL PARKER
BY Holman, Glascock, Downing & Seebold,
ATTORNEYS



INVENTORS
WALLACE JAMES PARKER
WILLIAM MITCHELL PARKER
BY Holman, Glascock, Downing & Seibold
ATTORNEYS

APPARATUS FOR RAISING, STACKING AND LOWERING BARRELS

This invention has reference to apparatus used in stacking barrels on floors, on stagings or in tiers on lorries and also for subsequently lowering the stacked barrels on to the ground or on to lorries.

In stacking barrels containing whisky or beer for example it is the usual practice to use a forklift. While a single barrel can be quickly raised by means of a forklift an appreciable amount of time is lost in returning the forklift to its initial position preparatory to lifting the next barrel. This is likewise the case when it comes to removing the stacked barrels.

The present invention has for its object to provide an improved apparatus by which barrels can be much more quickly raised and discharged onto preselected superimposed floors or stagings or on to a lorry or tiers of barrels on a lorry, and which can also be used to remove quickly the barrels from the floors or stagings or from the lorry.

According to the present invention an apparatus for the purpose set forth comprises a vertical tower, a barrel guide leading to the foot of the tower, a pair of power-driven elevator chains located within the tower end extending upwardly over the horizontal guide, horizontal cross shafts positioned at regularly spaced distances apart and interconnecting the two chains, each shaft carrying a pair of rollers or discs which engage the barrels being raised, or lowered, a pair of sprocket chains extending vertically at the front of the tower, a vertically movable structure supported by the tower and having an outwardly extending barrel-supporting member, means by which said structure can be positioned at any desired height, a pair of outer sprocket wheels and a pair of inner sprocket wheels carried by the structure, each sprocket chain being trained over an inner and outer sprocket wheel so that the chains, where they extend downwardly from the inner sprocket wheels, are positioned to retain a barrel in the tower while the chains extending upwardly from the outer sprocket wheels are positioned to permit a barrel being rolled between them onto or from the vertically adjusted barrel-supporting member.

The adjustable structure may be raised and lowered manually, such arrangement being suitable where the barrels are unloaded to form one, two and three tiers or are withdrawn from such tiers. Where the tower is of such height that the barrels can be unloaded onto three or more floors or stagings the vertically adjustable structure is power operated and carries the barrel-supporting member in the form of a platform on which an operator can stand to control the vertical movements. Further the platform may be used to turn a barrel rolled thereon through 90° in a horizontal plane so that it can be rolled on to floors or stagings extending laterally from either side of the platform, or so that the barrels can be rolled from such stagings on to the platform and then rotated as aforesaid so that they can be received by the elevator.

The apparatus may be provided with a rotary barrel pushing device driven in unison with one of the elevator chains so that when a barrel is being discharged onto the barrel-supporting member or platform it is given an impetus to take it clear of the elevator and ensures that movement of the barrel is properly synchronized with the elevator cross shafts when the barrel is being lowered.

A further feature of the invention consists in the provision of collapsible and extensible barrel supports suspended from the said vertically adjustable structure, such supports preventing bulging of the sprocket chains due to the barrels being raised and lowered within the tower.

A preferred embodiment of the invention will now be described with reference to the accompanying drawings wherein:

FIG. 1 is a side elevation of the apparatus which is designed to stack barrels in more than three tiers;

FIG. 2 is a section on the line 2–2 of FIG. 1;

FIG. 3 is a sectional plan view on the line 3–3 of FIG. 1;

FIG. 4 is a part sectional plan view on the line 4–4 of FIG. 2;

FIG. 5 shows diagrammatically a side elevation of the apparatus with the vertically movable structure in its highest position;

FIG. 6 is an end view of FIG. 5 looking to the left;

FIG. 7 is a sectional plan view of the line 7–7 of FIG. 5; and

FIG. 8 is a plan view of FIG. 6.

The improved apparatus has a fabricated vertical tower formed of four corner uprights 1 secured to a base frame 2 and to a top frame 3.

The front uprights extend upwardly beyond the top frame and at their upper extremities support a crossbeam 3*a*.

The base frame is mounted on a pair of front ground wheels 4 and a pair of rear ground wheels 5. Where the height of the tower so necessitates the front wheels may be positioned in front of the tower as shown in FIG. 5 to prevent the tower tipping and said wheels may be power driven. The top frame supports a motor 7, which through suitable gearing, drives a cross-shaft 8 carrying a pair of axially aligned sprocket wheels 9. Vertically below said cross-shaft are two stub shafts 10 supported by short uprights 11 extending between the base frame 2 and a horizontal tower-reinforcing member 12. The stub shafts carry a lower pair of sprocket wheels 13. Located at the rear of the lower pair of sprocket wheels 13 is a third pair of sprocket wheels 14 mounted on a further pair of stub shafts 15 supported by further short uprights 16. Trained over the said sprocket wheels are two endless elevator chains 17 which carry a series of cross-shafts 18 which are positioned at regularly spaced distances apart and each of said shafts carries a pair of rollers or discs 19. The vertical runs of both chains are guided by vertical guides 20 which may be in the form of double rail or rails of channel section.

Positioned at the foot of the tower so as to bear on the ground is a pair of ramps 21. Said ramps are pivoted at their forward ends as at 22 and at said ends they register with upwardly curved barrel guides 23 which at their upper ends register with the foot of the chains.

The spacing apart of the pairs of rollers or discs 19 is such that each pair will engage a barrel between the ends thereof and the plane through its largest diameter.

The sides of the tower may be boxed in except at the front at which are two vertical chains 33 anchored to the crossbeam 3*a* and to the base of the tower. The guides 23 register at their upper ends with the foot of the chains 33. Each chain is trained over an outer sprocket wheel 34 and inner sprocket wheel 35. The chains where they extend downwardly from the inner sprocket wheels 35 to the base frame 2 are spaced apart preferably somewhat of the same spacing as that of the rollers or discs 19, and where they extend upwardly from the outer sprocket wheels 34 to the crossmember 3*a* they are spaced apart greater than the distance between the ends of the barrels which the apparatus is designed to handle. Said pairs of sprocket wheels 34 and 35 are carried by a vertically adjustable structure 36 supported by the tower.

The apparatus shown is designed to raise barrels to and from more than three floors or stagings and said sprocket wheels 34 are driven by a motor 37 under the control of an operator standing on a platform 38 supported by the structure 36. The motor 37 through a coupling 37*a* and bevel gearing 37*b* drives two shafts 37*c* which in turn drive the sprocket wheels 34. As the sprocket wheels 34 are in mesh with the chains 33 the structure 36 will be raised or lowered in accordance with the direction of rotation of the shafts. When raised or lowered to the desired height the structure 36 is retained in position by means of a brake 37*d* applied to the transmission gear. The platform is such that a barrel can be rolled thereon and then turned through an angle of 90° in a horizontal plane so tat it can be rolled on to either of two laterally extending floors or stagings 38*a* and 38*b* which are in alignment with the platform.

Also carried by the vertically adjustable platform 38 is a horizontal shaft 39 which has fast thereon two barrel pushing devices each consisting of a diammetrically extending arm 40 the sides thereof being concave to conform with the parts of

the barrel with which they register. Said shaft, and therefore the pushing devices, is driven by a sprocket wheel **41** which engages one of the elevator chains **17** and which drives the shaft through a sprocket chain drive **42**.

Suspended from the vertically adjustable structure **36** to the base of the tower are two extensible and collapsible barrel supports each in the form of linkwork formed by a series of pivotally interconnected links **43** and interconnected by cross-bars **43***a* positioned to support the barrels in such manner as will prevent them from bulging the vertical chains **33** where they extend downwardly from the inner sprocket wheels **35** to the base frame **2**.

The ends of the cross bars carry L-shaped brackets **43***b* which engage the front upright **1** which act as guides.

In describing the operation of the apparatus it will be assumed that the barrels are to be raised from ground level and deposited on one of a series of floors or stagings **38***a* positioned one above the other and extending laterally from a central gap or lane.

The apparatus is wheeled into the said gap and the operator standing on the platform raises the adjustable structure until it is level with the floor or staging on which the barrels are to be deposited.

Barrels are rolled one at a time on to the bottom ramps **21** while the elevator is being driven, the rollers or discs **19** engaging the barrels and raising them in the tower. As each barrel is being raised the rollers or discs on which it is supported urges it against the vertical sprocket chains **33** where they extend downwardly from the vertically adjustable structure, the chains retaining the barrel within the tower until it is raised to the level of the platform **38**.

The said linkwork is such that it will not bulge outwardly and therefore aids in retaining the barrels within the tower until they are raised to the point where they are discharged.

Said chains **33** above the structure are then so spaced apart by the sprocket wheels **34** that the barrel rolls clear of the tower on to the platform. Said pushers **40** are constantly rotating and are synchronized so that they operate to impart an impetus to the barrel as it passes to said platform. Each barrel on being deposited on the platform is turned in a horizontal plane through 90° so that it can then be rolled on the floor or staging on either side of the gap, a foldable ramp **44** being provided to bridge the platform and the floor staging. After the row of barrels on the floor or staging has been completed the apparatus is advanced through the gap to make the net row until the said floor or staging on both sides of the gap has been filled with barrels. Further floors or stagings are filled in like manner after raising the vertically adjustable structure to the appropriate height.

Unloading of the barrels from the floor or staging is effected by reversing the aforesaid procedure.

Where it is required to raise the barrels to form three stages, for example in raising them to form three tiers on a vehicle the apparatus need only be of a height sufficient for this purpose and the vertically movable structure need have only a short platform and need not be power operated. Thus as shown in FIG. **1** the structure is provided with a ramp **45** and can be raised and lowered vertically by manual means, e.g. by a handwheel **46** operating through worm and wormwheel gearing.

It will be understood that the apparatus will not be provided with both a power-operated and a manually operated platform both of which are shown in FIG. **1** to obviate unnecessary duplication of the drawings.

I claim:

1. An apparatus for the purpose set forth comprising a vertical tower, a barrel guide leading to the foot of the tower, a pair of power-driven elevator chains located within the tower and extending upwardly over the guide, horizontal cross-shafts positioned at regularly spaced distances apart and interconnecting the two chains, each shaft carrying a pair of rollers or discs which engage the barrels being raised, or lowered, a pair of sprocket chains extending vertically at the front of the tower, a vertically movable structure supported by the tower and having an outwardly extending barrel-supporting member, means by which said structure can be positioned at any desired height, a pair of outer sprocket wheels and a pair of inner sprocket wheels carried by the structure, each sprocket chain being trained over an inner and outer sprocket wheel so that the chains, where they extend downwardly from the inner sprocket wheels, are positioned to retain a barrel in the tower while the chains extending upwardly from the outer sprocket wheels are positioned to permit a barrel being rolled between them onto or from the vertically adjusted barrel-supporting member.

2. An apparatus as claimed in claim **1** having manually operated means by which the adjustable structure is raised and lowered, such arrangement being suitable where the barrels are unloaded to form one, two and three tiers or are withdrawn from such tiers.

3. An apparatus as claimed in claim **1** wherein the tower is of such height that the barrels can be unloaded on to at least three floors or stagings, and the vertically adjustable structure is provided with power-operated adjusting means and carries the barrel-supporting member in the form of a platform on which an operator can stand to control the vertical movements.

4. An apparatus as claimed in claim **1** wherein the adjustable structure is raised and lowered by driven sprocket wheels carried by the structure and engaging the sprocket chains.

5. An apparatus as claimed in claim **1** provided with a rotary barrel-pushing device driven in unison with one of the elevator chains so that when a barrel is being discharged on to the barrel-supporting member or platform it is given an impetus.

6. An apparatus as claimed in clam **1** having collapsible and extensible barrel supports suspended from the said vertically adjustable structure, such supports preventing bulging of the sprocket chains due to the barrels being raised and lowered within the tower.