April 26, 1960 H. L. SHIVEK 2,934,211

DISPENSING APPARATUS

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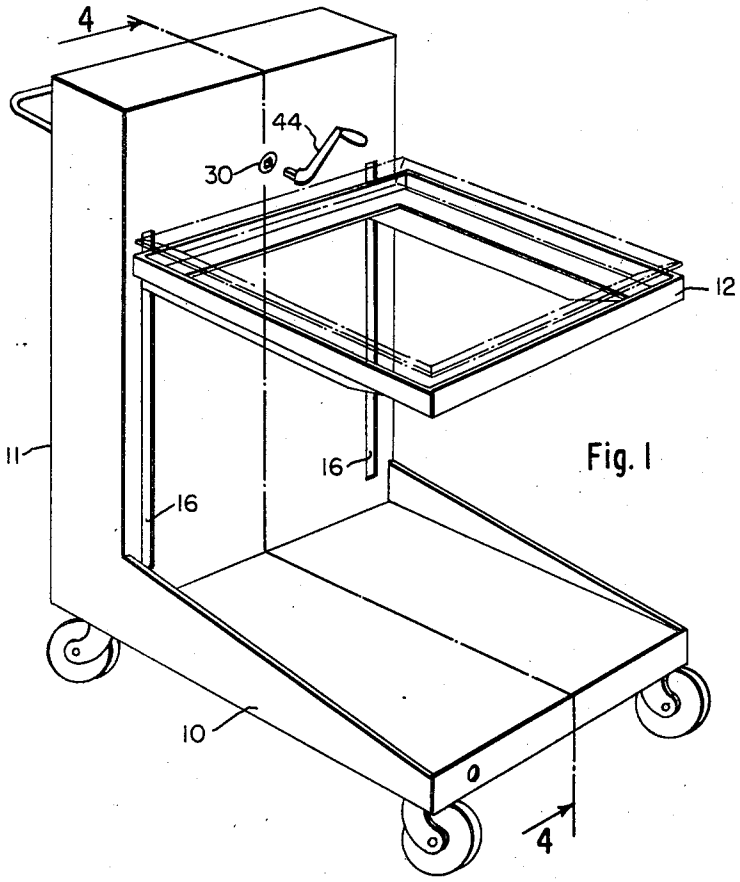

Fig. 1

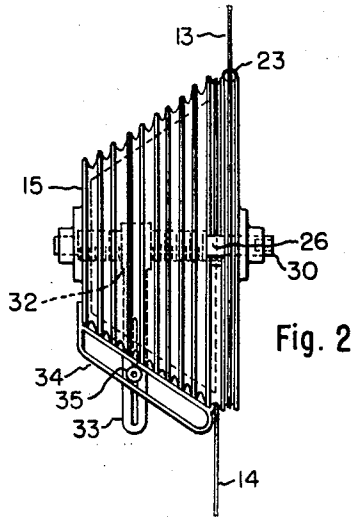

Fig. 2

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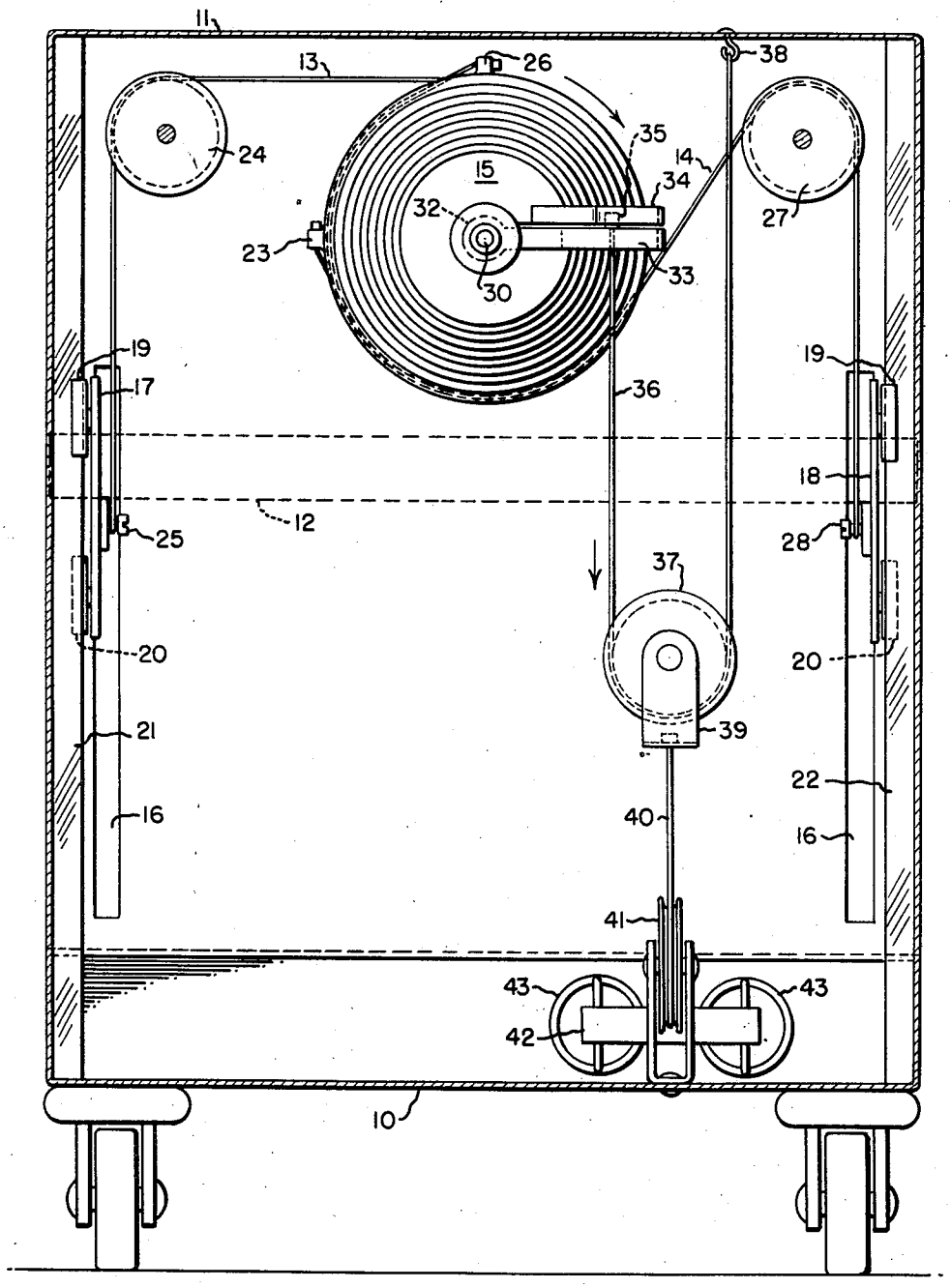

Fig. 3

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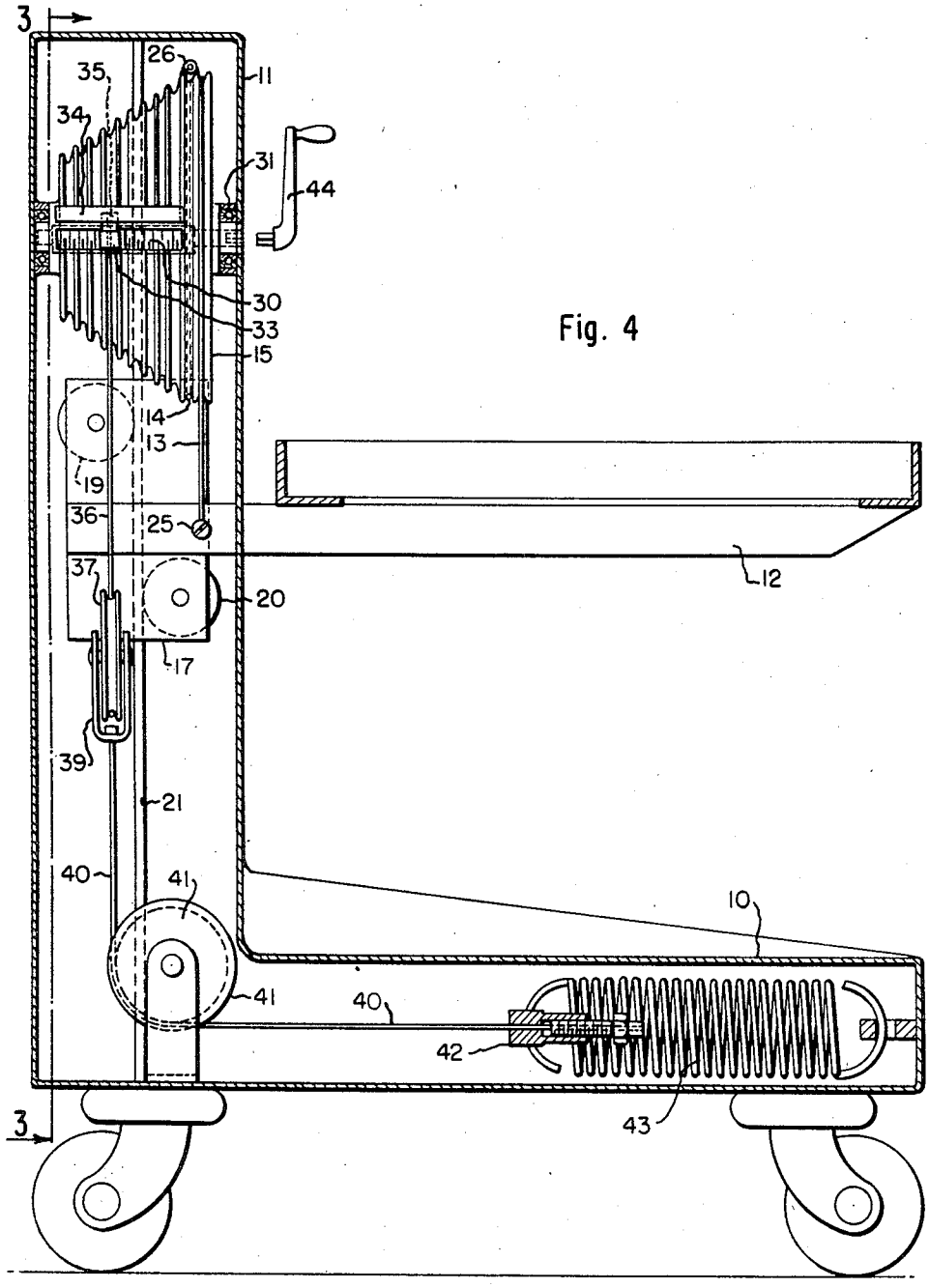

Fig. 4

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2,934,211

DISPENSING APPARATUS

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Application December 6, 1957, Serial No. 701,243

11 Claims. (Cl. 211—49)

This invention relates to self-leveling, storing and dispensing apparatus for articles such as dishes, table utensils, trays or the like. More particularly, it comprises new and improved mechanism for varying the capacity of dispensers used in restaurants to carry such loads of different weights at different times.

Heretofore the capacity of self-leveling dispensing apparatus has been changed and adjusted either by connecting or disconnecting springs until the required number of springs for the desired counter-balancing force is made available, or by providing adjustable lever mechanism of one form or another.

It is the purpose of this invention to overcome both the difficulty of having to connect or disconnect springs and the necessity of using an inconvenient lever mechanism and to provide instead capacity changing means that is simple in construction, inexpensive in manufacture and assembly and requires no special skill in its operation and adjustment.

I have discovered a mechanical construction by which these results may be achieved and of this the essential component is a conical drum or stepped pulley arranged on the one hand with encircling cables for hoisting the carrier and on the other hand adjustably connected to a tensioned actuating cable, thus carrying out both of the functions essential to the operation of satisfactory dispensing apparatus.

The objects of the invention are achieved and important advantages secured in apparatus including in its structure a vertically movable or floating carrier suspended by hoisting connections wound partially about the circumference of a conical drum or pulley in combination with a tensioned cable tending to rotate the drum for elevating the carrier and means for connecting the cable to the drum at different points along its conical surface thereby varying the effective hoisting effort of the drum on the carrier while maintaining constant the tension of the cable.

These and other features of the invention will be best understood and appreciated from the following description of a preferred embodiment thereof selected for purposes of illustration and shown in the accompanying drawings in which:

Fig. 1 is a view in perspective of the apparatus.

Fig. 2 is a top view of the conical drum,

Fig. 3 is a rear view of the mechanism contained within the housing, the housing being sectioned on the line 3—3 of Fig. 4, and

Fig. 4 is a view in longitudinal section on the line 4—4 of Fig. 1.

The apparatus as herein shown comprises a hollow base 10 from which rises a vertical hollow frame or housing 11. The carrier 12 of the apparatus is movable vertically and projects forwardly in cantilever fashion from the housing 11. It is suspended by cables 13 and 14 shown in Fig. 3 as partially wound about the circumference of the drum 15 and this drum is constantly biased to rotate in clockwise direction, as indicated by the arrows adjacent thereto, thereby counter-balancing the weight of the carrier and tending to elevate it.

The elements of the machine will now be more specifically described. The housing 11 is provided with parallel vertical slots 16 through which the opposite sides of the carrier 12 are connected to plates 17 and 18 within the housing. Each of the plates is provided with a pair of rollers 19 and 20 adapted to run upon opposite sides of vertical rails 21 and 22 fixed rigidly within opposite sides of the housing and extending downwardly into the base 10. The rails thus serve through the rollers 19 and 20 to maintain the carrier in horizontal position while permitting it to rise or fall vertically throughout the length of the slots 16.

The cable 13 which is fastened to the drum 15 by a clamping lug 23 is shown in Fig. 3 as wound about approximately 270° of the drum circumference at its major diameter. From the drum it passes over a guide pulley 24 and then downwardly to a clamp 25 by which its free end is attached to the left hand plate 17 as seen in Fig. 3.

The cable 14 is secured to the drum by a clamp 26 from which it is wound about approximately 240° of the drum circumference at the larger end of the drum and in a groove parallel to that of the cable 13. From the drum the cable 14 passes over a guide pulley 27 and thence downwardly to a clamp 28 by which its free end is secured to the right hand plate 18.

The mechanism for mounting and biasing the drum 15 in clockwise direction will now be described. The drum itself is journaled upon a transverse shaft 30 normally stationary but manually rotatable in ball bearings 31 secured to the opposite walls of the housing 11 in the upper portion of the housing. The intermediate portion of the shaft 30 is threaded and receives the internally threaded hub 32 of a radially disposed arm 33. This arm extends outwardly through a slot or passage extending longitudinally of the drum and radially from the shaft out through the conical surface of the drum. Secured to this surface of the drum adjacent to the opening of the slot is an inclined longitudinal guideway 34 in which travels a small roller 35 mounted upon a clamp to which is secured the upper end of a cable 36. The clamp to which the end of this cable is connected is arranged to slide freely in and out or radially with respect to the axis of the drum in moving along a slot provided for that purpose in the outer end of the arm 33.

As shown in Fig. 2 the roller 35 and the clamp beneath it, which constitutes the point of connection between the cable 36 and the drum 15, is located substantially in mid position of the guideway 34. If now the shaft 30 is manually rotated, the arm 33, by its threaded connection with the shaft, will be carried either toward the smaller end of the cone, in which case its moment arm will be reduced, or toward the larger end of the cone, in which case its moment arm will be increased. The arm 33 as shown in Fig. 3 bears always on the lower surface of the radial slot in the drum 15 so that it always tends to turn the drum in the direction shown by the arrow in this figure, and if the drum is rotated on the shaft in an anti-clockwise direction by the descent of the floating carrier the cable 36 will be wound upon the drum in the groove which happens to be opposite the adjusted position of the roller 35. Since the cable 36 is maintained always under tension in the direction shown by the adjacent arrow in Fig. 3, the hoisting effort of the drum upon the carrier will be varied without change in the tension of the cable.

The cable 36 is carried about an idle pulley 37 and thence upwardly to a hook 38 fixed in the upper wall of the housing. The idle pulley 37 is journaled in a stirrup 39 to the bottom of which is secured another cable 40. The cable 40 passes downwardly over a guide pulley 41

journaled in the base of the housing 11 and thence to a cross bar 42 by which it is adjustably connected to a pair of parallel tension springs 43 mounted within the base and secured at their outer ends to the front wall thereof. These springs 43 are biased or retained under tension so that the idle pulley 37 is always drawn downwardly tending to rotate the drum 15 in a clockwise direction and to elevate and counter-balance the carrier 12.

It will be seen that the suspending cables 13 and 14 encircle the drum 15 in separate grooves formed at the larger end of the drum beyond the end of the slot 16. These cables remain at all times in that predetermined relation with respect to the drum.

The actuating cable 36 on the other hand is controlled in its axial position with respect to the drum 15 and also in its offset distance from the axis of the drum by the position of the arm 33 on the threaded portion of the shaft 30. As a convenient means for manually rotating the shaft its front end is provided with an angular socket into which may be fitted a crank 44.

It may be assumed that the various elements of the dispenser are so initially assembled that when the carrier 12 occupies its uppermost position, at the upper ends of the slots 16, the drum 15 will come to rest with the arm 33 in substantially horizontal position as shown in Fig. 2. When the carrier is unloaded the arm 33 will be located also at the left end of the slot as seen in Fig. 4, that is to say, at the smaller end of the drum 15 and the cable 36 will hang free of the drum. In this position of the arm 33 the tensioned actuating cable 36 will be wound about the smallest circumferential slot of the drum and its moment arm will be at a minimum.

If the carrier is now loaded it will descend and the cables 13 and 14 will cause the drum 15 to rotate in anticlockwise direction against the tension of the springs 43 acting through the cable 36 and the arm 33. In order to provide in advance for increased capacity for load upon the carrier and counter-balance it, the user has only to rotate the shaft 30 to advance the arm 33 toward the larger end of the drum 15, thus increasing the effective moment arm of the tensioned cable 36 by shifting the cable into line with a circumferential groove of greater diameter.

It will further be apparent that rotation of the drum 15 through not more than 270° will wind in or release lengths of hoisting cable 13 and 14 at least equal to the length of the slots 16 that limit the range of carrier movement. And it will be seen that by reason of the interposition of the idler pulley 37 the movement of the elongation of the spring 43 will be only one half the movement of the hoisting cables.

The interposition of the pulley 37 between the springs 43 and the arm 34 is a matter of secondary importance. Satisfactory results may be attained by connecting the springs 43 directly to the arm 34 and reducing the diameter of the drum grooves by substantially one-half that suggested in Fig. 3.

It is contemplated that the drum mechanism herein described may replace the lever mechanism employed for a similar purpose in the dispenser of my co-pending application Ser. No. 642,116, filed February 25, 1957.

Having thus disclosed my invention and described in detail an illustrative embodiment thereof, I claim as new and desire to secure by Letters Patent:

1. Storing and dispensing apparatus for restaurants comprising a frame which includes a base and an upright housing, a carrier movable vertically with respect to the housing and connected thereto, a conical stepped drum having a central shaft journaled at its ends in said housing and having a threaded intermediate portion which is exposed by a longitudinal slot in the side wall of the drum, a guide arm connected to the threaded portion of the shaft and movable axially of the drum by rotation of the shaft, a tension spring mounted in the base of the frame, an actuating cable connecting the spring and drum through the medium of said guide arm, and suspending cables wound upon the drum and connected to the carrier.

2. Storing and dispensing apparatus of the character described in claim 1 in which the carrier is connected to a pair of plates within the housing and extends outwardly in cantilever fashion from the housing, vertical rails within the housing, and rollers mounted in the plates in positions to run on opposite sides of the rails.

3. Storing and dispensing apparatus comprising a base, an upright housing rising from the base and having vertical slots in its front wall adjacent the sides thereof, a floating carrier supported adjacent to the housing by arms projectng through and slidable within said slots, a cone drum rotatably mounted in the upright housing, spring tension means located in said base and having connection with said cone drum at a point offset from its axis of rotation, cables attached at one end to said carrier and to said cone drum at the other end, and means to vary the force exerted by said spring tension means on said drum.

4. Storing and dispensing apparatus comprising a base and an upright housing, a carrier adapted and arranged to have free vertical movement above said base and alongside said upright housing, a cone pulley mounted for rotation in the housing, cables attached at one end to said carrier and to said pulley at the other end, a pair of springs located in said base and having connection with said pulley at a selected point offset with respect to its axis of rotation, and means to vary the point of connection of the springs to and from the axis of the pulley.

5. Storing and dispensing apparatus comprising an upright housing, a floating carrier guided for vertical movement adjacent the housing and connected therewith, a cone pulley journaled on a normally stationary shaft within said housing and having a slot extending axially of the pulley and outwardly with respect to its axis, an arm movable in said slot and having threaded connection at its inner end with said shaft whereby the arm may be moved axially of the drum by rotation of the shaft, a tensioned cable fast to the outer end of said arm tending always to rotate the pulley through the arm in one direction, and a suspending cable tending to rotate the pulley in the other direction and being partially wound about the pulley and attached at its free end to the floating carrier.

6. Apparatus of the class described comprising a frame, a vertically movable carrier supported thereby, a conical drum rotatably arranged in the frame and having flexible hoisting connections for the carrier wound partially about its circumference, a spring tensioned cable connected to apply rotational force to the drum at different selected points axially of its conical surface, thereby varying the effective hoisting force applied to the carrier while maintaining substantially constant the tension of the cable.

7. Apparatus of the class described having a floating carrier, a stepped conical drum mounted on a longitudinal axis for rotation, suspending cables leading from the carrier and wound about the drum in pre-determined axial position, and a constantly tensioned cable having means for selective connection longitudinally of the drum and at points spaced radially from the axis of the drum.

8. Apparatus of the class described having a floating carrier, a conical drum having a longitudinal slot opening through the side wall of the drum, a cable means connected to the drum adjacent to the slot for selective connection to the drum of tension means, cables connecting the drum and carrier for suspending the latter, an actuating connection with the drum, and means movable in said longitudinal slot for variably controlling the effective position of said actuating connection.

9. Apparatus of the class described having a floating carrier, a stepped conical drum mounted on a threaded shaft and having an axially extending slot exposing said shaft, an arm having threaded connection with the shaft

and extending outwardly through said slot, a tensioned actuating cable connected to the drum through the medium of the arm and movable thereby to different points of connection axially of the drum, and suspending cables connected between the drum and carrier.

10. Self-levelling dispensing apparatus comprising a housing having a vertically movable carrier connected therewith, a horizontal shaft mounted in the housing, a conical drum rotatably mounted on the shaft, the drum having a groove at its larger end and a longitudinal slot extending axially from its smaller end, a longitudinally slotted arm movable in said slot and extending from the shaft to the outer surface of the drum, a pair of suspending cables connected between the carrier and spaced points in the circumference of the groove at the larger end of the drum, and a tensioned cable adjustably connected to the drum through the medium of the said slotted arm.

11. Storing and dispensing apparatus as defined in claim 10 further characterized in that the means for adjustably connecting the tensioned cable to the pulley includes a longitudinally slotted guideway secured to the outer surface of the drum at an inclination to its axis.

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