Aug. 5, 1941. W. J. GIBBS 2,251,873

APPARATUS FOR STORING AND DISPENSING STACKED ARTICLES

Original Filed March 13, 1937 2 Sheets-Sheet 1

Fig. 1

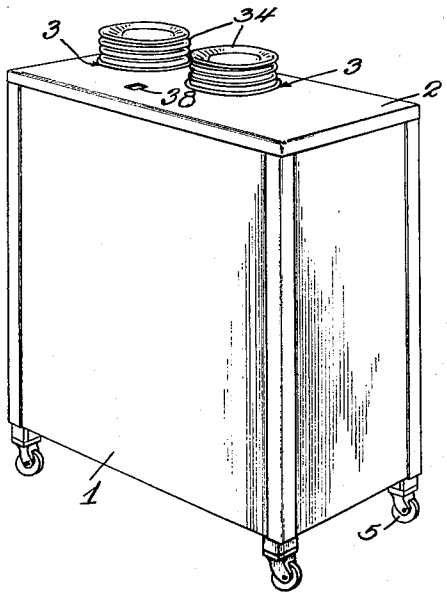


Fig. 3

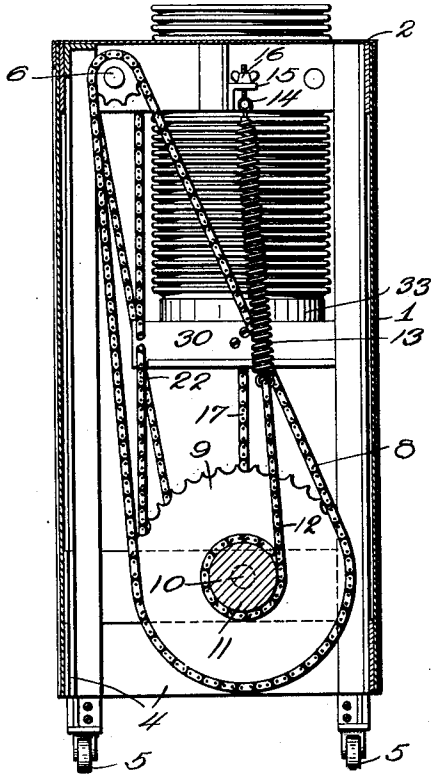
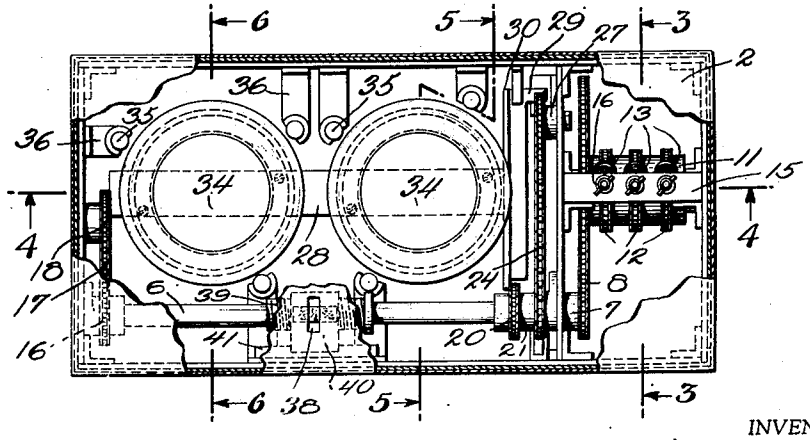


Fig. 2



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Fig. 4

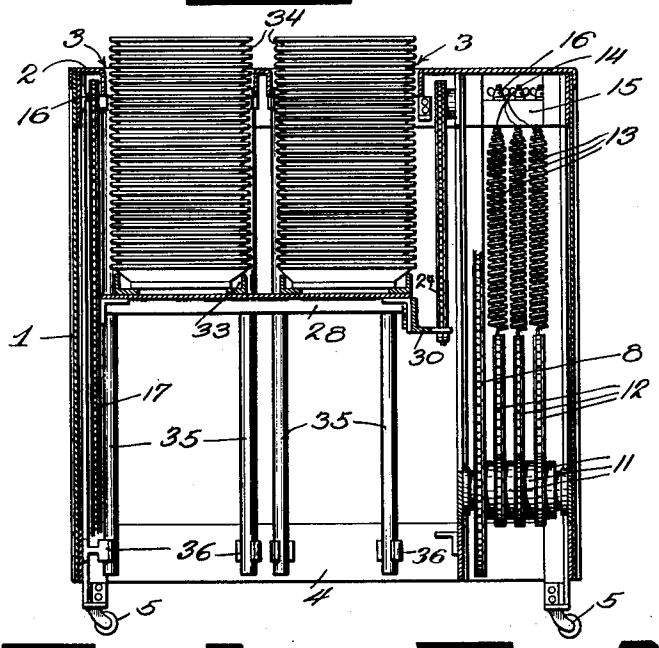


Fig. 5

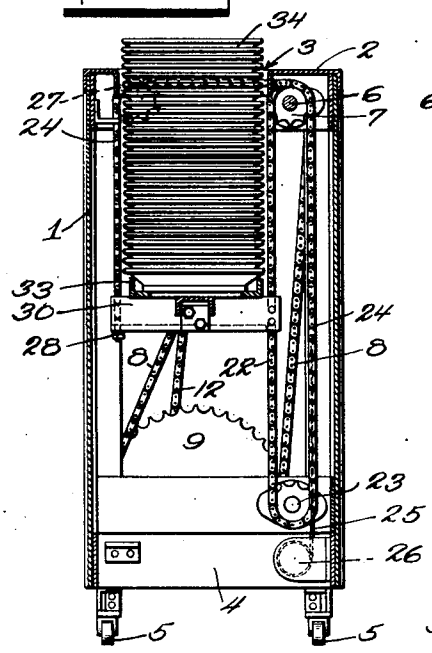
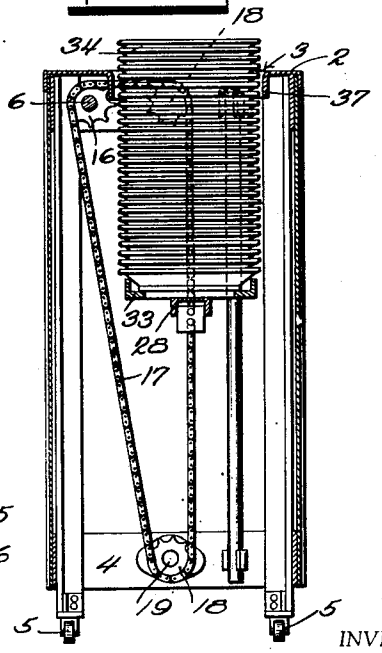


Fig. 6



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UNITED STATES PATENT OFFICE

2,251,873

APPARATUS FOR STORING AND DISPENSING STACKED ARTICLES

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Original application March 13, 1937, Serial No. 130,787. Divided and this application January 15, 1940, Serial No. 313,960

5 Claims. (Cl. 312—71)

This invention relates to apparatus for storing and dispensing stacked articles. More particularly, it relates to a device for housing and dispensing stacked articles of uniform size and weight, such as plates or other dishes or the like, said device being a specific form of the invention illustrated and described in my copending application Serial No. 130,787, filed March 13, 1937, of which this application is a division.

The invention has among its objects, the provision of a device for housing and dispensing stacked articles so that the uppermost unit of the stack is always presented for use at a predetermined convenient position and the underlying units of the stack are housed or held in a protected position for automatic upward feeding upon the removal of the uppermost article of the stack, the provision of a time, space and breakage saving unit, and a device which obviates the necessity of stooping, reaching or lifting stacks of articles from place to place when in use.

In carrying out the objects of the invention there is provided a storing and dispensing unit including a vertical housing and calibrated spring motivated load handling carrier so arranged that a stack of articles on the carrier is so positioned in loading and unloading that the uppermost article of the stack is brought to predetermined height or position convenient for removal at the top of the unit. The apparatus will be better understood from the following detailed description of the invention having reference to the accompanying drawings wherein like reference numerals have been used to represent like parts throughout the several views, and in which—

Fig. 1 is a perspective view of an embodiment of the invention adapted to hold and feed a stack of plates.

Fig. 2 is a top plan view partly in section of the device of Fig. 1.

Figs. 3, 4, 5 and 6, are respective sectional elevation views taken on the lines 3—3, 4—4, 5—5 and 6—6 of Fig. 2, looking in the direction of the respective arrows.

Referring to the drawings, wherein an embodiment of the invention is shown in the form of a mobile service unit arranged for individual use or use in conjunction with a service counter or the like, 1 indicates a rectangular casing or housing having a flat top portion 2 with a plurality of apertures 3 for passage therethrough of stacked articles. The casing can be of any suitable construction and encloses a supporting framework 4 carrying casters 5 whereby the unit is readily movable from place to place. The framework supports in suitable bearings near its top the rotatable shaft 6 carrying at one end thereof sprocket 7 over which passes the endless driving chain 8 which at its lower turn passes under sprocket 9 mounted in the lower shaft 10 rotatably supported in suitable bearings near the bottom of the framework. The lower shaft 10 carries rotatable therewith drum 11 with which a plurality of sprocket chains 12 are connected at their respective ends. Each sprocket chain 12 at its other end connects to the lower end of a respective tension spring 13 whose upper end is connected to an eye bolt 14 passing through a respective opening in angle bar 15 of the framework where a wing nut 16 or equivalent serves both for holding the eye bolt and for effecting adjustments of the tension on its respective spring. The arrangement constitutes a motivating means for shaft 6, the energy of said springs being transmitted so as to tend to rotate shaft 6 in one direction and oppose its reverse rotation.

The shaft 6 carries adjacent one end thereof sprocket 16 over which is trained an endless sprocket chain 17, said chain passing in a horizontal reach over an aligned sprocket 18 mounted at the top of the frame, and thence downwardly in a vertical reach to and around sprocket 19 and back up to sprocket 16. The sprocket 19 is rotatably mounted at the bottom of said framework in vertical alignment with sprocket 18 so that the reach of said chain 17 therebetween moves in a vertical direction.

The shaft 6 also carries adjacent sprocket 7 separate sprockets 20 and 21. Sprocket 20 cooperates with and supports the upper turn of the endless sprocket chain 22 which extends vertically downward and, at its lower turn, around sprocket 23 which is rotatably mounted on said framework 4 at the bottom thereof and in a position directly below sprocket 20. Sprocket 21 carries a sprocket chain 24 which in one direction extends downwardly to and connects with one end of a metal tape 25 whose other end is wound around a drum 26 which has a steep spring (not shown) which tends to turn said drum 26 in a direction to wind said tape thereabout and thereby hold said chain 24 taut and in engaging relation with said sprocket 21. In the other direction, the chain 24 extends horizontally to the opposite side of said framework where it passes over the free moving sprocket 27 and then downwardly to a T-shaped carrier frame 28, where its end is fastened to an outstanding lug 29 on one end of the cross bar 30 of the carrier. The opposite end 31 of said cross bar is connected to a link of chain 22, and the

longitudinal bar of said T-shaped carrier frame 28 connects with a link on said endless sprocket chain 17. The carrier frame is thus supported at three points in a level horizontal position underlying the apertures in the top of the casing.

The longitudinal portion or bar has fixed thereto a pair of spaced apart circular racks 33 above which are the correspondingly shaped openings 3 in the top of the casing. A stack of plates 34 on each of said racks 33 extends upwardly through a respective opening 3 in the top of the casing and is guided in up and down movement with said carrier by three spaced vertical rods 35 fixed at their upper and lower ends to said framework by the bracket arms 36. A downwardly depending flange member or guide 37 is provided at the top portion, apertures to guide the stacked articles passing through the top openings.

A gauge for indicating the volume of stacked articles on the carrier is arranged so as to be visible through a window or sight aperture 38 in the top of the casing. In the illustrated embodiment the gauge consists of a screw 39 on shaft 6 which screw carries a nut-like member 40 extended in length and having thereon indicating marks which register with the window 38. The indicator member is made to move across the window as the shaft 6 and screw thereon is rotated, and in such movement is held against rotation by engagement with a guiding projection 41 on the framework of the unit. The gauge is so marked as to indicate increase or decrease of stacked loads on the carrier.

The springs of the motivating means are calibrated and so adjusted by the spring tensioning means as to counterbalance any given load of uniform stacked articles on the carriers so that the uppermost units of the stacks are presented for use at a predetermined convenient level or height above the top of the housing. The spring actuated motivating means moves said carrier and its load upwardly upon decrease in the weight of the load thereon for a distance proportionate to the decrease in weight of the load and holds said carrier at the new position. The motivating means also responds to an increase in the weight of the loads on the carrier to permit the carrier and its increased load to move downwardly for a distance proportionate to the increase in the load and to hold the carrier and its load in the new position. The device is charged through the open top by placing stacked articles on the carrier or by adding to a stacked load thereon, the carrier descending during this operation automatically to a position where the uppermost units of the stack assume said predetermined position above the top of the casing. In reverse order the carrier is raised by the motivating means when one or more of the stacked units are removed so that the next uppermost units assume the said predetermined position.

The unit is preferably made of counter height for use alongside of or in series with other counter sections, or the unit may be independently positioned. Guide rods 35 confine the stacked articles against displacement but provide for complete circulation of air around the stacks. The stacks are protected against breakage and the arrangement is such as to provide a protected storage for a maximum number of articles in a minimum of space and at the same time obviate any necessity of a user stooping or reaching as is necessary with shelves and the like.

While the invention is described in connection with a specific embodiment, it is to be understood that the words used are words of description rather than of limitation, and that practice of the invention within the scope of the appended claims may be resorted to without departing from the true scope and spirit of the invention in all its aspects.

I claim:

1. In a storing and feeding mechanism for stacked articles, in combination, an open top support having a plurality of spaced vertical guide rods, a carrier vertically movable between said guide rods adapted to support a stacked load of articles freely movable through the open top, and self adjusting counterbalancing and motivating means for said carrier adapted to automatically lower and raise said carrier and a stacked load thereon through said open top on respective increase or decrease of the stacked load whereby the uppermost unit of the stacked load is maintained at a predetermined level above the top of the support, said means comprising a calibrated spring tensioning device.

2. In a storing and feeding mechanism for stacked articles, in combination, an open top support having a plurality of spaced vertical guide rods, a carrier vertically movable between said guide rods, and self adjusting counterbalancing and motivating means for said carrier adapted to automatically lower and raise said carrier and a stacked load extending freely through the open top on respective increase or decrease of the stacked load whereby the uppermost unit of the stacked load is maintained at a predetermined level above the top of the support, said means comprising a calibrated spring tensioning device, and means for adjusting said spring tensioning device for tension.

3. In a storing and feeding mechanism for stacked articles, in combination, a supporting housing having a top portion with a plurality of apertures for free passage therethrough of stacked articles, means for guiding stacks of articles within the housing, a carrier for said stacks of articles movable in said guiding means below said apertures, means for counterbalancing and motivating said carrier and stacked load thereon to maintain the uppermost unit of the stacks at a predetermined level above the housing, said means comprising an adjustable spring tensioning mechanism and a plurality of supporting flexible connections between said mechanism and carrier.

4. The combination in a serving counter unit, a supporting casing having an apertured top for passage therethrough of stacked articles, a vertically movable carrier below said top having racks for receiving and holding stacked articles extending through said top, a plurality of spaced rotatable chain sprockets, a plurality of sprocket chains fixed to said carrier and engaging respective ones of said sprockets, means for tensioning said sprocket chains to support and hold said carrier and a stacked load thereon at a given position dependent on the weight of the load and to raise said carrier and its load a given distance for each decrement in the load thereon, said means comprising a rotatable drum, a driving sprocket fixed thereto, a plurality of tension springs having ends thereof connected to the periphery of said drum and the other ends thereof adjustably anchored to said casing.

5. In a storing and feeding mechanism for stacked articles, a housing having a top with

a plurality of spaced apertures therein adapted for free passage therethrough of stacked articles into and out of the housing, a plurality of spaced vertical guide rods within the housing defining spaced guideways below the top apertures, a carrier vertically movable between said guide rods and underlying said apertures to support stacked loads of articles extending through the open top of the housing, and self-adjusting counterbalancing and motivating means for said carrier adapted to automatically lower and raise said carrier and stacked loads thereon through the open top of the housing on respective increase or decrease of the stacked load whereby the uppermost unit of the stacked load is maintained at a predetermined level above the top of the housing.

WILLIAM J. GIBBS.