Sept. 9, 1947. W. J. GIBBS 2,426,995

APPARATUS FOR STORING STACKED ARTICLES

Filed Feb. 24, 1944

Fig. 1.

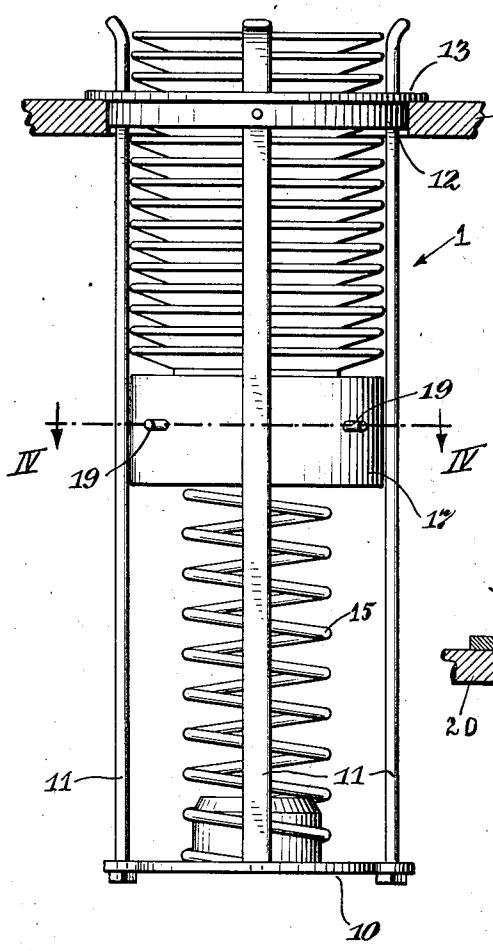


Fig. 2.

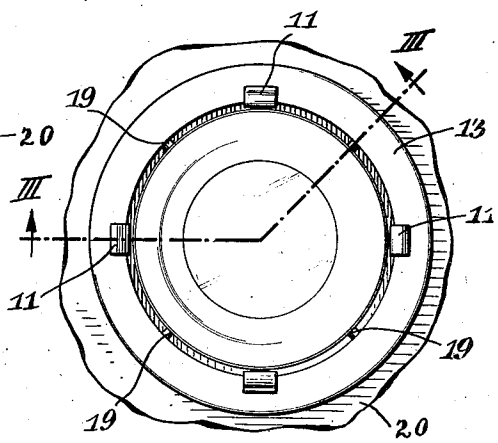


Fig. 3.

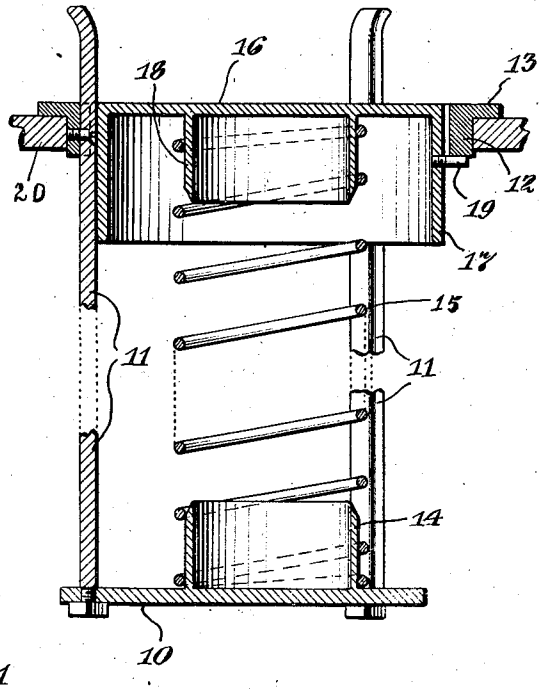
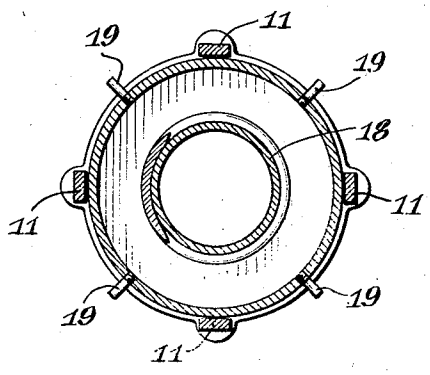


Fig. 4.



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APPARATUS FOR STORING STACKED ARTICLES

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4 Claims. (Cl. 312—71)

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This invention relates to devices for holding and automatically feeding stacked articles of approximately uniform size and weight. More particularly, it is directed to improvements in unitary storage and dispensing apparatus of the type shown in my Patent 2,251,876 issued on August 5, 1941.

Figure 1 is a view in elevation illustrating an embodiment of the invention.

Figure 2 is a top plan view of the device shown in Figure 1.

Figure 3 is a foreshortened cross sectional view taken on line III—III of Figure 2.

Figure 4 is a cross sectional view taken on line IV—IV of Figure 1.

As shown in the drawings, there is provided a vertical casing or housing 1 comprising base 10, a plurality of, and as shown four, vertically disposed rigid guide rods 11 secured thereto in any convenient manner and extending upwardly therefrom, and an upper portion or collar 12. These guide rods 11 are spaced about 90° apart and are substantially parallel to each other, with the upper end of each rod being bent slightly outwardly away from the vertical center line of base 10. The collar 12 is located exteriorly of the guide rods 11 and is located a short distance below the upper ends thereof. The guide rods 11 are rigidly secured in any convenient manner to the collar 12. The collar 12 has an outwardly extending rest or supporting flange 13 integral therewith.

Centrally located on the upper face of said base portion 10 and welded or otherwise secured thereto is a spring guide 14 which may be of cylindrical contour. The upper outer end of the guide 14 is tapered downwardly outwardly a material distance and about one quarter the length of guide 14. The outside diameter of the remainder of said cylinder guide 14 is just slightly less than the inside diameter of the spring hereinafter described.

A metallic calibrated compression spring 15, has its lower end surrounding the guide 14 and seated on the upper face of base 10. Mounted on the upper end of spring 15 is a load carrier, which as shown is a disc 16 having a cylinder 17 integral therewith and depending therefrom. The outside diameter of the cylinder 17 is just slightly less than the distance between any two oppositely disposed guide rods 11 so that the load carrier is free for vertical movement in casing 1. Centrally located on the lower face of disc 16, welded or otherwise secured thereto and depending therefrom is a cylindrical spring guide 18. The lower outer portion of the spring guide 18 is tapered outwardly upwardly from its lower extremity a material distance and about one quarter the length

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of guide 18. The outside diameter of the remainder of guide 18 is just slightly less than the inside diameter of spring 15. The upper free end of spring 15 bears against the lower face of disc 16 and surrounds the guide 18. A plurality of stops 19 and preferably at least three of them and as shown four of them, are disposed about 90° apart and are secured to the cylinder 17 and extend outwardly therefrom. They are located on the cylinder 17 midway between the rods 11. The vertical location of the stops 19 is such that the distance between the upper face of the disc 16 to the stops 19 is just slightly greater than the altitude of the collar 12.

The spring 15 which I prefer to employ has the following characteristics. The ratio of the diameter of the spring to its length is between about 5½ to 28 and about 6½ to 28 and preferably between 5¾ to 28 and 6¼ to 28. The spring 15 which has been found particularly suitable for my purposes has a ratio of diameter to length of approximately 6¼ to 28. The pitch of the spring 15 is preferably about one half its diamater and when a spring having a diameter of approximately 6¼ is employed, I prefer that its pitch be approximately 3 inches. I prefer that the ratio of the diameter of the disc 16 to the height or altitude of the cylinder 17 be no greater than about 3 to 1 and that the diameter of the disc 16 be greater than the diameter of the spring 15. I prefer that the altitude or length of each cylinder 14 and 18 be approximately one half that of the cylinder 17.

I have found that a device embodying the aforesaid invention and illustrated in the drawings is eminently suitable as a stacking and feeding device. The device may be supported on a counter 20 by inserting the same through an opening therein and having the flange 13 rest on the counter. With no load therein, the parts are in the relative positions shown in Figure 3, the carrier being in its uppermost position with the upper face of the disc 16 being at least as high as the upper face of flange 13, and at least two thirds of a coil and as shown more than one complete coil of the spring 15 encircles each cylinder 14 and 18. The carrier is maintained in its uppermost position by spring 15 and the position thereof is limited by the stops 19 which abut against the lower end of collar 12. A load of articles such as dishes or the like may be placed on the carrier and when placed thereon cause the carrier to be lowered against the action of the spring 15 whose coils are compressed towards each other and with some of them surrounding the cylinders 14 and 18. The tapered portions of the cylinders 14 and 18 aid in guiding the coils on said cylinders. After the maxi-

mum number of articles have been flat stacked, the uppermost article is in position to be easily removed. The spring 15 is so calibrated for articles of a given approximate weight that with a stacked load of articles on the carrier the uppermost unit will always be presented for removal from the stack at a predetermined level within the upper free ends of guides 11. Upon removal of a unit or units from the top of the stack, the spring 18 automatically expands to raise the stack a given distance for each decrement in the weight of the load.

The construction hereinbefore described and illustrated in the drawings, is of very simple design, may be readily manufactured and may be used over an extended period of time without servicing.

I claim:

1. A device for storing and feeding stacked articles comprising an elongated vertically extending open top casing having a top collar portion and a base plate portion, a carrier for stacked articles, said carrier being located in said casing and being freely reciprocable therein, a compression spring disposed between said carrier and said base plate to support said carrier and its load of stacked articles, said spring having a uniform pitch from base to carrier and being of substantially less diameter than said casing so that it is not supported against buckling by the casing, said spring being calibrated and adapted to expand and raise stacked articles on the carrier a given equal distance for each given equal decrement of the load whereby said stacked articles are presented with the uppermost unit of the stack at a predetermined level with respect to the upper portion of the casing, said spring being rendered substantially antibuckling by having the ratio of the length of the spring to its diameter between about 28 to 5½ and about 28 to 6½, the ratio of the diameter of the spring to the pitch thereof being approximately 2 to 1.

2. A device for storing and feeding stacked articles comprising an elongated vertically extending open top casing formed from a plurality of spaced vertical guides, said casing having a top collar portion and a bottom base plate portion, a carrier for stacked articles located in said casing and freely reciprocable therein, said carrier having a depending skirt engaging said guides to guide the carrier against tilting, a metallic compression spring disposed between said carrier and said base plate to support said carrier and its load of stacked articles, said spring having a uniform pitch from base to carrier and being of substantially less diameter than the casing so that it is not supported against bucking by the casing, said spring being calibrated and adapted to extend and raise stacked articles on the carrier a given equal distance for each given decrement of the load whereby said stacked articles are presented with the uppermost unit of the stack at a predetermined level with respect to the upper portion of the casing, said spring being rendered substantially anti-buckling by having the ratio of the length of the spring to its diameter between about 28 to 5½ and about 28 to 6½, the ratio of the diameter of the spring to the pitch thereof being approximately 2 to 1.

3. A device for storing and feeding stacked articles comprising an elongated vertically extending open top casing formed from a plurality of spaced vertical guides, said casing having a top collar portion and a bottom base plate portion, a carrier for stacked articles located in said casing

and freely reciprocable therein, said carrier having a depending skirt engaging said guides, to guide the carrier against tilting, a metallic compression spring disposed between said carrier and said base plate to support said carrier and its load of stacked articles, said spring having a uniform pitch from base to carrier and being of substantially less diameter than the casing so that it is not supported against buckling by the casing, said spring being calibrated and adapted to extend and raise stacked articles on the carrier a given equal distance for each given decrement of the load whereby said stacked articles are presented with the uppermost unit of the stack at a predetermined level with respect to the upper portion of the casing, said spring being rendered substantially anti-buckling by having the ratio of the length of the spring to its diameter between about 28 to 5½ and about 28 to 6½, the ratio of the diameter of the spring to the ptich thereof being approximately 2 to 1, said carrier having a circular supporting surface and said skirt being cylindrical to permit rotation of the carrier during its reciprocation in said casing.

4. A device for storing and feeding stacked articles comprising an elongated vertically extending open top casing having a top collar portion and a base plate portion, a carrier for stacked articles, said carrier being located in said casing and being freely reciprocable therein, a metallic compression spring disposed between said carrier and said base plate to support said carrier and its load of stacked articles, said spring having a uniform pitch from base to carrier and being of substantially less diameter than said casing so that it is not supported against buckling by the casing, said spring being calibrated and adapted to expand and raise stacked articles on the carrier a given equal distance for each given equal decrement of the load whereby said stacked articles are presented with the uppermost unit of the stack at a predetermined level with respect to the upper portion of the casing, said spring being rendered substantially anti-buckling by having the ratio of the length of the spring to its diameter between about 28 to 5½ and about 28 to 6½, the ratio of the diameter of the spring to the pitch thereof being approximately 2 to 1, said carrier having a spring guide secured to the lower face thereof and depending therefrom, the lower end of said guide being beveled inwardly at its outer face, a spring guide secured to said base portion and extending upwardly therefrom, the upper end of said second mentioned spring guide being beveled inwardly at its upper end, said compression spring having at least one complete turn of each end of the spring encircling the aforementioned guides.

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