Sept. 29, 1959 H. ERDMANN 2,906,433

DISPENSER FOR RETAINING RINGS

Original Filed July 14, 1952

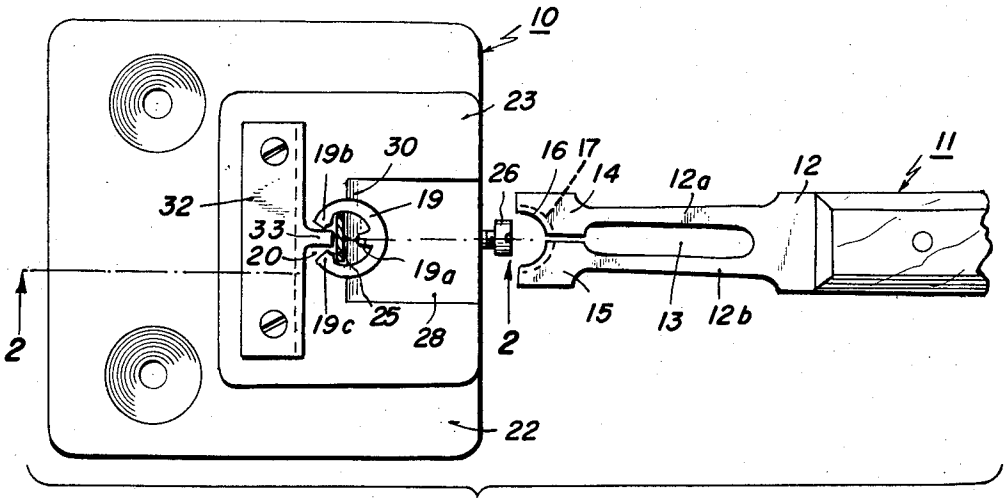


FIG. 1

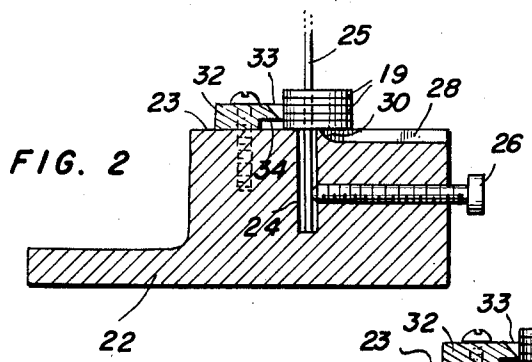


FIG. 2

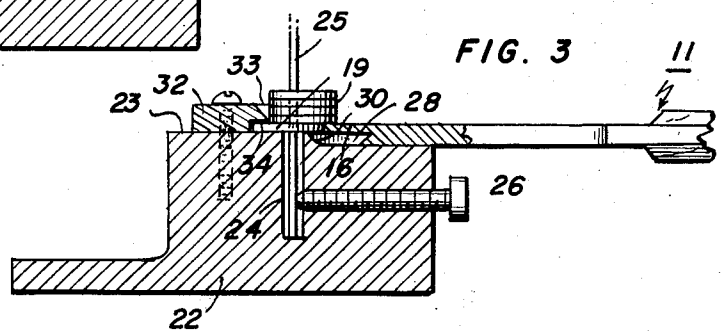


FIG. 3

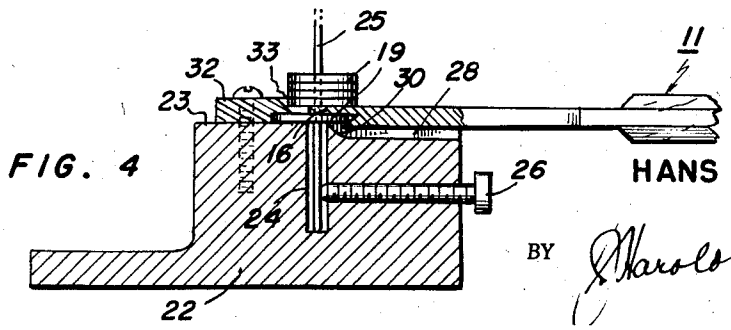


FIG. 4

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DISPENSER FOR RETAINING RINGS

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Original application July 14, 1952, Serial No. 298,869, now Patent No. 2,819,818, dated January 14, 1958. Divided and this application October 30, 1957, Serial No. 693,277

7 Claims. (Cl. 221—220)

This invention relates to improvements in dispensers for retaining rings as more fully disclosed in my application for United States Letters Patent Serial No. 298,869, filed July 14, 1952, now Patent No. 2,819,818, dated January 14, 1958, of which the present application is a division.

As explained in my aforesaid application, the mass assembly of spring retaining rings in the grooves of shafts, spindles and the like through the use of a special tool known as an applicator, which also serves initially to grip and withdraw the rings to be assembled from a stack or column thereof arranged on the stack rod of a dispenser, is rendered more difficult and time consuming than is desirable by the requirement of the prior dispensers that the applicator be held with its ring-backing flange disposed downwardly. It is a major object of the present invention to correct this difficulty through the provision of a form of dispenser which is so constructed and arranged that the ring applicator may be cooperated therewith to dispense, i.e. grip and withdraw, the lowermost ring of the stack (or the ring then in position to be engaged by said applicator, sometimes hereinafter referred to as the "assembly-readiness" position), with its backing flange disposed upwardly rather than downwardly as heretofore.

More particularly, a principal object of the present invention is the provision of a simple yet effective form of retaining ring dispenser of a design requiring the applicator to be held with its ring-backing flange disposed upwardly thereby to avoid the necessity of subsequently turning the applicator when performing ring assembly operations demanding that the ring be backed from above.

A further object of the invention is the provision of a retaining ring dispenser for dispensing retaining rings from a stack thereof through the use of an applicator held with its ring-backing flange disposed upwardly, whose construction and design are such as to reduce the dispensing operation to a simple push-and-pull movement of the applicator over the working surface (slideway) of the dispenser, and also to do away with the usual slide member serving to move the lowermost ring of the stack thereof to an "assembly readiness" position wherein it may be gripped by the applicator, as is required in all other forms of comparable retaining ring dispensers with which I am familiar.

Another object of the invention is the provision of a dispenser for retaining rings as aforesaid, characterized in that simple push movement of the applicator along its slideway first effects movement of the lowermost ring of the ring stack to an "assembly readiness" position, wherein it is held against the thrust of the applicator, and thereafter results in gripping of said ring, together with bodily raising of the ring stack or column the small amount necessary to prevent the final push movement of the applicator being impeded by the next higher ring or rings of the ring column.

In the accompanying drawing, illustrating the form of

retaining ring dispenser constituting the subject-matter of the present divisional application:

Fig. 1 is a plan view of the form of retaining ring dispenser to which the present specification is directed, the view also illustrating the applicator for use therewith;

Fig. 2 is a section through the dispenser taken along line 2—2 of Fig. 1;

Fig. 3 is a section through the dispenser similar to Fig. 2 but illustrating the applicator cooperated therewith, the latter being shown in the position as just having pushed the lowermost ring of the column or stack thereof to its "assembly readiness" position; and

Fig. 4 is a view similar to Fig. 2 but showing the applicator "pushed home" in the dispenser slideway, and the action of the applicator in gripping said lowermost ring and also of slightly raising the column of rings out of contact with said lowermost ring.

Referring to the drawings, reference numeral **10** generally indicates a dispenser according to the present invention, which is adapted to be actuated by a so-called applicator tool **11**. Preferably, the latter is of the type disclosed in United States Patent No. 2,488,379, to Brell, and comprises a shank **12** subdivided longitudinally into resilient arms **12***a*, **12***b* by a slot **13**, the arms terminating in clamping portions as provided by segmental jaws **14**, **15** which together define a semi-circular recess **17** for receiving a retaining ring, which latter is usually slightly undersize with respect to said ring recess. When seated in the recess, the retaining ring is backed on one side by a backing-flange **16** which, when the applicator is held with its ring recess opening downwardly, as in Figs. 3 and 4, is disposed to overhang and thereby back up the ring body, whose outer edge is spring-gripped by the jaw edges defining the aforesaid recess **17**. As will be understood from the foregoing, it is a feature of the invention that the dispenser to be described is adapted to be actuated by the applicator held with its backing flange disposed upwardly, whereby the operator is relieved of the obligation of turning the applicator during the course of assembling a ring in an application requiring that it be backed from above rather than from below.

As will be further understood, the retaining rings for which the aforesaid dispenser and applicator are designed, and which are designated **19** in the several views, are of the "open" type as best seen in Fig. 1; that is to say, they subtend an arc only slightly greater than 180° so that they have a wide gap **20** between their open ends. Such open rings are also usually provided with an inwardly directed middle lug or projection **19***a* and with end lugs **19***b*, **19***c* whose inner arcuate edges are adapted to bear with spring pressure against the bottom of a groove in a shaft when the ring is properly assembled therewith. It is further to be understood that the applicator, in addition to actuating the dispenser by gripping and withdrawing a ring from the column of rings maintained in the dispenser, is also used to assemble the ring in its groove by pushing it over its shaft in the plane of said groove.

Referring now to the dispenser **10**, such comprises a base **22** which may have rectangular form and is preferably provided with an upstanding block-like portion having a horizontal top surface **23**. Set into a vertical hole **24** opening through the top face of the base is a stack rod **25** which is rigidly held in upright position as by a set screw **26**, the stack rod serving as usual to hold a plurality of the retaining rings **19** to be dispensed and assembled in vertical stack or column formation.

Formed in the top or working face of the base **22** is a channel **28** adapted to provide a slideway for the applicator **11**. Accordingly, the width of the channel **28** is

such as to receive and provide guidance for the working end of the applicator and the depth of the channel corresponds substantially to the axial thickness of one of the retaining rings **19** to be assembled. As best seen in Fig. 1, the channel **28** extends inwardly from the front edge of the base substantially to the stack rod **25**, and it is also to be observed that the channel is disposed symmetrically with respect to said stack rod. At its inner end, the channel terminates in an inclined step **30** which leads to the aforesaid top face **23** of the base. Thus, considering said top face as having one elevation and the bottom wall or floor of the channel **28** as having a lower elevation, it will be seen that the dispenser base **22** has higher and lower level portions which are connected by the step or way **30**, which latter is disposed somewhat forwardly of the stack rod **25** upon which the plurality of rings to be dispensed are stacked.

Also secured to the top face **23** of the dispenser base is a cross bar **32** formed with a forwardly directed lug **33** (Fig. 1) which is adapted to extend into the gaps of the lowermost rings **19** disposed on the stack rod **25**, thus to maintain them in properly oriented position. As best seen in Fig. 2, said cross bar **32** is undercut along its forward edge to provide an overhanging ledge **34** which is spaced from the top face **23** of the base a distance corresponding to the axial thickness of one of the rings **19**. Thus, upon the lowermost ring of the column being pushed rearwardly by the thrust of the applicator **11** the predetermined small amount such that a portion of its edge moves beneath the ledge **34**, the latter functions to hold said ring against upward movement.

In the operation of the aforesaid dispenser, the applicator, turned so that its ring-backing flange **16** is disposed upwardly, is inserted into the channel or slideway **28** and a rearward push is applied thereto. Such results, in the first instance, see Fig. 3, in the forward end edge of said ring-backing flange **16** of the applicator engaging the peripheral edge of the lowermost ring **19** of the stack or column thereof disposed on the stack rod **25** and forcing said ring rearwardly to an "assembly readiness" position in which its opposite edge portion extends under the ledge **34** of the cross bar **32**, and also in said forward end edge of the flange moving inwardly under the next higher ring of the column. Continued push movement applied to the applicator causes the same to engage the inclined way or step **30** and to move up the same, and because the step is disposed beneath the ring column, the applicator in moving up same proceeds to lift the entire column of rings from the lowermost ring which has moved beneath the ledge **34**, which latter holds said lowermost ring from being also lifted, whereupon the applicator is free to continue its push movement without obstruction from the next higher ring or rings of the ring column. In the final push movement applied to the applicator, the spring jaws **14**, **15** thereof spread over and grippingly engage the outer edge of said lowermost ring held by the ledge **34**. The applicator may now be withdrawn by straight pull motion applied thereto, as results in said gripped ring being withdrawn from the column of rings held by the stack rod **25**, whereupon said ring column lowers on to the top face **23** of the base where it is supported in readiness for the next dispensing operation.

It will of course be understood that, whereas the stack rod throughout its major length portion has width corresponding to the inner-edge diameter of the bodies of the retaining rings **19**, the lower end portion thereof, or at least the portion thereof which projects immediately above the top face **23** of the dispenser base for a distance corresponding to the thickness of one or two of the retaining rings, has substantially reduced width which is such as to enable withdrawal of the lowermost ring gripped by the applicator tool without such ring movement being impeded by its end lugs **19*b***, **19*c*** being held by the side edges of the stack rod.

Without further analysis, it will be appreciated that the above described dispenser satisfies the objectives of the invention as stated in the foregoing in simple yet effective manner. That is to say, the present dispenser is of a form that renders it actuable by an applicator held with its ring-backing flange disposed upwardly, at the same time reducing the dispensing operation to a simple push-and-pull movement of the applicator over the working surface of the dispenser, and also of doing away with the usual slide members serving in the more conventional types of dispenser to effect movement of the lowermost ring of the stack or column thereof to an "assembly readiness" position wherein it may be gripped by the applicator.

As many changes could be made in carrying out the above construction without departing from the scope of the invention, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

I claim:

1. A retaining ring dispenser comprising a base having a top surface and a stack rod affixed to the base and extending upwardly from said top surface for holding a plurality of retaining rings adapted to be supported thereon in stack formation, a slideway in said top surface extending inwardly from the front end thereof to at least said stack rod, said slideway adapted to guide a ring gripping and applying tool having a ring-receiving recess and a backing flange for backing a ring received in said recess toward the ring column and having width corresponding substantially to the width of said tool and depth corresponding substantially to the axial thickness of one retaining ring, ring-stop means disposed a predetermined distance rearwardly of the stack rod and adapted to maintain a ring moved rearwardly thereto in "assembly readiness" position and said slideway having an inclined step disposed forwardly of the stack rod and which extends across said slideway beneath the column of rings supported on said top surface whereby, when a ring gripping and applying tool turned with its backing flange disposed upwardly is actuated along the slideway towards the ring column, it first pushes the lowermost ring of the column rearwardly to said "assembly readiness" position and at the same time moves in under the next higher ring of said column and thereupon, responsively to its movement up said inclined step, receives and grips said lowermost ring in its recess and lifts the higher rings of the column so as to free the gripped ring therefrom for subsequent removal.

2. A retaining ring dispenser substantially as set forth in claim 1, wherein said ring-stop means for maintaining a ring in the "assembly readiness" position comprises a cross member affixed to the top surface of the base at a small distance rearwardly from the stack rod.

3. A retaining ring dispenser substantially as set forth in claim 2, wherein said cross member is provided with means for preventing said lowermost ring moving thereto from being lifted by the tool with the main column of rings.

4. A retaining ring dispenser substantially as set forth in claim 1, wherein said slideway comprises the bottom wall of a channel formed in the top surface of the base which terminates at its inner end in said inclined step and a portion of said top surface aligned with said channel bottom-wall.

5. Apparatus for dispensing retaining rings comprising, in combination, a ring dispensing device and a tool for actuating the same, said device comprising a base carrying a vertically disposed stack rod extending from its upper face for holding a plurality of retaining rings in stack formation, said upper face having aligned portions arranged at different elevations and together forming a slideway for the tool extending beneath the ring stack, said aligned portions being connected by an inclined step of height substantially equaling the axial thickness of a retaining ring and which extends transversely across the

slideway immediately forwardly of the stack rod, ring-stop means extending transversely across the slideway and rearwardly of the stack rod for establishing an "assembly readiness" position of the lowermost ring of the stack upon the latter being pushed rearwardly thereto, said tool being insertible in the slideway for travel therealong and having a ring gripping portion including a ring-receiving recess opening through its forward end edge and a backing flange for backing a ring received in said recess, the construction and arrangement being such that, when the tool is inserted in said slideway with its backing flange disposed upwardly and is caused to slide therealong toward the ring stack, it first engages the lowermost ring of said stack and moves it to its "assembly readiness" position and thereafter, in moving up said inclined step, it receives and grips said ring in its recess while lifting the remaining rings of the stack from said lowermost ring.

6. Apparatus for dispensing retaining rings substantially as set forth in claim 5, wherein said ring-stop means for establishing the "assembly readiness" position of the ring comprises a cross bar extending across the slideway, the forward edge of said bar adapted to provide a ledge for preventing said lowermost ring moving thereto from being lifted by the tool with the main column of rings.

7. Apparatus for dispensing retaining rings substantially as set forth in claim 5, wherein said slideway portion of lesser elevation comprises the bottom wall of an upwardly opening channel sunk into the top surface of the base forwardly of the stack rod.

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