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2,735,581

DISPENSERS FOR RETAINING RINGS

Filed July 30, 1953

3 Sheets-Sheet 1

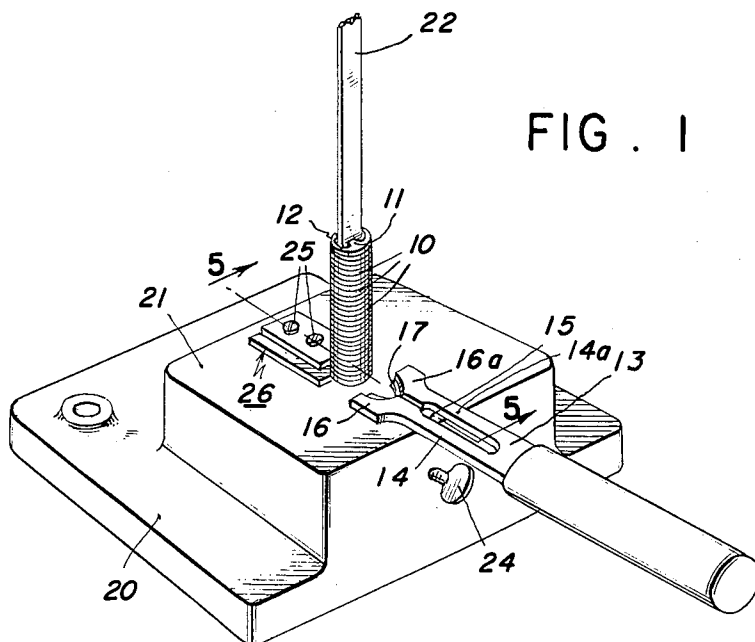


FIG. 1

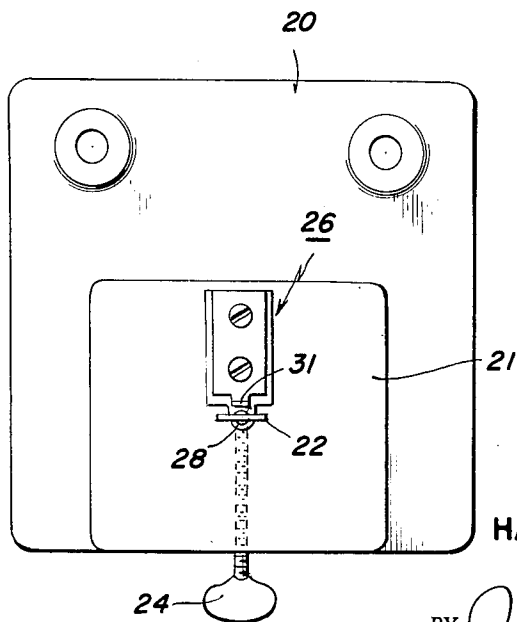


FIG. 2

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3 Sheets-Sheet 2

FIG. 5

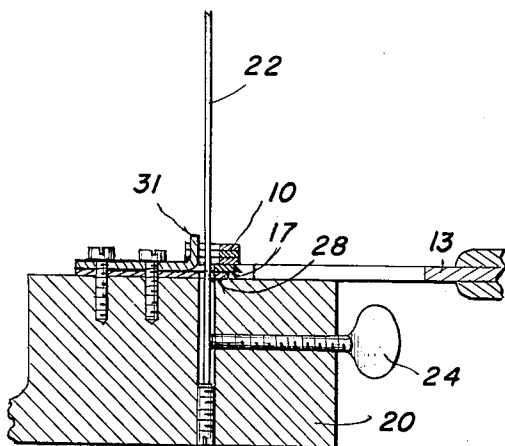


FIG. 6

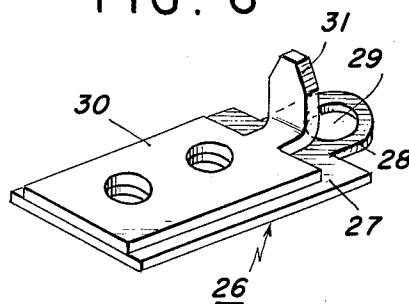
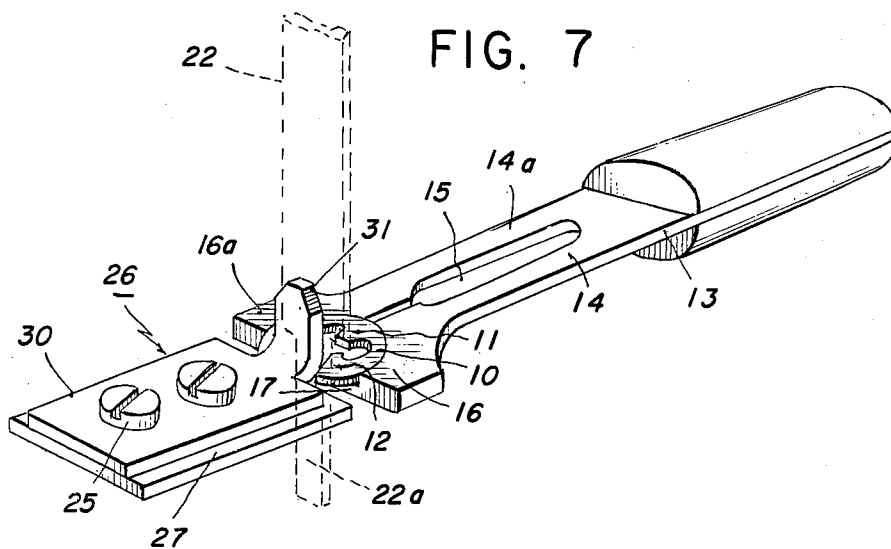


FIG. 7



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DISPENSERS FOR RETAINING RINGS

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3 Sheets-Sheet 3

FIG. 4

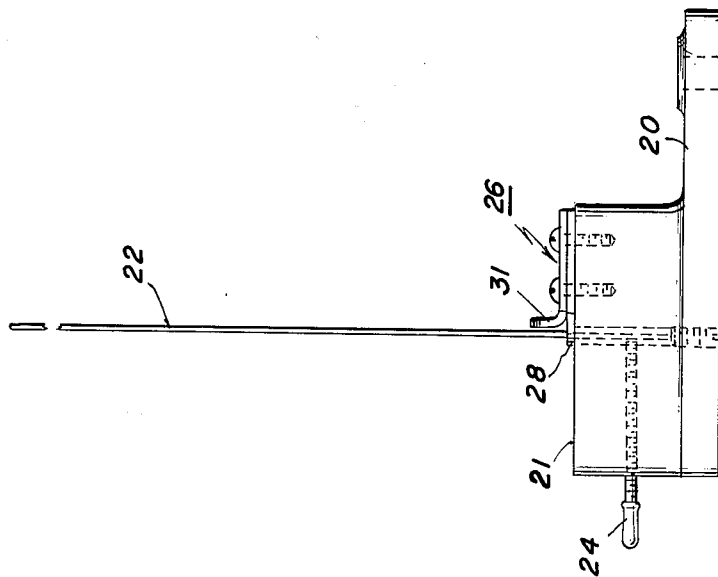
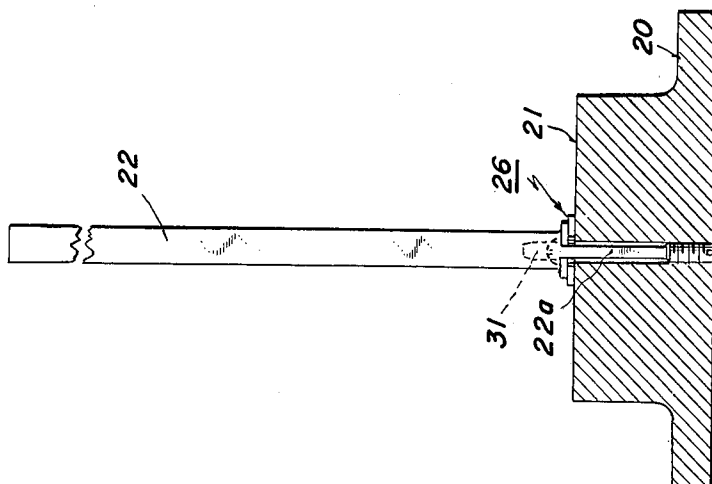


FIG. 3



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1

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## DISPENSERS FOR RETAINING RINGS

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Application July 30, 1953, Serial No. 371,360

2 Claims. (Cl. 221—220)

This invention relates to improvements in dispensers for retaining rings and more particularly to an improved dispenser for effecting withdrawal of single rings as required from a stack or column thereof, through the use of a so-called applicator which may also function as a ring handling and assembling tool.

Retaining rings as used in large numbers, for example in production line assembly methods, are usually of the open type characterized by a wide gap between their free ends, since open rings are easy to assemble by spreading them over their shaft or pin in the plane of the groove in which they seat. Such open rings are usually termed "crescent" or E rings, depending on their shape in plan, the crescent rings having an inner edge extending along a more or less continuous arc and the E rings being provided with inwardly directed middle and end lugs whose inner arcuate edges constitute the effective inner circle of the ring.

It is known to make such rings available in quantity at the various work stations along the assembly line through a dispenser mounting a plurality of rings arranged in stack formation and which is operated by a so-called applicator, i. e. the tool by which the rings are handled and assembled. One form of such a dispenser is disclosed in my prior application Serial No. 298,869, filed July 14, 1952, and the applicator for use in dispensing the rings is preferably of the type disclosed in the patent to Brell No. 2,483,379, dated September 27, 1949, providing resiliently interconnected jaws which together define a ring seating recess, and an arcuate backing flange which extends a short distance over one face of the ring seated in the recess, and serving to back same against thrusts applied to the other ring face.

In a dispenser according to my prior application aforesaid, the applicator is cooperated with the dispenser with its backing flange disposed upwardly, thus to face the ring gripped thereby downwardly as it is withdrawn from the dispenser. However, there are many ring applications wherein it is of advantage that the ring faces upwardly as it is withdrawn from the dispenser and such makes it desirable to cooperate the applicator with the dispenser and such makes it desirable to cooperate the applicator with the dispenser during the withdrawal operation with its backing flange disposed downwardly, so that no subsequent reversal of applicator and ring is required of the operator assembling the ring.

Accordingly, a principal object of the present invention is to provide a retaining ring dispenser of the general type disclosed in my aforesaid prior application, but differing therefrom in that withdrawal of the rings from the stack thereof maintained in the dispenser may be effected by an applicator held with its backing flange disposed downwardly, thus to face the ring upwardly rather than downwardly as heretofore.

Another object of the invention is the provision of a dispenser for so-called open retaining ring, wherein the rings are carried on a vertical stack rod, and wherein the stack rod is so constructed and arranged that it serves

2

both as an abutment for the lowermost ring of the stack, enabling same to be readily gripped by the applicator, and as a means for permitting the lowermost ring to be withdrawn by the applicator and to maintain the rings of the stack above the lowermost ring in orderly stack formation.

Yet another object of the invention is the provision of a dispenser for open retaining rings adapted for operation by an applicator of the type having a ring backing flange extending about its ring-seating recess and which is held with said backing flange disposed below said recess, which is so constructed and arranged as to make adequate provision for the thickness of said flange, to the end that the lowermost ring of a stack thereof maintained in the dispenser may be gripped by the applicator without interference from its backing flange.

Still another object of the invention is the provision of a dispenser for open-ended retaining rings of the so-called E type, wherein the stack rod on which the rings are carried cooperates with the inner edge formation of the rings in manner as to facilitate withdrawal of the lowermost ring of the stack, while holding all rings above the lowermost ring in orderly stack formation.

Yet another object of the invention is the provision of a dispenser for open-ended retaining rings adapted to be operated by the applicator tool by which said rings are conventionally assembled on their shafts or pins, which is so designed as to enable the applicator to be held with its ring seating recess facing upwardly, and whose construction is further such that at least the lower rings of the stack are always maintained against turning movement and lateral displacement.

The above and other objects of a retaining ring dispenser according to the present invention will be apparent from the following description, taken with the accompanying drawings illustrating a preferred physical embodiment thereof, wherein—

Fig. 1 is a perspective view of the improved retaining ring dispenser according to the present invention, and which further illustrates an applicator for use therewith moving to a ring-gripping position;

Fig. 2 is a top plan view of the dispenser illustrated in Fig. 1, with the stack of retaining rings and applicator omitted;

Fig. 3 is a front elevation of the dispenser as shown in Fig. 2;

Fig. 4 is a side elevation of the dispenser as shown in Fig. 2;

Fig. 5 is a section taken along line 5—5 of Fig. 1;

Fig. 6 is a detail view illustrating a preferred construction of stack supporting and ring orienting member; and

Fig. 7 is a detail view illustrating the action of the applicator in gripping the lowermost ring of the stack thereof carried by the dispenser, with all rings above said lowermost ring being omitted for clarity.

While a dispenser according to the present invention is adapted to dispense both the so-called crescent and E rings, it will be described as applied to the dispensing of rings of the latter form, which as seen in Fig. 7 comprises an arcuate body 10 having inwardly directed middle and end lugs 11, 12, respectively, of which only one end lug is shown. It will be understood that due to the formation of an E ring, a substantial gap is provided between the open ends thereof as defined by its aforesaid end lugs 12. The applicator employed in effecting withdrawal of rings singly from the dispenser is preferably of the type disclosed in Patent No. 2,483,379, dated September 27, 1949, to Brell, and comprises a shank 13 subdivided into resilient arms 14—14a by a slot 15, the arms terminating in a clamping portion provided by segmented jaws 16—16a which together define a semi-

circular recess of diameter slightly less than the outer diameter of the ring body. Such an applicator is usually provided with a so-called ring backing flange 17 which bounds the ring-recess, the flange extending a slight distance over one face of a ring seated in the recess, thus to back up the ring against thrusts applied against the other face thereof. The provision of the backing flange 17 of course adds thickness to the jaws, which must be taken into consideration when employing the applicator as a tool for operating the dispenser.

As stated above, the dispenser of the present invention is designed for operation by an applicator as described, held with its backing flange 17 disposed downwardly so as to face a ring seated in its recess in upward direction. Accordingly, the dispenser comprises a base 20 having a raised portion providing a horizontal working surface 21. A plurality of retaining rings as previously described are adapted to be maintained in stack formation on said horizontal surface by a vertical stack rod 22, said stack rod having throughout its major length portion a width corresponding closely to the internal diameter of the ring. Thus, when a plurality of rings are threaded on said stack rod 22, with their open ends facing to the rear, they are effectively "hooked" to the stack rod by their end lugs 12 which extend a short distance to the rear thereof.

However, as best seen in Fig. 7, the lower end 22a of the stack rod has reduced width, i. e. width corresponding to the width of the gap between the open ends of the rings. Accordingly, any ring or rings straddling the reduced-width lower end portion of the stack rod may be more or less freely disengaged therefrom, since such reduced width portion may move relatively to the ring and through the ring gaps. Said reduced end portion 22a of the stack rod is adapted to be inserted into a vertical opening provided therefor in the base 20 and thereupon to be secured in a desired position of vertical adjustment with respect to said base as by means of a thumb screw 24.

Also mounted on the base 20 as by screws 25 is a plate assembly generally designated 26 (Fig. 6) comprising a lower plate 27 having a forwardly extending tongue or protrusion 28 provided with an aperture 29 through which the stack rod 22 projects, and an upper plate 30 whose forward edge is stepped rearwardly from the forward edge of the lower plate 27 and from which extends a vertical stud or post-like extension 31 whose front edge terminates at about the line of the forward edge of said lower plate. As best seen in Figs. 5 and 7, the thickness of the lower plate 27 corresponds to the thickness of the backing flange 17 of the applicator, and it will be seen from Fig. 7 that the protrusion 28 is shaped to the recess provided in the applicator as defined by said backing flange. The thickness of the upper plate 30 may be at least the thickness of a single retaining ring, and the width of the post-like extension 31 corresponds to the width of the gap between the ring ends as aforesaid. Preferably, the vertical dimension of the post-like extension 31 of the upper plate equals the combined thickness of two or three retaining rings.

When secured in proper position as illustrated to the horizontal working surface 21 of the base, the aforesaid plate assembly 26 performs a plurality of functions. Thus, the protrusion 28 of the lower plate 27 provides a support for the stack of rings carried by the stack rod 22 and in addition elevates the lowermost ring of the stack to the level of the ring-seating recess of the applicator, as seen in Fig. 7. The post-like extension 31 on the upper plate on the plate assembly 26 is adapted to enter the gap between the three or four lower rings of the stack thereof carried by the rod 22, and thus it functions to properly center the lower rings of the stack and to hold them against lateral displacement. The rearward-stepping of the upper plate 30 with respect to lower plate 27 of the plate assembly 26 also provides clearance space for the ends of the lowermost ring supported on the lower plate protrusion 28. Said protrusion, whose

shape is such that it may enter the recess of the applicator as defined by its backing flange 17, also serves as a centering means for the applicator, and it may also function as well as an abutment therefor which limits the amount of rearward movement permitted the applicator. However, such movement is largely limited by engagement of the middle lug 11 of a ring seated in its recess with the forward face of the stack rod 22, whereby the stack rod provides the major abutment for the applicator via the ring seated in its recess.

The functioning of a dispensing device as described is briefly as follows: The stack rod 22, carrying a supply of rings 10, is affixed to the base 20 by inserting its reduced end 22a through the protrusion aperture 29 and thence into the base opening therefor and tightening of the thumb screw 24. Prior to its final securement, the height of the stack rod is adjusted so that the shoulder between its full and reduced width portions is at a level corresponding to that of the upper face of the lowermost ring of the stack thereof which lowers on to and is supported on the protrusion 28 of the lower plate 27, such permitting said lowermost ring to be withdrawn without interference from the ring end-lugs 12. All upper rings of the stack are of course held against removal by engagement of their end-lugs behind the stack rod 22.

To effect withdrawal of a ring, the applicator is placed on the horizontal working surface 21 of the base, with its backing flange 17 downwardly disposed, as in Figs. 1 and 7. Due to the thickness of the plate 27 being that of the thickness of the individual rings, the lowermost ring of the stack is disposed at the level of the ring seating recess of the applicator. A plurality of the lower rings, including the lowermost ring of the stack, are held against turning and lateral movement by the post-like extension 31 of the upper plate 30 which extends into the gap between their open ends.

The applicator is now pushed rearwardly and is appropriately centered on the lower plate protrusion 28 which enters the recess defined by its backing flange 17. Continued rearward movement of the applicator results in the lowermost ring being firmly held by engagement of its middle lug 11 with the stack rod 22 which provides a fixed abutment for said ring. Final push on the applicator causes its jaws to spread over said lowermost ring and thereupon to firmly seat it in its recess. It is now possible to withdraw the applicator and ring gripped thereby, since said ring is more or less free to disengage from the reduced-width lower end 22a of the stack rod. However, all rings above the lowermost ring remain "hooked" to the wider part of the stack rod, so that their removal is positively prevented. Upon full withdrawal of said lowermost ring, the next lowermost ring lowers into the place previously occupied by the just-withdrawn ring, with the desirable result that the dispenser is conditioned for the next dispensing operation.

As many changes could be made in carrying out the above constructions 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 in interpreted as illustrative and not in a limiting sense.

I claim:

1. A retaining-ring dispenser enabling the dispensing of single open-ended retaining rings from a stack thereof by means of a ring-gripping applicator tool having a substantially semi-circular ring recess and an arcuate backing flange for supporting a ring seated in said recess from one side thereof, comprising a base having a horizontal working surface, a vertically disposed stack rod supported in said base and extending upwardly from said working surface for holding a plurality of rings positioned on same with their open ends facing rearwardly in stack formation, a plane stack-supporting member affixed flush on said working surface and having thickness corresponding to the thickness of the tool backing-flange, said mem-

5

ber comprising a plate having a protrusion of shape generally corresponding to that of the applicator recess as defined by the tool backing flange, said protrusion being provided with an opening, said stack rod extending through said opening and having an upper portion of width slightly less than the internal diameter of said rings and a reduced-width lower end portion terminating above the supporting member a distance substantially equalling the thickness of a single ring, the width of said reduced-width end portion corresponding substantially to the width of the gap between the open ends of said ring, and an upper plate affixed flush on the first-named plate and having a forward edge which is stepped rearwardly from said protrusion and a forward extension thereon which is shaped to enter the gap between the open ends of at least the lowermost ring resting on said protrusion, the construction and arrangement being such that when a tool placed on said working surface with its recess in alignment with the lowermost ring of a stack thereof supported on said supporting member, and with its backing flange disposed flush against said working surface, is pushed rearwardly, it forces the middle portion of the

6

lowermost ring against the stack rod and thereupon grips the same, and being further such that the gripped ring may disengage from the reduced width lower-end portion of the stack rod while the remaining rings of the stack are held thereto by the wider upper portion of said rod.

2. A retaining-ring dispenser as set forth in claim 1, wherein said upper plate extension comprises a vertical post-like element of width corresponding to the width of the gap between the ring ends and having vertical height corresponding to the combined height of a plurality of the rings and being spaced rearwardly from the stack rod an amount such that it extends into the gaps of a plurality of the lower rings of the stack, whereby to secure said lower rings of the stack against turning movement and lateral displacement.

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