Dec. 8, 1942. E. G. KELLER 2,304,260

APPARATUS FOR PACKING CONTAINERS WITH YARN

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Fig. 1

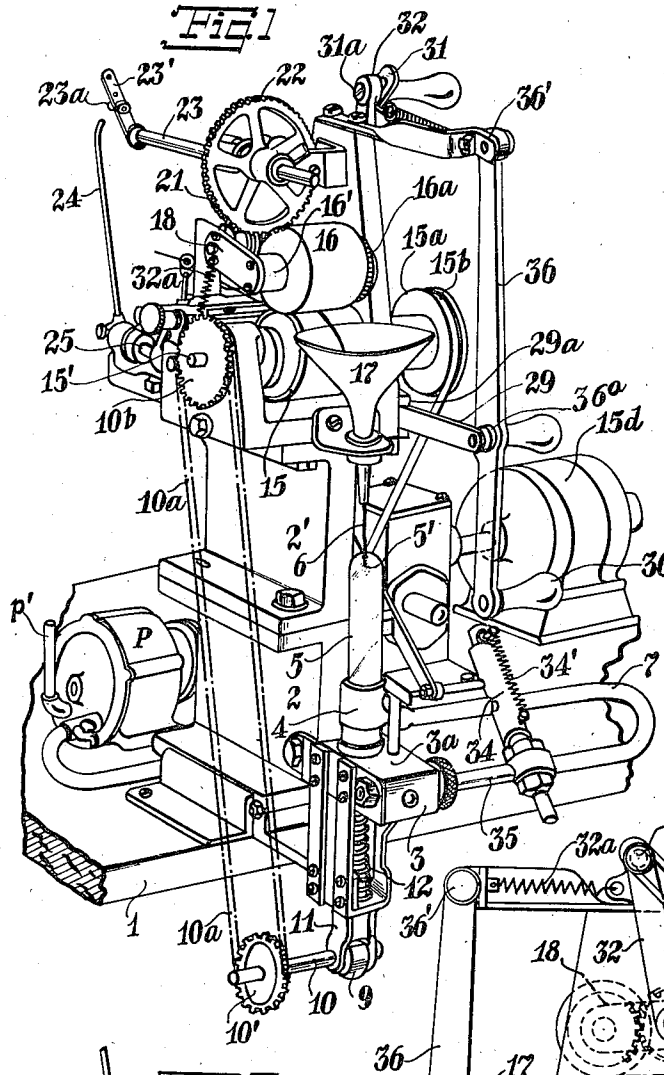


Fig. 3

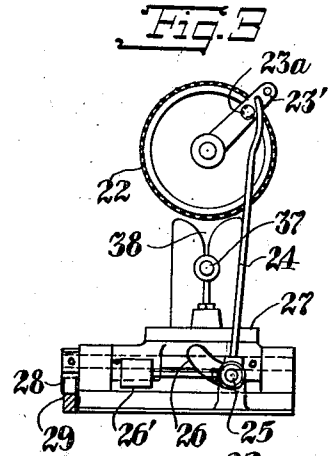


Fig. 4

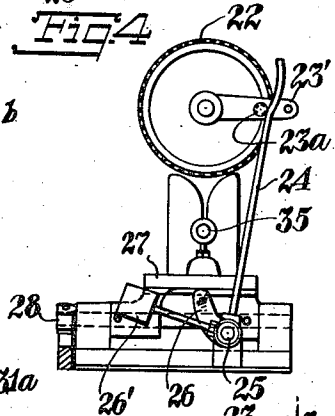


Fig. 2

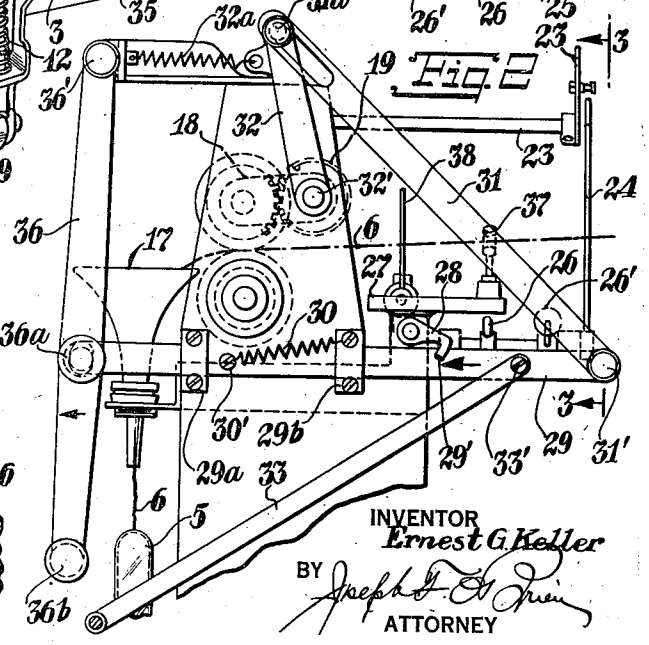
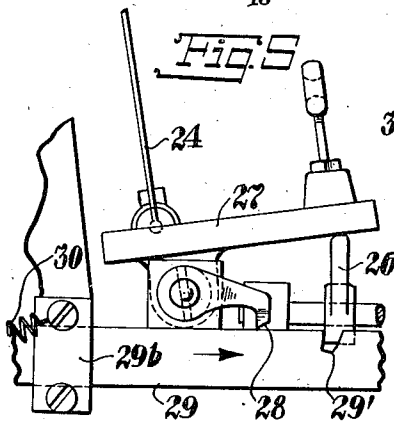


Fig. 5



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Fig. 6

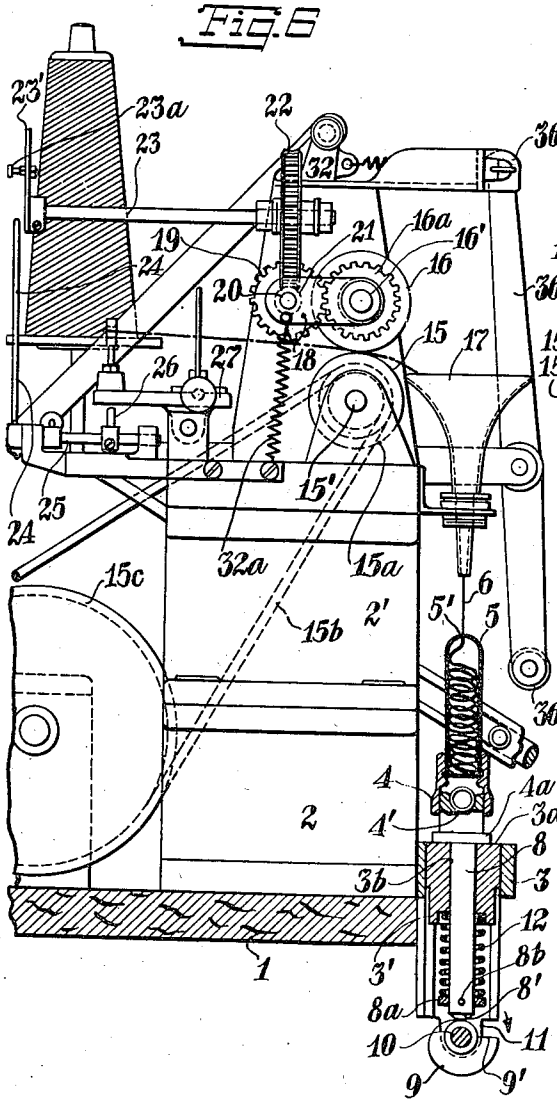


Fig. 7

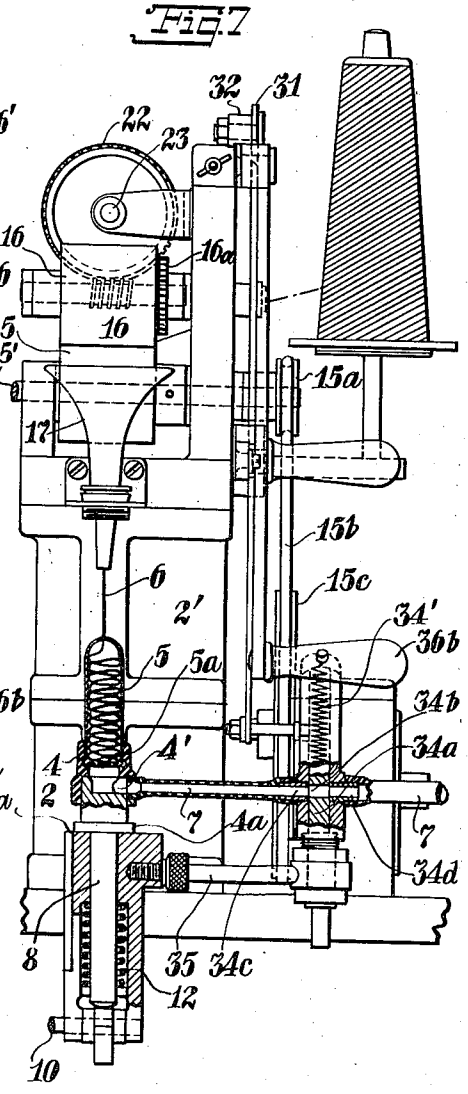


Fig. 8

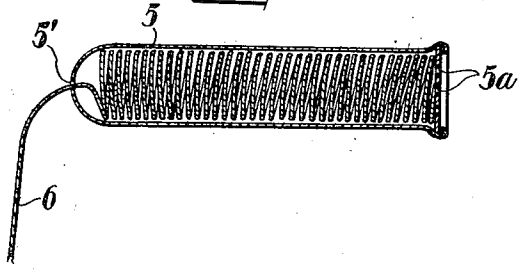


Fig. 9

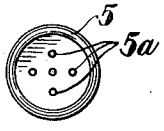
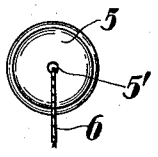


Fig. 10



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Patented Dec. 8, 1942 2,304,260

UNITED STATES PATENT OFFICE

2,304,260

APPARATUS FOR PACKING CONTAINERS WITH YARN

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Application November 17, 1938, Serial No. 240,968

2 Claims. (Cl. 226—19)

This invention relates to improvements in apparatus for packing the same with yarn.

One of the objects of this invention is to utilize, as a substitute for a spool or reel, a container within which yarn or thread is packed and completely enclosed to enable a better, more-ready and facile feed while preventing contamination thereof from outside sources, and avoiding deterioration of the yarn or thread.

Another object of my invention is to utilize a yarn container comprising a transparent capsule or cartridge composed of a shell of sheet material such as Celluloid or a condensation product which will encase and substantially shield the yarn from access of air and which will prevent deterioration of yarns that embody strands of rubber or the like.

Still another object of my invention is to utilize a substantially-enclosed capsule or cartridge having a relatively small head aperture to permit a direct filling movement of the yarn into the capsule or cartridge from a large bobbin and to provide for an outward feeding movement of such yarn when it is desired to use the material, as for example, in the shuttle of a sewing machine or the like;

Another object of my invention is to utilize a yarn or thread enclosing capsule or cartridge having at one end a hole or holes therein to cause packing of the thread within the capsule or cartridge by a fluid agent, as for example by exhausting air from one end of the capsule or cartridge by the operation of the sucking action of suction means to the thread or yarn enclosed in the capsule or cartridge or by forcing air into the capsule or cartridge through the opposite end during the filling operation thereof.

Another object of my invention is to utilize a capsule or cartridge having a head portion provided with a relatively small strand-receiving-and-guiding aperture.

Another object of my invention is to provide apparatus for packing yarn into enclosing capsules of the type hereinabove referred to, which will enable a maximum amount or yardage of yarn to be filled into a capsule.

Another object of my invention is to pack yarn within an enclosing container or capsule by applying suction to the bottom of the capsule to suck the yarn to the bottom of the capsule during a feeding movement thereof through the top of the capsule.

Still another object of my invention is to pack yarn within an enclosing container or capsule by applying vibration to the bottom of the capsule during the filling operation to force the yarn toward the bottom thereof, and preferably by vibrating or hammering the bottom of the container against a stationary support.

Another object of my invention is, in apparatus of the type specified, to utilize suction means for sucking yarn toward the bottom of the capsule during a filling operation, in combination with means for vibrating the capsule during the feeding and sucking operations for the purpose of assisting in packing within the capsule yarn fed in at the head portion thereof.

With these and other objects in view, the invention comprises the combination of members and arrangement of parts so combined as to co-act and co-operate with each other in the performance of the functions and the accomplishment of the results herein contemplated, and comprises in one of its adaptations the species or preferred form illustrated in the accompanying drawings, in which:

Fig. 1 is a view in perspective of a capsule-filling machine embodying my invention;

Fig. 2 is a fragmentary view in side elevation of the upper right hand side of the machine shown in Fig. 1;

Fig. 3 is a view in rear-elevation of the yarn-measuring members, the view being taken on the line 3—3 of Fig. 2, looking in the direction of the arrows;

Fig. 4 is a similar view showing the yarn-measuring members about to trip the yarn-feeding elements;

Fig. 5 is an enlarged fragmentary view in elevation from the right-hand side of the machine showing feed cut-off detent and adjacent parts;

Fig. 6 is an enlarged fragmentary view partly in section, showing the left-hand side of the machine and the means for applying suction and vibrating the yarn container;

Fig. 7 is a view in front elevation, partially broken away, of the mechanism shown in Fig. 6;

Fig. 8 is a view in longitudinal section of a yarn-enclosing capsule removed from the machine as illustrated in Figs. 1, 6 and 7;

Fig. 9 is a bottom view of the capsule shown in Fig. 8;

Fig. 10 is a top view of the capsule shown in Figs. 8 and 9.

Referring now to these drawings, which illustrate a preferred embodiment of my invention, 5 indicates a capsule which, in accordance with my invention, is filled with yarn or thread 6 and which, when so filled with yarn or thread, is use-

ful for any purpose to which a spool or bobbin of thread or yarn may be put and which is particularly useful as a feeding device for thread or yarn in the shuttles of sewing machines and other machines in which it is desired to avoid the sticking, jamming and tangling frequently encountered when yarn or thread is wound upon a spool or bobbin and then inserted in a shuttle. While the ease and facility of feeding is an important advantage procured by the use of my yarn-filled capsules, it will be obvious also that the enclosure of thread or yarn within a container of the type specified will retain the same in a condition free from contamination by outside sources and will also, when the thread contains a strand of rubber or like material, prevent any deterioration of such rubber due to drying out from access of air thereto.

My invention therefore, contemplates the provision, of a yarn-enclosing capsule 5 and the filling of this capsule with yarn or thread 6 in such a manner as to completely fill the capsule so as to contain a sufficient yardage of thread or yarn to enable the same to be used as a substitute for a spool, bobbin, or the like in the shuttle of a sewing machine or other machines in which shuttles are employed. In order to accomplish such filling and to utilize the space within the capsule to enclose a maximum yardage of material, I provide a filling machine having means for applying suction within the capsule to the yarn as it is filled through the top of the capsule to pack the same toward the bottom thereof and I also preferably provide, in combination with such suction means, additional means for providing a continuous hammering or percussion of the capsule against a table to cause the filled material to be more tightly packed within the capsule by a downward movement induced by such hammering or percussion.

In the accompanying drawings, I have shown one form of machine embodying the necessary mechanism for filling and packing a capsule with yarn in order to procure a maximum yardage within the same, and in such drawings, 1 indicates a base member on which is mounted upright frame members 2, 2'. At the front of the frame member 2, I attach a supporting-bracket 3 within which is slidably mounted a capsule-mounting socket 4. Capsules 5 are adapted to be successively mounted in the socket 4 and, as illustrated, each of the capsules is provided, at its upper end, with an aperture or head hole 5' through which a strand of yarn 6 is fed in the capsule by any suitable yarn-feeding mechanism and preferably by yarn-feeding mechanism hereinafter described which will measure the yardage of yarn fed to the capsule and which, when a given yardage is supplied, will automatically stop the feed of the yarn to the capsule.

In accordance with my invention, however, it is desirable to fill into a capsule of given dimensions, a maximum yardage of yarn and also to cause the laying within the capsule of the strands of yarn in such manner that the yarn may be readily and easily withdrawn from the capsule without tangling, sticking or jamming.

For the purpose hereinabove specified, I preferably provide a hollow capsule composed of Celluloid or other suitable material and comprising a body portion of substantially cylindrical conformation with a rounded head or top portion and completely closed except for the axially-disposed filling and feed aperture 5' hereinabove referred to. The capsule is mounted within the cylindrical socket 4, and has a bottom portion which, in mounted position, extends within the socket 4 and has an air-tight connection therewith, and said bottom portion has one or more and preferably a series of five suction apertures 5^a to which suction is applied through the socket 4. In the preferred form of my invention the head and body of the capsule are formed in one piece and the bottom end is bent or turned around a flat disc having the suction apertures 5^a hereinabove specified.

A substantially-closed capsule so mounted is, in accordance with my invention, completely filled with yarn and the yarn is packed therein in such a manner as to enclose, in the space provided within the capsule, a maximum yardage. In the preferred embodiment of my invention, I accomplished this object by applying suction to the bottom apertures 5^a of the capsule through the socket 4 during the feeding operation of the yarn so as to continuously draw yarn being fed through the top thereof down toward the bottom of the same and, at the same time, I preferably provide means for hammering the capsule 5 and socket 4 against the top of the bracket 3.

In the preferred form of my invention, the socket 4 is, at its lower end, provided with a lateral bore 4' connected with a flexible suction tube 7 leading to a suitable suction pump P shown in Fig. 1.

My preferred form of hammer or percussion-packing mchanism comprises the mounting of the socket 4 on a rod 8 extending through a guide-bore 3^b in the supporting bracket 3 and having its end 8' contacting with the peripheral surface of a hammering or percussion cam 9 mounted on a shaft 10 supported in bearing brackets 11 below the socket-supporting member 3. The said rod 8 has mounted thereon, a spring 12 stretched between the bottom 3' of the supporting bracket 3 and a washer 8^a on the rod 8 held in place thereon by pin 8^b. Said spring is intended to force end 8' under the rod 8 into continuous contact with the peripheral surface of the cam and to force the bottom of the flange 4^a downward to impinge against the upper surface 3^a of the supporting bracket 3. Upon a rotation of the cam 9, the rod 8 will be lifted to cause socket 4 to be raised above the surface 3^a until the radial surface 9' is reached when the rod will abruptly be forced to move toward the axis of the cam by the spring 12 and during this movement the flange 4^a will strike the upper surface 3^a of the supporting bracket so as to provide a hammering or percussion effect, which will cause any yarn within the capsule to be moved by inertia toward the lower end thereof and thus to provide a percussion packing thereof within the capsule, it being understood that this percussion packing will supplement the packing obtained through the suction action hereinabove described.

When a given yardage is supplied to the capsule, further feeding of the yarn is discontinued to permit severing of the yarn and removal of the container, and I therefore utilize, in combination with rotatable feed rollers 15, 16, between which the yarn is guided, means for applying suitable pressure to one of the feed rollers and, as illustrated, pressure is applied to the roller 16 to press it against the rotating roller 15 and to cause a feeding movement of the yarn 6 through funnel 17 and down into the container or capsule 5. As

shown, the feed roller 15 is mounted to rotate about a fixed shaft 15' supported in suitable bearings integral with the frame and is rotated through a pulley 15a connected by belt 15b with pulley 15c rotated by motor 15d. The feed roller 16, which applies pressure to the yarn is mounted on an axle 16' fixed in a tiltable frame 18 which is adapted, when a given yardage is supplied, to cause the lifting of the pressure roller 16 and thus to stop further feeding of the yarn. As illustrated, the roller 16 has connected thereto and rotates a gear 16a which meshes with and rotates a gear 19 fast on a shaft 20 and which, in turn, rotates a worm 21 also on shaft 20. The worm 21 meshes with and rotates a worm-wheel 22 and shaft 23 which rotates a trip-member 23' provided with an adjustable pin 23a adapted, upon a complete turn of the member 23' to engage a tilting lever 24 mounted on a pivot member 25 supported in suitable bearings and adapted, upon tilting by the lever 24, to cause a toe 26 to engage and tilt the table or plate 27 upwardly, the tilting toe 26 being normally held in its lowermost position out of contact with plate 27 by the weight 26'. The tilting of the plate releases a connected detent 28 from the notch 29' in a slidable arm 29 which is mounted to slide transversely of the frame of the machine in cleats 29a, 29b. Upon release of the detent, the arm 29 is shifted rearwardly as is more particularly shown in Fig. 5, by the action of the spring 30 which is stretched between a fixed point on the machine and a pin 30' on said lever 29. Rearward movement of the arm 29 tilts the tiltable frame 18 to elevate the pressure roller 16 and stop further feeding of the yarn. This movement is accomplished through the connecting rod 31, pivoted at one end 31' to the said arm 29 and at its opposite end 31a to the top of the tiltable frame 18 which comprises a lever arm 32 fastened at 32' to the tiltable bearing frame 18 in which the roller 16 is mounted. The lever 32 is normally held in its forward position to retain the pressure roller 16 in proper pressing relationship by the spring 32a. Thus, upon a revolution of measuring mechanism connected with the roller 16, the rearward movement of the sliding arm 29 will elevate said roller 16 to cause further feeding of the yarn to be immediately discontinued. Obviously, by properly proportioning the gears and pressure-applying roller any suitable yardage fed therethrough may be measured and the feeding then stopped.

Upon such discontinuation of the feeding movement of the yarn, the operator, in the embodiment illustrated, cuts the yarn between the funnel and the head of the capsule 5; then removes the capsule from its socket and replaces another one in said socket.

During such removal of the capsule, it is desirable that the suction be shut-off and for this purpose I provide means for cutting off the suction simultaneously with the discontinuance of the feeding movement. As illustrated, one end 33' of the connecting rod 33 is connected to the sliding lever 29 and the other end thereof is connected to a cut-off valve 34 which is normally open and is closed against the action of the spring 34' by movement of the arm 29 in a rearward direction upon release of the detent 28. As illustrated, the valve is mounted on an extension arm 35 connected to the bracket 3 and embodies a casing 34 having a slidable valve member 34a provided with a valve opening 34b normally held in registry with the inlet and outlet portions 34c, 34d, which are connected intermediate the ends of the hose 7 connected to a pump P. When the valve 34a is operated to shut off connection between the pump P and capsule, another channel is preferably provided to permit the pump to continue its normal operation during such cut-off period, and for this purpose I provide a conduit member p' having suitable means (not shown) adapted to open automatically upon the closure of the valve 34.

After a new capsule is inserted in the socket 4, the end of the thread is inserted through the aperture in the head of the capsule and then the lever 29 is moved forwardly by the operator to cause the detent 28 to lock within its notch 29' whereupon the feed of the yarn will again be started. As illustrated, a hand lever 36, pivoted on the frame at 36', is connected intermediate its ends at 36a to the lever 29 and is provided, at its end, with a handle 36b which may be grasped by the operator to swing the lever forwardly in order to connect the detent and cause the start of the feeding movement of the yarn as above indicated.

I have found that it is not necessary to discontinue the hammering movement of the socket and capsule during removal and renewal of the capsule. As shown, the shaft 10 for the hammering cam is rotated through the sprocket 10', chain belt 10a and sprocket 10b from the shaft 15' which is extended beyond its bearing for this purpose.

Suitable guides for the yarn are provided and, as shown, I have employed an eye-guide 37 and a V-guide 38 at the rear of the pressure roller. Of course, conventional means (not shown) is provided to stop the machine entirely when desired.

Having described my invention, I claim:

1. Apparatus for filling yarn into containers embodying, in combination, a frame member having a mounting base, a cartridge holder mounted in said mounting base and reciprocable toward and away from said base, a flexible suction hose connected to said holder, guide means disposed co-axially with said cartridge holder, roller feed mechanism mounted adjacent to said guide means for guiding said yarn through said guide means and into said cartridge, said holder being slidably mounted in said mounting base, and means for hammering said holder against said mounting base to assist in packing the thread or yarn within said cartridge.

2. Apparatus for filling yarn into containers embodying, in combination, a frame member having a mounting base, a cartridge holder mounted in said mounting base and reciprocable toward and away from said base, a flexible suction hose connected to said holder, guide means disposed co-axially with said cartridge holder, roller feed mechanism mounted adjacent to said guide means for guiding said yarn through said guide means and into said cartridge, said holder being slidably mounted in said mounting base, a cam member having a cam surface adapted to raise said holder and a radial drop surface adapted to cause the same to be hammered against said base and a spring for normally forcing said holder toward said base against the raising action of said cam.

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