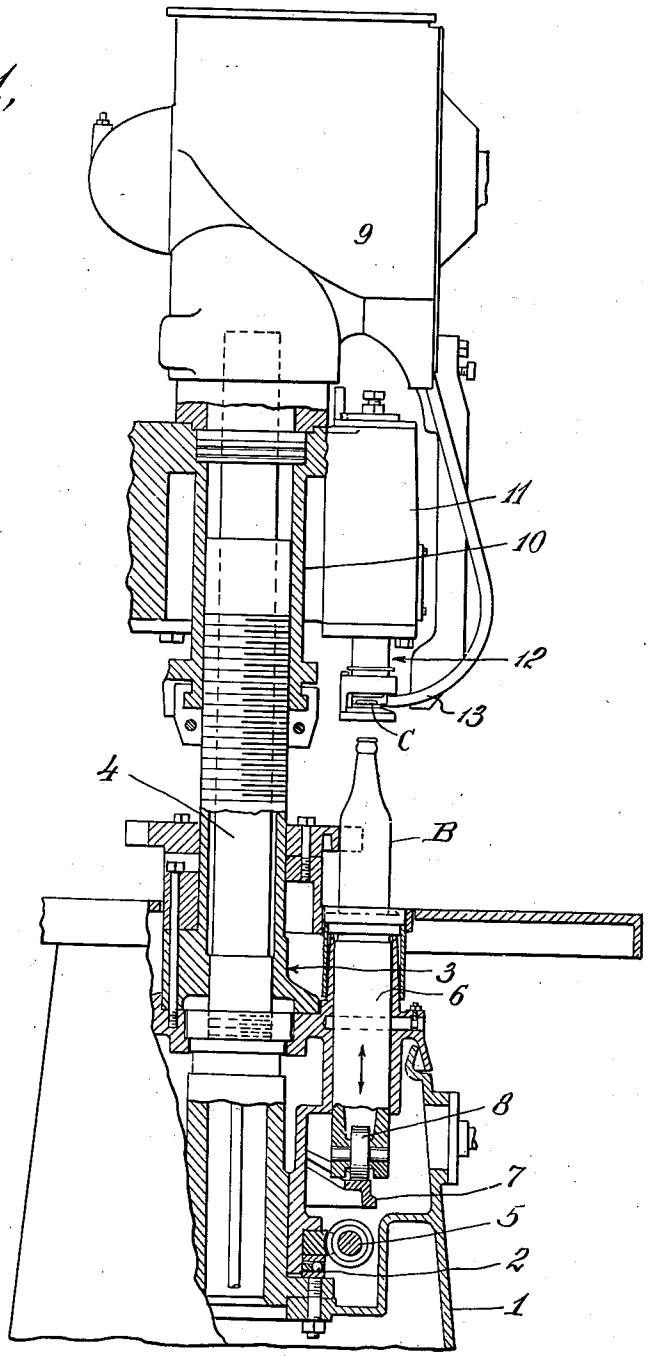
March 12, 1940. G. E. WALDRON 2,193,440

CONTAINER CAPPING APPARATUS

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Fig. 1,



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Fig. 2.

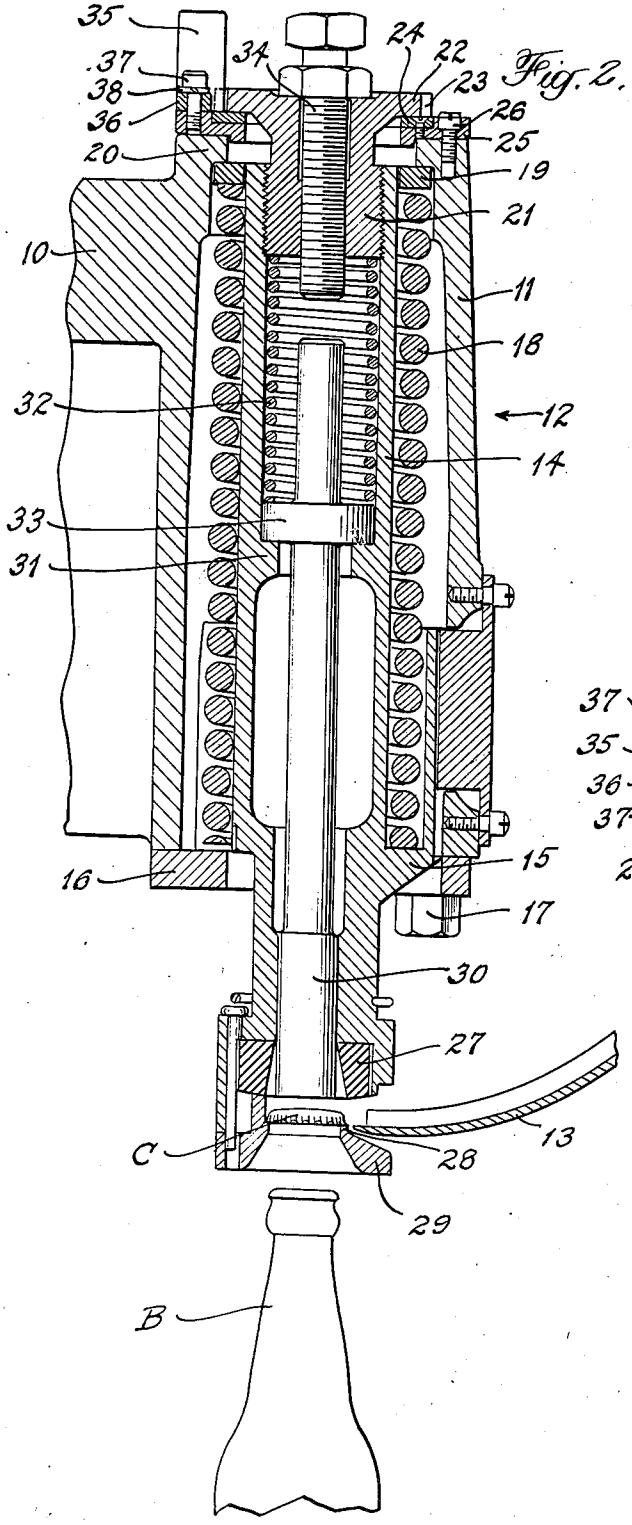
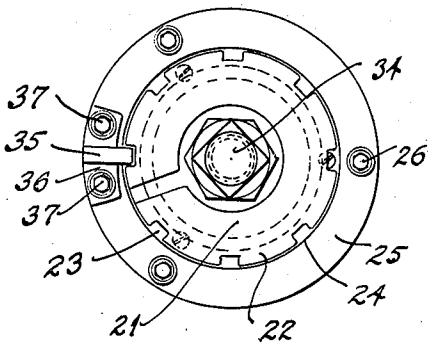


Fig. 3.



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CONTAINER CAPPING APPARATUS

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Application May 13, 1939, Serial No. 273,406

15 Claims. (Cl. 226—84)

This invention relates to container sealing apparatus and has particular reference to apparatus for applying the crown type metal caps to bottles and the like.

In one form of crown cap sealing apparatus, the filled bottles are conveyed to the capping machine in succession and raised by a cam mechanism into the bell of a capping head containing a crown cap, which is lifted by the lip of the bottle during the movement of the latter and forced into the die, which crimps the flange of the cap around the exterior bead at the lip of the bottle to complete the sealing operation, which is accompanied by resilient pressure of a plunger cooperating with the die to crimp the cap securely on the lip of the bottle.

Usually such machines comprise a circular series of such capping heads arranged on a rotating turret, so that successive capping heads are placed in alignment with successive bottles to be capped. A single stationary chute supplies each head, as it moves into alignment with the chute, with a crown cap in proper position for cooperation with the bottle and the die in the head. It is necessary that the crown cap is supplied accurately so as to be properly positioned in each head, and that necessity requires that the single crown cap chute be accurately aligned with each of the crown cap supports within each of the heads. By reason of the vertical reciprocation of the plunger and die relatively to the vertical stationary spider in which the head is mounted, there is a certain amount of inevitable wear between the die and plunger and its support in the spider. Sometimes this wear is aggravated by corrosion under conditions of moisture and the like to which the machine may be subjected in bottle-filling and sealing operations. This wear varies with the different heads, with the result that the crown cap support in each head soon becomes misaligned with the outlet of the crown cap chute, resulting in incorrect positioning of the cap in the head, crushing of the cap, or failure of the cap to lodge in the head, thereby either causing an imperfect seal or no seal at all on the bottle. Since the wear of different heads varies in the same machine, the wear cannot be compensated for merely by adjusting the crown cap chute, but requires adjustment of each individual head. Since it is virtually impossible to secure uniform adjustment of all heads, as the machine is now constructed, the task of realigning the capping apparatus with the chute becomes arduous, particularly by reason of the construction of such machines, which requires complete disassembly of each head in order to effect the adjustment.

In accordance with this invention, an improved container sealing apparatus for use with crown caps is provided, in which the adjustment of the individual heads of a multiple-head capping machine may be made accurately and quickly, without disassembling the machine and without making any adjustment in the crown cap chute supplying the individual heads.

In a preferred embodiment of the invention, the upper end of the die, which is mounted for limited vertical reciprocation relatively to the machine spider containing it, is threaded on a nut having a lateral flange resting upon a shoulder formed on the uper end of the sleeve of the spider in which the die is positioned. This flange is provided at spaced intervals with radial slits in which a keeper mounted on the sleeve shoulder is positioned to lock the nut against rotation. This keeper is releasable from the notch in which it is positioned to permit rotation of the nut, which, being fixed in vertical position relatively to the sleeve of the spider, effects vertical movement of the die in the sleeve when the nut is adjusted. Since, as is customary, the die carries the crown cap support, the latter is adjusted relatively to the fixed crown cap chute. In this way, each of the capping heads may be adjusted relatively to the supporting spider and to each other, to compensate for any variation between the crown cap support and the chute, so that all heads are readily adjustable to compensate for wear or the like with ease, rapidity, and without disassembling the individual capping heads to do so. The notches in the flange of the adjusting nut and the pitch of the thread connecting the latter to the die are selected so that a turn of the nut from one notch to another effects a very fine adjustment in elevation of the crown cap support. After the adjustment is made, the keeper is reinserted in the corresponding notch in the flange and locked in place, which maintains the die immovable.

For a more complete understanding of the invention, reference may be had to the accompanying drawings, in which:

Fig. 1 illustrates, partially in vertical section, a conventional form of bottle capping machine embodying the present invention;

Figure 2 is an enlarged axial section through a crown cap applying head of the type illustrated in Fig. 1, showing the upper end of the bottle in alignment therewith, the crown cap in place, and the crown cap chute, the head being fitted

with the adjusting means for the crown cap support;

Fig. 3 is a plan view of the head showing the means for locking the adjusting nut in adjusted position.

The capping machine illustrated in Fig. 1 is supplied with bottles by a suitable bottle feeding means according to the general arrangement illustrated in Patent No. 1,118,425, issued November 24, 1914, and, since the general structure and operating mechanism for supplying bottles to the capping machine forms no part of the present invention, it need not be further illustrated.

Referring to Fig. 1, the conventional parts of the crown cap applying machine there shown includes the base 1 supporting on thrust bearing 2 the rotary frame of the machine, which is generally designated 3, and which is rotated in a fixed horizontal plane around the stationary shaft 4 by the gearing 5 connected to a suitable source of power, not shown. Mounted for vertical sliding movement in the lower portion of rotary frame 3 are a plurality of bottle supports 6 arranged in circular series and each adapted to receive a bottle B from a suitable feeding mechanism, such as is disclosed in said patent.

As frame 3 rotates, the bottle supports 6 are successively elevated by a stationary cam 7, engaged by their cam-following rollers 8, to raise the corresponding bottles B to the corresponding capping heads to effect the sealing operation, as will be described, and then the sealed bottles are retracted as their supports 6 are lowered by the cam 7, whereupon the sealed bottles are discharged from the machine.

The upper portion of the rotary frame 3 constitutes the turret 10, and since it is part of the frame 3, the turret 10 also rotates in a fixed horizontal plane. The turret 10 comprises a circular series of sleeves 11, each containing a capping head, generally designated 12, which embodies the present invention, and which is axially aligned with the corresponding bottle support 6 on the lower portion of the frame 3.

Mounted on the upper end of fixed shaft 4 is the stationary crown cap magazine 9, from which depends and on which is supported the stationary chute 13 for delivering a crown cap C in proper inverted position to each capping head 12 as the latter moves into alignment with the chute 13 for receiving a cap therefrom. The discharge end of chute 13 is fixed in respect to each of the heads 12, its relation thereto being indicated in Fig. 2.

Mounted for vertical reciprocation within the sleeve 11, is the die cylinder 14 having an interrupted lower flange 15 normally spaced above the upper surface of a plate 16 fixedly secured to the lower end of the sleeve 11 by cap screws or bolts 17, as shown in Fig. 2. Resting on flange 15 and free of plate 16 is a heavy coil spring 18 engaging with its upper end the ring 19 abutting the inwardly turned flange 20 formed on the upper end of the sleeve 11. The upper end of the die cylinder 14 extends through the ring 19.

Threaded into the upper end of the die cylinder 14 is a nut 21 having at its upper end a lateral flange 22 provided with spaced or peripheral notches 23 and normally resting upon a bearing plate 24 carried by a disc 25 secured to the upper flange 20 of the sleeve 11 by screws 26. The die cylinder 14 is accordingly held in relatively fixed position by spring 18, with the flange 22 of nut 21 resting on the bearing plate 24, subject to upward movement when spring 18 is compressed, resulting in lifting of flange 22 from bearing plate 24.

The lower end of the die cylinder 14 carries the conventional die 27 which cooperates with the flanges of the cap C to crimp them around the bead of the bottle B when the bottle B forces cap C into the die 27.

Also carried by the die cylinder 14 is the support 28 for the cap C and the centering bell 29 for the bottle B. When the machine is in proper adjustment, the cap support 28 is in alignment with the outlet of the chute 13 as shown in Fig. 1. Also the cap support 28 is so proportioned that a cap C ejected thereon from the chute 13 is properly positioned axially in alignment with the bottle B and the die 27.

Slidable within the die cylinder 14 and projecting through the throat of the die 27 is a plunger 30 urged downwardly against the interior flange 31 of the die cylinder 14 by a spring 32 engaging the collar 33 on plunger 30 at its lower end and the under surface of the nut 21 at its upper end. In its vertical movement, plunger 30 engages the tip of the bolt 34 in nut 21.

Removably fixed on the rim of disc 25 for cooperation with one of the notches 23 in the flange 22 of adjusting nut 21 is a vertically-extending key or keeper 35 having a base 36. Cap screws 37 over lock washers 38 secure the base 36 to the disc 25, as shown particularly in Fig. 3.

During operation of the capping machine, a cap C is discharged from stationary chute 13 upon cap support 28 as the head 12 rotates into position opposite the mouth of the chute 13. After the cap C has been lodged on the support 28, the corresponding bottle support 6 carrying bottle B is then elevated by cam 7 so that cap C is lifted by a bottle B and forced into die 27, meanwhile engaging and lifting plunger 30, whose spring 32 maintains the cap C in firm engagement with the lip of the bottle while the die crimps the flange of the cap C around the bead of the bottle B.

The machine is normally adjusted to accommodate under-height bottles B so that all bottles will be properly capped. For average and over-height bottles, the upper end of plunger 30 engages the tip of bolt 34, thereby lifting the die cylinder 14 and its appurtenant parts, and compressing spring 18. This lifting of die cylinder 14 is accompanied by lifting of flange 22 of nut 21 from bearing ring 24, and when the bottle B recedes, being ejected from the die 27 by spring 32, this action is accompanied by a considerable impact between flange 22 of nut 21 and bearing ring 24. During this movement the nut moves upwardly along key or keeper 35.

The frequent impacts between flange 22 of nut 21 and the bearing ring 24, as well as normal wear of other parts of the machine, eventually causes lowering of the cap support 28 so that it is not in exact alignment with the outlet of chute 13, with the result that the cap C may not be accurately placed on the support 28. Corrosion, due to moisture in the air or splashing in the neighborhood of the filling machine where the capping apparatus is usually placed, and the like, augment the possibility of misalignment of the cap support 28 with the chute 13 and this misalignment almost inevitably varies between different heads.

The adjustment and realignment of the cap support 28 with the chute 13 may be simply effected in accordance with the invention by removing the keeper 35 or removing one of the

screws 37 and swinging the keeper or key 35 about the remaining screw 37 out of the corresponding notch 23 in the flange 22 of the nut 21, and then turning the latter so that it is screwed further into or out of the die cylinder 14, depending upon whether the adjustment to be made is upwardly or downwardly. The turning of the nut 21 in the manner described results in vertical movement of the die cylinder 14 and its appurtenant parts, including the cap support 28. By adjusting each cap support 28 with respect to the stationary cap chute 13 and the frame 3 in the manner described, the cap supports 28 of all of the heads of the machine may be simply and accurately aligned with the discharge end of the chute 13 without disassembling any of the heads.

After each adjustment has been made, the key or keeper 35 is reinserted in the corresponding notch 23 of the flange 22 of nut 21 and fixed in place by the screw or screws 37, thereby locking the nut 21 against turning.

It will be seen that this invention provides a very simple and effective means for maintaining a crown cap applying machine in accurate adjustment, so that it efficiently and effectively applies the crown caps to the bottles or other containers without fail and without injury to the caps or bottles, or loss or interruption in the filling and capping process by reason of imperfectly capped containers, whether the machine is of the reciprocating head type illustrated, or the equivalent reciprocating bottle support type.

While a preferred embodiment of the invention has been illustrated and described herein, it is to be understood that the invention is not limited thereby but is susceptible of changes in form and detail within the scope of the appended claims.

I claim:

1. In a container capping machine having a frame, a container support, a cap support aligned vertically with said container support, a cap supply means vertically fixed relatively to said frame, and means for relatively moving said frame and container support in a vertical direction to associate said container and a cap on said cap support, the combination of means for adjusting said cap support relatively to said frame to align the cap support with said cap supply means, and locking means for said adjusting means.

2. In a container capping machine having a frame, a container support, a cap support aligned vertically with said container support, a cap supply means vertically fixed relatively to said frame, and means for relatively moving said frame and container support in a vertical direction to associate said container and a cap on said cap support, the combination of adjustable means interposed between said frame and said cap support for aligning the latter with said cap supply means, and means for locking said adjustable means.

3. In a container capping machine having a frame, a container support, a cap support aligned vertically with said container support, a cap supply means vertically fixed relatively to said frame, and means for relatively moving said frame and container support in a vertical direction to associate said container and a cap on said cap support, the combination of threaded means interposed between said frame and said cap support for adjusting the latter relatively to said cap supply means, and means for locking said threaded means.

4. In a container capping machine having a frame, a container support, a cap support aligned vertically with said container support, a cap supply means vertically fixed relatively to said frame and means for relatively moving said frame and container support in a vertical direction to associate said container and a cap on said cap support, the combination of a threaded portion on said cap support, and a nut on said frame engaging said threaded portion, whereby relative rotation between said threaded portion and said nut effects adjustment of said cap support relatively to said cap supply means.

5. In a container capping machine having a frame, a container support, a cap support aligned vertically with said container support, a cap supply means vertically fixed relatively to said frame, and means for relatively moving said frame and container support in a vertical direction to associate said container and a cap on said cap support, the combination of a threaded portion on said cap support, a nut on said frame engaging said threaded portion, whereby relative rotation between said threaded portion and said nut effects adjustment of said cap support relatively to said cap supply means, and means for locking said threaded portion and said nut against rotation.

6. In a container capping machine having a frame, a container support, a cap support aligned vertically with said container support, a cap supply means vertically fixed relatively to said frame, and means for relatively moving said frame and container support in a vertical direction to associate said container and a cap on said cap support, the combination of a threaded portion on said cap support, a nut on said frame engaging said threaded portion, said nut being adjustable relatively to said threaded portion to adjust said cap support relatively to said cap supply means, and means on said frame for locking said nut in adjusted position.

7. In a container capping machine having a frame, a container support, a cap support aligned vertically with said container support, a cap supply means vertically fixed relatively to said frame and means for relatively moving said frame and container support in a vertical direction to associate said container and a cap on said cap support, the combination of a threaded portion on said cap support, a nut on said frame engaging said threaded portion and being adjustable relatively thereto to adjust said cap support relatively to said cap supply means, a recessed flange on said nut, and locking means on said frame engaging a recess in the nut flange for locking the nut in adjusted position.

8. In a container capping machine having a frame, a container support, a cap support aligned vertically with said container support, a cap supply means vertically fixed relatively to said frame and means for relatively moving said frame and container support in a vertical direction to associate said container and a cap on said cap support, the combination of a threaded portion on said cap support, a nut supported by said frame and engaging said threaded portion and being adjustable relatively thereto to adjust said cap support relatively to said cap supply means, a flange on said nut having a plurality of spaced peripheral notches, and a key on said frame removably engaging a notch in said nut flange to lock the nut in adjusted position.

9. In a container capping machine, the combination of a frame, a die member carried by said frame, a cap support on said die member, cap supply means fixed vertically relatively to said frame for supplying a cap to said cap support, a container support vertically aligned with said cap support and die member, means for relatively moving said frame and container support to engage a container on said container support with a cap on said cap support in said die, a positioning member for said die member engaging said frame, and an adjustable connection between said members for adjusting the vertical relationship between said die member and said frame to align said cap support and said cap supply means.

10. In a container capping machine, the combination of a frame, a die member carried by said frame, a cap support on said die member, cap supply means fixed vertically relatively to said frame for supplying a cap to said cap support, a container support vertically aligned with said cap support and die member, means for relatively moving said frame and container support to engage a container on said container support with a cap on said cap support in said die, a positioning member for said die member engaging said frame, and a threaded connection between said members for adjusting the vertical relationship between said die member and said frame to align said cap support and said cap supply means.

11. In a container capping machine, the combination of a vertically fixed cap supply means, a frame rotatable about a vertical axis in a substantially fixed horizontal plane past said means, a plurality of peripheral capping heads on said frame each including a die member on said frame and having a cap support for receiving a cap from said means for association with a container moved into cooperation with said die member, said cap support being normally fixed vertically relatively to said cap supply means when receiving a cap therefrom, and means interposed between the said die member of each head and said frame for adjusting the vertical relationship between them for aligning each of said cap supports with said cap supply means.

12. In a container capping machine, the combination of a vertically fixed cap supply means, a frame rotatable about a vertical axis in a substantially fixed horizontal plane past said means, a plurality of peripheral capping heads on said frame, each including a die member on said frame and having a cap support for receiving a cap from said means for association with a container moved into cooperation with said die member, said cap support being normally fixed vertically relatively to said cap supply means when receiving a cap therefrom, and means carried by the said die member of each head for adjusting the vertical relationship between it and the frame to align the corresponding cap support with said cap supply means.

13. In a container capping machine, the combination of a vertically fixed cap supply means, a frame rotatable about a vertical axis in a substantially fixed horizontal plane past said means, a plurality of peripheral capping heads on said frame each including a die member on said frame and having a cap support for receiving a cap from said means for association with a container moved into cooperation with said die member, said cap support being normally fixed vertically relatively to said cap supply means when receiving a cap therefrom, and a nut threaded on the said die member of each head and normally engaging said frame for adjusting the vertical relationship between the corresponding die member and the frame to align the corresponding cap support with said cap supply means.

14. In a container capping machine, the combination of a vertically fixed cap supply means, a frame rotatable about a vertical axis in a substantially fixed horizontal plane past said means, a plurality of peripheral capping heads on said frame each including a die member on said frame and having a cap support for receiving a cap from said means for association with a container moved into cooperation with said die member, said cap support being normally fixed vertically relatively to said cap supply means when receiving a cap therefrom, a nut threaded on the said die member of each head and normally engaging said frame for adjusting the vertical relationship between the corresponding die member and the frame to align the corresponding cap support with said cap supply means, and means interposed between said nut and said frame for locking the nut in adjusted position.

15. In a container capping machine, the combination of a vertically fixed cap supply means, a frame rotatable about a vertical axis in a substantially fixed horizontal plane past said means, a plurality of peripheral capping heads on said frame each including a die member on said frame and having a cap support for receiving a cap from said means for association with a container moved into cooperation with said die member, said cap support being normally fixed vertically relatively to said cap supply means when receiving a cap therefrom, a nut threaded on the said die member of each head and normally engaging said frame for adjusting the vertical relationship between the corresponding die member and the frame to align the corresponding cap support with said cap supply means, an apertured flange on said nut, and a key on said frame engaging in an aperture of said nut flange to lock said nut in adjusted position.

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