Feb. 11, 1958 C. M. STEARNS, JR 2,822,774

CAN CLOSING TOOL

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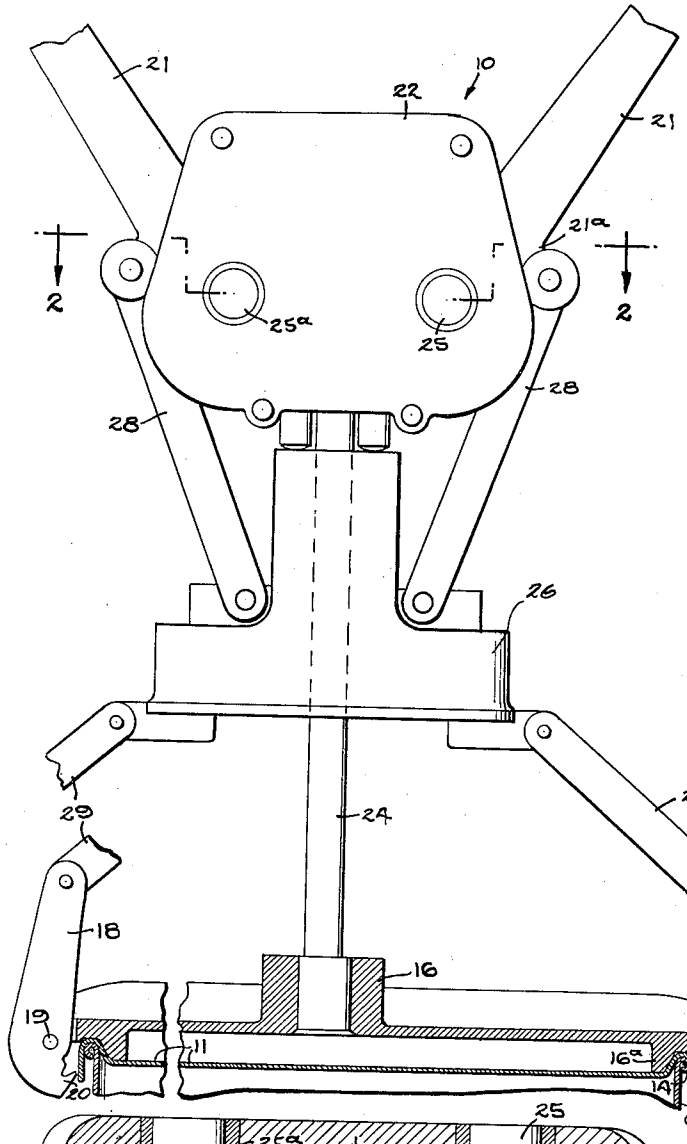


Fig. 1

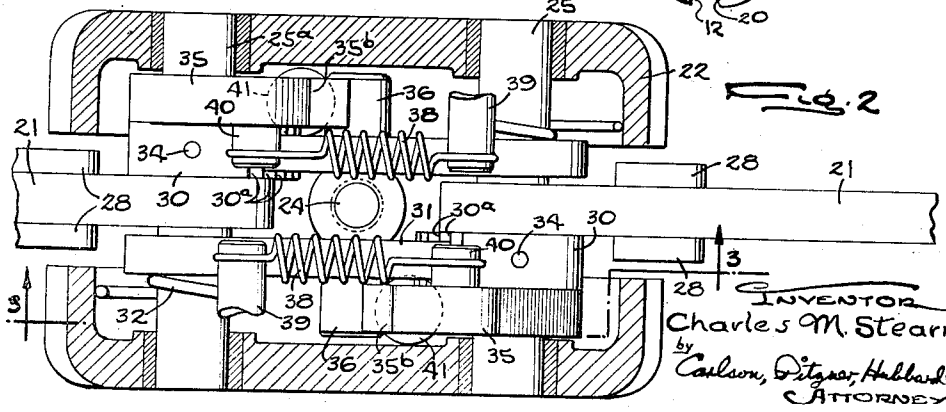


Fig. 2

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CAN CLOSING TOOL

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Fig. 3

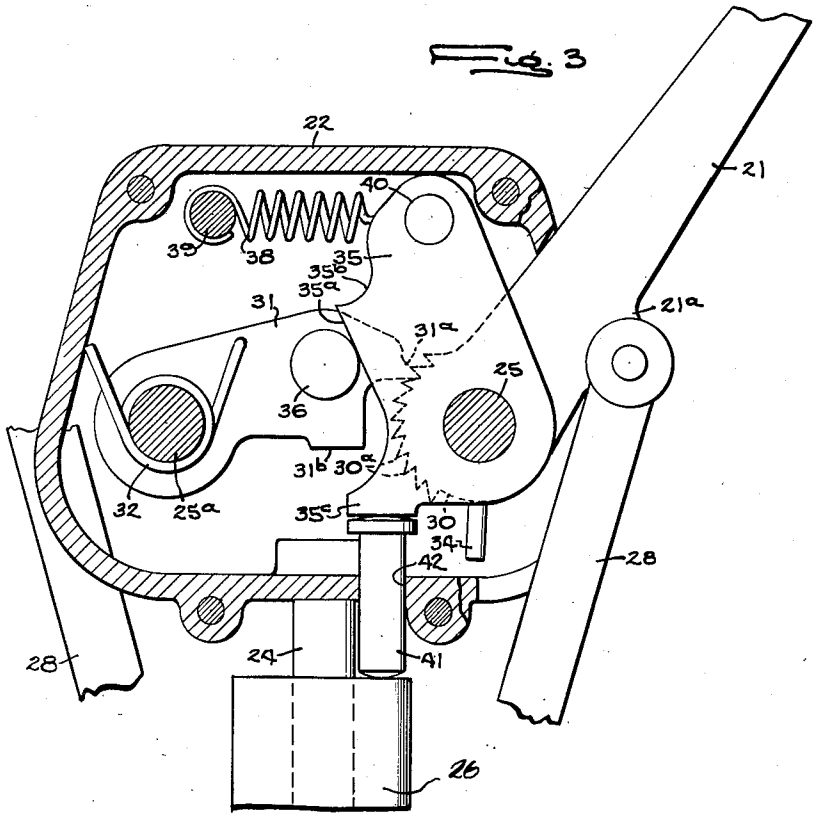
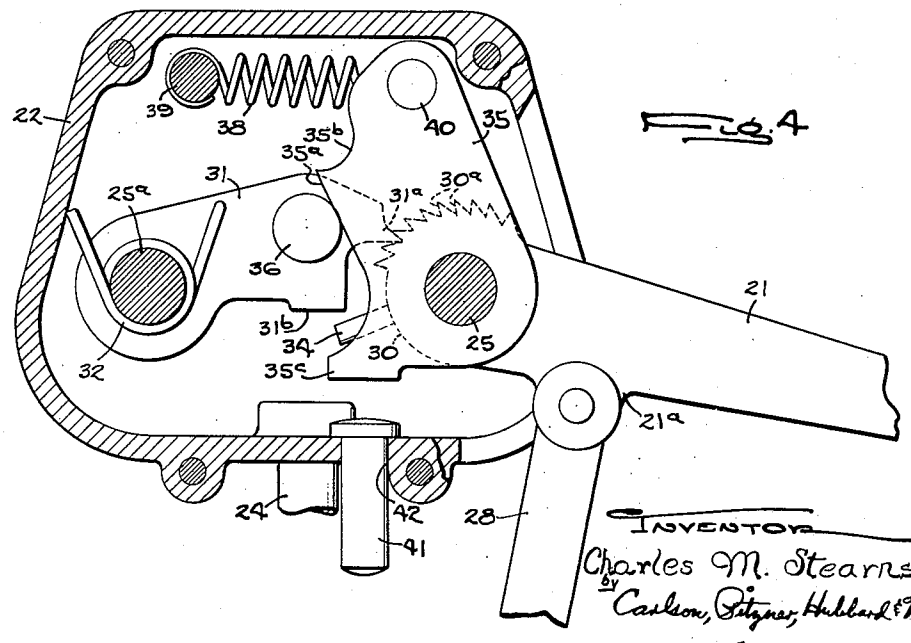


Fig. 4



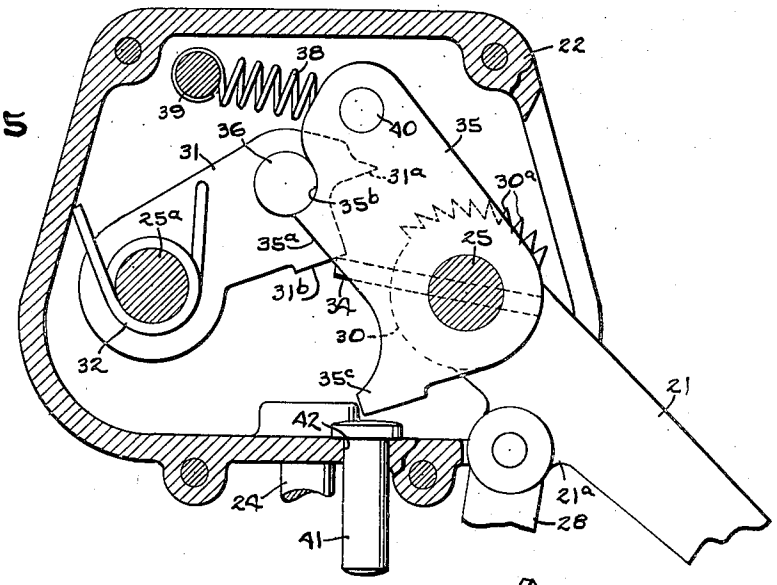
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CAN CLOSING TOOL

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Fig. 5



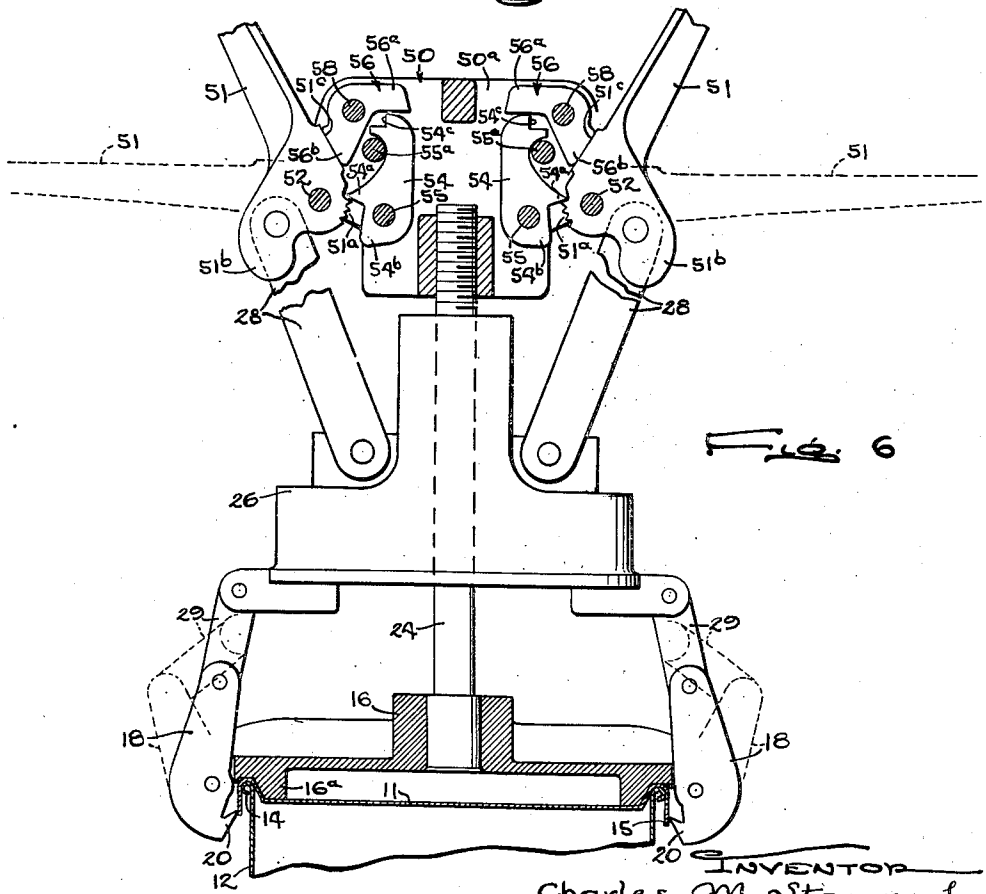


Fig. 6

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Fig. 8

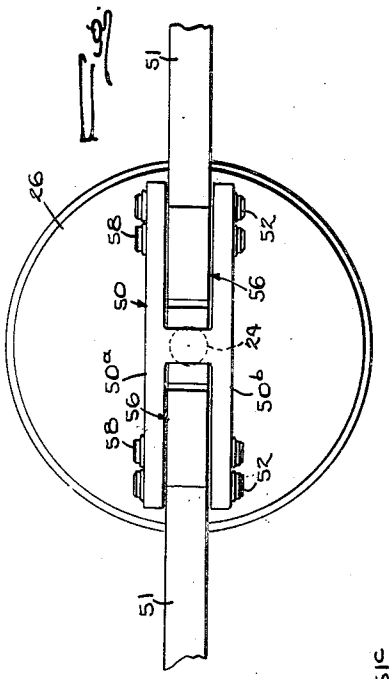
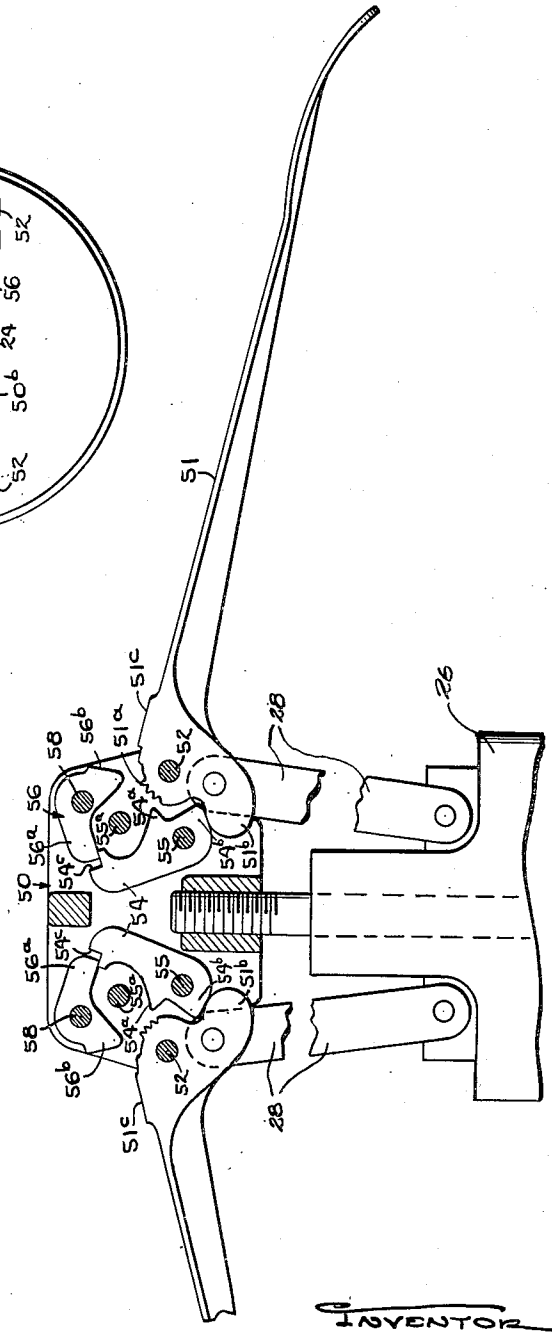


Fig. 7



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United States Patent Office 2,822,774
Patented Feb. 11, 1958

2,822,774

CAN CLOSING TOOL

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Application January 11, 1955, Serial No. 481,129

4 Claims. (Cl. 113—18)

The present invention relates to can closing tools and the like for sealing or crimping the flange of a lid into retaining conformity with a bead surrounding the edge of a can. More particularly, the invention pertains to improvements in can closing tools of the type having manually operable handles movable between first and second positions to open and close crimping jaws.

One exemplary form of a can closing tool of the foregoing type is disclosed and claimed in Grotnes Patent No. 2,017,495. The Grotnes device includes a plurality of crimping levers which are operatively connected to be closed around or opened from engagement with a lid flange by movement of a pair of operating handles. The handles are pushed downward to crimp the lid flange around the can bead, and then raised to release the crimping jaws from the sealed lid and can. The tool may then be lifted free of the can and employed successively to seal a number of cans.

Experience has shown that when the tool operator is tired or careless, it may happen that the handles are not pushed "home" so that the crimping jaws do not create a firm sealing engagement of the closure flange around the can bead. There is often no way of telling merely from inspecting the closed can whether the lid flange has been fully crimped; and the operator may only be sure that he is adequately sealing each can by exerting all his strength in pushing downwardly on the handles.

It is the general aim of the invention to obviate such difficulties and to provide a novel and improved can closing tool which positively assures that the crimping jaws are fully closed during each sealing operation.

More specifically, it is an object of the invention to provide an improved can closing tool which, after the crimping action has begun, cannot be removed from the can until the operating handles are shifted to completely close the crimping jaws. If the lid flange is not adequately crimped, therefore, the operator must exert a greater force on the handles to shift them to their full-crimp position before the tool can be removed from the can.

Another object of the invention is to provide such a can closing tool in which the operator need not exert his entire strength in sealing each one of a number of cans. He need only exert the estimated force required; if it is then possible to remove the tool from the can the seal is complete, but if the tool will not disengage, the operator is apprised of the fact that a greater force on the handles is necessary to complete the crimping operation.

It is a further object of the invention to provide a can closing tool having an operating handle movable between first and second positions to release or close crimping jaws, and which is characterized by one-way ratchet means which prevent the handles from being moved to their releasing position until they have first been shifted to their second position to fully close the crimping jaws.

Still another object is the provision in such a tool of a novel ratchet disabling means brought into play when the handle has reached its full-crimp position to thereby

permit the latter to be returned to its releasing position so that the tool may be removed from a closed can.

Other objects and advantages will become apparent as the following description proceeds, taken in conjunction with the accompanying drawings, in which:

Figure 1 is a fragmentary elevation, partially in section, of an improved can closing tool embodying the features of the invention;

Fig. 2 is a horizontal section taken substantially along the line 2—2 in Fig. 1;

Fig. 3 is a vertical section taken along the line 3—3 in Fig. 2 and illustrating the relationship of cooperating parts at the beginning of a work cycle, that is, with the crimping jaws open, certain parts being omitted for clarity;

Fig. 4 is similar to Fig. 3 but illustrating the tool after crimping has been initiated and the operating handles have been moved partially through their working stroke;

Fig. 5 is similar to Fig. 4 but illustrating the tool at the completion of its work stroke, i. e., when the crimping jaws are fully closed;

Fig. 6 is a fragmentary elevation, partially in section, of a second embodiment of the invention;

Fig. 7 is similar to Fig. 6 illustrating the relative positions of the cooperating parts when the crimping jaws are fully closed; and

Fig. 8 is a plan view of the second embodiment shown in Fig. 6.

Although the invention has been shown and is described in some detail with reference to particular embodiments thereof, there is no intention that it thus be limited to such detail. On the contrary, it is intended here to cover all modifications, alternative constructions and equivalents falling within the spirit and scope of the invention as defined by the appended claims.

Referring now to the drawings, the exemplary can closing tool **10** constructed in accordance with the invention has been shown as employed in sealing a lid **11** on a can **12** (Fig. 1). The can **12** has at its upper edge a rolled or otherwise suitably formed bead **14** around which a deformable flange **15** on the lid is to be crimped in sealing relation. Preferably, the flange **15** is serrated to facilitate this crimping deformation.

For effecting such sealing of the lid **11** to the can **12**, the tool **10** comprises a base **16** adapted to rest on the lid **11** and extending peripherally beyond the lid and can to pivotally support a plurality of circumferentially spaced crimping levers **18**. The latter are pivoted to the base **16** as at **19** and include a depending portion constituting a jaw **20** which is disposed to engage and crimp the flange **15** when rocked inwardly. During this operation an annular, axial projection **16***a* on the base **16** provides a backing or stationary die to prevent deformation of the can **12**.

For imparting such crimping movement to the levers **18**, that is, to open and close the jaws **20**, one or more handles **21** (in this instance two) are pivotally carried in a housing or support **22** fixed to the top of an upright standard **24** which is supported at its lower end in a boss on the base **16**. In this instance the handles **21** are fast on the corresponding ones of shafts **25** and **25***a* which are journaled for rotation in spaced side walls of the support **22**.

In order that upward and downward movement of the handles **21** may produce opening and closing of the jaws **20**, a collar **26** is reciprocally disposed on the standard **24** and connected at its top by a plurality of pivoted links **28** with respective ones of the handles. As shown in Fig. 1, the handles have integral apertured lugs **21***a* spaced outwardly from the shafts **25** and **25***a* for pivotally receiving the upper ends of the links **28**. Additionally, the collar **26** is connected from a plurality of circumferentially spaced points around its lower edge to the

upper ends of the crimping levers **18** by means of a corresponding plurality of pivoted links **29**. It will be apparent, therefore, that raising and lowering of the handles **21** correspondingly shifts the collar **26** along the standard **24** to swing the crimping levers **18** about the pivots **19** and thus open and close the jaws **20** with respect to the lid flange **15** and the bead **14**. In a first or uppermost position of the handles **21** (Fig. 1) the jaws **20** are completely open, while movement of the handles downwardly to a second or lowermost position (Fig. 5) serves to close completely the jaws **20** and to effect a reliable seal between the flange **15** and the can bead **14**.

In accomplishing the objects of the invention, provision is made to prevent movement of the handles **21** in an upward direction, i. e., toward their first positions, once closing of the jaws **20** has been initiated, until the handles are first rocked fully to their second (lower) positions. Thus, once the jaws have been partially closed they cannot be opened, nor can the tool be removed from the can, until the closure of the jaws is complete. Such provision is here made by latch means herein shown as a one-way ratchet mechanism operative on each of the handles **21**. In order to permit return of the handles to their first positions and thus permit opening of the jaws, means are provided to disable the ratchet mechanism when and only when the handles have been rocked to their lowermost positions, such disablement being continued by a lock-out mechanism as the handles are raised to their uppermost positions. In order that the ratchet mechanism is again rendered operative for another closing operation on the next can, additional means are provided to shift the lock-out means as an incident to the handles reaching their uppermost position, thereby effecting reengagement of the ratchet parts.

Since in the illustrated embodiments the novel mechanisms associated with each of the two handles **21** are identical and such mechanisms are disposed in the support **22**, a description of the mechanism for one handle will suffice for both.

As here illustrated in Figs. 1–5, the handles **21** are prevented from moving toward their uppermost positions, i. e., permitted to move only toward their lowermost positions, by a ratchet mechanism which includes a ratchet segment **30** fast on the shaft **25** so as to be rocked in unison with the handle **21**. The segment **30** includes a plurality of teeth **30***a* which are inclined in the usual manner to produce one-way ratcheting action. For cooperating with the teeth **30***a*, a pawl **31** is journaled or pivotally carried by the opposite shaft **25***a*, such pawl having a tooth **31***a*. The pawl **31** is biased in this instance by a torsion spring **32** so that the tooth **31***a* is brought into one-way locking engagement with the teeth **30***a*. It will be apparent from Fig. 3 that the handle **21** and its shaft **25** may be rocked downwardly (clockwise) with the pawl tooth **31***a* slipping successively from one of the teeth **30***a* to the next. With the pawl engaged as shown, however, the handle **21** and its shaft **25** cannot be rocked upwardly (clockwise) since the tooth **31** engaged between any pair of the teeth **30***a* effectively blocks such movement.

For the purpose of disabling the ratchet mechanism, means are provided to shift the pawl **31**, against the force of its biasing spring **32**, free of the ratchet segment **30** as an incident to the handle **21** reaching its lowermost or full-crimp position. This function is conveniently accomplished in the preferred embodiment by a projection **34** fast on the shaft **25** and disposed so as to contact a lower surface **31***b* on the pawl when the handle has reached its lower position (Fig. 5). The projection **34** as here shown may be a pin which serves the dual purpose of locking the ratchet segment **30** on the shaft **25**.

In order to permit return of the handle **21** to its upper position after the projection **34** has shifted the pawl **31** free of the segment **30**, automatic lock-out means acting on the pawl are provided. As here shown, a lock-out dog **35** is freely journaled on the shaft **25** and formed with a ramp-like edge **35***a* normally bearing against a stud **36** projecting laterally from the pawl **31**. The dog **35** is biased in a counterclockwise direction (Fig. 3) by suitable means such as a tension spring **38** connected between a cross pin **39** in the support **22** and a stud **40** fixed in the upper end of the dog. The spring **38** thus causes the ramp edge **35***a* to bear against a stud **36** on the pawl **31**, permitting the latter to rock about its shaft **25***a* except insofar as it is constrained by its torsion spring **32**. Thus, as the projection **34** cams the pawl in a counterclockwise direction (Fig. 5), the stud **36** snaps into the cradle edge portion **35***b*. With the parts so engaged as shown in Fig. 5, the pawl **31** is locked free of the segment **30** and its teeth **30***a*. With the pawl **31** thus disabled, the handle **21** and its shaft **25** may be rocked counterclockwise until the handle is restored to its first or uppermost position.

Re-engagement of the pawl **31** with the ratchet segment **30** is effected by novel means actuated as an incident to return of the handle **21** to its uppermost position. In the present instance, such action is provided by a plunger **41** which is slidably disposed through a vertical opening **42** in the lower wall of the support **22** and which is adapted upon upward movement to strike a foot portion **35***c* integrally formed with the dog **35**. The plunger is located to be displaced upwardly by the collar **26** when the latter is raised with the handle **21**. Thus, when the handle is returned to its uppermost position, the collar **26** shifts the plunger **41** upwardly, and the plunger in turn strikes the foot portion **35***c* thereby rocking the dog **35** clockwise against the bias of the springs **38** and **32** until the stud **36** is displaced from the cradle portion **35***b* and the pawl tooth **31***a* snaps back into engagement with the ratchet segment **30**.

From the foregoing description it is believed that the operation of the preferred illustrated embodiment of the invention will be clear. However, a brief summary of such operation may be helpful. To seal the lid **11** on the can **12**, the tool **10** is first positioned as shown in Fig. 1 with the base **16** resting on the lid. The operator then grasps the ends of the handles **21** and rocks them downwardly, the links **28** thereby shifting the collar **26** downwardly along the standard **24**. The lower links **29** in turn rock the upper ends of the crimping levers **18** outwardly, closing the jaws **20** to crimp the lid flange **15** around the can bead **14**.

Once this crimping action has been initiated, engagement of the pawl tooth **31***a* with the ratchet segment teeth **30***a* prevents the handle **21** from being moved upwardly, prevents the jaws **20** from being opened, and prevents the tool **10** from being removed from the can, until the handles have been first moved to their lowermost position and the jaws fully closed. Upon attainment of full crimping, the projection **34** strikes the pawl **31** (Fig. 5) and rocks the latter counterclockwise. This causes the stud **36** to ride up the ramp edge **35***a*, rocking the dog **35** against the bias of the spring **38**, until the stud **36** snaps into the cradle portion **35***b*. The pawl is thus locked free of the ratchet segment **30** and the handles **21** may be returned to the original uppermost position. As a result of this latter step, the collar **26** is raised along the standard **24** and strikes the plunger **41**, thus shifting the dog **35** clockwise and permitting the pawl **31** to snap into reengagement with the ratchet segment. The tool is then ready for use in closing another can.

Turning now to Figs. 6–8, the second embodiment of the invention there illustrated is generally similar to that previously described and provides the same advantageous operation. Insofar as the same parts appear in Figs. 6–8, the same reference characters employed in connection with Figs. 1–5 are used. In this second embodiment the base **16**, crimping levers **18**, crimping jaws **20**, standard **24**, collar **26** and the upper and lower links **28** and **29** are substantially identical, except for relative sizes, to those previously described. In this instance, however, a modi-

fied support 50 having spaced walls 50*a*, 50*b* is carried at the upper end of the standard 24 and instead of shafts journaled in such support, a pair of operating handles 51 are directly pivoted on suitable pins 52 inserted through the support. The handles 51 are pivotally connected with the upper ends of the links 28, as before, but include on their inner ends an integral ratchet segment having a plurality of ratchet teeth 51*a*. Referring only to the right handle (since both handles and their operating mechanisms are identical), it will be seen that the handle includes a depending portion 51*b* which, as will be explained, serves as a camming projection or cam lobe.

For cooperating with the ratchet teeth 51*a* and permitting movement of the handle 51 only toward its lower position, a pawl 54 is pivotally mounted on a pin 55 inserted through the support 50, the pawl having a tooth 54*a* which is urged into engagement with the teeth 51*a* by a torsion spring (not shown) biasing the pawl 54 in a clockwise direction. A stop pin 55*a* limits the extent of clockwise movement of the pawl 54.

When the handle 51*a* has been moved to its second or lowermost position (Fig. 7) the camming lobe or projection 51*b* strikes an eccentric arm 54*b* on the lower part of the pawl 54 and rocks the latter counterclockwise to free it of engagement with the ratchet teeth 51*a*.

For holding the pawl 54 in such disengaged position while the handle 51 is being returned to its first or original position, a lock-out dog 56 is pivotally carried on a pin 58 and biased in a counterclockwise direction by a torsion spring (not shown). The dog 56 includes a lock-out arm portion 56*a* and a release surface 56*b* integrally formed thereon and disposed on opposite sides of the pivot pin 58. When the handle 51 has been moved partially through its working stroke (as shown by dashed lines in Fig. 6) the lock-out arm 56*a* slidably bears against the upper surface of the dog 54 and permits the latter to have normal ratcheting engagement with the teeth 51*a*. However, when the pawl 54 is rocked clockwise by camming action of the lobe 51*b*, the lock-out arm 56*a* snaps into engagement with a shoulder 54*c* formed in the upper edge of the pawl 54 (see Fig. 7). As a result, the pawl is prevented from returning to engagement with the ratchet teeth 51*a* and the handle 51 may be raised to its original, uppermost position.

Upon restoration of the handle 51 to its uppermost position, a release surface 51*c* formed integrally on the handle 51 strikes the release surface 56*b*, rocking the lock-out dog clockwise against the force of its biasing spring and lifting the arm 56*a* free of the shoulder 54*c*. When this occurs the pawl 54 snaps back into engagement with the ratchet teeth 51*a* and the tool is ready for use in closing the next can.

It will be apparent from the foregoing description that the operation of the second embodiment is substantially the same as that described in connection with the first embodiment illustrated by Figures 1 through 6. Once closing of the jaws 20 has been initiated by downward movement of the handles 51, the engagement of the pawl tooth 54*a* with the ratchet teeth 51*a* prevents raising of the handles, prevents opening of the jaws and prevents removal of the tool. When the closing stroke is completed, however, and jaws 20 have been fully closed around the lid flange 15, the integral projection 51*b* strikes the arm 54*b* and rocks the pawl 54 free of the ratchet teeth. At this time, the lock-out arm 54*a* snaps into engagement with the shoulder 54*c*, thereby permitting the handle 51 to be returned to its original position. Upon such return of the handle 51, the release surface 51*c* strikes the dog 56, lifting the arm 56*a* out of the shoulder 54*c* and permitting the pawl to reengage the ratchet teeth.

There is thus little danger of a lid being only partially crimped in place on a can. If the seal is incomplete, the tool may not be removed from the can until additional crimping force has been applied. Additionally, this affords convenience for the operator since he need not exert his entire strength in closing each can. He may approximate the force required, and, if the tool may be disengaged from the can, he is assured that the lid flange has been fully crimped. On the other hand, if the tool will not disengage from the can, he may apply the additional force required.

I claim:

1. In a closing tool of the type having a pair of operating handles each pivoted at one end in a support member, said handles being movable between first and second positions, that improvement comprising, in combination, latch means for each handle including a one-way ratchet segment movable with the handle, a pawl pivoted on the support member, means biasing said pawl into engagement with said segment to permit swinging of said handle only toward its second position, a projection movable with the handle and operatively disposed to cam said pawl against its biasing means from engagement with said segment when the handle reaches said second position, a lock-out dog pivoted on said support member, means biasing said dog to bear against a portion of said pawl when the latter is engaged with said teeth, said dog-biasing means shifting said dog to lock said pawl free of said segment when the latter is cammed by said projection, and means for shifting said dog against the force of its biasing means when the handle is moved to said first position to thereby permit re-engagement of said pawl with said segment, the handle once moved from its first position being thereby locked from return to the first position until first moved fully to its second position.

2. In a closing tool having jaws adapted to crimp the flange of a lid around the bead of a can, a pair of handles pivoted to be rocked between first and second positions, and means operatively connecting said handles to open and close said jaws when in their first and second positions, respectively, the improvement of means for preventing disengagement of the tool from a can after crimping has been initiated until the jaws have been fully closed, said improvement means comprising, in combination, latch means associated with each handle including a toothed ratchet segment movable with the handle, a pivoted pawl spring-biased into engagement with said segment and operative to prevent movement of said handle toward its first position, a projection movable with said handle to engage said pawl and shift it free of said ratchet only when said jaws are fully closed, a pivotaly mounted lock-out dog spring-biased into engagement with said pawl, cooperative formations on said pawl and dog for causing the latter to hold the former disengaged from said segment as said handle is returned toward its first position, and means operative upon the return of said handle to its first position to shift said dog and thereby permit said pawl to snap back into engagement with said segment.

3. A closing tool for crimping a lid flange around a bead on the upper edge of a container wall, said tool comprising, in combination, a base adapted to fit around the inside of said flange, a standard supported by said base, a collar reciprocal on said standard, a pair of operating handles pivoted on said support structure to move between first and second positions and operatively connected to shift said collar along said standard, a plurality of crimping levers pivoted to said base and having jaws for crimping the flange between them and said base, link means connecting said levers to said collar for opening and closing said jaws as said handles are moved to said first and second positions, respectively, latch means associated with each handle including a ratchet segment movable with the handle, a pivoted pawl, means rotationally biasing said pawl into one-way locking engagement with said segment to permit movement of said handle only toward said second position, a projection movable with said handle and disposed to retract said pawl from said segment when said handle reaches its second position, a pivoted lock-out dog, means biasing said dog to snap into holdout relation with said pawl when the latter is retracted by said

projection, said handle being thereby free for return to said first position, and means shifted by said collar when said handle is returned to its first position for rocking said dog to permit re-engagement of said pawl with said ratchet segment.

4. In a closing tool having a pair of operating handles pivoted on a support member to be rocked between first and second positions, the handles being operatively linked to open and close crimping jaws when rocked to said first and second positions respectively, latch means for each handle comprising a series of ratchet teeth formed on the handle, a pawl pivoted on said support member and having a locking tooth positioned to engage said teeth, spring means for biasing said pawl to effect such engagement to thereby prevent movement of said handle toward said first position, a cam lobe on said handle located to strike said pawl and shift it from engagement with said teeth when said handle is rocked to said second position, a lock-out dog pivoted on said support member,

resilient means biasing said dog to abut said pawl when the latter is engaged with said teeth, said dog being biased to snap-lock said pawl in its disengaged position when the latter is cammed by said lobe, and cooperating surfaces on said dog and handle for causing the latter to return the former to its original position when the handle is pushed to said first position, thereby permitting said pawl to snap into re-engagement with said ratchet teeth.

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