Oct. 15, 1935. C. C. GROTNES 2,017,495

CAN CLOSING TOOL

Filed April 3, 1933

Fig. 1

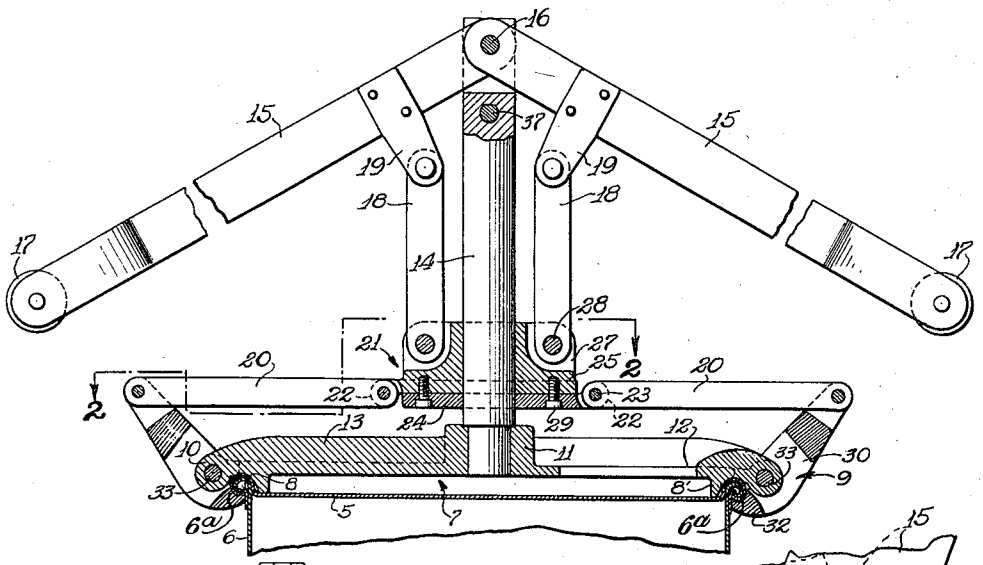


Fig. 2

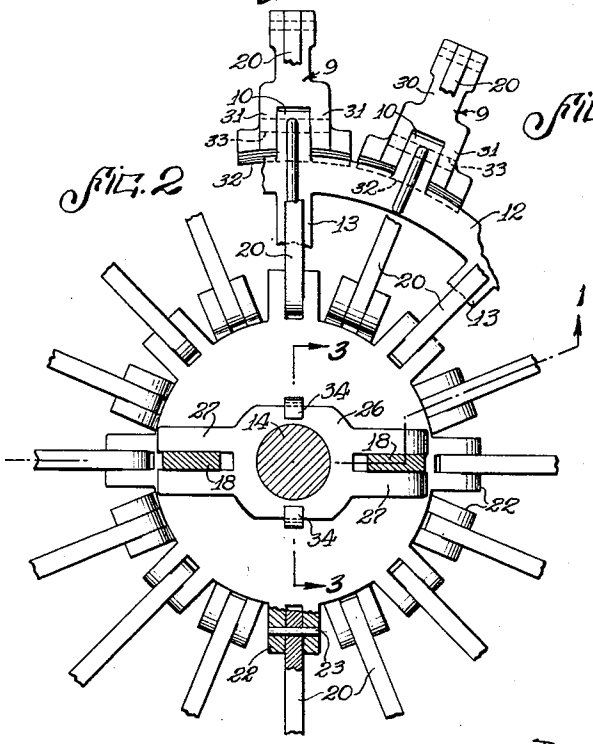
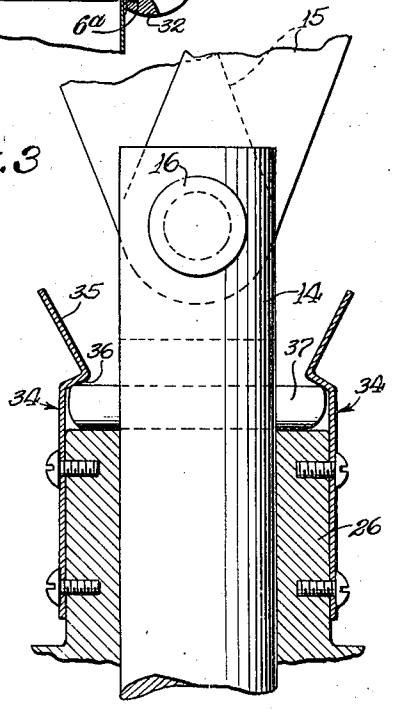


Fig. 3



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Patented Oct. 15, 1935

2,017,495

UNITED STATES PATENT OFFICE

2,017,495

CAN CLOSING TOOL

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Application April 3, 1933, Serial No. 664,079

11 Claims. (Cl. 113—18)

The invention relates to a tool for use in applying tops or covers to cans and is designed especially for use in applying covers formed with a serrated flange or series of lugs adapted to be bent into retaining relationship with a bead on the can.

More particularly, the invention relates to improvements in a tool having a composite active die, consisting of a series of circumferentially disposed crimping levers, a link extending radially inwardly from each of the levers, and a central axially reciprocable head or collar to which the inner ends of the links are pivotally connected; and has as one object the provision of a collar of novel construction providing in a small circumference strong and rugged pivotal connections for the links of a large number of levers arranged in closely spaced relation.

Another object of the invention is to provide a can closing tool embodying an improved operating handle and linkage arrangement enabling the active die to be operated efficiently with a minimum of effort.

A further object of the invention is to provide means operating automatically and as an incident to the movement of the operating handles into die-open position yieldably to retain the handles in that position.

Ancillary objects and advantages will be apparent from the description and from the drawing, illustrating an exemplary embodiment of the invention, in which:

Figure 1 is a vertical sectional view taken approximately along line 1—1 of Fig. 2.

Fig. 2 is a fragmentary horizontal plan view taken approximately along line 2—2 of Fig. 1 and showing only two of the levers.

Fig. 3 is an enlarged detail view of one feature of the tool.

In the exemplary embodiment illustrated in the drawing, a tool designed for use in applying a cover 5 to a cylindrical can 6 is shown. Covers of the type to be attached by this tool are usually depressed (see Fig. 1) and formed with a serrated flange or a series of lugs 6a adapted to be bent about a bead on the edge of the can.

To effect such bending of the flange on the cover about the bead on the can, the tool comprises generally a circular base 7 having at its periphery a fixed or passive die 8 and a movable or active die. In the present instance, the passive die 8 is formed at the periphery of the base, the latter having for this purpose a depending, peripheral flange 8' cast integrally with the base 7 and adapted to be received in the depressed cover. The active die is of a composite character, consisting of a plurality of crimping levers 9 pivoted on lugs 10 projecting radially from the base.

For lightness in weight and economy in manufacture, the base 7 is of a web construction consisting of a central hub 11, an annular rim 12, carrying the flange 8', and radial spokes 13 connecting the rim and the hub. The flange 8' is of a width substantially equal to the depth of the depression in the cover 5 and its outer face slopes outwardly and is gently rounded at the base of the flange to merge with the lugs 10, the lower surface of each of which is concave. For a can closing operation, the tool is placed on top of the can with the die flange 8' of the base 7 bearing against the edge of the cover 5, as shown in Fig. 1.

Rising from the hub 11 of the base is a cylindrical standard 14, the upper end of which is bifurcated and supports a pair of operating handles 15. The handles 15 extend in opposite directions but are pivoted at one end on a common horizontal axis, formed by a pin 16, to swing in a vertical plane. The free end of each handle is formed with a hand grip 17.

A suitable linkage connects the operating handles 15 with the levers 9 so that raising the handles swings the levers 9 to open the die while lowering the handles swings the levers to close the die and thereby bend the flange on the cover 5 into retaining relationship with the bead on the can 6, as shown in Fig. 1. Herein this linkage embodies an improved arrangement including a link 18 depending from the free end of an arm 19 rigid on each of the handles 15 near the pivoted end thereof and a link 20 extending inwardly from each of the levers 9. The linkage is completed by an annular collar 21 reciprocable on the standard 14 and pivotally attached to the links 18 and the links 20. With the handles 15 and the levers 9 connected in this manner the force applied to the handles by the operator of the tool is multiplied in being transmitted to the levers.

The links 20 are connected at their inner ends to the collar 21 through the medium of lugs 22 projecting radially from the periphery of the collar. In order that this connection may be of sufficient strength to withstand the strain placed thereon, the lugs 22 are formed in pairs equally spaced circumferentially about the collar (see Fig. 2) with the end of each link 20 received between the lugs forming a pair. A pivot pin 23 extends through the lugs and the end of the

link. To receive the pin 23 the lugs are first drilled. This operation requires a certain minimum spacing of the pairs of lugs to accommodate the tool employed in drilling. Consequently where there are a large number of levers 9 to be connected, a collar 21 of correspondingly large diameter has heretofore been required to accommodate all the lugs

To obviate such a large and bulky construction the collar is here composed of a number of separable parts, each formed with pairs of lugs about its periphery spaced the minimum distance apart. In the present instance, two parts 24 and 25 are employed. The lower part 24 is in the nature of a disk, while the upper part 25, also disk-like, carries on its upper face a hub 26 formed with diametrically opposed slotted lobes 27 to which the lower ends of the links 18 are connected by pivot pins 28. The lower disk 24 is secured as by screws 29 to the lower face of the disk 25, with the pairs of lugs of the disks in staggered relationship. With the exception of the collar 26, the parts 24 and 25 are identical in construction. Each is formed with the same number of pairs of lugs 22 and with the lugs offset laterally so that the axis of the bore in the lugs is in the plane of one face of the disk. The parts are assembled with the lugs 22 of the lower part 24 extending upwardly so that the pivot pins 23 of all links lie in the same horizontal plane. It will be apparent from the foregoing description and from Fig. 2 that with the collar constructed in the manner described, each disk is formed separately and with the maximum number of lugs permitting a drilling thereof so that twice as many pairs of lugs 22 are provided as could be provided on a collar of the same diameter but formed of but a single piece.

It is desirable that the entire flange of the cover 5 be bent in a single operation of the tool. To that end the levers 9 are constructed and mounted on the base 7 so as to provide a substantially continuous active die of a strong and rugged character. Thus each lever (see Fig. 2) has a comparatively wide intermediate portion 30 formed by spaced parallel legs 31 and terminates at one end in an even broader jaw 32 extending laterally beyond the legs and disposed to cooperate with the passive die 8. The space between the legs 31 of each lever serves to receive a lug 10 on which the lever is pivoted by means of a pin 33. The remaining end of the lever is substantially narrower and is bifurcated to receive and to be connected to one of the links 20.

By forming the lever of spaced parallel legs, a rugged construction is obtained permitting an uncommonly broad jaw to be employed without danger of the ends thereof fracturing. This results because the jaw 32 is supported intermediate the ends and the center of the jaw instead of at the center only as is the common practice. Consequently the jaws 32 may be so broad that the ends of adjacent jaws nearly abut and thus form a substantially continuous active die.

The construction of the levers 9 here employed contributes in another manner to the formation of a continuous active die. Just as in the case of the collar 21, manufacturing methods require that the lugs 10, on which the levers 9 are pivotally supported, be spaced a certain minimum distance apart in order that the lugs may be drilled to receive the pins 33. Thus for a base of given diameter, this minimum spacing of the lugs 10 determines the number of levers 9 that may be employed. By constructing the lever of spaced legs, the lever may be mounted on a single lug received between the legs instead of requiring a pair of lugs as is necessary when the lever is solid. As an obvious result a larger number of levers may be employed because more single lugs than pairs of lugs can be formed about the base while retaining the required spacing. With a larger number of levers 9 the breadth of each jaw 32 necessary to provide a continuous active die is correspondingly reduced. Thus with the required breadth of each jaw reduced and with the lever construction permitting an uncommonly broad jaw without danger of the ends fracturing, a substantially continuous active die is obtained.

The weight of the collar 21 and of the operating handles 15 tends to swing the levers 9 to die-closed position. Means is preferably provided, therefore, yieldably to retain the operating handles in raised or die-open position. In the present instance, the means provided operates automatically and as an incident to the movement of the handles to raised position. To that end, the hub 26 on the upper disk 25 carries a pair of diametrically opposed spring clips 34 bent to form cam surfaces 35 and 36 facing upwardly and downwardly respectively. Cooperating with the spring clips 34 is a projection, herein a pin 37, supported on the standard 14 near the upper end thereof. The pin 37 is positioned in the path of the spring clips 34 and is adapted to be engaged thereby as the collar 21 is raised as an incident to the movement of the handles to raised position. The ends of the pin 37 are preferably rounded at the bottom edge to facilitate passage of the spring clips over the pin, while the upper edges are substantially square to assure that the weight only of the handles and linkage will not be sufficient to release the spring clips. Upon the application of force to the handles 15, the spring clips yield and permit the collar 21 to move downward with a consequent closing of the die and the bending of the flange on the cover.

It will be apparent from the foregoing that the tool is materially stronger and reenforced at such points as are subjected to the greatest stress without a substantial increase in the size of the parts or without rendering the parts bulky and unduly expensive. Such a construction results in an improved tool and one which can be manufactured at a low cost. The tool also provides for the automatic retention of the operating handles in die-open position.

I claim for my invention:

1. In a can closing tool of the character described having a base, a plurality of crimping levers pivotally mounted about the periphery of the base and a link extending radially inwardly from each of the levers, a collar to which said links are connected to effect simultaneous actuation of the levers, comprising a pair of separable parts each formed with equi-distantly spaced radial projections about its periphery to which the links are pivotally connected, said parts being rigidly secured together with the radial projections in staggered relationship.

2. In a can closing tool of the character described having a base, a plurality of crimping levers pivotally mounted about the periphery of the base and a link extending radially inwardly from each of the levers, a collar to which said links are connected comprising separable parts each formed with spaced radial projections about its periphery to which the links are pivotally con-

nected, said parts being rigidly secured together with the radial projections of the separable parts displaced angularly with respect to each other.

3. In a can closing tool of the character described having a base, a plurality of crimping levers pivotally mounted about the periphery of the base and a link extending radially inwardly from each of the levers, a collar to which said links are connected to effect simultaneous actuation of the levers comprising a pair of disk-like parts each formed with pairs of lugs projecting radially and equally spaced a distance permitting drilling of each pair of lugs on a line parallel to a tangent at the base of the lugs, said parts being detachably secured together with the pairs of lugs of the separate parts in staggered relationship.

4. A can closing tool comprising in combination, a base having a periphery shaped to form a passive die, a plurality of levers pivotally mounted about the periphery and forming an active die, a standard rising from said base, operating handles pivotally mounted on said standard to swing in a vertical plane, and means connecting said operating handles and said levers including a series of radial circumferentially spaced links and a collar reciprocable on said standard, said collar comprising two disks each carrying a plurality of pairs of lugs equally spaced on its periphery and the two disks secured together with the pairs of lugs in staggered relationship.

5. A can closing tool comprising, in combination, a base having a periphery shaped to form a passive die, a plurality of levers pivotally mounted about the periphery and forming an active die, a standard rising from said base, operating handles pivotally mounted on said standard to swing in a vertical plane, a link depending from each of said handles, a link connected to each of said levers, and a collar reciprocable longitudinally of said standard and pivotally connected to said links, said collar comprising an upper disk formed with a hub and connected to the links depending from said handles and a lower disk, each disk being formed with pairs of lugs equally spaced about the periphery of said disks and connected to said links attached to said levers, said disks being secured to one another with the pairs of lugs in staggered relationship.

6. In a can closing tool of the character described having a base, a plurality of crimping levers pivotally mounted about the periphery of the base and a link extending radially inwardly from each of the levers, a collar to which said links are connected comprising two separable disks each formed with drilled lugs offset laterally relative to the plane of the disks, and pivot pins connecting the links to said lugs, said disks being secured together in reversed relation so that the axes of said pivot pins lie in the same horizontal plane.

7. A can closing tool comprising, in combination, a base having a periphery shaped to form a passive die and conforming to the shape of the can to be closed, an active die supported on said base and cooperating with the passive die, a standard supported on said base, a pair of oppositely disposed operating handles pivoted on said standard, a collar reciprocable longitudinally of said standard, linkage connecting said collar to said handles and to said active die to transmit the movement of said handles to said active die, the upward movement of said handles and collar opening said active die, and cooperating means on said standard and said collar automatically engaging yieldably to retain the die open.

8. A can closing tool comprising, in combination, a base, a depending flange on said base forming with the periphery thereof a passive die, an active die supported on said base and cooperating with the passive die, a standard supported on said base, a pair of oppositely disposed operating handles pivotally supported on said standard near the free end thereof to swing in a vertical plane, a collar reciprocable longitudinally of said standard, linkage including said collar coupling said active die to said operating handles, said active die being in open position when said operating handles are swung to raised position and said collar is raised on said standard, a projection on said standard near the top and a spring clip carried by said collar and engaging said projection to support said collar in raised position, said clip being automatically released from engagement by downward pressure imparted to said collar by said handles.

9. In a can closing tool, a base adapted to rest on a can top, a standard supported by said base, a collar reciprocal on said standard, means for reciprocating said collar on said standard, and cooperating means including a pin projecting endwise from said standard and spring clip means on said collar automatically engaging yieldably with said pin to retain the collar at the uppermost point of its upward reciprocation.

10. In a can closing tool, a standard, a collar reciprocal on said standard, means for reciprocating said collar, spring clips on said collar, and engageable means adjacent the top of said standard for engagement by said clips upon movement of said collar adjacent to said engageable means, said spring clips being flexible to yield and release said engageable means when a given positive pressure is exerted on said collar in a direction away from said engageable means.

11. In a can closing tool, a base adapted to rest on a can top, a standard supported by said base, a collar reciprocal on said standard and including connecting means near its upper face, a pair of oppositely disposed handles pivotally connected at their adjacent ends to said standard, and an operating linkage connecting said handles to said collar including a short pendant arm rigidly attached to each handle near said adjacent ends and links pivotally connected to the free end of each of said arms and to said connecting means on said collar, whereby upward or downward movement of said handles will correspondingly move said collar.

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