Nov. 28, 1933. J. M. YOUNG 1,936,611

MANUFACTURE OF CONTAINER OPENING KEYS

Filed April 24, 1931 2 Sheets-Sheet 1

Fig. 1

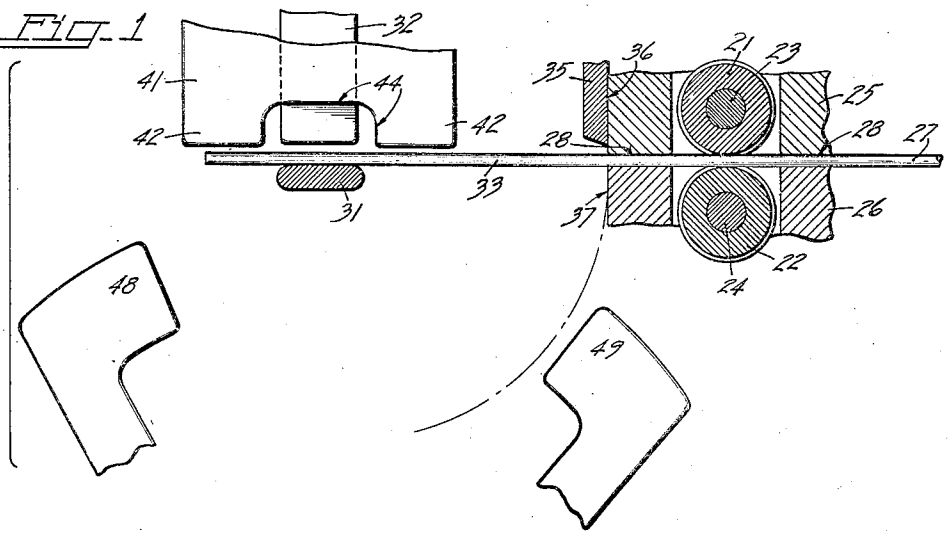


Fig. 2

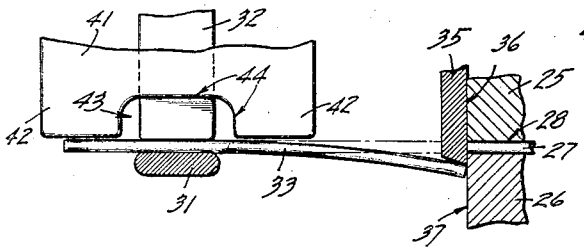


Fig. 4

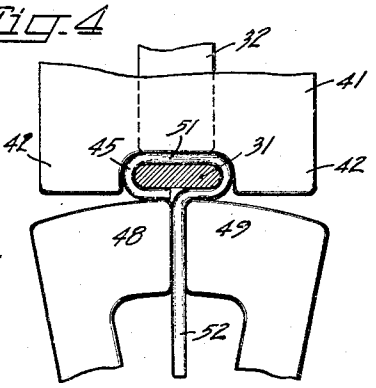


Fig. 3

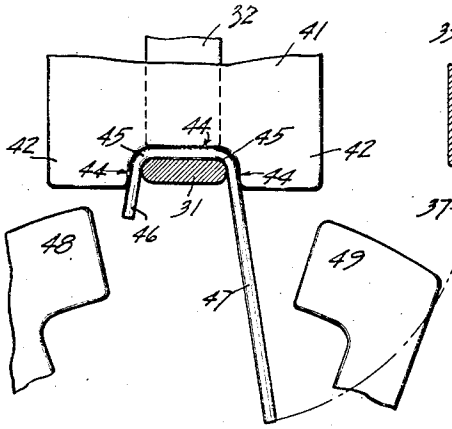
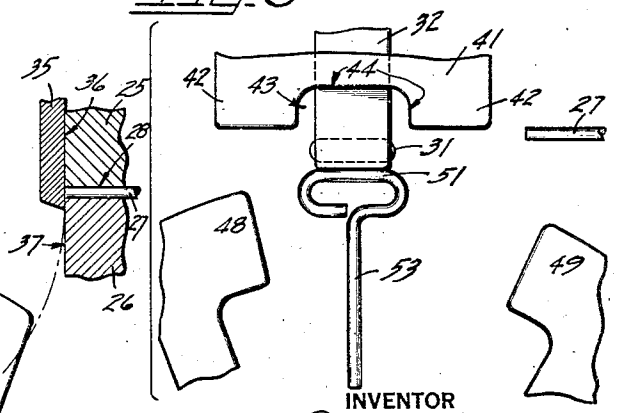


Fig. 5



INVENTOR

BY John M. Young

John C. Carpenter

ATTORNEY

Nov. 28, 1933. J. M. YOUNG 1,936,611

MANUFACTURE OF CONTAINER OPENING KEYS

Filed April 24, 1931 2 Sheets-Sheet 2

Fig. 6

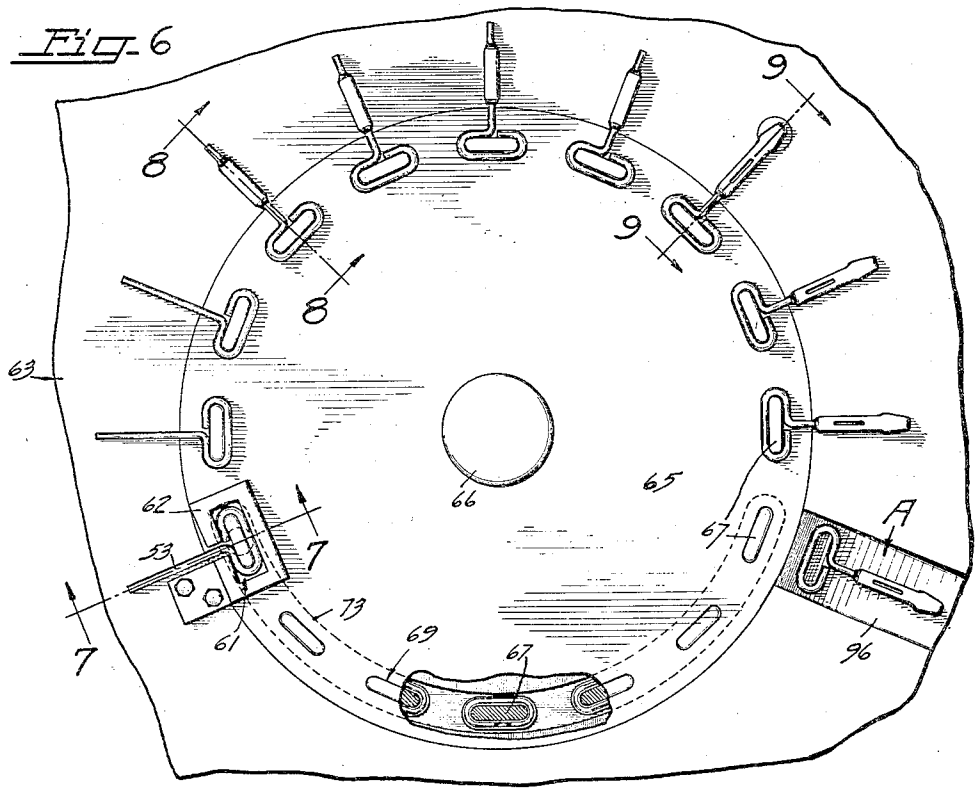


Fig. 7

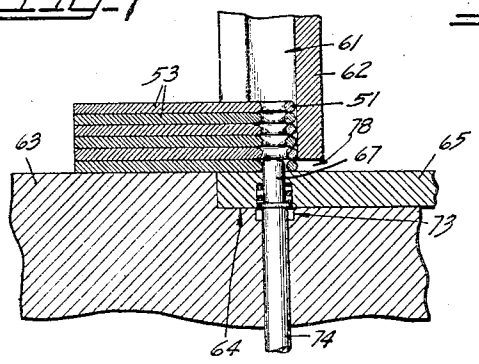


Fig. 9

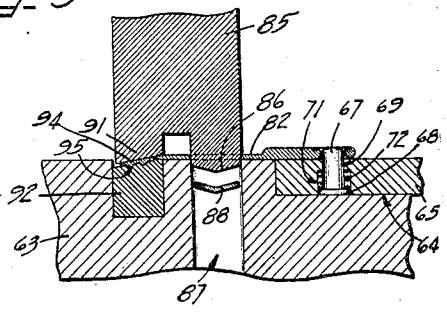


Fig. 8

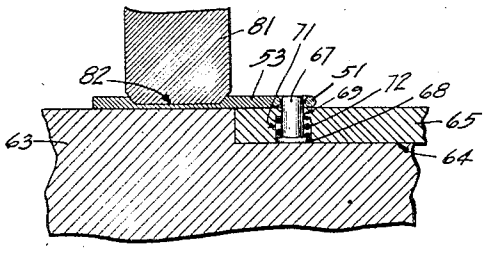
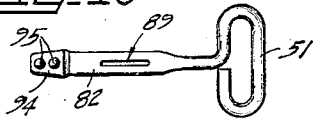


Fig. 10



INVENTOR

BY John M. Young

John C. Carpenter

ATTORNEY

Patented Nov. 28, 1933

1,936,611

UNITED STATES PATENT OFFICE

1,936,611

MANUFACTURE OF CONTAINER OPENING KEYS

John M. Young, Brooklyn, N. Y., assignor to American Can Company, New York, N. Y., a corporation of New Jersey

Application April 24, 1931. Serial No. 532,413

11 Claims. (Cl. 140—1)

The present invention relates to the manufacture of opening keys such as are used with tearing strip containers and has more particular reference to the accurate forming of the key and the prevention of twisting and misalignment of its parts.

Containers of the tearing strip type wherein a tearing strip in the container wall is wound on a key in opening the can, have of recent years become popular. This popularity has made it highly desirable that the key be secured to the container so that each container will have an opening key instantly available. Securing the keys to the containers in either of the most satisfactory ways as by spot welding, or by clinching, provides an ideal article which is commercially adapted to high speed production providing the keys be accurately formed and uniform both in dimension and shape.

The present invention relates to an improved method of key forming in a series of steps so that variations between the keys are largely eliminated. These steps contemplate the accurate forming of a head or handle on the blank key and then gaging or referencing of the key blank by an accurately formed part, as for example its head, and then presenting it while so gaged for the desired subsequent operations. In this way the head of the completed key, will be in the same plane as the flattened end connecting with the container and the twisting and misalignment, so frequently found in keys made according to previous methods, are entirely avoided.

The principal object of the present invention is the provision of a method for accurately forming a key blank so that parts of the same may be used as gage or reference points for subsequent operations, such for example, as the feeding and the attachment of the key to the can part, and the subsequent detachment of the key.

A further important object of the invention is the provision of a method for forming keys in a series of steps so that twisting strains in the wire are removed and each successive operation is carried on with an accuracy which insures uniformity in the keys.

An important object of the invention is the provision of a method for continuously and automatically forming accurately shaped key blanks from continuous wire and subjecting the formed key blanks to subsequent operations of flattening and slotting by maintaining the key head in the same plane as the flattened part of the key.

An important object of the invention is the method of accurately and economically manufacturing a key suitable for attachment to a container, as by welding or clinching, and one having its various elements properly related.

Numerous other objects of the invention will be apparent as it is better understood from the following description, which, taken in connection with the accompanying drawings, discloses a preferred embodiment thereof.

Referring to the drawings:

Figure 1 is a schematic showing of the principal working elements of an apparatus capable of cutting and forming an accurately headed key blank, the view illustrating the position of parts prior to the first key forming operation;

Figs. 2, 3, 4 and 5, are views similar to Fig. 1, illustrating progressive steps in the formation of blank keys;

Fig. 6 is a schematic fragmentary plan view of an apparatus capable of gaging, holding and presenting blank keys to different key forming steps;

Figs. 7, 8 and 9, are enlarged, fragmentary sectional views of Fig. 6, being taken respectively and substantially along the lines 7—7, 8—8 and 9—9 of that figure; and

Fig. 10 is a plan detail of a finished key suitable for subsequent welding to a container, such a key being made according to the steps exemplified in the drawings.

Prior to the present invention, keys have been made on machines by methods which did not insure accurate and uniform forming of the keys and great variations have accordingly resulted. These variations may not present difficulties in the use of the keys in their opening operations and, therefore, when not secured to the containers, may be twisted or otherwise irregular. The feeding and welding or clinching of keys, however, to containers, requires that accurate dimensions be maintained and particularly that the keys be free from any twist and distortion.

In the commercial production of containers having their keys attached, it is essential that the keys lie flat against the wall of the containers. If this is not done and if a key is twisted, so as to stick out beyond the container wall, it is liable to be broken off in can runways or in shipping boxes or in any number of possible situations which may arise in connection with placing the filled container into the hands of the ultimate consumer.

An apparatus capable of performing the steps of the present invention is illustrated in sufficient detail in the drawings, to point out the essential working elements and to exemplify the various steps in the key forming operations.

Such an apparatus may comprise feeding rollers 21, 22 (Fig. 1) secured to parallel rotating shafts 23, 24 mounted for rotation in frames 25, 26. The rollers 21, 22 cooperate with one another to straighten and feed a wire 27 which may pass through straightened channels 28 formed between the frame parts 25 and 26. These rollers 21, 22 are preferably intermittently rotated and project an end of the wire 27 forward of the frame parts 25, 26 and over an anvil 31 and beneath a vertically movable clamping plate 32.

After a predetermined length of the wire 27 has been advanced beyond the frame parts 25, 26, the clamping bar 32 is lowered to engage the projecting end of the wire (which is designated by the numeral 33) against the anvil 31, as shown in Fig. 2. At the same time a vertical shearing blade 35 descends, cooperating with forward walls 36, 37 of the frame parts 25, 26 and severs the predetermined length of wire 33 from the wire supply, as illustrated in Fig. 2.

A key head forming die member 41 mounted adjacent the clamping block 32 thereupon descends into engagement with the wire piece 33 while it is held clamped against the anvil 31. This member 41 is formed with spaced projections 42 separated by a recess 43, the boundary walls of which are shaped as die forming surfaces 44. These projections 42 press downwardly on the wire at each side of its engaged part, the projections straddling the anvil 31 and bending the wire into the form shown in Fig. 3 wherein circular bends 45 are created in the wire piece 33. The free ends of the wire thereupon project at slight angles in a short leg 46 and a long leg 47.

With the die block 41 in the lowered position just described (Fig. 3) the short and long legs 46, 47 of the key wire are respectively engaged by jaws 48, 49 which move in laterally toward one another and further bend the wire (Fig. 4) to provide an accurately dimensioned head 51 which takes the shape of the anvil 31. This head 51, together with a shank 52, which is the part of the leg 47 not bent in the operation, forms a blank key 53. The jaws 48, 49 then separate and the die member moves upwardly and away from clamped position. The anvil 31 is then slid laterally out of the formed head 51 of the key blank 53 whereupon the latter is free to fall (Fig. 5).

The blank keys 53 may then be placed into another machine for further operations. These keys are preferably arranged in stacked formation within a magazine 61 (Figs. 6 and 7). Such a magazine may embody a slotted passageway formed in a vertically extending magazine frame 62 mounted on a bed 63 of the machine. This bed 63 is depressed at 64 to provide a pocket for a horizontal disc 65 mounted upon and having rotation with a vertically extending shaft 66.

The disc 65 constitutes a key feeding turret which preferably carries a series of spaced posts 67 which may be of a shape and dimension to easily fit within the head 51 of the key blank 53. This provides one way of gaging and holding the key blank in a definite position. Other ways of gaging and holding the key by other parts than the head, as by the shank, are within the scope of the present invention.

Each post 67 is formed with a base or head 68 and is slidably mounted in a vertically extending opening 69 cut in the disc 65, the head of the post being located within an adjoining opening 71 of larger diameter cut in the disc. A spring 72 surrounds each post 67 and is located within the recess 71. It engages the post head 68 and tends to hold the post 67 downwardly. Throughout slightly more than half of the movement of the disc 65 the head of each post, as it is carried around in its circular travel, rides upon the horizontal floor of the recess 64 and each post throughout this part of its travel is held in its raised position by such engagement with the aforesaid floor. Throughout the other part of the travel the springs 72 hold their associated posts in lowered position, the floor of the recess 64 being relieved by an elongated arcuate depression 73 (Figs. 6 and 7) formed in the bed 63.

In this depression the post heads freely slide. The upper surface of each post in this lowered position is flush with the upper surface of the disc 65 and allows the disc 65 to move freely beneath the stack of blank keys 53 within the magazine. As a post reaches a position in alignment with the opening in the head 51 of the lowermost key 53, the head 68 of the post comes into alignment with and directly on top of a vertically extending sliding rod 74 located within the bed 64. Suitable mechanism thereupon operates to lift the rod 74 which engages the head 68 of the post 67 and raises it into the position illustrated in Fig. 7 wherein the upper end of the post is within the head of the lowermost key in the magazine.

The lower end of the magazine frame 62 along one side is spaced a slight distance above the upper surface of the disc 65 and provides a clearance slot 78. Continued movement of the disc 65, following the engagement between key head and post, slides the lowermost key laterally through the slot 78 and removes it from the key magazine. The remaining blank keys 53 in the magazine move downwardly by gravity and fill up the space made by the removal of the lowermost key, thus bringing another key into position for subsequent removal.

The shank 52 of the blank key 53 when it is being gaged by its head 51 as herein illustrated, projects beyond the edge of the disc 65 (Fig. 6) as it is being carried in a circular path of travel. The upper surface of the disc 65 is flush with the upper surface of the bed 63 and the shanks merely slide along the bed. With the blank key 53 accurately gaged relative to the disc 65, it may be accurately presented to one or more key forming operations located adjacent the periphery of the disc and held in fixed position relative to the bed 63. The key-blank is held in radial or other position by means of the non-circular shape of the handle or head 51 and of the post 67, so that each key-blank maintains a constant position (illustrated as radial) relative to the center of said circular path.

In the drawings there are illustrated two distinct key forming operating stations to which the key is presented and held during the rest period of the disc 65. The first station, illustrated as a key flattening station, is located in line with the section lines 8—8 as indicated in Fig. 6. The active flattening element operating at this station is indicated in Fig. 8 and comprises a vertically moving flattening die 81 which is brought down on the upper surface of a blank key positioned at that station. This key at such time is supported upon the upper surface of the bed 63 and is flattened (Figs. 8 and 10) intermediate its ends to provide a narrowed or flattened section 82. This section 82 is in the same plane as the head of the key inasmuch as the gaging flush

surfaces of the disc 65 and the bed 63 are in the same plane.

This partially formed key is then carried through a series of idle stations and brought to rest at a second operating station located in the path of travel of the shank of the key as it is being carried around on the disc 65. This operating station is located adjacent the lines 9—9 and elements of its operating parts are indicated in Fig. 9. Such operating elements may comprise a vertically movable punch member 85 provided with a slotting punch 86 which cooperates with a vertical opening or female die 87 formed in the bed 63.

The lower face of the slotting punch 86 may be angular, as illustrated in Fig. 9, to provide a shearing action for removing a thin section 88 from the flattened part of the key and to provide a slot 89 in the key. At the same time the extremity of the key is engaged by a shaping die member 91 carried on the punch member 85 which cooperates with a lower die 92 inserted within the bed 63. The end of the key clamped between the die elements 91, 92 is flattened and shaped as a terminal end 94 which may at the same time be provided with protuberances 95 if desired. Such protuberances adapt the key for subsequent welding to a container. If a clinched key is desired a differently shaped end would be formed by the proper die members 91, 92.

The key still held upon its post 67 is then advanced through idle stations to a discharge station indicated by the letter A in Fig. 6. Adjacent this position the bed 63 is cut away to provide an inclined radially extending discharge chute or groove 96 which inclines downwardly away from the peripheral edge of the disc 65. As the disc comes to rest at the station A the extending shank end of the formed key is sufficiently heavy to tilt the key over the edge of the disc 65, the post 67 at such a time coming over the arcuate depression 73 and under action of its spring 72 moving downwardly out of the key head and flush with the surface of the disc. The key thereupon falls from the disc and slides by gravity down the groove 96 and out of the machine.

It is thought that the invention and many of its attendant advantages will be understood from the foregoing description, and it will be apparent that various changes may be made in the form, construction and arrangement of the parts without departing from the spirit and scope of the invention or sacrificing all of its material advantages, the form hereinbefore described being merely a preferred embodiment thereof.

I claim:

1. The method of making container opening blank keys which comprises, cutting a predetermined length from a wire, and bending a part thereof to provide a loop head, and then holding the rest of the blank and moving it by means of said loop head, and flattening and slotting it while so held.

2. The method of making container opening blank keys which comprises feeding a wire into key forming position, cutting a predetermined length therefrom, and thence bending a part of said severed wire into loop form to provide a head, and then holding the rest of the blank and moving it by means of said loop head, and flattening and slotting it while so held.

3. The method of making container opening keys which comprises, cutting a predetermined length from a wire, bending a part thereof to provide a loop head, and thence holding the key blank by means of said loop head, and then further shaping the rest of the blank key into a completed key while gaging from a formed part thereof.

4. The method of making container opening keys which comprises, cutting a predetermined length from a wire, bending a part thereof to provide a loop head, and thence further shaping the resulting blank key into a completed key while holding the key-blank by its loop and gaging said further shaping from said loop head.

5. The method of making container opening keys which comprises, forming a loop head from a predetermined length of wire, gaging the resulting blank key by engagement with its loop head and holding the rest of the blank in projected position, and presenting it while so gaged to flattening and slotting operations.

6. The method of making container opening keys which comprises, feeding a wire into key forming position, clamping the end of said wire between die elements while cutting a predetermined length therefrom, die-forming a loop head on the said severed wire while still clamped in the said die elements producing blank keys, and holding said blank keys by their loops and moving them, while further shaping them successively to produce finished keys.

7. The method of making container opening keys which comprises, feeding a wire into key forming position, clamping the end of said wire between die elements while cutting a predetermined length therefrom, die forming a loop head on the said severed wire while still clamped in the said die elements and producing blank keys, and holding said blank keys in gaged position while flattening and slotting said key so that the flattened part thereof is in the same plane with said loop head.

8. The method of making container opening keys, which comprises initially forming a piece of wire of predetermined length to provide a handle part and thereafter employing said handle part to accurately position said piece of wire for subsequent key forming operations, and performing said subsequent operations at predetermined distances from said handle part.

9. The method of making container opening keys having a looped head and a slotted end, which comprises first forming an end of a piece of wire to desired condition and thereafter engaging said formed end to hold and move said piece of wire in accurate position, and then performing flattening and slotting operations at the other end of said wire and at predetermined distances.

10. The method of making container-opening keys, which comprises providing a piece of wire of suitable length and forming a non-circular handle loop at one end thereof, holding said loop in a definite plane, and then performing the flattening and slotting of the shank of the key with reference to said plane in which the handle loop is held.

11. The method of making container-keys, which comprises performing an initial handle loop formation upon wire stock, and thereafter holding the partly formed key-blank with its loop in a definite plane and carrying it in a circular path with its shank projecting from the center of said path, and then performing the final key-forming operations on the shank of the key-blank while the loop is so held.

JOHN M. YOUNG.