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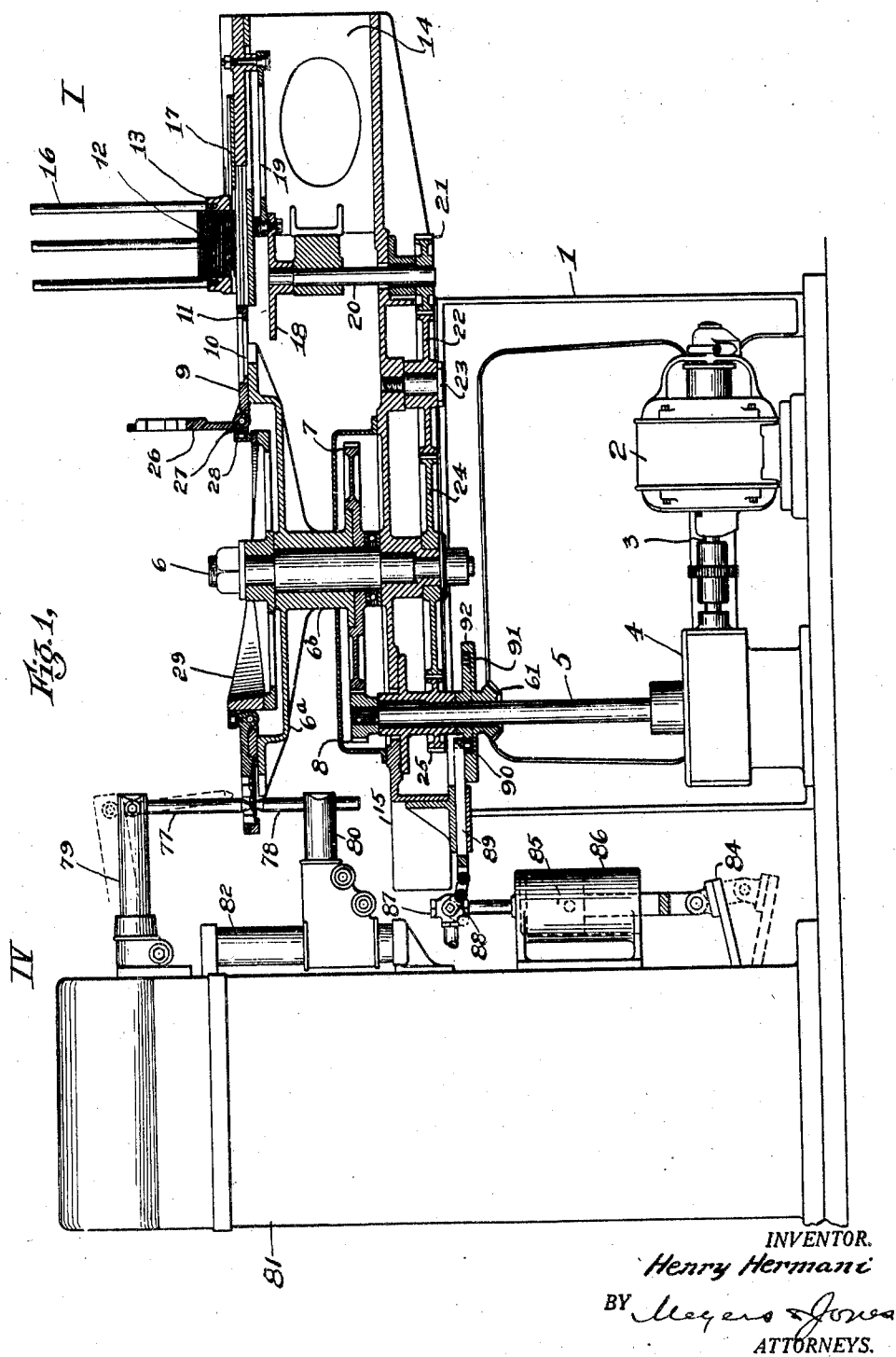
H. HERMANI

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MACHINE FOR ATTACHING KEYS TO CAN TOPS

Filed Aug. 14, 1928

4 Sheets-Sheet 1



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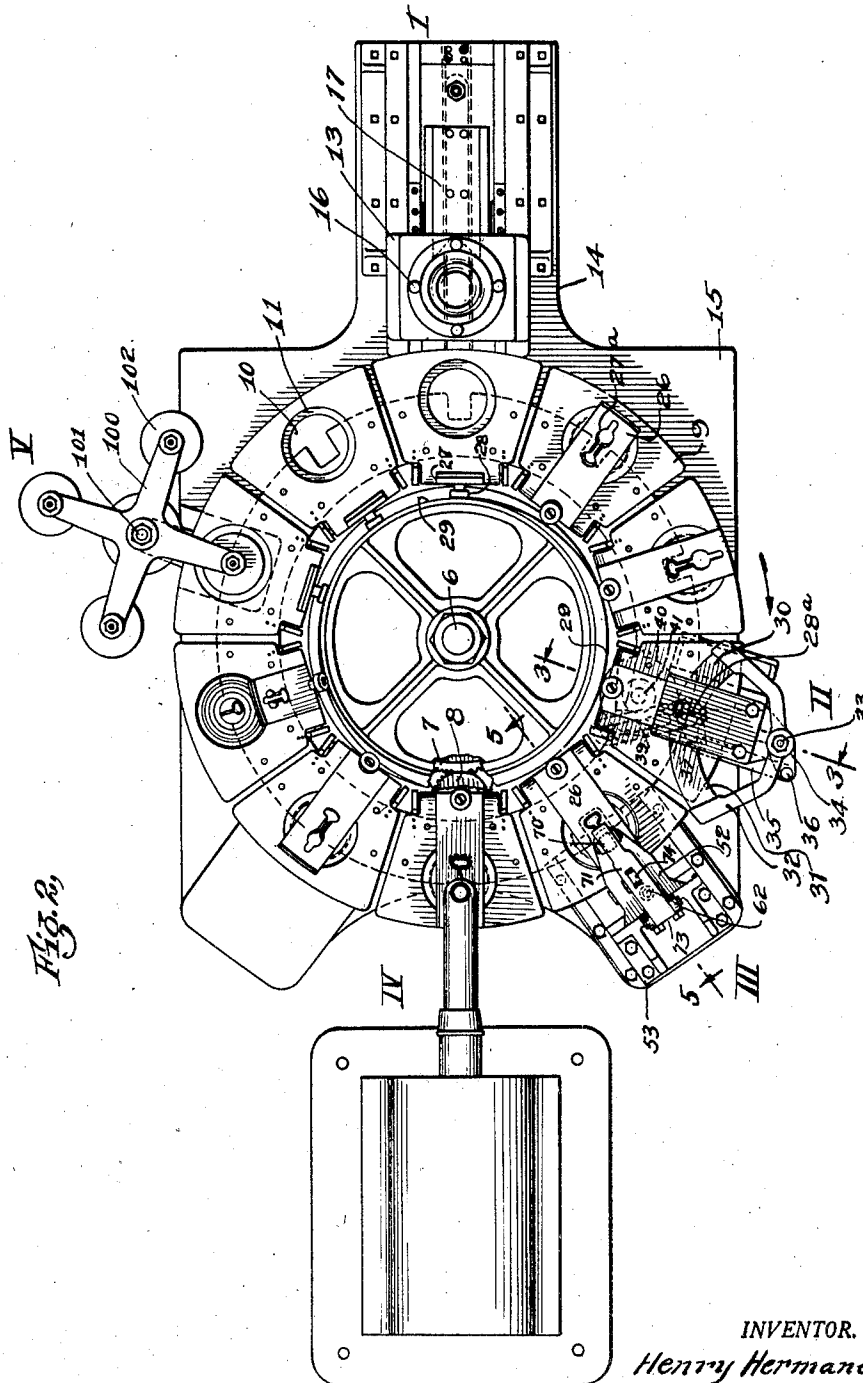
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Filed Aug. 14, 1928

4 Sheets-Sheet 2



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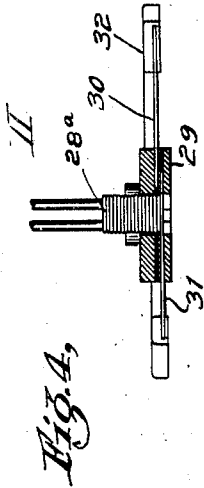
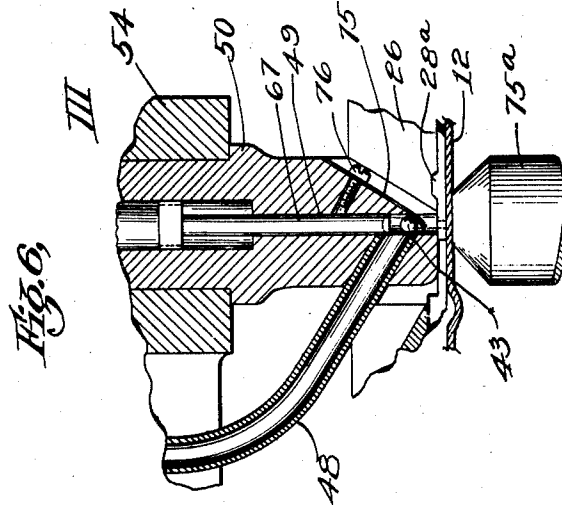
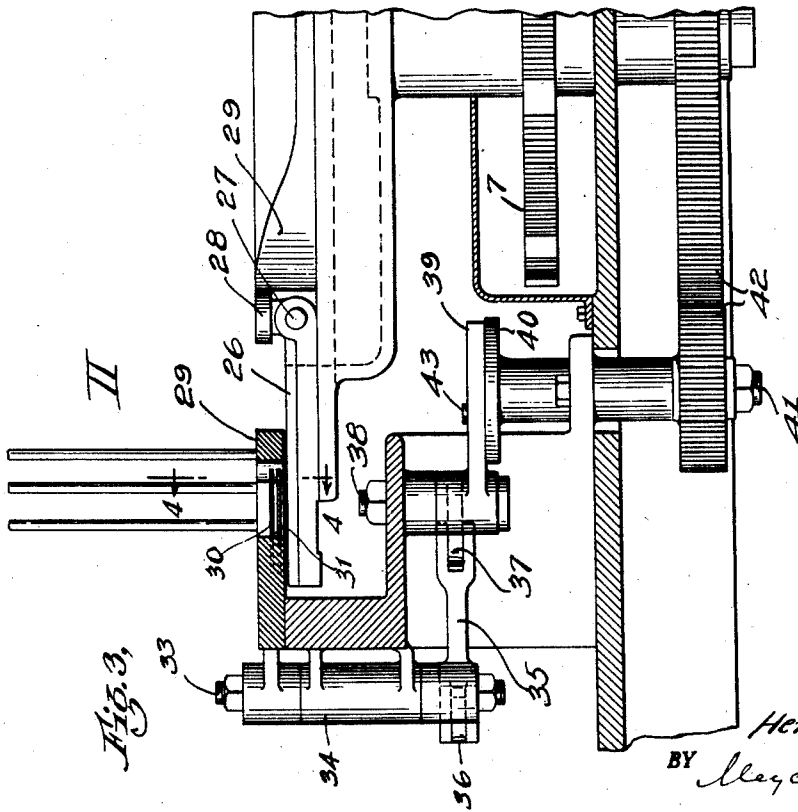
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MACHINE FOR ATTACHING KEYS TO CAN TOPS

Filed Aug. 14, 1928

4 Sheets-Sheet 3



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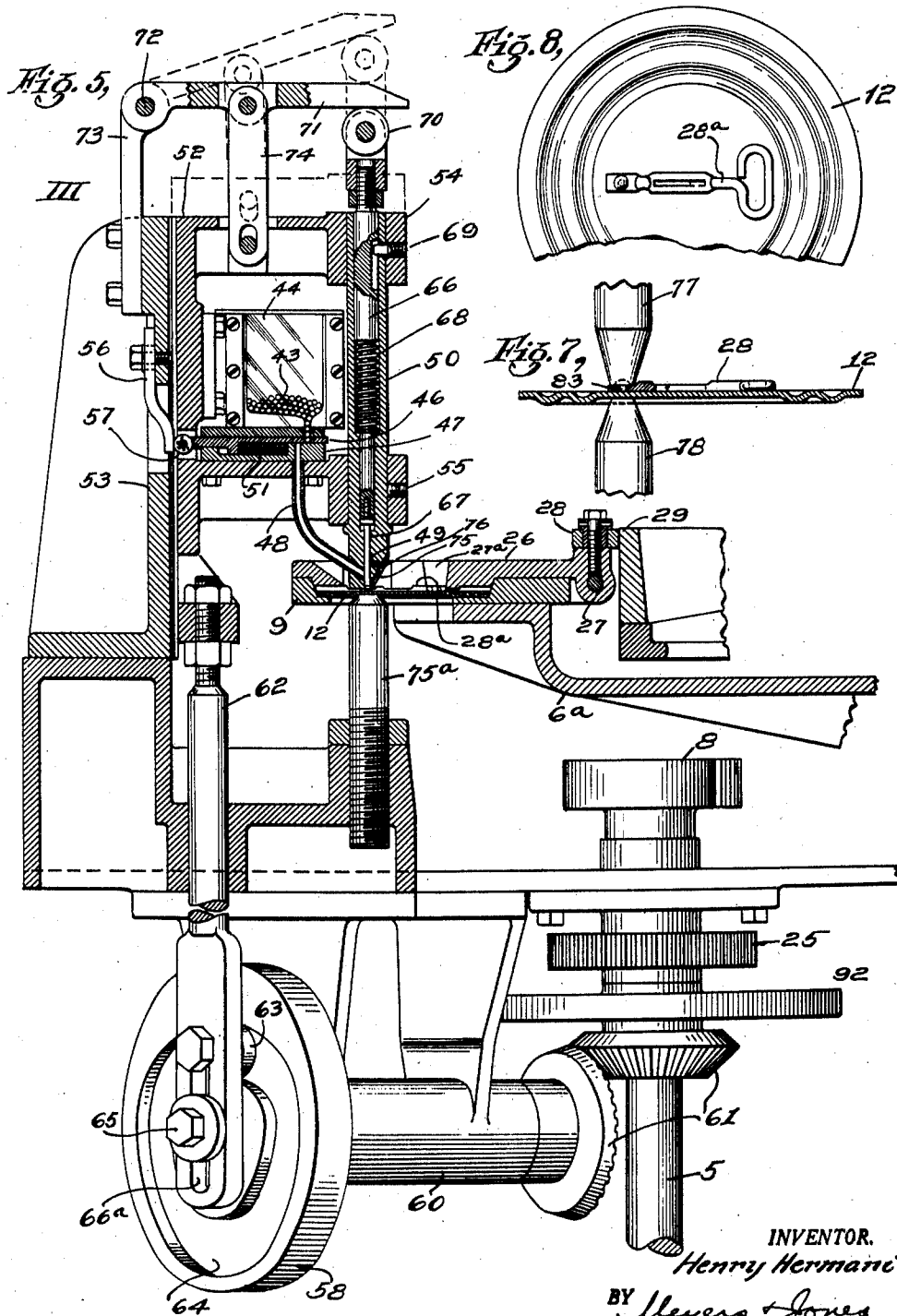
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1,884,683

MACHINE FOR ATTACHING KEYS TO CAN TOPS

Filed Aug. 14, 1928

4 Sheets-Sheet 4



# UNITED STATES PATENT OFFICE

HENRY HERMANI, OF BALTIMORE, MARYLAND, ASSIGNOR, BY MESNE ASSIGNMENTS, TO  
AMERICAN CAN COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW JERSEY

## MACHINE FOR ATTACHING KEYS TO CAN TOPS

Application filed August 14, 1928. Serial No. 299,537.

This invention is an improvement in machines for attaching keys to can tops, and more particularly in a machine for utilizing the method set forth in application Serial No. 285,340, filed on June 14, 1928.

In rip strip or tearing strip cans, it is desirable that a key for removing the rip strip or tearing strip be attached to the can, in such a manner as to be easily detached therefrom when desired for use, but so held that there is little or no liability of accidental displacement. A preferred method of connecting the keys is set forth in the above mentioned application, wherein the key has an auxiliary or rivet receiving opening, and a cold rivet headed above the key is formed in the opening, and afterwards soldered to the can top.

One of the primary objects of the present invention is the provision of a machine for automatically carrying out the process above mentioned, wherein the can tops are fed to an intermittently rotating turret, and are clamped thereto by clamps having openings for receiving the keys and through which the keys may be fed into position on the can top.

Another object is the provision in such mechanism of means for placing balls of cold solder in the auxiliary openings of the keys supported by the clamps, and for simultaneously forming the balls into headed rivets.

Another object is the provision of mechanism automatically operated for soldering the preformed rivet to the can top.

Another object is the provision of a machine of simple construction, wherein all of the several operations proceed in sequence and automatically.

With these and other objects in view the invention consists in the construction and novel combination of parts fully described hereinafter, illustrated in the accompanying drawings, and pointed out in the claims appended hereto, it being understood that various changes in the form, proportion, size and minor details of construction within the scope of the claims, may be resorted to without departing from the spirit of the invention.

In the drawings forming a part hereof:—

Fig. 1 is a longitudinal vertical section of the improved machine.

Fig. 2 is a plan view.

Figs. 3 and 5 are sections on the lines 3—3 and 5—5 of Fig. 2.

Fig. 4 is a section on the line 4—4 of Fig. 3.

Fig. 6 is an enlarged detail sectional view at the delivery end of the ball feeder.

Fig. 7 is a similar detail of the soldering mechanism.

Fig. 8 is a plan view of a part of the completed can top.

In the present embodiment of the invention a suitable frame 1 is provided, in which is mounted a motor 2 for driving the machine, and the motor shaft 3, which is horizontal, is connected by suitable gearing in a casing 4 with a shaft 5 journaled in vertical position in the frame.

A turret shaft 6 is also journaled in the frame in vertical position, and it is connected to the shaft 5 by means of a gear 7 on the shaft 6, and an inter-meshing pinion 8 on the shaft 5. The turret is driven intermittently or step by step, through the gears 7—8. Somewhat more than half of the periphery of the gear 8 is plain or untoothed, and the gear 7 has plain peripheral portions for engagement by the plain portion of the gear 8, so that when said plain portions of the two gears are in engagement there will be no motion of the turret. When the toothed portion of the gear 8 meshes with a toothed portion of the gear 7 the turret will be moved one step. This is the equivalent of the well known Geneva stop motion. It will be noticed referring to Fig. 1 that the turret 6a has a hub 6b which is journaled on the shaft 6, the said shaft being fixed.

The turret 6a carries a number of forms 9, each of which is substantially trapezoidal in shape, and each of these forms has an opening 10, and an annular marginal shoulder 11 encircles each opening, the shoulder being depressed below the top of the form as shown. That is, the upper end of each opening is reamed, and the openings are circular and shaped to receive a can top.

The turret preferably has a can-end feeding station I, a key-feeding station II, a

solder-feeding station III, a welding station IV, and a can-end discharge station V (Fig. 2).

The can tops indicated at 12 in Fig. 8 are arranged in superposed relation in a magazine, the magazine in the present instance consisting of a base 13 which is secured to an extension 14 from a table 15 which partially encircles the turret, and four rods 16 extending upwardly from the base. The tops are arranged in the magazine in superposed relation, and the bottom one is fed from the magazine at suitable periods by means of a pusher 17 operated from the shaft 5.

The pusher is connected to a disk 18 by means of a link 19, and disk 18 is arranged at the top of a counter shaft 20 journaled in the table, and connected by means of a gear 21, with another gear 22 on a stub shaft 23 journaled in the frame. The gear 22 meshes with a gear 24 journaled loosely on the shaft 6, and meshing with a gear 25 on the shaft 5. Thus the disk is rotated continuously and once during each complete rotation the pusher 17 is moved toward the turret and pushes out the lowermost can top into the adjacent form or turret holder or pocket 9, coming to rest on the shoulder 11.

The tops are held in the forms by means of hinged leaves 26, one of which is provided for each form. The leaves are hinged to the inner edges of the forms as indicated at 27, and a roller 28 is journaled on each leaf, the axis of the roller being vertical when the leaf is in holding position, and horizontal when the leaf is in open or inoperative position, as shown in Fig. 1. All of the rollers run on an annular cam 29, which is supported by the shaft 6 before mentioned, and it will be noticed referring to Figs. 1 and 2 that the rollers run partly upon the upper face of the cam and partly on the peripheral surface thereof. As the holders move away from the station I, at which station they receive the can tops, the rollers 28 move from the upper surface of the cam to the peripheral edge thereof, as clearly shown in Fig. 2, and the hinge leaf is thrown down upon the can top in the holder. This occurs immediately after the holder leaves station I. Eventually through the step by step motion the holders reach station II, at which point the keys are placed on the can tops.

Referring to Fig. 2, it will be seen that each of the leaves 26 has an opening 27a, of the shape of the key 28a which is to be applied to the can top, the opening being of a shape such that when the key is placed in the opening it will be held in a definite position with respect to the can top. The key placing mechanism is shown more particularly in Fig. 3, and it will be seen referring to this figure, that the keys 28a are arranged in a magazine 29, similar to the magazine 13-16 for the can tops, the keys being arranged in

superposed position. When a holder comes to a stop at station II, the opening 27a in the hinge leaf is in register with the opening of the magazine 29, which opening is shaped to correspond with the shape of the key, Figs. 3 and 4.

The keys are supported in the magazine and the lowermost is separated from the superincumbent keys by a pair of connected blades 30 and 31, arranged to move transversely of the lower end of the magazine. The blade 31 normally supports the pile of keys, as shown in Fig. 4. When a holder with a leaf 26 is in register with the magazine at station II, the blades are shifted from the position of Fig. 4, both blades moving to the left of this figure.

The adjacent ends of the blades overlap, so that before blade 31 is disengaged from the keys, blade 30 will be engaged therewith. As the blades move to the left of Fig. 4, the blade 30 is inserted between the lowermost key and those above, while at the same time the blade 31 is withdrawn from beneath the lowermost key. Thus the lowermost key is permitted to fall into the opening 27a of the adjacent leaf 26.

The blades are connected to the ends of a rocker 32 which is secured intermediate its ends on a rock shaft 33, journaled in a bearing sleeve 34 supported by the table 15. A link 35 connects a radial arm 36 on the lower end of the shaft 33 with a similar arm 37 on the lower end of a stub shaft 38 also journaled in the frame. The stub shaft has a fork 39, which extends above a disk 40 on a vertical shaft 41 journaled in the frame, and connected by a gearing 42 with the shaft 5. A roller 43 eccentrically placed on the upper face of the disk 40 engages between the arms of the fork, and rocks the stub shaft, and the rock shaft once during each rotation of the shaft 41. Thus the blades 30 and 31 are swung from the right of Fig. 4 to the left and reversely for each rotation of the shaft 41, to release a key as each holder comes into position at station II.

At station III, a ball of cold solder is fed into an auxiliary or rivet receiving opening in the key 28a. The mechanism for feeding the ball is shown in Figs. 5 and 6. The balls indicated at 43 are arranged in a magazine 44 having a bottom outlet 45, toward which the bottom of the magazine inclines in all directions. A feed plate 46 is arranged to move between the bottom of the magazine and a plate 47 which has an opening, registering with the upper end of a chute 48 delivering into the reduced outlet 49 of a sleeve 50 supported at the inner side of the magazine. The slide 46 has an opening for receiving a single ball, and this opening is adapted to register with the outlet 45 of the magazine and with the opening through the plate 47 in alternation. It is normally

pressed into position to register with the chute 48 by means of a coil spring 51, arranged between the plate 47 and the slide, and acting normally to move the slide away from the turret.

The magazine, the slide 46, and the fixed plate 47 are mounted in a support 52, which is vertically reciprocable in a superstructure 53 on the frame, and the sleeve 50 before mentioned is also supported by the frame 52, being held in bearing sleeves 54 thereon by means of a set screw 55. The superstructure has a slot in its outer wall, and a cam bar 56 is secured to the superstructure, the lower end of the cam bar extending through the slot as shown in Fig. 5, and in position to be engaged by a roller 57 on the outer end of the slide 46. The lower end of the cam bar 56 is offset inwardly so that it extends through the slot, and as the frame 52 moves upward, the roller moving on the inner face of the cam bar enables the slide to be moved outward by the spring 51, until the opening of the slide registers with the top of the chute 48, thus feeding a ball of solder through the chute. When the frame 52 moves downward, the slide is moved inwardly to bring the feed opening thereof into register with the discharge 45 of the magazine.

The frame 52 is operated by means of a cam 58 on a shaft 59 journaled in a bearing 60 on the frame, and having a miter gear connection 61 with the shaft 5. A follower 62 is connected with the frame 52, and the follower has a roller 63 journaled thereon, which runs in a face groove 64 in the cam 58. The follower is guided by a screw 65 passing through a slot 66a in the lower end of the follower, and engaging the end of the shaft.

The sleeve 50 moves with the frame 52, as does also the chute 48 and associated parts. A plunger 66 is arranged in the sleeve 50, and at its lower end the plunger carries a rivet forming punch 67, fitting the reduced lower end of the bore of the sleeve, into which the chute 48 opens. The punch 67, which has a threaded connection with the plunger, is normally in a position to close the lower end of the chute 48. It is normally biased away from this position by a spring 68 arranged in the bore of the sleeve between the sleeve and the plunger. The movement of the plunger under the influence of the spring is limited by a set screw 69 threaded through the upper bearing 54, the inner plain end thereof moving in a vertical slot in the plunger. The upper end of the plunger is provided with a roller 70, against which bears the free end of an arm 71, pivoted at 72 to a bracket 73 on the superstructure 53. Intermediate its ends the arm 71 is connected by a link 74 with the frame 52, the connection being a lost motion or pin and slot connection

as shown in Fig. 5. The arm normally holds the plunger in the position of Fig. 5. When the frame 52 is moved upward, an amplified movement is imparted to the free end of the arm 71, which enables the roller 70 and the plunger to move upward under the influence of the spring 68, and the punch 49 is moved from in front of the opening of the chute 48 enabling a ball to drop down upon a leaf spring 75 secured to the lower end of the sleeve by a screw 76, the free end of the spring extending into the bore of the sleeve in position to intercept and support the ball 43 which has dropped from the chute 48.

When the frame 52 again moves downward, the ball is forced past the spring by the punch 49, and forced into the auxiliary opening of the key. The lower end of the punch is concave to form a head on the rivet. Counter pressure on the underside of the can top is provided for by an anvil 75a, which has threaded engagement with the frame as shown. The engaging tip of the anvil is of considerably greater diameter than the lower end of the punch and provides efficient counter pressure during the formation of the rivet. The ball of solder is of a size such that the auxiliary opening 83 of the key is completely filled, and a suitable head is formed above the key.

The holder now moves to station IV, where the formed rivet is connected to the can top. The welding machine 81, shown in Figs. 1 and 2, is of known construction, including an upper electrode 77, and a lower electrode 78. These electrodes are supported by arms 79 and 80 respectively, which are connected with the machine 81. The arm 79 is swingably mounted as shown, and the arm 80 is adjusted with respect to the arm 79, on a supporting rod 82. The arm 79 is raised and lowered by suitable mechanism, forming no part of the present invention, and hence not more fully described, so that the upper electrode 77 is moved into and out of contact with the can top in the respective holders, as they come into position at station IV. The lower end of the electrode 77 is shaped to fit the rivet head. The lower end of the rivet is in contact with the can top 12, so that the heated electrodes will cause the rivet to be connected to the can top.

The riveting and welding mechanism is operated by a lever 84, usually a treadle, but in the present instance operated by fluid pressure. The lower end of a piston 85 is pivoted to the lever, the piston moving in a cylinder 86 which is supported by the welding machine 81. Fluid under pressure is supplied to the cylinder from a suitable source of supply, and the supply is controlled by a valve 87. An arm 88 is connected with the stem of the valve, and the arm is connected to a slide 89, movable in the frame 1. The inner end of the

slide has a roller 90 which moves in a cam groove 91 in the upper face of the cam 92 secured to the shaft 5. At suitable intervals, the valve is open to admit fluid under pressure to the cylinder, thus depressing the outer end of the lever 84, which controls the automatic action of the welding machine, causing the electrode 77 to engage the riveted key on the can top in the adjacent holder, fuse the rivet, thereby soldering it to the can top.

As each holder moves from station IV, the hinge leaf 26 begins to move to raised position, the roller 28 of the leaf moving from the peripheral surface of the cam 29 onto the upper edge thereof, and at station V, the leaf is fully lifted, (Fig. 2) and remains so until it has passed station I. This lifting of the leaf may be accomplished by cam or spring means (not shown) or in any suitable manner.

The operation of the machine is as follows. With the turret rotating intermittently, as each turret holder or pocket comes into position at station I, the hinge leaf of the holder being elevated as shown, a can top is fed into the holder. During the succeeding movement of the turret the leaf is swung down onto the cam into the holder, and a can top is fed into the succeeding holder. Eventually the holder with the first can top reaches station II, and a key is dropped through the opening of the leaf onto the can top, the key dropping mechanism and the leaf cooperating to position the key with respect to the can top. Another movement of the turret brings the top with the key in place to station III, where a solder shot or other suitable fusible material is fed into the auxiliary opening of the key, and formed cold into a headed rivet. The succeeding movement of the turret brings the top into station IV, where the rivet is spot welded or fused to the can top. Further movement of the turret brings the completed top with the fused connection cooled to station V, where the top is discharged, the discharging mechanism which forms no part of the present invention, including a turret 100, journaled on the shaft 101, and having means indicated at 102 for removing the cans from the holders. The elements 102 are magnets, which remove the tops from the turret.

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.

What is claimed as new is:—

1. In a machine of the class described, a rotating turret having a plurality of holders for holding can tops with both faces exposed, means to insert tops into the holders, means

to deposit a key having an auxiliary opening for a rivet on each top, means to preform a rivet in the opening, means to spot weld the rivet to the top, and a common means to rotate the turret and to operate all of said means in sequence.

2. In a machine of the class described, a rotating turret having a plurality of holders for holding can tops with both faces exposed, means to feed can tops to the holders, means to deposit keys thereon in a predetermined position with respect to the tops, means to deposit a solder shot on each key and to form it into a rivet, means to spot weld the rivet to the top, and a common means to rotate the turret and to operate all of said means in sequence.

3. In a machine of the class described, a rotating turret having a plurality of holders for holding can tops with both faces exposed, means to feed can tops to the holders, means to deposit keys thereon in a predetermined position with respect to the tops, means to deposit a solder shot on each key and to form it into a rivet, means to spot weld the rivet to the top, a common means to rotate the turret and to operate all of said means in sequence, and a connection between said common means and the turret to impart to the turret a step by step movement.

4. In a machine of the class described, a rotating turret having a plurality of holders for holding can tops with both faces exposed, means to feed can tops to the holders, means to deposit keys thereon in a predetermined position with respect to the tops, means to deposit a solder shot on each key and to form it into a rivet, means to spot weld the rivet to the top, a common means to rotate the turret and to operate all of said means in sequence, and means operated by the movement of the turret for opening and closing the holding mechanisms.

5. In a machine of the class described, a rotating turret having a plurality of holders for holding can tops with both faces exposed, means to insert tops into the holders, means to deposit a key having an auxiliary opening for a rivet on each top, means to preform a rivet in the opening, means to spot weld the rivet to the top, a common means to rotate the turret and to operate all of said means in sequence, the key depositing means including a magazine having a bottom discharge opening, and means moving transversely of the magazine to separate and drop the lowermost key.

6. In a machine of the class described, a rotating turret having a plurality of holders for holding can tops with both faces exposed, means to insert tops into the holders, means to deposit a key having an auxiliary opening for a rivet on each top, means to preform a rivet in the opening, means to spot weld the rivet to the top, a common means to rotate the

turret and to operate all of said means in sequence, the rivet preforming means including a magazine having an outlet chute, a forming punch movable past the opening into engagement with a key in a holder, and a counter pressure anvil below the holder for supporting the top.

7. In a machine of the class described, a rotating turret having a plurality of holders for holding can tops with both faces exposed, means to insert tops into the holders, means to deposit a key having an auxiliary opening for a rivet on each top, means to preform a rivet in the auxiliary opening, a spot welding machine for connecting the rivet to the top, and a common means to rotate the turret with a step by step movement, and to operate the machine and said other means in sequence.

8. In a machine of the class described, a rotating turret having a plurality of holders for holding can tops with both faces exposed, means to insert tops into the holders, means to deposit a key having an auxiliary opening for a rivet on each top, means to preform a rivet in the auxiliary opening, a spot welding machine for connecting the rivet to the top, a lever for operating the spot welding machine, fluid under pressure controlled means to operate the lever, a valve controlling said means, and a common means to rotate the turret, to operate the top inserting means, the key depositing means, the rivet preforming means, and the controlling valve for the spot welding machine in sequence.

9. In a machine of the class described, including a turret and means for moving the turret intermittently with a step by step movement, a plurality of holders for can tops in connection with the turret, each holder having a circular opening for receiving the can top and an inwardly extending ledge on which the top rests, means operated by the moving means for the turret for feeding can tops in succession to the holders, and means moving with the turret for clamping the top in the holder.

10. In a machine of the class described, including a turret and means for moving the turret intermittently with a step by step movement, a plurality of holders for can tops in connection with the turret, each holder having a circular opening for receiving the can top and an inwardly extending ledge on which the top rests, means operated by the moving means for the turret for feeding can tops in succession to the holders, a leaf having an opening corresponding to the shape of a key hinged at each holder, and means operated by the movement of the turret for swinging the leaves down upon the tops in the holders and for moving the leaves to release the tops.

11. In a machine of the class described, mechanism for holding can tops with both faces exposed, including a holder having an

opening to fit the top and an inwardly extending ledge to support the top in the opening, and a leaf hinged to the holder to swing down upon the same to clamp the top in the holder, said leaf having a key shaped opening to receive a key and position it with respect to the top.

12. In a machine of the class described, mechanism for holding can tops with both faces exposed, including a holder having an opening to fit the top and an inwardly extending ledge to support the top in the opening, and a leaf hinged to the holder to swing down upon the same to clamp the top in the holder, said leaf having a key shaped opening to receive a key and position it with respect to the top, transporting means to which the holder is connected, and means operated by the movement of said means to swing the leaf to operative and inoperative position.

13. In a machine of the class described, including a conveyor and means for intermittently moving the same, a plurality of mechanisms in connection with the conveyor for holding a can top and arranged to expose both faces of the top at the center thereof, and means to deposit a key on the top, said means including a magazine above the turret, a pair of blades rigidly connected at their remote ends and lapping at their adjacent free ends one above the other the thickness of a key, and means for moving the blades transversely of the bottom of the magazine to deliver the keys in succession.

14. In a machine of the class described including an intermittently moving conveyor, a plurality of mechanisms in connection with the conveyor for holding can tops, each of said mechanisms including a holder having a circular opening into which the can top fits and provided with a ledge extending into the opening upon which the top rests, and a clamping leaf hinged to each holder to close thereon, each leaf having an opening for receiving a key to position the key on the can top, and means operated by the movement of the turret for moving the leaf into operative and inoperative position.

15. In a machine of the class described including an intermittently moving conveyor, a plurality of mechanisms in connection with the conveyor for holding can tops, each of said mechanisms open to expose both faces of the can top, the upper opening shaped to receive a key and to position it with respect to the top, means for feeding a solder shot onto each key and for forming the said shot into a rivet, and means for spot welding the rivet to the can top.

16. In a machine of the class described, means to deposit a solder shot upon an opening through a key and to simultaneously form the shot into a rivet, said means including a counterpressure anvil, and a punch cooperating with the anvil to force the shot into the

key opening, and means for fusing the end of the rivet which is in the key opening, to attach the same.

17. In a machine of the class described, means for holding can tops, means to deposit  
5 a key having an auxiliary opening on the top, means to supply a definite quantity of cold solder to the key and to form it into a rivet in the auxiliary opening, means to  
10 spot weld the rivet to the top, and means for transporting the holder past the several means with a stop at each means to enable the operation thereof.

18. In a machine of the class described, means for holding can tops, means to deposit  
15 a key having an auxiliary opening on the top, means to supply a definite quantity of cold solder to the key and to form it into a rivet in the auxiliary opening, means to spot  
20 weld the rivet to the top, means for transporting the holder past the several means with a stop at each means to enable the operation thereof, and means in connection with the holding means for positioning the key  
25 with respect to the can top.

19. In a machine of the class described, an intermittently rotating turret having can top  
receiving holders, means for depositing can  
30 tops in said holders, means for feeding a key and accurately positioning the same upon a top, means for depositing a fusible material upon a key so positioned and means for fusing said material to secure said key to said  
top.

20. In a machine of the class described, means for depositing a metal piece in an  
35 opening of a key, and means for forming said piece into a rivet having a part extending inwardly of said key and an enlarged part  
40 extending outwardly of said key and means for fusing the part of the rivet which extends inwardly, to attach the same.

21. In a machine of the class described, a magazine for holding keys in superposed  
45 relation, said magazine having an open bottom, and means to support the keys and to drop single keys in succession through said bottom, and upwardly and downwardly movable leaves arranged to rest near the can top  
50 to receive keys from said magazine, said leaves being movable upwardly away from the key to expose the same.

22. In a machine of the class described, a magazine for holding keys in superposed  
55 relation, said magazine having an open bottom, and means to support the keys and to drop single keys in succession through said bottom, and upwardly and downwardly swingable and hinged leaves arranged to rest near  
60 the can top to receive keys from said magazine, said leaves being movable upwardly away from the key to expose the same.

Signed at Baltimore in the State of Maryland this 6th day of August, A. D., 1928.

HENRY HERMANI.