April 6, 1943. W. D. JORDAN 2,315,526

KEY ASSEMBLING MACHINE

Filed July 12, 1940 7 Sheets-Sheet 1

Fig. 1

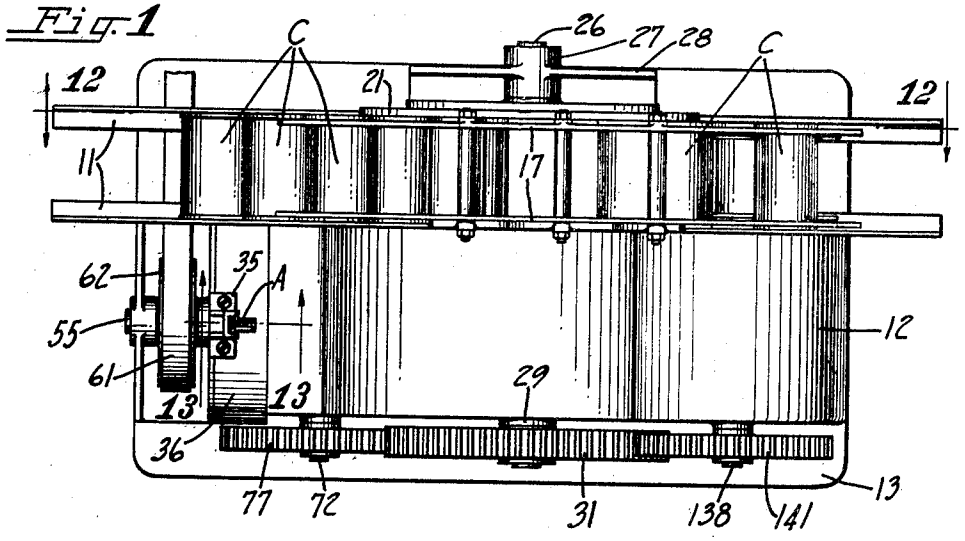
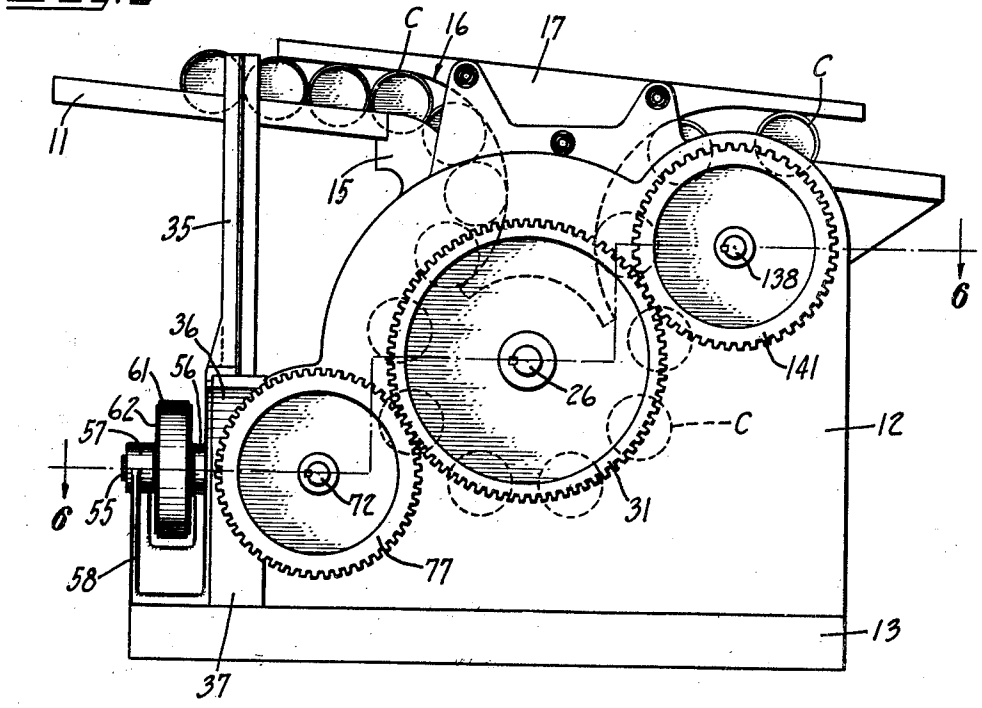



Fig. 2




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KEY ASSEMBLING MACHINE

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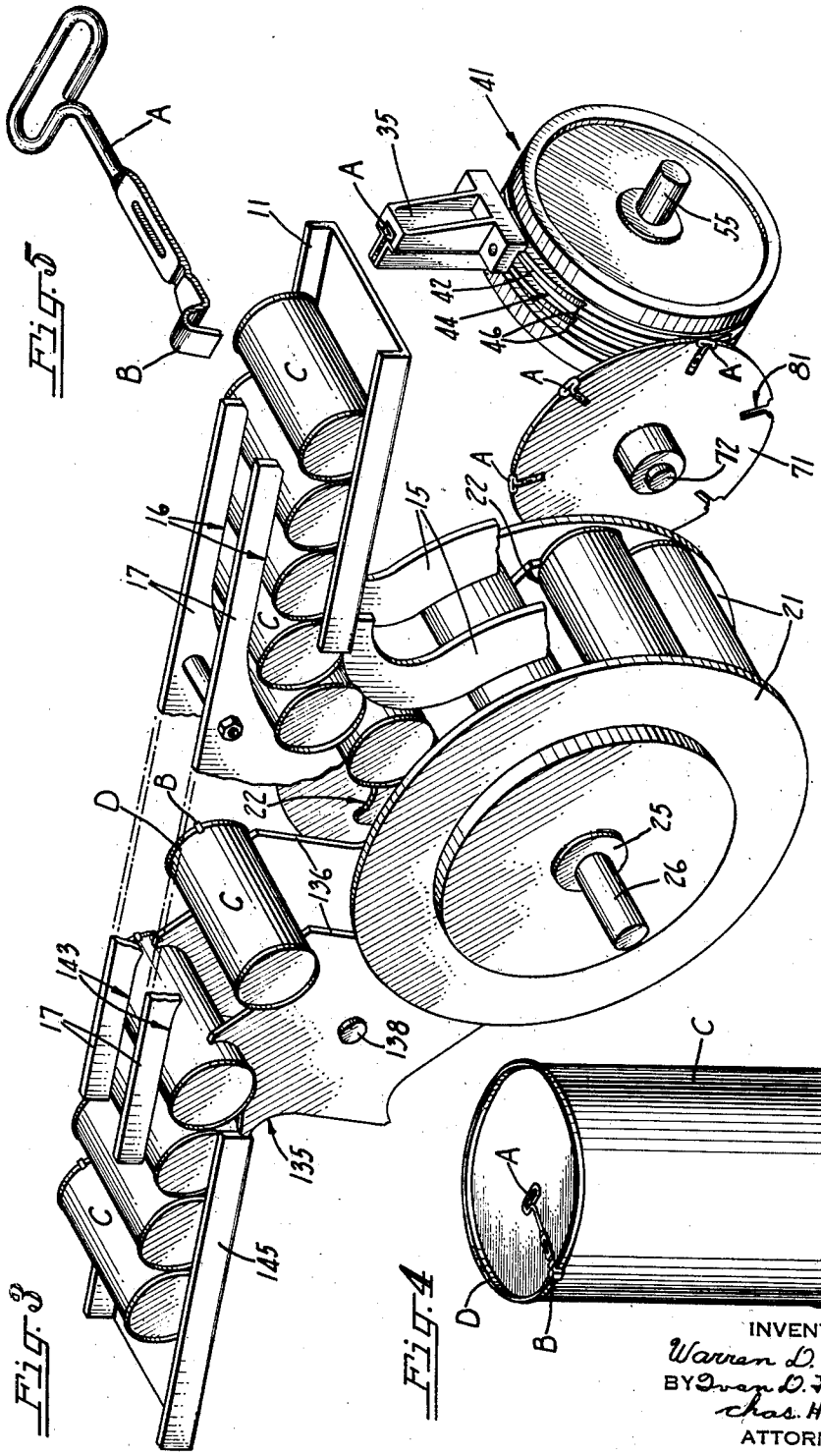



Fig. 3

Fig. 4

Fig. 5

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KEY ASSEMBLING MACHINE

Filed July 12, 1940 7 Sheets-Sheet 3

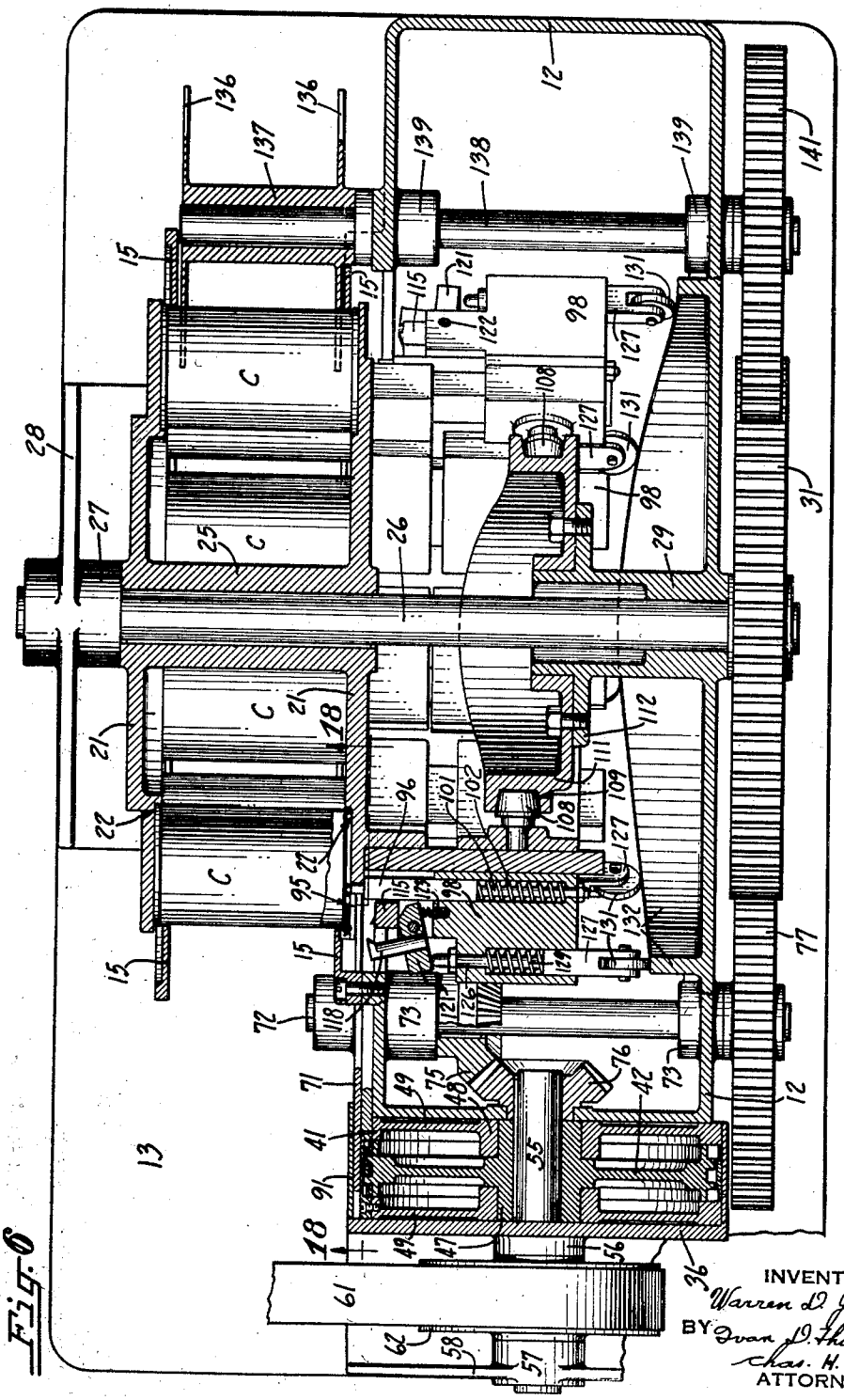


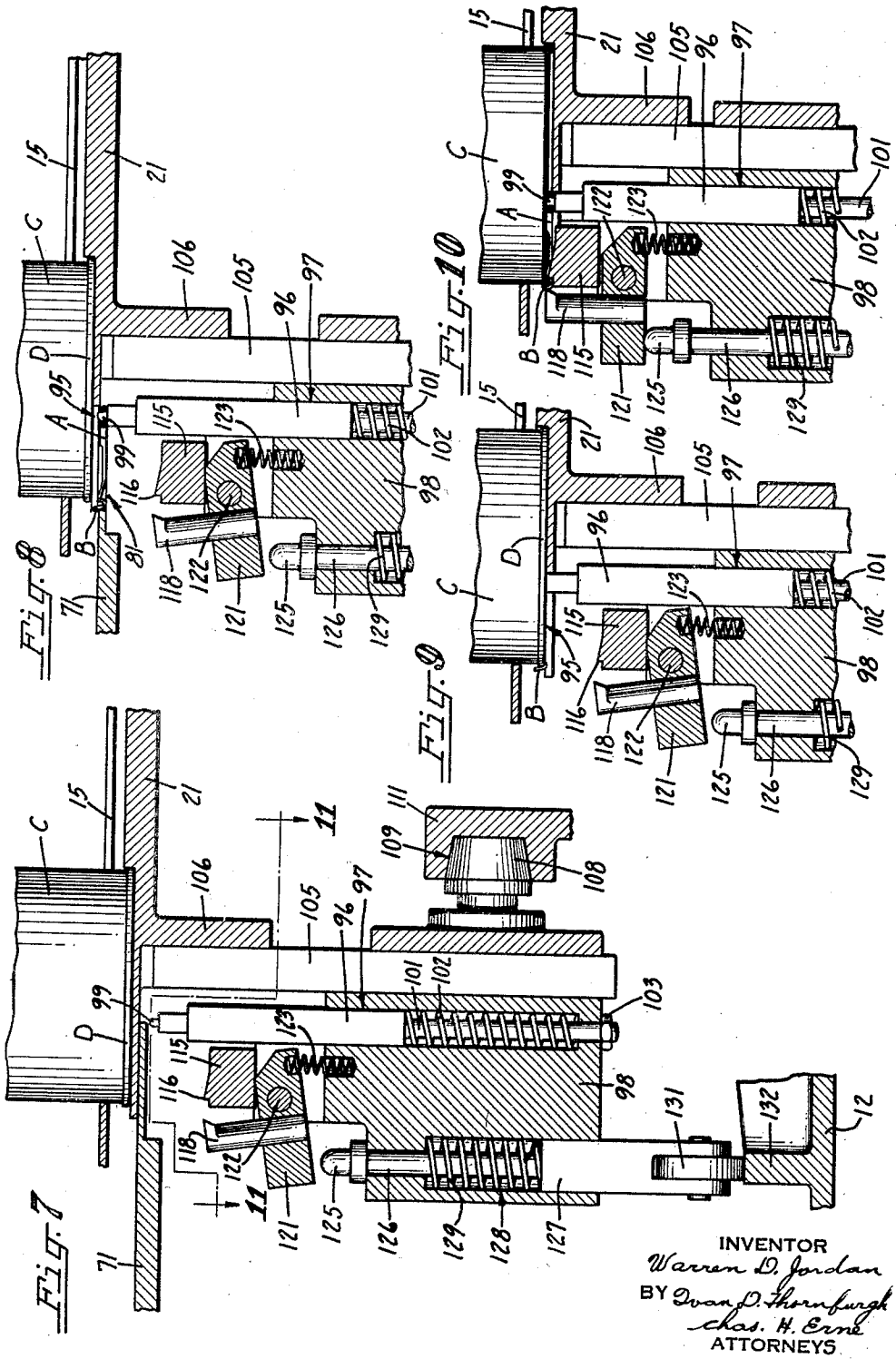
Fig. 6

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KEY ASSEMBLING MACHINE

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KEY ASSEMBLING MACHINE

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Fig. 11

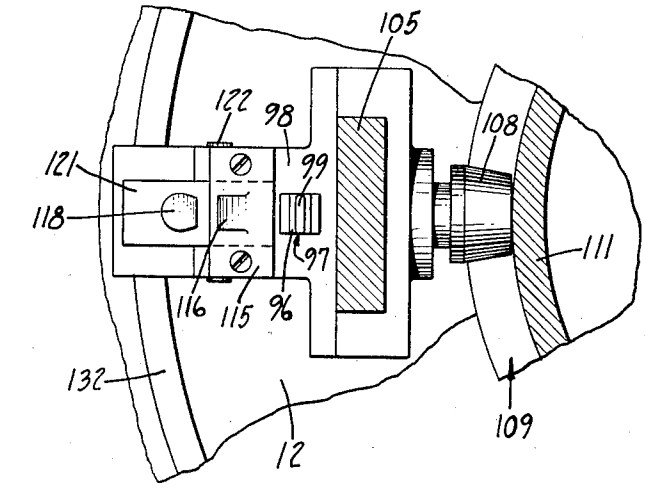
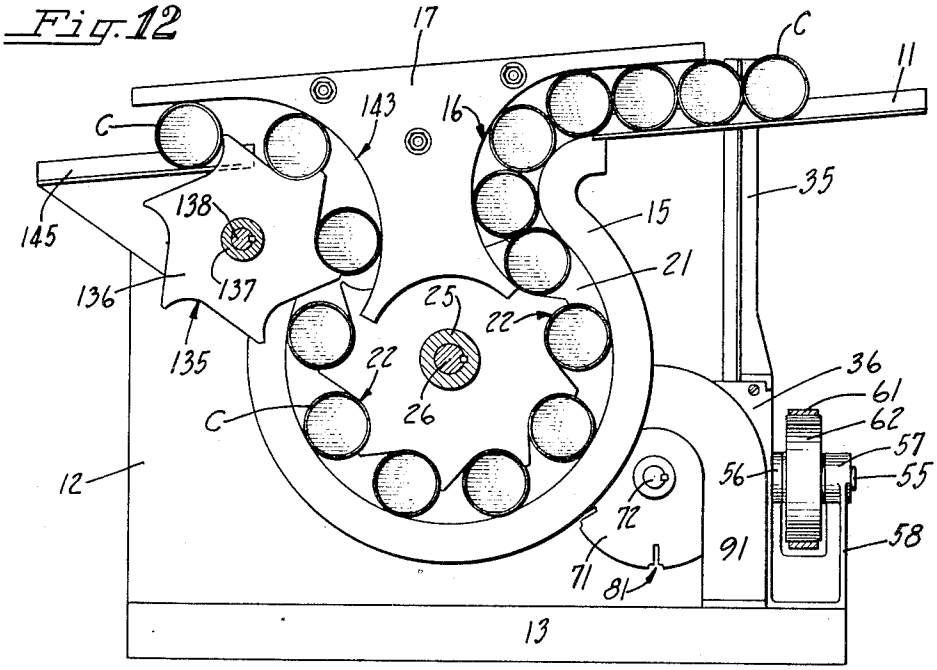



Fig. 12




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KEY ASSEMBLING MACHINE

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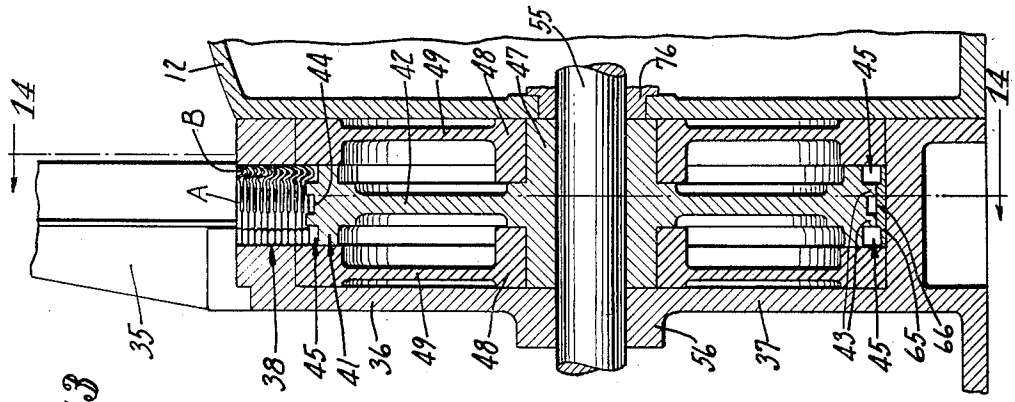



Fig. 13

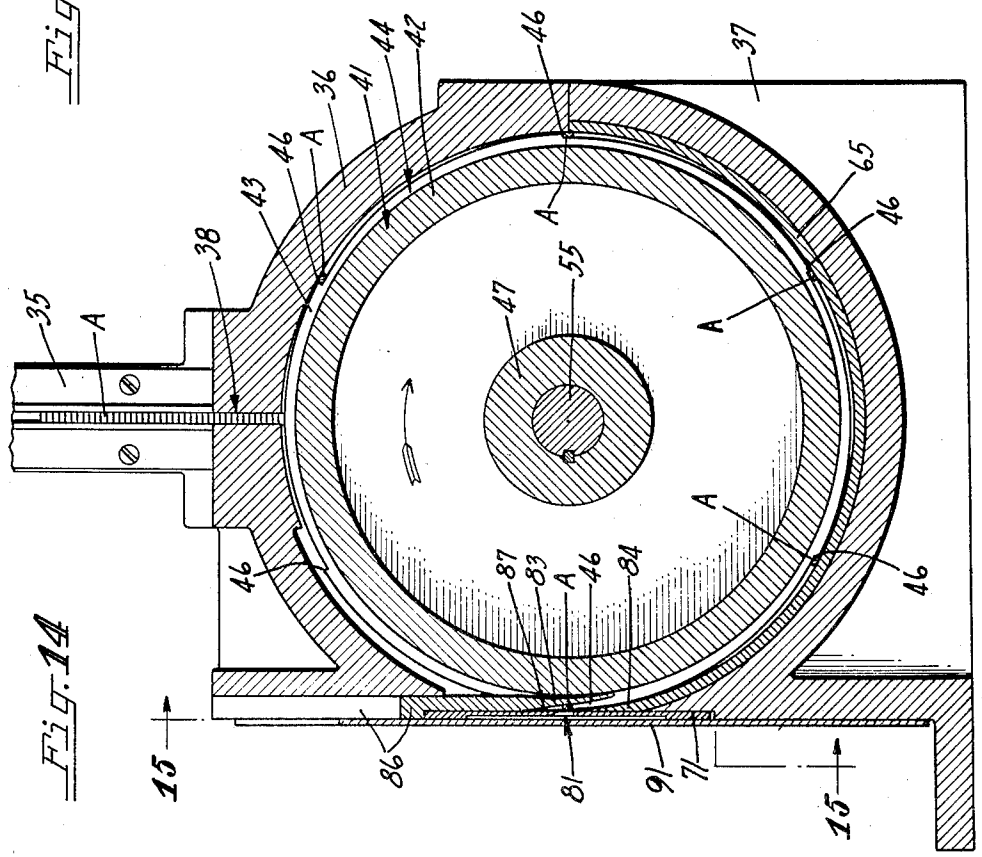



Fig. 14

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KEY ASSEMBLING MACHINE

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Fig. 15

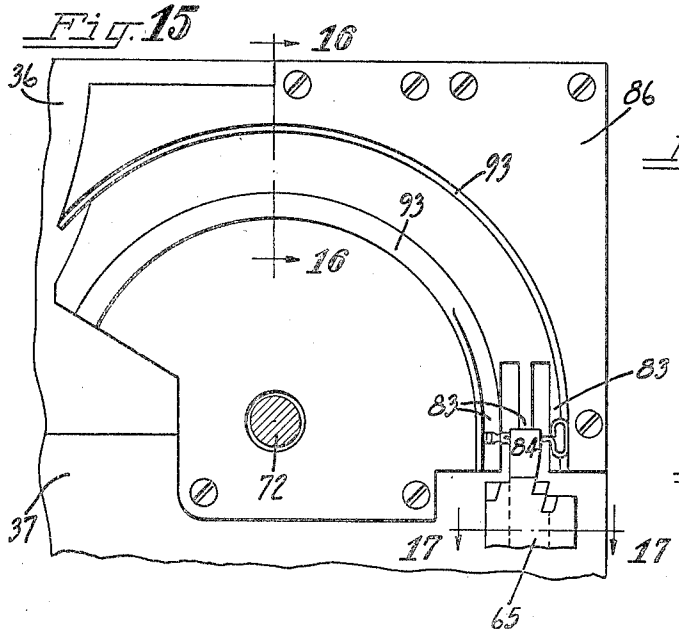



Fig. 16

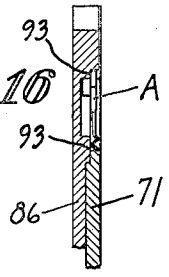



Fig. 17

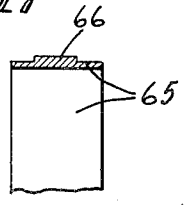
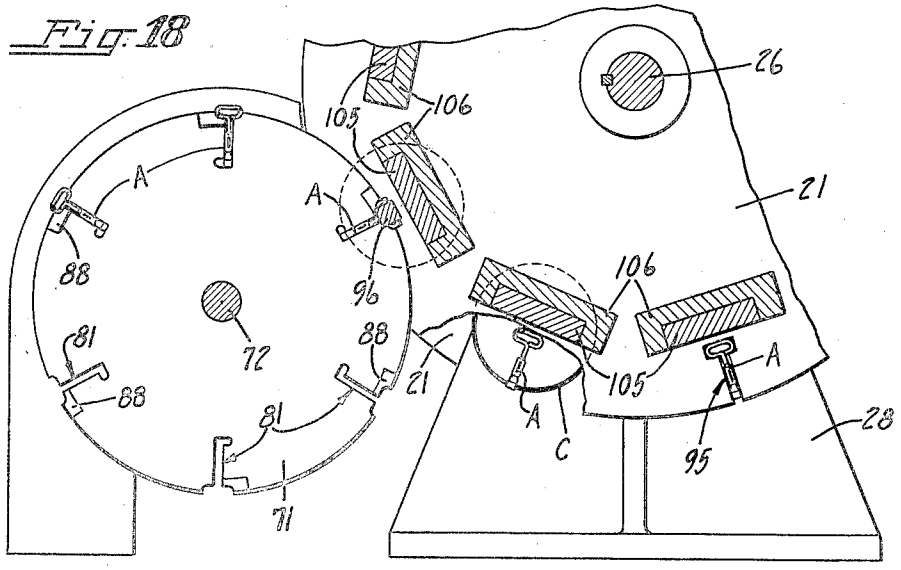



Fig. 18




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2,315,526

# UNITED STATES PATENT OFFICE

2,315,526

## KEY ASSEMBLING MACHINE

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Application July 12, 1940, Serial No. 345,230

7 Claims. (Cl. 113—1)

The present invention relates to a machine for attaching keys to cans and has particular reference to feeding the keys in succession into a predetermined position adjacent to cans which are traveling in a continuous procession through the machine and clinching the keys on a projecting part of the moving cans.

An object of the invention is the provision of an improved key and can assembling machine wherein a key is fed from a stack within a magazine, is positively moved into a predetermined position relative to an end of a can and is secured in place by being clinched over the can end seam while the cand and the key are continuously moving through the machine.

Another object is the provision of such an assembling machine wherein the can and the key to be attached thereto are fed and guided along controlled paths of travel in a uniform easy manner which affords of high speed production with little chance of machine break down or key jamming.

Numerous other objects and advantages 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 top plan view of a machine embodying the instant invention;

Fig. 2 is a side elevation of the machine shown in Fig. 1;

Fig. 3 is an enlarged schematic view in perspective of principal parts of the machine, showing the path of containers passing therethrough;

Fig. 4 is an enlarged perspective view of a container with a key in place;

Fig. 5 is an enlarged perspective view of a key before it is secured to a container;

Fig. 6 is an enlarged horizontal sectional view taken substantially along the broken line 6—6 in Fig. 2, with parts broken away;

Figs. 7, 8, 9 and 10 are enlarged fragmentary sectional detail views of the machine showing the parts in different positions and illustrating a can and a key in place for and during the attaching operation;

Fig. 11 is a sectional detail taken substantially along the broken line 11—11 in Fig. 7, with parts broken away;

Fig. 12 is a vertical sectional view taken substantially along the line 12—12 in Fig. 1;

Fig. 13 is a sectional detail taken substantially along the line 13—13 in Fig. 1, with parts broken away;

Fig. 14 is a vertical section taken substantially along the line 14—14 in Fig. 13;

Fig. 15 is a face view taken substantially along composite vertical planes indicated by the broken line 15—15 in Fig. 14, with parts broken away;

Figs. 16 and 17 are sectional details taken substantially along the respective lines 16—16, 17—17 in Fig. 15; and

Fig. 18 is a vertical sectional view taken substantially along the line 18—18 in Fig. 6.

As a preferred embodiment of the invention the drawings disclose a key assembling machine in which wire keys A (Fig. 5) having end hooks B are fed from a magazine, are conveyed into a predetermined position relative to cans C (Figs. 3 and 4) moving through the machine in a plane at an angle to the plane of movement of the key feeding devices and are clinched fast to can end seams D which unite the can ends to the cans.

The cans C preferably enter the machine by rolling on their sides, i. e., on horizontal axes and along an inclined runway 11 (Figs. 1, 2, 3 and 12) which is secured to the outside of a housing 12 which constitutes the main frame of the machine. The housing is carried on a machine base 13.

Adjacent the inner end of the runway 11 the cans C roll along the inner edges of a pair of spaced and curved guide rails 15 and along curved outer edges 16 of a pair of spaced and parallel guide plates 17. These guide rails and guide plates are bolted in spaced relation to the outside of the frame housing 12.

The guide rails 15 and guide plates 17 direct the rolling cans C into position between a pair of vertically disposed spaced and parallel rotating can turret discs 21 (see also Fig. 6) which constitutes a can conveyor. These discs have turret pockets 22 formed therein adjacent to but spaced inwardly from the outer circumference of the discs.

These discs are located on the outside of the frame housing 12 and are formed on a long hub 25 which is carried on a turret shaft 26. The outer end of the shaft is journaled in a bearing 27 formed in a bracket 28 which extends up from the machine base 13. The other end of the shaft extends into and through the frame housing 12 and is journaled in a bearing 29 formed in the housing. The shaft extends beyond the housing 12 and carries a gear 31 which is rotated in time with the other moving parts of the machine as will be hereinafter described.

Hence as the rotating shaft 26 revolves the turret discs 21, the incoming cans from the runway 11 are picked up by the turret pockets 22 and are

thus advanced through a circular path of travel in spaced and timed order. The cans in their pockets are retained against endwise movement by the discs. The cans are also held in place in their pockets by the guide rails 15 which curve downwardly around one side and the bottom of the turret discs and continue upwardly around the other side of the discs terminating adjacent the discharge end of the machine.

During this travel of a can C with the turret discs 21 a key A is brought into position adjacent the inner end of the can for assembly therewith. The feeding of the key will now be explained.

The keys A are preferably retained in a vertical stack within a magazine 35 (Figs. 1, 2, 3, 12, 13 and 14) which is secured to the top of a casing cover 36 bolted to a casing 37 secured to the machine base 13 adjacent the can entrance end of the frame housing 12. The keys A in the magazine pass down through a slot 38 formed in the casing cover and the lowermost key in the stack rests on the periphery of a key drum 41 which is disposed in the casing at right angles to the plane of movement of the can conveyor.

The key drum 41 includes a rotatable wheel 42 having a pair of spaced and parallel circumferential ribs 43 which set off an intervening or center groove 44 and a pair of outer clearance grooves 45. The ribs are formed with a plurality of key feeding teeth 46 arranged transversely of the ribs and at spaced intervals therearound. This wheel is formed with a hub 47 which rotates in bearings 48 formed in a pair of stationary guide discs 49 which are disposed one on each side of the wheel. These discs are secured in the casing 37 and in the casing cover 36. The inner side walls of the discs 49 adjacent the periphery of the wheel constitute side guides for the keys.

The wheel hub 47 is carried on a short driving shaft 55 which is journaled in a bearing 56 formed in the outer wall of the casing 37 and in a bearing 57 formed in a bracket 58 which is part of the casing. This shaft is preferably the main driving shaft of the machine and may be rotated in any suitable manner, such as for example, by the belt 61 and pulley 62 shown in the drawings.

Hence as the main shaft 55 rotates the wheel 42 in the direction shown by the arrow in Fig. 14, a set of the wheel teeth 46 picks off the lowermost key A from the stack in the magazine 35 and carries it around a circular path of travel inside the casing 37 in a zone of movement which is at right angles to that of the can conveyor. This path of travel extends down along one side of the wheel,, along the bottom of the wheel, and up on the other side.

During this travel of a key A it is guided against endwise shifting by the side walls of the casing 37 and the case cover 36. It is also retained against displacement from its propelling teeth 46 by the inside surface of the casing cover 36 which curves around the upper portion of the wheel and is closely adjacent thereto. In the casing 37 a guide rail 65 (Figs. 13 and 14) having a raised center portion 66 keeps the key in engagement with its propelling teeth. This guide rail curves around the lower portion of the wheel and is secured in the casing. Thus the keys are individually fed from the magazine and are advanced in spaced and timed order.

On the upward travel of the key with the wheel 42 the key is shifted from the wheel to a transfer disc 71 (Figs. 3, 6, 7, 8, 14 and 18) which is disposed at right angles to the key wheel and is tangent thereto. The transfer disc is carried on an outer end of a shaft 72 which is journaled in bearings 73 formed in the housing 12. Inside the housing the shaft carries a bevel gear 75 which meshes with and is driven by a bevel gear 76 carried on the inner end of the driving shaft 55. Thus the transfer disc is rotated in time with the key wheel. The transfer disc shaft 72 also carries a gear 77 which meshes with and drives the turret shaft gear 31 hereinbefore mentioned.

The transfer disc 71 is formed with a plurality of key shaped slots 81 which are arranged in radial fashion at spaced intervals adjacent the outer periphery of the disc. It is these slots that receive the keys from the key wheel 42 as each slot comes adjacent the wheel during the rotation of the transfer disc.

The actual transfer of the keys from the key wheel 42 to the transfer disc 71 is effected by the combined motions of wheel and disc and also by a plurality of guide fingers 83, 84 (Figs. 14, 15 and 16) which are disposed between the wheel and the disc. The finger 84 contsitutes an extension of the key guide rail 65 and tapers upwardly adjacent the point of tangency of the key wheel with the transfer disc and supports the key until actual transfer begins.

There are preferably three guide fingers 83 formed on a key guide plate 86 which is located between the transfer disc 71 and the key wheel 42 and is secured to the casing cover 36. The middle finger 83 extends into the center peripheral groove 44 of the key wheel while the two outer fingers extend into the outer clearance grooves 45. These fingers are formed with tapered outer surfaces 87.

Hence when a key A being propelled by its wheel tooth 46 comes adjacent the transfer disc 71, a slot 81 in the disc is disposed opposite the key. The key at this time engages and rides along the tapered surfaces 87 of the transfer fingers 83 and hence the key is pushed radially away from the key wheel 42 and thus enters the key slot 81 in the transfer disc.

Since during this transfer the key leaves its propelling teeth 46, provision is made for keeping the key in motion until it is fully lodged within its key slot 81 in the transfer disc. For this purpose the transfer disc is formed with key propelling lugs 88 (Fig. 18) which are disposed adjacent the key slots and which come adjacent a tooth 46 of the key wheel during the transfer of the key to form a shelf along which the key moves while shifting from its tooth 46 into its key slot 81.

The transferred key A is maintained in its slot 81 in the transfer disc by a backing plate 91 and by the guide plate 86. The backing plate 91 is located adjacent the outer surface of the transfer disc and is secured to the housing 12. In the guide plate 86 the two outer transfer fingers 83 taper to provide raised curved tracks 93 which engage against the inner surface of the transfer disc 71, along the path of travel of the key, and thus confine the key within its slot 81.

The transfer disc 71 carries the key A forward into position relative to a can C which is being carried in the rotating turrets 21. The outer edge of the transfer disc overlaps the inner turret 21 as shown in Figs. 3 and 18 and since the transfer disc and the turrets are rotated in timed relation, the key A in a slot 81 of the transfer disc comes adjacent the inner end of a can C in a corresponding pocket of the turret. Just as the can and key pass into position along a

straight line drawn between the turret shaft 26 and the disc shaft 72, the hook B of the key comes into a position directly opposite the end seam D of the can.

During this portion of the movement cycle of can and key, the latter is pushed out of its slot 81 in the transfer disc and is forced through a registering clearance slot 95 (Figs. 6, 8 and 18) in the inner turret 21. Thereupon it is clamped against the inner end of the adjacent can C with the hook B of the key superimposed over the can seam D. This shifting of the key is effected by a square plunger 96 (see also Figs. 7, 9 and 10) which is carried in a square recess 97 formed in a clinching head block 98.

On its outer end, the plunger 96 is formed with a shouldered projection 99 which is adapted to engage in the loop of the key and to force the key into place on the can as will be described. The opposite end of the plunger is formed with a stem 101 which is surrounded by a compression spring 102 located in the recess and this construction provides a yieldable backing for the plunger. The stem extends beyond the head block and carries a stop nut 103 which functions to limit the travel of the plunger.

There are a plurality of the head blocks 98, one for each can pocket 22 in the turrets 21 and these blocks are carried on rectangular slide bars 105 (see also Fig. 11) which are secured to channel shaped lugs 106 formed on the inner turret disc 21. Each head block carries a cam roller 108 which operates in a cam groove 109 of a stationary cam 111. This cam is secured to a flange 112 (Fig. 6) formed on the turret shaft bearing 29.

Hence as the turrets 21 revolve and bring a can C into place adjacent the transfer disc 71 to receive a key A, the cam roller 108 on the head block 98 adjacent the can, traverses the transfer part of the stationary cam groove 109 and thus starts the advance movement of the block from the position shown in Fig. 7 toward the corresponding can traveling with the turrets. As the key comes into the desired position relative to the can C, the projection 99 on the moving plunger 96 engages the key and pushes it out of the transfer disc and into the proper position on the can.

The head block 98 continues to move toward and closer to the can C while being carried around in its circular path with the turret and at this time the spring 102, becoming more and more compressed, takes up the stroke being held at one end by the relatively stationary plunger 96. It is this movement that clamps the key in place. This continued movement of the head block toward the can brings a pair of clinching tools into position on the end of the key. This clinches the key fast to the can seam D while key and can thus are moving with the turrets 21 as will be explained.

The clinching tools include a stationary anvil 115 (Figs. 6 to 10, inclusive) having a clinching projection 116 formed thereon. There is one of these anvils secured to each of the bead blocks 98. Adjacent each anvil there is a clinching tool 118 which is secured in a pivot block 121 carried on a pivot pin 122 secured in the respective head block. The inner end of the pivot block 121 is held under pressure of a compression spring 123 which is interposed between the pivot and head blocks. This spring normally keeps the pivot block in a tilted position so that the clinching tool 118 will be spaced from the anvil 115.

The outer end of the pivot block 121 overhangs an actuating nut 125 secured to the inner end of a stem 126 formed on a square plunger 127 carried in a square recess 128 in the head block. A compression spring 129 located in the recess and surrounding the stem 126 forms a yieldable backing for the plunger. The outer end of the plunger carries a cam roller 131 which operates on a stationary edge cam 132 constituting an annular track formed on a side wall of the housing 12. The spring 129 maintains the cam roller in engagement with this track.

Hence as the head block 98 of a clinching unit continues to move toward the can A under the action of the cam 111, its clinching anvil 115 is brought into engagement with the clamped key A with the anvil projection 116 pressed against and backing up that portion of the key hook B which is adjacent the inside surface of the can end seam D. With the anvil in this position, the actuating plunger cam roller 131 rides on a high portion of the stationary cam 132 and this shifts the actuating plunger 127 toward the can C. The nut 125 pressing against the pivot block 121 thus rocks the block on its pivot pin 122.

Rocking of the pivot block brings the clinching tool 118 into engagement with the outer end of the key hook B and thus bends this end of the hook inwardly around and against the outer surface of the can seam D, as shown in Fig. 10. It is this bending or clinching action that secures the key A in place on the can seam, this action taking place as the can is carried around by the turrets 21.

After securing the key to the can seam, the particular clinching tool unit now being considered moves back out of the path of the can and returns to its original position, as shown in Fig. 7. This takes place as the head block 98 draws away from the can, the anvil 115 and the clamping plunger 96 also being withdrawn from the key.

As the can with its key now secured in place approaches the terminal ends of the curved guide rails 15, it is picked up by pockets 135 (Figs. 3, 6 and 12) of a pair of spaced discharge star wheels 136. These star wheels are formed on a long hub 137 carried on a shaft 138 which extends into the housing 12 and is journaled in bearings 139 formed in the housing walls. The shaft extends beyond the housing and carries a gear 141 which meshes with and is driven by the turret driving gear 31. The discharge star wheels are thus rotated in time with the turrets 21.

Rotation of the star wheels 136 carries the can up along curved edges 143 of the guide plates 17. These curved guide edges strip the can out of the pockets 22 of the turret 21 and temporarily retain it in the star wheel pockets. The star wheels deliver the can into an inclined discharge chute 145 which is secured to the housing 12. The can thereupon rolls along on its side to any suitable place of deposit. This completes its cycle through 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. In a machine for attaching keys to cans,

the combination of independent separate means for moving cans and keys into registering key attaching position, and means carried by said can moving means for engaging a said positioned key and securing the same to a said positioned can while the key and can are being moved.

2. In a machine for attaching keys to cans, the combination of independent separate means for moving cans and keys into registering key attaching position, means carried by said can moving means for projecting a positioned key into engagement with a said positioned can, and means carried by said can moving means and movable with said key projecting means for securing the projected key to a said positioned can while the key and can are being moved.

3. In a machine for attaching keys to cans, the combination of independent separate means for moving cans and keys into registering key attaching position, said can moving means comprising a rotary turret having spaced peripheral can receiving pockets, and a clinching head carried by said turret adjacent a said pocket and movable axially and radially relative to the turret for engaging a positioned key for securing the same to a can in said turret pocket while the key and can are being moved by said rotary turret.

4. In a machine for attaching keys to cans, the combination of independent separate means for moving cans and keys into registering key attaching position, said can moving means comprising a rotary turret having peripherally spaced can receiving pockets, a clinching head carried by said turret and including a movable member engageable with a positioned key to project the same into engagement with the end of a can in a said pocket, and a clinching member carried by said clinching head and movable in time with said key projecting member for securing the projected key to the end of said can while the key and can are being moved by said rotary turret.

5. In a machine for attaching keys to cans, the combination of independent separate means for moving cans and keys into registering key attaching position, said can moving means comprising a rotary turret having peripherally spaced can receiving pockets, a clinching head carried by said turret and including a movable member engageable with a positioned key to project the same into engagement with the end of a can in a said pocket, and a clinching member carried by said clinching head and movable in time with said key projecting member for securing the projected key to the end of said can while the key and can are being moved by said rotary turret, means for actuating said can and key moving means from a common power source, and means spaced axially from said turret for actuating said key projecting and securing members in timed relation with the movement of said turret and key into registering attaching position.

6. In a machine for attaching keys to cans, the combination of means for successively separating keys from a stack and for successively moving said keys into predermined position to be attached to a can, a rotary turret having peripherally spaced can receiving pockets therein for successively receiving and moving the cans into spaced registry with successively positioned keys, a plurality of clinching heads carried by and movable relative to said turret and respectively disposed adjacent said turret pockets, a movable member carried by a said clinching head for engaging a positioned key when said key and can are in registry to project said key against the end of said can, a movable member also carried by said clinching head for engaging a projected key on said can for securing the key to the end of said can, and means for moving said clinching head relative to said turrett and for actuating said key projecting and securing members in timed relation while said cans are being moved in a circular path of travel by said rotary turret.

7. In a machine for attaching keys to cans, the combination of means for moving a key into position to be attached to a can, a rotary turret having a can receiving pocket therein for receiving and moving a can into registry with said positioned key, a clinching head carried by said turret adjacent a said turret pocket, a movable member carried by said clinching head for engaging the positioned key when said key and can are in registry to project said key against the end of said can, a second movable member carried by said clinching head for engaging a projected key on said can for securing the key to the end of said can, and means for moving said key projecting and securing members in timed relation relative to said clinching head while said can is being advanced in a circular path of travel by said rotary turret.

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