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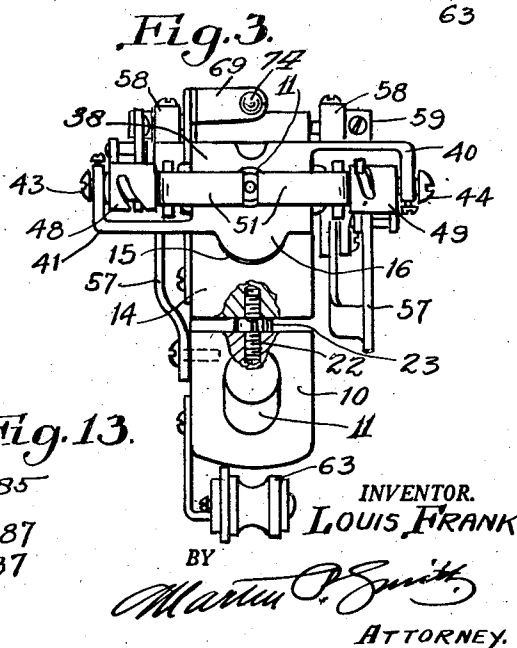
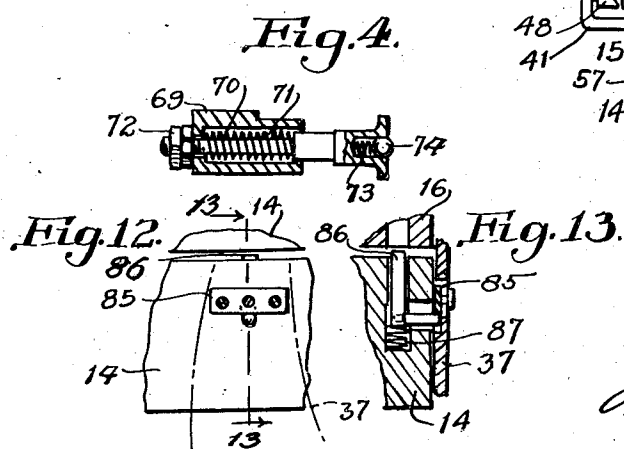
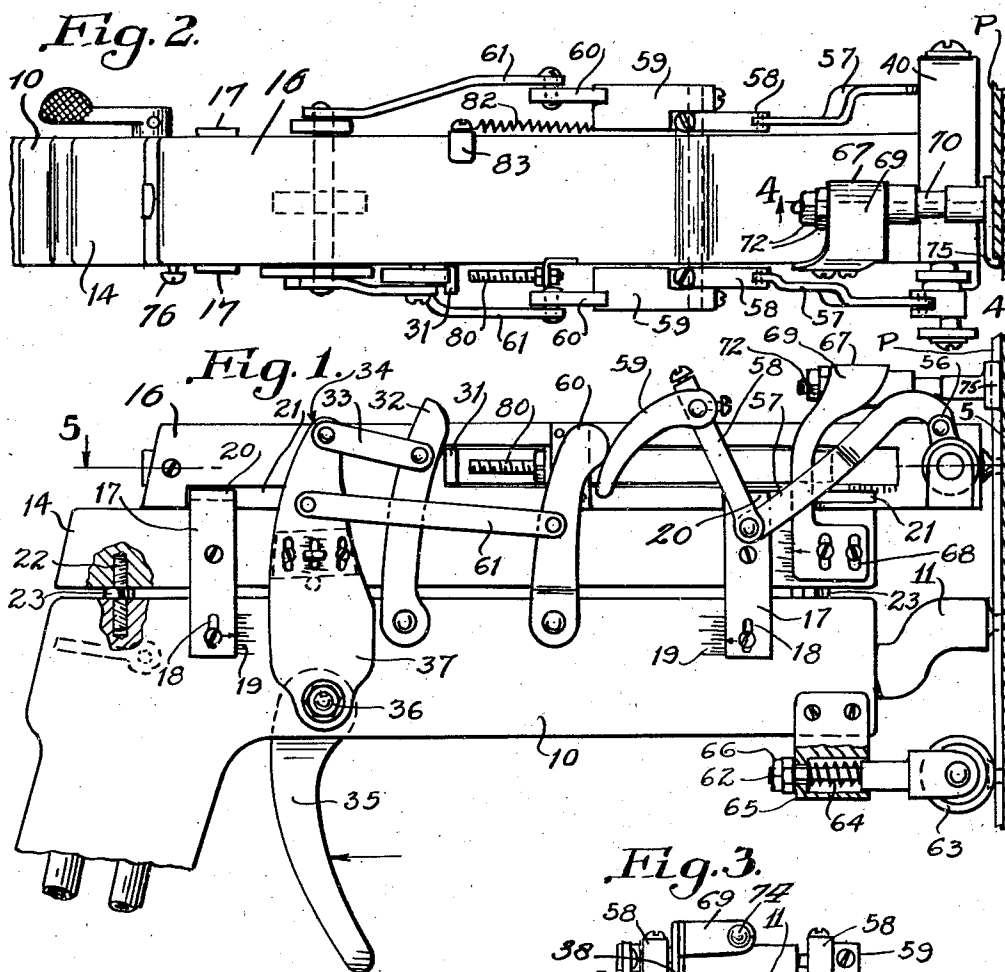
L. FRANK

2,416,474

RIVET EJECTOR AND GUN

Filed Sept. 13, 1943

2 Sheets-Sheet 1



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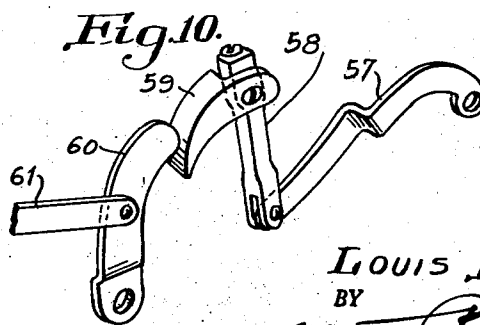
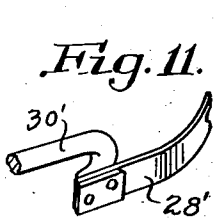
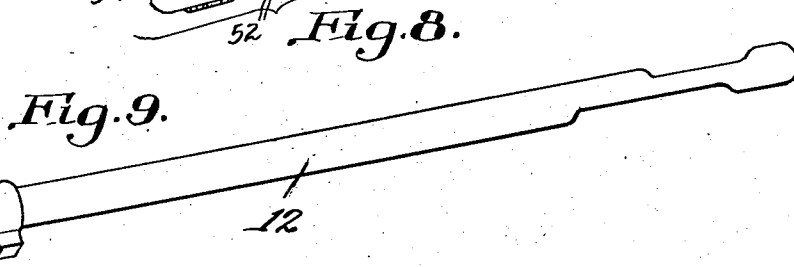
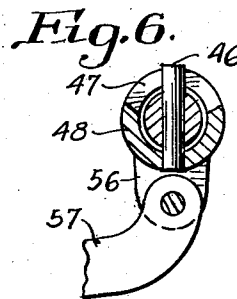
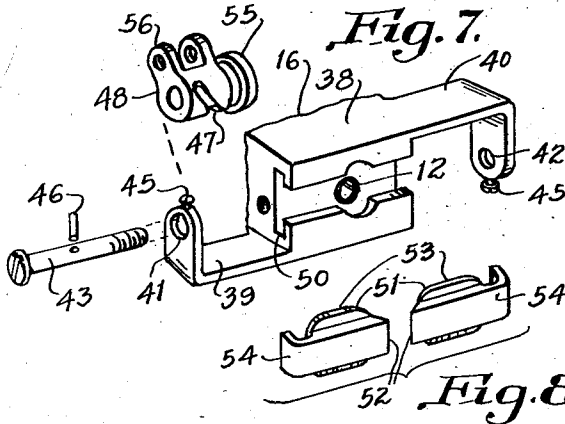
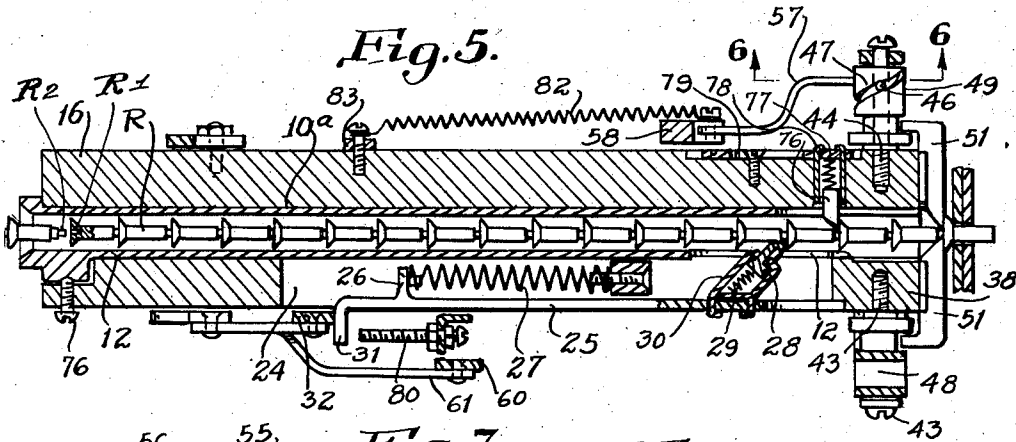
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RIVET EJECTOR AND GUN

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2 Sheets-Sheet 2



INVENTOR.
LOUIS FRANK
BY
Martin P. Smith
ATTORNEY.

UNITED STATES PATENT OFFICE

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RIVET EJECTOR AND GUN

Louis Frank, Fellows, Calif.

Application September 13, 1943, Serial No. 502,122

13 Claims. (Cl. 78—46)

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My invention relates to a tool for ejecting rivets, one at a time from a magazine, inserting said rivets in their holes in the work and then driving and setting said rivets and the principal object of my invention, is to provide a simple, practical and easily operated tool comprising in combination, a conventional pneumatic riveting gun or hammer and manually operable means for feeding a string of connected rivets forwardly from a holder or magazine so as to eject the forward one of the rivets from said holder and insert the ejected rivet in its hole, then sever the ejected and inserted rivet and finally imparting hammer-like blows to the head of the inserted rivet so as to set and rivet same in the work.

Further objects of my invention are, to provide a rivet ejecting and driving tool of the character referred to, which will materially lessen the time and labor ordinarily involved in the inserting and setting of rivets and to provide the tool with a number of readily manipulated adjustments in order that the tool will handle rivets having different sized heads or shanks of different lengths and also eject and insert the rivets in holes spaced different distances apart.

A further object of my invention is to provide simple and effective means for guiding the tool during its operation and gauging the positions of the ejector and hammer in relation to the spacing of the rivet holes.

With the foregoing and other objects in view, my invention consists in certain novel features of construction and arrangement of parts which will be hereinafter more fully described and claimed and illustrated in the accompanying drawing in which:

Fig. 1 is a side elevational view of the tool with parts broken away and in section.

Fig. 2 is a top plan view of my improved rivet ejector and gun.

Fig. 3 is a front end elevational view of the tool.

Fig. 4 is a detail section taken on the line 4—4 of Fig. 2.

Fig. 5 is a horizontal section taken on the line 5—5 of Fig. 1.

Fig. 6 is an enlarged detail section taken on the line 6—6 of Fig. 5.

Fig. 7 is a perspective view of certain parts of the rivet shearing assembly.

Fig. 8 is a perspective view of the rivet shearing jaws.

Fig. 9 is a perspective view of the string rivet magazine.

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Fig. 10 is a perspective view of certain cooperating parts of the rivet shearing mechanism.

Fig. 11 is a perspective view of a modified form of the rivet feeding pawl.

Fig. 12 is an elevational view of a carriage release.

Fig. 13 is a vertical section taken on the line 13—13 of Fig. 12.

Referring by numerals to the accompanying drawings, 10 designates the main body of the combined ejector and gun, the same having the customary handle and air connections (see Fig. 1) and at its forward end, a removable rivet set 11. This body 10 is practically identical with a conventional form of pneumatic riveting hammer.

Mounted upon the body 10 is an intermediate section or rail 14, having upon its upper face a longitudinal groove 15 adapted to receive the sliding carriage 16. (See Fig. 3.)

A tubular magazine 12 adapted to receive rivet strings such as R is removably positioned in a longitudinal bore 10^a in carriage 16.

Magazines such as 12 may be interchangeable so as to accommodate different sized rivets.

Carriage 16 is connected by straps to body 10 in a vertically adjustable relation by means of slot 18 in the straps with screws passing through said slots and graduations regulating such adjustment. Screws 22 having right and left hand threads and being threaded to body 10 and section 14, as in Fig. 1 are provided with a wrench engageable nut portion 23 to facilitate vertical adjustment between body 10 and section 14.

The straps 17 are fixed to intermediate section 14 and have at their free ends lugs 20 adapted to engage guide grooves 21 of carriage 16.

As in Fig. 5 the carriage 16 is provided with a groove 24 serving as a guide for a sliding strap 25, the same having an intumed lug 26 adapted to engage an expansion spring 27 which engages a fixed portion of the carriage 16. Strap 25 also carries at its forward end a resilient pawl 28, adapted to extend through a slot in the rivet holder and said pawl 28 is urged forward by a spring 29 mounted in a housing 30 carried by strap 25.

The rear end of strap 25 has an outwardly turned lug 31, (see Fig. 1) adapted to be engaged by the upper end of a lever 32, the lower end of the latter being pivoted on the side of body 10. A short link 33 pivotally connects the upper ends of lever 32 and trigger 37. Trigger 34 comprises a lower finger piece 35, keyed to pin 36 and an upper portion 37, keyed to the same pin 36.

The forward end of carriage 16 has an inte-

gral block 38, bored to receive the slotted forward end of rivet magazine 12 and provided with lateral arms 39 and 40, apertured at 41 and 42 to receive bolts 43 and 44 which are screw-seated in block 38 and are held against turning by set screws 45.

Pins 46 extend through the bolts 43 and 44 into the spiral slots 47 of cams 48 and 49 rotatively mounted upon bolts 43 and 44. The block 38 is provided with a guide groove 50 to receive, as seen in Figs. 7 and 5, a pair of shear strips 51, having cutting edges 52, guide flanges 53 and inturned lugs 54 adapted to engage flanges 55 of the cams 48 and 49.

The cams 48 and 49 are provided with lugs 56, to pivotally connect to links 57, which in turn are pivoted to arms 58 which are rotatively journaled on top of carriage 16 (see Fig. 2). The arms 58 are provided with arcuate anvils 59 adapted to be engaged by pusher arms 60 actuated by trigger 34 through the medium of links 61 the ends of the latter being pivotally connected to the intermediate portions of said links 60 and trigger 37 (see Figs. 1 and 2).

As shown in Fig. 1, I have provided means for locating the rivet set 11 of the gun body 10, relative to the rivets previously inserted by the use of a flanged roller 63 normally urged forward by spring 64, carried in housing 65 on gun body 10 and limited by nuts 66, on bolt 62.

A further guide provided to help locate the device in relation to the rivet heads and holes, is adapted to engage the free edge of the metal plate P. This guide comprises a bracket 67 adjustably secured, as at 68 to the section 14, and having a housing 69, to receive a slide bolt 70 normally urged forward by spring 71, and limited by nuts 72 (see Fig. 4).

The slide bolt at its outer end is provided with a foot portion having a centrally located bore to receive a spring 73 and a ball 74 adapted to be pressed forward by the spring, said ball being held in place by peening.

The foot portion of slide bolt 70 has a flange 75 (see Fig. 2) to guide the gun relative to the edge of the metal P. In the use of my combined rivet gun and ejector, the rivet magazine 12, is provided with a rivet string R and inserted into the carriage 16 and locked by set screw 76. In Figs. 1, 2 and 5 the carriage is shown moved forward so as to position the forward one of the rivets of the string in the rivet hole and with the blades 51 about to sever said rivet.

The first movement of trigger 35, moves strap 25 forwardly, independent of carriage 16 and as this initial movement takes place, pawl 28 feeds the rivet string forwardly the distance of one rivet and pawl 76 engaging behind the head of the rivet engaged by pawl 28, holds the rivet string against rearward movement when the carriage returns to its normal rearward position.

Thus the rivet string is, by strap 25 and pawl 28, moved forward a short distance before the final forward movement is imparted to the carriage to bring the severing means 51 into position to shear the forward rivet.

In other words, the rivet string is first moved forward to eject the forward rivet from the end of magazine 12 and when said rivet has been aligned with the rivet hole in the work, the carriage moves forward to insert the rivet in the hole and the tool is now elevated to bring rivet set 11 into position to hammer said rivet.

Rivet set 11 projects forwardly from the tool a distance approximately equal to the forward

travel of carriage 16 and thus it is necessary to first move the rivet forward out of the carriage before the latter is moved forward to insert the rivet in its hole.

As shown in Fig. 5 actuation of the trigger 34 when pulled will push forward with the strap 25 and carriage 16, causing the pawl to engage one of the rivets and move the string of rivets forward, whereby the foremost rivet is guided into the rivet holes of the metal plates, and the rivets being prevented from retracting by pawl 76. Pawl 76 is pressed forward by spring 77 carried by housing 78 of adjustable strap 79 of the carriage 16.

The forward motion of strap 25 is limited by stop screw 80 carried by carriage 16. The next step in the operation is to shear off the rivet now positioned in the rivet holes of the metal plates. To this end, the trigger 34 is further actuated causing pusher arms 60 to engage anvils 59, and rock the arms 58 which in turn, actuate links 57.

The links 57, being pivotally connected to cams 48 and 49, will cause the same to rock upon the bolts 43 and 44, and through the action of the pins 46 in spiral slots 47 of the cams, the shear strips will move inward to cut off the rivet positioned in the holes, from the rivet string R.

The carriage 16 will then be retracted by spring 82 (see Fig. 2), said spring being connected to one of the links 57 and to strip 83 fixed to the section 14.

The gun is next raised to a point where the rivet set 11 engages the head of the rivet cut off and the gun is then used in the conventional manner to head the rivet. As shown in Fig. 1 adjustment of screws 22, permits the positioning of the ejector and the rivet set and guide wheels 63, the same distance apart as the center of the rivet holes in the metal plates.

Figs. 12 and 13 show means to prevent the carriage 16 moving forward until the trigger 34 is actuated. Upon actuation of trigger 34, a plate 85, adjustably carried by part 37 (see Fig. 1) will force down a T shaped pin 86 retracting the upper end of same from a bore in the carriage 16 to release the said carriage. A spring 81 normally holds the pin 86 in locked position.

As seen in Fig. 11, I provide a modified form of feed pawl 28, comprising a flat piece of spring metal carried by a rod 30' connected to strap 25.

In some instances it may be found desirable to eliminate intermediate member or rail 14, and mount carriage 16 directly on body 10, in which event rivet sets such as 11, but with a greater degree of offset would be used.

In Fig. 5 at the left hand end of the rivet string I have shown the rear rivet of the string in the magazine provided with an axial recess, R¹ for the reception of a pin R² on the forward end of the forward rivet of another string, thus providing for a continuous feed of rivets in string form to pass through the tool. This same arrangement is shown and described in my copending application of patent on Rivet strings filed Feb. 22, 1943, Ser. No. 476,742.

Thus it will be seen that I have provided a rivet ejector and gun which is simple in structure, inexpensive of manufacture and very effective in performing the functions for which it is intended.

It will be understood that minor changes in the size, form and construction of the various parts of my improved rivet ejector and gun may be made and substituted for those herein shown

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and described without departing from the spirit of the invention, the scope of which is set forth in the appended claims.

I claim as my invention:

1. The combination with a pneumatic riveting hammer, of a rail mounted for vertical adjustment on top of said hammer, a carriage mounted for longitudinal sliding movement of said rail, a string rivet magazine removably positioned in said carriage and manually operable means for feeding the string of rivets forwardly through said magazine.

2. The combination as set forth in claim 1 and with means for severing the forward one of the rivets from said string.

3. The combination as set forth in claim 1 and with means for guiding the travel of the tool on the work.

4. The combination as set forth in claim 1 and with adjustable means for gauging the movements of the tool with respect to the rivet hole spacing in the work.

5. The combination as set forth in claim 1 with a grooved roller yieldingly mounted on the forward end of said hammer and a rivet set detachably mounted on the forward end of said hammer.

6. The combination as set forth in claim 1 and with adjustable rivet hole engaging means mounted on the forward portion of said rail.

7. The combination as set forth in claim 1 and with means mounted on the forward end of said carriage and actuated by said manually operable means for severing the forward one of the rivets after the string has been fed forwardly the distance of one rivet through said magazine.

8. The combination as set forth in claim 1 and with means fixed on said rail and having sliding engagement with said carriage for securing said rail to said hammer in differently adjusted positions.

9. The combination with a pneumatic riveting hammer, and its manually operable controlling

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means, of a rail mounted for vertical adjustment on top of said hammer, a carriage mounted for longitudinal sliding movement on said rail, a rivet string magazine removably positioned in said carriage, rivet severing means mounted for operation at the forward end of said carriage and manually operable means for feeding a rivet string forwardly through said magazine, then shifting said carriage forwardly and then actuating said rivet severing means.

10. The combination as set forth in claim 9 and with means carried by said hammer for guiding the travel thereof on the work.

11. The combination as set forth in claim 9 and with adjustable means mounted on the forward portion of said rail for gauging the movements of the tool relative to the spacing of the rivet hole in the work.

12. The combination with a pneumatic riveting hammer, of a carriage mounted for sliding movement and vertical adjustment on said hammer, a string rivet magazine removably positioned in said carriage and means for feeding the string of rivets forwardly from said magazine and for severing the forward one of the rivets from said string.

13. The combination as set forth in claim 12 with means for actuating said rivet severing means and means for imparting rotary pressure to said riveting severing means.

LOUIS FRANK.

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