

Nov. 18, 1969

G. T. GALUTIA

3,478,567

RIVETING GUN BUCKER ATTACHMENT

Filed Nov. 4, 1966

2 Sheets-Sheet 1

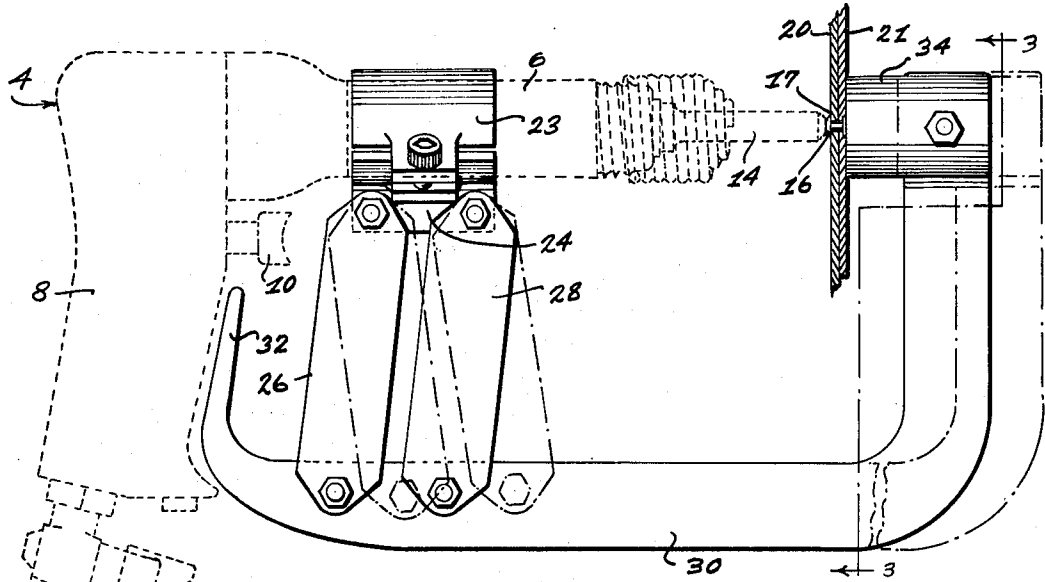


Fig. 1



Fig. 2

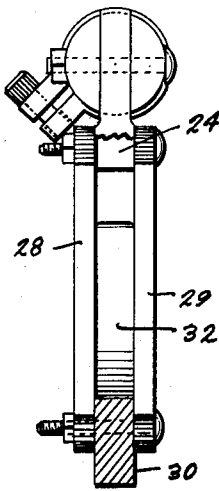
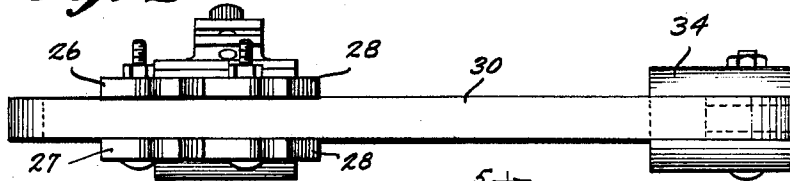


Fig. 3

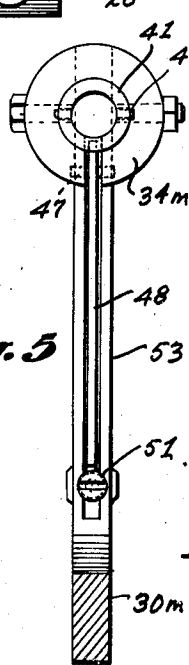


Fig. 5

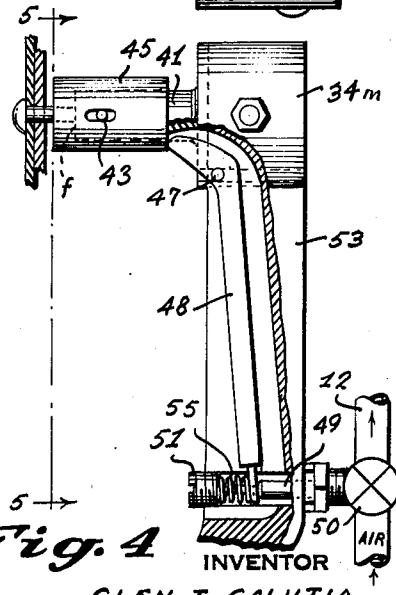


Fig. 4

INVENTOR  
GLEN T. GALUTIA

BY  
*Richard Hane*  
ATTORNEY

Nov. 18, 1969

G. T. GALUTIA

3,478,567

RIVETING GUN BUCKER ATTACHMENT

Filed Nov. 4, 1966

2 Sheets-Sheet 2

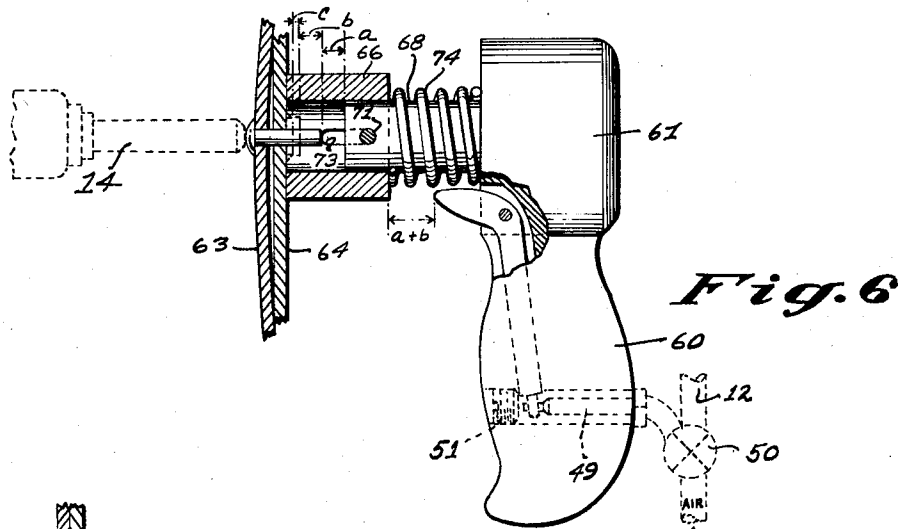


Fig. 6

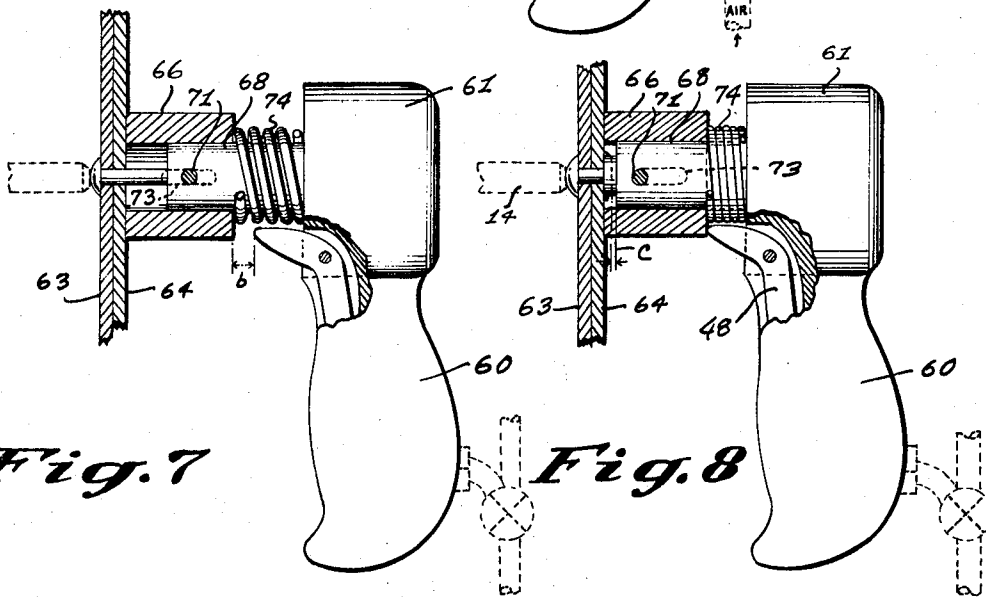


Fig. 7

Fig. 8

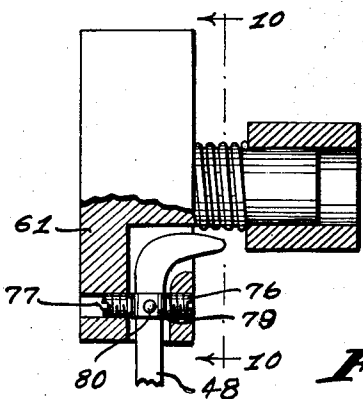


Fig. 9

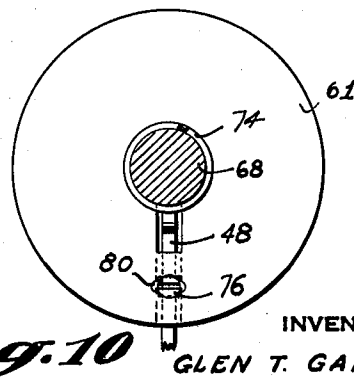


Fig. 10

INVENTOR  
GLEN T. GALUTIA  
BY  
*Richard W. Hanes*  
ATTORNEY

1

2

3,478,567

**RIVETING GUN BUCKER ATTACHMENT**

Glen T. Galufia, Colorado Springs, Colo.

(22005 29 Court St., Kent, Wash. 98031)

Filed Nov. 4, 1966, Ser. No. 592,136

Int. Cl. B21j 15/14, 15/18, 15/30

U.S. Cl. 72-457

6 Claims

**ABSTRACT OF THE DISCLOSURE**

The present disclosure is a device for use in combination with a riveting gun and includes an anvil or bucking bar which may be attached to the riveting gun and which has in combination therewith a sleeve and spring arrangement for determining the extent of upset on the rivet head.

The present invention relates generally to the riveting art and more specifically to apparatus for simplifying and improving the process of upsetting the rivet shank.

As is well known in the art, a riveted joint is made by inserting a headed shank in a hole drilled or punched through both pieces being joined and then locked in place by forming a head on the projecting butt end of the shank. The process of forming the butt end head is often called upsetting the rivet and may be done by hammering or squeezing the shank so as to deform the butt end. The hammering effect is most often achieved by a pneumatic powered riveting gun which delivers impact blows to the head of the rivet. The butt will deform in response to the blows if it is tightly pressed against a firm solid bucking surface such as a heavy steel tool or the like. The precision and form of the finished butt end will of course depend on the angle of the bucking surface with respect to the rivet axes and the thickness of the butt head will depend on the number of blows delivered to the rivet.

It is obvious that with hand held bucking surfaces, the available precision is not going to be great. In addition to that disadvantage, the holding of the bucking surface generally requires the services of an individual other than the one operating the riveting gun.

It is therefore the primary object of the present invention to overcome these aforesaid disadvantages and provide a bucking surface tool which may be attached to the riveting gun for operation by the riveting operator while at the same time providing increased accuracy in the selection and formation of the butt head of a rivet.

Other objects, features and advantages of the present invention will become apparent upon a reading of the following description of a preferred form of the device taken in connection with the accompanying drawings in which:

FIGURE 1 is a side elevational view of the riveting gun attachment of the present invention showing a standard riveting gun in dashed lines;

FIGURE 2 is a bottom view of the riveting gun attachment;

FIGURE 3 is a cross sectional view taken along lines 3-3 in FIGURE 1;

FIGURE 4 is a fragmentary view of the bucking bar and mounting yoke with portions broken away and shown in cross section to illustrate modification in the form of a height finding sleeve and adjustment therefor;

FIGURE 5 is a cross sectional view taken along lines 5-5 of FIGURE 4;

FIGURES 6 to 9 illustrate a further modified form of the present invention;

FIGURE 10 is a cross sectional view along lines 10-10 in FIGURE 9.

Referring first to FIGURE 1, a rivet gun 4 is shown in dashed outline as having a barrel 6 from the end of

which depends a pistol grip type of handle 8 which mounts a reciprocally movable trigger 10. An air supply for operating the gun is furnished through a flexible conduit 12. A plunger 14 protrudes from the end of the barrel 6 and is adapted to strike the head 16 of a rivet 17 intended to fasten two flat pieces 20 and 21 together. The foregoing is state of the art structure and forms no part of the present invention as such but is necessary to the total inventive combination.

To the barrel 6 of the rivet gun 4 is attached a collar 23 having a depending rib 24 which serves to pivotally mount two pairs of straight linking straps 26, 27 and 28, 29. The lower ends of the straps are pivotally connected to a C-shaped yoke member 30 which is provided at one end thereof with a finger grip portion 32. The other end of the yoke 30 is adapted to be disposed in alignment with the longitudinal axes of the riveting gun plunger 14 where a solid cylindrical bar 34 attached to the end can be used as a bucking means for upsetting the rivet butt.

It will be apparent that the designed depth of the yoke 30 can be varied to accommodate workpieces of generally larger or smaller lengthwise dimensions. Variations in work piece material thickness are readily adjusted for at the time of riveting by merely moving the finger grip 32 toward the handle 8 of the gun 4 until the bucking bar 34 is snugly against the butt of the rivet. Continued bucking pressure is maintained by continued finger pressure on the finger bar 32.

In view of the mechanical mounting of the yoke 30 to the riveting gun 4 the angle of the flat bucking surface of the bar 34 will always be normal to the axes of the rivet and will hence insure a more precise and well formed head on the butt of the rivet 17; however, the thickness or height of the butt head can only be controlled by the perception and experience of the operator.

One solution to this problem is seen in the structure illustrated in FIGURES 4 and 5. The bucking bar 34m is provided with a perpendicular cylindrical extension 41 having a pair of diametrically projecting pins 43 which are positioned slots 44 of a slidable sleeve 45 which is carried around the cylinder 41. Attached by a pin 47 to the bucking bar 34m is a pivotal crank arm 48 whose one end remains in contact with the end of the sleeve 45 and whose other longer end is connected to a valve stem 49. The stem 49 is the actuating means for an air valve 50 which is connected in series with the air supply conduit 12 for the riveting gun.

The purpose of the foregoing arrangement is to cut off the air supply and stop the operation of the riveting gun when the rivet butt has been upset to such an extent that the right butt head height has been obtained. In operation the face f of the cylindrical bucking extension 41 is placed against the butt end of the rivet. The desired height of the butt head may be adjusted by the rotation of the set screw 51 set between the bifurcated sides of the end portion 53 of the modified yoke 30m. Adjustment of the screw 51 against the bearing spring 55 will move the long end of the crank arm 48 and thereby adjust the limit position of the sleeve 45. At the limit position, where the end of the sleeve is in contact with the curved short end of the crank arm 48 the distance between the other end of the sleeve 45 and the face f of the bucking cylinder represents the height of the butt head of the rivet. It will be apparent that as the riveting process proceeds and the rivet butt head flattens out the sleeve 45 will approach the work piece and will contact the same at such time as the butt head achieves the correct height. Further operation of the rivet gun will cause the sleeve 45 to be pushed by the work piece backwardly against the crank arm. When the crank arm is thus pivoted, the stem 49 is also reciprocated, shutting off the air supply and stopping the gun.

It should be apparent that the bucking attachment of FIGURES 4 and 5 and the associated air valve could function in their own right as hand held implements and without being attached to the riveting gun at all. Such an arrangement is shown in FIGURES 6-8 where the bucking bar is equipped with a pistol grip type of handle 60. In addition to the handle, the bucking bar 61 is also provided with means, similar to that shown in FIGURES 4 and 5, for shutting off the air supply to the rivet gun at such time as the butt head has reached the desired height. While this modification of the apparatus possesses certain similarities to the previously described embodiments, the features of this form achieve at least two important advantages not heretofore realized. An explanation of the device and its operation will adequately bring out these objectives.

Very often, when a rivet is inserted in the matching holes of two flat pieces of material which are to be fastened together, such as those pieces referred to by reference numbers 63 and 64 in FIGURE 6, the pieces will not flush. If riveting is started, an enlargement of the rivet shank may appear between the inside surfaces of the pieces to be fastened, thus creating an undesirable bulge in the work. With the tool of the present invention, as illustrated in FIGURE 6, this problem can be eliminated by the same tool used for bucking the rivet. The sleeve 66, slidably mounted on the cylindrical extension 68 of the bucking bar 61 is urged forward to the limit of the pin and slot 71 and 73 respectively by a spring 74. Before riveting begins, the open end of the sleeve is pressed against the work piece around the rivet shank, thus pushing the two pieces 63 and 64 into a flush relationship so that the riveting operation can proceed. FIGURE 7 illustrates the position of the bucking bar extension just prior to turning on the riveting gun. As the butt of the rivet is upset, the bucking bar moves closer to the work and the crank arm comes into contact with the rear face of the sleeve 66. In accordance with the sensitivity of the air valve 50 and the valve stem movement, the valve 50 will be closed upon a slight amount of further movement of the bar 68 with respect to the sleeve 66, which position has been predetermined to be that corresponding with the proper butt head height.

It should be pointed out that by bringing the open end of the sleeve 66 to bear against the work piece before operation of the rivet gun, it is easy to determine whether the bucking surface is perpendicular to the axis of the rivet both by manual feel or visual observation that the sleeve end is flush at all points on its periphery with the flat surface of the work piece.

When it is desired to substantially change the height of the butt head, an adjustment may be made on opposed set screws 76 and 77 screwed into a threaded bore in the bucking bar 61. Between the said set screws is a slotted mounting shaft 79 having a spindle or pin 80 which pivotally mounts the crank arm 48. The pivot point 80 can be moved toward or away from the sleeve 66 for varying the height of the rivet butt by turning the set screws 76 and 77.

Having thus described the several useful and novel features of the riveting gun bucket attachment of the present invention with the accompanying drawings, it will be seen that the many worthwhile objectives for which it was designed have been achieved. Although but a few of the several possible embodiments of the invention have been illustrated and described herein, I realize that certain additional modifications may well occur to those skilled in the art within the broad teaching hereof; hence, it is my intention that the scope of protection afforded hereby shall be limited only insofar as said limitations are expressly set forth in the appended claims.

I claim:

1. In combination with a riveting gun having a handle and a barrel:
  - a yoke;
  - means movably mounting said yoke to the barrel of said riveting gun and including:
    - a collar surrounding the said barrel;
    - a plurality of swingable link means interconnecting the yoke and the collar;
  - finger grip means integral with the yoke and disposed in proximity to said handle;
  - rivet bucking means secured to one end of said yoke and positioned in alignment with the longitudinal axes of said barrel and having:
    - a sleeve slidably disposed on said extension;
    - a source of air pressure to operate said gun;
    - conduit means conveying said air pressure from the source to the gun;
    - an air valve in series with said conduit means;
    - actuator means responsive to sliding movement of said sleeve and operatively connected to said valve.

2. The apparatus of claim 1 wherein the actuator means includes a pivotal crank arm having one end thereof connected to said valve and the other end thereof in contact with the said slidably sleeve.

3. The apparatus of claim 2, and further including adjustment means, including a spring, operatively interconnecting the crank arm and the said yoke for adjusting and biasing the normal position of said crank arm.

4. The combination of claim 3 wherein the valve includes a reciprocable valve stem connected to the crank arm.

5. Bucking apparatus for use with a riveting machine, including:
  - a weighted mass having holding means and an elongated protrusion;
  - a hollow sleeve slideably mounted on said protrusion;
  - spring means positioned between said sleeve and said mass biasing said sleeve away from said mass;
  - pin and slot means interconnecting said protrusion and said sleeve;
  - a source of air pressure to operate said riveting machine;
  - conduit means conveying said air pressure from the source to the machine;
  - an air valve in series with said conduit means;
  - actuator means responsive to sliding movement of said sleeve against the biasing force of said spring and operatively connected to the said valve.

6. The combination of claim 5 wherein the actuator is a crank arm having a pivot pin carried by said mass, and further including means interconnecting the said pin and said mass for providing adjustment as to the position of the pivot pin with respect to the said sleeve.

#### References Cited

##### UNITED STATES PATENTS

840,524	1/1907	Sturdevant	72—465
1,430,292	9/1922	Dicks	29—243.54
1,885,986	11/1932	Butler	72—216
1,978,983	10/1934	Baur	227—153
2,570,296	10/1951	Weiss	72—451
2,630,030	3/1953	Gann	72—465

##### FOREIGN PATENTS

560,915 7/1923 France.

CHARLES W. LANHAM, Primary Examiner

70 GENE P. CROSBY, Assistant Examiner

U.S. Cl. X.R.

29—243.54; 72—391, 465, 476; 227—61