

N. E. CLARK.
RIVET MANUFACTURE.
APPLICATION FILED NOV. 7, 1911.

1,051,088.

Patented Jan. 21, 1913.

Fig. 1.

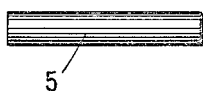


Fig. 2.



Fig. 3.

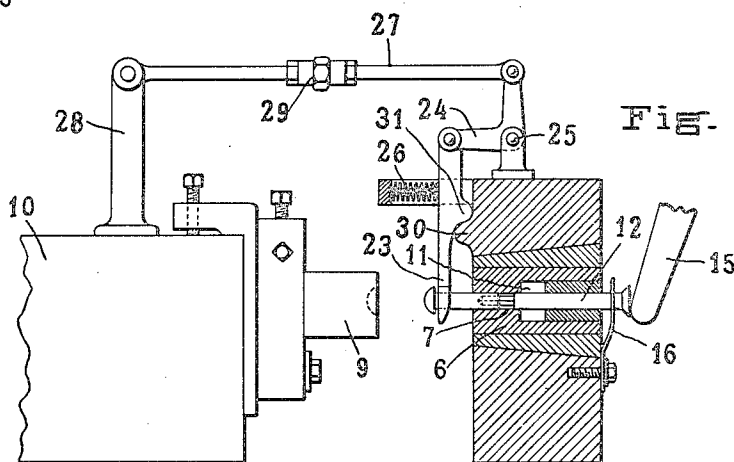


Fig. 4.

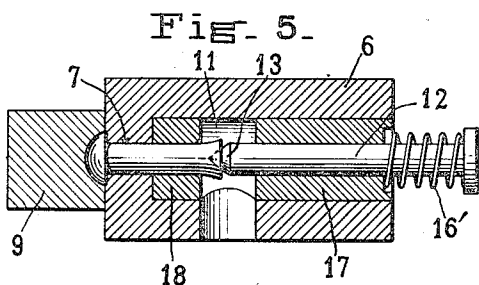


Fig. 5.

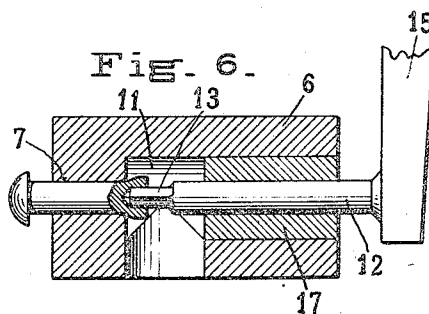


Fig. 6.

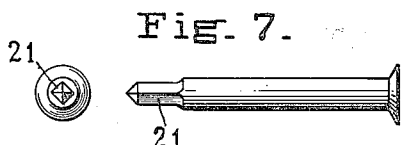


Fig. 7.



Fig. 9.

Fig. 8.



Fig. 11.

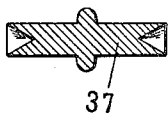


Fig. 10.



WITNESSES
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RIVET MANUFACTURE.

1,051,088.

Specification of Letters Patent.

Patented Jan. 21, 1913.

Application filed November 7, 1911. Serial No. 658,936.

To all whom it may concern:

Be it known that I, NORRIS ELMORE CLARK, a citizen of the United States, and resident of Plainville, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Rivet Manufacture, of which the following is a specification.

My invention relates particularly to a process and tools for manufacturing rivets and similar devices.

The right to claim the mechanism is reserved for another application.

The main object is to provide a simple process and the means for making rivets cupped at one end so that they may be readily and uniformly up-set. The principle will be found also applicable to the manufacture of bifurcated and tubular rivets.

Briefly considered, the invention contemplates the forcing of a rivet blank into a hole in a die, indenting and thereby spreading the end inside the die by means of a movable pointed punch, then forcing the rivet out of the die by means of the punch so that the spread end of the rivet inside the die is drawn out to form the cupped portion. Where the cupped portion is deep supplementary mechanism may be provided for taking off or ejecting the completed rivet from the die.

The principles of the invention are illustrated in the accompanying single sheet of drawings.

Figure 1, is a side view of a blank for forming a rivet. Fig. 2, is a longitudinal sectional view showing the rivet with the end indented and spread in accordance with a step of my invention and showing dotted the completed end. Fig. 3, is a perspective view of a completed rivet of my invention. Fig. 4, is a side view and partial section of apparatus for carrying out my invention. Fig. 5, is a longitudinal sectional view of forming dies showing the end of the rivet indented and spread. Fig. 6, is a similar view of a modification with a punch suitable for making a square or rectangular countersink. Fig. 7, shows an end view and a side view of the special punch shown in Fig. 6 for forming a rivet such as a clock-key rivet or stem having a square recess in the end as shown in Fig. 8. Fig. 9, shows an end and a side view of another form of punch with a wedge-shaped end for form-

ing a bifurcated rivet as shown in Fig. 10. Fig. 11, is a sectional view of another form of rivet which may be made according to my invention.

As the tools may be operated in any suitable form of rivet machine or header I have only attempted to illustrate those parts which concern my invention. The operation will be readily understood by one acquainted with the art.

The wire stock is fed intermittently by any suitable mechanism through any suitable cut-off die, (not shown) which may be mounted in the frame of the machine. The usual cut-off slide (not shown) may be employed for severing the end of the stock to form the blank 5. This slide as is customary in rivet machines may also be employed to carry or transfer the blank 5 into position in front of the die 6 in line with the opening 7. A completed rivet is shown at 8. A header 9 carried by the movable member or gate 10 is operated in the usual manner to drive the blank 5 into the die 6 and head or up-set a portion of the rivet as is customary. The shape of the head will of course depend upon the shape of the heading recess in the die 9.

The die 6 is provided with a recess 11 of a size larger than the passage 7 so as to permit the end of the rivet to spread as shown in Fig. 5. Preferably this recess is open at the bottom to permit scrap, etc., to fall out. The knock-out pin 12 constitutes a movable abutment or punch and has its end 13 shaped in accordance with the desired shape of the cavity to be formed in the end of the rivet. When the rivet blank is forced into the opening 7 the right hand end is indented and spread by the end 13 of the movable punch 12 as shown at 14. An arm 15 or similar device is provided for moving the knock-out pin or punch toward the left and a suitable form of spring 16 assists in retracting the knock-out pin or punch. In Fig. 5 a spiral spring 16' is shown for the same purpose. This figure also shows a separate sleeve 17 in the rear of the die 6 for guiding the knock-out pin or punch.

When the knock-out pin or punch 12 is forced to the left the rivet 8 is ejected through passage 7. The right hand end 14 of the rivet being spread is drawn out around the end 13 of the knock-out pin

or punch in being forced back through the passage 7. A separate bushing 18 may be conveniently provided for affording a drawing shoulder around the inner end of the passage 7, the edge of the passage in the bushing being rounded as shown in Fig. 5 so as to secure a better drawing action and avoid any shearing action. By this drawing action the spread portion 14 is drawn out into a tubular form as shown at 19 in Fig. 3 and dotted in Fig. 2. The drawing action will depend upon the relative size of the passage in the drawing die and the point of the punch and also the force applied to the punch. By exercising considerable force upon the punch and having the end 13 of a size less in diameter than the diameter of the rivet as shown for instance in Fig. 6 a very considerable drawing action may be produced. The drawing action and cavity will of course depend somewhat upon the characteristics of the metal of the rivet or other device. By shaping the end of the punch square and pointed as shown in Fig. 7 it is possible to produce by this method a clock-key rivet having a square recess as shown at 22 in Fig. 8.

Sometimes there is a tendency for the rivets to stick in the die 6 or on the end of the punch. In this case additional means should be employed to properly eject the rivet as shown for instance, in Fig. 4. A forked-like kicker 23 is pivotally hinged from an arm of the lever 24 which is pivoted at 25. A spring 26 presses the kicker toward the right as shown in Fig. 4. The upright arm of the lever 24 is connected by a rod 27 to the upright bracket 28 on a movable support 10 for the header 9. The rod 27 may be extensible in any suitable manner as for instance, by a suitable form of coupling 29 so that the length of the rod may be adjusted. A stationary cam 30 is provided adjacent the cam 31 on the kicker 23. When the header 9 and carrier 10 are being retracted the kicker 23 is moved downward and outward so as to eject the finished

rivet. When the header moves toward the right the kicker 23 is retracted.

In the form of punch shown in Fig. 9 the end is wedge-shaped as shown at 35 so that a corresponding indentation 36 is made in the end of the rivet as shown in Fig. 10. This punch serves to spread the rivet in two directions only and the drawing action draws down the spread portions.

In Fig. 11 I have shown another form of rivet 37 which may be formed according to my invention. The left hand end represents that portion of the rivet which is formed by the header punch. If such a countersink were attempted in connection with the usual die, the outward flow of the stock within the punch would cause the rivet to stick in the punch preventing a proper operation of the heading machine. But with my form of die owing to the greater outward flow of stock within the die than within the punch, the rivet always stays in the die until knocked out by the knock-out pin or punch 12.

What I claim is:—

1. In the art of forming rivets the improvement which consists in forming a conical indentation in one end of a blank and spreading the end around the indentation and then drawing out the spread portion.

2. The improvement in the art of forming rivets which comprises simultaneously forming a head on one end of a blank and indenting and spreading the opposite end and then drawing out the periphery of the spread end.

3. The improvement in the art of forming rivets which comprises indenting and spreading one end by a punch and then forcing the spread end through a die so as to draw out the periphery around the end of the punch.

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Witnesses:

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