Feb. 9, 1937. R. S. OSBORNE 2,070,309

RIVETING APPARATUS

Filed Aug. 12, 1935

Fig. 1.

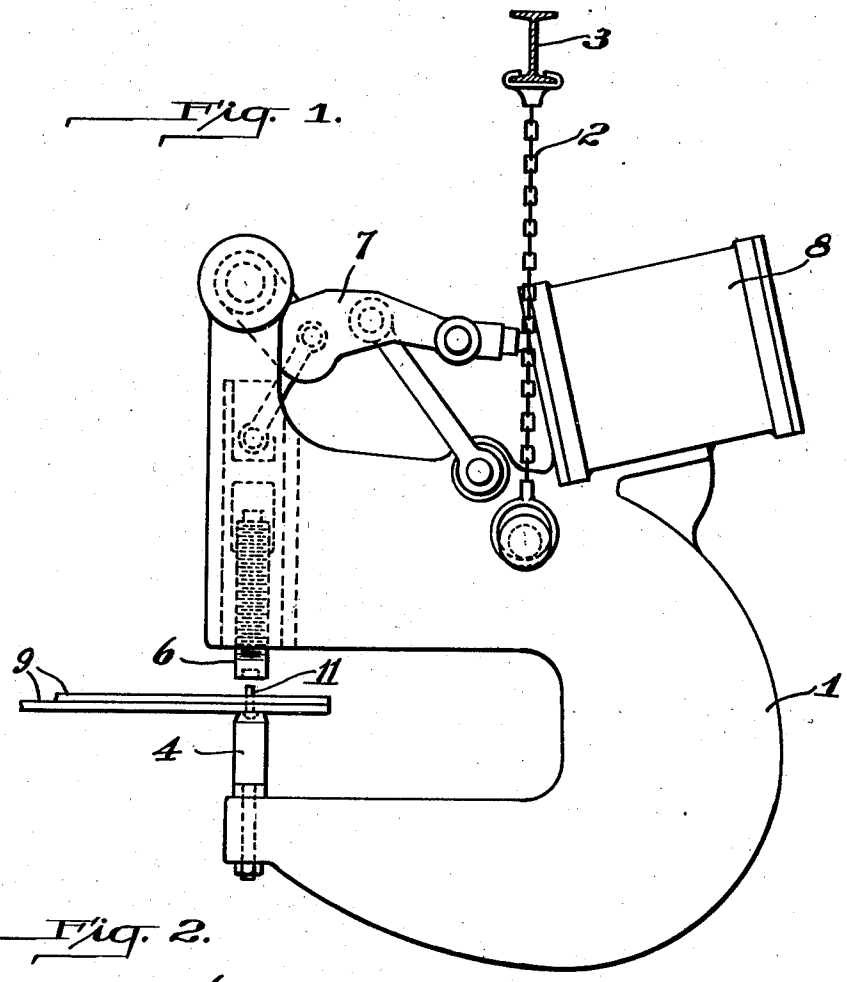


Fig. 2.

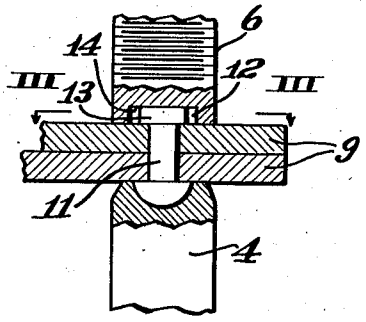
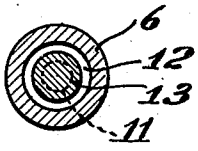


Fig. 3.



WITNESSES

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Patented Feb. 9, 1937 2,070,309

UNITED STATES PATENT OFFICE

2,070,309

RIVETING APPARATUS

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Application August 12, 1935, Serial No. 35,754

3 Claims. (Cl. 78—48)

This invention relates to riveting apparatus, and more particularly to compression riveter driving dies by which heads are cold formed on one end of rivet shanks.

In the use of compression riveters with which a head is cold formed on the "driven" end of the shank of a rivet by a single stroke of a driving die, either the riveter or the work, or both, must be movable or "float" in order to permit the various rivets to be brought into position for driving. If a rivet is to be driven properly, by which is meant the formation of a symmetrical head on the rivet shank without damage to the rivet or work, the axis of the rivet should be in line with the axis of the driving die at the completion of the driving operation, and the pressure exerted on the rivet should not be so great as to overwork and over-distort the material of the rivet or to distort the material being riveted by enlarging the rivet hole or indenting the material beneath the rivet head. With the button type of head in common use the head fills the cup in the driving die, and it takes more pressure to drive such a rivet than the material will stand without injury. Also, due to the floating of the riveter or the work, difficulty has been experienced in properly aligning the rivet with the driving die. The result has been that some rivets have been struck at an angle by the driving die, whereby lopsided heads have been formed and more pressure has been applied to the work at one side of the head than the other, thus causing injury to both the rivet and the work.

It is, therefore, an object of this invention to provide a compression riveter in which the driving die forms substantially perfect heads at pressures which do not damage the rivet or material being riveted. A further object is to provide a compression riveter in which the driving die is formed for bringing rivets into alignment with itself as they are being driven.

I have also discovered that another reason why cold rivets are not driven properly is that the entire surface of the head-forming socket in driving dies of the type known heretofore engages the upset portion of the rivet shank that forms the head and confines the metal in the socket. When there is more metal in the upset portion than the socket can accommodate, the excess metal tends to prevent the driving die from completing its driving stroke, and the exceedingly high pressure thus built up may injure the work or the rivet.

It is, therefore, a further object of this invention to provide a compression riveter in which the driving die forms substantially perfect heads on rivets that may vary to some extent in size.

The preferred embodiment of the invention is illustrated in the accompanying drawing in which Fig. 1 is a side view of a compression riveter; Fig. 2 an enlarged fragmentary view in vertical section of the riveter dies showing a rivet head formed by the driving die; and Fig. 3 a view taken on the line III—III of Fig. 2.

Referring to Fig. 1 of the drawing, a compression riveter having a yoke-like body portion 1 is suspended by a chain 2 or the like from any suitable overhead support 3 that may or may not be movable, depending on the type of work being riveted. Mounted in the lower arm of the yoke is a stationary bucking-up die 4, while directly above it in the upper arm of the yoke an axially adjustable driving die 6 is slidably mounted for movement toward and away from die 4. Reciprocation of the driving die is effected through a toggle connection 7 actuated by a piston 8 in any well-known manner.

Portions of two plates 9, constituting the work, are shown between the dies with the lower preformed head of a cold rivet 11 disposed in the bucking-up die. The rivet is positioned ready for having the upper end of its shank upset to form a head.

It is a feature of this invention, as shown in Fig. 2, that the head-forming cup or socket 12 in the lower end of driving die 6 has a cubical capacity which is greater than that of the head 13 which it forms on the upper end of the rivet by upsetting the end of the shank. Preferably, the cup is cylindrical, as shown in Fig. 3, with its inner or end wall 14 flat. This particular type of cup forms a substantially cylindrical flat top head on the rivet. It will also be seen in Fig. 2 that there is a considerable amount of space between the sides of rivet head 13 and the side wall of the cup, whereby the sides of the head are unconfined by the driving die at any time.

With a driving die constructed in accordance with this invention, pressure on the upper end of a cold rivet can not build up unduly because the head formed by the driving die never fills the cup in the die and is unconfined by the side wall thereof. Adequate pressure is thus applied to the end of the shank to cause the shank to be upset in and fill the rivet hole without the pressure injuring the rivet or the work, which is a very substantial advantage. A further advantage is that when the driving die strikes a rivet at an angle a portion of the die surrounding the cup touches the work at one side of the rivet and

straightens the work relative to the riveter whereby the rivet is properly aligned with the die while its upper end is being upset. This happens because the thickest side of the head being formed on the rivet can be pressed down to the same thickness as the opposite side, for the side wall of the socket does not interfere with lateral displacement of the metal forming the head.

According to the provisions of the patent statutes, I have explained the principle and construction of my invention and have illustrated and described what I now consider to represent its best embodiment. However, I desire to have it understood that, within the scope of the appended claims, the invention may be practiced otherwise than as specifically illustrated and described.

I claim:

1. In compression riveting apparatus, a driving die for upsetting one end of a cold rivet shank to form a head thereon against one surface of a rivet-receiving work piece, said die being provided with a head-forming cup having a side wall for limiting movement of the end wall of the cup toward said surface of the work piece and having a cubical capacity materially greater than the size of the head formed on the rivet by the die, whereby the sides of the head are unconfined by the die.

2. In compression riveting apparatus, a driving die for upsetting one end of a cold rivet shank to form a head thereon against one surface of a rivet-receiving work piece, said die being provided with a cupped head-forming socket, having a side wall for limiting movement of the inner wall of the socket toward said surface of the work piece the diameter of said socket being greater than that of the head formed on the rivet by the die, whereby the sides of the head are unconfined by the die.

3. In compression riveting apparatus, a driving die for upsetting one end of a cold rivet shank to form a head thereon against one surface of a rivet-receiving work piece, said die being provided with a cylindrical head-forming cup, having a side wall for limiting movement of the end wall of the cup toward said surface of the work piece and the diameter of said cup being greater than that of the head formed on the rivet by the die, whereby the sides of the head are unconfined by the die, and the end wall of the cup being substantially flat.

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