G. W. OSBORNE.

RIVETING MACHINE.

APPLICATION FILED AUG. 5, 1914.

1,166,711.

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Fig. 1.

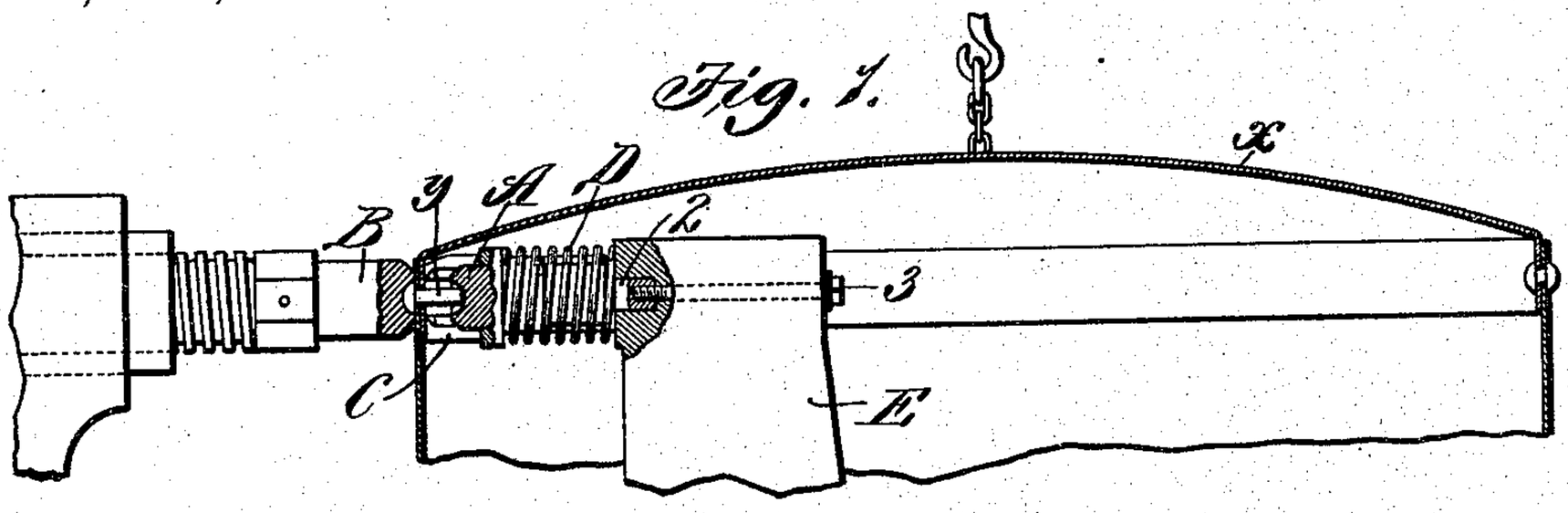


Fig. 2.

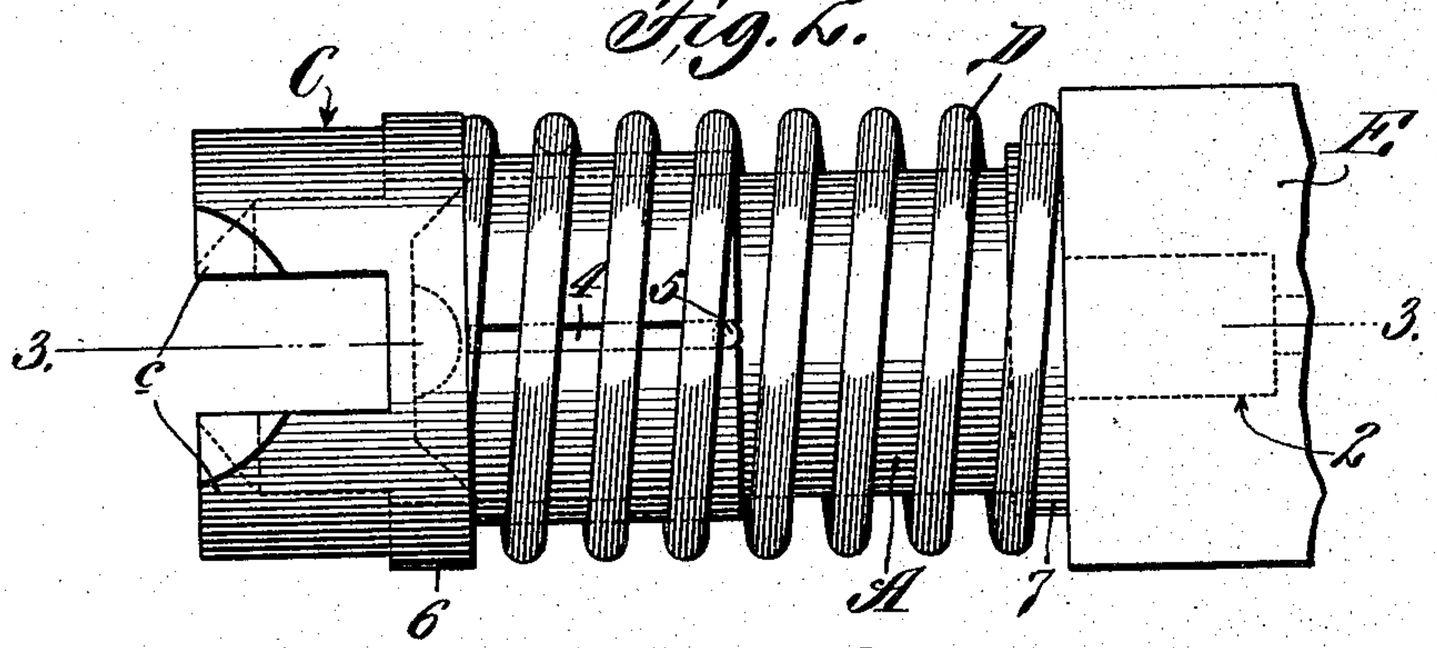


Fig. 3.

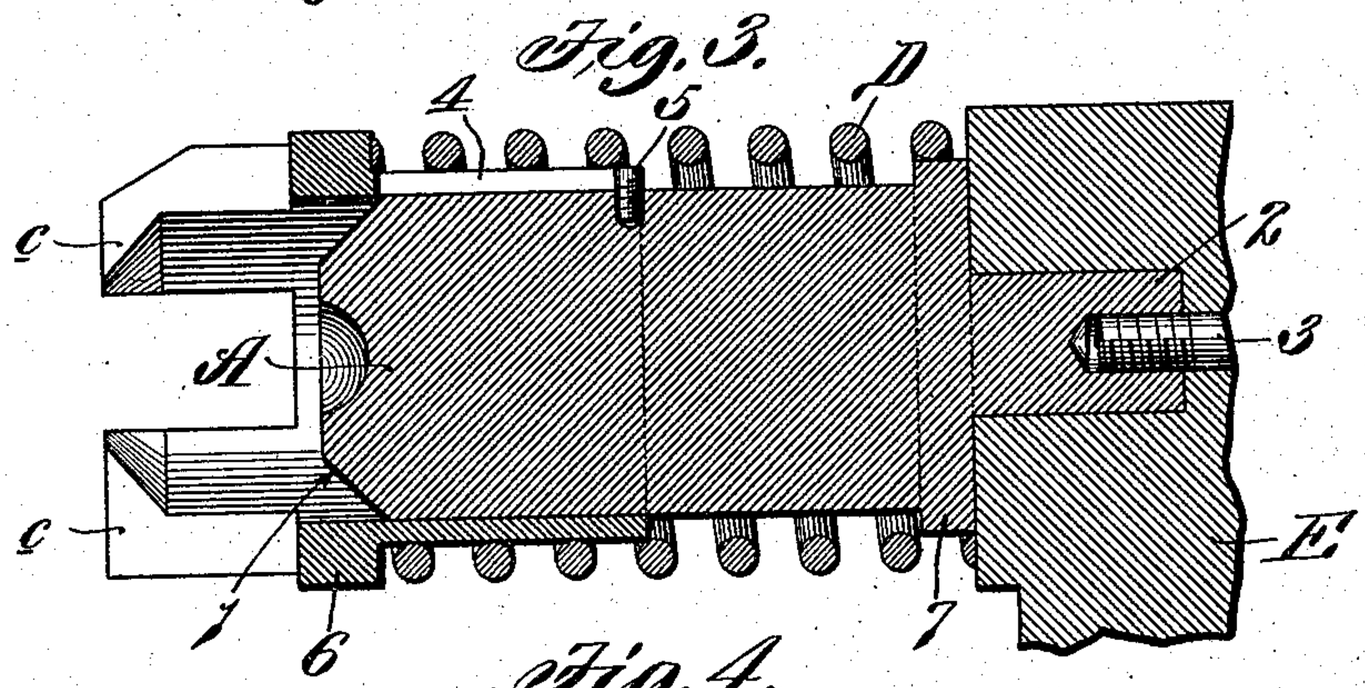
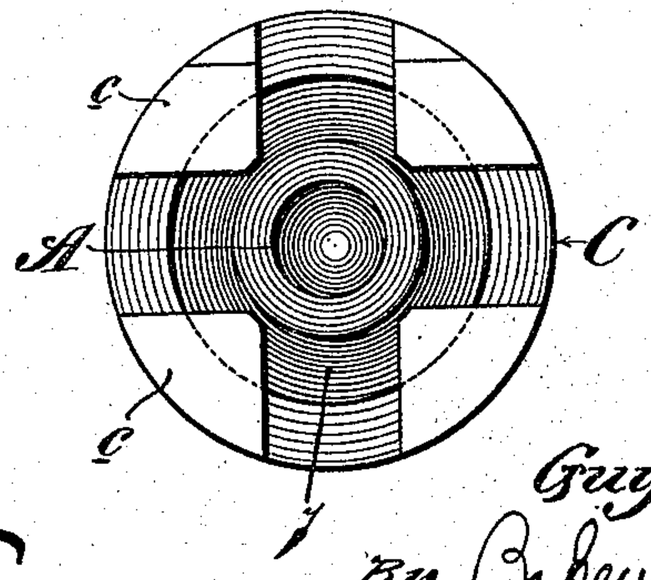


Fig. 4.



Witnesses:
Geo. P. Ladson
Jessie Clark

Inventor
Guy W. Osborne.
By Bakewell & Church Attys.

UNITED STATES PATENT OFFICE.

GUY W. OSBORNE, OF MASSILLON, OHIO.

RIVETING-MACHINE.

1,166,711. Specification of Letters Patent. Patented Jan. 4, 1916.

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To all whom it may concern:

Be it known that I, GUY W. OSBORNE, a citizen of the United States, residing at Massillon, Ohio, have invented a certain new and useful Improvement in Riveting-Machines, of which the following is a full, clear, and exact description, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to riveting machines, and has for its main object to provide an automatic work-gripping device of novel form that will securely hold in operative position work that is being riveted, and thus overcome the necessity of employing a workman for the specific purpose of holding the work during the riveting operation.

Another object is to provide a work-gripping device for riveting dies that will hold the work in such a position that there is little liability of a rivet becoming canted or assuming an incorrect position during the operation of upsetting the rivet. And still another object is to provide a stationary die or upsetting die for riveting machines that is equipped with a work-holding device that prevents the work from swinging or drifting out of line after the rivet is in place ready to be upset, and which is so designed that the work can be moved vertically and horizontally after a rivet has been upset without moving the work laterally away from the work-holding device.

Other objects and desirable features of my invention will be hereinafter pointed out.

Figure 1 of the drawings is an elevational view partly in section of a riveting machine equipped with a work-holding device constructed in accordance with my invention, showing the plunger die thrust forward to a point where the rivet is ready to upset. Fig. 2 is a top plan view of the upsetting die and the work-holding device that is combined with same. Fig. 3 is a vertical longitudinal sectional view taken on the line 3—3 of Fig. 2; and Fig. 4 is an end view of the upsetting die and the work-holding device.

Referring to the drawings which illustrate the preferred form of my invention, A designates the stationary die or upsetting die of a riveting machine, such, for example, as a pneumatic, hydraulic or compression riveter, and B designates the movable die or plunger die of the machine. The work *x* herein shown, which consists of a circular shell provided with a crowned head or end piece, is arranged between the dies A and B, and after the rivet *y* has been inserted the work is shifted into operative position between said dies. It is the general practice to employ workmen for the specific purpose of holding the work in operative position between the dies A and B, so as to prevent the work from swinging or drifting out of line or ahead and away from the plunger die, due to momentum caused by thrust of said die and the sudden retarding in velocity of thrust by rivet engaging upsetting die during the operation of upsetting the rivet, thus insuring in this manner a normal uniform head on both ends of rivet. It must be borne in mind that in operating riveting machines of the type referred to, the rivet is inserted in the work and thereafter the work is brought up against the plunger die with the rivet head in the cup of same before the plunger die moves, and when the plunger die moves forwardly, the work is moved thereby, and gathers momentum that tends to carry it away from the plunger die when the rivet comes into contact with the stationary or upsetting die. If it were impossible to prevent the overthrowing of the work, due to the thrust of said plunger die, practically every rivet upset would be a failure, as the rivet coming in contact with the stationary die retards or stops the thrust of the plunger die, and the work would continue on away from said plunger die, thus allowing the rivet to back out of its hole to such an extent that the upset end would be only partly formed, and the outer end would be what is termed an abnormal squash. As before stated, the work to be riveted has heretofore been, to some extent, controlled by workmen, although this has been very unsatisfactory, owing to the large number of imperfectly formed rivets that have had to be taken out and replaced.

In my improved machine a work-holding device C is combined with the stationary die or upsetting die A in such a manner that the work will be held securely against the movable die or plunger die B during the riveting operation, thus overcoming the necessity of employing a workman to hold the work and eliminating the possibility of the rivet becoming canted or backing out

of its correct position. In the preferred form, as shown herein, the work-holding device C consists of a member reciprocatingly mounted on the stationary die A and acted upon by a coiled compression spring D that holds said member securely against the work, but permits the work and said member to move inwardly toward the stationary die when the plunger die B is in operation. In other words, the upsetting die A of my machine is provided with a spring-pressed work-holding device C that bears against one side of the work being operated upon, and thus holds the work securely against the movable die B, thereby preventing the rivet *y* from assuming an angular or partly backed out position and preventing the work from drifting or swinging out of alinement with the dies after each stroke of the plunger die B.

The upsetting die A is made of hard steel and the front end of same is tapered off at 1 so as to permit the work-holding device C to bear upon the work in close proximity to the rivet, as hereinafter described. At the rear end of the die A is a shank or extension 2 that projects into a bore in the stake E of the riveting machine, and means are provided for securely connecting said die to the stake E, the means herein shown for this purpose consisting of a bolt 3 that passes through the stake and which is tapped into the rear end of the extension 2 on the die. The work-holding device C herein shown is in the form of a sleeve that is slidingly mounted on the die A, said sleeve being provided with an elongated slot 4 that receives a guide pin 5 on the die A, which prevents said sleeve from rotating relatively to the die A. The coiled compression spring D surrounds the sleeve portion of the work-holding device and at one end bears against an annular flange 6 on same, the opposite end of said spring bearing against the stake E of the machine. Adjacent the rear end of the die A is an annular flange 7 which centers the spring D and holds it spaced away from the die A, and the ends of said spring are tapered off, as shown in Fig. 2, so as to form flat faces at the ends of the spring which provide sufficient bearing for the spring against the shoulder 6 on the work-gripping device and the stake E which carries the upsetting die. The spring D is of sufficient cross-sectional area to offer the necessary resistance to the rearward thrust of the work-gripping device C to firmly grip the work when the plunger die B moves forwardly, thus causing the rivet to line up true, with the head thereof lying snugly against the outside of the work, before being upset in the die A. At the front end of the device C are a plurality of work-gripping jaws *c* that are beveled off or tapered on their inner sides, as shown in Fig. 3, so that they will conform to the tapered portion 1 at the front end of the upsetting die A, the tapered portions of the jaws *c* being a trifle shorter than the tapered part 1 of the die A, so that the front face of said die A will project slightly beyond the ends of the jaws *c* when the work-clamping member C is forced far enough back to bring the beveled faces on the jaws *c* into engagement with the tapered portion 1 of the die A. The two upper jaws are preferably tapered off partly at the top and front thereof so as to better adapt themselves to certain kinds of work, such as the riveting of dished heads where the flange is not very wide. The spring D which acts upon the work-clamping member C has sufficient coil pitch to permit the member C to move clear back against the tapered portion 1 of the die without fully compressing the spring, thereby permitting the die A to be redressed as the cup of same becomes worn.

In the embodiment of my invention herein shown the work-gripping member C is provided with four jaws *c* which are so arranged with relation to each other that a horizontal slot and a vertical slot are provided between the jaws, as shown in Fig. 4. The jaws *c* are of sufficient length to bear against the inner side of the article being riveted when the inner end of the rivet *y* engages the cup in the die A, and the vertical and horizontal slots between said jaws are wide enough to permit the upset end of the rivet or head of the rivet to pass freely from between same after the upsetting operation, by shifting the work horizontally or vertically, thus overcoming the necessity of moving the work laterally away from the work-clamping device C, after the riveting operation has been completed. While the front ends of the jaws *c* are of sufficient area to obtain a firm hold on the work, still they are small enough to enable all of the jaws to bear upon the inner lap of the seam at the same time, thus eliminating the possibility of the work being held in a slanting position and throwing the rivet out of line, as would occur if two of the jaws engaged the inner surface of the inner lap and the other two jaws engaged the inner surface of the outside lap.

My invention is applicable to compression, power, pneumatic or hydraulic riveters, and the main advantage of same is that it overcomes the necessity of employing a workman for the specific purpose of holding the work in operative position during the riveting operation. It places the work entirely in the hands of the operator of the riveting machine, so far as upsetting the rivet and holding the work in place is concerned, the rivet boy merely heating the rivets and putting them in place in the usual

manner. In addition to eliminating the services of one workman, my invention insures perfectly formed rivets, owing to the fact that the stationary die or upsetting die of the machine has combined with it a spring-actuated work-clamping device that bears upon the work in close proximity to the rivet and holds the work so securely against the movable die or plunger die of the machine that it is impossible for the rivet to become canted or assume an angular, as well as a lax or partly backed-out, position during the operation of upsetting a rivet.

Having thus described my invention, what I claim is:

1. An upsetting die for riveting machines provided with a tapered end, and a spring-pressed work-clamping member on said die having a tapered portion through which the tapered part of said die projects slightly during the riveting operation, said coöperating tapered portions limiting the movement of said work-clamping member in one direction with respect to said die.

2. An upsetting die for riveting machines consisting of a cylindrical-shaped member, a tubular-shaped work-clamping member reciprocatingly mounted on said die and provided at its front end with a plurality of spaced work-engaging jaws, the spaces between said jaws being of a width slightly greater than the diameter of a finished rivet head, and a coiled compression spring surrounding said tubular-shaped member and bearing against a shoulder thereon.

3. An upsetting die for riveting machines consisting of a cylindrical-shaped member provided with a tapered end, a tubular-shaped work-clamping member reciprocatingly mounted on said die and provided at its front end with a plurality of work-engaging jaws whose inner sides are beveled so that they will conform to the tapered portion of said die, a compression spring surrounding said tubular-shaped member and bearing against a shoulder thereon, and means adjacent the rear end of said die for holding said spring spaced away from the shank thereof.

4. In a riveting machine, a rigid support; an upsetting die comprising a cylindrical member having a tapered portion at its front end, and an integral collar adjacent its rear end; a cylindrical work-gripping member slidably mounted on said die and provided at its front end with inturned tapered portions that limit the rearward movement of said member on said die; and a coiled expansion spring interposed between said support and a shoulder on said member so as to normally tend to force said member forwardly on said die, said spring surrounding the collar on said die at its rear end.

In testimony whereof I hereunto affix my signature in the presence of two witnesses, this 1st day of August, 1914.

GUY W. OSBORNE.

Witnesses:
THOS. C. DAVIS,
CHARLES H. WISEMAN.