(No Model.)

J. D. STIRCKLER.

PROCESS OF RIVETING.

No. 439,043. Patented Oct. 21, 1890.

Fig. 1.

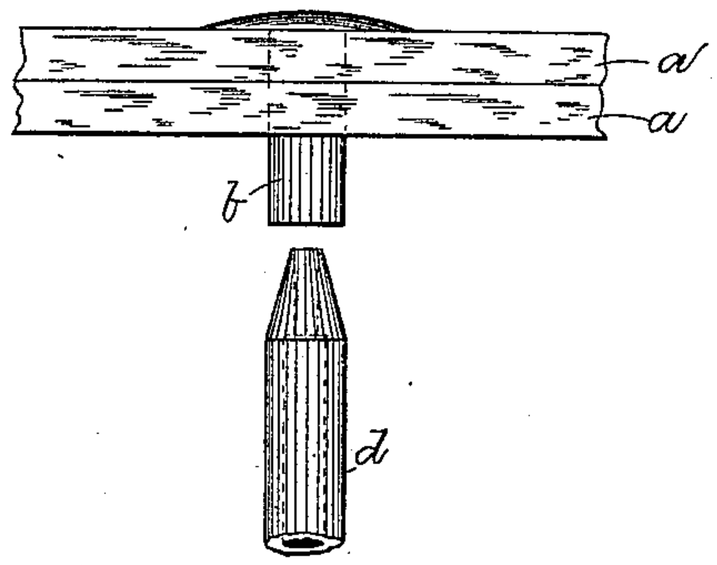


Fig. 2.

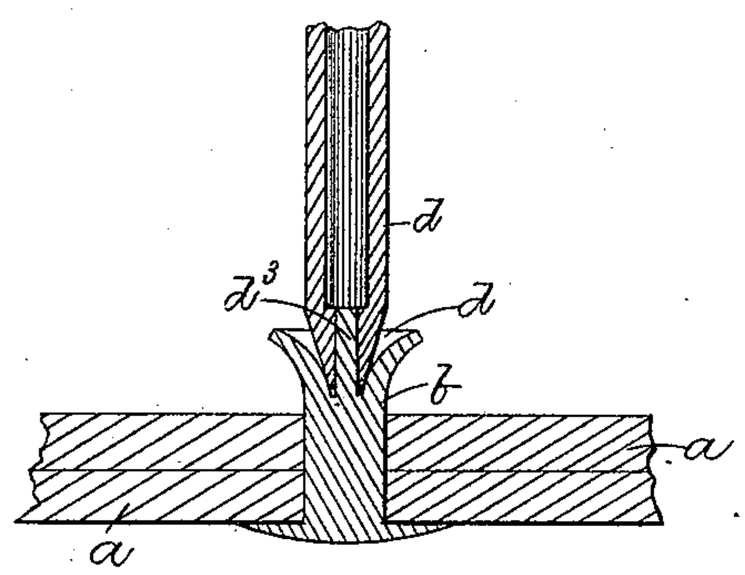


Fig. 3.

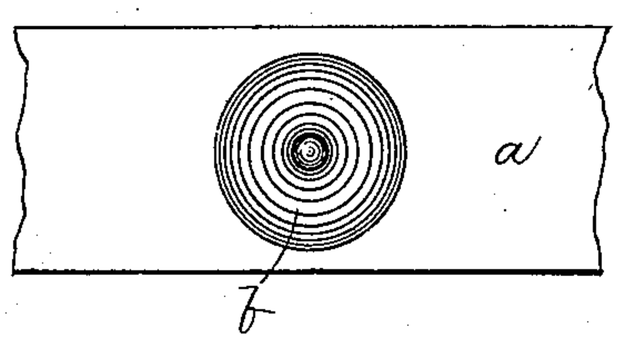


Fig. 4.

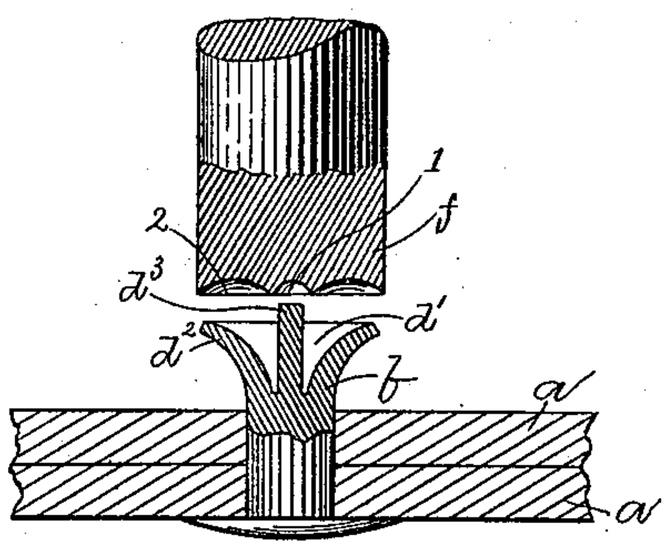


Fig. 5.

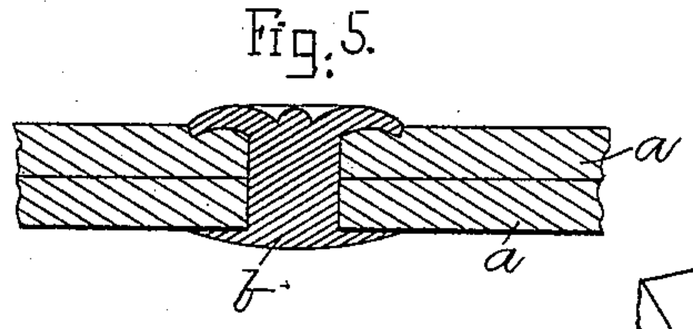


Fig. 6.

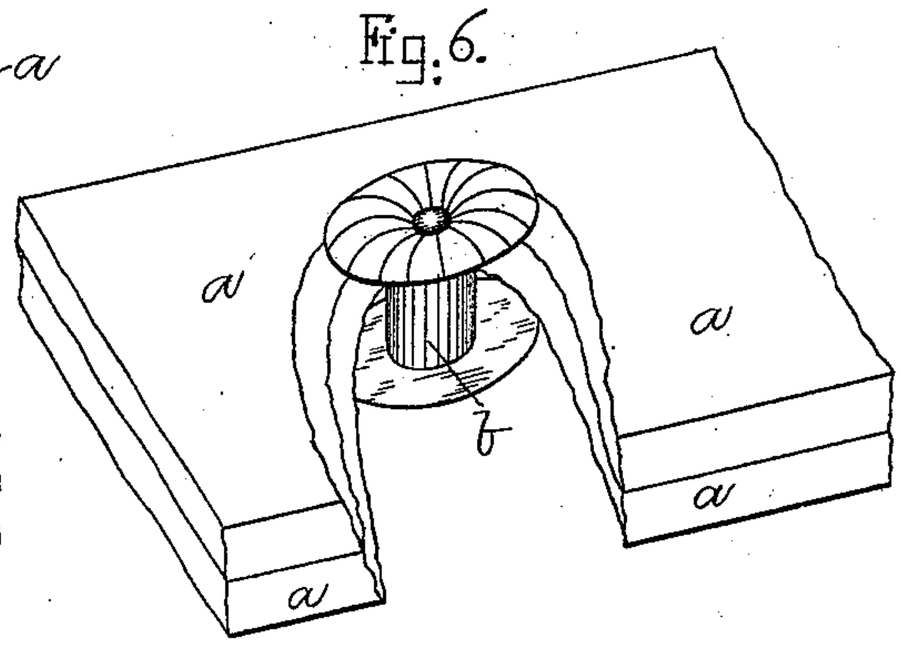


Fig. 7.

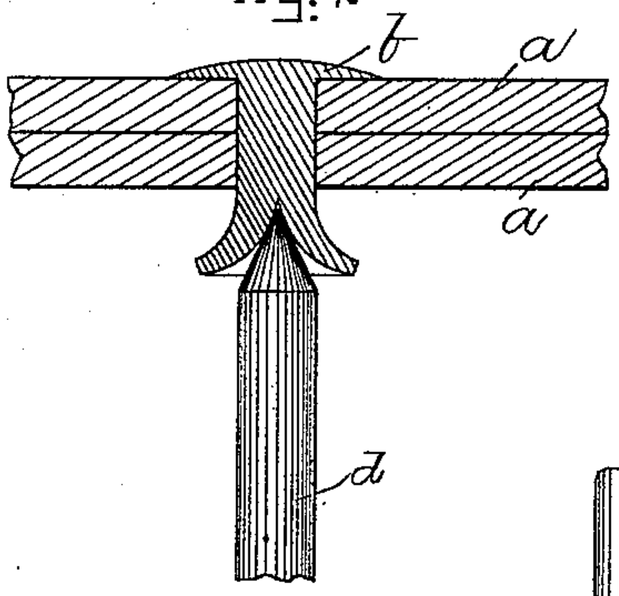
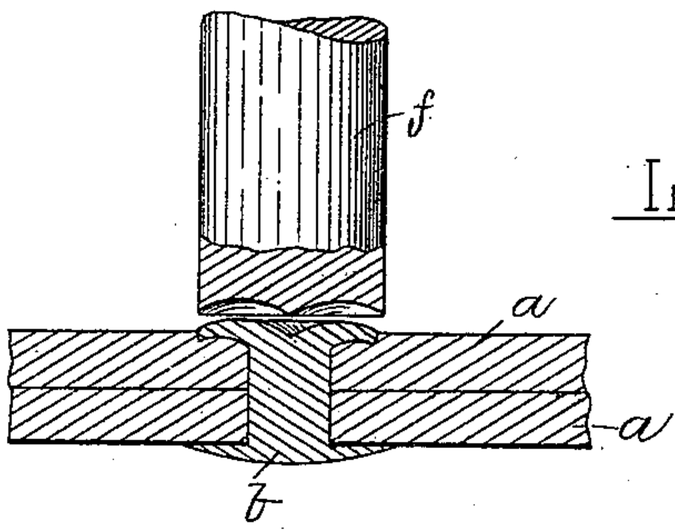


Fig. 8.



Witnesses.

Lauriston H. Miller

John R. Snow

Inventor.

John D. Stirckler

by his attys.

Wagner & Dickerson

UNITED STATES PATENT OFFICE.

JOHN DAVID STIRCKLER, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO THE STANDARD RIVET COMPANY, OF SAME PLACE.

PROCESS OF RIVETING.

SPECIFICATION forming part of Letters Patent No. 439,043, dated October 21, 1890.

Application filed April 21, 1890. Serial No. 348,937. (No model.)

To all whom it may concern:

Be it known that I, JOHN DAVID STIRCKLER, of Boston, in the county of Suffolk and State of Massachusetts, have invented a new and useful Improvement in Process of Riveting, of which the following is a specification, reference being had to the accompanying drawings, in which—

Figure 1 is a view showing a rivet through material, with a punch in position to strike the end of the shank. Fig. 2 is a sectional view of what is shown in Fig. 1, the punch being in its lowest position. Fig. 3 is a plan of the rivet in place in stock after the end of the shank has been operated on by the punch. Fig. 4 is a view, partly in section, of my new rivet in place in stock and ready to receive the blow of an upsetting-die. Fig. 5 is a view, partly in section, of the rivet in place in stock and of the upsetting-die, showing the end of the rivet after its shank has been upset. Fig. 6 is a plan of the upset rivet in place in stock. Figs. 7 and 8 show a modification.

My invention is an improvement on the process or mode of riveting set forth in my patent, No. 415,885, dated November 26, 1889, the object of my present invention being to cheapen and simplify the process set forth in my patent, and at the same time to produce a method better adapted than my patented method for practice on a commercial scale.

In my patent, No. 415,885, my plan is to break or cut off the central core after upsetting or spreading the circumferential portion of the shank surrounding the central core.

My present invention consists in putting the rivet through the stock, the rivet being inserted through a hole already formed or making its own hole and then cupping and upsetting the end of the shank.

In the drawings, *a* is the material, *b* the rivet, and *d* the hollow punch which I prefer to use to cup the end of the shank. This hollow punch is like the one I use in my patent, and forms an annular groove *d'* in the end of the shank, this groove separating the circumferential portion d^2 from the central core d^3. Since making my patented invention I have discovered that it is quite unnecessary to cut out or break off the central core d^3. The hollow punch which I preferably employ is forced into the end of the shank forming the core d^3 and circumferential portion, which is bent outward. This enables me to have the shank of the rivet fill the hole in the material, this being a very important matter, as is well known to all skilled in the art. When the punch is withdrawn, a die *f* is brought into play and the circumferential part of the shank upset, forming a flange and securing the rivet securely in place. At the same time by the same die the central core is smashed down, as shown in the drawings.

In the modification the punch, instead of being hollow, is solid, and simply cups the end of the rivet-shank, and this cupped end is then upset. By this plan I am enabled to have the rivet-shank fill the hole in the material; but I greatly prefer to use the hollow punch and treat the rivet-shank as shown in my other figures, because the solid punch in forming the cup compresses the metal in some cases more than is desirable. The hollow punch cuts into the shank and the upset is formed without fracture and with great neatness and smoothness. The central core being smashed down, adds somewhat to the strength of the fastening, re-enforcing in a measure the upset flange.

Another feature of my invention is the die *f*, the face of which is formed with a cup 1 within a cup 2, the bottom or end wall of the cup 1 engaging the end of the central core and forcing the core toward the main part of the shank at the same time the circumferential portion is turned over or upset to form the flange.

What I claim is—

1. The improvement in the art of riveting, consisting in putting the rivet through the material and then cupping the end of the shank and upsetting that cupped end, substantially as and for the purpose set forth.

2. The improvement in the art of riveting, consisting in putting the rivet through the material, then forming the end of the shank with the circumferential part and central core, and then smashing down the circumferential part and central core, substantially as and for the purpose set forth.

3. A die having its face formed with a cup 1 within a cup 2, substantially as and for the purpose set forth.

JOHN DAVID STIRCKLER.

Witnesses:

J. E. MAYNADIER,

EDWARD S. BEACH.