

No. 625,491.

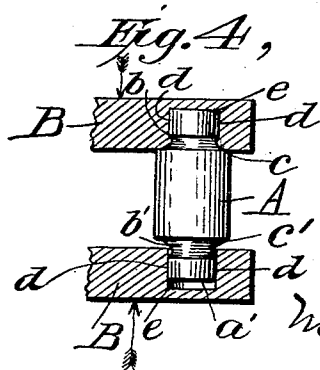
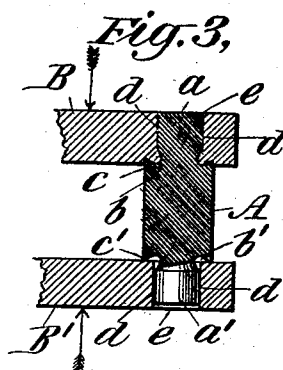
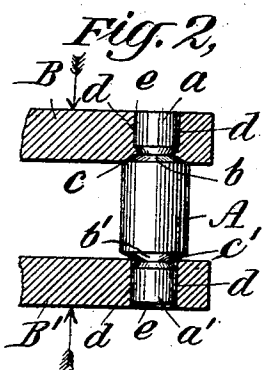
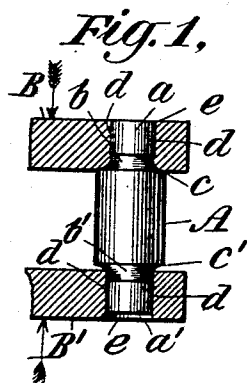
Patented May 23, 1899.

M. D. CONVERSE.

RIVET.

(Application filed July 30, 1896.)

(No Model.)



WITNESSES:

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RIVET.

SPECIFICATION forming part of Letters Patent No. 625,491, dated May 23, 1899.

Application filed July 30, 1898. Serial No. 687,275. (No model.)

To all whom it may concern:

Be it known that I, MASCHIL D. CONVERSE, a citizen of the United States, residing in the city, county, and State of New York, have invented certain new and useful Improvements in Rivets, of which the following is a specification.

My present invention relates more especially to self-setting hardened-steel or other hard-metal rivets, pins, and studs to be fixed in ductile, wrought, or malleable cast metal without the use of swaging tools or dies.

It is frequently desirable that the head ends of rivets, pins, or studs or analogous members should not project beyond the external surfaces of the parts attached and that the same be of hardened metal—as, for example, in drive-chains, where the center portions of the rivets or pins serve as pivots for the block or intermediate links, which also are usually of hard metal. In some instances it is also desirable that the heads of rivets or studs should not appear in the external surface of the parts attached in order that their location may be concealed—as, for example, in lock-cases—while in drive-chain manufacture and construction a hardened self-setting rivet or pin that needs not to have its head project beyond the lateral exterior of the side links and that can be set without disturbance or indentation thereof not only is desirable as offering less surface roughness or unevenness for the catching of grit when the chain is in service, but because of the greater facility with which such a rivet may be set by automatic machinery.

Hard-metal rivets having circumferential grooves or depressions near the ends for the reception of the softer metal of parts to be bound have been made with beveled margins incident to said grooves or depressions, forming the walls thereof wholly within zones compassed by the circle of the rivet-heads. Examples of this type are shown by Letters Patent of the United States issued to me, No. 460,952, and by Letters Patent of the United States No. 505,296, and by British patent to Boulton, No. 21,656, 1895. Such rivets are in all cases set, or, more properly, have the parts to be bound affixed to them by the medium of special swaging tools or dies applied upon the soft metal of the parts bound, in close prox-

imity to their extreme ends in a way either to convergingly compress (as shown in said patent to me, No. 460,952) or to indent and convergingly compress (as in said United States Patent No. 505,296 and in said British Patent No. 21,656, 1895) the soft metal of the attached parts upon the outermost sides of the same, while the sides thereof next the body of the rivet are variously prevented from disturbance during the swaging operation. In drive-chain manufacture it has been found that these swaging tools or dies are with difficulty maintained, owing to liability to breakage, especially when operated by automatic machinery, and, furthermore, require a very complex form of automatic machine for their proper operation, entailing further annoyance and expense for repairs. The purposes of my present invention are to overcome these difficulties and attain the advantages enumerated in a simple, convenient, and effective manner and to provide a construction for a rivet, pin, or stud and for analogous articles adapted to be self-setting without the employment of swaging tools or dies and also to insure simplicity and accuracy in the application of the rivet and to cheapen the cost of production and application.

My present invention comprises, essentially, a hardened rivet provided with outstanding shoulders upon its body portion, located in a zone outside of or beyond the circle of the heads of the reduced ends of the rivet adjacent to the beveled walls of circumferential grooves or depressions in the reduced ends thereof, said outstanding shoulders being so constructed and adapted that when the reduced ends of the rivet are entered in suitably-dimensioned holes in the parts to be bound or attached and pressure is externally applied—as, for example, by the application of the flat opposing jaw-faces of a common parallel vise—on the latter in the direction of the axial line of the rivet the softer metal of said parts on the inner sides thereof next the body of the rivet at the edges of the inner ends of the holes will by the abutting contact of said outstanding shoulders be turned and caused by said outstanding shoulders of the rivet acting as swages or dies to flow into and completely and compactly fill the said grooves in the necks of the rivet and firmly

bind the same; and, further, it consists in means for concealing the rivet ends and in other devices hereinafter disclosed. These devices, means, and methods will hereinafter be fully described and claimed.

In the drawings, Figure 1 is a side elevation, partly sectional, showing the peculiar construction and the relation of the parts of my improved rivet and illustrating the method of setting and the operation of the same. Figs. 2 and 3 are side elevations, both partly sectional, showing modifications of my invention; and Fig. 4 is a side elevation, partly sectional, showing how by the use of my improved self-setting rivet the heads thereof may be concealed in the attached parts, all of which will hereinafter be more fully described in detail.

Like letters indicate corresponding parts throughout the several figures.

A is the body portion of the rivet, *a* and *a'* are the reduced ends thereof, and *b* and *b'* are circumferential grooves or depressions at the base of these reduced ends, adjacent to which are provided outstanding landings or shoulders *c* and *c'*, the slope of which latter must lie in a zone outside of the circle of said reduced ends and preferably have a flat angle of something more than forty-five degrees (45°) to the axial line of the respective reduced ends of the rivet, and *d d d d* are smooth cylindrical surfaces on the reduced ends of the rivet extending from the extreme ends thereof back to the grooves *b* and *b'*, the functions of which will respectively hereinafter appear.

B and B' are side links, parts to be bound, pierced right-angularly by straight holes *e e* entirely through in Figs. 1, 2, and 3 and partially through in Fig. 4 for the reception of the rivet ends.

The corresponding parts in all figures are similar, except that in the modification shown by Fig. 2 the grooves *b* and *b'* are V-shaped at their bottoms, and in Fig. 3 the peripheral edges of the outstanding sloping shoulders *c* and *c'* are raised so that they are slightly undercut, and in Fig. 4 the holes *e e* do not entirely pierce the attached parts B and B', the rivet ends here being correspondingly shortened.

The preferred form for the grooves *b* and *b'* is shown by Figs. 1, 3, and 4, where their bottoms are rounded, and the same figures show the preferred construction for the shoulders *c* and *c'*, where they slope slightly away from the margins of the beveled walls of said grooves, the sharp angle in the V of the grooves in Fig. 2 being less desirable as making an emphasized point of breakage.

The operation of my invention and mode of application thereof are as follows: The rivet and parts to be bound thereby having been constructed substantially as shown, the former of a hard metal and the latter of a softer, the ends of the rivet are entered in the holes therefor in the latter (as illustrated

by the lower half of each figure) and suitable pressure, as by a vise, a pair of rolls, or by a square-on stroke from a flat-faced hammer, is brought to bear simultaneously upon the exterior sides—*i. e.*, from above and below in each of the figures—of the links B and B' in the direction of the axial line of the rivet, as indicated by the arrows, which forces the soft-metal parts B and B' to a contact, at the margins of the inner ends of the holes therein, with the harder outstanding sloping shoulders *c* and *c'*, causing the metal of the parts B and B' at this point of contact by the swaging action solely of these outstanding shoulders of the rivet itself to be depressed and flowed from the zone outside the plane of the reduced ends of the rivet convergingly into and to completely and compactly fill the grooves *b* and *b'*, as shown by the upper half of each figure. The lower half of each figure shows the relations of the form of the rivets and links—parts to be bound—before this setting operation has been performed.

It will be seen that the smooth cylindrical surfaces *d d d d* along the reduced ends of the rivet provide ample area of guiding-contact within the holes *e e*, (which they should fit snugly,) without which device the parts B and B' would be likely to get out of true position during the compression incident to the setting or riveting operation described.

It will be readily understood by those skilled in the art that there can be no failure in the flowing and upsetting of the metal at the described points of the parts B and B', so as to firmly grip and completely fill suitably-dimensioned grooves *b* and *b'* in the rivet, provided the leading feature or element of my invention, to wit: suitably-sloped landings or shoulders, *c* and *c'*, are constructed upon the body portion of the rivet and provided they are located in a zone outside the circle of the reduced ends thereof, even though the pressure or compression and movement of the parts B and B' are at right angles to the general direction of this flow of the metal, for the reason that the converging flow of the metal of relatively large volume meets a decreasing and relatively small space in the grooves, upsets upon itself, and consequently is projected centripetally, overtaking promptly all the confines of said grooves or depressions.

It will be seen that by stopping off the extremities of the rivet, making the distance therefrom, respectively, to the extreme peripheral level of the edge of the outstanding shoulders *c* and *c'* of Figs. 1 and 2 or to the level of the lowermost point in the slope of the undercut shoulders in Fig. 3 equal to the thickness of the links B and B', the rivet ends will be flush with the outer surfaces of said links after they are set, and that the ends of the rivet, furthermore, will serve as stops against the face of a hammer, rolls, jaws of a vise, or other plane surface applied during the riveting operation, or against the intervening bottom of the holes in case of con-

cealed riveting. (Shown in Fig. 4.) In this latter form, however, the length from said described points on the slope of the outstanding shoulders to the rivet ends is made equal to the depth of the holes for the latter. Therefore exact uniformity of finish—for example, in transverse width over all in drive-chains—is secured without employment of auxiliary means.

10 For convenience I have shown the application of my invention to drive-chain construction; but I do not limit myself to this, since it is apparent that it is adapted to be advantageously employed in many and varied structures; nor do I wish to limit myself to the use of the described relative length of the rivet ends and thickness of ductile parts, since it is apparent that these might be so proportioned that when the rivet is set the rivet ends would protrude beyond the exterior of the latter without in the least interfering with or departing from the spirit of the leading features of my invention.

It will also be clearly understood that studs or similar members having my invention embodied in their construction may be set by the application of pressure directly upon one end of the same in the direction of its axial line.

Having described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. A self-setting hard-metal rivet having reduced ends, circumferential suitably-dimensioned grooves at the base of its reduced ends, outstanding shoulders located in a zone outside the circle of said reduced ends and sloping into said grooves, in combination with

ductile parts of less, like or greater thickness than the length of the reduced rivet ends but materially greater than the transverse dimensions of said grooves and pierced by suitable holes for the reception of said rivet ends, the whole constructed and proportioned to operate substantially as and for the purposes shown and described.

2. A self-setting hard-metal rivet having reduced ends, circumferential suitably-dimensioned grooves at the base of its reduced ends, outstanding shoulders located in a zone outside the circle of said reduced ends and sloping into said grooves, and cylindrical surfaces on said reduced ends, in combination with ductile parts of less, like or greater thickness than the length of the reduced rivet ends but materially greater than the transverse dimensions of said grooves and pierced by suitable holes for the reception of said rivet ends, the whole constructed and proportioned to operate substantially as and for the purposes shown and described.

3. As an improved article of manufacture, the herein-described self-setting rivet comprising a rivet of hard metal provided with reduced ends, comparatively narrow circumferential grooves at the base of its reduced ends, and outstanding shoulders located in a zone outside the circle of said reduced ends sloping into said grooves, the whole proportioned so as to operate substantially as shown and described.

MASCHIL D. CONVERSE.

Witnesses:

SAML. A. DRURY,
H. GLENN PHELPS.