

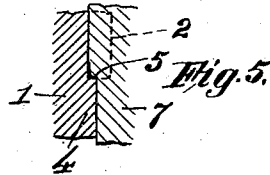
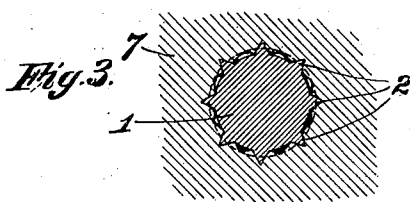
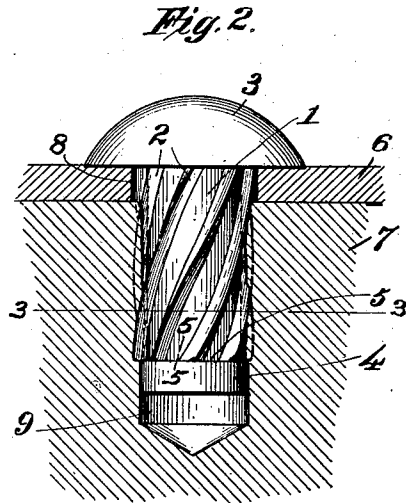
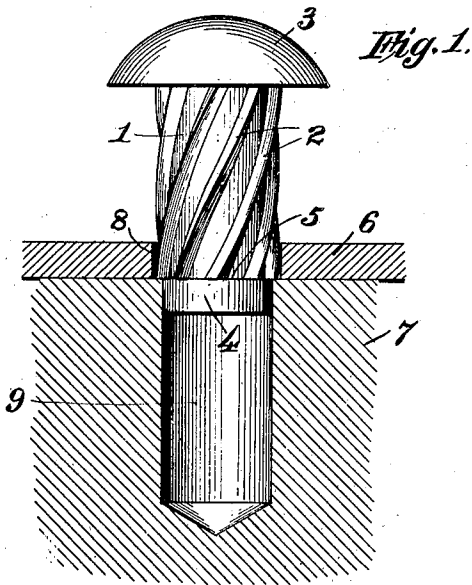
Jan. 29, 1924.

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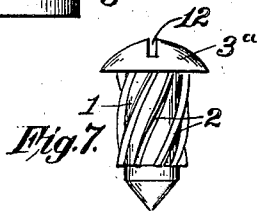
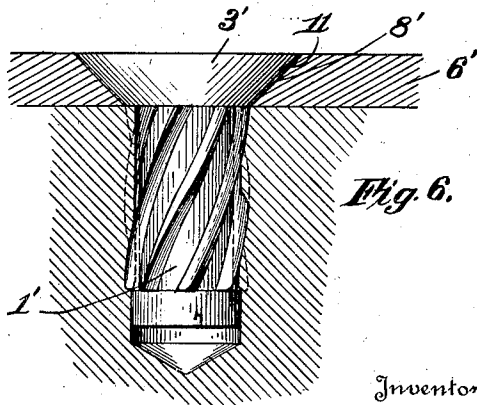
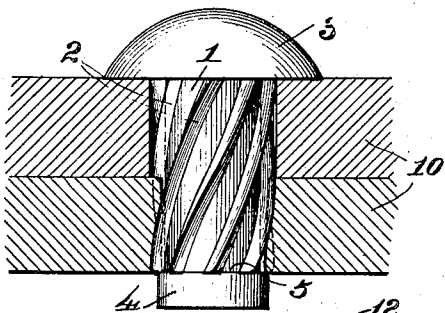
H. ROSENBERG

METALLIC FASTENER

Filed Sept. 24, 1921



*Fig. 4.*



Inventor.

Heyman Rosenberg,  
Edgar M. Fitchin,

By

his Attorney.

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# UNITED STATES PATENT OFFICE.

HEYMAN ROSENBERG, OF NEW YORK, N. Y.

METALLIC FASTENER.

Application filed September 24, 1921. Serial No. 502,972.

*To all whom it may concern:*

Be it known that I, HEYMAN ROSENBERG, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Metallic Fasteners; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to improvements in fastening devices, and more particularly to the type of pins employed for securing together plates of metal.

The object in view is the provision of means for quickly and easily, and yet effectively, securing name plates, metal tags, or like parts to the frame of machinery, or for securing together thin plates or sheets of metal, or for securing thin plates or sheet metal to heavier sections of metal.

A further object is the provision of such a securing means adapted to interlock with the engaged parts in a manner to resist removal of the securing means.

With these and further objects in view as will in part hereinafter become apparent and in part be stated, the invention comprises certain novel constructions, combinations and arrangements of parts as subsequently specified and claimed.

In the accompanying drawings,—

Figure 1 is a view partly in side elevation and partly in section showing an embodiment of the present invention in the position of first introduction preparatory to being forced to its seat, the parts being shown on a greatly magnified scale.

Figure 2 is a similar view of the same after seating.

Figure 3 is a transverse section taken on the plane indicated by line 3—3 of Figure 2, and looking downward.

Figure 4 is a view similar to Figure 2, illustrating the connection of two sheets or thin plates of metal.

Figure 5 is a fragmentary, vertical section taken on the plane indicated by line 5—5 of Figure 2.

Figure 6 is a view similar to Figure 2 of a slightly modified embodiment.

Figure 7 is a view similar to Figure 4 of a further slight modification, the parts being shown on a somewhat reduced scale but still magnified beyond actual size.

Referring to the drawings by numerals, 1 indicates a pin having a substantially cylindrical body formed with multiple, high-pitched threads 2, 2, and at its upper end having a head 3. The threads 2 are of such pitch that they extend angularly only a comparatively slight distance about the body of the pin 1 in the course of their length from the head 3 substantially to the other end of the pin. The pin 1 extends beyond the ends of the threads 2 in the form of a smooth, cylindrical portion 4, which serves as a guide or pilot and also as a lock. As best seen in Figure 5, the pilot 4 is of slightly greater diameter than the diameter of the pin 1 at the places of the valleys or grooves which appear between the threads 2, thus leaving a shoulder 5 at the upper terminus of the pilot 4 between the lower ends of each two of the threads 2. The threads 2 are made of hardened material so as to cut their way into or through the substances through which the pin 1 is passed, and for purposes of convenience in manufacture, the pin may be of case-hardened iron or steel so as to provide the requisite hardened cutting threads 2 at a minimum cost of manufacture. Reference in the appended claims to the fact that the threads are hardened will be readily understood by engineers and mechanics as directed to that clearly defined distinction universally recognized in the metal industry between hardened metal and soft metal. Metal working tools are hardened in order to enable them to enter or cut the same metal in its soft state, and the reference to the hardened threads, therefore, is to be taken to mean that character or condition of the threads distinguishing them from the threads of the soft iron of the conventional wood screw in that the hardened threads are able to cut or enter soft iron or soft steel substantially without injury to or effect upon the hardened threads. Hence, the reference to the hardened condition of the threads in the appended claims is to be taken in each instance to signify that degree of hardness enabling the threads to enter or cut metal, such as soft iron and soft steel, substantially without injury to the threads.

In applying the pin 1, after the manner indicated in Figures 1, 2 and 3, a sheet 6 is to be secured to a plate 7, or other part of a machine, and the sheet 6 is formed with an aperture 8 of a diameter equal to or slightly

larger than the greatest distance between the cutting edges of opposite threads 2, and the part 7 is drilled to form a bore 9 equal substantially to the diameter of the pilot 4.

5 The pin 1 is placed in position, as indicated in Figure 1, with the pilot 4 extending into the bore 9. The head 3 is then struck by a hammer or other suitable implement until the pin is driven to the position indicated in  
10 Figure 2. During this driving action, the metal of the part 7 will be severed by the several threads 2 and caused to flow at the opposite sides of said threads into the valleys therebetween and to a position overhanging the shouldered portion 5 of pilot 4. Thus  
15 the metal of the part 7 is caused to effectively lock the pin 1 from being withdrawn. The frictional action of the metal engaging the side walls of the several threads 2 co-operates in retaining the pin in its seated position. The pin rotates somewhat as it is being forced to its seat, as seen in Figure 2,  
20 corresponding to the degree of pitch of the threads 2. As the threads 2 extend angularly partway about the body of pin 1, the pin is primarily a screw, functioning in part as such but also functioning as a rivet, the pilot end being anchored by the interlock of materials as above described in lieu of  
25 being swaged up into the form of a head.

In Figure 4, the securing means consists of the same parts above described and the same reference numerals have been applied, the pin 1 in this instance, however, having  
35 been driven through the sheets or thin plates 10, 10 for securing the same together by the screw-threads and interlocking action above described. The lower plate 10 is provided with an aperture corresponding to the bore  
40 9 of the device seen in Figure 1, and the upper plate with the larger opening so that the cutting action of the threads 2 occurs only relative to the plate 10. The location and function of the pin is thus identical  
45 with that above described, differing only in being applied to slightly different material. Obviously, when the pilot portion 4 of the pin protrudes it may be swaged up unless excessive case-hardening prevents.

50 In Figure 6, the structure shown is identical with that set forth in Figures 1 and 2 and the same description will apply except that the head 3' is formed on the pin 1' which has the overhanging beveled surface 11  
55 adapted to be snugly seated within the recess 8' of the plate 6', the head 3' being flat and designed to lie with its flat face flush with the upper surface of the plate 6'. The other parts of the structure seen in Figure  
60 6 being identical in detail and function with those above described require no further discussion.

65 While the parts indicated by the reference numeral 2 have been referred to as "threads" in view of their angularity and

their resultant functioning at times in a manner somewhat similar to a screw thread of high pitch, the said parts are obviously ribs with valleys between, and the parts are so proportioned that the distance between  
70 the bases of any two diametrically opposite valleys is less than the diameter of the pilot 4.

In Figure 7 the structure illustrated is identical with that shown in Figures 1 and  
75 2, except that the head 3<sup>a</sup> is formed with a kerf 12 of the usual character provided in screws for receiving a screw-driver. The balance of the structure shown in Figure 7 being identical with the details shown in  
80 Figures 1 and 2, the same description and reference numerals are applicable. The application of the structure seen in Figure 7 for attaching plates or sheets together follows the same principle of operation as that  
85 of Figure 1, but instead of employing hammer blows for driving the pin to its locking position, it is forced into place by the employment of a screw-driver which is applied in the usual manner, except that maximum  
90 pressure is employed for thrusting the pin longitudinally while only slightly rotating the same.

Thus it becomes apparent that the securing means is a rivet-like pin, and at the same  
95 time is, in fact, a form of screw so that it may be properly termed a driven screw whether driven by a screw driver through excessive longitudinal pressure and slight  
100 torsional pressure or through driving blows while depending upon the angularity of the threads for causing the required angular movement.

By scientifically-conducted tests it has  
105 been proven that the present pin or driven screw has the same or greater capacity for securing metallic parts together as that of a rivet of equal size, and will resist separation of such connected parts under the same  
110 or greater stresses. It has also been made apparent from carefully conducted experimentation that stresses tending to separate metallic plates connected by the improved  
115 driven screw herein disclosed cause the metal engaged by the hardened threads to flow sufficiently to clog between the threads and thus resist withdrawal movement to the same or greater extent as the resistance of the head of a rivet.

It is not essential that the exact pitch of  
120 the threads shown in the drawings be adhered to. The pitch may be increased or decreased so long as kept within the limits represented on the one hand by being low  
125 enough to cause the drive screw or pin to turn when the pin is being driven in, and to also effect the required hold on the material engaged by the screw, and represented on the other hand by being high enough to permit the screw to be driven into an  
130

opening in metal of a diameter substantially equal to the diameter of the body of the screw while the threads enter the metal surrounding the opening. The number of threads employed is also susceptible of variation, but should be great enough to insure clogging of engaged metal between the threads when the screw is subjected to a withdrawing stress.

10 What is claimed is:—

1. A fastener comprising a pin-like body having high-pitched threads extending longitudinally on the body, and an interlock formed on the body of the pin and adapted to be engaged by the material caused to move by the action of the threads in reaching their final position.

2. A fastener for metal work comprising a pin having a head at one terminus and a pilot at the opposite terminus, and being formed with high-pitched, hardened screw threads extending from the pilot to the head, the diameter of the body of the pin measured from one of the grooves between threads to a diametrically opposite groove being less than the diameter of the pilot.

3. A fastener for metal work comprising a pin having a head at one terminus, hardened, high-pitched threads extending along and angularly about the body of the pin from the head toward the other terminus thereof and terminating short of the length of the pin, and means on the body of the pin adjacent the ends of the threads for underlying and interlocking with metal caused to flow by the action of the threads in arriving at a seated position.

4. A metal fastener comprising a pin having a hardened thread terminating short of the entering end of the pin, and means at the terminus of the thread for underhanging and interlocking with metal caused to flow by the action of the thread.

5. A fastener for metal work comprising a pin-like body having hardened threads of sufficiently high pitch to permit the driving of the body into an opening in metal of a transverse area less than a circle described about and touching the exposed edges of the threads, and sufficiently low to effect rotary movement of the body incident to the action of the threads engaging the metal when the body is being driven into such opening, there being a sufficient number of threads to cause each of the threads to occupy substantially as much space as the space between any two consecutive threads for causing a clogging action between the threads by the metal engaged thereby when the pin is subjected to a withdrawing stress after being driven into such opening.

6. A fastener for metal work comprising

a pin-like body having hardened threads of sufficiently high pitch to permit the driving of the body into an opening in metal of a transverse area less than a circle described about and touching the exposed edges of the threads, and sufficiently low to effect rotary movement of the body incident to the action of the threads engaging the metal when the body is being driven into such opening, there being a sufficient number of threads for causing the spaces between the threads to be equal substantially to the spaces occupied by the threads.

7. A fastener for metal work comprising a pin-like body having a pilot at one terminus and formed with high-pitched hardened threads extending along the body, the diameter of the body measured from the base of one of the grooves between threads to the base of a diametrically-opposite groove being less than the diameter of the pilot.

8. A fastener for metal work comprising a pin having hardened threads extending longitudinally thereof at such a high pitch as to enable the pin to be driven into an opening in metal of less diameter than the greatest distance between diametrically-opposite points on the exposed edges of the threads and sufficiently low to cause the pin to move angularly as the pin is being driven in, the threads being sufficient in number to occupy spaces substantially equal to the spaces between threads and being arranged sufficiently close to each other to cause metal flowing between the threads to wedge therebetween and frictionally resist withdrawal of the pin.

9. A fastener for metal work comprising a pin having a substantially cylindrical body and hardened threads extending along the pin and of sufficiently high pitch to allow the pin to be driven into an opening in metal of substantially the same diameter as the body, a portion of the body extending beyond one terminus of the threads for forming a pilot.

10. A fastener comprising a pin-like body having a rib extending along the body, and a pilot at the entering end of the body outstanding beyond the base of the rib.

11. A fastener comprising a pin-like body having ribs extending along the body with valleys therebetween, and a pilot at the entering end of the body of greater diameter than the distance between the bases of diametrically opposite valleys.

In testimony whereof I affix my signature in presence of two witnesses,

HEYMAN ROSENBERG.

Witnesses:

CHARLES K. KRUPITZKY,  
C. G. WILTSELEK.