Jan. 7, 1958 H. K. SWITZER 2,818,764

SCREW AND SHEET METAL SOCKET THEREFOR

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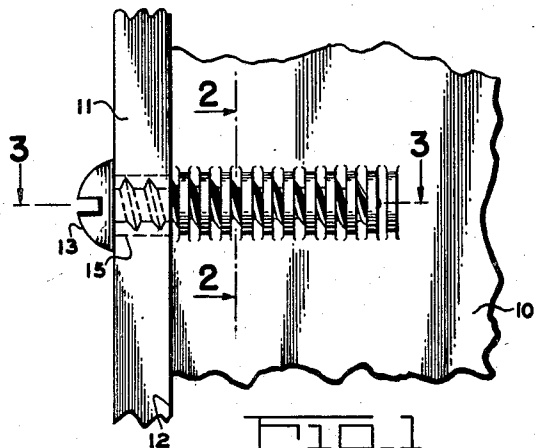


FIG. 1

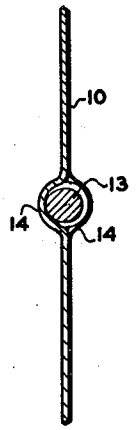


FIG. 2

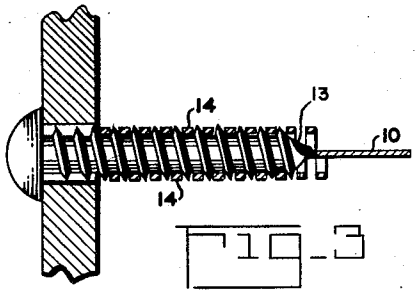


FIG. 3



FIG. 4

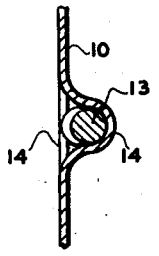


FIG. 6

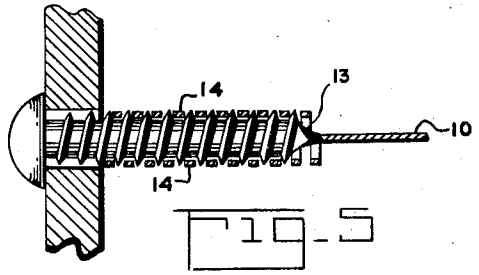


FIG. 5

INVENTOR.
Harold K. Switzer.
BY
Wood, Herron & Evans.
ATTORNEYS.

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SCREW AND SHEET METAL SOCKET THEREFOR

Harold K. Switzer, Alexandria, Ky.

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6 Claims. (Cl. 85—32)

This invention relates to metal fasteners, and is directed in particular to a metal fastener and a method of forming said fastener, which may be used to secure a sheet metal piece, or an article made of sheet metal, or a sheet metal part of an article, to another member, with the plane of the sheet metal, at the place of fastening, disposed edgewise to the member.

One of the objectives of the invention is to provide fastening means of the type set forth which is exceedingly simple in construction, inexpensive to manufacture and exceptionally strong. Another objective is to provide a novel internal thread formation, and a method of fabricating said internal thread formation, which is an integral part of a sheet metal piece and which is arranged with its longitudinal, central axis disposed substantially parallel to the plane of the piece.

Another objective is to provide an internal thread formation of the type set forth which is adapted to receive, without alteration, either a right hand or a left hand coarse pitch, sharp thread screw having a pointed end, such as an ordinary wood screw.

An additional objective is to provide an internal thread formation which may be fabricated in an edge of a sheet metal piece by a simple stamping or dieing operation, the thread formation thus formed being adapted to receive a screw, such as an ordinary wood screw, without further modification.

To fulfill the above objectives and others which will be readily apparent to those skilled in the art, I provide an internal thread formation in a sheet metal piece which comprises a plurality of arcuate bands which are died or stamped out of the sheet metal piece adjacent to an edge thereof. Each band is one-half as wide as the pitch of the screw to be received in the direction longitudinally of the thread formation. In the preferred embodiment, each band is arcuate and protrudes from a side of the sheet metal piece in an arc which is in a plane disposed at a right angle to the central axis of the thread formation. The respective bands protrude alternatively from opposite sides of the piece with the planes of their arcs disposed in equally spaced, parallel relationship with respect to one another. Preferably the bands are all of the same length and as long as, or slightly longer than one-half of the circumference of the screw adapted to be received, excluding the thread thereof. In this embodiment the central axis of the thread formation lies in the plane of the sheet metal piece. In a modified form of the invention the central axis of the thread formation is offset to one side of the plane of the piece. In this embodiment of the invention the bands which constitute one-half of the thread formation may lie in the plane of the sheet metal piece, whereas the bands which form the other half protrude from one side of the piece.

While I am aware that the broad idea of stamping or dieing out sections alternately from opposite sides of a sheet metal piece is old, to the best of my knowledge it has not been proposed heretofore to fabricate a complete, finished thread formation by such a stamping or dieing

operation. In the past, instead of providing narrow bands, one-half as wide as the pitch of a screw to be received, wide sections had been alternately stamped out. As a result it has been necessary to tap the inner, arcuate surfaces of these sections in a secondary operation to provide an internal thread. The tapped, internal screw thread thus formed has been a precisely formed, helical groove adapted to receive a bolt. By contrast, the thread formation of the present invention does not necessarily have to be precisely formed, and it can accommodate an ordinary wood screw, the pointed end of such a screw causing the narrow bands to conform to the screw thread as it is being turned into place. The fastening means of the present invention, therefore, saves the time and expense of a tapping operation and does not require as exacting a stamping or dieing operation.

Other objectives, features and advantages of the present invention will be readily apparent to those skilled in the art from the following detailed description of the drawings in which:

Figure 1 is a side elevational view showing a piece of sheet metal secured to a panel member by fastening means incorporating the principles of the present invention.

Figure 2 is a fragmentary cross sectional view taken on the line **2—2** of Figure 1.

Figure 3 is a fragmentary cross sectional view taken on the line **3—3** of Figure 1.

Figure 4 is a view similar to Figure 3 showing only the piece of sheet metal.

Figure 5 is a cross sectional view similar to Figure 3 in which a screw is utilized having left hand threads.

Figure 6 is a view similar to Figure 2 showing a modification of the invention.

The numeral **10** is used in the drawings to designate a piece of sheet metal. The piece shown is intended to be representative only. For example, the piece may be part of a large panel of sheet metal, a flange formed of thin metal, a web, or a sheet metal part of an article of manufacture. The numeral **11** is used to designate an upright which is affixed to the edge **12** of piece **10** and it represents any object secured to the piece. The numeral **13** designates a coarse pitch, sharp threaded, pointed screw such as an ordinary round headed wood screw. The threads of screw **13** may be either right handed as illustrated in Figure 3, or left handed, as illustrated in Figure 5. In the instance shown, the screw is a single thread type in which the lead is equal to the pitch, the word "pitch" meaning the distance between adjacent crests longitudinally of the screw.

Screw **13** is received in an internal thread formation constituted by a plurality of bands or strips **14** which are died out of the sheet metal. Each band or strip is one-half as wide as the pitch of the screw, and each one is substantially arcuate in shape. In addition, each band is as long or slightly longer than one-half the circumference of the screw excluding the thread. The successive bands, in going from the edge **12** of the piece of sheet metal inwardly, protrude from opposite sides of the sheet alternately. In each instance the arc of the band is at a right angle to the axis of the internal thread formation. Thus, in the instance shown, when the axis of screw **13** is disposed at a right angle to edge **12**, the respective bands are parallel to edge **12**. Considering the first two bands adjacent to edge **12**, the band which is designated A protrudes from the side A1 of the sheet. The band designated B protrudes from the side of the sheet indicated by B1. The width of A plus B is equal to the pitch of screw **13**, as can be seen from Figure 3.

Collectively, the respective bands define an internal thread formation which, although composed of a series of arcuate bands that are concentric with the longitudinal

axis thereof, is adapted to receive and hold a screw just as tightly as if it were made in the helical form of the threads upon the screw.

Preferably, the bands are formed by dies, one of which strikes the side A1 of the sheet of metal to push band B (and all other at its side of the sheet) outwardly into the arcuate configuration shown in Figure 2. The bands at the opposite side of the sheet are formed in a similar manner and preferably at the same time by a die which strikes the side of the sheet designated B1. Formed in this fashion, the outer faces of the bands are smooth; however, the side edges at the inner faces of the respective bands have burrs upon them where the bands shear away from one another when died out. It is found that the burrs thus provided serve to lock the screw once it has been threaded tightly into place.

It is preferred that the bands be died out initially to collectively define an internal thread formation or a screw receiving pocket which is slightly undersize, so that they must be spread slightly to accommodate the screw when it is threaded into place. This provides a tight fit in which the bands grip the sides of the screw in the areas between the turns of the thread.

In the modification shown in Figure 6, the screw receiving pocket is formed by stamping outwardly bands **15** from one side only of the sheet metal material. In all other respects the fastener is identical to the one shown in the other figures. This type of band formation may be utilized where it is desired to offset the axis of the screw to one side of the plane of the sheet metal at the point of fastening.

In the instance shown in Figure 1, screw **13** passes through an aperture **16** in the upright **11** and edge **12** is drawn up tightly against the side of the upright. It will be appreciated that it is not necessary for the edge of the sheet metal to abut the panel. Furthermore, the thread of the screw shown is symmetrical in that the flanks are disposed at the same angle to a line extending through the thread crest at right angles to the axis of the screw. It is contemplated that a buttress thread, in which these angles are not identical may be employed to provide a better, more secure, "bite" between the thread and the respective bands.

Having described my invention, I claim:

1. A metal fastener comprising in combination a coarse pitch, sharp thread, pointed screw and an internal thread formation at an edge of a sheet metal piece, said formation disposed with its axis parallel to the plane of the sheet metal piece and consisting of a plurality of arcuate bands, each band being substantially one-half as wide as the pitch of said screw, said bands protruding alternatively from opposite sides of the piece in planes which are parallel to one another and which are normal to said thread formation axis, and the distance between the inner faces of the bands at opposite sides of the internal thread formation being less than the major diameter of said screw, whereby the crests of the screw thread reside between adjacent bands at the opposite sides of said thread formation.

2. The combination of a coarse pitch, sharp thread, pointed screw and an internal thread formation adapted to receive said screw, said thread formation being formed as an integral part of a sheet metal piece and comprising a plurality of arcuate bands, each band being one-half as wide as said pitch and longer than one-half the circumference of the screw excluding the thread thereof, said

bands being parallel with one another and concentric to a common axis, and the respective bands alternately protruding from opposite sides of said sheet metal piece.

3. The combination of a coarse pitch, sharp thread, pointed screw and an internal thread formation adapted to receive said screw, said thread formation being formed as an integral part of a sheet metal piece in an edge thereof and in the plane thereof, said internal thread formation comprising a plurality of narrow bands, each band being one-half as wide as the pitch of said screw, said bands protruding outwardly alternately from opposite sides of said sheet in arcs which lie in spaced parallel planes disposed normal to the central axis of said internal thread formation.

4. A metal fastener comprising in combination a coarse pitch, sharp thread, pointed screw and an internal thread formation in a sheet metal piece adapted to receive said screw, said thread formation comprising a plurality of bands which are integral with said sheet metal piece and which lie in planes parallel with respect to one another and normal to the central axis of said internal thread formation, each of said bands being one-half as wide as the pitch of said screw, and every other one of said bands being arcuate and protruding outwardly from the same side of said sheet metal piece.

5. A metal fastener comprising in combination a coarse pitch, sharp thread, pointed screw and an internal thread formation in a sheet metal piece adapted to receive said screw, said internal thread formation comprising a plurality of bands which are integral with said sheet metal piece and which lie in planes parallel with respect to one another and normal to the central axis of said internal thread formation, each of said bands being one-half as wide as the pitch of said screw, every other one of said bands being in the plane of said piece, and the remaining bands protruding outwardly from the same side of said sheet.

6. The combination of a coarse pitch, sharp thread, pointed screw and an internal thread formation adapted to receive said screw, said thread formation being formed as an integral part of a sheet metal piece in an edge thereof and comprising a plurality of narrow bands, each band being one-half as wide as the pitch of said screw, said bands protruding outwardly alternately from opposite sides of said sheet in arcs which lie in spaced parallel planes disposed normal to the central axis of said internal thread formation, and the inside diameter of said internal thread formation being slightly undersized relative to the main body portion of the screw, whereby the screw upon being threaded into the thread formation must spread the bands slightly thereby providing a tight fit between the screw threads and the internal thread formation.

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