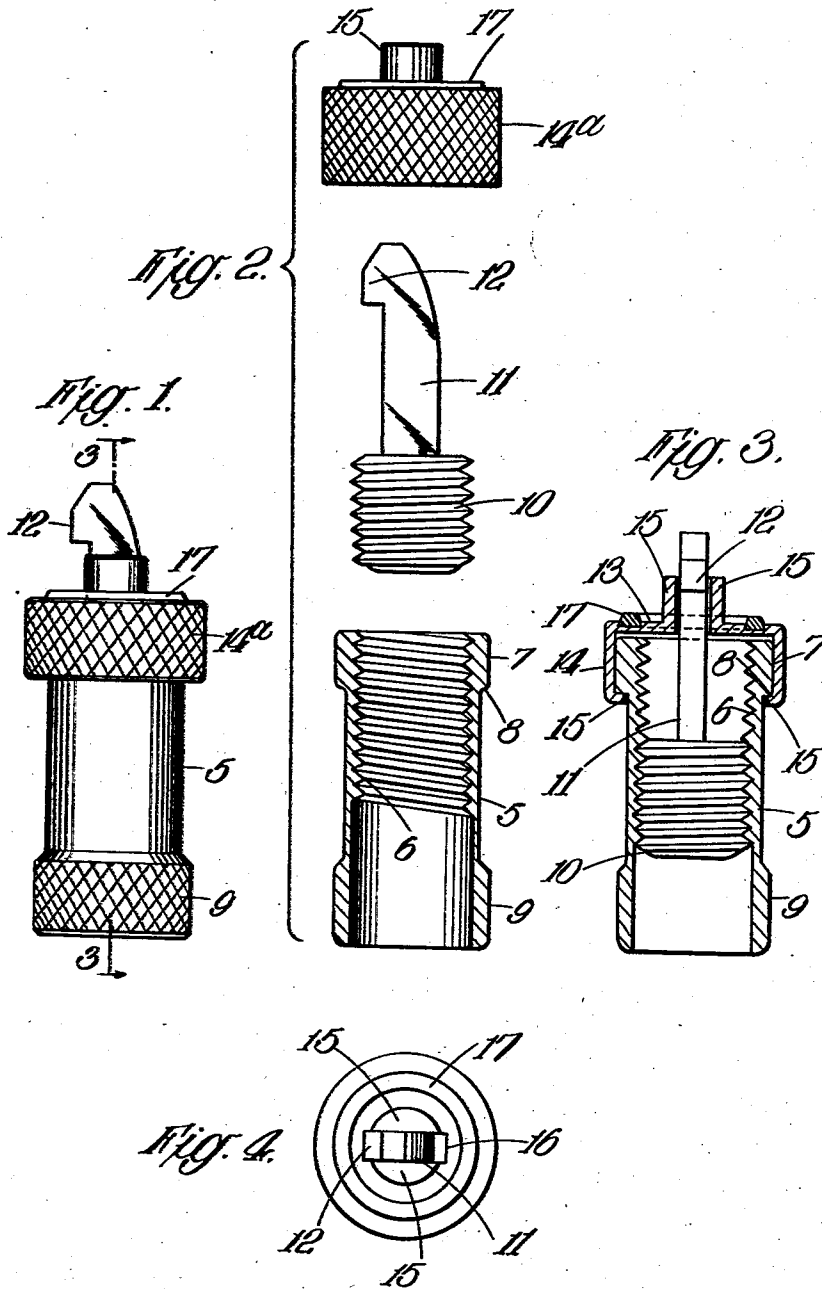


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 DEVICE FOR CLAMPING TOGETHER PIECES OF SHEET MATERIAL
 TO FACILITATE RIVETING AND THE LIKE OPERATIONS
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**DEVICE FOR CLAMPING TOGETHER PIECES
OF SHEET MATERIAL TO FACILITATE
RIVETING AND THE LIKE OPERATIONS**

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6 Claims. (Cl. 85—9)

The present invention refers to improved devices for clamping together pieces of sheet material, especially to facilitate riveting and the like operations.

When light metal sheets have to be riveted together the hitherto usual practice is to use ordinary bolts and nuts for securing the sheets together and much time is lost in threading the nuts on the bolts, especially in the case of closed structures such as the hull of a flying boat or the fuselage or wing of an aeroplane of the kind having a metal skin. In such an operation a second person is usually required to thread the nuts on the bolts and the operation frequently presents great difficulty, e. g., in awkwardly placed corners, and in some cases the inside end of the bolt may be completely inaccessible. The present invention affords a means by which one person can quickly clamp sheets together using only one hand and without the aid of any tools.

The improved device according to the present invention comprises an internally threaded tubular member, a claw member externally threaded for engagement with the internally threaded tubular member and an apertured abutment member, through which the claw member passes, being slidable and non-rotatable therein, and which is rotatably and non-slidably retained on one end of the tubular member.

Preferably the abutment member is provided with a central projecting spigot (adapted to enter an aperture in the workpieces), said spigot being apertured to allow the claw member to pass through it.

By relatively rotating the tubular member and the abutment member the claw member is extended or is withdrawn from the abutment member according to the direction of rotation. In using the device the abutment and tubular members are rotated until the claw is extended to a distance depending on the number and thickness of sheets to be riveted together. The claw is then inserted in a hole passing through all the sheets until its claw end is clear of the inner face of the inner sheet. The abutment member being against the outer face of the outer sheet, the tubular member is screwed in the direction to withdraw the claw and cause it to engage the inner sheet; further rotation of the tubular member causes all the sheets to be clamped together.

The provision of a spigot on the outer face of the abutment member ensures that the device is sufficiently centralised with respect to the hole in the sheets to prevent the claw end from slipping back through the hole when the claw member is retracted to tighten the device.

In a preferred form of construction the shank of the claw member is flat and passes through a slot in the abutment member to prevent relative movement of these parts.

Preferably also one end of the internally threaded tubular member is outwardly flanged and is embraced by the abutment member which is cup-shaped and has its free edge loosely closed in over the flanged end of the tubular member to retain it thereon while allowing it to turn.

It is further advantageous to provide the abutment member with a ring of rubber or a like yieldable frictional substance for abutment on the workpiece. Such a yieldable ring grips the face of the workpiece without damaging the same and prevents the abutment member from turning when the screwed tubular member is rotated within it. Alternatively the rubber or like ring may be omitted and the end of the abutment member may be roughened to afford a frictional grip on the workpiece and prevent the abutment member from turning. In this case however care must be taken not to clamp the device too tightly or the surface of the workpiece will be marked by the abutment member.

The present invention and a manner of performing the same will be more fully understood from the following description of an embodiment of the invention having reference to the accompanying drawing, in which:

Fig. 1 is a view in elevation of the device assembled.

Fig. 2 is an "exploded" view of the same, in side elevation, partly in section, the parts being separated from one another.

Fig. 3 is a sectional view taken along the line 3—3 of Fig. 1.

Fig. 4 is a plan view of the showing of Fig. 1.

Referring to the drawing:
A tubular member 5 internally threaded at 6 is provided with a flange 7 presenting a shoulder 8 where it joins the main body of the member, which is of lesser diameter. The claw member comprises an externally threaded part 10 engageable in the thread 6 of the tubular part 5 and a flattened shank 11 terminating in a claw 12. The abutment member is of cup-shaped form comprising a disc 13 and a skirt 14. In the centre of the face of the disc part 13 is a spigot 15 and a slot 16 is formed through the spigot and the disc part 13 so that the spigot is constituted by two half-round parts as shown in Fig. 4. The device is assembled by inserting the shank 11 of the claw member through the slot 16 of the abutment member which is then seated on the end of the tubular member 5 so that the skirt 14 of the abutment member surrounds the flange 7. The free edge 14b of the skirt 14 is then spun or pressed in over the shoulder 8 of the flange 7 so as to retain the abutment member on the tubular member. The edge 14b must of course not be pressed in so tightly as to prevent free rotation of the tubular member in the abutment member and to assist this the

shoulder 8 should be formed with a generous radius.

It may be noted that the slot 16 must be long enough to allow the shank 11 of the claw member to pass through it. If the slot 16 is located centrally of the abutment member and the claw 12 extends slightly to one side as shown, the tip of the claw 12 will overlap the end of the slot 16 when the claw member is withdrawn into the barrel of the tubular member, thus limiting the inward movement of the claw member and preventing it from being lost by being screwed out of the other end of the tubular member.

To enable the abutment member to obtain a good grip on the surface of the sheet against which it abuts an annular groove is formed in the disc part 13 of the abutment member and in this groove is inserted a rubber ring 17. In the embodiment illustrated the rubber ring 17 is of trapezoidal section, the base being wider than the top part so that it is firmly retained in the annular groove. This however is not essential and a ring of rectangular section may be employed as an alternative.

Alternatively again, as hereinbefore stated, the rubber ring 17 may be omitted and the face of the disc part 13 milled or otherwise roughened to enable the required frictional grip to be obtained.

For convenience in manipulating the device the skirt 14 of the abutment member is knurled as shown at 14a and the end 9 of the tubular member is also knurled as shown in Fig. 1.

For the sake of cheapness of production the claw member may if desired be entirely pressed out of sheet metal, in which case the part 10 will not present a continuous thread but two opposed sets of teeth, which after the first pressing operation resemble the teeth of a saw, being given the required angle to cooperate with the thread 3 of the tubular member by a second pressing operation performed in a die.

In using the device as illustrated the spigot 15 is inserted in a hole drilled through the sheets to be clamped so that the claw 12 enters the hole. The abutment member is then held up against the outer sheet and the tubular member 5 rotated by means of the knurled end 9 until the claw 12 engages behind the innermost sheet. The knurled end 9 is then rotated in the opposite direction until the sheets are gripped firmly between the claw 12 and the rubber ring 17 of the abutment member. The sheets are now firmly held together and the operator has both hands free for riveting or drilling further holes or such like operations.

What I claim is:

1. A device for clamping together pieces of sheet material, for example to facilitate riveting, including an internally threaded tubular member, a claw member externally threaded for engagement with the internally threaded tubular member and an apertured abutment member, through which the claw member passes being slidable and non-rotatable therein, and which is rotatably and non-slidably retained on one end of the tubular member and is provided with a central projecting spigot (adapted to enter an aperture in the workpieces), said spigot being apertured to allow the claw member to pass through it.

2. A device for clamping together pieces of

sheet material, for example to facilitate riveting, including an internally threaded tubular member, an abutment member rotatably and non-slidably retained on one end thereof and having a slot therein, and a claw member having a part externally threaded for engagement with the internally threaded tubular member and a flat part traversing the slot of said abutment member, being slidable but non-rotatable in said slot and terminating in a claw.

3. A device for clamping together sheet material, for example to facilitate riveting, comprising an internally threaded tubular member, a claw member having a hook-like claw at one end, an externally threaded part for engagement with the internal thread of the tubular member and having a non-circular shank between the claw and the threaded part, and an abutment member swivelably secured to the tubular member and having a slot through which passes the shank of the claw member, said slot engaging the shank to prevent relative rotation between the claw and the abutment members.

4. A device for clamping together sheet material, for example to facilitate riveting, comprising an internally threaded tubular member outwardly flanged at one end, a claw member having a hook-like claw at one end, an externally threaded part for engagement with the internal thread of the tubular member and having a non-circular shank between the claw and the threaded part, and a cup shaped abutment member having a slot through which passes the shank of the claw member, said slot engaging the shank to prevent relative rotation between the claw member and the abutment member which latter fits loosely over the flanged end of the tubular member, its free edge being closed in over said flanged end to retain it swivelably thereon.

5. A device for clamping together sheet material, for example to facilitate riveting, comprising an internally threaded tubular member, a claw member having a hook-like claw at one end, an externally threaded part for engagement with the internal thread of the tubular member and having a non-circular shank between the claw and the threaded part, and an abutment member swivelably secured to the tubular member and having a slot through which passes the shank of the claw member, said slot engaging the shank to prevent relative rotation between the claw and abutment members and a ring of yielding friction material carried by said abutment member to make contact with a workpiece.

6. A device for clamping together sheet material, for example to facilitate riveting, comprising an internally threaded tubular member, a claw member having a hook-like claw at one end, an externally threaded part for engagement with the internal thread of the tubular member and having a non-circular shank between the claw and the threaded part, an abutment member swivelably secured to the tubular member and having a slot through which passes the shank of the claw member, said slot engaging the shank to prevent relative rotation between the claw and the abutment members and a spigot, adapted to enter an aperture in the workpieces, mounted on the abutment member and apertured to allow the claw member to pass through it.

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