

Oct. 10, 1950

J. B. CAMPBELL

2,525,117

RIVET

Filed Feb. 19, 1944

4 Sheets-Sheet 1

FIG. 1.

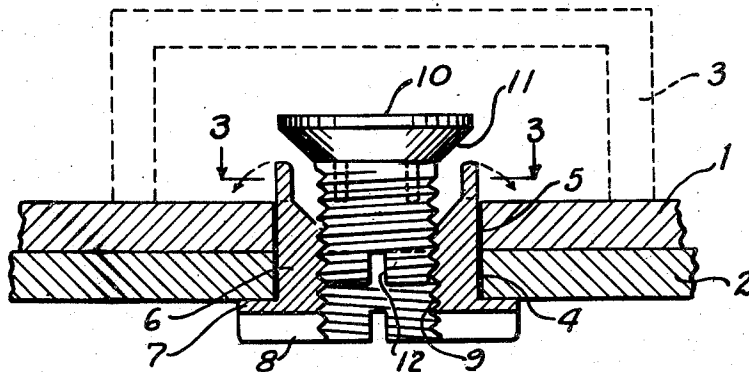


FIG. 2.

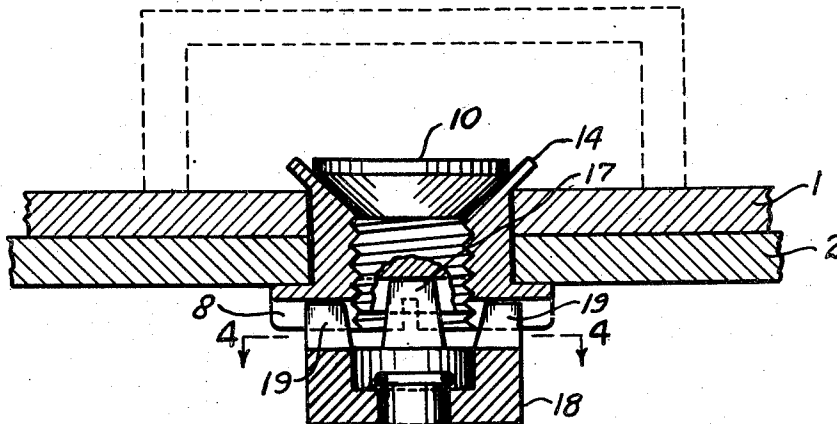


FIG. 3.

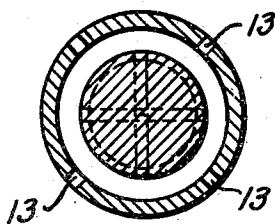
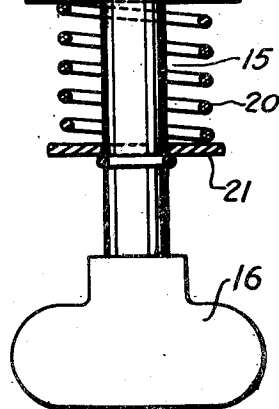
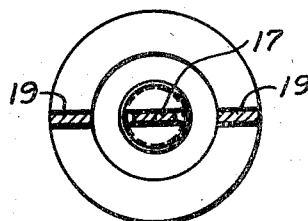


FIG. 4.



John B. Campbell
INVENTOR

BY *Barnes, Kinsella, Laughlin & Faisel*
ATTORNEYS.

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J. B. CAMPBELL

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4 Sheets-Sheet 2

FIG. 5.

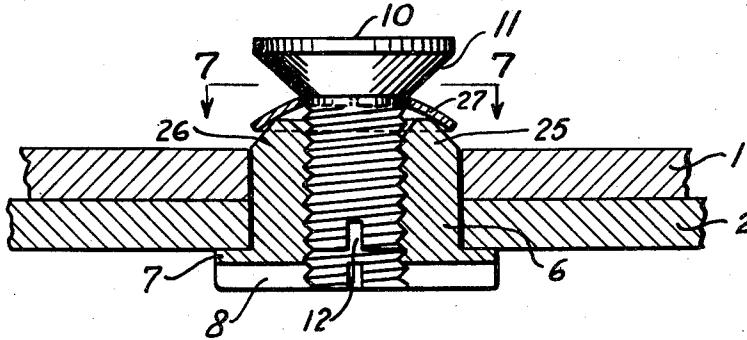


FIG. 6.

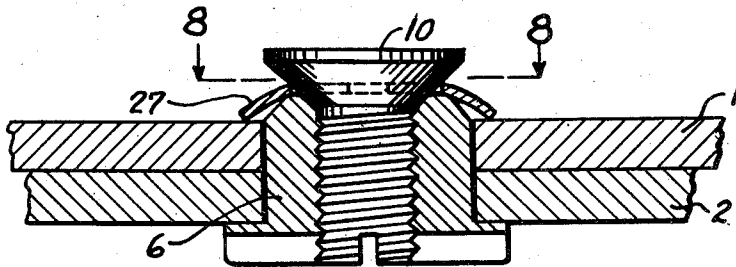


FIG. 7.

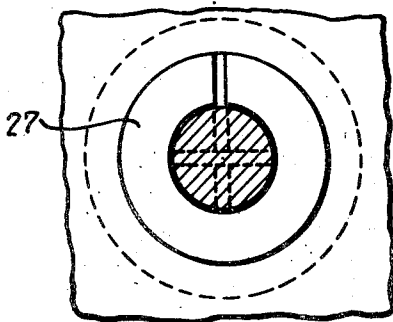
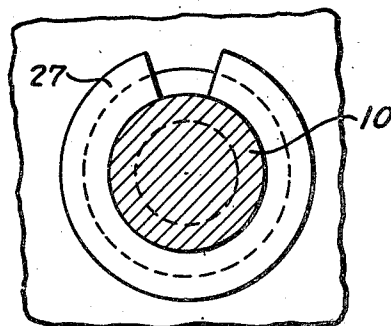


FIG. 8.



John B. Campbell
INVENTOR

BY
Barnes, Kisselle, Laughlin & Faisel
ATTORNEYS

Oct. 10, 1950

J. B. CAMPBELL

2,525,117

RIVET

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4 Sheets-Sheet 3

FIG. 9.

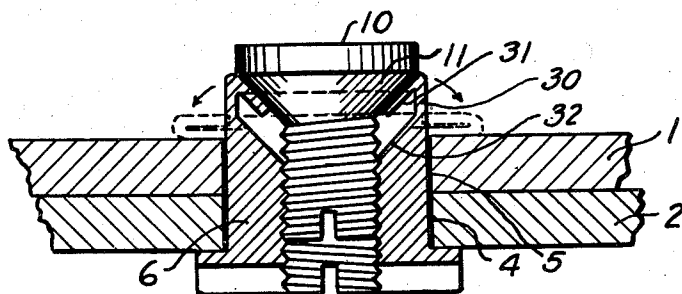


FIG. 10.

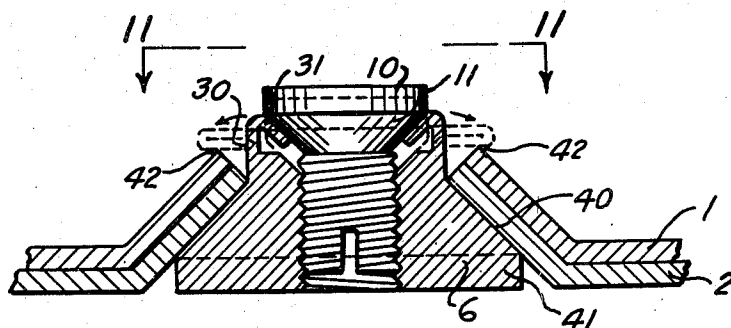
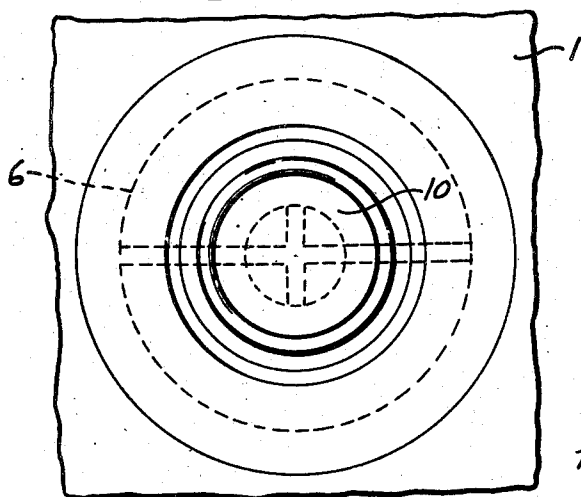


FIG. 11.



John B. Campbell
INVENTOR.

BY
Barnes, Kisselle, Laughlin & Friend
Attorneys.

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J. B. CAMPBELL
RIVET

2,525,117

Filed Feb. 19, 1944

4 Sheets-Sheet 4

FIG. 12.

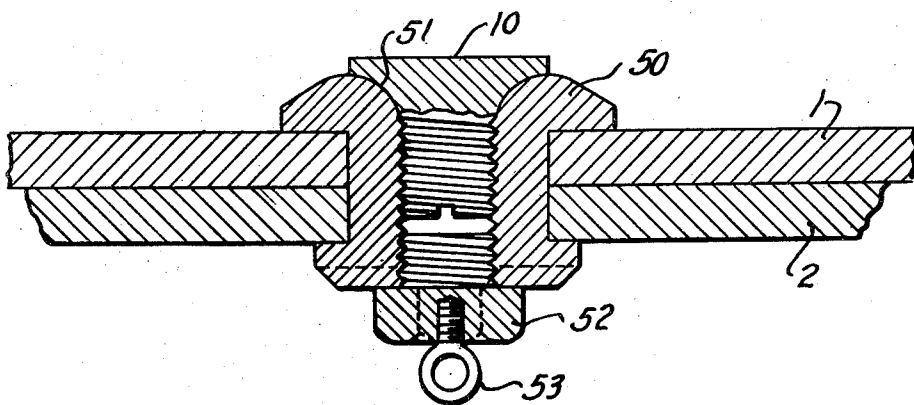
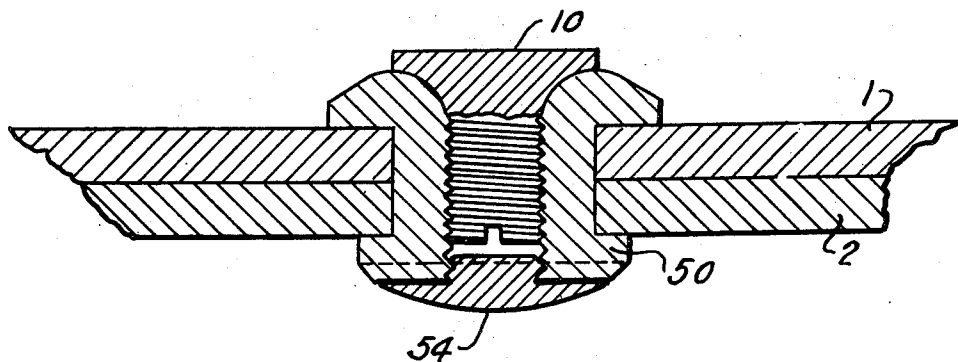


FIG. 13.



John B. Campbell
INVENTOR.

BY
Barnes, Kinsell, Laughlin & Hirsch
Attorneys

UNITED STATES PATENT OFFICE

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RIVET

John B. Campbell, Detroit, Mich.

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4 Claims. (Cl. 85-40)

1

2

This invention relates to a screw clinch rivet. It is an object of this invention to produce a rivet which can be installed entirely from one side of the work without any support on the other side of the work. This invention also contemplates such a rivet which is simple in structure, easy to install, and which will effectively hold the work together.

Fig. 1 is a sectional view showing my rivet in position in the work prior to being clinched, and Fig. 2 shows the rivet clinched on the work.

Fig. 3 is a section along the line 3-3 of Fig. 1.

Fig. 4 is a section along the line 4-4 of Fig. 2.

Fig. 5 is a section of a modified form of rivet positioned in the work preparatory to being clinched, and

Fig. 6 is a section of the same rivet after being clinched in position.

Fig. 7 is a section along the line 7-7 of Fig. 5.

Fig. 8 is a section along the line 8-8 of Fig. 6.

Fig. 9 is a sectional view of the second modified form of rivet showing in full lines the rivet in position in the work preparatory to being clinched and in the dotted lines the clinched or final position of the rivet.

Fig. 10 is a section of a third modification wherein the rivet is adapted for use in a counter-sunk hole.

Fig. 11 is a plan view along the line 11-11 of Fig. 10.

Figs. 12 and 13 are sectional views showing another modified form of rivet.

Referring more particularly to the drawings the work which is to be riveted together comprises panels 1 and 2 which, by way of example, may be sheet metal wing sections of an airplane. The element 3, shown in dotted lines, closes off a space so that the panels 1 and 2 must be riveted from one side only. Panels 1 and 2 are provided with rivet holes 4 and 5 which coincide to receive the rivet.

The rivet comprises a hollow tubular body member 6 having an outer flange 7 provided with four radial slots 8 for reception of the installing tool. The interior face of the hollow rivet 6 is threaded as at 9 and arranged to receive a screw plug 10 having a conical head 11. The screw plug 10 is provided with radial slots 12 in its inner end for reception of the screw driver. The inner end of the tubular rivet 6 is provided with one or more radial slots 13 which extend into the tubular body to about flush with the surface of the inner panel 1. Slots 13 are optional and can be omitted. Wall 14 is thin enough so that it can be clinched over by head 11 even though not slotted.

Preparatory to installing the rivet in the work, screw plug 10 is screwed part way into the hollow rivet 6 and the assembly is then inserted through rivet holes 4 and 5 with flange 7 of the hollow body against the outside face of panel 2. While in this position screw plug 10 is screwed into the hollow body 6 thereby causing the conical face 11 to clinch over the slotted inner end of the hollow rivet as indicated at 14, Fig. 2, to securely lock or clinch panels 1 and 2 together.

The tool for screwing the plug 10 into the hollow rivet 6 is shown in Fig. 2 and comprises a screw driver 15 provided with handle 16 and a point 17 which interengages the inner end of screw plug 10 in slot 12. Slot or socket 12 and driver point 17 can be any well-known or conventional shape such as in an Allen or Phillips screw. A holding member 18, provided with two teeth 19 which interengage the hollow sleeve 6 in slots 8, is slidably and rotatably mounted over shank 15 of the screw driver. Member 18 is backed up by compression coil spring 20 which abuts against shoulder 21 on shank 15. As handle 16 is pushed upwardly, as viewed in Fig. 2, spring 20 is under compression and acts through member 18 and teeth 19 to press the flange 7 of sleeve 6 against the outer face of panel 2 and thereby frictionally hold sleeve 6 against turning while screw plug 10 is turned into the sleeve 6 to expand its inner end.

The tool 15 is shown merely for purposes of illustration. Obviously any tool or tools can be used for installing the rivet which will hold sleeve 6 against turning while screw plug 10 is being screwed into sleeve 6 to expand its inner end; or, vice versa, plug 10 can be held stationary and sleeve 6 turned on to plug 10 to clinch over the inner end of the rivet.

From the above it will be seen that the rivet can be clinched or locked in position in panels 1 and 2 from the outer side of panel 2 without any need for support on the inside of panel 1.

The form of rivet shown in Fig. 5 differs from that shown in Fig. 1 only in that the inner end 25 of the hollow sleeve or tubular rivet 6 is not arranged to be clinched over the inner panel 1. The inner end of sleeve 6 is beveled or formed in the shape of a cone 26 and a spring steel washer 27 is mounted over the stem of the screw plug 10 between the one end 26 of the sleeve 6 and the conical head 11 of the screw plug 10. The spring steel washer 27 is concavo-convex as shown. As the screw plug 10 is screwed into the sleeve 6, conical head 11 draws washer 27 down over the conical end 26 of sleeve 6 into tight lock-

3

ing engagement with the inner face of panel 1 so that panels 1 and 2 are locked between the spring steel washer 27 and flange 7.

In the modification shown in Fig. 9 the inner end of the hollow sleeve 6 is provided with an circumferential flange 30 having an inwardly turned or return bent portion 31 which seats against the conical face 11 of the screw plug 10. The inner end of sleeve 6 is countersunk as at 32 to receive the conical end 11 of screw plug 10. As screw plug 10 is screwed into sleeve 6, flange 31 is forced against flange 30 and both of the flanges are clinched outwardly over the inner face of panel 1, as indicated in the dotted lines, Fig. 9, to thereby lock or rivet the panels 1 and 2 together.

Fig. 10 shows a rivet which is a modification of that shown in Fig. 9 in that the rivet shown in Fig. 9 has been modified and adapted for countersunk opening 40 in panels 1 and 2. In this case sleeve 6 of the rivet is provided with an outer conical head 41 arranged to fit tightly and snugly in the countersunk opening 40. As screw 10 is turned into the conical headed sleeve 6, flanges 30 and 31 are bent outwardly and downwardly over the inner edges 42 of the countersunk opening 40 to thereby lock or rivet the panels together, as shown in the dotted lines, Fig. 10.

It is understood that the rivet, that is, either or both tubular body 6 and screw plug 10, can be made from plastic, fiber, hard rubber or metal.

In the form shown in Fig. 12 the tubular body 50 is arranged to be clinched over the work 1 and 2 by a screw plug 10 in a manner substantially the same as the form shown in Fig. 1 except that the wedge face 51 of the screw head is arcuate in cross section. The outer end of the rivet is closed by a screw plug 52 provided with a screw eyelet 53 which can be used as a support or as a means of attaching anything desired to the work 1 and 2. In Fig. 13 the outer end of the rivet is closed by a screw plug 54.

In all of the forms of rivets, except that shown in Figs. 5 through 8, the rivet in assembled position in the work seals the holes 4 and 5 in the work.

It is understood that after the tubular rivet body 6, Fig. 2, or body 50, Fig. 12, has been clinched over the screw plugs 10 can be removed and the thus clinched over tubular rivet will hold or rivet the work together. In most cases, however, it is preferred to leave the screw plug 10 in the riveted or clinched over tubular rivet body.

I claim:

1. A two-part rivet comprising a body member having an enlarged head and a screw-threaded central bore, and a bolt somewhat shorter than said body member threaded in said bore and having an enlarged head covering the end of the body member opposite its enlarged head, the end of said bolt opposite its enlarged head having means for interlocking with a rotating instrument so as to be positively rotated thereby and the enlarged head of the body member having means for accommodating an element for holding the member stationary while the bolt is rotated.

2. A rivet according to claim above in which the end of the body member adjacent the enlarged head of the bolt is internally beveled.

3. A rivet comprising a tubular sleeve for pass-

4

ing through registering openings in front and rear plates with its rear end portion projecting from the rear plate, said sleeve having a head at its front end adapted to overlie the opening in the front plate and having means for holding the sleeve against turning, said sleeve being internally threaded from its front end, the rear end portion of said sleeve having its annular wall internally reduced in thickness, and a screw threaded into said sleeve from the rear end thereof, said screw having an expander at its rear end and at its front end having means for providing a positive drive connection with a turning tool whereby the screw may be advanced forwardly through said sleeve with its expander moving into the rear end of the sleeve and expanding the same to form a head cooperating with the head of the sleeve to clamp the plates between them.

4. A rivet comprising a tubular sleeve for passing through registering openings in plates to be secured, said sleeve being open at both ends, a head at the front end of said sleeve, the rear end portion of said sleeve being adapted to project from the rear plate and having its wall internally reduced in thickness, the wall of the sleeve between its front end and its reduced rear portion being internally threaded, a screw threaded into said sleeve in interfitting engagement with the threads thereof and having an expander head at its rear end and means at its front end for interlocking with a turning tool, said screw being advanced forwardly through said sleeve when turned so that its head moves into and expands the protruding rear end portion of the sleeve to form a head adapted to engage the rear plate and cooperate with the head at the front end of the sleeve to clamp the plates firmly against each other.

JOHN B. CAMPBELL.

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