Oct. 23, 1945. F. C. WALLACE 2,387,371

CLAMP

Filed Nov. 3, 1944

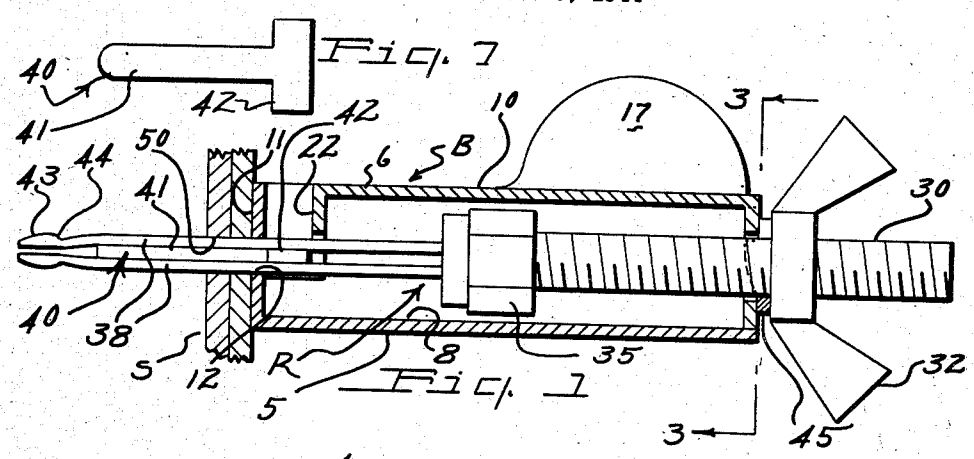


Fig. 7

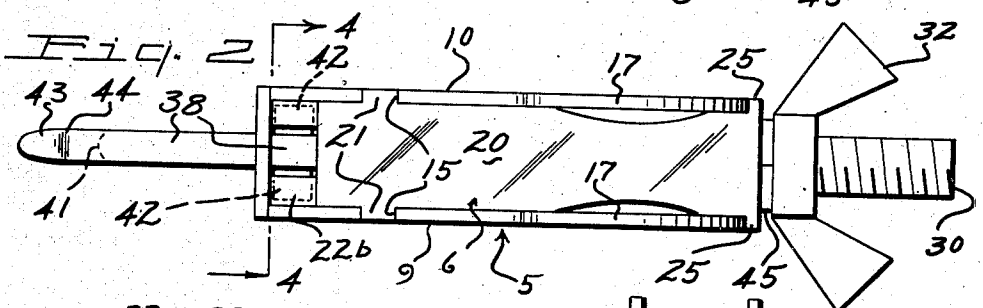


Fig. 1

Fig. 2

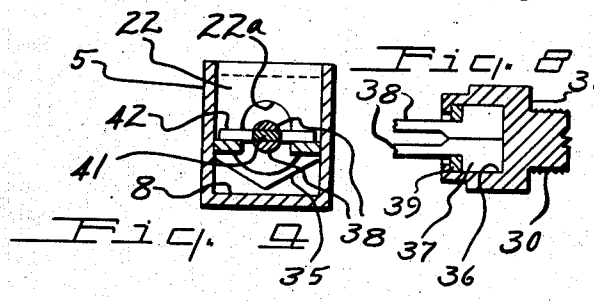


Fig. 4

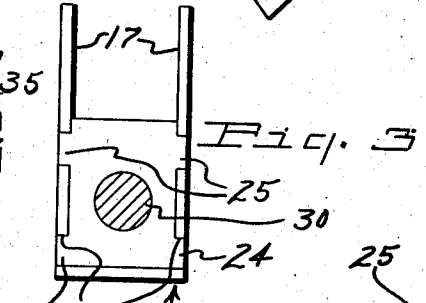


Fig. 3

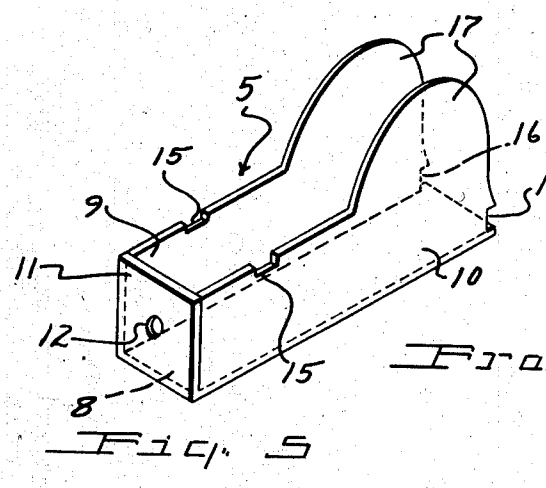


Fig. 5

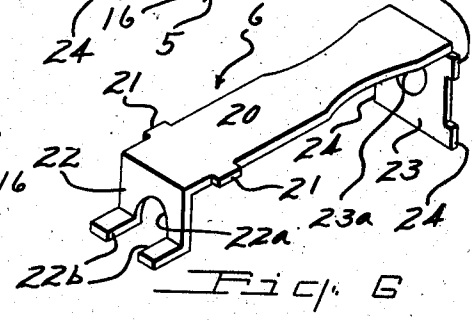


Fig. 6

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Atty

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CLAMP

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Application November 3, 1944, Serial No. 561,785

8 Claims. (Cl. 85—5)

My invention has to do with clamps, relating more particularly to sheet metal clamps.

Conventional sheet metal clamps have a cylindrical body or housing presenting an end wall with an opening therethrough and in which housing are reciprocally mounted a pair of retaining or clamping pins which are urged into clamping position by a compression spring, there being a flat spreader bar interposed between the retaining pins. Such clamps are relatively costly to manufacture if they are to possess any considerable strength since the body must be formed by a screw machine. If drawn by a stamping the body is necessarily too thin and shell-like.

Moreover, in some clamping jobs the clamping pressure required is greater than may be practicably obtained from use of a spring pressure applying member—that is, the retaining pins must be retracted by means of a nut and screw in order to obtain the necessary pressure. In such cases, since the body must necessarily be interposed between the nut and the work being clamped, there is a considerable longitudinal compressive stress on the body and to withstand this stress the body side walls must possess considerable section and strength. Also, the time and effort required to assemble such a clamp are such as to materially add to their cost.

It is, therefore, among the objects of my invention to provide a sheet metal clamp, the housing or body of which is of a construction which may be economically formed of stampings without being drawn and which possesses the requisite section and strength to render it highly durable and capable of withstanding the longitudinal compressive stresses incident to utilizing a screw type of clamping member.

Another object of the invention is to provide a clamp of a novel construction which tremendously facilitates and reduces the expense of assembly.

Another object is the provision of such a clamp of novel and efficient means for securing the retaining element in assembly.

My invention possesses still further objects and features of novelty and advantage which will be readily understood by those working in the art from a consideration of the following detailed description of one embodiment thereof which I have chosen for explanatory purposes, it being understood, of course, that within the scope of the appended claims, the invention is capable of being embodied in other and modified physical forms.

For purposes of the following description I shall refer to the accompanying drawing, in which:

Fig. 1 is a medial longitudinal section, some parts being shown in elevation;

Fig. 2 is a top plan view;

Fig. 3 is a section on line 3—3 of Fig. 1;

Fig. 4 is a section on line 4—4 of Fig. 2;

Fig. 5 is a perspective of a portion of the body;

Fig. 6 is a perspective of another portion of the body;

Fig. 7 is a side view of the spreader bar; and

Fig. 8 is a fragmentary section of the retaining element.

Referring now to the drawing, B generally denotes the body or housing and R the retaining element.

The body B is comprised of two metal stampings 5 and 6, shown in perspective in Figs. 5 and 6, respectively, which are first formed as flat blanks and then stamped into the shapes shown. The body elements 5, which I shall term the casing, has side walls 8, 9, 10 and an end wall 11 presenting an opening 12. Side walls 9 and 10 have slots 15 in their top edges and slots 16 in their inner end edges. A pair of opposed ears 17 are formed integral with the sides 9 and 10 to provide manual gripping members.

The body element 6, which I shall term the cover plate, consists of a plate 20 having side lugs 21 and right angled end portions 22, 23. The end portion 22 presents a recess 22a and end lugs 22b. End portion 23 presents an opening 23a and laterally projecting lugs 24, 25.

When assembled, the cover plate fits into the open side portion of the casing between the two side walls 9, 10, the lugs 21 fitting into the slots 15, the lugs 24 fitting in the slots 16 and the lugs 25 fitting against the inner end edge of the casing. Recess 22a and opening 23a are in axial alinement with the opening 12 in the casing end wall, while the outer ends of lugs 22b bear against the inner surface of the casing end wall 11.

The retaining element R comprises a threaded plunger 30 which projects from the inner end of the body through hole 23a where it threadedly receives a wing nut 32. Hole 23a is of larger diameter than the plunger to facilitate assembly.

The plunger is turned from hex stock and its enlarged opposite end 35 has a recess 36 within which are retained the headed inner ends 37 of a pair of parallel retaining pins 38. A washer 39 fits around the pins in the recess and the end edge of the plunger is spun to secure the heads 37 and washer in the recess. The pins project outwardly of the casing through recess 22a and

opening 12. A flat T-shaped spreader bar 40 having a central leg portion 41 and a cross arm portion 42 is interposed between the retaining pins, the center leg 41 extending outwardly through opening 12 between the retaining pins a distance at least as great as the thickness of any work sheets to be clamped. The cross arm portion of the spreader is held against longitudinal movement by fitting between the end wall 11 and the end portion 22 of the cover plate. The lugs 22b engage behind the cross arm 42 of the spreader to prevent the cover plate 6 from escaping from the casing. Each of the retaining pins has on its outer end a lateral projection 43 providing an inwardly facing shoulder 44 and at their outer ends the pins are somewhat biased towards each other to facilitate their insertion through holes in the work sheets.

A lock washer 45 is interposed between the wing nut 32 and the end portion 23 of the cover plate.

To assemble the device the plunger 30, collar 35 and the retaining pins are first assembled and the spreader bar 40 placed between the retaining pins with its cross arm 42 against the adjacent end of the plunger, so that the outer end of the central leg 41 of the spreader is spaced inwardly from the outer ends 43 of the retaining pins. With the parts thus assembled, the outer ends 43 of the retaining pins are inserted through the opening 12 and the spreader bar is then moved longitudinally between the pins until its central leg projects outwardly through opening 12 and the cross arm portion rests against the inner surface of end wall 11. Next the inner end of the plunger 30 is inserted through opening 23a in the cover plate and the opposite end of the cover plate is inserted between the side walls 9, 10 so that the retaining pins extend through the recess 22a, the lugs 22b being inserted behind the cross arm portion of the spreader bar. The cover plate is then secured in position by snapping the lugs 21 in slots 15 and the lugs 24 in slots 16. Then after applying the lock washer and wing nut the device is ready for use.

Operation of the device is as follows: With the outer ends of the retaining pins protracted from the body far enough to remove the outer end of the central leg of the spreader bar inwardly from between the pin ends 43 (Fig. 1) the retaining pins are inserted through the registering holes 50 in the work sheets S which it is desired to clamp together, the end wall 11 of the body bearing against the innermost sheet. The wing nut 32 is then rotated and inasmuch as the plunger is held against rotation by virtue of the hexagonal cross section of the collar 35, the retaining pins are retracted until their shoulders 44 engage the outermost work sheet S, thus clamping the work sheets between the shoulders 44 and the end wall 11. Inasmuch as the end wall 11 bears against the outer end edges of the sides 9 and 10 and the lugs 24, 25 of the cover plate bear against the opposite end edge of the casing, it will be seen that considerable clamping pressure may be applied by the nut 32. As the retaining pins are retracted into clamping position their outer ends 43 are spread apart by the longitudinally stationary spreader bar. To remove the clamp from the work the nut 32 is unscrewed so that the plunger may be pushed inwardly of the body to protract the retaining pins again to the position of Fig. 1, in which position they may be withdrawn from the work. When the device is not in use the combined diameter of the retaining pins and spreader is such that the shoulders 44 will engage the outer surface of the body end wall and prevent the outer ends of the retaining pins from passing inwardly through the opening 12.

I claim:

1. In a sheet metal clamp, a casing having three sides and a bottom end wall presenting an opening therethrough, a plate mounted on and forming the fourth side of the casing, said plate having a right angled outer end portion fitting over and providing a closure for the open end of the casing and having an opening coaxial with the first-mentioned opening, a retaining member reciprocally mounted in the casing and projecting at its respective ends through said openings, and means for releasably retaining the plate on the casing.

2. In a sheet metal clamp, a casing having three sides and a bottom end wall presenting an opening therethrough, a plate mounted on and forming the fourth side of the casing, said plate having a right angled outer end portion fitting over and providing a closure for the open end of the casing and having an opening coaxial with the first-mentioned opening, a retaining member reciprocally mounted in the casing and projecting at its respective ends through said openings, one end of the retaining member being comprised of a pair of laterally flexible work-engaging pins, a spreader bar mounted in the casing between the pins, and means for retaining the inner end of the plate against lateral movement relative to the casing, including a lug on the inner end of the plate engaging the spreader bar.

3. In a sheet metal clamp, a casing having three sides and a bottom end wall presenting an opening therethrough, two of said sides presenting slots in their side and top end edges, a plate mounted on and forming the fourth side of the casing, said plate having side lugs engageable in the slots in the side edges of the sides and having a right angled end portion providing a closure for the top end of the casing and presenting lugs engageable in the end slots in the casing sides, said right angled end portion having an opening coaxial with the first-mentioned opening, and a retaining member reciprocally mounted in the casing and projecting at its respective ends through said respective openings.

4. In a sheet metal clamp, a casing having three sides and a bottom end wall presenting an opening therethrough, two of said sides presenting slots in their side and top end edges, a plate mounted on and forming the fourth side of the casing, said plate having side lugs engageable in the slots in the side edges of the sides and having a right angled end portion providing a closure for the top end of the casing and presenting lugs engageable in the end slots in the casing sides, said right angled end portion having an opening coaxial with the first-mentioned opening, a retaining member reciprocally mounted in the casing and projecting at its respective ends through said respective openings, said retaining member having a threaded inner end, and means for moving the retaining member in one direction relative to the casing, comprising a nut threadedly engaging the inner end of the retaining member.

5. In a sheet metal clamp, a casing having three sides and a bottom end wall presenting an opening therethrough, two of said sides presenting slots in their side and top end edges, a plate mounted on and forming the fourth side of the

casing, said plate having side lugs engageable in the slots in the side edges of the sides and having a right angled end portion providing a closure for the top end of the casing and presenting lugs engageable in the end slots in the casing sides, said right angled end portion having an opening coaxial with the first-mentioned opening, a retaining member reciprocally mounted in the casing and projecting at its respective ends through said respective openings, said retaining member having a threaded inner end, and means for moving the retaining member in one direction relative to the casing, comprising a nut threadedly engaging the inner end of the retaining member, said nut being engageable against the right angled end portion of the plate.

6. The clamp of claim 4 in which the retaining member has a portion of angular cross-section engageable with the sides of the casing to prevent rotation of the retaining member relative to the casing.

7. In a sheet metal clamp, a casing having three sides and a bottom end wall presenting an opening therethrough, a plate mounted on and forming the fourth side of the casing, said plate having a right angled outer end portion fitting over and providing a closure for the open end of the casing and having an opening coaxial with the first-mentioned opening, a retaining member reciprocally mounted in the casing and consisting of an externally threaded inner end portion projecting through the opening in the outer end portion of the plate, a nut threadedly engaging said threaded inner end portion of the retaining member, a pair of work-engaging pins carried by the bottom end of the inner end portion of the retaining member, and a spreader bar having a portion disposed in the casing against the end wall thereof and having a portion projecting outwardly of the casing through the opening in the casing end wall between said pins.

8. The clamp of claim 7 in which the plate has an inner end portion engaging that portion of the spreader bar disposed in the casing to prevent longitudinal movement of the spreader bar in one direction relative to the pins.

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