March 13, 1945. P. F. ROSSMANN 2,371,470

CLAMPING DEVICE

Filed March 21, 1941

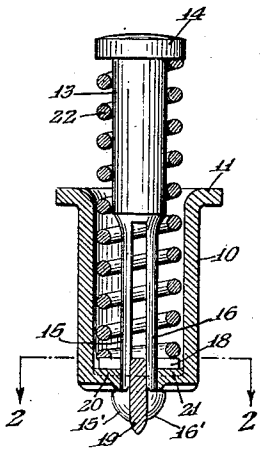


FIG. 1.

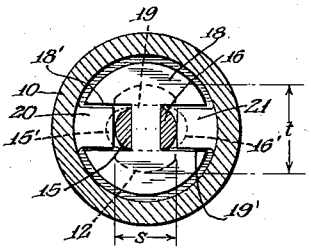


FIG. 2.

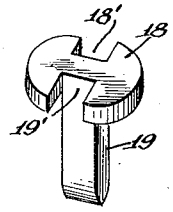


FIG. 3.

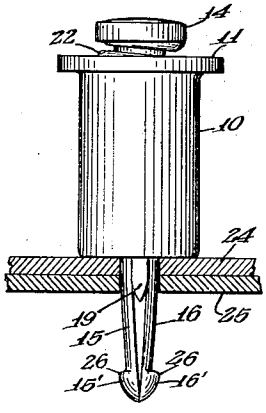


FIG. 4.

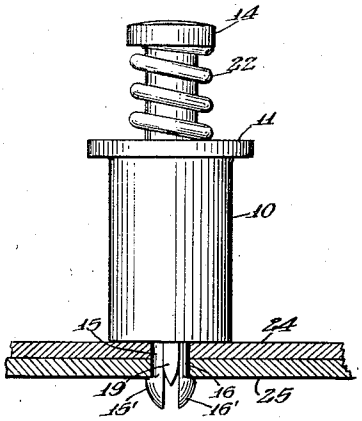


FIG. 5.

INVENTOR
Peter F. Rossmann
BY
Karl Klaus
ATTORNEY

Patented Mar. 13, 1945 2,371,470

UNITED STATES PATENT OFFICE

2,371,470

CLAMPING DEVICE

Peter F. Rossmann, Buffalo, N. Y., assignor to Irving Rossi, West Orange, N. J.

Application March 21, 1941, Serial No 384,461

13 Claims. (Cl. 85—5)

The present invention relates to devices for holding or clamping together perforated plate-like elements such as metal sheets preparatory to and to facilitate a riveting or other operation.

An object of the invention is to provide a clamp of the above character also known as a skin fastener which is both simple in construction and cheap to manufacture and which can be most easily applied by the aid of a plier or the like and removed from the aligned holes of the plates or sheets to be riveted or subjected to any other operation.

Another object is to provide a device of this type, the component parts of which can be readily assembled without permanently deforming same such as by bending, swaging, indenting or the like, thereby enabling the clamp to be easily dissembled for replacing any broken parts thereof.

A further object is the provision of a clamp or skin fastener which can be readily and easily inserted into and removed from the aligned holes of two or more superposed sheets or plates without requiring any special attention on the part of the operator such as canting or inserting and removing the clamp in an inclined position as is necessary with similar devices heretofore known in the art.

The above and further objects and advantages of the invention will become more apparent from the following description taken with reference to the accompanying drawing forming part of this specification and wherein:

Figure 1 is a vertical cross-sectional view in the non-use position of a clamp constructed in accordance with the invention;

Figure 2 is an enlarged cross-section taken on line 2—2 of Figure 1;

Figure 3 is an isometric view showing a component part of the clamp; and

Figures 4 and 5 are elevational views illustrating the insertion and final position of the clamp for holding together a pair of perforated plates.

Like reference characters identify like parts in the different views of the drawing.

Referring to the drawing, numeral 10 represents a body member in the form of a thimble or cup-shaped housing having an uper end provided with a flange 11 and a bottom wall provided with an opening or bore 12 having parallel sides spaced by a shorter distance *s* and arcuate sides spaced by a larger distance *t* as seen more clearly in Figure 2. Item 13 is a retaining member in the form of a plunger having an upper flange or seat 14 and on which are formed a pair of spaced resilient prongs 15 and 16 which are biased against each other as shown in Figure 4, such as by closing the lateral end projections or shoulders 15' and 16' thereof prior to a heat treatment in a manner well understood.

In the non-use or inoperative position, the prongs 15 and 16 are spread apart by a separator or spreader having a disc-shaped anchor portion 18 provided with diametrical recesses 18' and 19' and a spreader portion 19 at right angle to said disc-shaped portion as shown in Figure 3. The anchor portion 18 is seated against the inner face of the bottom wall of the cup 10 with the recesses therein engaging corresponding projections 20 and 21 of said bottom wall to prevent rotative movement of the spreader, while the spreader portion 19 serves to spread the prongs 15 and 16 passing through the inner portions of the recesses 18' and 19'. A coil spring 22 surrounding the plunger 13 has its upper end engaging the lower face of the flange or seat 14 of the plunger 13, while its lower end engages the upper face of the spreader portion 19.

In order to assemble the clamp the spring 22 is first placed around the plunger 13. The prongs 15 and 16 are then spread by means of an appropriate tool to permit the shank portion 19 of the spreader to slide into the slot formed between the prongs. This sub-assembly is then inserted through the hole 12 of the cup 10 with the prongs in their spreaded position aligned with the dimension *t* of the hole 12. Then by forcing the spreader against the spring 22 the entire assembly is rotated so that the prongs 15 and 16 will engage the shorter sides, dimension *s*, of the hole 12 and the slots 18' and 19' will align with the projections 20 and 21. The release of the spreader through the action of the spring 22 will then cause engagement of the slots 18' and 19' with the projections 20 and 21, thereby preventing relative rotation of the spreader and plunger assembly. At the same time, the lateral projections 15' and 16' of the prongs 15 and 16 will engage the underside of the bottom wall of cup 10 adjacent to the parallel sides of the opening 12 thereby completing the assembly operation. Disassembly of the clamp may be effected in the opposite manner as will be evident from the foregoing.

In use, the plunger 13 is pressed against the cup 10 by compressing spring 22 by means of an appropriate tool such as a plier having suitably shaped jaws engaging the upper face of flange 14 and the lower side of flange 11, respectively. In this position, as shown in Figure 4, the lower

ends 15' and 16' of the prongs 15 and 16 are forced together thus allowing insertion of the prongs through the aligned holes of a pair of metal sheets 24 and 25 or the like which are to be clamped together. The plier is then released whereby the plunger will return to its original position by the action of spring 22 thus causing the prongs 15 and 16 to be separated again by the spreader member 19 and resulting in the projections 15' and 16' engaging the underside of the lower sheet 25 and clamping the sheets together as shown in Figure 5.

The projections 15' and 16' of the prongs 15 and 16 are advantageously provided with rounded corners as shown at 26 to facilitate removal of the prongs from the holes in the sheets 24, 25 by again compressing the spring 22 in a manner as will be evident from the foregoing. This has the further advantage of preventing breakage by preventing excessive stress at the corners 26.

It will be evident from the foregoing that the invention is not limited to the specific details and arrangement of parts shown and disclosed herein for illustration but that variations and modifications may be resorted to differing from the specific construction shown and coming within the broader scope of the invention as defined in the appended claims. The specification and drawing are accordingly to be regarded in an illustrative rather than a limiting sense.

I claim:

1. A clamping device comprising a cup having an oblong bore provided in the bottom wall thereof, a plunger arranged to move into and out of said cup and having a pair of spaced resilient prongs extending therefrom and being conditioned so as to have their lower ends urged towards each other, lateral outward projections extending from the lower ends of said prongs, a spreader comprising a disc resting against the inner bottom surface of said cup and a shank at right angle thereto formed with a pair of parallel sliding faces and projecting through said bore, said disc being provided with recesses adjacent and extending to said sliding faces to receive said prongs in spread position and sliding engagement with said sliding faces, whereby movement of said plunger into said cup will cause the lower portion of said prongs to slide past said shank, and spring means restraining the movement of said plunger to urge said prongs into a position wherein said projections engage the underside of said cup adjacent to the narrower spaced sides of said bore, said projections being shaped to allow passage of said prongs in spread position engaging the wider spaced sides of said bore during the assembly of the device.

2. A clamping device comprising a cup having a bore provided in the bottom wall thereof, a plunger arranged to move into and out of said cup, said plunger having a pair of spaced resilient prongs urged towards each other, lateral outward protuberances at the extreme ends of said prongs, a removable spreader having a seat portion resting against the inner surface of the bottom wall of said cup and a spreader portion central and at right angle to said seat portion and projecting through said bore, said seat portion having opposite recesses adapted to pass said prongs projecting through said bore and slidably engaging the opposite sides of said spreader portion, and spring means arranged with its opposite ends engaging said seat portion and said plunger, respectively, to cause said protuberances to engage the outer surface of the bottom wall of said cup adjacent to said bore.

3. A clamping device comprising a cup having a bore provided in the bottom wall thereof, a plunger arranged to move into and out of said cup having a pair of spaced resilient prongs urged towards each other, lateral outward protuberances at the extreme ends of said prongs, a removable spreader having a seat portion resting against the inner surface of the bottom wall of said cup and a spreader portion central and at right angle thereto projecting through said bore, spring means having its opposite ends engaging said seat portion and said plunger, respectively, to cause said protuberances to engage the outer surface of the bottom wall of said cup adjacent to said bore in the spread position of said prongs, and further means to prevent relative rotative movement of said spreader with respect to said cup.

4. A clamping device comprising a cup having an oblong bore provided in the bottom wall thereof, a plunger arranged to move into and out of said cup, said plunger having a pair of spaced resilient prongs extending from one end thereof and being urged towards each other, a projection at the opposite end of said plunger, lateral outward protuberances at the extreme ends of said prongs, a removable spreader comprising a disc resting against the inner surface of the bottom wall of said cup and a shank central and at right angle thereto projecting through said bore, said shank having a pair of parallel sliding faces, said disc being provided with recesses extending from its periphery to said shank to pass said prongs engaging said sliding faces, whereby movement of said plunger into said cup will cause the lower ends of said prongs to slide past said shank, a coil spring having one end engaging said disc to urge said prongs into a position wherein said protuberances engage the outer surface of the bottom wall of said cup adjacent to the shorter spaced edges of said bore, and further projections on the inner surface of the bottom wall of said cup engaging said recesses to prevent relative rotative movement of said disc with respect to said cup.

5. A clamping device comprising a support provided with a bore, a member arranged to move toward and away from said support, said member having a pair of spaced resilient prongs extending therefrom and being urged towards each other, lateral outward protuberances at the ends of said prongs, a removable spreader resting against the inner surface of said support and being provided with recesses for passing said prongs, said spreader having an extension projecting through said bore in sliding engagement with the inner faces of said prongs, whereby movement of said member towards said support will cause the ends of said prongs to travel beyond said extension, and spring means engaging said member and said spreader, respectively, to restrain the movement of said member towards said support and to urge said prongs into a position wherein said protuberances engage the outer surface of said support adjacent to said bore.

6. A clamping device comprising a support provided with an oblong bore, a member arranged to move toward and away from said support, said member having a pair of spaced resilient prongs extending therefrom and being urged towards each other, lateral outward protuberances at the ends of said prongs, a spreader resting against the inner surface of said support and provided with recesses for passing said prongs, said spreader

having an extension projecting through said bore in sliding engagement with the opposite inner faces of said prongs, whereby movement of said member towards said support will cause the ends of said prongs to move beyond said extension, spring means arranged to restrain the movement of said member towards said support to urge said prongs into a position wherein said protuberances held in spaced position by said extension engage the outer surface of said support adjacent to the narrower spaced sides of said bore in the assembled condition of the device, said protuberances being shaped to allow passage of said prongs in spaced position engaging the wider sides of said bore during the assembly of the device.

7. A clamping device comprising a support provided with an oblong bore, a member arranged to move toward and away from said support, said member having a pair of spaced resilient prongs extending therefrom and being urged towards each other, lateral outward protuberances at the ends of said prongs, a spreader resting against the inner surface of said support, said spreader being provided with recesses for passing said prongs and having an extension projecting through said bore in sliding engagement with the opposite inner faces of said prongs, whereby movement of said member toward said support will cause the ends of said prongs to travel beyond said extension, spring means arranged to restrain the movement of said member towards said support and to urge said prongs into a position wherein said protuberances held in spaced relation by said extension engage the outer surface of the narrower spaced sides of said bore in the assembled condition of the device, said protuberances being shaped to allow passage of said prongs in spaced relation engaging the wider spaced sides of said bore during the assembly of the device, and means to prevent relative rotative movement of said spreader with respect to said support in the assembled condition of the device.

8. A device for temporarily clamping together perforated sheets in superposed relation comprising a body having a sheet engaging base provided with an opening, a retainer slidable through said opening having resilient legs operable towards each other and provided with shoulders at the outer ends thereof, a spreader resting against the inside of said base having a portion interposed between said legs, and spring means having one end engaging the inner end of said retainer and maintaining said spreader in bearing engagement with said base, said spring means drawing said retainer inwardly of said body to urge said shoulders spaced by said spreader against the outside of said base.

9. A device for temporarily clamping together perforated sheets in superposed relation comprising a body having a sheet engaging base provided with an opening, a retainer slidable through said opening and having resilient legs operable towards each other and provided with shoulders at the outer ends thereof, a spreader resting against the inside of said base and having a portion projecting through said opening and interposed between said legs, and spring means interposed between the inner end of said retainer and said spreader and drawing said legs inwardly of said body to urge said shoulders spaced by said spreader against the outside of said base, said spring means maintaining said spreader in bearing engagement with said base.

10. A device for temporarily clamping together perforated sheets in superposed relation comprising a thimble-shaped body having a base provided with an opening, a retainer slidable through said opening and having resilient legs operable towards each other and provided with shoulders at the outer ends thereof, a spreader resting against the inside of said base and having a portion interposed between said legs, a spring member, one end of said spring member engaging the inner end of said retainer and the other end of said spring member maintaining said spreader in bearing engagement with said base, said spring member drawing said retainer inwardly of said body to urge said shoulders spaced by said spreader against the outside of said base.

11. A device for temporarily clamping together perforated sheets in superposed relation comprising a thimble-shaped body having a base provided with an opening, a retainer slidable through said opening and having resilient legs operable towards each other and provided with shoulders at the outer ends thereof, a T-shaped spreader having an anchor portion resting against the inside of said base and a spreader portion projecting through said opening and interposed between said legs, and a coiled tension spring encircling said retainer, one end of said spring bearing against said anchor portion and the opposite end of said spring engaging the inner end of said retainer to maintain said spreader in bearing engagement with said base, said spring drawing said retainer inwardly of said body to urge said shoulders spaced by said spreader against the outside of said base.

12. A device for temporarily clamping together perforated sheets in superposed relation comprising a thimble-shaped body having a base provided with an opening, a retainer slidable through said opening having resilient legs operable towards each other and provided with shoulders at the outer ends thereof, a spreader resting against the inside of said base and having a portion interposed between said legs, a spring member, one end of said spring member engaging the inner end of said retainer and the other end of said spring member engaging said spreader, said spring member drawing said retainer inwardly of said body to urge said shoulders spaced by said spreader against the outside of said base.

13. A device for temporarily clamping together perforated sheets in superposed relation comprising a body having a sheet engaging base provided with an opening, said opening having a diametrical dimension substantially equal to the diameter of the perforations in the sheets to be clamped, a retainer slidable through said opening, said retainer comprising resilient legs operable towards each other and provided with shoulders at the outer ends thereof, a spreader resting against the inside of said base and having a portion interposed between said legs, said legs and spreader portion having a combined cross-sectional width substantially conforming to the diametrical dimension of said opening, and a coiled tension spring encircling said retainer, said spring having one end engaging the inner end of said retainer and having its other end maintaining said spreader in bearing engagement with said base, said spring drawing said retainer inwardly of said body to urge said shoulders spaced by said spreader against the outside of said base.

PETER F. ROSSMANN.