Nov. 10, 1942. P. VAN SITTERT 2,301,833

SHEET HOLDER

Filed Nov. 17, 1941

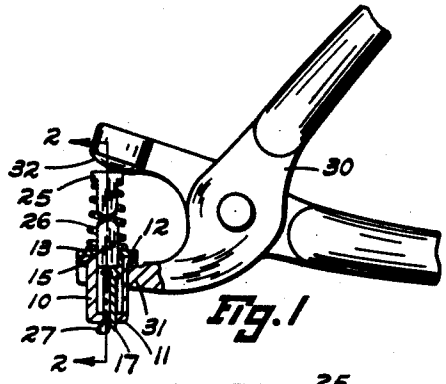


Fig. 1

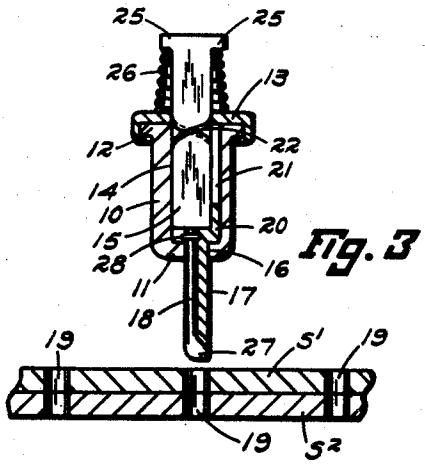


Fig. 3

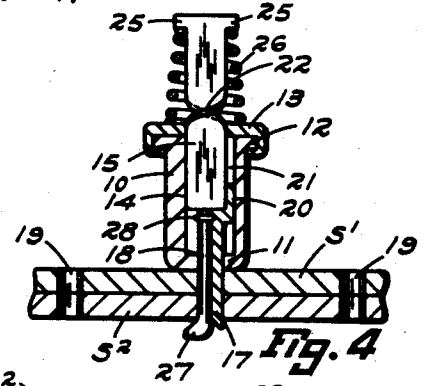


Fig. 4

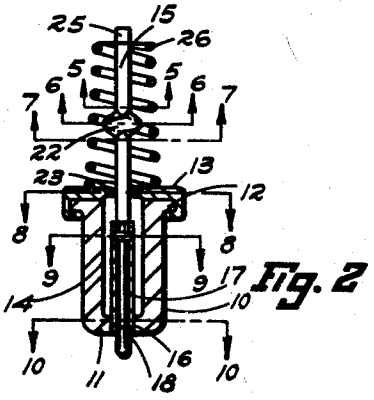


Fig. 2

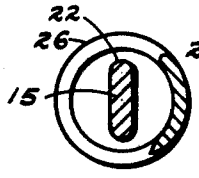


Fig. 5

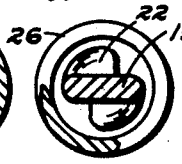


Fig. 6

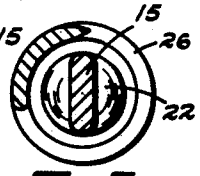


Fig. 7

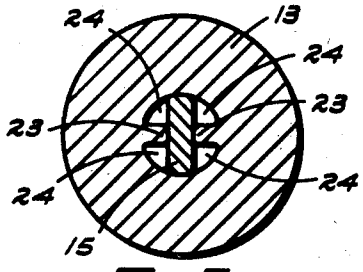


Fig. 8

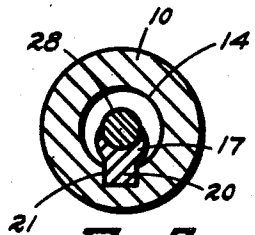


Fig. 9

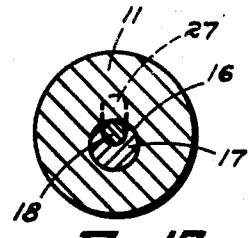


Fig. 10

INVENTOR
PAUL VAN SITTERT
BY
ATTORNEY

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2,301,833

SHEET HOLDER

Paul Van Sittert, Shaker Heights, Ohio, assignor to The Cleveland Pneumatic Tool Company, Cleveland, Ohio, a corporation of Ohio

Application November 17, 1941, Serial No. 419,375

8 Claims. (Cl. 85—5)

This invention relates to improvements in sheet holders, that is to say, small clamps operating through some of the registering rivet holes in a pair of metal sheets or plates to be joined for holding the latter while rivets are set in the remaining holes or in a sufficient number so that the clamps are no longer required. Holders of this general character are known in the art. The present invention has to do with improved means for accomplishing the purpose stated.

One of the objects of the invention, therefore, is the provision of a holder wherein the plunger with a hooked end which draws the sheets together against the base of the clamp may be positioned to form with the guiding finger a smooth cylindrical pin readily insertable through and removable from rivet holes.

Another object is the provision of a holder of this type which is simple in design, effective in operation, and susceptible of large volume production at relatively low cost.

Other objects and features of novelty will appear as I proceed with the description of that embodiment of the invention which, for the purposes of the present application, I have illustrated in the accompanying drawing, in which:

Fig. 1 is an elevational view of a holder embodying the invention wherein the plungers are about to be depressed in a pair of pliers specially constructed for the purpose but forming no part of the present invention;

Fig. 2 is a vertical sectional view on a larger scale of the holder only taken substantially along the line 2—2 of Fig. 1;

Fig. 3 is a vertical sectional view of a holder positioned above a pair of sheets to be joined, the holder being shown in its compressed condition with its plungers ready to enter registering rivet holes in the sheets;

Fig. 4 is a very similar view to Fig. 3, but with the holder in operative position, that is, clamping a pair of sheets;

Figs. 5, 6, and 7 are cross-sectional detail views on a larger scale of the spiral driver taken substantially on the lines 5—5, 6—6, and 7—7 of Fig. 2; and

Figs. 8, 9, and 10 are cross-sectional detail views also on a larger scale taken substantially on the lines 8—8, 9—9, and 10—10 of Fig. 2.

In the drawing I have shown at 10 a substantially cup-shaped housing having a base 11 and a rim 12 with an outturned flange, the housing having a lid 13 surmounting rim 12 and bent inwardly beneath the latter to form a tight non-rotatable connection. The housing itself has an axial bore 14 in which slides and rotates a lower portion of a ribbon steel actuator 15.

Through the base 11 of the housing there is an eccentrically arranged bore 16 of circular form through which projects a grooved plunger 17 of substantially crescent-shaped cross-section and a plunger 18 of circular cross-section which lies within the groove of the crescent. These two plungers have combined cross-sectional dimensions such as to fill approximately the bore 16 through the base of the housing, and likewise the registering rivet holes 19 in a pair of metal sheets S—1 and S—2 to be joined.

The upper end of plunger 17 within the housing 10 is offset as at 20 to extend into a guide groove 21 in the housing wall, by which means the plunger is held against rotation during its longitudinal movements.

Cylindrical plunger 18 and ribbon 15 are welded together or otherwise connected so as to be, in effect, a single operating plunger. The ribbon 15 about midway of its length is twisted through a substantial angle, preferably an angle of 180°, the twisted part being marked "22" in the drawing. The ribbon projects upwardly through a slot 23 in the lid 13, this slot being of a width to accommodate the thickness of ribbon 15 and being relieved at both ends, as indicated at 24 in Fig. 8, to better accommodate the twisted ribbon and reduce friction correspondingly. At its upper end the ribbon 15 has shoulders 25 against which bears the upper end of a strong coil spring 26, the lower end thereof bearing against the top 13 of the housing.

The lower extremity of the cylindrical plunger 18 is provided with a laterally extending projection or foot 27 which normally takes the angular position illustrated in Figs. 1 and 4, that is, when the twisted portion 22 of the ribbon stands above the lid 13, as it does when the spring 26 is permitted to act. When the twisted portion stands below the lid 13, the ribbon 15 and the plunger 18 have been turned through an angle of 180° and the foot 27 is then in the position illustrated in Fig. 3, where foot 27 underlies the end of the crescent-shaped plunger 17 and does not project beyond the surface confines of that plunger.

It is desirable that the plunger 17 follow the up and down movements of the plunger 18, and to make sure that this will occur, I may employ some such means as an annular bead 28 on plunger 18 running in a complementary groove in plunger 17.

When it is desired to insert a holder into a pair

of registering holes 19 in sheets to be joined, the workman grasps the holder in a pair of pliers 30 of special design comprising one bifurcated jaw 31 which engages the cup 10 beneath its outwardly extending rim, while the other jaw is provided with a round button 32 which engages the upper end of the metal ribbon 15. By means of the pliers, pressure is exerted to depress the ribbon 15 and the plungers from the position of Fig. 1 to the position of Fig. 3, thereby extending the plungers downwardly as far as they will go and at the same time swinging the foot 27 around underneath the plunger 17. The two plungers are now inserted together through the registering holes 19, after which pressure is relieved and the spring 26 permitted to raise the ribbon 15 with the plungers, whereupon the twisted portion 22 of the ribbon passes through the slot 23 in the lid 13, swinging the foot 27 around to the projecting position. Further upward movement causes the spring to pull the foot 27 tightly against the lower surface of sheet S—2, compressing the two sheets between the foot 27 and the base 11 of the housing 10. The removal of the holder is effected with the help of the pliers by proceeding through these steps in reverse order, as will be obvious.

Although the foregoing description is necessarily of a detailed character, in order to completely set forth the invention, it is to be understood that the specific terminology is not intended to be restrictive or confining and it is to be further understood that various rearrangements of parts and modifications of structural detail may be resorted to without departing from the scope or spirit of the invention as herein claimed.

Having thus described my invention, I claim:

1. In a device of the character described, a substantially cup-shaped housing having a bore extending through the base thereof, a lid fixed on said housing, a plunger axially slidable and rotatable in said housing through said bore and lid, a lateral projection on said plunger below said housing, said projection upon axial rotation of said plunger being movable into or out of the marginal edge of said bore, and interengageable means on said plunger and lid responsive to the slidable movement of said plunger for effecting its axial rotation.

2. In a sheet holder, a substantially cup-shaped housing having a bore extending through the base thereof, a pair of plungers slidable in said housing through said bore, one of said plungers being of crescent-shaped cross-section and the other being of round cross-section arranged for rotation within the groove of the former, a foot on the lower end of the round plunger beyond the lower end of the crescent-shaped plunger, said foot upon the rotation of said round plunger being movable into or out of the marginal edge of the lower end of said crescent-shaped plunger, and means responsive to the slidable movement of said round plunger for effecting its rotation.

3. In a sheet holder, a substantially cup-shaped housing, the lower surface of which functions as an abutment for engagement with the outer surface of one of a pair of sheets to be joined, two plungers projecting downwardly through said housing having a combined cross-section of approximately circular shape, a laterally extending foot on the free end of one of said plungers adapted to form an abutment for the outer surface of the other sheet to be joined, means dependent upon the projection of the plungers downwardly to the limit of their motion for turning the foot-carrying plunger to retract the foot beneath the extremity of the other plunger, and spring means tending to retract the said plungers and cooperating with said last-mentioned means for reversing the rotation of said foot-carrying plunger.

4. In a sheet holder, a longitudinally grooved plunger, a cylindrical plunger within said groove, the lower end of the latter plunger having an offset foot beyond the corresponding end of the grooved plunger lying within the surface confines of the latter plunger when the cylindrical plunger is in one angular position, and extending beyond said confines when the cylindrical plunger is in a different angular position, and means comprising a spring and a spiral tongue and groove connection for holding the cylindrical plunger with its offset foot extended normally, said cylindrical plunger being adapted to be rotated through part of a revolution by the depression of the plungers against the action of said spring to retract the foot into the surface confines of the grooved plunger, whereupon the two plungers may be projected into registered openings in the sheets to be joined.

5. In a sheet holder, a reciprocating plunger of crescent-shaped cross-section, a reciprocating and rotating plunger of round cross-section arranged within the groove of the crescent-shaped plunger, a foot on the lower end of the round plunger beyond the lower end of the crescent-shaped plunger normally projecting laterally outward beyond said latter plunger, means comprising a spring for holding the round plunger in the foot extending position, and means for rotating the round plunger to swing the foot to a position underlying said crescent-shaped plunger when said spring is compressed to a predetermined extent.

6. In a sheet holder, a substantially cup-shaped housing with a bottom and a lid, said bottom having a perforation therethrough and said lid having a slot therethrough, a plunger of crescent-shaped cross-section projecting through said perforation, means for preventing rotation of said plunger, a round plunger arranged within the groove of the crescent-shaped plunger also projecting through said bottom perforation, a foot on the lower end of the round plunger normally projecting laterally outward beyond the end of the crescent-shaped plunger, a spiral actuator attached to said round plunger projecting upwardly through the slot in the lid adapted, when depressed, to lower said plungers and to rotate said round plunger sufficiently to swing its foot inwardly beneath the crescent-shaped plunger, and spring means above the lid for raising said actuator and thereby holding said foot in extended position.

7. In a sheet holder a substantially cup-shaped housing with a bottom and a lid, said bottom having a perforation therethrough and said lid having a slot therethrough a plunger of crescent-shaped cross-section projecting through said perforation, means for preventing rotation of said plunger, a round plunger arranged within the groove of the crescent-shaped plunger also projecting through said bottom perforation, a foot on the lower end of the round plunger normally projecting laterally outward beyond the end of the crescent-shaped plunger, a spiral actuator attached to said round plunger, said actuator comprising a ribbon of metal which is twisted at an intermediate point through an angle of approximately 180°, said ribbon extending up-

wardly through the slot in the lid and when depressed sufficiently to cause said twisted portion to pass downwardly through said slot serving to turn the round plunger through an angle of 180° approximately and swing said foot inwardly beneath the crescent-shaped plunger, and spring means above the lid of the housing tending to raise said ribbon and to pull said twisted portion thereof upwardly through said slot for throwing the foot into its laterally extended position.

8. In a sheet holder, a substantially cup-shaped housing with a bottom and a lid, said bottom having a perforation therethrough and said lid having a slot therethrough, a plunger of crescent-shaped cross-section projecting through said perforation, means for preventing rotation of said plunger, a round plunger arranged within the groove of the crescent-shaped plunger also projecting through said bottom perforation, a foot on the lower end of the round plunger normally projecting laterally outward beyond the end of the crescent-shaped plunger, means for holding said plungers against relative movement longitudinally, a spiral actuator attached to the upper end of said round plunger and projecting upwardly through the slot in the lid of the housing, adapted when depressed to lower said plungers and to rotate said round plunger sufficiently to swing its foot inwardly beneath the crescent-shaped plunger, and spring means above said lid for raising said actuator and thereby turning said foot into extended position.

PAUL VAN SITTERT.