Feb. 3, 1942. F. C. WALLACE 2,271,879

CLAMP

Filed Nov. 4, 1941

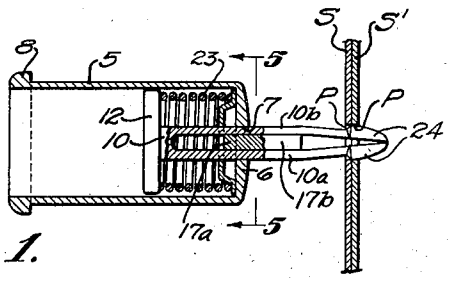


Fig. 1.

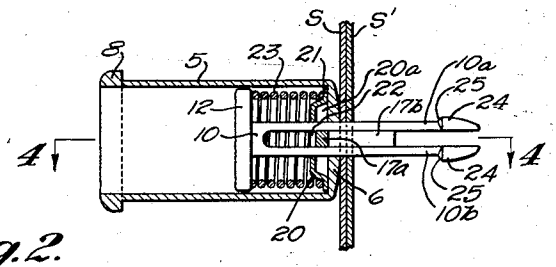


Fig. 2.

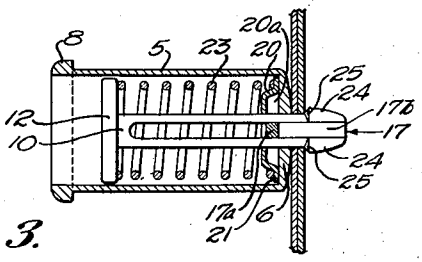


Fig. 3.

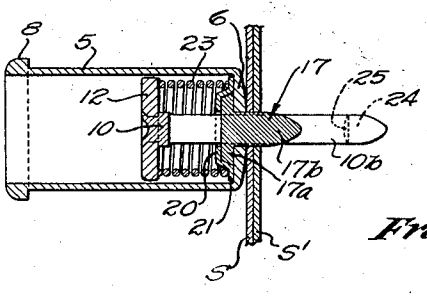


Fig. 4.

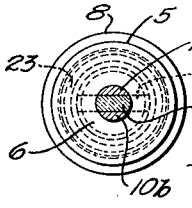


Fig. 5.

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Patented Feb. 3, 1942 2,271,879

UNITED STATES PATENT OFFICE

2,271,879

CLAMP

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Application November 4, 1941, Serial No. 417,813

8 Claims. (Cl. 85—5)

This invention has to do with improvements in clamps and more particularly it relates to fasteners for temporarily holding together perforated sheets in superposed relation.

One of the principal uses of my clamp is in the construction of airplanes and the like from metal sheets. The metal sheets are first laid in overlapping or superposed relation preparatory to riveting. My clamp functions as a temporary fastener to hold the plates together with the rivet holes in register.

In general my improved clamp comprises a cylindric housing and a spring pressed retaining pin slidably mounted therein. The retaining pin is longitudinally split so that as it is moved longitudinally its legs or segments are held apart by a spreader which is held against longitudinal movement. One of the shortcomings of such clamps has been that the retaining pin is easily deformed and broken by virtue of the twisting movement commonly imparted to the clamp housing by the operator in removing the clamp applying tool from the mounted clamp. In my copending application Serial Number 408,085, filed August 23, 1941, I have disclosed means for overcoming this serious shortcoming of prior clamps of this character. In that application I show a structure in which both the retaining pin and the spreader are rotatable relative to the housing. This present application is a continuation in part of that copending application and has to do more particularly with a clamp embodying this broad feature of relative rotatability and which at the same time embodies specific features which reduce the cost of manufacturing and assembling.

How these as well as still further advantages which are inherent in my invention are achieved will become apparent from the following detailed explanation of a presently preferred adaptation thereof, for which purpose I shall refer to the accompanying drawing, in which:

Fig. 1 is a longitudinal section partly in elevation showing my clamp in course of being applied to superposed perforated sheets;

Figs. 2 and 3 are views similar to Fig. 1 but showing the clamp in different positions;

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

Fig. 5 is a section on line 5—5 of Fig. 1.

Referring now to the drawing, I show at S, S' a pair of superposed sheets having registering perforations P. It will be understood that in practice these sheets are provided with additional perforations (not shown) for the reception of rivets.

The clamp element is comprised of a cylindric body or housing 5 having an end wall 6 through which a central hole 7 is provided. The opposite end of the housing is open and has an external annular flange 8 to facilitate mounting and operating the clamp in a suitable clamp operating tool, not shown. A retaining pin 10, longitudinally slotted to provide legs 10*a*, 10*b*, is slidably mounted in the body, legs 10*a*, 10*b* being slidable through opening 7. A washer or head 12 is secured on the inner end of pin 10 as by peening, the head slidably fitting in the housing. Legs 10*a*, 10*b* are spaced apart to receive therebetween a T-shaped spreader 17, which spreader has its cross arm 17*a* mounted inside the housing 5 and resting against the inner surface of wall 6 and has its central leg 17*b* projecting outwardly through hole 7 between legs 10*a*, 10*b*. A guard plate 20 is mounted in the housing over the cross arm 17*a* of the spreader so that arm 17*a* may rotate in the recess 20*a* provided in the plate, said plate having an annular flange 21 against which one end of a coil spring 23 bears to hold the plate and spreader against longitudinal movement in one direction. The opposite end of the spring bears against pin head 12 to normally urge the pin into retracted position. Plate 20 has a central opening 22 coaxial with hole 7 to slidably pass legs 10*a*, 10*b*. The outer ends of the legs 10*a*, 10*b* are enlarged at 24 to provide shoulders 25 which abut the inner sheet S' during the clamping operation. As the clamp applying tool (not shown) is applied and operated to move the head 12 inwardly of the housing, compressing spring 23, the legs 10*a*, 10*b* slide outwardly to the position of Figs. 1 and 2, in which position the enlarged ends 24 are spaced outwardly from the spreader a sufficient distance to enable the legs to be flexed towards each other as shown in Fig. 1 whereby to insert the retaining pin through the registering perforations of the sheets until the rounded outer surface of wall 6 abuts the inner sheet S (position of Fig. 2). Then, as the spring is released, it moves the retaining pin in the opposite direction to the position of Fig. 3, in which position enlarged ends 24 of the retaining pin are drawn over the leg 17*b* of the spreader, which leg 17*b* is likewise inserted into the registering perforations, to spread the retaining pin legs apart and against the side walls of the perforations and cause the sheets S, S' to be resiliently confined between shoulders 25 and housing end 6. The spring 23 resiliently holds the parts in this position until a clamp applying tool is used to compress the spring for removal of the clamp.

From the foregoing it will be seen that although the spreader 17 is held against longitudinal movement relative to the housing, the housing and spreader are free to rotate relative to each other since the cross arm 17*a* of the spreader and the plate 20 are relatively rotatable. Therefore, in the event the operator should twist or rotate the housing during removal of the clamp operating tool after the sheets S, S' are resiliently clamped between shoulders 25 and end wall 6, the relative rotatability as between the housing and

spreader will prevent any distortion of or damage to the retaining pin or sheets.

While I have resorted to considerable detail for the purpose of making my invention understood, I wish it understood that within the broader scope of my invention, as defined by the appended claims, various modifications and adaptations may be made without departing from the spirit of the invention.

I claim:

1. A clamp for temporarily holding together superposed perforated sheets, comprising a body, a retaining pin slidably and rotatably mounted in the body and having an expansible end portion projectable therefrom, a spreader rotatably mounted in the body and cooperating with said expansible end portion whereby to expand the same by virtue of sliding movement of the pin and a coil spring in the body, one end of said spring bearing against the pin to normally urge it inwardly of the body and the other end of the spring providing means resiliently opposing longitudinal movement of the spreader in one direction.

2. A clamp for temporarily holding together superposed perforated sheets, comprising: a hollow body having an end wall, a hole through the end wall, a spreader rotatably mounted in the body and having an elongated portion projecting outwardly therefrom through said hole, said end wall holding the spreader against outward longitudinal movement with respect to the body, a retaining pin slidably mounted in the body and having a split end portion projectable from the body astride the spreader whereby to be inserted through registering perforations in said sheets, said split end portion having diametrically opposed enlargements providing shoulders facing the end wall, and a coil spring mounted in the body and bearing at one end against the pin whereby to slide the pin with respect to the spreader and thereby engage said shoulders against one of the sheets to resiliently clamp the sheets between said shoulders and the end wall of the body, the other end of the spring resiliently opposing longitudinal movement of the spreader inwardly of the body.

3. A clamp comprising a cylindric body having an end wall, an opening through the end wall, a bifurcated retaining member slidably and rotatably mounted in the body and having its bifurcations retractable through said opening, and a spreader having a portion seating against the inner face of said end wall and a portion projecting through said opening between said bifurcations, said spreader being rotatable relative to the body.

4. A clamp comprising a cylindric body having an end wall, an opening through the end wall, a retaining member slidably and rotatably mounted in the body and having an expansible end portion projectable therefrom through the opening in the end wall, a spring in the body and functionally engaging the retaining member normally to urge it into retracted position, and a spreader element rotatably anchored between said spring and end wall, said spreader having means engaging the expansible end portion of the retaining member to expand the latter upon movement of the retaining member into retracted position.

5. A clamp comprising a cylindric body having an end wall, an opening through the end wall, a retaining member slidably and rotatably mounted in the body and having an expansible end portion projectable therefrom through the opening in the end wall, a spring in the body and functionally engaging the retaining member normally to urge it into retracted position, a bearing member mounted between said spring and end wall, said bearing member having a hole therethrough to pass the retaining member, and a spreader having an inner portion rotatably mounted between said bearing member and said end wall and an outer portion engaging the expansible end portion of the retaining member upon movement of the latter in a direction inward of the body.

6. A clamp comprising a cylindric body having an end wall, an opening through the end wall, a plate in the body and fitting against said end wall, an opening through said plate coaxial with the first-mentioned opening, said plate having a recess opening towards said end wall, a bifurcated retaining member slidably and rotatably mounted in the body and having its bifurcations retractable through said openings, a head on the retaining member, a spreader having a portion rotatably mounted in said recess and an integral portion projecting through the first-mentioned opening between the bifurcations, and spring means interposed between said head and said plate whereby to urge the bifurcations into retracted position and to resiliently hold the plate against longitudinal movement in one direction.

7. A clamp comprising a cylindric body having an end wall, an opening through the end wall, a plate in the body and fitting against said end wall, an opening through said plate coaxial with the first-mentioned opening, said plate having a recess opening towards said end wall, a bifurcated retaining member slidably and rotatably mounted in the body and having its bifurcations retractable through said openings, a head on the retaining member, a spreader having a portion rotatably mounted in said recess and an integral portion projecting through the first-mentioned opening between the bifurcations, and a coil spring in the body and disposed coaxially of the retaining member, said spring bearing at one end against said head to urge the bifurcations into retracted position and bearing at its other end against said plate to resiliently hold the latter against longitudinal movement in one direction.

8. A clamp for holding perforated sheets in superposed relation comprising a tubular body having an end wall, an opening through the end wall, a retaining pin rotatably and slidably mounted in the body and being longitudinally slotted to provide spaced parallel legs each presenting at its outer end a shoulder facing said end wall, said legs being retractable through said opening whereby to be inserted through registering perforations in said sheets and to be retracted to engage said shoulders against one of said sheets, a spring in the body, said spring engaging the retaining pin to retract said legs and thereby resiliently clamp said sheets between said shoulders and said end wall and a T-shaped spreader interposed between said legs to spread them into engagement with the said walls of the perforations in the sheets, said spreader having a head portion urged against the inner face of the end wall by said spring and a depending portion projecting through said opening to a point spaced outwardly from the end wall.

FRANK C. WALLACE.

CERTIFICATE OF CORRECTION.

Patent No. 2,271,879. February 3, 1942.

FRANK C. WALLACE.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 2, second column, line 68, claim 8, for the word "said" before "walls" read --side--; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 28th day of July, A. D. 1942.

Henry Van Arsdale,
Acting Commissioner of Patents.

(Seal)

DISCLAIMER

2,271,879.—*Frank C. Wallace*, Los Angeles, Calif. CLAMP. Patent dated February 3, 1942. Disclaimer filed November 25, 1944, by the assignee, *Herman H. Helbush.*

Hereby enters this disclaimer to claims 1, 2, 3, 4, and 8 of said patent.

[*Official Gazette December 19, 1944.*]