

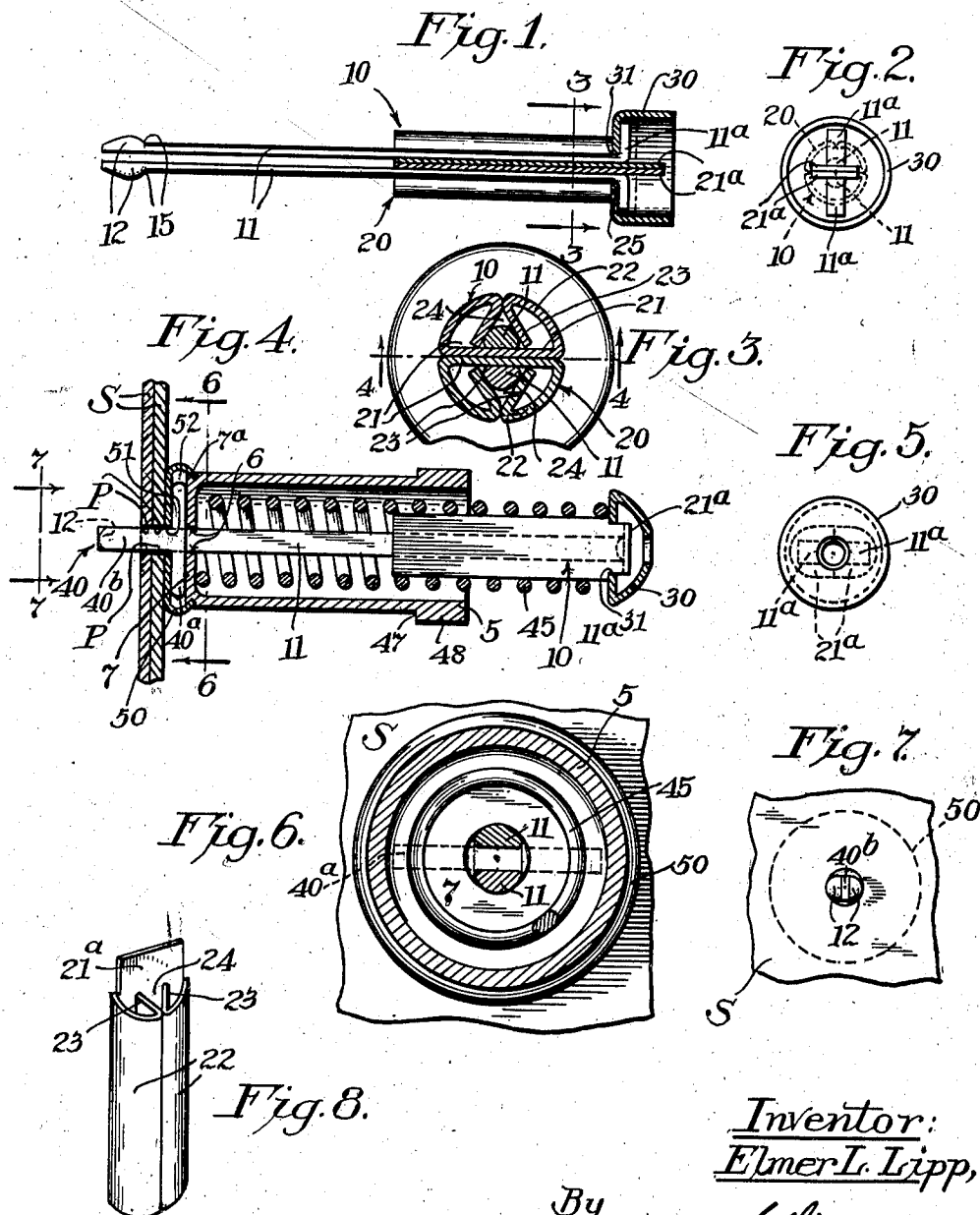
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SKIN CLAMP

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SKIN CLAMP

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This invention relates to clamps which serve in the nature of temporary rivets to hold together perforated sheets with the perforations in alignment, preparatory to application of permanent rivets.

The type of skin clamp to which my invention is particularly adaptable comprises generally a cylindric body within which there is reciprocally mounted for protraction and retraction a spring-pressed, longitudinally split retaining pin having shoulders at the outer end of the pin for engaging the sheets. The pins are protracted and inserted through the register of perforations and, upon release of the spring, the pins are retracted relative to a spreader, causing the shoulders to engage the sheets and clamp them against the end of the body. For instance, a clamp of this general construction is shown in the copending application of Frank C. Wallace, Serial No. 426,228, filed January 9, 1942, which application has matured into Patent No. 2,320,493.

Such clamps, many millions of which are being used in the aircraft industry, must necessarily be capable of being made relatively cheaply and yet must be capable of withstanding hard usage. One of the disadvantages inherent in the construction of prior clamps of this character has been the relatively high cost of manufacturing and assembling the plunger-like retaining pin unit and it is therefore to the production of a retaining pin unit of a design and construction which may be made and assembled relatively cheaply and which at the same time perform efficiently, that my present invention is principally directed.

Still further objects and corresponding advantages, however, will become apparent from the following detailed description of a presently preferred adaptation of the invention, for which purpose I shall refer to the accompanying drawing, in which:

Fig. 1 is a longitudinal sectional view of a retaining pin unit;

Fig. 2 is an end view of Fig. 1;

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

Fig. 4 is a longitudinal section of my improved clamp device in clamping position;

Fig. 5 is an end view of Fig. 4;

Fig. 6 is an enlarged sectional view taken on line 6—6 of Fig. 4 with the parts turned around a quarter turn;

Fig. 7 is an end view of Fig. 4; and

Fig. 8 is a perspective of one of the pin housing sections of my retaining pin unit.

Referring to the drawing, I show at 5 a

thimble-shaped cylindric body having an opening 6 through its end wall 7, which opening normally is of the same diameter as the perforations P in the sheet S to be clamped.

Reciprocally mounted in the body, there is a retaining member, pin unit or plunger 10 to which this invention is more particularly directed and which will now be described.

As best shown in Fig. 1, the unit 10 consists of a pair of retaining pins 11, each of which is preferably of semi-circular or segmental cross-section and each of which presents at its outer end an enlarged portion 12 providing a shoulder 15 facing towards the body.

The pins 11, with their inner flat surfaces facing towards each other, are disposed longitudinally in the housing 20. The housing is formed of two opposed sections each having a flat inner plate portion 21 (see Fig. 3), which flat portions are positioned between the pins 11 to space the inner ends of the pins apart. The side portions of each plate are curved outwardly and inwardly towards each other to provide a semi-circular skirt 22 and thence are bent inwardly at 23, the two end portions 23 diverging to provide therebetween a longitudinal channel 24 of V-cross-section. The two plates being formed in the same manner, except that they are opposed, a description of one suffices for both. The bent portions 22, 23 of the housing elements terminate at their top ends at the point 25, but the flat inner portions 21 have each an extension 21a projecting outwardly beyond the plane of the ends 25 to receive a ferrule 30 having an opening 31 through its end wall to pass the inner ends 11a of the pins and the extensions 21a.

In assembling the device, the two housing elements are placed together with their flat portions 21 in face to face relationship and the extensions 21a are inserted through the opening 31 in the ferrule end wall, after which the pins, which have bent inner ends 11a, are inserted through the channels 24 until the pin ends 11a rest against the inner surface of the ferrule end wall. Then the extensions 21a are bent down over the pin ends 11a and the side wall of the ferrule is bent inwardly to the position shown in Fig. 4. The retainer member assembly is then inserted in the body with the coil spring 45 therearound, the spring bearing at its inner end against the body end wall and at its outer end against the ferrule 30. The pins 11 are projected through the body end wall opening 6 and a spreader 40 is inserted between the projecting outer end of the pins. Spreader 40 is T-shaped,

having a cross arm 40a and a central arm 40b. An end cap 50 is then applied to the body, the cap having its peripheral edge crimped into the annular groove 7a of the body, so that the central arm 40a of the spreader projects outwardly between the pins through the opening 51 in the cap and the cross arm is held against longitudinal movement relative to the pins and body by being confined in the chamber 52 between the body end wall and the cap.

As thus assembled, the retaining unit 10 is normally urged to the right in Fig. 4, or into the retracted position, by the spring 45. The pin-housing sections are held together against lateral separation on the one hand by the ferrule 30 and on the other hand by the outer ends of the pins 11 engaging in the opening 6 in the body end wall, the flat portions 21 of the housing sections being positioned between the pins.

Among the advantages of this structure is the fact that the retaining pins do not have to be made with the shank portion of relatively large diameter to space them apart and, for the pin housing, it is possible to use a stamping instead of more expensive tube stock. Moreover, the structure is more durable and less apt to become loose or disassembled, since the pins are spaced apart by the spacer plates 21 which form an integral part of the housing. Assembly, which forms a very considerable part of the cost of such devices, is also materially reduced. Still further advantages inherent in this novel construction will be readily recognized by those skilled in this art.

In operation, the clamp is placed in the cradle of a conventional clamp-applying tool, not shown, which tool has a portion engageable against the annular shoulder 47 provided by the annular flange 48 on the clamp body and a plunger presses inwardly against the end of the ferrule 30 to protract the enlarged ends 12 of the retaining pins until they are spaced far enough from the body end wall 7 to be flexed together and inserted through the registering perforations P in the sheets S to be clamped. Upon releasing the plunger, which releases the thus compressed spring 45, the spring expands to retract the pins relative to the spreader 40 and body 5, causing the shoulders 15 of the pins to engage the outermost sheet and thus clamp the two sheets between those shoulders and the outer surface of the cap 50, as best shown in Fig. 4.

The specific details of construction and arrangement embodied in the foregoing description are intended merely as illustrative and are not to be deemed limitative since the underlying elements of novelty permit of variations and modifications within the scope of the appended claims.

I claim:

1. A clamp of the class described comprising a body having an end wall presenting: an opening, a pair of work-retaining pins reciprocally mounted in the body for protraction and retraction relative thereto, the pin portions adjacent their outer ends being held against lateral movement away from each other by the body end wall, spacer means disposed between the inner ends of the pins, said spacer means having integral portions embracing the inner ends of the respective pins whereby to prevent relative lateral outward movement of the inner ends of the pins, spring means interposed between the body and pins whereby normally to urge the pins into

retracted position and spreader means carried by the body for maintaining engagement of the outer ends of the pins with the work.

2. A skin clamp comprising a cylindrical body having an end wall with a reduced opening therethrough, a retaining member reciprocally mounted in the body for protraction and retraction relative thereto, including a pair of pins having their outer work-engaging ends projecting through said opening, spreader means for laterally separating said outer ends, a pair of spacer plates disposed in face to face relationship between the inner end portions of the pins, means retaining the plates against lateral separation and means carried by the plates and embracing the pins whereby to prevent relative lateral movement of the pins.

3. A clamp of the class described including a body and a retaining member reciprocally mounted in the body for protraction and retraction relative thereto, said retaining member comprising a pair of pins having their outer end portions projecting from the body and a pair of plates disposed in face to face relationship between the inner ends of the pins, each of said plates having a skirt portion bent upon itself to provide a pin housing.

4. A clamp of the class described including a body and a retaining member reciprocally mounted in the body for protraction and retraction relative thereto, said retaining member comprising a pair of pins having their outer end portions projecting from the body, a pair of plates disposed in face to face relationship between the inner ends of the pins, each of said plates having a skirt portion bent upon itself to provide a pin housing, and a ferrule encompassing the outer ends of the plates.

5. A clamp of the class described including a body and a retaining member reciprocally mounted in the body for protraction and retraction relative thereto, said retaining member comprising a pair of pins having their outer end portions projecting from the body, a pair of plates disposed in face to face relationship between the inner ends of the pins, each of said plates having a skirt portion bent upon itself to provide a pin housing, a ferrule encompassing the outer ends of the plates, and a coil spring bearing at one end against the body and at its other end against the ferrule whereby normally to urge the retaining member into retracted position.

6. A clamp of the class described including a body and a retaining member reciprocally mounted in the body for protraction and retraction relative thereto, said retaining member comprising a pair of pins having their outer end portions projecting from the body, and a pair of plates disposed in face to face relationship between the inner ends of the pins, each of said plates having a pair of side portions, which portions are oppositely bent outwardly to form a substantially semi-circular skirt, the outer ends of said portions being disposed divergently inwardly to define, together with the medial portion of the plate, a pin-receiving channel.

7. A clamp of the class described including a body and a retaining member reciprocally mounted in the body for protraction and retraction relative thereto, said retaining member comprising a pair of pins having their outer end portions projecting from the body and a pin housing member consisting of a pair of flat plates disposed in face to face relationship be-

tween the pins whereby to space them apart, each of the plates having an outer end extension and a portion on each of its sides, which latter portions are bent towards each other to provide a longitudinal pin-receiving channel, and a ferrule mounted over the end extensions of said plates.

8. A clamp of the class described including a body and a retaining member reciprocally mounted in the body for protraction and retraction relative thereto, said retaining member comprising a pair of pins having their outer end portions projecting from the body, and a pin housing member consisting of a pair of flat plates disposed in face to face relationship between the pins whereby to space them apart, each of the plates having an outer end extension and a portion on each of its sides, which latter portions are bent towards each other to provide a longitudinal pin-receiving channel, and a ferrule mounted over the end extensions of said plates and having an end wall disposed against the adjacent ends of the side portions, said end extensions being oppositely laterally bent within the ferrule.

5 9. A clamp of the class described including a body and a retaining member reciprocally mounted in the body for protraction and retraction relative thereto, said retaining member comprising a pair of pins having their outer end portions projecting from the body, and a pin housing member consisting of a pair of flat plates disposed in face to face relationship between the pins whereby to space them apart, 10 each of the plates having an outer end extension and a portion on each of its sides, which latter portions are bent towards each other to provide a longitudinal pin-receiving channel, and a ferrule mounted over the end extension of 15 said plates, said ferrule having an end wall disposed against the adjacent ends of the side portions, the inner ends of the pins and the end extensions of the plates projecting into and being oppositely laterally bent within the ferrule to secure the ferrule on the housing and prevent longitudinal movement of the pins in one direction relative to the housing.

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