Nov. 14, 1950 V. F. ZAHODIAKIN 2,529,582

FASTENING DEVICE

Original Filed Nov. 20, 1940

Fig. 1.

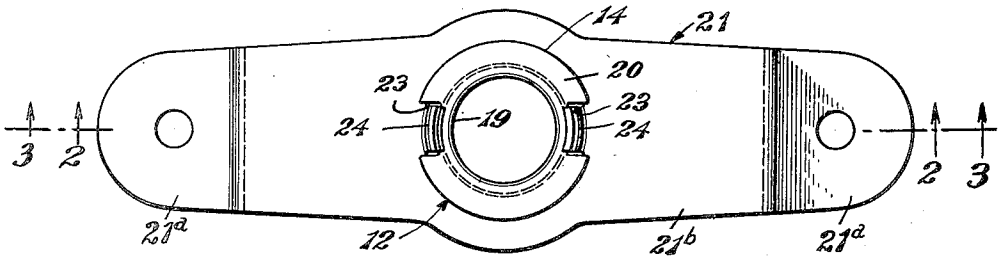


Fig. 2.

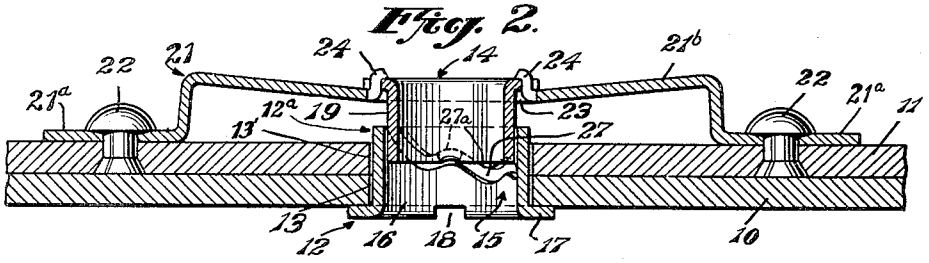


Fig. 3.

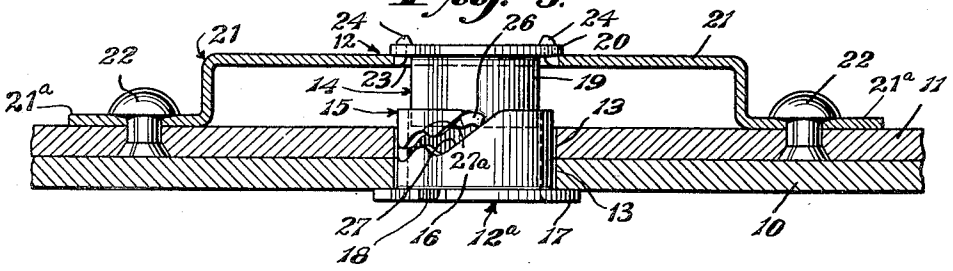


Fig. 4.

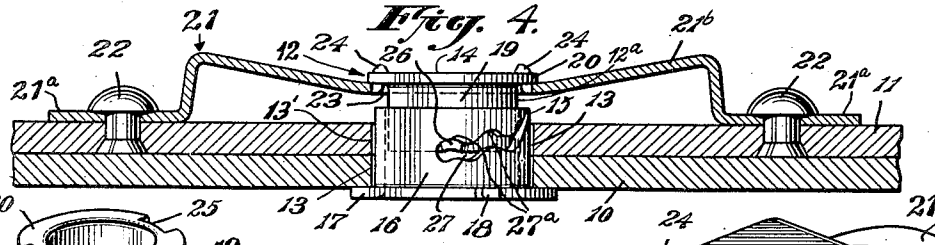


Fig. 6.

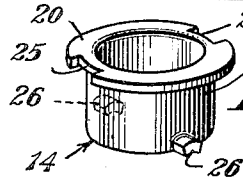


Fig. 5.

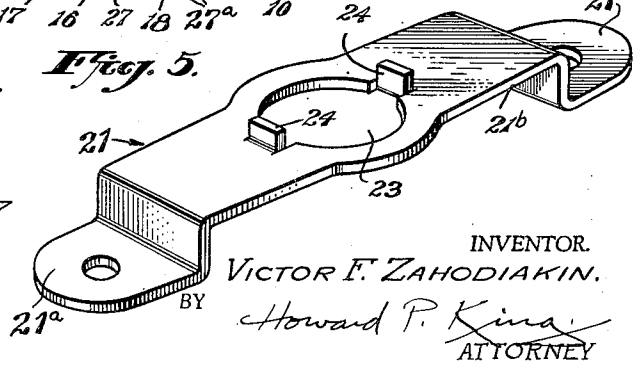
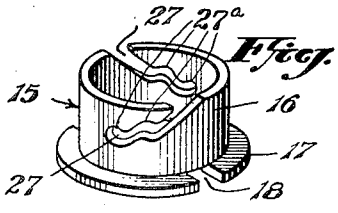


Fig. 7.



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FASTENING DEVICE

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Original application November 20, 1940, Serial No. 366,397, now Patent No. 2,355,196, dated August 8, 1944. Divided and this application July 10, 1944, Serial No. 544,274

6 Claims. (Cl. 24—221)

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This invention relates to improvements in fastening devices, and more particularly fastening devices for releasably clamping and locking together a plurality of juxtaposed members. This application is a division of and directed to the showing of sheet 2 of the drawing appearing in but not claimed in application S. N. 366,397, filed November 20, 1940, which eventuated in Patent No. 2,355,196, August 8, 1944.

An object of the invention is to provide an improved fastening device having means for securely clamping a plurality of juxtaposed members together.

Another object of the invention is to provide a fastening device having an improved lug and slot engagement which applies desired clamping pressure distributed over a considerable area.

A further object of the invention is to provide a sectional clamp which will telescope to locked position and occupy minimum space.

Again, an object of the invention is to obtain both telescopic and rotary motion between button sections and at the same time prevent rotation of one section in the yoke.

Yet another object of the invention is to provide an adjustment for desired locking pressure.

Still further objects of the invention will appear to those skilled in the art to which it appertains as the description proceeds, both by direct recitation thereof and by implication from the context.

Referring to the accompanying drawing in which like numerals of reference indicate similar parts throughout the several views—

Figure 1 is a plan of the fastening device per se in assembled condition;

Figures 2 and 3 are longitudinal sectional views shown as taken on lines 2—2 and 3—3 of Figure 1, and showing the buttons sections in different stages of interengagement for clamping together a plurality of juxtaposed members:

Figure 4 is a sectional view similar to Fig. 3, showing the button sections fully interengaged and the clamping sections tightly clamping the plurality of juxtaposed members together;

Figure 5 is a perspective view of the yoke section of the clamp; and

Figures 6 and 7 are perspective views of the button sections of the clamp separately.

In the specific embodiment of the invention illustrated in said drawing, the reference numerals 10, 11 indicate juxtaposed members, required to be held together, and of which one, as 10, may be termed the main plate, such as used in the construction of aeroplanes, automobiles, buildings

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and so forth, and the other member 11 may be a complementary plate, such as a cover for the service opening of aeroplanes, automobiles, buildings and so forth. It is to be understood that though only two such juxtaposed plates or members are shown, any number desired may be clamped together by the means of the present invention.

The fastening device of the present disclosure comprises essentially a sectional clamp 12, forming which there are provided two sections constituting what is termed the button 12a and another section which is termed the yoke and all of which will be more fully described hereinbelow. The button is of telescopic character and passes through and fits registering apertures 13 and 13' through said members or plates 10, 11, and a like aperture through said yoke section.

The said button in the present showing comprises two sections 14, 15, of which section 14 telescopes within section 15 and said sections are identified for convenience as inner section 14 and outer section 15. Said outer section 15 of the button provides a tubular body portion 16 the outer diameter of which is slightly smaller than the inside diameter of the aperture 13 of the plates or members 10, 11, so as to have appropriate loose fit therein that the button section may be rotated when seated in said aperture. As shown, the tubular body portion 16 has a length at least sufficient to pass through both said members 10, 11. One end of said outer button section 15, arbitrarily designated the lower end in consequence of position where shown in the several views, is provided with a peripheral flange 17. In use, the outer telescopic button section 15 is slid into aperture 13 and said flange brought into engagement with plate or member 10 at the margin thereof around the aperture. Said flange has a kerf 18 to accommodate a screw driver or other appropriate tool for turning or rotating said button section.

The inner telescopic button section 14 has a tubular body portion 19 approximately as long as body 16 of the outer section 15, and has an outer diameter substantially equal to the inner diameter of the outer telescopic button section 15 such that said sections may rotate with respect to the other while telescoped. The upper end of inner button section 14 is provided with a flange 20.

For providing the resiliency in the clamping action, said clamp provides a resilient section 21. As shown, said resilient section is an elongated bridged spring or yoke the ends 21a of which are

in engagement with and attached to plate or member 11 as by rivets 22. The intermediate portion 21b of said resilient section or yoke 21 is offset from and normally parallel to said plate 11, but under pressure exerted by the button sections may be resiliently bowed at its mid part toward the plate. Furthermore, at the mid part of the said yoke is an aperture 23 of generally circular configuration and of diameter substantially equal to the outer diameter of the tubular body 19 of inner section 14 of the button.

Punched upwardly from resilient section or yoke 21 at diametrically opposite sides of the aperture 23 as an integral part of said yoke, are two ears or upstanding projections 24. Said ears are spaced from each other a less distance than the outside diameter of the flange 20 of the telescopic section 14, and said flange is notched at diametrically opposite sides, as at 25, of width substantially that of the upstanding ears 24. In manufacture, as the said tubular button section 14 is inserted in place in the aperture 23, the notches 25 will receive said ears 24, after which the upper ends of the ears are upset or bent inwardly to secure the telescopic section 14 permanently in place with its flange 20 above the yoke section 21 and its body portion 19 projecting downwardly through said yoke 21 and held non-rotatable with respect thereto.

At the lower edge of the body 19 of the said telescopic inner section 14 and projecting outwardly therefrom diametrically opposite each other, are two lugs 26 the upper surfaces of which are cylindrically convex. Said lugs are preferably in a diametric direction transverse to the diametric direction of the notches 25 in the flange 20. Said lugs 26 are proportioned and situated to be received in upwardly opening ends of spiral slots or grooves 27 formed in the tubular body portion 16 of outer telescopic button section 15.

In use, when applying said outer section 15 to the inner button section 14, the upper open ends of slots 27 are caused to register with the lugs 26 and the outer section is then rotated which causes the lugs to feed downwardly in the spiral slots 27 with a screw action. As flange 17 on the lower or outer section 15 which is being rotated limits upward movement of that section, the upper or inner section 14 is drawn down as the lugs 26 travel in said spiral slots 27, depressing the mid-portion of yoke 21 which thereby exerts resilient tension tending to seat the lugs each in one of several humps 27a provided in the slots. By virtue of these humps in the slots 27 said sections may be tightly locked before the lugs 26 arrive at the far ends of said slots, and thereafter, because of wear or other causes, should the plates 10, 11 be not locked sufficiently the rotatable button section 15 may be turned further to bring the lugs into the next hump of the spiral slots. The structure accordingly effects a tight clamping of the sectional clamp 12 upon plates or members 10, 11 with desired resilient pressure, and is readily locked or unlocked, but maintains the clamping action until an operator applies the appropriate tool and rotates the telescopic section.

In unlocking the sectional clamp 12, pressure applied to the tool and outer button section 15 keeps that section from jumping from the apertures 13, 13 upon release, and as the other or inner button section 14 is fixed in the resilient section or yoke 21, by ears 24, it likewise remains with the yoke. Also, as shown in Figure 3, the inner telescopic button section 14 has adequate length to permit engagement of the lugs 26 in slots 27 before any flexing of the yoke 21 occurs, so that turning the outer section 15 becomes immediately effective to draw the inner section and yoke toward the outer section, and no force other than applied by rotating the outer section is necessary to initiate or complete the clamping action.

I claim:

1. A fastening device for juxtaposed members, said device comprising a sectional clamp one section of which is telescopic within another one of said sections, one of said sections having a spiral slot starting at an overlapping edge to the other section and said other section having a radially projecting lug engageable in said slot whereby rotation of one section with respect to the other feeds the lug into said spiral slot and draws the sections into telescopic contraction, flanges at the outer ends of said sections for exerting clamping pressure on said members as said sections are telescoped, and a resilient yoke interposed between one of said flanges and the next adjacent said member, said yoke having ends projecting laterally from and having a middle part depressible with said one of the flanges, and having non-rotating attachment to the said one of the flanges, and the laterally projecting yoke ends being non-rotatively secured to the said next adjacent member.

2. A fastening device of the character described for clamping a plurality of members together, comprising a locking button in combination with a resilient elongated yoke projecting laterally from the said button and attached next the ends of said yoke to one of said members, and said yoke having an aperture therein at the mid-part thereof, said locking button consisting of a plurality of tubular sections one telescopic within the other, one of said sections being smaller in diameter than the other and insertable in said aperture and having a flange at the outside of said yoke in engagement therewith, said yoke having a plurality of ears next the aperture and extending inwardly each at its outer end to contact and secure said flange and smaller tubular section non-rotatably and non-slidably in place whereby the inner tubular section and mid-part of the yoke move together as a unit, and said smaller tubular section having a plurality of lugs extending outwardly from the body portion thereof at a distance from said flange, the larger said tubular section having slots beginning at the overlapping end thereof with the smaller section and spiraling toward the far end of said larger section and adapted to receive the said lugs for effecting telescopic movement of one section with respect to the other as said larger section is rotated, and said larger section having a flange at its said far end, said flanges of the two sections exerting compressive pressure to the said members as said sections telescopically contact.

3. A fastening device in accordance with claim 2 wherein said slots have a plurality of humps therein for receiving said lugs and preventing inadvertent rotation of one said section with respect to the other.

4. A fastening device for juxtaposed members, said device comprising a sectional clamp one section of which is telescopic within another, one of said sections having a spiral slot entering at one end of that section and said other section having a radially disposed lug engageable in said slot whereby rotation of one section with respect to the other feeds the lug in said slot and tele-

scopes said sections, said slot having humps along the spiral successively further spaced from the slot-entering end of the section for retaining the lug seated upon arrival therein, and resilient means engaged peripherally of and by one of said telescopic clamp sections for transmitting resilient compressive pressure thereof through the telescopic clamp sections to said juxtaposed members for clamping said members together.

5. A fastening device for juxtaposed members, said device comprising a sectional clamp one section of which is telescopic within another one of said sections, one of said sections having a spiral slot starting at an overlapping edge to the other section and said other section having a radially projecting lug engageable in said slot whereby rotation of one section with respect to the other feeds the lug into said spiral slot and draws the sections into telescopic contraction, flanges at the outer ends of said sections for exerting clamping pressure on said members as said sections are telescoped, a resilient yoke interposed between one of said flanges and the next adjacent said member, and said yoke and last mentioned one flange having lateral engagement one with the other for preventing rotation of the section having the flange.

6. A fastening device for juxtaposed members, said device comprising a sectional clamp one section of which is telescopic within another one

of said sections, one of said sections having a spiral slot starting at an overlapping edge to the other section and said other section having a radially projecting lug engageable in said slot whereby rotation of one section with respect to the other feeds the lug into said spiral slot and draws the sections into telescopic contraction, flanges at the outer ends of said sections for exerting clamping pressure on said members as said sections are telescoped, a resilient yoke underlying one of said flanges, means securing said yoke and said one of said flanges together, and means securing said yoke and the next adjacent member together thereby retaining said flange and clamp section of which the flange is a part assembled on the yoke.

VICTOR F. ZAHODIAKIN.

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The following references are of record in the file of this patent:

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