United States Patent [19]

Bagnasco

[11] **3,883,930**

[45] **May 20, 1975**

[54] **SAFETY PIN**

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[73] Assignee: **Safety Snap Pin Corporation,** Clifton, N.J.

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[21] Appl. No.: **422,795**

Related U.S. Application Data

[63] Continuation-in-part of Ser. No. 229,798, Feb. 28, 1972, abandoned.

[52] **U.S. Cl.** ..... **24/156 R**

[51] **Int. Cl.** **A44b 9/10**

[58] **Field of Search** ..... 24/156 R, 161 R, 161 A, 24/160, 155 SP, 150 SP, 157 R

[56] **References Cited**

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[57] **ABSTRACT**

Safety pin with base-supported pin shaft and locking clasp having rigid wing members at opposite sides of the shaft point, the wing members including inwardly overhanging buttressed portions having spaced parallel flanges to form a guide slot for the shaft point, a spring strip biased upwardly against and bridging said portions and yielding to applied shaft pressure for movement of the shaft under the strip into locking position.

10 Claims, 10 Drawing Figures

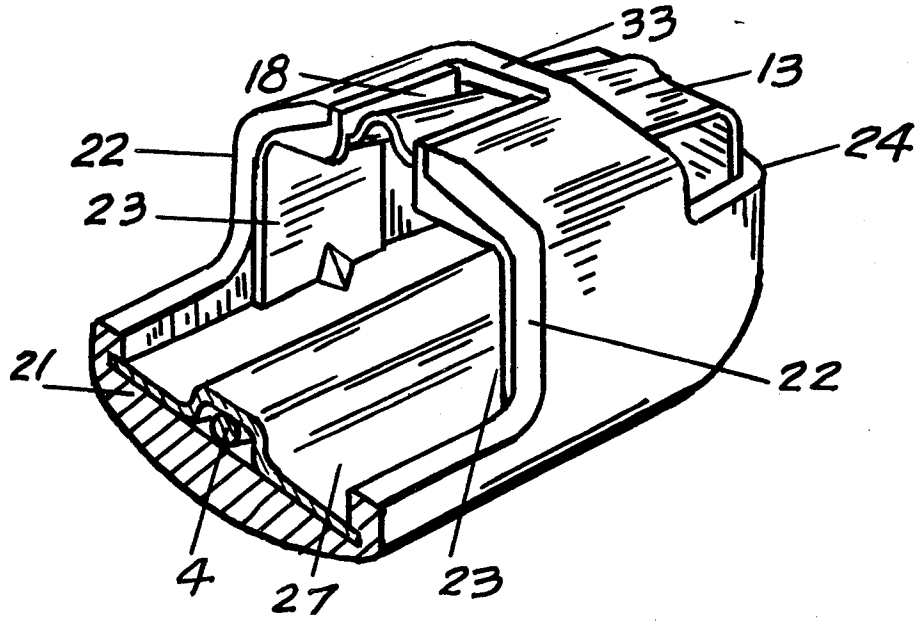


Fig. 2.

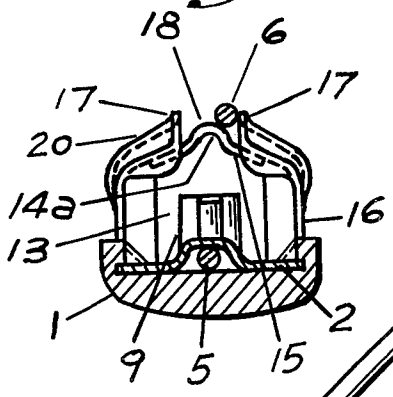


Fig. 1.

Fig. 4.

Fig. 3.

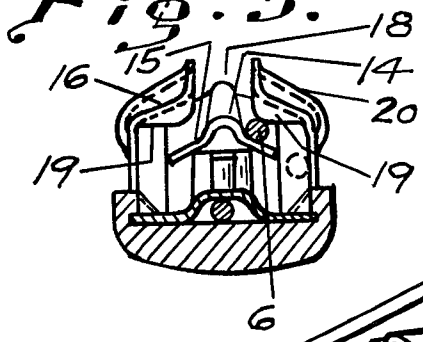


Fig. 5.

Fig. 6.

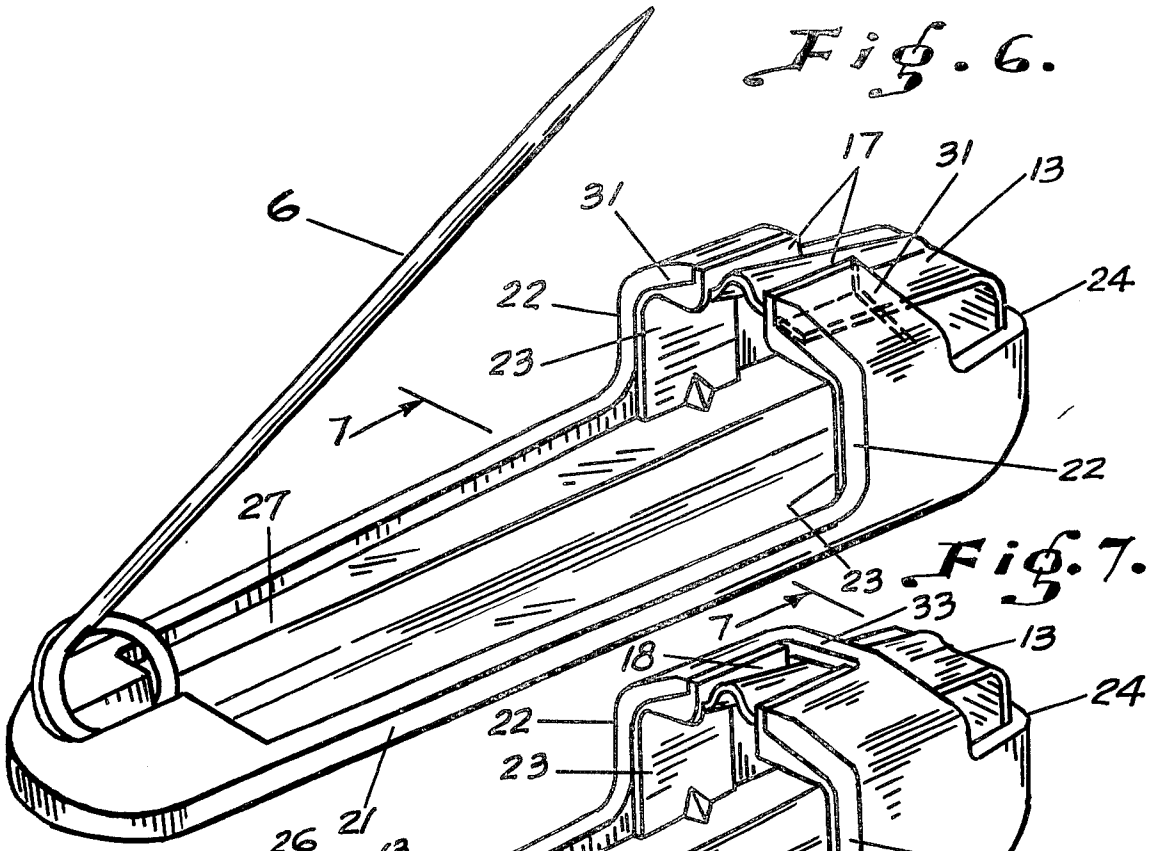


Fig. 7.

Fig. 8.

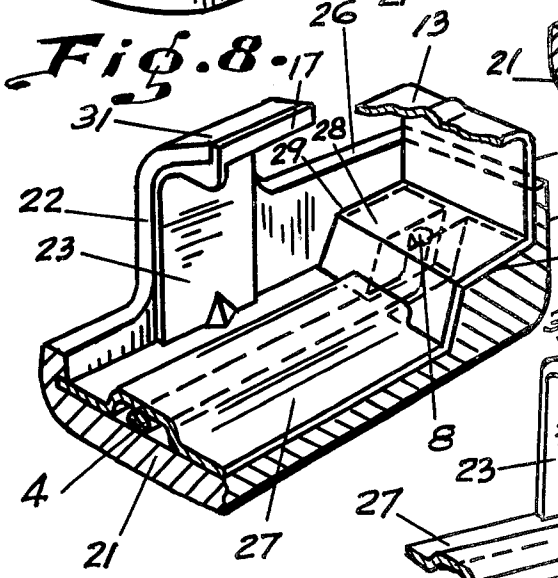


Fig. 9.

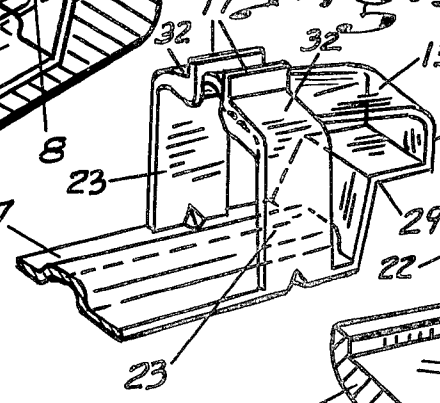
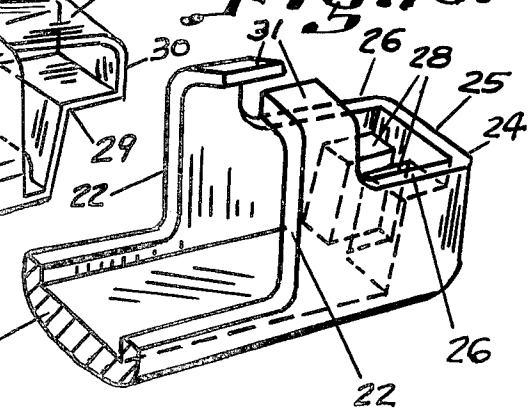


Fig. 10.



SAFETY PIN

This application is a continuation-in-part of my application Ser. No. 229,798, filed 28 Feb. 1972 for "Safety Pin", now abandoned.

BACKGROUND OF THE INVENTION

The invention relates to safety pins of the locking clasp type, wherein the piercing end of the spring-biased pin shaft is manually depressed from its open position and moved into a restraining or locking clasp, and wherein the pin can be subsequently released only by joint manipulation of the pin shaft and locking clasp. Clasp pins of this character are disclosed for example, in my U.S. Pat. Nos. 2,546,662, 2,760,247, and 3,018,533. The present invention is concerned with improvements on my prior patents and is directed to more positive locking and easy and trouble-free pin opening and closing.

SUMMARY OF INVENTION

In accordance with the invention, the clasp for the piercing or pointed end of the biased pin shaft basically consists of a spring strip secured to a base plate or the like so that it can overhang and restrain the pin end, the strip in turn being held in a slightly pre-stressed condition by overhanging wing portions at opposite sides, generally as shown in my Patents above. In the present invention the overhanging wing portions are especially constructed for rigidity and resistance to deformation. In addition, the portions are provided with vertical lip-like flanges that are spaced parallel to form a guide slot for the entering pin end. Thus, further guided manual pressure on the pin shaft depresses the spring strip so that the pin can slide laterally underneath a wing portion and beneath the strip into locked position.

A principal object of the invention therefore is an improved safety pin of the character defined above, that can be easily closed and opened indefinitely without malfunction, that is rugged and resistant to maladjustment and which will remain closed against accidental opening when closed but which may be readily opened.

A further object is an improved safety pin wherein the pin guiding lips and wing portions are structurally related for increasing the rigidity and strength of the flanges and thereby maintaining precise and predictable pin operation.

Other objects, features and advantages will appear from the following description with reference to the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of the assembly constituting the safety pin of the present invention;

FIG. 2 is a sectional view taken along the line 2 — 2 of FIG. 1 illustrating the initial pin-closing position;

FIG. 3 is a view similar to FIG. 2 illustrating succeeding pin positions;

FIG. 4 is a similar view illustrating movement of the pin to the locked closed position;

FIG. 5 is an exploded view of the assembly showing in perspective the essential components;

FIG. 6 is a perspective view of an assembly embodying a modified form of the invention;

FIG. 7 shows a variant of the buttressing structure of FIG. 6, with a base section at the line 7 — 7 of FIG. 6;

FIG. 8 is a partly broken-away portion of FIG. 6, including a vertical section at one side thereof; and

FIGS. 9 and 10 are detail views showing in part components of the assembly of FIG. 6.

DESCRIPTION OF PREFERRED EMBODIMENT

Referring to FIG. 1, a main support or back plate 1, preferably of plastic material, forms a seat for a metal base plate 2 that lies within the back plate. The plates 1 and 2 constitute the base structure and the pin retaining mechanism. A flat recess 3 in the support plate 1 receives and firmly positions the base plate 2.

The base plate 2 is conveniently made of spring material as hereinafter described and has a longitudinal groove 2*a* to receive the lower arm 4 of a spring pin 5, the other arm or shaft 6 of the pin being pointed. The arms 4 and 6 are connected by a spring coil 7 in the usual manner.

The support plate 1 is provided with a post 9 having a slot 10 to receive a bent-up end 8 for the pin arm 4, and the base plate 2 has an opening 12 through which the post 9 extends. The bent-up end 8 rests in the post slot 10 and is anchored thereby in the assembled position. By this construction the pin is firmly held in its upright position. The plate 2 is molded into the recess 3 in the support plate 1 to hold it and the pin 5 fixed in proper place.

The base plate 2 has its end corresponding to the free end of the pin bent backward to form a spring strip parallel to the body as shown at 13, and the end of the spring strip as shown at 14 is shaped to provide a central inwardly facing groove 14*a* on its lower side. This groove is adapted to receive the point of pin shaft 6. The strip 14 is also shaped to provide on its upper side lateral cam-like faces 15 on each side of the groove.

The base plate 2 also has opposide side wings 16 at the same end, which have overhanging portions 16*a* bent to fit over in spaced relation as shown in FIGS. 3 and 4, the lateral cam faces 15. The bent-back spring strip 13 is pre-stressed as indicated in FIG. 1 to bear upwardly against and bridge the spaced wing portions 16*a*. In this position the strip 13 is restrained from outward movement, the groove 14*a* forming a retaining socket for the pin point.

In order to facilitate guided and precise movement of the pin shaft 6 into the pin retainer or clasp, the wing portions 16*a* have extending parallel flanges 17 forming a guide slot or trough 18, FIGS. 2 and 3, to easily guide and locate the pin shaft 6 in position for closing.

In order to prevent the point of the pin from inadvertently sliding out between the lateral faces 15 of the spring 13 and the side wings 16, to cause accidental opening, each of the overhanging wing portions 16*a* has a downwardly bent edge 19 extending over the edge of the lateral faces of the spring strip ends 15. Thus the point of the pin is held below the level of the end edges of the strip and cannot slip between the strip and overhanging wing portion 16*a* to release the pin, except of course where the spring end 14 is positively depressed below the depending edge 19. This guarding against undue opening is clearly indicated in FIG. 4, wherein the restrained pin positions are indicated by dotted lines.

The base plate 2 and its parts may be made of a suitable spring material such for example as spring sheet brass, the end of which serves as spring strip 13. It is desirable however, that the side wings 16 including the overhanging portions 16*a* be comparatively rigid in order to prevent deformation thereof with possible

malfunction, especially in the opening operation. For example, referring to FIG. 4, it will be seen that if the right wing 16 were bent down and deformed (as by a crushing force), there will be corresponding depression of the spring end 14. The pin 6 will thus be moved closer to its limit position, i.e., at the post 9. Accordingly, the space between the wing overhang 16*a* and the strip 13 now might be insufficient when the strip is further depressed for opening, for the pin to clear the edge of the strip and move around it to the upper side thereof. To prevent such malfunction, means are provided to keep the side wings 16 rigid with respect to the strip 13. As shown in FIGS. 4 and 5 the wings are stiffened by buttresses or ridges as indicated at 20 for greater rigidity. Further strength and rigidity are provided by structurally inter-relating the buttress, slot flange 17 and depending pin guiding flange 19 as clearly shown in FIG. 1, so as to form an integral wing structure adapted to resist deformation by ordinary forces incidental to use or handling of the pin.

Initially, the pin shaft 6 is pushed from its open position, FIG. 1, into the slot 18. The oppositely inclined cam faces 15 on the spring strip 14 form a divide along the center of the slot so that the pin point tends to be cammed along one of the cam faces against the adjacent rigid slot flange 17. The pin is thus guided and forced into either one of two V-shaped troughs, thereby keeping it from accidentally riding out of the slot.

The second position of the parts when the pin is being closed is shown in FIG. 3 wherein the pin 6 has been manually moved further into the slot 18 and along the cam face to depress the spring end 14. Further pressure on the pin causes it to slide laterally between the cam face 15 and the side wing overhang 16*a* along the guide edge 19. As soon however as the pin point passes beyond the edge of the spring strip face 15, the latter snaps upward into engagement with the lateral overhang 16*a*. The pin which under its bias moves into the groove 14*a*, is now locked in its clasp, affording safety against accidental opening.

The pin is easily opened by depressing the overhanging spring strip 13 while moving the point of the pin 6 laterally (as for example to the extreme right dotted-line position, FIG. 4), and then over the edge of the strip face 15 in reverse direction and upward through slot 18.

The guide slot 18 is especially useful when the pin is closed quickly and casually without close inspection of the pin point position. In the prior art patents referred to above, it sometimes happens that when the pin point is quickly depressed along an off-center line, it tends to slide from the spring over and off the upper surface of the corresponding wing instead of depressing the strip and entering the clasp. This tendency is due to close metal-to-metal contact between the upper side faces of the spring strip and the corresponding wing overhang. By contrast, the pin guide flanges 17 of the invention each forms with its corresponding cam face 15 a converging trough that greatly facilitates positive contact with and depression of the spring strip, thereby ensuring movement of the pin into the clasp. It will be apparent that the flanges 17 can if desired be flared somewhat for further widening the entrance to the guide slot.

In the modification shown by FIGS. 6 to 10, the side wing members are buttressed by continuous backing means to give them even more rigid support; in addition, this arrangement serves both to strengthen the buttressing means itself and to support and protect the mounting of the pin-retaining spring strip.

To this end, referring to FIGS. 6, 8 and 10, the main supporting base 21 has at opposite sides thereof, upright plate-like extensions 22 that form backing members buttressing the side wing members 23 as described below in more detail. An end wall section 24 is formed by a transverse extension 25 of the base 21, the extension having lateral portions 26 that are joined to the base and to the backing members respectively. The base, backing members and end wall section comprise a molded unit of plastic material as indicated by FIG. 10, thereby giving strength and rigidity to the assembly.

The metal base plate 27 that terminates in a reverse bend forming the spring strip 13, is molded into the base support 21 as indicated in FIG. 8 and is generally similar to that of FIGS. 1 and 5 except for the pin anchoring arrangement. That is, instead of a pin anchor post extending from the base support through the metal plate as in FIG. 5, the anchor for the pin arm end 8 comprises a pair of spaced shoulders 28 forming part of the molded end wall 25, FIG. 10. The pin end 8 is positioned between the shoulders as shown in FIG. 8. The plate 27 is bent inwardly as best shown in FIG. 9 to form an angular reentrant section 29 that seats evenly on the front and upper sides respectively, of the shoulders 28, FIG. 8, to cover the pin end and form a solid seat for the spring strip 13. The reentrant section 29 is continuous with the strip 13 through a transverse portion 30 that seats in part against the inner side of the wall 25. This gives longitudinal support to the spring strip mounting as well as protection against deformation.

The backing members 22 for the side wings 23 have at their upper ends respectively, offset lateral portions 31 that overlay the corresponding overhanging wing portions 32. The members 22 and offset portions 31 fit snugly against and cover the outer sides of the side wings and overhanging portions respectively, and the opposing edges of the offset portions 31 abut the respective guide slot flanges 17. There is accordingly provided strong unitary buttressing means for ensuring both protection and rigid positioning of the complete side wing structure.

Where maximum rigidity of the side wing backing members is desired the overhanging lateral portions 31 can be integrally joined by an interconnecting bridging member 33 as shown in FIG. 7. This member can be part of the molded unit and is formed at the far edges of the lateral portions 31 so as to be beyond the traverse of the pin point at the guide slot 18. Thus, the molded unit comprising the support plate 21, buttressing members 22–31 and bridging member 33, constitutes a rigid braced and integrated structure that effectively precludes any spreading or distortion of the wing members 23–32 by accidental forces.

It will be understood that changes may be made in the apparatus described above without departing from the spirit of the invention or exceeding the scope thereof as defined in the following claims.

I claim:

1. A safety pin of the character described having supporting base structure, a pin shaft mounted thereon with opening bias, wing members mounted at opposite sides respectively of the base structure and having in-

wardly extending overhanging portions with the respective opposing edges spaced from each other, and a spring strip that is mounted on the base structure and biased to bridge the respective undersides of the overhanging portions for retaining the pin shaft in closed position, wherein the improvement comprises:

a. a rigid flange extending transversely and outwardly from each of the opposing edges of the overhanging portions to form a pin guide slot generally parallel to the pin shaft and overlying the spring strip;

b. the spring strip having oppositely inclined cam faces that extend into the guide slot and each cam face forming with the adjacent guide flange a generally V-shape trough respectively to receive the pin shaft;

c. the pin on entering the trough engaging the corresponding rigid guide flange and cam face to cam downwardly the spring strip, thereby allowing the pin to move laterally from the strip and beneath the corresponding overhanging portion;

d. and buttressing means located on the outer sides of the wing members and along the overhanging portions respectively, to join the corresponding flanges and maintain the flanges and wing members rigid with respect to the spring strip.

2. A safety pin as specified in claim **1** wherein the buttressing means includes a stiffening ridge that extends at least in part along the outer surface of each wing member and along the overhanging portion and is joined to the corresponding guide flange.

3. A safety pin as specified in claim **1** wherein the buttressing means comprise members that extend from opposite sides of the base structure and along and over the outer sides of the wing members and overhanging portions respectively, in rigid backing relation thereto.

4. A safety pin as specified in claim **3** wherein the base structure includes a base plate on which the wing members are mounted and a support plate for the base plate and the buttressing members are integrally joined to the support plate.

5. A safety pin as specified in claim **4** wherein portions extend laterally from the buttressing members respectively, to form with the support plate an end enclosure for the spring strip mounting.

6. A safety pin as specified in claim **5** wherein the end wall of the enclosure has spaced abuttments for supporting the spring strip and for anchoring the pin shaft.

7. A safety pin as specified in claim **6** wherein the support plate, buttressing members and end enclosure are of plastic material and together form a molded unit.

8. A safety pin as specified in claim **6** wherein the spring strip has a reversely bent extension that is secured to the support plate and includes an angular portion that seats on the end enclosure abuttments.

9. A safety pin as specified in claim **4** wherein the opposing ends of the buttressing members at the pin guide slot are rigidly joined by a bridging member across the slot at one end thereof, and the bridging and buttressing members, together with the support plate therefor, are of plastic material and together form a molded unit.

10. A safety pin as specified in claim **3** wherein the buttressing members are joined at the opposing edges thereof by a rigid bridging member extending across one end of the guide slot.

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