United States Patent [19]

McCoy

[11] **3,744,099**

[45] **July 10, 1973**

[54] **SAFETY PIN**

[76] Inventor: **Horace S. McCoy,** 11203 Lonewood Circle, Dallas, Tex. 75218

[22] Filed: **Aug. 2, 1971**

[21] Appl. No.: **167,923**

[52] **U.S. Cl.**..... **24/156 R,** 24/150 SP, 24/161 R

[51] **Int. Cl.**..... **A44b 9/12**

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

[56] **References Cited**

UNITED STATES PATENTS

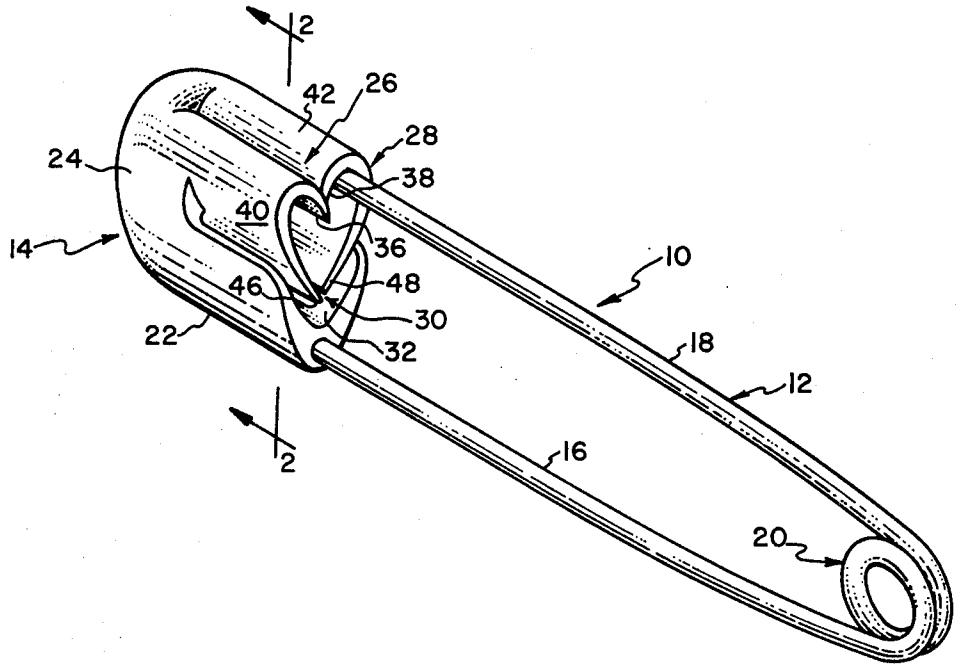
777,409	12/1904	Forsbeck	24/156 R
984,409	2/1911	Wright	24/156 R
3,052,938	9/1962	Hill et al.	24/161 R

Primary Examiner—Bernard A. Gelak
Assistant Examiner—Kenneth J. Dorner
Attorney—G. Turner Moller

[57] **ABSTRACT**

There is disclosed a safety pin having a keeper thereon for captivating the pin in a closed configuration. The keeper is constructed to receive the point through a one-way entry and to release the point through a one-way exit. Means are provided to cam the pin laterally following its passage through the one-way exit.

9 Claims, 7 Drawing Figures



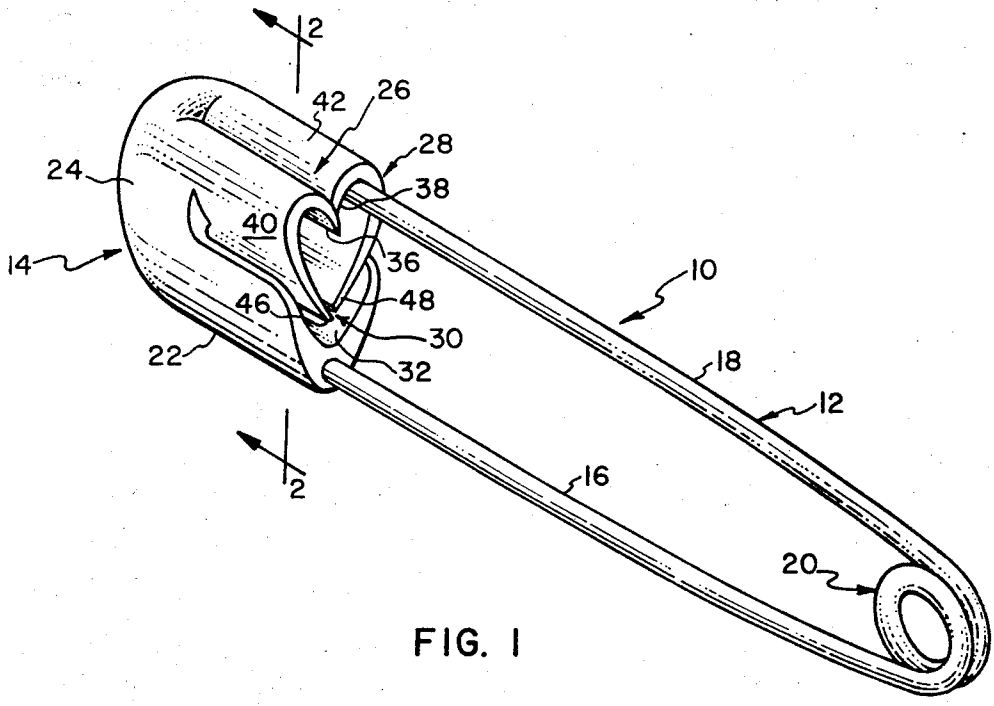


FIG. 1

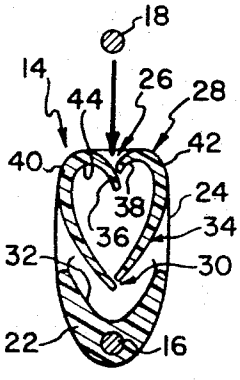


FIG. 2

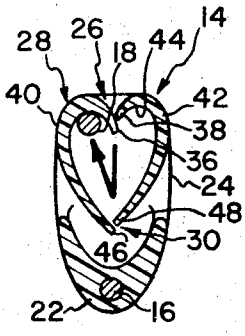


FIG. 3

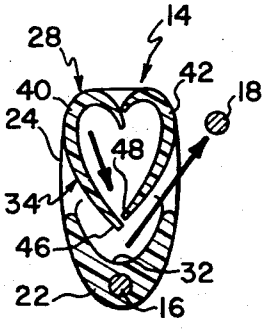


FIG. 4

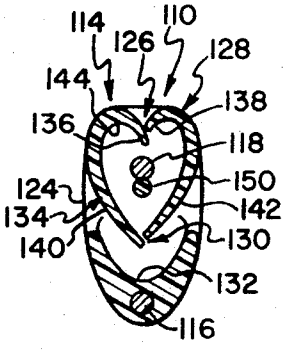


FIG. 5

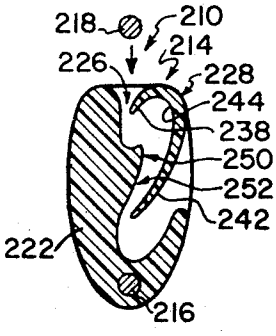


FIG. 6

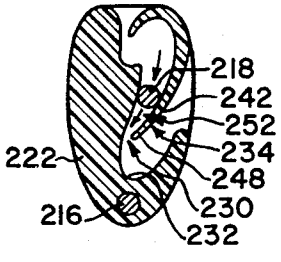


FIG. 7

INVENTOR
HORACE S. McCOY

BY G. Turner Moller

ATTORNEY

SAFETY PIN

BACKGROUND OF THE INVENTION

Since the initial development of the safety pin, most of the proposed improvements have been to the keeper and have either been directed to providing simpler means for captivating the pin or to providing foolproof means for retaining the pin in the captivated or closed position. The common safety pin now readily available is relatively easy to close and open. Its ease of opening presents a serious disadvantage for some uses, such as pinning diapers on infants. In this particular application, safety pins have been developed and are now widely used which cannot be readily opened and accordingly afford a measure of assurance that the infant will not be injured by an inadvertently opened pin.

This latter type of safety pin generally requires the pin to be depressed in the keeper and then moved laterally through a slot therein in order to open the safety pin. Although safety pins of this type afford some assurance against inadvertent opening, they are somewhat difficult to open and close, particularly when diapering a squirming infant.

The safety pin of this invention affords easy closing, almost complete assurance against inadvertent opening and easy intentional opening.

Of interest with respect to this invention are the disclosures in U.S. Pat. Nos. 362,780 and 2,604,681.

BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is an isometric view of the safety pin of this invention illustrated in the closed position;

FIG. 2 is a cross sectional view of the safety pin of FIG. 1 taken substantially along line 2—2 thereof illustrating the first step in the sequence of closing the safety pin;

FIG. 3 is a view similar to FIG. 2 illustrating the pin in the closed position;

FIG. 4 is a view similar to FIGS. 2 and 3 and illustrates the opening of the safety pin;

FIG. 5 is a cross sectional view, similar to FIG. 2, of another embodiment of the invention;

FIG. 6 is a cross sectional view, similar to FIG. 2, of another embodiment of the invention; and

FIG. 7 is a view similar to FIG. 6 illustrating the opening of the safety pin.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring to FIG. 1, the safety pin of this invention comprises as major components a suitable pin framework 12 and a keeper 14. The pin framework 12 may be of any suitable design and conveniently comprises a base 16, a pin 18 having a point thereon and means 20 biasing the pin 18 away from the base 16. The pin framework 12 is conveniently made by selecting a suitable wire, forming a loop therein providing the biasing means 20, folding the base 16 and pin 18 into a generally coplanar configuration and sharpening the end of the pin 18.

The keeper 14 is affixed to the base 16 and may be of any suitable material although, for convenience of manufacture, it is preferred to mold an organic polymeric resin to the base 16. The keeper 14 comprises a rigid base 22 affixed to the base 16 of the pin framework 12. Extending from the keeper base 22 generally toward the pin 18 is a support 24 which carries the

movable components of the keeper 14. The keeper 14 includes five operating elements: a one-way entrance 26 into the keeper 14, means 28 for holding the pin 18 against movement by the biasing means 20, a one-way exit 30 from the keeper 14, an abutment 32 affording a limit of movement of the pin 18 toward the base 16 and means 34 for camming the pin 18 laterally away from the keeper 14 upon self-biased movement of the pin 18 away from the base 16.

The one-way entrance 26 is provided by a pair of lips 36, 38 comprising part of a pair of walls 40, 42, respectively, which project from the support 24. Because of the inherent resilience of the material of the keeper 14, the lips 36, 38 are biased together and provide an exterior surface diverging away from the base 16. As the pin 18 is externally biased toward the keeper 14 and passes into engagement with the lips 36, 38, they deflect laterally to allow passage of the pin 18. After the pin 18 passes through the entrance 26, the lips 36, 38 return to their normal closed position.

Referring to FIG. 3, the release of an externally applied bias to the pin 18 causes the loop 20 to force the pin 18 away from the base 16. The pin 18 accordingly may engage one of the lips 36, 38 and may thus facilitate closing of the entrance 26. For this reason, it is preferred that one of the lips be slightly longer to overlap as shown in FIG. 3 which effectively precludes the pin 18 from inadvertently passing through the entrance 26 under the force applied by the biasing means 20. Since the underside of the lips 36, 38 present an upwardly diverging surface, it will be seen that they facilitate shifting of the pin 18 laterally out of a path of externally biased movement between the entrance 26 and the exit 30 upon release of the external biasing force.

The keeper walls 40, 42 provide a retention chamber 44 for securing the pin 18 in the closed position. Since the pin 18 is biased away from the base 16, the pin 18 tends to assume that position in the chamber 44 which is furthest from the base 16. Since the chamber 44 includes portions further from the base 16 than the entrance 26, it will be readily apparent that the pin 18 is self-biased to a position where it cannot pass in the opposite direction through the entrance 26.

The lower inside surfaces of the walls 40, 42 converge so that externally biasing the pin 18 toward the base 16 laterally shifts the pin 18 toward the exit 30. The exit 30 is provided by a pair of lips 46, 48 comprising part of the walls 40, 42, respectively. The lips 46, 48 are biased together and open upon engagement with the pin 18. After the pin 18 passes through the exit 30, the lips 36, 38 close because of the inherent resilience thereof. The lips 46, 48 preferably overlap in much the same manner as the lips 36, 38 to prevent the pin 10 from backing up through the exit 30. The pin 18 may come in contact with the abutment 32 thereby preventing further movement of the pin 18 toward the base 16. Release of the external biasing force from the pin 18 allows it to move away from the base 16 under the impetus provided by the biasing means 20. In so doing, the pin 18 engages the outer surface of one of the walls 40, 42 which act as the camming means 34 to shift the pin 18 laterally for continued self-biased movement toward the open position.

In summary, to close the safety pin 10, an individual forces the pin 18 directly toward the keeper 14 as suggested in FIG. 2. The pin 18 passes through the one-way entrance 26. The force applied by the user is re-

leased and the pin **18** is captivated in the chamber **44** as shown in FIG. **3.** To open the safety pin **10,** the individual again forces the pin **18** toward the base **16.** The pin **18** passes through the exit **30** and, upon release of the force, the pin **18** is cammed laterally and moves to the open position because of the bias applied by the loop **20.**

Referring to FIG. **5,** there is illustrated a safety pin **110** comprising another embodiment of this invention. For purposes of brevity, analogous reference characters are used to designate substantially identical parts with only the differences being specifically discussed. There is a tendency when one closes the safety pin **10** for the first time to press too hard on the pin **18** and thereby pass it through the entrance **26,** the chamber **44** and through the exit **30** so that closure of the safety pin **10** is not accomplished. This is not deemed to be a serious problem since it occurs only infrequently and usually only the first few times the safety pin **10** is used. To facilitate avoiding this problem, the safety pin **110** is provided with an abutment **150** in the pin retaining chamber **144** in the path of externally biased movement between the entrance **126** and the exit **130.** The abutment **150** is conveniently illustrated as circular and extends from the support **124** and is an integral part thereof.

The safety pin **110** is closed in substantially the same manner as the safety pin **10.** The user forces the pin **118** toward the keeper **114.** The pin **118** engages the lips **136, 138** and passes through the entrance **126.** The pin **118** then contacts the abutment **150** and the user consequently realizes that the pin **118** is in the chamber **144** and that the external biasing force may be released. The opening of the safety pin **110** is likewise substantially identical to the opening of the safety pin **10.** The user biases the pin **118** toward the base **116** whereupon the pin **118** engages the internal surface of the walls **140, 142** and is thereby guided toward the exit **130.** To prevent the pin **118** from hanging up on the abutment **150,** the edges thereof are conveniently rounded. After the pin **118** passes through the exit **130,** it may engage the abutment **132.** The external biasing force is then relaxed to allow the pin **118** to move away from the base **116.** During this self-biased movement, the pin **118** contacts the camming means **134** and is laterally shifted for continued movement toward the open position.

Referring to FIGS. **6** and **7,** there is illustrated a safety pin **210** comprising another embodiment of this invention. For purposes of brevity, analogous reference characters are used to designate substantially identical parts with only the differences being specifically discussed. An analysis of the embodiments of FIGS. **1–5** reveals two features which avoid inadvertent opening of the safety pin. The first is the distance that the pin must move toward the base. The second is that the pin must spread the lips constituting the one-way exit thereby requiring a greater force than is necessary merely to move the pin against the spring **20.** To provide additional assurance against inadvertent opening, the safety pin **210** is provided with a channel **252** of smaller cross section than the pin **218** thereby requiring that the wall **242** be spread during opening.

The additional major change in the embodiment of FIGS. **6** and **7** is that the base **222** is greatly enlarged thereby reducing the volume of the pin receiving chamber. The abutment **250** may comprise part of the base **222** and is thereby substantially more rigid and less subject to breaking.

The safety pin **210** is closed in substantially the same manner as the safety pins of FIGS. **1–5.** The user forces the pin **218** toward the keeper **214.** The pin **218** engages the lip **238,** which is self-biased against the base **222,** and passes through the one-way entrance **226.** The pin **218** then contacts the abutment **250** and the user consequently realizes that the pin **218** is in the chamber **244** and that the external biasing force may be released. The pin **218** is upwardly biased by the spring into the uppermost portion of the chamber **244.**

To open the safety pin **210,** the pin **218** is forced toward the base **216** and moves, against the bias of the spring, into the channel **252** as shown in FIG. **7.** The channel **252** is slightly narrower than the diameter of the pin **218** so that the wall **242** must be flexed in order to pass the pin **218** through the channel **252.** The channel **252** preferably narrows further adjacent the lip **248** to require a substantial force to open the one-way exit **230.** After the pin **218** passes through the exit **230,** it may engage the abutment **232.** The external biasing force is then released to allow the pin **218** to move away from the base **216.** During this self-biased movement, the pin **218** contacts the camming means **234** and is laterally shifted for continued movement toward the open position.

It will be apparent that the safety pin of this invention affords almost complete assurance that the pin will remain in the closed position. The restricted one-way exit and particularly the restricted channel require that deliberate effort be made to open the pin. The safety pin of this invention provides almost complete assurance against inadvertent opening and yet is easier to close and easier to open intentionally than either the diaper type safety pin or the common safety pin now presently used.

It will accordingly be seen that there is herein provided an improved safety pin having all of the objects of this invention and others as will be apparent to those skilled in the art.

I claim:

1. A safety pin comprising a base, a pin, means mounting the pin for self-biased movement away from the base toward an open position and for externally biased movement toward the base toward a closed position, and a keeper connected to the base for releasably securing the pin in the closed position, the keeper comprising

means defining a path of externally biased pin movement through the keeper including a one-way entrance, a pin retaining chamber in pin receiving relation to the entrance, and a one-way exit from the chamber, the one-way entrance and the one-way exit being aligned in the path of externally biased pin movement;

an abutment, in the pin retaining chamber, between the entrance and exit for blocking externally biased pin movement directly from the entrance to the exit;

means adjacent the exit affording a limit of externally biased pin movement toward the base; and

means adjacent the limit means for laterally deflecting the pin out of the path of externally biased movement for self-biased movement toward the open position.

2. The safety pin of claim 1 wherein the one-way exit comprises a resilient means diverging toward the chamber and defining therebetween an exit slot.

3. The safety pin of claim 2 wherein the resilient means comprises an abutment and a resilient lip biased theretoward and openable upon movement of the pin toward the base.

4. The safety pin of claim 2 wherein the resilient means comprises a pair of lips biased together and openable upon movement of the pin toward the base.

5. The safety pin of claim 4 wherein the lips overlap.

6. The safety pin of claim 1 wherein the path defining means comprises a pair of walls having exterior surfaces diverging away from the base from adjacent the limit means, the diverging external surfaces comprising the lateral deflecting means.

7. The safety pin of claim 6 wherein the internal surfaces of the walls, adjacent the one-way exit, diverge away from the base.

8. The safety pin of claim 1 wherein the path defining means includes

a channel, between the pin retaining chamber and the one-way exit, of smaller cross-section than the pin;

the channel being partially defined by a resilient wall deflectable by passage of the pin through the channel.

9. The safety pin of claim 8 wherein the path defining means includes the resilient wall having an exterior surface inclined away from the base from adjacent the resilient means, the inclined exterior surface comprising the lateral deflecting means.

* * * * *