United States Patent

Gaylord

[15] **3,659,322**

[45] **May 2, 1972**

[54] LOCKING DEVICE FOR RELEASABLE STRAP CONNECTORS

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[73] Assignee: **A. Koch & Sons, Inc., a divsion of Global Systems,** Corte Madera, Calif.

[22] Filed: **Aug. 21, 1970**

[21] Appl. No.: **65,908**

[52] **U.S. Cl.** **24/230**

[51] **Int. Cl.** **A44b 19/00**

[58] **Field of Search** ..... 24/230 A, 230 BC, 230 AT

[56] **References Cited**

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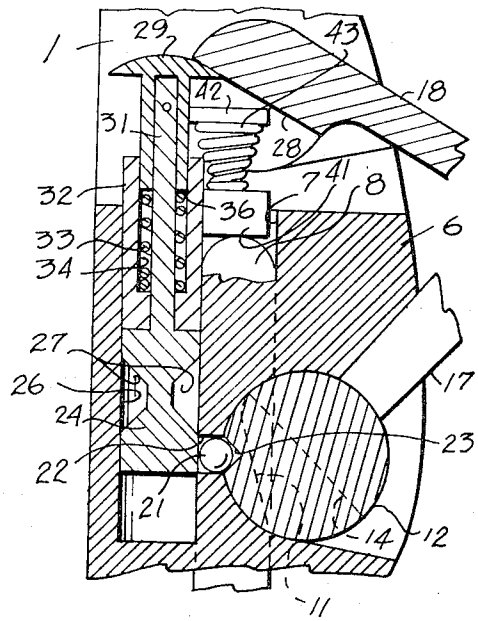
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Primary Examiner—Bobby R. Gay
Assistant Examiner—Garry Moore
Attorney—George B. White

[57] **ABSTRACT**

In a releasable strap connector wherein the male member has at least one prong insertable into a socket in the female member, which socket is intersected by a transverse oscillating bar cut away at the intersection so as to leave the socket unobstructed for the insertion of the prong before being resiliently urged into an obstructing position into engagement with a notch in the prong to hold the prong connected, and wherein levers are employed for oscillating the bar from an obstructing to an unobstructing position for the release of the prong; the improvement of a safety lock for directly locking the oscillating bar against accidental oscillation which includes a ball in the female connector spaced from said socket but engaging a keeper recess in the oscillating bar and being held there by a plunger which plunger is held in a guide by a spring in such locking position; a part of a lever in the manipulating device for the oscillating bar is engageable with the plunger about when the bar is to be oscillated to push the plunger down and bring a releasing recess in the plunger in registry with the ball thereby to release the lock. A spring pressed ejector associated with the plunger guide and slideable in the female member urges the unobstructed prong out of the socket and continues to hold the plunger in the unlocking position until the prong is again inserted so as to push the guide and the plunger up into the locking position.

7 Claims, 10 Drawing Figures



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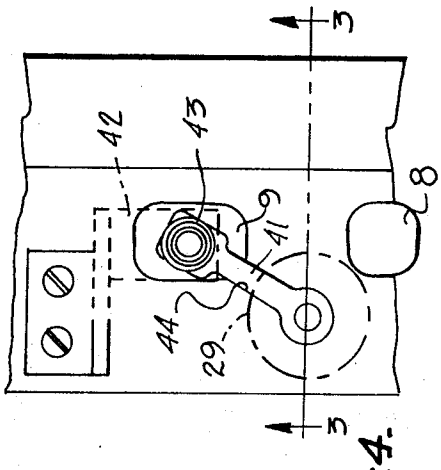


Fig. 4.

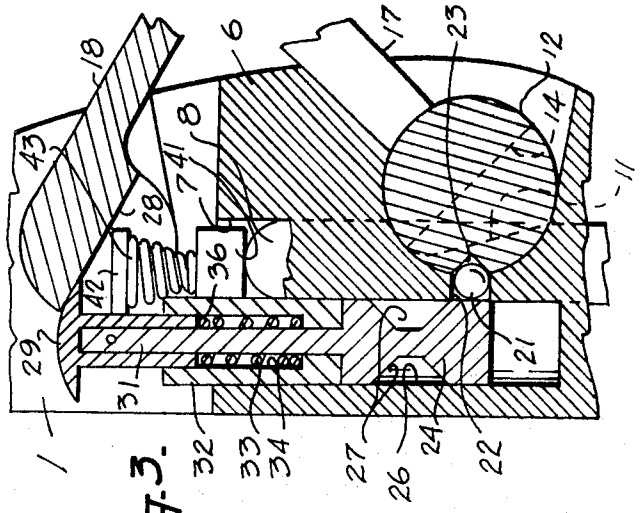


Fig. 3.

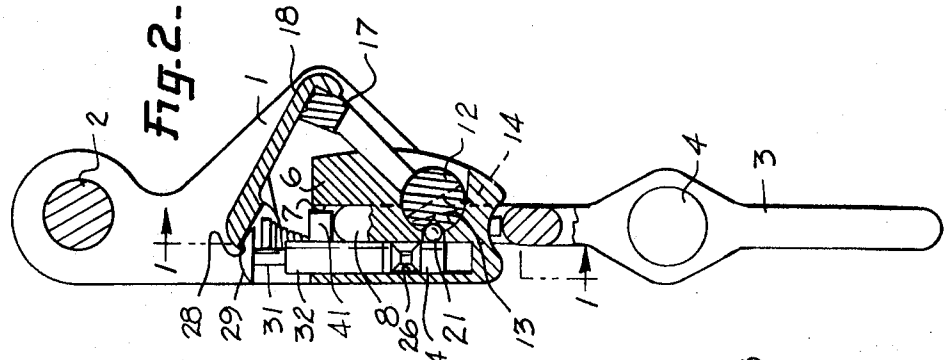


Fig. 2.

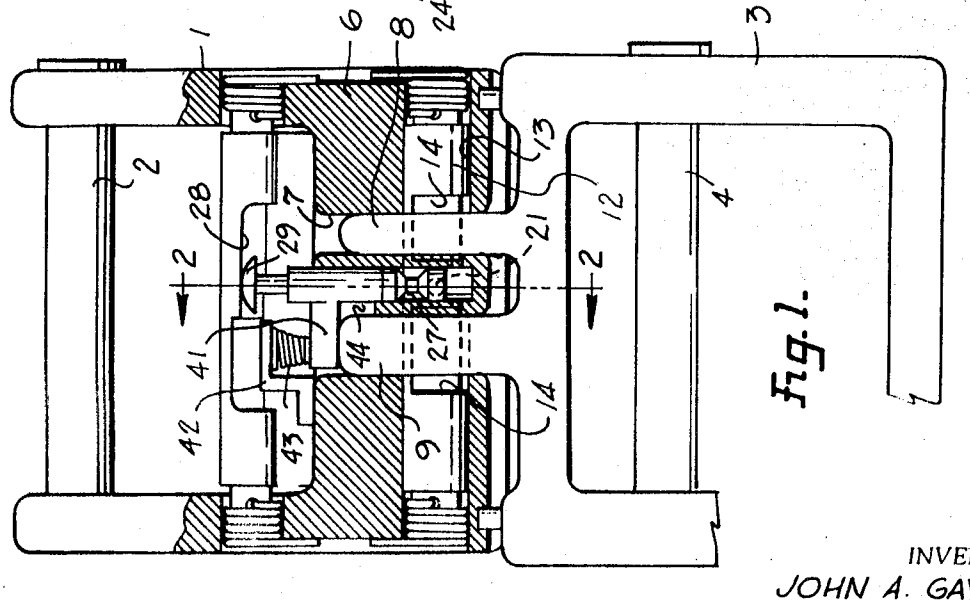


Fig. 1.

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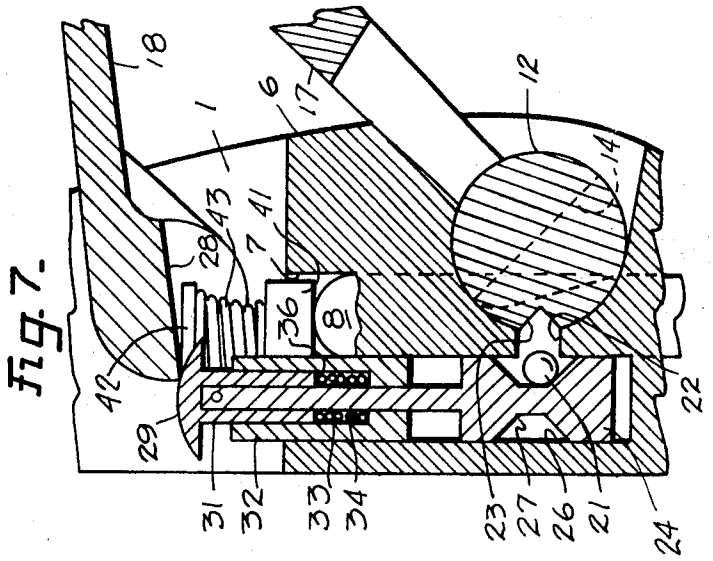


Fig. 7.

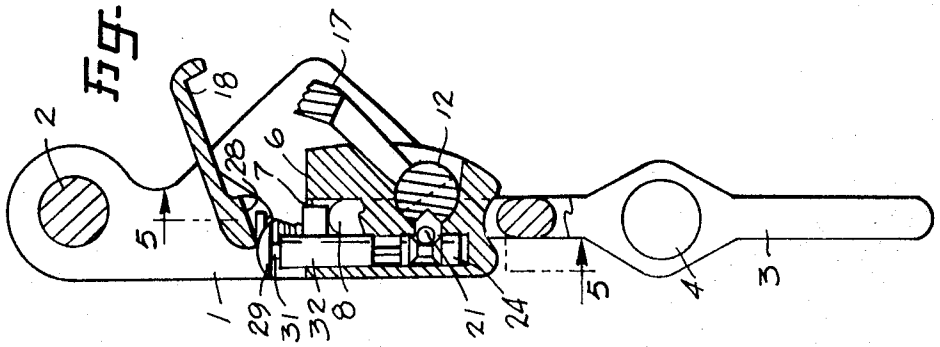


Fig. 6.

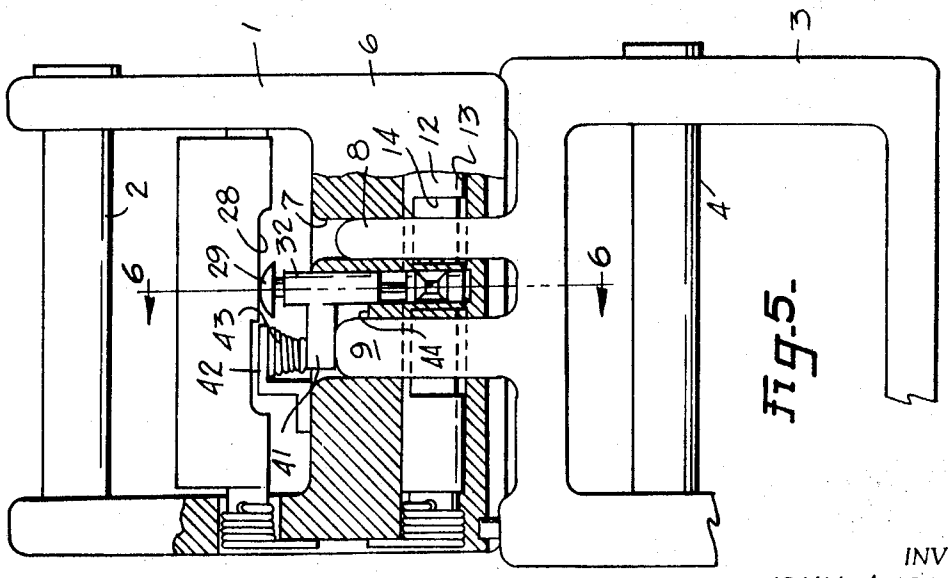


Fig. 5.

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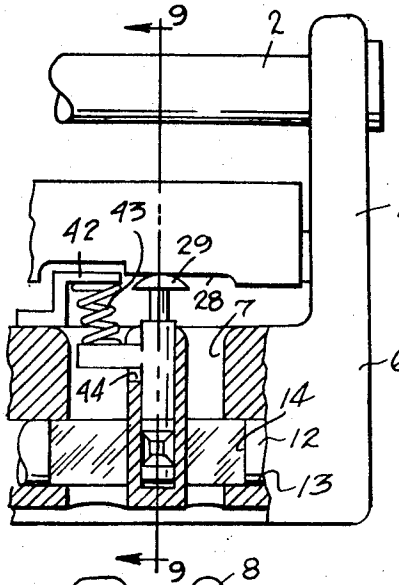
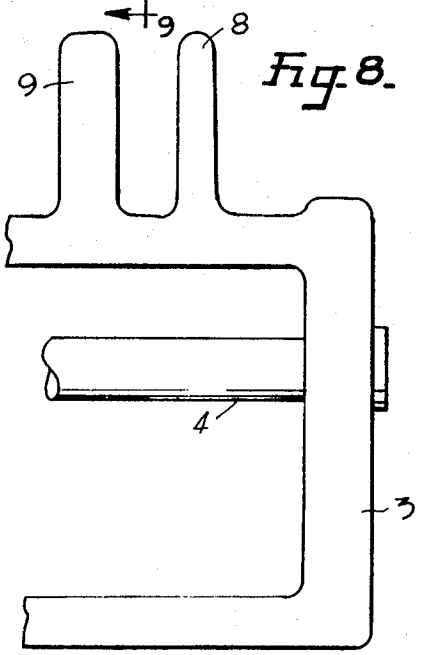


Fig. 8.



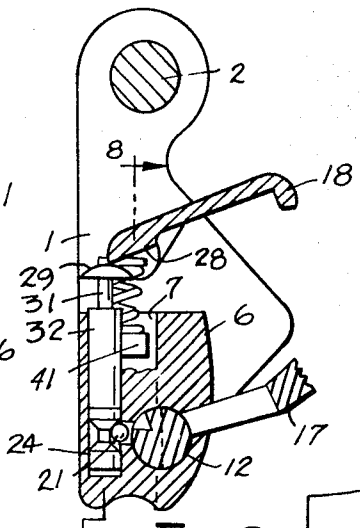
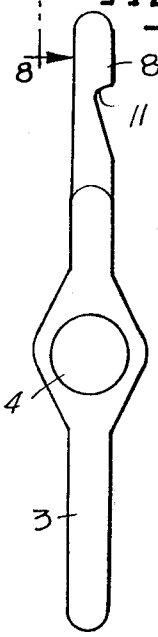


Fig. 9.



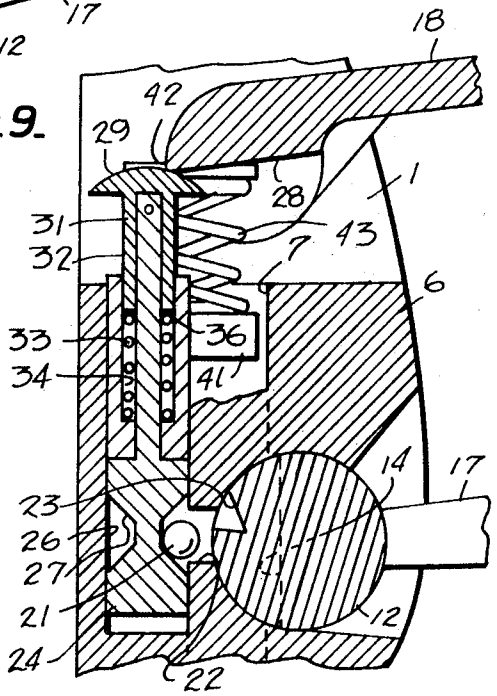
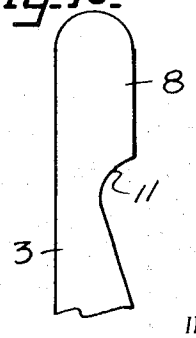


Fig. 10.



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LOCKING DEVICE FOR RELEASABLE STRAP CONNECTORS

BACKGROUND OF THE INVENTION

In releasable strap connectors of the type shown in Pat. No. 3,183,568 and 3,330,014 of John A. Gaylord, the safety device for the oscillating shaft is a safety lever which prevents the pulling of the hand lever for turning the oscillating bar into unobstructing position for releasing the prong of the male member. However, by reason of vibration and other stresses to which such strap connectors, particularly when used for the straps of a canopy or parachute, are turned accidently and release under such conditions can be fatal.

The primary feature of this invention is the direct locking of the oscillating bar in an obstructing position interlocked with the prong which can be released only when a manipulating lever for the releasing of the male prong is manipulated, such manipulation operating the locking device to free the oscillating shaft from its direct lock for oscillation.

Another feature of the invention is that the same locking device has means associated with it and co-operating with it for assisting in the ejection of the prong from its socket and also fro holding the locking device in unlocked attitude, and to again lock the locking device by the insertion of the prong into its socket.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a partly sectional view showing the locking device in locking position with the prong in engagement in the female socket, the section being substantially on lines 1—1 of FIG. 2.

FIG. 2 is a cross-sectional view of the assembled and locked device, the section being taken on lines 2—2 of FIG. 1.

FIG. 3 is a fragmental sectional view on an enlarged scale, the section being taken substantially on lines 3—3 of FIG. 4.

FIG. 4 is a fragmental top plan view of the part of the device shown in FIG. 3.

FIG. 5 is a fragmental view partly in section corresponding to FIG. 1 showing the safety lever raised for pushing down the plunger of the locking device into position, the section being taken on lines 5—5 of FIG. 6.

FIG. 6 is a sectional view taken on lines 6—6 of FIG. 5.

FIG. 7 is a fragmental view showing the locking device on an enlarged scale in said unlocking attitude.

FIG. 8 is a fragmental partly sectional view showing the prong released from the socket, the section being taken on lines 8—8 of FIG. 9.

FIG. 9 is a partly sectional view showing the operating handle lever holding the oscillating bar in unobstructing position to release the prong, the section being taken on about lines 9—9 of FIG. 8.

FIG. 10 is an enlarged view showing the locking device held in unlocking position after release of the prong.

DETAILED DESCRIPTION

A female member 1 has a usual cross bar or roller 2 to connect to one strap while the male member 3 has a suitable bar or roller 4 to connect to another strap, as described in the aforementioned prior patents. In the body 6 of the female member 1 is a socket 7 into which fits a prong 8 of the male member 3. In the present illustration there is also a second prong 9 of larger diameter than the first prong 8 fitting into another socket which determines the alignment of the prongs 8 and 9 in such a manner that a notch 11 on each prong 8 and 9 is facing toward an oscillating locking bar 12 in a transverse bearing hole 13 intersecting the sockets 7.

The oscillating bar 12 has a cut away portion 14 at the area of intersection with each socket 7 so that when the oscillating bar 12 is turned from the obstructing position shown in FIG. 2 into the unobstructing position shown in FIG. 9, the prongs 8 and 9 are allowed to be withdrawn from the respective sockets 7. The oscillating bar 12 is engaged by springs at its opposite ends, anchored in the female body 6 and biased so as to urge the bar into the obstructing position shown in FIG. 2. There is a manipulating device for oscillating the oscillating bar 12 for the release of the prongs 8 and 9. In this illustration the manipulating device includes a handle lever 17 connected to the oscillating bar 12, as described in more detail in the aforementioned patents, whereby the oscillating bar can be turned into the unobstructing position shown in FIG. 9. The manipulating device also includes a safety lever 18 pivoted in the female body 6 and resiliently urged toward the free end of the handle lever 17 so as to be interlocked with the handle lever 17 as shown in FIG. 2. Thus the safety lever 18 is to be lifted before the handle lever 17 can be moved in a clockwise direction viewing FIG. 2 for releasing the prongs 8 and 9.

The improvement in the previously described device is the positive locking of the oscillating bar 12 to the body 6 against accidental oscillation. This safety device includes a ball 21 in a pocket 22 in the female body 6. The ball 21 fits into a keeper recess 23 in the oscillating bar 12 in the obstructing position of said bar 12. The ball 21 is held in place by a plunger head 24 which reciprocates in a pocket 26 in the female body 6. The pocket 22 for the ball 21 is adjacent the plunger pocket 26. The plunger head 24 has a recess 27 all around the middle thereof so that when the plunger head 21 is moved from the locking position shown in FIG. 3 into the unlocking position shown in FIGS. 7 and 10 the ball 21 can escape into the plunger head recess 27 and thereby unlock the oscillating bar 12 for oscillation.

The shifting of the plunger into unlocking position is accomplished by a device co-ordinated with the manipulating device for the rocking of the oscillating bar 12 into unobstructing position. In the present illustration the safety lever 18 of the manipulating device has an abutment extension 28 engaged with the head 29 on a plunger stem 31. The plunger stem 31 is reciprocable in a plunger guide 32. A coil spring 33 between the bottom of the cavity 34 of the plunger guide 32 and a shoulder 36 on the plunger stem 31 normally urges the plunger upwardly and the stem head 29 against the abutment face 28 of the safety lever 18 as shown in FIG. 3. When the safety lever 18 is turned from its position shown in FIG. 3 into the position shown in FIG. 6, then its abutment face 28 presses the stem 31 and the plunger head 24 and compresses the spring 33 to the unlocking position shown in FIG. 7.

A device to co-ordinate the locking device with the withdrawal and insertion of the prongs, includes an arm 41 extended from the plunger guide 32 over one of the sockets 7, in this case above the prong 9. A bracket 42 extends from the top of the female body 6 toward the pivoted end of the safety lever 18 and spaced above the arm 41. A coil spring 43 between the bracket 42 and the guide arm 41 presses the guide arm 41 against the top of the prong 9. The guide arm 41 is reciprocable in a slot 44 in the wall of the socket 7 for the prong 9. The pocket 27, in this form, is located in the body 6 between the sockets 7 for the prongs 8 and 9, spaced from the sockets 7.

OPERATION

In operation the oscillating or rocking bar 12 is directly fixed in the obstructing position shown by FIG. 3 as long as the manipulating device is in its safety position. As soon as the safety lever 18 of the manipulating device is raised for the manipulation for releasing the prongs, the abutment face 28 presses down the locking plunger so as to push the plunger head 24 into the unlocking position shown in FIG. 7. Upon turning the handle lever 17 from the position shown in FIG. 7 into the position shown in FIG. 10 the oscillating bar 12 is turned into unobstructing position and as the compression spring 43 expands it pushes down the arm 41 and also pushes the respective prong 9 so as to positively assure release of the male member. At the same time the movement of the guide 32 against the plunger head 24, as shown in FIG. 10, causes expansion of the plunger spring 33 and thereby holds the locking mechanism in the unlocking position until such time that the prongs 8 and 9 are again inserted into the socket 7 and prong 9 pushes the arm 41 and the guide 32 up compressing the spring

43 into the initial locked position. It is to be understood that after the prongs are released the handle lever 17 is released and the oscillating bar 12 is returned to the obstructing position by the spring 16 and therefore when the prongs reach a position wherein the notches 11 of the prongs 8 and 9 are in the proper position the oscillating bar 12 snaps back into the locking position so that as the locking device is brought back into the locking position the keeper recess 23 is in registry with the locking ball 21.

I claim:

1. In a releasable strap connector, having a female member with at least one socket hole, a male member having at least one prong fitting into said socket hole, a bearing hole intersecting said socket, a locking bar oscillatable in the bearing hole, the portion of said locking bar projecting into said socket hole being cut away to leave said socket hole unobstructed in one position of said locking bar thereby to permit insertion of said prong, and in another position to project into said socket hole thereby to interlock with said prong, means for turning said locking bar from interlocking position to unobstructing position at will, and a manipulatable lever co-acting with said turning means being pivotally movable into interlocking and releasing positions,

the improvement of a safety lock, comprising,

said female member having a pocket therein generally parallel with and adjacent to said socket hole,

a keeper recess in said oscillating locking bar on the side adjacent to said pocket,

a connecting passage between said pocket and said keeper recess,

a locking element movable in said passage into and out of locking engagement with said keeper recess,

a plunger reciprocable in said pocket,

the inner end of said plunger being engageable with said locking element for holding the locking element in said passage in locking engagement with said locking bar,

a reduced portion at said end of said plunger adapted to be registered with said passage for permitting the release of said locking element from said passage and from said keeper recess,

and resiliently actuated connecting means between said manipulatable lever and said plunger for holding said plunger with said end in locking engagement with said locking element in the interlocking position of said manipulatable lever, and to shift said plunger to register said reduced portion with said locking element by the turning of said manipulatable lever out of interlocking position.

2. The safety lock for said releasable strap connector specified in claim 1, and

resiliently yieldable means activated by said prong whenever said prong is withdrawn from said socket to hold said plunger with the reduced portion in registry with said locking element until said prong is reinserted.

3. The safety lock for a releasable strap connector specified in claim 2, and

a plunger guide slideable in said pocket,

said resilient means to urge said plunger into interlocking position being a first spring bearing against said guide and against said plunger urging said plunger toward said manipulatable lever into said locking element engaging position,

a second spring bearing against said guide to urge it away from said manipulatable lever thereby to permit said first spring to expand away from said lever to keep said plunger in said locking element freeing position, and

a part on said guide being engageable by said prong whereby said guide is moved toward said lever and said springs are compressed by the insertion of said prong into said socket and whereby said second spring urges said prong out of said socket when said oscillating bar is turned into unobstructing position.

4. The safety lock for said releasable strap connector specified in claim 2, and

a plunger guide reciprocable in said female member,

said plunger being reciprocable in the plunger guide,

a plunger spring in said plunger guide bearing against said plunger normally to urge said plunger toward said lever thereby to hold said plunger in said interlocking position.

5. The safety lock for said releasable strap connector specified in claim 4, and

a guide part projecting into said socket in the path of said prong,

a guide spring in the female member urging said guide part into engagement with said prong inwardly of said socket whereby said plunger is held in position to free said locking element when said prong is withdrawn from said socket, and said prong during insertion into said socket moving said guide part and said guide to shift said plunger into locking position thereby compressing said guide spring,

said guide spring being adapted to exert force for ejecting said prong from said socket when said oscillating bar is twined into unobstructing position.

6. The safety lock for said releasable strap connector specified in claim 1,

said locking element being a ball movable in said passage,

said reduced portion of said plunger being an annular recess in registry with said ball in the freeing position of the plunger.

7. In a releasable strap connector, having a female member with at least one socket hole, a male member having at least one prong fitting into said socket hole, a bearing hole intersecting said socket, a locking bar oscillatable in the bearing hole, the portion of said locking bar projecting into said socket hole being cut away to leave said socket hole unobstructed in one position of said locking bar thereby to permit insertion of said prong, and in another position to project into said socket hole thereby to interlock with said prong, means for turning said locking bar from interlocking position to unobstructing position at will, and a manipulatable lever co-acting with said turning means being pivotally movable into interlocking and releasing positions,

the improvement of a safety lock, comprising,

said female member having a pocket therein generally parallel with and adjacent to said socket hole,

a plunger reciprocable in said pocket,

co-acting means between the inner end of said plunger and said oscillating locking bar for locking said locking bar in one position of said plunger and releasing said locking bar in a second position of said plunger,

and resiliently actuated means between said manipulatable lever and said plunger for holding said plunger in said one position for locking said locking element, and for shifting said plunger into said second position by the turning of said manipulative lever out of interlocking position,

said resiliently actuated means including a plunger guide slidable in said pocket,

a first spring bearing against said guide and against said plunger so as to urge said plunger toward said one position and to urge the other end of said plunger into engagement with said manipulatable lever,

a second spring bearing against said guide so as to urge said guide away from said manipulatable lever and inwardly of said pocket thereby to permit said first spring to expand away from said lever to keep said plunger in said second position,

a part on said guide being movable in said socket hole and abutting said prong whereby said guide is moved toward said lever and said springs are compressed by the insertion of said prong into said socket and whereby said second spring urges said prong out of said pocket when said oscillating bar is freed and turned into unobstructing position.

* * * * *