

[54] **PUSH-BUTTON LOCK FOR SAFETY BELTS**

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[58] **Field of Search** 24/230 A, 230 AL,
24/230 AP, 230 AS, 230 AV, 75, 77

[56] **References Cited**

UNITED STATES PATENTS

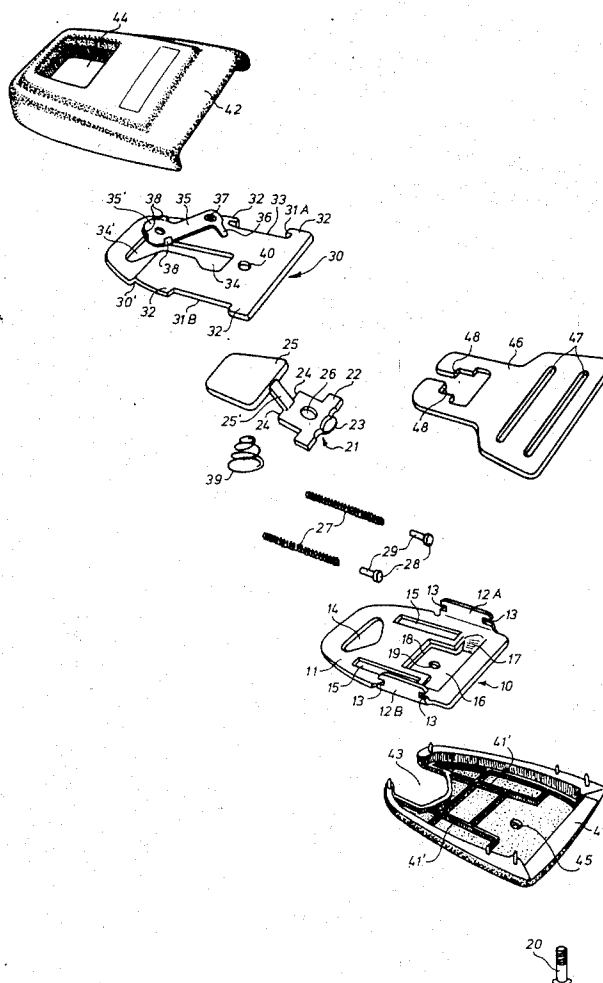
3,168,770	2/1965	John et al.	24/230 AS
3,499,193	3/1970	Hatfield	24/230 A
3,605,209	9/1971	Alarcon	24/230 A

Primary Examiner—Donald A. Griffin
Attorney—John R. Janes et al.

[57] **ABSTRACT**

In a push-button lock for safety belts there is provided a base plate and a cover plate which is mounted on the base plate. For this mounting the base plate forms two upwardly bent marginal flanges at two opposite side margins and the cover plate forms an opening to be threaded on one of the flanges by such opening, as well as projections for engagement with said one flange from the outer side thereof and with the other marginal flange from the inner side thereof by lateral displacement of the cover plate. There is provided on the cover plate a manually operable blocking member which may be set against the inner side of said one flange for retaining the cover plate in a position in which it is connected with the base plate by the engagement between the projections and the flanges.

8 Claims, 8 Drawing Figures



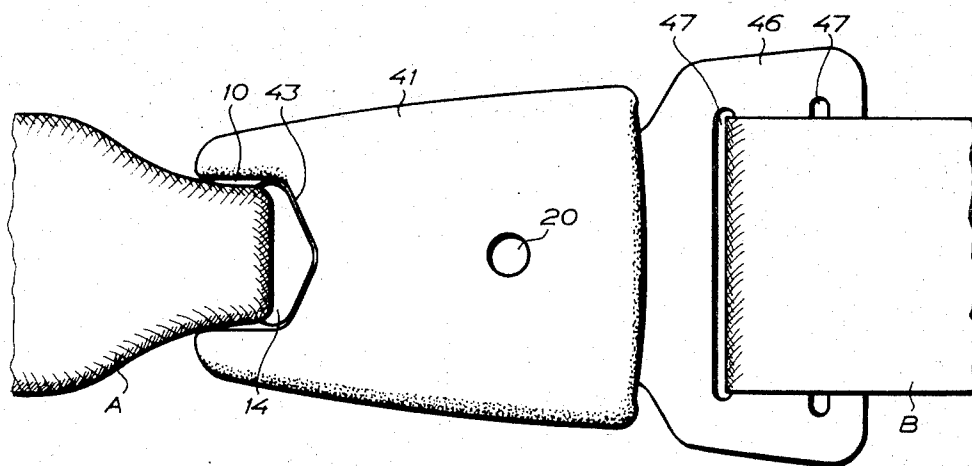


FIG. 3

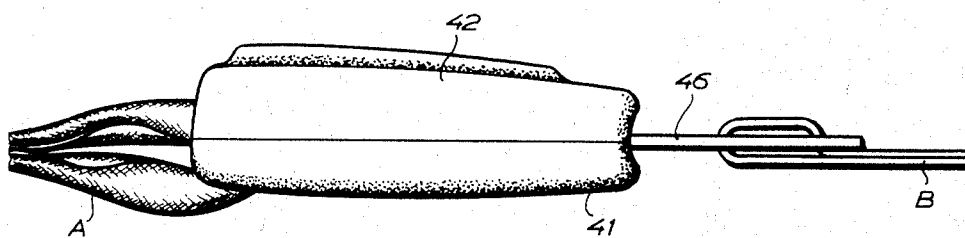


FIG. 2

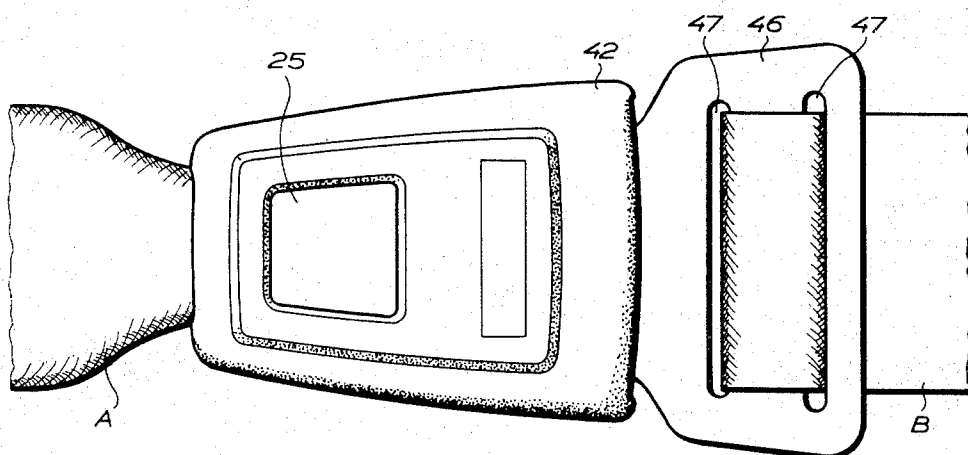
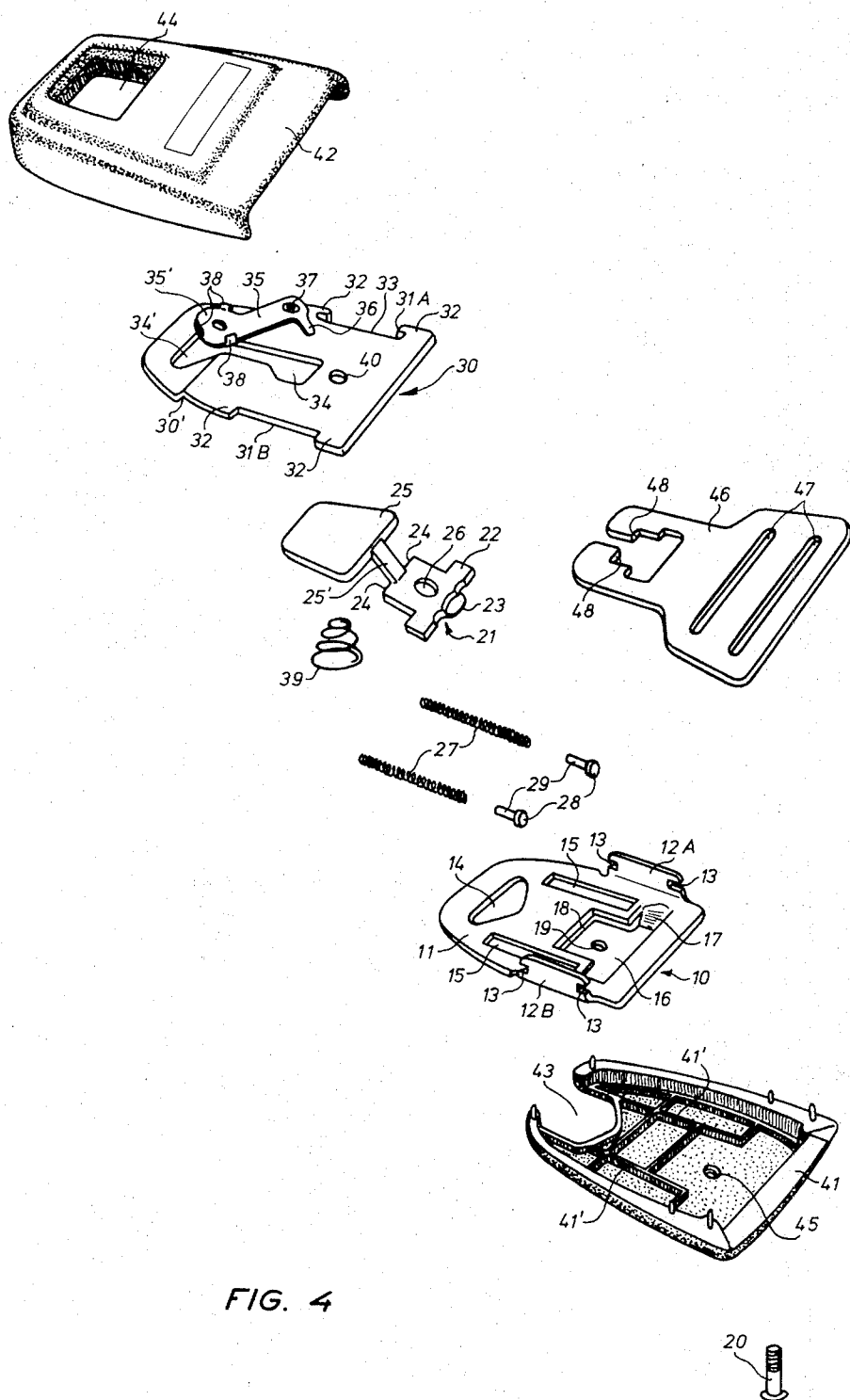


FIG. 1



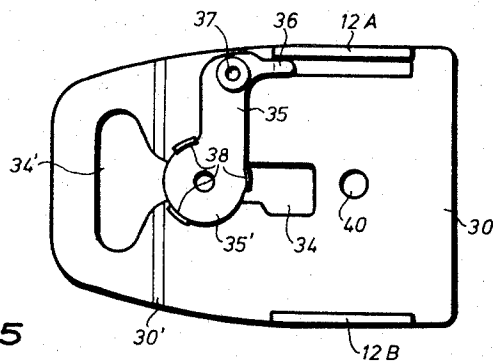


FIG. 5

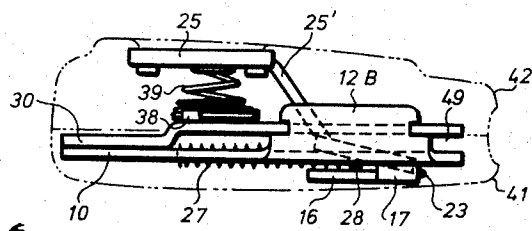


FIG. 6

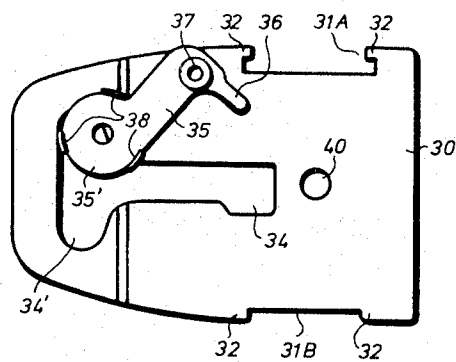


FIG. 7

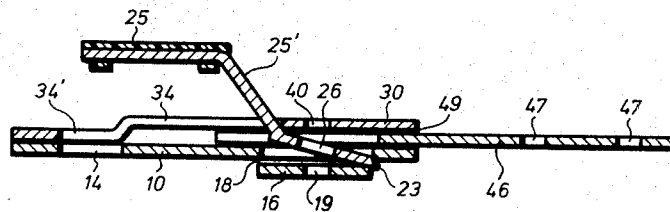


FIG. 8

PUSH-BUTTON LOCK FOR SAFETY BELTS

The invention relates to a push-button lock for safety belts, comprising a pivoted engagement member which is spring biased to locking position to engage a lock tongue inserted into the lock and which is operable, by means of a push button, to a disengaged position against the spring bias.

The use of these so called push-button locks has been more and more extensive in recent years due to the fact that the locks are easy to operate. The fear that such locks could be easily opened inadvertently by operation of the push button if the lock is pressed against parts of the body or the car at a collision or at sudden braking of the car has turned out to be unjustified. However, as far as the manufacture is concerned these locks as presently designed are less attractive due to the fact that they are composed of a great number of small elements and, furthermore, due to the fact that the mounting of these elements is very time-consuming, which unfavourably affects the manufacture cost.

An object of the invention is to overcome these drawbacks and to provide a lock of the kind referred to, which consists of a small number of elements which are easy to mount largely without using tools. However, the reliability of the lock has in no way been reduced due to the simplification of the construction thus provided.

The lock according to the invention comprises a base plate having upwardly bent marginal flanges at two opposite side margins, an engagement member pivotally mounted to the base plate, spring means biasing the engagement member to locking position to engage a lock tongue inserted into the lock from one end thereof between the marginal flanges, a push button for operating the engagement member to a disengaged position against the spring bias, a cover plate which forms an opening and is threaded by this opening onto one of the marginal flanges, projections on the cover plate for engagement with said one flange from the outer side thereof and with the other marginal flange from the inner side thereof by lateral displacement of the cover plate, and a blocking member on the cover plate to be set against the inner side of said one flange for retaining the cover plate in a position in which the projections are engaged with the associated flanges, the cover plate maintaining the engagement member in operative position on the base plate.

An embodiment of the invention will be described below reference being made to the attached drawing in which

FIG. 1 is a plan view of the lock according to the invention seen from the push button side thereof;

FIG. 2 is a side view of the lock;

FIG. 3 is a plan view of the lock from the opposite side thereof;

FIG. 4 is an exploded perspective view of the push button lock;

FIG. 5 is a plan view of the base plate of the lock with the cover plate mounted thereon;

FIG. 6 is a side view of the base plate and the cover plate with further elements mounted thereon;

FIG. 7 is a plan view of the cover plate only; and

FIG. 8 is a longitudinal sectional view of the lock without housing.

The push-button lock disclosed in the drawings comprises a base plate 10 which has at two opposite side margins of a planar body portion 11 of the plate mar-

ginal flanges 12A and 12B which are bent upwardly and are perpendicular to portion 11. Each marginal flange has in each end thereof an edge notch 13. In body portion 11 there is punched an opening 14 for attaching a strap A as is disclosed in FIGS. 1 to 3, which forms part of a safety belt. Alternatively the base plate may be arranged to be mounted directly to the floor panel of a car by being formed with an attachment flange at the end where opening 14 is disposed in the embodiment shown. In body portion 11 there are also provided two slots 15 parallel with the marginal flanges. Between the marginal flanges there is off-set towards the bottom of the base plate a portion 16 of the body portion 11, this portion 16 being connected with the rest of the base plate by two webs one of which is shown at 17, a space 18 being provided for the rest between portions 11 and 16. Finally, there is punched in the base plate a hole 19 for a fastening screw or rivet 20 for the final mounting of the lock as will be described later.

The lock includes a substantially Z-formed engagement member 21 which provides a cross bar 22 and a tongue 23 projecting centrally therefrom. Furthermore, the engagement member provides two shoulders 24 and is provided with a pressure plate 25 carried by a shaft 25' which forms the push button of the lock. The engagement member is introduced at tongue 23 into space 18 near the right hand end margin of base plate 10, as seen in FIGS. 4, 6, and 8, the cross bar being engaged with portion 16 and the push button extending to the left. Then, a hole 26 in the engagement member is opposite hole 19 which is arranged in portion 16 of base plate 10. In base plate 10 there are mounted also two helical pressure springs 27 which are provided at one end thereof with a head 28 inserted into the spring with a pin 29. The pressure springs and the associated heads are disposed in slots 15 and are retained in a manner to be described later.

A cover plate 30 is mounted on base plate 10 in a manner which is specific for the invention and which provides the simple mounting of the lock according to the invention as mentioned above. For mounting cover plate 30 on base plate 10 between marginal flanges 12A and 12B thereof cover plate 30 is formed with two notches 31A and 31B defined by marginal portions 32 at the ends thereof. Notch 31A widens to an opening 33 which is sufficiently large to enable marginal flange 12A to be introduced into this opening transversely of cover plate 30 the distance between marginal portions 32 of cover plate 30, defining the notches, being of a size which is less than the greatest length of the marginal flanges but allows marginal portions 32 to be introduced into notches 13 transversely of marginal flanges 12A and 12B. Furthermore, cover plate 30 has a slot 34 to receive therein shaft 25', cross bar 22 being disposed at one side of the cover plate and push button 25 being disposed at the other side of the cover plate. Slot 34 widens to form a portion 34' corresponding to opening 14 in base plate 10, and cover plate 30 is formed with a shoulder 30' to engage the portion of the base plate, in which portion 34' is formed such that this portion covers opening 14 and strap A, when threaded through opening 14, is threaded also through portion 34' of slot 34. On the cover plate there is mounted a bell crank having a long arm 35 and a short arm 36, which is connected with cover plate 30 by means of a tubular rivet 37 enabling the bell crank to be pivoted

about an axis which is transverse to the cover plate, between the position disclosed in FIGS. 4 and 7 and the position disclosed in FIG. 5. Arm 35 is formed with a circular portion 35' having three upwardly bent flaps 38 to form a seat for a conical helical pressure spring 39 engaged between this seat and the lower side of push button 25. Finally, there is punched in the cover plate a hole 40 for screw 20.

Before cover plate 30 is mounted onto base plate 10 engagement member 21 is inserted with tongue 23 in space 18, cross bar 22 being placed against portion 16 of the base plate. Then, cover plate 30 is threaded onto the engagement member, web 25' being received in slot 34 such that push button 25 will be disposed over cover plate 30, and the cover plate is threaded with opening 33 onto marginal flange 12A the bell crank 35, 36 being placed in the position disclosed in FIGS. 4 and 7. Now, cover plate 30 is displaced laterally in its own plane, marginal portions 32 being inserted into notches 13 in marginal flanges 12A and 12B from the outer side of marginal flange 12A and from the inner side of marginal flange 12B, respectively, the marginal flanges being received in notches 31A and 31B, respectively. When cover plate 30 has been brought into this position bell crank 35, 36 is turned in the counter-clockwise direction to the position disclosed in FIG. 5 and spring 39 is inserted under push button 25. Thereby, cover plate 30 will be completely fixed onto base plate 10 since it cannot now be brought out of notches 13 in marginal flanges 12A and 12B — this will be prohibited by arm 36 — and the engagement member 21 is biased to swing to the position according to FIG. 6 in which the engagement member at shoulders 24 engages the lower side of cover plate 30 due to the spring bias provided by spring 39. The bell crank may be locked in the position according to FIG. 5 by bending down arm 36 into opening 33. The mounting of the lock is then completed by introducing springs 27 with heads 28 into slots 15 the springs being slightly compressed when engaged between the ends of slots 15. The aggregate thus formed is enclosed in a housing comprising two halves 41 and 42 of which half 41 shall be disposed on the lower side of the base plate 10, FIG. 3, and has a recess 43 to enable belt strap A to be threaded through opening 14 without the housing interfering therewith. Half 42 of the housing shall be disposed on the upper side of cover plate 30, FIG. 1, and is formed with an opening 44 through which push button 25 is available for manual operation. Halves 41 and 42 of the housing are connected with each other by means of the screw or rivet 20 which is threaded through a hole 45 in half 41, hole 19 in base plate 10, hole 26 in engagement member 21 and hole 40 in cover plate 30 to be screwed into a threaded hole or to be driven with a grooved portion into a smooth hole in half 42 of the housing. If a drive rivet is used, the housing will be permanently interconnected. When housing 41, 42 has been mounted springs 27 and heads 28 are prevented from leaving slots 18 since these elements are guided between cover plate 30 on the upper side and half 41 of the housing on the lower side. This half has on the inner side thereof two ribs 41' disposed opposite to slots 15 in base plate 10 and forming guide paths for elements 27, 28.

The lock thus constructed is arranged to co-operate with a lock tongue 46 having slots 47 at one end thereof for the attachment of a belt strap B, and engagement

surfaces 48 at the other, forked end. The lock tongue is insertable with this latter end into the lock in the slot-like opening 49 formed between base plate 10 and cover plate 30 as well as marginal flanges 12A and 12B to push back engagement member 21 from the rest position thereof in engagement with cover plate 30, the engagement member being swung against the bias exerted by pressure spring 39, in a counter-clockwise direction as seen in FIGS. 6 and 8 to snap back under the action of the spring bias to its rest position in which shoulders 24 prevent withdrawal of the lock tongue from the lock due to engagement with shoulders 48. During the introduction of the lock tongue the insertion end of the tongue will engage heads 28 which will be pushed back by the tongue, pressure springs 27 being compressed guided by the slots 15. The lock tongue will be disengaged from the lock by a pressure being exerted onto push button 25, shoulders 24 being disengaged from shoulders 48 such that the lock tongue will be thrown out of the lock by the compressed springs 27. Furthermore, these springs prevent the lock tongue, when inserted into the lock, to stop in an intermediate position wherein the lock tongue has not yet engaged the engagement member, since the lock tongue will be thrown out of the lock from such intermediate position as soon as it is released by the hand.

In order to make it easier to find the lock and/or push button 25 also in darkness housing 41, 42 and/or push button 25 may be made of or coated with a fluorescent or luminescent material.

The invention is not limited to the embodiment disclosed but may be modified within the scope of the appended claims. Thus, the engagement between base plate 10 and cover plate 30 may be achieved without departing from the inventive idea by engagement members on the cover plate and the marginal flanges, respectively, which are formed in another way than that shown and described. The engagement member 21 may be modified as far as the type of engagement with the lock tongue is concerned, and of course the external form of the housing 41, 42 may be modified.

What I claim is:

1. A push-button lock for safety belts, comprising a base plate having upwardly bent marginal flanges at two opposite side margins, an engagement member pivotally mounted to the base plate, spring means biasing the engagement member to locking position to engage a lock tongue inserted into the lock from one end thereof between the marginal flanges, a push button for operating the engagement member to a disengaged position against the spring bias, a cover plate which forms an opening and is threaded by this opening onto one of the marginal flanges, projections on the cover plate for engagement with said one flange from the outer side thereof and with the other marginal flange from the inner side thereof by lateral displacement of the cover plate, and a blocking member on the cover plate to be set against the inner side of said one flange for retaining the cover plate in a position in which the projections are engaged with the associated flanges, the cover plate maintaining the engagement member in operative position on the base plate.

2. A lock as claimed in claim 1 wherein the projections are formed by marginal portions of the cover plate defining marginal recesses therein at the ends thereof, the opening forming a widened portion of one of the marginal recesses inwardly of the projections.

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3. A lock as claimed in claim 2 wherein each of the marginal flanges is formed with a notch in the opposite end edges thereof to receive therein the projections formed by the marginal portions of the cover plate.

4. A lock as claimed in claim 1 wherein a spring biasing the engagement member is arranged on the upper side of the cover plate.

5. A lock as claimed in claim 4 wherein there is provided on the cover plate a bell crank one arm of which forms the blocking member and the other arm of which forms a seat for the spring biasing the engagement member this bell crank being pivoted about an axis transverse of the cover plate for setting the blocking member against said one marginal flange, the spring seat being simultaneously inserted under the push button.

6. A lock as claimed in claim 1 wherein the engagement member is pivoted by a tongue inserted into a slot in the base plate and is held by the spring bias in en-

gagement position against the lower side of the cover plate, shoulders on the engagement member being in an operative position for engagement with the lock tongue.

7. A lock as claimed in claim 1 wherein there is displaceably guided in the base plate at least one abutment which is displaceable against the spring bias by the introduction of the lock tongue into the lock in order to throw out the lock tongue when the engagement member is operated towards the disengaged position.

8. A lock as claimed in claim 7 wherein the abutment is disposed at one end of a helical pressure spring which is received by a slot in the base plate and is retained therein by the cover plate at one side of the base plate and by a housing enclosing the base plate and the cover plate, at the other side of the base plate.

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