Nov. 15, 1966 D. W. BIRMINGHAM ETAL 3,285,647

HINGE STAY MECHANISM

Filed Oct. 1, 1964

FIG.2

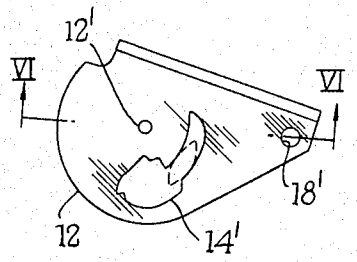


FIG.6

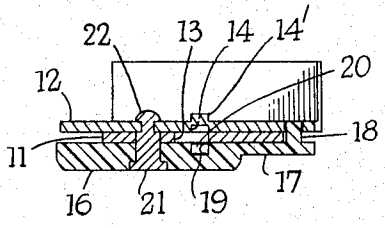


FIG.3



FIG.1

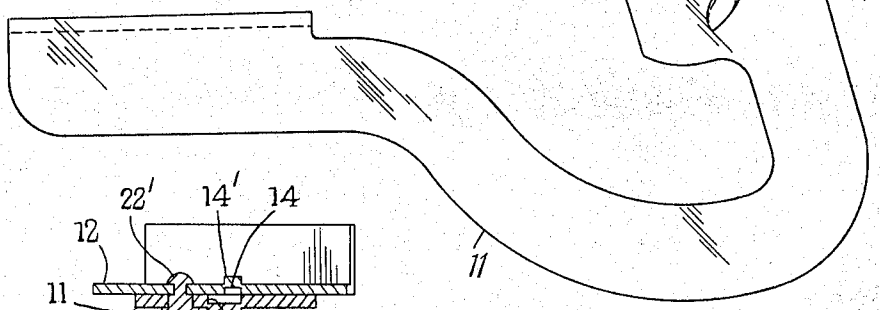


FIG.7

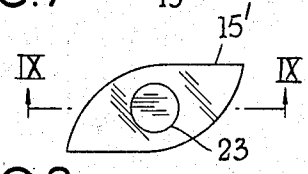


FIG.8

FIG.5



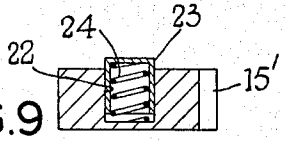


FIG.9

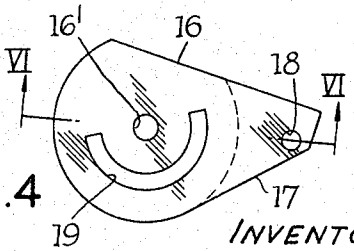


FIG.4

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HINGE STAY MECHANISM

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5 Claims. (Cl. 292—263)

This invention relates to a locking stay mechanism and, more specifically, to an improvement in or modification of a locking stay mechanism described and claimed in my U.S. Patent No. 3,141,694.

Two embodiments of a locking stay mechanism according to the present invention are illustrated in the accompanying drawings, in which:

FIGURES 1 to 5 are plan views of separate parts of a first embodiment of the mechanism,

FIGURE 6 is a sectional view of the assembled mechanism of which the parts are shown in FIGURES 1 to 5, the section being taken on lines VI—VI of the respective parts shown in FIGURES 1, 2 and 4,

FIGURE 7 is a sectional view, generally similar to FIGURE 6, of an assembled second embodiment of the invention, and

FIGURES 8 and 9 are respectively a plan view and a sectional view (taken on the line IX—IX of FIGURE 8), on an enlarged scale, of a pawl comprised by the assembly shown in FIGURE 7.

The first illustrated locking stay mechanism comprises an arm member **11**, shown in FIGURE 1, and a bracket member **12**, shown in FIGURE 2, these members being formed each with a hole **11'** or **12'** respectively by means of which they can be pivotally secured together in sliding face-to-face engagement. The members **11** and **12** are further provided, adjacent their holes **11'** and **12'** respectively, with slots **13** and **14** respectively adapted to receive a double-ended pawl **15** (shown in FIGURE 3) with the thickness thereof accommodated partly in the slot **13** and partly in the slot **14**. As shown in FIGS. 2 and 3, slots **13** and **14** extend around the generally circular areas about the common pivotal axis of the arms **11** and **12**. Each of the slots **13** and **14** has portions extending in the direction of relative pivotal movement, i.e. arcuately. These extensions overlie one another and accommodate the pawl **15**. As the first arm is pivoted clockwise relative to the other, the pawl **15** remains stationary relative to the other arm until its end is engaged by a portion of the wall of the slot of the first arm. The first arm carries the pawl **15** until the other end of the pawl engages a wall portion of the slot of the other arm; and when this occurs the two slot wall portions acting obliquely on opposite ends of the pawl **15**, cam those ends in opposite directions and rotate the pawl **15** clockwise into a first rotated position in which further rotation of the pawl is prevented by abutments of the ends of the pawl against stops formed on the wall of the slots **13** and **14**.

If, now, the first arm is pivoted in a reverse direction relative to the other arm, the pawl **15** will remain stationary relative to the arm which is not moving until the pawl's forward end is engaged in a corner of the slot on the first arm. When this occurs, the other end of the pawl has already been disengaged by the wall portions of the slot of the arm which is not moving. As the first arm continues its reverse pivotal movement the engagement of the pawl by the corner of the slot of the moving member carries the pawl bodily in a reverse direction also and due to the frictional strength on the pawl tends to locate it still further in a clockwise direction, thereby rotating the pawl into a second rotated position. If the frictional restraint is not sufficient, then a camming action will take place similiar to that mentioned hereinbefore.

The slot **14** is closed at one face of the member **12** (namely the face which, in the assembled mechanism does not engage the member **11**) by a cover **14'** and according to the present invention this is achieved by providing that, when the slot **14** is punched out of the member **12** by means of a suitably shaped punch die, the punch does not completely remove the material displaced in forming the slot **14** but leaves it peripherally integral with the member **12** to constitute, itself, the cover **14'** in the manner indicated in FIGURE 6.

The mechanism also includes a boss **16**, shown in FIGURE 4 and preferably moulded from a plastic material such as polyethylene. The boss **16** is formed with a central hole **16'** and with a projecting arm **17** from which projects a spigot **18**. Further, the boss **16** is formed with a semi-annular recess **19** which in the assembled mechanism accommodates a spring **20** which is shown in FIGURE 5. The spring **20** is formed from an annular blank of sheet metal by bending the blank along a diameter thereof to provide two mutually integral semi-annular parts overlying one another in spaced relationship.

In the assembled hinge stay mechanism, as shown in FIGURE 6, the parts are held together by a rivet **21** passed through the holes **16'**, **11'** and **12'** before having its end **22** deformed. The spigot **18** is located in a hole **18'** (see FIGURE 2) formed in the bracket member **12**, thus preventing relative rotation, about the bolt **21**, between the bracket member **12** and the boss **16**. The pawl **15** (not shown in FIGURE 6, because in the illustrated relative position of the parts it would be approximately in the positions, relative to the members **11** and **12**, shown in broken lines in FIGURES 1 and 2 respectively) has its thickness accommodated partly in the depth of the slot **14** and partly in the depth of the slot **13**.

The spring **20**, accommodated in the recess **19** of the boss **16**, bears against one flat face of the pawl **15** and urges its other flat face against the cover **14'**. Since the boss **16** and bracket member **12**, and thus the spring **20** and cover **14'** have no pivotal movement relative to one another, the pawl **15** tends because of friction between it and the spring **20** and cover **14'** to remain stationary relative to the bracket member **12** and moves relative thereto only when constrained to do so by engagement with wall portions of the slot **13** as the arm member **11** is pivoted relative to the bracket member **12**. It will be appreciated that the slots **13** and **14** are so shaped and disposed relative to the holes **11'** and **12'** respectively that, however the pawl **15** may be constrained to move in the slots, it remains engaged by the spring **20**.

The second illustrated embodiment of the invention, shown assembled in FIGURE 7, differs from that described above only to the extent mentioned below; and the same reference numerals are used herein to refer to corresponding parts in the two embodiments. Firstly, the material punched out in forming the slot **13** in the member **11** is not completely removed but is left (in the same way as is described above with reference to the slot **14** of the member **11**) peripherally integral with the member **11** to constitute a cover **13'** for the slot **13**. Accordingly no boss corresponding to the boss **16** is provided, and the members **11** and **12** are riveted together by means of a shorter rivet **21'**. The spring **20** is also omitted, and instead of the pawl **15** shown in FIGURE 3 there is provided in the slots **13** and **14** a pawl **15'** which has the same shape but is provided at its centre (as shown in FIGURES 8 and 9) with a stopped bore **22** in which is

disposed a spring 23 surrounded by a cylindrical cap 24 which the spring 23 urges out of the bore 22.

As in FIGURE 6 the pawl 15 is not shown, so in FIGURE 7 the pawl 15' cannot be seen. It is housed, however, within the slots 13 and 14 with its thickness accommodated partly in the one slot and partly in the other, and with the projecting end of the cap 24 and the face of the pawl which is remote therefrom pressed by the spring 23 into frictional engagement with the covers 13' and 14' respectively.

The pawl 15' co-operates with the slots 13 and 14, in operation of the second embodiment described above, in the same manner as the pawl 15, and to the same effect; and, so far as the operation of the mechanisms is concerned, it is not significant that, whereas the two flat surfaces of the pawl 15 bear frictionally against the cover 14' and, respectively, the spring 20 which is substantially secured against rotation relative to the cover 14', the cap 23 and the flat face of the pawl 15' which is remote therefrom bear frictionally against two surfaces (namely the covers 13' and 14') which pivot, relative to one another, about the rivet 21'.

What we claim is:

1. A locking stay comprising a first member and a second member connected together by connecting means which permits, between the members, a defined relative movement in a forward and a reverse direction, each member being formed with a surface overlying a surface of the other member and movable thereover during said relative movement of the members, the said surface of at least one of the members being one side of a sheet-like portion of that member, and each of the said surfaces being formed with a slot partially overlying and in register with the slot of the other surface, the slot formed in the said surface of the said one member being formed by punching out a piece of the material of the said sheet-like portion and the said piece being incompletely punched out and being peripherally integral with the remainder of the sheet-like portion, thereby constituting a cover for the slot of the said one member, there being provided, yieldingly constrained to maintain its instantaneous position but otherwise floating, a double-ended pawl having its thickness accommodated partly in one slot and partly in the other slot, the slots being formed with bounding walls so shaped that on successive relative movements of the members alternately in the forward direction and in the reverse direction the pawl is cammed by the walls successively into progressively rotated positions, the pawl being engaged by the walls of the two slots, in a first and a third of said rotated positions, to prevent further relative movement of the members in the forward direction and, in the second of said rotated positions, to prevent further relative movement in the reverse direction, and the pawl, in the fourth of its said rotated positions, being generally aligned with the permitted direction of relative movement and with an extension in that direction of at least least one of the slots, said extension permitting movement of the extended slot and of the associated member relative to the aligned pawl and the other member, in the reverse direction to a relative position of the members which is substantially displaced, in the reverse direction of relative movement, from their relative position as limited, in that direction, by the pawl in its said second rotated position.

2. A locking stay as claimed in claim 1, in which both the said members comprise sheet-like portions and the said surfaces are each one side of the said sheet-like portion of the said one member and of the other member respectively and in which the slot formed in the said surface of the said other member is formed as an aperture extending right through the said sheet-like portion thereof, wherein there is provided against that side of the sheet-like portion of the said other member which is then more remote from the said one member a non-integral cover therefore, and means securing the said non-integral cover in fixed position relative to the said one member.

3. A locking stay as claimed in claim 2, wherein the said non-integral cover is formed with a recess and there is provided in the recess spring means which bears against the pawl and urges it against the incompletely punched-out piece which constitutes the cover for the slot of the first member, thereby yieldingly constraining the pawl to maintain its instantaneous position.

4. A locking stay as claimed in claim 1, in which both the said members comprise sheet-like portions and the said surfaces are each one side if the said sheet-like portions of the said one member and of the other member respectively, wherein the slot formed in the said surface of the said other member is formed by punching out a piece of the material of the said sheet-like portion of the said other member and the said piece is incompletely punched out and is peripherally integral with the remainder of the said sheet-like portion, thereby constituting a cover for the slot of the said other member.

5. A locking stay as claimed in claim 4, wherein the pawl has one flat face which bears slidingly against one of the said pieces constituting covers for the slots and is formed with a recess, there being provided within recess of the pawl spring means which projects therefrom and bears against the other of the said pieces, the said pieces and the said spring means thereby yieldingly constraining the pawl to maintain its instantaneous position.

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