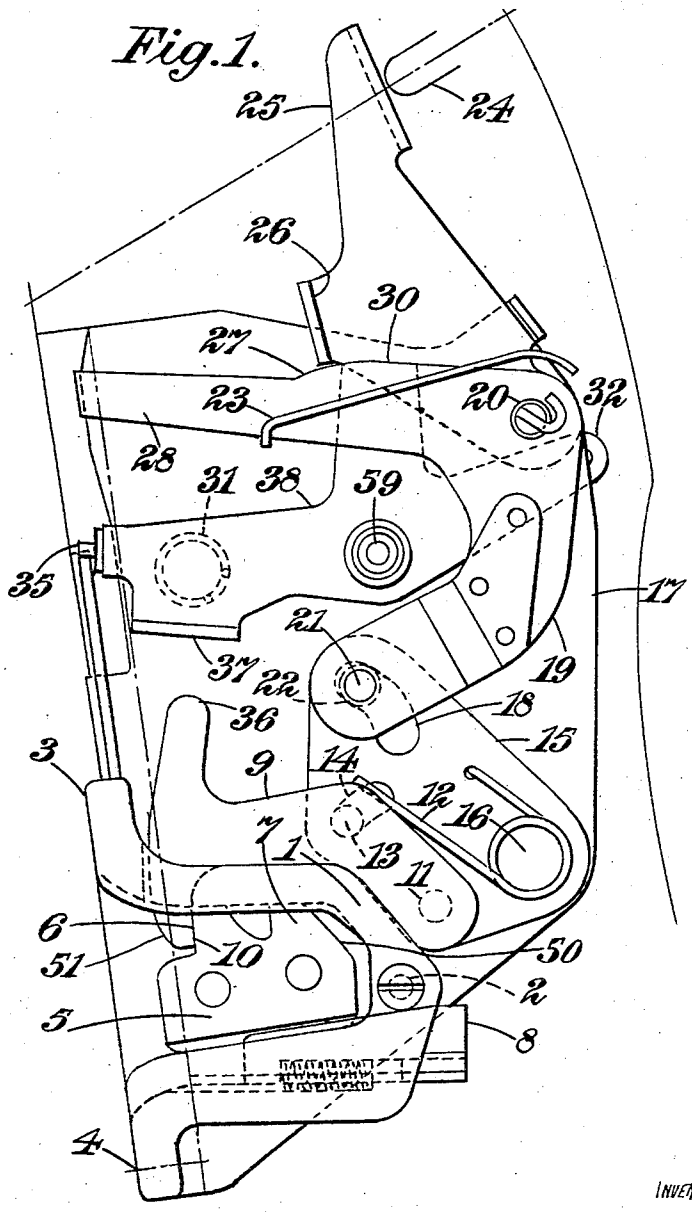
June 14, 1960 F. D. PRIESTMAN 2,940,789

DOOR LATCH

Filed Dec. 5, 1955 3 Sheets-Sheet 1

Fig. 1.



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DOOR LATCH

Filed Dec. 5, 1955

3 Sheets-Sheet 2

Fig. 4.

Fig. 2.

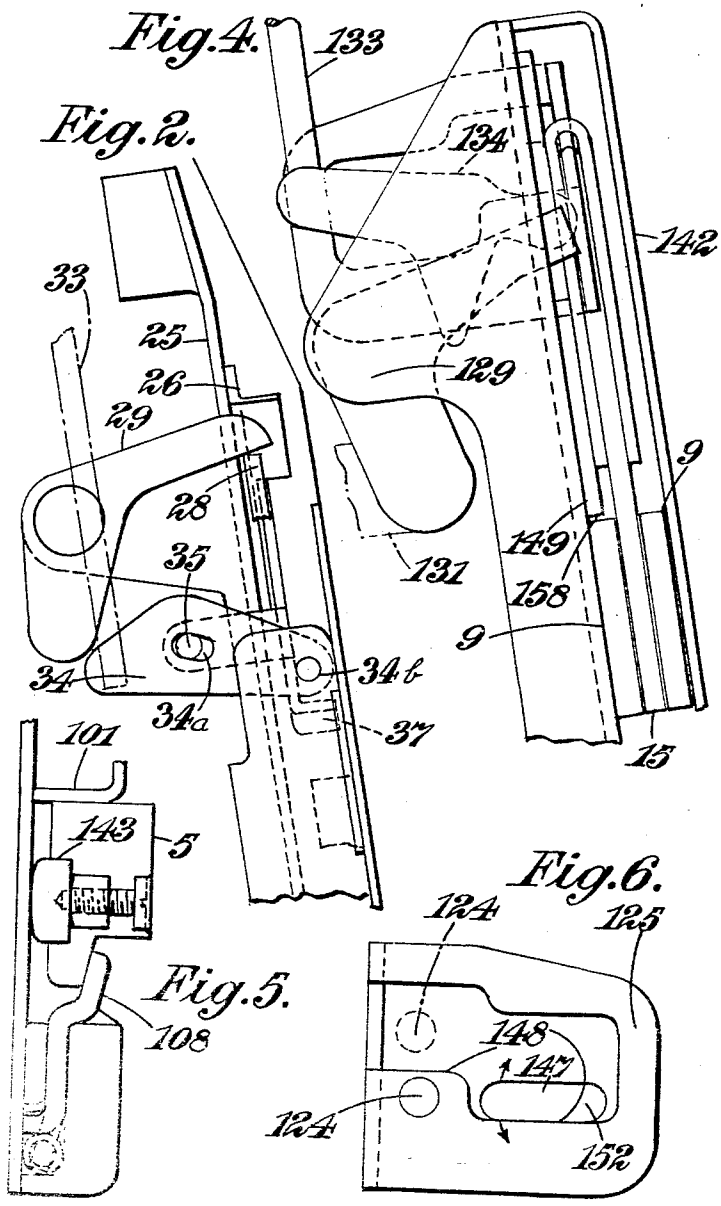


Fig. 6.

Fig. 5.

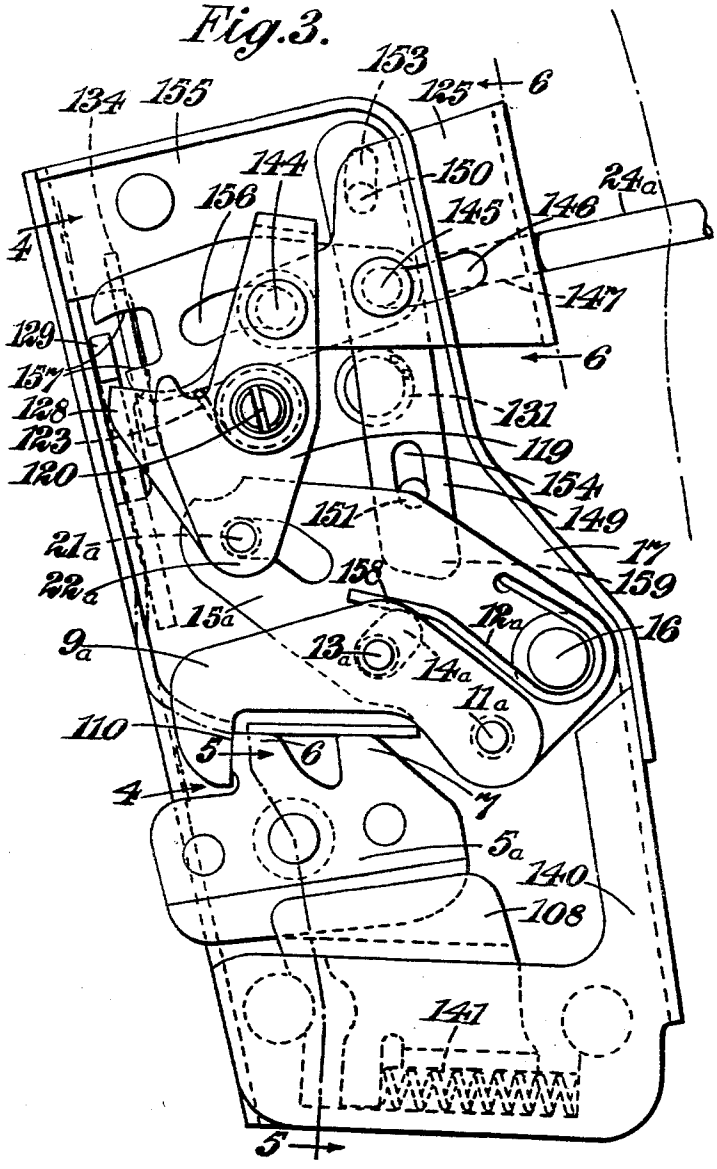
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DOOR LATCH

Filed Dec. 5, 1955 3 Sheets-Sheet 3

Fig. 3.



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DOOR LATCH

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2 Claims. (Cl. 292—126)

The invention relates to door latches and especially, but not exclusively, to latches for the doors of motor cars.

In some cases a latched door exerts an opening force on the latch, for example, in the case of a motor car door the force may be derived from compression of a resilient door seal or buffer, and it may be necessary to release the latch while under load. The effort required to effect such release may be considerable (e.g. more than can conveniently be applied by a push-button release device) and it is an object of the present invention to provide a construction of latch in which this effort is lessened.

The invention consists in a door latch intended for use in circumstances where the door exerts an opening force and it may be necessary to release the latch while under load from such force, which latch comprises a striker, secured or to be secured to a fixed door frame member, and having an abutment surface facing against the direction of opening of the door, a catch supported, or to be supported, on the door in a manner permitting movement in a direction transverse to the opening force into and out of latching engagement with the striker surface aforesaid, the support means and the engagement between the striker and the catch being such that the opening force produces a disengaging force tending to move the catch in the disengaging direction, stop means resisting such disengaging force and manually operable means for rendering the stop means ineffective and for moving the catch out of latching engagement with the striker or for permitting such movement. Preferably the frictional resistance to movement of the catch is approximately equal to the disengaging force but it may be either more or less than the disengaging force.

In one form of the invention the catch is pivoted to the door and has an abutment surface facing in the opening direction for engagement, when in latching position, in door-holding relation with the surface on the striker, the two surfaces being disengageable by movement of the catch around its pivot, which pivot is so positioned in relation to the engaging surfaces and the angle those surfaces make with the line of the opening force, that the force produces a moment about the pivot tending to disengage the surfaces and the friction between the surfaces produces a moment which resists such disengagement, and, preferably, is approximately equal to or a little greater than the disengaging moment.

The arrangement may be that the surfaces are substantially perpendicular to the opening force, and the pivot is in front of the surfaces (i.e. the catch extends from the pivot to the surfaces against the direction of opening) and is offset from the surfaces on the side to which the catch surface moves for release.

The degree of offset required may be defined as being such that, measured from the effective point of contact between the surfaces through which the opening force acts, the ratio of the distance by which the pivot is in front of the point to the offset approximates to the coefficient of friction between the two surfaces. For example the ratio may be between three-quarters of the coefficient and equality therewith.

The catch may be freely pivoted to the door (i.e. without spring pressure tending to rotate the catch).

The manually operable means aforesaid may be arranged to rotate the catch about its pivot in the disengaging direction and the stop may be associated with such manually operable means and arranged positively to resist disengaging rotation of the catch except when the manual means are operated.

In one construction according to the invention designed to permit an automatic latching action when the stop is effective, the catch is constructed in two parts of which one part, on which the stop is effective, is pivotally attached to the door as above described and the other, which carries the abutment surface, is pivoted to the first part, the pivotal connection between the parts lying at a position where the opening force will have substantially no disengaging moment about the pivotal connection. The pivotal connection between the parts may also be so positioned (i.e. on the line of action of the opening force), that the force will have substantially no engaging moment. The catch and striker may be shaped to provide the automatic latching action as the door is closed, the action consisting of pivotal movements of the second-mentioned part about the pivotal connection, first in the disengaging direction and then in the return direction, a spring acting between the two parts being provided to effect the return movement into the engaged position of the abutment faces. There may be co-operating stops on the two parts limiting the return movement. The arrangement may be that the manually operable release means operate on the part of the catch which is pivotally attached to the door thereby to rotate the catch as a whole.

In an alternative to the construction just described, the part carrying the abutment surface is guided on the pivoted part for sliding movement transversely to the opening and closing direction and the latching action consists of such transverse outward and inward sliding movements.

In a further alternative the catch is constructed in only one part and latching action is provided by a portion of the striker carrying the abutment surface which is movable transversely of the opening and closing direction against a return spring.

The latch may include locking means for preventing disengagement of the catch by the manually operable means. The locking means may, for example, operate by placing a stop in the path of the manually operable means. In one arrangement the manually operable means comprise a member which is operable from one side of the door (e.g. the inside) directly to effect disengaging rotation of the catch and a member which is operable independently from the other side of the door to effect disengaging rotation of the catch and the locking means may be effective only to prevent operation of the second member. The second member may for example operate through the first.

The locking means may be arranged for operation from both sides of the door, one side manually and the other side by means of a key-lock.

For the purpose of preventing the doors of a motor car being locked with the keys inside it is preferred that the catch and locking means are arranged so that during latching movement of the catch as aforesaid the catch engages the locking means if they are in the locking position and moves the locking means to the unlocking position.

The invention includes the converse of the arrangement described above in which the striker is on the door

and the catch is pivoted to the fixed member, the abutment surfaces also being conversely arranged.

Two specific constructions of door latches incorporating locking means and according to the invetnion will now be described by way of example and with reference to the accompanying drawings, in which:

Figure 1 is an elevation of the latch looking on the edge of the door with a cover plate removed and showing the striker;

Figure 2 is a side view of the latch;

Figure 3 is a view, similar to Figure 1, of the second construction;

Figure 4 is a view in the direction **4—4** in Figure 3;

Figure 5 is a section on the line **5—5** in Figure 3, and

Figure 6 is a view in the direction **6—6** in Figure 3.

In the example shown in Figures 1 and 2 the main body of the lock is fitted inside the door and there is provided a separately constructed female dovetail member **1** which is secured to the door and held by screws **2, 3** and **4**. The striker **5** is secured to the fixed door frame pillar and is arranged to engage within the dovetail thereby to locate the door vertically by the top surface of teeth **6** and **7** on the striker bearing against the upper surface of the dovetail and the lower surface of the striker bearing against a sliding wedge **8** constituting the lower surface of the dovetail.

Withdrawal of the striker from the dovetail and opening of the door is normally prevented by a two-part catch **9, 15** which has an abutment surface **10** on the part **9** forming an arc about a pivot **11** between the two parts and arranged to engage a mating abutment surface on the tooth **6** of the striker. The catch part **9** is urged downwardly by a spring **12** acting between the two parts and the movement is limited by a stud **13** on the part **9** working in a slot **14** in the part **15**. On shutting the door, the inclined surfaces **50, 51** of the striker and the catch part **9** cause the catch part to lift against the action of the spring **12** and to latch over the striker as shown in the drawing without operation of any other part of the latch mechanism.

The catch part **15**, to which the part **9** is pivoted at **11**, is pivoted at **16** to the lock base plate **17** and is formed with an angular slot **18** at its upper end. Pivoted to the base plate at **20** there is a release lever **19** carrying a pin **21** which operates in slot **18** and locks the catch part **15** when in the part **22** of the slot which is tangential to a circle centred on the pivot **20**.

An unlocking force caused by compression of a door seal or buffer normally exists between tooth **6** and surface **10**. This force has no moment about the pivot **11** but has an unlatching moment about pivot **16** which is approximately balanced by the moment resulting from the frictional force between tooth **6** and surface **10**. The two-part catch is therefore approximately in equilibrium and little force in excess of that required to overcome a spring **23** is necessary to rotate the lever **19** to cause the pin **21** to move beyond the portion **22** of the slot **18** and thus to raise the catch part **15** and with it the part **9** thereby to release the striker. The spring **23**, which is shown broken to avoid confusing the remainder of the drawing, acts to rotate the lever **19** clockwise as seen in Figure 1. One end of the spring is hooked under the lever **19** and the other end is anchored in a slot in the pivot **20**.

A push-button **24** on the outside of the door engageable with a contactor **25** is provided for applying the operating force to lever **19**. The contactor **25** has a turned up part **26** which bears on the surface **27** of the release lever **19**. Rotation of the lever **19** may also be effected by a bell-crank lever **29** operated by an internal door handle. The bell-crank lever bears on a projection **28** from the release lever **19**.

To prevent release of the catch by the push-button when it is desired to lock the door, there is a locking

lever **38** which is pivoted to the base plate **17** at **59**. The locking lever **38** has a surface **30** which is movable into a position in which it blocks the operating movement of the part **26** of the contactor. A fly-over or toggle spring **31** of which one end is attached to the lever and the other end to the lock casing ensures that the lever **38** is in the fully locked or fully unlocked positions. The lever **38** may be turned from the outside of the door by means of a key-lock of the cylinder type in the outside door handle connected with lost-motion to extension **32** of lever **38**, the purpose of the lost motion being to enable the key-lock to be returned freely to a key-removing position after operation to lock or to unlock the door. The lever **38** may also be turned from inside of the door by means of a knob fitted to a rod **33** which acts through lever **34** (Figure 2) having a slot **34***a* which engages over a projection **35** on the lever **38**. The lever **34** is pivoted to the lock casing at **34***b*.

In order to avoid the possibiit of the key for the key-lock being locked inside the car by closing the door when the locking lever **38** is in the locking position a cancelling device is incorporated in the latch. This device consists of a turned up part **37** on the lever **38** which moves close to a projection **36** on the catch part **9** when the lever **38** is moved downwardly into the locked position. Any operation of the catch part **9** either by means of the inside door handle or during spring latching will cause the projection **36** to rise and to engage the part **37** and so to rotate the locking lever **38** to the unlocked position as shown in the drawing. Accordingly it is not possible to slam the door into the locked position and it is only possible to lock all the doors of a car by use of the key on at least one of them.

The force necessary, in practice, to overcome the friction between the surfaces **6** and **10** may be between about 10% and 20% of the opening force between these faces resulting from compression of the door seal, and the position of the pivot **16** may be chosen to provide an unlatching force which is about 15% of the opening force so that the unlocking load will be between zero and 5% of the opening force.

In the second example, shown in Figures 3 to 6, the main body of the lock, is, as in the first example, fitted inside the door but the dovetail member is constructed as an integral part of the lock. This member comprises an upper guide surface **101** and a sliding wedge **108**, the wedge being urged by a spring **141** into gripping engagement with the striker **5***a* which is similar in construction and arrangement to the striker **5** above described. A pad or stud **143** of the material known under the trade name "nylon" is secured to the striker and bears on the lock face to provide lateral location against the striker.

The construction embodies a two part catch **9***a*, **15***a* supported and arranged substantially as in the first example. There is also a release lever **119** which is pivoted at **120** to the lock casing and is the equivalent of lever **19** above described.

In this example the external push button **24***a* is arranged to engage a contactor **125** which is pivoted at **144** to the release lever **119** and is guided by a pin **145** working in a slot **146** in the contactor, the slot being so shaped that the point on the contactor which is engaged by the button **24** moves in a straight line. The release lever **119** has a projection **128** which is engageable by a bellcrank lever **129** operated by a link **131** from an internal door handle. A spring **123** returns the release lever **119** to the latched position on release of the operating pressure.

Release of the lock by the push button may be prevented, when desired, in the following manner. A key lock (not shown) in an external handle for the door carries a cam **147** which engages in a slot **148** in contactor **125** in any position of the contactor. The pin **145** which guides the contactor is carried by a slide **149** which

is guided for limited up and down movements on pins 150 and 151 secured to the back plate of the casing. A fly-over spring 131 urges the slide to one or other of the limits of its movement. Partial rotation, by the key lock, of the cam 147 about centre 152 as indicated by the arrows (in Fig. 6) causes the contactor 125 to move around pivot 144 carrying the slide from one limiting position to the other. When the contactor and slide are at the upper limit of their movements (as shown), the push button 124 engages the contactor when operated, but when the contactor and slide are moved by operation of the key lock, to the lower limit of their movements, the push-button is aligned with a part of the slot 148 so that if the push button is operated, it misses the contactor and cannot release the latch.

Pivoted on pin 145 which is attached to the slide there is a lever 155 which has a slot 156 embracing the pivot pin 144 which serves as a fulcrum for the lever. A knob, inside the car body, attached to rod 133 acts through lever 134 which engages with the lever 155 at surfaces 157 and operates to rock the lever 155 about its fulcrum and so to move the slide and contactor 125 between the limits as above described.

A cancelling device to prevent locking of the door with the key inside the body is incorporated as in the first example. The catch part *9a*, which is forked to embrace the part *15a*, has on one side a surface 158 which, if the latch is raised when the slide is in its lower, locking position, engages the lower end 159 of the slide and raises the slide to the upper unlocked position.

I claim:

1. In a door and door frame assembly comprising a door which is movable relative to said frame in opening and closing directions and is capable of exerting a force in the opening direction, a door latch mechanism comprising a catch structure and a coacting striker structure mounted respectively on the two members of the said assembly, said striker structure having a catch-holding abutment and said catch structure including a support and a catch, which catch also has an abutment and is mounted on a pivot on said support for movement of its abutment in a direction transversely of said opening direction into and out of co-operating door-holding engagement with the catch-holding abutment of the striker, at least one of said abutments having an abutment surface for co-operation with a surface on the other abutment to resist the opening force, which surface is oblique to the direction of the transverse movement, in the sense to resolve the opening force into a catch-releasing component of force on the catch in the said direction of transverse movement, the abutment surface on the catch facing in a direction towards the pivot of the catch and the abutment surface on the striker facing in a direction away from the pivot, stop means for positively resisting such latch releasing transverse movement of the catch by said catch-releasing component and manually operable means for rendering said stop means ineffective and for withdrawing the catch abutment from engagement with the striker abutment, said catch being composed of two parts of which one part, on which the stop means are effective, is pivotally attached to the support as aforesaid and the other part, which carries the catch abutment is pivoted to the first part for movement of the catch abutment transverse to the opening direction, the pivotal connection between the parts lying at a position where the opening force will have substantially no abutment-disengaging moment about the pivotal connection and said catch and striker having positions positioned to deflect the second mentioned part in unlatching direction about the pivotal connection upon door closing movement and the catch structure including a spring acting between the two parts to effect return movement in the latching direction of the second mentioned part into door-holding engagement of the abutments on completion of the door closing movement.

2. In a door and door frame assembly comprising a door which is movable relative to said frame in opening and closing directions and is capable of exerting a force in the opening direction, a door latch mechanism comprising a catch structure and a coacting striker structure mounted respectively on the two members of the said assembly, said striker structure having a catch-holding abutment and said catch structure including a support and a catch, which catch also has an abutment and is mounted on a pivot on said support for movement of its abutment in a direction transversely of said opening direction into and out of co-operating door-holding engagement with the catch-holding abutment of the striker, at least one of said abutments having an abutment surface for co-operation with a surface on the other abutment to resist the opening force, which surface is oblique to the direction of the transverse movement, in the sense to resolve the opening force into a catch-releasing component of force on the catch in the said direction of transverse movement, the abutment surface on the catch facing in a direction towards the pivot of the catch and the abutment surface on the striker facing in a direction away from the pivot, stop means for positively resisting such latch releasing transverse movement of the catch by said catch-releasing component and manually operable means for rendering said stop means ineffective and for withdrawing the catch abutment from engagement with the striker abutment, said catch being composed of two parts of which one part, on which the stop means are effective, is pivotally attached to the support as aforesaid and the other part, which carries the catch abutment is pivoted to the first part for movement of the catch abutment transverse to the opening direction, the pivotal connection between the parts lying at a position where the opening force will have substantially no abutment-disengaging moment about the pivotal connection and said catch and striker having portions positioned to deflect the second mentioned part in unlatching direction about the pivotal connection upon door closing movement and the catch structure including a spring acting between the two parts to effect return movement in the latching direction of the second mentioned part into door-holding engagement of the abutments on completion of the door closing movement, and co-operating stops on the two parts limiting the return movement of the second part, the manually operable withdrawing means operating on the part of the catch which is pivoted to the support, to rotate the catch as a whole.

References Cited in the file of this patent

UNITED STATES PATENTS

1,514,528	Hurd	Nov. 4, 1924
2,143,965	Van Voorhees	Jan. 17, 1939
2,246,782	Dall	June 24, 1941
2,311,688	Olson	Feb. 23, 1943
2,376,992	Endter	May 29, 1945
2,435,180	Ledin	Jan. 27, 1948
2,435,987	Tierney et al.	Feb. 17, 1948
2,569,040	Endter	Sept. 25, 1951
2,569,041	Endter	Sept. 25, 1951
2,569,042	Endter	Sept. 25, 1951
2,641,495	Leslie	June 9, 1953
2,673,757	Marple	Mar. 30, 1954
2,758,862	Endter	Aug. 14, 1956
2,801,869	George	Aug. 6, 1957

FOREIGN PATENTS

962,447	France	June 9, 1950