Nov. 9, 1965 C. S. LAUTENBACH 3,216,762

CONVERTIBLE TOP

Filed April 23, 1964

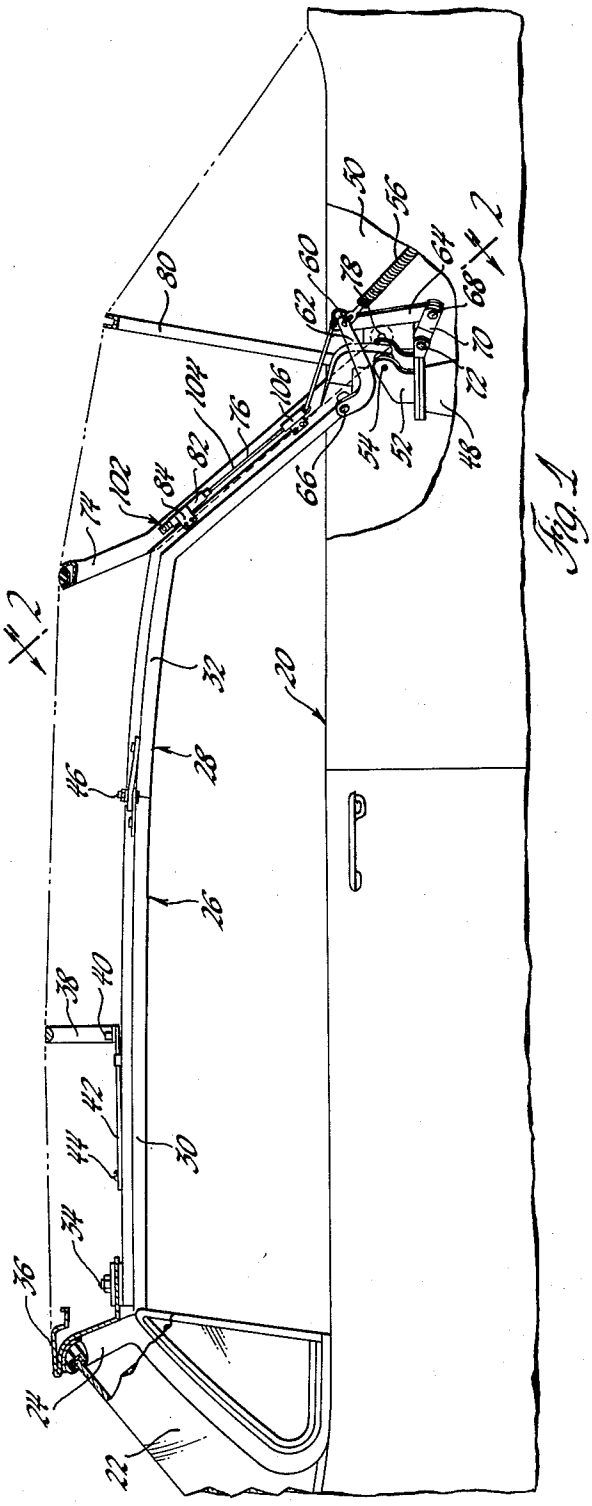


Fig. 1

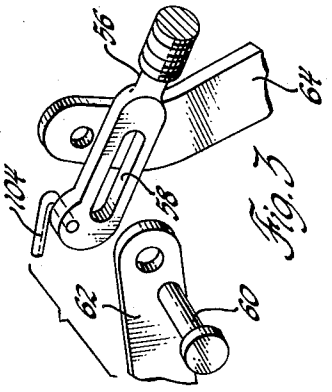


Fig. 3

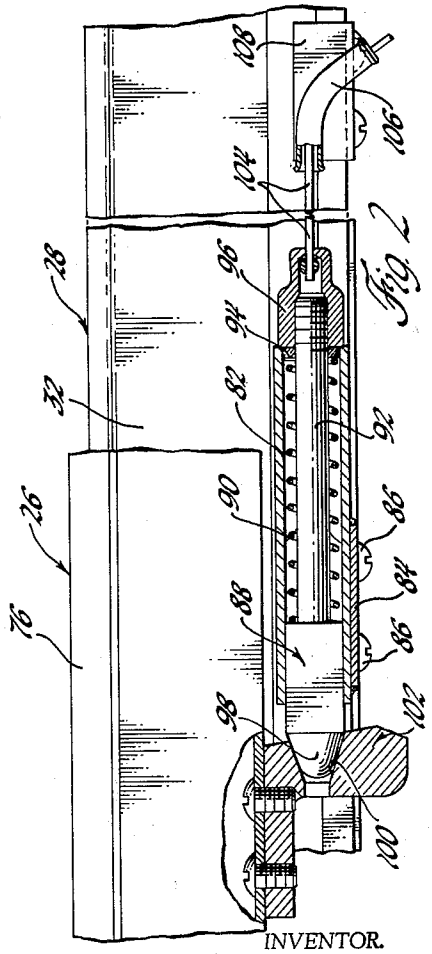


Fig. 2

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CONVERTIBLE TOP

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This invention relates to convertible tops and more particularly to convertible tops of the inwardly folding side rail type.

One feature of this invention is that it provides an improved convertible top of the inwardly folding side rail type. Another feature of this invention is that it provides an improved inwardly folding side rail convertible top having a bow structure movable in a plane longitudinally of the body upon folding movement of the top, and means coupling the bow structure to the side rails of the top in one position thereof. A further feature of this invention is that it provides a convertible top including a first top member movable inwardly of the body, a second top member movable longitudinally of the body and latch means for latching the top members to each other to prevent movement of both in one position of the top. Yet another feature of this invention is that it provides an improved power operated convertible top including an inwardly folding side rail structure, a bow structure movable longitudinally of the body, and latch means for latching the side rail structure and the bow structure to each other in the raised position of the top. Yet a further feature of this invention is that the latch means are operated in synchronism with the folding and unfolding movement of the rail structures. Still another feature of this invention is that it provides an improved foldable convertible top having a pair of members movable in dissimilar planes and latch means for latching the members to each other in one position of the top to prevent movement thereof.

These and other features of the top of this invention will be readily apparent from the following specification and drawing wherein:

FIGURE 1 is a partially broken away partial side elevational view of a vehicle body embodying a convertible top according to this invention;

FIGURE 2 is an enlarged partially broken away view taken generally along the plane indicated by line 2—2 of FIGURE 1; and

FIGURE 3 is an exploded perspective view of a portion of FIGURE 1.

Referring now particularly to FIGURE 1 of the drawings, a convertible vehicle body **20** includes a windshield **22** and a windshield header **24**. A convertible top **26** of the inward folding rail type is mounted on the body **20** for movement between a raised position, as shown, and a lowered position, not shown, in order to open and close the passenger compartment of the body. Top **26** is substantially the same as that shown and described in Gilson et al. 3,097,883, issued July 16, 1963 and assigned to the assignee of this invention. Accordingly, only a brief description will be given herein.

The top **26** generally includes a spaced pair of inwardly folding side rails **28**, each of which includes a front rail section **30** and a rear rail section **32**, with the rear rail sections being supported on the body as will be described.

Since the rails **28** are of like construction, although of different hand, only one such rail is shown and will be described, and it will be understood that the other is of the same construction.

The front rail sections **30** are each pivotally connected at **34** to one end of a convertible top header **36** which spans the body and is adapted to bear against the windshield header **24** in the raised position of the top as shown in FIGURE 1.

A front or No. 1 bow **38** of rigid construction has its ends pivoted at **40** to the rearward ends of links **42**. The forward ends of links **42** are pivoted at **44** to the front rail sections **30**. When the front rail sections **30** swing inwardly about the pivots **34** as the top is being lowered, the links **42** swing outwardly of the rail sections **30** about their pivots **44** to allow the bow **38** to move with the top and to be folded relative to the rail sections **30**. Rail sections **30** and **32** are pivotally interconnected at **46** by a simple butt type hinge which generally comprises overlapping hinge butts or plates secured to respective rail sections. Reference may be had to Serial No. 216,399, Convertible Top, Lautenbach, filed August 13, 1962 and assigned to the assignee of this invention, for a showing of such a hinge.

A mounting support **48** is mounted within the top well **50** of the body rearwardly of the rear seat. Preferably, the support **48** is welded or otherwise rigidly secured to the inner rear wheel housing, not shown, of the body. Support **48** mounts a trunnion bracket **52** which includes a spaced pair of upstanding ears pivotally secured at **54** to the rear rail sections **32**. The axes defined by the pivots **54** lie in a horizontal plane, with each axis extending generally forwardly and inwardly of the body in this horizontal plane whereby the axes converge with respect to each other. Each axis lies in a vertical plane located approximately 45° with respect to the vertical plane of the center line of the body.

The rear rail sections **32** are power operated in a known manner to move the top between raised and lowered positions. Such power operating means includes an electric motor driving a pair of flexible cables, each of which drives a gear drive unit, as disclosed in the aforenoted patent to Gilson. A screw shaft **56** is threadedly received in each of the gear drive units, and the upper end of the screw shaft includes an elongated slot **58**, FIGURE 3. A pivot pin or rivet **60** extends through the slot **58** and pivotally connects one end of a pair of links **62** and **64** to the upper end of the screw shaft. Link **62** is pivoted at its other end at **66** to the real rail section **32** and link **64** is pivoted at its other end at **68** to a clevis **70** which is pivoted at **72** to an extension of the trunnion bracket **52**.

The intermediate or No. 2 bow **74** is of one-piece construction and is integral with or fixed to bow supports **76** which rest on rail sections **32** in the raised position of the top. The bow supports **76** are pivoted at **78** to a bracket secured to the body, with supports **76** swinging in parallel longitudinal vertical planes with respect to the body. The rear or No. 3 bow **80** has its ends pivoted to the bracket for likewise swinging movement in parallel longitudinal vertical planes with respect to the body.

As best shown in FIGURE 2, a generally square-shaped tube or latch housing **82** has a bracket or mounting member **84** secured to a wall thereof and bolted at **86** to a flange of the rear rail section **32**. A generally square-

shaped plunger or latch member **88** is slidably mounted in the housing **82** and a coil compression spring **90** surrounds a threaded shaft or extension **92** of the latch member and seats between the latch member and an apertured wall **94** of the housing **82** to normally bias the latch member **88** outwardly of the latch housing. The latch member is located against the action of the spring **90** by engagement of a threaded cap **96** on the extension **92** with the wall **94** of the housing. The generally conically shaped or blunt nose portion **98** of the latch member is adapted to be received within a similarly received recess **100** of a striker member **102** which is bolted to a flange of the bow support **76**. The latch member **88** bolts or couples the rear rail section **32** to the bow support member **76** in the raised position of the top. A cable **104** has one end thereof fixed to the cap **96** in a known manner and the other end thereof secured in the same manner to the upper end of the screw shaft **56** as shown in FIGURE 3. The movement of the cable relative to the rear rail section **32** is guided by a tubular member **106** which is mounted on the rear rail section **32** by a bracket **108** bolted thereto.

Upon operation of the electric motor in a suitable direction to drive each of the gear units, the screw shafts **56** will be shifted downwardly and rearwardly of the body to fold the links **62** and **64** relative to each other and also fold the link **64** relative to the clevis **70** and in turn swing the rear rail sections **32** rearwardly and downwardly of the body about the pivots **54**. As the rear rail sections swing rearwardly and downwardly of the body, the rail sections **30** will swing generally outwardly with respect to the rear rail sections about the pivots **46** to in turn fold each of the rails **28**. The links **42** swing outwardly of the rail sections **30** about the pivots **44** to permit bow **38** to move generally rearwardly of the body and remain substantially parallel to the top header **36** which also moves rearwardly of the body as the front rail sections **30** fold relative thereto about the pivots **34**. During this folding movement of the front and rear rail sections the bow supports **76** swing rearwardly and downwardly of the body in planes located generally longitudinally of the body to move the No. 3 bow to a lowered position.

In order to permit the rear rail sections to swing rearwardly and downwardly of the body and the bow supports to swing longitudinally of the body, the latch member **88** must be released from the striker member **102**. Likewise, the latch member should be moved into engagement with the striker member after the top has been moved to a substantially fully raised position. Thus, engagement and disengagement of the latch member and the striker member must be coordinated with the folding and unfolding movement of the top **26**. This will now be described with particular reference to FIGURE 3 of the drawings.

When the top is in a raised position, the pivot **60** is located intermediate the ends of the slot **58** as shown in FIGURE 3 so that there is slack in the cable **104** and the spring **90** can bias the latch member **88** outwardly of the housing **82** and into engagement with the recess **100** of the striker member. When the top is lowered, the screw shaft **56** will move rearwardly and downwardly of the body as previously described and after initial slight movement of the screw shaft **56** in this direction, the upper end of the slot **58** will engage the pin **60** to shift the cable **104** rearwardly of the body and in turn withdraw the latch member **88** from engagement with the striker member approximately simultaneously with the start of folding movement of the side rails of the top as the links **62** and **64** start to fold relative to each other. The screw shaft **56** maintains the latch member in a retracted position until the top is almost in a fully lowered position whereupon the folded side rails **26** of the top move to a fully folded position within the body ahead

of any movement of the screw shafts **56** so that the pin **60** is disposed intermediate the ends of the slot **58** and the cable **104** is slack in the folded position of the top.

As the top is being moved from a stored or folded position to a raised position, the pin **60** will normally engage the lower end of the slot **58** so that the cable **104** remains slack and the latch member will project outwardly of the latch housing and be located in extended position. When the top reaches a substantially unfolded position and drops of its own weight into engagement with the windshield header **24**, ahead of movement of the shafts **56**, the links **62** and **64** will shift the pivot **60** into engagement with the upper end of the slot **58** to retract the latch member within the latch housing as the opening of the housing becomes approximately aligned with the opening **100** of the striker member. As the top drops into engagement with the header **24**, the screw shafts **56** will continue to be shifted upwardly and will thereafter move the slot **58** relative to the pin **60** so that the cable **104** is again slack whereupon the spring **90** will bias the latch member **88** into engagement with the recess **100** of the striker member **102**.

It will be understood, of course, that a latch member and striker member may be provided for both of the bow supports and side rails if desired. By latching or coupling at least one of the side rails to the bow support, relative movement between the rail section and the bow support is prevented and the top is strengthened in its raised position.

Thus, this invention provides an improved convertible top of the inwardly folding side rail type.

I claim:

1. In combination with a vehicle body, a foldable convertible top movable between raised and lowered positions and including a side rail mounted on said body for movement inwardly thereof upon folding movement of said top, bow support means mounted on said body for movement in a plane longitudinally thereof upon folding movement of said top, and means locking said side rail to said bow support means in the raised position of said top to prevent movement of said top to a lowered position.

2. In combination with a vehicle body, a foldable convertible top movable between raised and lowered positions and including a side rail mounted on said body for movement inwardly thereof upon folding movement of said top, bow support means mounted on said body for movement in a plane longitudinally thereof upon folding movement of said top, means locking said side rail to said bow support means in the raised position of said top to prevent movement of said top to a lowered position, and means for releasing said locking means to permit movement of said top to the lowered position thereof.

3. In combination with a vehicle body, a convertible top movable between raised and lowered positions and including a plurality of pivotally interconnected rail sections mounted on said body for folding movement inboard thereof, operating means for folding said rail sections, bow support means mounted on said body for movement in a plane longitudinally thereof upon folding movement of said rail sections, means locking said rail sections to said bow support means in the raised position of said top to prevent movement of said top to a lowered position, and means releasing said locking means upon actuation of said operating means to permit movement of said top to the lowered position thereof.

4. In combination with a vehicle body, a foldable convertible top movable between raised and lowered positions and including a side rail member, a bow support member mounted on said body for movement relative to said side rail member, latch means mounted on one of said members for movement between latched and unlatched positions, striker means mounted on the other of said members and engageable with said latch means in the latched position thereof and raised position of said top to prevent movement of said rail member and bow

member relative to each other, means for moving said latch means to unlatched position upon movement of said top to a substantially raised position and movement of said striker means to a position wherein said striker means is engageable by said latch means in the latched position thereof and means for moving said latch means to latched position in engagement with said striker means upon movement of said top to fully raised position.

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