Oct. 9, 1951 L. D. MILHAN 2,570,261

HEADER LOCKING MECHANISM

Filed July 1, 1948 3 Sheets-Sheet 1

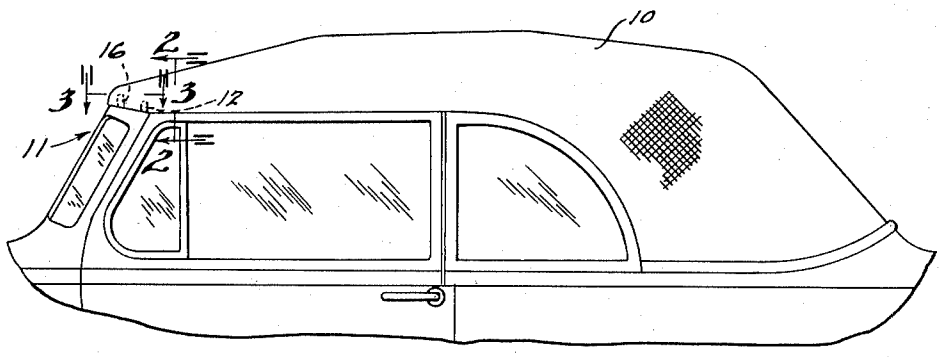

FIG. 1.

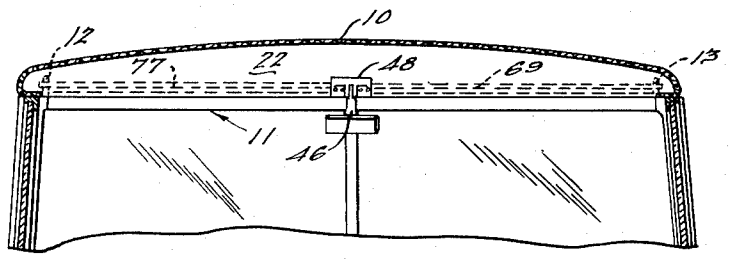

FIG. 2.

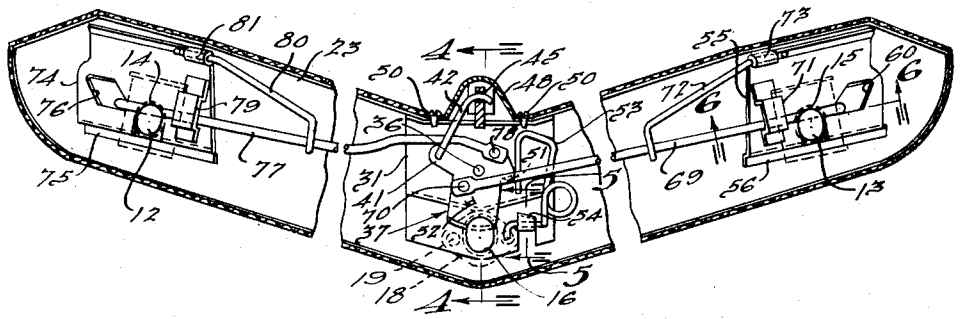

FIG. 3.

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HEADER LOCKING MECHANISM

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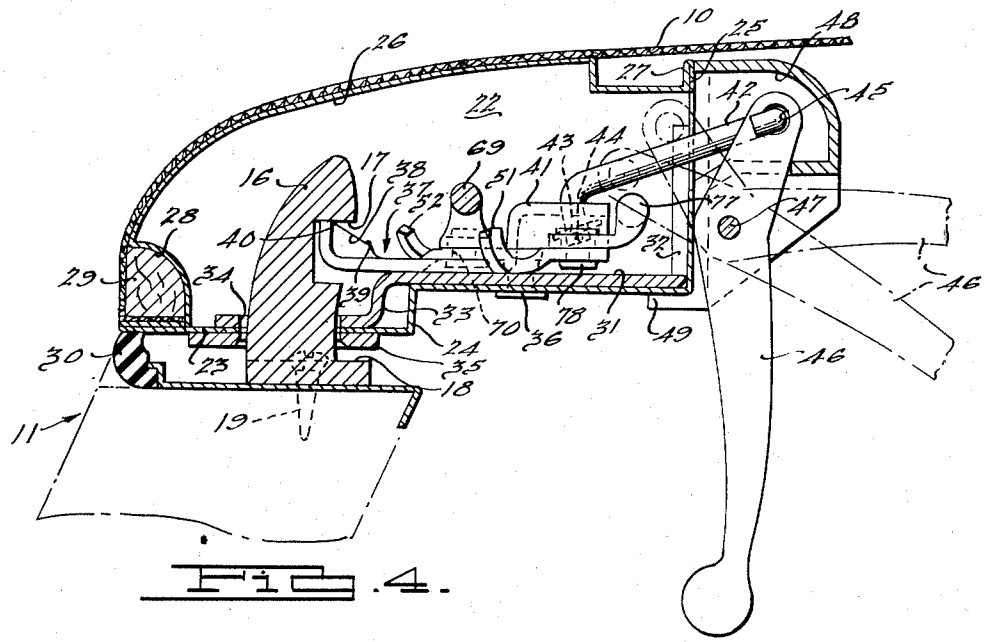

Fig. 4.

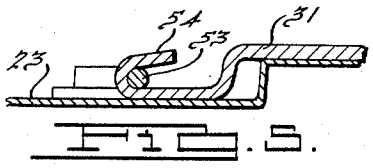

Fig. 5.

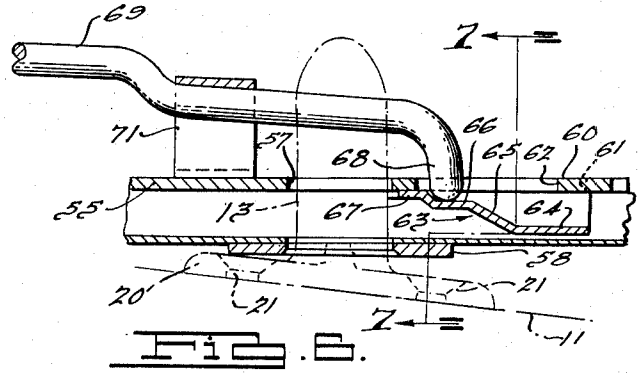

Fig. 6.

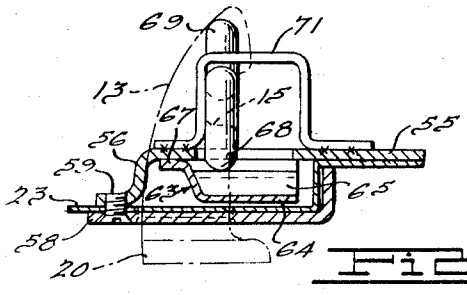

Fig. 7.

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HEADER LOCKING MECHANISM

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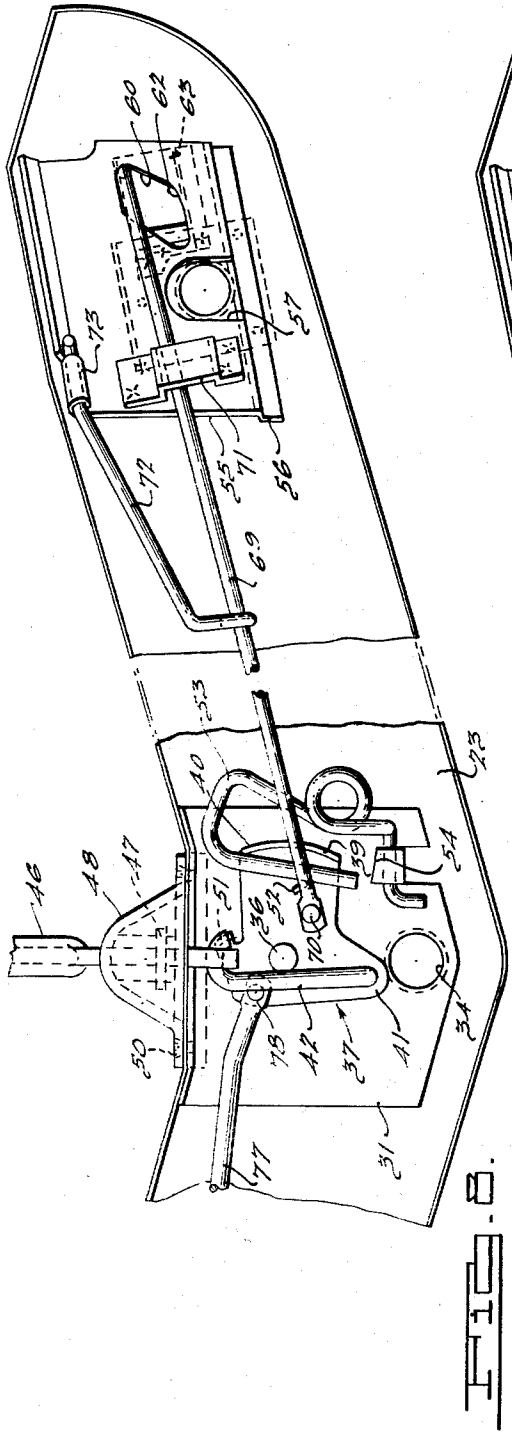

Fig. 8.

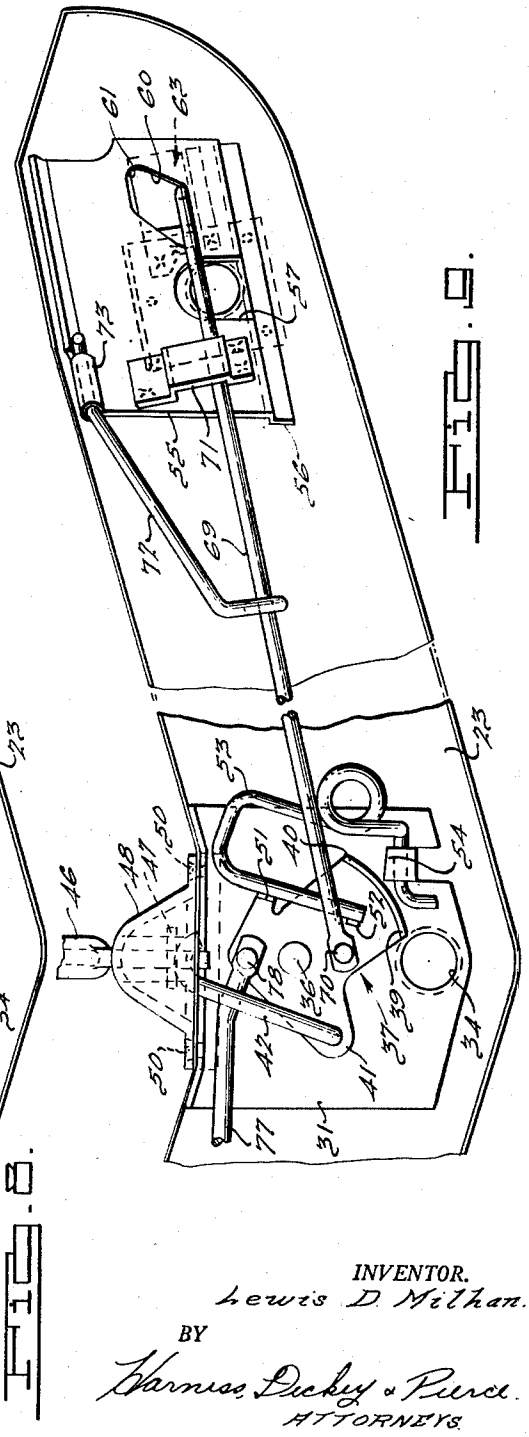

Fig. 9.

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Patented Oct. 9, 1951

2,570,261

UNITED STATES PATENT OFFICE

2,570,261

HEADER LOCKING MECHANISM

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Application July 1, 1948, Serial No. 36,479

4 Claims. (Cl. 296—120)

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This invention relates generally to header locking mechanisms for foldable vehicle tops and more particularly constitutes an improvement over the header locking mechanism shown and described in my pending application, Serial No. 9,403, filed February 19, 1948, and assigned to the assignee of the present invention.

Inasmuch as the header locking mechanism of the aforementioned pending application embodies an operating cam arranged in a substantially vertical position, its application is necessarily limited to those vehicles having a foldable top provided with a relatively large front bow or header portion for accommodating the various parts of the locking mechanism. Where, however, a foldable top is utilized having a relatively small front bow or header portion, the locking arrangement of the aforementioned application cannot be utilized. The present invention contemplates the provision of a novel header lock whose use will be substantially universal with all types of foldable tops thereby overcoming the above disadvantage.

An object of the present invention, therefore, is to provide a novel and improved header lock for a foldable vehicle top.

Another object of the invention is to provide a novel header locking mechanism embodying a substantially horizontally disposed operating cam thereby adapting the mechanism for universal use with foldable vehicle tops having front bow or header portions of varying sizes.

A further object is to provide an improved header lock arrangement for foldable vehicle tops embodying a novel camming means whereby the vehicle top may be readily and rapidly locked to the vehicle frame with a minimum amount of effort required on the part of the operator.

Another object is to provide a novel header lock for a foldable vehicle top wherein subsequent to a manual operation of a handle to actuate the lock to its open position, prior to operation of the top to a retracted or collapsed position, when the handle is released, the locking mechanism is urged to a latchable position so that upon a later extension of the top the various parts of the locking mechanism will come into operative engagement with the vehicle frame. Thereafter, a single motion of the handle to a locked position will promptly lock the front bow of the top to the vehicle frame in a rapid and desirable manner.

The above and further objects and novel features of the invention will more fully appear from the following detailed description when the same is read in connection with the accompanying

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drawings. It is to be expressly understood, however, that the drawings are for the purposes of illustration only and are not intended as a definition of the limits of the invention.

In the drawings wherein like reference characters refer to like parts throughout the several views:

Figure 1 is a side elevation view of a portion of a vehicle having a foldable top embodying the novel header locking mechanism hereof;

Figure 2 is a section view taken substantially along line 2—2 of Figure 1;

Figure 3 is a section view taken substantially along line 3—3 of Figure 1;

Figure 4 is an enlarged section view taken substantially along line 4—4 of Figure 3 showing the novel mechanism hereof in a locked position;

Figure 5 is an enlarged section view taken substantially along line 5—5 of Figure 3;

Figure 6 is an enlarged section view taken substantially along line 6—6 of Figure 3;

Figure 7 is a section view taken substantially along line 7—7 of Figure 6;

Figure 8 is an enlarged top elevation view, similar to Figure 3, showing the locking mechanism hereof in an open position; and

Figure 9 is a view similar to that of Figure 8 showing the locking mechanism in a latched or latchable position.

Referring now to the drawings for a more detailed description of the present invention, the novel header locking mechanism hereof is shown as applied to the front bow of a foldable vehicle top 10 which is shown in Figure 1 as locked to a windshield frame 11, the latter having rigidly secured thereto upwardly projecting end dowels 12 and 13 (Figure 2) having conically shaped heads and side recesses 14 and 15 (Figure 3) formed therein and an intermediate dowel 16, similar to dowels 12 and 13, having a side recess 17 formed therein. Dowel 16 has a base flange 18 formed therewith or secured thereto by virtue of which it is fastened to the frame 11 by way of screws 19 while dowels 12 and 13 are each provided with an inclined base flange 20 (Figure 6) secured by way of screws 21 to an inclined portion of frame 11.

The header or front bow of the foldable vehicle top 10 is provided with a chamber 22 (Figure 4) defined by a base plate 23 having a stepped portion 24 and an upwardly projecting rear wall 25 together with a cover 26 therefor which at its rear is provided with a reinforcing rib 27 for connection with the free end of wall 25 and at its front is provided with an arcuate wall termi-

nating in a front recess 28 connected to the base plate. A suitable member 29 may be contained in recess 28 to which top 10 is connected, the latter being drawn into intimate engagement with the outer surface of cover 26 in a well-known manner. A conventional sealing gland 30 is provided on frame 11 to engage the base plate 23 when the top is in an extended position to seal the opening between the frame and the top.

Located at a substantially central portion of the base plate 23 is a reinforcing bracket 31 having at one end an upwardly extending slotted wall 32 in engagement with wall 25 of the base plate which is likewise slotted, and at its other end a downwardly stepped portion 33 terminating in an opening 34 for accommodating relative motion of intermediate dowel 16 therein. If desired, a second reinforcing member in the nature of an apertured plate 35 may be secured to the underside of plate 23.

Rotatably mounted on bracket 31 by way of a stub shaft or rivet 36 which passes through plate 23 and bracket 31 is a cam member, generally designated with the reference character 37, which has a raised cam surface 38 provided with a low point 39 and a high point 40 for cooperation with recess 17 of the intermediate dowel in a manner and for a purpose to presently appear. Cam 37 is formed with an extended and raised apertured ear 41 for receiving the bent end of a driving rod 42, the lower end of the bent portion of the rod being provided with a retaining ring 43 and a transverse pin 44 whereby the rod will be maintained in an assembled condition with the ear of the cam. At its opposite end rod 42 is bent to pass into and to be retained within an opening 45 formed in one end of a lever defining a handle 46, the latter being pivotally mounted by way of a transverse pin 47, journaled within the side of a hollow casing 48 which carries a lower flange 49 for engagement with the underside of base plate 23. Casing 48 is fastened to walls 25 and 32 of plate 23 and bracket 31 by way of suitable screws 50. Manual operation of handle 46 about pivot 47 produces linear movement of rod 42 which, in turn, angularly displaces cam 37 about shaft 36.

Cam 37 is provided with a pair of spaced and raised lugs 51 and 52 located above and below the center of rotation of the cam, the lugs, under conditions to be explained hereinafter, cooperate with the free end of a compression spring 53 whose other end is anchored to bracket 31, the latter having a bent-over lip 54 (Figure 5) for fixedly holding the spring therein. Handle 46 is shown in Figure 4 as being in a full line locked position in which event the high point 40 of cam 37 is located within recess 17 of dowel 16 and as a result thereof the top has been cammed into a locked position relative to frame 11. At this point lug 51 of the cam is engaged by the free end of spring 53 and inasmuch as such engagement is effected to one side of and below the center of the cam, the spring tends to further rotate the cam relative to the recess (Figure 3) in a clockwise direction. This further rotation of the cam by the spring, however, is prevented by the fact that the high point of the cam is already located within the recess of the intermediate dowel.

By moving handle 46 to the intermediate dotted line position of Figure 4, cam 37 is rotated counterclockwise by rod 42 to withdraw the high point of the cam as well as the low point thereof from the recess of the dowel whereupon both lugs 51 and 52 engage with the free end of spring 53, such engagement being effected when the low point of the cam has passed out of the recess. This is the latched or latchable position of the locking mechanism hereof and such position is maintained by virtue of the fact that the action of spring 53 on lug 51, tending to rotate the cam counterclockwise, is balanced by the action of the spring on lug 52 which tends to rotate the cam clockwise (Figure 9). The upper dotted line position of the handle shown in Figure 4 represents the open position in which cam 37 has been moved counterclockwise an additional amount to move lug 51 out of engagement with spring 53, the spring, however, engaging lug 52 (Figure 8) at this point, such engagement being effected at a point below the axis of rotation of the cam. As soon as the handle after having been moved to its open position is released, spring 53 acts on lug 52 to rotate the cam clockwise to its latched position, such rotation coming to an end when lug 51 engages with the spring.

One end of base plate 23 is provided with a bracket 55 having a downwardly extending flange 56 for securing the bracket to the base plate and having a central opening 57 for accommodating relative motion of end dowel pin 13 therein. If desired, a reinforcing member in the form of an apertured plate 58 may be provided at the underside of the base plate and the latter may be fastened to plate 23 and flange 56 of the bracket by way of screws 59 (Figure 7). As better shown in Figure 8, for example, bracket 55 has an opening formed therein, one side of which defines an inclined cam surface 60 having an open position 61 and a latched or latchable position 62. Arranged underneath the opening or cam surface 60 is a plate member 63 which is suitably fastened to the underside of bracket 55, the plate having a generally straight portion 64, an inclined cam portion 65 and a level portion 66 terminating in a raised flange 67 for fastening one end of the plate to the bracket. Cam surface 60 is thus superimposed over cam surface 65.

Mounted for cooperation with both cams 60 and 65 is the bent end or finger 68 of a rod 69 which at its opposite end is connected by suitable means such as a pin 70 to cam 37 for movement thereby. A stepped or raised bracket 71 fastened to bracket 55 acts as a guide or limit for transverse motion of the rod. A spring 72 having one end anchored to bracket 55 by way of a bent lip portion 73 has the opposite end thereof bent over rod 69 to engage and normally urge the latter in a downward direction toward the recess 15 of end dowel pin 13 as viewed in Figure 8.

In a generally similar manner, the opposite end of base plate 23 has a bracket 74 fastened thereto, the bracket being raised relative to the plate by virtue of a flange 75. One end of the bracket is formed with an opening, similar to the opening of bracket 55, having an inclined or cam surface 76, the latter being superimposed over a cam surface (not shown) similar in all respects to cam surfaces 65 of plate 63. The bent end or finger of a rod 77 cooperates with both of the cam surfaces in the same manner that finger 68 of rod 69 cooperates with cam surfaces 60 and 65, the opposite end of rod 77 being connected by way of a pin 78 to cam 37 for movement thereby. A stepped or raised guide bracket 79 fastened to bracket 74 defines the limits of transverse motion of rod 77 while a spring 80 which at one end is attached to bracket 74 by way of a lip 81, has a bent over portion at its

other end for engaging and normally urging rod 77 towards recess 14 of end dowel pin 12.

Assuming that top 10 is in an extended position as shown in Figure 1 and handle 46 is in its locked or full line position as shown in Figure 4, whereby the top is maintained in a locked position relative to the vehicle frame by the novel locking mechanism hereof and it is desired to unlock and retract the top, the operator closes a switch or valve for retracting the top and at the same time moves the handle 46 to its open position represented by the uppermost dotted line position of Figure 4. As a result of such handle movement cam 37 is moved counterclockwise out of recess 17 of dowel 16 and rods 69 and 77 are both moved outwardly to the open position on cam surfaces 60 and 76 as shown in Figure 8, in which case the top is unlocked from the frame and is in condition for a retracting operation. At this point lug 51 of the cam has been moved in a counterclockwise direction away from spring 53 but lug 52 has been moved into engagement therewith so that as the header portion of the top moves away from the frame and the handle 46 is released, spring 53 exerts a force on lug 52 to cause clockwise motion of the cam which motion terminates as soon as lug 51 is brought into engagement with spring 53. Motion of the cam in a clockwise direction causes finger 68 of rod 69 to travel from the open position 61 on cam 60 to the latch position 62 (Figure 9), while the corresponding finger of rod 77 is caused to move to a corresponding latch position on cam 76. Handle 46 is moved by the cam from the open or uppermost dotted line position of Figure 4 to the latched or intermediate dotted line position of Figure 4.

The advantage of the foregoing described arrangement is that the novel locking mechanism of the present invention is maintained in a latchable condition so that as the top is extended and dowels 12, 13 and 16 enter the openings of brackets 31, 55 and 74, the conical ends of dowels 12 and 13 will deflect rods 69 and 77 outwardly against the action of springs 72 and 80 until the rods are opposite the dowel recesses 14 and 15 whereupon the springs will urge both rods into their corresponding dowel recesses. Handle 46 is thereafter grasped and operated manually to its locked or full line position of Figure 4 which results in further clockwise motion of cam 37, the high point 40 thereof entering the recess of dowel 16 and thus camming the top at that point to its locked position relative to framt 11. Simultaneously with such camming action rods 69 and 77 are pulled inwardly whereby finger 68 of rod 69 travels upwardly on cam surface 65 until it comes to rest on level portion 66 of plate 63 at which time the rod by engaging with the recess of dowel 13 and moving upwardly has operated the top to a locked position relative to frame 11 and the corresponding finger of rod 77 travels on a similarly upwardly inclined cam to engage with the recess of dowel 12 to cam the top at the latter point to a locked position relative to frame 11. Thus by being maintained in a latchable condition when the top is being either retracted or extended the operating portions of the novel mechanism hereof position themselves when the header portion comes to rest over the dowels so that by a simple motion of the handle the header portion of the top is promptly and positively locked relative to the vehicle frame.

There has thus been provided a novel header locking mechanism for a foldable vehicle top which is simple to operate and which provides a positive locking action and which, moreover, is so constructed as to provide a compact and simple arrangement adapted for use with foldable tops having header portions of varying sizes.

Although but a single embodiment of the present invention has been illustrated and described in detail it is to be expressly understood that the invention is not limited thereto. Various changes may be made in the design and arrangement of the parts without departing from the spirit and scope of the invention as will now be understood by those skilled in the art.

What is claimed is:

1. A header lock adapted for fastening a vehicle top to a vehicle windshield frame having a recessed dowel arranged at each end of the frame together with a third dowel arranged intermediate said end dowels, said lock comprising a cam rotatably mounted on said top for cooperation with the recess of said intermediate dowel for camming said top into engagement with said frame, a first and second pair of superimposed stationary cams carried by said top on each side of said first cam and spaced therefrom, a first rod carried by said top and movable into the recess of one of said end dowels for cooperation therewith and having one end thereof movable on one of said first pair of cams for moving said rod from said recess of said one of said end dowels and thereafter movable on the other of said first pair of cams for cooperating with said one of said end dowels to cam said top into engagement with said frame, a second rod carried by said top and movable into the recess of the other of said end dowels for cooperation therewith and having one end thereof movable on one of said second pair of cams for camming said second rod from said recess of the other of said end dowels and thereafter movable on the other of said second pair of cams for cooperating with said other of said end dowels to cam said top into engagement with said frame, said rods being connected at their opposite ends to said first cam, and means comprising a handle for operating said first cam.

2. A header lock adapted for fastening a vehicle top to a vehicle windshield frame having a recessed dowel arranged at each end of the frame together with a third dowel arranged intermediate said end dowels, said lock comprising a cam having an open, latch and locked position rotatably mounted on said top for cooperation with the recess of said intermediate dowel for camming said top into engagement with said frame when said cam has been moved to its locked position, a first and second pair of superimposed stationary cams carried by said top on each side of said first cam and spaced therefrom, a first rod carried by said top and movable into the recess of one of said end dowels for cooperation therewith and having one end thereof movable on one of said first pair of cams for camming said first rod from said recess of said one of said end dowels and thereafter movable on the other of said first pair of cams for cooperating with said one of said end dowel to cam said top into engagement with said frame, a second rod carried by said top movable into the recess of the other of said end dowels for cooperation therewith and having one end thereof movable on one of said second pair of cams for camming said first rod from said recess of said other of said end dowels and thereafter movable on the other of said second pair of cams for cooperating with said other of said end dowels to cam said top into engagement with

said frame, said rods being connected at their opposite ends to said first cam, means comprising a handle for operating said first cam to any one of its positions, and means comprising a spring for urging said first cam to a latch position subsequent to operation of said first cam to an open position.

3. A header lock adapted for fastening a vehicle top to a vehicle frame having a recessed member thereon, said lock comprising a cam, means supporting said cam on said top for rotation about a substantially vertical axis, said cam being adapted to be moved into said recess of said member to cam said top into engagement with said frame, means connected to said cam for operation thereby for simultaneously camming said top into engagement with said frame at a point spaced from the point of engagement effected by said cam, and means for rotating said cam.

4. A header lock adapted for fastening a vehicle top to a vehicle frame having a recessed member thereon, said lock comprising a cam, means supporting said cam on said top for rotation about a substantially vertical axis, said cam being adapted to be moved into said recess of said member to cam said top into engagement with said frame, means connected to said cam for operation thereby for simultaneously camming said top into engagement with said frame at a point spaced from the point of engagement effected by said cam, a linearly movable rod connected at one end to said cam at a point spaced from the axis of rotation of said cam for rotating said cam, and a pivotally mounted handle connected to the other end of said rod for moving the latter.

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