April 6, 1965 J. C. LOUTON, JR 3,177,034

CONVERTIBLE TOP ASSEMBLY

Filed Sept. 20, 1961 2 Sheets-Sheet 1

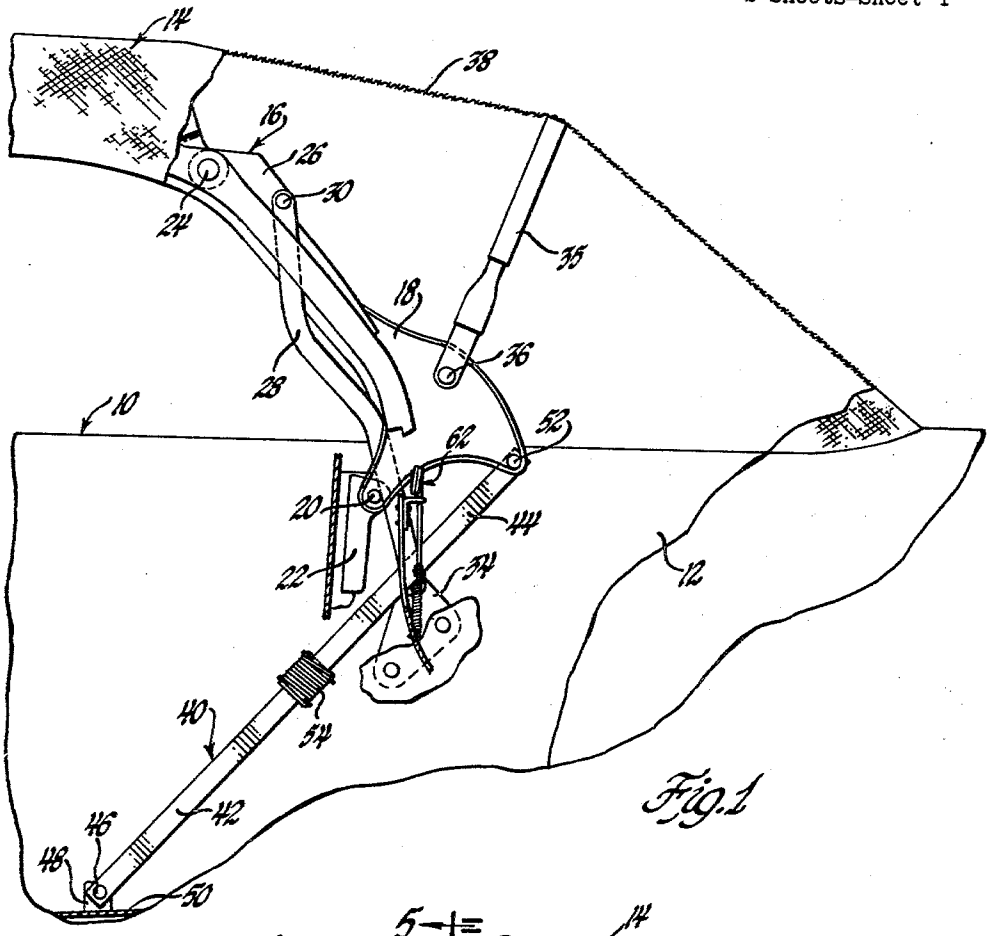


Fig. 1

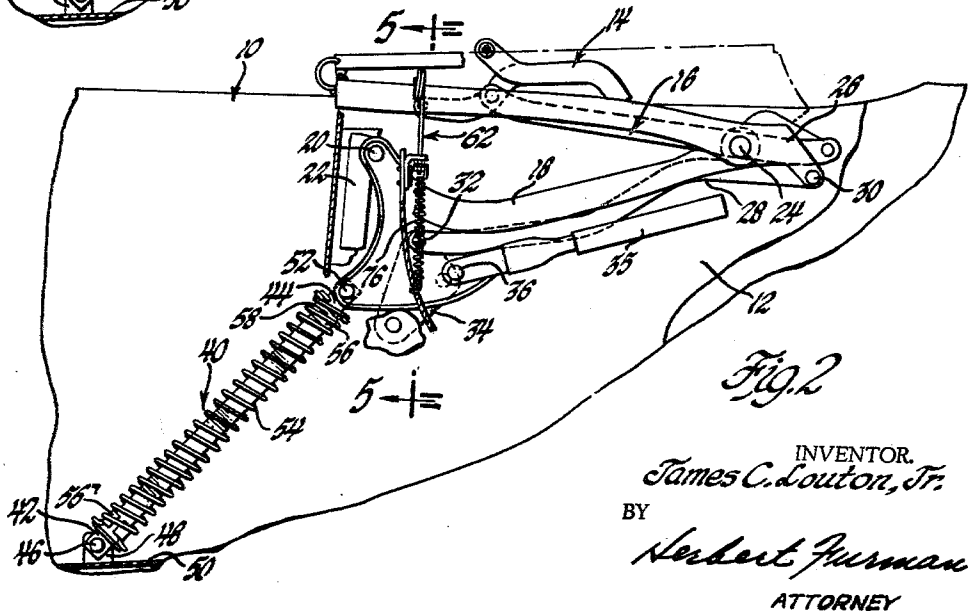


Fig. 2

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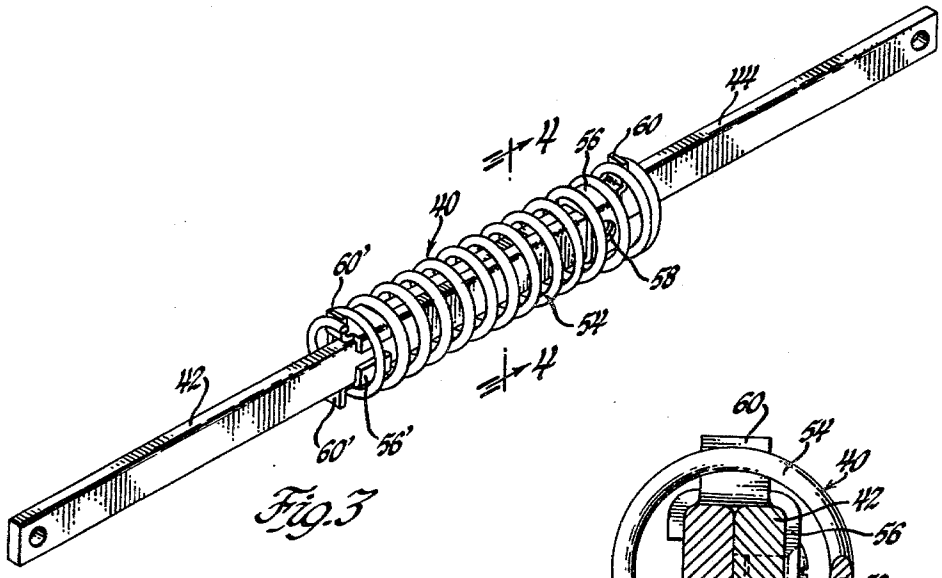


Fig. 3

Fig. 4

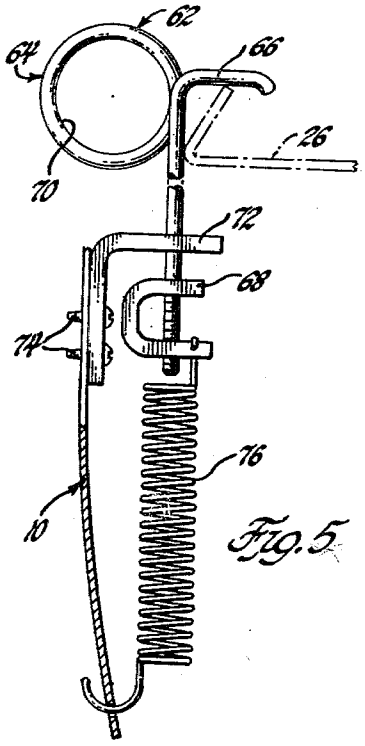


Fig. 5

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CONVERTIBLE TOP ASSEMBLY

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This invention relates to convertible tops assemblies and more particularly to a counterbalance means for a convertible top.

Most modern convertible tops are moved between raised and lowered positions by power means. Previous to this, most convertible tops were of the manual type wherein the operator furnished the motive force for raising and lowering the top. Such manual tops were commonly called "one man tops" and were supplanted by the modern power operated tops due to the many difficulties encountered by the operator in raising and lowering such manual tops.

The counterbalance assembly of this invention is particularly intended for use with manual tops and reduces the force required of the operator to a minimum so that he need supply very little force in order to raise and lower the top. The counterbalance assembly is also interchangeable with known types of power means, and further, can be used in conjunction therewith, such as by employing the counterbalance assembly on one side of the convertible top and power means on the other side of the convertible top to reduce cost to a minimum while still providing a power operated top. Generally, the counterbalance assembly includes a pair of extendable and retractable members, one member being pivotally mounted on the body adjacent one end thereof and the other member being pivotally connected adjacent one end thereof to the rear rail of the top frame. A coil spring surrounds the members, one end of the spring being anchored to the one member adjacent the other end thereof and the other end of the spring being anchored to the other member adjacent the other end thereof. The free or neutral position of the spring corresponds to a partially extended position of the members wherein the convertible top is intermediate its raised and lowered positions. When the top is in raised position, the members are in an extended position to compress the spring so that it exerts a force tending to cause the members to move toward retracted position and move the top to its lowered position. When the top is in lowered position, the members are in a retracted position to tension the spring so that it exerts a force tending to cause the members to move toward extended position and move the top to its raised position. Thus, the counterbalance assembly aids the operator in raising and lowering the top as the spring moves between a compressed position and a tensioned position through a neutral or free position during each cycle of raising or lowering the top. When the top is in its raised position, any known type of convertible top header latch can be used to hold the top in this position against the force of the counterbalance assembly. When the top is in its lowered position, a hand latch assembly may be used to hold the top in this position within the top well.

The counterbalance assembly of this invention is of very simple and economical construction and overcomes all of the disadvantages previously associated with manual tops.

The primary object of this invention is to provide a new and improved convertible top assembly. A more specific object of this invention is to provide a new and improved counterbalance assembly for convertible tops.

These and other objects of the invention will be readily apparent from the following specification and drawings wherein:

FIGURE 1 is a partially broken away partial side elevational view of a convertible vehicle body having a convertible top mounted thereon and counterbalanced by a counterbalance assembly according to this invention, with the top being showed in raised position;

FIGURE 2 is a view similar to FIGURE 1 and showing the top in lowered position;

FIGURE 3 is an enlarged perspective view of the counterbalance assembly;

FIGURE 4 is an enlarged sectional view taken generally along the plane indicated by line 4—4 of FIGURE 3, and;

FIGURE 5 is an enlarged view taken generally along the plane indicated by line 5—5 of FIGURE 2 and showing the hand latch assembly for holding the top frame in its lowered position.

Referring now to FIGURES 1 and 2 of the drawings, a convertible vehicle body 10 includes a top well 12 which is adapted to receive the convertible top assembly 14 in the lowered position thereof as shown in FIGURE 2. Only one side of the assembly 14 is shown and described but it will be understood that the other side is the same although of different hand. The top frame 16 is of known construction and forms no part of this invention. Generally the frame 16 includes a rear rail section 18 which is pivotally secured at 20 to a bracket 22 mounted on body 10. The rear rail section 18 is pivotally connected at 24 to the intermediate rail section 26. A power arm or link 28 has one end thereof pivoted at 30 to the intermediate rail section 26, rearwardly of the pivot 24, and the other end thereof pivotally connected at 32 to a mounting plate 34 secured to the body 10. A rear bow 35 is pivotally mounted at 36 to the rear rail section 18. The top frame 16 supports the usual top fabric 38. The operation of the top frame 16 will not be described in view of the fact that it is of a known type construction and the operation thereof is well understood by persons skilled in the art.

The top frame 16 is counterbalanced in both its raised and its lowered position by its counterbalance assembly 40 according to this invention. As shown in FIGURES 1 through 4 of the drawings, the counterbalance assembly includes longitudinally slidable members 42 and 44, member 42 being pivoted at one end thereof at 46 to a bracket 48 secured to the body floor structure 50, and member 44 being pivoted at one end thereof at 52 to the rear rail section 18 at a point located rearwardly at the pivot 20 of the rear rail section on the body. Members 42 and 44 are slidable relative to each other between an extended position, as shown in FIGURE 1, wherein the top frame 16 is in its raised position, and a retracted position, as shown in FIGURE 2, wherein the top frame is in its lowered position. Although the members 42 and 44 are shown in the form of bars, it will be understood, of course, that the members may be in other forms, such as internesting channel members. A coil spring 54 surrounds the members 42 and 44. As best shown in FIGURE 4, a generally C-shaped bracket 56 is bolted at 58 to the member 42 adjacent the other end thereof, with the bracket 56 surrounding the members 42 and 44 to hold these members together and insure that they will slide or move longitudinally relative to each other. Bracket 56 also includes a pair of laterally extending integral ears 60 which receive and seat one end of the spring 54, ears 60 being received between the last and the penultimate coils at one end of the spring 54. A like bracket 56' is similarly secured to member 44 adjacent the other end thereof and includes laterally extending

ears 60' which are received between the last and penultimate coils at the other end of the spring 54, whereby the brackets 56 and 56' seat and anchor each end of the spring 54 to a respective member 42 and 44 and also insure that the members 42 and 44 will slide or move longitudinally relative to each other.

The counterbalance assembly 40 is shown in its free or neutral position in FIGURE 3 and this position corresponds to a position of the top frame 16 intermediate its raised and lowered positions. When the top frame is in its raised position, as shown in FIGURE 1, the members 42 and 44 are in their extended position and the brackets 56 and 56' are adjacent each other so that spring 54 is compressed whereby the force of the spring urges the members 42 and 44 toward their retracted position and in turn urges the top 16 to its lowered position. When the top frame moves from its raised position of FIGURE 1 to its lowered position of FIGURE 2, the members 42 and 44 will move from their extended position to their retracted position. The spring 54 will initially urge the members 42 and 44 toward their retracted position until the members 42 and 44 have moved to their position as shown in FIGURE 3, wherein the spring 54 is in its neutral or free position. Thereafter, upon continued movement of the members 42 and 44 to their retracted position, the spring 54 will be tensioned as shown in FIGURE 2, to thereby exert a force tending to urge the members 42 and 44 to their extended position. Thus, the spring counterbalances the top in each ultimate position thereof and aids the operator in moving the top from either of its ultimate positions to the other ultimate position. It will further be noted that the force of the spring 54 is exerted longitudinally of members 42 and 44 and is also exerted at a point rearwardly of the pivot 20 of the top frame 16 on the body.

In order to hold the top frame 16 in its lowered position within the top well 12 against the force of the counterbalance assembly 40, a hand latch assembly 62 is provided. As best shown in FIGURE 5, latch assembly 62 includes a wire member 64 having one end thereof bent in the shape of a hook 66 and the other end thereof threaded so as to adjustably mount a U-shaped nut 68. The intermediate portion of member 64 includes one or more coils 70 so that the operator may insert his finger to move the member 64. The member 64 is slidably supported on the body by a bracket 72 which slidably receives the other end of the member 64 therethrough and is secured at 74 to the body 10. A tension spring 76 hooked between the nut 68 and the body 10 continually urges the member 64 in a downward direction. When the top frame is in its lowered position, as shown in FIGURE 2, the hook portion 66 of member 64 engages over the intermediate rail section 26, as shown in FIGURE 5, to hold the top frame in this position. When it is desired to move the top frame to its raised position, the operator inserts his finger through the coil 70 of member 64 and simultaneously pulls the member 64 upwardly against the action of the spring 76 while turning the member so as to release the hook member 66 from the intermediate rail section 26 and allow the top assembly to be raised.

Thus this invention provides a new and improved counterbalance assembly for convertible tops.

What is claimed is:

1. In a vehicle body having a convertible top mounted thereon for movement between raised and lowered positions and including a rear rail section swingably mounted on the body, the combination comprising, a counterbalance assembly including a pair of members movable between extended and retracted positions, means swingably mounting one of said members adjacent one end thereof on said body, means pivotally connecting the other of said members adjacent one end thereof to said rear rail section to one side of the pivot thereof on said body, resilient means interconnecting said members adjacent the other free ends thereof, said resilient means having a free position corresponding to a position of said top intermediate said raised and lowered positions thereof and being arranged to selectively and alternately bias said members to said extended and said retracted positions thereof when said top is in said lowered and said raised positions thereof, respectively.

2. In a vehicle body having a convertible top mounted thereon for movement between raised and lowered positions and including a rear rail section swingably mounted on the body, the combination comprising, a counterbalance assembly including a pair of members movable between extended and retracted positions, guide means guiding longitudinal movement of said members, means swingably mounting one of said members adjacent one end thereof on said body, means pivotally connecting the other of said members adjacent one end thereof to said rear rail section to one side of the pivot thereof on said body, coil spring means surrounding said members, means anchoring said coil spring means to each of said members adjacent the other free ends thereof, said spring means having a free position corresponding to a position of said top intermediate said raised and lowered positions thereof and being arranged to selectively and alternately bias said members to said extended and said retracted positions thereof when said top is in said lowered and said raised positions thereof, respectively.

3. In a vehicle body having a convertible top mounted thereon for movement between raised and lowered positions and including a rear rail section swingably mounted on the body, the combination comprising, a counterbalance assembly including a pair of longitudinally movable members movable between extended and retracted positions, guide means guiding longitudinal movement of said members, means swingably mounting one of said members adjacent one end thereof on said body, means pivotally connecting the other of said members adjacent one end thereof to said rear rail section rearwardly of the pivot thereof on said body, a coil spring surrounding said members, means securing each end of said spring to a respective other free end of said members whereby said spring exerts its force longitudinally of said members, said spring having a free position corresponding to a position of said top intermediate said raised and lowered positions thereof and being compressed in the raised position of said top and extended position of said members and being tensioned in the lowered position of said top and retracted position of said members to bias said top toward the opposite ultimate position thereof from the ultimate position said top is in.

4. In a vehicle body having a convertible top mounted thereon for movement between raised and lowered positions and including a rear rail section swingably mounted on the body, the combination comprising, a counterbalance assembly including a pair of members coaxially movable between extended and retracted positions, means swingably mounting one of said members adjacent one end thereof on said body, means pivotably connecting the other of said members adjacent one end thereof to said rear rail section to one side of the pivot thereof on said body, coil spring means interconnecting said members adjacent the other free ends thereof and being coaxial therewith, said spring means having a free position corresponding to a partially extended position of said members and a partially raised position of said top intermediate the raised and lowered positions thereof and being in compression in the extended position of said members and the raised position of said top to bias said top toward said partially raised position thereof and move said members to said partially extended position thereof, movement of said top from said partially raised position to said lowered position thereof moving said members toward said retracted position and causing said spring means to be tensioned so as to continuously build up a counterbalance force, said force tending to bias said members toward said partially extended position thereof

and bias said top toward said partially raised position thereof.

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