

[54] **SPRING-LOADED FOLDING ARM**

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[58] **Field of Search**248/166, 188.2, 240.4, 292, 248/351, 356, 421, 429; 296/27, 23 A; 108/129; 52/66

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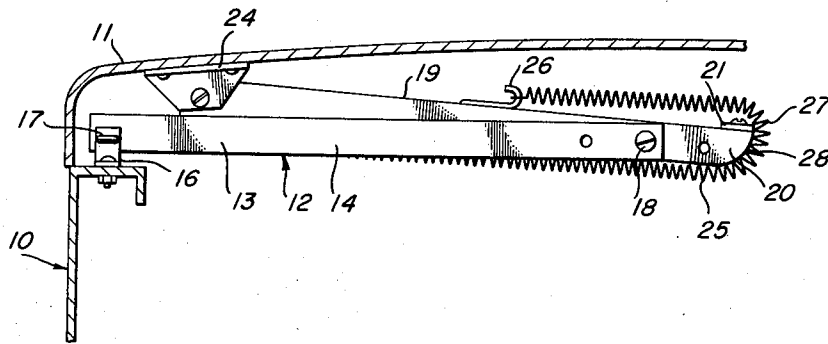
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[57] **ABSTRACT**

A spring-loaded folding arm comprising two pivotally connected leg portions, with a spring having one end connected to each leg and arranged to urge the arm into the extended position. In a particular application, shown and described, the arms are employed between a stationary structure and a movable structure to provide a substantially counterbalanced extensible mechanism.

2 Claims, 4 Drawing Figures



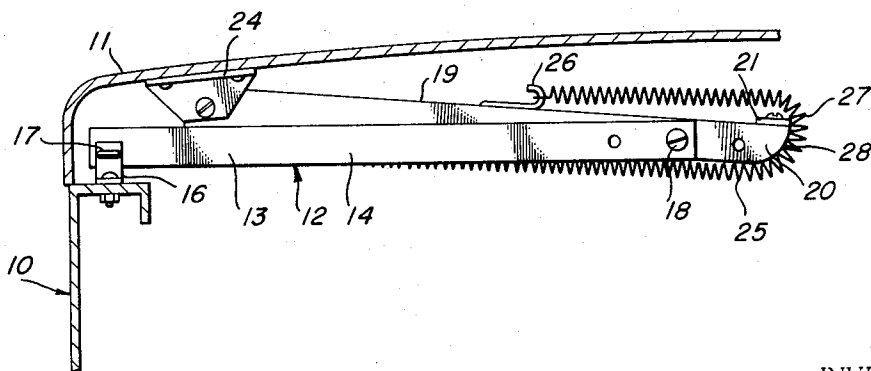
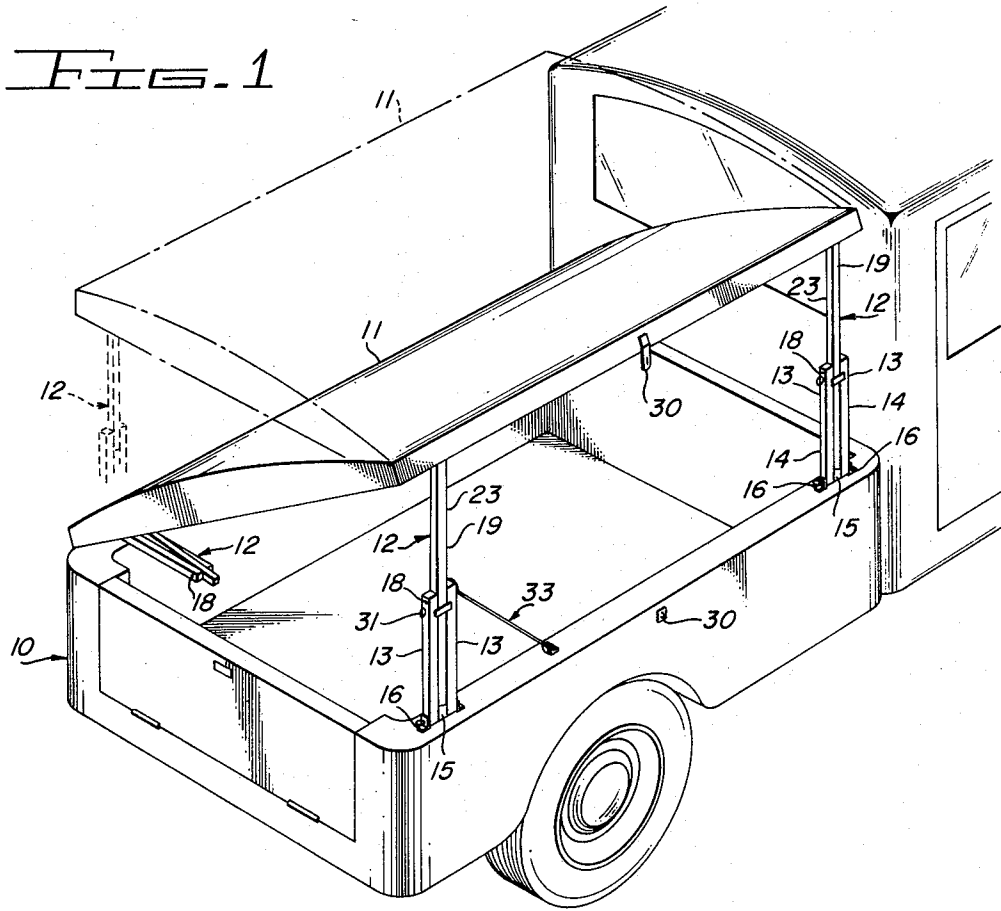


FIG. 4

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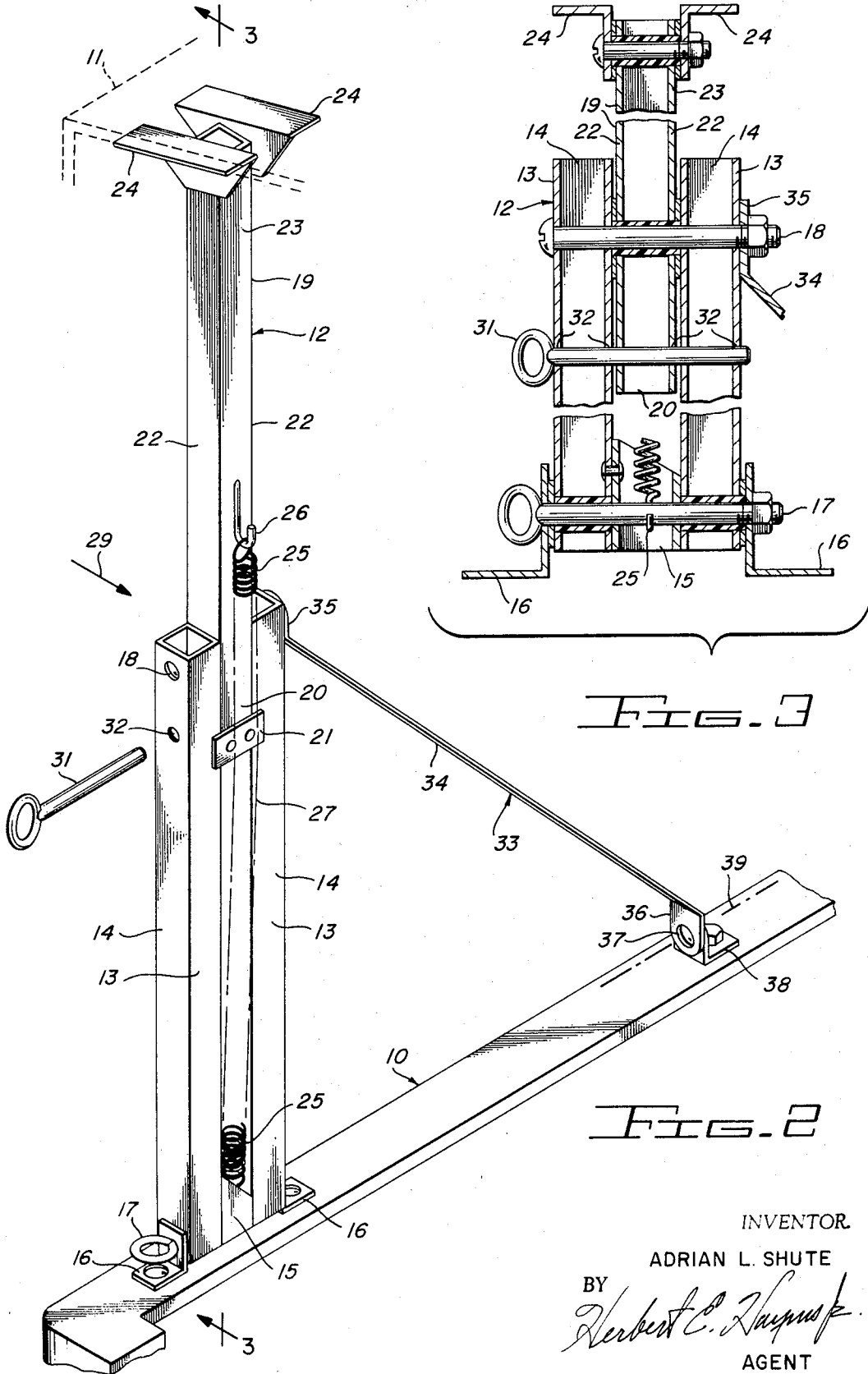


FIG. 3

FIG. 2

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SPRING-LOADED FOLDING ARM

BACKGROUND OF THE INVENTION

This invention relates to mechanical devices and more particularly to a spring-loaded folding arm having a particular application in the art of extensible structures.

1. Field of the Invention

The extension and retraction of relatively large objects has long presented a challenge in the field of mechanical design and many elaborate systems have been developed to solve particular problems.

Complexity and cost of these elaborate systems have contributed materially to their limited commercial acceptance. Therefore, it would be highly desirable to provide a simple low cost extending device for use with extensible structures.

2. Prior Art

Heretofore, the retraction and extension of relatively large structures have required elaborate extending devices such as screw jacks, chain-pulley combinations, gear-rack mechanisms and the like. Devices of this nature have varied in complexity and cost, dependent on the size and weight of the extensible object and the amount of automatic operation desired. Therefore, many devices have been developed ranging from crank operated mechanisms to fully power assisted devices.

SUMMARY OF THE INVENTION

The spring-loaded arm of the present invention, as described and claimed, comprises a base leg in the form of a bifurcated member, with an extending leg pivotally mounted between the tines at the open end thereof. A spring is provided for urging the arm into the extended position and has one end attached to the closed end of the bifurcated member, and the other end attached intermediate the ends of the extending leg so that the spring is positioned to one side of the pivot point. The extending leg is provided with a protruding portion which extends beyond the pivot point into the bifurcated member. The protruding portion of the extending leg is provided with a laterally extending stop plate positioned on the same side of the pivot point as the spring, thus the spring urges the plate into engagement with the tines when the arm is in the extended position. Folding of the arm may be accomplished only in one direction due to the stop plate, and is accomplished against spring tension which will return the arm to the extended position unless a force is exerted on the folded arm which exceeds the force of the spring.

Mounting one or more of the folding arms of the present invention on the opening side of a hinged lid-like structure, and selecting the spring force approximately equal to the weight of the lid will provide a substantially counterbalanced opening mechanism which may be easily operated in either direction by manually upsetting the balance.

Mounting a plurality of folding arms of the present invention in spaced relationship around the periphery of the base of an object to be extended, and properly selecting the spring sizes, results in the same counterbalanced operation heretofore described in relation to the aforesaid lid-like structure.

It is therefore one object of the present invention to provide a spring-loaded folding arm which is simple to fabricate and inexpensive to manufacture.

Another object of the present invention is to provide a spring-loaded folding arm which is biased in the extended position.

A further object of the present invention is to provide a spring-loaded folding arm in which the spring is easily replaceable to change the force required to fold the arm.

A still further object of the present invention is to provide a spring-loaded folding arm which when mounted to an extensible structure provides a substantially counterbalanced extending device.

The foregoing and other objects of this invention, as well as the invention itself, may be more fully understood from the following description when read in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view schematically illustrating the spring-loaded folding arm of the present invention in operation on an extensible camper cover.

FIG. 2 is a perspective view of the spring-loaded folding arm of the present invention.

FIG. 3 is a fragmentary sectional view taken on the line 3—3 of FIG. 2.

FIG. 4 is a side view of the folding arm of the present invention, showing the arm in the folded position.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring more particularly to the drawings, FIG. 1 illustrates a truck-bed 10 having a camper cover 11 mounted thereon by a plurality of spring-loaded folding arms 12 of the present invention.

The folding arm 12, as best seen in FIGS. 2, 3 and 4 comprises a bifurcated base leg 13 with upstanding tines 14 which are suitably connected at their lower ends by an interposer member 15. Extending outwardly from opposite sides of the base leg 13, are mounting flanges 16, pivotally mounted by a pivot pin 17. The tines 14 of base leg 13 are provided at their upper ends with a pivot pin 18 which pivotally attaches an extending leg 19 between the tines 14. Extending leg 19 is provided with a lower portion 20 depending downwardly between tines 14. Suitably attached to lower portion of the leg 19 is a transverse stop plate 21 positioned to laterally extend beyond both sides 22 of the lower portion 20 of leg 19 to limit travel thereof, as will be hereinafter described in detail. An upper portion 23 of extending leg 19 is provided with pivotally attached mounting flanges 24 positioned in the outermost ends of leg 19.

A spring 25 is provided to urge the arm 13 into the extended position as best seen in FIG. 2. The lower end of spring 25 is suitably attached in the area of interposer 15; with the upper end being attached intermediate the ends of extending leg 19 by a hook 26 with intermediate portion 27 of the spring 25 in abutting contact with the outwardly facing surface of stop plate 21.

As seen in FIG. 4, the lower end 20 of extending arm 19 is formed with an arcuate surface 28 to prevent spring distortion when the arm is in the folded position.

To provide a smooth, durable, easily operated structure, each of the pivot pins are suitably journaled on bushings.

OPERATION

Folding the arm 13 from the extended position as shown in FIG. 2 may be accomplished by exerting a force in the direction of arrow 29 in the general area of pivotal movement. The completion of the folding action may then be easily accomplished by the weight of the extensible object, with possibly a slight pushing force if the weight is insufficient to overcome tension of the spring 25.

Mounting arms 13 of the present invention in opposite corners of a rectangular object such as the camper cover 11, shown in FIG. 1, results in an easily extensible structure. To raise the cover 11, the operator need only release the locking mechanisms 30 suitably mounted on both sides of the cover, then simply lift one side of the cover to the position shown in solid lines. This action extends the two arms on that side and similar action on the other side will completely raise the cover to the position shown in broken lines. If it is desired to lock the arms in the extended position, a locking pin 31 may be inserted through holes 32 as seen in FIGS. 2 and 3.

Longitudinal stabilization of the extended structure for driving purposes may be provided by stabilizer bars 33. Each bar 33 comprises a strut portion 34, having an upper tab 35 to provide means for attaching the bar to pivot pin 18. The lower end of each bar 33 is provided with a lower tab 36 which is mounted to truck bed 10 by bolt 37 carried in angle bracket 38. As seen in FIG. 1 an axis 39 illustrates the coaxial relationship between pivot pin 17 and stabilizer bar mounting bolt 37.

This co-axial relationship allows bars 33 to pivot about bolts 37 when the arms 12 are folded.

A modified extensible structure may be provided by mounting one or more folding arms of the present invention to the opening side of an access lid, having a suitable hinge on the opposite side thereof. Operation of this type of mechanism may be accomplished in the same manner as the first step hereinbefore described in relation to the camper cover.

Various changes in the device herein chosen for purposes of illustration in the drawing will readily occur to persons skilled in the art having regard for the disclosure hereof. To the extent that such modifications and variations do not depart from the spirit of the invention, they are intended to be included within the scope thereof which is not limited to the device specifically illustrated but rather by a fair interpretation of the following claims.

I claim:

1. A spring-loaded folding arm for use between a stationary structure and an extensible structure comprising:

- a. a bifurcated base leg;
- b. an extending leg pivotably mounted between the outer-

most ends of said bifurcated base leg, said extending leg having a lower portion protruding downwardly into said bifurcated base leg;

c. stop means mounted to the lower portion of said extending leg for limiting pivotal movement of said extending leg;

d. a tension spring connected at one end thereof to the lower portion of said bifurcated base leg, and having the other end attached intermediate the ends of said extending leg, said tension spring having its intermediate portion laterally adjacent to the pivot point of said base leg and said extending leg; and

e. mounting means pivotably mounted to opposite ends of the arm for attaching the arm between the stationary structure and the extensible structure.

2. A spring-loaded folding arm as claimed in claim 1 wherein said extending leg has an arcuate surface formed on the bottom portion thereof for preventing distortion of said tension spring when the arm is in the folded position.

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