July 26, 1955 R. E. TAYLOR 2,714,002

SPRING COMPENSATING DEVICE

Filed Jan. 25, 1954 2 Sheets-Sheet 1

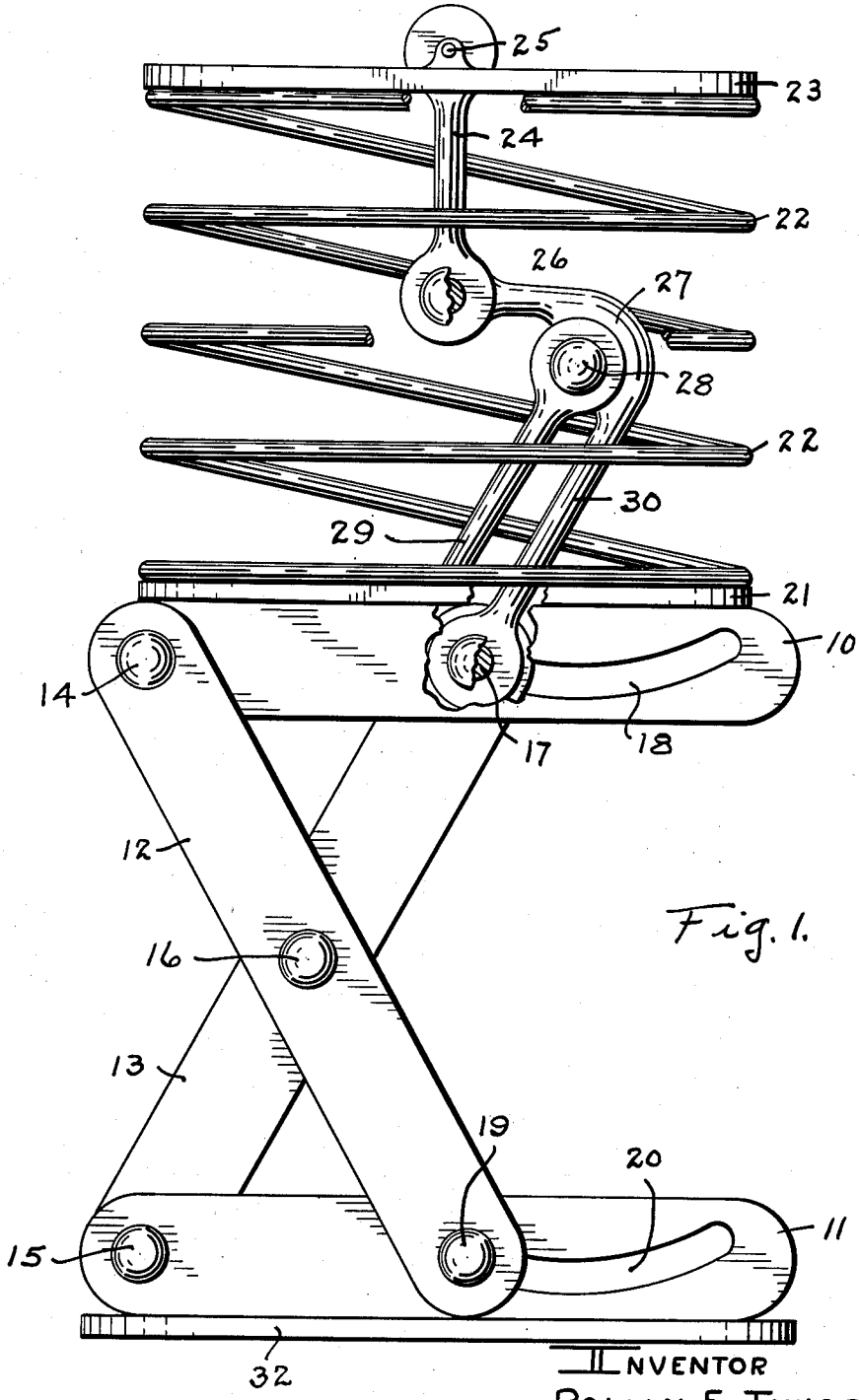


Fig. 1.

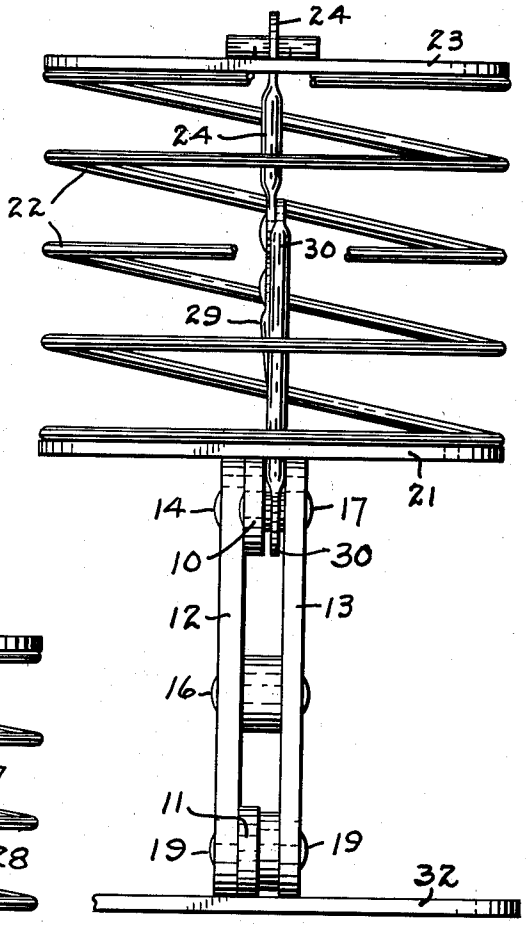
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Filed Jan. 25, 1954 2 Sheets-Sheet 2

Fig. 2.



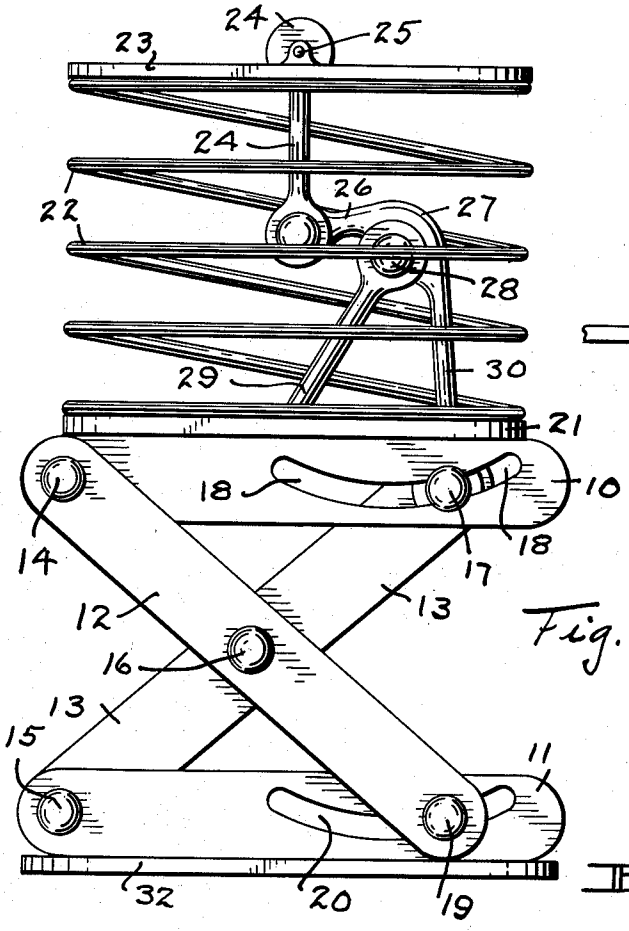


Fig. 3.

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United States Patent Office 2,714,002 Patented July 26, 1955

2,714,002

SPRING COMPENSATING DEVICE

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Application January 25, 1954, Serial No. 405,802

3 Claims. (Cl. 267—20)

This invention relates to a spring compensating device particularly designed whereby through a leverage system, a short heavy spring may be employed to give the effect of a lighter and longer spring in the spring action thereof. Where spring length is limited and there is room for the leverage system, the structure comprised in this invention may be very well used in such instances as front and rear end suspensions for automobiles and trucks, landing gear suspensions on airplanes, railroad car suspensions, and even in smaller spaced conditions such as recoils in guns, and even in machinery.

These and many other objects and advantages of the invention will become apparent to those versed in the art in the following description of one particular form of the invention, as illustrated in the accompanying drawings, in which:

Fig. 1 is a view in side elevation and partial section of a structure embodying the invention;

Fig. 2 is a view in front elevation and partial section on a reduced scale; and

Fig. 3 is a view in side elevation similar to that shown in Fig. 1 but with the spring under compression.

A leverage system is constructed to have upper and lower substantially horizontally disposed bars **10** and **11**, the horizontal positions as indicated being relative of course, and to each end on the same side of these bars **10** and **11**, there is hinged respectively connecting levers **12** to the upper bar **10**, and **13** to the lower bar **11**, the hinging being accomplished by any suitable means, herein shown as by pins **14** and **15**. These levers **12** and **13** cross each other to be rockably interconnected substantially at their center points in respect to their lengths by a pin **16**, so that the levers **12** and **13** normally are presented between the bars **10** and **11** in an X shape. The free ends of these levers **12** and **13** are respectively slidably tied to the bars **10** and **11** in the following manner.

The upper end of the lever **13** carries a pin **17** which is slidably guided through an arcuate slot **18** extending along and through the bar **10** at a distance removed from the pin **14** toward the free end of the bar. The lower end of the bar **12** has a pin **19** which is slidingly received through the slot **20**, also arcuate in nature and being positioned along the bar **11** at a distance from the pin **15**, the bars **10** and **11**, in fact, being duplicates of each other. On top of the bar **10**, there is a plate **21** fixed such as by welding as a base for supporting a spring of a helical nature, the spring being designated by the numeral **22**. The spring **22** is mounted on the base **21** to be substantially centered along the length of the bar **10**.

A top bearing plate **23** is provided to engage against the top side of the spring **22**, and there is fixed to this plate **23** in a rockable manner by means of a pin **25** a connecting link **24** extending downwardly and substantially axially within the spring **22**.

The lower end of this link **24** is rockably connected to the short arm **26** of a lever **27** which is hinged through

the pin **28** on an inclined post **29** in turn fixed to the base plate **21**. The lever **27** is in fact a bell crank and has a lower arm **30** which extends on downwardly and through the plate **21** freely to interengage the pin **17** in a rockable manner.

When pressure is applied to the plate **23**, the spring **22** tends to be compressed, with the result that the plate **23** travels downwardly toward the plate **21**, and resultant action is that the connecting link **24** will push the arm **26** of the crank **27** downwardly tending to rock the arm **30** outwardly and thus carry the upper end of the bar **13** outwardly along the slot **18** as indicated in Fig. 3, simultaneously causing the lever **12** likewise to have its pin **19** travel outwardly in the slot **20**, thereby reducing the distance between the bars **10** and **11**. By means of the lever **27**, the plate **23** normally is spaced the full distance from the plate **21** as is required by the spring **22** when it is not under load. The lower cross arm **11** may of course be secured to any suitable base such as the plate **32**.

Thus it is to be seen that by use of the spring **22** which is comparatively short as compared to the distance between the plate **23** and the plate **32**, the overall travel will be resiliently had by means of the leverage system through the arm **12** and **13** as set up by the crank lever **27** and the interconnecting length **24**.

Therefore it is to be seen that I have produced a structure quite simple in form for the purposes above set forth, and while I have described the structure in the one precise form, it is obvious that structural variations may be employed without departing from the spirit of the invention, and I therefore do not desire to be limited to that precise form beyond the limitations which may be imposed by the following claims.

I claim:

1. A spring construction comprising a supporting member; a lower member substantially parallel thereto; a lever hinged to the supporting member and extending diagonally downwardly thereunder; said lower member having a slot therethrough toward one end thereof; a bearing member carried by the lower portion of said lever and riding in said slot; a second lever hinged to said lower member substantially vertically under the hinge of the first lever to said supporting member; said second lever extending diagonally upwardly crossing said first lever; said supporting member having a slot therealong; a bearing member carried by the second lever and resting in said supporting member slot; said two levers being rockably interconnected at their mid points between their hinged axes and said bearing members; a spring having one end bearing on said supporting member; a bearing member at the other end of said spring; a lever rockably supported by said spring supporting member; one end of said last lever being rockably engaged with said second lever slot bearing; and a link rockably inter-connecting the other end of said last lever with said other spring end bearing member.

2. A spring structure comprising a spring; a member supporting one end of said spring; a collapsible parallel movement device carrying said member, said device comprising a pair of substantially parallel bars, a pair of crossed levers rockably interconnected at their central zones, one of said levers being pivotally connected to one end portion of one bar and the other lever being pivotally connected with an end of the other bar, the free ends of said levers being slidingly carried along opposite end portions of said bars to have the levers in X form between the bars; said spring supporting member being carried by one of said bars; and a leverage system between the other end of said spring and the free end of one of said levers inducing reciprocating travel of

said one lever free end along the spring supporting member bar under compression and release of the spring.

3. The structure of claim 2 in which said leverage system comprises a bell crank rockably supported by said spring end supporting member, a connection between one arm of the bell crank and said other end of the spring, and the other arm of the bell crank is rockably interconnected with said second lever free end.

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