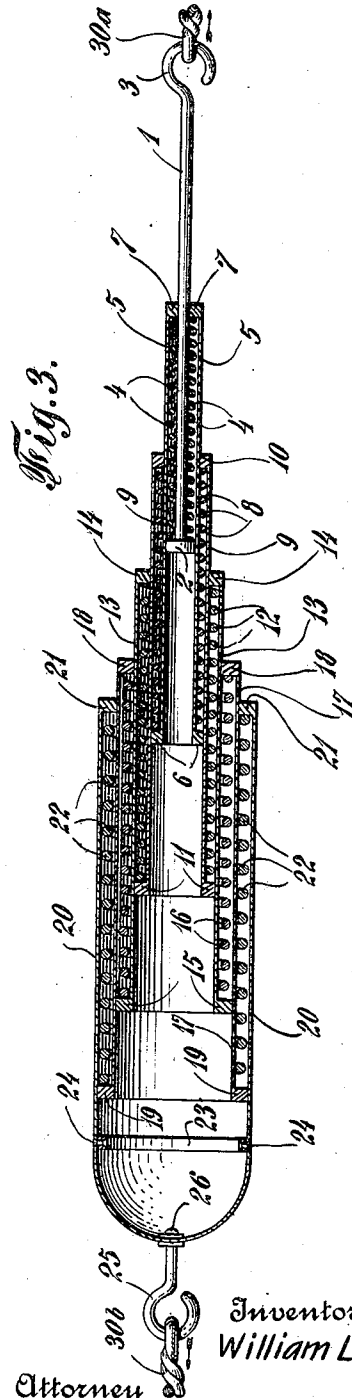
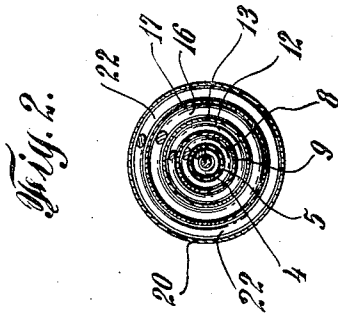
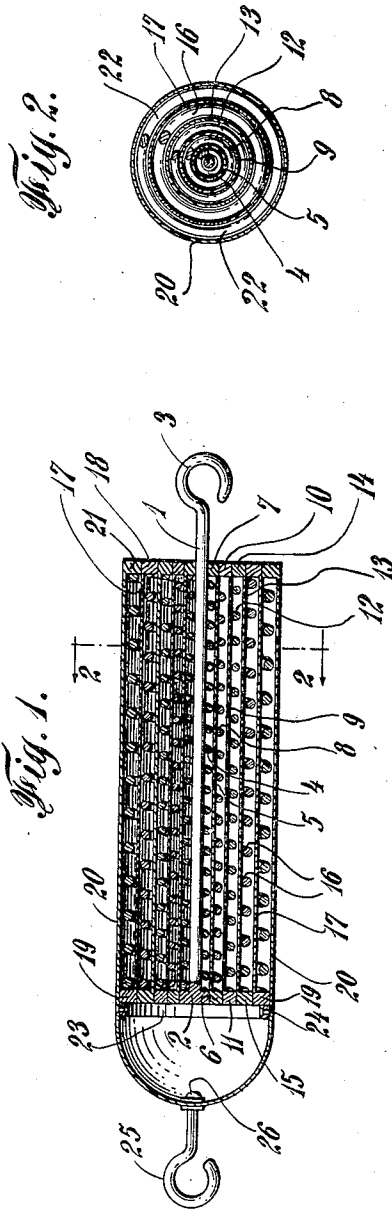


W. LIND.
TENSION CONTROLLING DEVICE.
APPLICATION FILED JUNE 29, 1921.

1,425,528.

Patented Aug. 15, 1922.



By *hi* Attorney

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WILLIAM LIND, OF NEW YORK, N. Y.

TENSION-CONTROLLING DEVICE.

1,425,528.

Specification of Letters Patent. Patented Aug. 15, 1922.

Application filed June 29, 1921. Serial No. 481,271.

To all whom it may concern:

Be it known that I, WILLIAM LIND, a citizen of the United States of America, residing at New York, N. Y., have invented certain new and useful Improvements in Tension-Controlling Devices, of which the following is a specification.

This invention relates to tension controlling devices and particularly to a resilient coupling link for towing lines used on ships.

It is the object of the present invention to provide a simple and efficient device for gradually absorbing a sudden stress to which a towing line or other device or apparatus might be subjected.

With this object in view, the present invention contemplates the construction of a tension controlling device in which the outside force applied to the device is opposed by a plurality of resilient means of varying elasticity. Due to the difference in the elasticity of the various resilient means, notwithstanding the fact that the outside force is simultaneously applied to all such means, first, the resilient means of the greatest elasticity will respond and another resilient means of lesser elasticity will respond only when the former had been strained to the limit of its elasticity. A shock will thus be gradually absorbed.

In accordance with the present invention, the mentioned resilient means are preferably in the form of coiled springs of various strengths counteracting each other. A stress exerted on a towing line between two sections of which the device may be provided, will cause first the compression of the weakest spring. When this spring absorbs a portion of the shock, a stronger spring is compressed, etc., until the device is fully operated. The springs are held within hollow tubes and are normally in a telescoped position. Upon the application of force, the tubes and springs are extended in the same direction, each spring coacting with the two adjacent tubes. The arrangement is so provided that the resiliency of the device may be varied by the addition of new springs and without the necessity of changing the thickness or length of the existing springs.

In order to exemplify and more fully to explain the invention, an embodiment thereof will be described in detail.

In the drawings, Fig. 1 is a longitudinal cross section of the device in its normal

position, Fig. 2 is a sectional view along lines 2—2 of Fig. 1; and Fig. 3 is a cross section like Fig. 1, the device being in its actuated position.

1 is a rod or plunger having a hook shaped end 3. The other end of this plunger is provided with a shoulder 2. A coiled spring 4 is wound around the plunger 1. One end of this spring 4 engages the shoulder 2 of the plunger, and the other end is in engagement with an inside projecting ring 7 provided at one end of a hollow tube 5 that normally encloses the plunger 1 and the spring 4. The inside end of the tube 5 is provided with an outside projecting ring 6 against which rests the inside end of a coiled spring 8 wound around the tube 5. The outside end of this spring 8 is in engagement with ring 10 provided inside of a hollow tube 9 and at the outward end thereof. This tube 9 is of the same length as the tube 5 but of a sufficiently large diameter to enclose the latter.

In addition to the above mentioned tubes and springs, hollow tubes 13 and 17 of gradually increasing diameters are provided and arranged to actuate coiled springs 12, 16 and 22. For this purpose, these tubes also are provided with inside projecting rings 14 and 18 at one end, and outside projecting rings 11, 15 and 19 at their other ends.

The largest hollow tube 17 and the surrounding coiled spring 22 are enclosed within a casing 20 provided at one end with an inside projecting ring 21 engaging one end of the spring 12. The other end of the casing 20 is closed and a hook 25 is attached thereto by means of a rivet 26. A plate 23 secured within the casing 20 by means of rivets 24 serves as a stop against which the hollow tubes and the plunger 1 normally rest.

It could be noted that the coiled springs 4, 8, 12, 16 and 22 are of gradually increasing strengths. The spring 4 is the weakest and the spring 22 the strongest.

Preferably, the device is used to control the tension of towing lines and should for this purpose be attached between two sections 30^a and 30^b of a towing line. When power is applied to the two sections of the towing line in the directions indicated by the arrows, first only the weakest spring 4 will respond and permit the movement of the

shoulder 2 of the plunger towards the ring 7. When the spring 4 absorbs a portion of the shock, the outside stress will be transmitted through the tube 5 and its outwardly projecting ring 6 to the stronger coiled spring 8. The spring 8 is now pressed against the ring 10, and will in turn transmit the outside stress to the next spring. If the stress has not as yet been absorbed, this operation continues until the last and strongest coiled spring 22 is fully compressed.

It will be seen therefore that a sudden pull on the towing line will not act as a shock, but will be gradually absorbed by the tension controlling device the various parts of which will one after the other respond to such outside force.

If desired, the graduation of the springs may be such that the compression of one spring begins when that of the preceding is terminated, i. e. a spring will not respond until after the preceding spring is fully compressed.

It will be obvious to those skilled in the art that certain features of the invention may be utilized for other purposes than the relieving of strain or tension on towing lines. Furthermore, the device may be variously modified without departing from the spirit of the invention. Instead of the coiled springs, other resilient means may be utilized; the order in which the coiled springs respond may be reversed or otherwise changed; the number of the springs may be varied at will; a plurality of such devices may be provided in a single towing line; etc., etc.

What I claim is:

1. In combination, a plunger, a coiled spring of certain elasticity wound around said plunger, a shoulder on said plunger engaged by one end of said spring, a hollow tube enclosing said spring and plunger, an inside projection on one end of said tube engaging the other end of said spring, a coiled spring of different elasticity wound around said tube, an outside projection on the other end of said tube engaging one end of said last mentioned spring, a second hollow tube enclosing said last mentioned spring, and an inside projection on one end of said second tube engaging the other end of said second mentioned spring.

2. In combination, a plurality of coiled springs, each of a different elasticity and one enclosing the other, a plunger enclosed by the smallest spring, a plurality of hollow tubes, each separating adjacent springs, an inside projection on one end and an outside projection on the other end of each tube for engaging the adjacent springs, a projection on the plunger for engaging one end of the smallest spring, a casing enclosing the largest spring, and an inside projection on one end of said casing for engaging one end of said largest spring.

3. In combination, a casing, a plurality of tubes telescoped within said casing, means for extending said casing in one direction and said tubes in the opposite direction, and a plurality of coiled springs of different strengths for opposing the extending of said tubes.

4. In combination, a casing, a closure on one side of said casing, a plurality of tubes telescoped within said casing, and engaging with their inner ends said closure, a plurality of coiled springs, each spring being interposed between the inner end of one and the outer end of the next largest tube, means for pulling the casing, in one direction and the smallest centrally located tube in the opposite direction, and means operative thereupon for completely compressing said springs in succession.

5. In combination, a towing line divided into two sections, a plurality of coiled springs of gradually increasing spirals and strengths, a plunger attached to one section of said towing line enclosed by the smallest spring, a plurality of hollow tubes of gradually increasing diameters, each separating adjacent springs, an inside projection on one end and an outside projection on the other end of each tube for engaging the adjacent springs, a projection on the plunger for engaging one end of the smallest spring, a casing enclosing the largest spring, an inside projection on one end of said casing for engaging one end of said largest spring, and a connection between the other end of said casing and the other section of the towing line.

In testimony whereof, I have signed my name to this specification.

WILLIAM LIND.