No. 706,306. Patented Aug. 5, 1902.

P. C. EWART, Dec'd.

M. V. EWART, Executrix.

MEANS FOR AUTOMATICALLY REGULATING THE RESISTANCE OF RESILIENT DEVICES

(Application filed Aug. 22, 1899.)

(No Model.) 2 Sheets—Sheet 1.

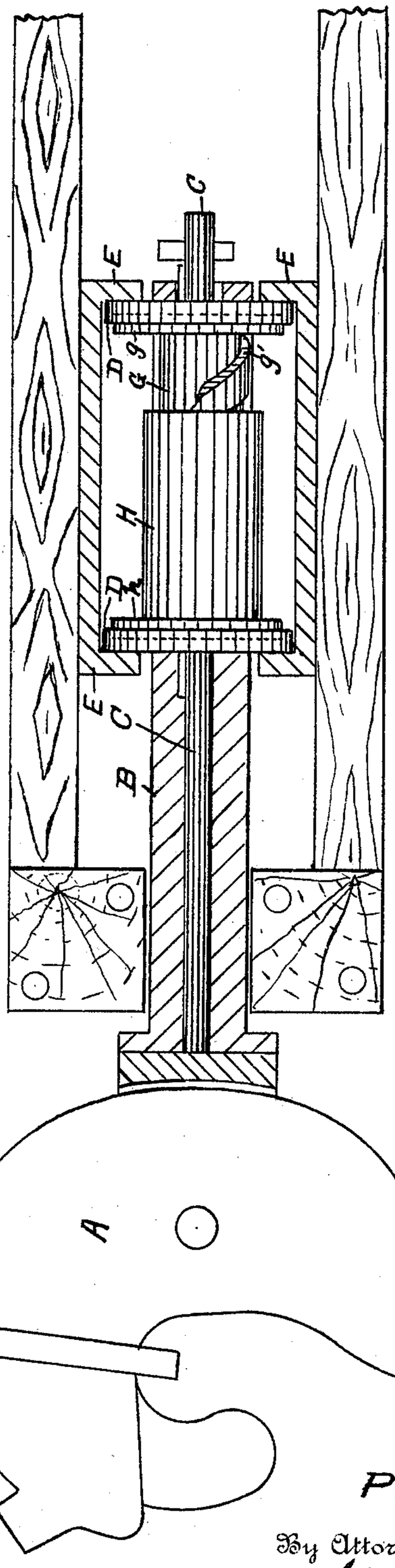

Fig. 1.

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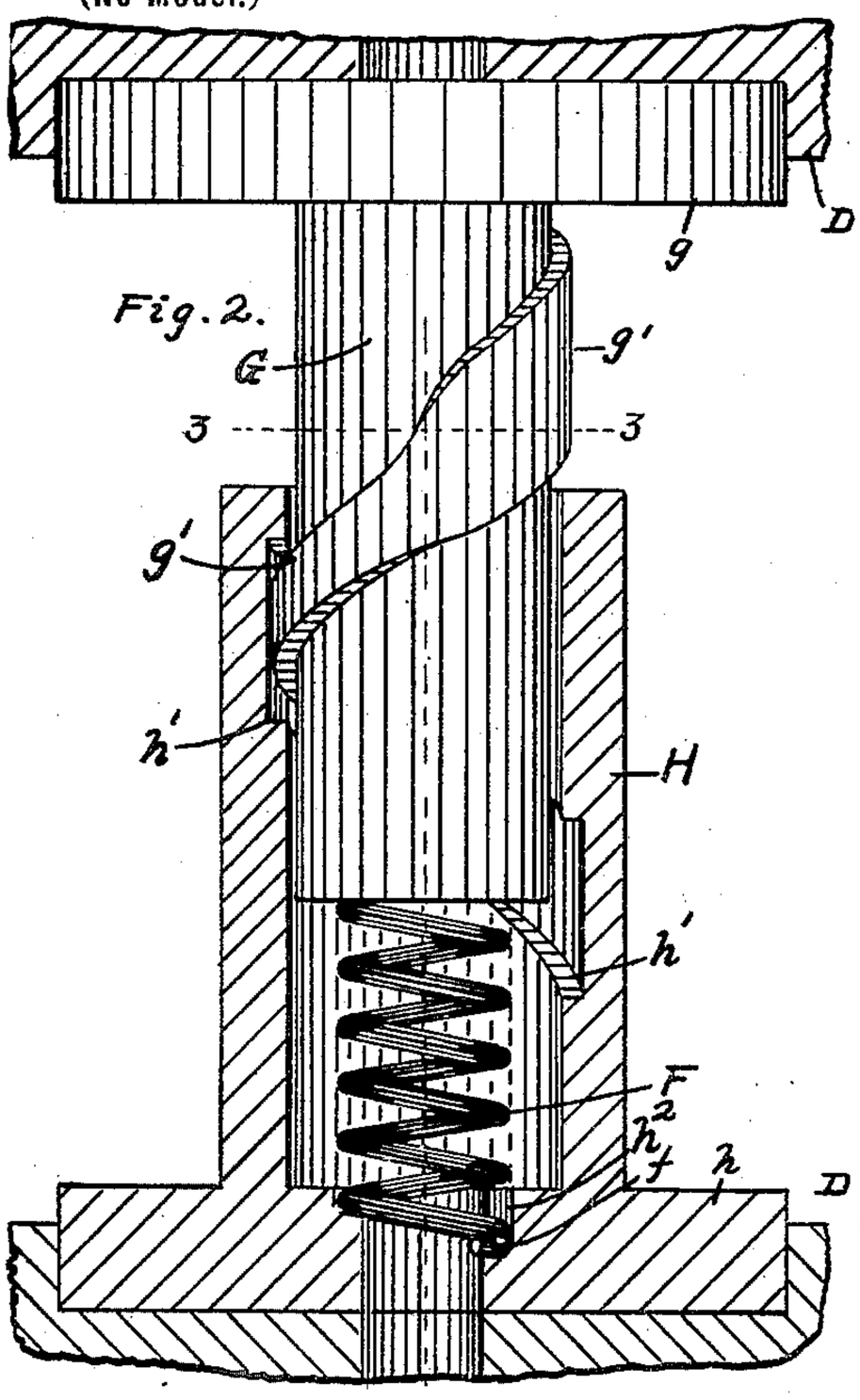
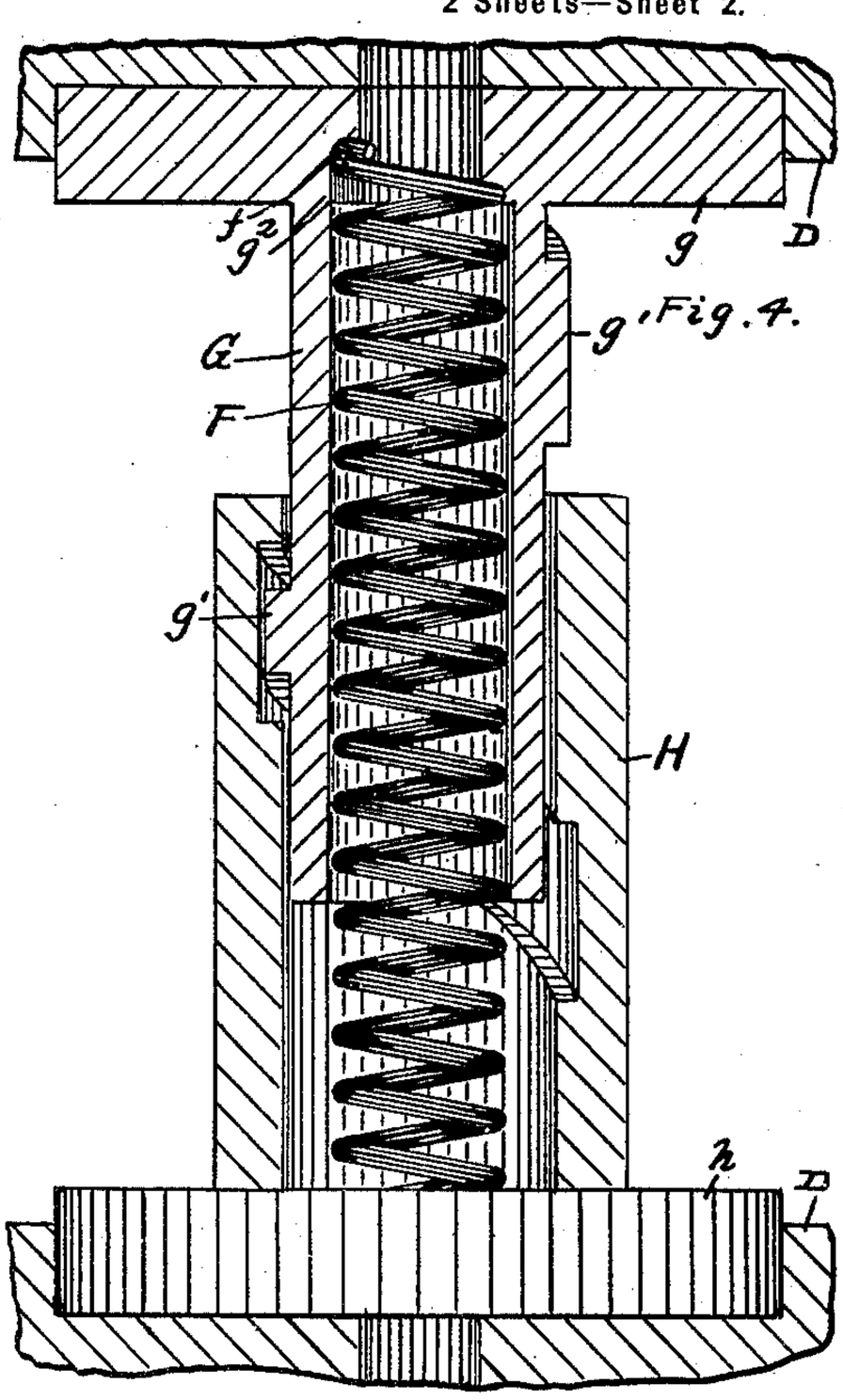




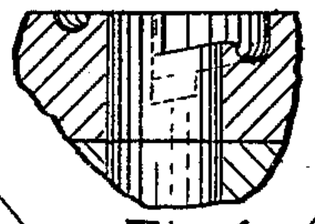


Fig. 6

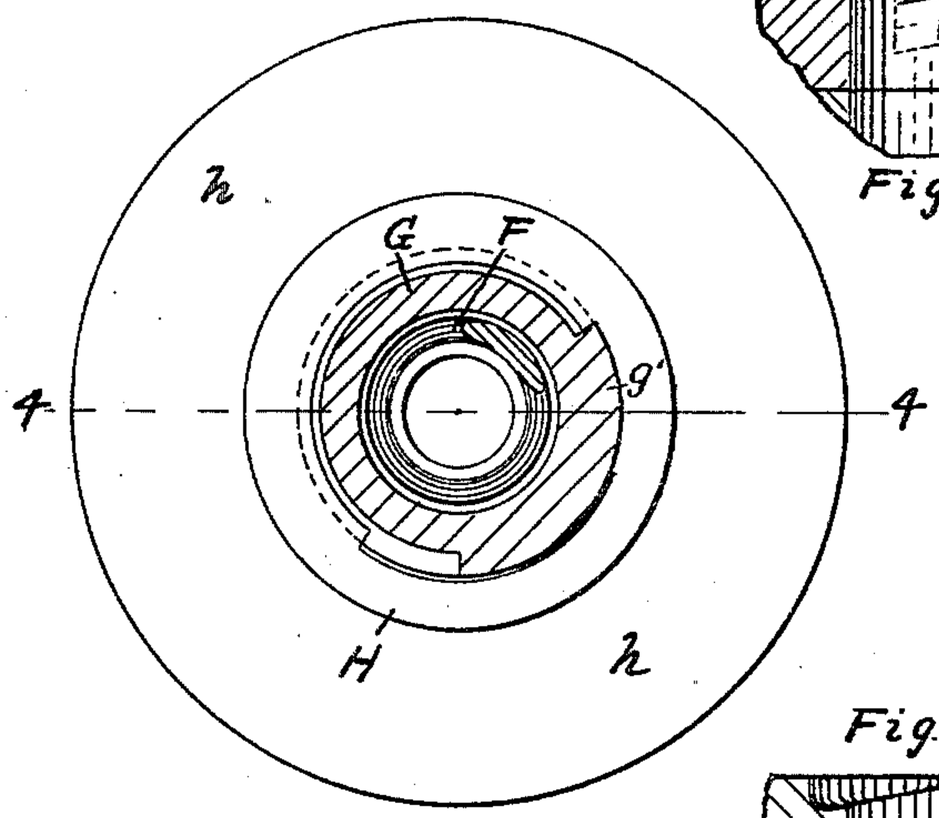


Fig. 3.

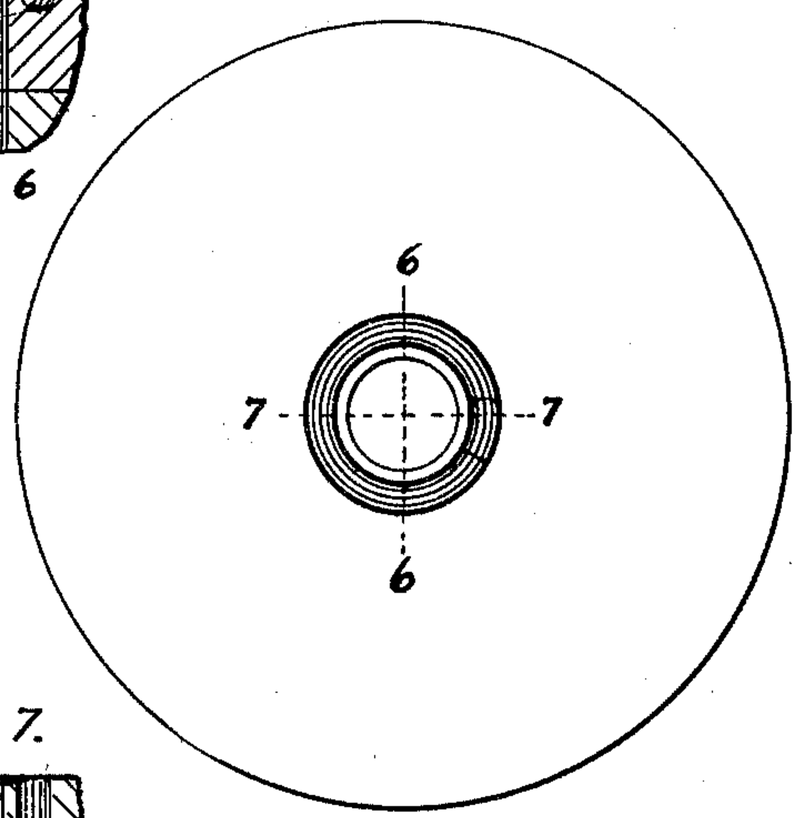
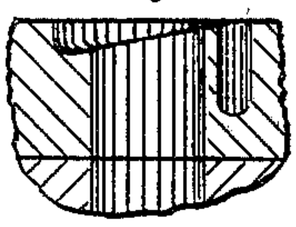


Fig. 5

Fig. 7.



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UNITED STATES PATENT OFFICE.

PHILO C. EWART, OF CINCINNATI, OHIO, ASSIGNOR OF ONE-HALF TO CHARLES A. BARNARD, OF CINCINNATI, OHIO; MYRA V. EWART EXECUTRIX OF SAID PHILO C. EWART, DECEASED.

MEANS FOR AUTOMATICALLY REGULATING THE RESISTANCE OF RESILIENT DEVICES.

SPECIFICATION forming part of Letters Patent No. 706,306, dated August 5, 1902.

Application filed August 22, 1899. Serial No. 728,086. (No model.)

To all whom it may concern:

Be it known that I, PHILO C. EWART, a citizen of the United States, residing at Cincinnati, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Means for Automatically Regulating the Resistance of Resilient Devices, of which the following is a specification.

It is desirable, for instance, in railway draft and buffing springs to provide resilient mechanism adapted for use with materially differing resistances. If the spring alone is depended upon and is properly proportioned for sustaining a slight stress, it does not afford sufficient resistance for a heavy stress, and if properly proportioned for a heavy stress the initial resistance is too great for a light stress. In starting or stopping trains it is desirable to have the draft-springs yield readily to the first stress and then offer gradually-increasing resistance.

The object of my invention is to provide a device adapted for use with light or heavy loads, whereby the resistance is automatically graduated with relation to the load; and my invention consists in the parts and combinations and arrangement of parts hereinafter described and claimed.

In the drawings, Figure 1 is a longitudinal section, partially in elevation, of a device embodying my invention when used as a draft-spring in a car-coupling; Fig. 2, a detail section, partially in elevation, of the resilient device; Fig. 3, a section on line 3 3 of Fig. 2; Fig. 4, a section on line 4 4 of Fig. 3; Fig. 5, a plan view of the spring-socket in the friction-plates; Fig. 6, a section on line 6 6 of Fig. 5, and Fig. 7 a section on line 7 7 of Fig. 6.

Reference-letter A represents a coupling-head; B, a hollow draw-bar stem; C, a draft-rod; D, a set of followers; E, a set of stops adapted to engage followers D; F, a spring encircling draft-rod C; G, a hollow plunger adapted to receive a portion of the spring and serve as a mounting for one of its ends; H, a housing adapted to receive the plunger and serve as a mounting for the other end of the spring.

The coupling-head A; draw-bar stem B; draft-rod C; followers D; stops E are old and may be of any desired form or construction, their function being to utilize the compressive resistance of the spring F for both draft and buffing strains. The plunger G and housing H are of any suitable material and are provided with heads or plates g and h, which have a frictional bearing in followers D. They are also provided with threads or spirals g' and h', preferably having their pitch in a direction reverse to the coil of the spring. The male thread g' at the end which first engages the female thread (shown as the lower end) is preferably made narrower than the latter in order to allow some compression of the spring before the threads are brought into active engagement. The spring F is of the usual spiral form and preferably of a strength sufficient to support by its own resiliency, when partially compressed, the lighter loads incident to its use. I have illustrated it as seated in spiral sockets g^2 and h^2 in the friction-heads g and h. These sockets preferably consist of spiral rests accommodating the greater portion of one coil of the spring, and each is provided at its inner end with a notch adapted to receive and engage the back-turned end f of the spring F.

The operation is as follows: Owing to the diminution in the size of the lower end of the thread g' when one of the lighter loads for which the spring is designed is applied, the plunger slides into the housing a corresponding distance without rotation of either; but when a heavier load is applied this longitudinal motion is sufficient to cause the threads in the two parts to engage and rotate the parts, thereby winding the spring and causing additional resistance. By winding the spring in a direction reverse to that of its coil the coils are drawn toward the axis, the diameter diminished, and the resistance increased, and the tendency of the coils to bulge neutralized. As either or both the plunger and housing rotate, the friction-plates g' and h' are caused to rotate on their bearings, thus affording further resistance. As the plunger progresses into the housing the portion g^2 of

the thread *g*, connecting the smaller end with the larger end, acts as an inclined plane to transfer the active engagement between the threads *g* and *h* from the smaller portion of thread *g* to the larger, thus adding another resistance to the compression of the spring. In addition to the resistances already mentioned which tend to assist the spring in its work all the normal friction between the threads is rendered available. The lengths of the plunger G and housing H are such that each contacts with the head of the other before the spring is completely compressed, thus preventing injury to the coils by solid contact with each other. The pitch of the threads of the plunger and housing is such as to permit the return of the parts to their non-operative position by the recoil of the spring.

I claim—

1. The combination of a hollow plunger; a housing adapted to receive the plunger; a coiled spring within the plunger having one end adapted to engage the plunger and the other adapted to engage the housing, and screw-threads on the plunger and housing whereby the spring may be wound as it is compressed, substantially as and for the purposes set forth.

2. The combination of a hollow plunger; a housing adapted to receive the plunger; friction-heads upon the plunger and housing; a coiled spring within the plunger having one end adapted to engage with and be rotated by the friction-head on the plunger and the other end adapted to engage with and be rotated by the friction-head on the housing; and screw-threads on the plunger and housing whereby the spring may be wound as it is compressed, substantially as and for the purpose set forth.

3. The combination of a coiled spring mounted in bearings, one or both of which are rotatable, with screw-threaded parts connecting the bearings, the male member of the thread being narrower at the end first engaging, than the female member, thereby permitting longitudinal play before the threads actively engage, substantially as and for the purpose set forth.

4. The combination of a coiled spring mounted in bearings, one or both of which are rotatable, with screw-threaded parts connecting the bearings, the pitch of the threads being in a reverse direction to the coil of the spring and the male member of the thread being narrower at the end first engaging than the female member, thereby permitting longitudinal play before the threads actively engage, substantially as and for the purpose set forth.

5. The combination of a hollow plunger; a housing adapted to receive the plunger; a coiled spring within the plunger having one end adapted to engage the plunger and the other adapted to engage the housing; screw-threads on the plunger and housing whereby the spring may be wound as it is compressed, and stops adapted to prevent complete compression of the spring, substantially as and for the purpose set forth.

6. The combination of a hollow plunger; a housing adapted to receive the plunger; a coiled spring within the plunger having one end adapted to engage the plunger and the other adapted to engage the housing; screw-threads on the plunger and housing whereby the spring may be wound as it is compressed; the pitch of the threads being in a direction reverse to that of the coil of the spring, and the male member being narrower, for a portion of its length, than the female member, and stops adapted to limit the compression of the spring, substantially as and for the purpose set forth.

7. The combination of a hollow plunger; a housing adapted to receive the plunger; friction-heads on the plunger and housing; a coiled spring within the plunger having one end adapted to engage with and be rotated by the friction-head on the plunger and the other end adapted to engage with and be rotated in the reverse direction by the friction-head on the housing; and screw-threads on the plunger and housing whereby the spring may be wound as it is compressed, substantially as and for the purpose set forth.

8. The combination of a hollow plunger; a housing adapted to receive the plunger; friction-heads on the plunger and housing; a coiled spring within the plunger having one end adapted to engage with and be rotated by the friction-head on the plunger and the other end adapted to engage with and be rotated in the reverse direction by the friction-head on the housing; screw-threads on the plunger and housing whereby the spring may be wound as it is compressed, and stops limiting the compression of the spring, substantially as and for the purpose set forth.

9. The combination of the plunger B; the housing C; the heads *g* and *h*; the screw-threads *g'* and *h'*; the sockets g^2 and h^2; and the coiled spring F having back-turned ends *f*, substantially as and for the purpose set forth.

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Witnesses:
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BRAYTON G. RICHARDS.