J. P. MURREY.

VEHICLE SPRING STRUCTURE.

APPLICATION FILED JAN. 8, 1908.

932,489. Patented Aug. 31, 1909.

Fig. 1.

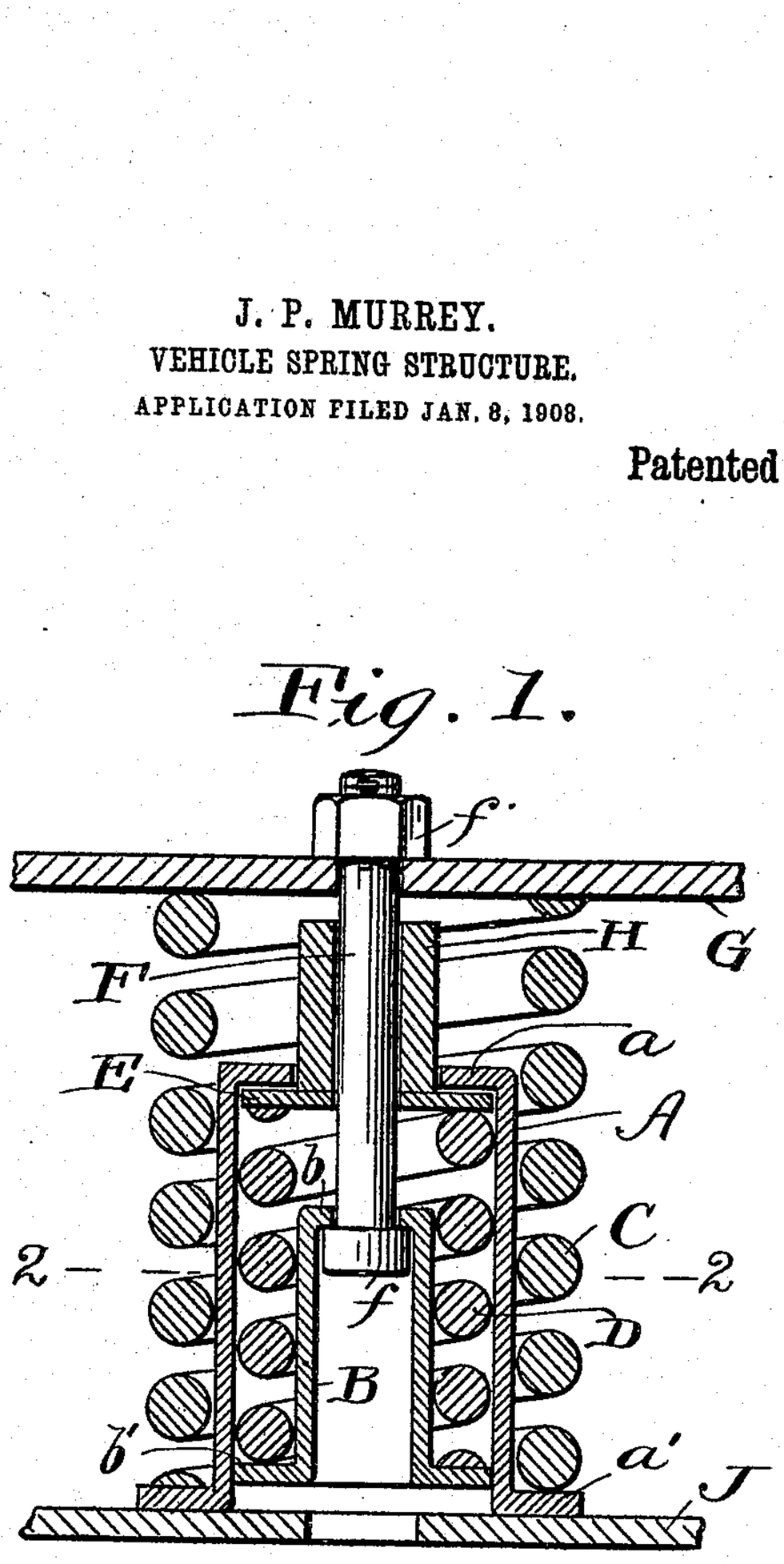
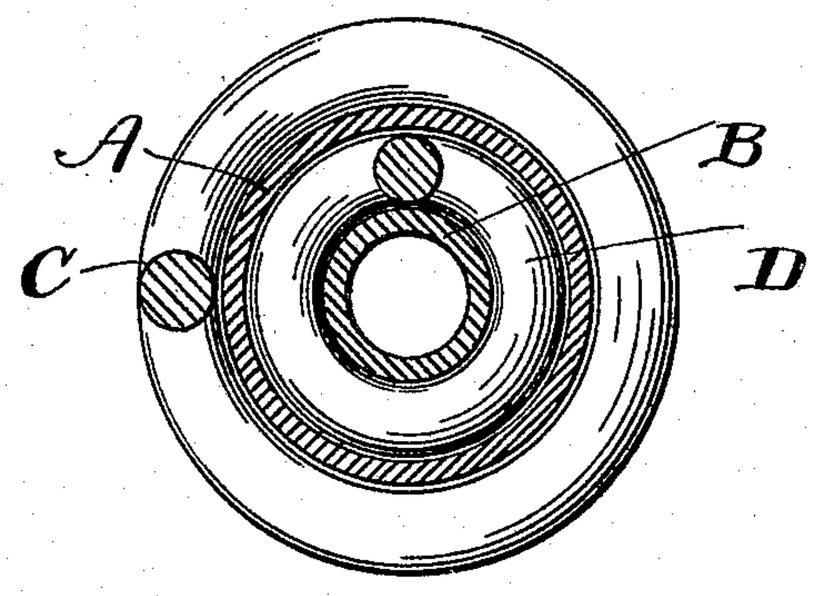



Fig. 2.

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# UNITED STATES PATENT OFFICE.

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## VEHICLE-SPRING STRUCTURE.

932,489. Specification of Letters Patent. Patented Aug. 31, 1909.

Application filed January 8, 1908. Serial No. 409,742.

*To all whom it may concern:*

Be it known that I, JASPER P. MURREY, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented a certain new and useful Improvement in Vehicle-Spring Structures, of which the following is a full, clear, and exact description.

This invention is especially adapted for use on railway cars and automobiles.

The object is to provide a spring structure which will yield easily from its normal position, but which rapidly increases its resistance to the movement of the supported weight and thereby rapidly checks same; it also serves as a check to limit the rebound or movement in the opposite direction of the weight supported upon said spring structure.

The invention may be summarized as a combination of parts shown in the drawing and hereinafter described and set forth definitely in the claims.

In the drawing Figure 1 is a centrally vertical section of a spring structure embodying the invention; and Fig. 2 is a transverse sectional view thereof in the plane of line 2—2 on Fig. 1.

Referring to the parts by letters, A represents a spring barrel which is in the form of a cylinder having an inwardly turned flange or head *a* on its upper end, and an outwardly turned flange *a'* on its lower end.

B represents an inner spring barrel which has an inwardly turned flange or head *b* on its upper end, and an outwardly turned flange or head *b'* on its lower end,—this latter flange being of such diameter that it may move freely in the spring barrel A.

C represents a spring coil which embraces the spring barrel A and has its lower end resting upon the flange *a'*.

D represents a spring coil which embraces the spring barrel B within the spring barrel A, and has its lower end resting upon the flange *b'*. Within the barrel A, and between its head *a* and the upper end of the spring coil D, is a washer E. A bolt F passes axially through the heads of both spring barrels and through this washer, and its head *f*, which lies inside the spring barrel B engages with the flange *b* thereof. The upper end of this bolt passes loosely through a weight-supporting plate G, which rests upon the upper end of spring coil C. A sleeve H loosely embraces the bolt F, and passes through the head of the barrel A into the engagement of the washer E,—this sleeve being of such length that it normally does not touch plate G. This plate G may be a part of the car body or member to be supported by the spring structure described, or it may be a plate which forms a part of the spring structure and to which a car body is to be secured. The spring barrel A rests upon and should be secured to a plate J, which may be a part of the truck, or other supporting member, or may be attached thereto. This plate extends under the spring barrel B so that it will be engaged thereby when the spring structure operates in the manner to be described. There is preferably a hole through plate J large enough for the passage of the head *f* of the bolt F.

In adjusting the described device for use, the nut *f'* is screwed onto the projecting upper end of the bolt F, which is thereby moved endwise upward drawing the spring barrel B with it. This compresses spring D and this causes an upward movement of the spring barrel A and a consequent compression of spring C. In this adjustment of the parts the lower end of spring barrel B will be drawn away from plate J. The length of the spring coil D should be such that when the spring barrel B is engaging with the plate J, said spring coil will not be under compression, but will be inert.

When the described device is arranged for use, the parts thereof will normally occupy substantially the relative position shown in Fig. 1.

It will be understood from the foregoing that the spring D is exerting the energy stored therein to draw plate G and the weight supported thereon downward, and that this downward movement is resisted by the spring C, which, it will be understood, must be strong enough for the purpose. When, therefore, any force is applied tending to move the plate G downward relative to the plate J, this downward movement is resisted by a force equal to the difference between the force of the spring C, which does the resisting, and the force of the spring D, which is exerted in the direction to assist this downward movement. Obviously, therefore, the car body will move downward from its normal position very easily. As this downward movement continues, the resisting force of the spring C

increases, and the assisting force of spring D decreases until the lower end of the spring barrel B comes in contact with the plate J, when the spring D becomes inert. Further downward movement of the car body is now resisted by the increasing force of the spring C, and this condition continues until plate G strikes the upper end of sleeve H. A further downward movement of the car body presses this sleeve down upon the washer E, which causes a compression of the spring D, which thereafter offers an increasing resistance to a continued downward movement of the car body.

By reason of the described action, the spring is very easy under normal conditions, but rapidly stiffens up and checks the downward movement of the car body. On the rebound, when the plate G attempts to move upward above its normal position, it pulls up on the bolt F and thereby spring barrel B is drawn upward, which upward movement is resisted with increasing force by the spring D.

It is evident that the invention is broader than the specific embodiment thereof shown in the drawings; and that changes of various sorts may be made therein without departure from the invention as defined by the broader of the appended claims.

Having described my invention, I claim:

1. In a vehicle spring structure, the combination of two spring coils, means for compressing them in opposition to each other, and means whereby the further compression of the one coil by the weight supported thereon, is at first accompanied by the extension of the other spring coil until it becomes inert, and is afterward accompanied by a compression of said other spring, substantially as specified.

2. In a vehicle spring structure, the combination of a spring coil G, a fixed support for its lower end adapted to be connected with the supporting truck or frame, a weight-supporting plate superposed upon said coil and adapted to be connected to the vehicle body to be supported, a spring coil D, a yielding support for one of its ends, means limiting the yielding movement thereof, a rod which limits the separation of the latter support and the weight-supporting plate,—which rod is slidable through one of the last mentioned two parts to permit them to approach one another,—a flange which is rigid with the support for the lower end of coil C and extends over the coil D, a washer located between said flange and the coil D, and a shouldered device intermediate of said washer and the weight-supporting plate which is shorter than the normal distance between said parts.

3. In a vehicle spring structure, the combination of a spring barrel A, the plate J to which it is secured, the plate G, and a compressed spring coil surrounding said spring barrel and lying between said plates, an inner spring barrel having an external flange at one end and an internal flange at the other, a washer within the spring barrel A and adapted to engage therewith in order that its upward movement may be limited, a spring coil surrounding the inner spring barrel and compressed between the lower flange thereof and said washer, a connection between the plate G and the inner spring barrel, which connection is capable of sliding in one of said parts, and means whereby after the plate G has moved down a definite distance, it will cause said washer to also move down in company with it.

4. In a vehicle spring structure, the combination of a spring barrel A, having the inwardly turned flange $a$ and the outwardly turned flange $a'$, the spring barrel B having the inwardly turned flange $b$ and the outwardly turned flange $b'$, the washer H and the plates G and J, with a spring coil compressed between the flange $b'$ and the washer H, a sliding bolt connecting spring barrel B with plate G, and the sleeve E which embraces the bolt and is arranged so that its ends may engage with the washer and plate G.

In testimony whereof, I hereunto affix my signature in the presence of two witnesses.

JASPER P. MURREY.

Witnesses:
E. L. THURSTON,
E. B. GILCHRIST.