No. 655,738. Patented Aug. 14, 1900.

W. ROBINSON.

CAR SPRING.

(Application filed Dec. 31, 1896.)

(No Model.)

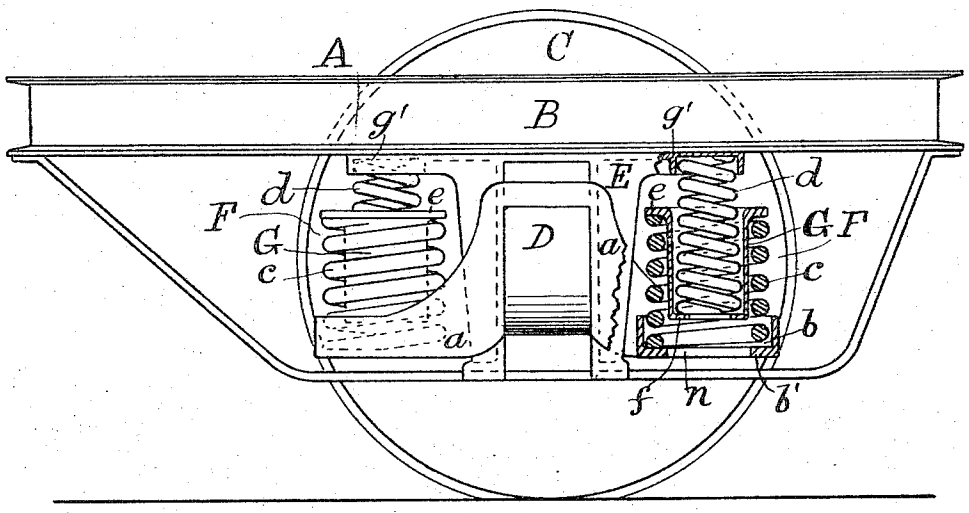

Fig. 1.

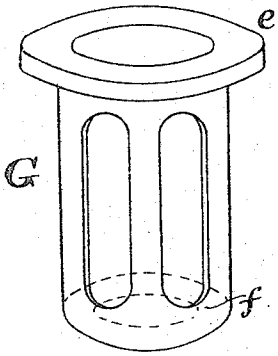

Fig. 2.

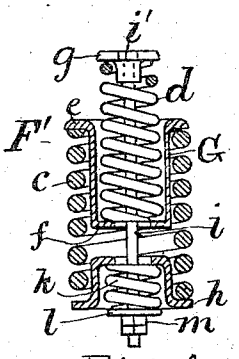

Fig. 4.

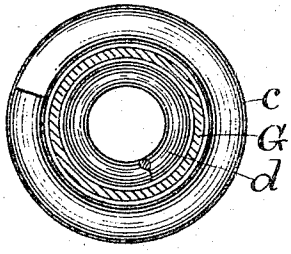

Fig. 3.

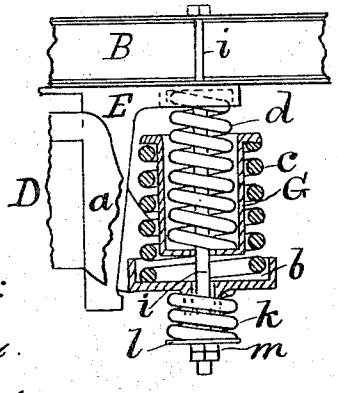

Fig. 5.

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WILLIAM ROBINSON, OF BOSTON, MASSACHUSETTS.

CAR-SPRING.

SPECIFICATION forming part of Letters Patent No. 655,738, dated August 14, 1900.

Application filed December 31, 1896. Serial No. 617,555. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM ROBINSON, a citizen of the United States, residing at Boston, in the county of Suffolk and State of Massachusetts, have invented a new and Improved Car-Spring, of which the following is a specification.

The nature of my invention will be clearly understood from the description which follows, reference being had to the accompanying drawings, which form a part of this specification, in which—

Figure 1 is a side elevation, partly in vertical section, of a portion of a car-truck illustrating my invention partly developed. Fig. 2 is a detached isometric view of the intermediate spring-supporting cup. Fig. 3 is a top view, partly in section, of my improved spring so far as illustrated in Fig. 1. Fig. 4 shows the spring fully developed, and Fig. 5 shows the fully-developed spring as applied to a car-truck.

A represents a portion of a car-truck consisting, mainly, of the frame B; the wheel C, with its journal-box D, adjustably secured to the frame B; the pedestal E, keeping the box D in proper alinement with reference to the frame B, and my improved springs F.

The journal-box D is provided with the spring-supporting wings *a*, and these wings are provided with the spring cups or receptacles *b*. The exterior spring *c* rests upon the bottom *b'* of the cup *b* and is supported thereby. The intermediate spring-cup G has its top provided with the annular flange *e*, extending outwardly, and its bottom with the annular flange *f*, extending inwardly. The said cup G is dropped down inside of the spring *c*, extending approximately to the bottom of said spring, the flange *e* of said cup resting on top of said spring *c*, as shown. The spring *d*, of less diameter than the spring *c*, is placed within the intermediate cup G and rests on the bottom flange *f* thereof, while the truck-frame B rests on top of the spring *d*, as shown. One of said springs *c d* is preferably stiffer and offers more resistance to compression than the other, the outer spring usually being the stiffer of the two.

The operation is as follows: The load (represented by the frame B) rests directly on the lighter springs *d*, compressing these springs materially and giving an easy resilient support to a light load, the heavier springs *c*, which directly support the springs *d* and their load, being somewhat compressed. As the load is increased commensurately with the resistance of the springs *c* these springs *c* become more and more easy and resilient. Thus this combination of springs makes the riding equally easy whether the load be light or heavy.

As to the relative compression and vibration of the springs, if the resistance of the spring *c* be twice as great, for instance, as the resistance of the spring *d* then the compression of the spring *d* under a given load will be just twice as great as the compression of the spring *c*. To illustrate, if we assume that the distance between the spring-bearing *g'* of the frame B and the top of the flange *e* of the cup G is one inch then a load compressing the spring *d* one inch will at the same time compress the spring *c* half an inch, from which it is evident that the frame B will have to travel downward one and one-half inches before striking the top of the flange *e* of the intermediate cup G.

It is evident that even if the inner and outer springs be made of the same relative resistance, yet the aggregate length of the two springs together will give much greater resiliency and ease of riding than a spring the length of only one of them could possibly give.

In Fig. 4 the spring *d* is provided with the spring cap or bearing *g* and the spring *c*, with the base-cap or inverted cup *h*, which forms a bearing for the outer spring *c* and the check-spring *k*, as shown. The spring-post *i*, having its head *i'* countersunk in the cap *g*, passes centrally through all the springs. The spring-post *i* is provided at its lower end with the washer *l*, supporting the spring *k*, and with the adjusting-nuts *m* below said washer. Thus it will be seen that by means of the adjusting-nuts *m* any desired initial compression may be imparted to the springs *c d* and also to the check-spring *k*. Furthermore, in practice the check-spring *k* prevents the sudden and extreme rebound of the springs *c* and *d* and allows only an easy and limited rebound of said springs, thus preventing in a great measure the teetering or

galloping of car-bodies on their springs so prevalent, especially when long car-bodies are mounted on short trucks.

The arrangement of springs shown in Fig. 4 may be conveniently made at the spring works with any required degree of initial compression. This is also a convenient form in which to ship the springs complete and ready for use. In this case the nests of springs arranged as shown in Fig. 4 are inserted in the spring-cups *b* of the journal-box D, the frame B resting on the spring-caps *g* of said springs, and the adjusting-nuts *m* protruding through the orifice *n* in the bottom of the spring-cups *b* of the box.

The arrangement of springs shown in Fig. 5 is precisely the same as that shown in Fig. 4, except that the upper end of the spring-post *i* is secured to the frame B and the upper end of the check-spring *k* abuts directly against the bottom *b'* of the spring-cup *b* of the journal-box.

In many car-trucks, especially for electric cars, it is often very difficult to find room for a satisfactory arrangement of springs to insure easy riding under varying conditions of load. It will be observed, therefore, that one important advantage of my springs is the little space which they occupy while securing all the varying advantages of light and heavy springs combined.

I have shown my springs as supported directly by the journal-boxes; but it is evident that they may be used in any position in which car-springs are usually placed or wherever these springs may be found useful or suitable without departing from the spirit of my invention.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a car-spring, the combination, substantially as described, of an outer spring, a second spring extending within said outer spring, a spring-cup extending between said springs, said spring-cup having one end supported by one of said springs and its opposite end, in turn, supporting the other spring, caps or bearings on the respective free ends of said springs, a tension or check spring on the opposite side of one of said caps or bearings, an adjusting-rod passing through all of said springs and means for adjusting the tension of said springs.

2. In combination, substantially as described, the outer spring *c*, the spring *d* extending within said spring *c*, the intermediate spring-cup G located within the spring *c* and outside of the spring *d*, said spring-cup resting on one of said springs and supporting the other, each of said springs supporting the load imposed on the free or extreme end of either, caps or bearings *g*, *h* on the free ends of said springs *c*, *d*, the tension or check spring *k* on the opposite side of the bearing *h*, the adjusting-rod *i* passing through all of the springs, and the adjusting-nut *m* on the end of the rod *i* and adapted to impart initial tension to said springs.

3. In combination with the truck-frame and the axle-gear, an outer spring supported by the axle-gear, an intermediate spring-cup supported by said spring and extending down inside of the same, an inner spring passing down within said spring-cup and supported on the bottom thereof, the truck-frame resting on top of said inner spring, a post or rod connected to said truck-frame and passing down through said springs and axle-gear, a tension or check spring surrounding the lower end of said rod and abutting against a plate or bearing of said axle-gear, and a nut or device on the lower end of said rod adapted to adjust the tension of said springs, substantially as described.

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