

M. HOUDAILLE.
 MEANS FOR REGULATING AND LUBRICATING A LAMINATED SPRING.
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1,050,138.

Patented Jan. 14, 1913.

Fig. 1.

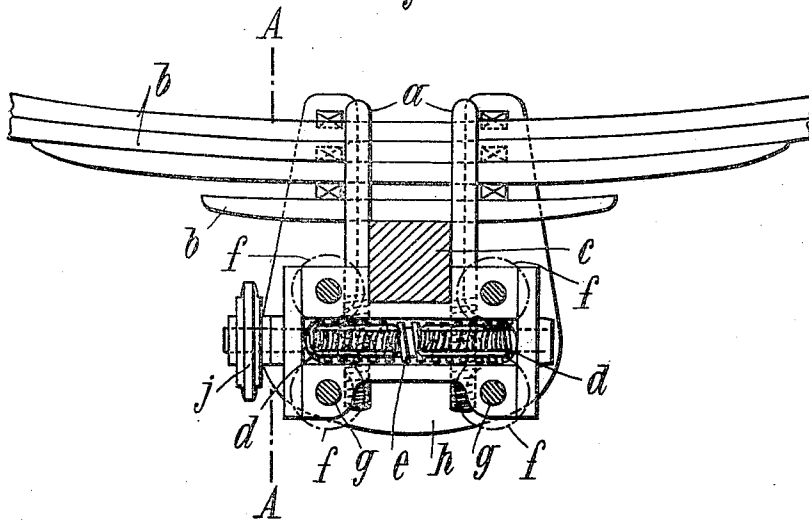
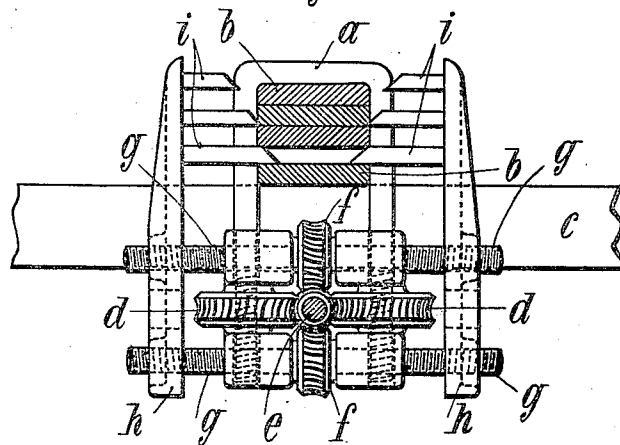


Fig. 2.



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MEANS FOR REGULATING AND LUBRICATING A LAMINATED SPRING.

1,050,138.

Specification of Letters Patent.

Patented Jan. 14, 1913.

Application filed July 24, 1911. Serial No. 640,287.

To all whom it may concern:

Be it known that I, MAURICE HOUDAILLE, a citizen of the French Republic, residing at Paris, France, have invented certain new and useful Improved Means for Regulating and Lubricating a Laminated Spring, of which the following is a specification.

The suspension of a car is of the utmost importance to the good preservation of the car and the comfort of the passengers.

The characteristic features of a laminated spring are its flexibility and its period of oscillation. Its flexibility must be regulated in accordance with the additional load placed on the vehicle, and its period of oscillation in accordance with the state of the road on which it travels. In fact, the proper period of oscillation of a spring can be equal to the frequency of the shocks, or simply be multiples of it. In that case the amplitude of oscillations can increase indefinitely and bring about the breaking of the spring. The only remedy is to modify the proper period of oscillation of the spring. As at the moment of bending the sagging of each elementary blade of the spring must decrease, it follows that the ends of each of the said blades move, and that each of them slides on the adjoining one. It is therefore imperative to facilitate the relative movement of the blades by frequently greasing them throughout the whole of their surface.

This invention relates to means for progressive regulation of the characteristic properties of laminated springs (flexibility and period of oscillation) and for individual lubrication of the blades on the whole of their surface.

The means consist in mechanism for successively isolating or coupling the elements of a spring, and in bringing about in that way a methodical and progressive regulation of the characteristic properties of the spring in accordance with the load.

The means must comprise on the one hand, the uncoupling of the whole of the blades of the spring, and on the other hand, the introduction between the said blades of wedges, for instance, having for their object to eliminate them in a number in proportion to the flexibility which the spring in question is to retain. These two functions must be obtained simultaneously, so

that to an uncoupling of a given value should correspond always a moving away to the same value of the blades from each other, in order that they should always remain rigidly secured together.

This invention is illustrated by way of example in the accompanying drawing in which—

Figure 1 is a vertical front section made in front of the central portion of a vehicle spring to which the device in question is applied, and Fig. 2 a cross-section on line A A of Fig. 1.

According to the invention illustrated in Figs. 1 and 2, the regulation of adjustment of the resiliency of suspension springs of a vehicle is effected by successively isolating or coupling the elements constituting each spring, in such manner that to the loosening of the whole of the elements, corresponds the introduction between them of wedges, resulting in eliminating the said blades in a number in proportion to the flexibility which the spring in question is to retain. These two functions are carried out in such manner that the elements always remain rigidly secured to the whole, whatever be their relative positions.

In the construction illustrated the ordinary nuts of the shackles or buckles *a* connecting the blades *b* of the spring to the axle *c* are formed into worm wheels *d* engaging simultaneously with a worm *e* arranged and suitably supported between each pair of the said wheels *d*. With the same worm *e*, and in a plane at a right angle to that of the wheels *d*, engage two other pairs of worm wheels *f* keyed to horizontal spindles *g* terminating at the ends in screw threaded portions of opposite thread. These screw threaded portions pass through vertical disks *h* provided at the top with a series of wedges *i* arranged in steps and of different length. The number of the said wedges *i* corresponds to that of the intervals between the blades *b* of the spring. They are provided with an inclined plane terminating in two parallel faces, one of which is separated from that of the adjoining wedge by an interval equal to the thickness of the corresponding blades *b* of the spring. The spindle of the worm *e* carries a chain wheel or any other suitable driving part *j* which can be operated from any convenient

point of the vehicle. This part can be secured to similar parts of the other springs of the same vehicle, in order to enable the characteristic properties of the said springs to be simultaneously adjusted. In accordance with this construction, when the worm *e* is rotated in one or in the other direction, the whole of the wheels *d* and *f* are simultaneously rotated, and consequently the buckles *a* are loosened or tightened, and the disks *h* brought nearer together or farther apart. These two simultaneous functions result in the lowering or raising of the group of blades which are in engagement with the wedges *i*, and consequently in a separation or bringing nearer of the said group to the blades of the spring situated below. As soon as a spring blade is isolated from the group of the others, the said blade ceases to affect the characteristic properties of the whole of the spring, which are thus reduced in a given proportion. By means of an oil can with a long neck, a few drops of thick oil are introduced between the surfaces to be lubricated of the two blades separated.

By this means, it is possible therefore to adjust the characteristic properties of the whole of the springs of a vehicle in accordance with the load on the same by means of parts which do not comprise any additional spring, acting under the same control gear, or of parts separately controlled.

The above construction is given merely by way of example, the shapes, dimensions, materials, application and details can vary without departing from the spirit of the invention.

What I claim as my invention and desire to secure by Letters Patent is:—

1. In combination with a laminated spring, means for gradually adjusting the flexibility, comprising mechanism for moving said means in opposite directions to separate the blades of the spring and means for securing the blades in their relative positions.

2. In combination with a laminated spring, means for gradually adjusting the flexibility comprising wedges, means for moving said wedges in opposite directions to separate the blades of the spring and means for securing the blades in their relative positions.

3. In combination with a laminated spring, means comprising wedges for successively isolating or bringing nearer the blades, said wedges having simultaneous movement operated simultaneously with the securing of the blades.

4. In combination with a laminated spring, shackles securing said springs, wedges for successively isolating or bringing nearer the blades of said springs, disks carrying said wedges, oppositely screw threaded parts securing said disks, and means whereby said shackles are released in proportion operated by the same means as said disks.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

MAURICE HOUDAILLE.

Witnesses:

RENÉ FISSOT,
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