C. M. HIGGINSON.
Car-Spring.

No. 205,269. Patented June 25, 1878.

Fig. 1.

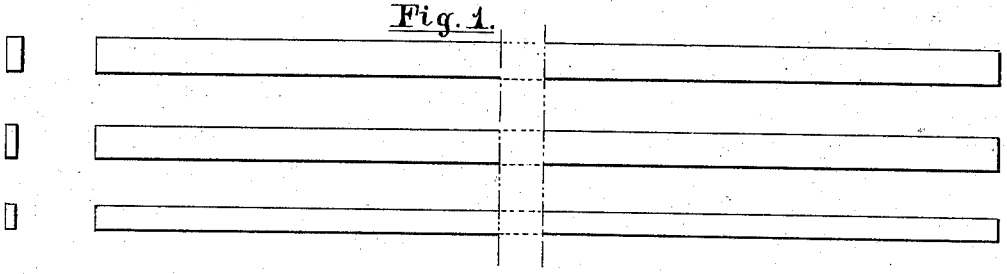


Fig. 2.

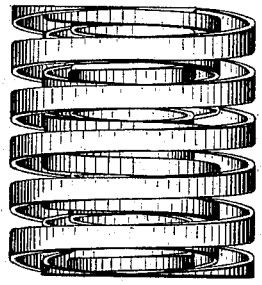


Fig. 3.

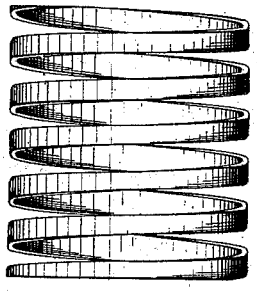


Fig. 4.

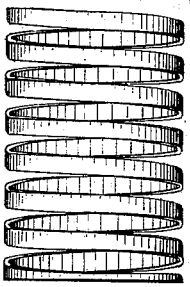


Fig. 5.

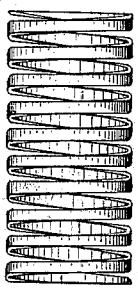


Fig. 6.

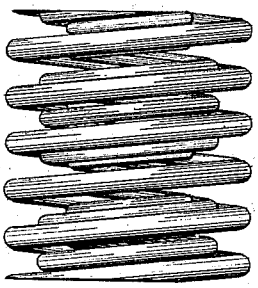


Fig. 7.

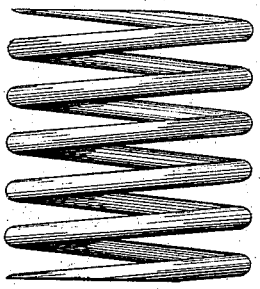


Fig. 8.

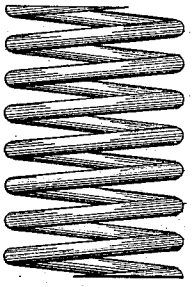


Fig. 9.

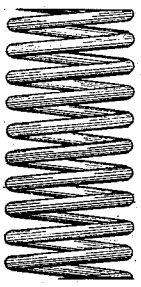
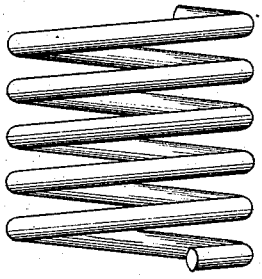


Fig. 10.



Witnesses:

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D. G. Stuart

Inventor:

Charles M. Higginson

by A. McCallum

Atty

UNITED STATES PATENT OFFICE.

CHARLES M. HIGGINSON, OF CHICAGO, ILLINOIS.

IMPROVEMENT IN CAR-SPRINGS.

Specification forming part of Letters Patent No. **205,269**, dated June 25, 1878; application filed June 28, 1877.

To all whom it may concern:

Be it known that I, CHARLES M. HIGGINSON, of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Car-Springs; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

My invention relates to that class of springs known as "nest-springs," made of spiral coils of different thicknesses of metal, arranged one within the other.

Nest-springs, as usually constructed heretofore, are defective, for the reason that they have generally been formed of coils from rods or bars of different lengths and with spirals of different degrees of inclination, the consequence of which is that their resistance to compression is not relatively uniform, and some one of them must be brought to a bearing before the others, thereby causing it to support the whole weight or thrust of the car, and hence liable to become broken or weakened, while the others are still capable of further compression, but are restrained from the further exertion of what should otherwise be an increasing resistance to the downward thrust of the car by reason of the fixed resistance of the other.

I have discovered that by constructing nest-springs in accordance with the following conditions the difficulties above specified are entirely obviated, to wit: First, that each of the spiral coils shall be formed from rods or bars of equal length; secondly, that the thickness or width of each rod or bar from which the different coils are made shall, in their plane of compression, each be relatively proportioned to the outer diameter of their coils—that is to say, if the diameter of any one of the coils shall be, say, as four to one to the thickness of its rod or bar, then the diameters of all the other coils must respectively bear the same ratio to the thickness of their bars, and so, if the standard ratio assumed should be as five to one, or as three and a half to one, then each of the coils used must bear the same ratio between their diameter and the thickness of their bars; and, lastly, each rod, on being coiled to form the spring, must be coiled so as to incline on the same angle—that is to say, if an angle of forty-five degrees should be selected as the standard angle on which they are to be spirally coiled, then each must be coiled on the same angle, and so, if an angle of sixty degrees, or any other angle, should be selected, then all must be made to conform to the same angle, and each of the coils be of the same height.

In the accompanying drawings, Figure 1 represents the bars from which the springs are made, said bars being of uniform length, though of different thicknesses, and they may be made square or oblong in their cross-section, or round, or in the form of rods, as found most convenient or desirable. Fig. 2 represents a spiral nest-spring made from bars oblong in their cross-section. Figs. 3, 4, and 5 are detached views of the several coils or spirals of which the nest-spring represented by Fig. 2 is composed. Fig. 6 represents a nest-spring made from round bars or rod metal. Figs. 7, 8, and 9 are detached views of the several coils or spirals of which the nest-spring shown by Fig. 6 is composed.

As shown by these figures, the ends of the coils are made tapering, and I prefer to have them so made; but the ends may be left of full size, or of equal diameter with the rest of the coils, as shown by Fig. 10 of the drawings.

The bars from which the coils are made are all of the same length, but vary in thickness or diameter, the outer spiral being of greater thickness than the inner, as clearly shown by the drawings.

By making the coils from bars of equal length, and making the coils themselves of the same length or height, I secure uniform motion of all the parts of the nest-spring, giving ease to the springs when used under cars, and insure such proportions between the spirals and the loads each will bear as to avoid weakening or breaking the inner spirals—a frequent occurrence with the springs hereto-

fore in use, the inner and smaller springs heretofore used being of a sharper pitch and made from longer bars than the outer coils or spirals.

The most perfect way of operating my invention is to proportion in any ratio the width or cross-section of the bars in the line of compression to the outside diameter of the coil, and the proportion so adopted should be adhered to in constructing all the coils. If the ratio so used shall not be exactly proportionate, either in any one of the coils or between the several coils, but shall be nearly so, the result will be practically the same.

It is found that the desired result is practically obtained by simply making the bars of equal length before coiling, and respectively proportioning them in their width to the outside diameter of their coils, as above described.

I claim—

The improved method of manufacturing nest-springs, as described, consisting of taking rods of equal length and of diameters proportional to the proposed outer diameters of the several coils, and then coiling them on the same pitch, whereby all the springs of the nest are made substantially of equal height, for the purpose set forth.

In testimony that I claim the foregoing as my own I affix my signature in presence of two witnesses.

CHAS. M. HIGGINSON.

Witnesses:
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SAM. L. CHARLES.