A. M. LAYCOCK.

SPRING.

APPLICATION FILED APR. 20, 1916.

1,208,990.

Patented Dec. 19, 1916.

2 SHEETS—SHEET 1.

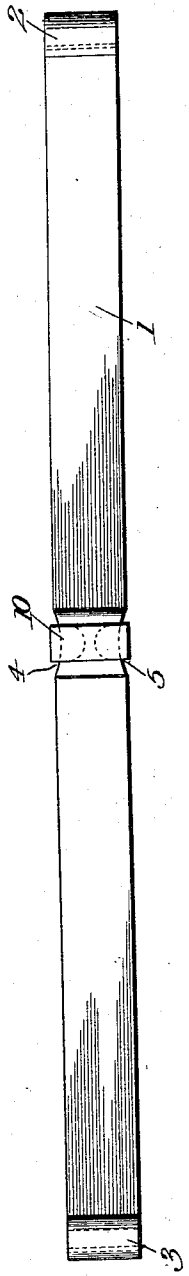


Fig. 1.

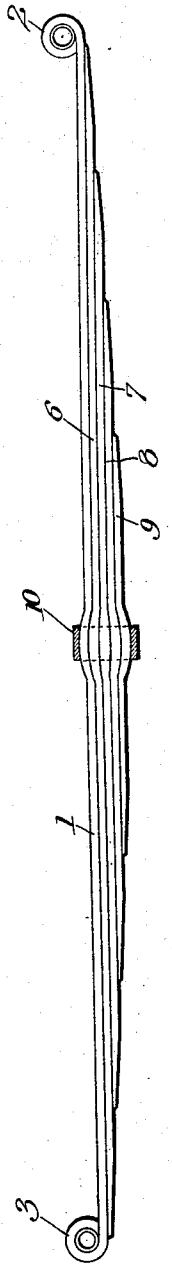


Fig. 2.

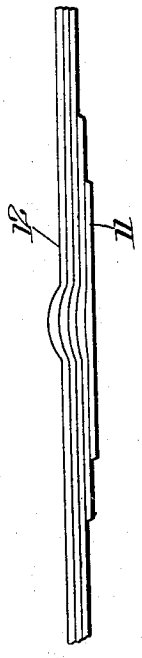


Fig. 3.

Witnesses

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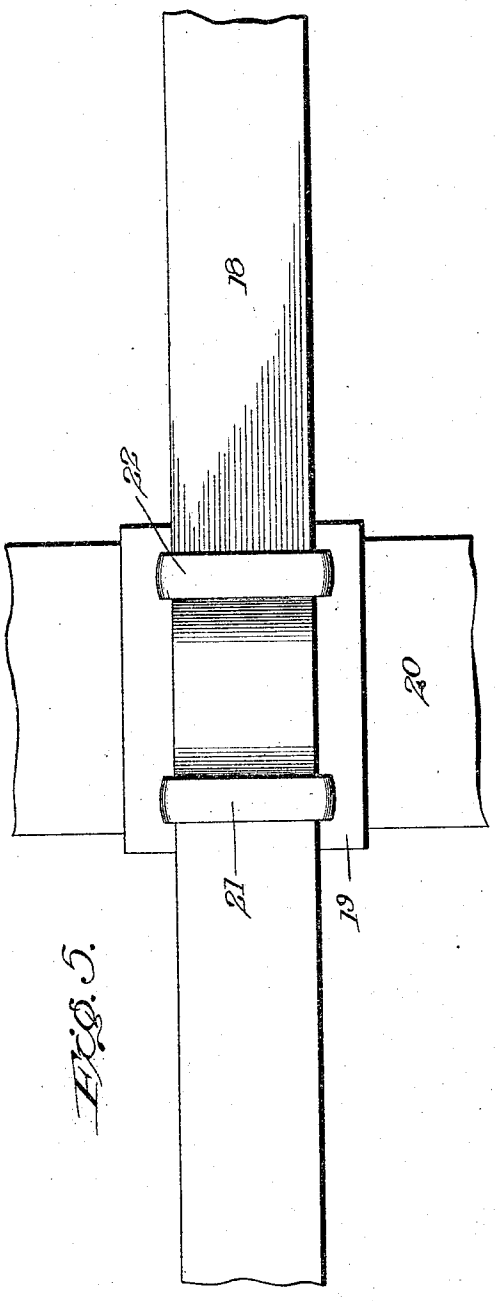


FIG. 3.

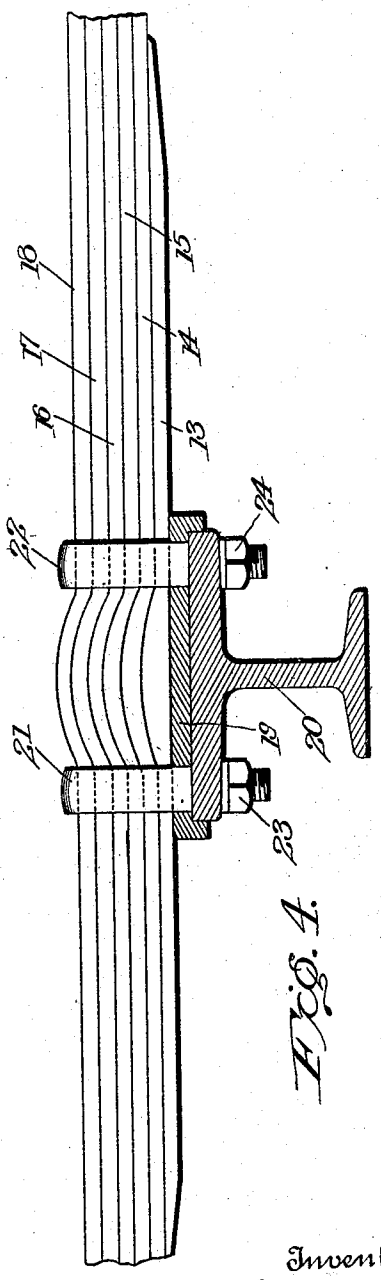


FIG. 4.

Witnesses

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UNITED STATES PATENT OFFICE.

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SPRING.

1,208,990. Specification of Letters Patent. Patented Dec. 19, 1916.

Application filed April 20, 1916. Serial No. 92,493.

To all whom it may concern:

Be it known that I, ARTHUR M. LAYCOCK, a subject of the King of Great Britain, residing at Kingston, Luzerne county, State of Pennsylvania, have invented certain new and useful Improvements in Springs, of which the following is a specification.

This invention relates particularly to leaf springs and its object is to provide simple and efficient means for strengthening such springs at the center where the supporting clip is applied and at the same time provide means whereby the clip will more effectively hold the leaves of the spring in proper position.

The novel features of the invention will be apparent from the following description taken in connection with the drawing.

In the drawing: Figure 1 is a plan view of one form of spring embodying some features of my invention; Fig. 2 is a side elevation of a spring, embodying the invention, the clip being shown in section; Fig. 3 is a side elevation of a modified form of spring embodying the invention; Fig. 4 is a side elevation of another modification showing the fastening means; and Fig. 5 is a plan view of the form shown in Fig. 4.

It is a well known fact that leaf springs, being ordinarily formed of leaves of uniform width and thickness, have a tendency to break at the center where the supporting clip is applied for securing it to the axle or other support. Because of this support of the spring at the center the bending strains due to weight on the spring tend to break it and it has been the purpose of my present invention to avoid this tendency by strengthening the spring at the center. A further purpose has been to make it easy to fasten the spring properly and securely in place on the axle or other support. In accomplishing these results in the form of the invention shown in Fig. 1, I so swage the ordinary leaf springs at the center as to reduce them in width and at the same time increase their thickness. The metal displaced by the swaging operation, which reduces the width, is used in the present invention to increase the thickness and the swaging is so done that the leaf is gradually reduced in width from a point near the center on each side to the center, thus producing a reduction in width on a symmetrical curve, as illustrated in the drawing. The metal displaced by this reduction in width is symmetrically distributed so that the thickness of the leaf at the center is increased from points on opposite sides to the center on a curve, the thickest point being at the center. Since the leaves of the spring should fit together accurately, it is necessary to so bend the adjacent leaves at the central thickened portion as to make each leaf fit properly against the adjacent leaf.

In Fig. 2 of the drawings there is shown a leaf spring made up of five leaves, the top leaf 1 being provided with the rolled ends 2 and 3 to receive the usual bolts or clips for supporting the vehicle. The top leaf 1 is swaged inwardly at its sides on the curves marked 4 and 5, as shown in Fig. 1. The leaves 6, 7, 8 and 9 are similarly swaged inward at the sides, thus thickening each of those leaves, corresponding to the thickened portion of leaf 1. The center leaf 7 is made as shown in Fig. 2 with the displaced material projecting uniformly from both sides, whereas the adjacent leaves 6 and 8 are curved or bent, as shown in Fig. 2, to fit over the enlarged portion of leaf 7. In the same way, leaves 1 and 9 are bent to fit over the enlarged curved portions of leaves 6 and 8. A clip 10 fits closely around the spring at the central point where the width is reduced and the inner surfaces of this clip are so shaped as to properly fit against the sides, top and bottom of the spring. This clip may be of any suitable form for securing the spring to the axle or other support. The construction is such that the spring will be more securely held in position on the axle than would be the case with the ordinary straight sided leaf springs. The thickening of the springs at the center tends to prevent breaking of the springs at the point of support, since it is, of course, well known that the strength of a spring varies directly with its width but as the square of the thickness. The reduction in width therefore does not reduce the strength of the spring at the center but, on the contrary, the metal thus displaced, adding to the thickness, increases the strength very materially. This added strength is secured, furthermore, without any additional material at the center and by a very simple operation of swaging. By gradually reducing the width and increasing the thickness there is no point of abrupt change from one strength to another and therefore there is less likelihood of breakage.

In Fig. 3 I have shown a form of construc-

tion in which all of the displaced metal due to swaging in the sides of the leaves is on one side, so that the bottom of the spring, for instance, may be perfectly straight and the curvature due to the thickening may all be on the top side of the spring. As shown in this view, the bottom leaf 11 has a perfectly straight under surface whereas the top leaf 12 has a considerable projection at the center. It will be understood that this form of spring is adapted for use with a clip like that shown in Figs. 1 and 2.

As shown in Figs. 4 and 5, the leaves may be stiffened or thickened at the center without decreasing their width and this may be done in various ways. For instance, it may be done by jumping or upsetting the stock longitudinally of the leaves at the center. It will also be understood that the main purpose and advantage of my invention may be secured without thickening all of the springs at the center, this being illustrated for instance in Fig. 4 where the three upper leaves are of the same thickness throughout, whereas the three lower leaves are thickened at the center. For the purpose of illustration, I have shown in Fig. 4 a spring made up of six leaves, 13, 14, 15, 16, 17 and 18, the three upper leaves 16, 17 and 18 being of substantially the same thickness and width through, but being bent at the center so as to fit against each other and over the thickened portion of the lower leaves. The lower leaves, 13, 14 and 15 are shown as thickened in the center and in the particular form shown this has been accomplished without either increasing or decreasing the width at the center. They are so formed or bent at the center, however, as to accurately fit each other. As shown, the spring rests on a plate 19, which preferably has its upper surface made to conform to the shape of the lower surface of the bottom leaf 13, so that the spring will accurately fit in place. This plate is carried by an axle or other support 20 and the spring is secured in place by means of a clip embodying the straps 21 and 22 made in the form of U-shaped loops fastened over the spring and having screw-threaded ends and the nuts 23 and 24 for securing them to the axle 20. These straps of the clip fit over the spring against adjacent sides of the central enlargement due to the thickening and in this way the spring is very securely and firmly held in position. It will, of course, be understood that the thickening of the springs at the center may be applied to any number of leaves desired and that this thickening may be secured in various ways in all of the forms shown.

Having thus described the invention, what is claimed and desired to be secured by Letters Patent is:

1. A spring comprising superimposed leaves fitting on each other, at least one of said leaves having a portion of limited area at the center where the spring is adapted to be supported materially thicker than the adjacent portions of the leaf.

2. A spring comprising superimposed flat spring metal leaves, some of said leaves having a portion of limited area at the center where the spring is adapted to be supported materially thicker than the adjacent portions thereof, and the center portion of some of said leaves being so bent that the leaves will fit together.

3. A spring comprising superimposed leaves, some of which have a portion of limited area at the center where the spring is adapted to be supported materially thicker than the adjacent portions of the leaf the adjacent surfaces of said leaves being so shaped as to fit together, and a fastening clip at said central portion securing said leaves together.

4. A spring comprising superimposed flat spring metal leaves fitting on each other, some of said leaves having portions of limited area at the center where the spring is adapted to be supported materially thicker than the adjacent portions of the leaves and said leaves at the thickened portions being so bent that the leaves will fit together, and a fastening clip fitting tightly around said spring at the center and against the projection formed by the thickening on opposite sides of the thickest point.

5. A spring comprising superimposed flat spring metal leaves so swaged as to increase the thickness materially throughout a limited area at the center, the increase in thickness being gradual from points immediately adjacent and on opposite sides of the center to the center.

6. A spring comprising superimposed flat spring metal leaves of substantially uniform cross sectional area increased in thickness materially on a symmetrical curve throughout a limited area at the center, the said thickened portions of the leaves being so bent that adjacent leaves will fit on each other.

In testimony whereof I affix my signature.

ARTHUR M. LAYCOCK.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."