April 3, 1928. 1,664,647

O. J. SUNDSTRAND

MEANS FOR ATTACHING COILED SPRINGS

Filed Nov. 22, 1923

Fig. 1.

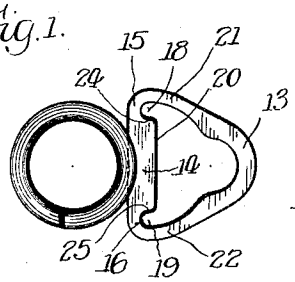


Fig. 2.

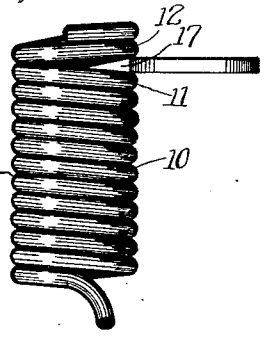


Fig. 3.

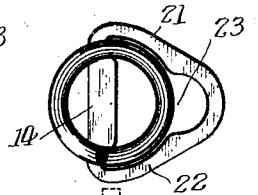


Fig. 4.

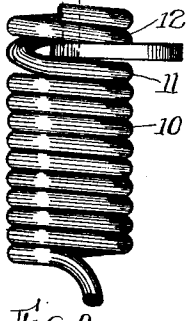


Fig. 5.

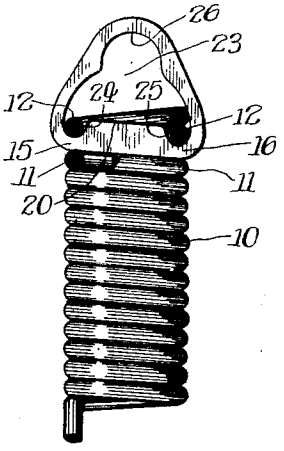


Fig. 6.

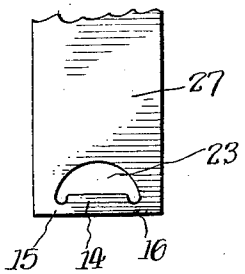
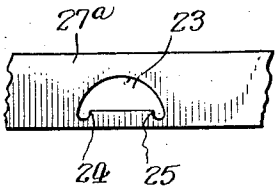


Fig. 7.



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UNITED STATES PATENT OFFICE.

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MEANS FOR ATTACHING COILED SPRINGS.

Application filed November 22, 1923. Serial No. 676,374.

This invention relates to means for attaching coiled springs to their points of anchorage and to the levers or other machine elements operated thereby.

The common way of attaching a spring is manually to bend into a loop the end of the wire of which the spring is formed. Such loops, however, are sometimes difficult to make, especially when the spring is of relatively small diameter and of relatively stiff wire, the loop breaking off in the process of formation.

It is also common to employ a metallic loop which can be "screwed" onto the coils of the spring, but this operation is rather tedious.

The object of the present invention is to provide a spring-attaching means which shall be inexpensive and free from the objections inherent in prior devices.

In the accompanying drawings, I have illustrated the invention in a number of embodiments, showing in particular one form which illustrates the essential parts of the invention and the method of connecting the same to the spring.

Figures 1 and 2 illustrate a form of the invention which provides a terminal loop for the spring and the manner of first inserting the loop between the coils of the spring. Figs. 3 and 4 are views showing the loop completely inserted between the coils. Fig. 5 shows the loop in final position. Figs. 6 and 7 show the invention embodied in variously formed members to which it is desired to attach a spring.

The drawings show generally a representative spring 10 which is obviously of the tension type. The spring may be made of wire of any suitable gauge. The spring, in the present instance, has its coils in contact with each other. This, however, is not a necessary feature. Any two adjacent coils 11 and 12 near the end are chosen for use in illustrating the application of the invention. For this purpose the invention is shown embodied in a piece of material 13 as, for example, sheet metal, which has been made in the form of a loop. It will be observed that the piece 13 is shaped as a stirrup having a straight portion 14. Fig. 2 shows such straight part 14 to be relatively thin, the degree of thinness being obviously consistent with the ultimate application and use of the attachment as will appear from the ensuing description. The flat part 14 of the piece 13 is inserted between the coils 11 and 12 until it is substantially diametrically disposed therebetween, as shown in Figs. 3 and 4. The portions of the part 14 underlying the coils of the spring are herein made of a width which is substantially the same as the thickness of the member 14. At the points 15 and 16 underlying the coils the attachment has, therefore, substantially equal dimensions in right angular directions. This requirement may be met by a substantially square or round cross section at these points. In the drawings, the part 14 is shown with a straight edge 17 and with notches 18 and 19 of such a depth that a substantially square cross section results at the points 16 and 17. The formation of these notches creates the portion 20 projecting into the opening of the stirrup. The notches 18 and 19 may also be said to be formed as a result of the projection 20 and the yoke-like sides 21 and 22 of the stirrup.

It will be observed that the sides 21 and 22 in the position shown in Fig. 3 are sufficiently separated to form an opening 23 through which the end of the spring may pass when the attachment is turned through 90° to the position shown in dotted lines in Fig. 4 and in full lines in Fig. 5. In this position the projection 20 stands parallel to the spring and is made of sufficient size so that it forms shoulders 24 and 25 against the inner walls of the spring to retain the attachment substantially fixed in the coil 12. As a result of the construction described the coil 12 lies in the notches 18 and 19 at the points 15 and 16.

The advantage of the flat sides presented by the use of a square cross-section becomes apparent which the attachment is used with a spring having its coils normally in contact with each other. In Fig. 5 where the coils 11 and 12 normally contract toward each other, they hold the stirrup rigidly in the position shown in Fig. 5 by virtue of the flat sides upon which the coils act.

It is obvious that a turning of the loop from the position shown in Fig. 5 to that shown in Fig. 4, separates the coils 11 and 12 to a distance equal to the diagonal of

the square cross section. Since such separation is against the force of the spring described, a substantial force will be required to turn the loop from the functional position of Fig. 5. A round cross section would not function in this manner, and the square cross section would not function in a spring in which the coils were normally separated. The opening 23 which accommodates the end of the spring in the turning movement is further enlarged by a continuation of the sides 21 and 22 to form a closed loop 26 by which the whole may be suspended or anchored.

While I have described somewhat in detail the various parts of the stirrup-shaped member 13, the application of the invention is not limited to such a member as has been shown and described. The particular shape of the member 13 is not to be taken as limiting the invention as will appear from the embodiments of Figs. 6 and 7. It is sufficient that any lever, link or other member as 27 or 27[a] have a substantially thin portion, similar to the portion 14 in the stirrup, which can be inserted between the coils of a spring and then turned about points 15 and 16 as in the manner described for the stirrup. At these points the portion 14 has a cross section which has dimensions substantially the same in right angular directions. While the stirrup member 13 and the members 27 and 27[a], all having the openings 23 therein to accommodate the spring, are provided with notches in which the spring coil may lie, it is obvious that it is the shoulders 24 and 25 of the projecting means on the part 14 which retain the spring and the members 13, 27 or 27[a] in engagement with each other. Consequently, I do not limit myself to the exemplary embodiments of the drawings nor the description thereof, but aim to cover all modifications of my invention which are comprehended in the appended claims.

I claim as my invention:

1. An attaching element for a coiled spring comprising a piece of relatively thin material having an opening adjacent one edge thereof, said opening having two notches extending toward said edge, the notches being adapted to receive opposite sides of a coil of the spring.

2. A terminal loop for a coiled spring comprising a thin stirrup-shaped member having a straight part, the greater width of the opening of the stirrup along said part being substantially the outer diameter of the spring, and a projection on said part into the opening to fit the inner side of the spring.

3. An attaching element for a coiled spring comprising a piece of material having a length greater than the external diameter of the spring, the piece having its other dimensions substantially equal in right angular directions, said dimensions being suitable for insertion of the piece between the coils of the spring transversely thereof, and projecting means rigid with the piece along one of said dimensions forming shoulders adjacent to the inner periphery of the spring.

4. An attaching element for a coiled spring comprising a piece of material having a substantially square portion adapted to extend longitudinally between and across the coils of the spring, a part projecting from said member on one side of the square to abut the inner side of the spring in the final position of the attachment, and a part rigid with said portion adapted for maintaining said spring carrying portion and the spring in a fixed position.

In testimony whereof, I have hereunto affixed my signature.

OSCAR J. SUNDSTRAND.