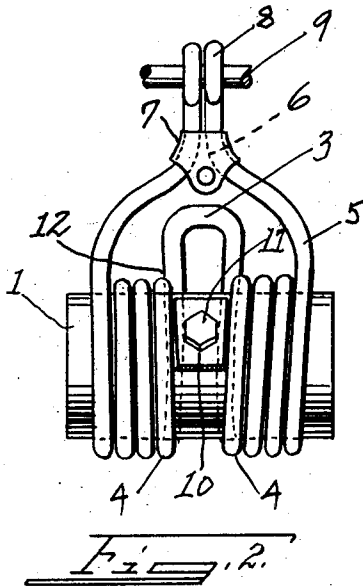
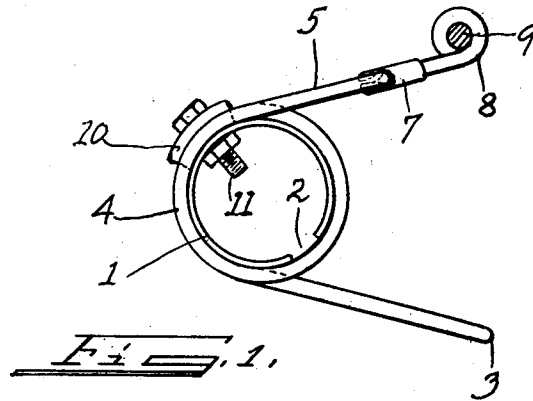


A. G. WICKER.
SPRING.
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To all whom it may concern:

Be it known that I, ALBERT G. WICKER, a citizen of the United States, and a resident of Cincinnati, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Springs, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification.

My invention relates to springs for general purposes, among others for vehicles, spring seats, shock absorbers, and other heavy duty, as well as light duty.

In the spring art, so far as I am advised, one feature which is desirable is that the spring be free to move at all points and not fixed, since otherwise the continual strain adjacent the point of fixed attachment will inevitably result in the breaking down of the spring. Another feature which is desirable is to have the strain on the spring taken up with slight resistance at the first portion of the spring compression or distortion; this resistance increasing as the compression continues, and after the blow has subsided, to have the spring expand or return to normal again, slowly at first and ending rapidly, but without exerting great force at the final expansion.

Another advantage in spring structure is to utilize as great an area of spring surface as possible in doing the desired work at all times, as thereby the various parts of the spring relieve each other of constant duty, which prolongs the life of the spring and makes it easy in operation.

It is my object to provide a spring having all of the qualities above noted, and which in addition is capable of being cheaply and quickly made, and among other things, as I am advised of the art, I provide a spring on a novel principle, whereby a coil or coils arranged around a resilient core make up the spring, the core comprising in its simplest form a split tube of spring steel.

These objects and the advantages to be noted, I accomplish by that certain construction and arrangement of parts to be hereinafter more specifically pointed out and claimed.

In the drawings,

Figure 1 is a side elevation of the spring.

Fig. 2 is a front elevation thereof, with the spring turned partially toward the observer from the position it would normally be placed in, as shown in Fig. 1.

The spring comprises a tube 1 of spring metal, which has a cut-away portion at 2 to permit it to expand and contract as a spring, and around this tube the desired arrangement of coils, the ends of which are connected to the objects between which spring action is desired.

In the example shown, which I consider the best arrangement, a single piece of steel wire or rod is employed which is bent at the middle as at 3 and then wrapped around a mandrel to form diverging coils 4 of the desired number, and the ends 5 of the piece extended outwardly from the coils so as to clear them, and brought together as at 6. The tempering of the wire or rod will be done after coiling, the coils made of a size to fit over the core.

Where the ends 5 abut at 6 it is usually desirable to mount a securing strap 7 and the extreme ends 8 of the piece are then equipped with any desired form of connection, preferably a connecting bolt or pin 9, which is suitable for serving as a member to be journaled in a suitable mounting clip.

In order to hold the coiled spring portions in assembly with the split tube, I preferably demountably secure on the periphery of the tube a block 10, which is long enough not to be in danger of twisting around, and which may be slightly concaved at the sides to engage over the adjacent coils of the spring.

This block I prefer to mount on the core by means of a bolt 11, which bolt is substantially diametrically opposite the cut-away portion of the core and the block acts as a spacer between the right and left turns of the coils, without binding, as well as preventing the coils from slipping off the tube.

Where the spring is bent at the middle it is slightly formed inwardly as at 12, so that when the core is slipped into the coils, the branching portions to the bend 3 will not contact with the inner coils of the spring upon contraction.

I prefer that when the spring is assembled with the coils over the core, that the arms 5 and the arms at 12 extend at a slight divergent angle from the main body of the device, so as to be out of parallel with each other, but not too widely diverging.

While I have not shown any particular use of my spring, I may state that the ends 8 may be swung by a suitable clip from the body of a vehicle and the end 3 may be journaled by a suitable clip to a vehicle frame. When so used the end 3 is formed with a

straightened end (see Fig. 2) which acts as a shaft to be journaled in the desired clip.

When in use, the spring will take up the slight jars by means of the extended ends of the coiled element coming toward each other and the partial tightening of the wrapping of the coils around the core, a large proportion of the spring resisting contraction, although not with great force. The extended ends in the form shown are double in each case, and hence will have great strength, and where pivoted or journaled to the bodies to be spring connected, there will be no point which is held against free movement.

When a heavy duty is imposed on the spring, the coils will wrap tightly around the core and the core will contract, with the entire body of the coiled member and the core member doing work, and the strain progressively growing greater as the coils tighten around the core and the core contracts.

The spring may be termed "full-floating," since its end may be connected to the interspaced members to be spring connected, by means of journaling devices, and the intermediate parts of the spring are entirely free of any connection.

It may be that I will prefer in some instances to make the coiled portions of the spring from two independent pieces, one coiled to the right and one to the left, although for large or small devices I prefer the one piece, instead of two pieces connected together at their ends. I may also modify the form of the core without departing from the spirit of my invention. Also the spring may be readily and effectively employed where either or both ends are secured rigidly to the article to be spring-spaced. Also the angle of departure of the spring ends from the coil may be widely varied to suit different purposes.

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

1. In a spring, the combination of a resilient core member adapted to expand and contract, and a resilient coil member wrapped around the core with the ends of the coil member extended for connection to the objects to be spring-spaced, said core and coil having resiliency along the same axis.

2. In a spring, the combination of a resilient core member adapted to expand and contract, and a resilient coil member wrapped around the core with the ends of the coil member extended for connection to the objects to be spring-spaced, and means on the core to prevent relative lengthwise movement of the coil and core.

3. In a spring, the combination of a resilient

core member adapted to expand and contract, and a resilient coil member wrapped around the core with the ends of the coil member extended for connection to the objects to be spring-spaced, and means on the core to prevent relative lengthwise movement of the coil and core, comprising a block demountably secured on the core and engaging between the coiled strands of the coil member.

4. In a spring, the combination of a resilient core member adapted to expand and contract, and a resilient coil member wrapped around the core with the ends of the coil member extended for connection to the objects to be spring-spaced, and the core member comprising a split tube.

5. In a spring, the combination of a resilient core member formed of a metallic tube having a lengthwise portion of its body removed, so as to permit contraction and expansion, and a double strand of linear spring metal wound in left and right coils over the core with the ends of the double strand extending outwardly from the coils at an angle slightly divergent from a parallel relation with each other.

6. In a spring, the combination of a resilient core member formed of a metallic tube having a lengthwise portion of its body removed, so as to permit contraction and expansion, and a double strand of linear spring metal wound in left and right coils over the core with the ends of the double strand extending outwardly from the coils at an angle slightly divergent from a parallel relation with each other, said tube being turned with its cut-away portion downwardly, and a member demountably secured on the tube and acting as a spacer between the right and left hand coils at the central portion of the tube.

7. In a spring, the combination of a resilient core member formed of a metallic tube having a lengthwise portion of its body removed, so as to permit contraction and expansion, and a double strand of linear spring metal wound in left and right coils over the core with the ends of the double strand extending outwardly from the coils at an angle slightly divergent from a parallel relation with each other, said tube being turned with its cut-away portion downwardly, and a member demountably secured on the tube and acting as a spacer between the right and left hand coils at the central portion of the tube, said demountable member comprising a block and a bolt or the like to secure it to the tube, said bolt and block being set substantially opposite the cut-away portion of the tube.

ALBERT G. WICKER