(No Model.)

P. N. FRENCH.

ELLIPTIC SPRING.

No. 457,266. Patented Aug. 4, 1891.

FIG. 1.

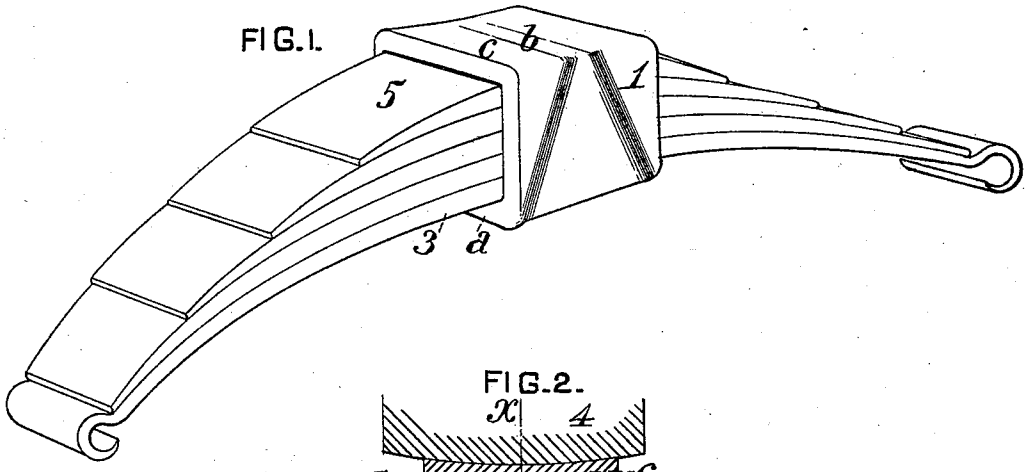


FIG. 2.

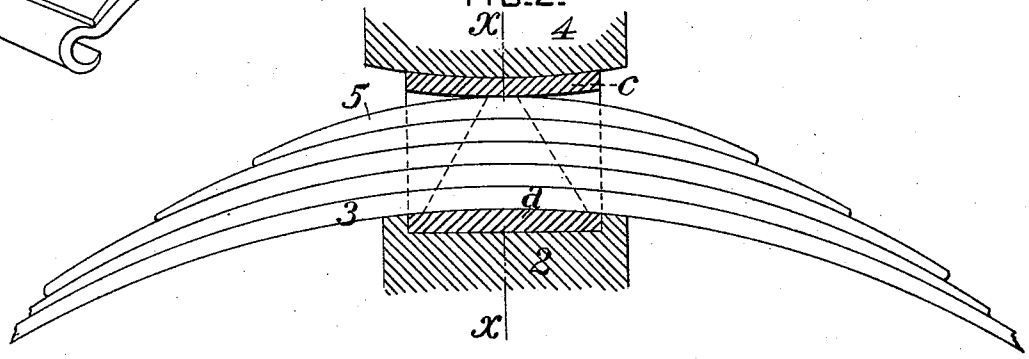


FIG. 3.

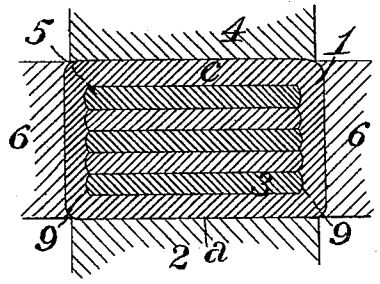


FIG. 4.

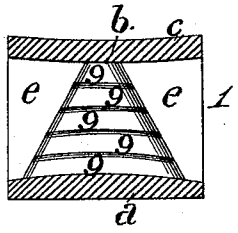
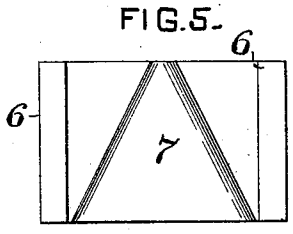


FIG. 5.



WITNESSES:

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UNITED STATES PATENT OFFICE.

PHILO N. FRENCH, OF PITTSBURG, PENNSYLVANIA, ASSIGNOR TO THE A. FRENCH SPRING COMPANY, LIMITED, OF SAME PLACE.

ELLIPTIC SPRING.

SPECIFICATION forming part of Letters Patent No. 457,266, dated August 4, 1891.

Application filed May 13, 1891. Serial No. 392,612. (No model.)

To all whom it may concern:

Be it known that I, PHILO N. FRENCH, a citizen of the United States, residing at Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented or discovered certain new and useful Improvements in Elliptic Springs, of which improvements the following is a specification.

The invention described herein relates to certain improvements in the manufacture of elliptical springs. In order that the leaves or lifts of these springs, especially such as are employed in railway service, may be held in proper relation to each other it is customary to bind said leaves or lifts together by a band compressed tightly around the leaves midway of their length. This band is usually made of considerable width, as compared with the short outside leaf or lift of the spring; and as the band is made to bear throughout its entire length on said leaf, the spring action thereof is limited to the short unbound ends thereof. In consequence of this limited length of resilient action this short leaf is liable to be broken when the spring is subjected to heavy loads.

The object of this invention is to provide a band for this class of springs which, while retaining a broad lateral bearing on the edges of the spring, thereby keeping the leaves or lifts in line one upon the other, shall have a graduated clamping engagement with the edges of the leaves or lifts, whereby they are held together, the bearing of the band on the short outside leaf being as narrow as is compatible with an effectual binding of the leaves or lifts together.

In general terms the invention consists in the construction and combination, substantially as hereinafter more fully described and claimed.

In the accompanying drawings, forming a part of this specification, Figure 1 is a perspective view of a spring having my improvement applied thereto. Fig. 2 is a side elevation of the spring arranged between the binding-dies, one side of the band being removed and the dies shown in section. Fig. 3 is a transverse section of the spring, the plane of section being indicated by the line $x x$, Fig. 2. Fig. 4 is a sectional elevation of one of the bands, removed from the spring, and Fig. 5 is an end view of one of the side dies.

In the practice of my invention the band 1 is made in the usual or any desired manner, all of its faces being of the same or practically the same length. The band when properly heated is slipped onto the spring and the latter placed between the dies of a suitable press. As is customary, four dies are employed, operating either simultaneously on the four sides of the band or two by two, the first pair maintaining a compressive action until after the second pair operates. As shown in Fig. 2, the die 2, operative on the side of the band adjacent to the inner or longest leaf or lift 3, is constructed as regards its face to have a uniform bearing over the entire outer surface of the side *a* of the band, thereby causing said side to bear for its entire length and width on the leaf 3. The die 4 is constructed as regards its operative face so that only a narrow portion *b* of the side *c* of the band will be pressed down against the short outer leaf or lift 5, as shown in Fig. 2, thereby forming a narrow fulcrum or middle support for said leaf. The die 6, operating on the two other sides, have formed on their operative faces V-shaped raised portions 7, as shown in Fig. 5, which at their base or widest part have a width nearly equal to the length of the bands, and at their top or narrowest part are approximately equal to the breadth of the portion *b* of the strap bearing upon the leaf 5.

It is customary in banding springs to subject the sides of the band adjacent to the edges of the leaves or lifts to sufficient pressure to cause the edges of the leaves to indent the inner faces of said sides, thereby forming a seat or print for each leaf, and locking each leaf in position independently of the others. In constructing the side dies 6 the raised portions 7 are made to project only far enough from the other portions of the faces of the dies, so that when in the operation of banding the portions 8 of the dies outside of the raised portions 7 will have caused the portions of the side *e* of the band pressed by them to simply bear against the edges of the leaves the projections 7 will have so pressed in the portions of the band acted on by them that

the edges of the leaves of the spring will form independent seats or prints 9, as shown in Fig. 4. It will be observed that the seats or prints 9, which lock each leaf in position independently of the others, decrease in length as the leaves decrease in length, thereby rendering greater portions of each leaf available for resilient action.

The action of the two side dies 6 tends to stretch the metal of the sides *e* of the band, which is firmly held at all points, except at the ends of the side *c* of the band. The die 4 being constructed to have its main bearing-point about the middle of the side *c* the stretch of the metal of the edges of the sides *e* will raise the ends of the side *c*, as shown in Fig. 2, thereby affording greater freedom of movement of the short outer leaf.

By making the band of uniform length each leaf has an equal lateral support, the portions *e* of the sides of the band which are not indented by the edges of the leaves serving to prevent any lateral displacement thereof.

It is characteristic of this invention that while maintaining a broad support or brace for the leaves as against lateral movement their ends are held together in proper relarion to each other by seats or prints decreasing in length approximately proportional to the decrease in length of the leaves themselves.

I am aware of Patents No. 7,660, reissued May 8, 1877, No. 193,080, dated July 17, 1877, granted to A. French, and No. 393,569, dated November 27, 1888, granted to Morris and Lawrence, and make no claim to any construction therein shown and described.

I claim herein as my invention—

1. A banded elliptic half-spring having a band of uniform length on all sides and having a tapering or graduated leaf-gripping area, substantially as set forth.

2. A banded elliptic half-spring having a band of uniform length on all sides, the bearing-face of the side adjacent to the long inner leaf corresponding approximately to the length and breadth of such side, the side adjacent to the short leaf having a narrow bearing transverse of said leaf, and the sides adjacent to the edges of the leaves having a V-shaped area of gripping-surface, substantially as set forth.

3. A banded elliptic half-spring having a band of uniform length on all sides, the sides adjacent to the edges of the leaves having seats or prints for the edges of the leaves graduated as to length, thereby forming V-shaped gripping areas, the portions of said sides outside of the gripping areas bearing against the edges of the leaves, substantially as set forth.

In testimony whereof I have hereunto set my hand.

PHILO N. FRENCH.

Witnesses:
R. H. WHITTLESEY,
DARWIN S. WOLCOTT.