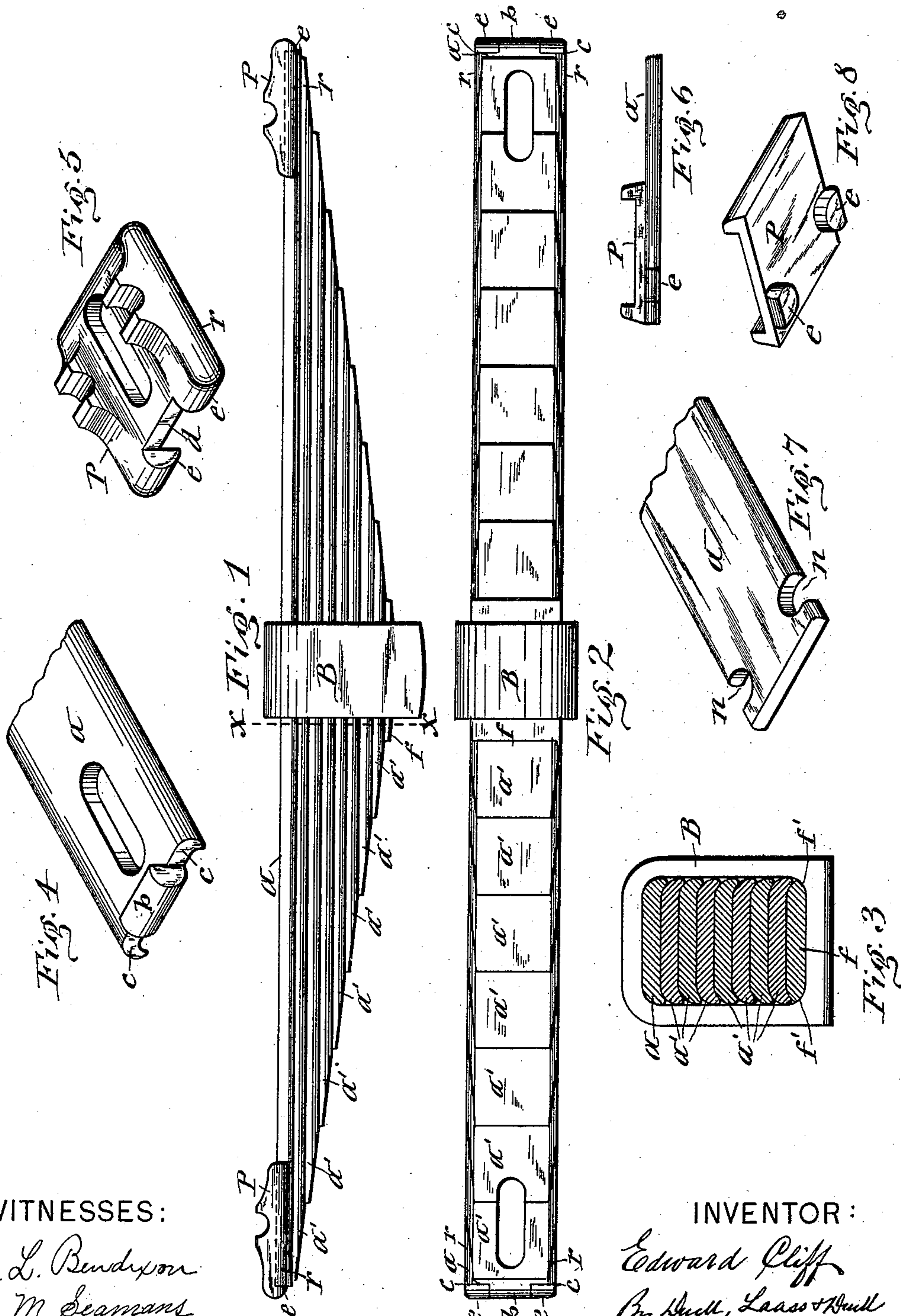


(No Model.)

E. CLIFF.
SEMI-ELLIPTIC SPRING.

No. 463,342.

Patented Nov. 17, 1891.



WITNESSES:

C. L. Bendixon
H. M. Seaman

INVENTOR:

Edward Cliff
By Buck, Laessle & Buck
his ATTORNEYS.

UNITED STATES PATENT OFFICE.

EDWARD CLIFF, OF NEWARK, NEW JERSEY.

SEMI-ELLIPTIC SPRING.

SPECIFICATION forming part of Letters Patent No. 463,342, dated November 17, 1891.

Application filed July 11, 1891. Serial No. 399,229. (No model.)

To all whom it may concern:

Be it known that I, EDWARD CLIFF, of Newark, in the county of Essex and State of New Jersey, have invented new and useful
5 Improvements in Semi-Elliptic Springs, of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

This invention consists, first, in an im-
10 proved construction of the leaves of the spring, which leaves are effectually prevented from moving laterally on each other and are stiffened and strengthened without enlargement of the thickness of the leaves and also
15 exert less strain on the usual band which embraces the spring; and the invention consists, secondly, in the combination, with the semi-elliptic spring, of separately-formed bearing-plates mounted on the end portions of the
20 main leaf of said spring and locked against longitudinal movement in both directions on said leaf, all as hereinafter more fully described, and specifically set forth in the claims.

In the annexed drawings, Figure 1 is a side
25 view of a semi-elliptic spring embodying my improvements. Fig. 2 is an inverted plan view of the same. Fig. 3 is a transverse section on line $x x$, Fig. 1. Fig. 4 is a perspective view of one of the end portions of the
30 main leaf. Fig. 5 is a detached perspective view of one of the end bearing plates of the spring. Fig. 6 is an edge view of one of the end portions of the main leaf, with the bearing-plate mounted thereon embodying a modi-
35 fication of my invention; and Figs. 7 and 8 are detached perspective views of said parts.

Similar letters of reference indicate corresponding parts.

a represents the main leaf of the spring,
40 and $a' a'$, &c., the supplemental shorter leaves, all of which leaves are placed successively one upon the other in the usual manner, and when applied to railroad-cars said spring is usually disposed with its main leaf a on top,
45 as shown. All of said leaves are of the same width, and each is formed straight across the main portion of its width and with tapered side edges, which are curved to form flanges toward the subjacent leaf, so as to partly em-
50 brace the edges of the latter, as shown more clearly in Fig. 3 of the drawings. The said

curved side edges or flanges extend throughout the main portion of the leaf and terminate with close embrasures of the top portions of the edges of the adjacent leaf.

f denotes the usual filler, which is applied
55 to the under side of the shortest leaf a' , and is likewise formed straight across the main portion of its width and has the top and bottom of its side edges curved toward each other,
60 and is thus likewise partly embraced by the overlying leaf a' , and at the same time forms rounded corners $f' f'$ on the bottom of the spring, corresponding in shape to those formed
65 on the top of the spring by the curved edges of the main leaf a . The spring thus formed has vertical sides, horizontal top and bottom faces, and rounded corners. This feature is
70 important to the life of the band B, which closely embraces the central portion of the spring. The interior of said band being
formed with corresponding rounded corners, enables the same to better resist the strain
75 across said corners of the band. This band firmly clamps the leaves of the spring together and the partial embracing of the edges
of each leaf by the edges of the superposed
80 leaf effectually prevents lateral displacement of the leaves, and aside from this the leaves are stiffened by their side flanges.

P P represent the bearing-plates, which are
85 secured to the top of the end of the spring for supporting the load to be carried by the spring. These plates I form separate from the spring and preferably of malleable iron.
They are mounted on top of the end portions of the spring and locked against longitudinal as
90 well as lateral movement thereon, preferably by means of upwardly-projecting abutments b , formed on the ends of the spring, and shoulders $c c$ formed by square faces on said ends.
The plates P are each formed with a shoulder
95 d and downwardly-projecting lugs $e e$ on their outer end and rest with the shoulder d against the abutment b , and engage by the lugs $e e$
the shoulders $c c$, which latter prevent the
100 plate from slipping inward on the spring, while the abutment b prevent the outward movement of the plate. Although the foregoing prevents also to some degree the lateral displacement of the plate P, yet I prefer to guard more effectually against such displace-

ment by forming the edges of the plate with longitudinal downwardly-projecting ribs *r r*, which are concave, to snugly engage the rounded side edges of the top leaf *a*. It will be observed that the described bearing-plates *P P* are readily detached and replaced when required for repairs or renewal, and when applied to the spring said plates are securely retained in their requisite positions.

I do not, however, wish to be limited specifically to the aforesaid construction, inasmuch as the engaging abutments and shoulders can be formed by lugs *e e* on the plate *P* entering notches *n n* in the side edges of the leaf *a*, as shown in Figs. 6, 7, and 8 of the drawings.

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

1. A semi-elliptic spring composed of a plurality of leaves seated closely one upon the other of the same width and formed straight across the main portions of their widths and each curved at its side edges toward the adjacent leaf, said curved edges extending throughout the main portion of the leaf and terminating with a close embrasure of the latter leaf, and a band closely embracing the spring, substantially as set forth.

2. A semi-elliptic spring composed of a plurality of leaves superposed one upon the other, all of the same width and formed straight across the main portions of their widths and each curved at its side edges toward the adjacent leaf, and a filler on the shortest leaf, formed likewise straight across the main portion of its width and having the top and bottom of its side edges curved to-

ward each other, in combination with a band closely embracing said spring, as set forth.

3. The combination, with the semi-elliptic spring, of separately-formed bearing-plates mounted on the end portions of the main leaf of said spring and locked against longitudinal movement on said leaf, as set forth.

4. The combination, with the semi-elliptic spring, of separately-formed bearing-plates mounted on the end portions of the main leaf of said spring, locked against longitudinal movement on said leaf, and provided with flanges embracing the side edges of the leaf, substantially as set forth.

5. The combination of the main leaf *a*, formed at its end with the upwardly-projecting abutment *b* and shoulders *c c*, and the plate *P*, mounted on said leaf and formed with the shoulder *d*, and downwardly-projecting lugs *e e*, engaging, respectively, the abutment and shoulders of the aforesaid leaf, as set forth.

6. The combination of the main leaf *a*, formed with rounded side edges and with the abutment *b* and shoulders *c c* on its end, and the plate *P*, mounted on the end portion of said leaf and formed with longitudinal concave ribs *r r*, engaging the side edges of the leaf, and with the end shoulder *d* and lugs *e e*, engaging, respectively, the abutment and shoulders of the aforesaid leaf, substantially as set forth and shown.

In testimony whereof I have hereunto signed my name this 6th day of July, 1891.

EDWARD CLIFF. [L. S.]

Witnesses:

GEO. B. LAUCK,

WILFRED N. O'NEIL.