

(No Model.)

I. A. TIMMIS.
COILED STEEL SPRING.

No. 432,341.

Patented July 15, 1890.

FIG. 8.

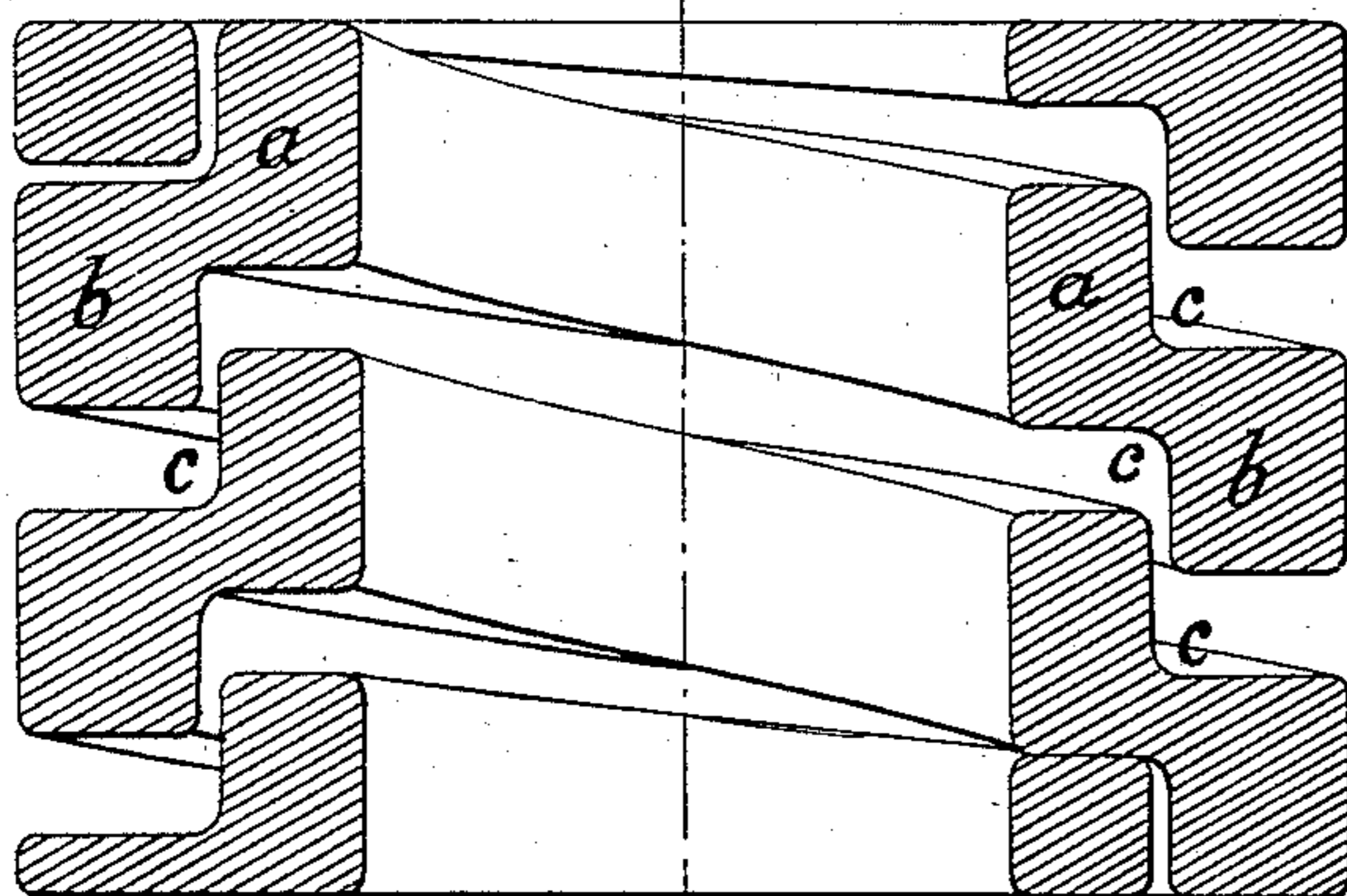


FIG. 9.

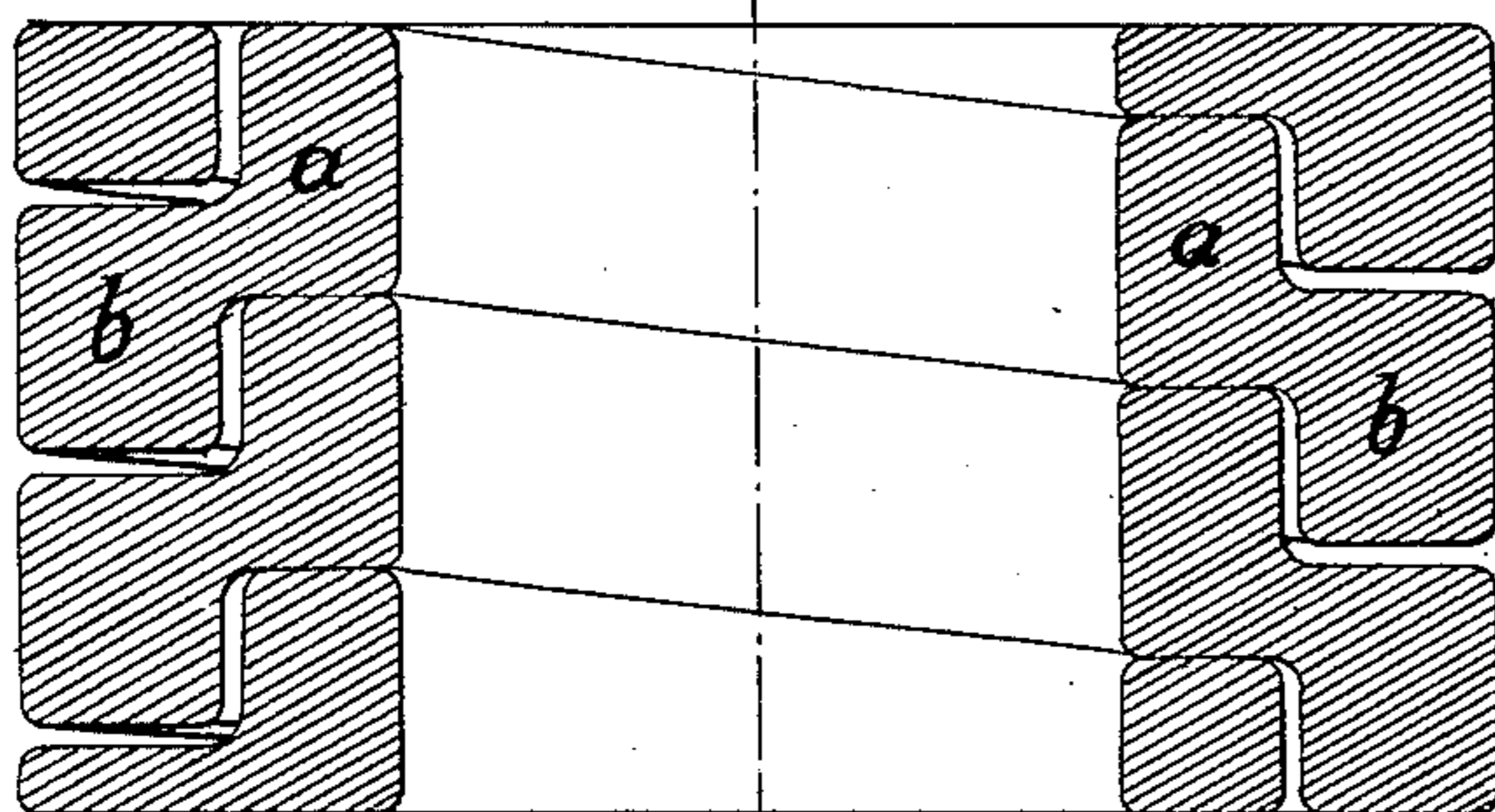
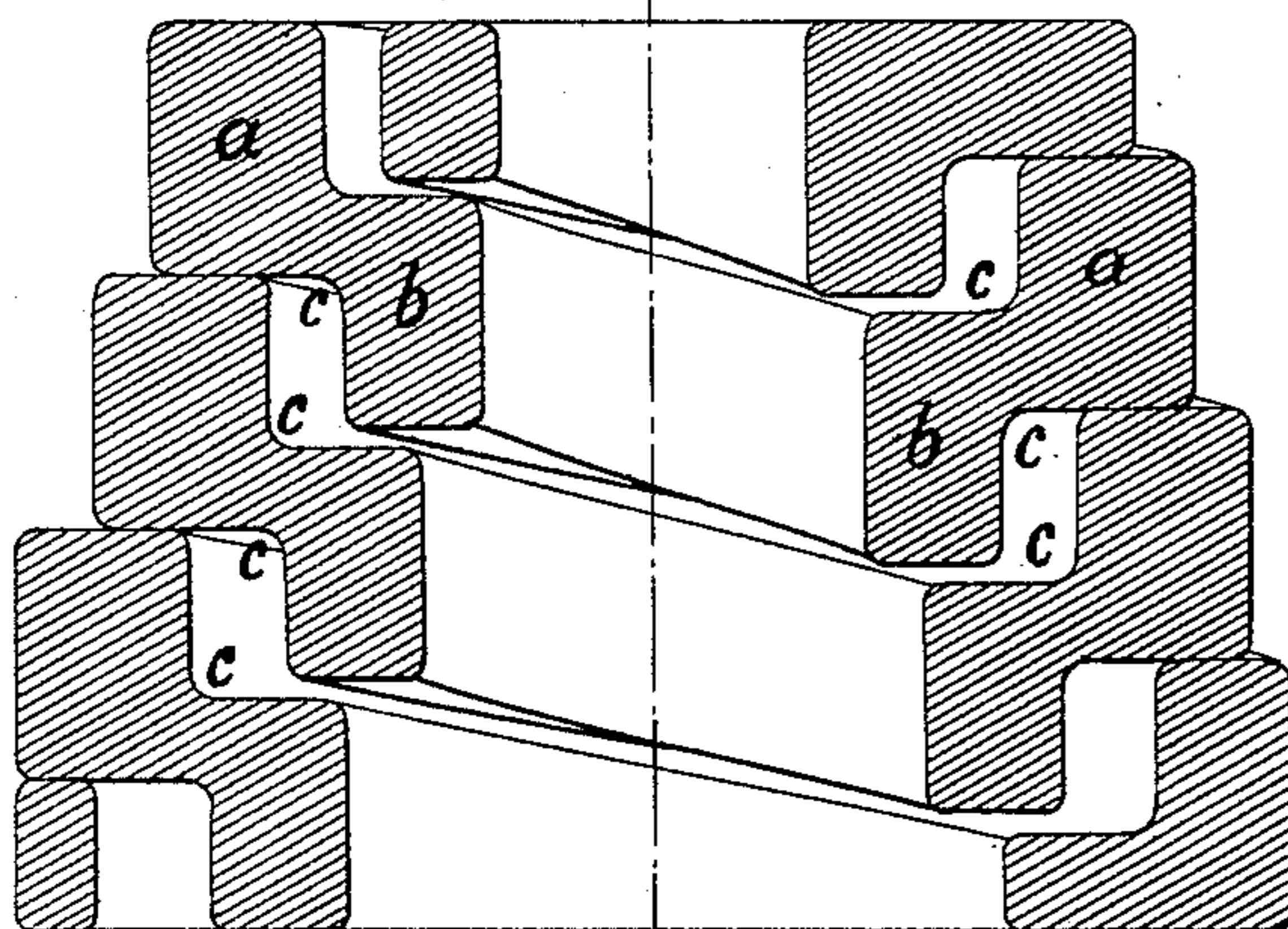


FIG. 10.



Witnesses
J. H. Luck
W. C. Clavough

FIG. 1.

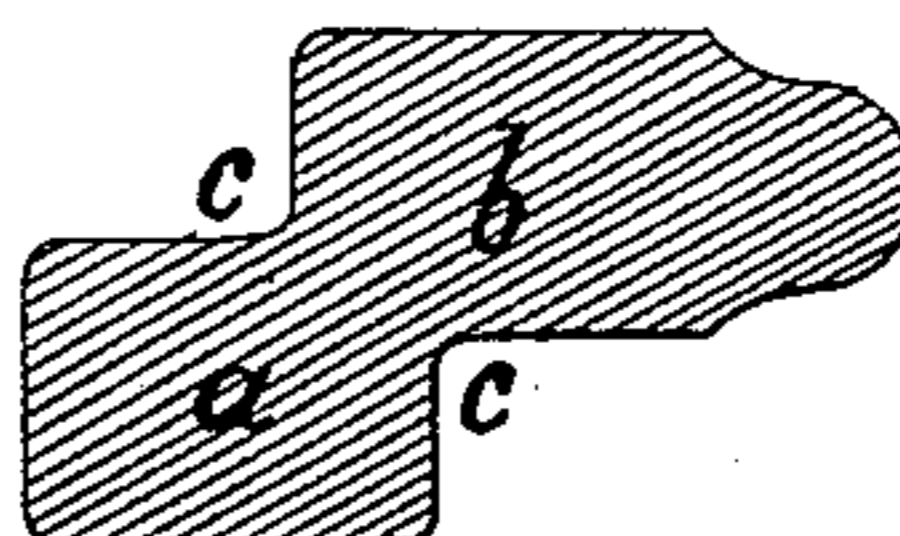


FIG. 2.

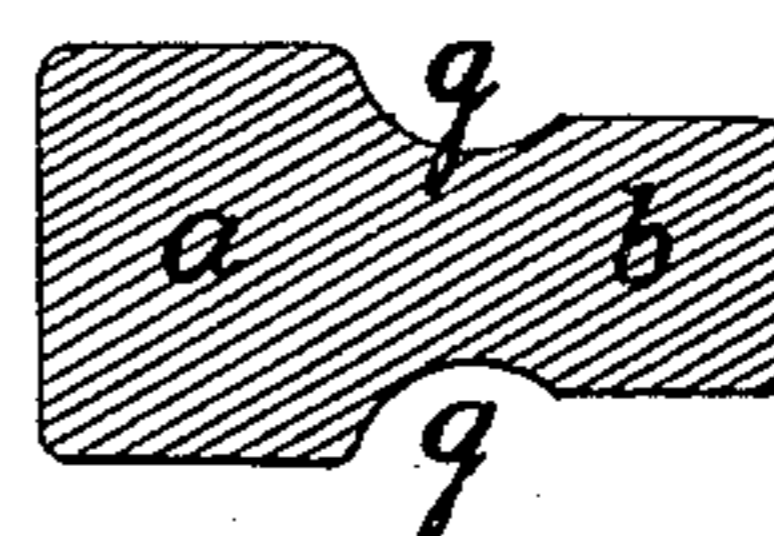


FIG. 3.

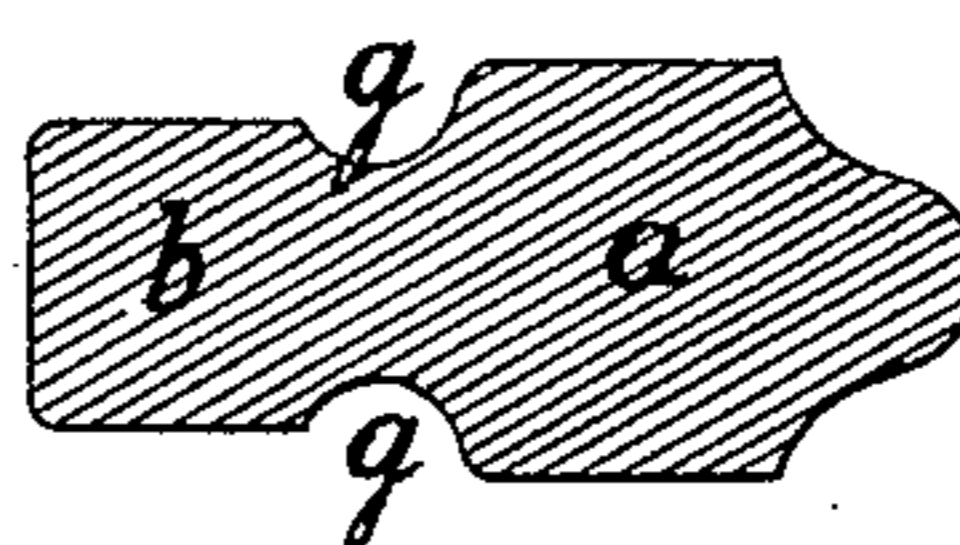


FIG. 4.

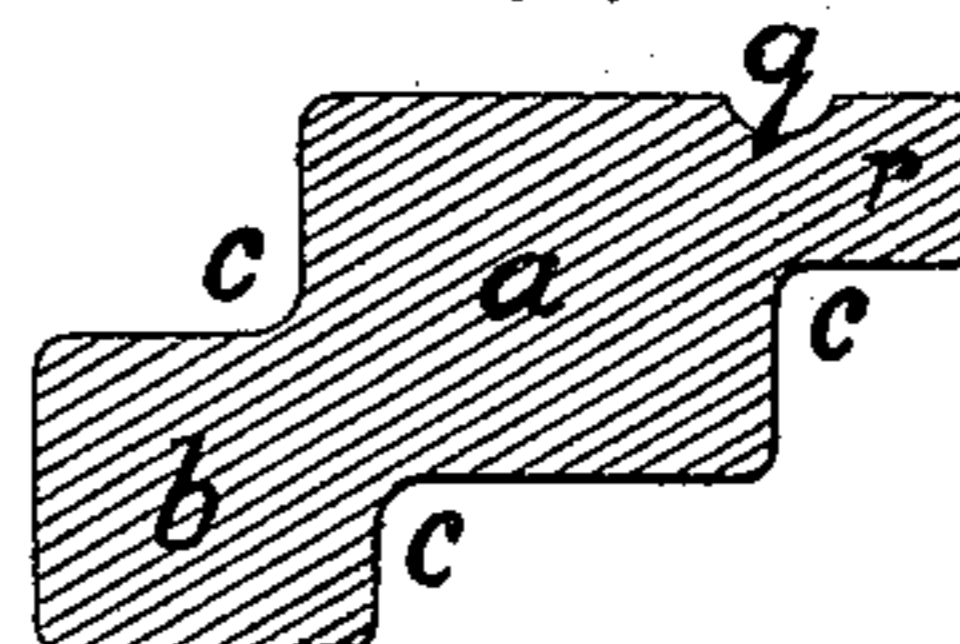


FIG. 5.

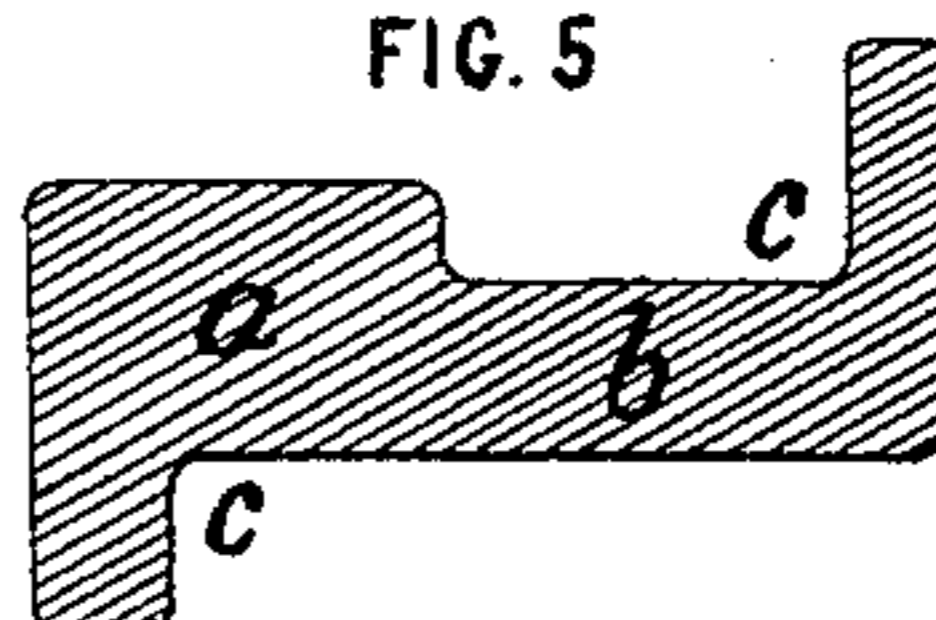


FIG. 6.

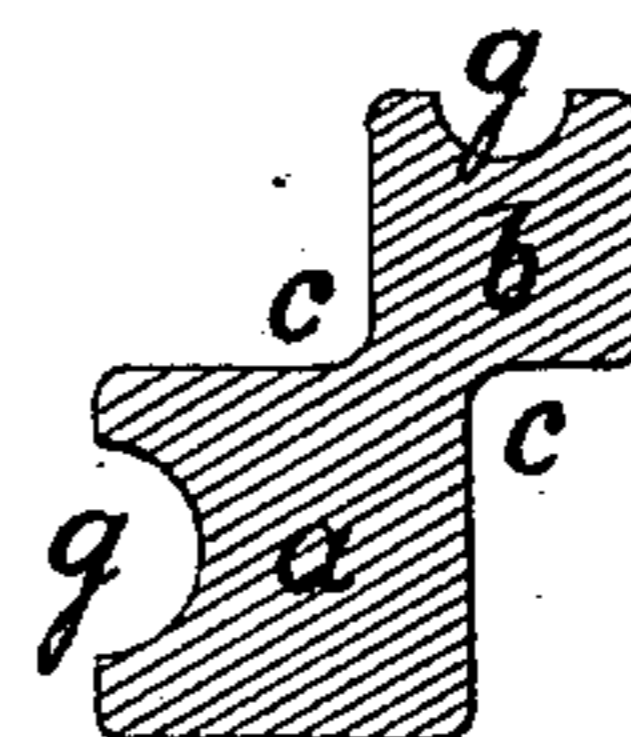
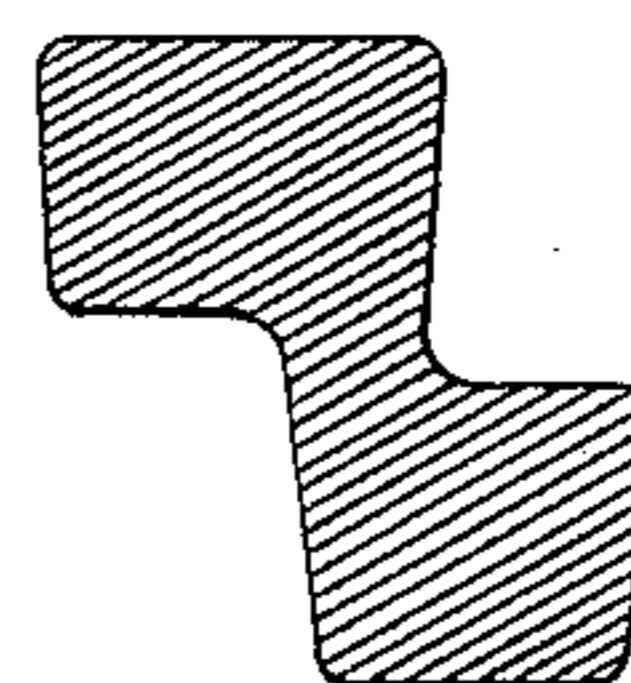


FIG. 7.



Inventor
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UNITED STATES PATENT OFFICE.

ILLIUS AUGUSTUS TIMMIS, OF LONDON, COUNTY OF MIDDLESEX, ENGLAND.

COILED STEEL SPRING.

SPECIFICATION forming part of Letters Patent No. 432,341, dated July 15, 1890.

Application filed August 9, 1889. Serial No. 320,256. (No model.) Patented in England June 8, 1889, No. 9,538; in France June 29, 1889, No. 199,278, and in Belgium July 15, 1889, No. 86,852.

To all whom it may concern:

Be it known that I, ILLIUS AUGUSTUS TIMMIS, a subject of the Queen of Great Britain, residing at 2 Great George Street, Westminster, London, S. W., in the county of Middlesex, England, have invented certain new and useful Improvements in Coiled Steel Springs, (for which I have obtained the following patents: in Great Britain, No. 9,538, dated June 8, 1889; in Belgium, No. 86,852, dated July 15, 1889, and in France, No. 199,278, dated June 29, 1889;) and I do hereby declare the following to be a full, clear, and exact description of the invention, reference being had to the accompanying drawings, which form part of this specification.

The objects of my invention are to give a maximum of power and range with a minimum of weight.

In the accompanying drawings, Figures 1, 2, 3, 4, 5, 6, and 7 are sectional views of different forms of bars from which the springs are coiled. Figs. 8 and 9 are vertical central sectional views of a helical spring, and Fig. 10 is a similar view of a conical spring embodying the main features of my invention.

In carrying into effect my improvements in the manufacture of spiral springs—helical or conical—I roll the bars so that there are two or more thick parts, and by preference these parts are not in the same plane in the cross-section of the springs. Figs. 1 to 10 give examples of some of these sections. In Figs. 2, 3, and 5 the thick parts are in the same plane. Fig. 8 gives an example of one of the above-named sections, Fig. 7, coiled up; and Fig. 9 is the same spring when pressed home. There are three principles involved in these sections, (and there may be a great many more sections rolled than those I have given above which would embody or carry out the same principles.) The first principle is that there are two thick parts *a* and *b*. *a* being the thickest part in conjunction with curves *c c*, there may be more than two thick parts. (See Fig. 4.) The second principle is that one thick part is thicker than the other, and thus the thick parts *a a*, as is shown, Figs. 9 and 10, come together when the spring is pressed home, while the parts *b b* do not come home, and thus are not subjected to any impact shock. This pre-

serves the life of the spring. Fig. 10 shows another variation. The inner parts *b b* are not home and the outer parts *a a* are home; but these outer parts are protected by thin webs, (see Fig. 3,) or by a third outer part, Fig. 4. The third principle is that by placing the various thick parts, as in Figs. 1, 4, 6, 8, and 9, in different planes great additional strength is given.

I roll the bars of steel, preferably, so that after coiling the parts which come in contact when the springs are driven home are parallel, and thus have a proper bearing one on the other (see Fig. 7) before coiling. All the other figures show the sections after coiling. The thick parts *a* or *b* or *r* may have grooves (one or more) of any size rolled in them. (See Figs. 2, 3, 4, and 6 as illustrations.)

These springs are coiled helically, as at Figs. 8 and 9, or conically, as at Fig. 10. The grooves *g g* may be dispensed with.

In Fig. 10 the section may be varied, so that the openings caused by the bar being coiled conically may be partially filled in—i. e., the parts *a* or *b* may be rolled thicker, and thus more metal put into the same diameter of spring and greater strength given.

There is an almost infinite variety of ways in which the sections above explained may be varied other than those which are specifically drawn and explained and which will carry out the principal objects I have in view; but,

Having now described the nature and objects of my invention and the way in which the same may or can be carried into effect, I desire it to be understood that what I claim is—

1. A steel spiral spring consisting of a coiled bar presenting in cross-section two masses joined by a thinner integral web, one of said masses having on its edge a rib or diminished part, whereby the said mass is strengthened by the more flexible rib on each edge, substantially as described.

2. A steel spiral spring of helical or conical form, consisting of a coiled bar presenting in cross-section two or more masses of metal of substantially equal bulk or area, said masses being in different planes and connected by a web or webs thinner than either of the masses,

and one of said masses being thicker than the other in the direction of the axis of the spring, substantially as described.

3. A steel spiral spring presenting in cross-section two or more masses of metal of different vertical depth, two of said masses being connected by an integument or web thinner and of softer temper than either of the masses, the said masses being formed with parallel
10 contacting surfaces, whereby when the spring is compressed the thicker masses will be brought into close contact, while the thinner masses will be separated from each other, substantially as described.

15 4. A steel spiral spring consisting of a coiled bar presenting in cross-section two or more masses of metal in different planes, two of said

masses being connected by an integument or web thinner than the masses so connected, one of said masses being of greater vertical
20 depth than the other and of substantially rectangular form, whereby when the spring is compressed the said thicker masses will contact together, substantially as described.

In testimony that I claim the foregoing I
25 have hereunto set my hand this 19th day of June, 1889.

ILLIUS AUGUSTUS TIMMIS.

Witnesses:

AMBROSE FISH,
Notary's Clerk, 5 Waterloo Place, London,
S. W.

TOB. G. RIDGWAY,
Not. Pub., 5 Waterloo Place, London, S. W.