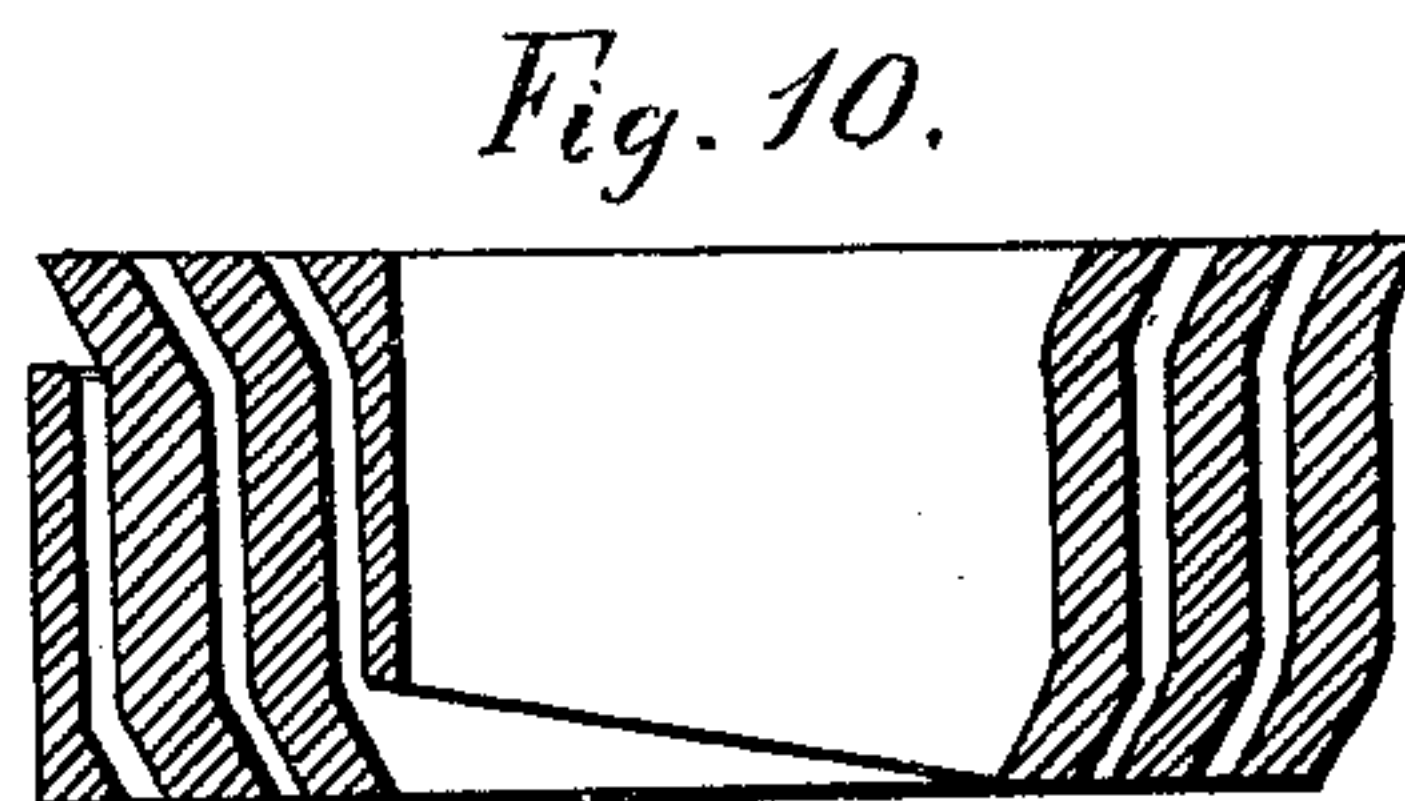
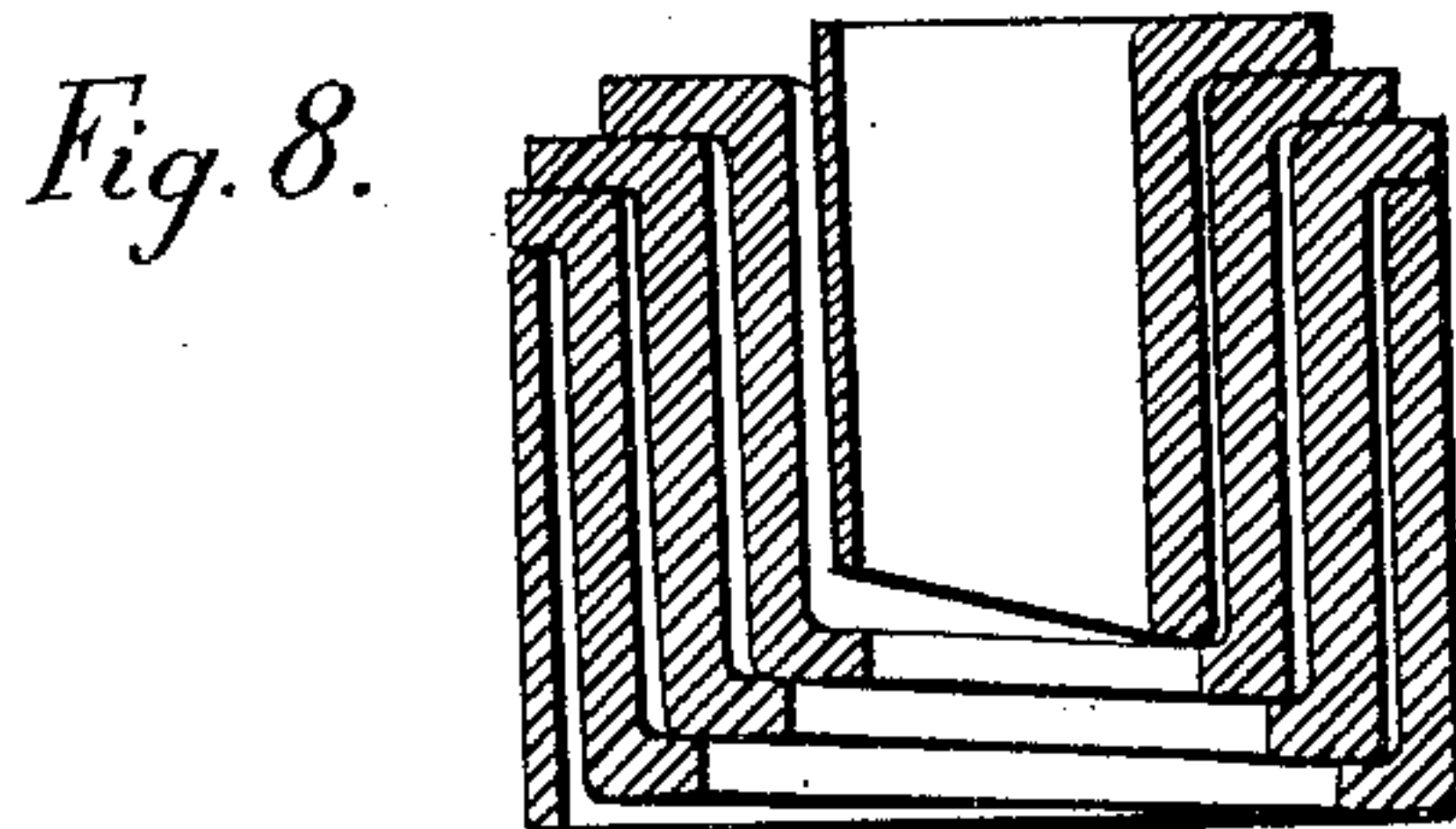
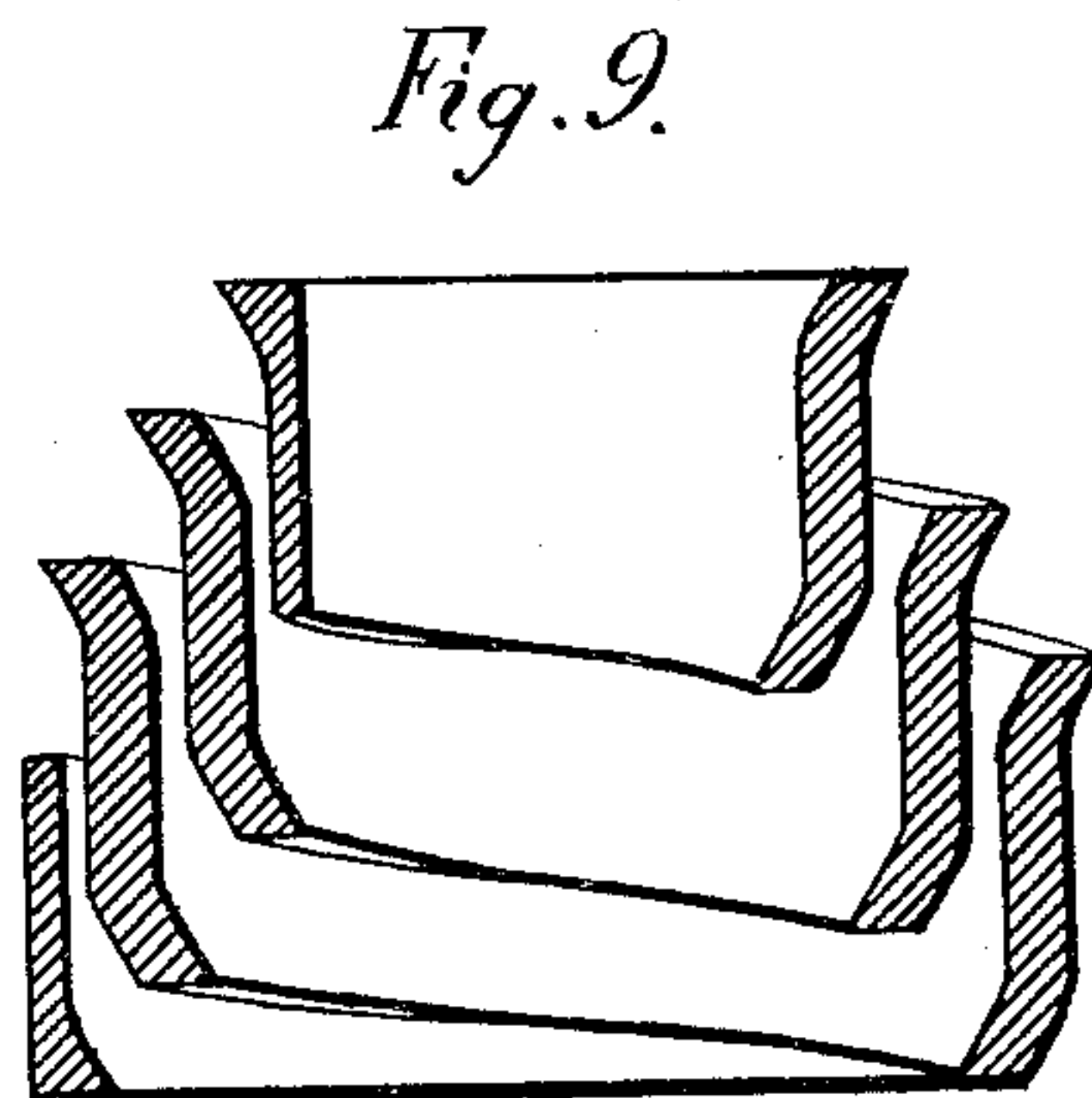
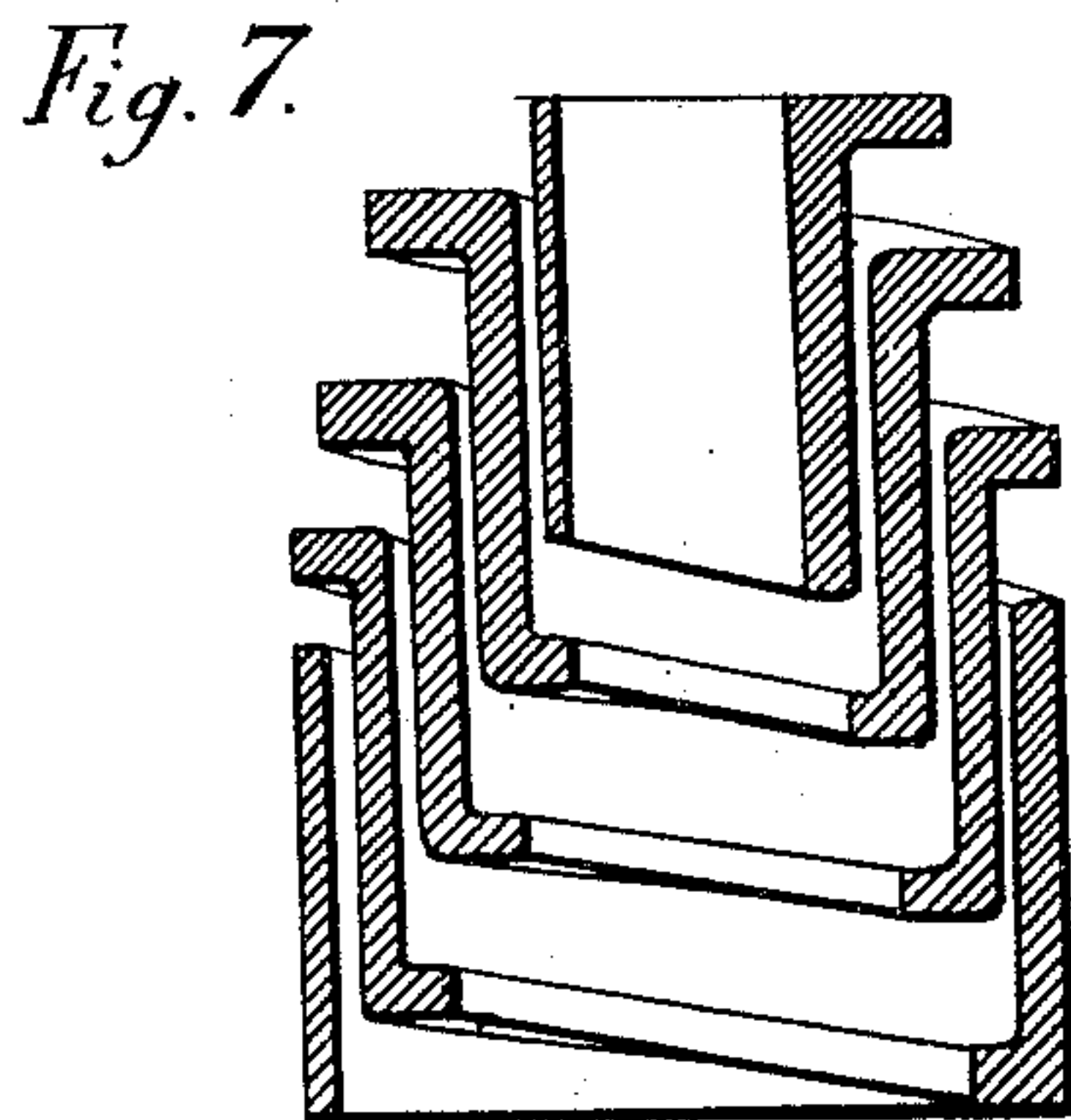
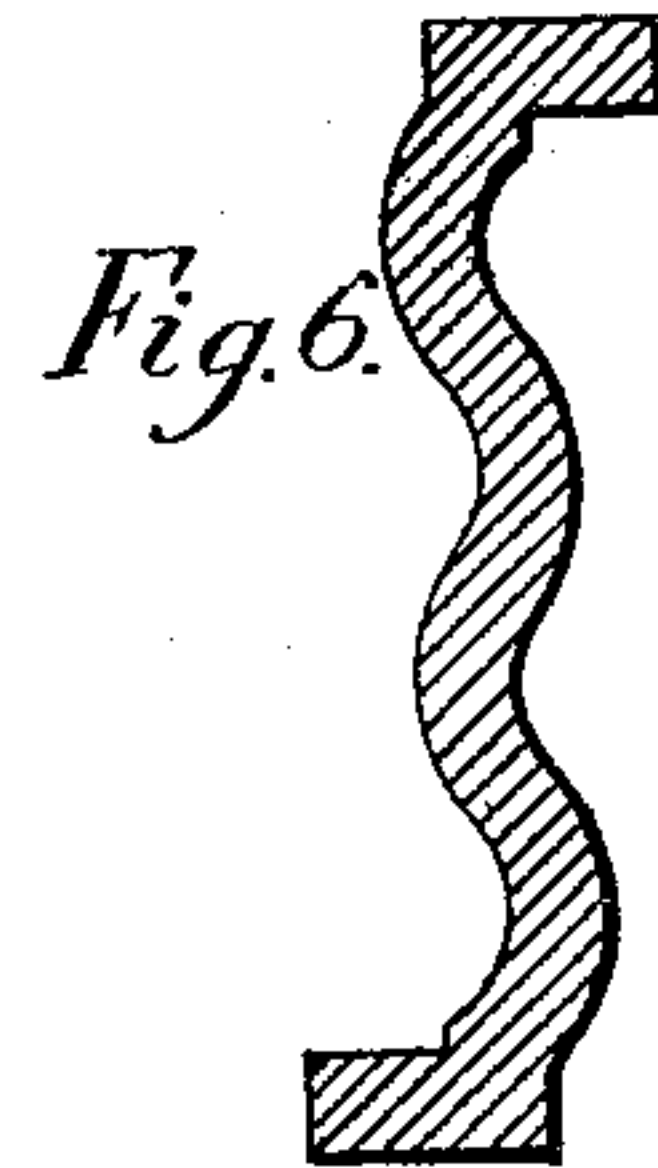
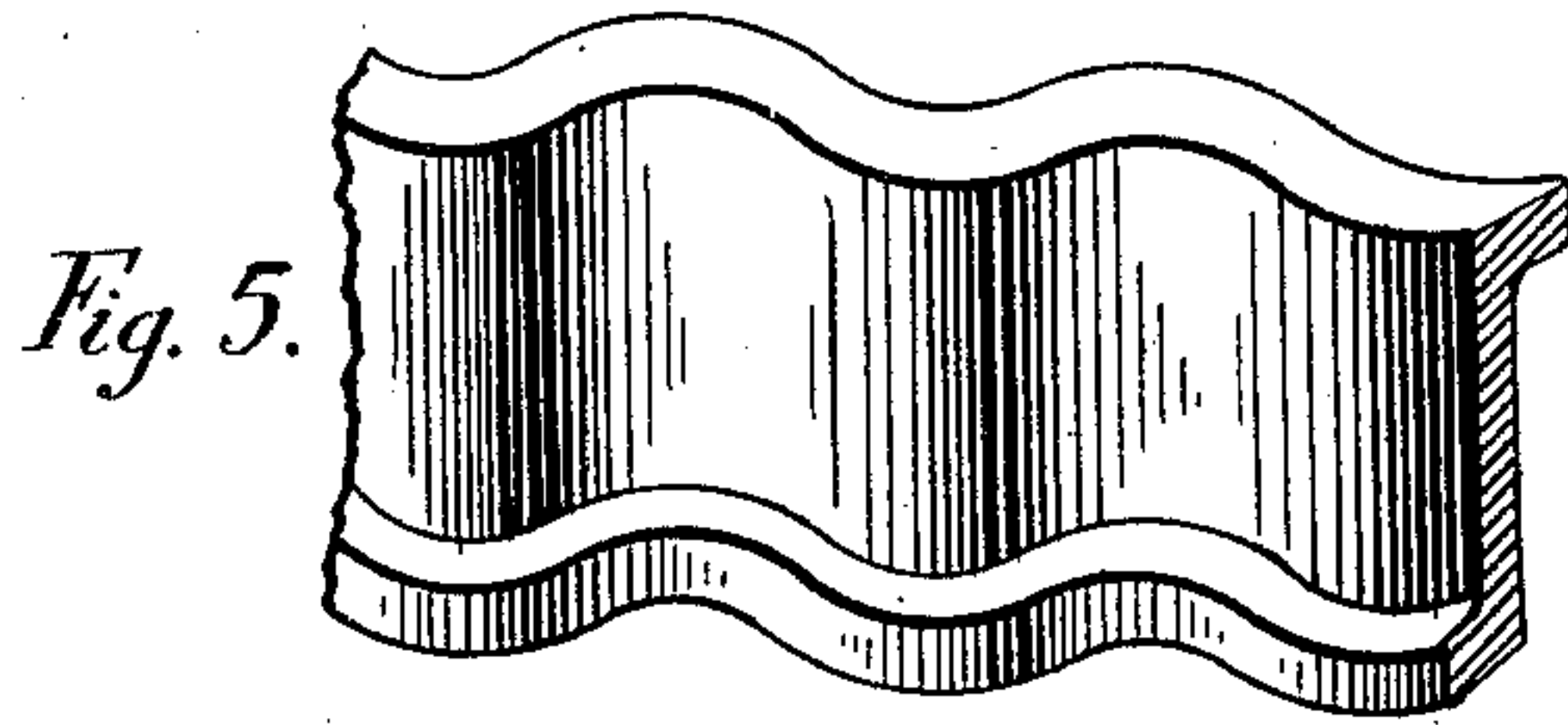
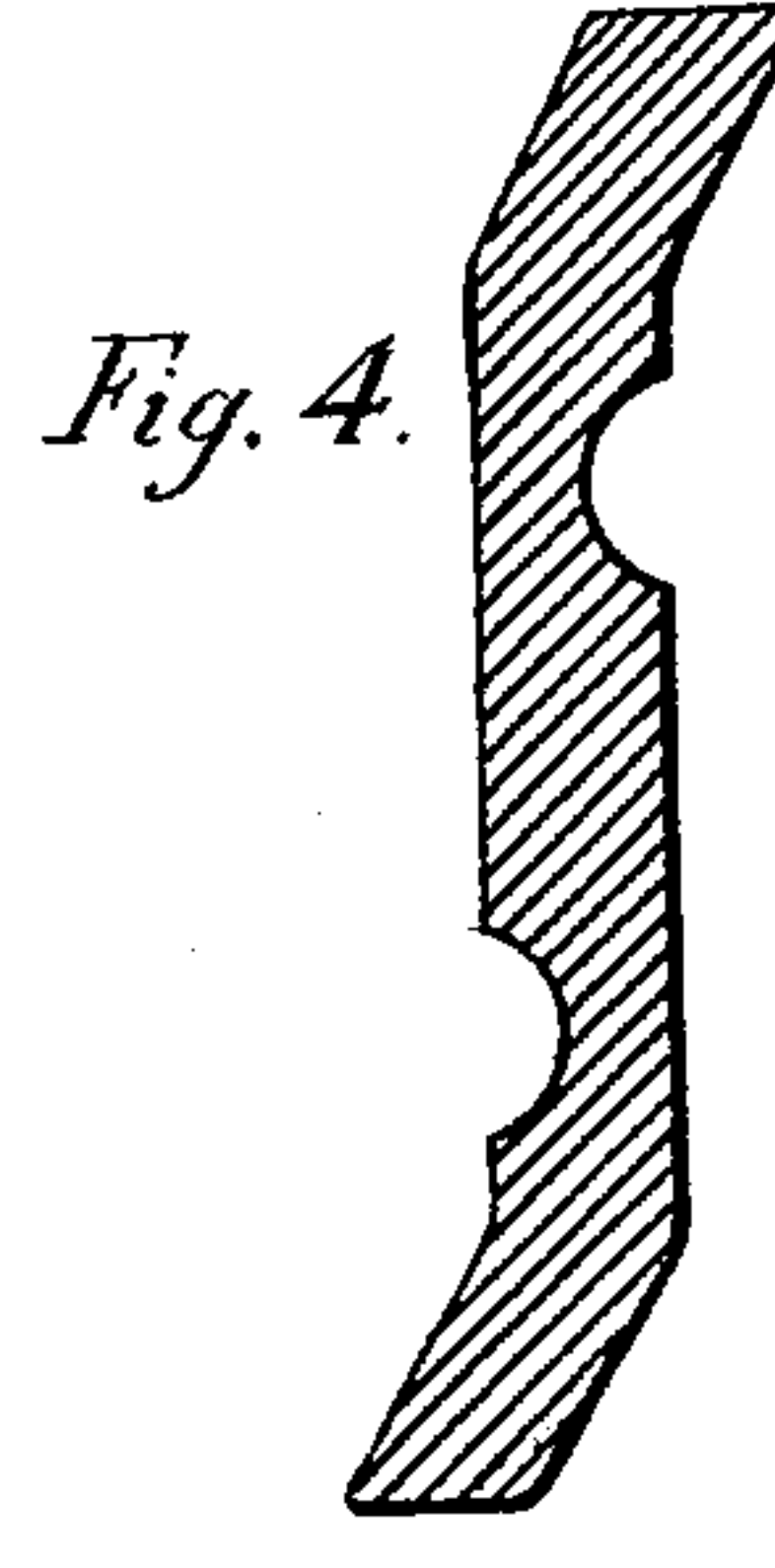
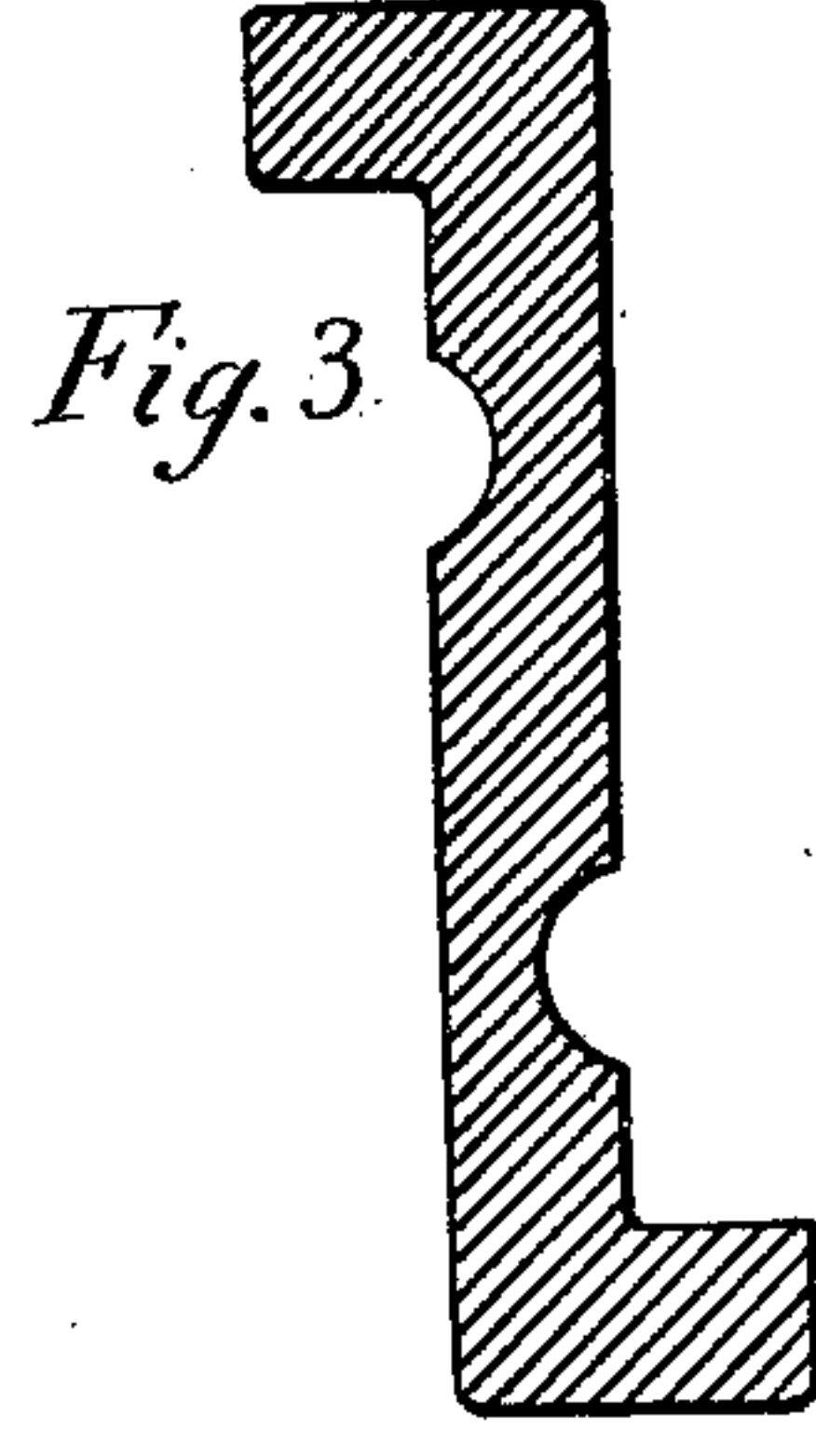
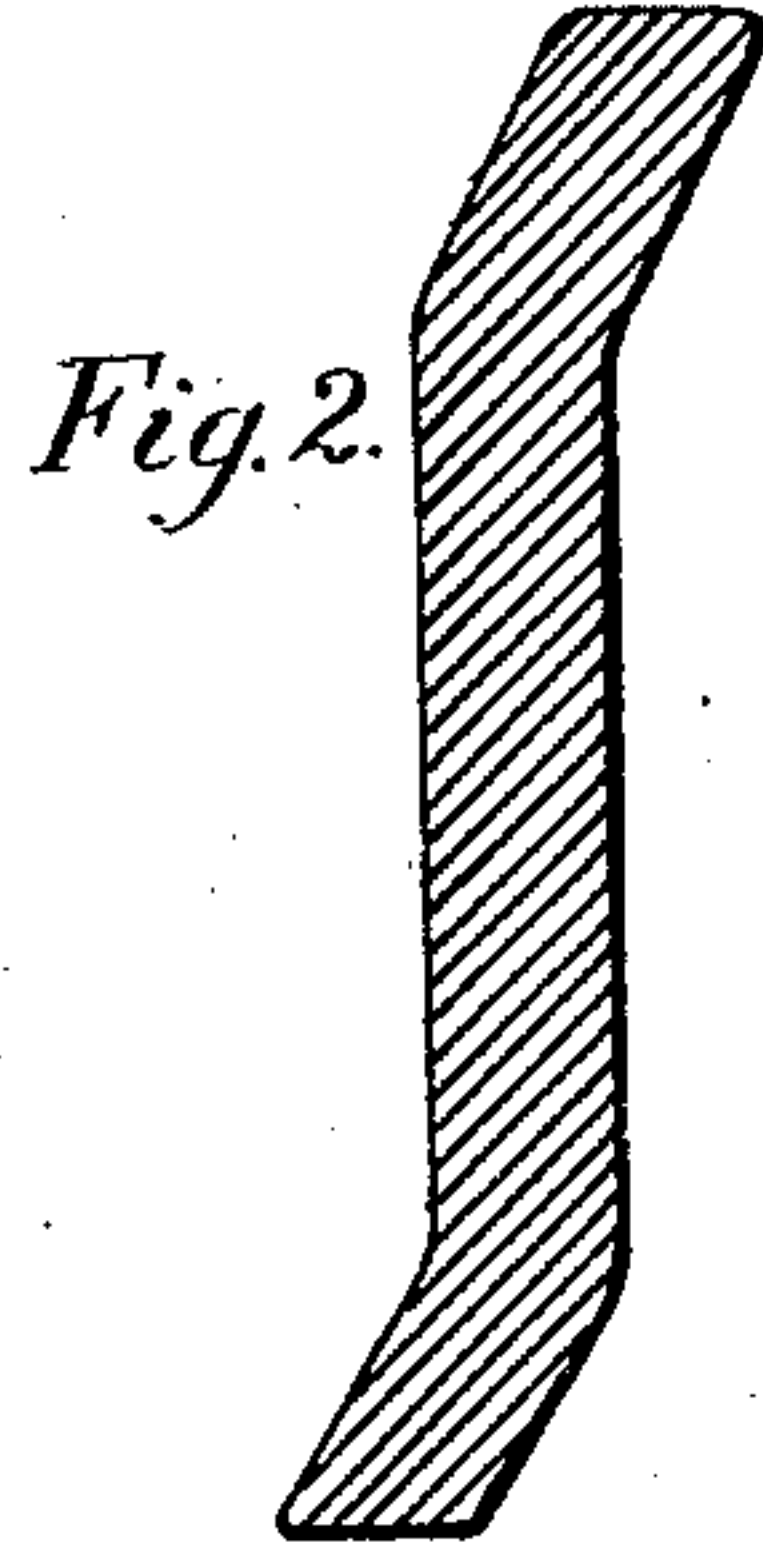
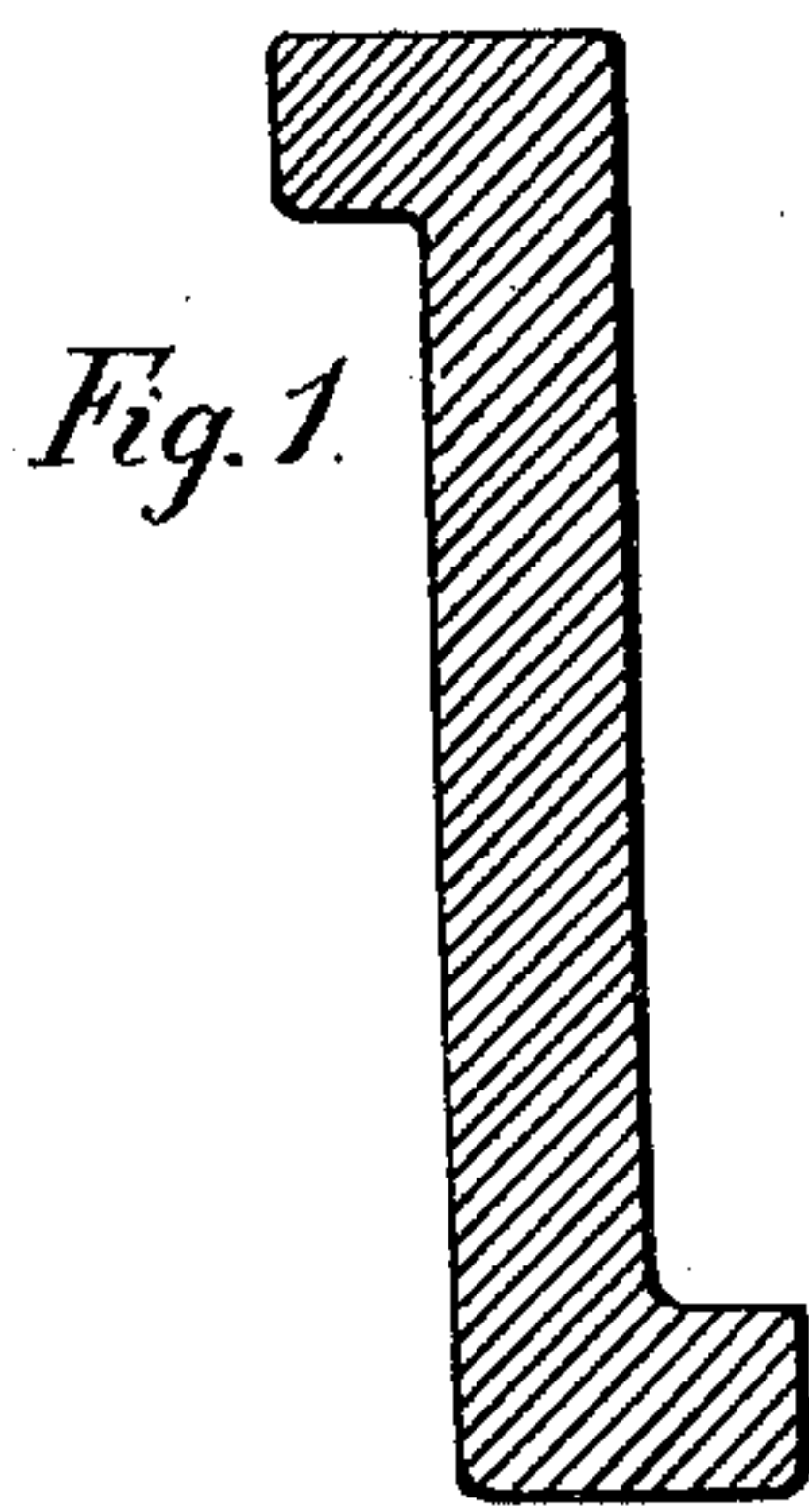


(No Model.)

I. A. TIMMIS.  
COILED STEEL SPRING.

No. 432,342.

Patented July 15, 1890.



*Witnesses*  
*C. W. Curtis*  
*J. B. McGinnis*

*Inventor*  
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*by C. W. Curtis*



# UNITED STATES PATENT OFFICE.

ILLIUS AUGUSTUS TIMMIS, OF LONDON, ENGLAND.

## COILED STEEL SPRING.

SPECIFICATION forming part of Letters Patent No. 432,342, dated July 15, 1890.

Application filed April 14, 1890. Serial No. 347,921. (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, civil engineer, a subject of the Queen of Great Britain, residing at No. 2 Great George Street, Westminster, London, S. W., 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 France, No. 199,278, dated June 29th, 1889; and in Belgium, No. 86,852, dated July 15, 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. With these objects in view I roll steel bars of various sections and coil them into volute spiral forms, as shown in the annexed drawings, and described hereinafter.

The bars rolled are flat, but with flanges, as at Figures 1 and 2. They may have one or more grooves in them, as at Figs. 3 and 4, and these grooves may be on one or both sides and in any part of the bar, and of any shape. They may also be rolled with corrugations in them of any shape and size, and these corrugations may be in any direction crosswise, Fig. 5, or longitudinally, Fig. 6, or diagonally. The webs may be at any angle. (See Figs. 1, 2, 3, and 4.) Figs. 7 and 9 show springs coiled free, and Figs. 8 and 10 show the same springs pressed home.

The thickness of the web apparently takes away correspondingly from the range or action of the spring; but I find it does not do so, as it gives an increased angle of pitch, and thus the range is not decreased. I find, also, that with the same weight of metal I get considerably more power. I have obtained

one-third more; and a further advantage is that the coils keep clear of each other, and thus I get an absence of friction. I would point out that the two flanges act as the strengthening-webs of a girder, and also that with one flange only there is as much harm as good done; but with the double flange the tendency to torsional resistance on one side by one flange is counteracted by the opposite flange.

The width and thickness of the bars and the size and shape of the webs are varied to suit the diameter, hole, range, power, &c.

As a matter of course the bars are rolled, so that the best effect is obtained when they are coiled and made into finished springs.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is—

1. A spiral volute spring consisting of a bar of metal presenting in cross-section a body part having sides substantially parallel with the axis of the spring and outwardly and inwardly turned flanges on its opposite edges, respectively, substantially as described.

2. A spiral volute spring consisting of a bar of metal having a body with sides substantially parallel with the axis of the spring and grooved in the direction of the length of the bar, with outwardly and inwardly turned flanges at its opposite edges, respectively, substantially as described.

In testimony that I claim the foregoing I have hereunto set my hand this 24th day of January, 1890.

ILLIUS AUGUSTUS TIMMIS.

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