

(No Model.)

2 Sheets—Sheet 1.

P. O. GREIPP.  
MANUFACTURE OF SPRINGS.

No. 454,963.

Patented June 30, 1891.



FIG. 2.

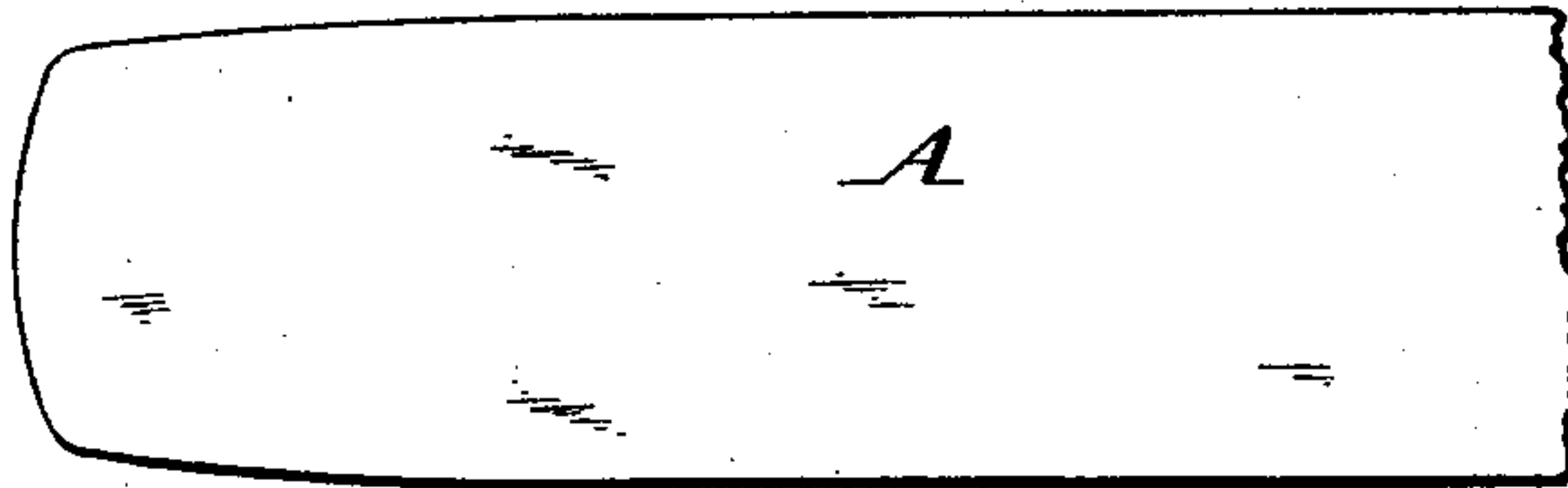


FIG. 3.

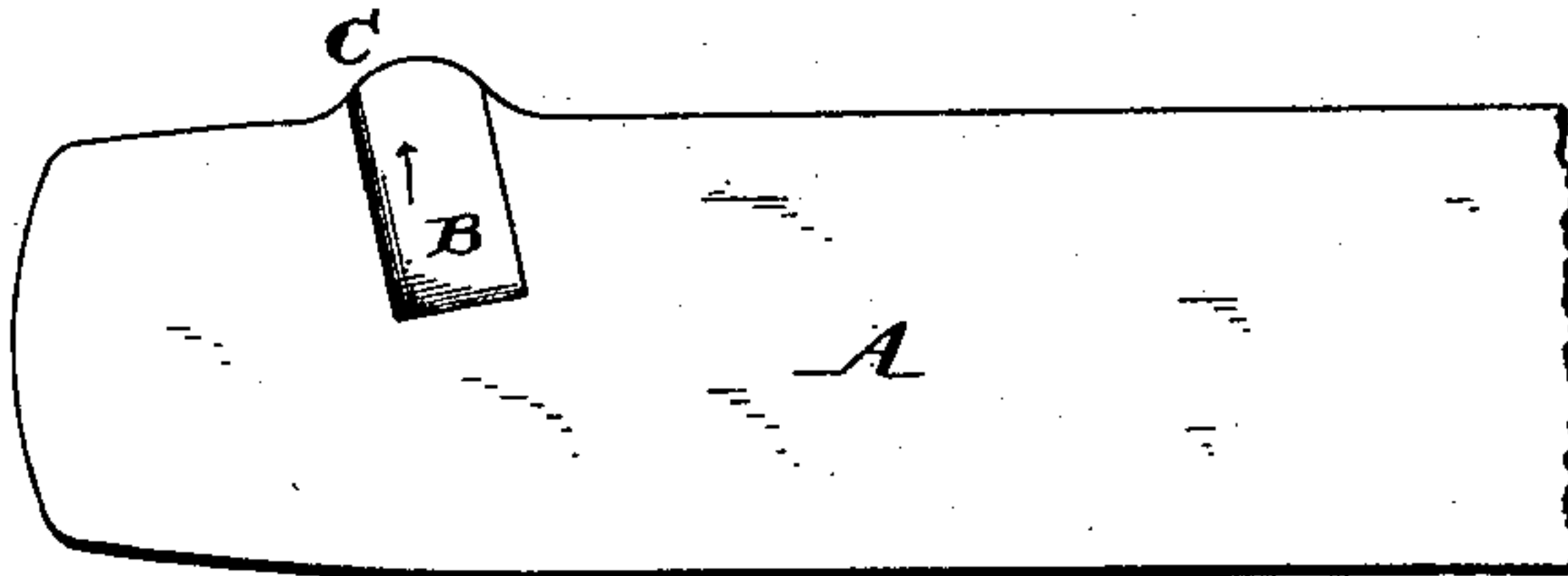


FIG. 4.

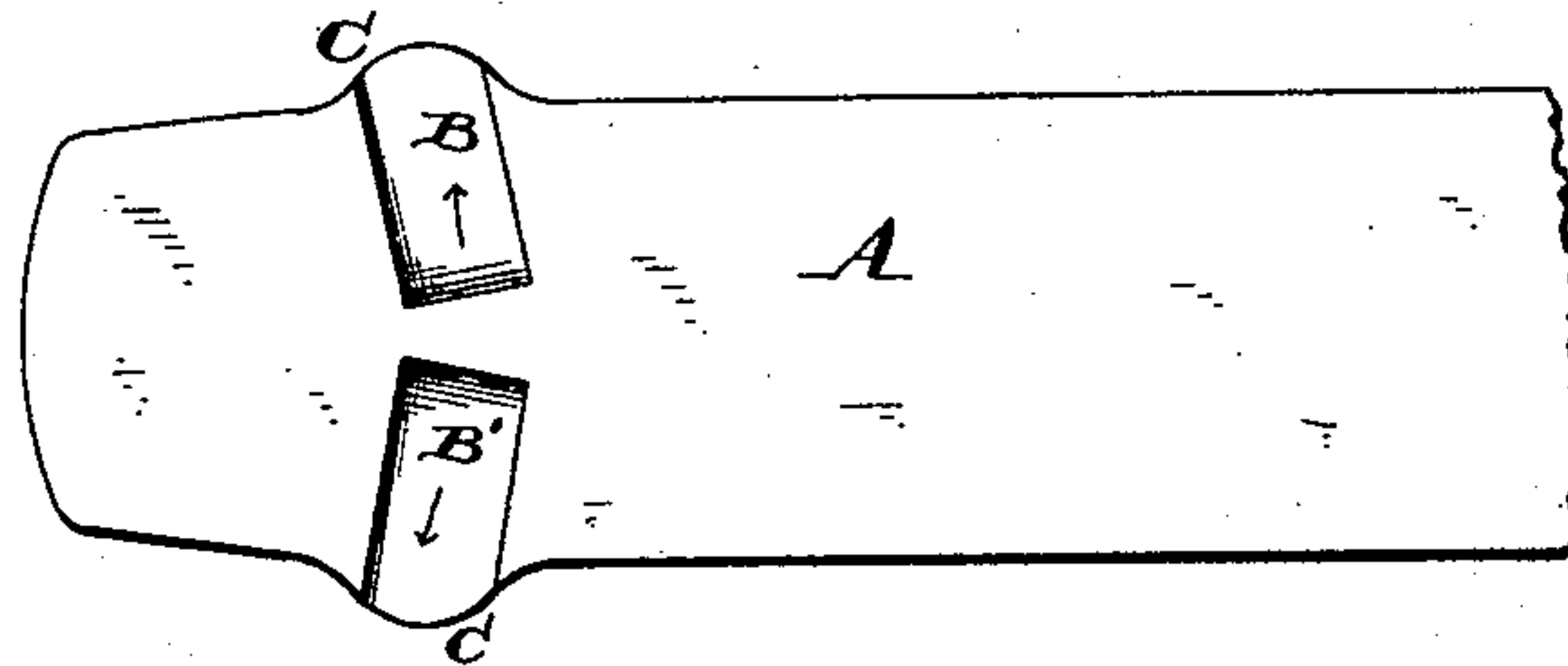


FIG. 5.

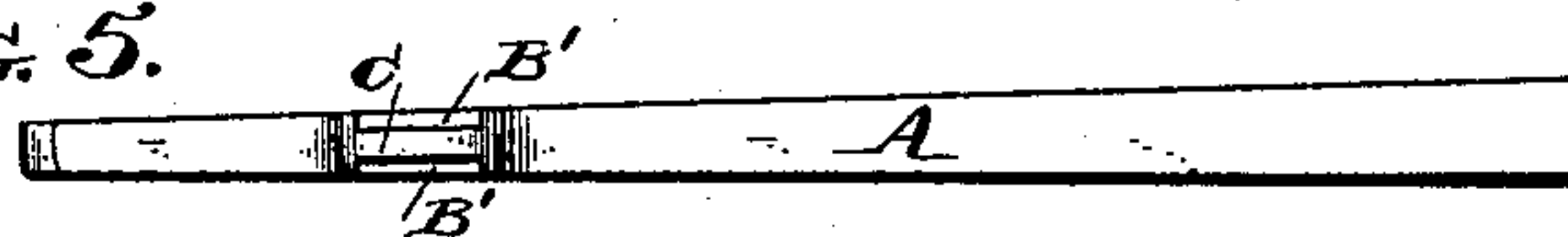


FIG. 8.



FIG. 10.



FIG. 6.

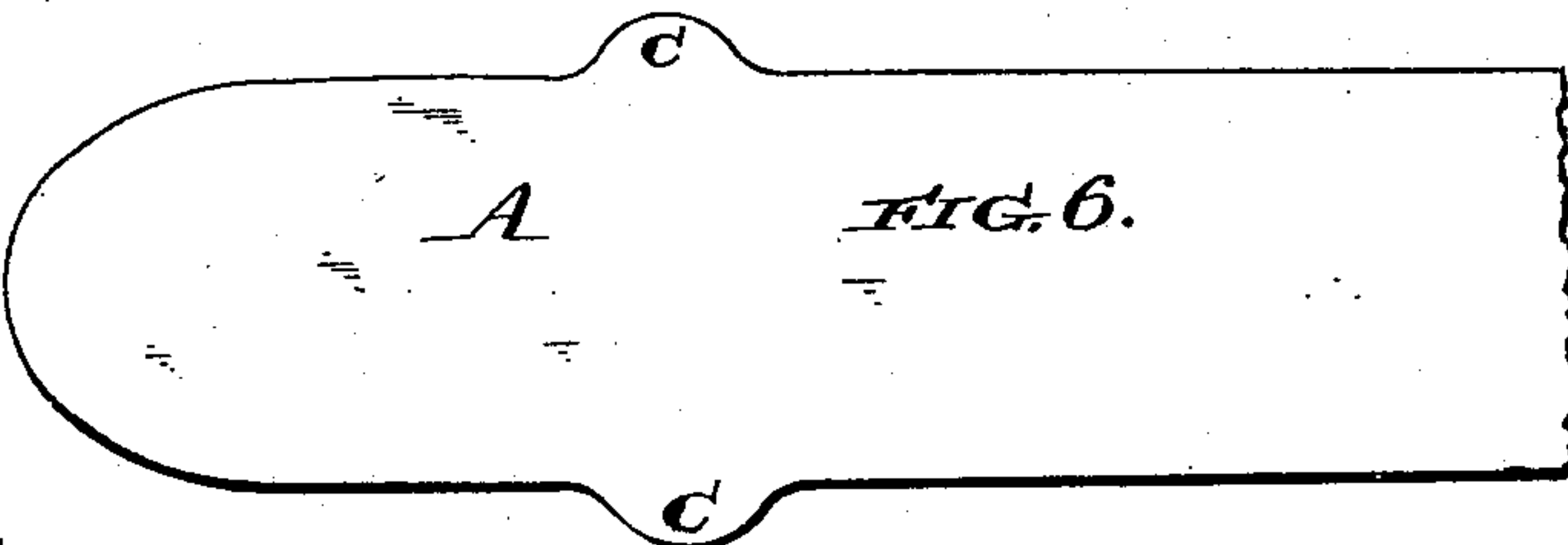


FIG. 7.



FIG. 9.



Witnesses:

Henry Dunning  
Joshua M. Kasky, Jr.

Inventor:

Peter Otto Greipp  
by his atty.  
James T. Chambers

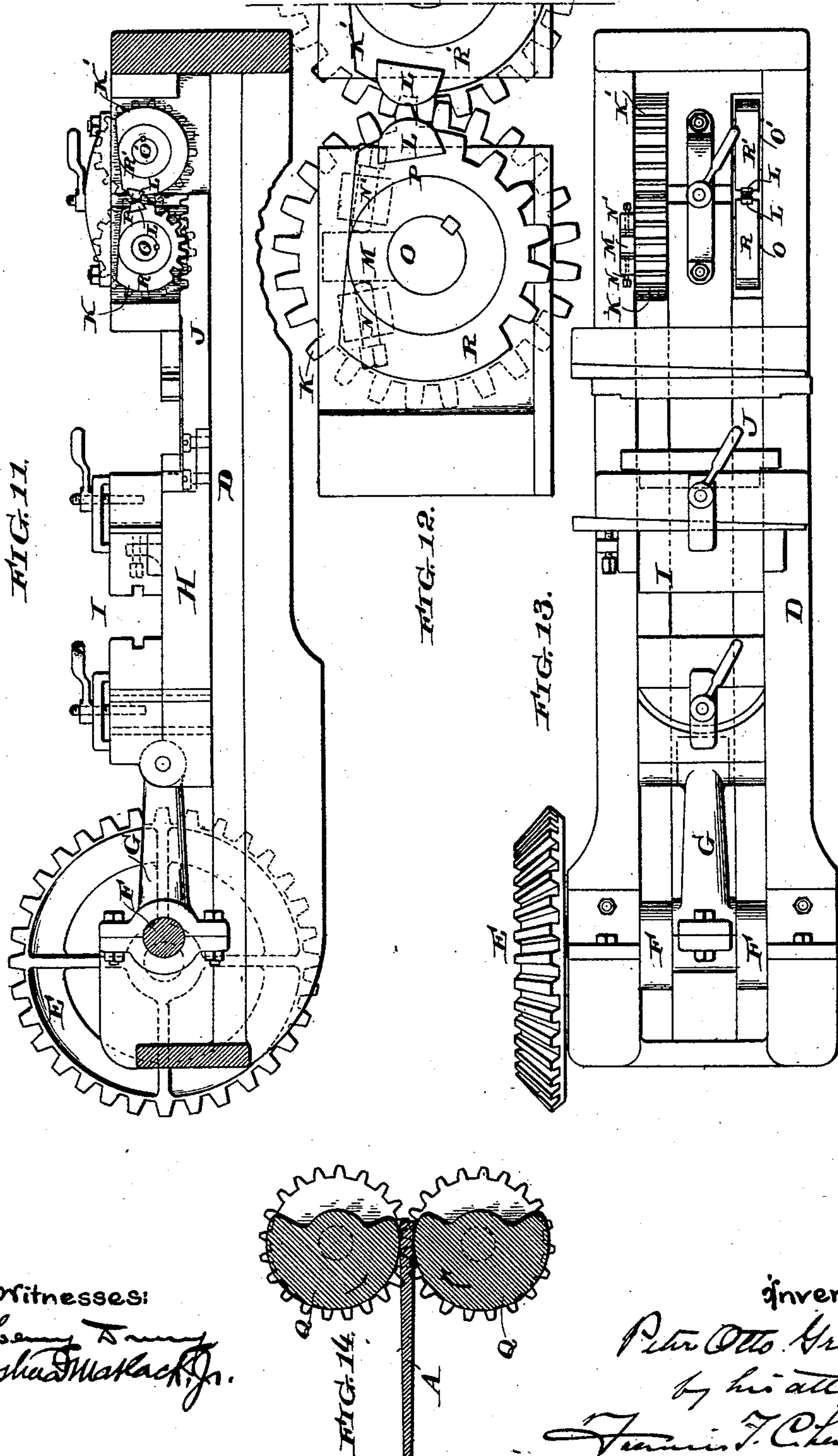
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2 Sheets—Sheet 2.

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# UNITED STATES PATENT OFFICE.

PETER OTTO GREIPP, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO  
WILLIAM & HARVEY ROWLAND, OF SAME PLACE.

## MANUFACTURE OF SPRINGS.

SPECIFICATION forming part of Letters Patent No. 454,963, dated June 30, 1891.

Application filed March 24, 1891. Serial No. 386,234. (No model.)

*To all whom it may concern:*

Be it known that I, PETER OTTO GREIPP, of the city and county of Philadelphia, State of Pennsylvania, have invented a certain new and useful Improvement in the Manufacture of Springs, of which the following is a true and exact description, reference being had to the accompanying drawings, which form a part of this specification.

My invention relates to the manufacture of elliptic springs in which the composite spring is made of a series of metal plates or leaves, and particularly to that kind in which the superimposed leaves of the spring are held in proper alignment by having one or more lugs extending downward from the end of each leaf, so as to lap over the edge of the next leaf. Heretofore such projecting lugs have, so far as I am aware, been formed either by welding them to the metal of the leaf proper or by forming an enlarged head to the leaf in the process of rolling it, and then cutting away the metal, so as to give it the desired form and leave the projecting lugs, which are afterward bent down at or substantially at a right angle.

The object of my invention is to form the lugs in a new and inexpensive way; and my method consists in subjecting the blank from which the leaf is formed before it has been rolled down to its ultimate thickness to the action of narrow rolls or cams, which engage the blank at or near the center and, acting crosswise to it, form grooves and simultaneously push out the metal to the side toward which they act. After this treatment the blank is rolled down to its ultimate proportions by rolls acting upon it in the direction of its length and which obliterate the grooves formed by the narrow rolls aforesaid, while leaving the metal pushed out by them unaffected, or, if affected at all, slightly broadened. The spring-leaf thus prepared may be sold, or if it is to be assembled with other leaves into an elliptic spring at once the lugs at its side are bent down so as to lap over the next leaf in the composite spring, reference being now had to the drawings, which illustrate my invention, and in which—

Figure 1 is a view of half of an elliptic spring of the kind to which my invention re-

lates; Fig. 2, a plan view of a leaf-blank in the condition in which it is prior to treatment by my process; Fig. 3, a plan view illustrating the result of subjecting the blank to the action of the narrow cross-acting rolls; Fig. 4, a similar view showing the blank after it has been twice passed through the rolls to form lugs on each side; Fig. 5, an edge view of the blank as shown in Fig. 4; Fig. 6, a plan view of the blank after it has been rolled down in a longitudinal direction to its proper thickness and size; Fig. 7, an edge view of the blank shown in Fig. 6; Fig. 8, a cross-sectional view on the line 1 2 of Fig. 7; Fig. 9, a view of the end of the spring-leaf, showing the lugs turned up to engage an adjacent leaf; Fig. 10, a cross-section on the line 3 4 of Fig. 9; Fig. 11, an elevation of a machine adapted for use in effecting the cross-rolling of the blank; Fig. 12, an enlarged view of the rollers and immediate connections; Fig. 13, a plan view of the same machine, and Fig. 14 an elevation showing a pair of segmental eccentric rolls used in rolling down the blank to its final proportions and size.

A is the blank; B and B', grooves formed by the cross-rolling; C C, the projections or lugs forced out from the side of the blank by the cross-acting rolls.

D is the frame of the machine; E, the driving-wheel, shown here as a beveled pinion; F, a crank actuated by said pinion; G, a connecting-rod connected with the crank and actuating a rack J. As shown, the connecting-rod acts upon the rack J through the mechanism illustrated at H and I, which, however, as it forms no part of my present invention, need not be described. It is here shown simply to illustrate the ease with which the cross-rolling mechanism can be attached to other mechanism used in spring-works. The rack J engages a pinion R, attached to a shaft O, and upon which shaft is also secured a pinion K, said last-mentioned pinion engaging a pinion K' on a counter-shaft O', so that the two shafts rotate with the same speed in opposite directions. Upon the edge of the pinion R and the edge of a corresponding disk R', attached to shaft O', are formed or secured the active or biting faces L L, between which the blank is passed to form the grooves B B' and



the lugs C. In order to preserve a proper alignment between these active faces, the pinion K is preferably made adjustable upon the shaft O, a projection M extending from the shaft, and set-screws N N', working in lugs secured to the pinion K, resting against the projection M, as shown best in Fig. 12.

Q Q, Fig. 14, show a pair of segmental eccentric rolls such as are used in rolling down the blanks longitudinally to their proper size and to obliterate the grooves formed by the cross-acting faces L L.

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

1. In the manufacture of spring-leaves, the method of forming lugs at the sides thereof, which consists in passing the blank between

narrow rolls arranged to groove the metal across the blank and push it out to the side thereof and then rolling the blank lengthwise to bring it to proper thickness and obliterate the grooves.

2. In the manufacture of spring-leaves, the method of forming lugs at the sides thereof, which consists in passing the blank between narrow rolls arranged to groove the metal across the blank and push it out to the side thereof, then rolling the blank lengthwise to bring it to proper thickness and obliterate the grooves, and then bending the lug or lugs to an angle with the leaf.

P. OTTO GREIPP.

Witnesses:

LEWIS R. DICK,  
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