

(No Model.)

2 Sheets—Sheet 1.

M. REDLINGER.
SPRING HINGE.

No. 524,351.

Patented Aug. 14, 1894.

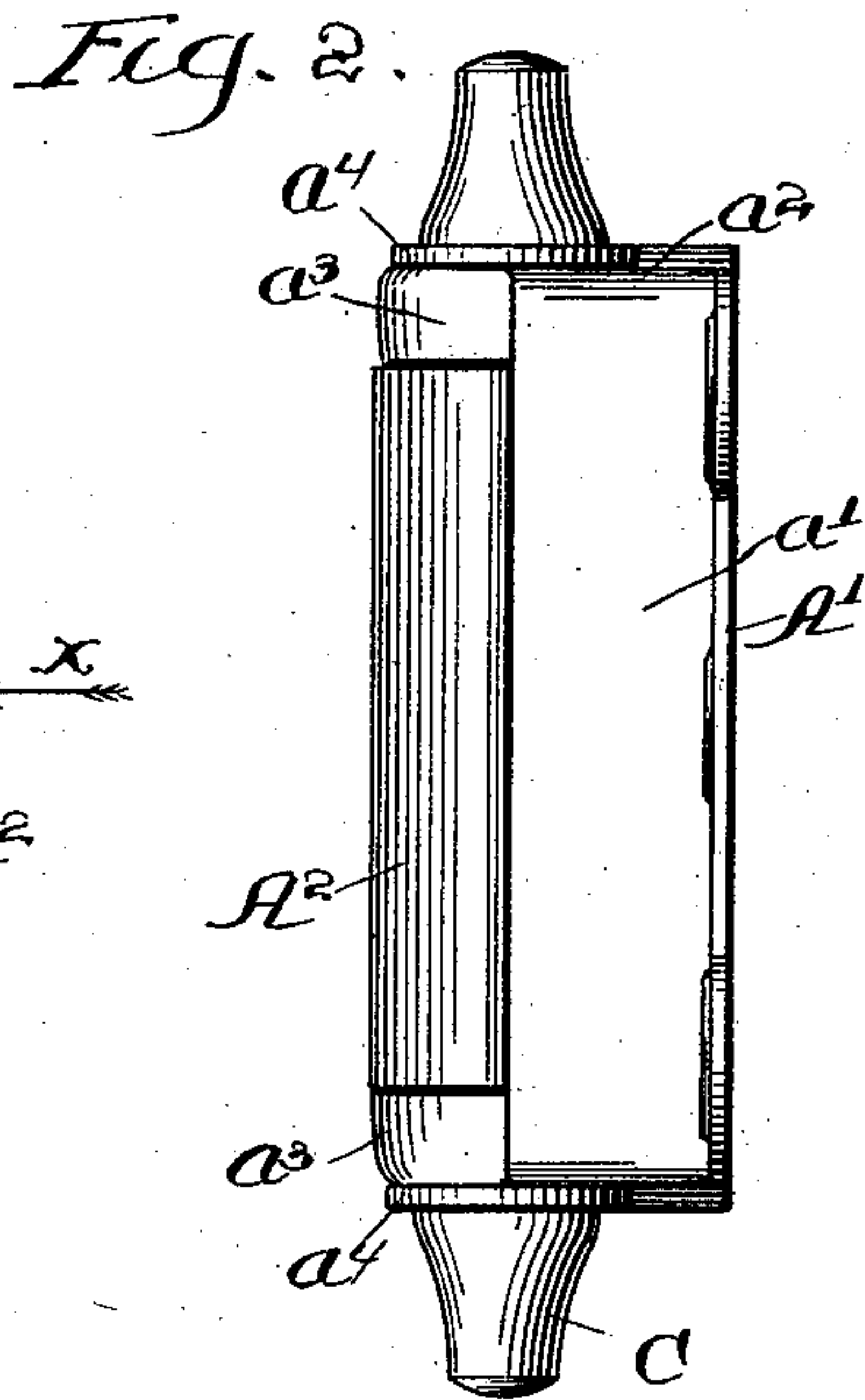
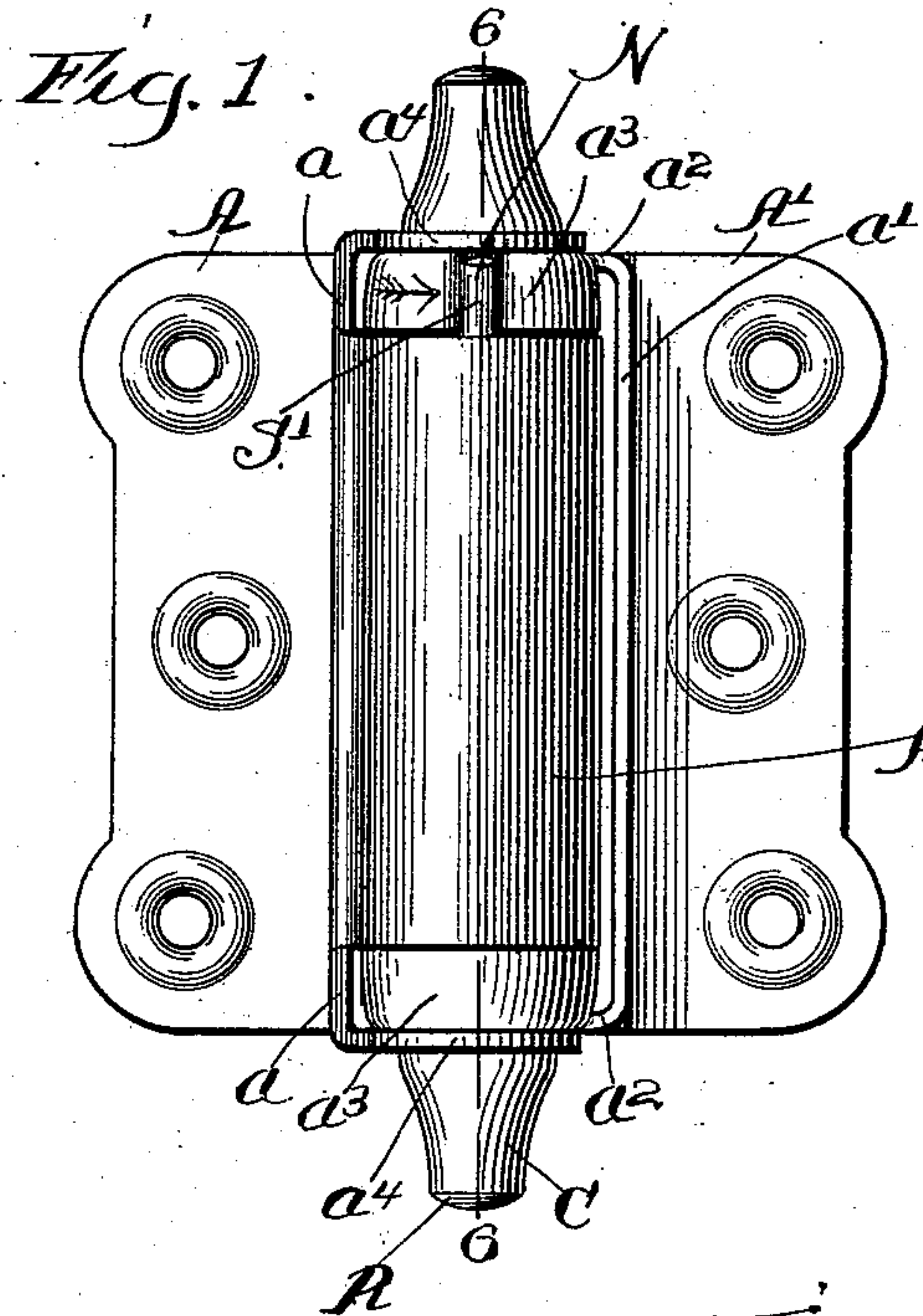


Fig. 3.

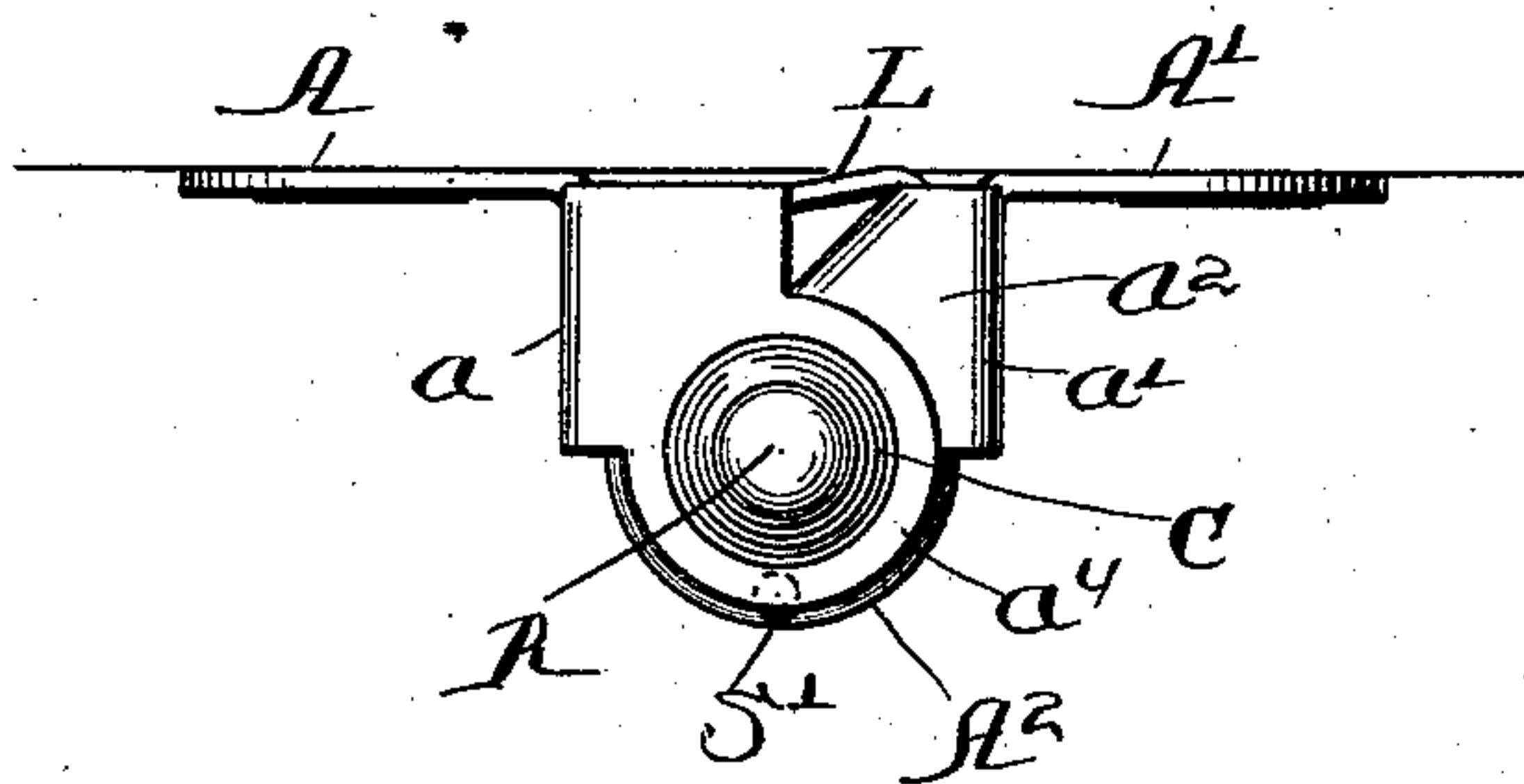
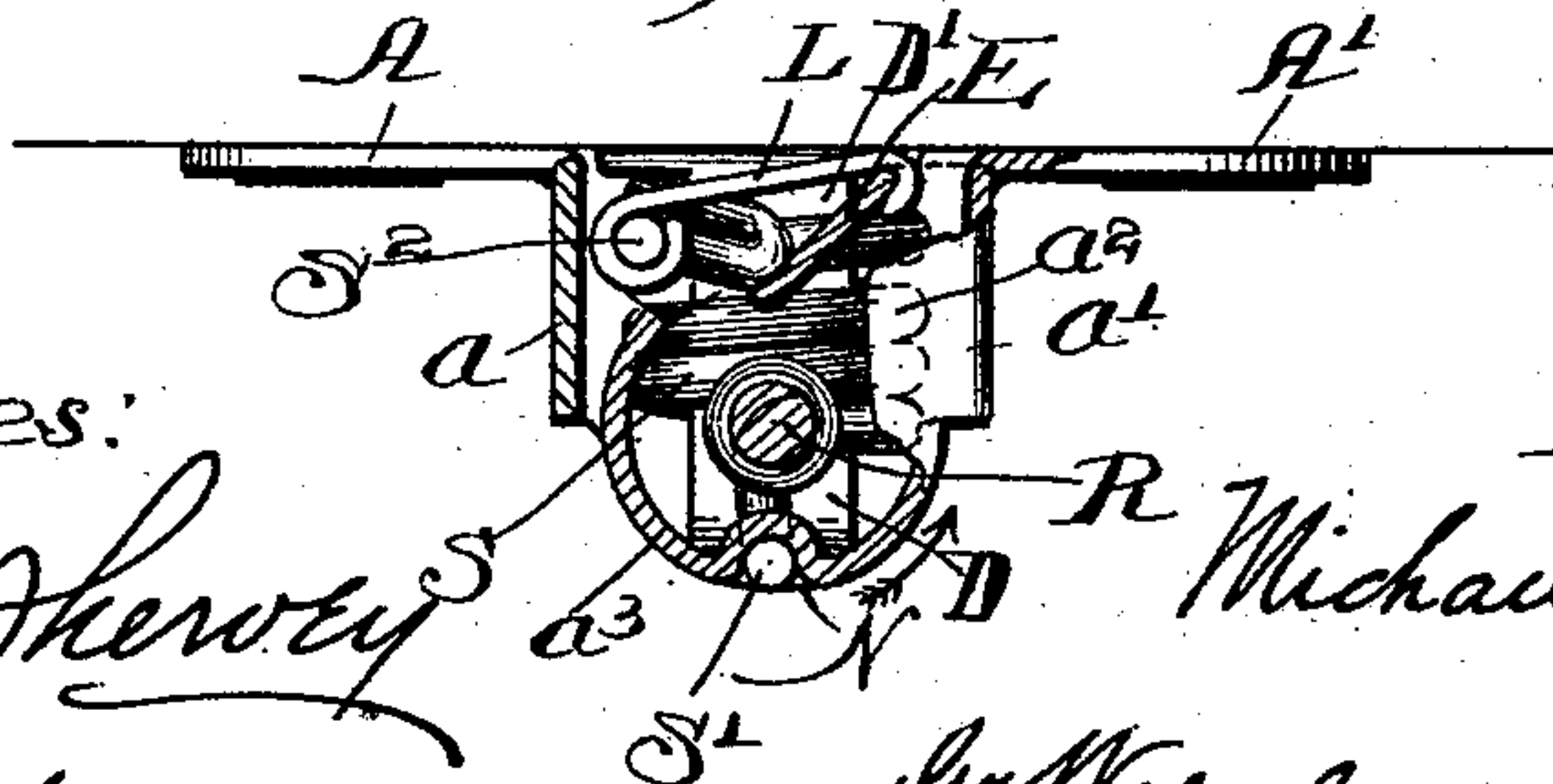


Fig. 4.



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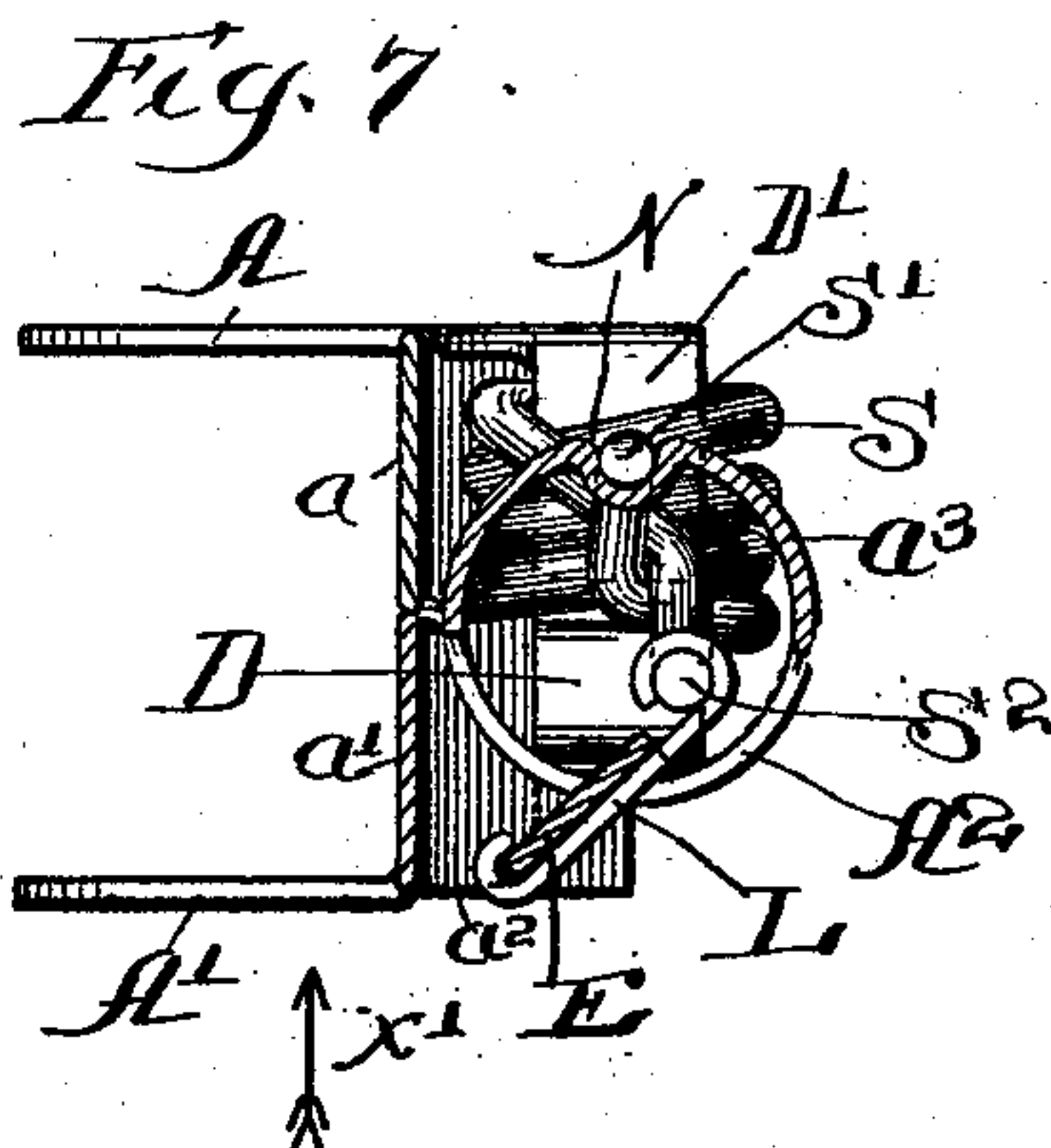
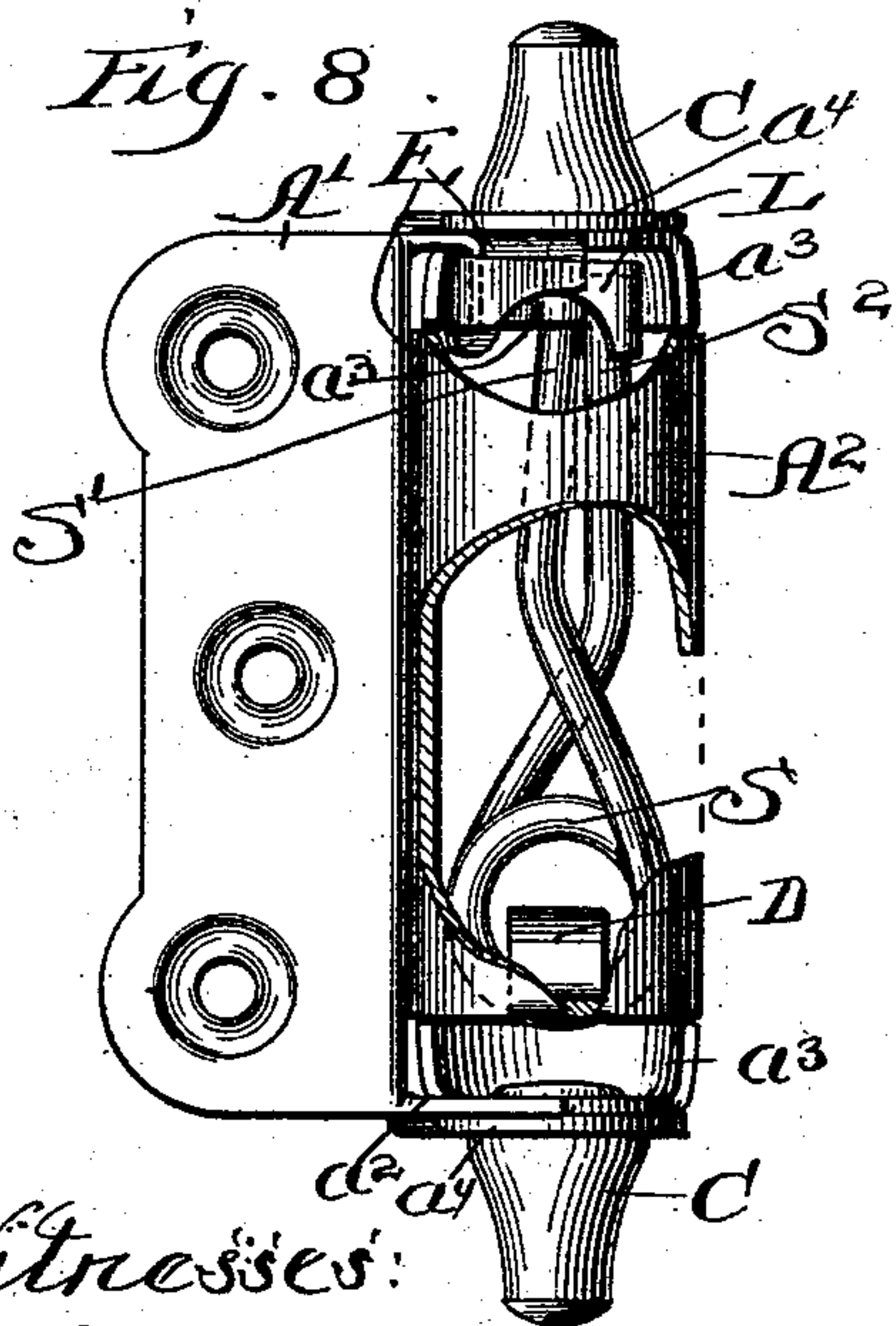
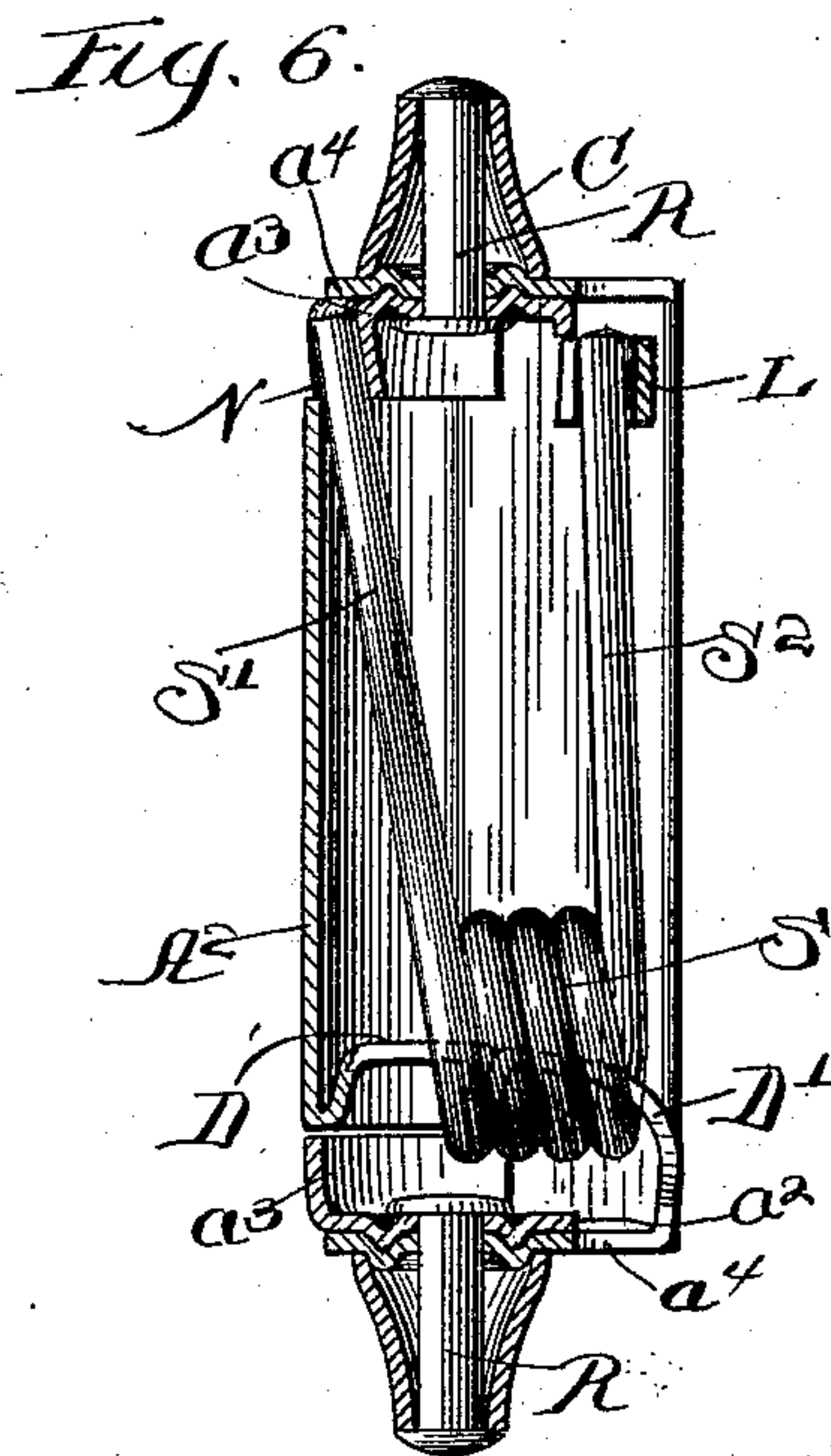
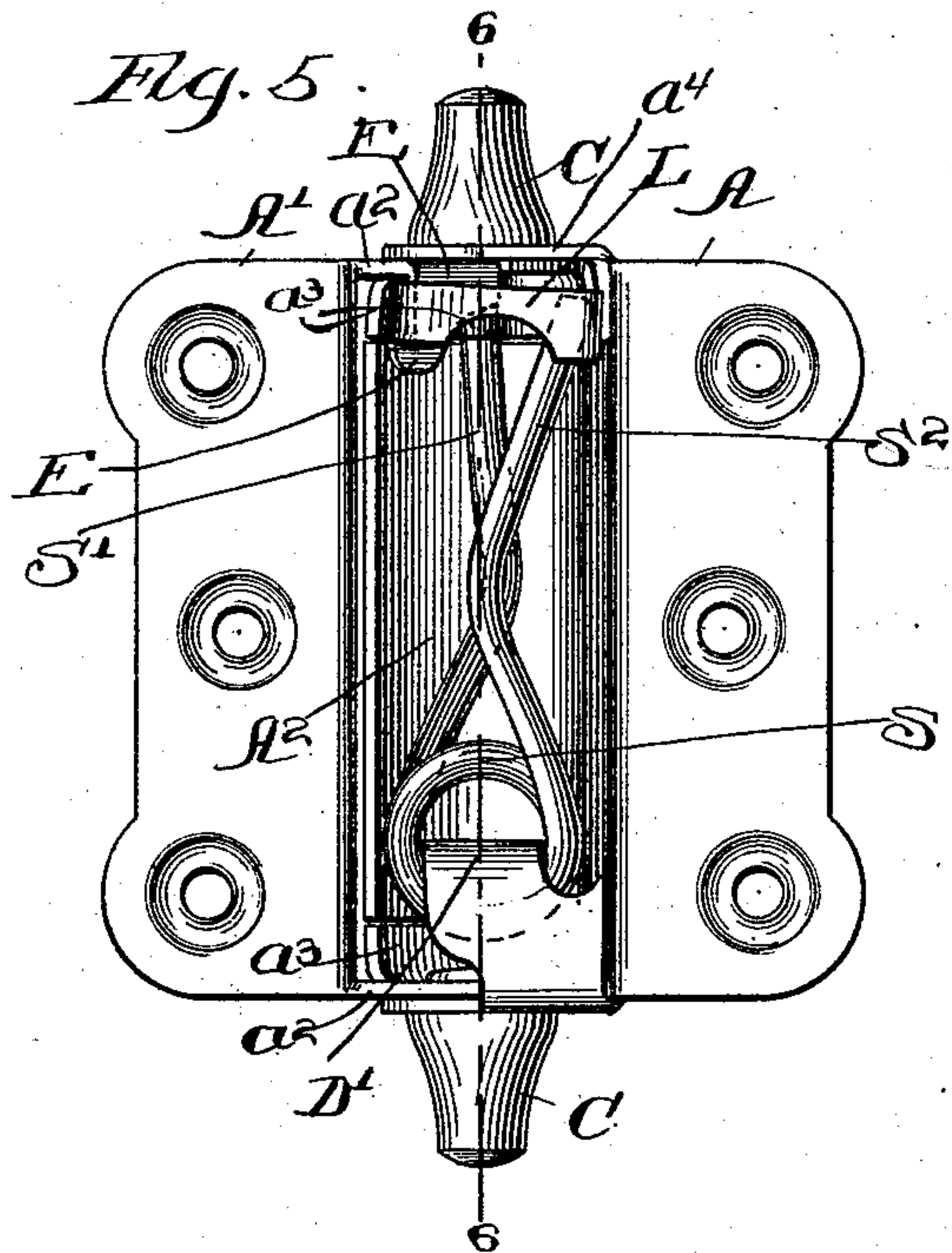
(No Model.)

2 Sheets—Sheet 2.

M. REDLINGER.
SPRING HINGE.

No. 524,351.

Patented Aug. 14, 1894.



Witnesses:

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UNITED STATES PATENT OFFICE.

MICHAEL REDLINGER, OF FREEPORT, ILLINOIS, ASSIGNOR TO ALBERT BAUMGARTEN, EDGAR H. MORGAN, AND CHARLES MORGAN, OF SAME PLACE.

SPRING-HINGE.

SPECIFICATION forming part of Letters Patent No. 524,351, dated August 14, 1894.

Application filed December 23, 1893. Serial No. 494,592. (No model.)

To all whom it may concern:

Be it known that I, MICHAEL REDLINGER, a citizen of the United States of America, residing at Freeport, in the county of Stephenson and State of Illinois, have invented certain new and useful Improvements in Spring-Hinges, of which the following is a specification.

My invention relates to improvements in spring hinges, and more particularly to improvements in that class of spring hinges in which the leaves and spring-supporting parts are formed of sheet-metal.

The invention is fully described and explained in this specification and shown in the accompanying drawings, in which—

Figure 1 is a front elevation of a hinge embodying my improvements. Fig. 2 is a side elevation of the same hinge, the view being in the direction indicated by the arrow, α , Fig. 1. Fig. 3 is a top plan of the same hinge. Fig. 4 is a top plan of the hinge, the upper end of the hinge being removed to show construction. Fig. 5 is a rear elevation of the hinge showing the location of the spring. Fig. 6 is a vertical section of the hinge through the line 6—6, Figs. 1 and 5. Fig. 7 is a top plan of the hinge open one hundred and eighty degrees from its normal position, the upper end of the hinge being removed as in Fig. 4. Fig. 8 is an elevation of the hinge in the position shown in Fig. 7, the view being in the direction indicated by the arrow, α' , Fig. 7.

In the views, A, A' are two leaves of suitable form showing screw-holes for attaching them to a door and casing lying in the same plane, the hinge shown in the drawings being what is known as a surface hinge. At suitable distances from their outer margins the two leaves are bent forward at right angles to form the two approximately parallel sides, a, a' , of a spring-inclosing case. The side, a' , on the leaf, A', has its ends, a^2, a^2 , bent inward at right angles to itself and parallel to each other and each of these inwardly turned parallel ends terminates in a circular ear adapted to form part of a knuckle joint. These ears have their margins bent inward to form annular flanges, a^3, a^3 , one of which is formed with a notch or depression, N,

shown in Figs. 1, 4, and 6. The side, a , formed on the leaf, A, has its ends a^4 , turned inward parallel to each other to form ears at such distance from each other as to fit closely against the outer faces of the ears on the leaf, A'. All of the ears are formed with central openings for the reception of rivets, R, R, which hold them together in pairs and each of the ends of the hinge is preferably finished by means of a cap, C, of suitable form held in place by the corresponding rivet.

The ears and cap at each end of the hinge may be of any desired construction, but I prefer that shown in Fig. 6, in which the central openings of the ears are encircled by annular corrugations fitting one within the other, and preferably projecting outward, and the inner end of the cap is hollow or concave and fits closely about the corrugation on the ear with which it is in contact. This construction adds greatly to the stability of the joints of the hinge and of the caps or tips at its ends.

I am aware that in the construction of sheet-metal hinges it has heretofore been proposed to form the ears with outwardly swaged cones conforming to each other to form hinge joints, but it is impossible to give these cones sufficient projection to make the suitable ornamental tips which are almost indispensable in making a marketable hinge. Such tips have sometimes been riveted on the outer faces of the flat sheet metal ears of hinges, but they are unstable and apt to fall out of line and thus detract from rather than add to the appearance of the hinges. The construction described obviates this difficulty and makes it a simple matter to apply to the ears of sheet-metal hinges such tips as shall be suitable and ornamental.

The central portion of the side, a , upon the leaf, A, is continued or extended and bent into a curved shell, A², which forms a cover for the case partly formed by the sides, a, a' . The cover, A², has a curve corresponding to that of the annular flanges, a^3, a^3 , so that when the two leaves are in working relation, these flanges and the cover completely close the outer or front face of the spring-inclosing case and present the appearance of a semi-cylindrical shell.

Within the case lies a spring made up of a

coil, S, and two arms, S', S², the coil being located at one end of the case and the arms being of such length as to extend to the opposite end thereof. The coil is held in place by means of two fingers, D, D', bent downward from the cover A², and upward from the lower margin of one of the ends, a⁴, of the leaf, A, respectively. These two fingers lie within the coil and not only hold it in place in the case, but prevent its rotation under the torsional strain to which it is subjected.

In my prior patent No. 447,844, I have shown and described a hinge similar in many particulars to the one forming the subject of this application and in that hinge the coil of a spring substantially like the one shown herein is mounted on a single finger, termed a post or pin, the finger being formed integral with the hood or cover of the case. In the hinge shown and described herein, the coil of the spring is supported upon the two fingers, D, D', in the manner above set forth. The advantage of the use of the two fingers entering the opposite ends of the coil as compared with the single finger shown in said prior patent is that the coil may, and sometimes does, slip off the single finger after the parts of the hinge are assembled, but before the hinge is applied to the door, whereas the use of the two fingers holds the spring coil securely in place and absolutely prevents its accidental escape. The improved construction thus described could hardly be used in a cast iron hinge, since it would be impossible to form the two oppositely placed fingers without great additional expense, whereas in the sheet-metal hinge this construction is perfectly practical. The end of the arm, S', of the spring lies in the notch or depression, N, in one of the flanges, a³, of the leaf, A', already described, and all the parts are so arranged that, when the hinge is closed, the force exerted by this arm tends to swing the flange, a³, and the leaf, A', in the direction indicated by the arrows on flange, a³, in Figs. 1 and 4. The end of the arm, S², engages one end of a link, L, the opposite end of the link being hooked over the edge of a lug, E, formed on the lower edge of the inwardly turned corresponding end, a², of the leaf, A'. The force of this arm is exerted in a drawing strain upon the link which tends to rotate the leaf A', in the same direction as that in which it is moved by the arm, S', so that, when the hinge is closed, the force exerted by the spring through both the arms tends to hold the leaf, A', in its normal position and prevent the opening of the hinge. The relation of the ends of the spring to the other parts of the hinge is, however, such that when the hinge has been opened through a certain angle the action of the spring upon the leaf, A', is reversed and tends to swing the leaf to the position shown in Fig. 7, in which the hinge is fully open. As this action of the spring is already well known in the art

and constitutes no part of this invention a detailed explanation of it is unnecessary.

By referring to Figs. 4 and 7, it will be seen that when the hinge is closed, the free end of the link L, is much farther from the center than when the hinge is completely open. The lug, E, is so formed and so placed that when the hinge is completely open, there is considerable angle between the plane of the lug and the plane of the link, but as the leaf, A', swings from its normal position, the link gradually approaches the plane of the lug and presently comes in contact with it, and during the remaining movement of the leaf the link and lug are in close contact, and the link no longer swings but operates as if it were rigidly fastened to the lug. The effect of this construction is to give the end of the arm, S², greatest possible leverage when the hinge is completely closed and to move it toward the axis of the hinge as the hinge opens, thereby greatly decreasing the absolute distance through which the end of the arm must move in the complete opening of the hinge. By this means I greatly increase the closing force exerted upon the leaf, A', when the hinge is closed as compared with the force exerted upon it when the hinge is partly open and thus secure a most desirable feature of operation in hinges of this class.

It will be observed that the ears on both the leaves of the hinge are formed by bending the stock inward from the side pieces of the spring-inclosing case instead of bending them upward or downward as in other sheet metal hinges of this general construction. This not only secures certain advantages of convenience in construction, but also forms much more perfect closed joints at the ends of the spring-inclosing case than can be obtained by the old method and I consider it therefore an important detail in the forming of the hinge.

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

1. The combination with the leaf, A', formed with the wall, a', and ears, a², a², of the leaf, A, formed with the wall, a, ears, a⁴, a⁴, cover, A², and fingers, D, D', and the spring made up of the coil, S, and arms, S', S², the coil being mounted upon the fingers, D, D', of the leaf A, and the ends of the arms being connected with the leaf, A', substantially as shown and described.

2. The combination with the leaves formed and connected substantially as shown and described, and the spring made up of the coil, S, and arms, S', S², supported between the leaves, of the link, L, hooked at one end of the leaf, A', and free to swing within certain limits about its point of connection, the end of one of the arms of the spring being in engagement with a fixed point on one of the leaves, and the end of the other arm being in

engagement with the free end of the link, whereby the distance of the free end of the link and of the end of the arm connected therewith from the axis of the hinge is greatest when the hinge is completely closed.

3. The combination with the leaf, A, formed substantially as shown and described, of the leaf, A', formed and connected with the leaf, A, substantially as shown and described, and having the oblique lug, E, the link, L, hooked at one end to said lug and having an oscillating movement limited in one direction by

said lug, and the spring made up of the coil, S, and the arms, S', S², the end of one of said arms being in engagement with a fixed point upon the leaf, A', and the end of the other arm being in engagement with the free end of the said link; substantially as shown and described.

MICHAEL REDLINGER.

Witnesses:

ALBERT HERBIG,
E. H. MORGAN.