

(No Model.)

C. A. LIEB.
CLAMP FOR TROLLEY WIRES.

No. 462,359.

Patented Nov. 3, 1891.

Fig. 1.

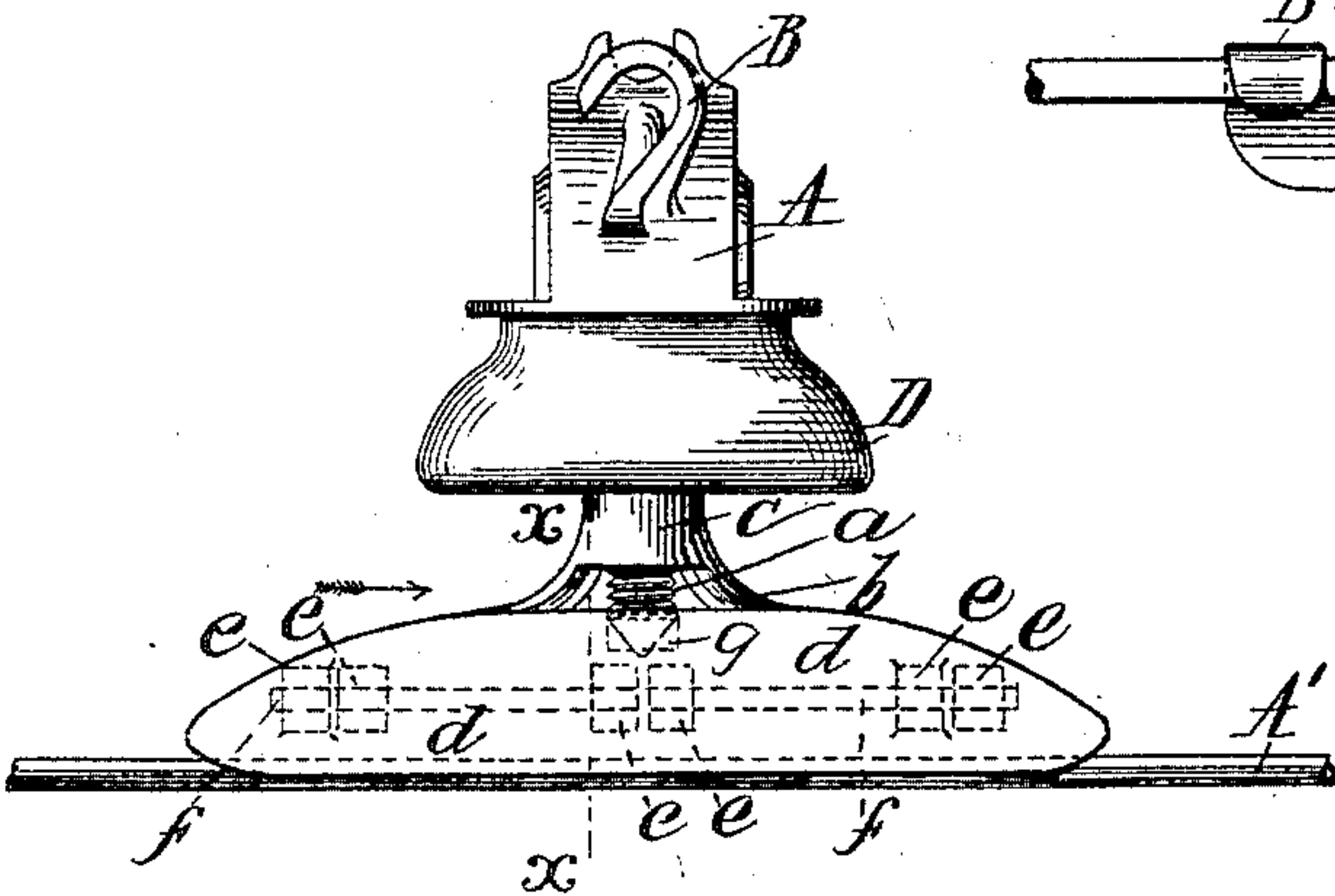


Fig. 2.

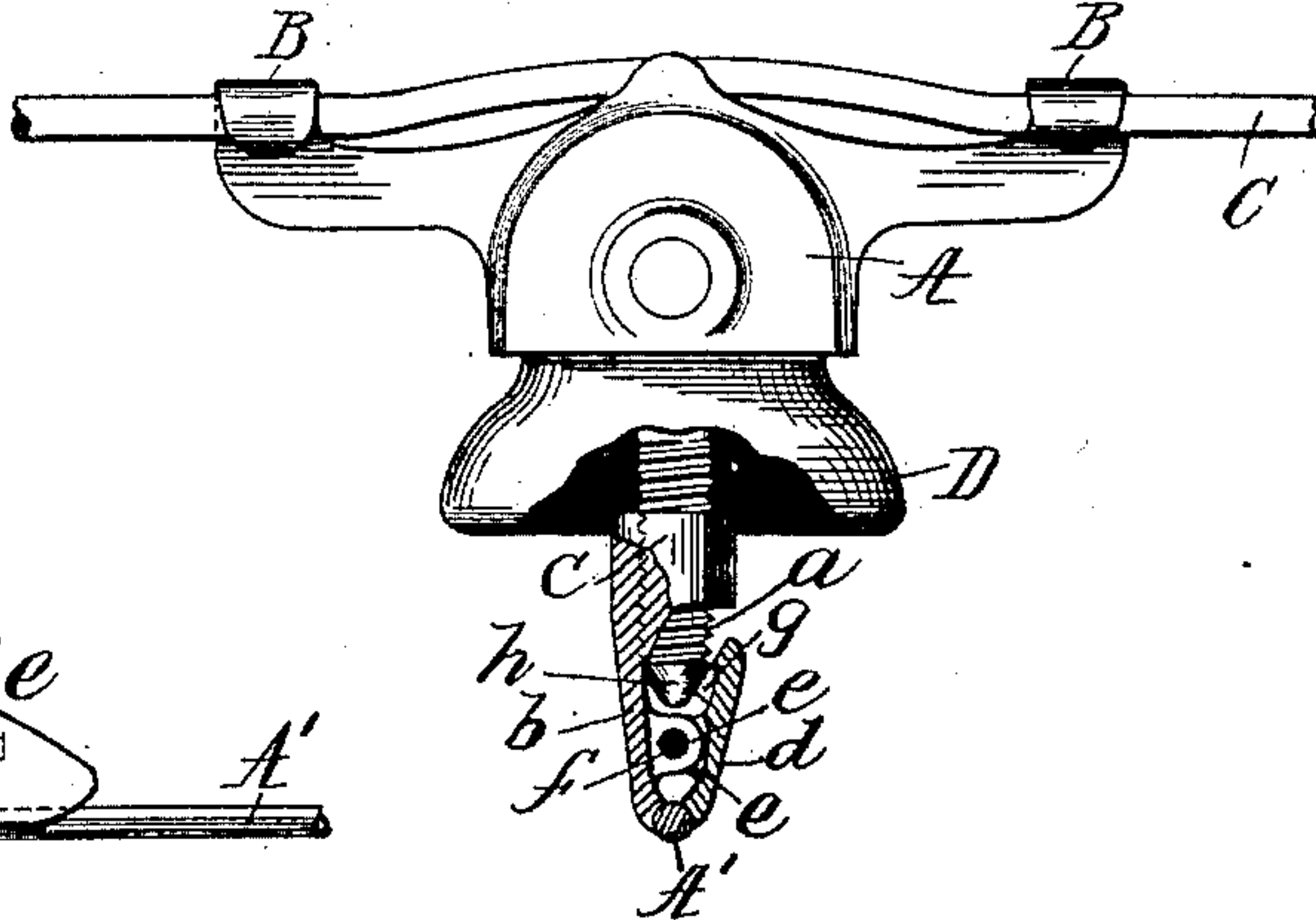


Fig. 3.

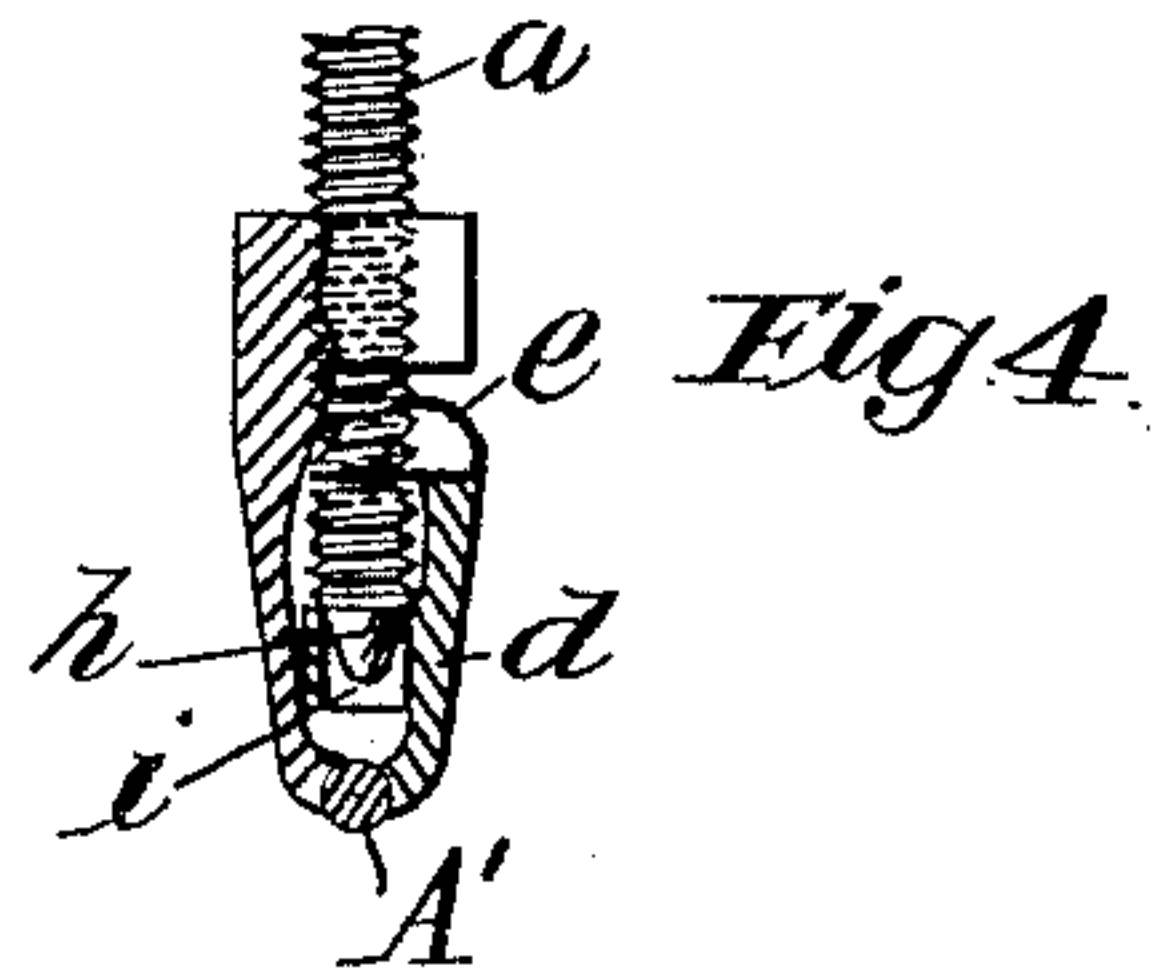
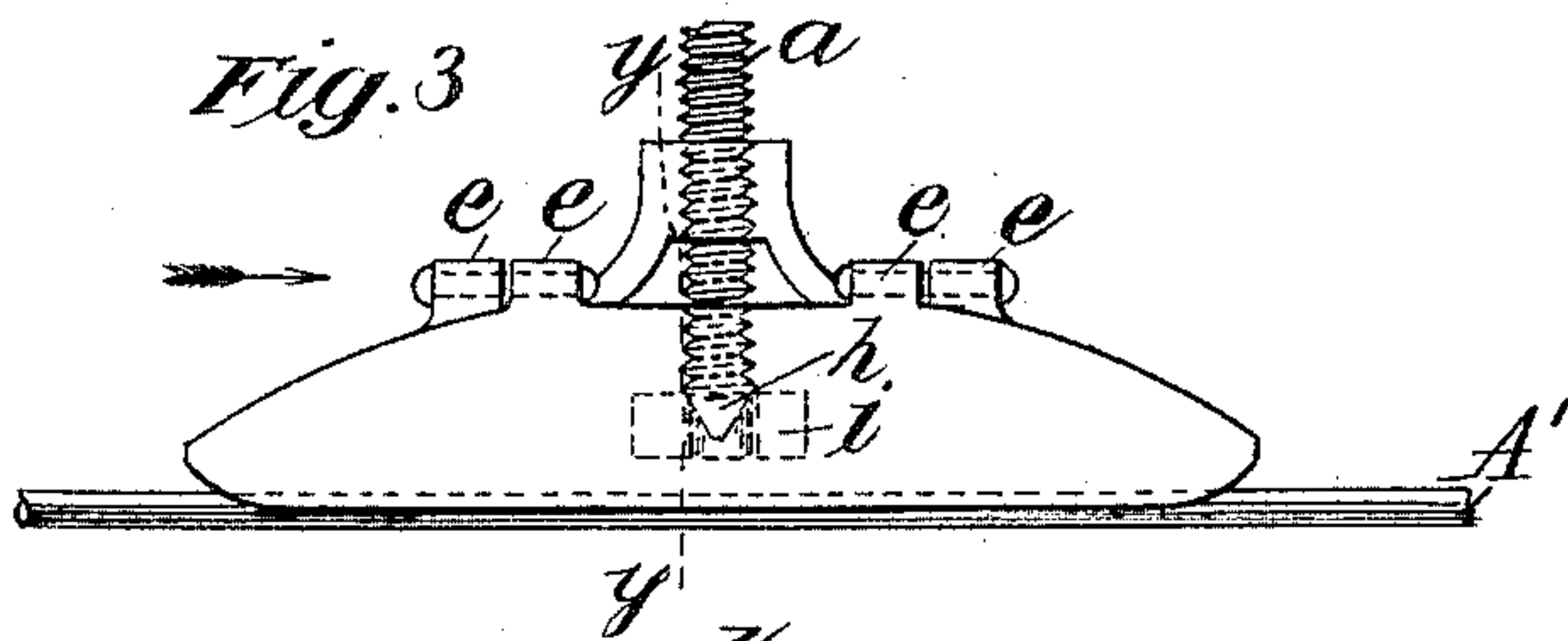


Fig. 5.

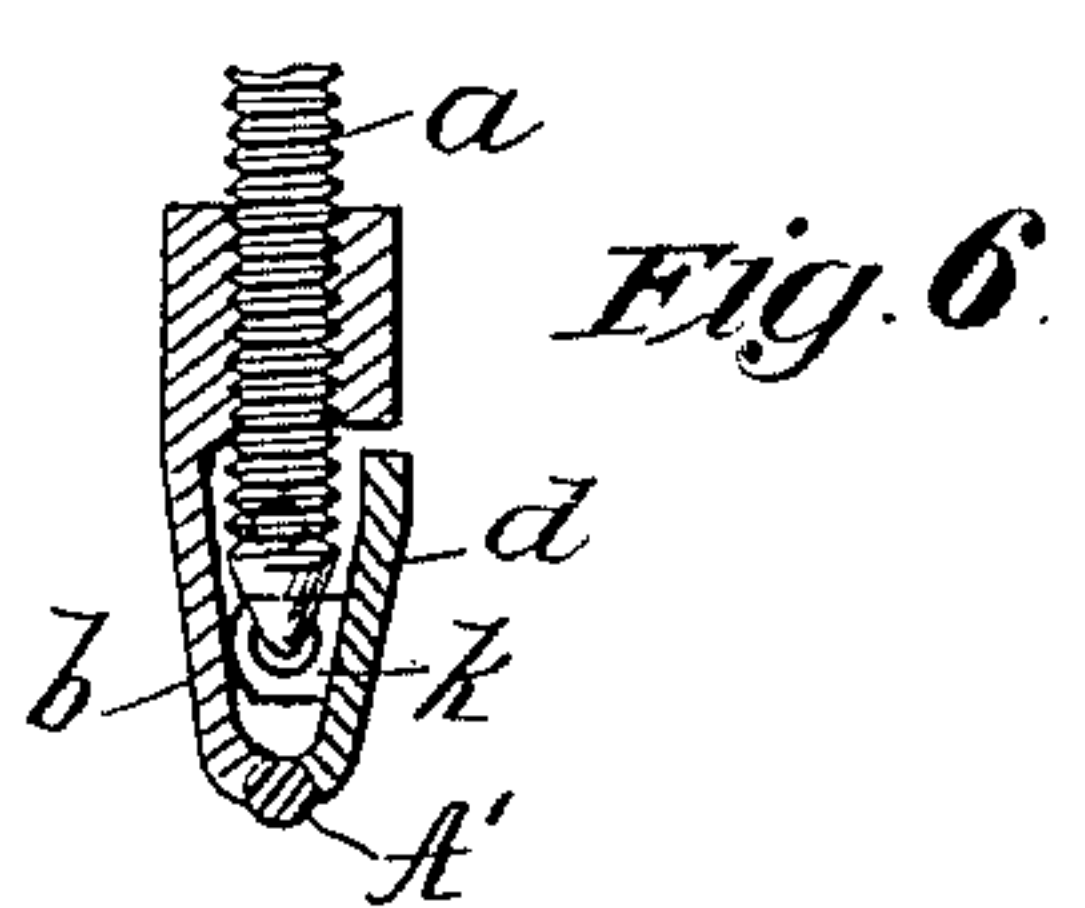
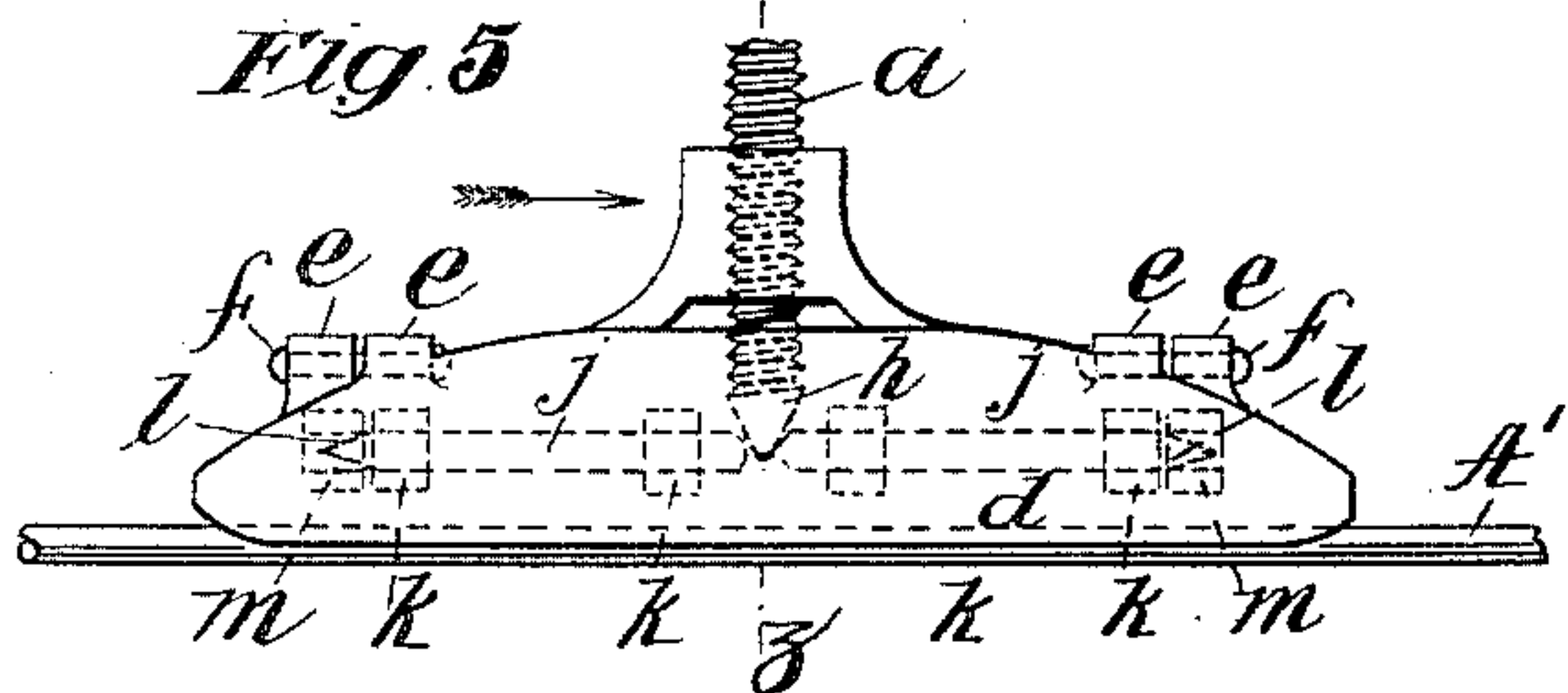
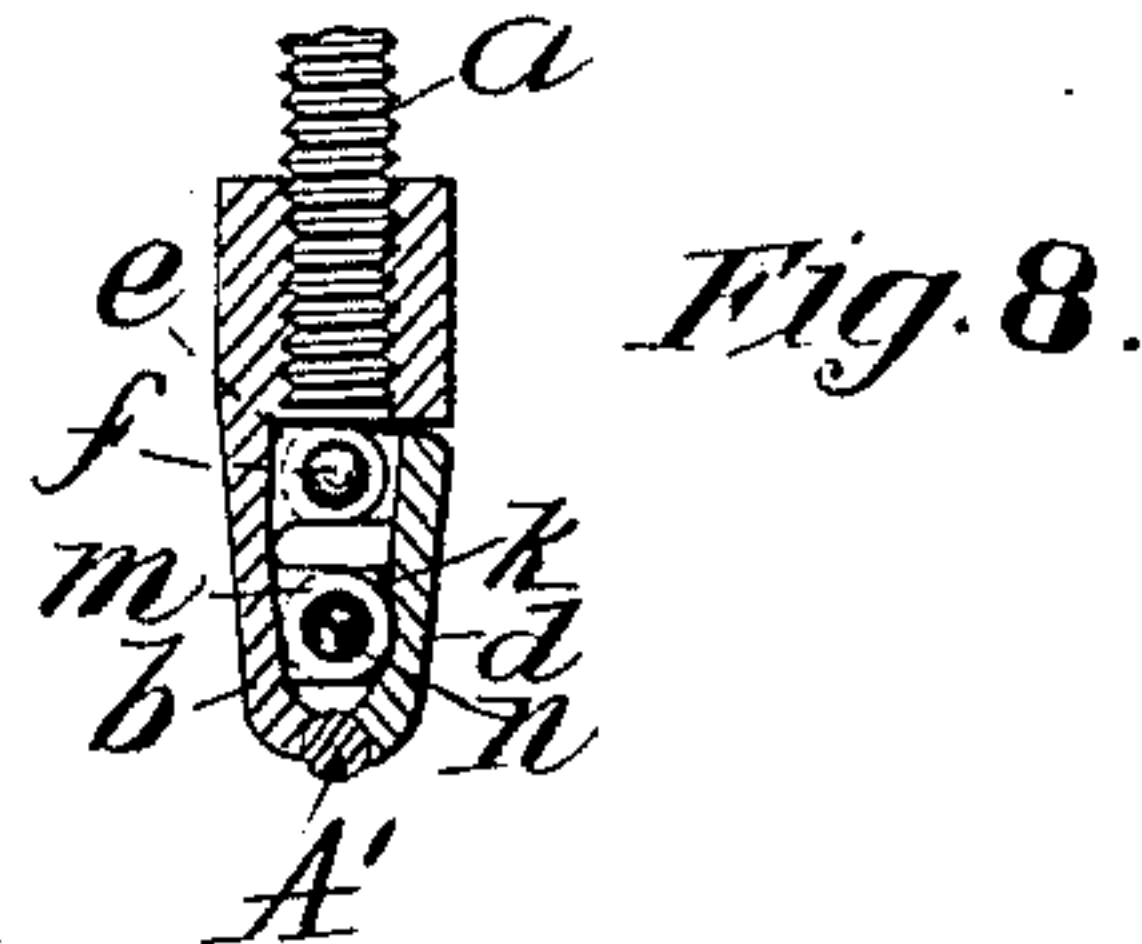
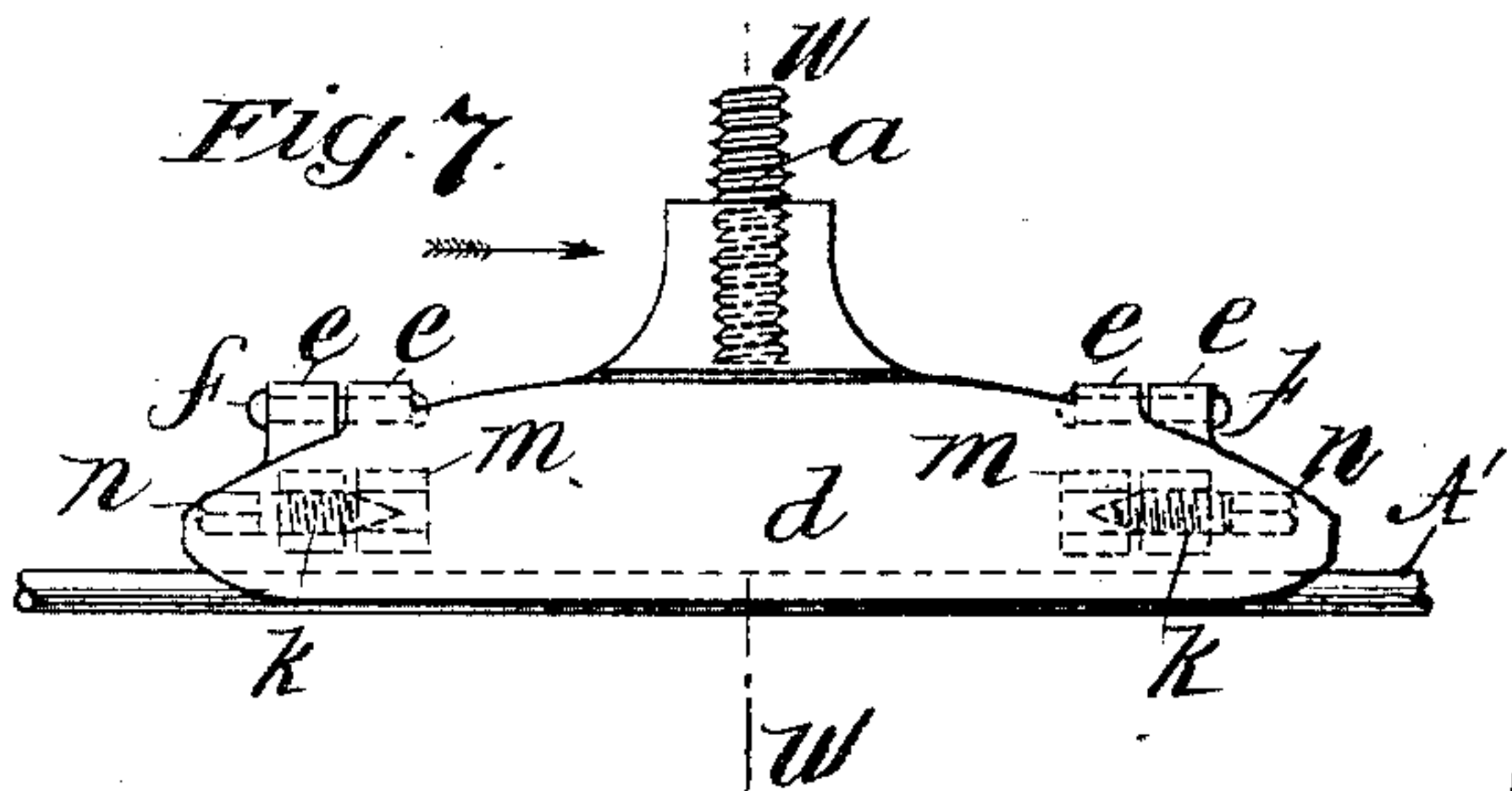


Fig. 7.

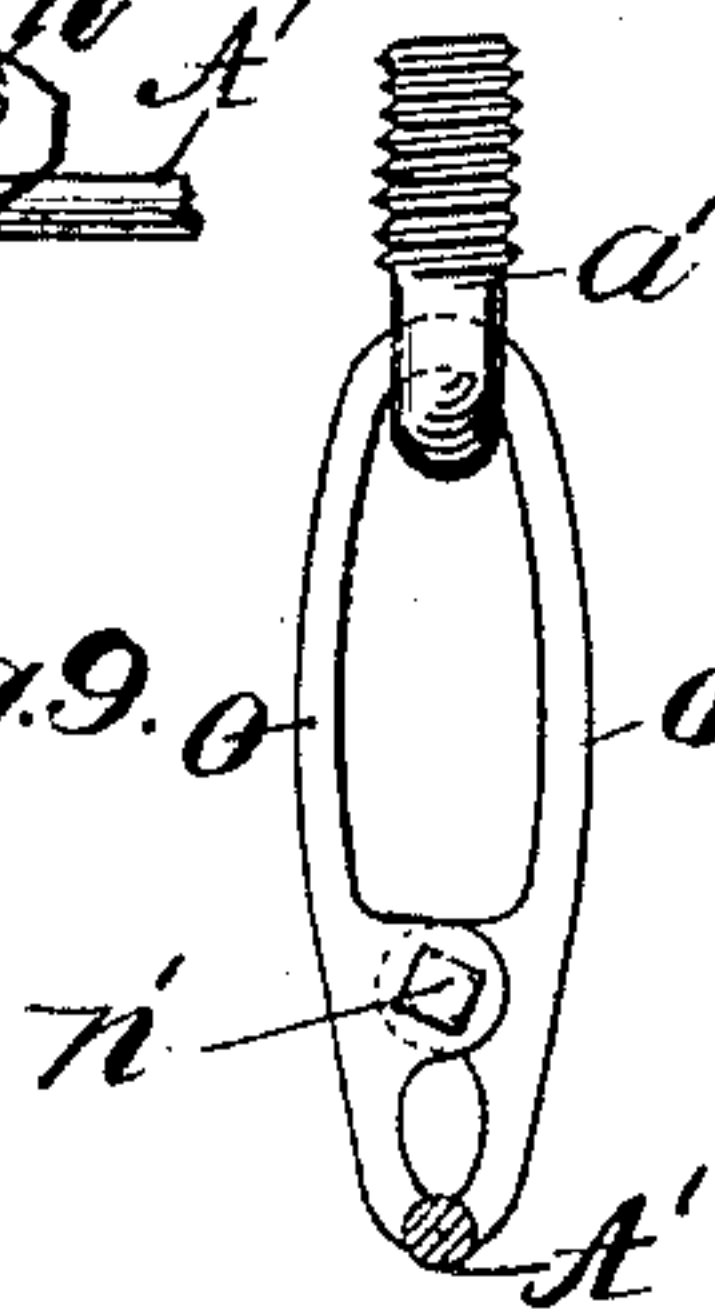


WITNESSES:

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Fig. 9.



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CLAMP FOR TROLLEY-WIRES.

SPECIFICATION forming part of Letters Patent No. 462,359, dated November 3, 1891.

Application filed July 28, 1891. Serial No. 401,015. (No model.)

To all whom it may concern:

Be it known that I, CHARLES A. LIEB, a citizen of the United States, and a resident of New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Clamps for Trolley-Wires, of which the following is a specification.

My invention relates to certain improvements in clamps for trolley-wires, whereby they are suspended to the span-wire.

Prior to my invention various devices have been employed for the purpose stated; but none of them, so far as I am aware, have been so constructed as that the holding jaws or clamps are adjustable relatively to each other, so that the same clamp can tightly hold trolley-wires of different sizes. This feature is an exceedingly valuable one, because trolley-wires differ somewhat in size and also because the same wire changes in size during use because of a variety of reasons, some of which are the stretching of the wire, the hammering-out action of the trolley-wheel upon it, the action of the elements upon it, &c.

My present invention therefore consists in so constructing the device as that the jaws come together adjustably; and it further consists in placing the devices which actuate or clamp the jaws at or near the ends of the jaws, so that the clamps may be firmly pressed upon the wire throughout their entire length should there be any unevenness in the size of the wire at the place where the clamps engage with it.

In the drawings I show various forms of my invention; but they are not by any means all the forms which may be devised, but sufficient to show the nature of my invention.

Figure 1 is an elevation of one form of my clamp. Fig. 2 is an elevation, partly in section on the line *xx* of Fig. 1. Fig. 3 is an elevation of another form of my invention. Fig. 4 is a vertical section on the line *yy* of Fig. 3. Fig. 5 is an elevation of still another form. Fig. 6 is a transverse section on the line *zz* of Fig. 5. Fig. 7 is an elevation of still another form of the invention. Fig. 8 is a transverse section on the line *ww* of Fig. 7. Fig. 9 is an end view of the clamps made of spring metal.

In Figs. 1 and 2 only of the drawings I show

the bell and hanger. Of course they are present or used in conjunction with the devices shown in the other figures as well.

A is the hanger, provided with hooks B B for engaging with the span-wire C and provided with an umbrella D. These parts may be made in any desired manner; but I prefer the form shown in the drawings, which has been already patented to me.

Referring to Figs. 1 and 2, *a* is a threaded spindle or stem, which is fastened in any suitable manner to the hanger. *b* is one jaw of the clamps. It has a boss or lug *c* at its upper part, which is threaded to coincide with the thread of the stem *a*. *d* is the other jaw of the clamp. These two jaws are hinged together by lugs *e e e e e*, three on one jaw and three on the other. They are all bored axially and a rod or wire *f* passes through them all, thus hinging them together. *g* is a little block of metal, which has preferably an inclined inner face, as shown in Fig. 2, which acts as a bearing-surface for the conical end *h* of the stem *a*. Of course the part *g* is not essential. The end of the stem may engage with the upper edge or any other suitable part of the loose jaw *d*, if preferred.

The operation is as follows: The jaws are turned relative to the body part of the hanger, so that they would run off from, or at all events toward, the point of the spindle by reason of the action of the screw-threads. As the point of the spindle recedes from the upper edge of the movable jaw *d*, it is obvious that that jaw will have considerable rocking motion before it will be obstructed by striking against the lower end of the spindle. The jaws being thus opened, they are fitted to or upon the trolley-wire A', and are preferably held in this position by one hand and with the other the adjuster whirls or turns the hanger, so that the threaded spindle moves downwardly again under the action of the screw-threads until the conical face *h* of the spindle bears upon the inclined bearing-surface *g* on the swinging jaw *d*. He then gives it an additional half or a full turn, as desired, to set the parts up firmly together, and then engages the span-wire under the hooks B of the hanger in the usual and well-known manner.

If by reason of stretching of the wire or from

any other cause the trolley-wire should become loosened, all that is necessary to be done is to unhook the hanger from the span-wire, give the hanger an additional turn or two, which tightens up the jaws, and rehang the hanger to the span-wire. It will be thus seen that in a most simple and effective mechanical manner the trolley-wire is firmly gripped and is held rigidly by the clamps, and that the same clamps may be used upon wires of different sizes, and that if for any cause the trolley-wire becomes loosened in the clamps it may be in a moment and in a most effective manner readjusted upon the wire and again hold it firm.

In Figs. 3 and 4 I show the same invention, having a slightly-different construction. In these figures the two jaws are hinged together by the lugs *e e*, made upon their upper edges instead of about half-way down the width of the jaws. This construction of course requires a modification in the method of engagement between the spindle *a* and the swinging jaw *d* an outwardly-projecting loop or eye *i*, within which the conical point *h* of the spindle passes, and by engagement with the outer arc of the loop it draws the jaws together, instead of pushing them together, as in the construction shown in Figs. 1 and 2.

In Figs. 5 and 6 I show still another form in which my invention may be made. In it the conical end of the threaded spindle enters between the adjacent ends of two small steel rods *j j*, which slide lengthwise of the jaws through suitable guides *k k*, &c., which are attached to one of the jaws, (shown in this case as upon the movable one,) and the points of these rods are made conical, as shown, so that they engage with eyes *m m*, made upon or attached to the opposite jaw in substantially the same manner that the spindle *a* does with the eye *i* in Figs. 3 and 4. In this way, of course, the two jaws are adjustably drawn together. It will be noticed that in the form shown in Figs. 5 and 6 the power is applied to the jaws at or near their two ends instead of at the central portion, as in the constructions shown in Figs. 1, 2, 3, and 4. This has certain advantages, because the strain upon the clamps is not so great, and also because there being a little lost motion in the hinges the ends of the jaws may be slightly nearer together at one end of the clamp than at the other, thus compensating for any little irregularities or unevenness in the trolley-wire.

In Figs. 7 and 8 I show still another form of my invention. In it the two jaws are hinged together, substantially as in Figs. 5 and 6, and the jaws have each lugs or eyes *k* and *m*, respectively, corresponding to the like devices in Figs. 5 and 6, with the exception, however, that the lugs *k*, which are shown as being upon the movable jaw *d*, are threaded interiorly, and each of them is provided with a little threaded stem *n n*, the outwardly-

projecting ends whereof are squared, so that they may be readily turned by any suitable device—such, for instance, as a key having a squared socket in its end. The ends of these little stems *n*, being made conical, engage with the lugs or eyes *m* on the other jaw and draw the two jaws together in a manner already described, and of course the ends of the jaws may be separately and independently adjusted by reason of the spindles being at or near their opposite ends, respectively.

In Fig. 9 I show a form of my invention in which I employ clamps made all of one piece of material—as, for instance, spring-steel or other sheet metal. It is not essential, however, that it be elastic or springy. The two jaws are formed upon opposite edges of the material, and it is then bent upon itself in the manner shown, so that the two parts *o* and *o'* lie substantially parallel to each other, and the spindle *a'* is in this case made in form of a loop or eye at its lower part, which enters the loop formed by the bending of the material of which the jaws are composed upon itself. These jaws are drawn together by threaded spindles *n'*, preferably having square ends, substantially the same as shown in Fig. 7, there being a threaded lug or lugs made upon one of the jaws, into which the spindles thread, and corresponding open lugs or eyes upon the other jaw similar to the parts *m* in Fig. 7. The operation is of course well understood. It is not, by the way, essential that in this form of my clamps the material forming the jaws should be all in one piece. They may be made separately and fastened together at their upper part, and likewise they may be engaged with the suspending spindle or stem *a'* in any preferred manner.

As already stated, the forms of my invention described and illustrated herein are not by any means all the methods which may be employed, and I therefore do not limit myself to the details shown; nor is it essential that a threaded stem should be employed as the means for forcing the jaws together. I prefer them, because, all things considered, it is a very desirable mechanical feature; but their equivalent mechanical devices may be employed.

I claim—

1. The combination, in a clamp for trolley-wires, of two jaws or parts movable relative to each other and permanently attached together, and a spindle threaded into one of the parts, which engages with the other part, whereby their clamping-surfaces may be adjusted toward or from each other, substantially as set forth.

2. The combination, in a clamp for trolley-wires, of two jaws or parts permanently attached together, and spindles at or near their ends, which are threaded into one of the parts and the ends of which engage with suitable surfaces upon the other part, whereby their

clamping-surfaces are caused to approach each other, substantially as set forth.

3. The combination, in a clamp for trolley-wires, of a threaded spindle which supports
5 the clamping-jaws, two clamping-jaws permanently hinged together, one of them having a threaded boss or nut into which the said spindle screws, and the other of which is adapted to engage with the end of the said
10 spindles, whereby their clamping-surfaces

may be adjusted toward or from each other, substantially as set forth.

Signed at New York, in the county of New York and State of New York, this 24th day of July, A. D. 1891.

CHAS. A. LIEB.

Witnesses:

PHILLIPS ABBOTT,
J. E. HOFFMAN.