

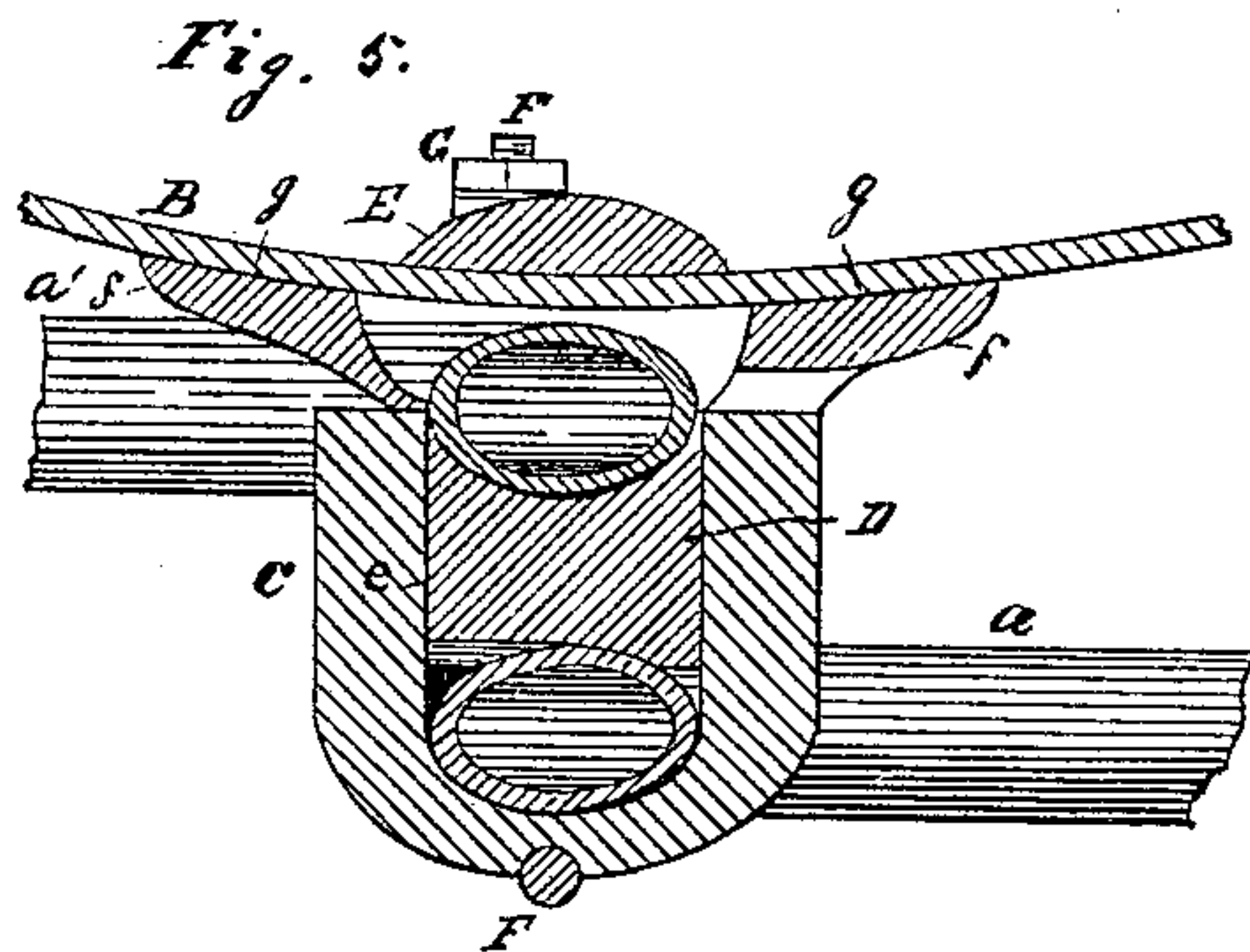
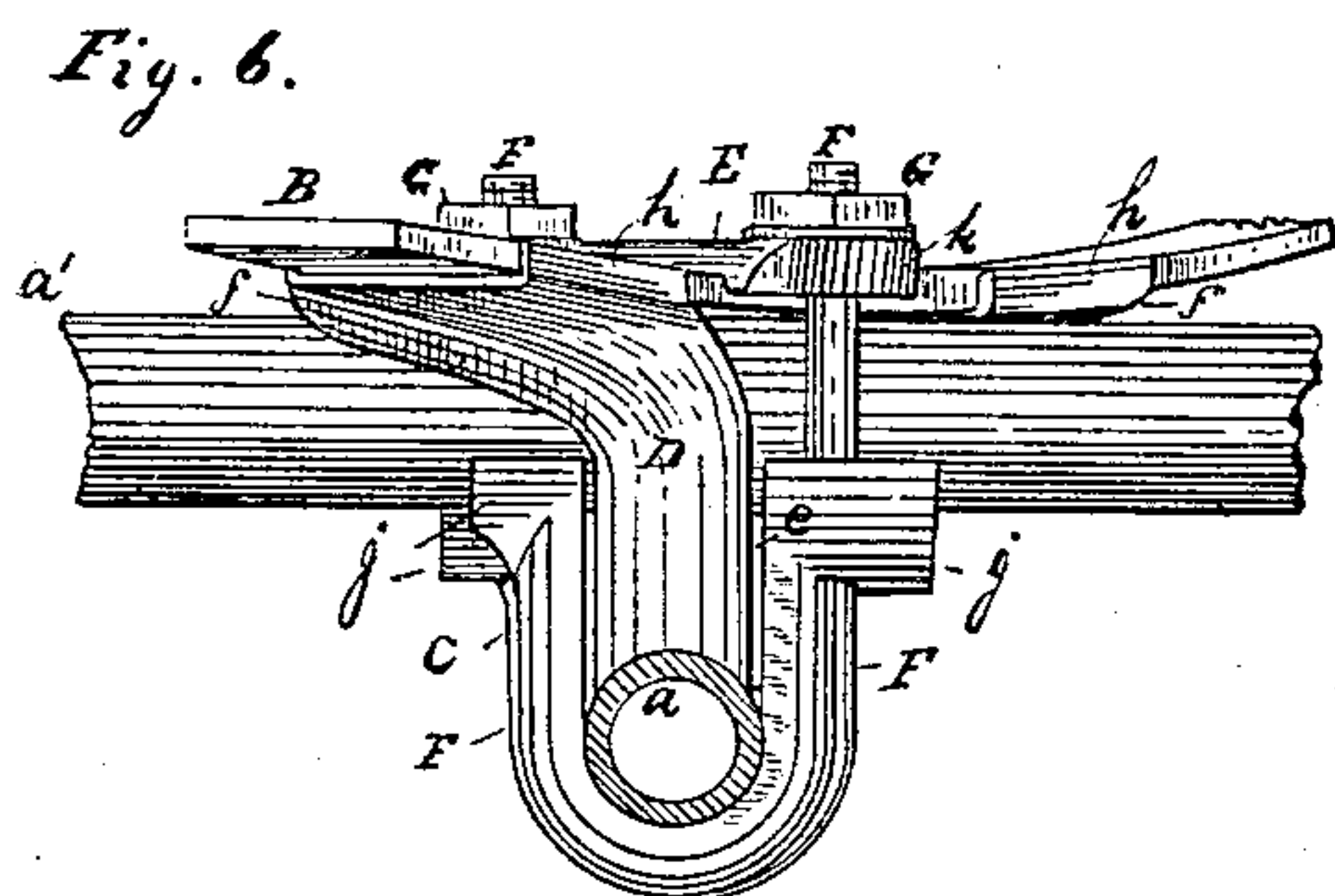
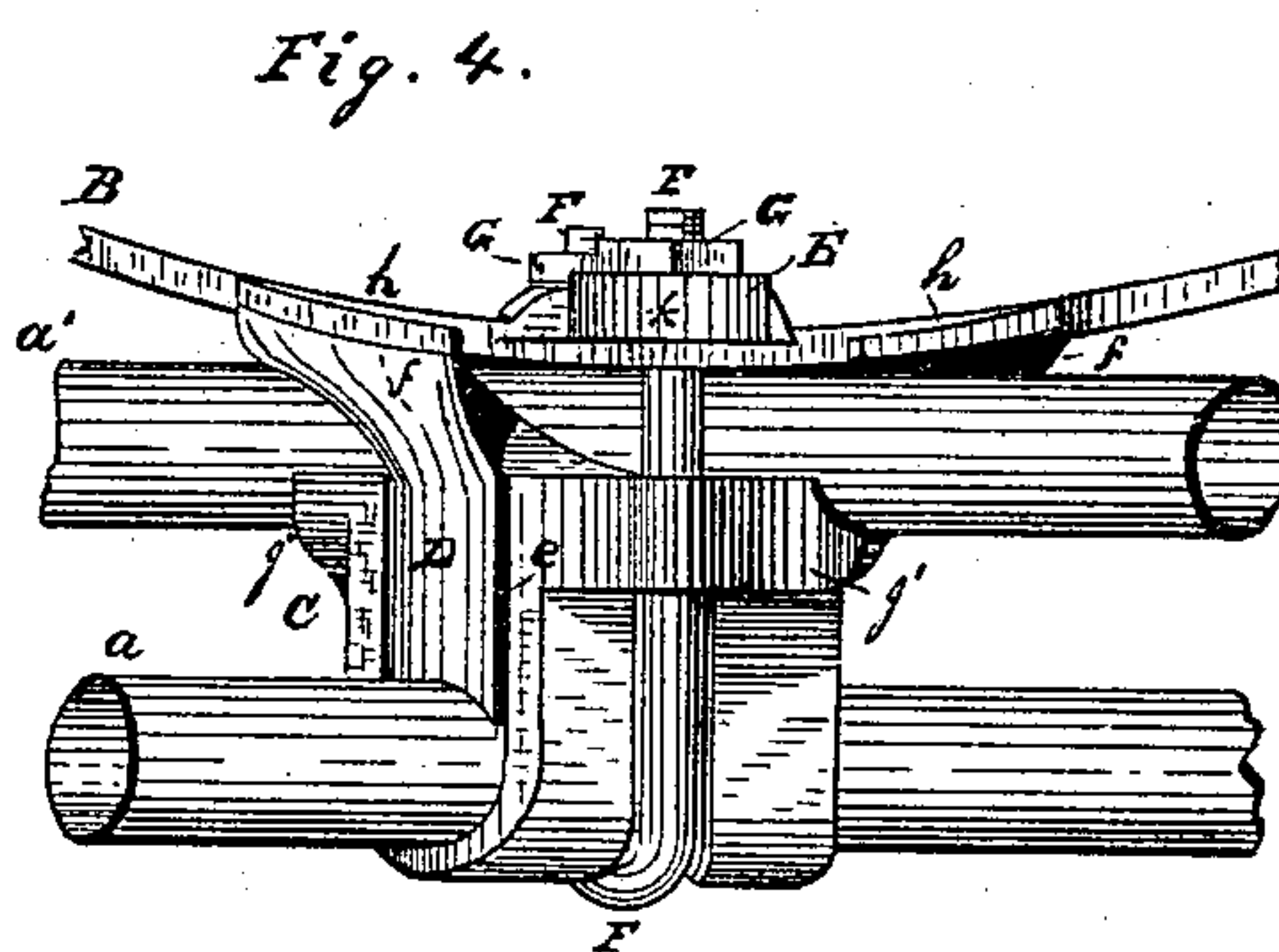
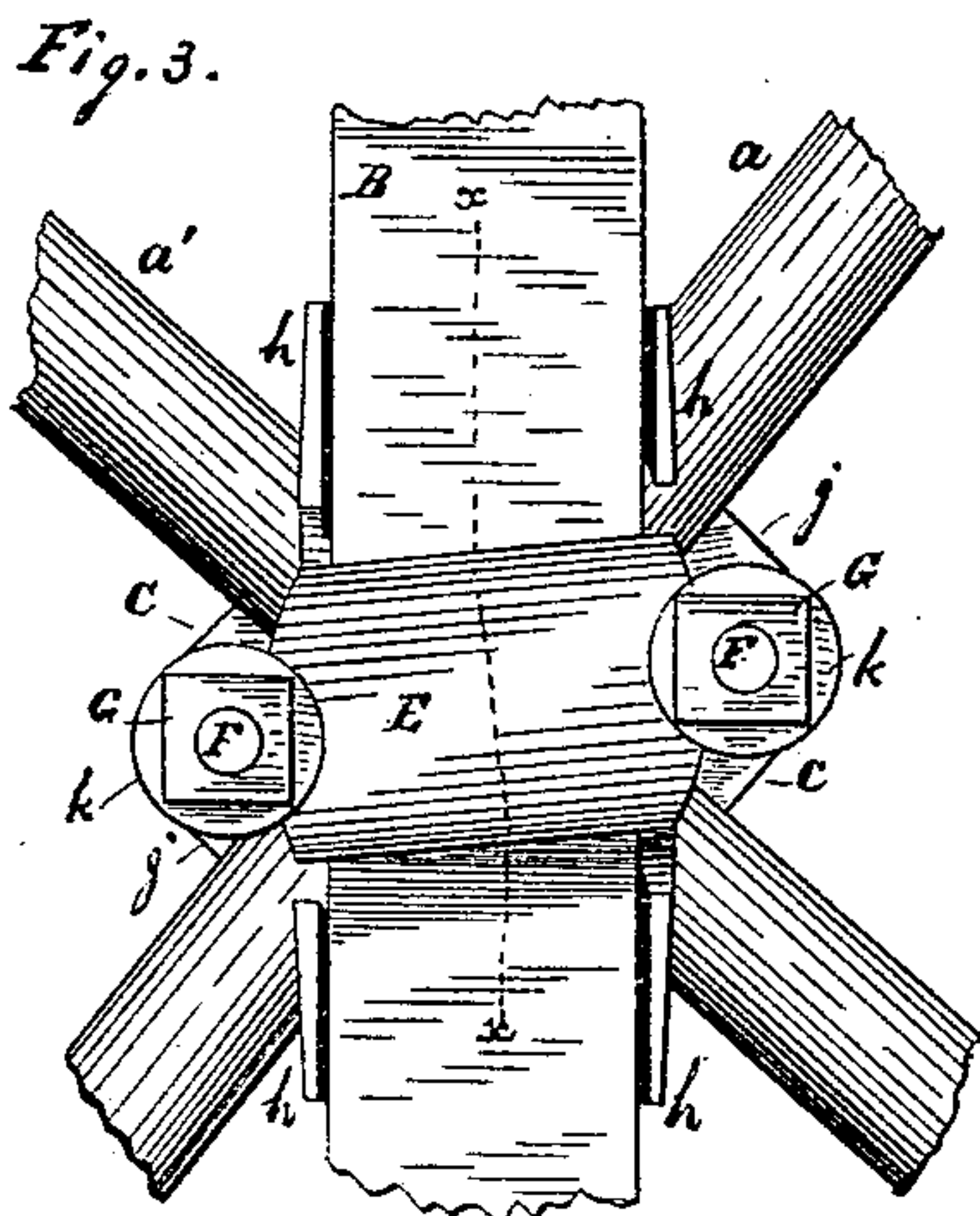
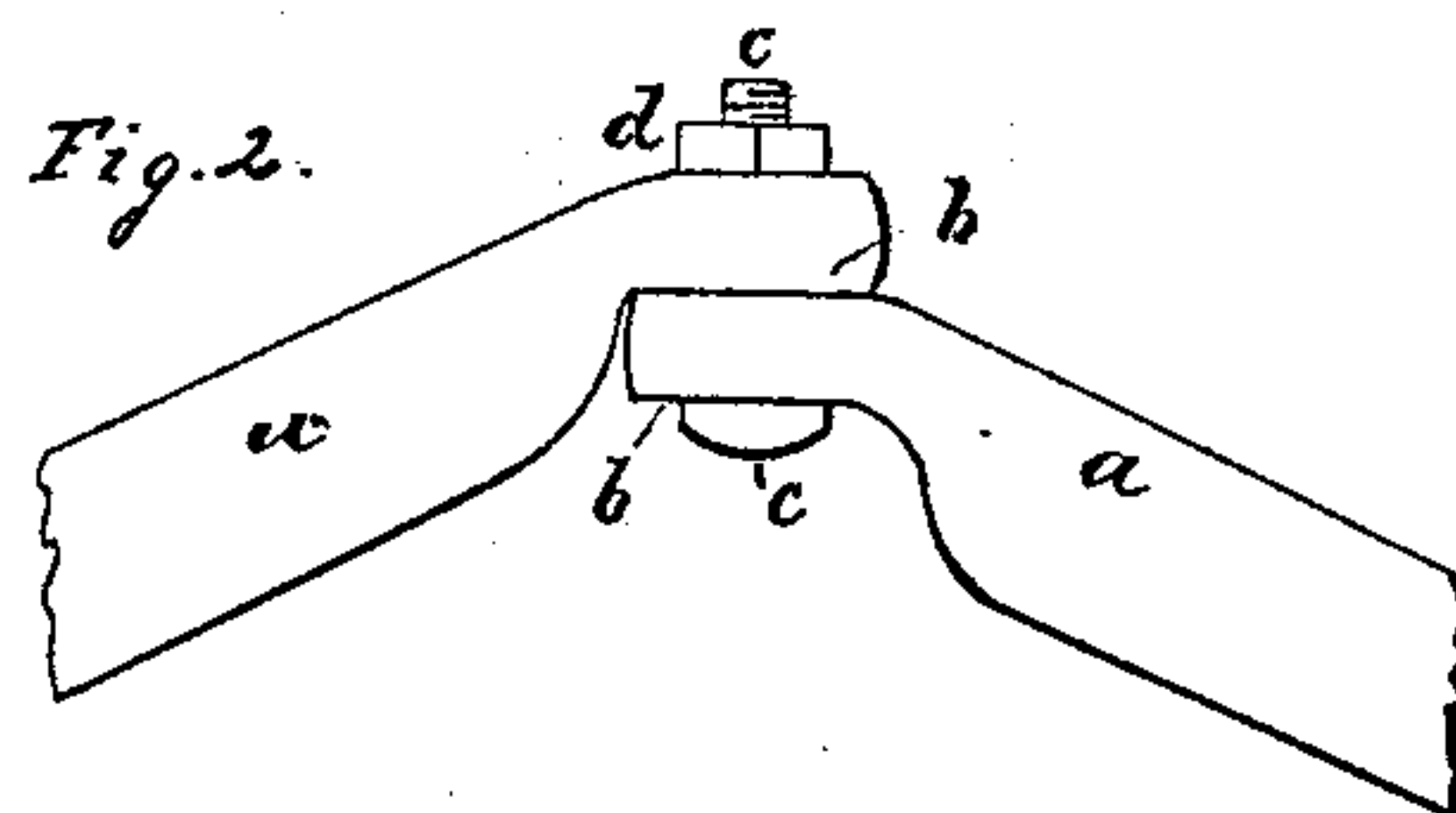
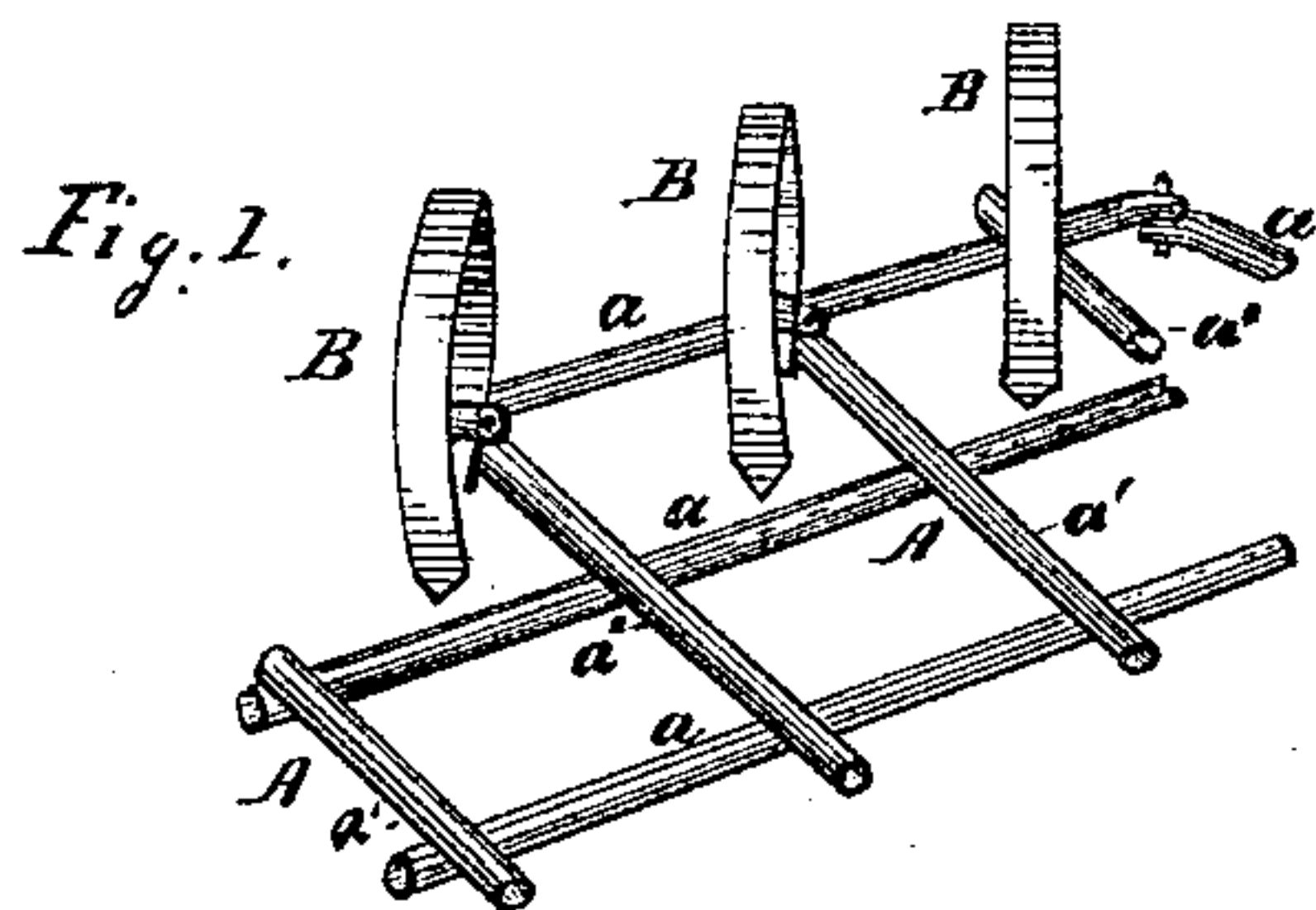
(No Model.)

2 Sheets—Sheet 1.

L. D. SWART.  
SPRING TOOTH HARROW.

No. 377,053.

Patented Jan. 31, 1888.



WITNESSES:

W. D. Russell  
John M. Barrett

INVENTOR:

Lester A. Swart.  
BY F. F. Warner,  
his ATTORNEY.

(No Model.)

2 Sheets—Sheet 2.

L. D. SWART.  
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Fig. 7.

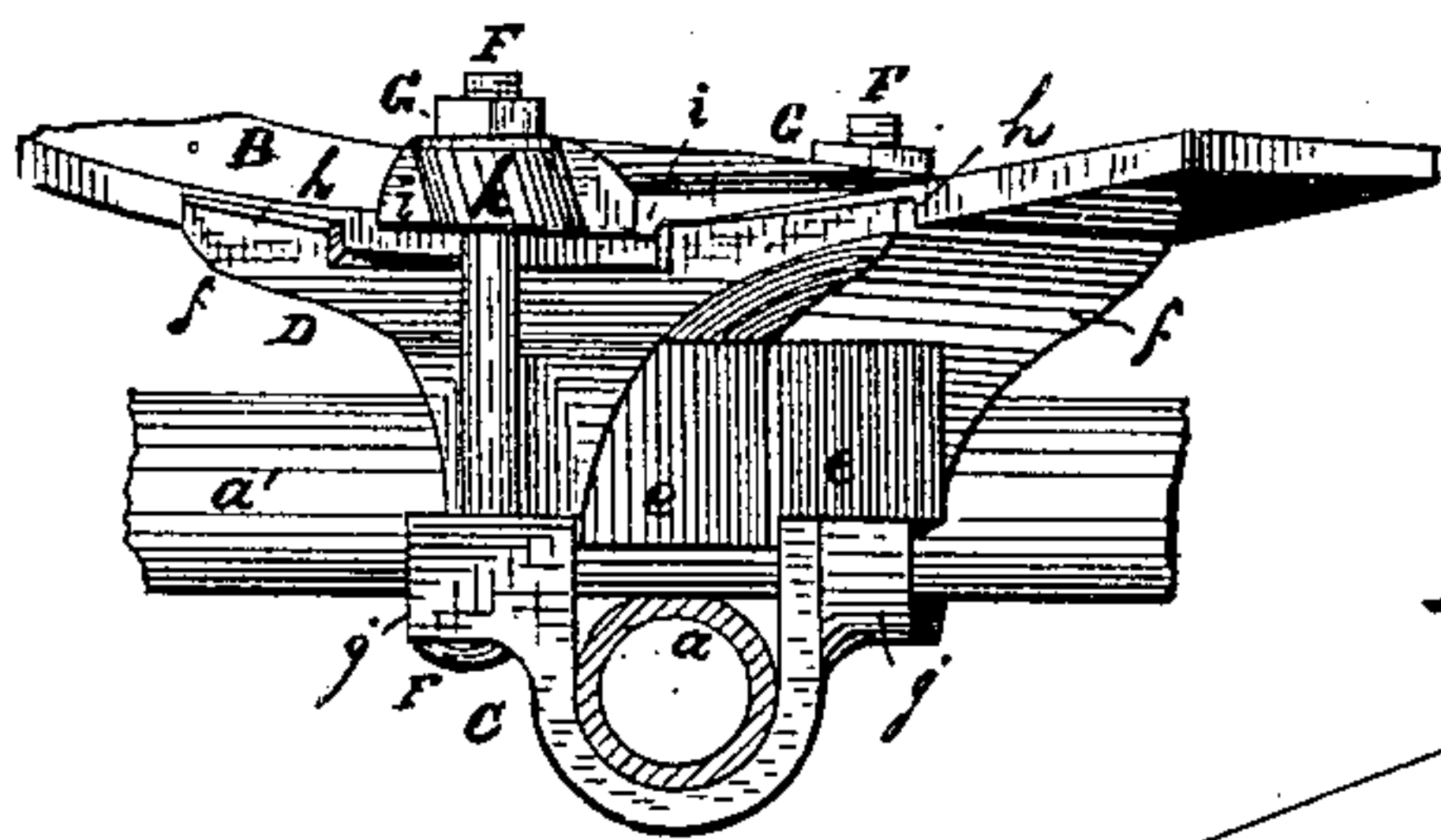


Fig. 8.

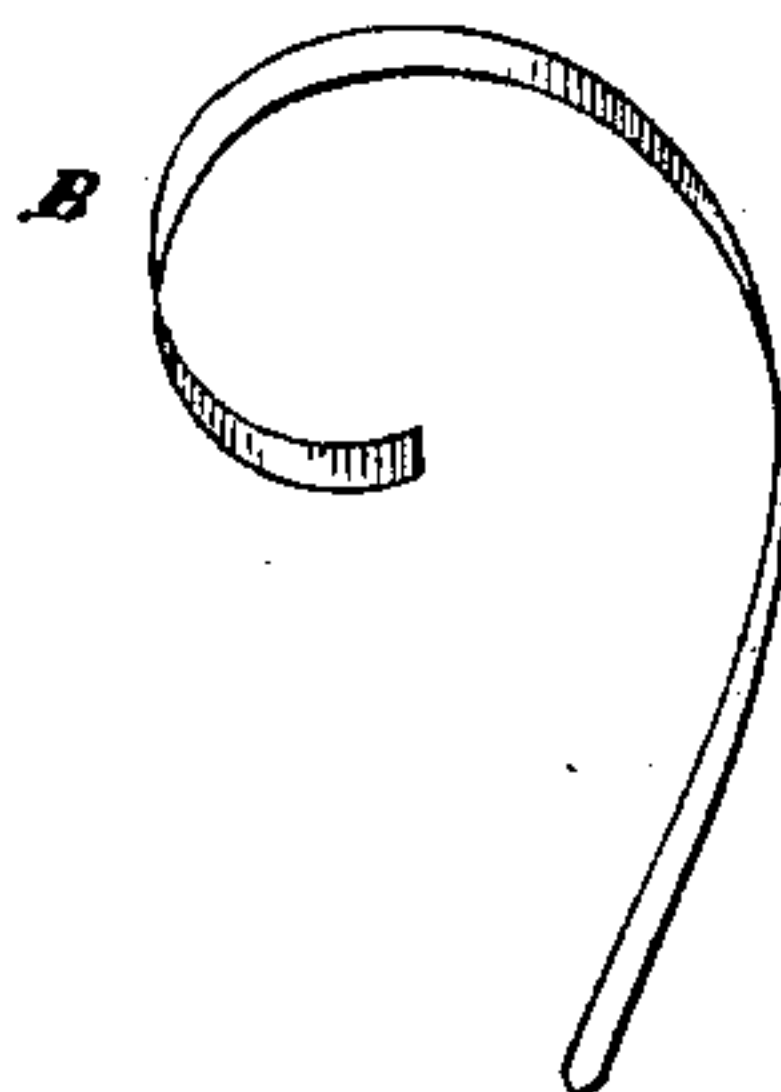


Fig. 9.

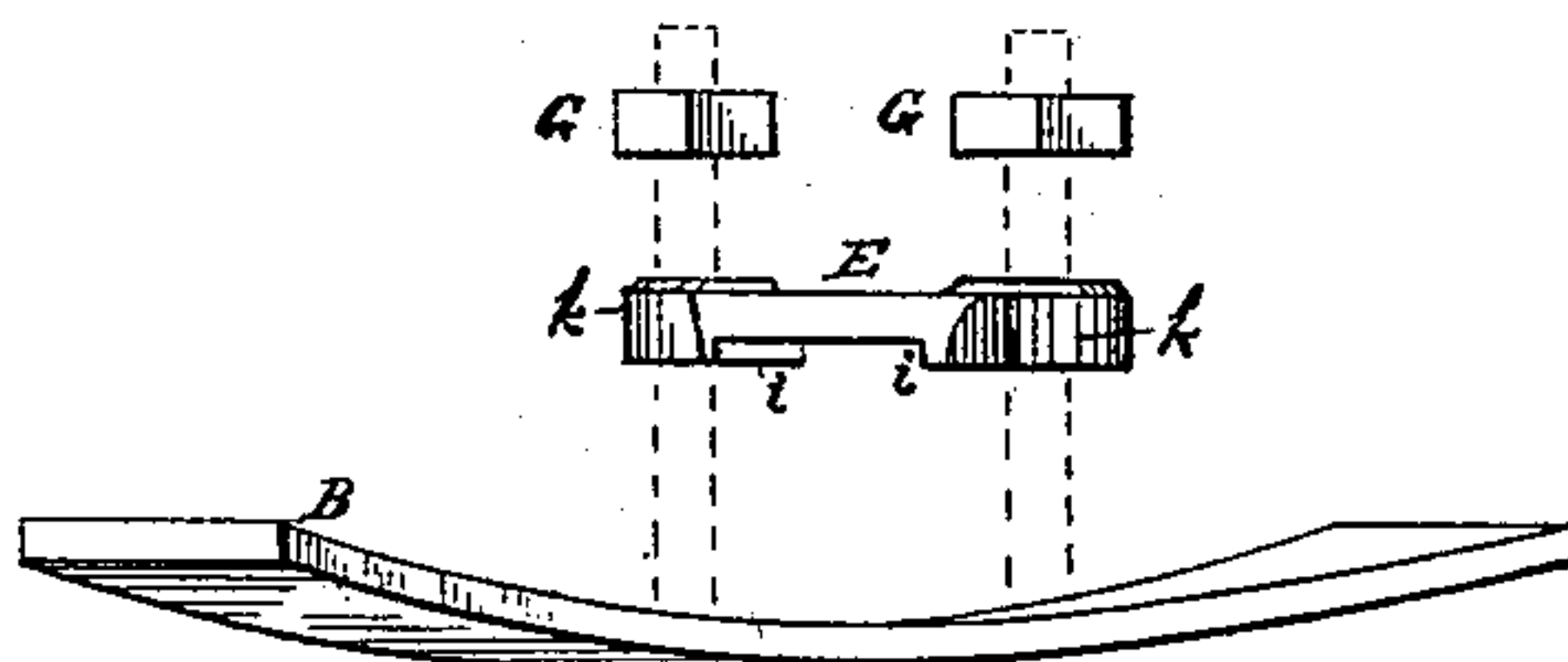
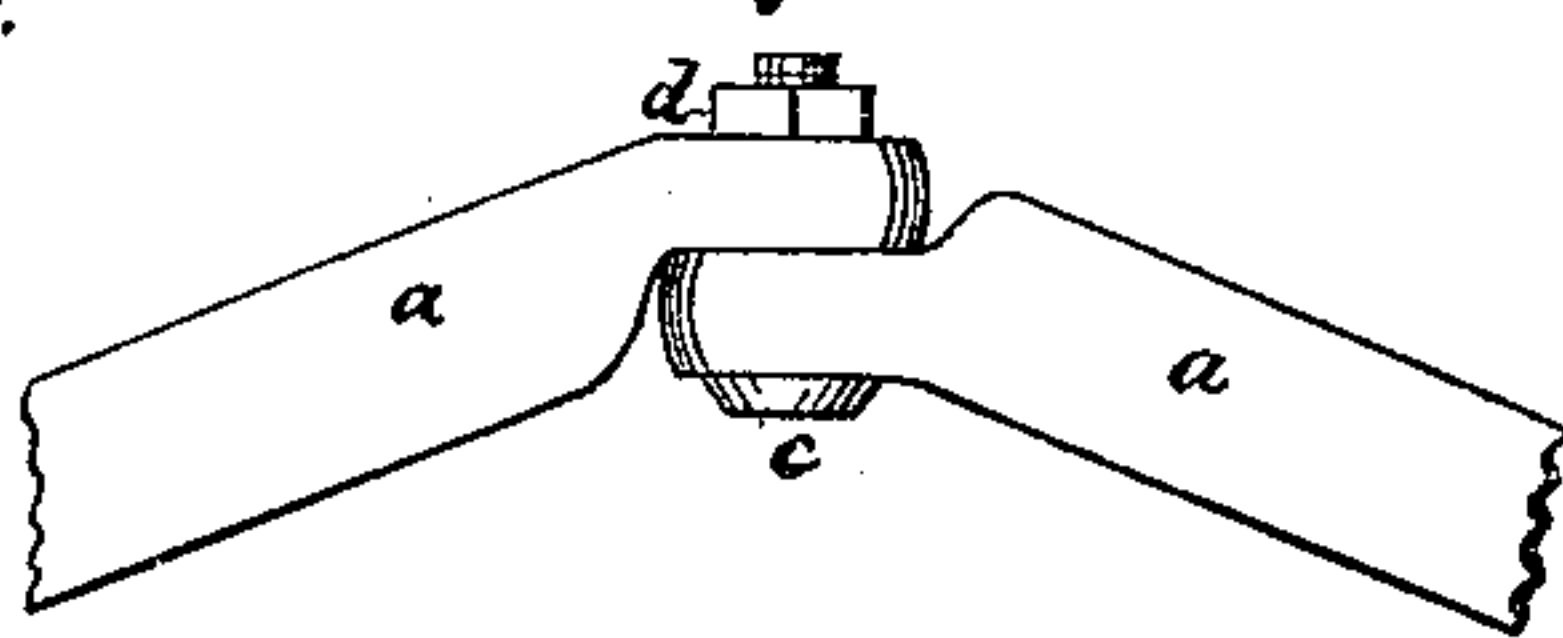
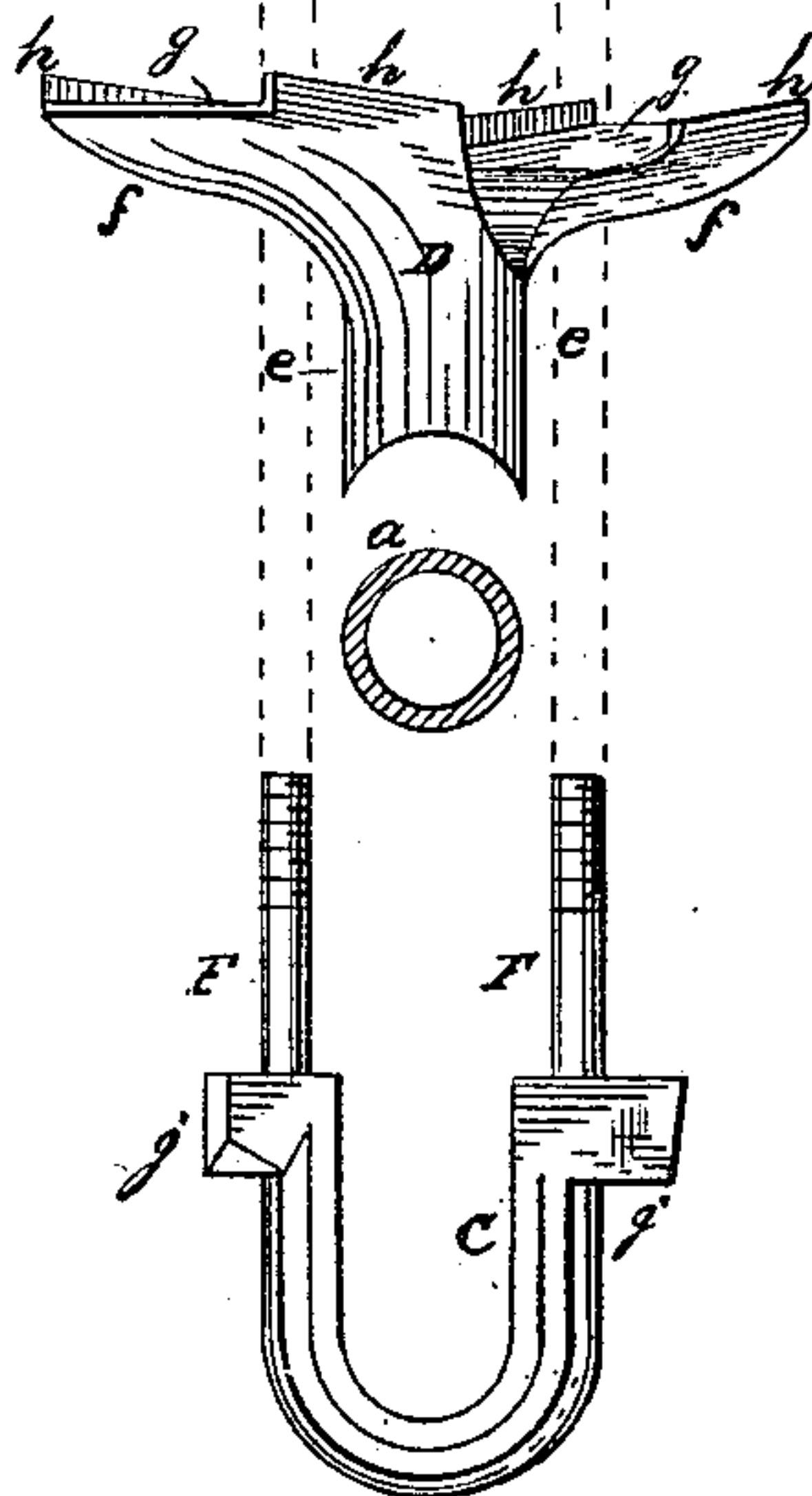
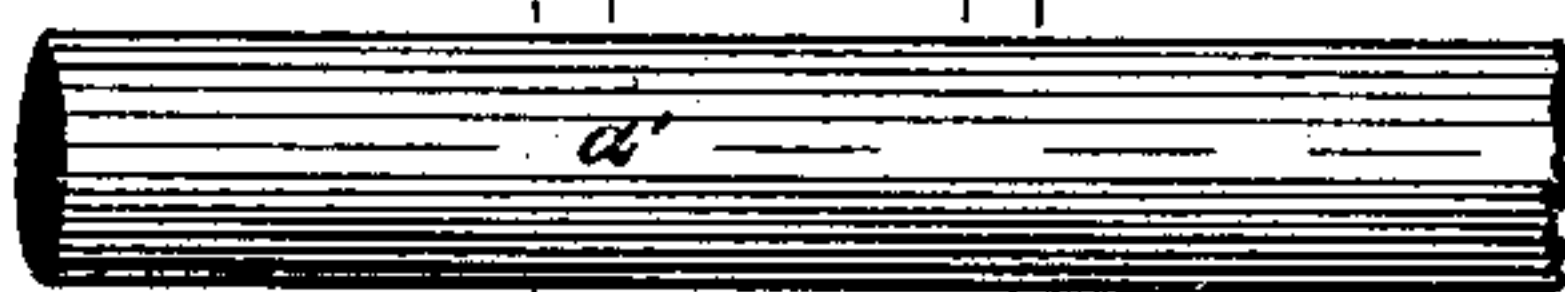


Fig. 10.



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# UNITED STATES PATENT OFFICE.

LESTER D. SWART, OF AUBURN, NEW YORK.

## SPRING-TOOTH HARROW.

SPECIFICATION forming part of Letters Patent No. 377,053, dated January 31, 1888.

Application filed October 12, 1887. Serial No. 252,178. (No model.)

*To all whom it may concern:*

Be it known that I, LESTER D. SWART, a citizen of the United States, residing at Auburn, in the county of Cayuga and State of New York, have invented certain new and useful Improvements in Spring-Tooth Harrows, of which the following, in connection with the accompanying drawings, is a specification.

This invention relates to improvements in spring-tooth harrows in which the frame is made in sections hinged together in a central line extending from front to rear, and in such a manner as to permit each section to tilt vertically and independently as the harrow is drawn over uneven ground.

My purpose is to improve the construction of the frame. I also aim to provide improved means for securing the springs to the frame.

The distinctive features of my invention are separately set forth in my several claims; but to enable others more fully to understand the same I will now describe, with greater particularity the means I employ for attaining the objects above referred to, and in so doing will refer to the accompanying drawings, which are illustrative of the said means.

In the drawings, Figure 1, Sheet 1, is a perspective representation of a harrow of the class to which my invention appertains; but no attempt is there made to show my improvements in detail. Fig. 2, Sheet 1, is a detail showing the manner of hinging or connecting the draw-bars in one section of the frame to those in the other. Fig. 3, Sheet 1, is a top or plan view showing in detail a portion of the harrow at the intersection of one of its draw-bars with one of the cross-bars. Fig. 4, Sheet 1, is a detail, the same being a representation of the parts shown in Fig. 3 when the same are arranged to show the spring-tooth in side elevation. Fig. 5, Sheet 1, is a section in the plane of the line *x x* of Fig. 3. Fig. 6, Sheet 1, is a detail showing the parts represented in Fig. 3 when they are arranged to show the bottom piece or frame-grip in end elevation. Fig. 7, Sheet 2, is a detail showing in side elevation a modification in the construction of the parts shown in Figs. 3, 4, 5, and 6. Fig. 8, Sheet 2, shows a modification in the form of the meeting ends of the draw-bars. Fig. 9, Sheet 2, represents, in perspective, one of the spring-teeth; and Fig. 10, Sheet 2, represents all the

parts detached or separated, but otherwise in their relative positions.

Like letters of reference indicate like parts. 55

A, Fig. 1, represents the harrow-frame. This frame consists of draw-bars *a a* and of cross-bars *a' a'*. The draw-bars upon one side of the frame are parallelly arranged, and the cross-bars upon that side intersect or cross the draw-bars on the same side at an angle to the draw-bars, all being arranged at suitable distances from each other, respectively, as indicated in Fig. 1. The frame consists of two like sections, the draw-bars of one meeting those of the other obliquely in a line extending from the central front portion of the frame to the central rear portion thereof, and the draw-bars are hinged or connected at their meeting ends in such a manner as to permit each section of the frame to tilt vertically and independently while the harrow is being drawn over uneven ground, and the meeting ends of the draw-bars are forward of their other ends, as shown. 75

B B are the spring-teeth. These springs have heretofore been clamped to the frame (usually at the junction of the draw-bars with the cross-bars) in such positions that each will make a separate track or furrow as the implement is drawn along, the tracks or furrows so made being parallel or nearly parallel to each other. Provision has also been made for hitching a team to the implement; but as the features of construction thus far referred to are all old and well known to those familiar with the art I need not describe the same with greater particularity, my purpose being in making such reference to distinguish or point out briefly those features of construction which I do not here intend to claim, broadly. 85 90

As a feature of one part of my invention, I make the draw-bars and cross-bars hollow and of metal and tubular in form, although the mere form or shape of these bars may be varied without a departure from my invention. By this means the frame will be strong while comparatively light. It will also be durable and comparatively cheap and may be constructed with facility. The meeting ends of these hollow draw-bars I flatten, as indicated at *b b*, Figs. 2 and 8, and these flattened portions I bore or pierce to receive a horizontally-arranged bolt, *c*. 95 100



*d* is a nut upon the projecting or screw-threaded end of the bolt *c*. A hinge or joint is thus made at the meeting ends of the bars *a a* with facility, and the sections of the frame are thereby firmly connected to each other in such a manner that each section is capable of tilting vertically and independently as the implement moves over uneven ground.

*C* is a U-shaped iron or frame grip, in which the bar *a* is arranged, and *D* is a grip-iron entering the iron *C*, and seated on that part of the bar *a* which is in the said grip *C*. That part of the iron *D* which is within the part *C* has flattened sides *e e* and upwardly-branching arms *f f*, between which latter the bar *a'* passes. The arms *f f* have flattened upper surfaces, *g g*, which dip or decline toward the central part of the iron somewhat; and *h h* are ears or lugs projecting slightly above the said surfaces. A line passing along the surfaces *g g* and parallel to the ears *h h* would be diagonal to that part of the iron *D* which is within the iron *C*, and would be also somewhat curvilinear in form, or approximately so. In other words, the upper faces of the iron *D* serve as a seat or support for the spring *B*, while the ears *h h* prevent the spring from being turned on its seat, and so hold it that its lower or rear end or portion will pass downward behind the intersection of the bars *a* and *a'*; or it may be said that the relative positions of the parts are such that a plane passing vertically through the spring would bisect the angle formed by said bars, or substantially bisect it.

*E* is a cross plate or tie having depending flanges or lugs *i i* at its ends. This plate passes across the spring at right angles thereto, or nearly so, and its lugs clasp the spring at its edges.

*F* is a U-bolt extending upward through shoulders *j j* on the iron *C* and through extensions *k k* of the plate *E*.

*G G* are nuts run upon the ends or screw-threaded portions of the bolt *F*.

In practice two bolts may be employed instead of a single U-bolt, the lower ends of the said bolts being headed or bent underneath the shoulders *j j*, as shown in Fig. 7.

As the parts have been thus far described, the construction and arrangement are such that the bars *a* and *a'* are separated from each other by a portion of the iron *D*; but in the modification shown in Fig. 7 the said bars are in contact with each other, and the iron *D* is seated on the upper bar. This latter form of construction renders it possible to make the parts which bind the bars and springs together somewhat smaller in some of their proportions, and consequently lighter, than when the former details of construction are employed; but in either case the principal features of my invention are embodied, as will hereinafter more fully appear.

It will appear from the foregoing description and from reference to the accompanying drawings that the frame of the harrow, when

made of hollow iron bars, will have the advantage of combining strength and durability with lightness and facility of construction. Iron tubing, as is known, is an article always to be found upon the market in form and size adapted to the use described, excepting as to length, perhaps, and the flattening of the ends for joining the meeting ends of the draw-bars.

It will be perceived that in the means employed for clamping the bars and springs together the irons *C*, *D*, and *E*, in connection with the bolts and nuts, perform a double function—viz., bind the bars of the frame together and also clamp the springs to the frame. It will also be perceived that the springs by being interposed between the parts constituting the clamp or grip perform the function of producing a constant tension or spring-pressure upon the parts in such a manner that the nuts after being once firmly set will be firmly held and prevented from becoming loose accidentally under ordinary circumstances. In other words, the springs will within a certain range compensate for wear, and practically lock the nuts, yet permit them to be loosened when occasion requires.

It is to be understood that the curvature of the spring at or near the end entering the grip or clamp is such as to be capable of being increased; in other words, it is not fitted or formed to rest fully upon its seat, but is capable of being bent or flexed toward it by the tightening of the nuts. I also desire to call attention to the fact that the heads of the bolts, when two are employed, as shown in Fig. 7, are sunken into the lower grip-iron or shielded or protected by the shoulders *j j*; also, that when a single U-bolt is used it is also firmly held by passing through the said shoulders, as well as by being to some extent embedded in the said iron.

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

1. The combination, in a spring-tooth harrow, of a frame-grip adapted to admit the lower frame-bar, a spring-seat adapted to enter the said grip and having upwardly-branching spring-supports, a detachable cross-tie, the spring-tooth, and hollow or tubular frame-bars, the said spring and bars passing at their intersections between the said grip and the said tie, substantially as and for the purposes specified.

2. The combination, in a spring-tooth harrow, of the U-shaped frame-grip *C*, the spring seat or grip *D*, entering the grip *C* and having upwardly-branching arms or spring-supports *f f*, arranged diagonally with relation to the grip *C*, the spring-tooth *B*, seated on the said arms, the cross-tie *E*, a frame-bar passing through the grip *C*, a frame-bar extending across the said grips, one or more grip-bolts, and nuts on the said bolts, substantially as and for the purposes specified.

3. The combination, in a spring-tooth harrow, of the U-shaped frame-grip *C*, having thereon the shoulders *j j*, the spring seat or



grip D, having upwardly-branching or spring supports *f f*, arranged diagonally to its lower part or base, the said arms having thereon the ears or lugs *h h*, the spring-tooth B, the cross-tie E, having thereon the depending flanges or lugs *i i*, the fastening-bolts passing through the said tie and shoulders, the nuts on the said bolts, and the frame-bars, all arranged together substantially as and for the purposes

10 specified.

4. As an improved article of manufacture, a grip or clamp for spring-tooth harrows, the said grip or clamp consisting of a U-shaped frame-grip, a spring-seat having a base or

lower portion adapted to enter the frame-grip, 15 and also having upwardly-extending arms or spring-supports arranged diagonally to the said base, a cross-tie, one or more bolts, and fastening-nuts, all adapted, substantially as described, for arrangement together about the 20 frame-bars at their intersection with each other and to receive and clamp the upper end of the spring-tooth.

LESTER D. SWART.

Witnesses:

EDWARD NUGENT,  
ALFRED S. ALLEN.