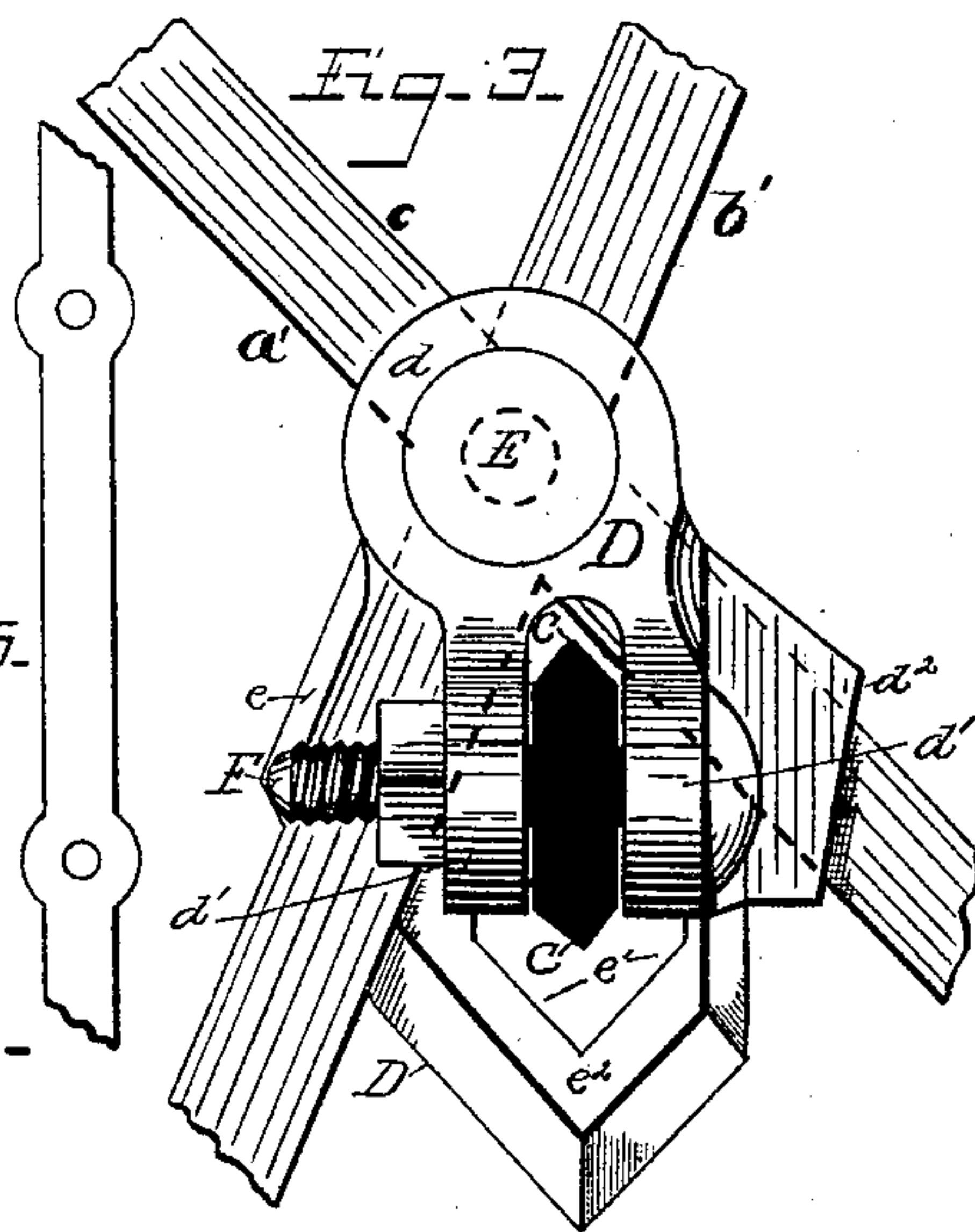
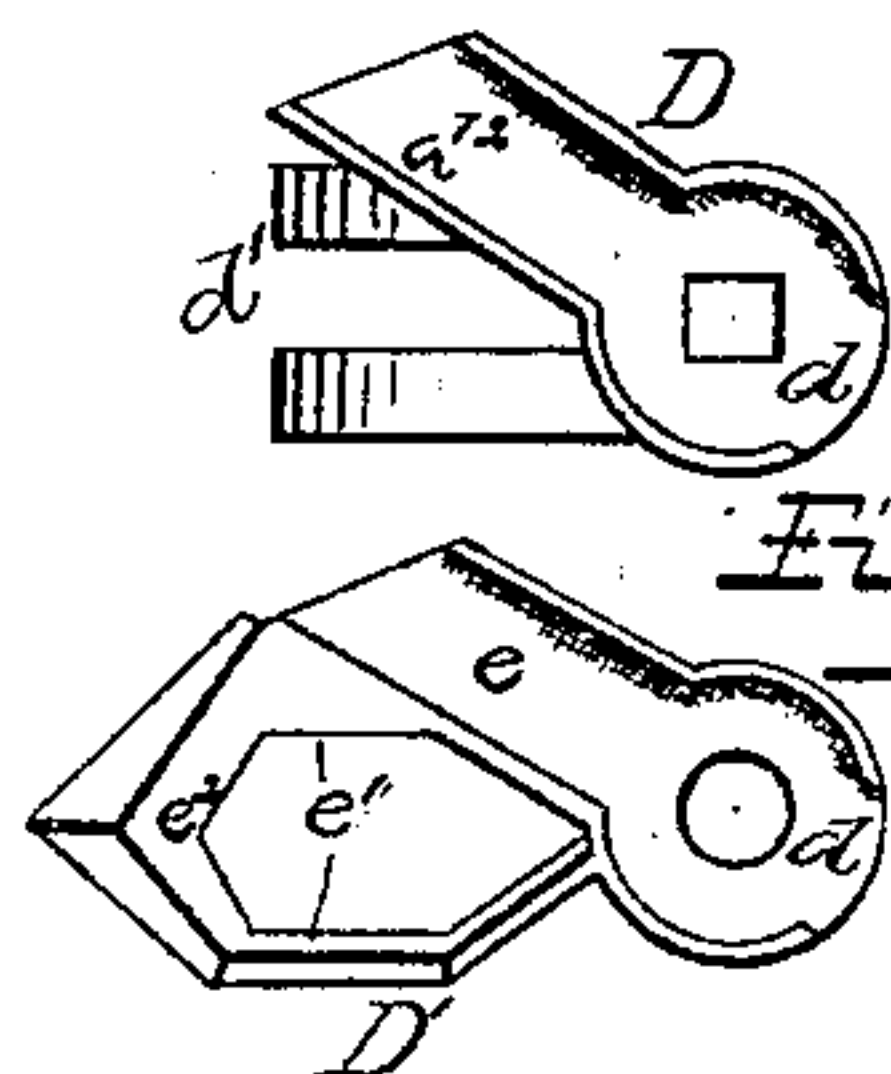
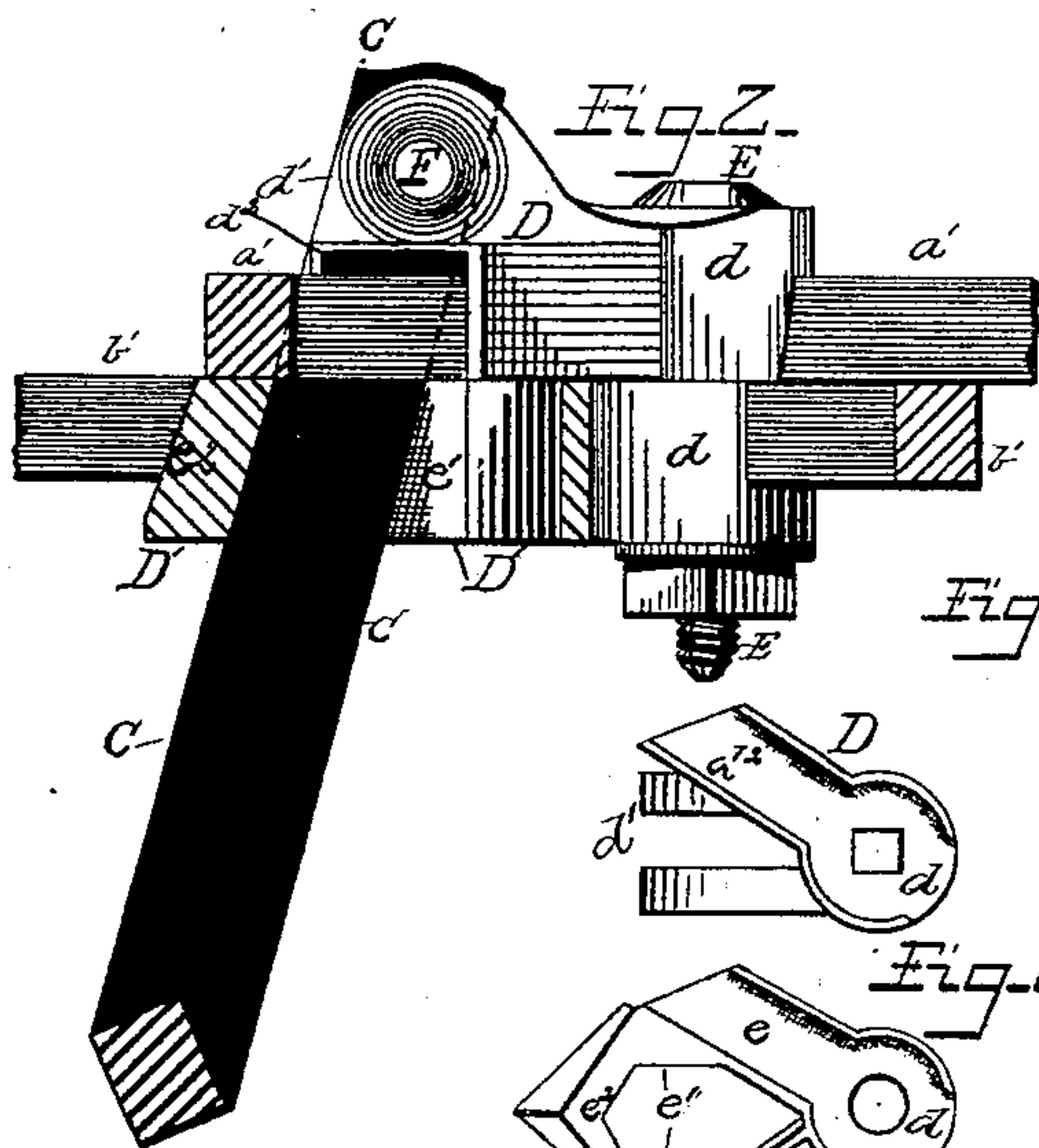
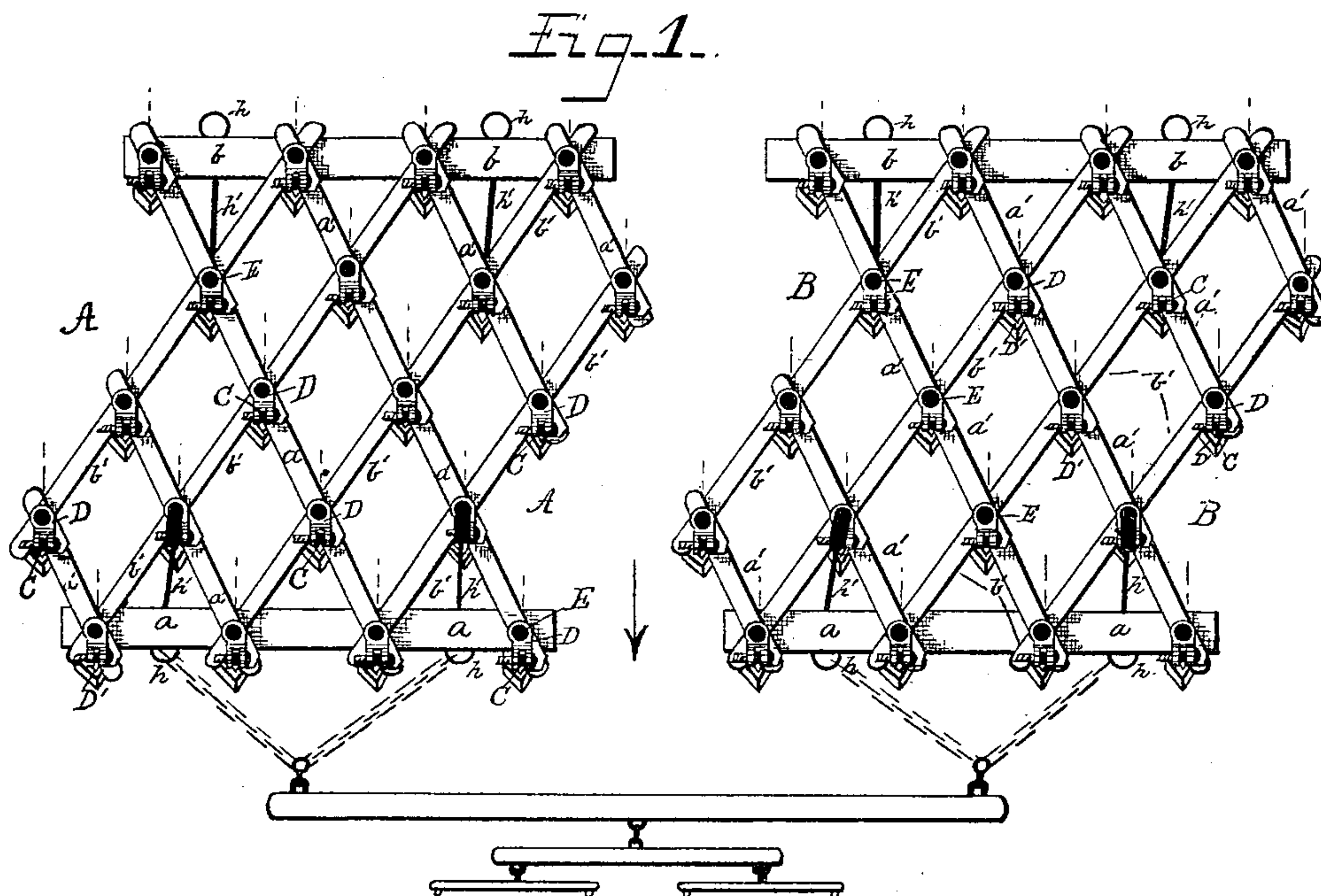


A. B. FRIEDRICH.

HARROW.

No. 389,216.

Patented Sept. 11, 1888.



Witnesses,
J. B. Johns,
Wm. F. Breckin,

Inventor,
Albert B. Friedrich,
By his Attorney
Henry W. Garrett.

(No Model.)

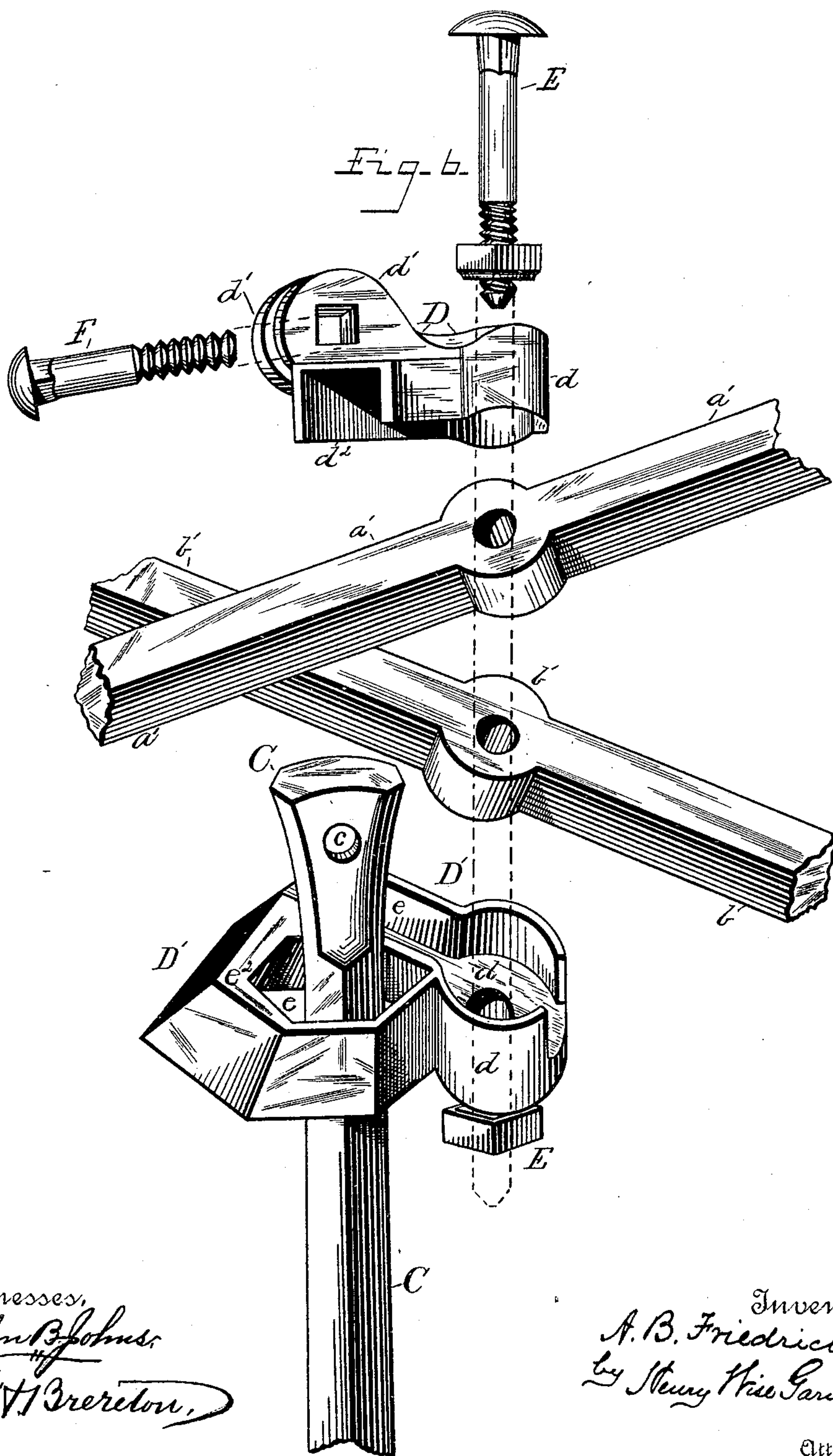
2 Sheets—Sheet 2.

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John B. Johns,
Wm. V. Brereton,

Inventor.
A. B. Friedrich -
By Henry Wise Garnett.

Attorney.

UNITED STATES PATENT OFFICE.

ALBERT B. FRIEDRICH, OF LIVINGSTON, WISCONSIN.

HARROW.

SPECIFICATION forming part of Letters Patent No. 389,216, dated September 11, 1888.

Application filed January 31, 1888. Serial No. 202,537. (No model.)

To all whom it may concern:

Be it known that I, ALBERT B. FRIEDRICH, a citizen of the United States, residing at Livingston, in the county of Grant and State of Wisconsin, have invented certain new and useful Improvements in Harrows; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention has relation to harrows, particularly that class of harrows in which the teeth are pivoted and reversible; and my said invention consists in a head for holding the reversible tooth, of peculiar novel construction, whereby the tooth is securely held in place, a certain amount of play permitted thereto, and at the same time the transverse bars composing the harrow are held in place, as will be hereinafter more fully explained.

The object of this invention is to provide an effective yet simple and economical harrow; and to this end I proceed as follows, reference being had to the accompanying drawings, in which—

Figure 1 represents a plan of a harrow constructed according to my invention, and Figs. 2, 3, and 4 are detail views of the head for holding the teeth and cross-bars of the harrow in place. Fig. 5 is a view of one of the diagonal bars. Fig. 6 is a view in detail perspective of the several parts composing the tooth holder or head, showing the said head, tooth, and bars of the harrow in their respective positions with relation to each other and their mode of attachment.

This harrow usually consists of two, three, or more sections, A B, which, as shown in Fig. 1, are attached to an evener; but only one section may be used, if desired, and each section is composed of a front and back bar, *a b*, and a series of diagonal bars, *a' b'*, crossing each other at oblique angles, at the intersections of which the teeth C are secured in the head D D'. Each of these teeth C is formed with an eye, *c*, by which they are secured to the head D, and this head is formed, preferably, of cast malleable iron in two sections, D and D', each of which has a head, *d*, to receive a bolt, E, by which the parts are secured together. This bolt E also passes

through the diagonal bars of the harrow, and thus secures these portions together as well as the sections of the head. The top portion of the head is also formed, in addition to the head *d*, with lugs or ears *d'*, between which the tooth is secured, as shown in Figs. 2 and 3, by a bolt, F, and at the under side of said portion of the head is formed a seat or channel, *d''*, Figs. 4 and 6, to receive the top cross-bars of the harrow. The bottom portion, D', of the head is also formed with a similar seat or channel, *e*, Figs. 4 and 6, to receive the lower diagonal bars, and with a slot, *e'*, within which the tooth plays, which play of the tooth is limited by the end *e''* of said slot, as shown in Fig. 2.

The head for holding the tooth is, as before stated, preferably of cast metal and in two sections, as shown, and by reason thereof the teeth are pivotally held in place and have a limited movement and may be reversed when desired. The cross-bars of the frame are also held together and from any lateral displacement.

With reference to arranging the teeth in the frame so that they will not follow one behind the other, the distance apart of said teeth is the same in the front and back bars, *a b*, and also in the diagonal bars *b'*—viz., about twelve and one-half inches—while the spaces between the teeth of the top bars, *a'*, is less than in the bars *b'* and *a*—viz., about eleven and one-fourth inches. Each tooth will therefore occupy its own path, as shown in dotted lines of Fig. 1.

The frame composing the harrow is so arranged that it will be the same upon each side, where attachments, as at *h*, are provided for the evener, as shown in Fig. 1. The harrow may therefore be used either side first, and when it is drawn in the direction indicated by the arrow in Fig. 1 the teeth will stand straight, while if drawn in an opposite direction the teeth will be slanting, as shown in Fig. 2. From the links *h* on the bars *a* and *b* a rod, *h'*, extends to and is secured at the first crotch of the diagonal bars *a' b'*, whereby the parts are strengthened and held rigid.

Having thus described my invention, what I claim, and desire to secure by Letters Patent of the United States, is—

In a harrow, the combination, with the tooth

C, having the eye *c*, and diagonal bars *a' b'*, having holes at their crossing points, of the head for securing said tooth and bars of the harrow together, composed of two sections, D and D', the top section, D, being formed with ears *d'* to receive the tooth, and the bottom section, D', a slot, *e'*, and stop *e''*, to limit the play of said tooth, and each of said sections D and D' formed with a socket-head, *d*, and angular socket *d'' e*, to receive and hold the cross-bars *a'* and *b'*, respectively, and bolts E and F, all constructed and arranged as described, for the purposes specified.

A. B. FRIEDRICH.

Witnesses:

W. M. COMSTOCK,
GEO. FRIEDRICH.