

(No Model.)

M. DALEY.
HARROW.

No. 389,502.

Patented Sept. 11, 1888.

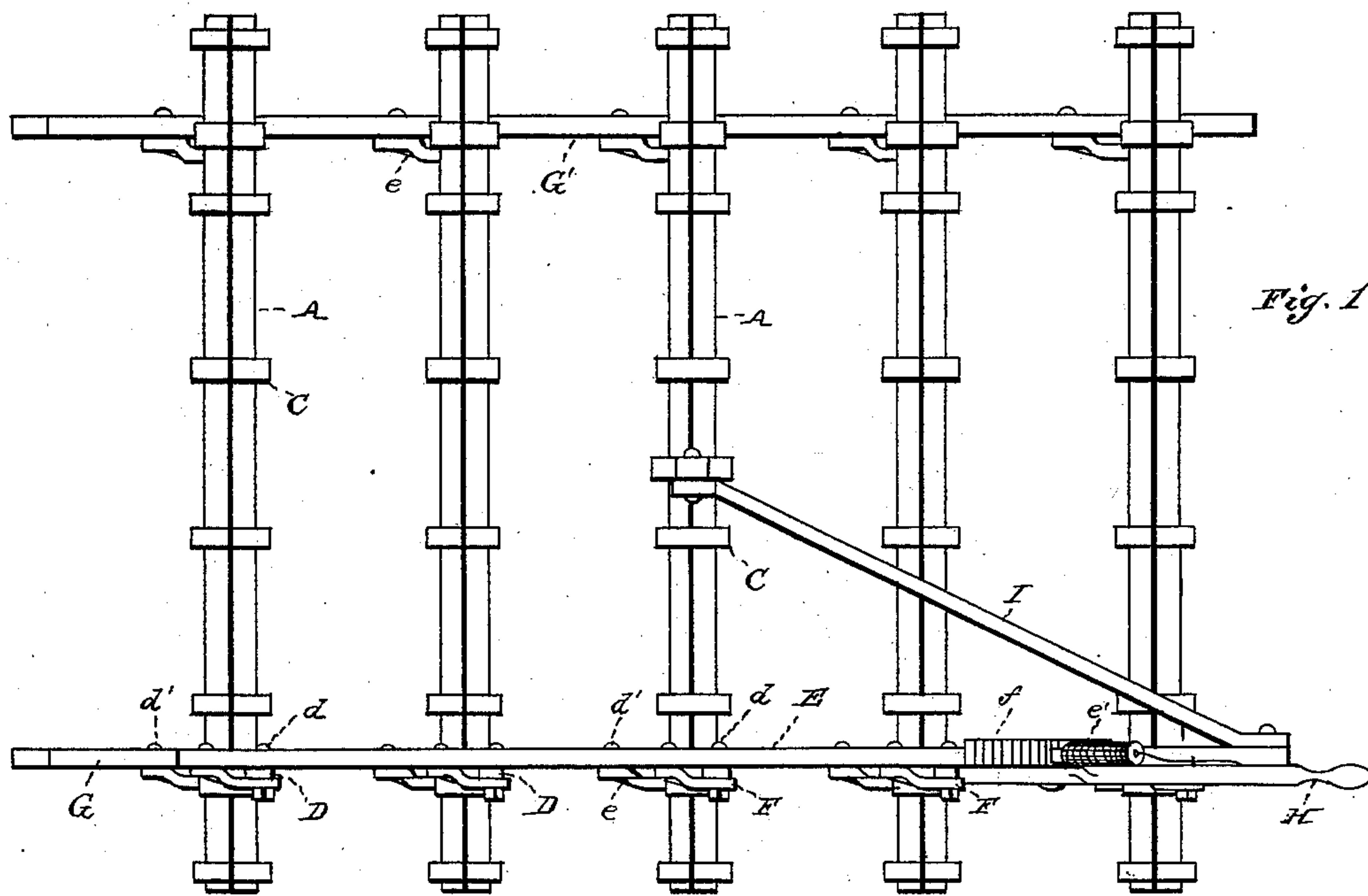


Fig. 1

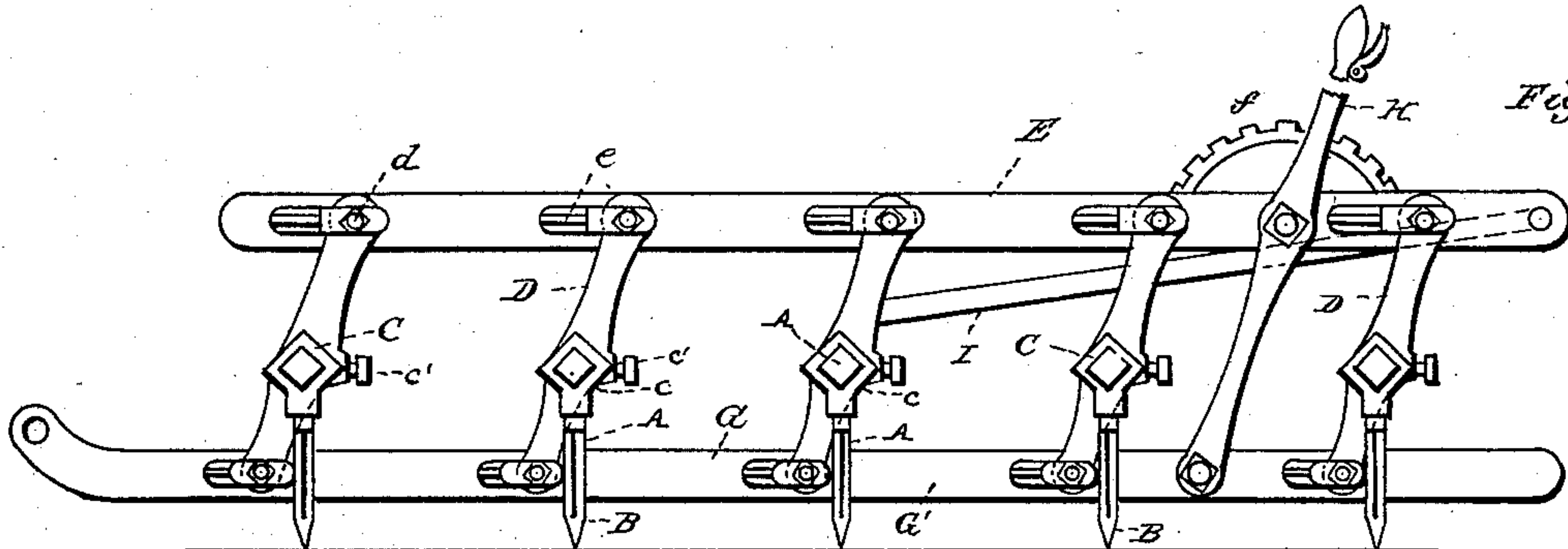


Fig. 2.

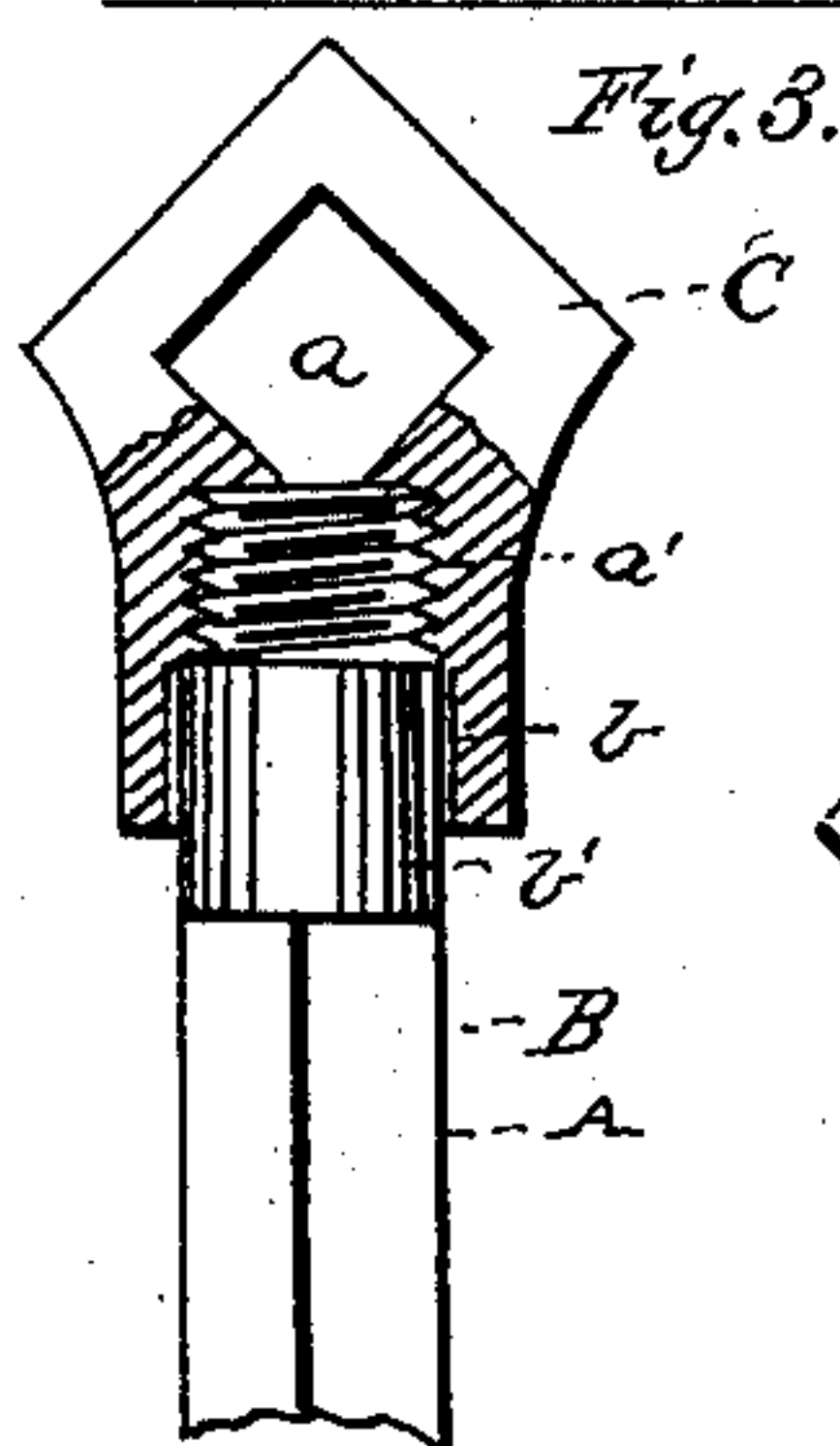


Fig. 3.

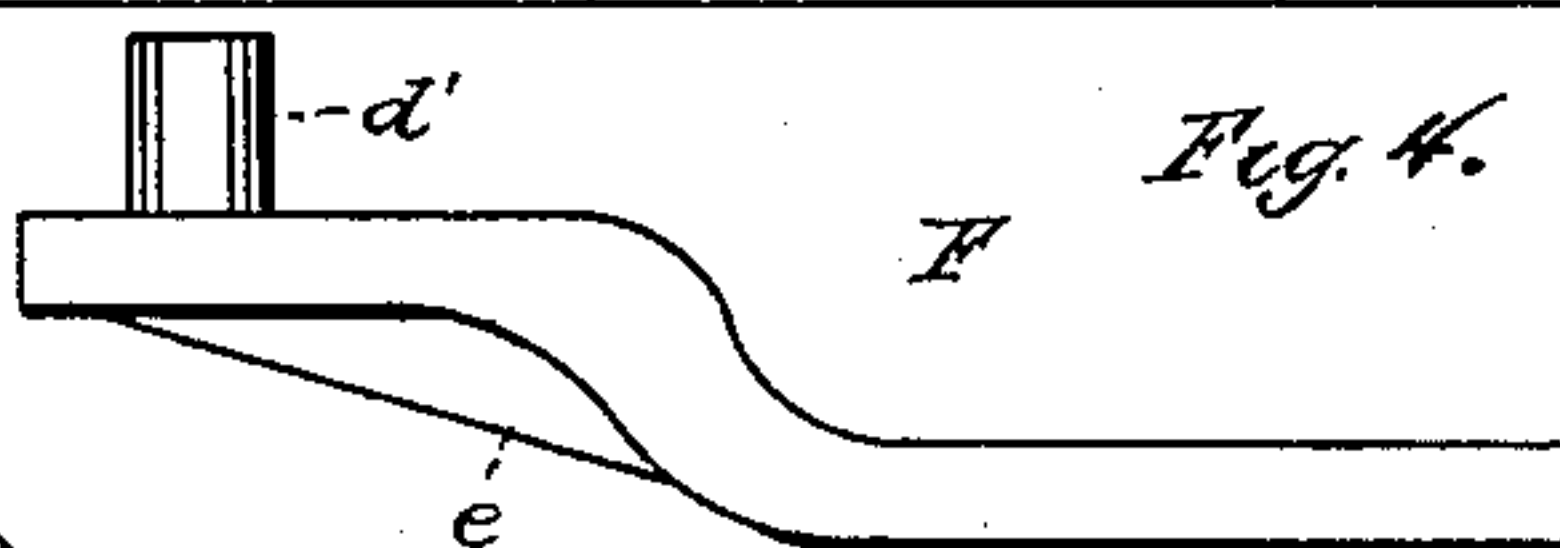


Fig. 4.

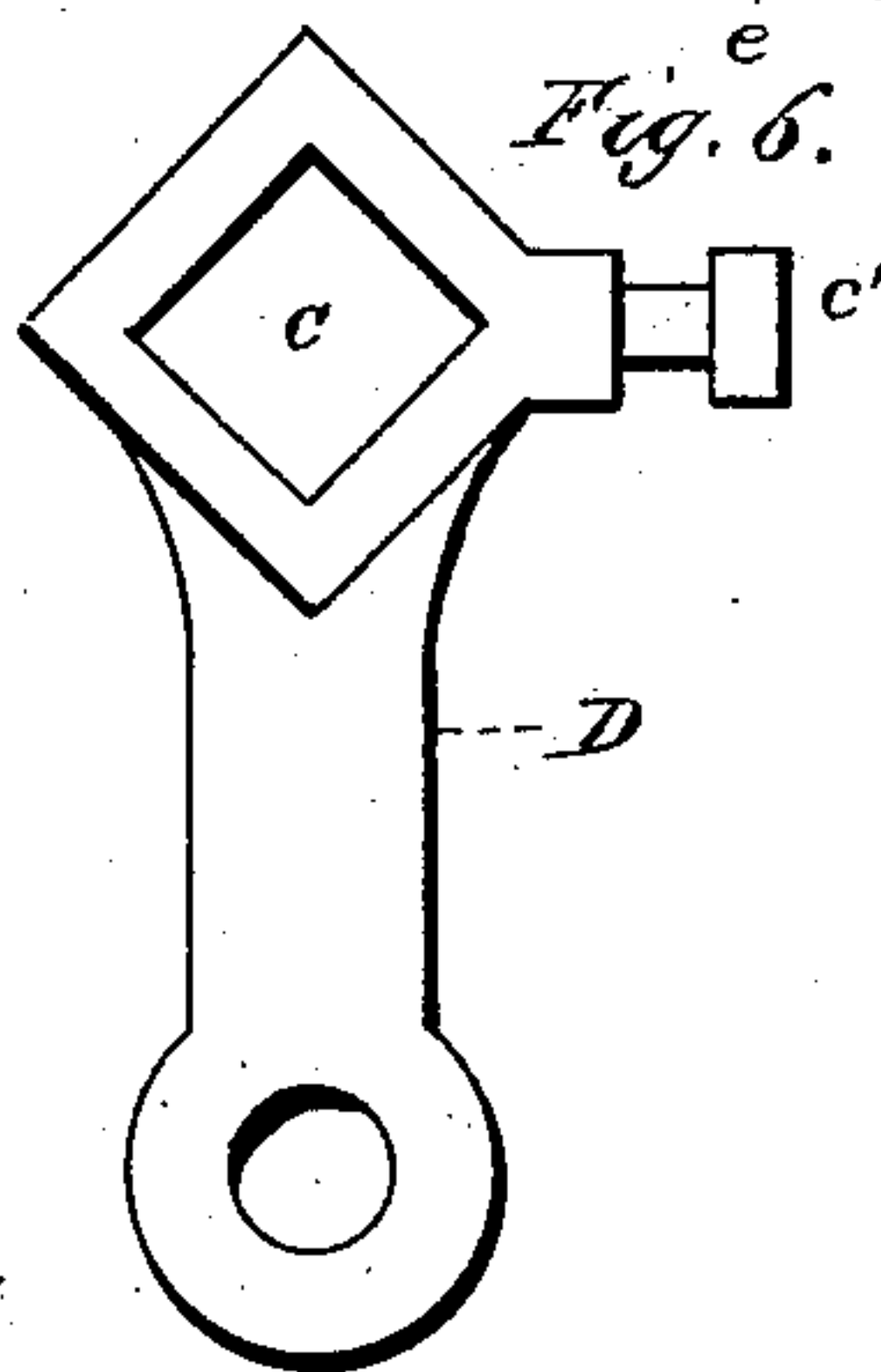


Fig. 6.

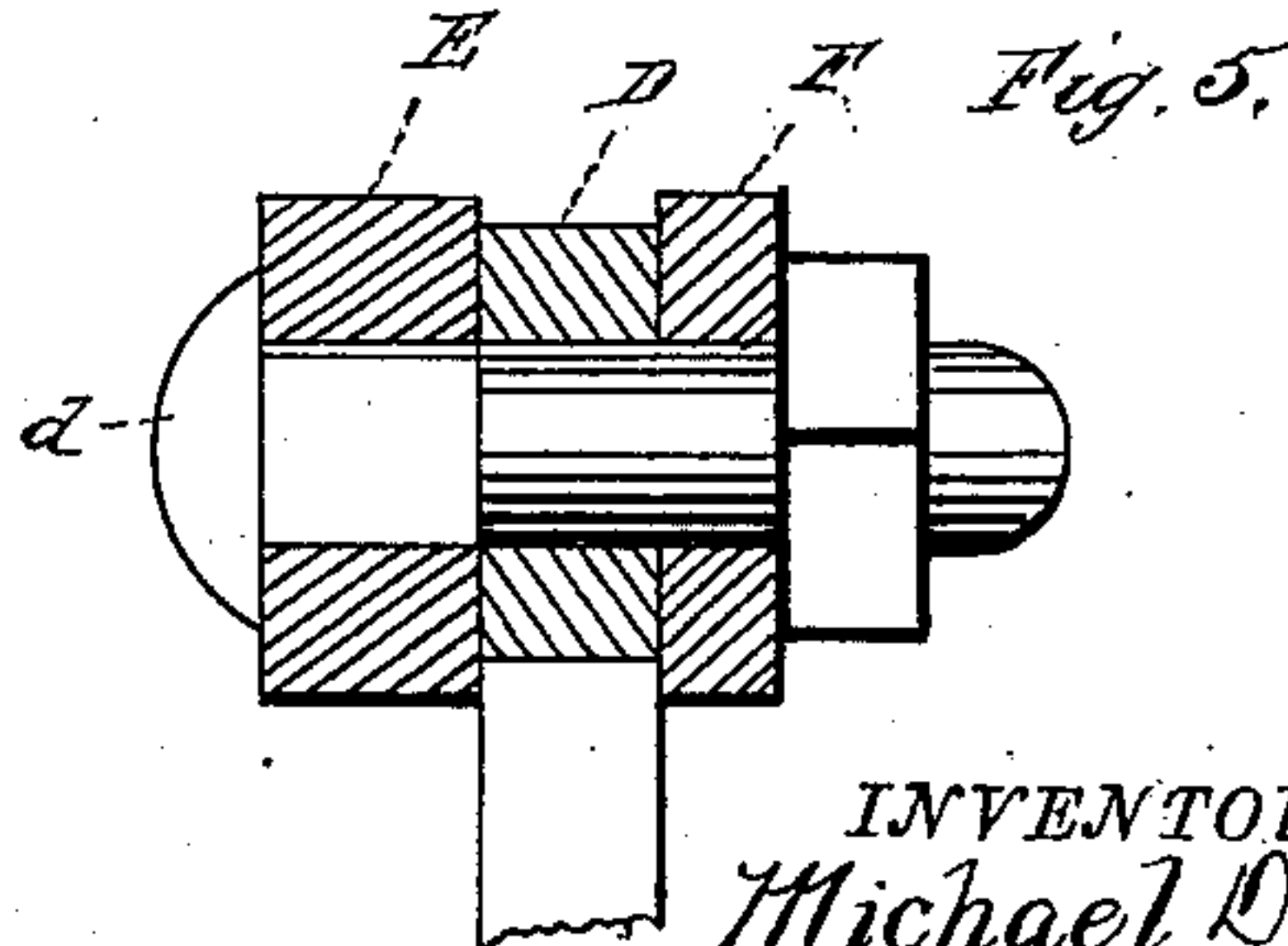


Fig. 5.

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HARROW.

SPECIFICATION forming part of Letters Patent No. 389,502, dated September 11, 1888.

Application filed March 20, 1888. Serial No. 267,859. (No model.)

To all whom it may concern:

Be it known that I, MICHAEL DALEY, a citizen of the United States, and a resident of De Kalb, in the county of De Kalb and State of Illinois, have invented certain new and useful Improvements in Harrows; and I do 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, reference being had to the accompanying drawings, and to letters or figures of reference marked thereon, which form a part of this specification.

Figure 1 of the drawings is a representation of the invention, and is a top view thereof. Fig. 2 is a side view; and Figs. 3, 4, 5, and 6 are detail views.

The invention relates to improvements in harrows; and it consists in the construction and novel combination of parts, as hereinafter set forth.

Referring to the drawings, A designates the tooth-bars, preferably angular in cross-section, and B shows the harrow-teeth.

C is a socket having the square or angular opening *a* through its head portion adapted to fit closely over the angular bars A. The depending socket is interiorly threaded for a portion of its way, as at *a'*, to engage the threaded end of the tooth. The section *b* of the socket below its threaded portion is designed to embrace the rounded neck *b'* of the tooth, thus protecting the tooth from direct strain upon the first thread or weaker portion. The main portion of the tooth is made angular, as shown, so that an ordinary wrench may be used to turn the tooth and bring its upper end against the lower edge of the tooth-bar to clamp the sockets firmly thereon.

D represents double lever-arms, having the angular opening *c* near the center, through which the tooth-bars pass. A set-screw, *c'*, as shown, impinges upon the edge of the bar and holds the lever-arms in place.

E is the operating-bar, transverse to the tooth-bars, pivotally connected to the upper arms of the lever-arms D by a bolt, *d*, having a squared end, which passes through a square opening in the bar E, a round opening in upper arm of the lever D, and through an opening in the clip-strap F, where it is provided

with a thread and nut. The bolt *d* by its squared portion is prevented from turning, and the lever-arm is adapted to turn on the bolt, which obviates the possible loosening of the nut by friction.

The clip-strap F is provided near one end with a malleable-iron rivet, *d'*, cast integral therewith, which is riveted within the opening in the bar E forward of the pivot-bolt, and a strengthening-rib, *e*, is cast on the outer face of the return portion of the clip-strap.

G is the draft-bar connected to the lower arm of the double lever in a similar manner to the bar E. The draft-bar G' is similarly connected to the tooth-bars near the opposite end. The lever-arm in this case, however, is not provided with the upper arm.

The draft-bars G and G' have the upwardly-turned front end, which permits them to be used as runners when it is desired to draw the harrow from field to field or along the road. When so used, the teeth are lifted from the ground, as hereinafter explained.

H is the hand-lever pivotally connected to the bars E G, as shown, provided with the detent *e'*, for engaging the semicircular rack *f*. The rack *f* is rigidly attached at its ends to the bar E at equal distances from the point where the hand-lever is pivoted to bar E.

The brace-rod I is rigidly secured to the bar E and stands at an angle thereto to its pivotal connection with the middle tooth-bar, the connection being like the connections of the draft-bar G'. By means of the lever-arms and connections the harrow-teeth may be adjusted vertically or at any desired angle with the ground. By throwing the lever H forward the teeth will be brought parallel to the ground, allowing the draft-bars to come in contact with the ground, thus providing a means for transporting the harrow.

Having described my invention, what I claim is—

1. In combination with the tooth-bar, the socket having the angular opening through its head, and the depending threaded portion, and the tooth having the threaded end adapted to clamp the socket on the tooth-bar, substantially as specified.

2. The socket having the angular opening, the threaded portion, and the section *b*, de-

signed to embrace the tooth below its threaded portion, substantially as specified.

3. In combination with the tooth-bars, the lever-arms having the angular opening and the set-screw, substantially as specified.

4. In a harrow, the clip-straps having near one end the integral malleable-iron rivet, substantially as specified.

5. In a harrow, the combination of the angular tooth-bars, the sockets having the angular opening and the threaded portion, the teeth

having the threaded end, the lever-arms, the set screw, the bars E and G, the clip-straps having the malleable-iron rivets, the bolts, the hand-lever having the detent, and the rack, substantially as specified.

In testimony whereof I affix my signature in presence of two witnesses.

MICHAEL DALEY.

Witnesses:

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