

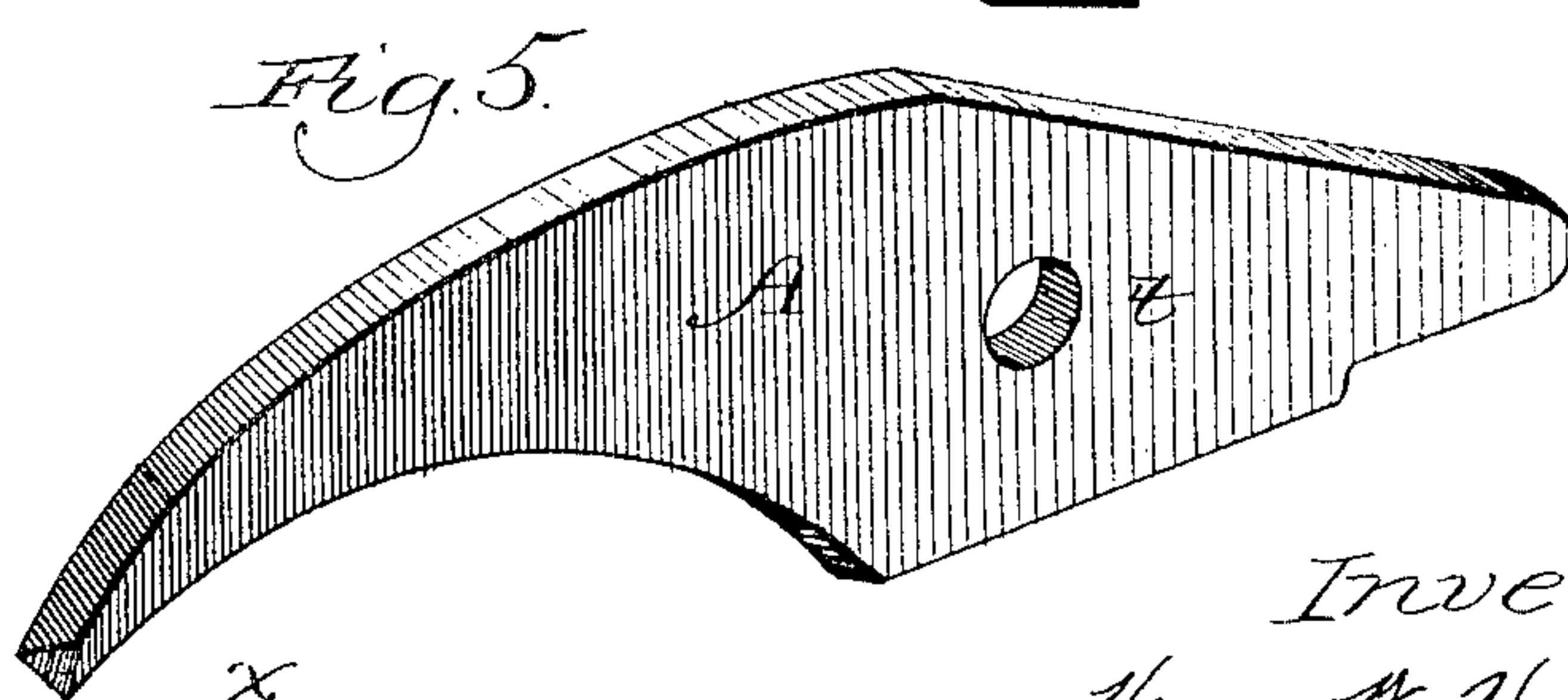
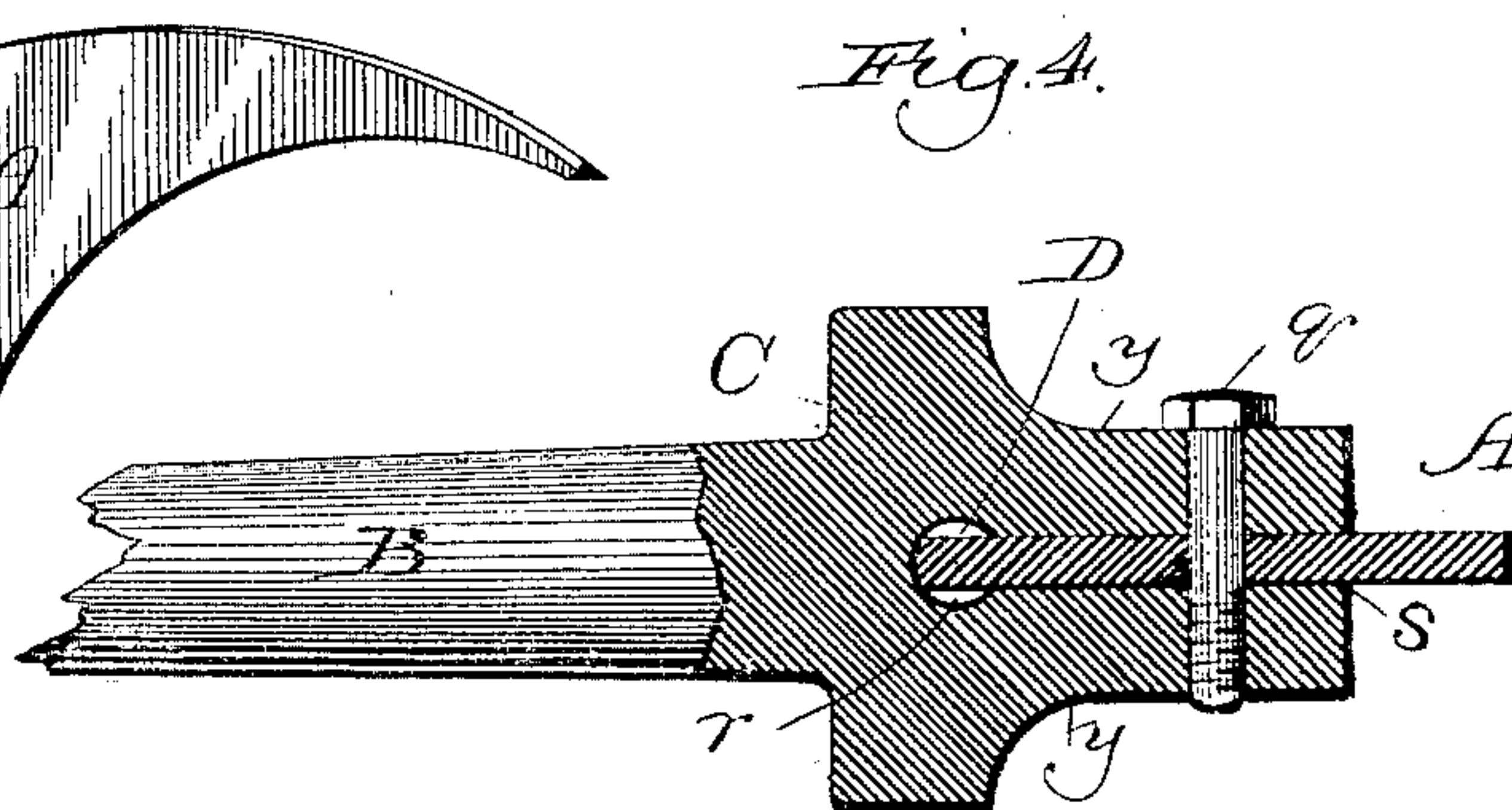
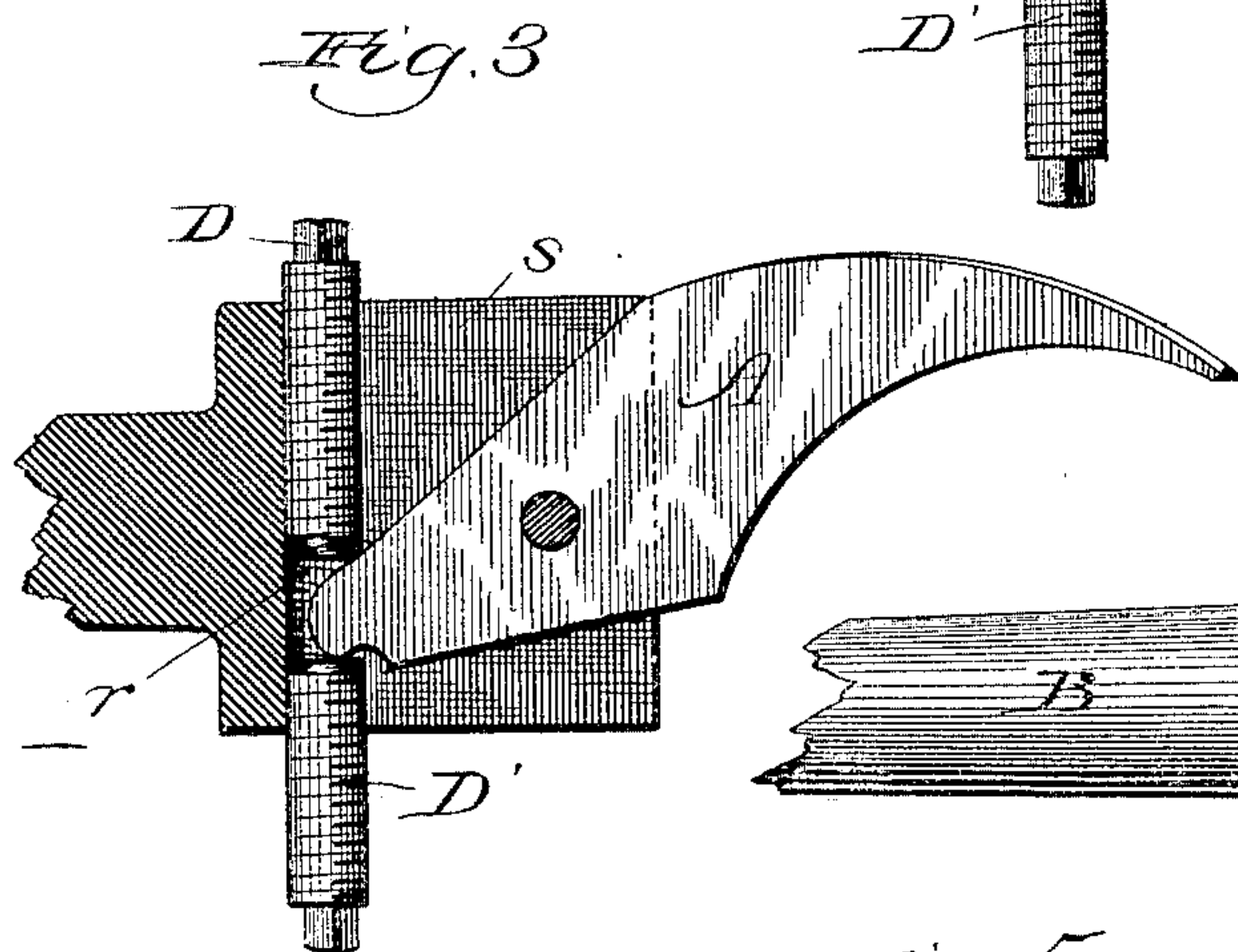
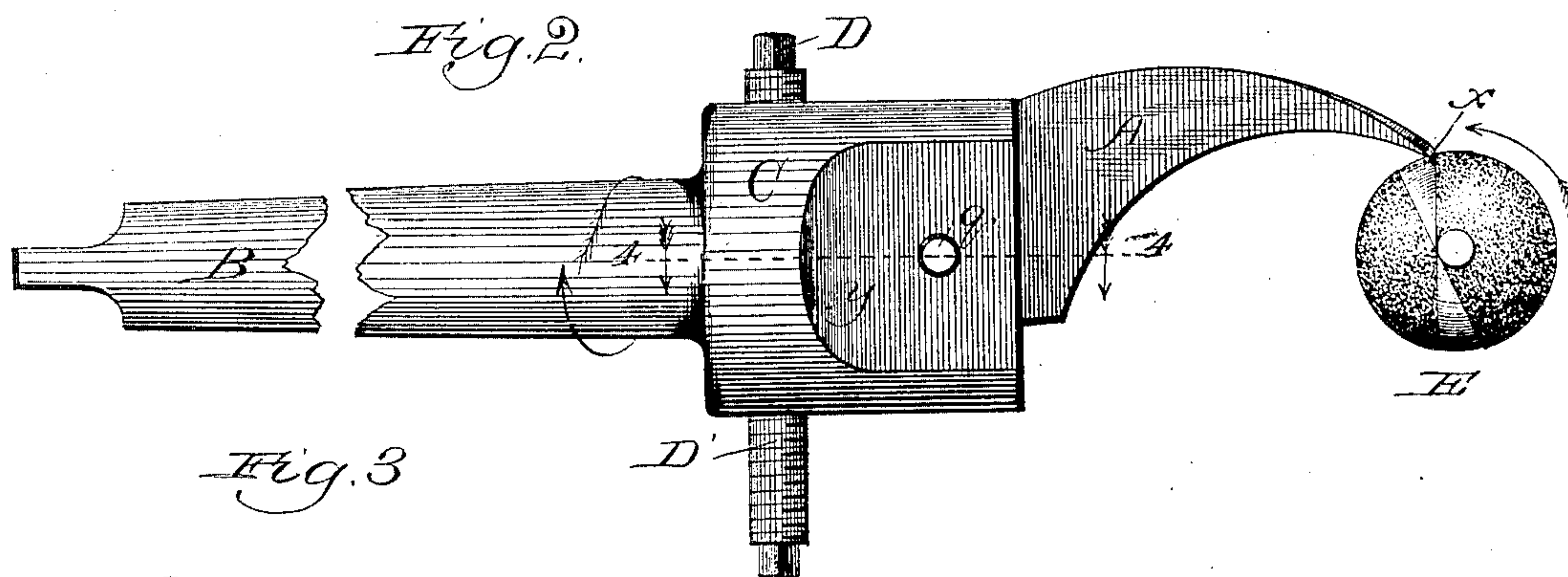
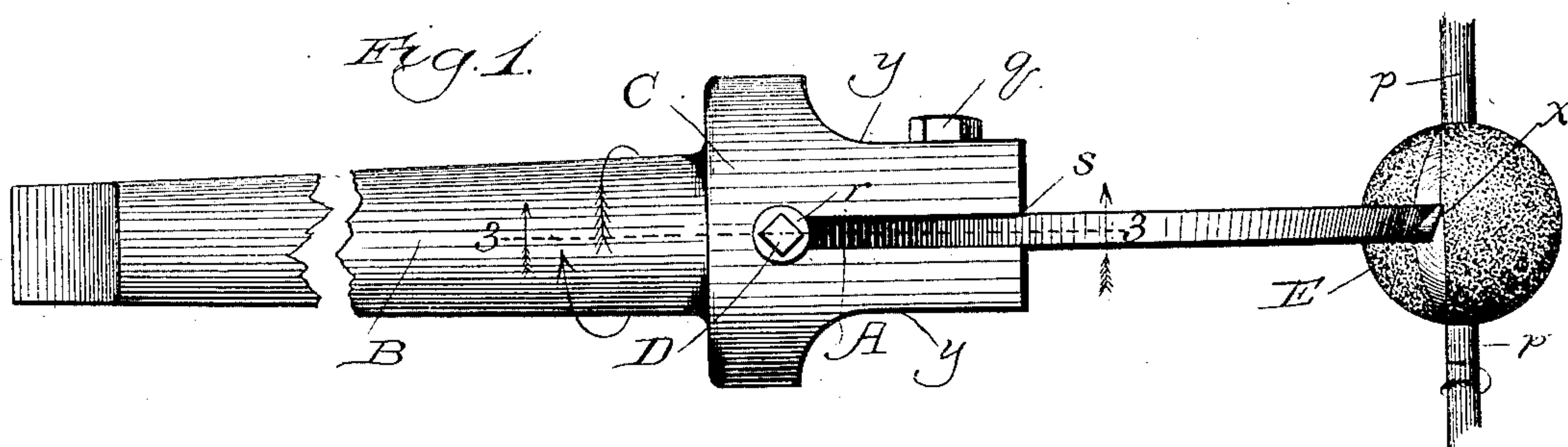
(No Model.)

H. W. HUBBARD.

TURNING TOOL.

No. 325,085.

Patented Aug. 25, 1885.



Witnesses:

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UNITED STATES PATENT OFFICE.

HENRY W. HUBBARD, OF AURORA, ILLINOIS.

TURNING-TOOL.

SPECIFICATION forming part of Letters Patent No. 325,085, dated August 25, 1885.

Application filed February 9, 1885. (No model.)

To all whom it may concern:

Be it known that I, HENRY W. HUBBARD, a citizen of the United States, residing at Aurora, in the county of Kane and State of Illinois, have invented a certain new and Improved Turning-Tool; and I hereby declare the following to be a full, clear, and exact description of the same.

My invention is designed particularly—though its usefulness is by no means necessarily confined to such application—for finishing and “truing up” perfectly a ball or globe of any required size.

I employ the device for finishing the globe-valve shells applied in large numbers and in different sizes in locomotives, and cast in brass in imperfect form, to finish or perfect which it has hitherto been the custom to use files operated by hand. This, however, is not only an exceedingly tedious operation, requiring for its performance a great deal of time, which must be paid for, and thus forms an important item in the matter of the cost of producing these valves, but it is also productive of results only remotely approximating perfection, owing to the practical inability of human skill applied in this manner to form a nearly or quite perfect globe having a smooth and even surface.

My invention consists in the general construction of the turning-tool whereby it is adapted to its purpose; and my invention further consists in certain details of construction and combinations of parts, all as hereinafter particularly set forth.

Referring to the drawings, Figure 1 is a rear view of my improved tool represented in operative position and operating upon a globe shown to be partly finished, and adjustably connected with a suitable stem or holder having a part broken away toward its rear end to permit proper representation of the device; Fig. 2, a side view; Fig. 3, a central longitudinal section taken on the line 3 3 of Fig. 1, viewed in the direction of the arrows, and illustrating the manner of adjusting the tool or cutter; Fig. 4, a central longitudinal section taken on the line 4 4 of Fig. 2, viewed in the direction of the arrows, and showing a detail of the adjustment, and Fig. 5 a perspective view of the cutting-tool.

A is the turning-tool or cutter, composed of

a blade, preferably of hard plate-steel, of the desired thickness, wedge-shaped toward its base and provided therein with an opening, *t*, and having the narrow sides of the blade toward its forward extremity, which is beveled on one side, as shown at *x*, Fig. 5, to afford the edge, convex on one side, to form an arc of a circle of a certain diameter, and concave on the opposite side, to form an arc of a circle of a smaller diameter and eccentric with the first-named circle.

B is the holder to support the tool A, and is provided toward one end with a cylindrical head, C, reduced toward its forward extremity on opposite sides, as shown at *y*, and provided with a transverse slot, *s*, formed centrally between the reduced portions *y*. The slot *s* leads into a cylindrical opening, *r*, extending across its rear extremity and formed through the head C, and screw-threaded to receive adjusting-screws D and D', of which one is inserted into the opening *r* from each side of the head C.

The tool A is inserted into the slot *s* of the head C in a manner to cause the end of its wedge-shaped portion to lie between the adjacent ends of the adjusting-screws D and D' and to bring the opening *t* coincident with a similar opening formed through the head C to admit a set-screw, *q*, which serves to hold the tool A firmly in any adjusted position.

To operate my invention, the holder B is adjusted at its rear extremity into the spindle of a milling or other suitable machine in a manner to cause the edge of the tool A to project toward the table which supports the chuck for holding at a right angle to the tool the work—shown in the drawings, for example, in the form of a globular valve-shell, E—upon which it is to operate.

The tool A is adjusted by turning the screws D and D' in opposite directions to bring its edge *x* as far back from the central line or axis of the center B, forming its support, as is necessary to cause it to describe a circle upon the object E of the required diameter, and when properly adjusted it is firmly secured against removal from its adjusted position by means of the set-screw *q*. If the object, which is slowly rotated on its axis in a direction either toward or from the rapidly-rotating tool and at right angles to it, were

independent of lateral supports *p*, like a billiard ball, for example, in which case other means than those indicated in the drawings for supporting it in its rotation would have to be provided, the circle to be described upon it by the tool A could pass through opposite diametrical points of the surface of the work; but in the case of globular valve-shells E, which are ordinarily provided with tubular projections, *p*, the circle, if these project from opposite sides of the shell, as shown, must be described between them, and, preferably, in order to perform the work without the necessity of readjusting the object E, in a manner to cause it in each rotation to reach the angles of junction of the shell and projections.

To understand the operation, it must be borne in mind that the tool A is revolved rapidly around the axis of the spindle with which it is connected, through the medium of the headed holder B, in the lateral direction, which would bring the backward-projecting bevel *x* of the cutting portion into contact with the work, while the work E is slowly rotated on its axis either toward or from the cutting-tool, whereby a spiral-shaped circle must be cut clear around the object, affording a smooth and even surface upon it.

Where the tubular projections diverge from adjacent points of the shell, as is sometimes the case, one or more unfinished spots may be left near them, which will have to be finished by filing.

As hereinbefore mentioned, the operation of my tool is not necessarily confined to producing or finishing and "truing up" globular surfaces, for it may be employed, by proper adjustment of a tool slightly modified by increasing the curvatures of the concave and convex sides, to finish the curved surfaces of elbows in tubes presented lengthwise at a proper angle to it to cause it to pass through the same point on the under side of the bend in each of its revolutions.

By reversing the tool in its holder, to cause the edge to project in a direction opposite to that shown in the drawings, a very practicable device is afforded for milling out the interior surfaces of cylindrical holes.

Under certain conditions of work it may be desirable or practicable to employ two tools, A, facing each other upon the same center, adjustable in the manner already described of one, and such modification is included in my invention. It is thought, however, that as one may always be used, and two only upon certain kinds of work, more than one will seldom be required.

Although the concavo-convex form of tool shown and described is the one preferred, any other form of tool may be used whereby the tool will be deflected from the line of axis of its rotation and its forward extremity provided with the cutting-edge reflected toward the line of axis of rotation, thus causing the edge to be presented to the "work" during the entire revolution of the tool, and such other forms are included in my invention.

What I claim as new, and desire to secure by Letters Patent, is—

1. An adjustable turning-tool comprising a blade, A, having an edge, *x*, in combination with a rotary holder upon which the turning-tool is pivotally mounted, and adjusting means, substantially as described, upon the holder to adjust the turning-tool to various positions with relation to the holder and work, as set forth.

2. An adjustable turning-tool, A, comprising a blade having the sides of the body eccentrically concavo-convex to afford an edge, *x*, toward its forward extremity, and provided with an opening, *t*, toward its rear extremity, in combination with a holder, B, provided with a head, C, having a slot, *s*, to receive the rear extremity of the tool, and openings coinciding with the opening *t* in the adjusted tool, containing a set-screw, *q*, and a longitudinal opening, *r*, along the base of the slot *s*, containing adjusting-screws D and D', the whole being constructed and arranged substantially as described.

HENRY W. HUBBARD.

In presence of—

J. P. CASS,

CHAS. F. TYLER.