

T. J. SLOAN.

MACHINE FOR MANUFACTURING WOOD-SCREWS.

No. 172,349.

Patented Jan. 18, 1876.

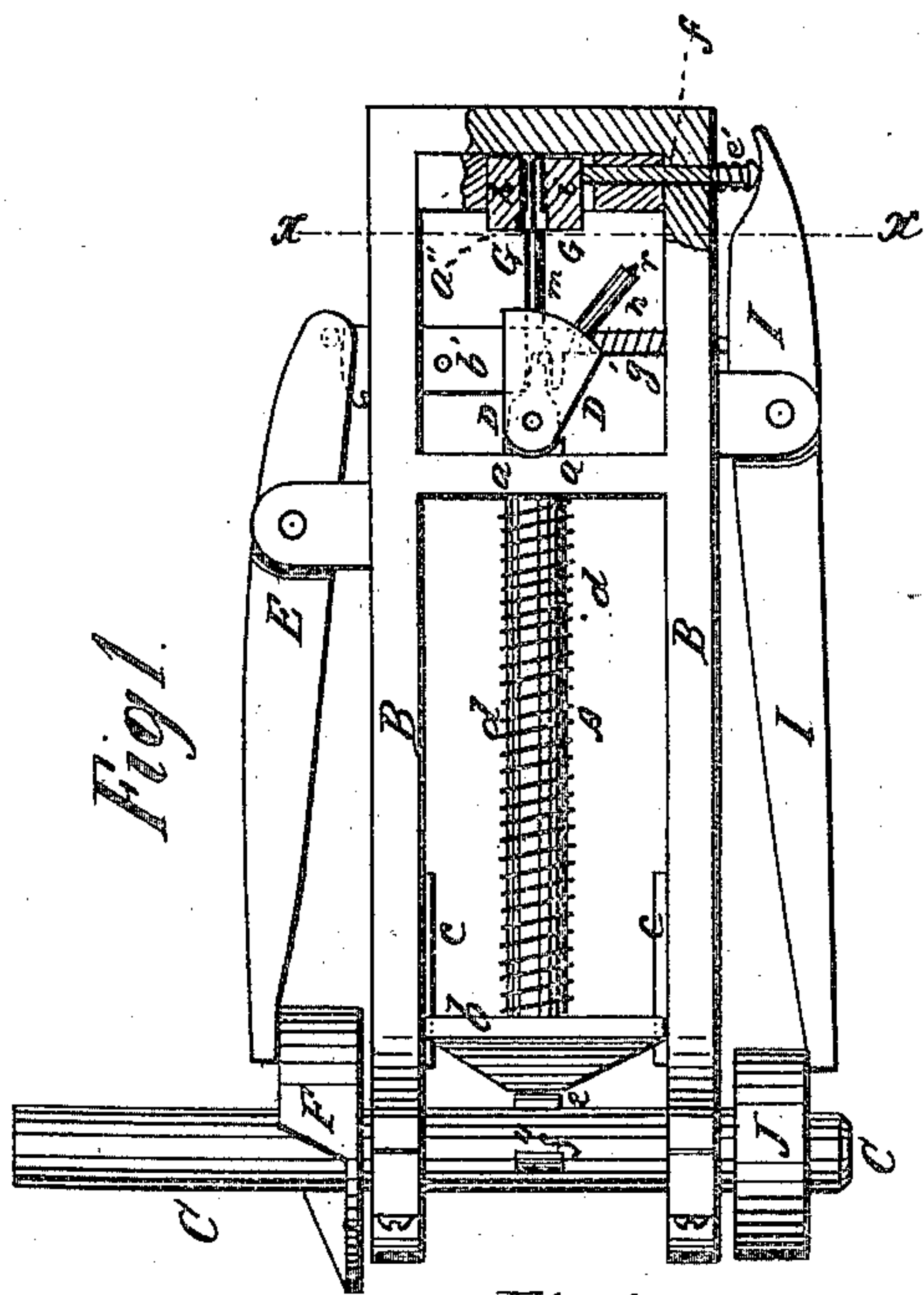


Fig 1.

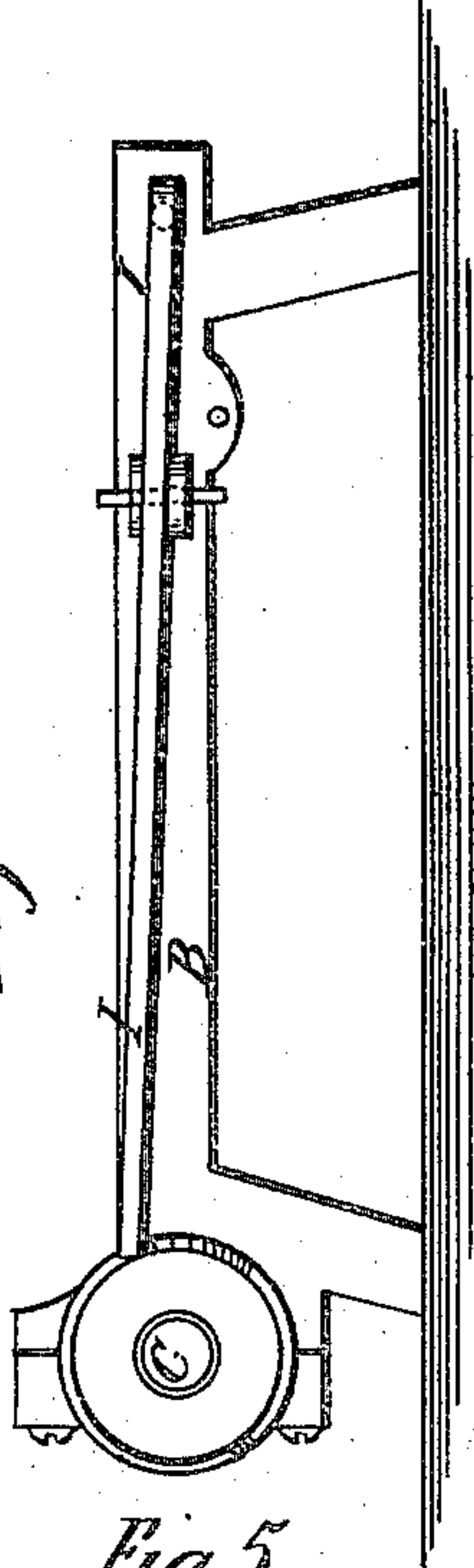


Fig 2.

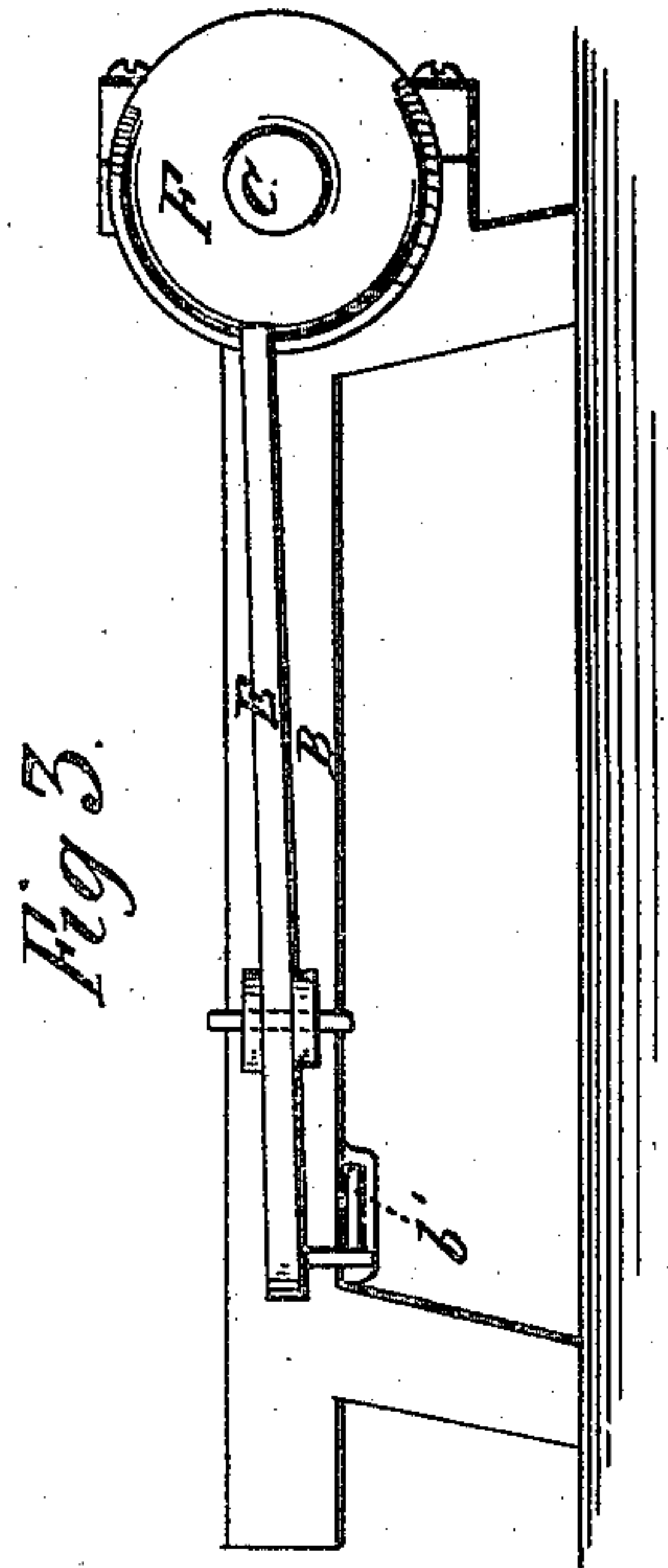


Fig 3.

Fig 4.

Fig 5.

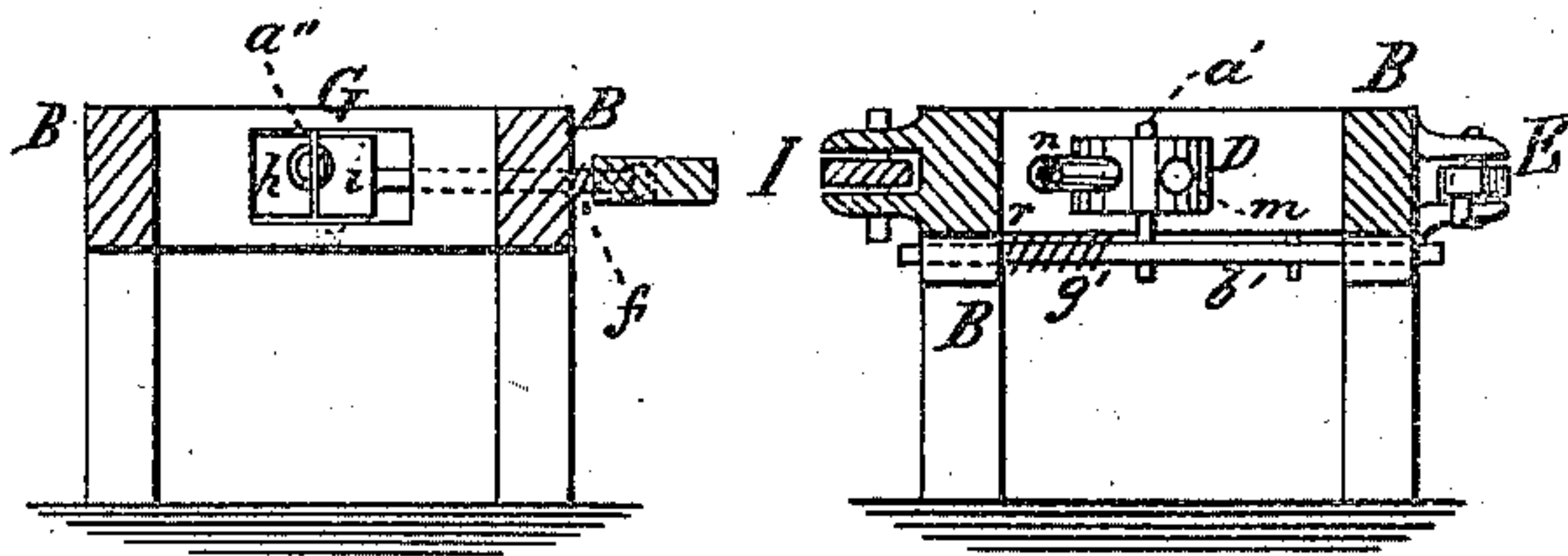


Fig 6.

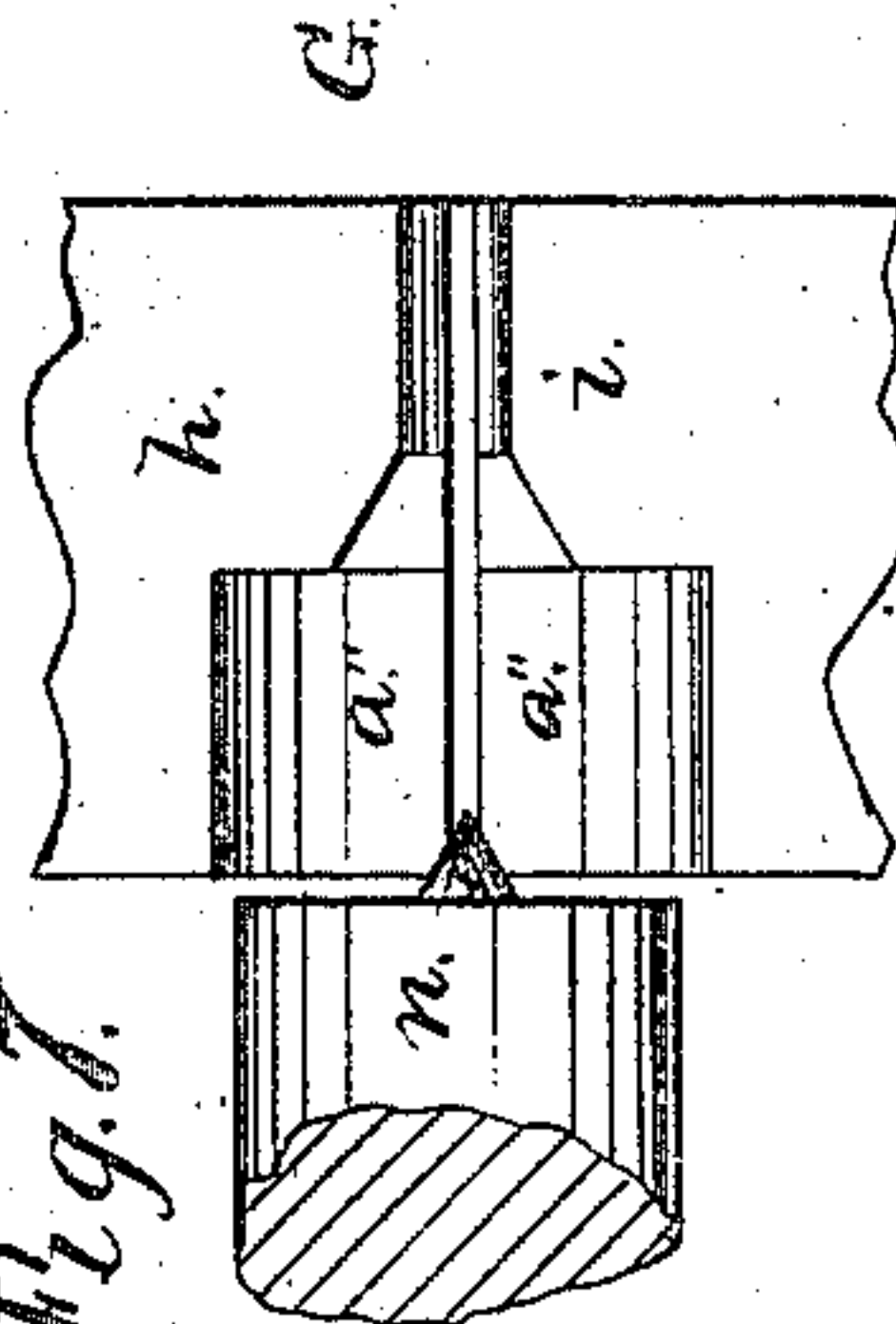


Fig 7.



Witnesses

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# UNITED STATES PATENT OFFICE.

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## IMPROVEMENT IN MACHINES FOR MANUFACTURING WOOD-SCREWS.

Specification forming part of Letters Patent No. 172,349, dated January 18, 1876; application filed May 25, 1875.

### CASE A.

*To all whom it may concern:*

Be it known that I, THOMAS J. SLOAN, of the city, county, and State of New York, have invented certain Improvements in Machinery for the Manufacture of Wood-Screws, of which the following is a specification:

This invention is designed for use in the manufacture of that variety of wood-screws in which the head is formed with a central cavity or recess traversed by the usual groove or nick, whereby provision is made for the use of a peculiarly-constructed driver in turning the screw, with the result that the driver is prevented from slipping out of the groove, and the screw is driven without injury thereto, and without special care or annoyance to the operator.

The object of this my present invention is to provide for the cheap and convenient formation in the head of the screw of the recess or cavity hereinbefore indicated; and to this end it consists in the combination of a die in which to upset the end of the screw-blank or form the head of a wood-screw, with a punch or stem constructed with a conical teat for producing a conical hole in the center of the screw-head.

The invention further consists in a novel combination of parts, whereby the apparatus is peculiarly fitted for successful use in the manufacture of screws made from brittle or refractory metal; also in a novel combination of parts, whereby the most advantageous operation of the principal feature of the invention is secured.

Figure 1 is a plan and partial horizontal section of a machine made according to my invention. Figs. 2 and 3 are elevations of opposite sides of the machine. Figs. 4 and 5 are vertical transverse sections taken on the line *xx* of the figures hereinbefore enumerated, but viewed from stand-point respectively in front and rear of the machine. Fig. 6 is a central longitudinal section of the screw, for the production of which my present invention is intended. Fig. 7 is a sectional view on an enlarged scale of certain portions of my machine aforesaid.

A is a longitudinally-sliding shaft, having

one of its bearings at *a* in the supporting-frame B, and at its opposite or rear end furnished with a cross-head, *b*, running on fixed guides *c*. At the rear end of the frame B is a driving-shaft, C, provided with two curved studs, arms, or cams, *e f'*, arranged to act in succession upon the cross-head *b* to move the shaft A forward, the reverse or rearward movement of said shaft being given thereto by a special spring, *d*, coiled around the same and bearing at one end on the cross-head *b*, and at the other against the fixed bearing *a*. On the front end of the shaft A is a swinging head, D, attached to the shaft A by a vertical pivot, *a'*, and connected by a rod, *b'*, with the forward arm of a lever, E, the rear arm of which bears against the face of a cam, F, on the driving-shaft C. A spring, *g'*, is arranged to bear against that side of the head D opposite that at which the lever E is placed, the spring thus tending to press the said lever in due contact with the aforesaid cam, and also to cause the head to follow the movement of the lever incident to the varying motion of the cam thereon.

Projecting from the front end of the head D, both in the same plane, at a suitable distance apart, but each in a position radial to the pivot *a'*, are the heading-die *m* and the stem *n*, the latter having at its front extremity the indenting-punch *r*, the form of which is identical with that of the recess or cavity to be formed in the head of the screw-blank. G is that one of the heading-dies which holds the blank during the formation and punching of the head upon the blank, and which comprises a fixed jaw, *h*, and a movable jaw, *i*, the latter moved by means of a laterally-projecting rod, *f*, forced outward by a coiled spring, *e'*, and inward by a lever, I, actuated by a cam, J, on the driving-shaft C, the latter being, of course, rotated by a belt and pulley, or any other ordinary or suitable means. The die G is shaped internally for receiving and holding the pieces of wire from which the headed blanks are made, and for the requisite shaping of the inner side or surface of the head, in the manner usual in heading machinery, and the wire is fed to the said die G, and the blanks



removed therefrom, by any of the usual means employed in machinery for heading screw-blanks in the ordinary manner. A piece of wire of suitable kind and length being clamped in the die G, (by the closing of the latter through the action of the lever I and the cam J,) with its extremity projecting into the heading-cavity  $a''$  of the said die, the cam F actuates the lever E to swing the head D into such position that the die, which has the usual flat-ended form, exactly in line with the piece of wire inclosed and gripped by the die G, whereupon the cam  $e$  of the driving-shaft C forces forward the sliding shaft A, and, bringing the die  $m$  forcibly against the extremity of the wire, upsets the same into the suitably-shaped cavity  $a''$  of the die G, and thereby shapes the head upon the wire and forms the blank.

It should be set forth in this connection that the cavity  $a''$  is elongated beyond what is required merely for the formation of the head, as aforesaid, its elongated part having a shape and diameter corresponding to that of the die  $m$  in such wise that the latter, entering such cavity before coming in contact with the metal to be upset, may be guided in its thrust upon the metal and kept from lateral displacement during the formation of the head. When the head has been formed upon the blank the continued rotation of the driving-shaft C releases the sliding shaft from the action of the cam  $e$ , whereupon the spring  $d$  forces the die  $m$  back from contact with the blank, and the cam F actuates the lever E to swing the head into such position that the punch  $n$  is brought exactly coincident or in line with the blank held in the die G, whereupon the cam  $f''$  forces forward again the sliding shaft A, and drives the teat  $r$  into the center of the head of the blank, the said teat indenting, recessing, or forming a cavity in the center of the head, this same operation bringing the flat end surface of the punch  $n$  around the teat  $r$  forcibly against the outer surface of the head, thereby completing the flattening thereof and giving the requisite contour to the head simultaneously with the formation of the recess therein. This done, the cam releases the sliding shaft, the reversed movement of the latter withdraws the punch, and the cam J and lever I, acting through the rod  $e'$ , open the die G to permit the expulsion

of the blank and the introduction of another piece of wire for conversion into a headed and recessed blank by a repetition of the operation just described. The requisite recess or cavity having been formed in the blanks, the latter may in due order be subjected in the usual manner to the operations of shaving, nicking, and threading, essential in the formation of the finished screw.

It will be understood that the outermost portion of the cavity  $a''$  of the die G serves as a guide and support for the punch  $n$ , in the same manner as for the die  $m$ . It will also be understood that the same result—that of forming the recess, cavity, or indentation in the head of the blank—will be secured by providing the teats  $r$  upon the end of the die  $m$ , thereby dispensing with the movable head D and punch  $n$ , and accessory mechanism; and this simple construction and *modus operandi* may be adopted when the metal to be operated upon is very soft and tough, but the construction and method of operation shown in the drawings and hereinbefore fully described are to be employed when the metal is of the inferior and refractory character commonly used in the fabrication of wood-screws, and which would be likely to split if the teat  $r$  should be made to act thereon previous to the upsetting or spreading of the metal in or by the formation of the head.

What I claim as my invention is—

1. The combination of the die G, in which to upset the end of the blank or form the head of an ordinary screw, and the punch  $n$ , with a central conical teat,  $r$ , for producing a conical hole in the center of the screw-head, as described and shown.
2. The movable head constructed with the die  $m$  and punch, in combination with the die G, for holding the blank, substantially as and for the purpose set forth.
3. The sliding shaft A, carrying the die  $m$ , punch  $n$ , and teat  $r$ , and driving-shaft C, carrying the cams  $e$   $f''$ , in combination with the die G, for holding the blanks, the whole being constructed and arranged for operation substantially as and for the purpose set forth.

THOS. J. SLOAN.

Attest:

JAMES A. WHITNEY,  
W. M. EDWARDS.