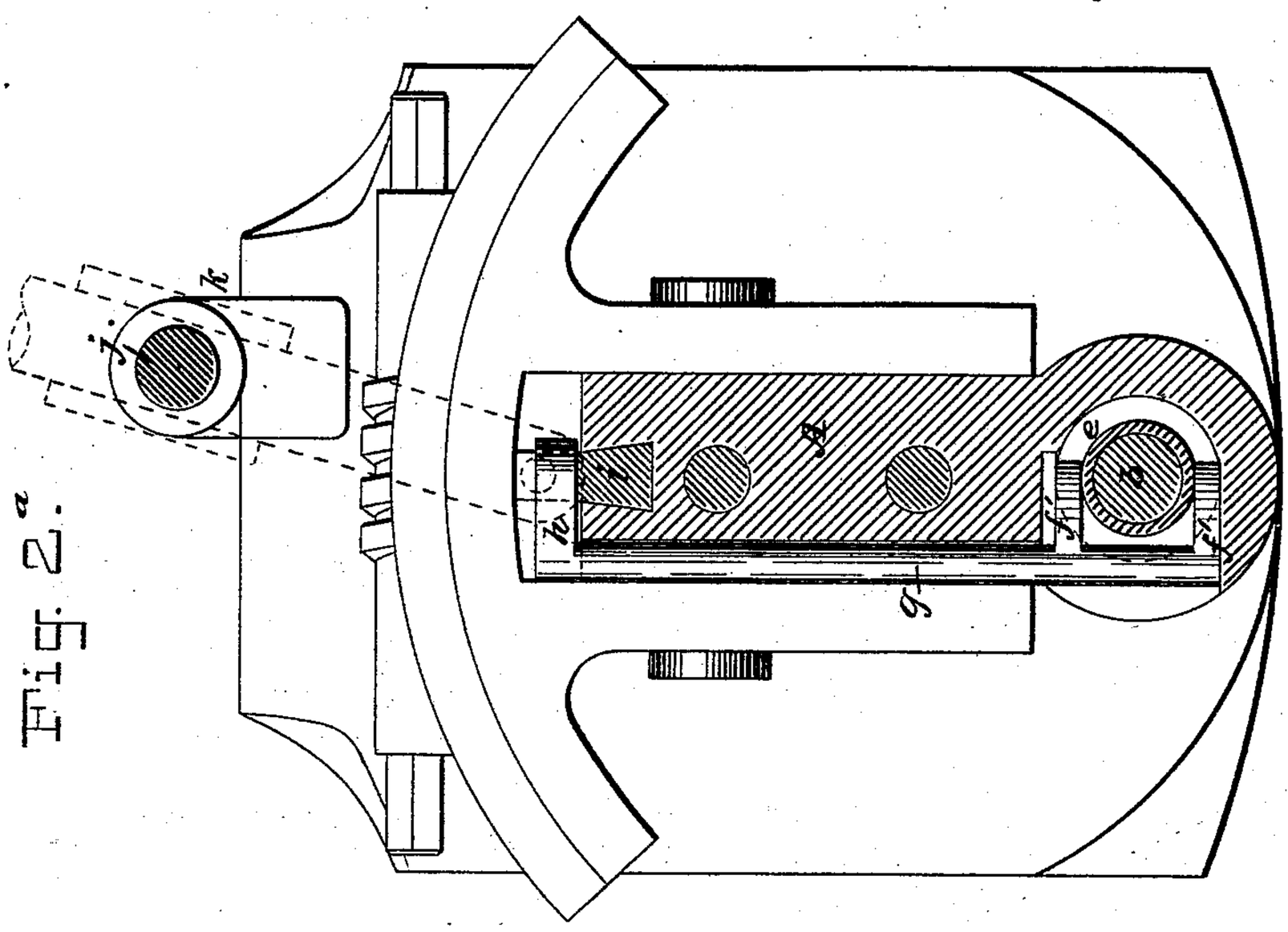
(No Model.)

3 Sheets—Sheet 1.

J. ANGUS.

TOOL OSCILLATING DEVICE FOR SHAPING MACHINES.

No. 298,268. Patented May 6, 1884.



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(No Model.)

3 Sheets—Sheet 2.

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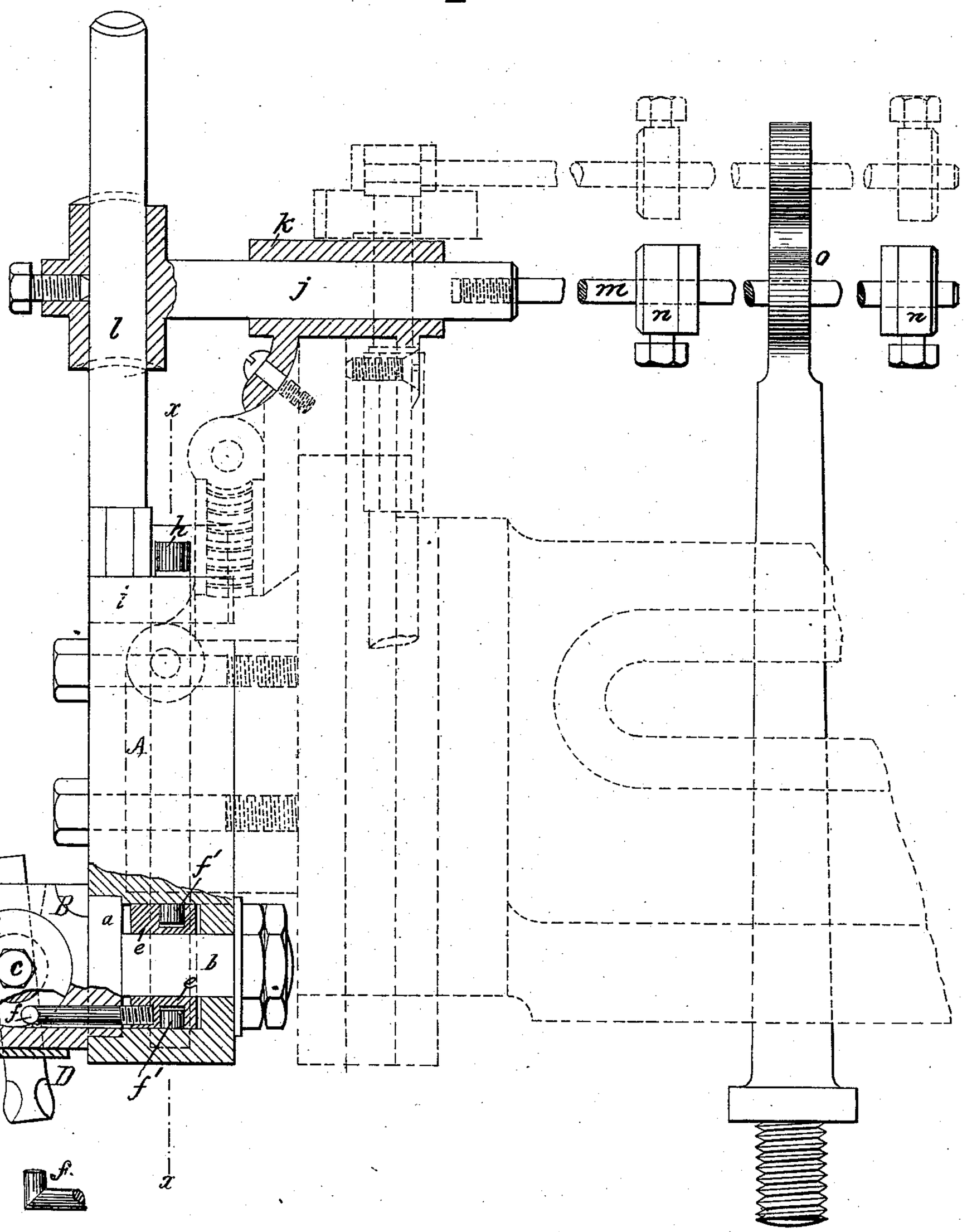
Fig 2.



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(No Model.) 3 Sheets—Sheet 3.

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TOOL OSCILLATING DEVICE FOR SHAPING MACHINES.

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Fig 3.

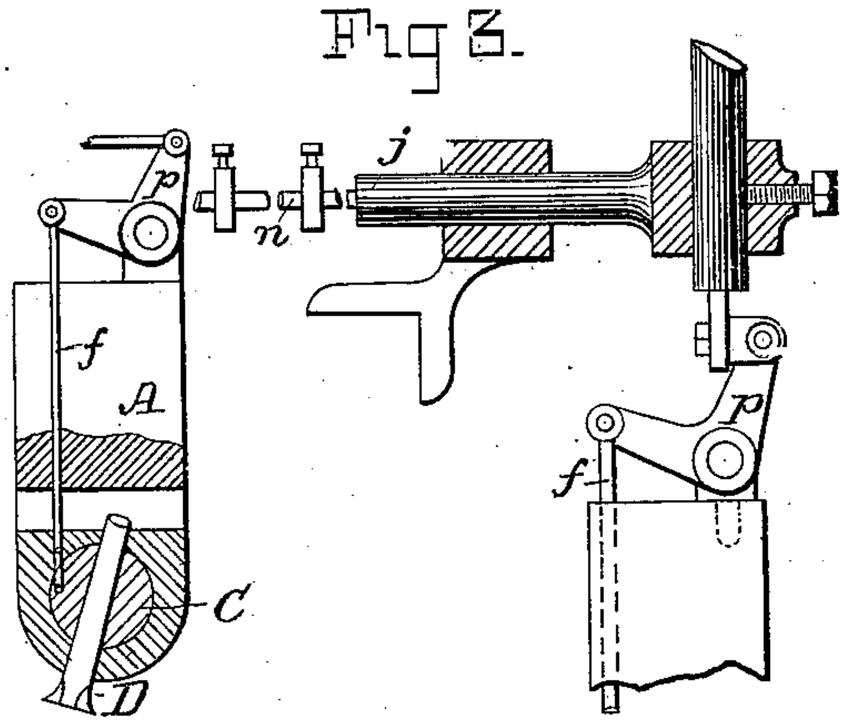
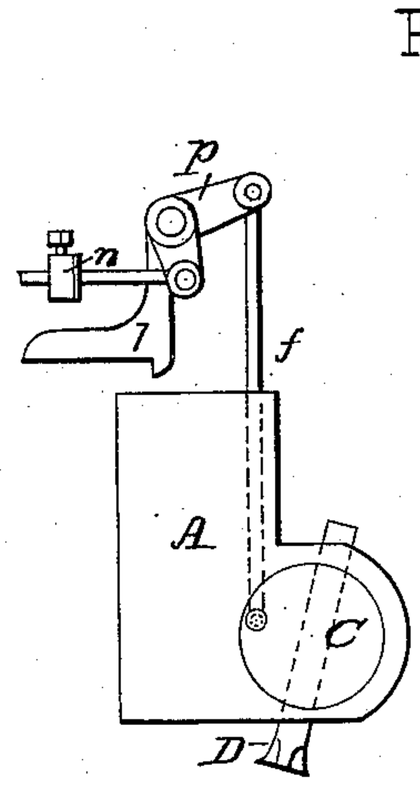


Fig 4.



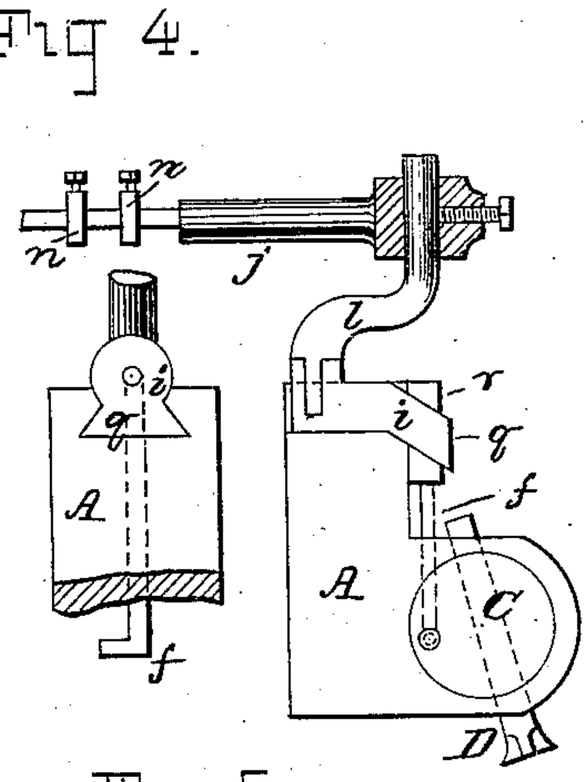


Fig 5.

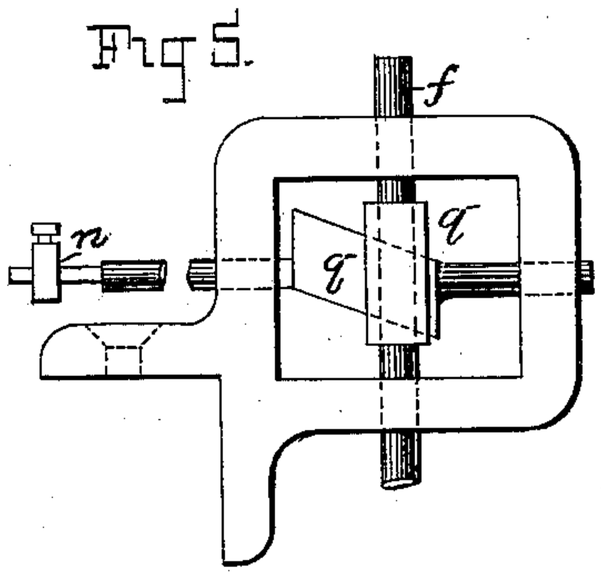


Fig 6.

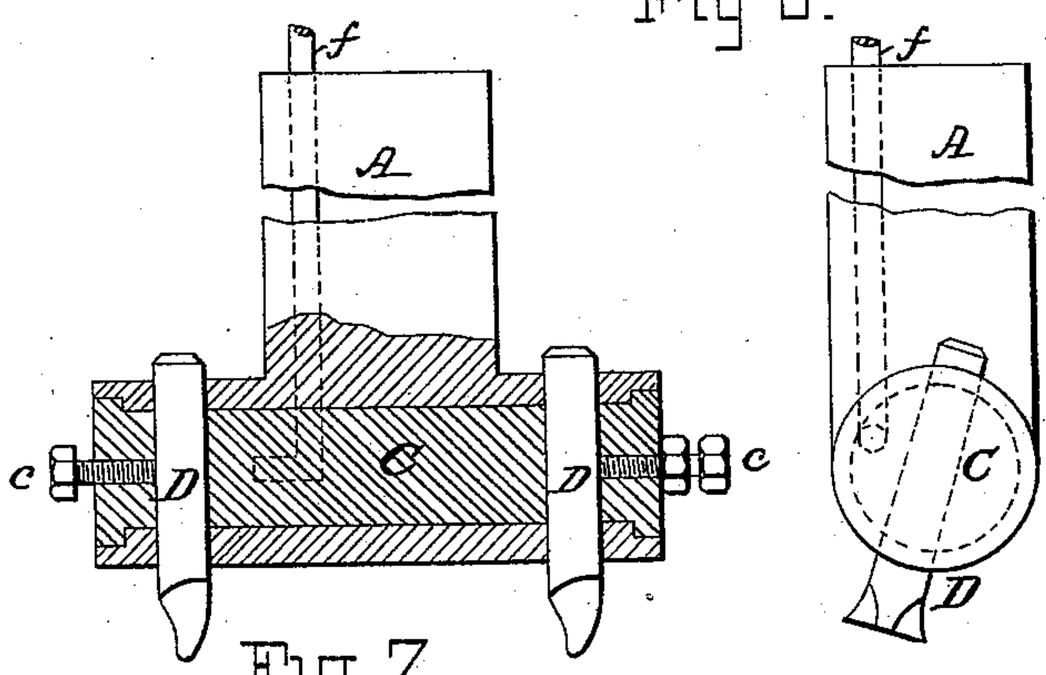
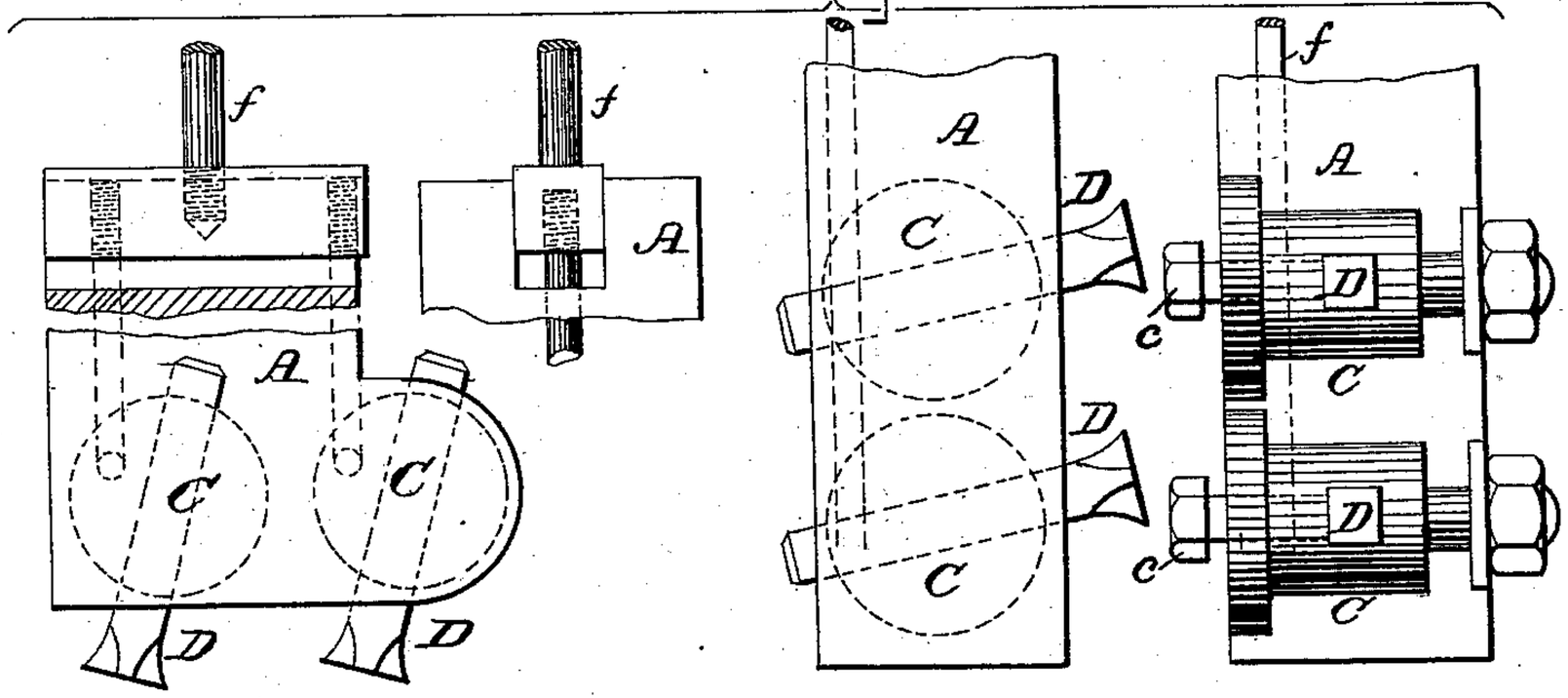


Fig 7.



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UNITED STATES PATENT OFFICE.

JOSEPH ANGUS, OF SOUTH LAMBETH, COUNTY OF SURREY, ENGLAND.

TOOL-OSCILLATING DEVICE FOR SHAPING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 298,268, dated May 6, 1884.

Application filed October 3, 1881. (No model.) Patented in England March 13, 1880, No. 1,091.

To all whom it may concern;

Be it known that I, JOSEPH ANGUS, a subject of the Queen of Great Britain, residing at South Lambeth, in the county of Surrey, England, have invented certain Improvements in Tool-Oscillating Devices for Shaping-Machines, of which the following is a specification.

My invention relates to mechanism for holding and shifting the cutting-tool of a shaping-machine, whereby it may be made to cut in both directions, instead of being idle on the back-stroke, as in ordinary machines of this kind.

In the drawings, which serve to illustrate my invention, Figure 1 is a front elevation of the preferred form of the tool-holding mechanism, wherein the tool-holder is set in a socket-piece in the tool-bar. The ram of the machine is shown in dotted lines. Fig. 2 is a side elevation of the same mechanism, some of the parts being in section. Fig. 2ª is a sectional view taken in the plane of the line *x x* in Fig. 2. Figs. 3, 4, and 5 are detached views showing modifications of the tool-reversing mechanism. Fig. 6 is a detached sectional view showing two double-cutting tools set in different cutting-planes. Fig. 7 shows elevations and plan of a holder wherein two double-cutting tools are set in the same cutting-plane.

A is the tool-bar, which is secured to the ram-head of the machine by bolts. The lower end of this bar is bored out to receive the compound tool-bearer. This consists of a socket-piece, B, mounted so as to be adjustable on its axis in the bar, being provided with a shoulder, *a*, tail-pin or shank *b*, washer, nut, and jam-nut, as shown in Fig. 2, and a tool-holder, C, mounted so as to rock upon its axis in the socket-piece B, and also provided with a shoulder, tail-pin, washer, nut, and jam-nut, like those of the socket-piece. The axis of the holder C crosses that of the socket-piece B at right angles.

D is a double-cutting tool, which fits snugly in a transverse aperture through the holder C, wherein it is securely held by a set-screw, *c*. Its ends play in apertures in the socket-piece B, said apertures being just wide enough for the tool to play freely and long enough to permit the required oscillatory movement of the holder, as will be understood by reference to Fig. 2. To prevent the chips and light particles of metal from entering the aperture on the cutting-side, I provide an apron or plate, *d*, of rubber, leather, or other similar material, which I slip over the point of the cutting-tool, as shown. The tool has two cutting-edges, as clearly shown in the several figures, and is arranged to take off a chip on the "back-stroke," as well as on the "forward stroke," thus doing double the work of an ordinary tool. The said tool is fixed in the oscillating holder, and provided with mechanism whereby, when the forward cutting-edge has reached the end of its stroke, having passed over the metal being shaped, it is reversed automatically, so that the back cutting-edge may engage and cut the metal on the return-stroke.

I will now describe the mechanism for automatically shifting or oscillating the tool-holder C at the termination of each stroke.

Embracing and surrounding the tail-pin *b* of the socket-piece B is a collar, *e*, which is arranged to slide freely thereon within the cavity of the tool-bar A for a limited distance. Into this collar is screwed or fixed an operating-rod, *f*, which extends through an aperture in the socket-piece B, and its hooked extremity engages a recess in the flange of the tool-holder C, as indicated in Fig. 2. The arrangement is such that when the collar *e* is slipped back and forth on the pin *b* the holder B will be oscillated back and forth sufficiently to reverse the tool to the extent required. The collar *e* has a circumferential groove or recess cut in it, which is engaged (see Fig. 2ª) by a short arm or arms, *f'*, on a vertical shaft, *g*, which rests in a groove in the tool-bar, and may turn or oscillate therein. Oscillation of the shaft *g* causes reciprocation of the collar *e* through the arm or arms *f'*. To oscillate the shaft *g* at the proper time and reverse the tool, I provide its upper extremity with an arm, *h*, and arrange this arm to engage a slot in a dovetail slide, *i*, mounted in the top of the tool-bar, and connected with a sliding bar, *j*, arranged to slide and oscillate in a bearing, *k*, fixed on the machine. This construction is made, for purposes of adjustment, through the medium of a rod, *l*, hinged to the top of the slide *i*, and secured by a set-screw in an eye

in the forward end of the bar *j*, to the other end of which is fixed a tappet-rod, *m*, on which are mounted adjustably the tappets *n n*, as shown in Fig. 2. The tappet-rod passes through a tappet-bracket, *o*, fixed to the head of the machine-ram, and the tappets are or may be provided with suitable facings of leather or rubber where they come in contact with said bracket. The bar *j* and tappet-rod *m* may be considered as one, since one is only a continuation of the other.

The operation is as follows: When the tool D has advanced to the end of its stroke, the rear tappet, *n*, engages the bracket *o* and shifts the tool to the opposite angle through the medium of the parts C, *f*, *e*, *f'*, *g*, *h*, *i*, *j*, *l*, and *m*, as will be readily understood. On the back-stroke the tool again cuts the metal, and is again reversed, thus cutting in both directions. By employing the socket-piece B and collar *e*, I am enabled to work the tool at any angle in a vertical plane by simply turning the said socket-piece and securing it at the angle desired. The collar *e* turns with the tail-pin or shank *b*, and the engagement of the arms *f'* with the said collar is not disturbed.

In Figs. 3 and 4 I have shown modifications of the above-described mechanism, differing mainly in the socket-piece B being dispensed with. In the first three of the views, Fig. 3, bell-cranks *p*, variously arranged, connect the tappet-rod with the hooked rod *f*, which oscillates the tool-holder. In the last two views, Fig. 4, the dovetail slide *i* has a beveled wiper, *q*, arranged to engage a corresponding aperture in a block, *r*, fixed to the end of the rod *f*. A modified arrangement of this wiper is also shown in Fig. 5. All of these devices are merely for the purpose of changing the direction of the motion, the tappet-rod and operating-rod *f* being in this case arranged at right angles to each other.

In Fig. 6 are shown a sectional view and side elevation of a tool-holder, in which two (or more) tools are arranged in one holder, but in different cutting-planes. This requires merely an elongation of the holder.

In Fig. 7 are shown two holders, each bearing a double-cutting tool, and both of the tools arranged in the same cutting-plane. The views to the left show the arrangement of the holder for operating on a horizontal surface, and those to the right for operating on a vertical surface. In both of these arrangements the same rod, *f*, oscillates both of the holders.

By this construction of mechanism the tool also acts or reverses with continual unvarying regularity while being applied in any required position or direction in which it may be applied to the work, with any or all of the adjustments and combinations thereof, ordinarily given to the vertical slide and quadrant or angularly-adjusting part common to the usual construction of shaping-machines.

By the terms "tappet-rod" and "tappet-bracket" I intend to be understood any suitable moving part receiving its motion from the machine-ram in connection with any suitably-arranged stationary part which controls the movements of the moving part, so as to effect the reversing of the tool, as herein set forth.

Figs. 3 to 7, inclusive, illustrate modifications which are not herein claimed, and may be made subject-matter of a separate application.

I herein disclaim the subject-matter of claims 1 and 2 in my application for a tool-holder for planing-machines, filed November 26, 1880, Serial No. 21,190.

Having thus described my invention, I claim—

1. The combination of a double-cutting tool, a rocking tool-holder, in which the tool is mounted, the reciprocating tappet-rod *j* adapted to rock on its axis, a stationary tappet-bracket, a rod, *l*, adapted to slide in a socket on the tappet-rod, and the mechanism connecting the said rod *l* with the tool-holder, whereby the tool-holder is rocked and the tool reversed at the termination of each forward and return stroke of the machine irrespective of the various adjustments of the machine connected with the tool.

2. The combination of the double-cutting tool D, rocking tool-holder C, tool-holder socket B, sliding collar *e*, connecting-rod *f*, oscillating shaft *g*, provided with the arms *j'* and *h*, slide *i*, sliding and rocking bar *j*, rod *l*, tappet-rod *m*, and tappet-bracket *o*, substantially as and for the purpose herein specified.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

JOSEPH ANGUS.

Witnesses:
CHARLES GROSSETETE,
CHARLES ROCHE.