

S. W. SOULE.  
Paper-Cutting Machines.

No. 158,812.

Patented Jan. 19, 1875.

Fig. 2.

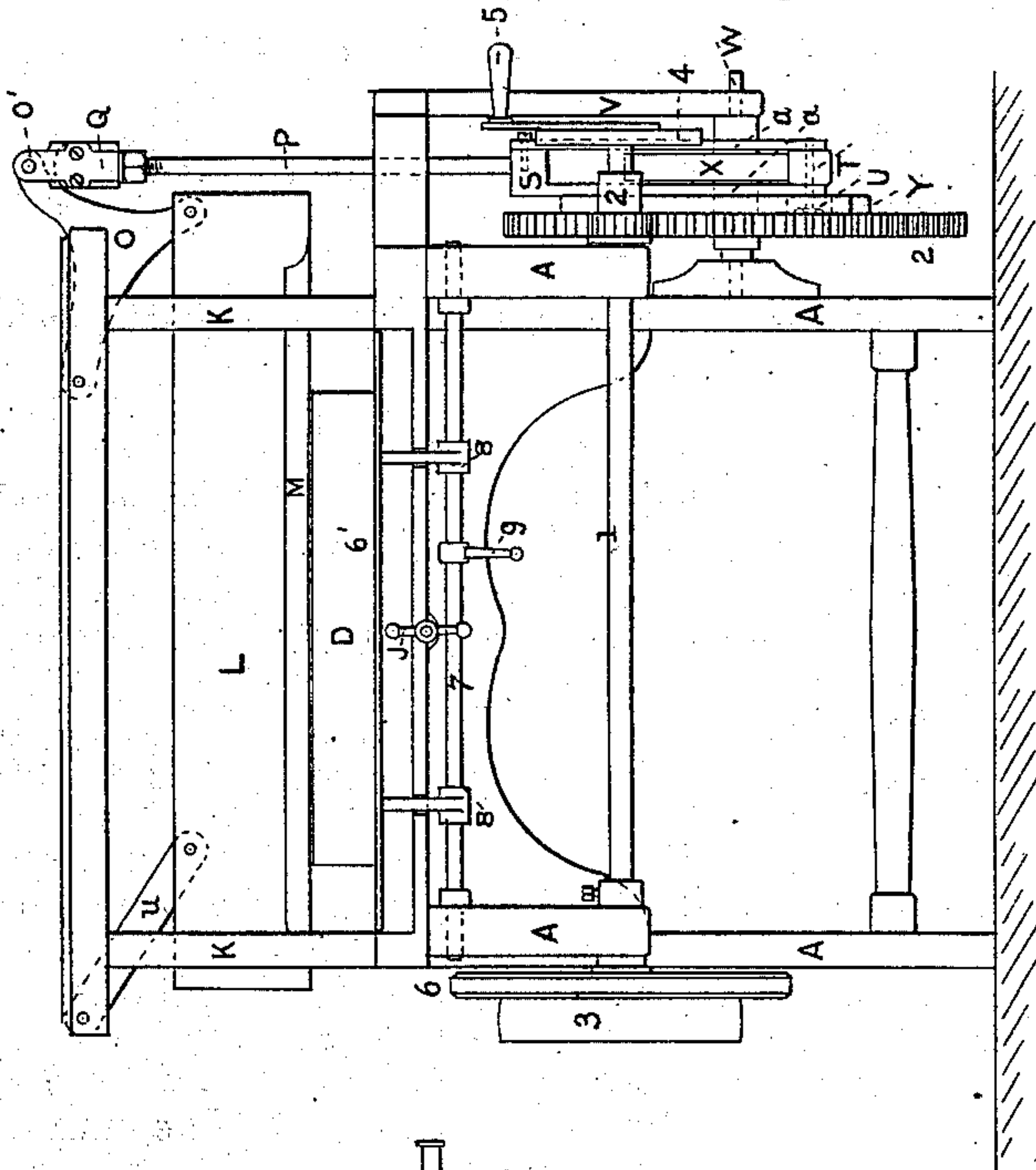


Fig. 1.

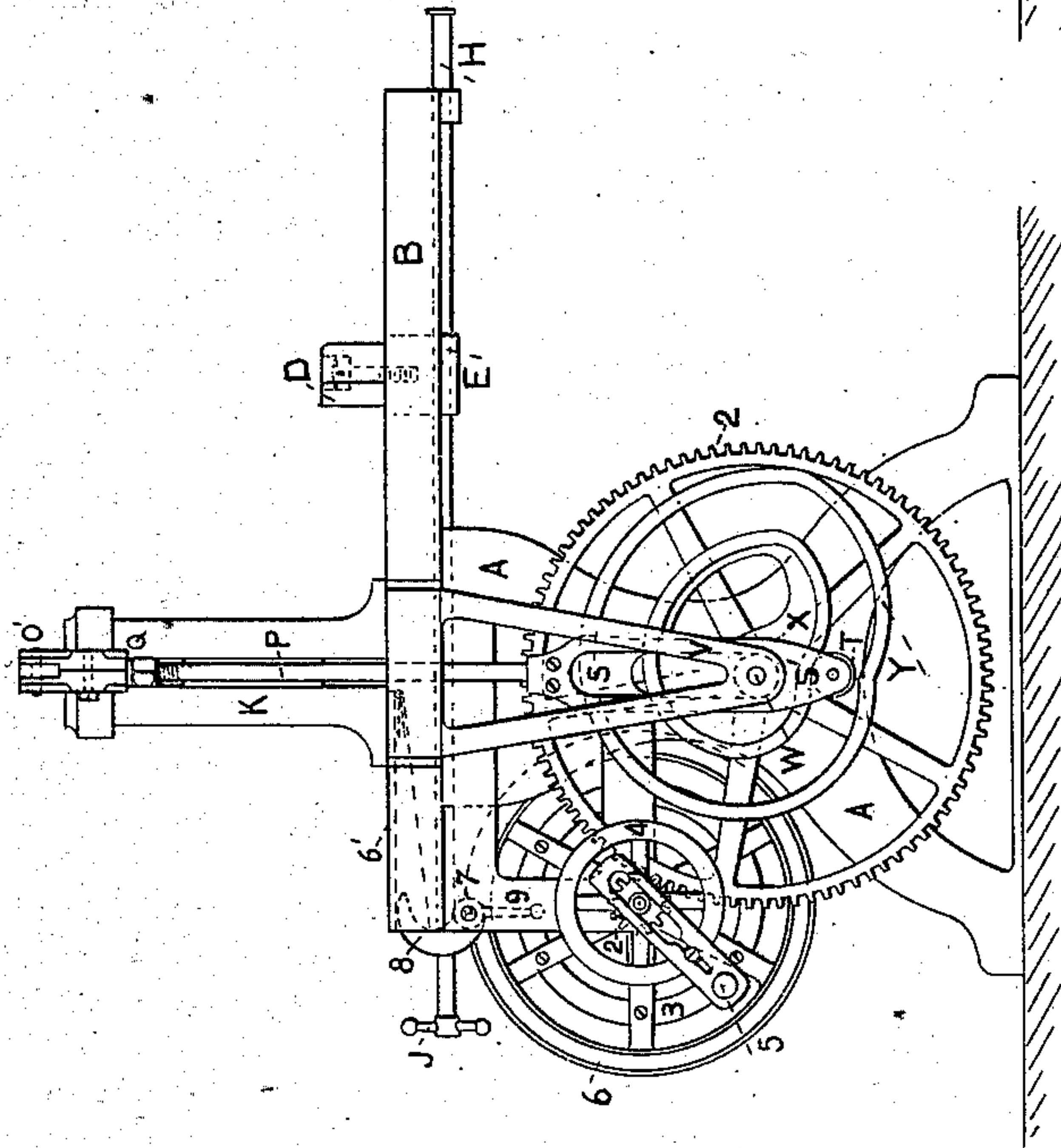


Fig. 4.

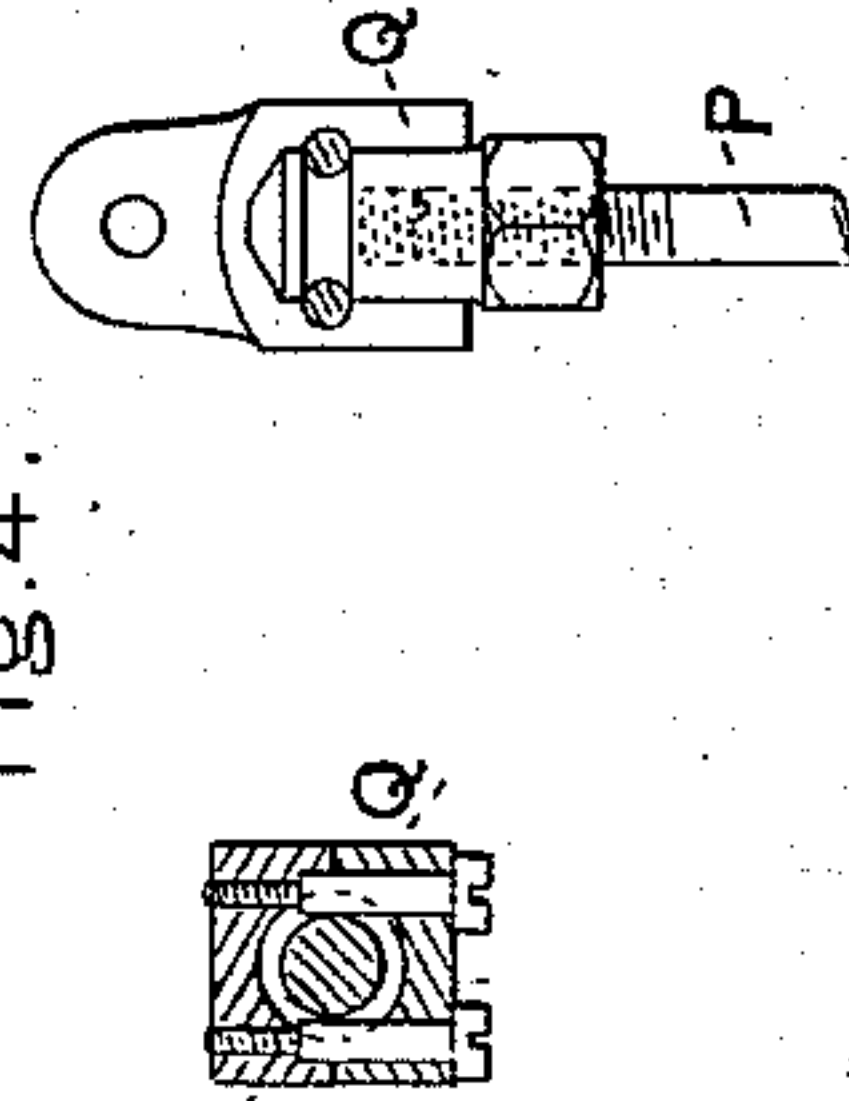
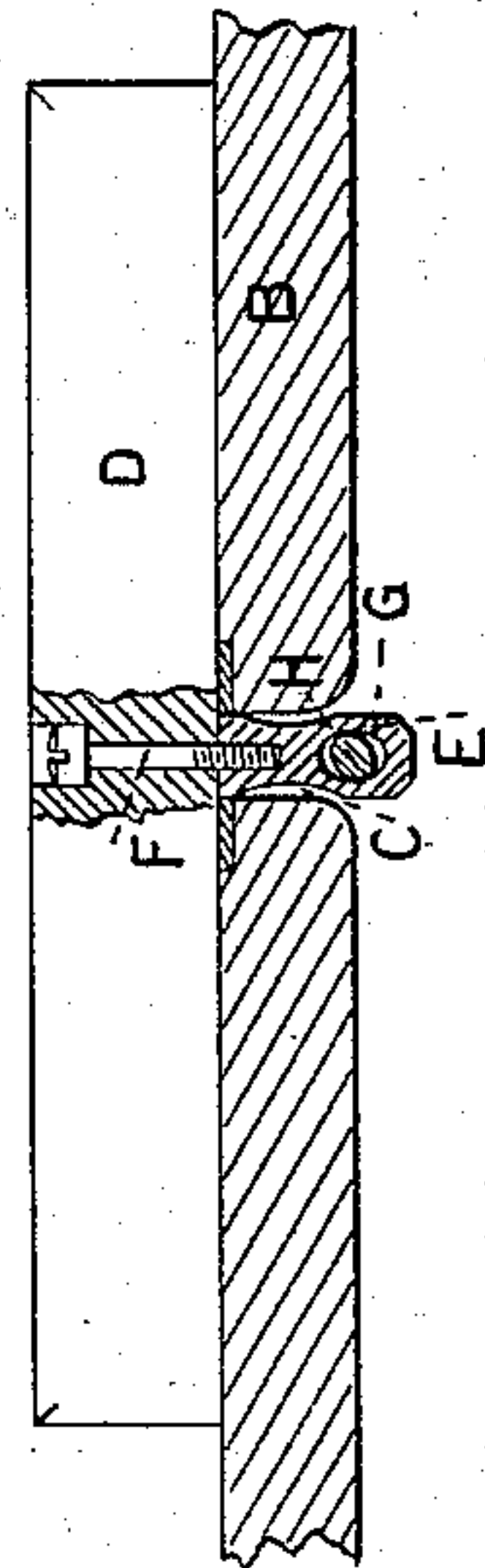


Fig. 3.



WITNESSES.

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# UNITED STATES PATENT OFFICE.

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## IMPROVEMENT IN PAPER-CUTTING MACHINES.

Specification forming part of Letters Patent No. 158,812, dated January 19, 1875; application filed March 3, 1874.

*To all whom it may concern:*

Be it known that I, SAMUEL W. SOULE, of the city, county, and State of New York, have invented new and useful Improvements in the Construction of Machines for Cutting Paper or other textile fabrics; and that the following is a full, clear, and correct description of the same, reference being had to the accompanying drawings making a part of this specification, and to the letters of reference marked thereon, in which—

Figure 1 is a side view of the machine. Fig. 2 is a front view of the machine. Fig. 3 is a view of paper-gage. Fig. 4 is a view showing more particularly the means employed for adjusting the connection between the power and the knife.

In the drawing like parts of the invention are pointed out by the same letters of reference.

The nature of the present invention consists in the construction, as more fully hereinafter set forth, of an improved machine for cutting paper and other purposes; and the invention will be found to pertain more directly to an improved mechanical power for operating the machine; to the construction of a paper-gage for the machine; to the means employed to shorten the connection between the power and the knife, and to the construction of the front part of the table, having a vibratory movement.

To enable those skilled in the arts to make and use my invention, I will describe its construction and operation.

A shows the frame for supporting the operative parts of the machine. B shows the rear of the table of the machine slotted at C, to allow for connecting the paper-gage D with the rod H under the table, and also to allow its necessary forward-and-back movement. The paper-gage D is attached to block E (see Fig. 3) by means of screw F. The block E reaches through the slot C; and in the lower end of it is an oval opening, G, through which the rod H passes, said rods being provided with supports attached underneath the table B. That portion of the rod H which passes through the oval hole G is made of an oval shape, and of a size a little smaller than the hole G, so that the major diameter of the rod

H is greater than the lesser diameter of the hole G, so that when it is necessary to move the gage D to the required position the rod H is turned by grasping the handle J and turning the rod H to the right or left until the rod impinges in the hole, when the rod and gage will move together, and a movement vice versa when the gage is not required to be moved. K shows the upper portion of the frame slotted to guide the knife-bar L, to which the knife M is attached. At each end of frame K links N and O are attached, the opposite ends of which are pivoted to the knife-bar, thereby giving the knife a lateral motion through the paper. The link O is extended at O', for the purpose of attaching the power, so that its movement is (as near as may be) as far above as below the pivotal point of the link O', thereby forming but a slight variation from an up-and-down motion. To the point O' of the link is attached the box Q, divided in two parts, and being held together by screws. The upper end of the box incloses the journal, which forms the attachment to the link O', and the lower end incloses the upper portion of a nut, said nut being rounded and held firmly in the box by the screws, the connecting-rod P being screwed in said nut, while the other end is to be attached to the stirrup S, said stirrup being slotted and divided so that the bearings on each side of cam  $x$  pass back and forth therein. There are also at one end, S', of stirrup S the friction-rollers T and U, supported by a shaft. One of said rollers is inclosed by the stirrup S, and bears upon cam  $x$ , and the other being outside of said stirrup, and bearing upon cam  $y$ . Cam  $x$  is made to rotate between the two divisions of the stirrup S, and bearing against the roller T on its external diameter produces, through the intermediate connections, the proper power and motion to the knife for cutting. Cam  $y$  is concentric with cam  $x$ , upon which the roller U impinges on its internal surface, and is for the purpose of producing the proper motion of carrying the knife and connections in an opposite direction from cam  $x$ . Gear-wheel 2, cams  $x$  and  $y$ , are firmly held in the same relative positions, and placed upon shaft  $w$ , said shaft being supported by bearings, one in the frame A and the other by



bracket V. Shaft 1, held in boxes by frame A, has attached to it gear-wheel 2, meshing with larger gear 2, fly-wheel 6, pulley for belt 3, and hand-wheel 4, to which is attached handle 5. 6' shows the front portion of the table, of which B is the rear; in other words, that portion fronting the beveled edges of knife M. Said front portion of the table is pivoted near to the point where the knife finishes cutting, and is supported at the other ends by cams 8 8. Through the front portion of frame A is shaft 7, to which are attached cams 8 8 and handle 9. Cams 8 8, in their greatest throw, raise the front portion of the table in a plane with the rear portion, which is necessary while adjusting the material preparatory to being clamped. After being clamped the cams 8 8 can be moved, by means of handle 9, to a lesser throw, which will allow the front part of the table to fall down the required distance. This movement can be done before cutting or during its process.

The vibration of the table should correspond as near as possible to the angle of the knife-edge and bar, which passes into the material to be cut, for the purpose of making the opening through the material to be cut, and preventing an impingement against the knife through the force necessary to slide the sheets under pressure in order to make an opening by the usual method; and also that the portion of the material which is cut asunder and lies in front of the knife may lie in a more upright and square position.

By proper mechanical appliances the front table 6 can be raised and lowered by connection with stirrup S or connecting-rod, and therefore be made to operate automatically. A suitable clamping device may be employed for clamping the paper or other material to be severed by the knife. The cam  $x$  is placed within the stirrup S, as indicated, for the purpose of resisting the great strain upon the connection to the knife consequent upon cutting, which varies greatly according to the mass to be cut, and the sharpness of the knife-edge, which also allows a strong hold upon each end of the shaft of the friction-roller T, upon which it impinges. Cam  $x$ , while the

knife is cutting, is pressing against the friction-roller T, the stirrup resisting the power applied upon the bearings  $a$   $x$ , on each side of the cam, which bearings rotate upon the stirrup as fast as the stirrup moves upon them; therefore, that part of cam  $x$  which throws the knife in cutting position is made on an involute curve from the bearings through the slots in stirrup S.

To compensate for the wear of the knife and its proper adjustment, the screws in box Q are loosened, and the nut is turned to shorten or lengthen the connection, as desired. When a counter-balance is used to throw the knife and connections contrary to the cut the cam  $y$  and roller U can be dispensed with.

The mode of operation is as follows: The paper or other material is placed under the knife in the desired position by first adjusting the front portion of the table in a plane with the rear, then clamping and turning down the front table, and applying the power by hand or otherwise to propel the shaft and pinion-gear, thereby moving the large gear and the two cams  $x$  and  $y$ ; said cams actuate the stirrup S, connecting rod, link, and knife to make the cut and return.

The paper-gage is moved by turning the rod until sufficient adhesion is attained to produce a draw, and, vice versa, when it is desired to return the rod for another draw, by adjusting the amount of motion to the rod to the length desired for each cut—as, for instance, cutting strips of regular widths—it will be found convenient, and obviate the necessity of a front gage for the purpose.

Having thus described my invention, what I claim as new is—

1. The combination of the oval rod H, block E, provided with oval opening G, and gage D, for the rapid adjustment of the gage, substantially as and for the purposes specified.

2. The cams 8, shaft 7, and handle 9, in combination with the table 6', as and for the purposes set forth.

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Witnesses:

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