No. 709,116. Patented Sept. 16, 1902.

C. I. SHAWVER.

MACHINE FOR CUTTING PICTURE MATS.

(Application filed Jan. 16, 1902.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1.

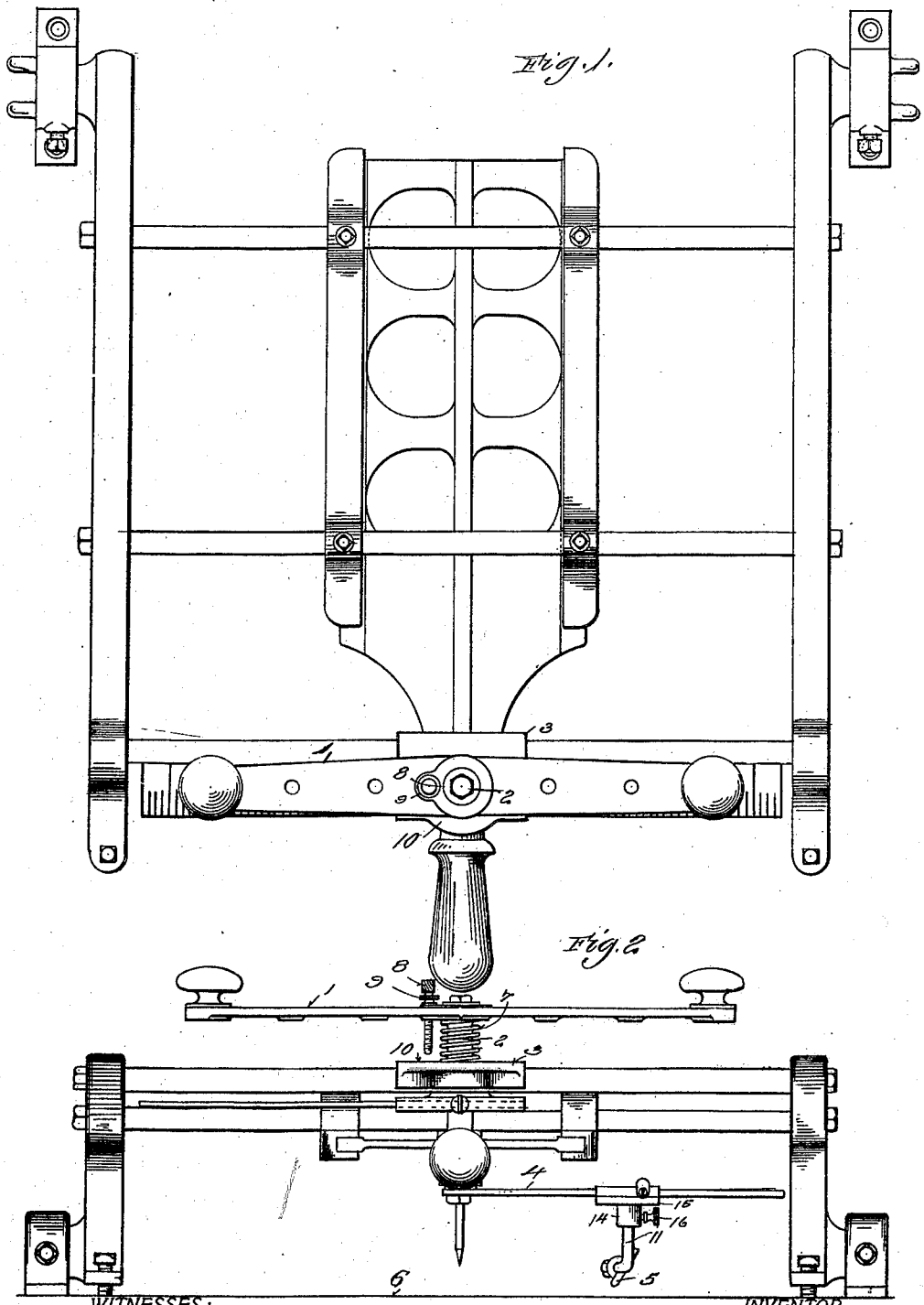


Fig. 2.

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Fig. 3.

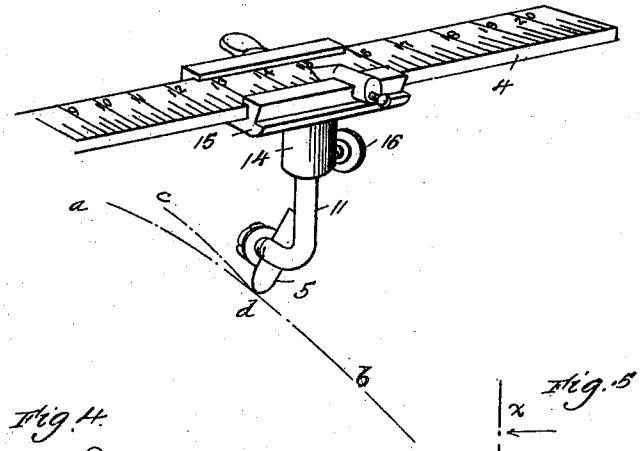


Fig. 4.

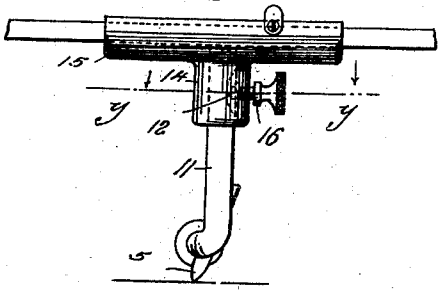


Fig. 5.

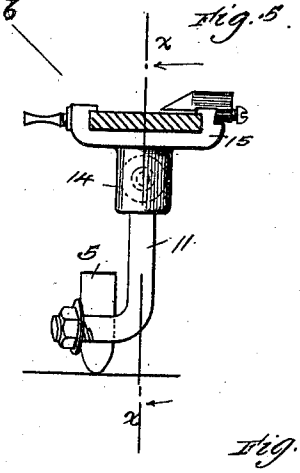


Fig. 7.

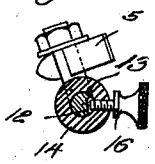
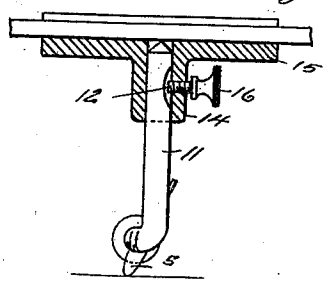


Fig. 6.



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UNITED STATES PATENT OFFICE.

CHARLES I. SHAWVER, OF SPRINGFIELD, OHIO.

MACHINE FOR CUTTING PICTURE-MATS.

SPECIFICATION forming part of Letters Patent No. 709,116, dated September 16, 1902.

Application filed January 16, 1902. Serial No. 89,964. (No model.)

To all whom it may concern:

Be it known that I, CHARLES I. SHAWVER, a citizen of the United States, residing at Springfield, in the county of Clark and State of Ohio, have invented certain new and useful Improvements in Machines for Cutting Picture-Mats, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to machines for cutting picture-mats, and is in the nature of an improvement upon the machine set forth in Letters Patent No. 673,483, granted to me May 7, 1901, although my present invention is applicable to other machines of a similar type.

The object of my present invention is to provide means for improving the regularity and efficacy of operation of the cutting-tool; and to these ends my invention consists in certain novel features which I will now proceed to describe and will then particularly point out in the claims.

In the accompanying drawings, Figure 1 is a plan view of a machine embodying my invention. Fig. 2 is a front elevation of the same. Fig. 3 is a perspective view of the tool-carrying arm and tool. Fig. 4 is a front elevation of the same. Fig. 5 is a side elevation with the arm in section. Fig. 6 is a sectional view taken on the line $x\ x$ of Fig. 5 and looking in the direction of the arrows, the shank of the tool being in elevation; and Fig. 7 is a plan section taken on the line $y\ y$ of Fig. 4 and looking in the direction of the arrows.

For a general description of the machine shown in Figs. 1 and 2 reference is made to my prior Letters Patent hereinbefore referred to, it being sufficient for an understanding of the present invention to state that said machine comprises an operating-lever 1, secured on a shaft 2, which is capable of both vertical and rotary motion in a bearing 3, and which shaft imparts its vertical motion to a tool-carrying arm 4, which moves in either a circular or elliptical path, according to the adjustment of the machine. Downward pressure on the operating-lever 1 causes a corresponding downward movement of the tool 5 toward the table 6, on which the work is supported, and in my preferred construction a spring 7 is interposed between the bearing 3 and operating-lever 1 in order to hold this latter normally in its raised position.

In practice it has been found that where an excessive downward pressure is placed upon the operating-lever 1 the cutting-tool is forced entirely through the work and into the table or support, thereby not only damaging both table and cutter, but also retarding the work. I propose to obviate this difficulty by providing a stop to limit the downward movement of the operating-lever and cutter, so as to prevent the latter from passing through the work to too great an extent, and for this purpose I prefer to employ an adjustable stop, so that the downward movement of the cutter may be limited to suit varying circumstances. To this end I provide a threaded aperture in the operating-lever 1, near the center thereof, adjacent to the shaft 2, and through this threaded aperture I insert a corresponding threaded stop pin or screw 8, which may be vertically adjusted, in an obvious manner, so as to cause its lower end to project to a greater or less extent below the operating-lever. This stop pin or screw is provided with a locking-nut 9, by means of which it may be secured after adjustment to prevent accidental disarrangement. The bearing 3 is provided on its upper side with a flat horizontal surface 10, parallel with the table or support 6 and having a normally-fixed distance above the same when the machine is in operation. This bearing-surface is of a radius such that the lower end of the stop pin or screw 8 will contact with it when the lever is depressed, this contact taking place no matter what the angular position of the lever may be throughout its circle of rotation. It will thus be seen that by properly adjusting the stop pin or screw 8 the cutter 5 may be prevented from cutting too deeply through the material operated on, thereby preventing damage to the table or support and to the cutter and also preventing too great a resistance to the power applied to the operating-lever to rotate the same.

In mat-cutting machines of the character to which this invention relates, in which the cutting-tool travels in a circular or elliptical path, a rigid connection between the cutting-tool and the arm by which it is carried is satisfactory where the edge of the opening is vertical or at right angles to the surface of the

mat; but where this edge is inclined or beveled it is desirable to provide for a movement of the cutting-tool toward and from the center of the mat for the reason that when the lower edge of the tool first engages the mat it does so on the upper surface thereof at the top of the cut, and as the tool advances into the material its lower edge must move inward toward the center of the mat to make the bevel, its final position being some distance inward from its initial position. To permit this movement it has heretofore been proposed to provide a swiveling connection between the shank of the tool and the arm by which it is carried. This, however, has certain objections. A trailing cutting-tool swiveling around a vertical axis (by which I mean a tool having its cutting edge some distance in the rear of its vertical swiveling axis) has in a machine of this type a certain normal path or orbit which it follows after it has become fully engaged with the material on which it operates; but prior to the engagement of the tool with the mat it is free to swing outward under centrifugal force beyond this normal path or orbit when the operating-lever is turned. In practice this is found to occur, so that either by reason of the tool being so turned when the operating-lever is depressed as to strike the mat outward or beyond its normal path or by reason of its assuming such a position owing to the rotary motion of the machine before it strikes the mat there are formed cuts or disfigurements in that portion of the mat which is exposed to view when the mat is in use, which portions lie outward from the normal path of the cutter. These defective mats materially detract from the value of the work performed by these swiveling cutters. I propose to remedy this objection by substituting for the swiveling cutter a trailing cutter whose movement outward is limited to its normal path and which shall be free to move inward or toward the center of the mat to form the bevel, this inward movement being preferably limited. To this end I provide the vertical shank 11 of the cutter with a notch or recess 12, preferably curved from top to bottom, as shown in Figs. 4 and 6, and of a width less than the width of the cutter, thus leaving a vertical wall 13, which forms a stop-shoulder. The shank of the cutter is mounted to rotate in a collar 14, carried by a clip 15, adjustable on the arm 4, and a set-screw 16 is threaded through the collar 14, its extremity entering the recess 12, as shown. In practice the end of the set-screw extends into the recess to a greater or less extent, as desired, and the arrangement is such that the stop-shoulder 13 contacts with the end of the set-screw when the cutter has moved outward to its normal position or is following its normal trailing path, beyond which it cannot go by reason of the contact between the stop-shoulder and set-screw. The cutter is permitted to swing inward from this position to a greater or less extent, according to the position of the set-screw, its range of movement decreasing as the set-screw is advanced into the recess and increasing as it is withdrawn. Of course the set-screw may be turned up so that it will lock the cutter absolutely, or it may be withdrawn to an extent sufficient to permit the entire removal of the shank of the cutter from the collar. It is also obvious that where the recess has shoulders at top and bottom or does not extend the entire length of the shank the set-screw when inserted will prevent the cutter-shank from dropping out of the collar when the machine is raised. Furthermore, the collar provided with a set-screw is adapted to receive the cylindrical shank of an ordinary straight cutter when the opening being cut has a straight instead of a beveled edge. Since the cutter cannot swing outward beyond its normal path, it therefore cannot come into contact with that portion of the mat lying outward beyond the same, and hence the subsequently-exposed surface of the finished mat cannot be damaged by the cutter. Moreover, the stop-shoulder furnishes a ready means for bringing the cutter to its normal position by hand before lowering it into contact with the mat, and even if this were not done the only contact which the cutter can have with the mat is inside of its line of cut, where the damage to the waste center of the mat is immaterial. When, however, the particular construction illustrated or a similar one is employed, the contact of the bottom of the recess with the end of the set-screw 16 also limits the inward movement of the cutter, so that this latter is always held in approximately its normal position, although free to yield inward sufficiently to form the bevel. I do not limit myself, however, to the particular form of recess shown, the essential feature being that there shall be some kind of recess which shall allow inward motion of the cutter and a stop-shoulder to limit its outward motion.

It will be noticed that the type of cutter to which my invention relates is, as heretofore stated, what I have termed a "trailing" cutter in which the cutting edge of the tool is in the rear of the vertical axis around which it swings, so that the edge may automatically follow the line prescribed to it by the part to which its shank is connected, and that the construction which I have devised remedies the difficulties attendant upon the use of trailing cutters, as hereinbefore pointed out.

I have illustrated in Fig. 3 the normal path of my improved cutter by the dotted line *a b*, beyond which the cutter cannot move, and in this same figure I have illustrated, by the dotted line *c d*, the abnormal path outside of its normal, which a swiveling cutter may and frequently does follow when it strikes the mat outside of the normal position, thereby injuring the face of the same.

I do not wish to be understood as limiting myself to the precise details of construction hereinbefore described, and shown in the ac-

companying drawings, as these details may obviously be modified without departing from the principle of my invention.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a picture-mat-cutting machine, the combination, with a tool-holder traveling in a curved path, of a trailing tool mounted to rotate around an axis at right angles with the plane of said path, said tool having its forward engaging or contact edge in the rear of its axis of rotation, and means for limiting the outward motion of said tool, substantially as described.

2. In a picture-mat-cutting machine, the combination, with a tool-holder traveling in a circular or elliptical path, of a trailing tool having a shank mounted to rotate around a vertical axis in said holder, said tool having its forward engaging or contact edge in the rear of its axis of rotation, and means for limiting the outward movement of said tool to prevent its passing beyond the normal path thereof, substantially as described.

3. In a picture-mat-cutting machine, the combination, with a trailing cutting-tool having a vertical shank, the cutting edge of said tool being in the rear of the axis of the shank, of a tool-holder traveling in a circular or elliptical path, said shank being rotatably mounted in said tool-holder, and means for limiting the rotation of said shank so as to prevent the tool from moving outward beyond its normal path, substantially as described.

4. In a picture-mat-cutting machine, the combination, with a trailing tool having a vertical shank provided with a vertical stop-shoulder, the cutting edge of said tool being in the rear of the axis of the shank, of a tool-holder having a collar in which said shank is rotatably mounted, and a projection to engage said stop-shoulder and thereby limit the outward motion of the cutter to prevent its moving outward beyond its normal path, substantially as described.

5. In a picture-mat-cutting machine, the combination, with a trailing bevel-cutter provided with a vertical shank, the cutting edge of said tool being in the rear of the axis of the shank, said shank having a recess provided with a lateral stop-shoulder, of a tool-holder comprising a collar in which said shank is rotatably mounted, and a set-screw adapted to enter the recess and engage the stop-shoulder, substantially as described.

6. In a picture-mat-cutting machine, the combination, with a trailing bevel-cutter provided with a vertical shank, the cutting edge of said tool being in the rear of the axis of the shank, said shank having a longitudinally-curved recess of less width than the shank, whereby a lateral stop-shoulder is formed, of a tool-holder comprising a collar in which said shank is rotatably mounted, and a set-screw threaded through said collar and having its end extending into said recess and adapted to engage the stop-shoulder when the shank is rotated in one direction, and the bottom of the recess when the shank is rotated in the opposite direction, whereby the rotation of the shank is limited in both directions, substantially as described.

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

CHARLES I. SHAWVER.

Witnesses:
E. O. HAGAN,
IRVINE MILLER.