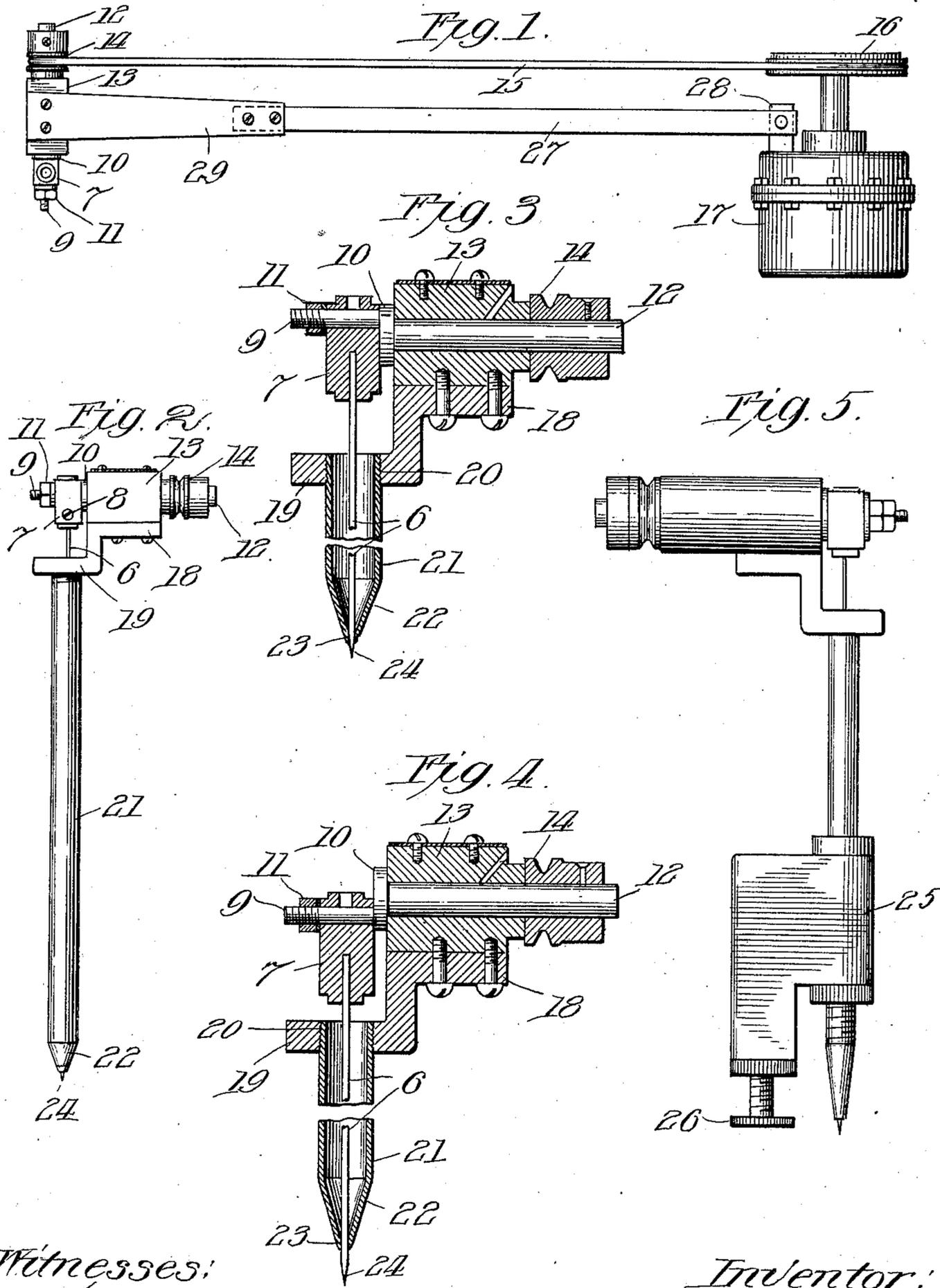


W. N. SELIG.
CUTTING TOOL.
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990,786.

Patented Apr. 25, 1911.



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UNITED STATES PATENT OFFICE.

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CUTTING-TOOL.

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, WILLIAM N. SELIG, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Cutting-Tools, of which the following is a specification.

The tool of the present invention is intended more especially for the cutting of flexible material, such as thin sheet metal, celluloid, paper, etc.; and the object of the invention is to actuate the tool in a manner whereby the point will not be maintained in constant engagement and forced forward through the material, which would result in the bunching of the same ahead of the tool, thereby causing the material to become torn when the tool is forced thereagainst.

Another object is to construct the tool so that it is capable of operating in a manner similar to a scroll-saw, whereby it can be manipulated to effect sharp turns, so that patterns of irregular configuration can be cut from the body of the material.

A further object of the invention is to form the parts in an extremely simple and compact manner, so that mal-adjustment will not take place during ordinary usage, which would affect the practical results obtained from the use of the tool. And a further object is to actuate the tool at a high speed, whereby the plunging action with which it enters the work will occur so fast that no uncut portions will remain after the tool has been passed across the work; that is, the moment of inaction when the tool is out of the work will be so short that the operator will not be able to move the tool the distance of one of the holes, hence, the holes will overlap one another and produce a continuous cut.

Further objects of the invention will appear from a detailed description and the combination of parts hereinafter described and claimed.

In the drawings, Figure 1 is a plan view showing the tool operatively connected to an actuating mechanism; Fig. 2, a front elevation of the tool; Fig. 3, an enlarged sectional elevation of the head which carries

the tool and the mechanism for operating the head, and showing the tool in its raised position; Fig. 4, a view similar to Fig. 3, showing the tool in its lowered position; and Fig. 5, a front elevation showing the tool provided with a steady rest.

The tool is in the form of an elongated stem or rod 6, which is secured within a head 7 by means of a set screw 8, or other suitable device. The head is pivotally mounted upon a crank pin 9, which extends from and is formed with a disk 10 and is mounted eccentrically thereon; and side movement of the head upon the crank pin is prevented by means of lock nuts 11 secured to the crank pin. The disk 10 is formed integral with a shaft 12 and is positioned at one end thereof, and said shaft is mounted within a block 13 and carries upon its opposite end a pulley 14. The pulley 14 is connected by means of a cable 15 to a pulley 16 operated by a motor, or other suitable device, the pulleys 14 and 16 and motor 17 being shown and described merely for the purpose of showing one method of actuating the tool, as obviously these parts are not essential to the device, any more than that they operate it at a high speed.

It will be noted that the ratio of size between the pulley 14 and the pulley 16 is one which actuates the pulley 14 at a very high rate of speed, and this actuation of the pulley 14 at a high speed enters materially into the practical operation of the device, as will be more fully hereinafter set forth.

Secured to the block 13 is a strap 18, which is offset to provide a ledge 19, which underlies the head 7; and the ledge 19 is formed with an opening 20 in alinement with the head 7, into which is entered a tube 21, which tube extends downwardly and is tapered at its lower end 22. The tube has an opening 23 in its lower end, through which projects the cutting edge 24 of the tool 6, the tube 21 serving to guide the tool 6 during its up and down movements. In Fig. 5 the tube is shown equipped with a steady rest 25, which is capable of adjustment along the tube 21, and which is provided with a headed portion 26 adapted to

rest against the work; and the headed portion, as shown, is in the form of an adjustable screw, so that it is adjustable with respect to the cutting edge 24 of the tool 6.

5 The steady rest is employed where it is desired to accurately gage the work to certain depths, as by resting this upon the surface of the work, the tool, of course, cannot penetrate beyond a certain distance, and this
10 distance can be regulated either by adjusting the position of the rest with respect to the work, or by adjusting the tool with respect to the head.

The tool is supported by a swinging arm
15 27 pivotally secured to a post 28, and said arm may be provided, if desired, with a flexible member 29, which is secured to the block 13, thus permitting of the manipulation of the block in any direction desired to
20 bring the tool into contact with the different portions of the work.

The operation is as follows: When power is applied and the pulley 14 rotated, the shaft 12 will be rotated therewith, rotating
25 the disk 10 and moving the crank pin 9 through a circular path of travel around the axis of the shaft 12. This will result in raising and lowering the head 7 and imparting a reciprocating movement to the
30 tool 6. It will be noted that the tube 21 is of sufficient diameter to permit of the necessary swinging movement which will be imparted to the tool by the actuation of the head 7, as, of course, said head will not be
35 actuated with a straight reciprocating movement, but will have a certain amount of swinging movement imparted thereto, because of the circular path of travel of the crank pin 9. But this swinging movement
40 will be easily accommodated because of the play permitted to the tool 6 within the tube 21; and the operative end of the tool passing in and out of the hole in the end of the tube will be driven with a rectilinear movement,
45 thus causing it to enter and leave the work in a straight line, which is the action desired.

By reason of the high speed connection which the pulley 14 has with the power
50 driven pulley 16, the shaft 12 and the head 7 will be operated at a very high rate of speed; and, although the tool is withdrawn from the work with each upward movement of the head 7 and so performs the cutting
55 operation by a punching movement, the up and down movements will follow so closely after one another that no space will be left in the work through which the tool has not penetrated. That is to say, when the operator passes the tool across the surface of
60 the work; he will do it in a manner similar to that which would be used in operating an air brush, or like instrument, which is intended to trace a line upon the work. And
65 the tool will be operated at such high speed

that it will penetrate through every portion of the work over which it has passed and will not leave any uncut surfaces, due to the withdrawing of the tool from the work by the upward movement thereof. This with- 70 drawing of the tool from the work is essential and necessary to accomplish practical results, because of the fact that if a straight cutting operation is used in operating upon flexible material, such as celluloid, paper, or 75 thin metal, the cutting instrument will be constantly forced against the work; hence, the pressure of the tool against the work will cause the same to wrinkle or bunch, so that the cutting action of the tool in passing 80 therethrough will not make a clean cut, but will go through with a tearing action, which results in the mutilation of the work. And moreover, where a broad cutting surface is used, such as a disk, it is a very difficult 85 matter for the operator to follow closely the line of a pattern. This is especially true if the pattern be of a complex configuration. In the present operation, the tool is alternately advanced and retracted from 90 the work and operates to cut the same with a punching operation. Hence, there is no forcing of the tool against the work and no bunching of the work ahead of the tool is possible. In this manner, a clean cut is 95 made by passing the tool over the work, which cutting consists in nothing more than the punching of a plurality of holes through the work; and when these holes are of fine diameter and all overlap one another, ob- 100 viously a clean line of cutting will be made without the danger attendant upon forcing a tool against the work in a manner to cause the bunching or crowding thereof ahead of the tool. Moreover, by utilizing a fine drill 105 point, as shown in the drawings, the operator can follow the sharpest curves and angles without any difficulty or unusual manipulation of the tool, the tool being, as heretofore stated, operated with the same move- 110 ment as that of an air brush or similar instrument.

I claim:

1. In a cutting tool of the class described, the combination of a tool member, a tube 115 surrounding the tool and serving as a finger piece, means for operating the tool, consisting of a shaft, a disk on the end of the shaft, a pin on the disk, and high-speed mechanism operatively connected for rotating the 120 shaft, a head swingingly mounted on the pin and carrying the tool, a block swingingly mounted on the shaft, a connection between the block and tube, and means for swingingly supporting the block, including 125 a flexible member, substantially as described.

2. In a cutting tool of the class described, the combination of a tool member, a tube surrounding the tool and serving as a finger 130 piece, means for operating the tool, consist-

ing of a shaft, a disk on the end of the shaft, a pin on the disk, and high-speed mechanism operatively connected for rotating the shaft, a head swingingly mounted on the pin and carrying the tool, a block swingingly mounted on the shaft, a connection between the block and tube, and means for supporting the block comprising a swinging arm and a flexible member connecting the arm and block, substantially as described. 10

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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."
