CUT-OUT MACHINE

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4 Claims. (Cl. 30—275)

This invention relates to a machine for forming ornamental cut-out work from sheet material. The principal object of the invention is to provide a simple, compact, light-weight machine which can be readily moved and easily guided along the lines of a given design to form a clean, continuous cut-out of the design.

Other objects of the invention are to provide a support for the machine which will form a firm foundation and yet allow the machine to be readily moved upon the supporting surface of the work; to provide convenient hand grips by means of which the user may accurately guide the machine along a desired line; to provide a pressure foot which will hold the work down under the cutting blade and which will automatically accommodate itself to surfaces of varying thicknesses, to provide a universal shaft connection which will allow the blade to turn in any desired direction while reciprocating and which can be quickly and easily assembled or disassembled; to provide a machine of this character in which all belts, pulleys, gears, etc. will be eliminated; and to provide means for supporting a lamp which will illuminate the work being cut.

Other objects and advantages reside in the detail construction of the invention, which is designed for simplicity, economy, and efficiency. These will become more apparent from the following description.

In the following detailed description of the invention reference is had to the accompanying drawings which form a part hereof. Like numerals refer to like parts in all views of the drawing and throughout the description.

In the drawings:

Fig. 1 is a perspective view of the complete machine.

Fig. 2 is a front view thereof with the front cover plate removed.

Fig. 3 is a longitudinal section taken on the line 3—3, Fig. 2.

Fig. 4 is a detail view illustrating the two parts of the universal connecting rod.

Fig. 5 is a detail rear view of the cutting blade and pressure foot.

The machine consists of a motor housing 10 closed at its rear by means of a bearing cap 11 and at its front by means of a front cap 12. The housing encloses a suitable electric motor 13, the shaft of which extends forwardly through a bearing 15 in a partition blade 16 formed in the housing 10.

The rearward portion of the shaft carries a fan 17 by means of which air is circulated through the motor 13 and through the housing 10 through suitable ventilation openings 18 therein. The forward extremity of the motor shaft 19 terminates in a relatively heavy counter-balanced crank disc 20 elastically forwardly of which a crank pin 21 is screwed.

A connecting rod 22 depends from the crank pin 21 and terminates in a ball 23. The ball 23 is clamped between two half shaft members 24 as shown in Fig. 4. The shaft members 24 are each semi-cylindrical in shape and together form a complete cylindrical vertical shaft. The shaft members are formed with semi-spherical cavities 25 at their upper and lower extremities. The cavities 25, at the upper extremity grasp the ball 23 of the connecting rod 22. The cavities 25, at the lower extremities, grasp a similar ball 26 formed upon the upper extremity of an L-shaped holder 27.

The two shaft members 24 are held together about the balls 23 and 26 by means of an enclosing tube 28, into which they fit snugly with sufficient freedom to reciprocate. The lower extremity of the tube 28 is slotted as indicated at 48 for the passage of the offset L-shaped extremity of the blade holder 27, so that the latter can not rotate in but can transmit rotation to the tube.

The tube 28 is journalled in a nipple 29 which is threaded through the bottom of the housing 10 and locked in place therein by means of suitable lock nuts 30. The nipple 29 forms a guide bearing for the tube 28 and the tube in turn forms a guide bearing for the shaft members 24.

The nipple 29 is projected below the housing 10 to receive a spring cup 31 containing a compression spring 32. The spring 32 is compressed between the nipple 29 and a flange 33 on the tube 28. Therefore, the action of the spring is to constantly force the tube downwardly. The tube 28 extends downwardly below the blade holder 27 and terminates in a pressure foot 35, preferably formed of relatively stiff, U-shaped, bent wire as illustrated. The spring 32 constantly presses the foot 35 against the sheet being cut.

When the machine is lifted from the work a thrust bearing 34 absorbs the thrust of the spring in the cup 31.

The blade holder 27 holds a cutting blade 36 in place by means of a suitable set screw 37. The blade 36 is formed with a sharp, chisel-like lower extremity which is positioned within the outline of the U-shaped pressure foot 35.

The motor housing 10 is supported above the work upon suitable runners 38. The runners are
free to move over the work being supported upon bearing balls 33 which are rotatably mounted in ball housings 40, formed on the runners. The forward extremities of the runners 38 are curved in circular arcs as shown at 41 to form a double hand hold.

An electric globe 42 is mounted in a suitable socket 43 enclosed in a light shield 44 on the bottom of the housing 10. Current is supplied to the globe 42 and the motor 13 through a suitable flexible cord 45. The current to both the lamp and the motor is controlled by means of a suitable switch 46. The switch 46 is preferably positioned on the front cover plate 12 of the motor housing 10, convenient to the operator's right thumb. A handle 47 on the motor housing facilitates lifting and carrying of the complete machine.

In use the operator grasps the two hand holds 41 in the right and left hands, placing the blade 36 over the starting point on the design. He then pushes the switch 46 with his thumb starting the motor in operation. The motor reciprocates the blade 36 vertically to push the chisel-like point rapidly and successively through the sheet being cut. He then draws the machine along the design with the pressure foot 35 dragging thereon. As the machine is guided around corners and turns in the design, the foot 35 swings the tube 28 in the nipple 29 causing the blade to be turned so as to follow the design edgewise at all times and at all positions.

While a specific form of the improvement has been described and illustrated herein, it is desired to be understood that the same may be varied, within the scope of the appended claims, without departing from the spirit of the invention. Having thus described the invention, what is claimed and desired secured by Letters Patent is:

1. In a device of the character described, means for transmitting reciprocating motion from a crank to cutting blade comprising: a vertically positioned rotatable tube below said crank; a shaft slidably mounted in said tube; a connecting rod connecting the upper extremity of said shaft with said crank; an offset blade holder on the lower extremity of said shaft for receiving the cutting blade; a foot member on the lower extremity of said tube contoured to contact said sheet eccentrically of said shaft; a spring cup surrounding said tube; a projection on said tube within said spring cup; and a spring positioned within said cup about said tube and acting against said projection to constantly force said foot against the work.

2. A cut out machine comprising: a housing; an electric motor in said housing; a counter-balanced crank disc mounted on the shaft of said motor; a guide sleeve passing through said housing below said disc; a vertically positioned shaft passing through said sleeve; a blade holder mounted on the lower extremity of said shaft; a connecting rod extending from said shaft to said crank disc; a tube surrounding said shaft within said sleeve; a pressure foot carried by the lower extremity of said tube; means for forcing said pressure foot downwardly against the work, said tube being rotatable in said sleeve and said blade holder being rotatable about the axis of said shaft; and means for transmitting the rotation of said tube to said blade holder.

3. A cut out machine comprising: a housing; an electric motor in said housing; a crank member rotated by said motor; a vertical guide bearing extending downwardly through said housing below said crank member; a hollow tube rotatably mounted in said guide bearing; a shaft mounted in said tube; a connecting rod connecting said shaft with said crank member; a foot member on the lower extremity of said tube; a blade holder formed on the lower extremity of said shaft and projecting to one side thereof through a vertical slot in the lower extremity of said tube, said shaft projecting below said guide bearing and said tube projecting below said shaft; a spring cup secured on the lower extremity of said bearing and projecting downwardly about said tube; a flange formed on said tube within said cup; and a compression spring within said cup compressed between said bearing and said flange and acting to urge said tube downwardly.

4. A cut out machine comprising: a housing; an electric motor in said housing; a crank member rotated by said motor; a vertical guide bearing extending downwardly through said housing below said crank member; a hollow tube rotatably mounted in said guide bearing; a shaft mounted in said tube; a connecting rod connecting said shaft with said crank member; a foot member on the lower extremity of said tube; a blade holder formed on the lower extremity of said shaft and projecting to one side thereof through a vertical slot in the lower extremity of said tube, said shaft projecting below said guide bearing and said tube projecting below said shaft; a spring cup secured on the lower extremity of said bearing and projecting downwardly about said tube; a flange formed on said tube within said cup; a compression spring within said cup compressed between said bearing and said flange and acting to urge said tube downwardly; and a thrust bearing between the bottom of said spring cup and said flange to support the latter when said foot is out of contact with the work.

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