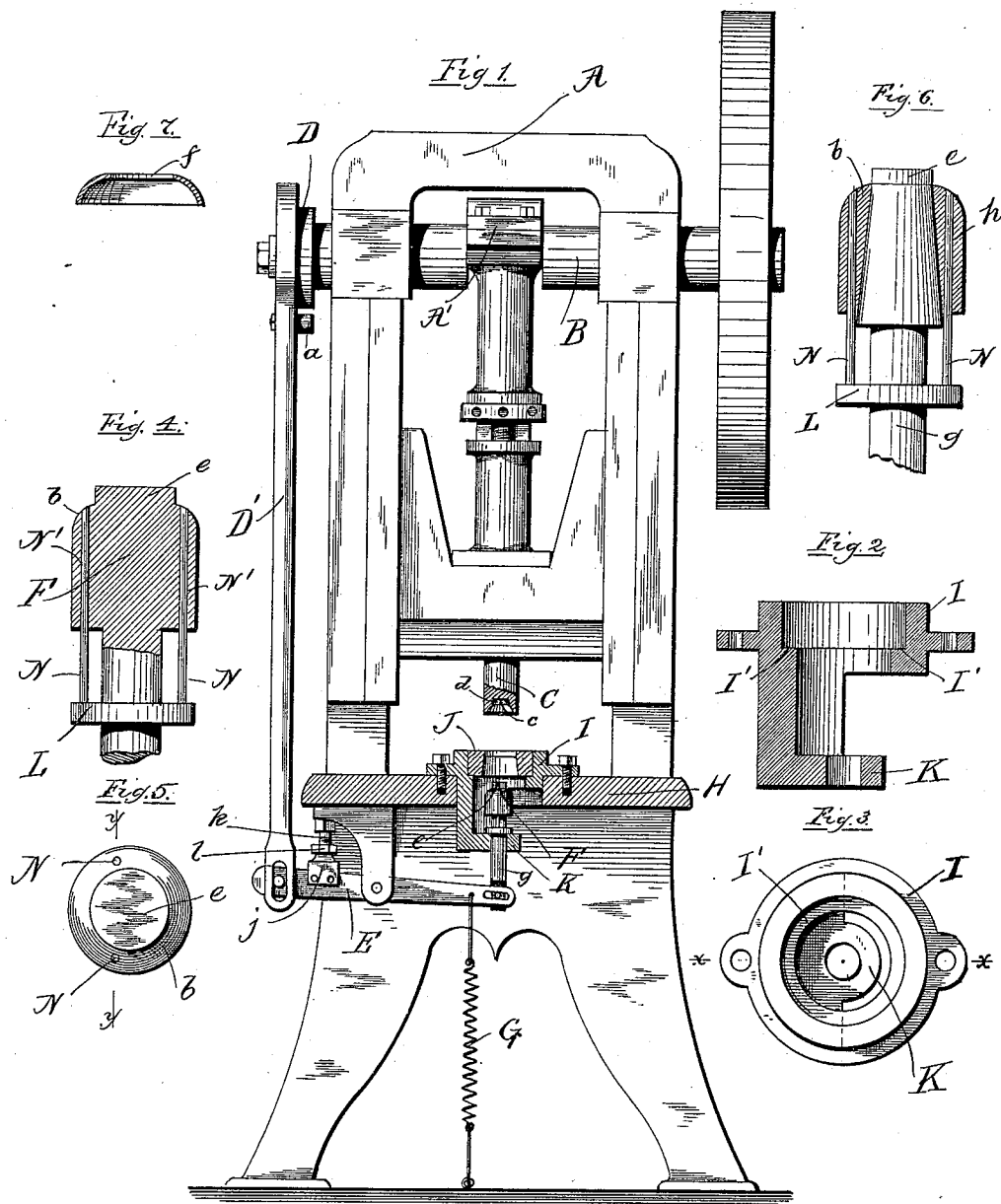


(No Model.)

W. A. TURNER.
SHEET METAL SHAPING MACHINE.

No. 463,345.

Patented Nov. 17, 1891.



Witnesses
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SHEET-METAL-SHAPING MACHINE.

SPECIFICATION forming part of Letters Patent No. 463,345, dated November 17, 1891.

Application filed September 17, 1890. Serial No. 365,246. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM A. TURNER, a citizen of the United States, and a resident of Worcester, in the county of Worcester and State of Massachusetts, have invented a new and useful Improvement in Dies for Working Sheet Metal, of which the following is a specification, accompanied by drawings forming a part of the same, and in which is represented a die-press, together with a set of dies therein, embodying my invention.

Figure 1 represents a front elevation of the die-press, with the stationary die and the portion supporting the same shown in central vertical sectional view. Fig. 2 is a vertical central sectional view of what is known as the "die-dish," represented as detached from the press. Fig. 3 is a top view of the die-dish. Fig. 4 is an elevation of the lower punch and die, partly shown in sectional view. Fig. 5 is a top view of the same. Fig. 6 is an elevation of the lower punch and die represented in Fig. 4, but showing a modification in the construction of the same; and Fig. 7 is a central sectional view of a sheet-metal blank as shaped by the opposing faces of the reciprocating dies represented in the accompanying drawings.

Similar letters refer to similar parts in the different views.

My invention consists in the construction and arrangement of the dies in a die-press or other mechanism, by which the proper motion is imparted to the upper and lower reciprocating dies, as hereinafter described and claimed, by which certain results can be attained in the forming of sheet metal by a single operation of the machine.

The dies represented in the accompanying drawings are so shaped as to form the sheet metal into the form represented in central sectional view in Fig. 7; but other forms of dies can of course be employed as the demands of the work shall determine.

A denotes the frame-work of the die-press, and B a rotating shaft journaled in the frame A and provided with a crank A', by which a reciprocating motion is imparted to the upper reciprocating die C. Upon the shaft B is a cam D, so shaped as to strike at the proper

time against a stud *a* upon the link D' and force the link downward, depressing the connected end of the pivoted lever E, raising the opposite end of the lever and its connected lower die F, the motion of the lever and connected die F being reversed by the action of a spring G.

The connected operating mechanism by which the upper and lower reciprocating dies of a die-press are operated, as shown in the accompanying drawings, is well known and in common use in machines of this class. Therefore it is not necessary to illustrate it in detail, especially as the essential feature of my present invention is not confined to its use, as other operating mechanism can obviously be employed to impart the desired reciprocating motions to the upper and lower dies C and F.

H denotes a horizontal table forming a part of the frame-work of the machine, upon which is fastened the casting I, known as a "die-dish." The die-dish I is provided with the internal shoulder I' I', upon which rests the stationary die J. (Shown in central vertical sectional view in Fig. 1.) This die has a hole concentric with the upper reciprocating die C, of the same diameter, so that when a piece of sheet metal is placed upon the upper surface of the stationary die J and a reciprocating movement is imparted to the upper die C carrying it a short distance within the hole in the stationary die, a circular disk or blank will be cut from the metal sheet the diameter of the hole and pushed ahead of the upper die C. The movements of the upper die C and the lower die F are made to correspond, so that as the blank is carried into the hole in the stationary die the lower die is moved upward to meet it and compress the blank between the upper surface of the lower die F and the lower surface of the upper die C, the shape of the compressed blank being determined by the corresponding upper and lower faces of the reciprocating dies C and F.

In the accompanying drawings the lower face of the upper die C is shown as being concave, forming a female die, and the upper surface of the lower die F as correspondingly convex at *b*, Figs. 4 and 5.

The upper throw or movement of the lower die F is completed during the period of dwell of the upper die C upon its downward movement, and immediately upon the compression of the sheet-metal blank between the dies C and F the lower die is allowed to move downward into the position represented in Fig. 1 of the drawings, and the action of the crank A' carries the upper die C into the position in which it is represented in Fig. 1 and in position to allow a second piece of sheet metal to be placed beneath it and upon the stationary die J.

The under surface of the upper die C is provided with a circular recess *c*, in which I place a block of rubber *d*, filling the recess, and upon the end or upper surface of the lower die F is a cylindrical projection *e*, filling the recess *c* in the upper die, and as the faces of the dies C and F are brought together the projection *e* will act as a punch to cut a circular disk from the center of the stamped metal piece, forming a hole *f*, Fig. 7. The hole through the die J is made slightly flaring, being larger at the bottom, so that the blank, which is carried downward by the downward movement of the upper die C, will pass rapidly downward and rest upon the upper surface of the lower die F.

The lower die F slides through an arm K, forming a part of the casting I, and upon the upper surface of the arm K, I place a collar L, resting upon the arm and allowing the spindle of the lower die F to slide freely through it. Attached to the collar L are the two parallel and vertical rods N N, passing through holes N' in the die, Fig. 4, with the upper ends of the rods even or slightly below the face of the die F when the die is in its highest position, as represented in Fig. 4; but as the die F moves downward the rods N N are forced up through the die F, pushing the piece of stamped metal off the lower die, and as the rods N N are both placed upon the same side of the center of the die, as shown in plan view in Fig. 5, the stamped piece will be lifted at one side, causing it to slide off the lower die and thus free the machine for the succeeding operation.

In Fig. 6 I have shown a modified form of lower die F, in which the spindle *g* and sleeve *h* are made in separate pieces, allowing either to be exchanged for one of different size independently of the other. The spindle *g* is either made tapering or, if preferred, provided with a shoulder to limit the motion of the sleeve as it is slipped over the end of the spindle *g*, which projects through the end of the sleeve to form the punch. The upward movement of the lower die is determined by the throw of the actuating-cam D, and the downward movement of the lower die is limited by a stop applied to the pivoted lever E, and consisting of a plate *j*, attached to the lever and carrying an adjusting-screw *k* and

check-nut *l*, the head of the screw striking against a fixed portion of the machine as the lever E is moved by the tension of the spring G.

In the operation of the machine the upper die C moves down upon a piece of sheet metal placed between it and the stationary die J, acting first as a punch in cutting a circular blank from the sheet metal and carrying it into the hole in the stationary die. The upper die C then serves as the female die, while the upward movement of the lower die compresses the blank between the opposing faces of the dies, and the projecting end of the lower die entering the recess *c* and compressing the rubber block *d*, whose tension serves to eject the circular disk cut from the stamped sheet-metal blank as the lower die moves downward.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The combination of the die-box I, arm K, with a space between said die-box and said arm for the delivery of the stamped blank, a stationary die J, held in said die-box, reciprocating die C, concentric with said stationary die, and a reciprocating die F, supported in said arm, substantially as described.

2. The combination, in a die-press, of a reciprocating die having a recess in its face, an elastic material placed in said recess, a corresponding reciprocating die having an opposing motion, whereby a sheet-metal blank is compressed between their opposing faces, and a projection entering said recess in the opposing die as the dies are brought together for the purpose of cutting a hole in the sheet-metal blank, substantially as described.

3. In a die-press, the combination of a pair of opposing reciprocating dies between which the blank is stamped, one of said dies being provided with a central recess *c* and the opposing die consisting of a central projecting cylinder or spindle *e*, fitting said recess, whereby a piece is cut from the blank, and a concentric removable sleeve *b*, held from longitudinal movement on said spindle and provided with a face the reverse of the upper opposing die, substantially as described.

4. In a die-press, the combination, with the upper and lower reciprocating dies between which the blank is stamped, of a rod sliding within the lower of said dies and eccentric to the axis of said die, whereby the blank is lifted at one side of its center so as to be delivered from said die by its own gravity, substantially as described.

5. In a die-press, the combination of a reciprocating die having a recess in its face, an elastic material held in said recess, an opposing reciprocating die having a central cylindrical projection entering said recess by which a piece is cut from the blank, and a stationary die J, held between said reciprocating dies, substantially as described.

6. In a die-press, the combination of a stationary die J, an upper reciprocating die provided with a concentric recess, an elastic material held in said recess, a lower reciprocating die having a cylindrical projection entering said recess, said upper and lower dies acting together to form the blank into its desired shape, and a rod sliding within the lower of said dies and placed eccentrically to

its axis, whereby the blank is released from said lower die, substantially as described.

Dated at Worcester, in the county of Worcester and State of Massachusetts, this 15th day of September, 1890.

WILLIAM A. TURNER.

Witnesses:

E. CONVERSE,
RUFUS B. FOWLER.