H. R. LELAND.

SHEET METAL BENDING MACHINE.

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1,235,821.

Patented Aug. 7, 1917.

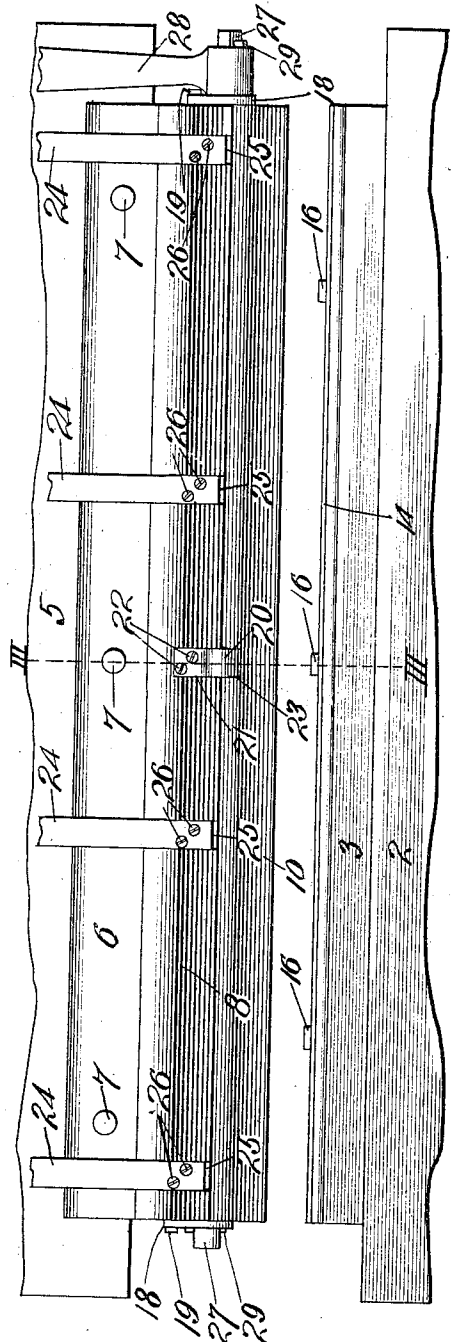


Fig. 1.

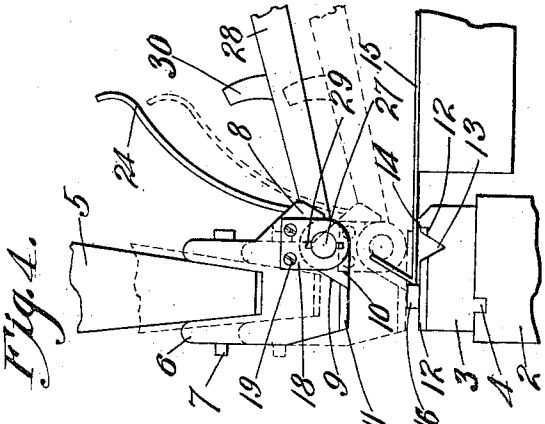


Fig. 4.

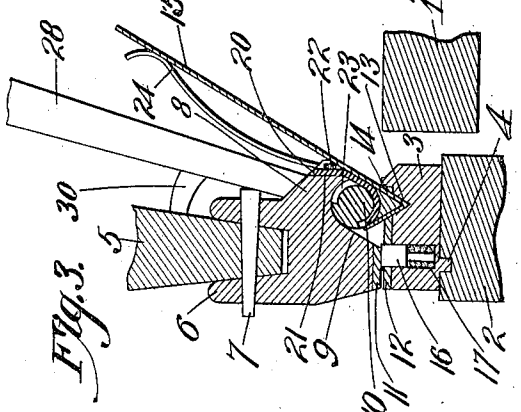


Fig. 3.

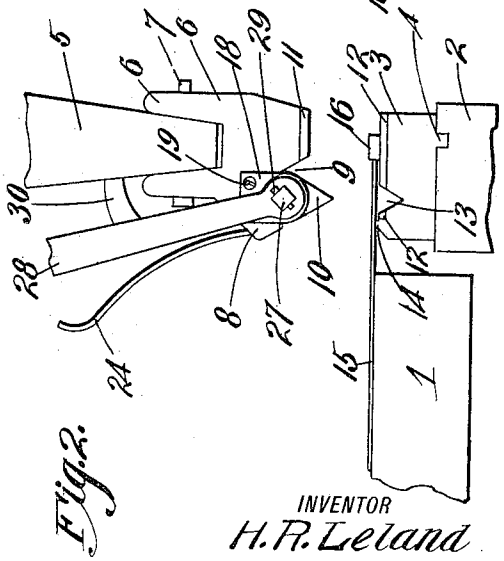


Fig. 2.

WITNESSES:

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SHEET-METAL-BENDING MACHINE.

1,235,821. Specification of Letters Patent. Patented Aug. 7, 1917.

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To all whom it may concern:

Be it known that I, HARRY R. LELAND, citizen of the United States, residing at Topeka, in the county of Shawnee and State of Kansas, have invented certain new and useful Improvements in Sheet-Metal-Bending Machines, of which the following is a specification.

This invention relates to sheet metal bending machines, and my object is to produce a sheet metal bending machine of simple, strong, durable and inexpensive construction, which can be controlled by the same operator who feeds the machine, a further object being to provide means which will facilitate the handling of the sheet metal and reduce the chances of injury to the operator.

With these objects in view the invention consists in certain novel and peculiar features of construction and organization of parts as hereinafter described and claimed, and in order that the invention may be more fully understood reference is to be had to the accompanying drawing, in which:—

Figure 1, is a fragmentary front elevation of a press equipped with plate bending mechanism embodying my invention.

Fig. 2, is a view showing the right hand end of the press with the die in position to effect the first bending operation, a sheet metal plate being in position.

Fig. 3, is a section on the line III—III of Fig. 1, but showing the male die depressed and the metal plate bent by the coöperating dies.

Fig. 4, is a view showing the left hand end of the press, in full lines ready to descend to effect the second bending operation of the plate, and in dotted lines as having completed the second bending operation.

In the said drawing, 1 indicates the table for supporting sheet metal plates while being operated upon by the machine, 2 is a suitable base for the female die 3, which is adapted to be secured thereon by means of a tongue and groove connection 4, preferably running the full length of the machine, or said die may be otherwise secured on the base.

A beam 5 overlies the die 3, and is adapted to be vertically reciprocated, by any suitable means, not shown, and to said beam the head or carrying member 6 is rigidly secured by means of taper pins 7, of which there are any suitable number. Head 6 is formed with a forwardly and downwardly projecting shoulder 8, said shoulder in conjunction with the body of the head, forming a longitudinal recess 9, in which a die 10, substantially V-shaped in cross section, is secured by means hereinafter mentioned, the die being so fixed that when in vertical position the pointed or apex portion will depend below the plane of the lower surface of the wear plate 11 secured to the bottom of the carrying member 6, as shown in Fig. 2. When in raised position the V-shaped portion will lie horizontally in the recess 9 and its lower side will be flush with the lower surface of the wear plate 11, as shown by Fig. 4.

The female die 3 is equipped at its upper side with wear plates 12 at opposite sides of a V-shaped recess 13 for receiving the male die when it is in its depressed position, and with an upstanding bead or rib 14, to form a fulcrum on which each plate 15 will rock to facilitate the first bending operation thereof.

At suitable points in the length of the female die stops or gages 16 are arranged, and said gages or stops are held elevated by means of springs 17, when there is no pressure on their tops. These gages or stops are to determine the distance each plate 15 shall be inserted between the dies, as shown, and are adapted to recede into the female die when the male die is depressed for a bending operation on the metal plate.

The male die is secured to the head 6 by means of bearing plates 18 secured to each end of the head by screw bolts 19, and to more substantially support the die if the same is of any considerable length a hook-shaped plate 20 is secured in a recess 21 to the projecting shoulder of the head by means of screw bolts 22, its hook end fitting in a curved recess 23 through the die 10.

At suitable points on the head, springs 24 are fastened in recesses 25, by means of screw bolts 26. These springs constitute cushions against which the free ends of the plate 15 strike in the first bending operation thereof, as shown by Fig. 3.

At each end the die 10 is formed with axial extensions or trunnions 27 for turning in the bearing plates 18, the right hand one being squared for the reception of a manually operable handle 28, said die being secured in

position at each end by means of cotter pins 29, engaging at one end the outer surface of one of the bearing plates 18 and at the other the outer side of the handle 28. The handle is provided with a lug 30 to impinge against the forward side of the beam 5, as shown in Figs. 2 and 3.

To reinforce a margin of a plate 15, the operator shoves a plate forward from the table upon the female die until arrested by contact with the gages or stops 16. As this is accomplished he swings the lever 28 from the position shown in Fig. 4 to the position shown in Fig. 2, this operation being accomplished while the upward movement of the beam is taking place. He holds the lever in the position last referred to during the ensuing downward movement of the beam, and should be careful, as the point of the die 10 engages plate 15, to remove his hand from said plate because under the downward pressure of the die 10, the plate is bent down into the die 13, and the outer or free portion of the plate, fulcrumed at first on the rib or bead 14, is caused to swing upwardly with considerable force, the portion of the plate beyond the point of the die being bent upward at the same time, the upward movements of the portions of the plate at opposite sides of and for a short distance from the point thereof being arrested by contact with the sides of the die. The form of the dies determines the angle to which the marginal portion of the plate is bent with respect to the body portion, and as the latter is of such size that when swung upward it projects a considerable distance above the arm 8, it is desirable to check or cushion such upward movement by means of the springs 24.

Without these cushions 24 the upwardly projecting portion of the body of the plate will, due to its resiliency, fulcrum on the front corner of the arm or shoulder 8 and swing upward to a substantially higher position than that occupied by the springs 24 and would then swing back against and perhaps vibrate several times before the operator could safely grasp the upper edge of the plate. By the use of the springs any great vibration of the upper end of the plate is checked, and in consequence the operator is enabled to safely grip such edge without letting so much time elapse after the downward movement of the die occurs as would be necessary if the cushion springs were not employed, and as he grips the plate the beam 5 starts to rise. By the time it retains its elevated position the operator has withdrawn the bent plate from engagement with the female die, lowered said plate upon the table and pushed it forward to the position shown in full lines Fig. 4, and at about the same instant he pulls lever 28 downward to dispose the die 10 in the position shown in the last named figure, so that the downwardly disposed face of said die shall engage the upwardly and forwardly extending flange, produced on the plate by the first bending operation, and continue the bending of said flange until it rests flatly upon the body portion of the plate as indicated by dotted lines in Fig. 4.

If the plates are to be reinforced along each margin in the manner explained and shown in connection with one margin, the plates will be cut away at the corners so that the reinforce portions shall not overlap, but as this invention pertains simply to an individual reinforcing operation, it is unnecessary to illustrate the plate in further detail.

From the above description it will be apparent that I have produced a machine for readily and efficiently reinforcing the margin of a sheet metal plate by bending a portion of it flatly back against its body portion, which embodies the features of advantage enumerated as desirable in the statement of the object of the invention, and it is to be understood that I reserve the right to make such changes as properly fall within the spirit and scope of the appended claims.

I claim:

1. A sheet metal bending machine, comprising a base and a beam adapted for relative approaching and receding movement, a die mounted upon the base and provided with a longitudinal V-shaped recess in its upper side, a carrying member secured to and depending from the beam and provided with a longitudinal recess in its under side, bearing plates depending from opposite ends of the carrying member in the vertical plane of said recess, a V-shaped die arranged in said recess and provided with end trunnions pivotally engaging said bearing plates, means for disposing the said die member vertically for entrance into the recess of the first-named die member or in substantially horizontal position to cause its lower side to parallel the upper side of the die on the base, and cushioning means secured to and projecting upwardly and forwardly from the carrying member.

2. A sheet metal bending machine, comprising a base and a beam adapted for relative approaching and receding movement, a die mounted upon the base and provided with a longitudinal V-shaped recess in its upper side, a carrying member secured to and depending from the beam and provided with a longitudinal recess in its under side, bearing plates depending from opposite ends of the carrying member in the vertical plane of said recess, a V-shaped die arranged in said recess and provided with end trunnions pivotally engaging said bearing plates, means for disposing the said die member vertically for entrance into the recess of the first-named die member or in substantially

horizontal position to cause its lower side to parallel the upper side of the die on the base, and a plurality of springs secured to and projecting upwardly and forwardly from said carrying member.

3. A sheet metal bending machine, comprising a base and a beam adapted for relative approaching and receding movement, a die mounted upon the base and provided with a longitudinal V-shaped recess in its upper side, a carrying member secured to and depending from the beam and provided with a longitudinal recess in its under side, bearing plates depending from opposite ends of the carrying member in the vertical plane of said recess, a V-shaped die arranged in said recess of the carrying member and provided with end trunnions pivotally engaging said bearing plates, a handle secured to one of the trunnions for pivotally operating said last-named die and provided with a lug to impinge against said beam when the said die is swung to a vertical position by said handle, a plurality of springs extending upward and forward from the carrying member, and spring elevated gages or stops mounted in the first-named die rearward of the recess thereof and adapted to be depressed by the carrying member when the die thereof is lowered to bend a metal plate interposed between the said dies and fitted at its front edge against the said gages or stops.

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

HARRY R. LELAND.

Witnesses:
P. T. JOHNS,
W. B. GODMAN.

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