A. M. GRIFFIN.

METAL BENDING MACHINE.

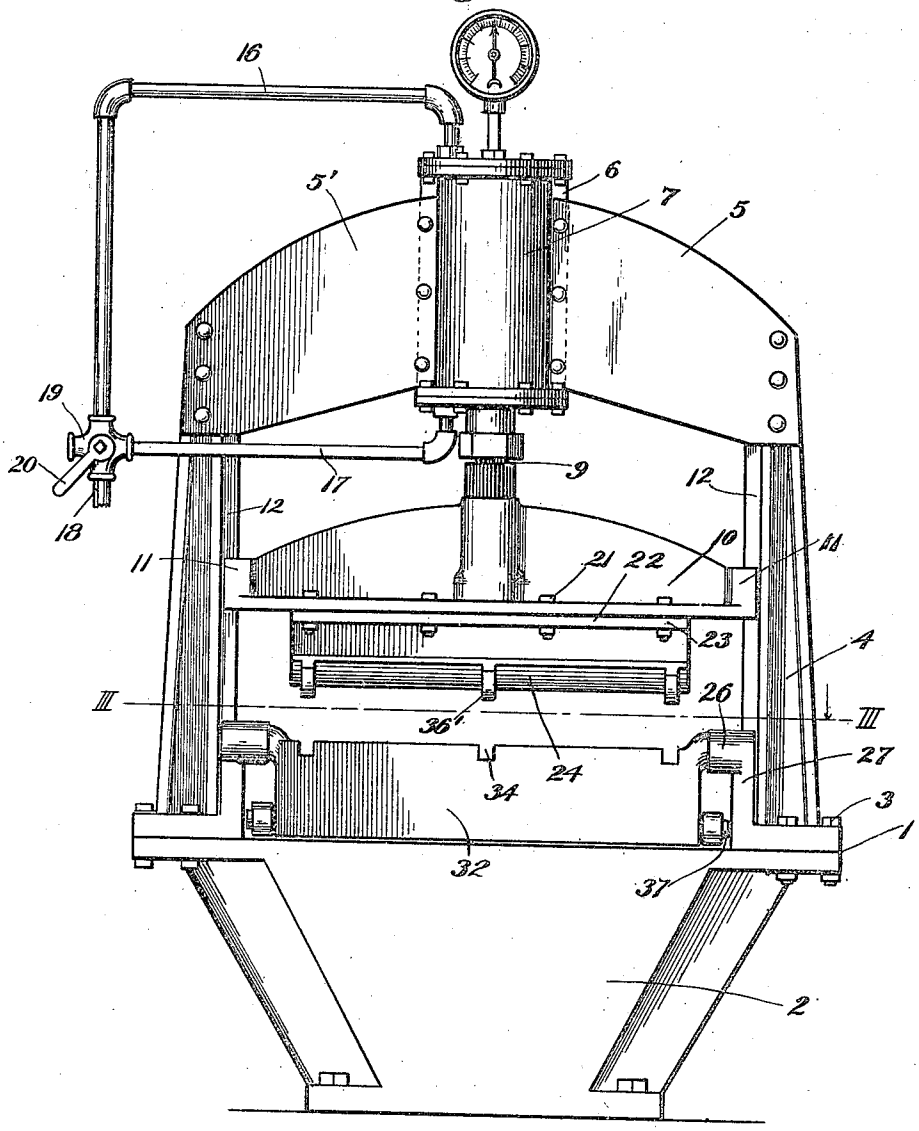
APPLICATION FILED JULY 5, 1916.

1,258,892.

Patented Mar. 12, 1918.

3 SHEETS—SHEET 1.

Fig. 1.



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3 SHEETS—SHEET 2.

Fig. II.

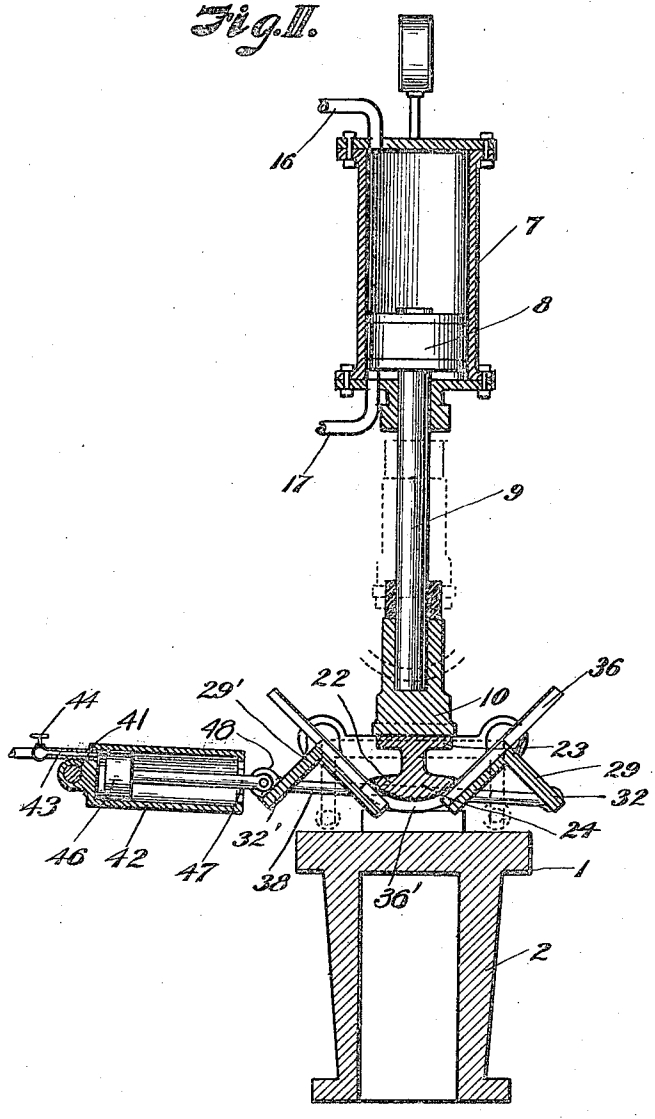
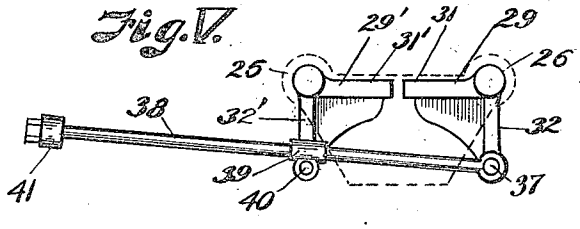


Fig. V.



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3 SHEETS—SHEET 3.

Fig. III

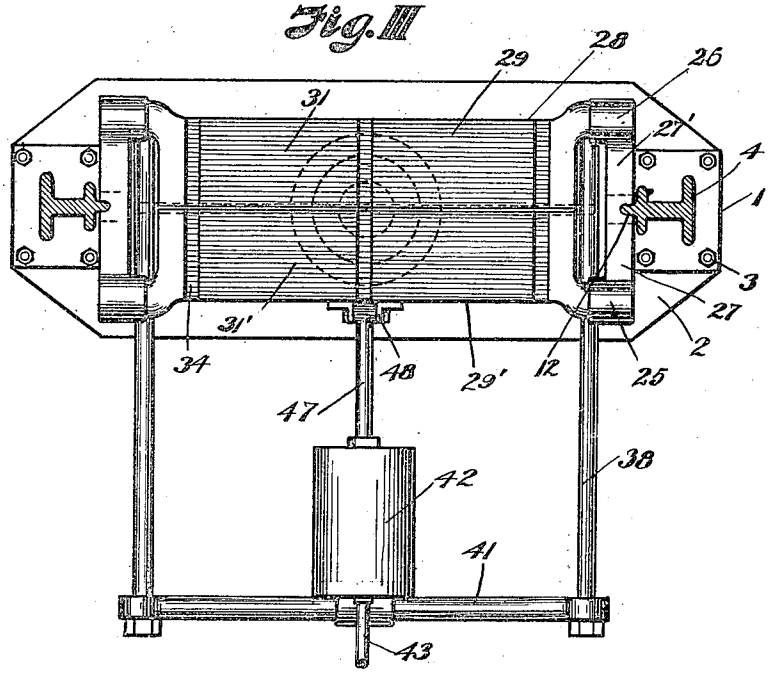
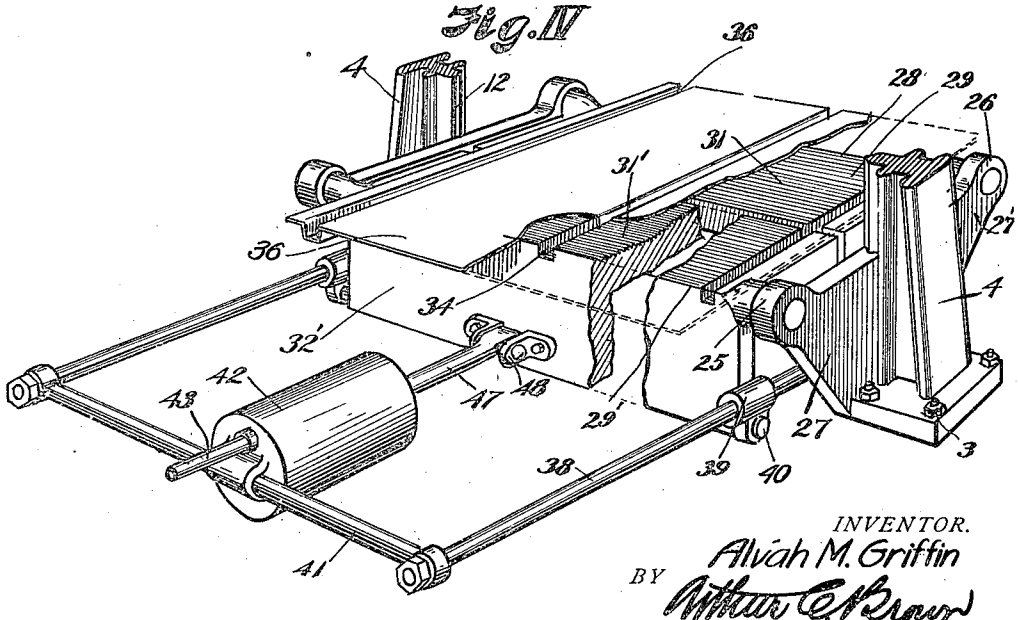


Fig. IV



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UNITED STATES PATENT OFFICE.

ALVAH M. GRIFFIN, OF KANSAS CITY, MISSOURI, ASSIGNOR TO ANDREW A. KRAMER, OF KANSAS CITY, KANSAS.

METAL-BENDING MACHINE.

1,258,892. Specification of Letters Patent. Patented Mar. 12, 1918.

Application filed July 5, 1916. Serial No. 107,522.

To all whom it may concern:

Be it known that I, ALVAH M. GRIFFIN, a citizen of the United States, residing at Kansas City, in the county of Jackson and State of Missouri, have invented certain new and useful Improvements in Metal-Bending Machines; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

My invention relates to a metal bending machine and more particularly to a machine of this character for forming the corners or hips of a sheet metal building such as a bin or garage wherein the wall parts are ribbed or joined together by box joints, the principal object of the invention being to provide a machine whereby the ribbed strips may be bent without buckling.

In accomplishing this object I have provided the details of structure hereinafter described and illustrated in the accompanying drawings, wherein:—

Figure I is a side view of a metal bending machine constructed according to my invention.

Fig. II is a vertical section of the same.

Fig. III is a horizontal section on the line III—III, Fig. I, particularly illustrating the forming tables and their clamping means.

Fig. IV is a perspective view of a part of the machine, showing a plate in place on the forming table before being bent, parts of the machine and plate being broken away for better illustration.

Fig. V is an end view of the pivotally mounted forming tables and their clamping means.

Referring more in detail to the drawings:—

1 designates a metal bending machine constructed according to my invention, comprising a base 2 of such height as to conveniently support the working parts thereon, and secured at opposite sides thereof by bolts 3 are spaced standards 4, connected at their upper ends by plates 5—5′ that are bolted to the standards and to the side flanges 6, of a centrally located air cylinder 7.

Slidably mounted in the cylinder 7 is a piston 8 having a piston rod 9 attached thereto which extends downwardly from the cylinder and carries at its outer end a cross-head 10. The cross-head 10 is provided at its ends with yoke portions 11 adapted for slidable movement on guide flanges 12 on the inner faces of the standards 4, which guide the cross-head vertically between the standards when it is raised or lowered by the piston action.

The piston 8 is actuated by a fluid pressure medium which is admitted to the cylinder at either side of the piston through pipes 16—17 leading from a main supply pipe 18 through a fourway valve 19, whereby the medium may simultaneously be admitted to one side of the cylinder and drain from the other side back through the valve to exhaust, to effect and permit movement of the piston; the action of the valve being controlled by a valve lever 20.

Secured to the cross-head 10 by bolts 21, is a presser head 22 comprising flanges 23 for receiving the bolts 21 and a head portion 24, the face of which is curved in a convex arc of the curvature to which it is desired to bend the metal.

Pivotally mounted below the presser head 22, in spaced bearings 25—26 carried on arms 27—27′ at each side of the base adjacent the standards 4, is an ironing table 28, which comprises paired sections 29—29′ supported at their outer corners in the bearings 25—26 and which are adapted to swing downwardly at their adjacent free edges under pressure of the head 22, but are normally supported in a horizontal plane as presently described.

The table sections 29—29′ comprise corrugated face or ironing surfaces 31—31′ and downwardly extending edge flanges 32—32′; the ironing surfaces being provided with transverse parallel grooves 34 which are adapted for receiving the joint or rib por-

tions of the metal plates 36 to be formed, and the head 22 having ribs 36′ thereon adapted for registering with the grooves to lock the plates to the tables and to prevent the joints from opening during the pressing or bending process.

The presser head is also preferably provided with corrugations for coöperating with the corrugations in the ironing table to hold the metal and prevent the metal from slipping or buckling.

Pivotally mounted on studs 37 at the lower corners of the flange 32 are rods 38 which extend forwardly through collars 39 that are pivotally carried on studs 40 on the lower corners of the flange 32′ and are connected at their outer ends by a cross-rod 41.

Pivotally mounted on the rod 41 is a fluid pressure medium cylinder 42, having an intake, or outlet pipe 43 and a valve 44 to admit or release the pressure medium thereto or therefrom to actuate a piston 46 and rod 47, the rod being pivotally connected at its outer end with the lower edge of the table flange 32′ between ears 48, so that when a pressure medium is admitted to the cylinder the piston is forced outwardly to move the ironing surfaces of the table 28 to a horizontal position, and upon release of the pressure medium from the cylinder the table will be allowed to open downwardly at its transverse center.

Presuming the parts to be so constructed, a plate to be formed is placed on the table with the ribs seated in the table grooves. The presser head is then lowered by admitting pressure medium to the upper end of the cylinder to move the piston and crosshead downwardly.

As the head moves downwardly, the ribs 36′ seat within the grooves of the metal plate and clamp the plate solidly against the table to prevent its slipping, and when a jointed plate is being bent to prevent the joints from opening.

With the presser head seated against the plate to be bent and the pressure medium turned into the cylinder 7, the valve 44 is turned to gradually release the pressure medium from the cylinder 42, so that the pressure in the cylinder 7 will overcome that in the cylinder 42, thus forcing the piston 46 and rod 47 outwardly allowing the table sections to open downwardly beneath the presser head, so that the plate is rolled on the head 22 and given a curve corresponding to the curvature of the head.

After the bending has been completed the valve arm 20 is turned to reverse the piston action and the presser head is raised from the table, so that the formed plate may be removed.

The table sections are then restored to their normal position by turning pressure medium into the cylinder 42 to move the piston and rod outwardly and the flanged parts of the table inwardly to bring the ironing surfaces again into a horizontal position.

It is apparent that by so constructing the machine, ribbed plates may be placed on the ironing table with the ribs in the table grooves and that the ribs of the presser head seating therein will hold the plate firmly in position and prevent the plate from buckling or joints of a positioned plate from opening during the bending operation.

It is also apparent that by making the presser heads removable and by providing a number of such heads each having a different radius of curvature, any desired curve may be given the formed metal.

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

1. The combination with a base having spaced standards thereon, of a presser head slidably mounted between the standards, a table mounted above the base pivotally supported at its corners and adapted to open downwardly at its transverse center, a piston for actuating the presser head toward and from the table, a pressure cylinder, a piston operable in said cylinder and means operatively connecting said cylinder and piston with the movable table sections to yieldingly retain the latter against the presser head.

2. In a bending machine the combination with a movable presser head, of a table comprising paired sections pivotally supported at their outer edges and adapted to open downwardly at their adjacent edges and having downturned flanges at their outer edges, collars pivotally mounted at the lower corners of one of said table flanges, and arms pivotally mounted at the lower corners of the opposite section and slidably extended through said collars.

3. In a bending machine the combination with a movable presser head, of a table comprising paired sections pivotally supported at their outer edges and adapted to open downwardly at their adjacent edges and having downturned flanges at their outer edges, collars pivotally mounted at the lower corners of one of said table flanges, arms pivotally mounted at the lower corners of the opposite sections and slidably extended through said collars, a cross member on said arms and yieldable means connected with said cross member and with one of the table members for resisting opening movement of the table members and returning the same to table forming position.

4. In a bending machine the combination with a movable presser head, of a table comprising paired sections pivotally supported at their outer edges and adapted to

open downwardly at their adjacent edges and having downturned flanges at their outer edges, collars pivotally mounted at the lower corners of one of said table flanges, arms pivotally mounted at the lower corners of the opposite sections and slidably extended through said collars, a cross member on said arms, a cylinder carried by the cross member, a piston in said cylinder connected with one of the table members, and means for controlling intake and outlet of a fluid pressure medium to and from said cylinder.

In testimony whereof I affix my signature.

ALVAH M. GRIFFIN.

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