No. 649,996. Patented May 22, 1900.

A. SCHWARTZBAUER.

MACHINE FOR FORMING SHEET METAL TUBES.

(Application filed Feb. 28, 1900.)

(No Model.) 3 Sheets—Sheet 1

Fig. 1.

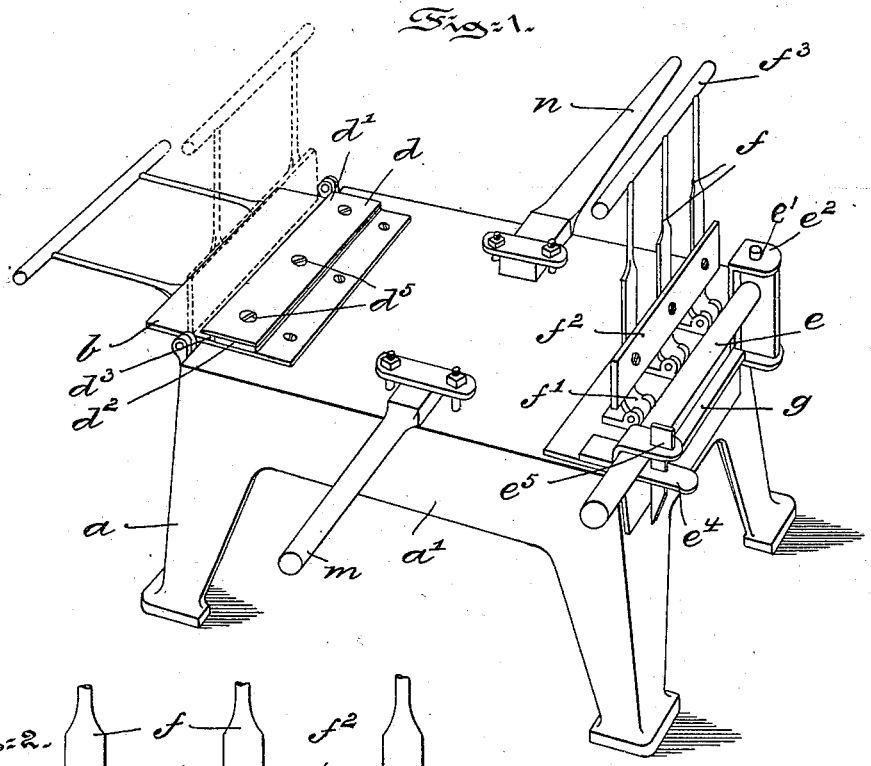

Fig. 2.

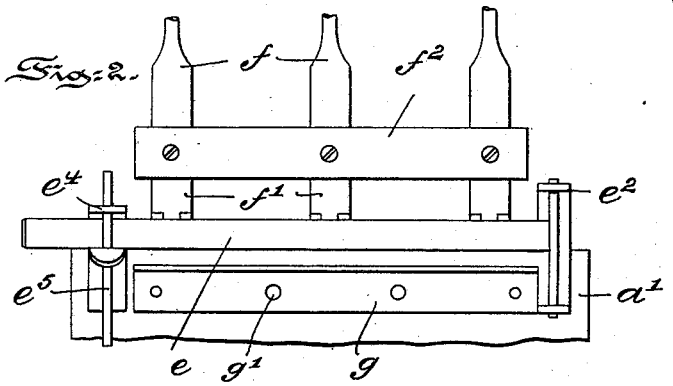

Fig. 3.

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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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Fig. 4.

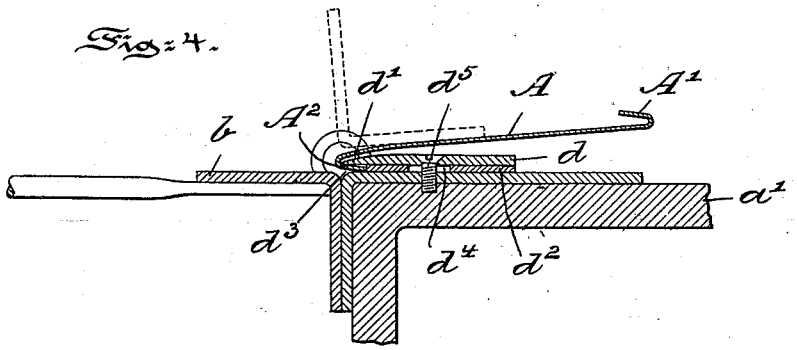


Fig. 5.

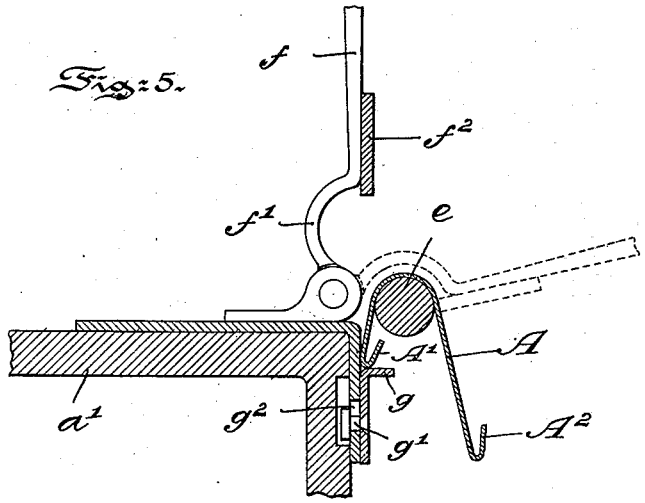
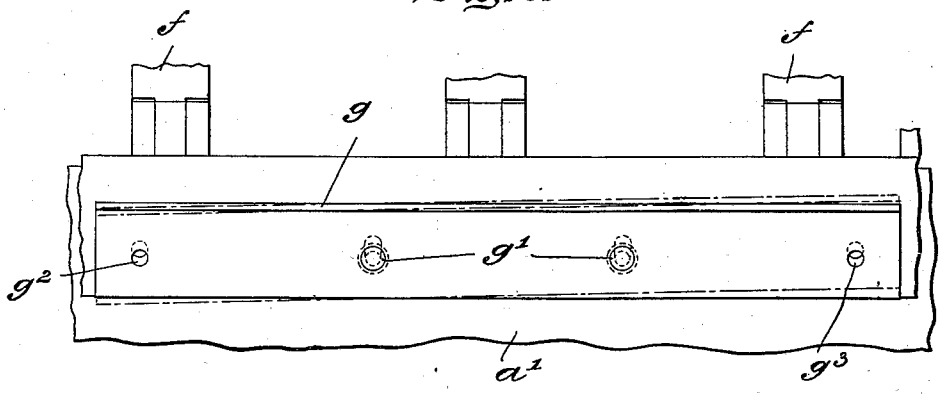


Fig. 6.



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(No Model.) 3 Sheets—Sheet 3.

Fig. 7.

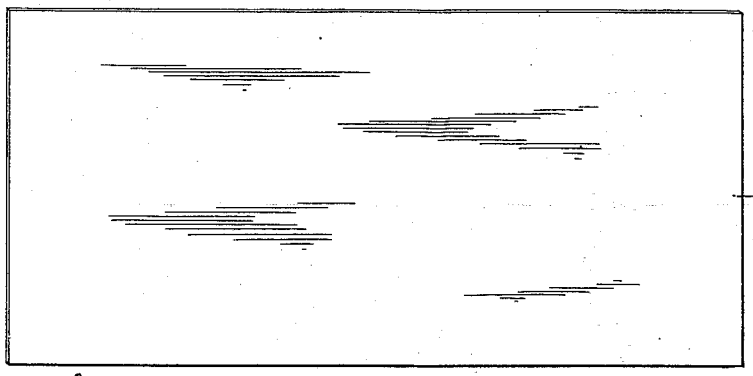


Fig. 8.

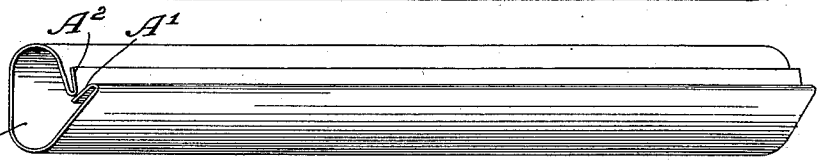


Fig. 9.

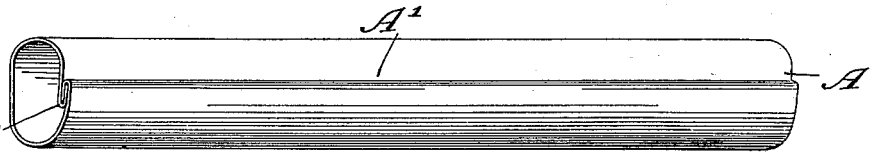


Fig. 10.

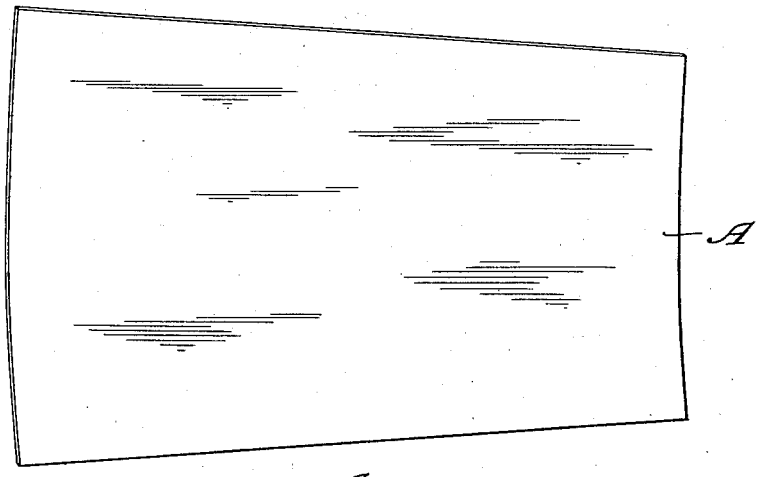
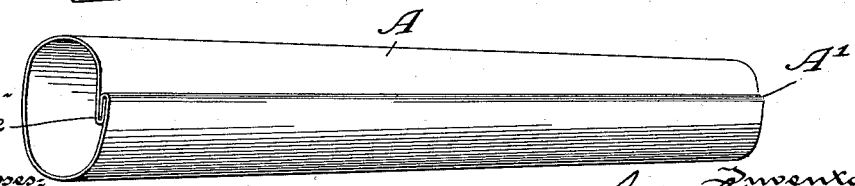


Fig. 11.



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UNITED STATES PATENT OFFICE.

ANTON SCHWARTZBAUER, OF PHILADELPHIA, PENNSYLVANIA.

MACHINE FOR FORMING SHEET-METAL TUBES.

SPECIFICATION forming part of Letters Patent No. 649,996, dated May 22, 1900.

Application filed February 28, 1900. Serial No. 6,787. (No model.)

To all whom it may concern:

Be it known that I, ANTON SCHWARTZBAUER, a citizen of the United States, residing at No. 1838 South Fifth street, in the city of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Machines for Forming Sheet-Metal Tubes, of which the following is a specification.

My invention has relation to a machine for forming sheet-metal tubing, and in such connection it relates to the construction and arrangement of such a machine.

The principal object of my invention is to provide a machine whereby sheet-metal tubing, whether of cylindrical or tapered form, may be easily and quickly made; and to that end my invention consists, essentially, of a machine provided with mechanism for lapping the edges of the sheet metal to form a locking means for the tube, mechanism for bending the lapped-edged sheet into the tubular form required, and mechanism for finishing the bent tube.

My invention further consists of a machine for making sheet-metal tubing when constructed and arranged in substantially the manner hereinafter described and claimed.

The nature and scope of my present invention will be more fully understood from the following description, taken in connection with the accompanying drawings, forming part hereof, in which—

Figure 1 is a perspective view of a machine embodying main features of my invention. Fig. 2 is an end elevational view of the right-hand end of the machine. Fig. 3 is a longitudinal sectional view of Fig. 1. Fig. 4 is an enlarged longitudinal sectional view illustrating in detail the mechanism for lapping the edges of the sheet. Fig. 5 is a similar view illustrating in detail the mechanism for bending the lapped sheet into substantially tubular form. Fig. 6 is an enlarged view of Fig. 3, illustrating the means for adjusting the guide bar or plate. Figs. 7, 8, and 9 are perspective views of respectively the sheet, the partly-formed tube, and the formed tube of cylindrical shape; and Figs. 10 and 11 are perspective views of respectively a sheet and a tapered tube formed therefrom.

Referring to the drawings, a represents the supports, and a' the bed-plate, of the machine. At the left-hand end of the machine is hinged a brake or folding bar b, and on the bed-plate a', immediately in front of the folding-bar b, is located a die-plate d. The die-plate d has a beveled edge d', which is separated from or raised above the bed-plate by means of a removable gage-plate d^2. In the space d^3 thus formed the edge of the sheet A is adapted to be inserted, as clearly illustrated in Fig. 4. It will be readily understood that the depth of the space d^3 will depend upon the thickness of the gage-plate d^2, and hence by interposing plates d^2 of varying thickness between the die-plate d and the bed a' of the machine the space d^3 may be regulated to accommodate sheets of varying thickness of metal. The beveled edge d' projects beyond the front edge of the gage-plate d^2 to a distance corresponding with the width of the lap required, and to permit of the variation in this width of lap the gage-plate d^2 is made adjustable between the bed of the machine and the die-plate d by slotting the plate d^2, as at d^4, and passing set or fastening screws d^5 through these slots and through the die-plate d and into the bed-plate a'. After the sheet A has been provided at two opposite edges with a lap the sheet is then bent into required form by the bending mechanism. This mechanism is arranged at the other end of the table, and consists of a round bar or mandrel e, one end of which is pivoted, as at e', in a projecting bracket e^3, extending from the side of the bed-plate a'. The other end of the mandrel e is adapted to enter a bracket e^4 and to be locked therein by a bolt e^5, as clearly illustrated in Figs. 1 and 2. Adjacent to that edge of the table at which the mandrel l is located is arranged a bending-frame consisting of two or more pivoted arms f, the lower ends of which are curved, as at f', to fit concentrically over the bar or mandrel e. These arms f carry a flat strip f^2 and have at their upper end a common handle f^3. Below the mandrel l is located a gage-plate g, upon which the lapped edge of the sheet is adapted to rest and also upon which the lapped edge is guided. This gage-plate g is united to the side of the machine by preferably two bolts g', each passing through a slot g^2 in the side of the machine and arranged in such a manner as that the

upper edge of the plate g may either rest parallel with the mandrel e or be turned so that it shall rest at an oblique angle to either end of said mandrel. When tilted to its oblique position, the gage-plate g is adapted to be locked by means of a peg passed through either the opening g^2 or g^3, arranged at either end of the gage-plate g and adapted, respectively, to register when that end is tilted upward with a similar opening in the side of the machine.

At the front and rear sides of the machine and upon the bed thereof are removably secured the finishing mandrels or formers m and n, of which m is substantially cylindrical throughout its length, while the mandrel n is tapered.

The operation of the machine hereinbefore explained is as follows: The opposite sides of the sheet A are first formed with the laps A′ and A², adapted when the sheet is bent around to interlock, as illustated in Figs. 9 and 11. When a cylindrical or straight tube is to be formed, the sheet A is oblong, as illustrated in Fig. 7, but when the tube is to be of tapered form the sheet is of the form illustrated in Fig. 10. After the laps A′ and A² have been formed by the brake b, as previously explained, the sheet is removed to the bending mechanism. In this portion of the machine the lapped edge A′ is first inserted between the mandrel e and the side of the machine until it rests on the gage-plate g. The arms f and strip f' are then moved downward from a vertical to a horizontal position and the sheet is partly bent or curved, as illustrated in Fig. 5, being forced down upon the curved mandrel by the curved portions of the arms f' and spread closely over the mandrel by the lower edge of the strip f^2. The partly-bent sheet is then removed from the mandrel e by swinging the mandrel and sheet away from the side of the tube. The other lapped edge A² is next inserted between the mandrel e and the side of the table with the lapped edge resting on the gage-plate g. The mandrel e is then again locked in place and the bending-frame operated to bend the sheet A into the form illustrated in Fig. 8. The lapped edges A′ and A² are then interlocked and the tube placed upon the shaper m or n and the seam flattened down to form the completed tube illustrated in either Fig. 9 or Fig. 11. When a tapered tube is to be formed, the operation is precisely the same, as above explained, but the gage-plate g must be tilted after each bending operation to an opposite inclined position.

Having thus described the nature and object of my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a machine of the character described, a bending mechanism, comprising a bending-frame hinged at its lower end to the bed of the machine and curved at that point, a flat strip located adjacent to and above the curved portion of said frame, a mandrel pivoted at one end of the machine adjacent to the bending-frame, means for locking the other end of said mandrel to the end of the machine and a gage-plate located between said frame and mandrel and below the same, substantially as and for the purposes described.

2. In a machine of the character described, in combination with a bending-frame, a mandrel pivoted at one end of the machine adjacent to one end of said frame, means for locking the other end of said mandrel so that said mandrel shall rest parallel with said frame, a gage-plate located below the mandrel, and means for tilting said gage-plate obliquely to either end of said mandrel, substantially as and for the purposes described.

In testimony whereof I have hereunto set my signature in the presence of two subscribing witnesses.

ANTON SCHWARTZBAUER.

Witnesses:

J. WALTER DOUGLASS,

THOMAS M. SMITH.