(No Model.)

G. W. PETERS.

METAL TUBE MACHINE.

No. 563,797. Patented July 14, 1896.

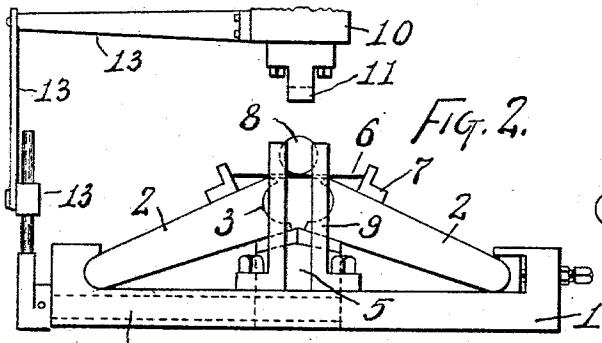

FIG. 2.

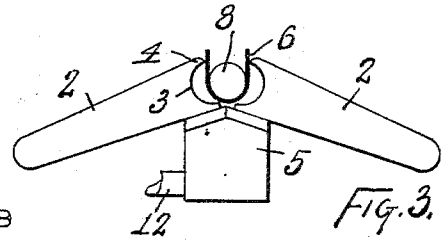

FIG. 3.

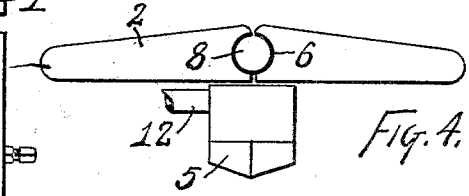

FIG. 4.

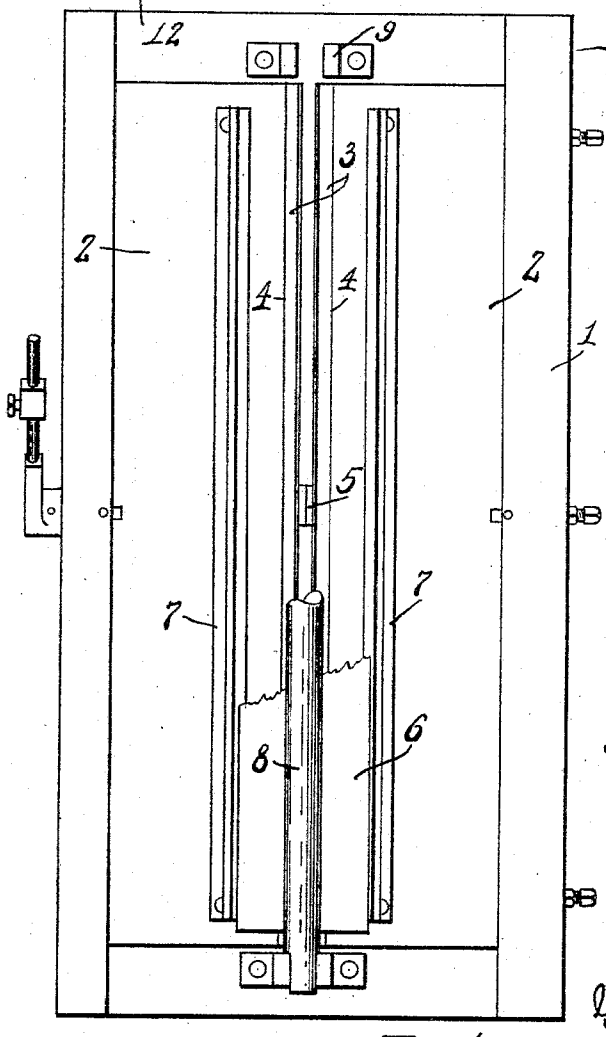

FIG. 1.

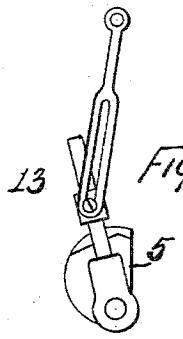

FIG. 5.

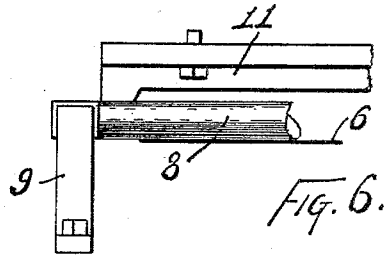

FIG. 6.

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UNITED STATES PATENT OFFICE.

GEORGE W. PETERS, OF HAMILTON, OHIO, ASSIGNOR TO THE HAMILTON TUBE COMPANY, OF SAME PLACE.

METAL-TUBE MACHINE.

SPECIFICATION forming part of Letters Patent No. 563,797, dated July 14, 1896.

Application filed February 28, 1896. Serial No. 581,101. (No model.)

To all whom it may concern:

Be it known that I, GEORGE W. PETERS, of Hamilton, Butler county, Ohio, have invented certain new and useful Improvements in Metal-Tube Machines, of which the following is a specification.

This invention pertains to improvements in machines for forming metal tubes of such small diameter or thick material that they will not lend themselves to the ordinary method of coiling on a mandrel. In my machines a die system is employed which may be used in any suitable punching-machine.

My improvements will be readily understood from the following description, taken in connection with the accompanying drawings, in which—

Figure 1 is a plan of a machine exemplifying my invention, the skelp being in position for the beginning of the operation; Fig. 2, an end elevation of the same; Fig. 3, an end elevation of the dies when the skelp has been brought to a second stage of action; Fig. 4, a similar view at the stage of the completion of the tube; Fig. 5, a side elevation of the cam mechanism, and Fig. 6 a side elevation of a part of the mandrel and its accessories.

In the drawings, 1 indicates a bed-plate, having a length in excess of that of the tube to be made, this plate being adapted to rest on the bed-jaw of any suitable ordinary punching-machine; 2, a pair of dies with their heels pivoted in the bed-plate, the dies being arranged togglewise and having a length equal at least to that of the tube to be made; 3, longitudinal concave die-surfaces in the inner edges of the dies, and having a form corresponding with that of the tube to be made, the illustration providing for a tube of circular cross-section; 4, the upper edges of the dies, forming the top margins of the recesses 3, these edges being preferably sharp; 5, a cam under the dies and adapted to hold them in upwardly-deflected position, in which position the recesses 3 will be open and the distance between the edges 4 will be equal to the outside diameter of the tube to be made; 6, the skelp, resting upon the edges 4 of the dies; 7, gages on the dies to insure the proper location of the skelp with reference to the space between the dies; 8, a mandrel having cross-section corresponding with the interior of the tube to be produced, the length of the mandrel exceeding that of the dies and the mandrel resting on the skelp over the space between the dies; 9, guides on the bed-plate engaging the ends of the mandrel projecting beyond the skelp, the mandrel being preferably flattened at its ends where it fits between the guides, so that the mandrel will move vertically in the guides and without turning; 10, the ram of the punching-machine, over the mandrel; 11, a plunger attached to this ram and adapted to come down and bear upon the top of the mandrel at its ends projecting beyond the ends of the skelp, the plunger thus exerting its pressure upon the mandrel at two points, straddling the length of the skelp; 12, the shaft of the cam 5, and 13 mechanism, exemplifying in character, by means of which the ram 10, in its descent, causes the turning of the cam, so as to permit the dies to descend.

It is to be understood that with metals of sufficient softness the mandrel and the die-surfaces 3 will have cross-sectional forms corresponding with the finished tube, but that with harder metals liable to spring some after formation it may be desirable to so modify the cross-sectional form of dies and mandrel as to give to the tube, at the completion of the operation, such modification of form as will compensate for the springing of the metal.

In operation the skelp is to be laid upon the dies and the mandrel placed upon the skelp and in the guides, as seen in Fig. 2. The plunger now descends and engages the mandrel and pushes it down into the space between the dies, the skelp bending up into U form, as seen in Fig. 3. In this operation the metal of the skelp has been forcibly compressed between the mandrel and the edges 4 of the dies, the result being a drawing operation on the metal, giving it a permanent set where bent upon the mandrel. While this operation has been going on the dies have been supported in their open position by cam 5. At this stage of the action cam 5 turns down out of the way and the plunger forces the mandrel and skelp and dies to their downward position, as seen in Fig. 4, the action of

the dies being to compress the skelp entirely around the mandrel, thus completing the formation of the tube. The plunger now rises to its original upper position, cam 5 returning to its active position and raising the dies and leaving between them the mandrel and tube, which is to be removed and the entire operation repeated.

I claim as my invention—

1. In a tube-machine, the combination, substantially as set forth, of a pair of longitudinally-grooved separate dies having aggressive margins, a loose mandrel free from attachment to its supporting and guiding and forcing mechanism and having a length greater than said dies and adapted to be supported solely by a skelp resting upon said dies, guides for said mandrel, and mechanism for forcing said mandrel betwen the dies and for forcing the dies toward each other upon the mandrel.

2. In a tube-machine, the combination, substantially as set forth, of a bed-plate, a pair of dies pivoted thereto at their outer edges and having recesses with aggressive margins at their inner edges, a removable support under the inner edges of said dies and adapted to hold the dies up with said margins separated, a mandrel adapted to enter between said margins, guides for the mandrel, and means for forcing said mandrel downwardly.

3. In a tube-machine, the combination, substantially as set forth, of a bed-plate, a pair of dies having their outer edges pivoted to said bed-plate and having their inner edges longitudinally grooved and provided with aggressive margins, a cam under the inner edges of said dies and adapted to support them with said margins separated, a mandrel lying parallel with and adapted to enter between said margins, guides for the mandrel, a plunger adapted to engage the mandrel beyond the ends of the dies, and mechanism for moving said plunger and cam.

GEORGE W. PETERS.

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