(No Model.) 2 Sheets—Sheet 1.

W. AUSTIN.

MACHINE FOR MAKING SHEET METAL PIPE.

No. 262,723. Patented Aug. 15, 1882.

Fig. 1.

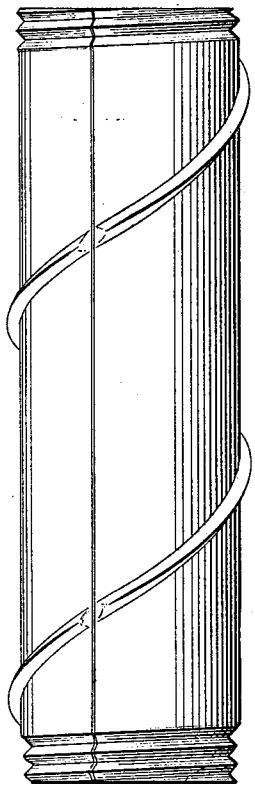
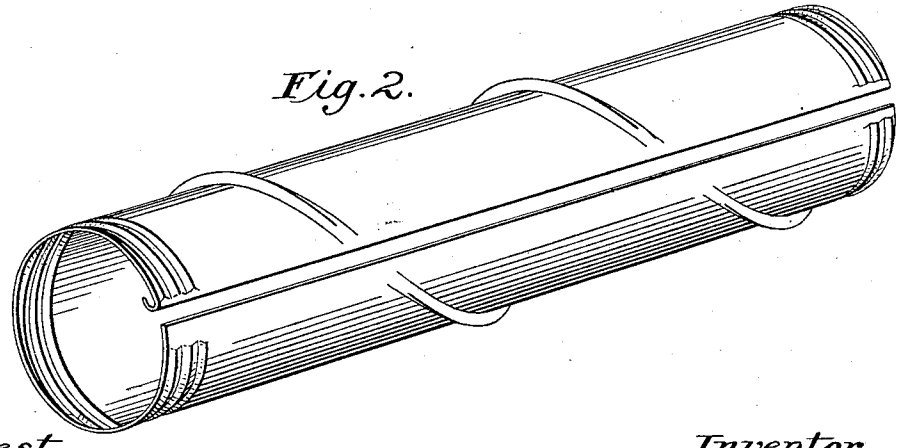


Fig. 2.



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(No Model.) 2 Sheets—Sheet 2.

W. AUSTIN.

MACHINE FOR MAKING SHEET METAL PIPE.

No. 262,723. Patented Aug. 15, 1882.

Fig. 3.

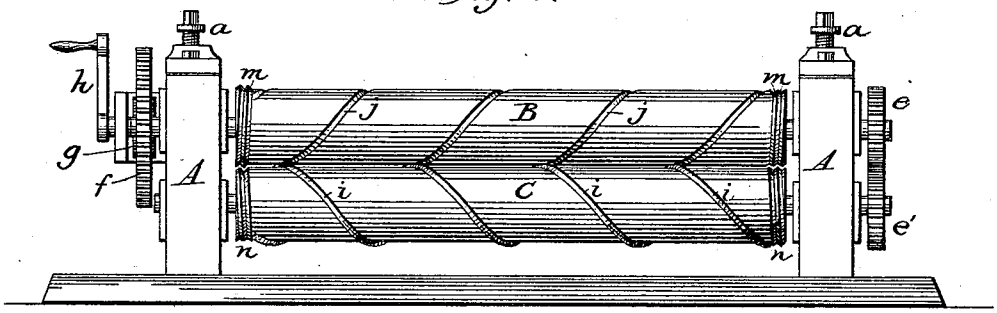


Fig. 4.

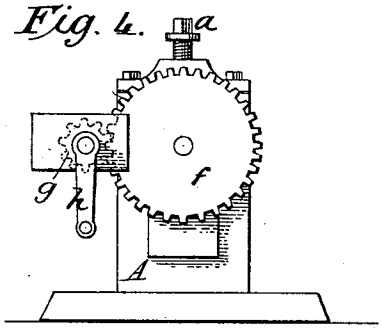


Fig. 5.

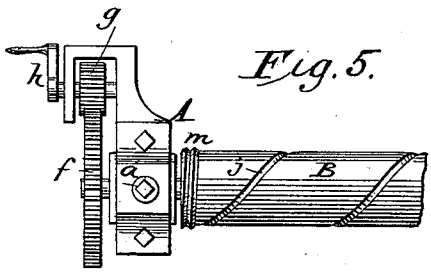
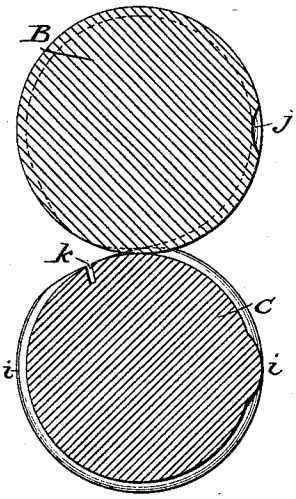


Fig. 6



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UNITED STATES PATENT OFFICE.

WILLIAM AUSTIN, OF PHILADELPHIA, PENNSYLVANIA.

MACHINE FOR MAKING SHEET-METAL PIPE.

SPECIFICATION forming part of Letters Patent No. 262,723, dated August 15, 1882.

Application filed April 8, 1882. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM AUSTIN, of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain Improvements in Machines for Making Sheet-Metal Pipe, of which the following is a specification.

The present invention relates to a machine of peculiar construction designed particularly for the manufacture of the spirally-ribbed metal pipe for which Letters Patent of the United States were granted to me on the 14th day of February, 1882, No. 253,493, each pipe-section consisting, as represented in the patent, of a sheet of metal bent into a cylindrical form, seamed together along its edges, and provided its entire length with a spiral rib or ribs formed by pressing up the metal, the ribs forming narrow lines in the otherwise smooth cylindrical surface. In the formation of this peculiar pipe it is necessary, to secure practically good results, that the ribs shall be formed in the sheet metal at the same time that the metal is being bent into a cylindrical form. To prevent the buckling, crimping, and bending of the metal, it has been found necessary that the sheet shall be subjected to a considerable pressure while being bent into a tubular form and ribbed, and that it shall be held and bent with great firmness, as otherwise the blank will be irregular in form and imperfect in its surface. It is also desirable that the edges of the ribbed and bent sheet or blank shall be left plain or smooth, in order that they may be readily seamed together or otherwise united to complete the pipe.

With these ends in view the invention consists essentially of two co-operating rolls having their otherwise smooth surfaces provided respectively with a narrow spiral rib and a narrow spiral groove to receive said rib, one roll being also provided with a groove to receive and hold the edge of the sheet for the double purpose of bending the same around the roll and preventing the sheet from being displaced by the action of the ribs and grooves. To preserve the straight or flattened edges of the sheet, the ribbed roll has the ends of the ribs cut away, and the companion roll has its surface adapted to conform closely thereto.

I am aware that short rolls having screw-threads in their peripheries have been used for producing screw-threads on the extreme ends of sheet-metal pipe.

I am also aware that straight sheets of metal, designed for cornices and similar ornamental articles, have been provided with ornamental designs by passing them between rolls having corresponding designs thereon; but I believe myself to be the first to construct and combine the members of a machine as hereinafter described, and the first to produce an organized machine capable of manufacturing the pipe represented in my patent.

The invention also consists in certain minor features, which will be hereinafter described.

Referring to the accompanying drawings, Figure 1 is a side elevation of a section of my improved pipe. Fig. 2 is a perspective view of the blank as formed by the present machine; Fig. 3, a side elevation of the machine. Fig. 4 is an end elevation of the same. Fig. 5 is a top plan view of one end of the same. Fig. 6 is a vertical cross-section through the two rolls.

Referring to the drawings, A A represent upright rigid standards, containing boxes or bearings, which receive the journals of two horizontal rolls, B C, one mounted above the other. The respective rolls are provided at one end with pinions *e* and *e'*, gearing into each other, and at the opposite end of the machine the upper roll is provided with a gear-wheel, *f*, actuated by a pinion, *g*, which latter is provided with a hand-crank, *h*, a pulley, or equivalent device, through which power may be applied to drive the machine. Set-screws *a*, seated in the top of the standards, serve as a means of adjusting the upper roll vertically as may be required. The roll C is provided, as shown, with a raised spiral rib, *i*, encircling the same from end to end, while the roll B is provided with a corresponding groove, *j*, into which the rib *i* extends, as shown in the drawings, the arrangement being such that as the rolls revolve the rib of one follows in the groove of the other, the effect of which is to produce in a sheet of metal which may be passed between them a series of curved or oblique ribs in such position that when the sheet is coiled into the tubular form and its edges united the several rib-sections will form a continuous spiral rib around the pipe.

In order that the rolls may bend the blank into the tubular form at the same time that the spiral ribs are formed therein, the lower roll is provided, as shown in Fig. 7, with a longitudinal groove, *k*, into which the edge of each blank is inserted before commencing the operation. The edge of the sheet being inserted into the groove, the rotation of the rolls first bends the edge forward at an angle with the sheet, after which the sheet, having its edge retained in the groove, is drawn between the rolls and wound or coiled closely around the lower roll, from which it is removed by springing its edges apart. Upon being removed the sheet presents the appearance represented in Fig. 2.

Inasmuch as it is desirable that the two edges of the sheet to be joined shall be flat and straight, to facilitate the seaming of them together, I prefer to cut away or flatten down the ribs of the roll adjacent to the groove *k*, and to make the surface of the opposite roll of such form as to conform closely to the flattened surfaces. Under this construction of the rolls the oblique ribs are caused to vanish or merge gradually into the sheet of the blank, near each edge of the latter, leaving the edges of the blank flat and plain, so that they may be united without difficulty.

For the purpose of forming threads upon the ends of the pipe, to unite the sections with each other, the rolls are provided, as shown, with suitable male and female threads, *m* and *n*, formed upon their ends. It is desirable, in order to facilitate the connection of the threaded ends of the pipe-sections, to contract each section slightly at one end in order that it may readily enter the end of the next section. This formation of the pipe I secure by making one of the threaded ends of the roll C of less diameter than the opposite end, and in giving to the adjacent end of the roll B a corresponding enlargement. This construction causes the blank to be reduced at one end.

While it is preferred to retain the details of construction represented in the drawings, it is manifest that they may be modified as desired, provided no departure is made from the essential features.

Instead of constructing the rolls to give the pipe a single continuous rib, they may be provided with two or more ribs and grooves in order to produce a number of ribs upon the pipe; and, if desired, the ribs and grooves, instead of being made continuous, may be broken at suitable intervals.

While the rolls represented in the drawings are adapted to force the ribs outward upon the blank, it is manifest that they may be adapted to force the ribs inward toward the center of the pipe by simply forming the slot *k* in the grooved instead of in the ribbed roll.

While it is preferred to retain the groove *k* as a means of securing the blank to the roll, set-screws or clamping or other devices may be employed as a means of temporarily attaching the end of the sheet to the roll.

Having thus described my invention, what I claim is—

1. In a machine for forming ribbed sheet-metal pipe, the combination of two co-operating rolls with cylindrical surfaces, provided respectively with a narrow spiral rib and a corresponding spiral groove extending from end to end thereon, one of said rolls being also provided with means, substantially as described, for retaining the edge of the blank sheet therein, whereby the machine is adapted to perform simultaneously the operations of bending the blank into a cylindrical form and of raising a narrow spiral rib therein.

2. In a machine for forming ribbed sheet-metal pipe, the combination of the cylindrical roll C, having a narrow spiral rib thereon, the smooth roll B, having a corresponding groove therein, each roll being also provided at both ends with screw-threads, as described and shown, whereby the rolls are adapted to produce a blank having spiral strengthening-ribs, and also screw-threads in the ends.

3. The spirally-ribbed roll C, having the groove *k*, and the flattened ends of the ribs adjacent to said groove, in combination with the spirally-grooved roll B, having its surface adapted to conform to the flattened surface of the first roll, as described and shown, whereby the blank is provided with oblique ribs merging into flattened edges.

WILLIAM AUSTIN.

Witnesses:
B. P. OBDYKE,
H. CLARK GARO,
E. A. GAFFNEY.