3 Sheets—Sheet 1.

C. A. SCOTT & M. SCHULTZ.

BENDING-MACHINE.

No. 180,436. Patented Aug. 1, 1876.

Fig 1.

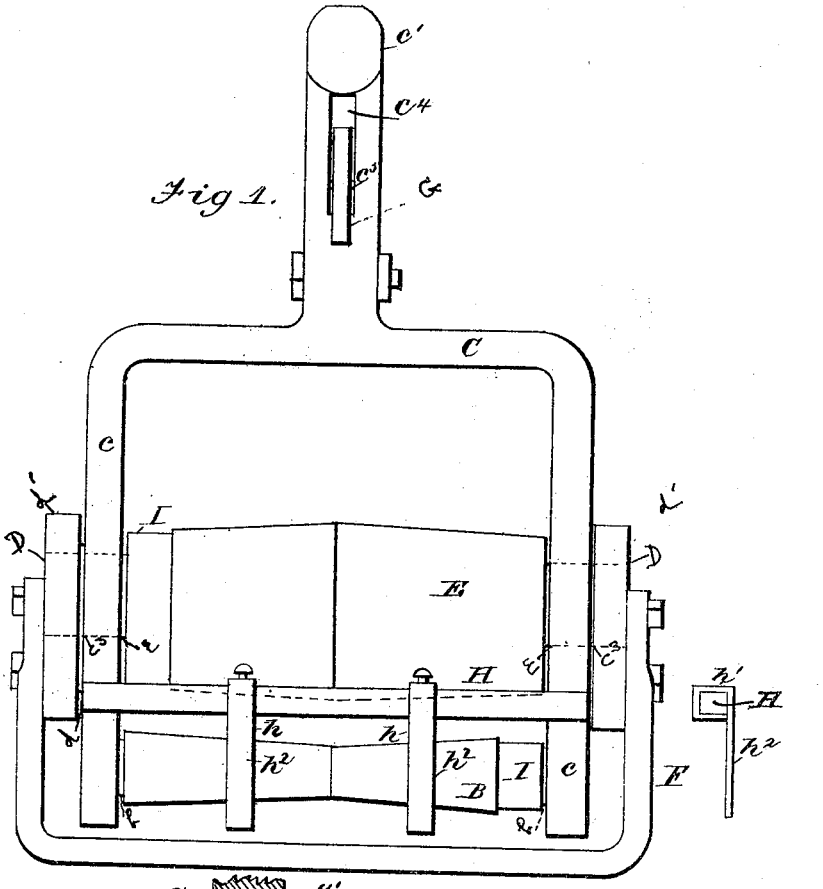


Fig 2.

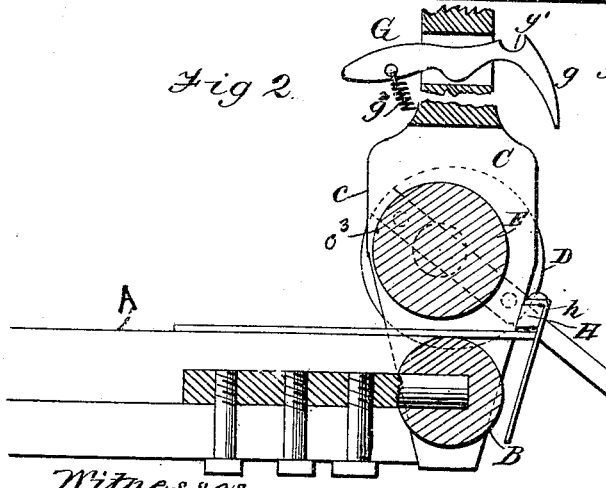
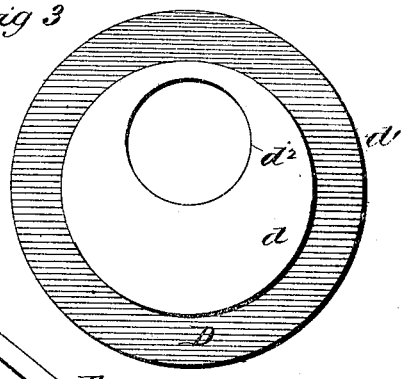


Fig 3



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3 Sheets—Sheet 2.

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Fig 4

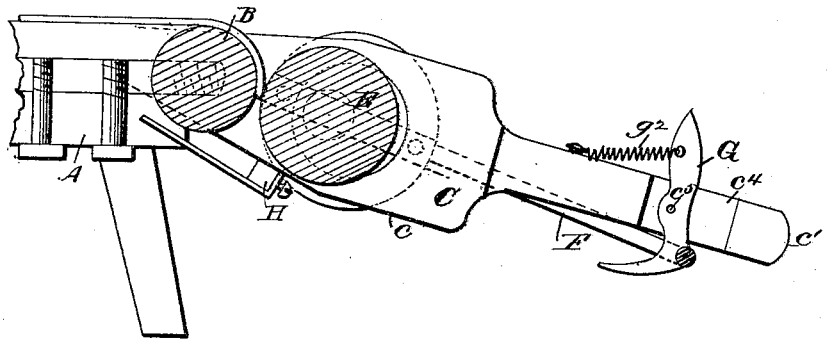


Fig 5

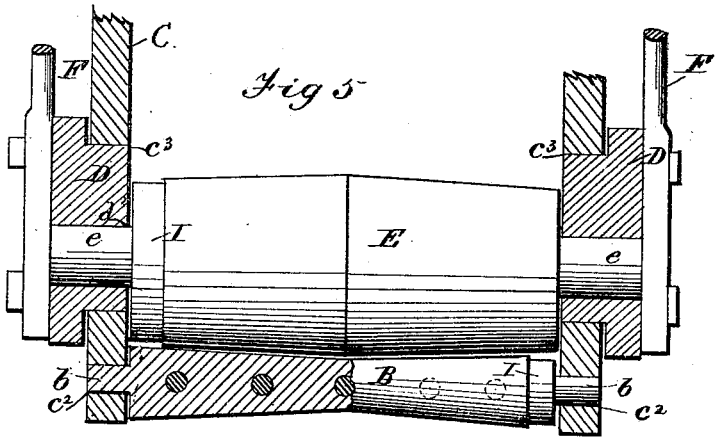
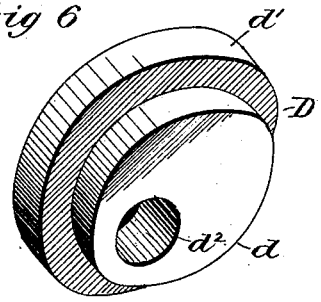


Fig 6



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3 Sheets—Sheet 3.

C. A. SCOTT & M. SCHULTZ.

BENDING-MACHINE.

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Fig 6

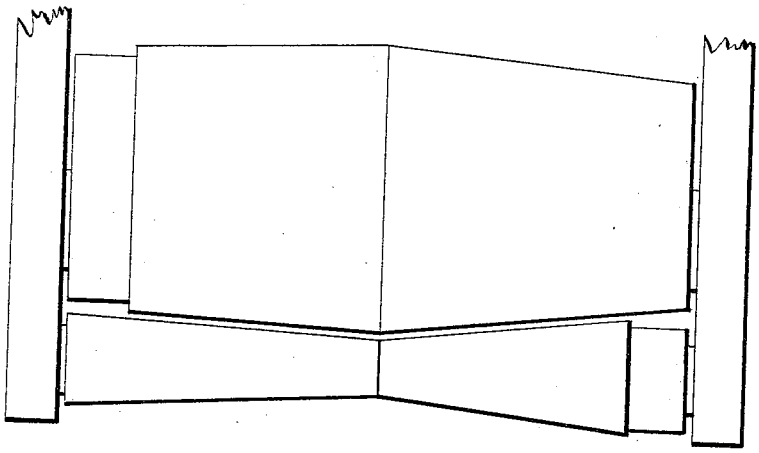


Fig 7.

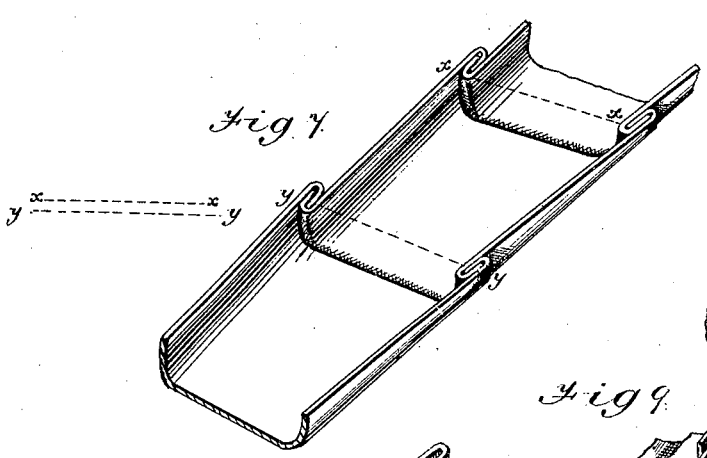


Fig 9.

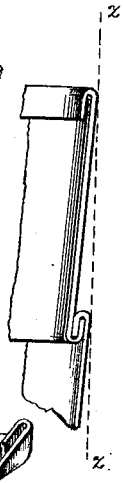
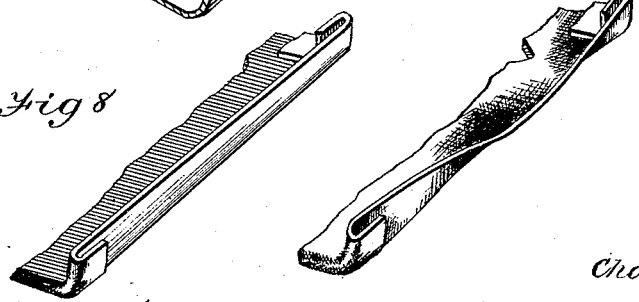


Fig 8



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UNITED STATES PATENT OFFICE.

CHARLES A. SCOTT AND MICHAEL SCHULTZ, OF CINCINNATI, OHIO; SAID SCHULTZ ASSIGNOR TO SAID SCOTT.

IMPROVEMENT IN BENDING-MACHINES.

Specification forming part of Letters Patent No. **180,436**, dated August 1, 1876; application filed August 17, 1874.

To all whom it may concern:

Be it known that we, CHARLES A. SCOTT and MICHAEL SCHULTZ, of Cincinnati, Ohio, have invented an Improved Sheet-Metal-Bending Machine, of which the following is a specification:

This invention is a special machine, adapted to bend the roofing-plates covered by patent of C. A. Scott, January 20, 1784, 146,555; and consists, mainly, in certain details of construction, which will be fully described hereinafter.

In the drawings, Figure 1 represents a front elevation of our improved machine; Figs. 2 and 4, vertical sectional elevations of the same; Figs. 3 and 6, Sheets 1 and 2, views of the eccentric sleeve or collar detached; Fig. 5, a front elevation of the bending-cylinders detached; Fig. 6, an exaggerated view representing the tapering form of the lower bending-surface; Fig. 7, a perspective view of a series of plates when bent and united to cover the roof; Fig. 8, a perspective view of the edge of a single plate properly bent; and Fig. 9, a similar sheet, showing a plate improperly bent.

To enable others skilled in the art to make and use our invention, we will now proceed to describe fully its construction and manner of operation.

A represents any suitable frame-work or table adapted to strongly support the machine proper which is attached thereto. B represents the cylinder forming the lower bending-surface, which is rigidly secured to one end of the table, in such position that its upper surface lies in the same plane as the table-surface, as shown in Figs. 2 and 4. That portion of the cylinder upon which the metal rests when bent is given, of course, the form it is desired to produce in the metal acted upon, this consisting in this case of the section of a cylinder centrally depressed, as shown in Figs. 1 and 5. The bending-surface of this cylinder, also, it will be observed, in addition to its central depression, is tapering from one end to the other, as shown in Fig. 6, the object of which peculiarities of construction will be described hereinafter. *b b* represent journals formed on the ends of the fixed cylinder B, as shown in Fig. 5. C represents a frame consisting of the standards or arms *c c*, separated below to hold the ends of the upper bending-cylinder, but bent together and united above to form a common handle, c^1, as shown in Fig. 1. c^2 c^2, Fig. 5, represent journal-openings at the ends of the arms *c c*, which are adapted to inclose the journals *b b* of the fixed cylinder B. c^3 c^3 represent journal-openings, in which are held the eccentric collars of the upper cylinder. c^4 represents a recess in the handle, and c^5 a transverse shaft or pin adapted to hold the handle of the catch-lever, as will be hereinafter described. D D, Figs. 3, 5, and 6, represent eccentric collars, consisting of an inner portion, *d*, adapted to turn in the journal-openings c^3, and an outer portion, d^1, of enlarged area, to which the handle F, for actuating the eccentric, is attached. d^2 represents the journal-bearing for one end of the upper cylinder, this being located upon one side of the center of the collar, as shown. E represents the cylinder which forms the upper bending-surface, which is provided with a convex surface corresponding with the depressed portion of the lower cylinder, and has also journals *e e*, adapted to rest in the corresponding bearings of the eccentric collar, as shown. F represents a bar properly bent to form a convenient handle, as shown, which is fastened at its ends to the outer portion d^1 of the collar. G represents a lever, pivoted in the recess of the handle, which is provided at one end with an inclined face, *g*, and a catch, g^1, adapted to hold the bar F, as shown. g^2 represents a spring of suitable construction secured at one end to the frame C, and at the other to the handle of the catch-lever, by means of which the latter is held in proper position to catch the bar when it is brought into contact with it. H represents a transverse bar, united at its ends to the edges of the standards of the frame C, in front of the opening between the bending-cylinders, as shown. *h h* represent guide-stops, consisting of square sockets h^1 h^1, adapted to slide freely upon the bar, and depending arm h^2 h^2, adapted to arrest the movement of the plate inserted between the rollers, and hold it in proper position to be acted

on by them. I I represent recesses or depressions in the bending-cylinders, by means of which they are adapted to act upon the plates, which have already a folded edge when presented to this machine for action.

The operation of our machine is as follows: The plates, having been previously bent upon the edges in another machine, are successively presented to this machine for action. A plate having been laid upon the table, one end is inserted between the opening between the cylinders, which have been separated to permit this operation, and pushed forward until its forward edge comes in contact with the guide-stops, as shown in Fig. 2. The handle F is then raised until it is caught by the catch-lever, by which means the eccentric collars are partially revolved, and the upper cylinder consequently brought down upon the lower. The frame C is then brought forward, as shown in Fig. 4, by means of which action the upper cylinder is caused to pass over the lower, and by its pressure the intermediate metal plate is caused to assume the form of the bending-surfaces. The bar F, being disengaged from its catch, is left in its depressed position, while the frame C is raised for the purpose of elevating the upper bending-surface, in order that the plate may be removed from the machine. The plate may be held from moving, when acted upon, by a suitable clamp upon the table.

The lower bending-surface is made tapering from end to end, as shown in Fig. 6, and the upper surface caused to conform thereto, in order that the plate, when acted upon, may be bent more at one end than the other, so that when a series is put together, as shown in Fig. 7, the adjacent ends will interlock readily, the narrow end of one fitting accurately the wide end of the other, as shown.

This will be understood by inspecting Fig. 7, in which the lines *x x* and *y y* indicate the relative width of the upper and lower ends of the plate, the lower end of the plate, it being observed, being less in width just the distance necessary to enable it to fit within the bent sides of the upper end of the plate below it, the sides of each plate being bent on a taper for the purpose, as indicated in the drawing by the lines *z z*. The lower bending-surface is depressed, and the upper surface caused to conform thereto, in order that the sheet may be bent more in the middle than the ends, this excess of pressure in the center being necessary to cause the sheet to assume a uniform curve throughout its length, as shown in Fig. 8. The edges of the sheet, being double, retain their place when bent; but the central portion, being single, has a tendency to spring backward, as shown in Fig. 9, after the pressure has been removed, and hence the central portion requires an excess of pressure, as described.

Having thus fully described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. The combination of the fixed bending-cylinder and the movable bending-cylinder with the eccentric clamping mechanism, the movable cylinder, when actuated by the clamping mechanism, being adapted to pass over the fixed bending-surface, substantially as described.

2. The combination of the fixed and movable bending-cylinders with the frame C, eccentric collars D D, and bar F, as described.

3. The combination of the bar F and catch-lever G, as described.

4. The combination of the angular bar H with the adjustable stops, having the angular sockets to prevent revolution.

5. In combination with the fixed bending-surface B, having a depressed central portion and a recessed end, as described, a surface, E, having a corresponding projection, and also a recessed end, the construction being such that more pressure is given to the single thickness of plate acted upon than to the double portion, for the purpose of securing uniformity of curvature, as described.

6. The bending-surfaces provided with recesses, as and for the purposes described.

7. The tapering bending-surfaces, adapted to make the plates narrower at one end than the other, as described.

8. The bending-surfaces provided with the tapering surfaces, the depressed and projecting portion, and the recesses, as described.

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MICHAEL SCHULTZ.

Attest:
S. H. WHITMORE,
GEO. P. BROWN.