(No Model.) 4 Sheets—Sheet 1.

R. C. NUGENT.

Machine for Bending Sheet Metal Articles.

No. 242,838. **Patented June 14, 1881.**

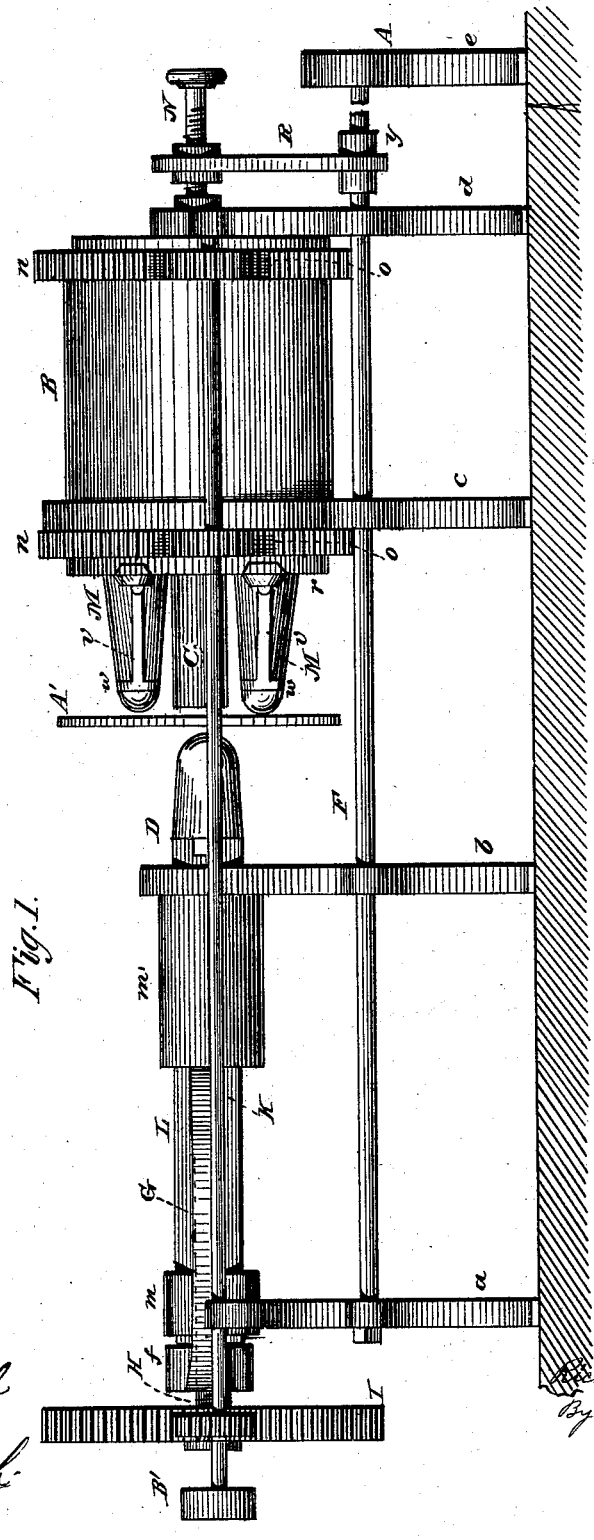

Fig. 1.

Witnesses
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P. C. Dieterich

Inventor
Richard C. Nugent.
By J. J. Johnston,
his Attorney

(No Model.) 4 Sheets—Sheet 2.

R. C. NUGENT.

Machine for Bending Sheet Metal Articles.

No. 242,838. **Patented June 14, 1881.**

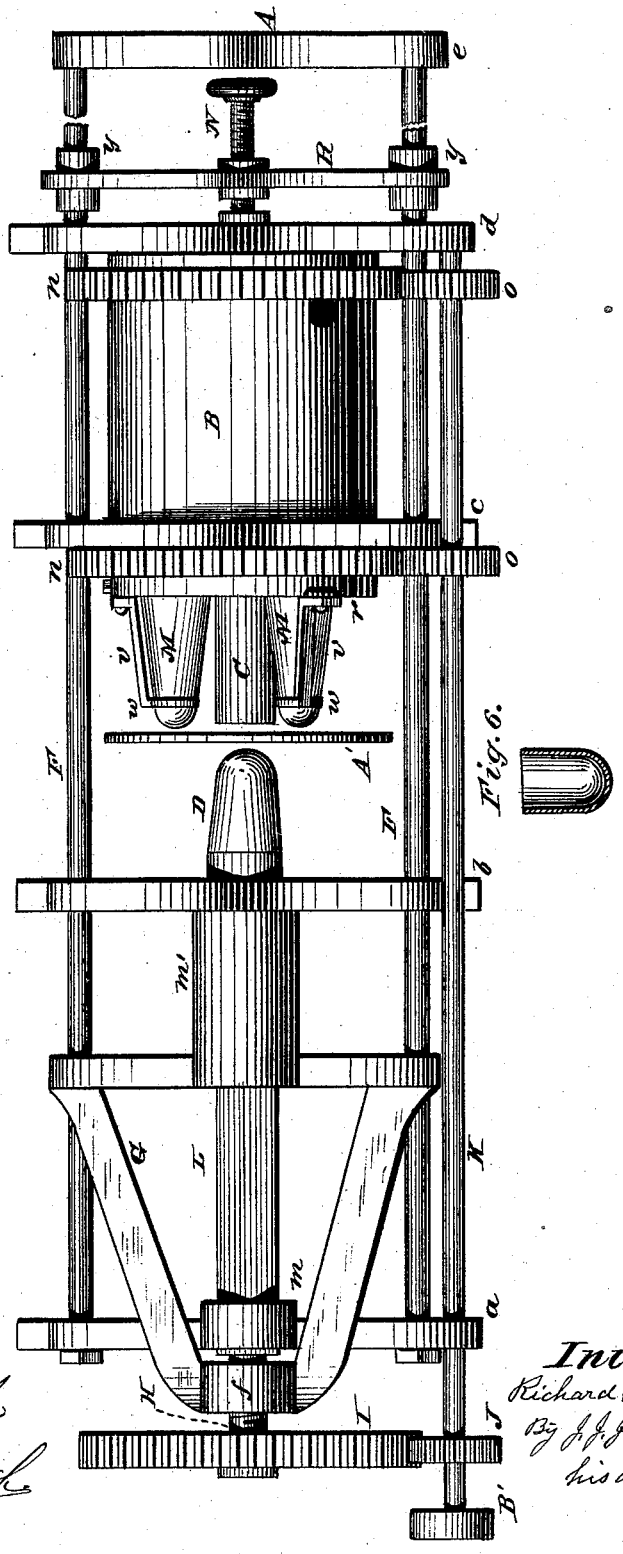

Fig. 2.

Fig. 6.

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(No Model.) 4 Sheets—Sheet 3.

R. C. NUGENT.

Machine for Bending Sheet Metal Articles.

No. 242,838. Patented June 14, 1881.

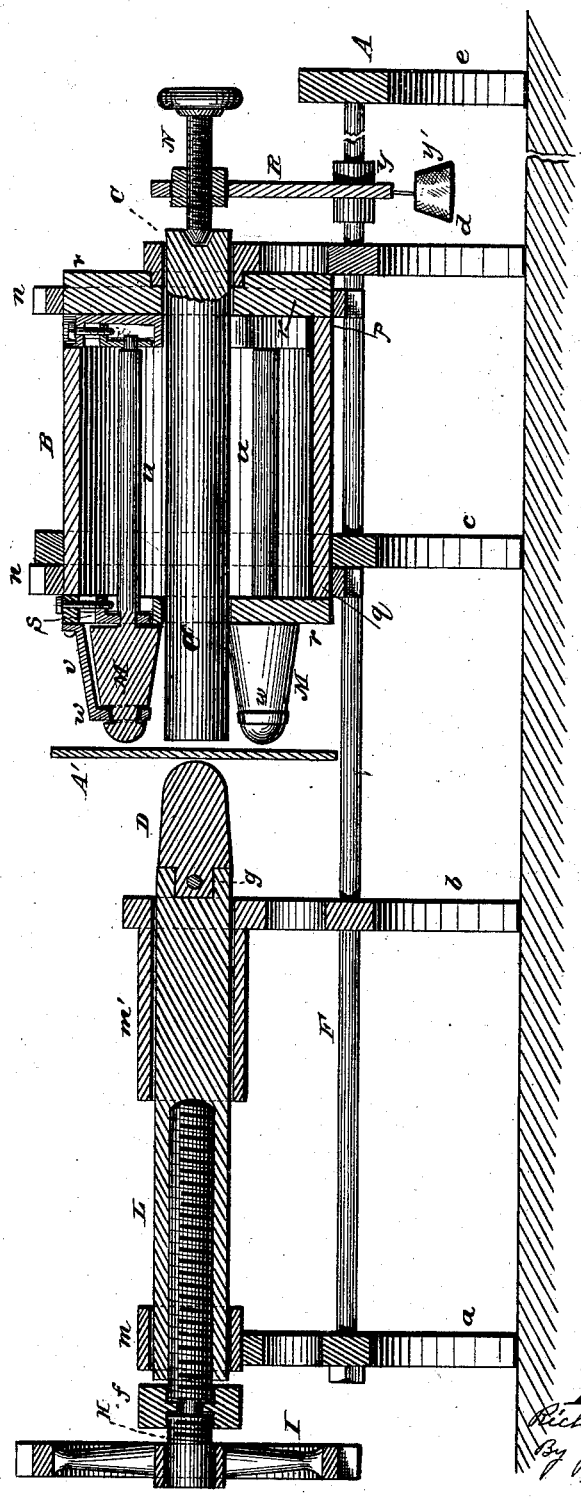

Fig. 3.

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(No Model.) 4 Sheets—Sheet 4.

R. C. NUGENT.

Machine for Bending Sheet Metal Articles.

No. 242,838. Patented June 14, 1881.

Fig. 4.

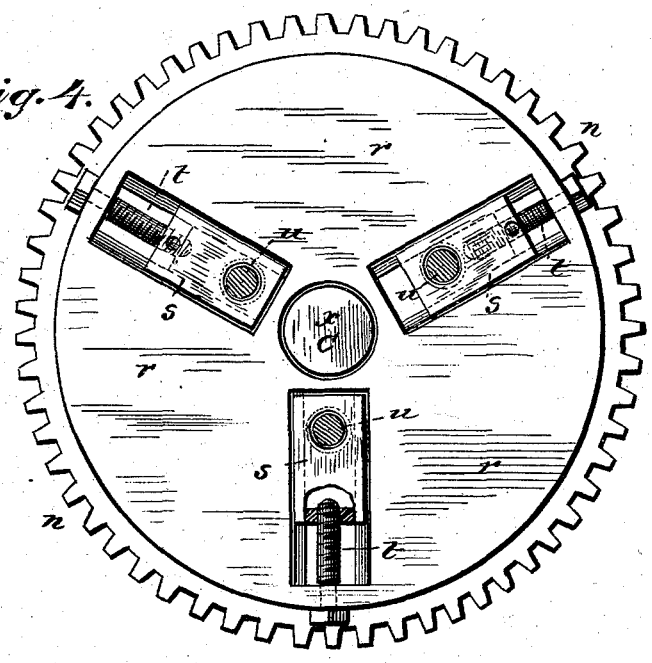
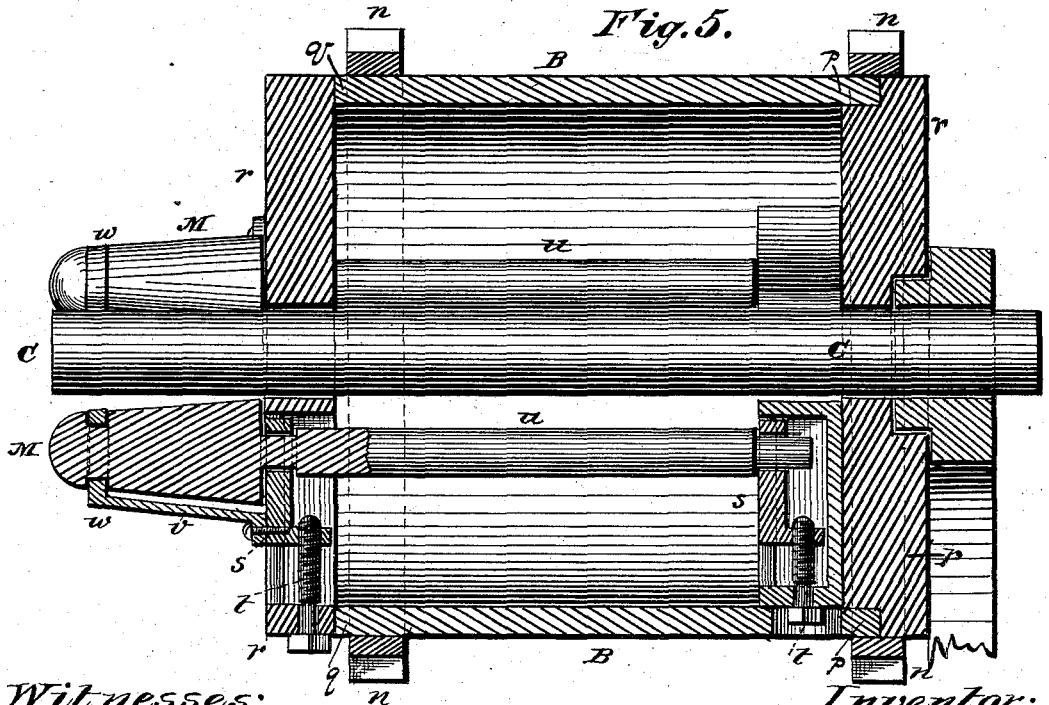


Fig. 5.



Witnesses:
Fred. G. Dieterich
P. C. Dieterich.

Inventor:
Richard C. Nugent,
By J. J. Johnston,
his Attorney.

UNITED STATES PATENT OFFICE.

RICHARD C. NUGENT, OF PITTSBURG, PENNSYLVANIA, ASSIGNOR OF ONE-HALF TO JOHN FARRELL, OF SAME PLACE.

MACHINE FOR BENDING SHEET-METAL ARTICLES.

SPECIFICATION forming part of Letters Patent No. 242,838, dated June 14, 1881.

Application filed February 12, 1881. (No model.)

To all whom it may concern:

Be it known that I, RICHARD C. NUGENT, of Pittsburg, in the county of Allegheny, State of Pennsylvania, have invented a new and useful Improvement in Machines for Bending Sheet-Metal Articles; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings and to the letters of reference marked thereon.

My invention relates to an improvement in machines for bending sheet-metal articles; and it consists in the combination and arrangement of an adjustable mandrel, adjustable cuneiform rolls, and a traveling form, arranged and operating with relation to each other, as will hereinafter more fully appear.

To enable others skilled in the art with which my invention is most nearly connected to make and use it, I will proceed to describe its construction and operation.

In the accompanying drawings, which form part of my specification, Figure 1 is a side elevation of my improvement in machine for bending sheet-metal articles. Fig. 2 is a top view or plan of the same. Fig. 3 is a vertical longitudinal section of the same. Figs. 4 and 5 are detail views enlarged.

In the accompanying drawings similar letters of reference refer to the same parts in the several figures of the said drawings.

A represents the frame of the machine, which consists of uprights *a*, *b*, *c*, *d*, and *e*, in which are bearings of the cylinder B, adjustable mandrel C, and moving form D. The uprights *a*, *b*, *c*, *d*, and *e* are held in a vertical and fixed position with relation to each other by the bars F, the uprights *a* and *b* at their upper end being coupled together and braced by means of the part G, in which, at *f*, revolves the feed-screw H, on the outer end of which is a gear-wheel, I, which meshes into a pinion, J, on the driving-shaft K, which has its bearings in the uprights *a* and *d*, as shown in Figs. 1 and 2. The feed-screw H is fitted in a mandrel, L, furnished with screw-threads adapted to the screw-threads of said feed-screw. On the inner end of the mandrel L is fitted the form D, as shown in Fig. 3, and is held in place by means of a pin, *g*. The mandrel is moved longitudinally in bearings *m m'* on the upper ends of the uprights *a b*, and is so constructed that it will not rotate in said bearings *m m'*, which result may be obtained by means of a "feather" on the mandrel fitted to grooves in the bearings *m m'*, or by having said mandrel square when viewed in cross-section and the bearings fitted to the form of said mandrel. The cylinder B has its bearings in the uprights *c* and *d*, and at each end is furnished with gear-teeth *n n*, which mesh into pinions *o o* on the driving-shaft K.

To the inner side of the end *p* and to the outer side of the end *q* of the cylinder B are secured disks *r r*, furnished with dovetail slides *s*, which are operated by adjusting-screws *t*, the slides, screws, and disk being the same in construction and operation as that of the ordinary centering face-plate of a turning-lathe, the construction and operation of which are well understood by the skillful mechanic.

The axes *u* of the cuneiform rolls M have their bearings in the slides *s* of the disks *r*. By this arrangement of the axes of the cuneiform rolls M in the slides *s* said rolls can be moved out from and toward the center of the disks *r r*, thereby adapting said rolls to the bending of articles of different diameters. The outer ends of the cuneiform rolls M are supported by arms *v*, which are secured to the slides *s*. The end *w* of said arms is fitted in a groove in the cuneiform rolls, as shown in Figs. 3 and 5. In the center of the disks *r* is an opening, *x*, through which passes the adjustable mandrel C, which is used for pressing the sheet metal firmly against the form D, through the medium of screw N, which operates in an adjustable head-piece, R, which has its bearings *y* on the bars F, which said head-piece moves as the form D moves toward it. The traction of the bearings *y* of the head-piece R on the bars F may be increased by a weight suspended to said head-piece, as indicated at *y'*, Fig. 3, or by set-screws in the bearings *y*.

The construction and arrangement of the several parts of the machine hereinbefore described will be readily understood by the skillful mechanic from the foregoing description,

reference being had to the accompanying drawings. I will, therefore, proceed to describe its operation.

The operator, if he desires to form a copper kettle, places on the mandrel L a form, D, corresponding in form and size to the interior of the kettle desired. He then takes a sheet of copper of the thickness required for the kettle and cuts from said sheet a circular disk of suitable diameter, which is placed in the machine between the form D and the end of the mandrel C, as shown at A′ in Fig. 1, which is forced against the form D by the screw N. Power being applied to the pulley B′, it will revolve the driving-shaft K, which will cause the pinions *o o* to revolve the cylinder B, and the pinion J will revolve the wheel I, which will turn the feed-screw H, which will feed forward the mandrel L and its form D. The latter, pressing against the center of the plate of sheet-copper A′, will force it against the ends of the cuneiform rollers, which are distant from the center of the plate A′ and are revolved by their impinging against plate A′, and by the revolving of the cylinder B the action of said rolls, combined with the forward feed and pressure of the form D, will cause the plate A′ to bend to the contour of said form, thereby forming the kettle, as shown in Fig. 6, which is subsequently furnished with ring and bail in the usual manner. The pressure of the plate A′ against the end of the mandrel C which presses against the end of the screw N will cause the said mandrel, screw, and head to move back as the form D moves forward between the cuneiform rolls.

Having thus described my improvement, what I claim as of my invention is—

1. In a machine for bending sheet-metal articles, a form adapted to move longitudinally in the plane of its axis, in combination with conical rolls the axes of which revolve in an orbit the diameter of which is greater than the diameter of said form, suitable means for operating these parts, and a mandrel around which said rolls revolve, substantially as herein described.

2. In a machine for bending sheet-metal articles, a form adapted to move longitudinally in the plane of its axis, in combination with conical rolls the axes of which are adapted to move toward and from a common center and revolve in an orbit the diameter of which is greater than the diameter of said form, suitable means for operating these parts, and a mandrel around which said rolls revolve, substantially as herein described.

3. The combination of the rolls M, having adjustable bearings S, cylinder B, form D, and their operating mechanism, substantially as herein described, and for the purpose set forth.

4. The combination of the rolls M, having adjustable bearings S, cylinder B, mandrel C, form D, and their operating mechanism, substantially as herein described, and for the purpose set forth.

R. C. NUGENT.

Witnesses:
A. C. JOHNSTON,
J. J. JOHNSTON.