(No Model.)

G. R. EVERSON.

SHEET METAL BENDING MACHINE.

No. 383,391. Patented May 22, 1888.

FIG. 1.

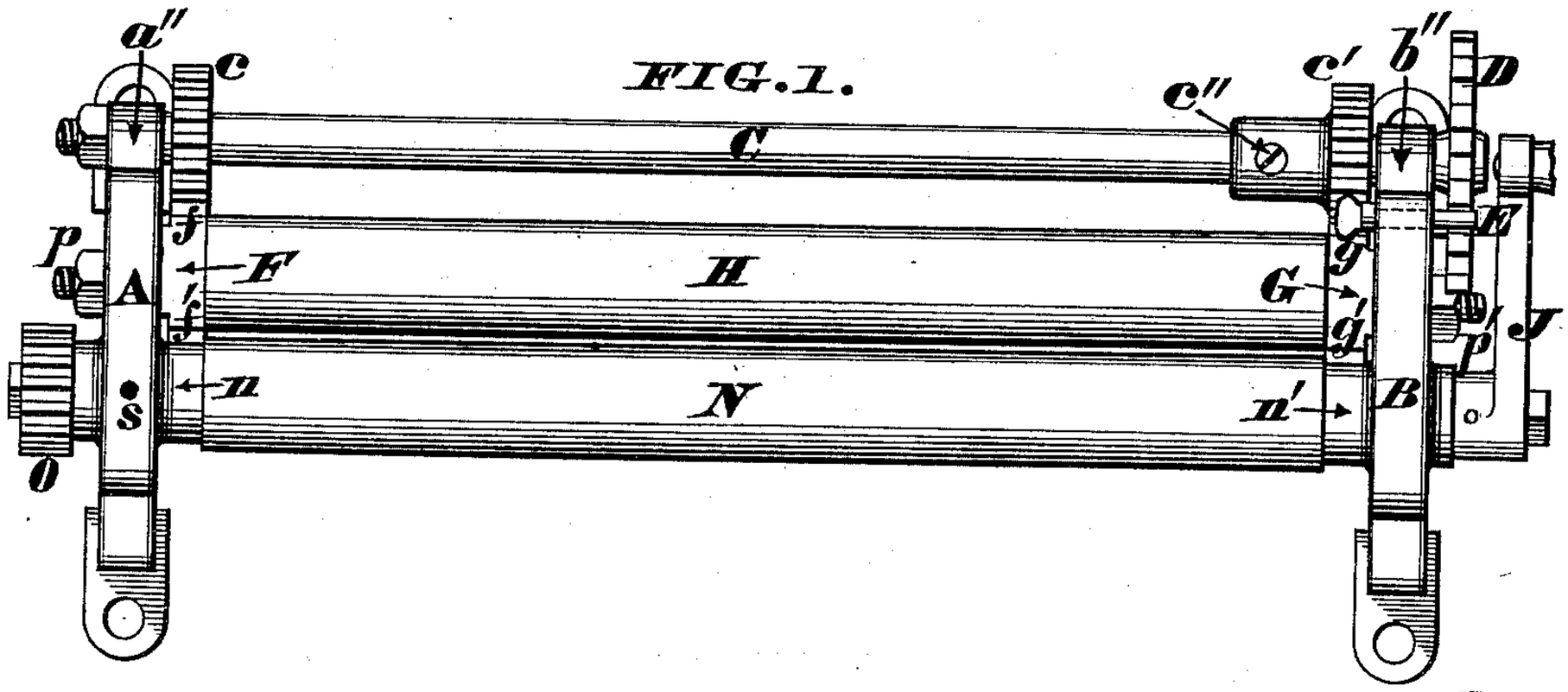


FIG. 2.

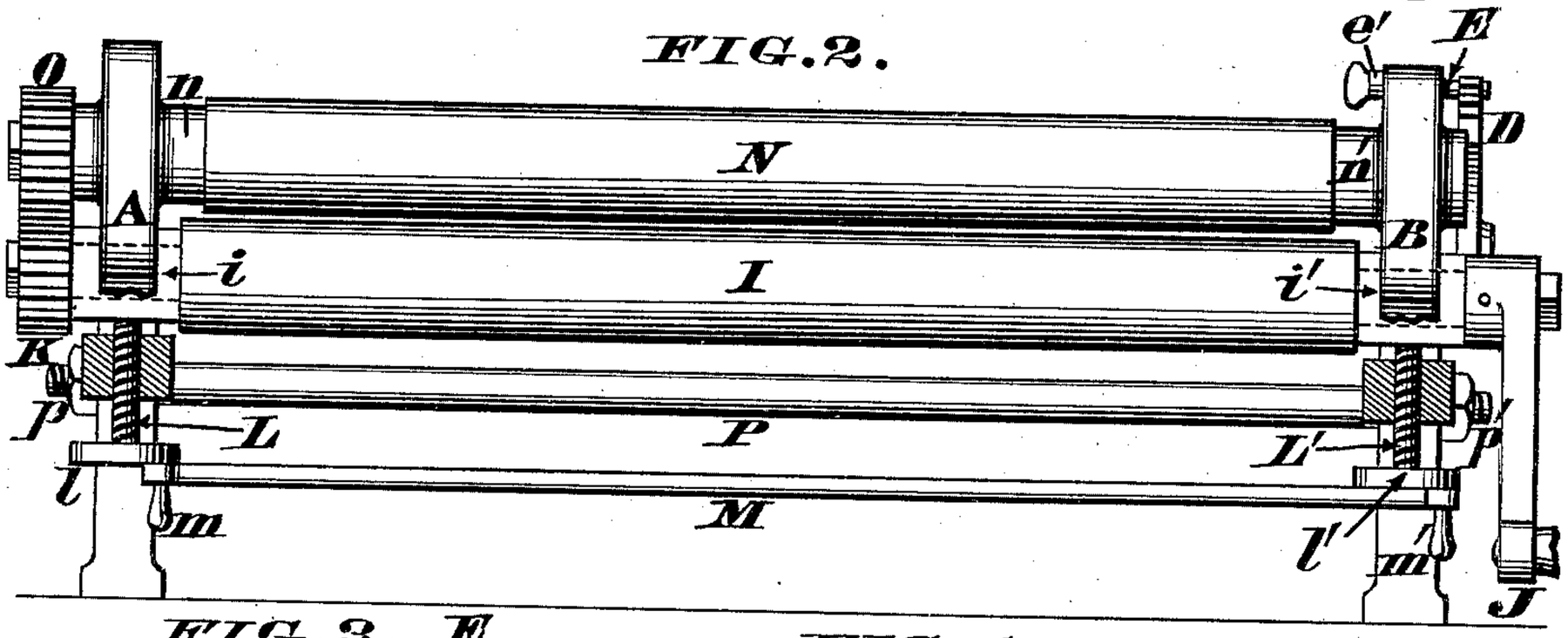


FIG. 3.

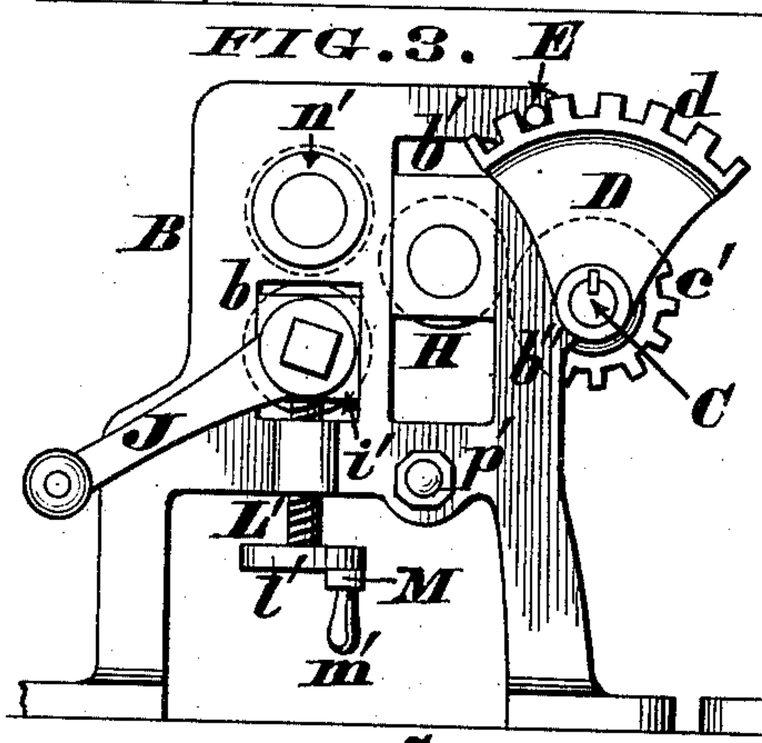


FIG. 4.

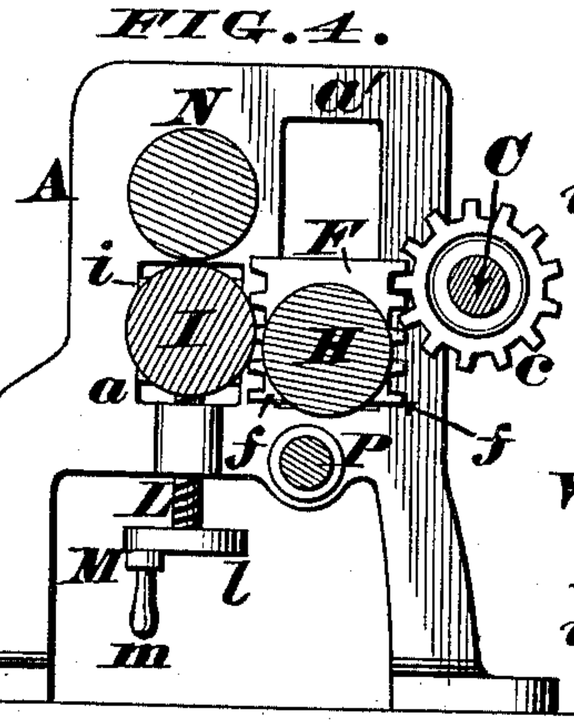


FIG. 7.

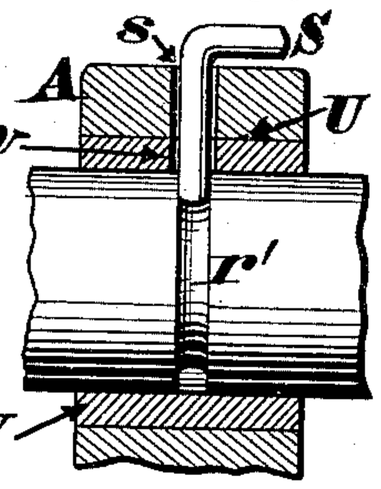


FIG. 8.

FIG. 6.

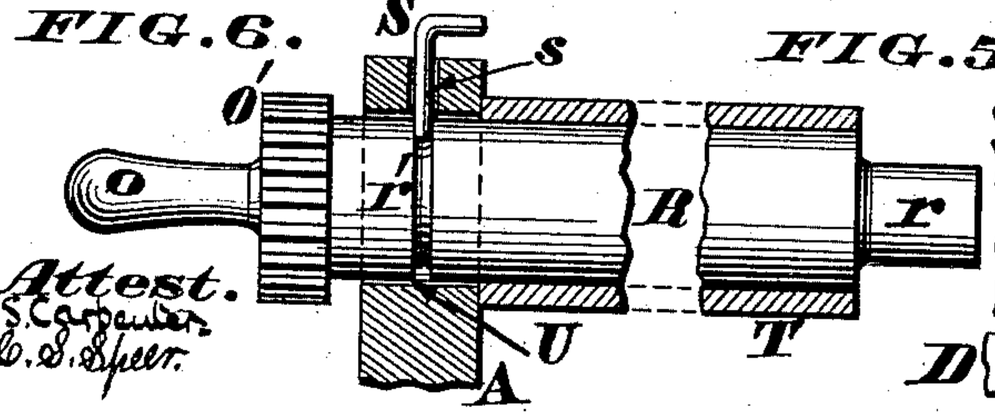
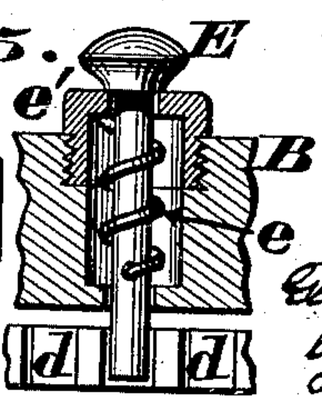


FIG. 5.



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UNITED STATES PATENT OFFICE.

GEORGE R. EVERSON, OF CINCINNATI, OHIO, ASSIGNOR OF ONE-HALF TO WILLIAM L. ROCKENFIELD, OF SAME PLACE.

SHEET-METAL-BENDING MACHINE.

SPECIFICATION forming part of Letters Patent No. 383,391, dated May 22, 1888.

Application filed March 19, 1888. Serial No. 267,728. (No model.)

To all whom it may concern:

Be it known that I, GEORGE R. EVERSON, a citizen of the United States of America, residing at Cincinnati, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Sheet-Metal-Bending Machines, of which the following is a specification, reference being had therein to the accompanying drawings.

My invention comprises various improvements in those machines used for bending sheet metal, the details of said improvements and the advantages resulting from their employment being hereinafter more fully described.

In the annexed drawings, Figure 1 is a plan of a sheet-metal-bending machine embodying my improvements. Fig. 2 is a rear elevation of the same, the lower portion of the standards being broken away and sectioned. Fig. 3 is an end elevation of the machine, the bending-roll being elevated. Fig. 4 is a transverse section of the machine, said roll being lowered. Fig. 5 is an enlarged section of the stop-pin that locks the pinion-shaft of the machine. Figs. 6, 7, and 8 show modifications of the invention.

A B represent the standards or end plates of the machine, said standards being slotted vertically at *a a' b b'*, and having in front lugs *a'' b''*, which lugs afford journal-bearings for a shaft, C, that carries a pair of pinions, *c c'*, the latter being secured to said shaft by a set-screw, *c''*, or equivalent device. Furthermore, this shaft has a gear wheel or segment, D, secured to it, said segment being provided with notches or sockets *d* to admit the end of a stop-pin or lock, E, which pin is fitted horizontally within the standard B, and is shot by a spring, *e*, as seen in Fig. 5.

e' is a cap that retains the stop-pin in place.

The pinions *c c'* gear with racks *f g* of the brasses or boxes F G of the front or bending roll, H, which boxes traverse the slots *a' b'* of the standards, said racks being preferably duplicated, as at *f' g'*, so as to readily compensate for any wear of the machine. The rear slots, *a b*, are traversed by the brasses or boxes *i i'* of the lower roll, I, one end of the latter being provided with an operating-crank, J, while its opposite end has a gear-wheel, K, secured to it, the aforesaid boxes being supported upon screws L L', tapped in the standards A B. These screws have disks or cranks *l l'* fastened to their lower ends, which disks are united by a connecting-rod, M. *m m'* are handles which couple the ends of said rod to the disks *l l'*.

N is the upper or unadjustable roll, the journals of which occupy necks or bearings *n n'* of the standards. O is a gear-wheel secured to one end of this roll, said wheel being driven by the gear K of lower roll, I.

p p' are nuts secured to the ends of a tie-rod, P, that unites the standards of the machine.

The above describes a machine which has no provision for the bodily removal of the upper roll; but as such a removal is frequently necessary I prefer the modified construction seen in Fig. 6. Here the upper roll, R, has a journal, *r*, at one end and a circumferential groove, *r'*, near its opposite end, said groove being adapted to admit the end of a pin, S, which is inserted within a vertical hole, *s*, of the standard A. O' is the gear-wheel of this roll, and *o* is a pull or handle for the same. T is a tube bent around said roll.

U is a circular bore in the standard for the roll R to turn in; but in Fig. 7 the diameter of this bore is reduced by a bushing, V, having a hole, *v*, in it for the passage of the pin, which then enters the groove of the roll.

In Fig. 8 is seen a bushing, W, of thicker metal than the bushing V, but of the same external diameter. This bushing is pierced at *w* to admit the pin.

My machine is adjusted and operated in the following manner: For the simple purpose of straightening a piece of sheet metal the stop-pin E is first retracted to permit the shaft C being turned until the roll H is lowered to the position seen in Fig. 4. Either of the handles *m* or *m'* is then grasped and the disks *l l'* are turned, thereby operating the screws L L' in such a manner as to lower the bearings *i i'* of the roll I. The plate is now inserted between the rolls I N and the screws are turned to raise said roll I, and thus bring the desired pressure to bear against the plate or sheet. Handle J is then turned to pass the sheet through the machine in the usual way, which sheet is thus

straightened, because the roll H is now so low as to be inoperative; but when a sheet is to be bent this roll is elevated and locked in position by engaging the stop-pin E with the appropriate notch or retainer *d* of segment D, as seen in Fig. 3, the distance to which said roll H is elevated being governed by the degree of curvature to be given to the sheet. To bend conical or tapering tubes the screw *c''* is unslackened and pinion *c'* is turned by hand, so as to cause a slight elevation of box G, and then said screw is tightened, which act raises the right end of said shaft somewhat above its left end. Consequently, when crank J is turned, the machine will bend the sheets on a taper, because the roll H is inclined instead of being parallel with the other rolls, I N. As this inclination is preserved by thus tightening the screw *c''*, it is evident the angle of the shaft remains the same, no matter whether said shaft is raised or lowered, which vertical adjustment is necessary to permit the bending of conical tubes of large or small diameter. It frequently happens that heavy sheet metal is so tightly bent around the upper roll as to necessitate the bodily removal of the latter before the tube can be detached therefrom, which detachment is readily effected by the arrangement of devices seen in Fig. 6. This illustration shows that after the tube T has been tightly bent around the upper roll, R, the pin S can be withdrawn from the hole *s*, after which act the handle *o* is grasped, and said roll is then pulled directly through the bearing U of standard A. Consequently this standard serves as an abutment which strips the tube from the roll when the latter is withdrawn; but if a tube of less diameter is to be bent a roll of the corresponding size must be used, in which event either of the reducing-bushings seen in Figs. 7 or 8 may be used, and by employing a sufficient number of such bushings the machine can be adapted for a great variety of uses. Finally, the gears K O may be duplicated at the right end of rolls I N, if desired.

I claim as my invention—

1. The combination, in a sheet-metal-bending machine, of bending-roll H, rack-bearings F *f* G *g*, shaft C, fixed pinion *c*, shiftable pinion *c'*, and a device for locking said shaft, substantially as herein described.

2. In combination with the shaft C, operating the bending-roll H, as herein described, the stop-pin E and plate D, the latter being provided with a series of retainers, *d*, for the purpose stated.

3. The combination, in a sheet-metal-bending machine, of standard A U, slip-roll R *r'*, perforation *s*, and shiftable pin S, for the purpose described.

4. The combination, in a sheet-metal-bending machine, of standard A U, slip-roll R *r'*, perforation *s*, shiftable pin S, and reducing-bushing V *v*, for the purpose described.

In testimony whereof I affix my signature in presence of two witnesses.

GEORGE R. EVERSON.

Witnesses:

JAMES H. LAYMAN,

FRANCIS B. JAMES.