2 Sheets--Sheet 1.

# J. T. G. PIEDBOEUF.

## Improvement in Machines for Bending the Flanges of Boiler-Heads.

No. 132,489. Patented Oct. 22, 1872.

FIG. 2.

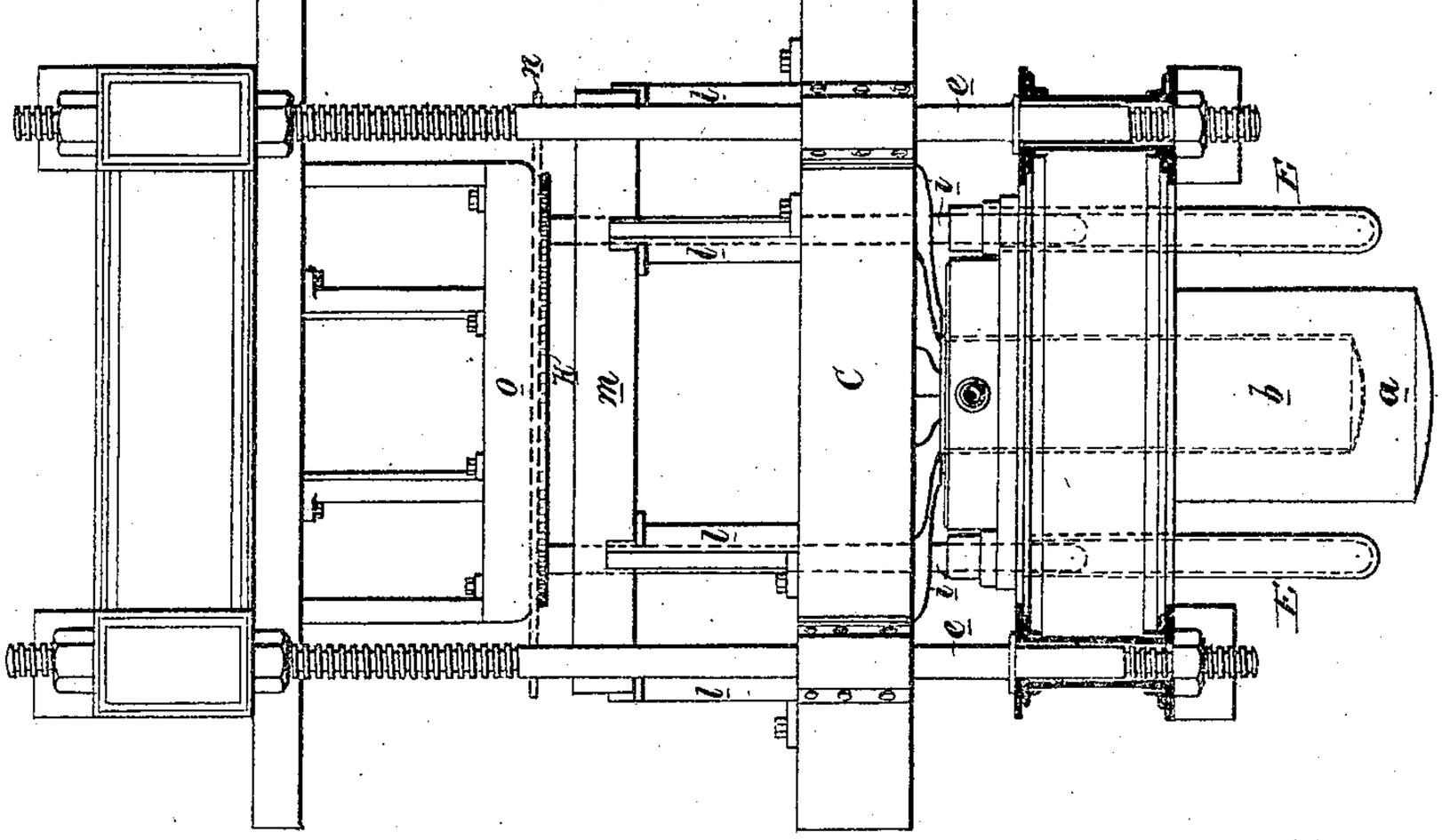
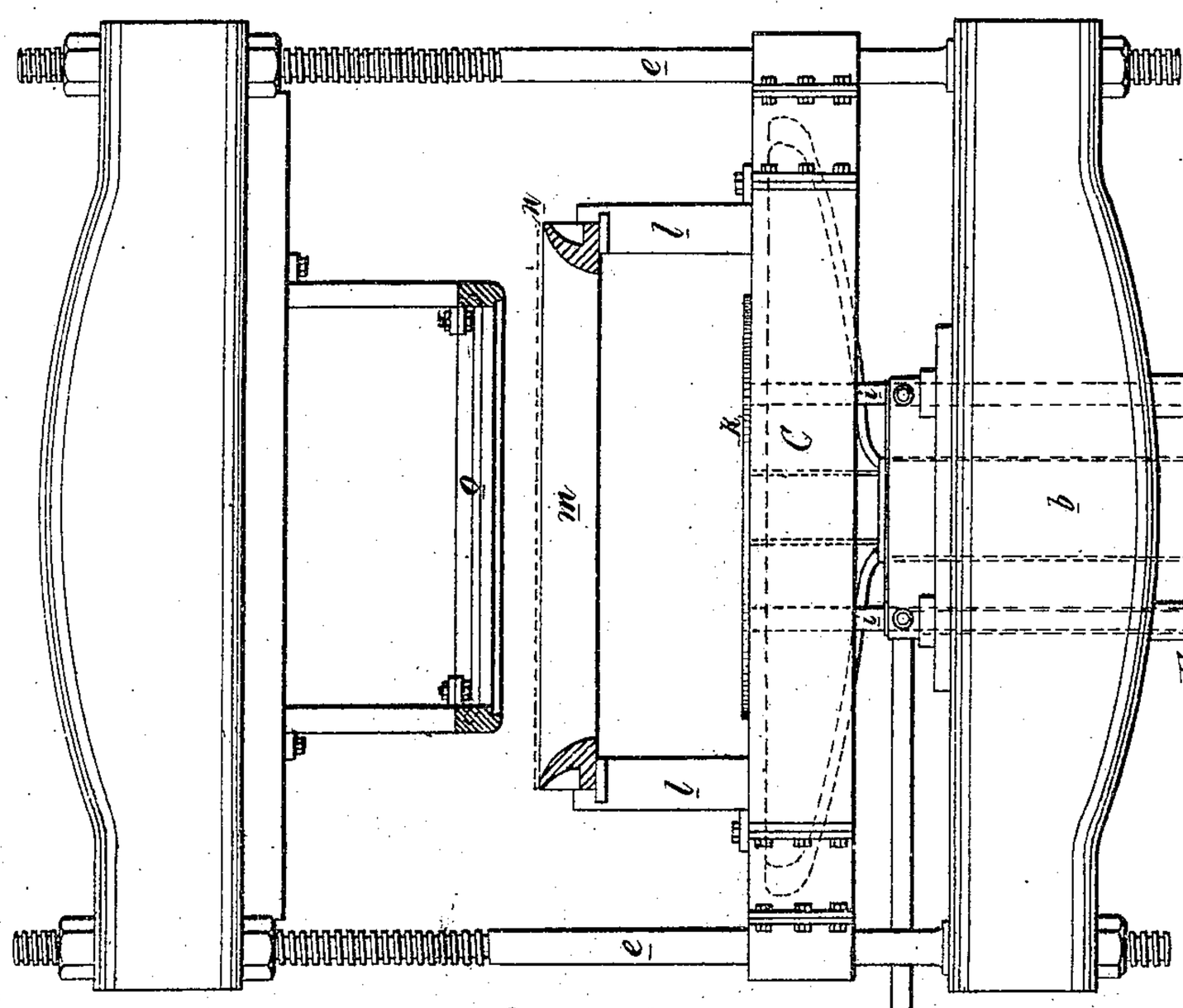



FIG. 1.




WITNESSES,

Harry Smith.
Thomas McElwain

J. T. G. Piedboeuf.
by his Attys.
Howson and Son.

2 Sheets--Sheet 2.

# J. T. G. PIEDBOEUF.

## Improvement in Machines for Bending the Flanges of Boiler-Heads.

No. 132,489. Patented Oct. 22, 1872.

FIG. 3.

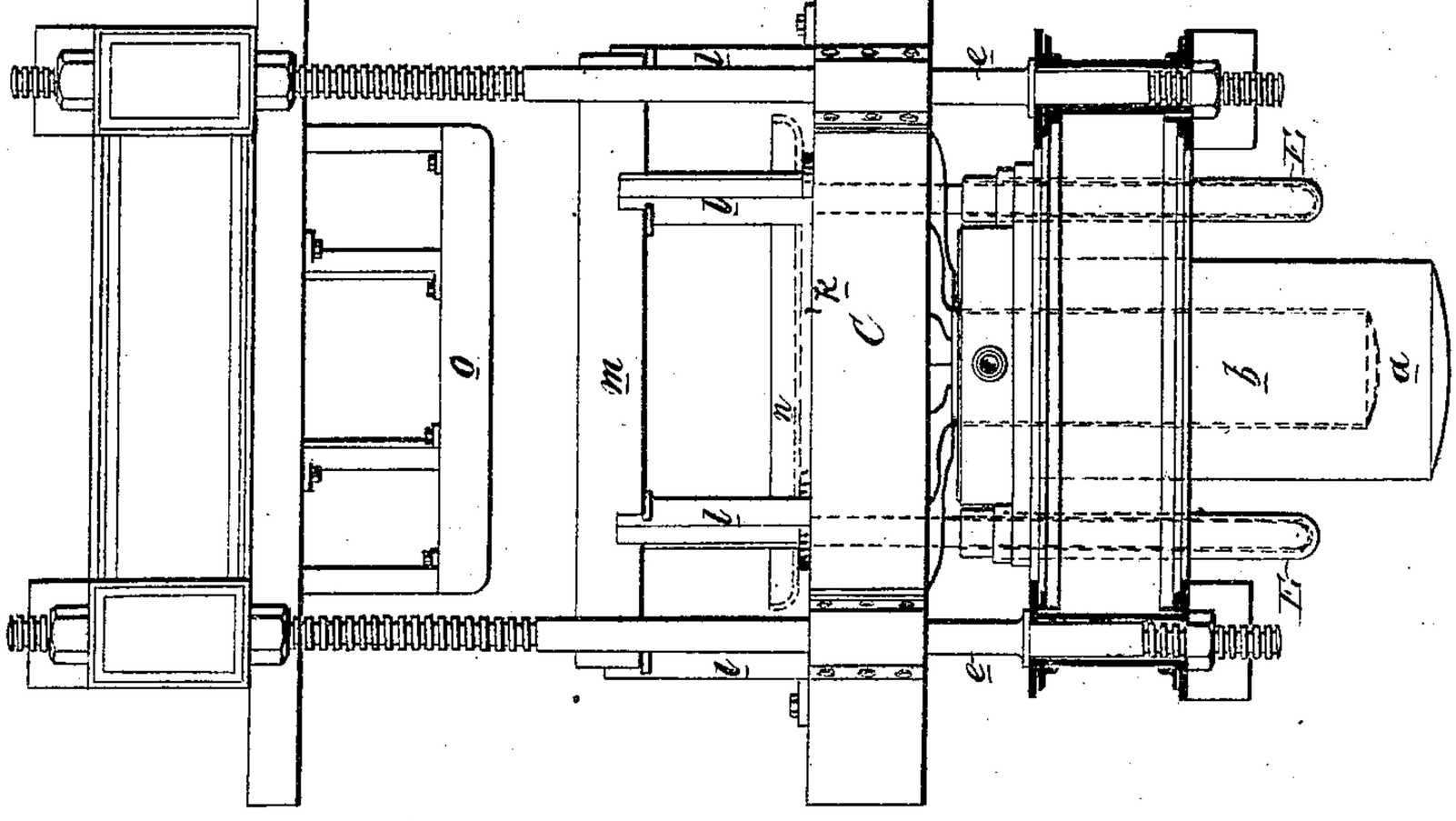
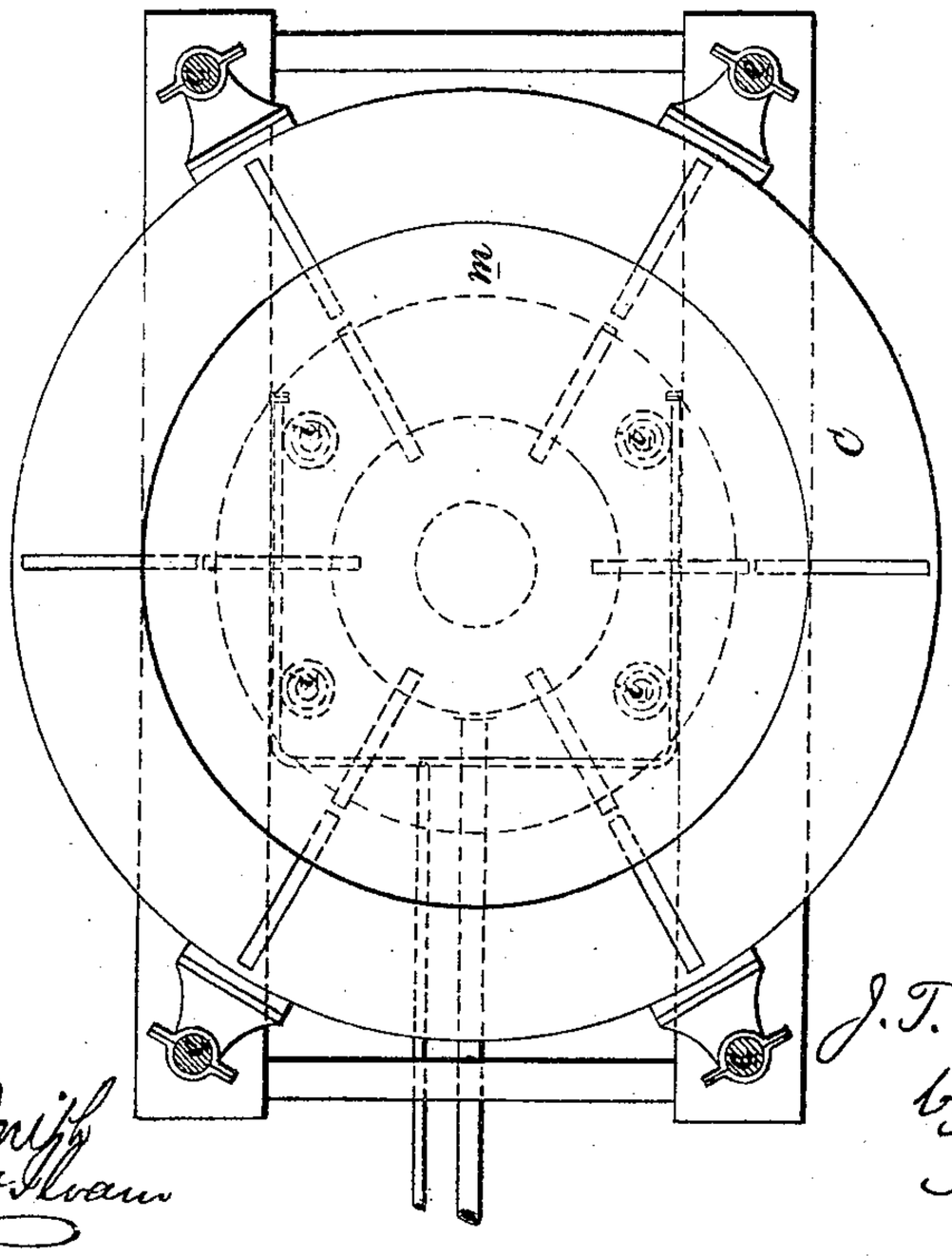



FIG. 4.




WITNESSES

Harry Smith

Thomas McElwain

J. T. G. Piedboeuf

by his Attorneys

Howson and Sons

# UNITED STATES PATENT OFFICE.

JAMES THEODORE GUSTAVUS PIEDBOEUF, OF TUPILLE, NEAR THE CITY OF LIEGE, BELGIUM, ASSIGNOR TO CHARLES JAMES ADOLPH DICK, OF PITTSBURG, PENNSYLVANIA.

## IMPROVEMENT IN MACHINES FOR BENDING THE FLANGES OF BOILER-HEADS.

Specification forming part of Letters Patent No. **132,489**, dated October 22, 1872.

*To all whom it may concern:*

Be it known that I, JAMES THEODORE GUSTAVUS PIEDBOEUF, of Tupille, near the city of Liege, in the Kingdom of Belgium, have invented Improvements in Machinery for Bending and Shaping Metal Plates, of which the following is a specification:

My invention consists of certain mechanism, too fully explained hereafter to need preliminary description, for bending, shaping, and flanging metal plates—such, for instance, as the fire-box and smoke-box plates of locomotive-boilers.

In the accompanying drawing, Figure 1 (drawing No. 1) is a front elevation, partly in section, of my machine for bending and shaping metal plates; Fig. 2, an end elevation; Fig. 3, (drawing No. 2,) an end elevation; and Fig. 4, a plan view.

C is a sliding bed attached to or forming a part of the piston or plunger *b* of a hydraulic press, of which *a* is the barrel or cylinder. The upper and lower frames of the machine are connected together by the four rods *e e e e*, which serve to guide the sliding bed C in a manner sufficiently explained by the drawing. I have illustrated my invention in the present instance as applied to the formation of a flange on the edge of a disk of boiler-plate, and this flanging is effected by the combined action of a plate, K, and the annular dies *o* and *m*, the latter resting on adjustable supports secured to the sliding bed C. The annular die *o* is suspended by hangers from the upper frame of the machine, as shown. A plate, K, is supported by four small rods, *i i*, which pass through the sliding bed C into cylinders E attached to the lower frame of the machine, each rod being, in fact, the piston or plunger of an hydraulic press, the four plungers being operated simultaneously by the simultaneous introduction of water under pressure to the four cylinders. The disk *n* of boiler-plate is, while in a heated state, adjusted to its proper position on the upper edge of the die *m*, as shown in Fig. 1, and the plate K is then elevated so as to carry the disk up to and hold it firmly in contact with the under side of the die *o*. The bed C, and with it the die *m*, is now elevated and caused to pass the stationary die *o*, and during this upward movement of the die *m* the desired flange is formed on the edge of the disk. While the die *m* is retained in an elevated position, the plate K supporting the flange-disk *n* is lowered, as shown in Fig. 3, after which, on removing one or more of the supports *l l*, the said flanged plate may be withdrawn from the press.

In many cases it may be desirable to emboss or impart different shapes to the body of a plate, as well as to flange the edges of the same. In such cases the plate K and upper die *o* should be made in accordance with the shape to be imparted to the plate to be operated on.

It will be evident that the invention may be applied to the formation of the fire and smoke box plates of locomotives, dished end plates of ordinary boilers, and the plates of thin vessels usually made of wrought iron, copper, or other ductile metal or alloy.

In treating plates of iron and steel it is preferred to bend them while at a red heat, as is usually done in working these metals.

I claim as my invention—

The combination of the stationary upper die *o*, die *m*, and hydraulic press for operating the same, and the pressure-plate K and its auxiliary hydraulic presses, substantially as described.

JAMES THEODORE GUSTAVUS PIEDBOEUF.

Witnesses:

CHARLES DEGIVE,

JAMES SAIVE.