

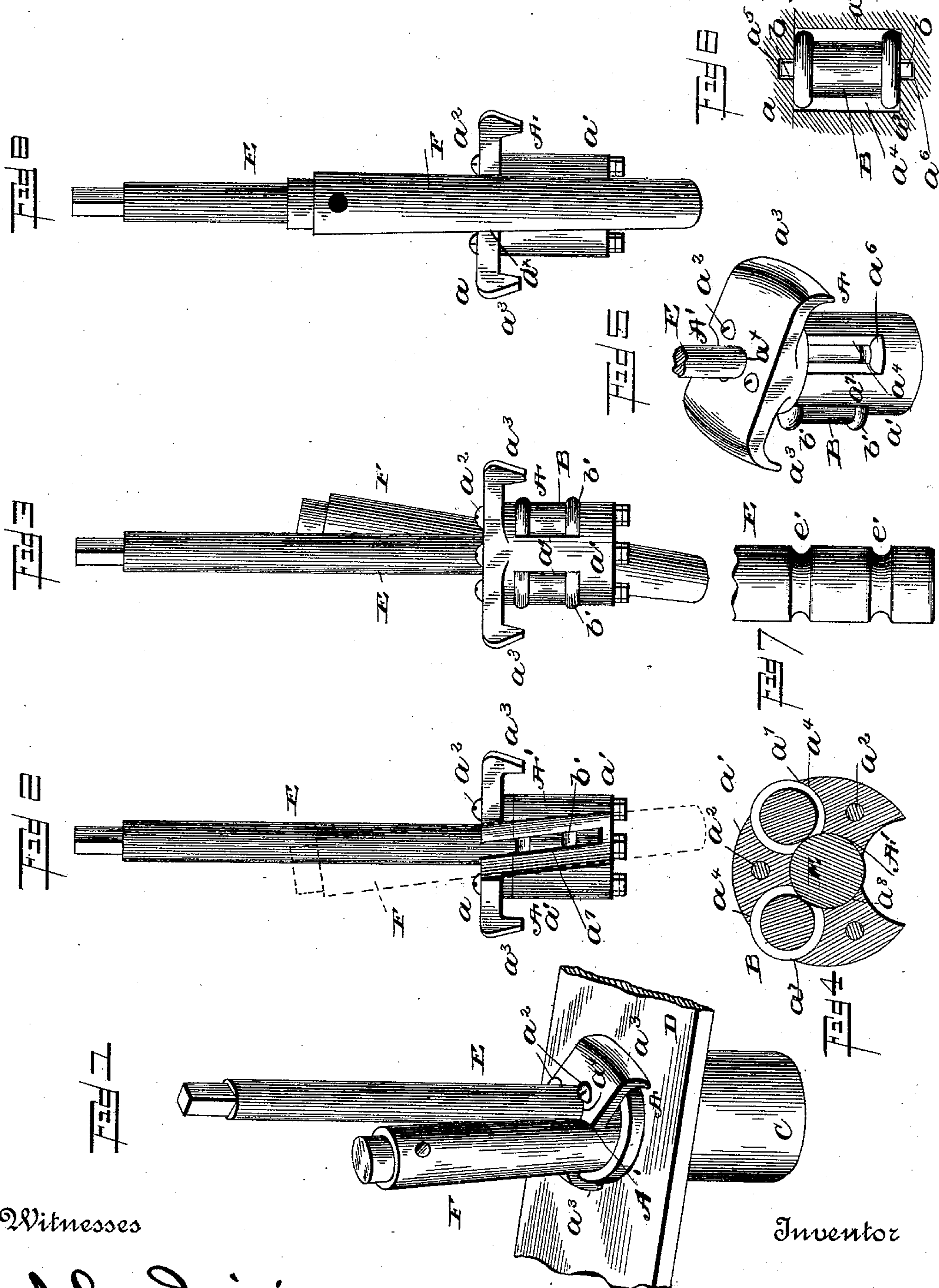
(No Model.)

2 Sheets—Sheet 1.

C. A. FRAYER.
PIPE OR FLUE BEADER AND EXPANDER.

No. 478,000.

Patented June 28, 1892.



Witnesses

John D. Irvine
Spencer Wilton

Inventor

By his Attorney Charles A. Frayer.

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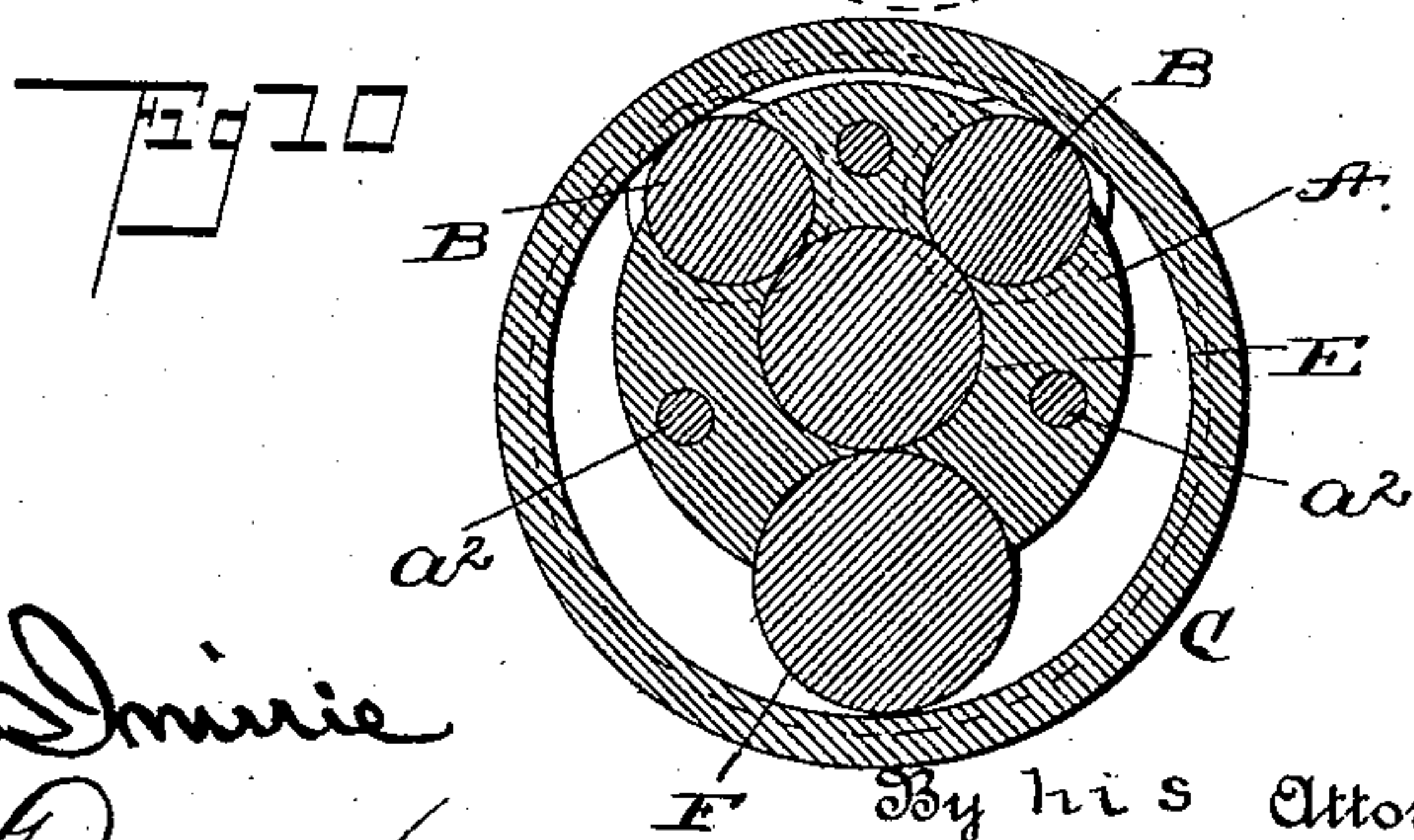
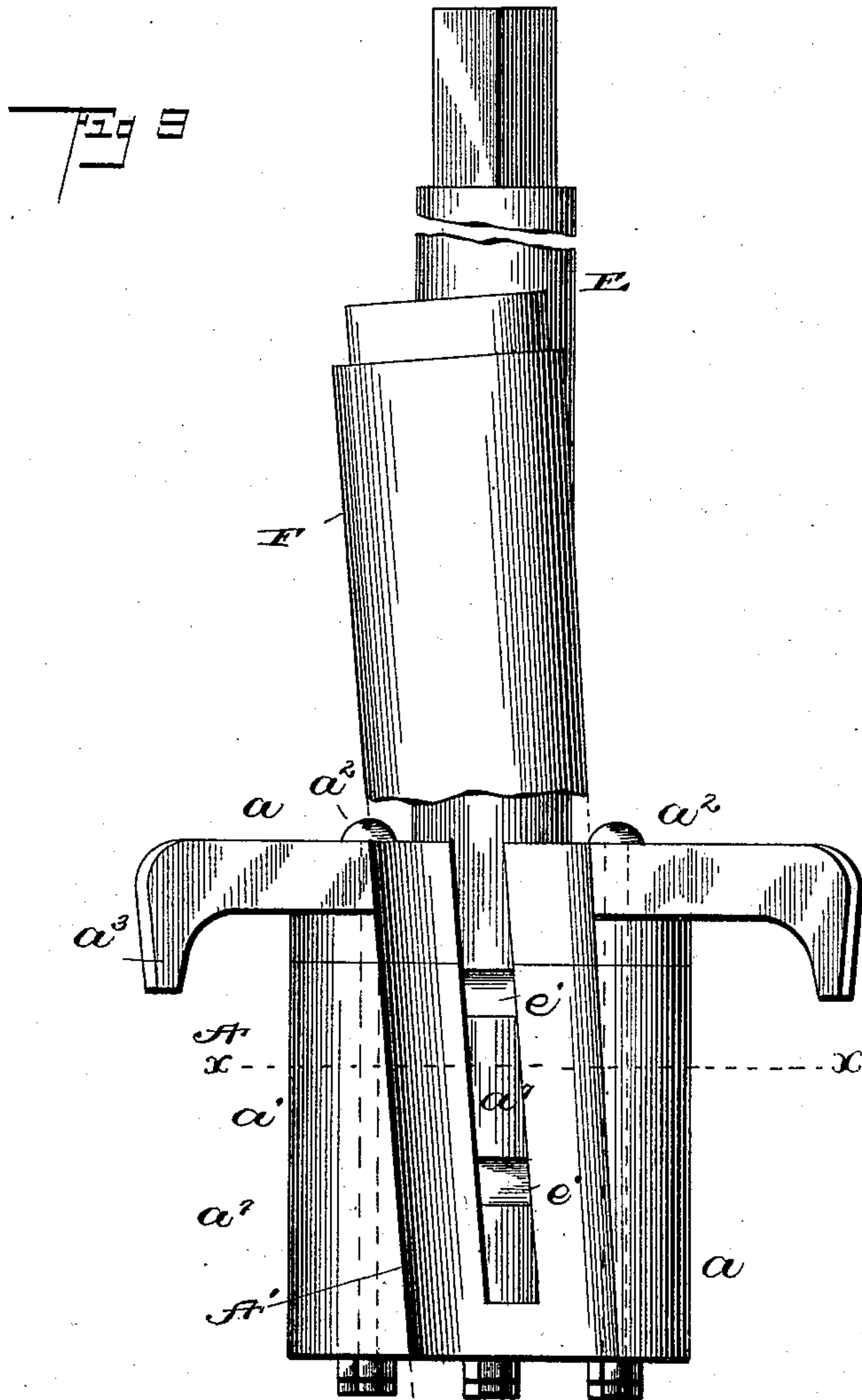
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UNITED STATES PATENT OFFICE.

CHARLES ANSON FRAYER, OF KEITHSBURG, ILLINOIS.

PIPE OR FLUE BEADER AND EXPANDER.

SPECIFICATION forming part of Letters Patent No. 478,000, dated June 28, 1892.

Application filed August 3, 1891. Serial No. 401,543. (No model.)

To all whom it may concern:

Be it known that I, CHARLES ANSON FRAYER, a citizen of the United States, residing at Keithsburg, in the county of Mercer and State of Illinois, have invented certain new and useful Improvements in Pipe and Flue Beaders and Expanders; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

Figure 1 is a front elevation of this device as in use. Fig. 2 is an elevation of the device removed from the tube, the taper pin being dotted in. Fig. 3 is an elevation from the opposite side. Fig. 4 is a horizontal sectional view of Fig. 2. Fig. 5 is a detail in elevation, one of the rolls removed; Fig. 6, sectional detail of roll, showing how it is secured in place. Fig. 7 is a detail view showing the lower end of the actuating-stem. Fig. 8 is an elevation showing both the stem and pin arranged vertically. Fig. 9 is an elevation of the tool, enlarged, showing more clearly the construction of the interior portion, the inclined pin being shown partly in dotted lines. Fig. 10 is a cross-section of the above on line xx , showing position of the mandrel and taper pin when the flue-bead has been made.

This invention belongs to that class known as "pipe or flue beaders and expanders;" and the novelty in the present instance consists in the construction of the several parts and in their combination as a whole, and in the operation of the device, all as will now be fully set forth, as well as pointed out in the claims.

In the accompanying drawings, A denotes the frame in which the vertical rolls B are held. This frame is made of horizontal and vertical pieces $a a'$, held together by the tie-rods a^2 , each suitably secured at the ends by head and nut, as shown. The piece a is bent at its ends a^3 , so as to fit loosely over the end of the tube or pipe to be expanded or beaded, or both, and up against the flue-sheet, boiler-head, or other surface through which the tube or pipe to be expanded or beaded, or both, passes, as shown in Fig. 1.

D shows a section of flue-sheet.

Between the pieces $a a'$ and in the sockets a^4 in the latter are held the vertical rolls B,

by means of teats b at top and bottom, respectively, of the rolls, which fit into the radially-elongated cavities a^5 and a^6 , respectively, on the under side of part a and in the bottom of the sockets a^4 . Each socket is vertically open at a^7 on the outside to expose the bead and expanding portion of each roll, and also at a^8 on the inside to expose the rolls to the action of the actuating-stem E. Each roll has or may have at top or bottom or both a horizontal bead b' , which in the action of the device is designed to make beads in the tube of the flue sheet or pipe, inside or outside or inside and outside, or, if the beads be omitted, to act as expanders of the tube or pipe.

Centrally passing through the opening a^x of the piece a is the stem or mandrel E. This is squared at the upper end e or is otherwise prepared for the adaptation of a suitable operative tool. At its lower end this stem is horizontally grooved at $e e'$, which grooves are adapted for beads on the rolls to fit into.

The taper pin F is designed to fit the inclined semicircular groove A' at the side of the frame opposite that in which the rolls B are held. This at the inside has a narrow vertical slot a^4 , where the grooved lower end of the stem is exposed, and consequently said pin impinges upon this end of the stem at this opening.

It will be understood that the rolls may have one bead only for beading outside the flue-sheet, or one only for beading inside the flue-sheet, or none at all, in which latter instance the machine can be used simply as a pipe or tube expander.

As thus constructed the operation of the device is as follows: The frame having been placed in an end of the tube to be beaded or expanded and suitably fixed in position, the taper pin F is now placed in the opening formed by the inclined groove A' and the sides of the tube or pipe, and is usually driven slightly by a light tap of a hammer. This brings all the parts in close contact, and as the stem E is revolved the pin forces the beads of the rolls against the inside of the pipe and thereby causes them to revolve, and thereby the pipe or tube to be beaded and expanded, the taper-pin F pressing against the inside of the tube or pipe and expanding the same si-

multaneously with the action of the rolls in making the bead. As the work progresses the bead becomes deeper, its depth being regulated at the will of the operator, limited by the size of the beads on the rolls. After a bead of the depth of the bead on the rolls has been formed in the tube or pipe, that portion of said rolls between the beads impinges upon the tube or pipe, and as the taper pin continues to feed it aids in the expansion of the tube or pipe. After the device has begun operations the taper pin F will ordinarily feed down sufficiently fast to cause the rolls to impinge on the tube or pipe with as much force as is necessary to the effective action of the rolls, owing to the fact that the axis of said pin F is inclined to the axis of the stem or mandrel E, whose axis coincides with the axis of the tube or pipe to be expanded or beaded. When the tube or pipe is sufficiently expanded or beaded, the action of the stem or mandrel E is reversed, the taper pin F thereupon, owing to the inclination of its axis and said reverse motion, is disengaged from its close contact with the tube or pipe, all parts become loosened, and the machine is easily withdrawn, thus completing the operation.

The above description is applicable when but one bead is used, with the modification suggested naturally by the use of but one bead.

When the tool is used as a simple expander, the beads on the rolls are omitted and the rolls, as well as the taper-pin, press at once against the tube or pipe, and the same expanded as much as deemed advisable, the taper pin F feeding in as before.

The semicircular groove A', instead of being inclined to the axis of the device, may have its axis parallel with the axis of the stem or mandrel E, and if so disposed the only difference of the tool in operation would be the necessity of then driving in the taper pin F during the progress of the operation, as it would not feed in of itself, as before. In all other respects the tool and the method of operation would be the same as above set out.

The terms above used of "vertical rolls," "horizontal bead," &c., it will be understood,

are merely descriptive of the tool as shown in the drawings.

I claim—

1. In a device substantially as described, in combination with a frame carrying vertical rolls horizontally beaded and a central stem in said frame operating said rolls, an inclined and tapered pin fitting into said frame and acting to cause said rolls to impinge on said stem, all as and for the purposes set forth.

2. In combination with a frame A and the beaded rolls B therein, projecting outwardly from and inwardly into the central opening, the central operating-stem E, extending through the frame, and the tapered pin F, acting by the inclination of its axis to feed in while in operation, and thus to force the rolls outwardly, substantially as described.

3. The frame A, composed of the head-piece a and main part a', the latter having sockets open on the outside and inside, and the rolls B in said sockets, combined with a central operative stem E and an inclined taper pin F, substantially as set forth.

4. The frame A, the parts a and a' of which are held together by headed tie-bolts and nuts and having sockets a⁴ open on the outside and inside, and the central stem E, and loose pin F for operating said rolls by impingement.

5. In a tube-expanding device, as set forth, and in combination with its rolls and operating-stem, an inclined tapering pin, acting as and for the purposes set forth.

6. In a tube-expander having rolls and a central operating-stem and an opening at one side through the interior of its frame for reception of a pin F, substantially as set forth.

7. In a tube-expander, the combination of the rolls B with the stem E and the taper pin F, in the manner and for the purposes described.

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

CHARLES ANSON FRAYER.

Witnesses:

R. C. HUMBERT,
CHAS. C. CLARK.