(No Model.)

C. A. FRAYER.

PIPE OR FLUE BEADER AND EXPANDER.

No. 474,956. Patented May 17, 1892.

Fig 1

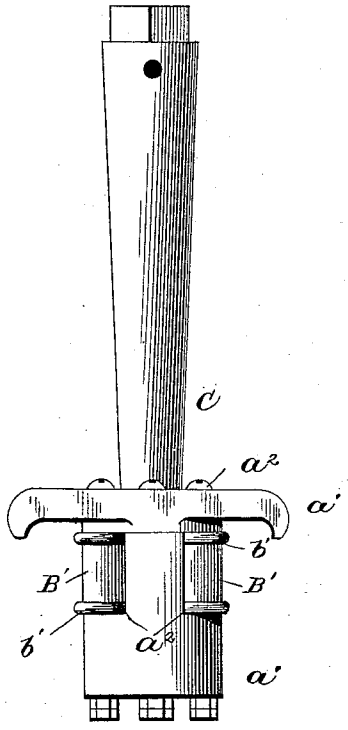


Fig 2

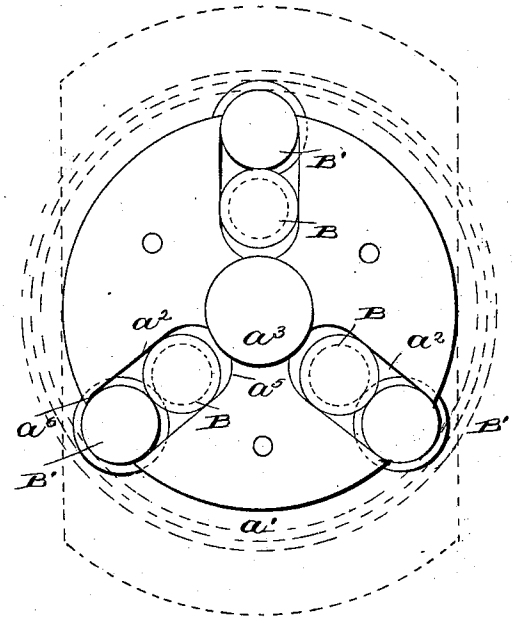


Fig 3

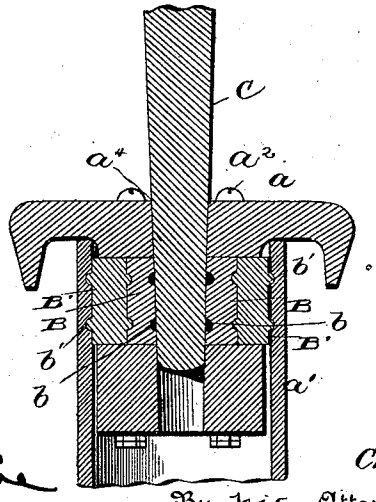


Fig 4

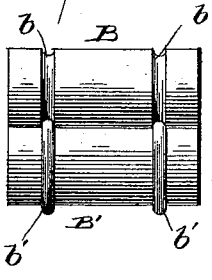
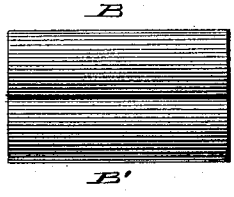


Fig 5



Witnesses

John Dunbar

Spencer Hilton

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By his Attorney

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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. 474,956, dated May 17, 1892.

Application filed August 3, 1891. Serial No. 401,542. (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 or 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 side elevation of this device. Fig. 2 is a top plan, the upper part of the frame being shown in dotted lines. Fig. 3 is a plan view of a pair of the rolls. Fig. 4 is a detail view of the central pin. Fig. 5 is a plan view of a pair of the rolls with plain surface for expanding.

This device belongs to the class of instruments or tools designed for beading or expanding boiler-tubes or other like pipes; and the novelty consists in the construction of the several parts and in the combination thereof with each other and in the device as a whole and in its methods of operation, all as will now be more fully set forth and explained, reference being had to the accompanying drawings, in which—

A denotes any suitable frame. In this instance it is composed of the upper and lower parts a a', which are fastened together by the tie-rods a^2, held, respectively, at top and bottom by head and nut, as shown. The upper part a is dished or bent at the edges, so as to fit loosely over the end of the tube or pipe to be expanded and up against the flue-sheet or boiler-head or other surface through which the tube or pipe to be expanded or beaded, or both, passes. It may be a complete circle or have segments cut off. The lower part a', which forms the body of the frame, has several sockets or cavities a^3, (three being now shown,) extending radially from the central opening a^3, (which opening may be tapering.) This opening registers with a similar one a^4 in the head. The sockets are contracted toward the central opening at a^5 and at the outer edge at a^6. By means of these contractions and the head a the rolls are held in position, the inner rolls B facing the opening a^5 and the outer rolls B′ facing the outer opening a^6. When the tool is used as a simple expander, the outer rolls, as well as the inner rolls, have no beads. When the tool is to be used as an expander and beader, each of the outer rolls has horizontal beads b of such number and size as may be desired, according to the bead or beads to be made in the flue or pipe. When the tool is used as an expander and beader, in each of the inner rolls B are grooves b' to correspond with and form seats for the beads b of the facing-roll B. In the central opening through the parts a a' is placed the tapered pin C, which in this position impinges upon the vertical faces of the inner rolls B, and these in turn are pressed against the rolls B′. The revolution of the pin C by any ordinary or suitable means causes these rolls to revolve and the outside beaded rolls to make beads on the inside of the tube or pipe in which the mechanism is placed. As the beads perform their office, the pin gradually descends and the depth or size of the bead or enlargement of the pipe or tube can be regulated at will. There may be as many sets of rolls with each tool as difference between the beads in vertical distance or difference in the size of the bead or beads is required. These rolls can be easily removed and changed by merely loosening the tie-rods which hold the head a upon the part a' of the frame.

The mode of operation is as follows: Having inserted the suitable sets of rolls, the main part of the beader and expander is inserted into the flue, the edges of the head a fitting up close against the flue-sheet. The taper-pin C (of any suitable diameter and length and with a head fitted for wrench or bar or other device for twisting) is inserted into the central cavity and by a hammer or other suitable tool is then made to fit tightly. The pin is now twisted, causing the tool to revolve, and by its upper and lower beads makes a bead on both inside and outside of the flue-sheet. As the work progresses, the taper-pin is driven still farther in by hammer or other suitable tool till finally the beads roll a cavity equal to their own depth or size, at which time the space on the rolls between the beads presses against the tube or pipe, and, proceeding with the work, the said surface between the beads presses against the tube or pipe, still further expanding it, and pressing

it tightly against the edges of the opening into the flue-sheet. This finishes the operation. The taper-pin is withdrawn, the rolls drop toward the central cavity, and the frame is removed.

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

When the tool is used as a simple expander, the beads are omitted and the rolls press at once against the tube or pipe and the same expanded as much as deemed advisable. Where but one bead is used in connection with tubes for flues or other like situations, it may be so situated on the roll as to make the bead in the flue on either the outside or inside of the flue-sheet, but preferably on the inside. The chief object of the inner roll B is to present as large a bearing-surface as possible to the taper-pin and make the beads *b* as sharply defined as practicable. Thus as the inner roll is grooved and the beads in the outer roll fit into the groove in the inner roll the beads will not be like to become flattened, and as the inner roll practically comes into contact for its entire length with the pin the maximum bearing-surface is obtained.

The terms above used of vertical faces, horizontal beads, &c., it will be understood, are merely descriptive of the tool, as shown in the drawings.

What I claim is—

1. In a tube or pipe beader and expander, the combination of rolls arranged radially in pairs and so that the inner rolls are exposed on the side and the outer can be made to project beyond the edge of the containing-frame, and a central tapering operating pin or stem adapted to impinge upon and move the inner rolls.

2. In a device as described, the combination of the rolls arranged in pairs, one of each pair being beaded and the other grooved, and said beads fitting into said grooves, with a central tapering operating-pin impinging on the inner and grooved roll of each pair, substantially as set forth.

3. In a beading and expanding tool, the frame A, made of parts *a* and *a'*, suitably held together, and the rolls B, held in the cavities or sockets of part *a'* and arranged radially in said socket and combined with the central tapering operating-pin, in the manner and for the purposes set forth.

4. In a beading and expanding tool, as described, the parts *a* and *a'*, held together, as set forth, the part *a'* having radial sockets, each open at the inside and outside, and the rolls arranged in pairs in said sockets, the outer roll of each pair being beaded, and a central operating pin or stem, substantially as described.

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

CHARLES ANSON FRAYER.

Witnesses:
R. C. HUMBERT,
CHAS. C. CLARK.