Oct. 6, 1925. 1,556,387

H. E. WILLIAMS

PIPE OR FLUE EXPANDER

Filed March 20, 1924 2 Sheets-Sheet 1

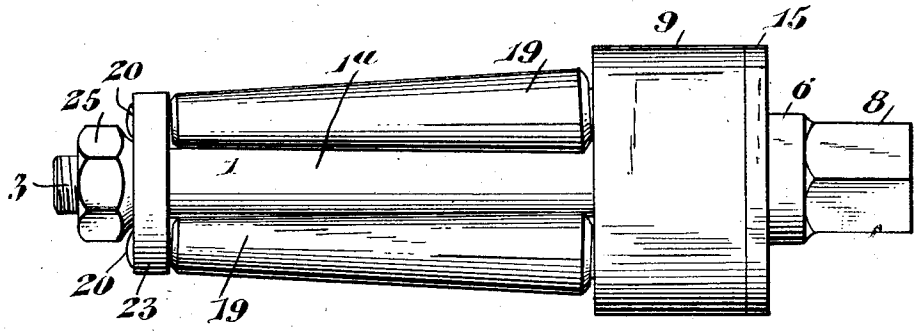
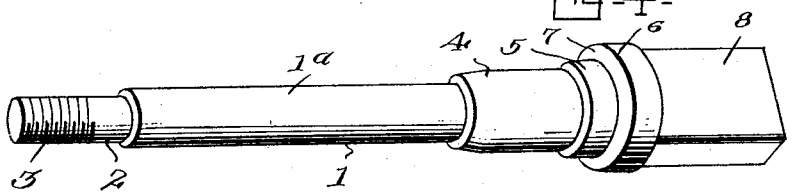


Fig-1-

Fig-4-



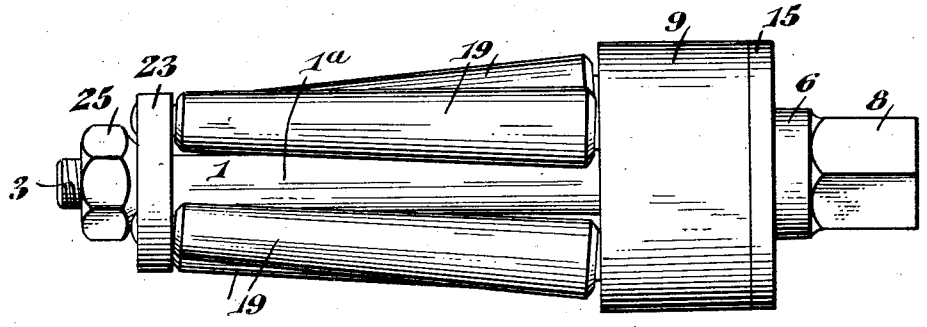


Fig-5-

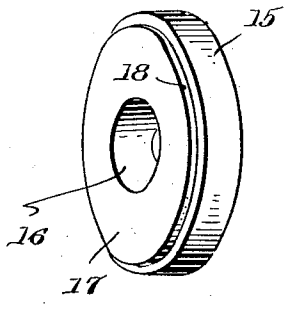
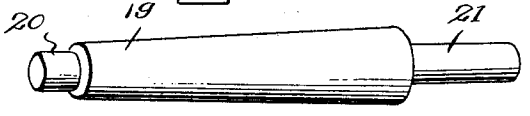


Fig-2-

Fig-3-



Harvey E. Williams, INVENTOR

BY

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PIPE OR FLUE EXPANDER

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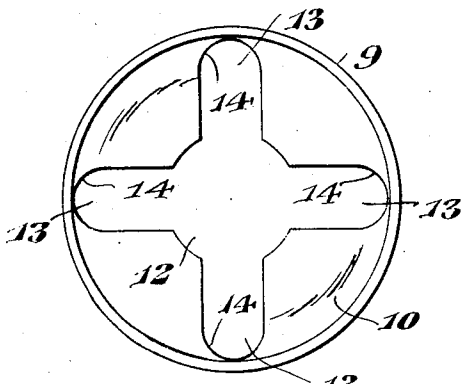


Fig-6-

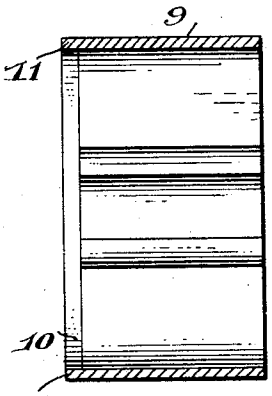


Fig-7-

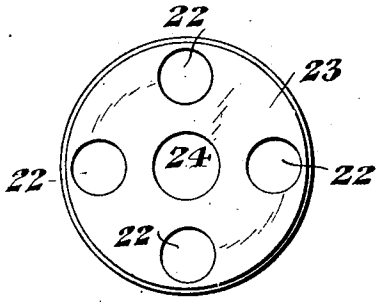


Fig-8-

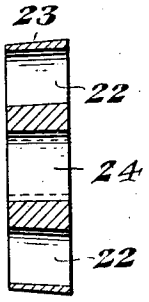


Fig-9-

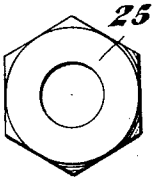


Fig-10-



Fig-11-

Harvey E. Williams, INVENTOR

BY

Geo. P. Kimmel ATTORNEY

Patented Oct. 6, 1925. 1,556,387

UNITED STATES PATENT OFFICE.

HARVEY E. WILLIAMS, OF ST. JOSEPH, MISSOURI.

PIPE OR FLUE EXPANDER.

Application filed March 20, 1924. Serial No. 700,669.

To all whom it may concern:

Be it known that I, HARVEY E. WILLIAMS, a citizen of the United States, residing at St. Joseph, in the county of Buchanan and State of Missouri, have invented certain new and useful Improvements in Pipe or Flue Expanders, of which the following is a specification.

This invention relates to pipe or flue expanders.

The primary object of this invention is the provision, in a manner as hereinafter set forth, of a flue expander having the improved means for expanding the end of a flue by the action of rolling members positioned therein, whereby an accurate and equal expansion of the flue will be had throughout its circumference.

A further object of the invention is the provision, in a manner as hereinafter set forth, of a flue expander making use of a mandrel having a body portion of equal diameter throughout and carrying thereon bearings supporting a series of tapering rollers which rollers bear against the mandrel and are caused to revolve in the opposite direction to the mandrel when the same is turned to expand the tube in which the device is placed.

A final object of the invention is the provision, in a manner as hereinafter set forth, of a tube expander of simple and sturdy construction, strong, durable, and inexpensive to manufacture.

The invention will be best understood from a consideration of the following detailed description taken in connection with the accompanying drawings forming part of this specification with the understanding that the invention is not confined to any strict conformity with the showing of the drawings but may be changed and modified so long as such changes and modifications mark no material departure from the salient features of the invention as expressed in the appended claims.

In the drawings:

Figure 1 is a side elevation of the assembled device.

Figure 2 is a side elevation of the same showing the position assumed by the rollers when the device is revolved within a tube.

Figure 3 is a detail perspective view of one of the roller members.

Figure 4 is a detail perspective view of the mandrel.

Figure 5 is a detail perspective view of a cap used to close one end of the bearing box supporting the rollers.

Figure 6 is an end view of a roller bearing box.

Figure 7 is a transverse sectional view of Figure 6.

Figure 8 is an end view of a bearing plate supporting the forward end of the rollers.

Figure 9 is a transverse sectional view of the same.

Figure 10 is an end elevation of the nut which engages the mandrel and holds the assembled device together.

Figure 11 is a side elevation of the same.

Referring now to the drawings in detail wherein like numerals of reference indicate corresponding parts throughout the several views of the drawings the device embodying this invention comprises a mandrel indicated as a whole at 1. This mandrel comprises an elongated body portion 1^a of equal diameter throughout and the forward end of this body portion is reduced as at 2 and is peripherally threaded as indicated at 3. The rear portion of the body 1^a has a portion 4 of substantial length and of greater diameter than the body 1^a and this portion 4 provides a bearing surface for a part of the device to be described hereafter. The bearing portion 4 merges into a second bearing portion of less length but of greater diameter than the first mentioned bearing portion, this second bearing portion 5 also carries a part of the device to be hereinafter referred to. Surrounding the mandrel at the rear of the second mentioned bearing portion 5 is an enlarged annular collar 6 against the inner surface 7 of which the structure carried upon the bearing 5 abuts. This collar 6 has formed upon its outer face a squared head 8 by means of which the mandrel can be engaged by a wrench or other suitable device, and be revolved.

Adapted to be positioned upon the first mentioned bearing surface 4 of the mandrel, is a circular bearing box 9, one face of which has a shallow circular depression 10 cut therein, this depression being of slightly less diameter than the diameter of the box thus forming the flange 11 extending around the periphery of the bearing upon one side thereof. The bearing 9 has formed through the central portion thereof a circular bore 12 through which the bearing surface 4 of the mandrel extends, and the bearing box 9 fur-

ther has formed longitudinally therethrough radial recesses 13, these recesses extending from and opening into the central passage 12 outwardly to a point in alinement with the inner face of the flange 11 and further are of semi-circular contour at their outer ends as indicated at 14 in Figure 6 of the drawings. When the circular bearing box 9 is placed upon the mandrel 1 the recessed portion 10 is spaced toward the rear of the mandrel. However, before the bearing box 9 is placed in position a cap member 15 having a central aperture 16 therethrough is threaded onto the mandrel and the central aperture 16 is of equal diameter to the bearing surface 5 of the mandrel and the cap is positioned thereon. One face of the cap 15 has the circular upstanding portion 17 thereon and this portion is of less diameter than the diameter of the cap thus forming the shoulder 18. This shoulder and raised portion faces the forward end of the mandrel and when the circular bearing box 9 is placed in position upon the bearing surface 4 the flange 11 of the bearing box fits over the shoulder 18 above the cap member 15 and thus the cap closes the outer side of the radial openings 13 in the bearing box 9.

Adapted to roll upon the body portion 1^a of the mandrel is a series of tapered rollers 19 each having a trunnion on each end. The forward end of the roller, which is the small end, is provided with the short trunnion 20 while the rear end of the roller is provided with a substantially elongated trunnion 21. These long trunnions 21 which extend from the large end of the tapered roller 19 are each adapted to be positioned within one of the recesses 13 in the bearing box 9.

Each of the short trunnions 20 at the small end of the tapered roller 19 is positioned in an aperture 22 formed through a plate 23 at diametrically opposed points as clearly shown in Figure 8 of the drawings. This plate further has formed centrally therethrough the passage 24 for the passage of the tapered end 2 of the mandrel. When the plate 23 is positioned upon the tapered end 2 of the mandrel it abuts the forward end of the body portion 1^a of the mandrel, and after the plate is so positioned with the rollers each having its short trunnion through one of the apertures 22 and its long trunnion through the passages 13, a nut 25 is threaded upon the threaded end 3 of the reduced portion 2 until it engages the outer face of the plate 23 and acts to bind the same against the end of the body portion 1^a.

When the pipe expander is assembled as above described and the plate 23 secured in position by the nut 25 as set forth the plate 23 will be held stationary, whereas the bearing box 9 will be free to rotate slightly upon the bearing surface 4 and as the tapered rollers 19 rest flat upon the body 1^a the revolution of the mandrel when the device is in position in a tube will cause the plate 23 to move with the mandrel whereas the bearing box 9 will not move immediately but will remain stationary until the rollers 19 assume the position as shown in Figure 2 whereupon a twisting spreading action will be had against the inner surface of the pipe and as the mandrel is continually turned and driven into the pipe at the same time the pipe end will be evenly expanded to the desired extent.

Having thus described my invention what I claim is:

1. In a pipe expander, a mandrel having a substantially elongated body portion of equal diameter throughout and further having a portion thereof formed to provide a bearing, a bearing box encasing said bearing, said box having radial through passages extending from the center thereof, a fixed apertured bearing plate upon said mandrel, and revoluble trunnioned rollers extending between said plate and bearing box and bearing against said body portion, each roller having one trunnion in an aperture in said plate and another trunnion in one of said through passages.

2. In a pipe expander, a mandrel having a substantially elongated body portion of equal diameter throughout and further having a portion thereof formed to provide a bearing, a bearing box encasing said bearing, said box having radial through passages extending from the center thereof, a fixed apertured bearing plate upon said mandrel, revoluble trunnioned rollers extending between said plate and bearing box and bearing against said body portion, each roller having one trunnion in an aperture in said plate and another trunnion in one of said through passages, and a cover plate removably carried by said mandrel rearwardly of said bearing box and closing said through passages.

In testimony whereof, I affix my signature hereto.

HARVEY E. WILLIAMS.