F. W. FRANK.

FLUE EXPANDER.

APPLICATION FILED NOV. 29, 1913.

1,111,650.

Patented Sept. 22, 1914.

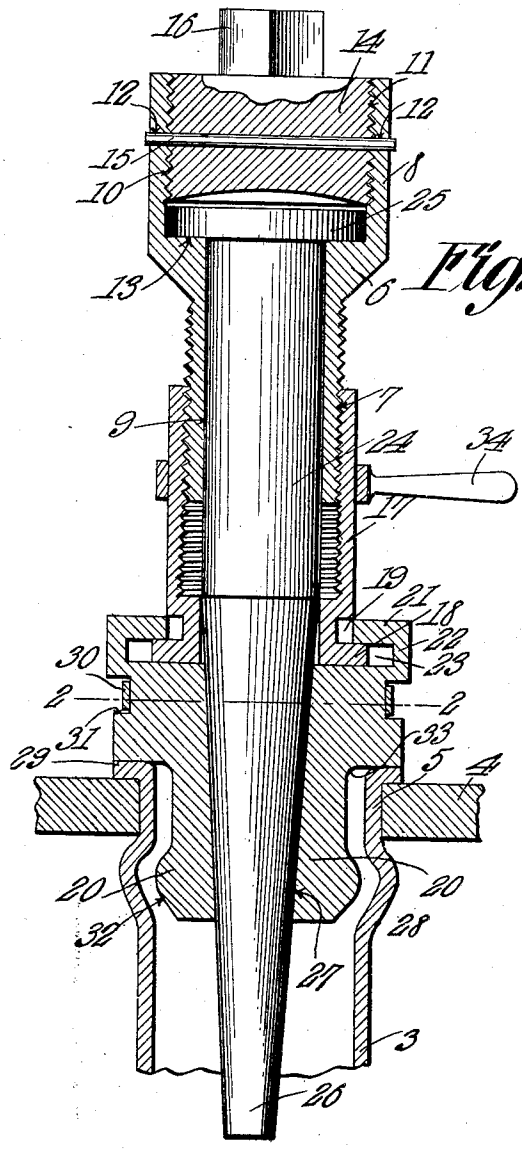


Fig. 1.

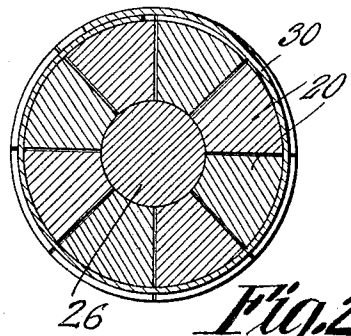


Fig. 2.

Witnesses

J. P. Tomeis

J. Willson.

Fredrick W. Frank, Inventor

by C. A. Snow & Co.

Attorneys

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

FREDRICK WILLIAM FRANK, OF ROCKY MOUNT, NORTH CAROLINA.

FLUE-EXPANDER.

1,111,650. Specification of Letters Patent. Patented Sept. 22, 1914.

Application filed November 29, 1913. Serial No. 803,745.

To all whom it may concern:

Be it known that I, FREDRICK WILLIAM FRANK, a citizen of the United States, residing at Rocky Mount, in the county of Edgecombe and State of North Carolina, have invented a new and useful Flue-Expander, of which the following is a specification.

This invention relates to improvements in flue expanders.

An object of the present invention is to provide a tool or apparatus which will expand or calk the tubes of a boiler or allied structures.

A further object is to provide a calking tool or flue expander which may be secured to a reversible air motor and the flue or tube expanded by the power thereof.

A further object is to provide a self-feeding flue expander in which the expanding members are forcibly driven against the side walls of the tube by reason of a tapered pin being wedgedly forced into contact therewith. The wedged engagement between the expanding members and pin being had by reason of the screw thread which drives the pin forwardly into engagement with the expanders and which structures also provide for the positive retraction of the pin and which allows for the contraction of the expanding members.

With the foregoing and other objects in view which will appear as the description proceeds, the invention resides in the combination and arrangement of parts and in the details of construction hereinafter described and claimed, it being understood that changes in the precise embodiment of the invention herein disclosed, can be made within the scope of what is claimed, without departing from the spirit of the invention.

In the drawings accompanying this specification and forming a part thereof, the preferable embodiment of my invention is illustrated, in which:—

Figure 1 is a longitudinal sectional view of my improved flue expander. Fig. 2 is a cross sectional view taken on the line 2—2 of Fig. 1.

Referring to the drawings in which similar reference numerals designate corresponding parts throughout the several views, 3 represents the end of a boiler tube and 4 the head plate thereof which is provided with the openings 5 extending therethrough and against the side walls of which the tube 3 is expanded.

A casing 6 is externally threaded as at 7 and is provided at its upper extremity with the enlarged portion 8. The main portion of the casing is provided with the longitudinal bore 9 extending therethrough and which communicates and is in axial alinement with the bore 10 of the enlarged portion 8. The enlarged portion 8 of the casing is internally threaded as at 11 and is provided with the restricted openings 12 extending through the side walls thereof. The meeting portions of the bores 9 and 10 define the outstanding ledge or shoulder 13 therebetween.

A plug 14 threadedly engages the bore 10 and is designed to be held therein by the locking pin 15. The pin 15 extends through the alined openings 12 in the side walls of the enlarged portion 8 of the casing and through a suitable opening in the plug and prevents the relative rotations thereof in either direction. The plug is provided with the outstanding and centrally or axially arranged polygonal lug 16 which may be engaged by an ordinary wrench, or may be inserted directly in the chuck of a reversible air motor so that rotation will be imparted thereto.

A second casing or sleeve 17 is internally threaded and engages the casing 6. Thus the two casings are adapted to telescope if they be rotated in one direction or extended if they have a relative rotation imparted thereto in the opposite direction. The casing or sleeve 17 is provided at its lower extremity with the outstanding flange 18, the said flange with the extremity of the casing defining an annular groove 19. A plurality of expanding members 20 are provided at their upper extremity with the annular flange 21 which flange is spaced a distance from the end walls of the expanding members and held so positioned by the arms 22. The ends of the expanding members taken in connection with the annular flanges 21 and arms 22 define an annular recess 23 which receives the outstanding flange 18 of the casing therein.

A shaft or pin 24 is provided at its upper extremity with the enlarged head 25 which is of such a diameter that it fits within the enlarged portion 8 of the casing and con-

tacts with the ledge 13 thereof. The plug 14 when located in its position as illustrated in Fig. 1, prevents the pin 24 from moving longitudinally of the casing in one direction and the ledge 13 prevents such motion in the opposite direction. The pin or shaft is provided with the tapered portion 26 which tapered portion is adapted to contact with the inner frustro-conical surfaces 27 of the expanding members. The expanding members are provided with a suitable external surface so that when coming into contact with the tube 3 they will form the inner bellied portion 28 and the outer ridge 29 which is at the extremity of the tube. Thus the boiler head 4 will be securely locked to the tube and the tube will be prevented from moving in either direction by means of the ridge 29 and the bellied portion 28.

The circular spring 30 embraces the expanding members and is located in an annular groove 31 which extends therearound. The spring provides that the expanding members will be retracted when the tapered pin is withdrawn or retracted from the expanding members. The expanding members are provided with the ridge 32 extending around their lower extremities and which contacts with the tube 3 to form the bulged or bellied portion 28. A second beveled shoulder 33 is provided upon the expanding members and forms the outstanding ridge 29 in the tube.

In operation the tool or expander is placed within the tube 3 with the casings 6 and 17 extended so that the lower extremity of the pin or shaft taper will be in contact with the expanding members whereby the same will be retracted to such a diameter that they will readily fit within the tube or flue. The lug 16 is forcibly rotated and the casing 17 is held against rotation by some suitable handle 34. The relative rotation of the casing 8 and sleeve 17 will result in the telescoping thereof and the pin or shaft 24 being forcibly driven by contacting with the plug 14 against the inner conical side walls of the expanding member to forcibly expand the same. The said expanding members are held against shifting in a longitudinal direction by reason of their interlocking or interengagement with the lower extremity of the sleeve or casing 17. In this connection it will be noted that the interengagement referred to while preventing any longitudinal shifting of the expanding members, allows them to move freely in a transverse direction. The tapered portion of the pin 24 will be driven forcibly against the expanding members until such time as the flue has been properly expanded into contact with the opening in the boiler head and the ridged or bellied portions formed thereon. When it is desired to remove the expander, the lug 16 is rotated in the reverse direction with the result that the shoulder 13 will contact with the head of the pin and forcibly move the same in a longitudinal direction so that the spring 30 will contract the expanding members and allow the entire expander to be removed from the flue.

Having thus described the invention, what I claim is:—

1. A device of the class described comprising an externally threaded casing provided with an enlarged end, said casing provided with a bore extending therethrough, and communicating with a larger bore extending through the said enlarged end, a plug disposed within the said enlarged end, means for locking the same therein, a tapered pin disposed within the casing and provided with an enlarged head fitting within the enlarged portion of the casing and held against longitudinal shifting thereby, a sleeve threadedly engaging the said casing, means carried by the sleeve contacting with the tapered pin adapted to expand the flue.

2. A device of the class described comprising an externally threaded casing provided with an enlarged head, said casing provided with a bore extending therethrough and communicating with a relatively larger internally threaded bore extending through said head, an externally threaded plug positioned within said enlarged head and provided with a wrench engageable end, means extending through the said head and plug, preventing the relative rotations thereof, a sleeve threadedly engaging the said externally threaded casing, and a tapered pin provided with an enlarged head, said enlarged head and tapered pin housed within the enlarged head of the casing and interposed between the ledge defined at the meeting of the two bores and the said plug, and means carried by the sleeve adapted to be expanded into contact with a flue.

3. A device of the class described comprising a casing, a tapered pin rotatably and non-shiftably carried thereby, a sleeve provided with an annular flange extending transversely thereof engaging the casing, said annular flange secured to said casing by a reduced portion, said casing, reduced portion and annular flange defining an annular recess, expanding members provided with an annular flange spaced therefrom and defining therewith an annular recess, said recesses adapted to receive the adjacent annular flanges, means disposed upon the outer surface of said expanding members adapted to wedgedly engage and expand a flue in contact therewith, an annular spring member extending around the expanding members and resiliently contract-

ing the same, the inner walls of the expanding member beveled to correspond with the tapered pins adapted to be expanded thereby, and a handle rigidly carried by said sleeve adapted to hold the same against rotation.

In testimony that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

FREDRICK WILLIAM FRANK.

Witnesses:
W. J. CULLIN,
J. W. NEIL.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."