





# UNITED STATES PATENT OFFICE.

ARTHUR MUNCH, OF ST. PAUL, MINNESOTA.

## FLUE-EXPANDER.

SPECIFICATION forming part of Letters Patent No. 711,581, dated October 21, 1902.

Application filed May 10, 1902. Serial No. 106,688. (No model.)

*To all whom it may concern:*

Be it known that I, ARTHUR MUNCH, a citizen of the United States, residing at St. Paul, in the county of Ramsey and State of Minnesota, have invented certain new and useful Improvements in Flue-Expanders, of which the following is a specification.

My invention relates to improvements in flue-expanders, its object being to provide improved means for holding the parts together and for guiding the pressure-rollers.

To this end my invention consists in the features of construction and combination hereinafter described and claimed.

In the accompanying drawings, forming part of this specification, Figure 1 is a side elevation of my improved flue-expander, showing the mandrel in connection therewith. Fig. 2 is a rear end elevation of the expander. Fig. 3 is a section on line *xx* of Fig. 2, and Fig. 4 is a front end elevation of the flue-expander.

Referring to the drawings, A designates the head of the flue-expander, provided with a central aperture 2, through which is adapted to be passed the mandrel B. The outer portion 3 of the head is reduced, as shown, and its reduced portion is provided with longitudinal openings 4, in which are placed the pressure-rollers 5. In the inner face of the base 6 of the head are formed the grooves 7, connecting with the openings 4. Each of the grooves 7 is preferably curved and receives the enlarged end 8 of the right-angle-shaped guide C, the opposite end 9 of the guide projecting into an opening 10 in the end of the adjacent roller 5. Surrounding the head is a sleeve 11. The sleeve 11 is formed with a shoulder 12, abutting against one side of the base of the head, the sleeve upon the opposite side of the base of the head being formed with a groove 13, adapted to receive the spring 14. One end 15 of the spring projects into an opening in the wall of the sleeve, as shown in Fig. 2. The edge of the sleeve adjacent to the opposite end of the spring is formed with a finger-opening 16 to allow the removal of the spring from its groove. By means of the shoulder 12 the spring 13 of the sleeve is securely held upon the head, closing the ends of the grooves 7 and preventing displacement of the roller-guides.

In operation the parts are placed together, as shown in Fig. 3. In use the narrowed portion of the head is placed in the end of the flue and the pressure-rollers forced outward by the mandrel B. As the pressure-rollers slide outward they will be held in position and guided by the guides C.

As will be seen, the guides C are removable both from the head and the pressure-rollers, so that in case of breakage of one of the guides it can be removed and a new one substituted.

I claim—

1. In a flue-expander, the combination of a head provided with a series of longitudinal side openings, rollers arranged in said openings, and right-angled guides, one end of each of said guides projecting into an opening in the adjacent roller, and the opposite end of each guide projecting outwardly and being slidable in a groove in the head.

2. In a flue-expander, the combination with a head formed with a base portion and a narrowed portion, said narrowed portion being provided with longitudinal openings in its side, rollers arranged in said openings, and guides carried by the base of said head and projecting into said rollers, of a sleeve for the base of said head, said sleeve being provided with a shoulder bearing against one side of said base, and a locking-spring interposed between the opposite side of said base and said sleeve.

3. In a flue-expander, the combination with a head provided with a base and a centrally-projecting narrowed portion, said narrowed portion being provided with longitudinal side openings, pressure-rollers arranged in said openings, and guides carried by said base and projecting into said rollers, of a sleeve surrounding said base, said sleeve being provided with a shoulder bearing against one side of said base, and a spring removably arranged in a groove in said sleeve upon the opposite side of said base, said spring projecting inwardly over said base, as and for the purpose set forth.

4. In a flue-expander, the combination with a head provided with longitudinal side openings, and rollers arranged in said openings, of right-angle-shaped guides for said rollers, one end of each guide removably projecting

into the adjacent roller, and the opposite outwardly-projecting end of said guide being enlarged and slidable in a groove in said head, a sleeve surrounding said head, and means  
5 for detachably securing said sleeve thereon.

5. In a flue-expander, the combination with a head formed with a base portion and a narrowed portion, said narrowed portion being provided with longitudinal openings in its  
10 side, rollers arranged in said openings, and guides for said rollers, of a sleeve inclosing the base of said head, a locking-spring re-

movably arranged in a groove in said sleeve adjacent to one end of the base, said sleeve projecting inwardly over said base, and means 15 cooperating with said spring to hold said sleeve upon said base.

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

ARTHUR MUNCH.

Witnesses:

H. S. JOHNSON,  
EMILY EASTMAN.