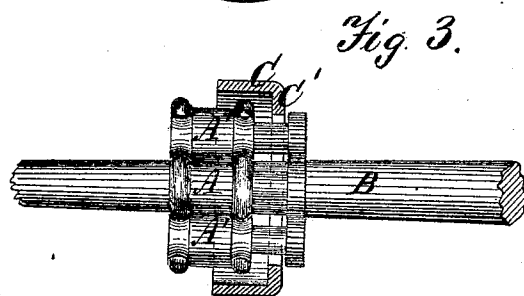
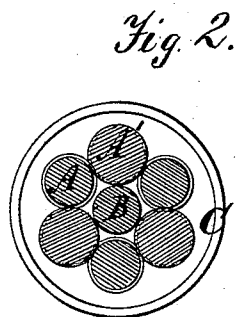
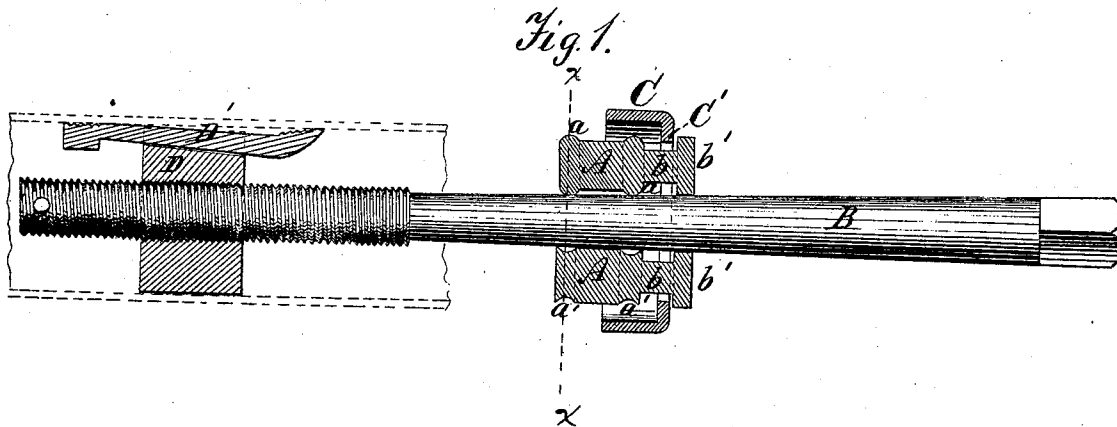


I. S. HAMILTON.

Improvement in Flue Expanders.

No. 121,514.

Patented Dec. 5, 1871.



Witnesses.

A. Ruppert.
J. H. Winter

I. S. Hamilton

Inventor.

D. P. Holloway & Co.
Attys.

UNITED STATES PATENT OFFICE.

IRA S. HAMILTON, OF HAMILTON, OHIO, ASSIGNOR TO HIMSELF AND OWENS, LANE, DYER & CO., OF SAME PLACE.

IMPROVEMENT IN FLUE-EXPANDERS.

Specification forming part of Letters Patent No. 121,514, dated December 5, 1871.

To all whom it may concern:

Be it known that I, IRA S. HAMILTON, of Hamilton, in the county of Butler and State of Ohio, have invented a certain Improvement in Flue-Expanders; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawing making a part of this specification, in which—

Figure 1 is a longitudinal section of the tool complete. Fig. 2 is a transverse section on a plane indicated by line *xx* of Fig. 1. Fig. 3 is a sectional elevation of the expanding rollers, the cap in which they operate, and a portion of the tapering mandrel.

The same letters of reference are employed in all the figures in the designation of identical parts.

This invention, relating to that class of tools which is used for setting the flues in the flue-sheets of steam-generators, consists in the combination of a tapering mandrel; a series of swaging-rollers, every alternate one of which is constructed with a bead at each end fitting grooves in the others, and which are arranged to form a circle around the mandrel; and a cylindrical socket for revolving the rollers bodily around the mandrel and holding them temporarily in place until they begin to form grooves in the flue, when they will be supported between the mandrel and the wall of the flue independent of the socket. The object of my invention is to dispense with the necessity of fitting the swaging-rollers in bearings in the socket, as has been customary heretofore, and in this way to simplify and cheapen the construction of tools of this class.

In the example illustrated in the drawing six swaging-rollers are employed, those marked *A* being constructed with a bead or rounded collar, *a*, at each end, while those marked *A'* have grooves *a'* corresponding with the beads on the former. Every one of the rollers terminates at one end in a short neck, *b*, with a collar, *b'*. The rollers are arranged in a circle around the taper-

ing mandrel *B*, which is passed through them after they have been inserted in elongated slots in the head *C'* of the cylindrical socket *C*, with their necks, as shown. The collar on the end of the neck prevents the withdrawal of any one of the rollers until the mandrel is removed. The bore of the socket is such as to fit over the end of the flue to be set, and it should be so constructed that it can be readily turned on the flue by means of a wrench or other suitable device. The tapering mandrel terminates at the smaller end in a cylindrical screw-threaded bar, to work in a nut, *D*, which is held stationary at any desired point in the flue by means of a dog, *D'*, the latter fitting in an inclined groove in the nut so as to bind on the flue as the nut is drawn outward slightly in arranging the tool for operation. The opposite end of the mandrel is squared for the reception of a crank or wrench to feed it forward and force the rollers gradually apart as the swaging proceeds. A sufficient number of rollers should be employed to form a belt around the mandrel and cause the beads on one to extend into the grooves of its neighbors. In this manner they form a bearing one for the other and prevent individual longitudinal motion before that is more effectually prevented by the formation of grooves in the flue by the beading-rollers.

What I claim as my invention, and desire to secure by Letters Patent, is—

The combination of the tapering mandrel *B*, swaging-rollers *A A'*, constructed as described and arranged to form a belt around the mandrel for mutual support, and the socket *C C'*, substantially as and for the purpose set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

IRA S. HAMILTON.

Witnesses:

ELITHA F. LAYMAN,
J. L. WARTMANN.

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