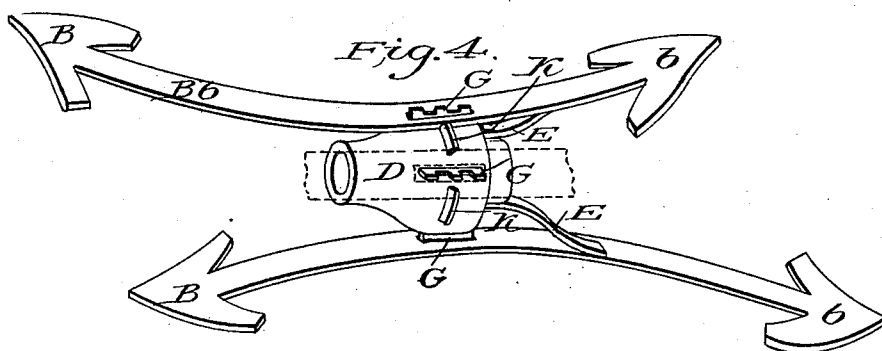
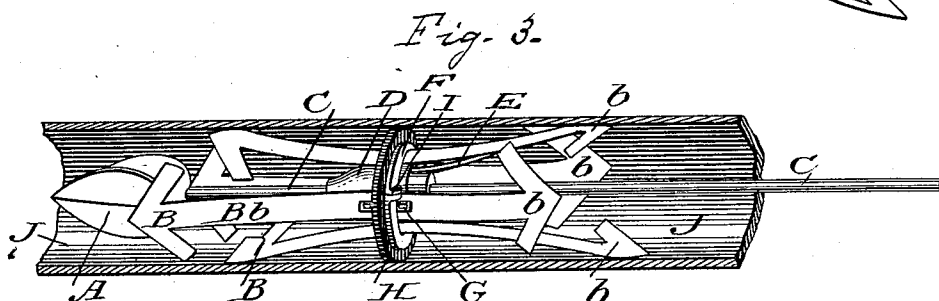
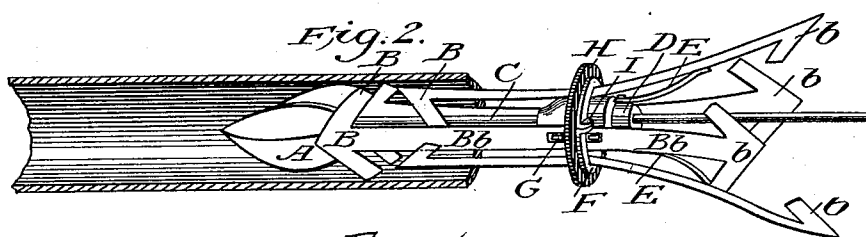
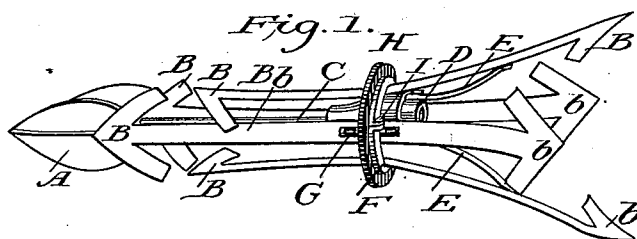


(No Model.)

D. W. DART.
FLUE CLEANER FOR STEAM BOILERS.

No. 521,155.

Patented June 12, 1894.



Witnesses.
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UNITED STATES PATENT OFFICE.

DANIEL W. DART, OF BINGHAMTON, NEW YORK, ASSIGNOR OF ONE-HALF
TO SIDNEY B. DOOLITTLE, OF SAME PLACE.

FLUE-CLEANER FOR STEAM-BOILERS.

SPECIFICATION forming part of Letters Patent No. 521,155, dated June 12, 1894.

Application filed July 10, 1893. Serial No. 480,076. (No model.)

To all whom it may concern:

Be it known that I, DANIEL W. DART, a citizen of the United States, residing at Binghamton, in the county of Broome and State of New York, have invented a certain new and useful Improvement in Flue-Cleaners for Steam-Boilers; and I do hereby declare that the following specification is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, forming part thereof.

My invention relates to devices for cleaning the flues of steam boilers; and the object of my invention is to provide a tool or device, which, fixed upon a rod or handle, and introduced into the flue of a steam boiler, and drawn back and forth therein, will, by the action of the spring knives, arranged in a certain manner, causing them to come into contact with the inner surface of the boiler tube, remove from the whole inside surface of the flue all adhering rust, scale, or ashes. I attain this object by means of the mechanism illustrated in the accompanying drawings, in which—

Figure 1. represents a view in perspective of my steam boiler flue cleaner with its rod or handle detached. Fig. 2. is a perspective view of my flue cleaner with its handle attached, and a sectional view of a tube into which the cleaner is entering. Fig. 3. is a sectional view of my cleaner as it appears when entirely in the flue. Fig. 4. is a perspective view of two of the spring knives of my flue cleaner and the core, showing their construction and the connection of said knives with the core.

Referring to Fig. 1. it will be seen that my cleaner is composed of the core (D.) into one end of which is screwed the rod (C.) upon the end of which is the guide (A.) which is not essential and may be made in any other form. In the opposite side of the core (D.) is an opening into which a guiding rod or handle can be screwed. Upon the core (D.) are formed the projections (G.) lengthwise of the core upon which the knives (B.) (b.) are placed the

projections entering through a slot in the knife shank (B'.) (b'.) fitting loosely. Upon this core and between each of the projections (G.) are other projections not shown in this figure but shown in Fig. 4. by letter (K.) running in the direction of the circumference of the core. Over these projections and around the core is bolted at (I.) the doubling ring or clasp (F.) in sections between which is fixed the ring of leather or rubber (H.) which projects outwardly far enough to touch the inside surface of the tube which it is used to clean.

The end of my cleaner having the guide (A.) I call the forward end, and the end in which the handle is screwed I call the rear end.

It will be seen that the knives (B.) and (b.) are attached to a shank (B'. b'.) which is slotted and secured at a point not equidistant from their two ends but rather nearer one end than the other, each pair opposite each other being slotted alike: thus arranging the four knives so that there are two short and two long shanked knives on the forward end and also on the rear end of the cleaner.

The knives (b.) (b.) (b.) (b.) upon the rear of the cleaner are held expanded by the springs (E.) (E.) (E.) (E.) which are secured to the core (D.) and by this expansion the forward knives (B.) (B.) (B.) (B.) are forced down and contracted toward the rod (C.) The knives (B.) (B.) (B.) (B.) and (b.) (b.) (b.) (b.) are arrow shaped and curved to such a degree that when expanded their shear outer edges will come in close contact with the inner surface of the tube, and by being arranged alternately back of each other the entire circumference or concavity of the tube is touched.

The guide (A.) is a four flanged arrow shaped head, its largest circumference being about the size of the tube in which it is used. Its office is to guide the knives and protect them as they enter the tube but this head is not essential and may be left off or any other head substituted in its place. In use this tool is attached to a rod handle and thrust forward and backward in the tubes.

The shear edge of the knives (B.) (b.) allows them to pass a permanent obstruction and at the same time to better cut away tem-

porary obstructions: while the rubber or leather ring (H.) rubs or brushes the surface of dust or ashes.

In Fig. 2. the forward knives (B.) (B.) (B.) (B.) are following behind the guide (A.) closely contracted while the rear knives (b.) (b.) (b.) (b.) are expanded by their springs (E.) (E.) (E.) (E.) As the tool is forced fully into the tube (J.) the rear knives are pressed together by contact with the tube, and the forward knives are expanded thereby till they come in contact with the inner tube surface, as shown in Fig. 3. where the knives are seen to be in equal contact with the surface of the tube: so that by thrusting the tool back and forth the inner surface is cleaned at all points.

In Fig. 4. is shown plainly the core (D.) with its projections (G.) and (K.) The knives (B.) (b.) rest upon the projections (G.), the part of the core on which the knives rest acting as a fulcrum upon which the knife shanks play. These knife shanks are slightly convex on their lower surfaces and their rear ends rest on the springs (E.) (E.) (E.) (E.) These knives are made of roll tempered steel and their shear cutting edges cause them to cut under the dirt instead of over it having this advantage

over straight edge knives or knives placed in the center.

What I claim as my invention, and desire Letters Patent for, is—

The combination, in a boiler flue cleaner, of a central core with attached upwardly and outwardly bent springs, and a series of concavo convex, arrow-head-shaped, cutting blades surrounding the central core, their concave side facing said core, said blades secured at their blunt ends to each end of concavo convex shanks of equal length whose convex sides are movably, secured at a point alternately forward and backward of the center of their horizontal length, upon lugs or projections formed upon the core, causing the said arrow shaped blades to attain such a position alternately backward and forward of each other as that their shear edges will engage the whole inner surface of the tube into which the device is introduced; as described and for the purpose specified.

DANIEL W. DART.

Witnesses:

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