

CHARLES LUNGLEY.

Improvement in Apparatus for Cleaning Tubes, Flues, &c.

No. 114,695.

Fig. 1.

Patented May 9, 1871.

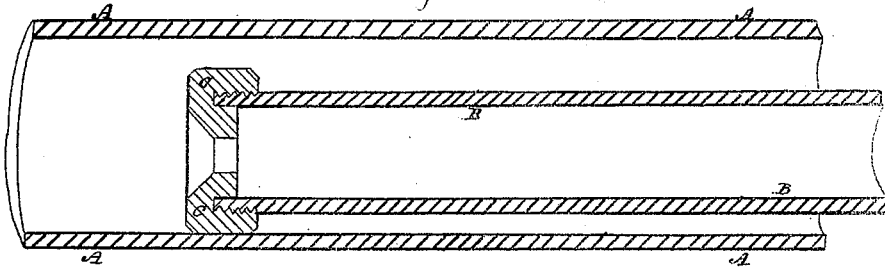


Fig. 2.

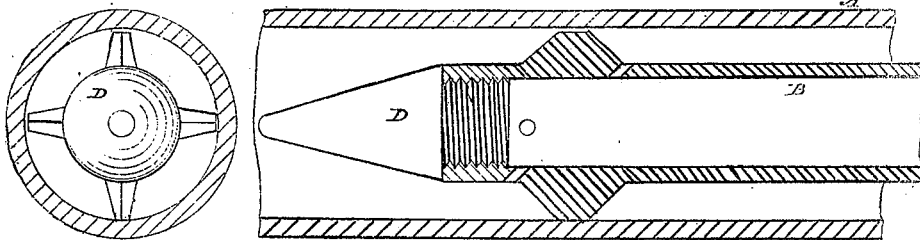


Fig. 3.

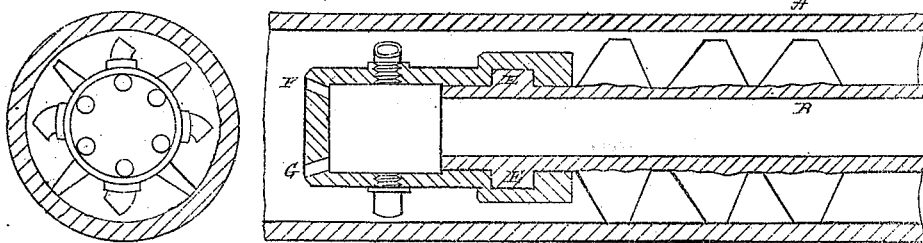
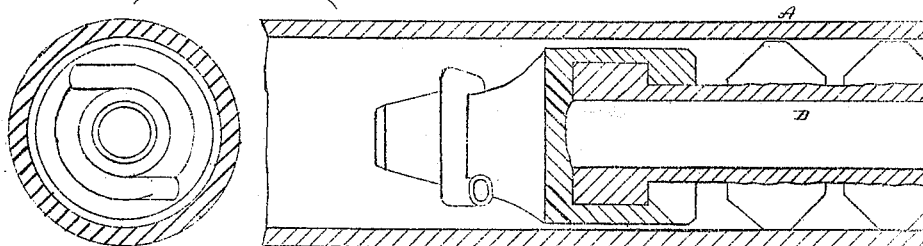


Fig. 4.



Witness
Spencer

Charles Lungley
E. A. Daniel

CHARLES LUNGLEY.

Improvement in Apparatus for Cleaning Tubes, Flues, &c.

No. 114,695.

Patented May 9, 1871.

Fig. 7.

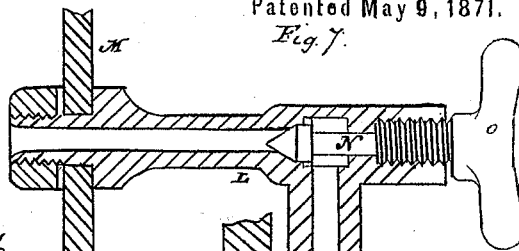


Fig. 6.

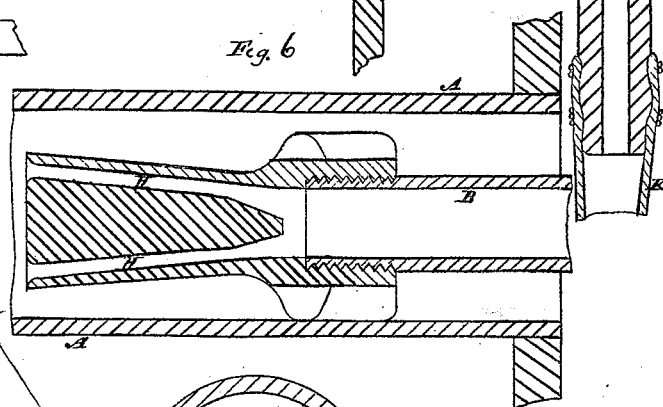


Fig. 9.

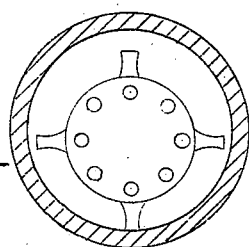
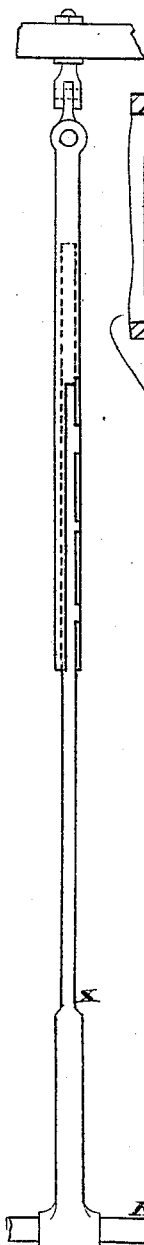
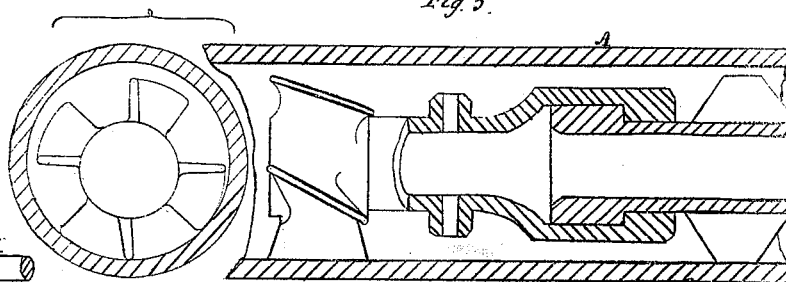


Fig. 5.



Witness
W. J. Brown

Charles Lungley

E. H. Daniel

CHARLES LUNGLEY.

3 Sheets--Sheet 3.

Improvement in Apparatus for Cleaning Tubes, Flues, &c.

No. 114,695.

Patented May 9, 1871.

Fig. 11.

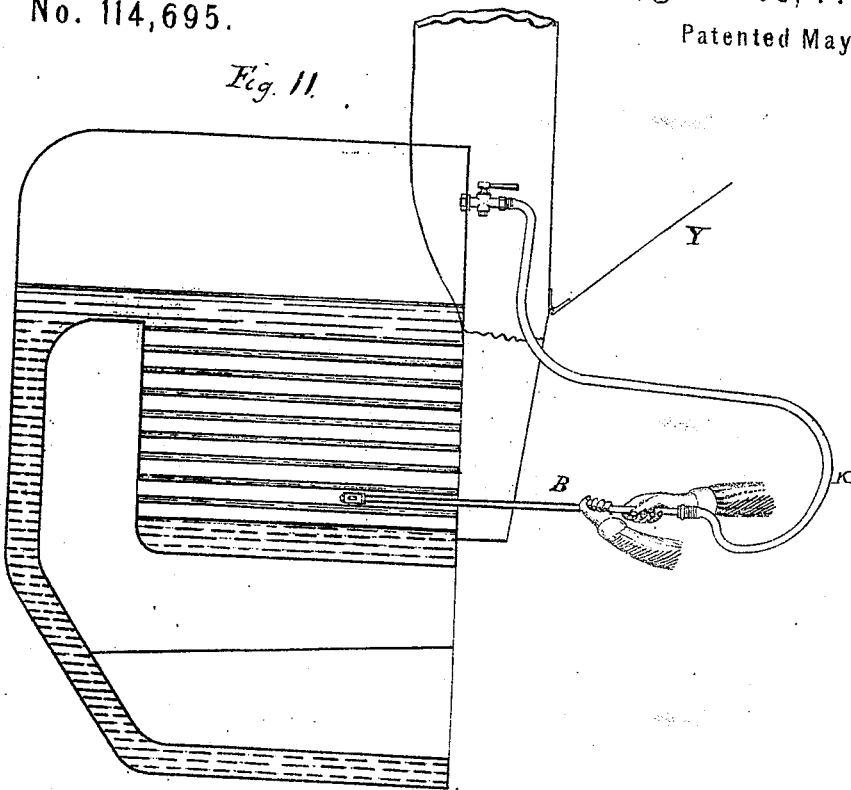
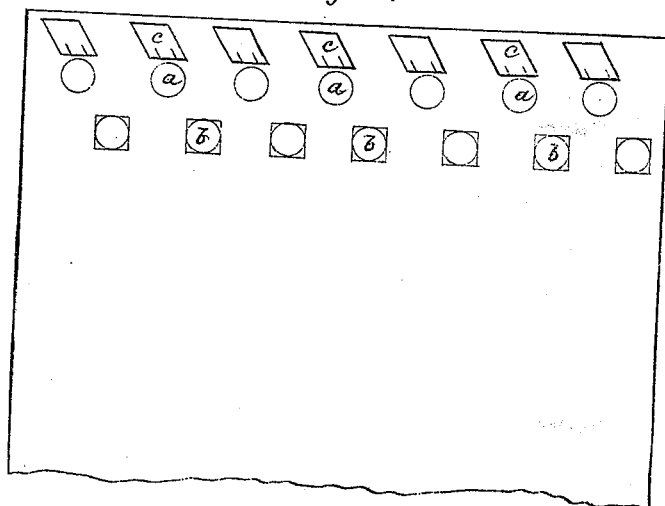


Fig. 10.



Witness
J. Hardner
 166 Fleet Street
 London

Charles Lungley
E. M. Daniel
 166 Fleet Street London

UNITED STATES PATENT OFFICE.

CHARLES LUNGLEY, OF GREENWICH, ENGLAND.

IMPROVEMENT IN APPARATUS FOR CLEANING TUBES, FLUES, &c.

Specification forming part of Letters Patent No. 114,695, dated May 9, 1871.

To all whom it may concern :

Be it known that I, CHARLES LUNGLEY, of Greenwich, in the county of Kent, England, hydraulic engineer, have invented or discovered certain new and useful Improved Means of and Apparatus for Removing Deposit from Tubes, Flues, and Passages; and I do hereby declare that the following is a full, true, and exact description thereof, reference being had to the drawings hereunto annexed; that is to say—

This invention relates to the employment of vapor, air, or combustible liquid for removing soot and other deposit from the interior of tubes, flues, or passages, and in the apparatus to be used therewith.

The apparatus relates to a pipe to be worked to and fro in the tubes, flues, or passages, by hand or by mechanical means, the pipe being supplied with steam, air, or liquid under pressure from a generator or reservoir. The action of the steam, air, or liquid against the soot or deposit causes it to fall away from the sides, and the force of the current drives it out of the tubes or flues.

A cap may be fitted over the end of the pipe and perforated with holes, either straight or diagonally, in any direction, or the pipe may be perforated, through which holes or perforations the steam, air, or liquid is caused to pass and impinge against the soot or deposit for the same purpose. The pipe or cap may have nipples or jets fitted on it or them for the steam, air, or liquid to pass through, or they may be widened out, or bell-mouthed, and perforated.

My invention consists in a rotating creeper or a screw-blade arranged on the body or end of the pipe or cap, to remove the soot or deposit from the tubes after it has been dislodged from them. The soot or deposit may be ejected from the front or back end of the tube or flue into a chamber or receiver. The pressure or heat of the steam, air, or liquid may be so great as to consume the soot or deposit as soon as it is dislodged, in which case the refuse only would have to be removed. The outer end of the pipe is attached by flexible tubing or jointed pipes to the generator or reservoir. In places where the heat is too great for the operator to bear I employ a mantlet or screen in order to protect him from injury.

Figure 1 of the accompanying drawings is a section of a tube, A, such as is usually employed in marine and tubular boilers. Into the tube may be inserted a pipe or tube, B, of smaller diameter, through which steam, air, or fluid, or a combination of them, may be passed under pressure. The pipe B may be opened to its full diameter, or contracted in any suitable manner, or it may be fitted with an end piece, C, as shown. The end piece has a hole in its middle, the outer face of which is cone-shaped, for spreading the vapor, air, or fluid against the interior surface of the tube as it is drawn to and fro therein. The flange of the end piece C overlapping the end of the pipe serves to force the deposit along the tube in either direction, as it becomes dislodged by the action of the fluid. Fig. 2 shows another example for removing the soot or other deposit from the tubes. In this case the pipe B is entirely stopped up at the end by the screw-plug D, and in order to prevent the vapor-pipe from resting upon the bottom of the tube A, by which the holes would become clogged, a ring or a similar contrivance may be fitted close to the end; this ring is provided with spikes or angular projections, so that it can pass easily over or through the deposit without fixing itself in the tube. In this figure I have shown the holes, by which the vapor or fluid escapes, formed at an angle, so that the issue of the vapor forces the loose soot, &c., before it as well as dislodging it, as the pipe B is being drawn to and fro. Fig. 3 shows the end of a pipe, B, formed with a flange or ring, E, which is embraced loosely by a cap or ferrule, so that it may be free to turn thereon. This cap or ferrule is furnished with nipples, which are bent or curved to insure the cap turning by the action of the vapor in its passage along the tube. There are holes F and G formed at an angle, so that the loose deposit is blown out of the tube. Fig. 4 is a similar view of a pipe, B, fitted with a rotating nozzle or cap; the jets or nipples in this case are bent or curved in a forward direction, so that the fluid acts upon the loose deposit as well as upon the fixed deposit. Fig. 5 is a view showing the cap fitted with screw-blades or vanes, so that as the cap revolves the vanes draw or push the loose deposit before them. Fig. 6 shows another form of cap or end piece. In

this case the end piece is cone-shaped and perforated, so that the vapor is spread to impinge against the tube to remove the deposit and at the same time blow the loose deposit out at the back end of the tube A. I fit or form shoulders or ribs on the cap, so that the holes H are kept clear of the bottom of the tube.

The pipe B, by which the vapor is furnished to the tube A, is connected by a flexible tube, K, leading from a tap, L, Fig. 7, so that steam from the upper part of the boiler M may be passed into it when the cone of the plug N is removed from its seat by turning the handle O.

To facilitate the working of the pipe B in any of the arrangements described above, I attach the flexible tube K to a connection on the end of a rod, X, Fig. 9. This rod passes up into a tube, which is jointed and hung to a beam overhead, so that it can be turned about in any direction. The lower rod X has a lug or projection on it so that it can be pushed up and retained in position, when not required for use, by the lug being passed into one of the recesses provided for it in the suspension-tube.

When it is necessary to shield the workman from the effects of the heat when the smoke-door is open for cleaning the tubes, I fit a mantlet or shield, Fig. 10, formed with sight-holes *a a*, through which the workman can look, and other holes *b b* for the insertion of the pipe B. These pipe-holes are furnished with flaps or shutters *c c*, so that the holes not required may be shut up. This mantlet may be composed of wings or sliding pieces so that

one or more portions may be slid in the fixed portion or portions to economize space and offer facilities for getting at the tubes. Fig. 11 represents in section a marine-boiler with the steam-tube in one of the ordinary flue-tubes, and taking its supply of steam from the upper part of the boiler by the flexible pipe K. The flap or smoke-door Y is thrown open to allow of the cleaning-tube being passed in the flue-tubes with facility.

I claim—

1. The revolving cap, as shown in Figs. 3 and 4, in combination with a steam-jet head for cleansing flues, substantially as herein shown and described.
2. The scraping-blades, as shown in Figs. 5 and 6, in combination with a steam-jet head for cleansing flues, substantially as herein shown and described.
3. The flexible tube K, attached to the rod X, when the same are constructed, arranged, and operate as herein shown and described.
4. The shield, Fig. 10, for protecting the operator from the effects of heat while cleansing the tubes, substantially as set forth.

In witness whereof I, the said CHARLES LUNGLEY, have hereunto set my hand this sixteenth day of June, one thousand eight hundred and seventy.

CHARLES LUNGLEY.

Witnesses :

A. GARDNER,
166 Fleet Street, London.

E. C. DANIEL,
166 Fleet Street, London.