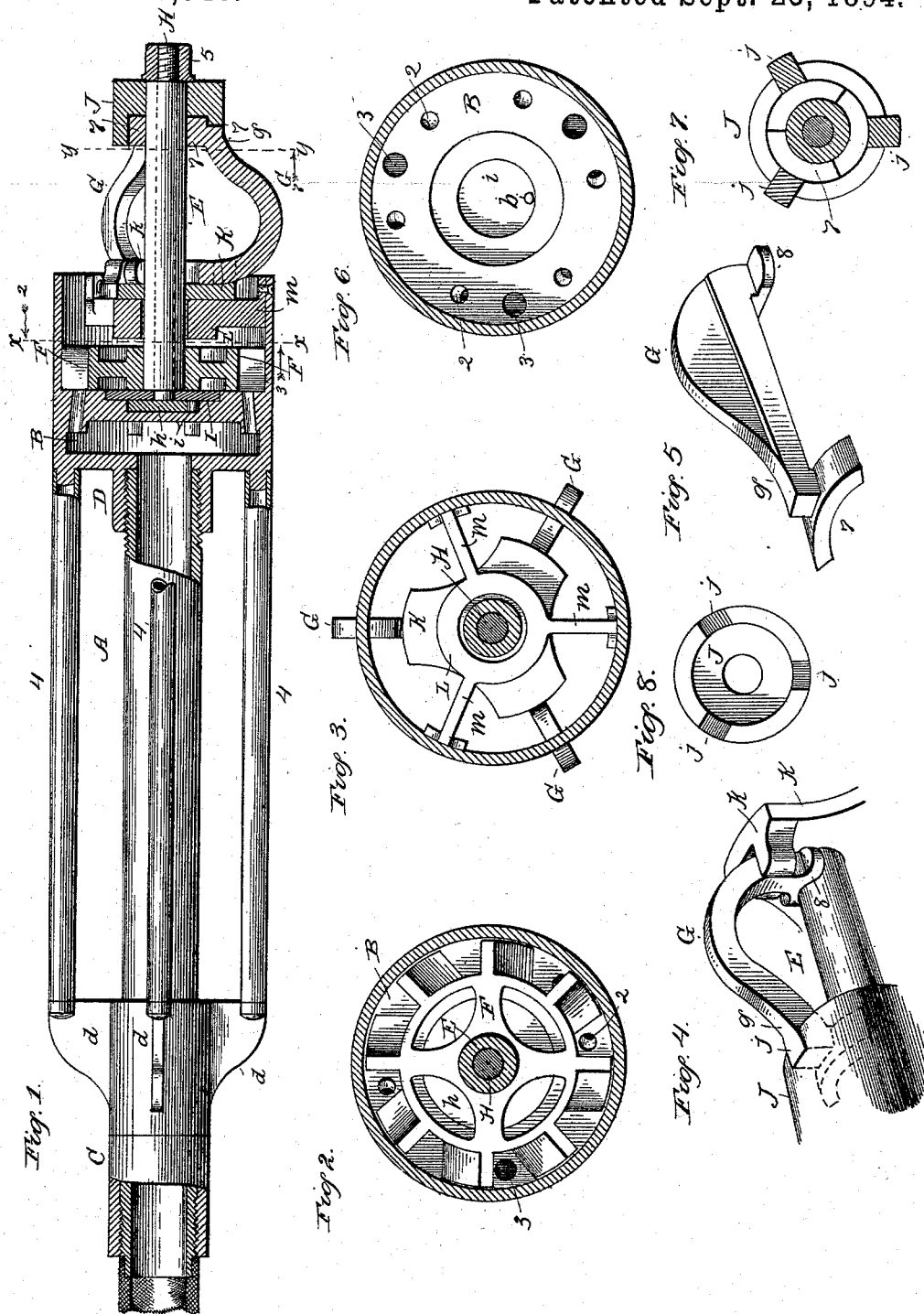


(No Model.)

C. S. DEAN.  
BOILER FLUE CLEANER.

No. 526,648.

Patented Sept. 25, 1894.



Witnesses  
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# UNITED STATES PATENT OFFICE.

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## BOILER-FLUE CLEANER.

SPECIFICATION forming part of Letters Patent No. 526,648, dated September 25, 1894.

Application filed May 29, 1894. Serial No. 512,879. (No model.)

*To all whom it may concern:*

Be it known that I, CYRUS S. DEAN, a subject of the Queen of Great Britain, residing at Fort Erie, in the county of Welland and Province of Ontario, Canada, have invented certain new and useful Improvements in Boiler-Flue Cleaners; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention aims to provide a cleaner for the flues of tubular boilers which will be positive in its action and perform the work of removing soot, scale and deposit from the sides of the flues in a thorough, efficient and rapid manner without fatiguing the fireman or other person engaged in this otherwise tiresome task.

The improvement consists of a cylindrical casing open at its forward and closed at its rear end by a hollow head constituting a steam chamber, adapted to be connected to a flexible steam hose or other pipe and be moved through the tube or flue to be cleaned, a propeller located within the casing and driven by jets of steam escaping from the steam chamber, and blades mounted on the same shaft with the propeller and adapted to move outward to adapt themselves to any irregularities in the walls of the flues or tubes to prevent damage to the device in the event of an unyielding obstruction being met with and to conform to any depressions in the said walls so as to remove all deposits therefrom.

The invention also consists in the peculiar formation of the blades and the manner of mounting them on the shaft whereby they will move outward in radial lines and be firmly braced against lateral stress when in active operation.

The invention further consists of the novel manner of connecting the propeller and the blades and mounting them on a tubular shaft which is journaled upon a spindle attached to the casing so as to revolve therewith, but free to move laterally to center the blades in the flue.

The invention also further consists of the novel features and the peculiar construction and combination of parts which hereinafter

will be more fully described and claimed and which are shown in the annexed drawings, in which—

Figure 1 is a side elevation of a cleaner embodying the invention, parts being broken away to show more clearly the relative disposition of the parts. Fig. 2 is a section on the line X—X of Fig. 1 on a larger scale looking to the left. Fig. 3 is a similar section taken on the same line as Fig. 2 looking to the right. Fig. 4 is a detail view of one of the blades. Fig. 5 is a view of a modified form of blade. Fig. 6 is a detail view of the closed end of the casing. Fig. 7 is a section on the line y—y of Fig. 1 looking to the right. Fig. 8 is a detail view of the cap.

Similar letters and numerals indicate corresponding parts in the several views of the drawings.

The letter A represents a casing which is cylindrical and of proper diameter and length open at the front and closed at the rear end by a hollow head B. The outer wall of the head connects with a pipe C, which is twelve to fourteen inches in length, having a coupling at its outer end to which a hose or other operating pipe is to be attached when it is required to use the device. The inner wall has a series of oblique openings 2 arranged in a circle near the outer edge forming outlets for the jets of steam by means of which the propeller is actuated. The walls of the openings 2 are prolonged into the steam chamber a sufficient distance to give the required angle to the steam jet, to secure the best results. Other outlets 3 in the inner wall are straight and designed to throw jets parallel with the length of the tube to be cleaned so as to furnish a blast by means of which the loosened soot, scale, &c., will be carried off in advance of the cleaner as it is moved through the tube. A sleeve D at the outer end of the pipe C has bracket arms *d* projecting radially therefrom to support rods 4 which extend in parallel relation with each other and with the pipe C and are attached at their forward ends to the casing A. The outer elements of the rods come about flush with the outer surface of the casing and are designed to touch the inner walls of the boiler tubes and steady and prevent wobbling of the cleaner therein. These

rods are preferably tubular and their ends are fitted on nipples or projections on the casing and the brackets *d*. The number and position of the rods may be varied at will.

5 The shaft E carrying the propeller F and the blades G, is tubular and mounted upon a spindle H threaded at its outer end to receive a nut 5, and having a head *h* at its inner end to enter a recess *i* centrally disposed in the  
10 inner wall of the steam chamber. A plate I comes flush with the said inner wall and is bolted or otherwise secured thereto and serves to retain the head *h* in the recess *i*. The spindle passes through an opening in the plate  
15 I and is held from turning independently of the casing by a pin *b* projecting from the inner wall of the steam chamber entering a notch or opening in its head *h*. The recess *i* and head *h* are of such relative dimensions  
20 that the spindle can move laterally at its outer end in all directions thereby admitting of its automatic adjustment to center the blades.

The propeller F is a small motor wheel whose buckets or wings stand obliquely and  
25 receive the impact of the steam at approximately right angles to their faces under which conditions the jets are utilized to the best possible advantage in driving the wheel.

The blades G curve outward between their  
30 ends and have a neck portion *g* by which they are pivotally connected to the shaft E and may be skeleton shaped, or have the form of curved bars, as shown most clearly in Fig. 4, or be flat plates, as shown in Fig. 5. Cross  
35 heads are provided at each end of the blades to retain them in place and limit their movements. The cross heads 7 at the outer or neck ends of the blades are segments of a circle. These segment heads form a circle when the  
40 parts are assembled as shown in Fig. 7. The inner cross heads 8 form stops simply to limit the outward movements of the blades. A cap J secured on the shaft E is enlarged at its inner end to receive the segment cross heads 7  
45 and has notches *j* to receive the ends of the blades. A plate K secured on the shaft E a proper distance from the cap J has pairs of lugs *k* near its outer edge to receive the inner ends of the blades which work between the  
50 said lugs in their movements to and from the shaft E. The cross heads 8 engage with the inner ends of the lugs *k* and limit the outward movement of the blades. These blades  
55 may be of tempered steel or chilled cast iron and will be sufficiently hard to maintain a cutting edge. This plate K is triangular shaped and the lugs *k* are disposed at the angles. The plate is arranged relative to the casing so that the straight openings 3 will come  
60 about opposite the space provided between the edges of the plate and the inner walls of the casing so that the jets will have a clear sweep to remove the loose matter from the tube in the process of cleaning. A bearing  
65 ring L located between the propeller and the plate K has arms *m* which are secured to the inner walls of the casing.

The cleaner is attached to a hose or other pipe which is connected with the boiler or reservoir of compressed air or other media  
70 by which the blades are rotated and the loose stuff carried off.

The cleaner is pushed through the tube and the blades rotating at a high rate of speed remove all deposits from the walls thereof. The  
75 jets from the straight outlets 3 supplemented by the other jets create a blast through the tube which carries off all loose particles as soon as detached thereby preventing choking and impediment to the progress of the cleaner  
80 through the length of the tube or flue. The blades fly outward by centrifugal action and scrape the walls of the tubes.

The cross heads 7 fit loosely within the cap J to admit of the free movements of the blades  
85 at their inner or rear ends in an outward direction under centrifugal action. The cutting edges of the blades come very close to the walls of the tube and but little movement of the blades is necessary to bring the said  
90 cutting edges into active position. The degree of movement of the cross heads within the cap is so slight as not to be appreciable and ample provision is had therefor in the loose fit or joint between the said cap and  
95 cross heads 7.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. A flue cleaner comprising a casing, a  
100 propeller located within the casing and protected thereby, and a scraper exterior to the casing and driven by the propeller, substantially as specified.

2. A flue cleaner comprising a cylindrical  
105 casing open at the front and closed at the inner or rear end by a hollow head, a propeller located within the casing and adapted to be driven by jets escaping from the said chamber, and a scraper exterior to the casing and  
110 having connection with and operated by the said propeller, substantially as described.

3. A flue cleaner comprising a casing open at the front and closed at the rear end by a  
115 hollow head having oblique outlets in the inner wall, a propeller located within the casing, and a scraper exterior to the casing and operated by the propeller, substantially as set forth.

4. A flue cleaner comprising a casing open  
120 at the front and closed at the rear end by a hollow head having oblique outlets in the inner wall, a propeller located within the casing, and having its buckets standing at an opposite angle to the oblique outlets, and a  
125 scraper exterior to the casing and operated by the propeller, substantially as set forth.

5. A flue cleaner comprising a casing open at the front and closed at the rear end by a  
130 hollow head having oblique and straight outlets in its inner wall, a propeller located within the casing and driven by the jets issuing from the oblique outlets, and a scraper exterior to the casing and operated by the pro-

5 peller, the jets issuing from the straight out-  
lets being designed to create a blast in the  
tube to remove loose particles, substantially  
as specified.

5 6. A flue cleaner comprising a casing open  
at the front and closed at the rear end by a  
hollow head having outlets in its inner wall,  
a spindle connected with the said head by  
a universal joint, a hollow shaft mounted  
10 on the spindle, a propeller and a scraper car-  
ried by the said hollow shaft, substantially  
as described.

15 7. A flue cleaner comprising a casing open  
at the front and closed at the rear end by a  
hollow head having outlets in its inner wall,  
a spindle connected with the said head by  
a universal joint, a hollow shaft mounted  
on the spindle, a propeller attached to the  
20 hollow shaft, and a series of scraping blades  
disposed about the said shaft and adapted to  
have an outward movement, substantially as  
and for the purpose described.

25 8. A flue cleaner comprising a casing open  
at the front and closed at the rear end by a  
hollow head having outlets in its inner wall,  
a spindle connected with the said head by  
a universal joint, a hollow shaft mounted  
on the spindle, a propeller attached to the  
hollow shaft, and a series of scraping blades  
30 curved outward between their ends and hav-  
ing a neck portion by means of which they  
are pivotally attached to the said shaft, sub-  
stantially as set forth.

9. In a flue cleaner the combination with

a rotary shaft, having supports disposed a 35  
short distance thereon, of scraper blades hav-  
ing cross heads at their ends and engaged  
with the said supports, substantially as speci-  
fied.

10. In a flue cleaner, the combination with 40  
a rotary shaft, a cap and a plate mounted  
thereon, of blades having segment cross heads  
at one end which are engaged by the said cap,  
and having engagement at the opposite ends  
with the said plate, substantially as described. 45

11. In a flue cleaner, the combination with  
a rotary shaft, a cap and a plate having pairs  
of lugs secured on the shaft, of scraper blades  
having cross heads at their ends and engaged  
with the cap and the plate, the movable ends 50  
working between the lugs and limited in their  
outward movement by the cross heads, sub-  
stantially as described.

12. In a flue cleaner, the combination with  
a casing carrying the scraping devices, a 55  
short pipe attached to the casing, a sleeve  
mounted on the outer end of the pipe and  
having bracket arms, and guide rods sup-  
ported between the casing and the bracket  
arms and adapted to steady and guide the 60  
device in the tube to be cleaned.

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

CYRUS S. DEAN.

Witnesses:

JOHN A. KENNEDY,  
GEO. C. TALBOT.