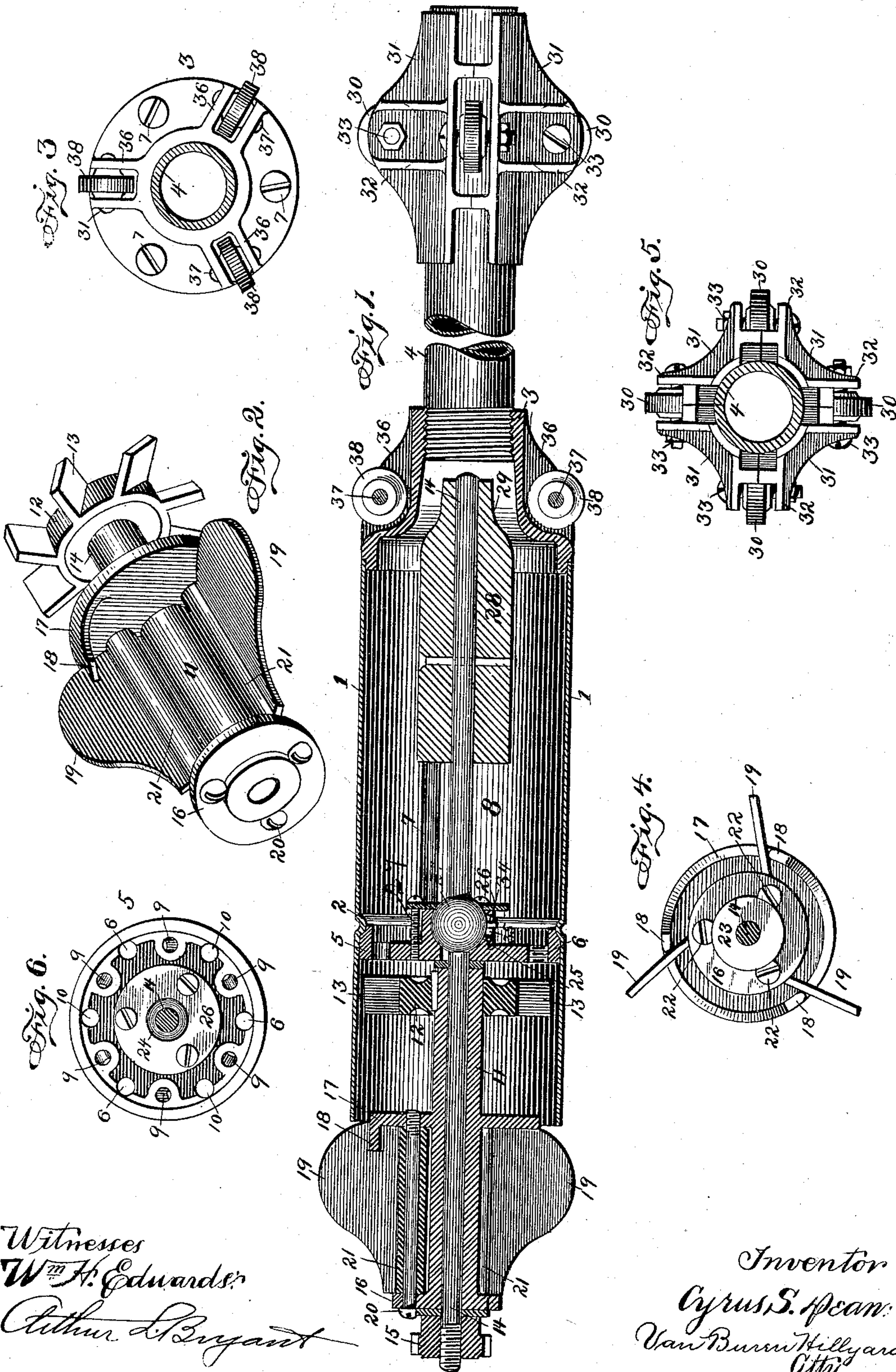


(No Model.)

C. S. DEAN.
BOILER FLUE CLEANER.

No. 561,497.

Patented June 2, 1896.



Witnesses
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UNITED STATES PATENT OFFICE.

CYRUS S. DEAN, OF FORT ERIE, CANADA, ASSIGNOR OF ONE-HALF TO
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BOILER-FLUE CLEANER.

SPECIFICATION forming part of Letters Patent No. 561,497, dated June 2, 1896.

Application filed December 23, 1895. Serial No. 573,069. (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, Province of Ontario, Canada, have invented certain new and useful Improvements in Boiler-Flue Cleaners, of which the following is a specification, reference being had therein to the accompanying drawings.

10 This invention relates to flue-cleaners which embody in their organization cutting-blades actuated by jets of steam, compressed air, or other medium to rotate them at a high speed, and which fly outward under centrif-
15 ugal force against the sides of the flue and remove the soot, scale, and deposit therefrom.

The object of the improvement is the provision of a cleaner which will be positive in its action and perform the work in a rapid,
20 effective, and thorough manner without fatiguing the person engaged in this otherwise arduous and tiresome occupation.

A further object of the improvement is to increase the life and usefulness of the device
25 and to prevent injurious contact of the cutting-blades with unyielding obstructions and scale in the boiler-flues.

The improvement also aims to centralize the rotary cutter, so as to insure a uniform action, whereby the soot and scale are removed
30 evenly and a thorough cleansing of the flue effected.

The invention also aims to reduce the friction of the device to a minimum when moving it through the flues, and thereby lessening the task of the user.

Other objects and advantages are contemplated and will become apparent as the nature of the invention is comprehended; and
40 to this and such other ends as appertain to the character of the invention the latter consists in certain details of construction, novel features, and peculiar combinations of the parts, which hereinafter will be more fully de-
45 scribed, illustrated, and claimed.

In the accompanying drawings is illustrated an embodiment of the invention, although various changes in the form, proportions, and minor details of construction may
50 be resorted to without departing from the

spirit of the invention, and in the said drawings--

Figure 1 is a central longitudinal section of a boiler-flue cleaner constructed in accordance with the principles of this invention. 55
Fig. 2 is a detail perspective view of the tubular shaft bearing the propeller-wheel and the rotary cutter. Fig. 3 is a rear end view of the device, showing the relative disposition of the wheels for relieving the friction. Fig. 60
4 is an end view of the rotary cutter, showing the washer for locking the pins or bolts upon which the blades are mounted. Fig. 5 is a detail view of the antifriction-wheels and their mountings for supporting the pipe by 65
means of which the device is manipulated. Fig. 6 is a detail view of the plate or head having the jet-openings and in which the spindle is balanced and supported by means of a ball-and-socket joint. 70

The same reference-numerals denote corresponding and like parts in all the figures of the drawings.

The numeral 1 indicates the casing, which is of suitable length and diameter to suit the 75
nature of the work and to accommodate the size of the flue or tube for which the cleaner is designed, and this casing is open at both ends and is provided between its ends with an inner shoulder or rib 2, formed by swag- 80
ing or spinning a groove in the outer side of the casing, as commonly practiced in sheet-metal working. A head or end 3 is fitted to and closes the rear end of the casing 1 and is adapted to have a pipe 4 coupled thereto 85
for ease and convenience in manipulating the cleaner. A plate or head 5 is fitted within the casing against the shoulder or rib 2, and the edge contiguous to the said rib is recessed to receive the latter and is provided at inter- 90
vals near its edge with threaded openings 6 to receive the inner threaded ends of the bolts or machine-screws 7, by means of which the head 3 and the plate 5 are secured in place. 95
The space 8, formed between the parts 3 and 5, receives the steam, compressed air, or other medium by means of which the rotary cutter is driven, and the said plate 5 is provided with a series of oblique openings 9 and a corresponding series of straight openings 10, and 100

these openings 9 and 10 provide for the issuing of jets for operating the cutter and clearing the tube or flue of the scale and soot loosened from the sides thereof by the cutter.

5 The shaft 11, carrying the propeller-wheel 12 with its blades 13, is tubular and is mounted upon a spindle 14, which is threaded at its outer end to receive a nut 15, having its head
10 formed with projections or otherwise constructed so as to be readily turned by the hand. The propeller-wheel 12 is a small motor-wheel whose buckets or wings 13 stand obliquely and receive the impact of the jets at approximately right angles to their faces,
15 thereby admitting of the said jets being utilized to the best possible advantage for driving the wheel, and this propeller-wheel is secured upon, or, if desired, may be formed with, the inner end of the tubular shaft 11.
20 An annular flange or ring 16 is provided at the front end of the shaft 11, and a companion flange or ring 17 is provided upon the shaft 11 and is located a short distance in the rear of the flange 16 and is provided at intervals around its periphery with stops 18 to
25 prevent the blades 19 from passing beyond a given position.

The blades 19 curve outwardly between their ends and will be of tempered steel or
30 chilled cast-iron, so as to maintain a cutting edge, and are tangentially disposed with reference to the circumference of the shaft 11 and are hinged or pivotally supported at their inner edge, preferably by means of pins or
35 bolts 20, which pass through a sleeve or knuckle 21 at the inner edge of the said blades and through alining openings in the flanges 16 and 17, the inner openings being threaded to receive the inner threaded ends
40 of the bolts 20.

Any convenient means of pivoting the blades to the shaft may be provided, although the provisions shown are preferred, in that they admit of the blades being readily re-
45 moved for making repairs or to be substituted by new blades.

The heads of the bolts 20 have indentures 22 in one side to receive the edge of a washer 23, by means of which the said bolts are locked
50 against rotation and accidental displacement after being properly positioned, and this washer 23 is mounted upon the outer end of the spindle 14 and is confined between the front end of the shaft 11 and the nut 15.

55 The spindle 14 is provided at a point intermediate of its ends with a ball 24, which obtains a bearing in a socket 25, formed centrally in the plate 5, and is retained in the said socket by means of a ring 26 and binding-screws 27, the latter passing through openings in the ring 26 and entering corresponding threaded openings in the plate 5. The ball-and-socket bearing thus provided be-
60 tween the spindle 14 and the plate 5 admits of the cutter oscillating so as to adapt itself to the tube or flue being cleaned, thereby enabling the cutter to clear any inequalities or

70 unyielding obstructions formed on the inner walls thereof. A weight 28 is secured upon the rear end of the spindle 14 and is of sufficient mass to counterbalance the rotary cutter and the propeller-wheel, thereby providing for the equipoise of the rotary cutter, and thereby facilitating the work of the cleaner. The rear end of the weight is reduced, as
75 shown at 29, and projects into the reduced portion of the head or end 3 and has a limited movement therein, whereby the amplitude of movement of the rotary cutter is controlled.

In order to prevent the pipe 4 from coming
80 in direct contact with the sides of the flue or tube to be cleaned and to centralize the same, antifriction-wheels 30 are provided and are mounted between the adjacent ends of segments 31, whose ends 32 extend outwardly
85 and are apertured to receive bolts 33, upon which the antifriction-wheels 30 are mounted, and which serve to secure and clamp the segments 31 about the said pipe 4 at a convenient point.
90

The pipe 4 is to be connected with the boiler, reservoir of compressed air, or other medium by means of which the cutter is driven and the loose scale and soot carried off, and the cleaner is pushed through the flue or tube,
95 and the cutter rotating at a high rate of speed causes the blades to fly outward and engage with the sides of the flue or tube and remove all deposits therefrom. The jets from the straight openings or outlets 10, supplemented
100 by the other jets, create a blast through the flue or tube sufficient to carry off all loose particles, and thereby prevent choking and impediment to the progress of the cleaner through the flue. Should the blades meet
105 with any unyielding obstructions, they will turn on their pivotal supports and ride over the said obstructions without receiving injury. The series of blades and their mounting constitute the rotary cutter and will be
110 so designated in the subjoined claims.

To the successful operation of the cleaner, it is essential that the counterbalanced spindle be held against rotation, and to attain
115 this end the ball 24 is provided with a pin 34, which operates in a slot 35 in that portion of the plate 5 inclosing the socket 25, and this construction in no wise prevents the universal movement of the spindle when adapting itself to the character of the tube or flue be-
120 ing cleaned.

The head or end 3 is provided with pairs of lugs 36, which are formed with alining openings, through which pass pins or bolts 37, upon which are mounted rollers 38, which are adapted to bear against the sides of the flue or tube,
125 so as to relieve the frictional contact incident to the movement of the cleaner through the flue or tube operated upon.

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

1. A flue-cleaner comprising a casing and a counterbalanced spindle provided on its outer

end with a rotary cutter, substantially as and for the purpose set forth.

2. A flue-cleaner comprising a casing, a plate located within the casing, and a counterbalanced shaft mounted in the plate and provided at its outer end with a rotary cutter, substantially as set forth.

3. A flue-cleaner comprising a casing, a plate located within the casing, a spindle mounted in the plate intermediate of its ends by means of a ball-and-socket joint, a counterbalance at the inner end of the spindle, and a rotary cutter at the outer end of the said spindle, substantially as and for the purpose set forth.

4. In a flue-cleaner the combination of a casing, a plate located within the casing and provided with openings for the escape of the propelling medium, a counterbalanced spindle mounted in the plate by means of a ball-and-socket bearing, and a rotary cutter at the outer end of the counterbalanced spindle, substantially as described for the purpose specified.

5. In a flue-cleaner the combination of a casing, a plate located within the casing and provided with openings for the escape of the propelling medium, a spindle having connection with the plate by means of a universal joint, a tubular shaft mounted upon the spindle and provided with a propeller-wheel, and a rotary cutter at the outer end of the tubular shaft, and exterior to the casing, substantially as set forth for the purpose described.

6. In a flue-cleaner, the combination of a casing, a plate located therein, a counterbalanced spindle mounted in the said plate by means of a universal joint, a pin extending across the joint between the spindle and the plate to hold the said spindle against rota-

tion, and a tubular shaft mounted upon the outer end of the spindle and provided with a propeller-wheel and a rotary cutter, substantially as and for the purpose set forth.

7. In a flue-cleaner, the combination with a casing, inclosing the operating parts of an end piece having pairs of lugs, and rollers journaled between said lugs and adapted to travel upon the inner wall of the flue or tube to be cleaned, substantially as set forth.

8. The combination with a flue-cleaner, of a manipulating-pipe, having connection therewith, segments having their ends extending outwardly and adapted to be clamped about the said pipe and antifriction-wheels journaled upon the fastenings connecting the said segments, substantially as set forth for the purpose described.

9. The herein shown and described boiler-flue cleaner, comprising a casing having an inner shoulder about midway of its end, a head closing the rear end of the casing, a plate fitted against the said inner shoulder and provided with openings for the escape of the propelling-wheel, bolts connecting the said head and plate, a counterbalanced spindle having a ball-and-socket connection with the plate and held from rotating, a tubular shaft mounted upon the outer portion of the spindle and provided with a propeller-wheel and with a rotary cutter, and means for securing the tubular shaft upon the spindle, substantially as set forth.

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

CYRUS S. DEAN.

Witnesses:

SHIPLEY BRASHEARS, Jr.,
CHARLES O. RANO.