A. A. HULL.

FLUE CLEANER.

APPLICATION FILED NOV. 6, 1912.

1,067,117.

Patented July 8, 1913.

Fig. 1.

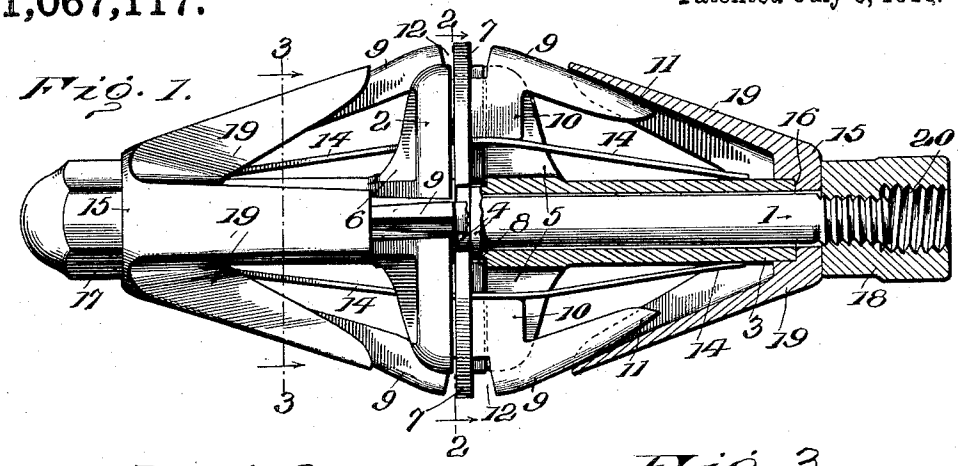


Fig. 2.

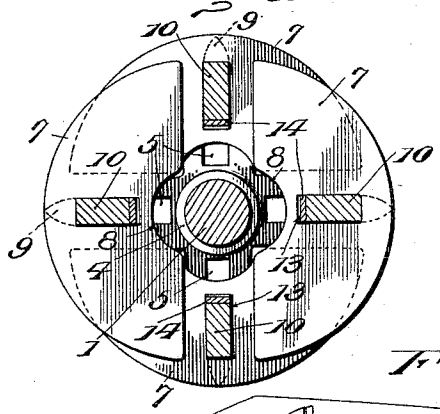


Fig. 3.

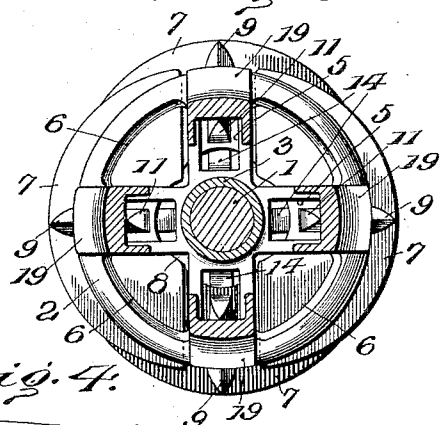
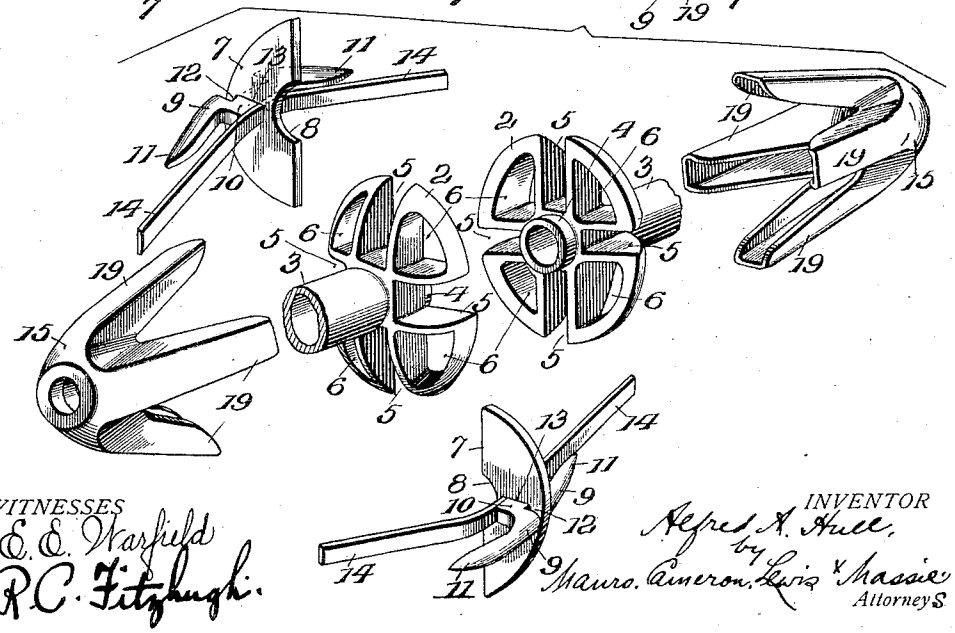


Fig. 4.



WITNESSES

E. E. Warfield

R. C. Fitzhugh.

INVENTOR

Alfred A. Hull,

by Mauro, Cameron, Lewis & Massie

Attorneys

COLUMBIA PLANOGRAPH CO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

ALFRED A. HULL, OF KNOXVILLE, TENNESSEE.

FLUE-CLEANER.

1,067,117. Specification of Letters Patent. Patented July 8, 1913.

Application filed November 5, 1912. Serial No. 729,554.

To all whom it may concern:

Be it known that I, ALFRED A. HULL, of Knoxville, Tennessee, have invented a new and useful Improvement in Flue-Cleaners, which invention is fully set forth in the following specification.

This invention relates to flue cleaners provided with transverse scraping elements bearing outward against the interior face of a boiler tube, while the cleaner is reciprocated longitudinally in the tube, and is more particularly designed as an improvement on U. S. Patent No. 1,018,826, granted to me February 27th, 1912.

The object of the invention is to increase the efficiency of the cleaner, reduce the number of its parts, whereby its construction is simplified and it is rendered less liable to get out of order, and its cost of construction is reduced.

The inventive idea involved in my invention is capable of receiving a variety of mechanical constructions, one of which, for the purpose of illustrating the invention, is shown in the accompanying drawings, but it is to be understood that such drawings are for the purpose of illustration only, and are not designed to define the limits of the invention, reference being had to the claims hereto appended for this purpose.

In said drawings—Figure 1 is a side elevation, partly in section, of one form which the invention may assume; Fig. 2 is a vertical transverse section on the line 2—2 of Fig. 1, looking in the direction of the arrows; Fig. 3 is a similar view on line 3—3 of Fig. 1, looking in the direction of the arrows; and Fig. 4 is a view showing certain of the parts disassembled and in perspective.

Referring to the drawings, in which like reference characters indicate like parts, 1 is an axial member, here shown in the form of a shaft screw-threaded at its opposite ends upon which the scraper elements are mounted, and to which the rod for manipulating the cleaner is attached, as hereinafter described.

2, 2, are a pair of oppositely disposed guiding elements having formed integral therewith in each case a sleeve 3, by which said guide members are mounted upon the shaft, each of the members having on its inner face a projecting hub or boss 4, by means of which the said guide members are suitably spaced, so that when in position upon the axial member or shaft 1, there is formed an annular guiding space between the members. Each of these guiding members is provided with four radial slots 5 (Fig. 4), which divide the guide members into quadrants. Preferably, each of the quadrants is chambered out, as at 6, for the purpose of preventing any accumulation of soot in the annular guiding space between the members, and for lightening the construction.

Mounted in the annular space between the guide members 2 are a plurality of scraper elements 7, here shown as four in number. Each of these scraper elements is substantially in the form of a semi-circular disk, preferably of hardened steel, to enable them to stand the wear incident to use, and each of them has a central semi-circular notch 8 formed therein, to enable the same to embrace the axial member or shaft 1 and perform its radial movement without interference from said shaft. Each of said scraping elements 7 is carried by a scraper support 9, disposed at right-angles to the plane of the scraper and longitudinally of the axial shaft 1. Preferably, said scraper supports are in the form shown in the drawings, that is, in the form of a central portion 10 with two wings 11 extending on either side thereof longitudinally of the cleaner, and with the extreme tips tapering inward toward the axis of the cleaner, which tips are preferably provided with exterior scraping or knife edges adapted to prevent accumulation of soot in the channeled fingers 19, hereinafter more fully described. Between the wings 11, 11, of said supports, there is formed a notch 12. Each of the scraper elements 7 has a radial slot or opening 13 formed therein, and when the parts are assembled, the bar 10 of the support 9 rests in said slot or opening, with the peripheral portion of the scraper 7 occupying the notch 12 in the support. Said opening 13 is sufficiently long to permit a flat elongated spring 14 to pass into the opening under the bar support 10. The position of the scraper element, the wing support and spring, when assembled, is clearly shown in Fig. 4.

When the parts as thus far described are assembled in the cleaner, the scraper elements 7 are arranged radially in relation to the axial element or shaft 1 within the annular guide channel between the guides 2, with the wings 11 of the scraper supports and the spring 14 extending longitudinally

of the cleaner in the slots 5, 5, of the guides 2, with the ends of the springs resting upon the sleeves 3 of said guides. For the purpose of retaining the parts in the position thus described, a retaining member 15 is mounted on each end of the shaft 1, and provided with a counter-bore forming a shoulder 16, which abuts against the outer end of the sleeve 3, and when the nuts 17 and 18 are screwed upon the ends of the shaft 1, the parts are securely locked against longitudinal displacement or movement. Each of the retaining members is provided with outwardly flaring, interiorly channeled fingers 19, and when the retaining members are in place, said channels receive the extremities of the wings 11 of the supporting members 9 and the extremities of the springs 14, thereby efficiently guiding said wings and said springs, and preventing circumferential movement thereof around the axis of the cleaner.

The annular guiding channel for the scraper elements 7 is of a width a little more than twice the thickness of the scraper elements, so that such elements have a slight longitudinal play therein, to the end that space may be formed between the faces of the guides 2 and the scraper elements, for the escape of soot which might otherwise clog the device and prevent its free operation. The chambered openings 6 in said guides 2 facilitate the escape of soot that might otherwise collect in the annular guide channel, and likewise the fingered form of the retainers 15 constitutes an improvement over the cone-shaped shell retainers of my patent referred to, wherein soot might become lodged, and interfere with the free operation of the cleaner.

When the parts are assembled, and the retainers 15 firmly locked in position between the nuts 17 and 18 on the shaft, the scraper supports 9 are pressed slightly inward against the tension of the springs 14 by the conically formed channels in the fingers 19, and the whole is thus formed into a compact but flexible cleaner. The flue cleaner has its largest diameter at the scrapers 7, and gradually tapers inward toward the axis at each end.

The scrapers 7 and the scraper supports 9 are loosely and yieldingly held in their position by the springs 14, so that they may move, not only radially inward, but the scrapers may have a slight rocking movement longitudinally of the shaft 1, and the scraper supports a slight turning movement transverse to the shaft.

By this construction, there is formed a strong, compact, yielding cleaner, with a minimum number of parts and with a construction insuring against clogging of the parts by soot.

A suitable operating rod may be connected to the nut 18, through the medium of the screw-threads 20.

What is claimed is:—

1. In a flue cleaner, the combination with an axial member, of scraping elements arranged about said member, means engaging said scraping elements for exerting outward pressure thereon, and devices including a plurality of channeled fingers engaging said means for preventing displacement thereof.

2. In a flue cleaner, the combination with an axial member, of scraping elements arranged about said member, supports for said elements including knife edges, and retaining means engaging said knife edges.

3. In a flue cleaner, the combination with an axial member, of guide members mounted upon said axial member, scraping members interposed between said guides, supports for said scraping members, and means engaging the medial portions of said supports directly beneath said scraping members for yieldingly exerting outward pressure upon said scraping members.

4. In a flue cleaner, the combination with an axial member, of guide members including sleeves mounted upon said axial member, scraping elements interposed between said guides, supports for said scraping elements, and yielding means having a bearing on said sleeves and engaging the medial portion of said supports.

5. In a flue cleaner, the combination with an axial member, of guide members including sleeves mounted upon said axial member, scraping elements interposed between said guides, supports for said scraping elements, means having a bearing on said sleeves and engaging the medial portion of said supports for yieldingly exerting pressure upon said scraping elements, and means for retaining said supports in position.

6. In a flue cleaner, the combination with an axial member, of guide members mounted upon said axial member, scraping members interposed between said guides, supports for said scraping members, means engaging the medial portions of said supports and yieldingly exerting outward pressure upon said scraping members, and retaining devices including a plurality of channeled fingers engaging said supports for sustaining the same in position.

7. In a flue cleaner, the combination with an axial member, of guide members including sleeves mounted upon said axial member, scraping elements interposed between said guides, supports for said scraping elements, means having a bearing on said sleeves and engaging the medial portions of said supports for yieldingly exerting outward pressure upon said scraping elements, and means for retaining said supports in position.

8. In a flue cleaner, the combination with

an axial member, of guide members including sleeves mounted upon said axial member, scraping elements interposed between said guides, supports for said scraping elements, means having a bearing on said sleeves and engaging the medial portions of said supports for yieldingly exerting outward pressure upon said scraping elements, and retaining devices including a plurality of channeled fingers engaging said supports for sustaining the same in position.

9. In a flue cleaner, the combination with an axial member, of scraping elements surrounding said member, supports for said elements, and means engaging the medial portions of said supports directly beneath said elements for exerting an outward pressure upon said elements.

10. In a flue cleaner, the combination with an axial member, of two guide members including sleeves mounted upon said axial member, slotted scraping elements located between said guide members, supports for said scraping elements consisting of winged bars passing through the slots in said scraping elements, blade springs also passing through said slots and forcing said scraping elements and winged bars outwardly, and retaining devices including a plurality of channeled fingers engaging the wings of said bars and sustaining them against the outward tension of said springs.

11. In a flue cleaner, the combination with an axial member, of two guide members including sleeves mounted upon said axial member, slotted scraping elements located between said guide members, supports for said scraping elements including oppositely extending wings passing through the slots in said scraping elements, means also passing through said slots for forcing said scraping elements and supports outwardly, and retaining devices including a plurality of channeled fingers engaging the wings of said supports and sustaining them against the outward tension of said means.

12. In a flue cleaner, the combination with an axial member, of two guide members including sleeves mounted upon said axial member, slotted scraping elements located between said guide members, supports having notches for receiving said scraping elements and consisting of winged bars passing through the slots in said scraping elements, and means also passing through said slots for forcing said scraping elements and supports outwardly.

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

ALFRED A. HULL.

Witnesses:
HARMON O. ACUFF,
J. AUTH ATCHLEY.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."