G. C. BEMIS.

TUBE CLEANER.

APPLICATION FILED MAY 26, 1909.

944,008. Patented Dec. 21, 1909.

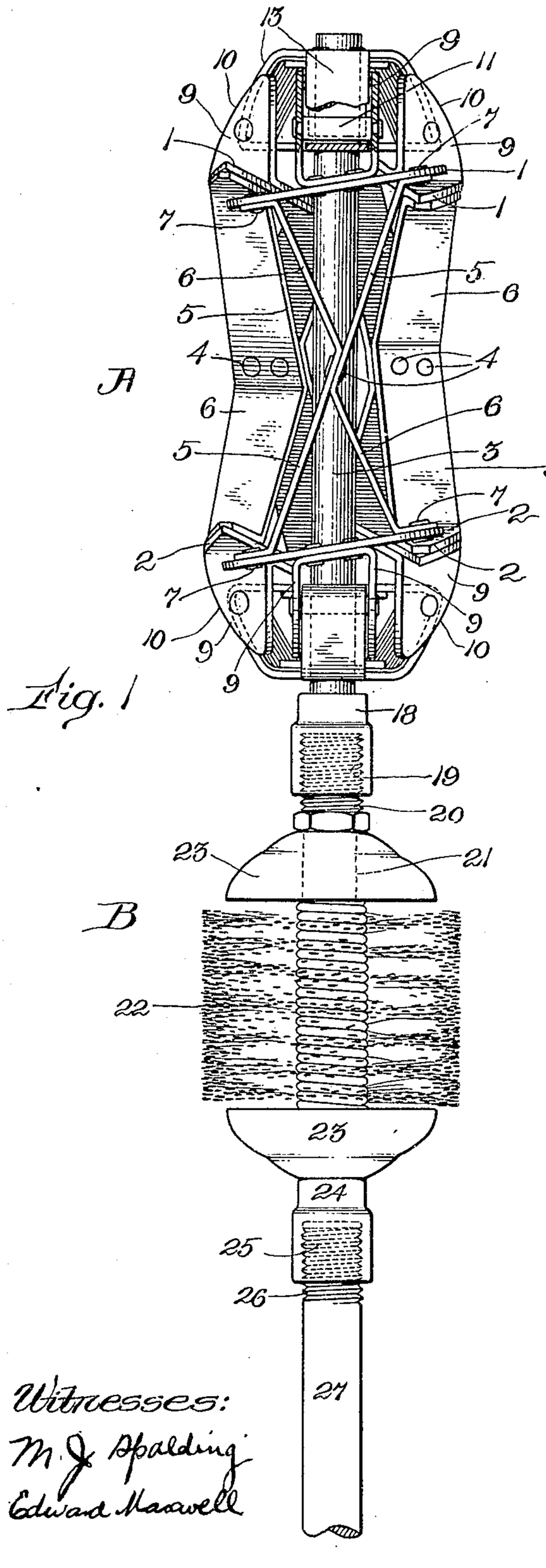

Fig. 1.

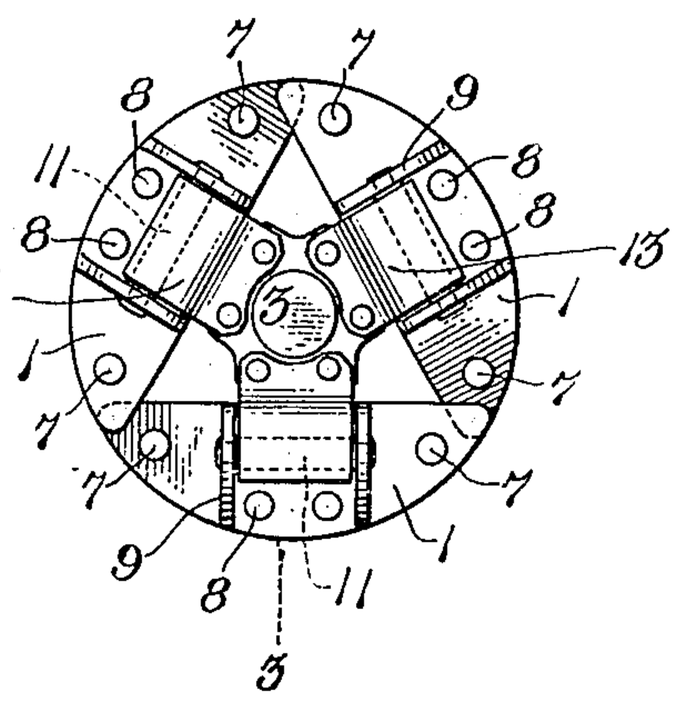

Fig. 2.

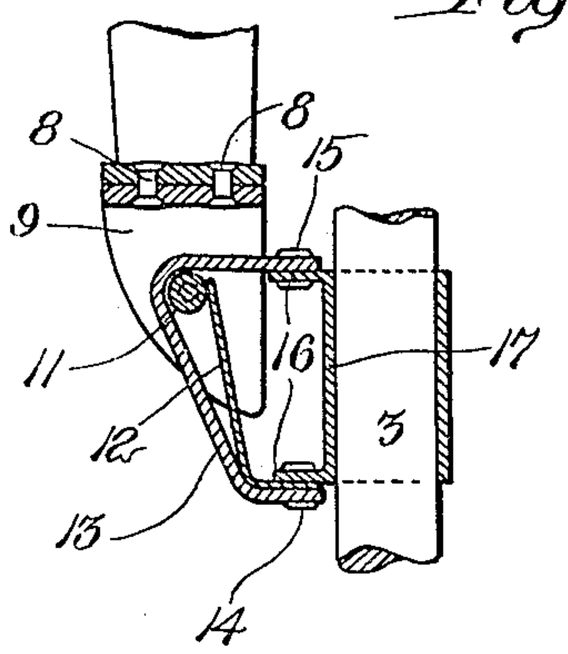

Fig. 3.

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UNITED STATES PATENT OFFICE.

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TUBE-CLEANER.

944,008. Specification of Letters Patent. **Patented Dec. 21, 1909.**

Application filed May 26, 1909. Serial No. 498,470.

To all whom it may concern:

Be it known that I, GILBERT C. BEMIS, a citizen of the United States, and resident of Lynn, in the county of Essex and State of Massachusetts, have invented an Improvement in Tube-Cleaners, of which the following description, in connection with the accompanying drawings, is a specification, like characters on the drawings representing like parts.

My invention has for its object to provide a tube cleaner whose scraper is capable of yielding on one side or at one end to an obstruction without tending to cause the rest of the scraper to yield, to provide scraper connections for preventing an obstruction in the tube from catching against the inner edges of the blades, to provide a construction capable of being readily made from stamped or pressed metal in such manner as to permit different sizes to be made from the same stampings, excepting the blades; to secure great strength and durability, to protect the individual springs from having their temper drawn by the usual heat of the tube, to secure special rigidity not only against longitudinal movement or shifting of the parts but lateral or rotary shifting; besides other objects which will appear more fully in the course of the following description, taken with reference to the accompanying drawings, in which I have shown a preferred embodiment of the invention.

In the drawings, Figure 1 is a view in side elevation of a complete device, parts being broken away to show the internal construction; Fig. 2 is an end view thereof; and Fig. 3 is an enlarged sectional detail in the direction of the line 3, Fig. 2.

My tube cleaner comprises a comparatively rigid scraper portion A and brush portion B, the former being herein shown as composed of three similar members, viewing the same endwise, as in Fig. 2, whose details will presently be described. By having three of these members and making each member independently yielding, preferably at either end separately or at both ends together, as distinguished from having the members diametrically opposite each other or substantially in coöperating pairs, I secure the important result of obtaining superior scraping effects, as, when any one member meets an obstacle or any special resistance, it yields without compelling the other members to yield or collapse, inasmuch as they are at such an angle with relation to each other and to the said member that they naturally brace each other against yielding and thereby offer much greater resistance than is the case when the various members are opposite one another.

Viewing Figs 1 and 2 it will be seen that each of the three scraper members consists of oblique end blades 1, 2 substantially parallel and only slightly oblique to the supporting rod or axis 3 on which the scraper portion A is mounted, the scraping edges of all of said blades being at the same radial distance from the axial center so as to lie in one and the same cylindrical projection, and unyieldingly joined in pairs by scraper connections riveted together at 4, each connection having preferably a long section 5 and a short section 6, the scraping or outer longitudinal edges thereof all lying in the same cylindrical surface with the edges of the blades 1, 2. The ends of the connections 5, 6 are riveted at 7 to the ends of the adjacent scraper blades and, secured to the middle outer sides at 8 of said blades are U-shaped supports 9 having their outer edges 10 curved from their meeting point which is coincident with the scraping edges of the blades 1, 2 gradually inwardly toward the rod 3 to constitute buffer arms for meeting any obstruction, and depressing the adjacent scraper blade so as to ride over said obstruction, and for acting as a directing or guiding member and protecting member in general. The riveted end of each U-shaped buffer arm 9 is preferably oblique so as to rest flat against the adjacent blade and constitutes therewith a double thickness of wearing surface for the scraper, the riveted ends of the connections 5, 6 also giving a double wearing surface to the end portions of the blades. The parallel leg portions of the members 9 are riveted rigidly together by shouldered rivets or bolts 11, see the upper end of Fig. 1, which serve to space said leg portions rigidly apart so as to give certainty of free movement and prevent their binding against any adjacent part when moved, said rivets or bolts 11 resting against the free ends of springs 12, see Fig. 3, retained within a buffer support or cover 13 riveted at its opposite ends at 14, 15 to the opposite flanges 16 of a collar 17 which tightly fits the axial support 3. The cover

or buffer support 13 which houses the springs 12 serves the double purpose of protecting the springs from having their temper drawn by the heat of the tube being cleaned, and also their broad flat surfaces are so inclined as to afford a gradual buffer-like approach to the buffer arms 9, as best shown in Fig. 3. By having a spring 12 at each end of each scraper member I secure a capacity for independent yielding movement which permits each buffer arm and the adjacent end of its scraper member to work separately or independently of the rest so as to yield upon meeting an obstruction without requiring the rest of the mechanism to yield. By this means the scraper is rendered highly efficient.

The straddling or divergent longitudinal scraper connections 5, 6 tend to crowd away any obstruction and dislodge the same before the following blade reaches the obstruction. The sections 5 and 6 preferably extend at different angles with relation to the axis so as to increase the shearing or diverting effect mentioned.

A further advantage of my construction is that for different sizes of scraper portions all the same parts are used, excepting solely the blades. In other words, in order to make different sizes it is merely necessary to use different blades connected, supported, and operated otherwise by the same parts. All the parts are stampings or are pressed or punched out of sheet metal just alike, so that it becomes unnecessary to grind the scraper after it has been put together, inasmuch as all the parts necessarily come together uniformly. Preferably the U-shaped member 9 and the adjacent scraper blade are formed from similar stampings, the former being simply bent into U-shape while the blade remains straight. At its lower or inner end the rod 3 has immovably secured thereto a shouldered socket member 18 internally threaded at 19 to receive the threaded end 20 of a second rod 21 which carries a heavy metallic brush or brush-scraper 22 protected at its opposite ends by inclined deflectors 23. At its lower end the rod 21 has a socket member 24 corresponding to the member 18 internally threaded at 25 to receive the threaded end 26 of the operating rod or handle 27. The socket members 18 and 24 are internally threaded just alike, so that the end 26 of the operating rod 27 can fit into the threads 19 of the socket 18. The chief importance, however, of the socket provision is to make the brush member quickly removable so that it can be renewed. So far as I am aware, the brush portion of other scrapers has heretofore been made as an integral and non-removable portion of the scraper, so that when clogged or injured the entire flue cleaner has been rendered useless for the time being. By making the brush as a separate section, however, all that is necessary is simply to unscrew the injured brush portion and screw in place a new brush portion, without seriously interrupting the work.

When the flue cleaner is inserted in a tube, the inclined end portions 13 and 10 automatically center and direct the flue cleaner forward, the springs 12 of the individual branching scraper members yielding to any given obstruction or necessity of the tube. Each scraper blade is capable of operating independently of the rest, and presents its two-ply thickness or scraping surface to the walls of the tube to the best advantage, while the longitudinal shearing scraper members or connections 5, 6 prevent any obstruction in the tube catching against the inside edge of the blade. If any one of the three scraper members or any part of it is obliged to yield inwardly to pass over an obstruction, the other two divergent members brace against it and continue scraping without interruption inasmuch as the three-branched relation of said members causes any two to resist a radial movement of the third. The bolts or spacing rivets 11 occupy the corners of their housing members 13 and transmit all longitudinal thrusts of the scraper members to the adjacent end portions of said housings or buffer supports 13, while the latter effectually preserve the springs from direct injury from the adjacent heat of the tube.

From the foregoing description it will be evident that my invention is not limited in all particulars to the preferred construction herein shown, excepting as may otherwise be required by any individual claim.

Having described my invention, what I claim as new and desire to secure by Letters Patent is:

1. A flue cleaner, having a scraper portion provided with a central longitudinal support and longitudinal scraper members each having transverse end blades and longitudinal divergent connections, all points of all their scraping edges being at the same radial distance from the longitudinal axis, said connections comprising a plurality of sections of different lengths with relation to the same end blade.

2. A flue cleaner, having a scraper portion provided with a central longitudinal support and longitudinal scraper members having transverse end blades and longitudinal divergent connections, all points of all their scraping edges being at the same radial distance from the longitudinal axis, said connections comprising a plurality of sections of different lengths arranged at angles with relation to the same end blade.

3. A flue cleaner, having a scraper portion provided with a central longitudinal support and longitudinal scraper members having

transverse end blades, and longitudinal connections secured to the opposite ends of said end blades and joining the same in pairs, said connections extending obliquely to said support.

4. A flue cleaner, having a scraper portion provided with a central longitudinal support and longitudinal scraper members having transverse end blades, and longitudinal connections secured to the opposite ends of said end blades and joining the same in pairs, said connections extending obliquely to said support, each connection being angularly bent intermediate its ends so as to extend at different angles with relation to said support.

5. A flue cleaner, having a scraper portion provided with a central longitudinal support and longitudinal scraper members having transverse end blades, and longitudinal connections secured to the opposite ends of said end blades and joining the same in pairs, said connections extending obliquely to said support, each connection being angularly bent intermediate its ends so as to extend at different angles with relation to said support, said connections being overlapped and immovably secured together adjacent their said intermediate bends.

6. A flue cleaner, having a scraper portion provided with a central longitudinal support and longitudinal scraper members having transverse end blades, separate spring supports for each end of each member, a protecting retaining member inclosing said spring, and means connected with said members engaging said spring supports within said protecting member.

7. A flue cleaner, having a scraper portion provided with a central longitudinal support and longitudinal scraper members having transverse end blades, U-shaped buffer arms secured to the outer sides of said end blades, and rigid means between the legs of said U-shaped buffer arms for preventing lateral movement.

8. A flue cleaner, having a scraper portion provided with a central longitudinal support and longitudinal scraper members having transverse end blades, U-shaped buffer arms secured to the outer sides of said end blades, rigid means between the legs of said U-shaped buffer arms for preventing lateral movement, and transverse spacers connecting said legs extending through said rigid bracing means for retaining said scraper members against longitudinal movement.

9. A flue cleaner, having a scraper portion provided with a central longitudinal support and longitudinal scraper members having transverse end blades, U-shaped buffer arms secured to the outer sides of said end blades, rigid means between the legs of said U-shaped buffer arms for preventing lateral movement, transverse spacers connecting said legs extending through said rigid bracing means for retaining said scraper members against longitudinal movement, and yielding supports beneath said spacers.

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

GILBERT C. BEMIS.

Witnesses:
M. J. SPALDING,
EDWARD MAXWELL.