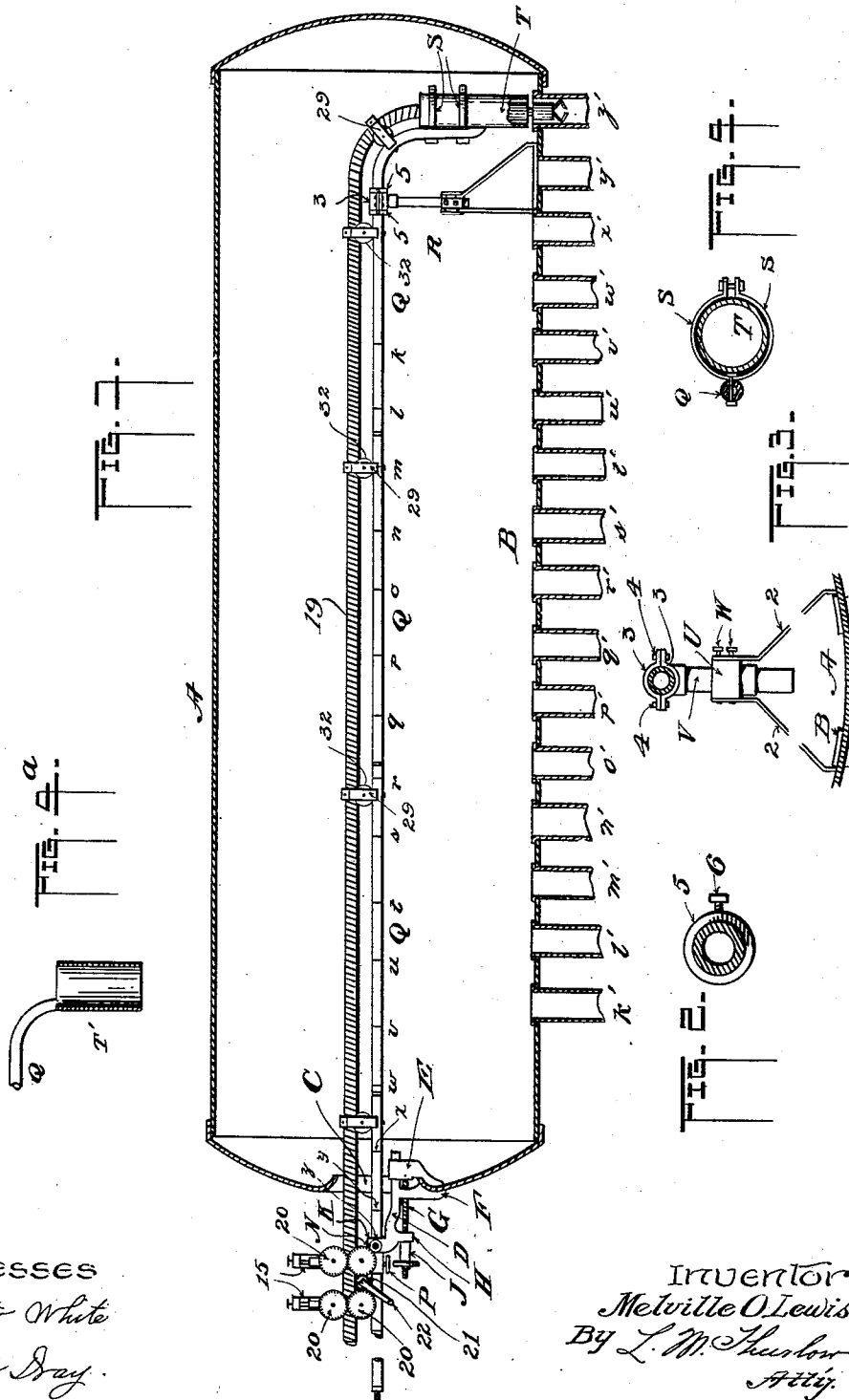


M. O. LEWIS.
 DEVICE FOR HANDLING FLUE CLEANERS.
 APPLICATION FILED MAR. 16, 1908.

977,411.

Patented Nov. 29, 1910.

3 SHEETS-SHEET 1.



Witnesses
 Loretta White
 Ladd Day.

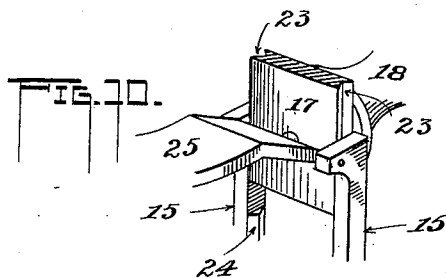
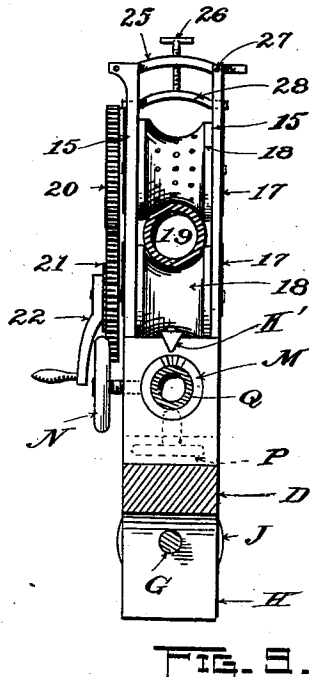
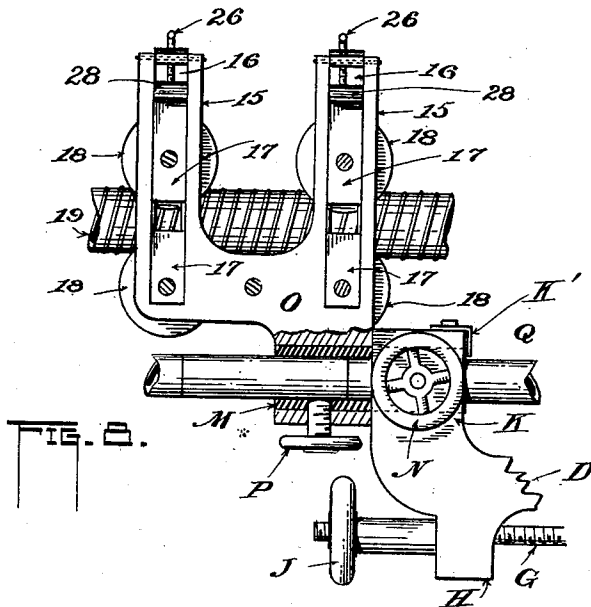
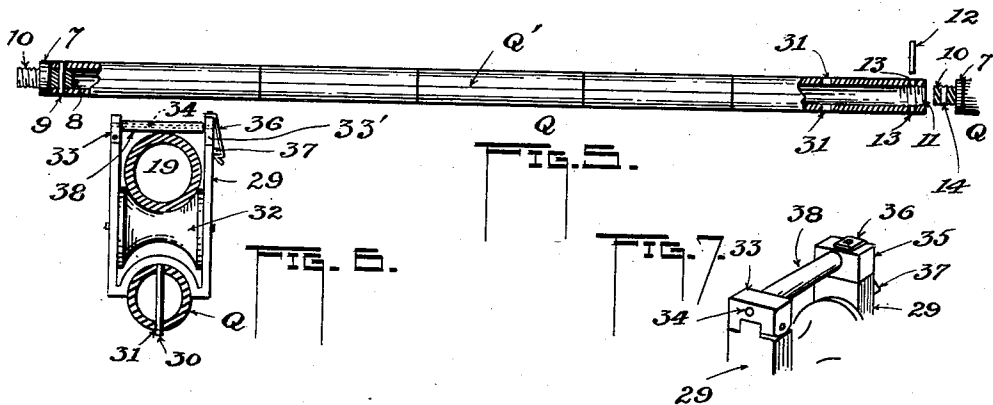
Inventor
 Melville O. Lewis
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3 SHEETS—SHEET 2.



Witnesses
 Loretto White
 Ladd Dray

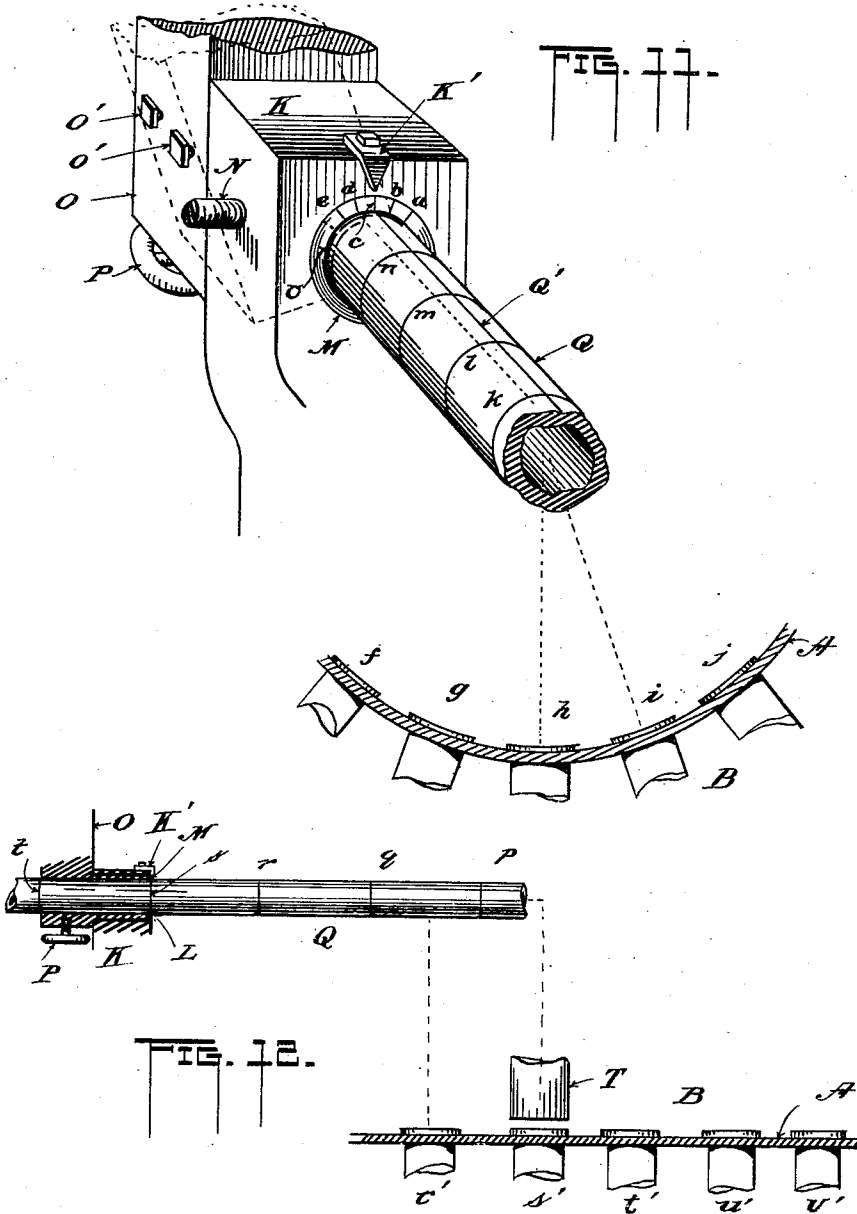
Inventor
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3 SHEETS—SHEET 3.



Witnesses
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 Ladd Day

Inventor
 Melville O. Lewis
 By L. M. Shearlow
 Atty.

UNITED STATES PATENT OFFICE.

MELVILLE O. LEWIS, OF PEORIA, ILLINOIS.

DEVICE FOR HANDLING FLUE-CLEANERS.

977,411.

Specification of Letters Patent.

Patented Nov. 29, 1910.

Application filed March 16, 1908. Serial No. 421,343.

To all whom it may concern:

Be it known that I, MELVILLE O. LEWIS, a citizen of the United States, residing at Peoria, in the county of Peoria and State of Illinois, have invented certain new and useful Improvements in Devices for Handling Flue-Cleaners; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same.

This invention has reference to an apparatus for use in handling flue cleaning devices.

An object of the invention is to provide means to carry and by which to insert a flue cleaning device into the flue of a boiler without the necessity of entering the latter, said cleaner being manipulated from outside of the boiler, the mechanism including means by which the device may be inserted into any desired flue.

Another object is to provide a mechanism by which the operator is enabled to quickly and positively locate the flue cleaning device above the mouth of and insert it into a given flue even though the flues are not visible to said operator.

A further object is to provide a series of markings or callibrations for mechanism of this kind by which the operator can quickly and positively locate the cleaner at the mouth of any flue of a series though the latter may not be visible.

In order to clean the flues of large sized vertical tube boilers men are usually employed to enter the drums with which the tubes communicate to do that work. These drums are often difficult to operate in and are usually too hot to remain in for any length of time thus requiring several men who relieve one another from time to time. In view of this I have devised an apparatus needing but a single attendant to perfectly and quickly clean the flues from a position outside said drum, said apparatus being shown in its preferred embodiment in the appended drawing in which:—

Figure 1 is a vertical longitudinal section of the drum of a boiler showing my apparatus therein. Fig. 2 is a transverse section of a support showing an adjustable collar for the same. Fig. 3 is a transverse section of the support drawn to a smaller scale with a standard shown in connection therewith. Fig. 4 is a horizontal section of the

support and a guide shown in Fig. 1. Fig. 4^a is a modification of the parts shown in Fig. 1 for guiding a flue cleaning device into a flue. Fig. 5 is a plan of one of the sections of the support. Fig. 6 is a vertical section of the support and a detachable member for carrying a hose. Fig. 7 shows in perspective, part of the member shown in Fig. 6. Fig. 8 is a side elevation of a portion of the apparatus shown in Fig. 1 much enlarged. Fig. 9 is a front elevation of the same. Fig. 10 shows, in perspective, a portion of what is shown in Fig. 9. Fig. 11 shows, in perspective, certain callibrated portions of the apparatus, and Fig. 12 is a side elevation of the same with parts in longitudinal section.

A indicates the steam drum of a boiler of the vertical flue type, whose flues are indicated at B, while C is the usual man-hole in said drum.

D is an arm having at its end within the drum a slidable jaw E shaped to fit the drum head beneath said man-hole.

F is an outer companion jaw rigidly secured to or forming part of the arm D and having a face adapted to fit the outer surface of the drum head. A thread-bar G is secured at one end within the jaw E in any suitable manner and the other end extends through a depending portion H of the said arm D and receives an internally threaded hand-wheel J which bears upon the said portion H and serves through the jaw to clamp the arm D firmly to the drum-head. Said arm D has a vertical extension or head provided with a bore as indicated at L in Fig. 12, to receive a sleeve M which is held fixedly within said head by means of a hand screw N, said sleeve extending rearward from said head to carry a driving-head O bored to receive it as shown in Figs. 8 and 12, there being a hand screw P extending through the said head O to engage said sleeve. In Fig. 11 two set screws O' are provided to permanently engage the sleeve to hold it rigid relative to said head but said sleeve need not be separate from the head O but may be a tubular extension thereof to enter the head K as in Fig. 12. It receives a horizontally disposed support composed preferably of a series of pipe sections Q, indicated in several figures, one of which sections is illustrated separately in Fig. 5 there being suitable means at the ends of said sections by which they may be readily attached to one another but this will

be described presently. The carrying mechanism for the support Q, made up of the sections, may, of course, be mounted in any suitable manner so long as it is fixed relative to the drum.

When connected the sections constitute a rigid support of some length, Fig. 1, such support being rigidly held relative to the head O by the screw P therein, the inner end of the support being mounted in a standard indicated at R. The inner end of the innermost section Q is bent downward substantially at right angles to its horizontal portion and adjustably secured thereto is a short length of tubing T of the same internal diameter as the inside diameter of the flues to be cleaned which serves as a guide by which to direct the flue cleaner into a flue, said tube being adapted for vertical adjustment and held for instance by clamping rings S carried by the support Q as clearly shown in Fig. 4.

The standard R hereinbefore mentioned preferably consists of a member U bored to receive a vertically adjustable pipe V held in any adjustment by means of set screws W. Secured to the member U are two legs widely separated at their lower ends to straddle several rows of flues and forming a broad base.

As shown in Figs. 1 and 3 the feet of the legs 2 rest upon the drum and are arranged to engage the ends of the flues so as to be guided thereby. In this way the supporting member Q is arranged to be guided by the ends of the flues thereby throwing the strain off the carrier clamped at the man-hole. The feet are preferably of such a length as to span or extend across at least two tube ends longitudinally of the drum. In this way the guiding action will be facilitated since the feet will engage one pair of tubes before breaking contact with the preceding pair.

The pipe V has a split head composed of the members 3 secured together by means of bolts 4, and the head carries the support Q which is permitted to rock freely therein. Carried by said support at each side of the head is a collar 5 provided with a set screw 6 so that said collars can be adjusted along the support to permit the latter to be shifted through the head to any desired position but any other means to provide for this adjustment, may of course be used.

The flue cleaning device may be of any approved form such, for instance, as the rotary or "turbine" cleaner. I have not illustrated this device however since no claim is made thereto *per se*. I do show, however, a flexible hose 19 for carrying and driving said device though the equivalent of the hose may be used such, for instance, as a flexible shaft or other means that while imparting movement to the cleaning device

will readily lend itself to the movement of which the hose or the flexible shaft is capable, that is to say, such as will permit it to be readily guided into a flue though extending axially of the drum.

The manner of connecting the sections Q is as follows:—In Fig. 5 I show a coupling comprising a flange 7 of substantially the same diameter as the diameter of the sections and having at one side a stem 8 to slip into the bore of the section and permanently held therein by a rivet 9 or other suitable means. An extension or stem 10 at the opposite side of the flange is threaded to receive the end of the next section which is threaded internally. This is clearly shown in Fig. 5 wherein the threads of the section are shown by the numeral 11. When two sections are connected a pin or wedge 12 is inserted through holes 13 in the pipe and through a corresponding hole 14 in the extension of the coupling which prevent the sections turning relatively.

The head O hereinbefore described, has two pairs of vertical extensions 15 all of which are slotted at 16 to receive slides 17 the corresponding pairs of which carry upper and lower rollers 18 between which is carried the hose 19 just mentioned which conveys the fluid for driving the turbine cleaner. The spindles which carry the rollers 18 are provided each with a gear 20, Figs. 1 and 9, the upper and lower ones being in mesh. Between the two lower gears is a pinion 21, Fig. 1, driven by means of a crank 22. The slots 16 in the members 15 open through the top of the latter so that pairs of the slides 17 may be removed together with the roller, Fig. 10. By this means rollers of other diameters may be substituted to suit the diameter of the hose in use. The slides are grooved on their edges as at 23 and the inner adjacent faces of the members 15 are provided with beveled portions 24 to correspond with said grooves. Pivoted at one end on each of the members 15 is a cross-head 25 carrying a tension screw 26; the opposite end of said cross-head being suitably secured to the member 15, as, for instance, by means of a pin 27. A spring 28 shown in Fig. 9 has its ends resting upon opposite slides 17, the tension screw bearing thereupon and producing more or less pressure on the top rollers and consequently upon the hose. Movement imparted to the crank will turn the wheels 20 causing the lower rollers to revolve in one direction while the upper rollers will naturally revolve in the opposite direction due to the reverse movement imparted by the gears, the movement of all of the rollers being such, however, as to impart a positive movement to the hose in a given direction. The rollers are "lagged" with leather so that the wire wrapping preferably used will

sink into it and in addition to this, as shown in Fig. 9, the rollers are also furnished with projections as, for instance, rivet heads, or the like, which act in the same capacity as the cogs of a wheel by entering between the convolutions of wire serving therefor to aid in the positive movement of the hose.

At intervals along the support made up of the sections Q, I provide supporting rollers 32 as shown, there being one at the bend of the support where it turns down to carry the guiding pipe T. Fig. 6 shows the manner in which the rollers are carried. A frame is provided which consists of vertical extensions 29 and a bottom whose under surface is grooved to fit upon the support and extending downward from said bottom is a pin 30 extending through a hole 31 in said support. The roller 32 is mounted between the extensions 29 of the frame and pivoted to one of them is a member 33 carrying a pin 34, the latter having a piece of piping 38 slipped upon it to constitute a roller. The opposite end of the pin 34 carries a member 33' similar to 33 which rests upon the opposite frame extension 29. A spring 36 is secured at one end to the top of the member 33' its free end being bent and adapted to pass beneath a lug 37 on the frame. The hose pipe is placed in position on the roller 32 by raising the roller 38. The rollers 32 are readily removed from the support Q when desired by lifting them to withdraw their pins 30 from the holes 31.

Under some of the old methods of cleaning boiler flues which open into a steam drum, it is often necessary after "drawing" the fires to permit the boiler to remain untouched several days before it had become sufficiently cool to permit men to enter and begin their work, or, if a device is used to clean the flues from a position outside the drum it is necessary for the operator to actually see the flues so that he may be enabled to properly position the cleaner so that the work can proceed.

One of the purposes of my invention is to provide for cleaning the flues immediately after drawing the fires even though the drum is very hot and even though the operator is unable to see the flues for any reason. As a matter of fact if the flues can be cleaned before they have cooled and before they have become thoroughly dry the scale can be more readily removed. While the drum may be still full of steam I can begin work. I employ certain devices by which the operator can readily place the cleaner opposite the mouth of any flue in exact position for work.

The forward or inner end of the sleeve M terminates at the front face of the head K and on its end face is a series of radial lines *a, b, c, d, e*, corresponding in number to the number of longitudinal rows of flues and which, in the figure named are for conven-

ience indicated by the letters *f, g, h, i, j*. Secured upon the head K is an indicator K' which serves to indicate the central position of the middle mark of the series as well as a means by which the operator can determine the proper position of the cleaner for a given longitudinal row of flues it is desired to clean.

Extending along the support, composed of the members Q, is a line Q', Figs. 5 and 11, which line is designed to register exactly with the center line C of the sleeve. When these lines are thus in register and directly beneath the indicator K' the guiding pipe T for the flue cleaner is in register with the center line of flues *h*, Fig. 11. When the operator desires, for instance, to clean the line of flues indicated by *i* the hand screw M in the head K is loosened to permit the sleeve to rock within said head. By using the head O as a lever this rocking of the sleeve is accomplished. When the mark *b* has been brought into register with the indicator the guiding pipe T will then be found to be in proper register with said line of flues *i* and upon tightening the said screw N the entire device will be held in that position having been rocked, of course, within the standard at R which, together with the supporting member D holds the axis of the support Q substantially in register with the axis of the drum so that the said pipe T will be substantially the same distance above the mouths of all the flues in any position it may be placed. Since the screw P of the head O secures the support Q therein that member must, of course, rock with the sleeve and it is evident that the remaining rows of pipes can be reached by the guiding pipe T by the method described, the lines *a, d* and *e* corresponding to the flues *f, g* and *j* respectively. The broken lines in Fig. 11 indicate the position of the head O when swung to bring the radial line *b* of the sleeve opposite the indicator K' to position the pipe T above the flue *i* described, and the dotted line along the support Q indicates the position of the center line Q' when swung to the position just described.

In order to bring the guiding pipe T into proper register with the transverse rows of flues I have provided on the support Q a series of circumferential marks indicated in Fig. 1. Beginning near the forward end of the support these marks are indicated by the letters *k, l, m, n*, etc. Said marks are spaced apart a distance corresponding exactly to the distance from center to center of the flues. The line at *z* in Fig. 1, is exactly in register with the face of the sleeve M which bears the radial lines *a, b, c, d, e*, the marks at *s* in Fig. 12 making this clear. When thus in register the guiding pipe T is exactly in line with the most remote transverse lines of flues indicated by *z'*.

By loosening the screw P in the head O the support can be drawn rearward or toward the operator through the sleeve M until the line γ is in register with the face of the sleeve. This movement carries the guiding pipe T into register with the transverse line of flues indicated by Y'. The remaining marks will permit the operator to station the guiding pipe above any desired row of flues, it being my purpose to provide for each mark an indicating character to correspond with a given line of flues and a given flue in that line whereby the operator is enabled at once to locate the flue he desires to clean. It is clear that even though the drum may be filled with steam at the time the apparatus is located for use, the operator without being able to see the flues can locate the guide T for the cleaner above any line of transverse flues by means of the circumferential marks k, l, m , etc., and then by means of the radial lines a, b, c, d, e he can locate all of the flues of that row, and after cleaning them he can proceed to the next row and so on.

The indicating device and marks on the head and on the support Q constitute locating means so that the operator can properly locate the flue cleaner over a tube in the drum without entering the same. The line Q' on the sections in connection with the pins 12 constitute locating means to locate the sections in proper relative position so that the line sections Q' on the different sections will always be placed in the same relation and position with respect to the guide T.

When placing the apparatus in the drum the standard R and the first length of the support are inserted through the man-hole, then the clamping arm D is set in place and secured after the centers of the bores of the sleeve M and the head 3 of the standard are made to coincide with the axis of the drum. Then one of the sections Q can be entered through the sleeve and connected with the first section. The first one or two rows of flues, or at least those within the limit of the sections are cleaned, then another section is inserted and so on until all of the flues have been cleaned. The lines Q' of each section are made to exactly and permanently register with one another since after each said section has been screwed home the pins 12, before described, make such registering positive.

I have mounted the means that moves the hose so that it can swing with the support as already described and its weight when tilted toward one side is substantially counterbalanced by the weight of the downturned end of the support, the guide T and the flue cleaner, so that but little effort is necessary to obtain any desired adjustment to cause the guide to register with the flues.

The guiding member T of the support Q may be an extension of the latter and not a separate part. That this may be understood, Fig. 4^a shows said member which is indicated by T'; being shown as an integral part of the support Q. The member T or T' is suspended above and clear of the mouth of the flue and is adjustable upon the support in the first form described to move it relative to the flues and secured by the bands S, and in the second form the same result is obtained by the adjustment of the part V in the standard R. By this means the said member or guide can be adjusted within the fraction of an inch from the flue ends and it can then be moved across the transverse rows by the support Q without difficulty and can be readily shifted over the longitudinal rows since it moves in a plane parallel to the plane in which the mouths of said rows lie. The adjustable collars 5 are provided on the support Q adjacent to the head composed of the parts 3 on the pipe V whereby the support may be shifted relative to the standard when desired though ordinarily as the support is moved the standard moves with it.

In using the member T the hose may be withdrawn from the flues without shutting off the water and the turbine is therefore allowed to revolve within the member while moving the latter to a new position. The support Q is preferably made up of short lengths after the manner described so that in cramped positions as, for instance, when the boiler is too close to a wall to allow the support to be entered in a full length the said sections may be added one by one as the work proceeds.

Various changes in the structure may be made without departing from the spirit and intent of the appended claims.

I claim:—

1. The combination of a flue cleaning device, means to carry it and by which driving power is transmitted thereto, a horizontally disposed support extending into the drum of a boiler to carry said means, said support being proximate to the longitudinal axis of the drum, means carried by said support to guide the cleaning device into a flue and adapted to have an arc of movement across the mouths of the flues.

2. The combination of a flue cleaning device, means to carry it and by which power is transmitted thereto, a horizontally disposed support for said means extending into the drum of a boiler and proximate to the points from which the center line of the flues of each transverse row radiate and extending to the mouth of a flue and adapted to suspend the cleaning device above and positively direct it into a flue, and means in which the support is carried and adapted to rock.

3. The combination of a flue cleaning device, means to carry it, a horizontally disposed support for said means extending into the drum of a boiler and proximate to the points from which the center lines of the flues of each transverse row radiate and extending to the mouth of a flue and adapted to suspend the cleaning device above and for positively directing it into a flue, and means in which the support is carried and adapted to rock and within which it is also adapted to shift longitudinally.

4. In combination with a flue cleaning apparatus comprising a member having a flue cleaning device at one end, of a support to carry the member, said support being located in the drum of a boiler and extending outside the same and having an extremity extending to the mouth of a flue to positively direct the flue cleaning device thereinto, means to carry the support and in which it is adapted to rock to impart to the cleaning device an arc of movement across the mouths of a transverse row of flues, and adapted also to shift substantially parallel to a longitudinal row of flues and movable from outside the drum.

5. The combination with a flexible member having a flue cleaning device at one end, of a support removably inserted in the drum of a boiler to carry the member, a single means resting upon the bottom of the drum to carry the support, said support extending to and terminating at the mouth of a flue and adapted for directing the cleaning device thereinto, said support adapted to impart to the cleaning implement an arc of movement across the mouths of transverse rows of flues and adapted also to shift in a direction parallel to longitudinal rows of flues and movable from outside the drum.

6. In combination with a flexible member having a flue cleaning device at one end, of a support removably inserted in the drum of a boiler for carrying the member, means to carry the support, and adapted for suspending the cleaning device above a flue, the terminal of said support adapted to be fixed opposite a flue and to direct the device thereinto and adapted to impart to said device an arc of movement across the mouths of a transverse row of flues and likewise adapted to shift in a direction parallel to longitudinal rows of flues, and movable from outside the drum, the member and its device being movable upon the support also from outside the drum, and means to fix the support in any position of adjustment.

7. In combination with a support located within the drum of a boiler and terminating in an inclosing guide free to be moved and extending to and terminating in the mouth of a flue, means to carry the support, a flexible member carried by the support and having a flue cleaning device at its end to enter

said guide and directed into a flue by the latter, said support adapted to rock and to have a longitudinal shifting movement in the means that carries it.

8. In combination with a support located in the drum of a boiler and having a free end terminating at the mouth of a flue, means to carry it, a flexible member carried by said support and having a flue cleaning device at its inner end, the support acting as a guide to direct the device and adapted for a rocking and a longitudinally shifting movement in the means that carries it, the member being also movable relative to the support.

9. In combination with the flues of a boiler, a support, a flexible member provided with a flue cleaner and carried directly upon and movable along said support parallel to the longest axis thereof, said support extending in its longest measurement across the mouths of the flues but separated therefrom by a space, and a guide carried by said support, the same being rigid relative thereto and suspended above the mouth of a flue and through which the cleaner is guided, said guide being adapted to direct the flue cleaner into the mouth of a flue.

10. In combination with a flexible member having a flue cleaner at one end, of a support removably inserted into the drum of a boiler, devices carried on the support for holding the member thereon but from which said member is removable at will, means outside the drum for imparting longitudinal movement to the member, and a guide on the support for directing the flue cleaner into a flue.

11. In combination with a flexible member having a flue cleaner at one end, of a support located in the drum of a boiler and along which the member is movable, means secured to the end of the drum at the entrance thereof to carry the support and in which said support is movable both longitudinally and axially, and means to secure the support and the first said means normally relatively rigid.

12. The combination of a support extending into the drum of and disposed at right angles to the flues of a vertical tube boiler, means to carry said support, a flexible member and its flue cleaning device carried by, lying parallel to, and adjustable longitudinally along said support, a guide on the support for directing the flue cleaning device into a flue, means to shift the member along said support, and means to rock the support in the carrying means.

13. In combination with a flue cleaning device and a member to which it is attached, of a support for the member adapted to be located in the drum of a boiler, a device resting on the bottom of the drum to carry the support, the said support extending outside

the drum and having a guide terminating at the mouth of a flue, the member and its flue cleaning device being adapted to move through said guide into the flue.

6 14. In combination with a flexible member and a flue cleaning device thereon, a horizontally disposed support for the member adapted to extend into the drum of a vertical flue boiler, means to carry the support and with which it is rigidly related, the said support having a depending extension as a rigid part thereof lying opposite the mouth of a flue to receive and guide the flue cleaner into a flue.

15 15. In combination with a horizontally disposed support located in the drum of a vertical flue boiler substantially axially thereof and having a rigid depending guide thereon suspended at the mouth of a flue, a flexible member movable along the horizontal portion of the support and having a flue cleaning device at its end adapted to pass vertically into the guide and into a flue, and means to carry the support, the member being movable from outside the drum.

25 16. In combination with a flexible member having a rotary flue cleaner at one end, of a support for insertion into the drum of a boiler and on which said member is carried and guided, means to carry the support, driving means outside the drum in positive driving engagement with the member by which to impart longitudinal movement thereto, and a guide carried by said support into and through which the said flue cleaner is adapted to pass and by which it is directed into a flue.

30 17. In a device of the class described, an adjustable support located in the drum of a boiler above its flues consisting of a series of separable sections, a standard for one end of the support to rest upon the bottom of the drum, said support and standard adapted to be shifted longitudinally within the latter, means detachably secured to the drum to hold the opposite end of the support in any adjustment, a member carried on said support and movable along the same and having a flue cleaning device at its end, and means on the support for guiding the member and its device into a flue, longitudinal movement being imparted to said member from a position outside the drum.

50 18. In a device of the class described, an adjustable support consisting of a series of separable sections located in the drum of a boiler, a member within and adapted to rest upon the bottom of the drum to hold the inner end of the support, the latter and the member adapted to be shifted longitudinally within the drum, the support adapted to rock within the member, means detachably secured to the drum to hold the opposite end of the support and having provision for holding the latter in any adjustment, a

flexible member having a flue cleaning device at its end and carried on the support and longitudinally movable thereon, means on the support for vertically guiding the device into a flue, and means outside the drum for imparting longitudinal movement to the flexible member. 70

19. In combination with a flexible member having a flue cleaning device at one end and located in the drum of a boiler above the mouths of the flues, of a horizontally disposed support for carrying said member and insertible into said drum through the manhole thereof, said member being adapted for longitudinal movement relative to the support and operated from a position outside the drum, a movable standard for carrying the support, the same being shiftable longitudinally of the drum for adjusting said support and for suspending the support a fixed distance above the flues, and in which said support is adapted to rock axially, and means on the support for guiding the member and its flue cleaning device into a flue. 75 80

20. In combination with a horizontally disposed member for insertion into the drum of a boiler above and substantially at right angles to the flues of the latter, a standard carried by said support and inserted therewith into the drum and free to shift within the latter in a longitudinal direction and lying upon the same by which to locate the support centrally above the series of the flues and in which it is adapted to rock axially, a flexible member carried by the support and longitudinally shiftable therealong, a flue cleaning device at its inner end, means on the end of said support for guiding said flue cleaning device into a flue, the said support, and its standard, and the member adapted to be bodily inserted into and removed from the drum. 85 90 95 100 105

21. In combination with a flexible member having a rotary flue cleaning device at its end, of a support therefor for insertion into the drum of a boiler and along which it is adapted to travel, a bracket rigid relative to said drum and carrying one end of the support, said support adapted to be longitudinally and axially adjustable in said bracket, a standard within the drum to carry the inner end of the support and lying upon said drum in contact with and guided by longitudinal rows of the flues, the support being axially movable in said standard, and a guide carried by the inner end of the support and adapted to lie at the mouth of a flue for directing the flue cleaning device into said flue. 110 115 120

22. In a device of the class described, a member and its flue cleaning device adapted for insertion into the drum of a boiler, a support for the member extending into said drum, means to carry the support, a guide on the support to direct the flue cleaning de- 125 130

vice into a flue, said support adapted to rock within the carrying means, and other means to secure it in a desired position.

23. In a device of the class described, a member and its flue cleaning device adapted for insertion into the drum of a boiler, a support for the member extending into said drum, means to carry the support, a guide on the support to direct the flue cleaning device into a flue, said support adapted to rock within the carrying means and having a longitudinal shifting movement therein, and means to secure the support in a desired adjustment.

24. The combination with a flue cleaning device, of a support therefor extending into the drum of a boiler and comprising a plurality of separable pipe sections, connected at their ends, the longest axes of said sections being substantially coincident, and means at each extremity of the support for carrying it.

25. In combination with a flexible member having a flue cleaner at one end, of a support consisting of pipe sections connected at their ends located in the drum of a boiler along which the member is movable, means carried on the drum at its entrance to carry the support and in which said support is longitudinally and axially adjustable, and means to secure the support to the first said means.

26. In an apparatus of the class described, a support, a standard to carry it, a member and a flue cleaner carried by and adjustable along the support, a guide carried by and adjustable relative to the support in line with the longest axis of a flue, and adapted for guiding the flue cleaner into a flue.

27. In an apparatus of the class described, a support, a standard to carry it, a member and its flue cleaning device carried by and movable relative to the support, a guide to direct said device into a flue and adapted for adjustment toward the mouth of a flue in line with the longest axis thereof, and means to fix the same in a desired adjustment.

28. In an apparatus of the class described, a support, a carrier for the support, a member and its flue cleaning device carried by and movable relative to the support, a guide carried by and adjustable relative to the support in line with the axis of a flue, means to fix the guide and support relatively rigid, and means to shift the member along said support.

29. In an apparatus of the class described, a support, a carrier for the support, a member and its flue cleaning device carried by and adjustable along the support, a guide carried by the support and adjustable relative thereto in line with the longest axis of a flue and adapted to move across the mouths of the flues.

30. In an apparatus of the class described,

a support, a carrier for the support, a member and its flue cleaning device carried by and adjustable along the support, a guide carried by the support and adjustable relative thereto in line with the longest axis of a flue, means to secure said guide in any adjustment, and means to shift the member along the support.

31. In an apparatus of the class described, a support, a carrier for the support, a member and its flue cleaning device carried by and adjustable along the support, a guide carried by and adjustable relative thereto in line with the longest axis of a flue, means to secure said guide in any adjustment, and means to swing the support and its guide.

32. In an apparatus of the class described, a horizontally disposed support located in the drum of a boiler, a standard adjustable for height to carry its inner end, means to fix the standard at a desired height for a fixed vertical adjustment of the support, a guide at the said inner end of the support, and a member having a flue cleaning device thereon directed by said guide into a flue.

33. In an apparatus of the class described, a horizontally disposed support located in the drum of a boiler, a standard for its inner end, said standard being vertically adjustable, means to fix its parts after adjustment, means secured on the drum in which the support is adjustably carried, other means to secure the support after adjustment, a guide on the inner end of the support, and a member having a flue cleaning device directed by said guide into a flue.

34. In an apparatus of the class described, the combination of a carrying member adapted to be secured at the opening of the drum of a boiler, a horizontally disposed support carried in said member, means on the latter to secure the support in a desired adjustment, a member carried by the support and having a flue cleaning device at one end, a device adjustably secured on the said carrying member for operating the member having the flue cleaner and a guide at the inner end of the support to guide the flue cleaner into a flue.

35. In an apparatus of the class described, the combination with the drum of a boiler, of a carrying member secured relative thereto at the opening thereof, a horizontally disposed support carried in said member, means on the latter to secure the support in a desired adjustment, a plurality of pairs of driving wheels, a device mounted on the carrying member on which said wheels are carried, means for operating all of the wheels simultaneously, a member carried on the support and engaged by said wheels and provided at its end with a flue cleaning device and a guide at the inner end of the support to guide the device into a flue.

36. In a flue cleaning device, the combina-

tion with a member adapted to extend into and longitudinally of the drum of a boiler, of means for securing said member to the head of the drum, and means on said member adapted to support and guide a flue cleaner into the flues extending from the drum.

37. In a flue cleaning device, the combination with a member adapted to extend into and longitudinally of the drum of a boiler, of means for supporting said member, means on said member adapted to guide a flue cleaner into the flues extending from the drum, and means extending outside of the drum constructed to adjust said guiding means over the ends of the flues.

38. In a flue cleaning device, the combination with a member adapted to extend into and longitudinally of the drum of a boiler, of means for supporting said member, and means extending along said member for guiding a flue cleaner of the flexible type therealong, and means at the end of said member for guiding the cleaner directly into the mouths of the flues extending from said drum.

39. In a flue cleaning device, the combination with a member adapted to extend into and longitudinally of the drum of a boiler, of a standard near the end of said member and resting loosely on the inside walls of the drum so as to be freely adjustable therein, and means on and near the end of said member for guiding a flue cleaner directly into the mouths of the flues extending from the drum.

40. In a flue cleaning device, the combination of a support adapted to extend into and longitudinally of the drum of a boiler and comprising a series of separable sections adapted to be built up, and means at the end of said support and extending at right angles therefrom for guiding a flue cleaner directly into the mouths of the flues extending from the drum.

41. In a flue cleaning device, the combination of a support adapted to extend into and longitudinally of the drum of a boiler and comprising a series of separable sections adapted to be built up, means on and detachable with said sections adapted to guide a

flue cleaner therealong, and means at the end of said support and extending at right angles therefrom for guiding a flue cleaner directly into the mouths of the flues extending from the drum.

42. In a flue cleaning device, the combination with a member adapted to extend and be adjusted over the ends of the flues of a boiler, of a support for said member guided by the ends of the flues, and means on said member for supporting and guiding a flue cleaner.

43. In a flue cleaning device, the combination with a member adapted to extend and be adjusted over the ends of the flues of a boiler, of a standard for supporting said member provided with feet arranged to engage the ends of the flues, and to span the ends of at least two flues in the same row, and means on said member for supporting and guiding a flue cleaner.

44. In a flue cleaning device, the combination with a member adapted to extend into and longitudinally of the drum of a boiler, of means for supporting said member, means on said member adapted to guide a flue cleaner into the flues extending from the drum, means permitting adjustment of said member on said support from the outside of the drum so as to adjust said guiding means in position with respect to the flues, and locating means for said adjusting means accessible outside of the drum.

45. In a flue cleaning device, the combination with a member adapted to extend into and longitudinally of the drum of a boiler, of a support for said member, means on said member adapted to guide a flue cleaner into the flues extending from the drum, and means for mounting said member on said support constructed to permit longitudinal and transverse adjustments of said member on said support so as to adjust said guiding means in position with respect to the flues.

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

MELVILLE O. LEWIS.

Witnesses:

L. M. THURLOW,
J. M. DAVID.