C. A. CLAFLIN.

DEVICE FOR DELIVERING GASEOUS FLUID UNDER PRESSURE.

APPLICATION FILED OCT. 19, 1912.

1,190,860.

Patented July 11, 1916.

Fig. 1.

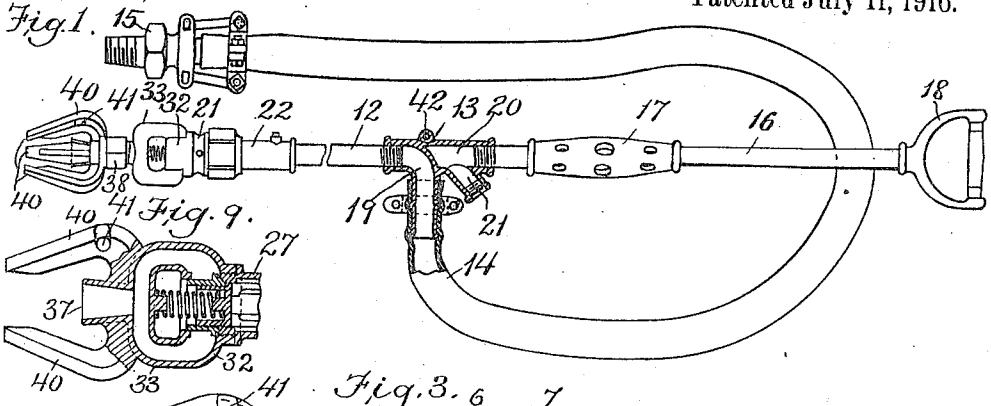


Fig. 9.

Fig. 3.

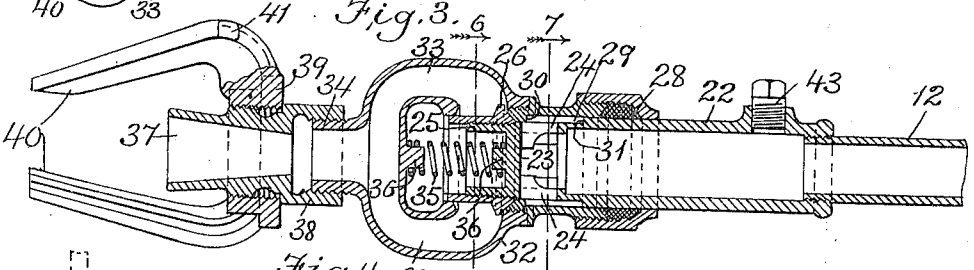


Fig. 4.

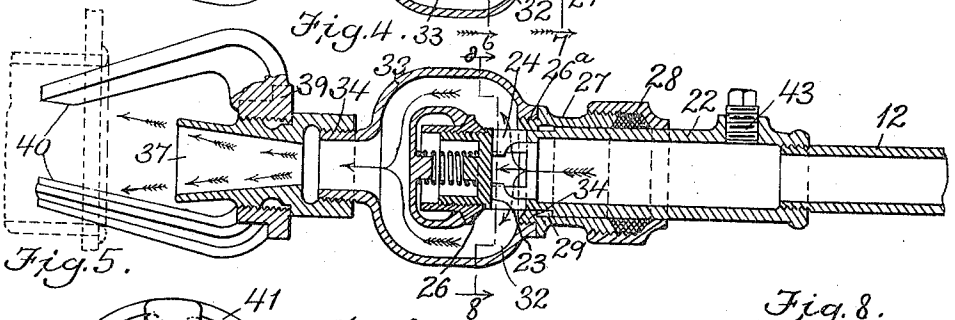


Fig. 5.

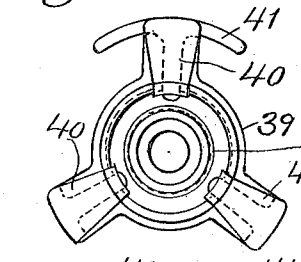


Fig. 6.

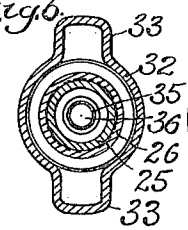


Fig. 7.

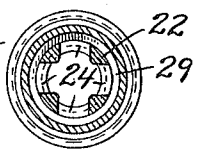


Fig. 8.

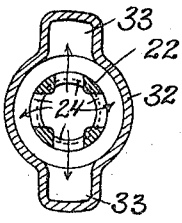
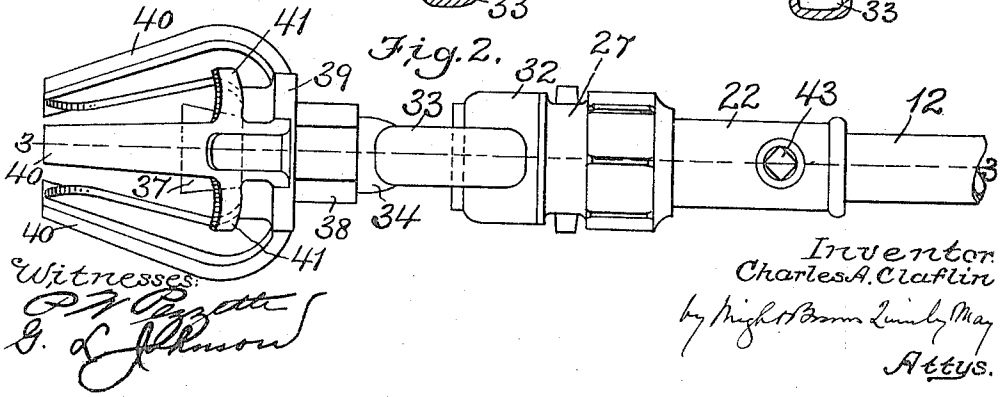


Fig. 2.



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UNITED STATES PATENT OFFICE.

CHARLES A. CLAFLIN, OF MEDFORD, MASSACHUSETTS.

DEVICE FOR DELIVERING GASEOUS FLUID UNDER PRESSURE.

1,190,860. Specification of Letters Patent. Patented July 11, 1916.

Application filed October 19, 1912. Serial No. 726,761.

To all whom it may concern:

Be it known that I, CHARLES A. CLAFLIN, a citizen of the United States, and resident of Medford, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Devices for Delivering Gaseous Fluid Under Pressure, of which the following is a specification.

This invention relates to devices for delivering steam or other gaseous fluid under pressure in a forcible jet adapted for various purposes, such as cleaning boiler tubes. A device of this nature is described and claimed in Letters Patent 913,260, granted to me February 23, 1909.

One of the objects of the present invention is to provide an improved skeleton head adapted to deliver the maximum amount of both the impelling fluid, such as steam, and air.

Another object is to provide an improved means whereby the valve may be held open manually to enable the blast to be directed at will.

Another object is to provide means whereby the weight of the device may be counterbalanced to facilitate its use in connection with various tubes of a boiler.

Another object is to provide means whereby the device can be conveniently manipulated by means of a handle affixed thereto at either one of a plurality of angles.

Further objects are to provide improvements which will be hereinafter explained.

To these ends the invention consists in the construction and combination of parts substantially as hereinafter described and claimed.

Of the accompanying drawings; Figure 1 represents a side elevation of a device embodying my improvements; Fig. 2 is a plan view of the telescopically connected members of the device on a larger scale than Fig. 1; Fig. 3 represents a section on line 3—3 of Fig. 2, the valve being closed; Fig. 4 is a view similar to Fig. 3, illustrating the positions of the parts when the valve is open; Fig. 5 is a front end view; Fig. 6 represents a section on line 6—6 of Fig. 3; Fig. 7 represents a section on line 7—7 of Fig. 3; Fig. 8 represents a section on line 8—8 of Fig. 4; Fig. 9 is a view similar to a portion of Fig. 3, but illustrating a modification hereinafter described.

Similar reference characters represent the same or similar parts in all of the figures.

The conduit includes a tubular section 12 connected at its inner end to a fitting 13, having an elbow-shaped portion to which a flexible steam supply pipe or hose 14 may be connected in any suitable or preferred manner, the other end of the hose 14 being provided with a coupling 15 for connection to a source of supply of steam or other fluid under pressure. A handle 16 for manipulating the device is shown as provided with hand grips 17, 18, similar to the structure in said Patent 913,260.

My improved fitting 13 has the steam passage 19 separated by a curved wall from the diverging handle sockets 20, 21, the socket 20 being straight to enable the handle 16 to extend in line with the tubular section 12 for convenient use when the tubes to be cleaned are at a low level. When the higher tubes are to be reached the handle 16 can be screwed into the socket 20 so that the operator will not need to stand on a platform.

Connected to the outer end of the section 12 is a tubular section 22 having a transverse end wall 23, adjacent which are lateral ports 24. Said section 22 is provided with an externally threaded section 25 to which is fitted the sleeve or hub of the valve 26. Fitted to slide on the section 22 is an outer tubular section 27 having a stuffing box 28 at one end and a valve seat 26^a at its other end (see Fig. 4) to coöperate with the valve 26, as illustrated by comparing Figs. 3 and 4. The section 22 adjacent the ports 24 is reduced in diameter to form an annular chamber 29, the ends of which are defined by an outer end wall 30 of the section 27 and the inner wall or shoulder 31 of the section 22, said chamber lengthening and contracting as the parts slide or telescope one upon the other, said chamber admitting steam, which so acts therein as to tend to normally hold the valve seated or closed.

The front end of the section 27 is externally threaded. Mounted thereon is the chamber 32 having hollow arms 33, said two arms converging at the nipple 34. These hollow arms permit the passage of steam, as indicated by arrows in Fig. 4, and the valve

is opened by pushing the section 22 forwardly, as illustrated by comparing Figs. 3 and 4. A spring 35 is mounted on studs 36, one of which projects forwardly from the end wall 23 of the section 22 and the other projecting rearwardly from the wall of the converging arms 33. Said spring 35 merely holds the valve yieldingly on its seat to protect it from injury when not in use, the valve being normally held against its seat by steam pressure acting as described against the shoulders 30, 31. It will be seen that this location and mounting of the spring is such that it in no way interferes with the passage of steam, and it is accessible for removal if, in case of breakage or for any other reason, it is desired to replace one spring by another.

The steam nozzle 37 has its socket 38 fitted to the nipple 34, and said nozzle is externally threaded to receive the hub 39 of the skeleton head, the arms 40 of which extend substantially radially from the hub and then converge, as shown by comparing Figs. 3 and 5. Preferably there are three of the arms 40 and they are externally tapered so as to adapt them to fit the end of a boiler tube of any size within the limits prescribed by the size of the device. The construction is such that tapering passages are formed between the arms for the flow of air induced by the blast of steam or other fluid through the nozzle 37. The nozzle 37 is axially in line with the center of the space between the arms 40 so that the supply of steam will always be exactly at the center of the tube end. Owing to the external tapering form of the arms and the fact that the openings or spaces between them are tapering, the area for the passage of air increases in accordance with the size of the tube that is to be cleaned, because the larger the tube the farther in the skeleton head can be inserted, resulting in bringing larger air induction areas in proximity to the entrance end of the said tube to be cleaned.

The operation of the device is practically the same as explained in said Patent 913,260, viz. by simple pressure of the handle after the skeleton head has been placed in proper position, such pressure opening the valve to the position shown in Fig. 4. Sometimes, however, it is desired to blow soot off the tube sheet, or to use the cleaner for purposes where no surface is presented against which the skeleton head can be placed. To enable the valve to be opened at such time, I provide a handle or pull-bar 41, which for convenience is carried by one of the arms 40. Said pull-bar 41 is separated from the steam nozzle and can be grasped by the operator without discomfort, the skeleton head and the members at the rear thereof being drawn backwardly so as to open the valve.

The fitting 13 is shown as provided with an eye 42 to enable a counterbalancing device to be connected thereto. In practice such a counterbalancing device may consist of a cord or chain connected to the eye 42 and passing over a pulley, said cord or chain having a weight which will sufficiently counterbalance the weight of the entire device to enable it to be conveniently manipulated.

The section 22 is shown as formed with a hole having a plug 43 which may be removed whenever it is desired to lubricate the device by oil deposited through said hole. The steam passing through the section 22 will distribute the oil so deposited, to the surfaces which slide relatively to each other during the telescopic action of the device.

As stated, the skeleton head preferably has three arms 40, but it may have only two, as indicated in Fig. 9, which two will be diametrically opposite each other. Instead of making the skeleton head and nozzle and chamber 32 in separate parts connected together, they may be formed in one casting, as shown in Fig. 9.

The supply of the steam through a single jet in line with the center of the space between the tapering arms, as shown, provides a structure which is absolutely unobstructed by baffle plates or other impedimenta and tends to create and maintain a considerable vacuum immediately surrounding the point of steam discharge into the tube. The very large openings through which an almost unlimited volume of air is permitted to flow into the tube behind the steam not only supplies relief to the vacuum caused by the steam but forms a densely crowded swab-like current, which travels so swiftly as to dislodge and carry with it every particle of soot.

It will be observed that the section 27 carries the arms 33 and that the structure permits of a relative sliding movement between the said section and its arms and the valve 26, the said valve being supported within and guided by said section 27 and its arms, leaving a space beyond said valve 26 and between said valve and the point where the arms 33 converge, which space is open to the atmosphere and contains the spring 35. The spring therefore is so exposed to the atmosphere that there is no liability of its temper being drawn by the heat of the steam.

Referring to Fig. 4, the pipe or tube indicated by dotted lines is one of the large sizes with which the device shown is designed to be used. In other words, the device has its arms 40 so inclined or tapered, and so spaced apart, that the device can be used to clean a tube of a size which will just barely admit the extreme ends of the arms, or a tube relatively as large as indicated in Fig. 4, or perhaps slightly larger. In any event it is not designed to use a device having arms of a given size in con-

nection with a tube so large as to admit the arms far enough to permit the nozzle 37 to approach the end of the tube much closer than shown in Fig. 4. This is for the reason that if the end of the nozzle were to pass into or nearly into the end of the tube, its presence in that location would form an obstruction to the admission of the proper relative volume of air. By holding the nozzle at such a distance from the end of the tube as to insure the provision of a space for the induction of the proper amount or volume of air, I am able to secure advantageous results because the moment that the steam valve is opened by the thrusting of the device to position, the instant rush of steam induces a swiftly traveling rush of air which effects a quick and powerful blow.

The arms 40 are hooked or composed of inner portions radiating from the nozzle and outer portions angularly arranged relatively to the inner portions, the outer portions being extended forward and converging to points in advance of the nozzle. The arms are separated from each other throughout their entire length so that their surfaces coöperate with the periphery of the nozzle and the mouth of the tube in which the arms are inserted, in forming relatively large unobstructed ducts permitting correspondingly large streams of air to flow undeflected along the periphery of the nozzle and into the tube, the volume of said streams being limited only by the diameter of the tube and the cross sectional areas of the nozzle and arms. The amount of air admitted to a relatively large tube is therefore greater than the volume admitted to a smaller tube.

I claim:

1. A device of the character described, comprising a telescopic conduit having a valve mechanism, a chamber provided with arms having passages for fluid passing the valve mechanism, said arms converging and having a delivery nozzle, and a spring mounted between said arms and coöperating with the members of the telescopic conduit to hold the valve closed.

2. A device of the character described, comprising a conduit having a delivery head at one end and a fitting for the connection of a fluid supply tube at the other end, said fitting having two diverging handle sockets, one of said sockets being in alinement with the conduit, the passage for the fluid through said fitting being separated from said sockets by a curved wall.

3. A device of the character described, comprising a valved conduit, a chamber secured to said conduit, said chamber having arms provided with fluid passages, a nozzle for delivering fluid from said passages, and tapering arms for locating the device relatively to a tube, said arms extending beyond the delivery end of the nozzle.

4. A device of the character described, comprising a stream-delivering nozzle, and a plurality of hooked arms having inner portions radiating from said nozzle and outer portions extended to points in advance of the nozzle and converging from their junction with the inner portions to present inclined backs adapted to enter and bear on the mouth of a tube, said arms being separated from each other along their entire length, so that their surfaces coöperate with the periphery of the nozzle and the mouth of said tube in forming relatively large unobstructed ducts permitting correspondingly large streams of air to flow undeflected lengthwise of the nozzle and into the tube, the volume of said streams being limited only by the diameter of the tube and the cross sectional areas of the nozzle and arms.

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

CHARLES A. CLAFLIN.

Witnesses:
A. W. HARRISON,
P. W. PEZZETTI.

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