

1,143,409.

G. S. KYLE.
BOILER FLUE CLEANING APPARATUS.
APPLICATION FILED SEPT. 30, 1914.

Patented June 15, 1915.
2 SHEETS—SHEET 1.

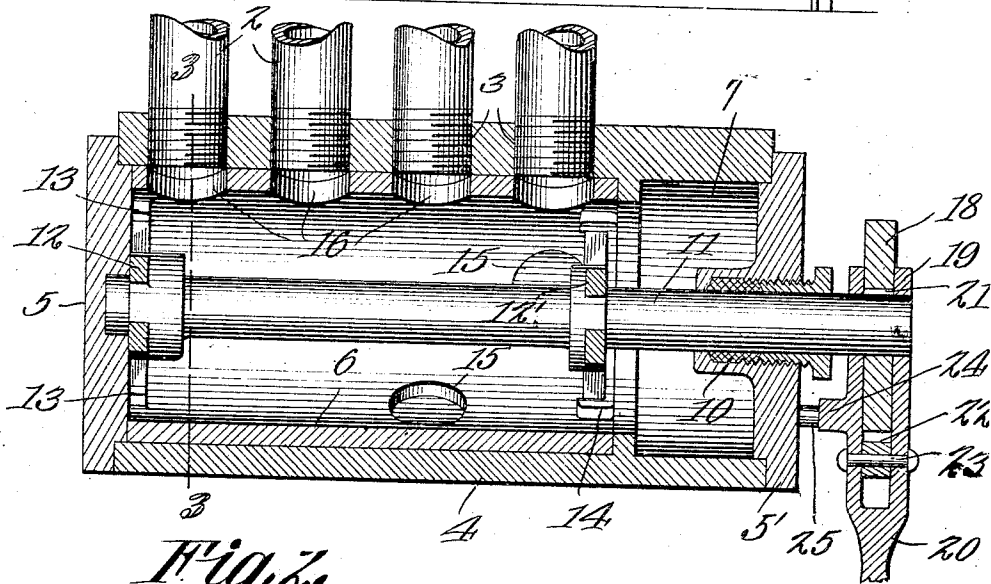
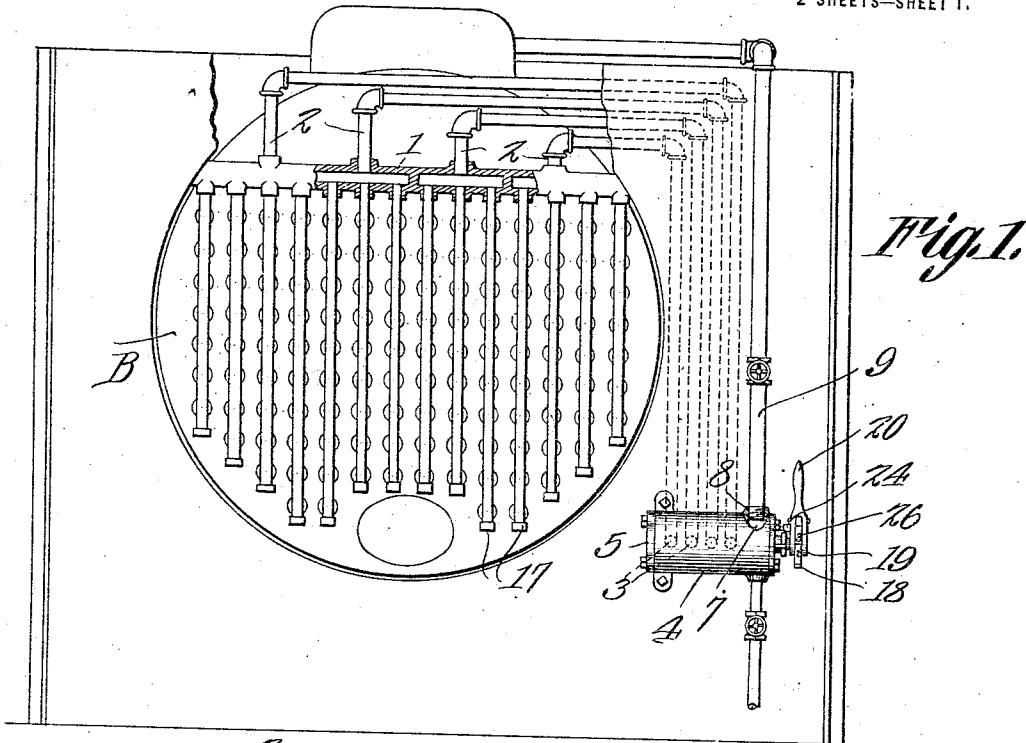


Fig. 2.

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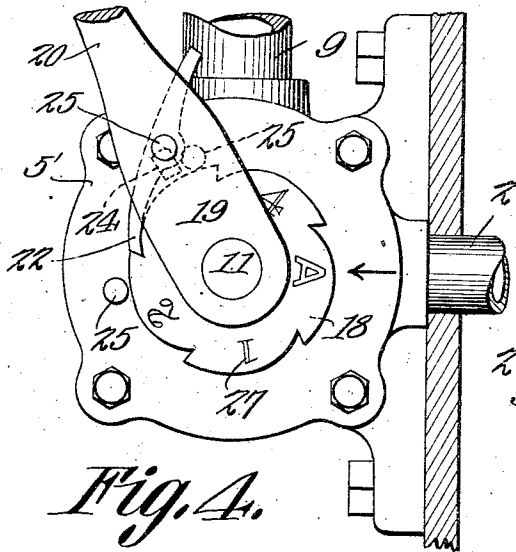


Fig. 4.

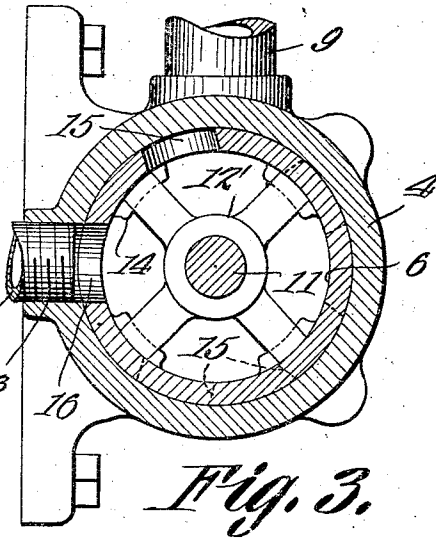


Fig. 3.

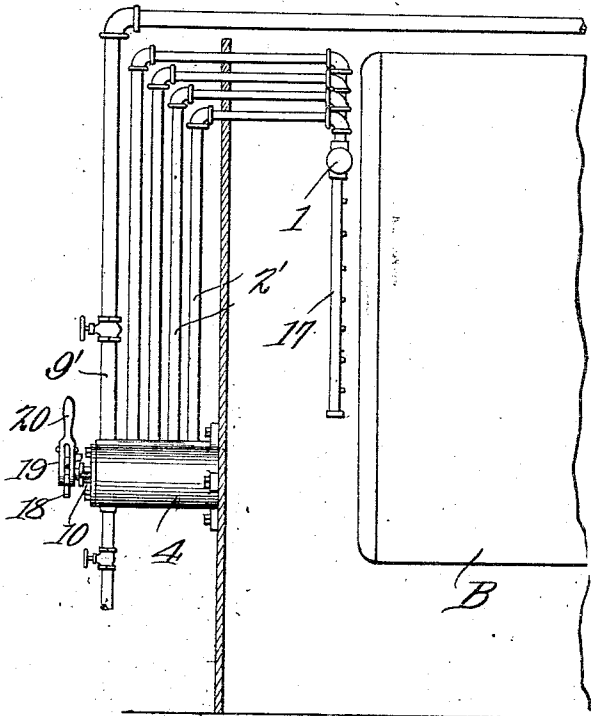


Fig. 6.

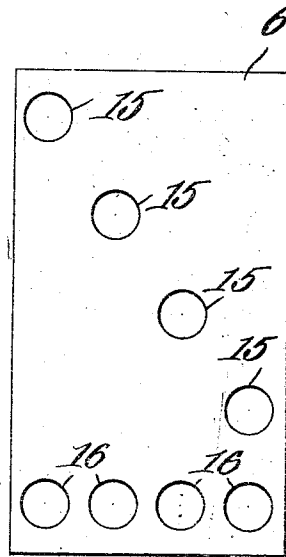


Fig. 5.

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UNITED STATES PATENT OFFICE.

GEORGE S. KYLE, OF CHAMBERSBURG, PENNSYLVANIA.

BOILER-FLUE-CLEANING APPARATUS.

1,143,409.

Specification of Letters Patent.

Patented June 15, 1915.

Application filed September 30, 1914. Serial No. 864,301.

To all whom it may concern:

Be it known that I, GEORGE S. KYLE, a citizen of the United States, residing at Chambersburg, in the county of Franklin and State of Pennsylvania, have invented a new and useful Boiler-Flue-Cleaning Apparatus, of which the following is a specification.

The present invention relates to improvements in boiler flue cleaning apparatus, one object of the invention, being the provision of a device of this character adapted to be connected, so that the various series or sections of tubes may be successively cleaned by a steam blast, the continued operation of the present device connecting all of the tubes for simultaneously receiving the steam blast, thus insuring the proper cleaning of the boiler tubes.

A further object of the present invention is the provision of a device of this character which is readily applied to any of the present constructions of boilers, and which is readily operable and provides means for indicating the position of the valve therein so that the operator at a glance may know which series of tubes are being cleaned and when all series are being cleaned simultaneously.

A still further object of the present invention, is the provision of a device of this character which is simple, inexpensive and durable in construction, and which is thoroughly efficient and practical in use and readily assembled and taken apart.

With the foregoing and other objects in view which will appear as the description proceeds, the invention resides in the combination and arrangement of parts and in the details of construction hereinafter described and claimed, it being understood that changes in the precise embodiment of the invention herein disclosed can be made within the scope of what is claimed without departing from the spirit of the invention.

In the drawings—Figure 1 is a front elevation partly in section of a boiler showing the present invention in operable relation thereto. Fig. 2 is a longitudinal sectional view through the present valve construction of the present apparatus showing the valve in the position it assumes when directing steam to all of the flues. Fig. 3 is a section taken on line 3—3 of Fig. 2. Fig. 4 is an end view of the present valve construction taken from the operating end thereof. Fig.

5 is a diagram showing the relative position of the ports of the rotary valve member.

Fig. 6 is a side elevation of a boiler showing the present invention applied in a position at right angles to that illustrated in Fig. 1.

Referring to the drawings and more particularly to Fig. 1 thereof, B designates the boiler, which is provided at its forward end within the walls of the casing thereof, with a header 1, which is divided into four sections into which lead the respective pipes 2. These pipes 2 lead from and are connected to the respective outlet ports 3 of the main valve casing 4. This valve casing 4 is made in the form of a cylinder, as illustrated in Fig. 2, being closed by the ends or caps 5—5', so that the cylindrical or tubular valve member 6 may be readily disposed and rotated therein. The valve 6 is of lesser length than the interior chamber of the casing 4 and therefore provides a normally open space 7 at one end thereof, into which the steam outlet port 8 opens, a steam directing pipe 9 being disposed in said port, and such port being disposed at any point within the chamber 7 as may be found desirable. As for instance, in the structure as shown in Fig. 6, the pipe 9' is in alinement with the pipes 2' upon the upper surface of the valve casing 4, while the pipe 9 in the construction or arrangement shown in Fig. 1, is led in at the side. The cap 5' of the casing 4 is provided with the stuffing box 10 in which is adapted to be fitted for rotation, a shaft 11. This shaft 11 is provided with the two spiders 12 and 12' which are fixed thereto and movable therewith so that the same may be readily inserted between the spaced lugs 13 at one end and within the tubular valve 6, to be seated within the recessed lugs 14 at the opposite end of such valve 6 so that when the shaft 11 is rotated, as will presently appear, the tubular valve 6 will also be rotated therewith. It will thus be seen that the steam admitted into the chamber 7 will enter the open end of the tubular valve 6 adjacent thereto and consequently will be interiorly thereof, to be directed, as will presently appear, to the respective pipes 2, one at a time in succession and finally through all of them simultaneously. In order to accomplish this, there is provided through the wall of the tubular valve 6, the staggered ports 15, and the longitudinally alined ports 16, one port to each pipe 2. Although only four of these

pipes are shown in the present instance, it is apparent that any number may be employed according to the size of the boiler upon which the present device is to be employed. Thus for instance, the valve 6 is operated so as to place one port 15 in registration with its pipe 2, thus directing steam from the pipe 9 into the chamber 7 through such port and pipe to the selected series of directing pipes 17 which are in communication with the respective chambers of the header 1, thus blowing out the tubes controlled thereby. The valve 6 next is moved to bring the following or successive port 15 in registration with the second pipe 2, and so on until the staggered ports 15 have all been placed in registration with their respective pipes. The final movement of the valve 6 causes the alined ports 16 to be placed in registration simultaneously with the pipes 2, so that the steam is conducted through all of such pipes simultaneously to finally blow out all of the tubes within the boiler in one operation.

It has been found in practice, that this is essential, for the reason that the pressure is concentrated at the initial cleaning of the tubes when the respective ports 15 are placed in registration, while a certain accumulation of soot and dust will enter the tubes after the port 15 has been placed out of registration and before the ports 16 are placed in registration.

In order to operate the valve 6, and at the same time have indications upon the exterior thereof so that the operator may ascertain at a glance the position of the respective ports 15 and 16 relatively to the pipes 2, a ratchet wheel 18 is straddled by the forked end 19 of the lever 20, such lever 20 and the ratchet 18 being disposed upon the extended end of the shaft 11 adjacent the cap 5', while the ratchet 18 is keyed as at 21 to the shaft so as to be fixed thereto. The forked end 19 is rotatably mounted upon the shaft 11 at opposite sides of the ratchet 18 so that the same may be oscillated freely thereupon to cause the movement of the shaft 11 as desired through the instrumentality of the pawl 22 secured within the forked end 19 by the pin 23 relatively to the ratchet 18. In order to limit the distance of movement of oscillation of the lever 20, the lug 24 is carried thereby and is disposed in the line of, to engage the respective pins 25 projecting from the outer face of the cap 5'.

The indicating marks 26 are disposed circumferentially relatively to the teeth of the ratchet 18, while the indicating numerals 27 are disposed upon the outer face of the ratchet instead of the circumferential face of the teeth thereof. Thus in the present instance, the indicating Nos. 1, 2, 3 and 4 and the letter A are indicated so that when the first port 15 is placed in registration with the pipe 2, the tooth indicated by No.

1 will be engaged, and so on throughout the series, while A will indicate that the tooth adjacent to the openings 16 is engaged to place all of such openings in registration with the pipe 2 to thus indicate that all pipes 2 are being supplied with steam.

From the foregoing description, taken in connection with the drawings, the operation of the present device is readily understood, but briefly stated it is as follows.

To clean the boiler tubes, the handle 22 is operated so that the tooth of the ratchet wheel 18 bearing the No. 1 will be engaged and be moved to the left as viewed in Fig. 4, thus placing in registration with the first pipe 2, the first port 15 of the tubular valve 6. The valve is held in this position for a predetermined period so that the soot and other accumulation will be blown from the tubes of the boiler, at which time, the handle 20 is moved in the opposite direction to release the pawl 22 from the ratchet 18. At this time, the handle is moved in the opposite direction, thus rotating the valve 6 to place the next succeeding port 15 in registration with the succeeding pipe 2 and removing the first port 15 from registration with the previously registered pipe 2. This operation is carried on until the series of pipes 2, which may be of any number, are brought separately into play, at which time, the handle 20 is operated to place the ports 16 in registration with all of the pipes 2, thus permitting the introduction of steam simultaneously to all pipes 2 to blow out all of the boiler tubes of the boiler simultaneously. In the cleaning of boilers, it is found desirable to divide the tube groups and thus primarily clean a group at a time, the final blast being directed to all of the tubes simultaneously to insure the proper cleansing of the tubes.

In the arrangement as shown in Fig. 1, the casing 4 is connected longitudinally in front of the boiler whereas in the structure shown in Fig. 6, the same is connected with its longitudinal length at right angles thereto, it being evident that the present device may be assembled as circumstances may require and that any number of pipes 2 may be employed according to the capacity or size of the boiler.

It is also possible to connect a single valve mechanism with a battery of boilers, so that the steam for cleaning may be directed to a selected boiler of the group, and to a selected group of tubes of the selected boiler.

What is claimed is:

1. A boiler flue cleaning apparatus having a casing provided with a cylindrical chamber, and a rotatory tubular valve mounted in and in communication from its interior with the chamber, said valve being of lesser length than the chamber, said casing being provided with a series of outlet ports

and one steam inlet port, the steam inlet port being beyond one end of the valve and said valve being provided with one port for each outlet port of the casing, said ports being disposed in staggered relation to each other, and with a plurality of alined ports for registration simultaneously with the outlet port, and means for selectively rotating the valve.

2. A boiler flue cleaning apparatus having a casing, and a rotatory tubular valve disposed therein and in communication with the casing upon the interior thereof, said casing being provided with a series of outlet ports and one steam inlet port, and said valve being provided with one port for each outlet port of the casing, said ports being disposed in staggered relation to each other, and with a plurality of alined ports for registration simultaneously with the outlet ports, and means for imparting intermittent rotatory movement to the tubular valve to dispose the staggered ports one at a time in registration with the respective outlet ports and for placing the alined ports in registration simultaneously with all of the outlet ports.

3. A boiler flue cleaning apparatus, having a casing, and a rotatory tubular valve disposed therein and in communication with the casing upon the interior thereof, said casing being provided with a series of outlet ports and one steam inlet port, and said valve being provided with one port for each outlet port of the casing, said ports being disposed in staggered relation to each other, and with a plurality of alined ports for registration simultaneously with the outlet ports, means for imparting intermittent rotatory movement to the tubular valve to dispose the staggered ports one at a time in registration with the respective outlet ports and for placing the alined ports in registration simultaneously with all of the outlet ports, and indicating means to indicate upon the exterior of the casing, the position of the relative ports of the valve.

4. A boiler flue cleaning apparatus including a cylindrical casing having a single steam inlet port and a plurality of alined outlet ports, an open ended tubular valve disposed for rotation within the casing and having the interior thereof at all times in communication with the steam inlet port of

the casing, said tubular valve being provided with a plurality of staggered ports for registration one at a time with the outlet ports of the casing and with a longitudinal series of alined ports for registration simultaneously with the outlet ports of the casing.

5. A boiler flue cleaning apparatus including a cylindrical casing having a single steam inlet port and a plurality of alined ports, an open ended tubular valve disposed for rotation within the casing and having the interior thereof at all times in communication with the steam inlet port of the casing, said tubular valve being provided with a plurality of staggered ports for registration one at a time with the outlet ports of the casing and with a longitudinal series of alined ports for registration simultaneously with the outlet ports of the casing, and means for imparting intermittent rotatory movement to the valve to selectively cause the registration of the respective ports thereof with the outlet ports of the casing.

6. A boiler flue cleaning apparatus including a cylindrical casing having a single steam inlet port and a plurality of alined outlet ports, an open ended tubular valve disposed for rotation within the casing and having the interior thereof at all times in communication with the steam inlet port of the casing, said tubular valve being provided with a plurality of staggered ports for registration one at a time with the outlet ports of the casing and with a longitudinal series of alined ports for registration simultaneously with the outlet ports of the casing, a shaft journaled in the casing and operably connected to the valve, the outer end of the shaft being disposed exteriorly of the casing, a ratchet wheel mounted upon the shaft provided with one tooth for each port, a lever mounted upon the shaft for oscillation, a pawl carried thereby for engaging the ratchet, and cooperative means carried by the lever and the casing for limiting the distance of oscillation of the lever.

In testimony that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

GEORGE S. KYLE.

Witnesses:

IVY E. SIMPSON,
M. E. MCCARTHY.