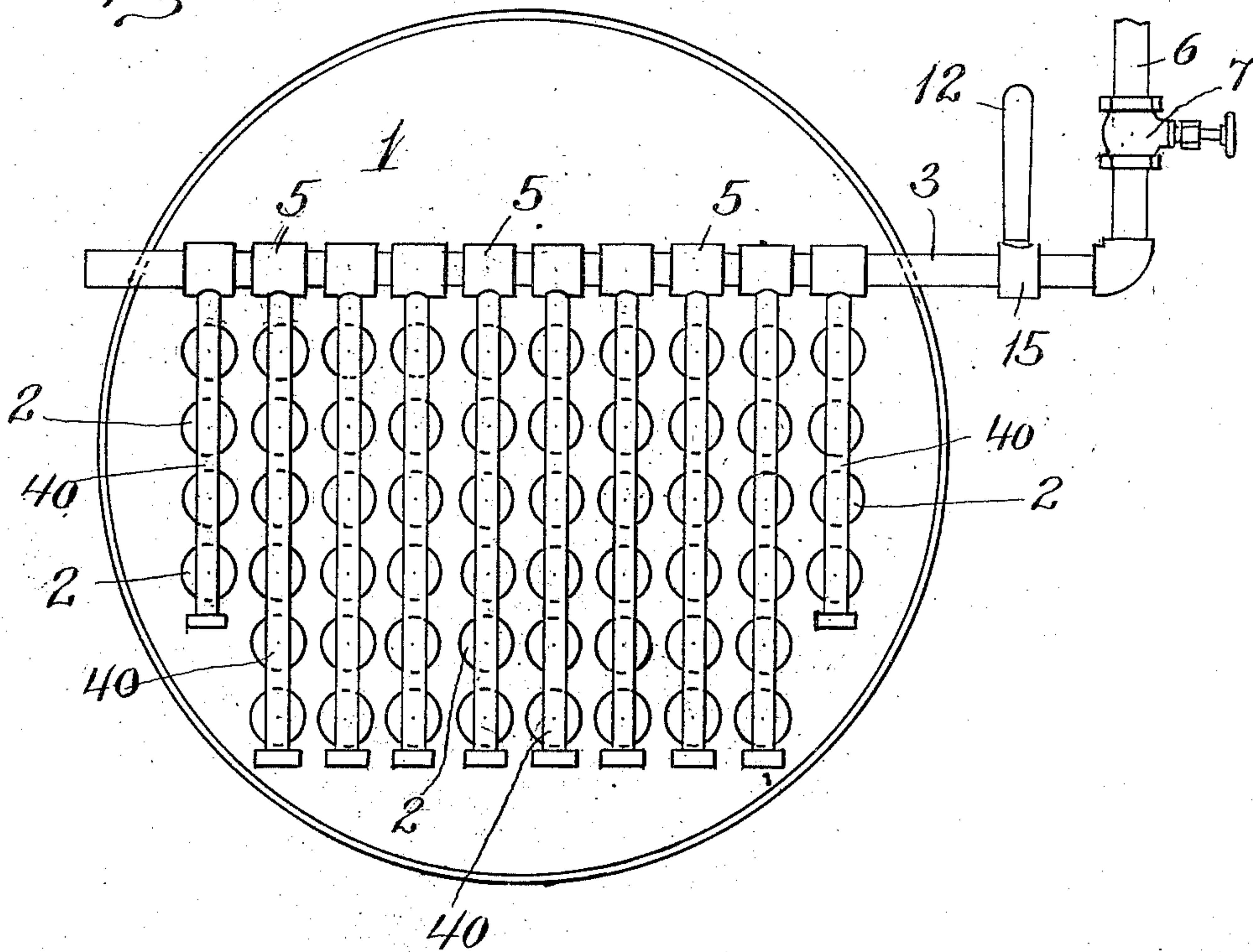


A. GRÖNVALD.  
BOILER FLUE CLEANER.  
APPLICATION FILED NOV. 2, 1908.

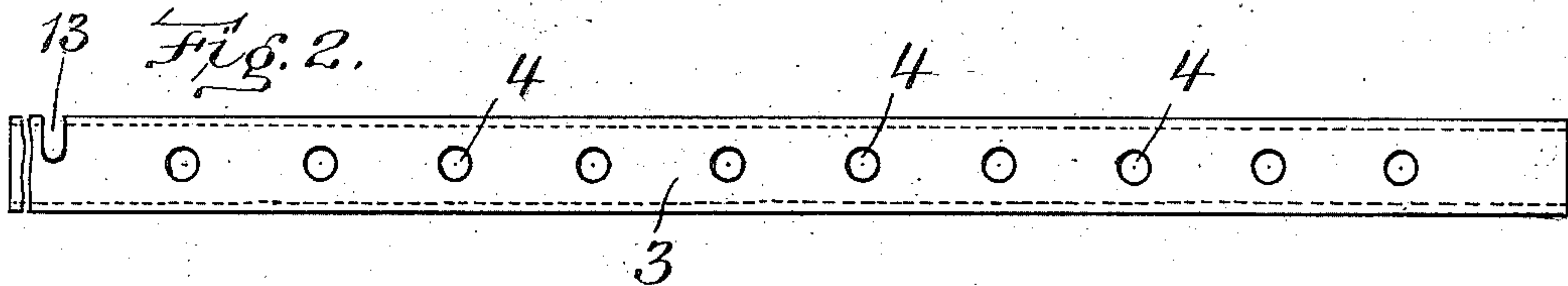
924,611.

Patented June 8, 1909.

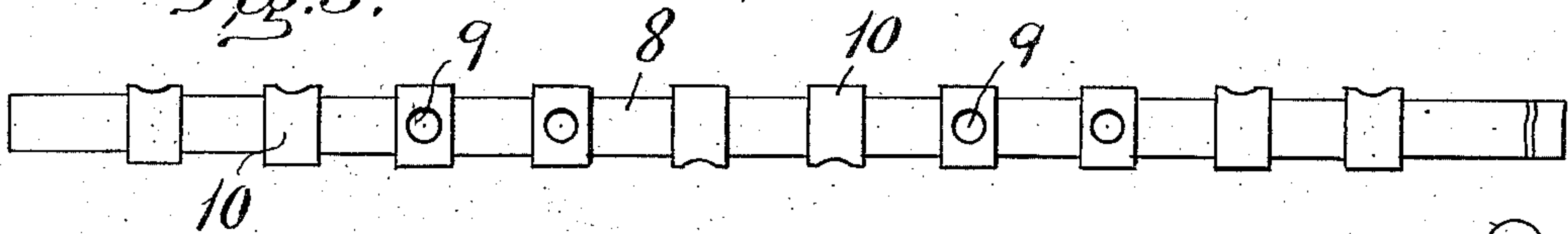
*Fig. 1.*



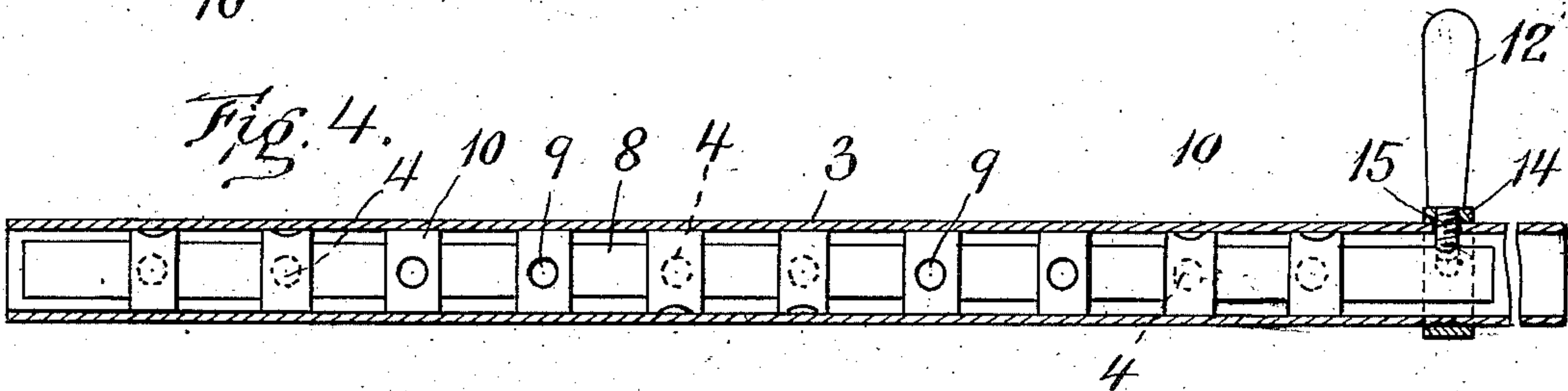
*Fig. 2.*



*Fig. 3.*



*Fig. 4.*



Witnesses.  
F. R. Roulstone  
A. C. Ratigan

Inventor.  
Andreas Grönwald  
by Wright, Smith, Dundy & May  
Attorneys



# UNITED STATES PATENT OFFICE.

ANDREAS GRÖNVALD, OF SKIEN, NORWAY.

## BOILER-FLUE CLEANER.

No. 924,611.

Specification of Letters Patent.

Patented June 8, 1909.

Application filed November 2, 1908. Serial No. 460,631.

*To all whom it may concern:*

Be it known that I, ANDREAS GRÖNVALD, of Skien, Norway, have invented certain new and useful Improvements in Boiler-Flue Cleaners, of which the following is a specification.

This invention relates to an apparatus for clearing the fire tubes or flues of steam boilers of deposits of soot, cinders and the like while the boiler is in operation without necessity of extinguishing the fires and without danger or discomfort to the operator.

More particularly, the invention is an improvement on that described and claimed in Patent No. 808,982, granted to me January 2, 1906, the object of the improvement being to render the operation of the device more efficient and to eliminate liability of breakage of the parts in operating. In the prior patent above referred to the apparatus consists of a header pipe extending across the end of the boiler from which depend cleaning pipes having orifices in line with each of the several flues or tubes of the boiler, and from which openings steam is blown through the flues to clean them. The steam is delivered to the depending pipes through the header from a connection leading from the boiler, and there is a valve in the header governing the admission of the steam to the several depending cleaning pipes. This valve consists of a tube fitting closely within the header and having a series of openings adapted to register with the inlet ends of the several depending cleaner pipes. In practice I have found that when this valve tube is made to fit tightly enough to prevent leakage of steam between its exterior and the interior surfaces of the header, the friction is excessive, making it extremely difficult to turn the valve, and frequently causing the operating handle to break away. When, on the other hand, the valve is made to fit so loosely that it can be readily turned, there is sufficient leakage of steam around the valve and into all the cleaning tubes to cause loss of pressure in the cleaning tubes, which are put actively into operation, so that there is not sufficient force in the jets of steam issuing from the latter to effect the proper cleaning of the boiler flues.

In the present invention I have designed the tube valve which operates within the header pipe so that it is effectively packed therein to prevent leakage of steam, with at the same time so little frictional resistance as

to offer no great impediment to its being turned, and to eliminate all danger of breaking it or the handle by which it is turned. These results I accomplish by constructing the valve tube throughout the greater part of its length of a less diameter than the interior diameter of the header so that in these portions it makes no contact with the header, but it does fit tightly enough immediately adjacent those portions in which the outlet openings are located to prevent leakage of steam.

The construction of my improved boiler flue cleaner is illustrated in the accompanying drawings, in which,—

Figure 1 represents an end view of a steam-boiler, showing the cleaning device applied thereto. Fig. 2 represents an under plan view of the header. Fig. 3 represents an elevation of the valve tube. Fig. 4 represents a sectional view of the header, showing the valve tube in place therein.

The same reference characters indicate the same parts in all the figures.

Referring to the drawings, 1 indicates the end of a boiler as the same is seen in front elevation, such boiler having the usual flues or fire tubes 2.

3 represents a header which extends across the front end of the boiler and has a series of outlet ports 4 (Fig. 2) above and in alignment with each row of boiler flues. Extending downward from the header and in front of each up-and-down row of flues is a series of cleaning pipes 40 which are secured to the header by means of collars 5 surrounding the latter, in which the ends of the cleaning pipes are fastened. The openings in these collars which contain the ends of the cleaning tubes pass entirely through the collars and register with the outlet ports 4 of the header. Each cleaning tube has perforations in line with the respective boiler flues and arranged to direct a jet of steam into such flues when the steam is admitted to the cleaning pipes.

The means for delivering steam to the header is a pipe 6 leading from the boiler, having a valve 7 and connected directly with the end of the header. When the valve 7 is opened, the steam flows from the boiler into the header and is admitted to the latter under the control of a tubular valve 8 placed within the header. This valve is open at its end (that is the right-hand end as viewed in Fig. 1) so that the steam which flows through the pipe 6 will enter the interior of the valve.



This valve also has a series of ports 9 extending through its sides and communicating with its longitudinal passage, these ports being spaced equally with the ports 4 in the header 3, so as to register with these latter ports when the valve is appropriately turned. The ports 9 are not all on the same side of the valve tube but are located at different points in the periphery thereof so that all will not register with the ports in the header at any one time. That is, the arrangement is such that the valve can never be placed so as to cause steam to blow out of the lateral perforations in all the cleaning pipes at the same time, but the latter are operated in sections. That is, in one position of the valve, one, two or more of the cleaning pipes are supplied with steam and caused to blow jets of steam through the boiler flues in line therewith while the others are inactive, and in another position of the valve admission to the tubes first referred to is closed while steam is admitted to other tubes.

The arrangement of the ports around the sides of the valve is such that by continuous oscillation of the valve back and forth, the various cleaning tubes are rendered operative in turn, and all are operated in one complete cycle of movements of the valve. Thus during the cleaning of the entire set of boiler flues, the fire is not dulled, and the draft not interrupted, but are improved, because of the fact that the steam is only blown through a small proportion of the flues contrary to the direction of draft at any one time. The header and cleaning tubes are located within the front of the boiler setting so that there is no need of opening the front of the boiler to operate the apparatus, and the operator is not exposed to the heat or to poisonous gases of the fire.

As will be seen from Figs. 3 and 4, the valve tube as a whole is of less diameter than the interior of the header, so that throughout the major portion of its length it makes no contact with the interior surface of the header. But immediately adjacent to the several ports 9, the valve is provided with shoulders or enlargements 10 which fit closely within the header, making contact with the latter so tightly on all sides of the outlet ports 9 as to prevent leakage of steam, thus permitting escape of steam from the valve only when its ports are in line with the ports 4 of the header. The frictional resistance to turning of the valve is thus very much less than would be the case if the valve made steam-tight contact with the header throughout its entire length, and in the case of devices in which the headers and valves are of great length, the construction having a limited area of contact eliminates the danger of

breakage, which is present in those devices where the contact is continuous.

The valve is rotated by means of a handle 12 secured suitably in its periphery and projecting through a semi-circumferential slot 13 in the header. This slot is covered by a collar or sleeve 14 which surrounds the header at this point and through which the shank 15 of the handle 12, which is directly secured to the valve tube, extends. The sleeve packs the slot 13 and prevents leakage of steam therefrom.

I claim:—

1. In a boiler flue cleaner, in combination with a header and cleaning pipes therefrom having outlet orifices in line with the flues or tubes of the boiler, a valve tube having ports and adapted to register successively with the inlet openings to different portions of said cleaning pipes and making contact with the interior walls of the header only at points immediately adjacent to and surrounding said ports.

2. In a boiler flue cleaner, in combination with a header and cleaning pipes depending therefrom, a valve consisting of a tube mounted coaxially within the header and having ports adapted to register successively with the inlets to different cleaning pipes, said valve tube having separated enlargements making steam-tight contact with the interior walls of the header on each side of the ports, said valve tube being otherwise out of contact with the header.

3. In a boiler flue cleaner having a header provided with outlet ports in its side and cleaning pipes extending therefrom and having inlets registering with said ports, a tubular valve located within said header and rotatable about the axis thereof, said tube having annular members making steam-tight contact with the interior walls on each side of the ports and being elsewhere out of contact with the header.

4. In a boiler flue cleaner, in combination with a header having ports in its sides, a tubular valve having a longitudinal passage and connecting lateral ports adapted to register with the ports of the header, and enlarged shoulders surrounding the valve annularly and extending beyond the ports on each side thereof, making steam-tight engagement with the interior walls of the header, said valve being out of contact with the header at all other points.

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

ANDREAS GRÖNVALD.

Witnesses:

ARTHUR H. BROWN,  
A. C. RATIGAN.