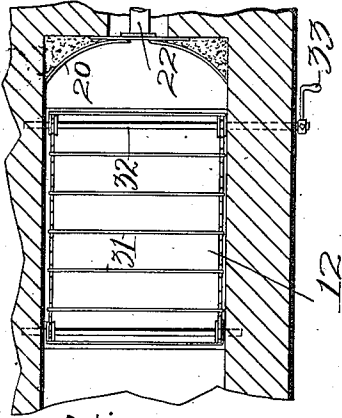
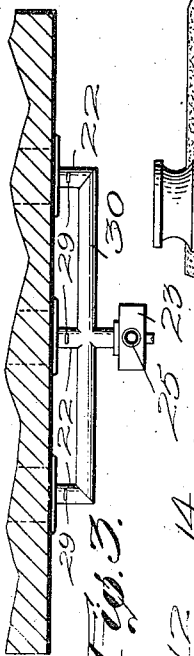


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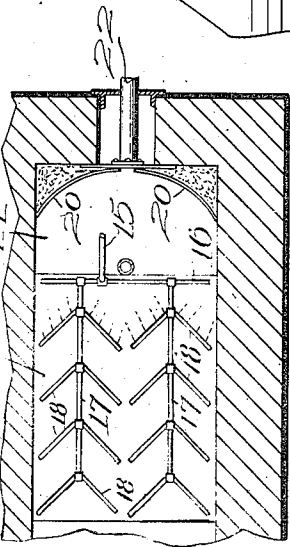
2 SHEETS—SHEET 1.



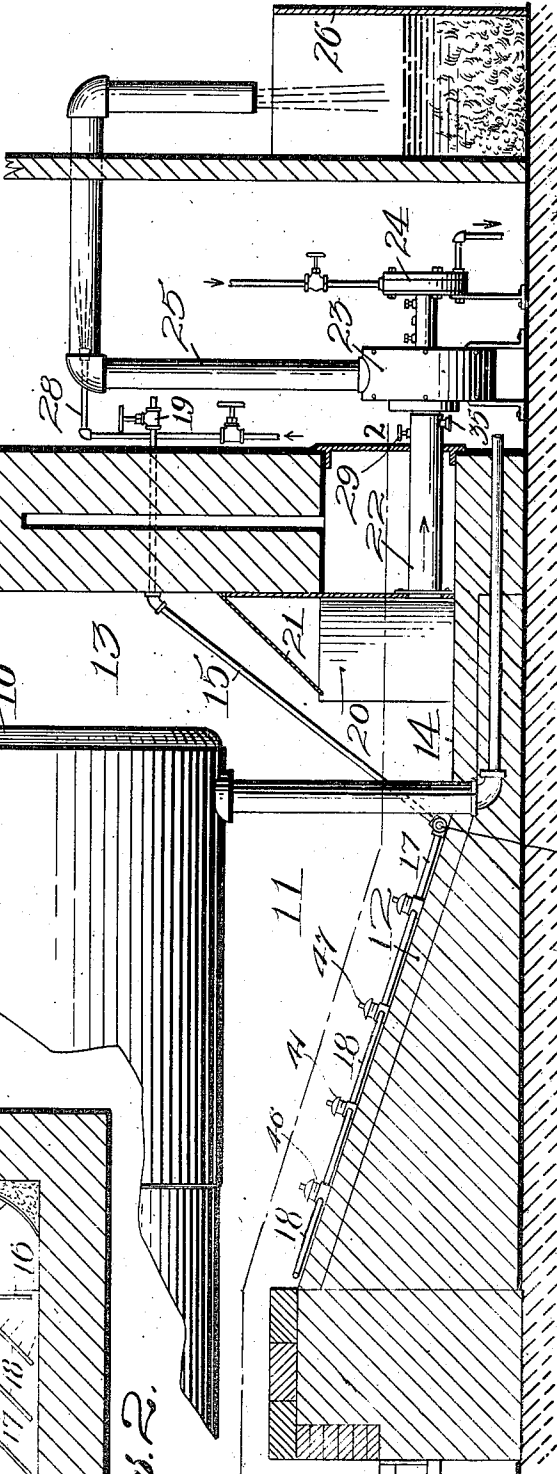
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20



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Witnesses:  
C. F. Mason  
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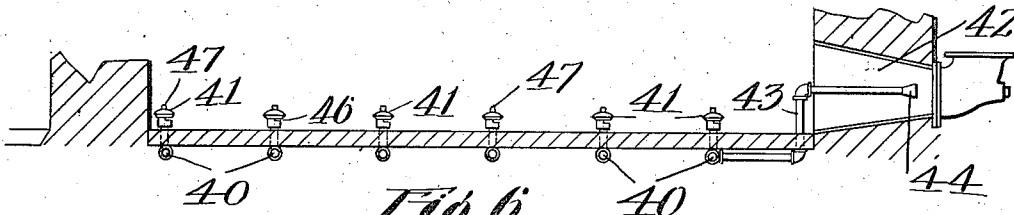
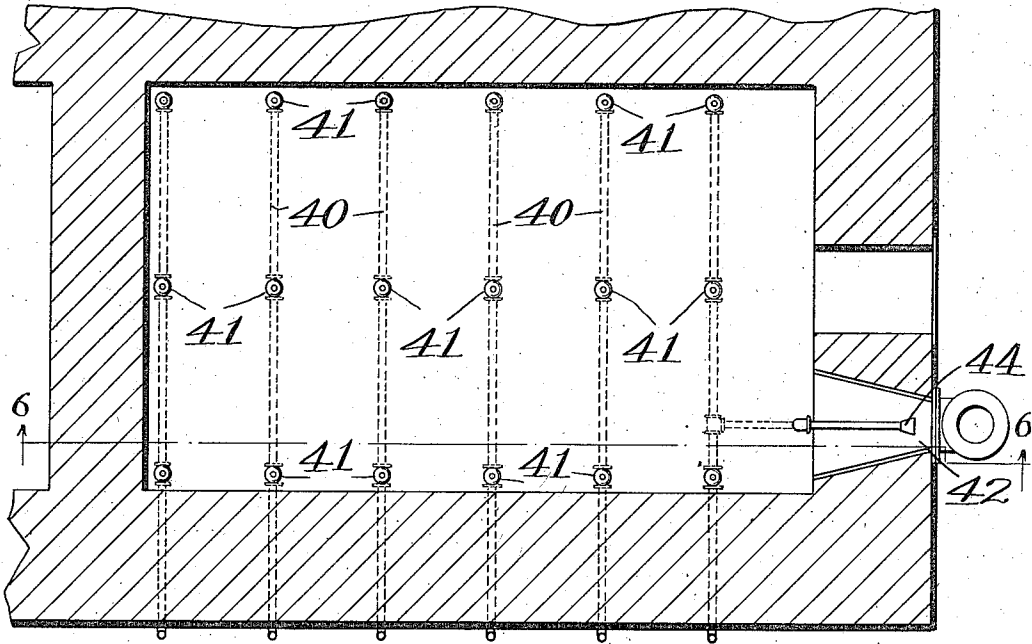
E. J. McCARTY.  
SOOT EXTRACTOR FOR BOILERS.  
APPLICATION FILED MAY 9, 1912.

1,179,202.

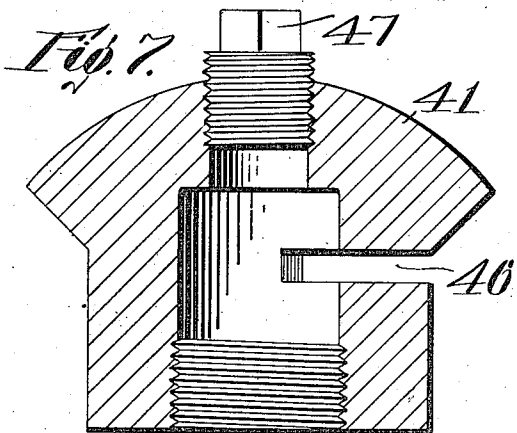
Patented Apr. 11, 1916.

2 SHEETS—SHEET 2.

*Fig. 5.*



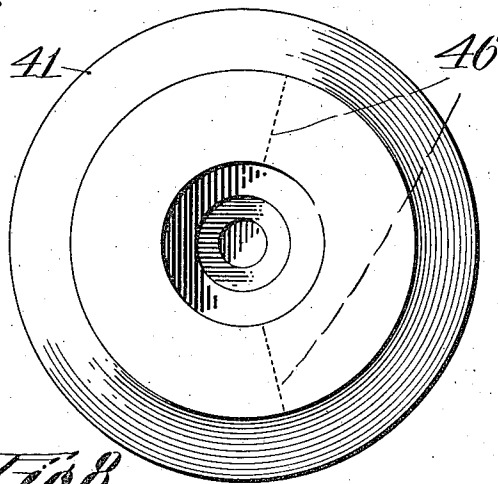
*Fig. 6.*



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*Fig. 8.*



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# UNITED STATES PATENT OFFICE.

EUGENE J. McCARTY, OF CLINTON, MASSACHUSETTS, ASSIGNOR TO HIMSELF, THOMAS J. McNAMARA, AND JOHN H. COUGHLIN, ALL OF CLINTON, MASSACHUSETTS.

## SOOT-EXTRACTOR FOR BOILERS.

1,179,202.

Specification of Letters Patent.

Patented Apr. 11, 1916.

Application filed May 9, 1912. Serial No. 696,067.

*To all whom it may concern:*

Be it known that I, EUGENE J. McCARTY, a citizen of the United States, residing at Clinton, in the county of Worcester and State of Massachusetts, have invented a new and useful Soot-Extractor for Boilers, of which the following is a specification.

This invention relates to an arrangement for cleaning out the combustion chambers of boilers. In many plants the physical conditions make boiler cleaning extremely disagreeable and unsatisfactory. Some plants operate the boilers continuously and in that case cleaning becomes most difficult because of the intolerable heat. In other cases the position of the boiler and the limited space for operation make cleaning a task to be dreaded. In all boiler rooms the heated air currents become laden with the small particles removed from the tubes and other surfaces in the cleaning process and this matter finally settles down in the form of a sooty dust on all of the boiler room fixtures.

The principal objects of this invention are to provide a convenient, safe and economical arrangement for accomplishing this cleaning operation without any of these attendant disadvantages.

The invention also involves improvements in details of construction and relative arrangement of parts as will appear hereinafter.

Reference is to be had to the accompanying drawings in which,

Figure 1 is a central longitudinal sectional view of a portion of a boiler foundation and walls with a preferred form of this invention applied thereto; Fig. 2 is a substantially horizontal sectional view of the same, but having a modified form of sprinklers and showing it on the line 2-2 of Fig. 1. Fig. 3 is a fragmentary view similar to Fig. 2, showing how a battery of boilers is connected up in accordance with this invention. Fig. 4 is a view similar to Fig. 2 showing a modification. Fig. 5 is a plan of a modification. Fig. 6 is a sectional view of the lower part thereof on the line 6-6 of Fig. 5. Fig. 7 is a central vertical sectional view of one of the nozzles, and Fig. 8 is a plan thereof.

The invention is shown as applied to a well known type of horizontal boiler 10 having a combustion chamber 11 provided with

a slanting bottom 12. The space 13 at the end of the boiler through which the products of combustion pass into the tubes is shown as provided with a horizontal floor 14 at the bottom. For the purpose of loosening the soot and ashes which collect on the inclined bottom of the combustion chamber and moving them along on the horizontal bottom 14, a steam supply pipe 15 is shown coming into the boiler at any convenient point and connected with a cross pipe 16 which in turn is connected with a plurality of branch pipes 17 each having perforated pipes 18 extending therefrom in a series. The perforations or nozzles on these pipes are located on the downward side thereof so that when the valve 19 which controls this system is opened the steam will be discharged into the soot and along the inclined bottom to raise the dust and force it positively downward along the incline. On the horizontal bottom a wall 20 is shown curved gradually from the sides toward the center of the end of the combustion chamber. This is provided to cause the current of dust and ashes to concentrate near the end and keep it out of the corners. It constitutes means for receiving and collecting the soot and ashes. Over this wall is shown an inclined roof 21 the purpose of which is to catch the soot and dust settling down from above and cause it to slide off the roof at a point back from the end of the boiler. Thus it will not collect during the idle period in such position as to choke up the mouth of an exhaust pipe 22 which is located at the center of the end of the boiler in position to receive the soot and ashes moved along the curved walls 20. This pipe leads to an exhaust fan 23 which is shown as operated by a steam turbine 24 or the like. The outlet 25 of this blower is shown as extending upwardly then horizontally of the building and conveniently downwardly into a receptacle 26 adapted to receive water. This receptacle is shown as open at the bottom and simply resting on or in the earth so that water can drain out leaving the soot and ashes in the receptacle. In order to assist in forcing the current of soot and ashes along the outlet pipe 25 a water injector 28 is shown near the end of the horizontal part of the outlet pipe for wetting down the dust and forcing it along the same and assisting in the operation of

cleaning out the combustion chamber. The intake 22 of the exhauster is provided with a cock 35 to which can be connected a hose having a nozzle or any kind of implement for cleaning out the tubes or other cleaning purposes.

Fig. 3 shows a construction in which a battery of three boilers is connected up in this way, the several exhaust pipes 22 being connected by a transverse pipe 30 with the blower 23.

In the form of the invention shown in Fig. 4 the inclined bottom 12 of the combustion chamber is provided with an endless chain scraper 31 having a shaft 32 with a crank 33 on the same for operating it. This is turned in a direction to scrape the ashes and soot along the inclined bottom toward the lower end thereof and has an effect similar to that of the steam ejector system which is shown in Figs. 1 and 2.

In operation the exhauster is started and the valve 19 is opened and likewise a damper 29 in the in-take 22 of the exhauster, and the valve in the spray pipe 28. The valve 19 is turned off and on as desired so as to allow steam or even air, if desired, to be used to raise the ashes into a current of air passing into the exhauster through the pipe 22. The entire operation of an ordinary boiler can be completed in a few minutes. The tubes can be cleaned or scraped while the exhauster is running and all deposits therefrom are discharged down in front of the pipe 22 but not near enough to clog it up and are taken up at once and carried away immediately. Furthermore there is a continuous current of air or air and steam, caused by pressure behind and exhaust in front so that each helps the other and neither has to be as powerful as if used at different times or alone. Further assistance is also provided by the water supply from the pipe 28.

Referring now to Sheet two, it will be seen that another arrangement of floor and combustion chamber is illustrated. The pipes 40 cross under the floor and are connected through the floor of the combustion chamber by short nipples with specially designed cap spray nozzles 41. These nozzles are set to make a clean sweep of the surface on which the soot and ashes are located for the purpose of carrying it to an outlet 42 into which extends a pipe 43 having a nozzle 44 thereon for assisting in discharging the soot and ashes. It will be obvious of course that the pipes under the floor of the combustion chamber can be arranged in many different ways in accordance with this principle, and may be handled collectively or in sections as desired.

It will be understood, of course, that the nozzles can be placed in the side of the boiler walls at a point about level with the bottom

of the boiler shell to blow a jet of steam or air upon the bottom shell of the boiler and remove the scale, ashes or corrosion from the surface thereof. One advantage of this arrangement is that it permits burying the steam pipes underneath the floor of the combustion chamber and have everything insulated from the heating, excepting the cast iron heads 41.

The nozzles 41 are placed along the sides of the combustion chamber or any other place in such a position that a horizontal slot 46 in the side of each nozzle will be located just above the surface of the floor of the chamber and will usually be all on the same side of the respective nozzles so as to create a current in a direction toward the outlet. These slots extend about one-third of the way around the circumference so as to blow a flat jet of steam or air across the floor of the combustion chamber. It will be seen that the circular top of the head 41 projects over the side wall all around so as to protect the opening 46 from the ashes and dirt that settle down on the floor and prevent clogging. Each head 41 is shown also as provided with a removable plug 47 in the top which in ordinary practice is left in place. It can, however, be removed to permit steam to be blown against the bottom of the boiler shell for displacing any sediment or scale adhering thereto.

While I have illustrated and described certain preferred embodiments of this invention, I am aware that many modifications can be made therein without departing from the scope of the invention as expressed in the claims. Therefore I do not wish to be limited to all the details of construction herein shown and described but

What I do claim is:—

1. The combination with an ash pit provided with a bottom and means at the end of said bottom for collecting and receiving soot and ashes, of means distributed all along said bottom for directing a continuous current of air or steam along said bottom, loosening the soot and ashes thereon and moving them along in a comparatively dry state into said receiving means, means for simultaneously drawing air and with it the loosened soot and ashes out of said receiving means, and means for wetting them as they are being drawn out.

2. The combination with an ash-pit provided with an inclined bottom, of stationary means distributed at intervals longitudinally and transversely along said bottom for producing air or steam jets for loosening the soot and ashes and moving them toward the lower end thereof in a substantially dry state, and means at the lower end of said inclined bottom for drawing the loosened soot and ashes out of the boiler, said means being provided with an outlet pipe, a recep-

tacle into which said outlet pipe discharges, and a water pipe discharging into said outlet pipe for assisting in forcing the material into it.

5 3. The combination with a boiler having a grate and ash-pit at one end and a combustion chamber at the other provided with a bottom inclined down substantially all the way from the grate to the opposite end thereof, of means distributed all along said 10 inclined bottom for producing air or steam jets for loosening the soot and ashes all along the inclined bottom and moving them toward the lower end thereof, and means at 15 the lower end of said inclined bottom for drawing the loosened soot and ashes out of the boiler, said means being provided with an outlet pipe, a receptacle into which said outlet pipe discharges, and a water pipe dis- 20 charging into said outlet pipe for assisting in forcing the material into it.

4. The combination with a boiler having a combustion chamber, of means at the end of the combustion chamber for drawing the 25 soot and ashes out of the chamber, a vertical curved wall at the end of the combustion chamber directed toward said means, and an inclined roof in the lower part of the combustion chamber over said curved wall and

independent thereof for preventing the settling of soot and ashes at the entrance of said means when not in operation.

5. The combination with a boiler having a combustion chamber thereunder having an outlet, of a series of nozzles under the boiler 35 having horizontal slots in the sides thereof toward said outlet whereby steam or air discharged therethrough will force the ashes toward the outlet, and having means whereby they can be opened at the top to discharge 40 steam or air against the boiler.

6. The combination with a boiler having a combustion chamber thereunder provided with an outlet, of a series of nozzles under the boiler, each having means for forcing 45 the steam or air discharged therethrough toward the outlet, and having removable plugs in the tops thereof, whereby they can be opened at the top to discharge steam or 50 air against the bottom of the boiler.

In testimony whereof I have hereunto set my hand, in the presence of two subscribing witnesses.

EUGENE J. McCARTY.

Witnesses:

WILLIAM H. DIETZMAN,  
HANNAH F. KITTREDGE.