No. 889,641. PATENTED JUNE 2, 1908.

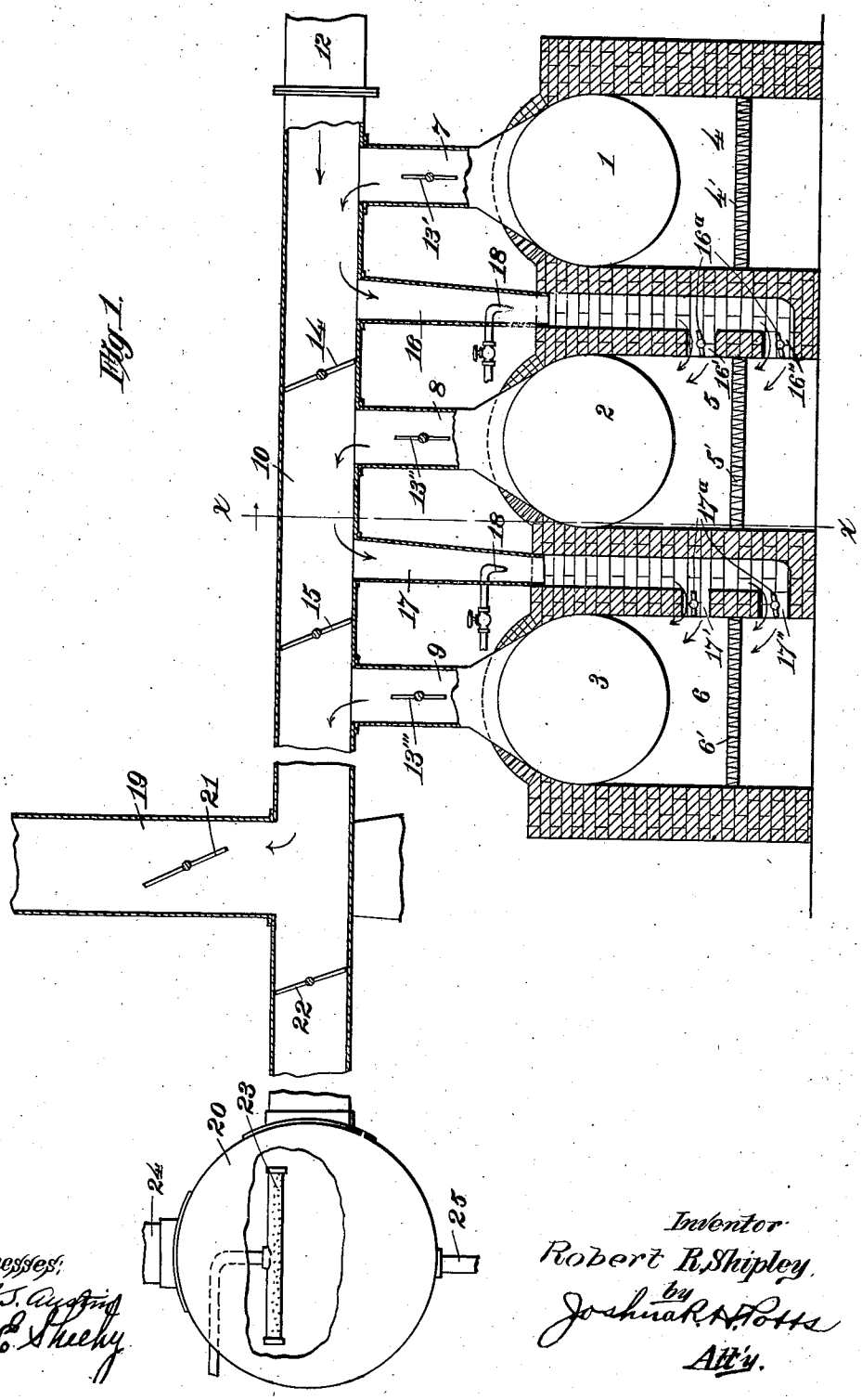
R. R. SHIPLEY.

SMOKE CONSUMER.

APPLICATION FILED JULY 11, 1907.

2 SHEETS—SHEET 1.

Fig. 1.



Witnesses:
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F. C. Sheehy

Inventor
Robert R. Shipley
by Joshua R. H. Potts
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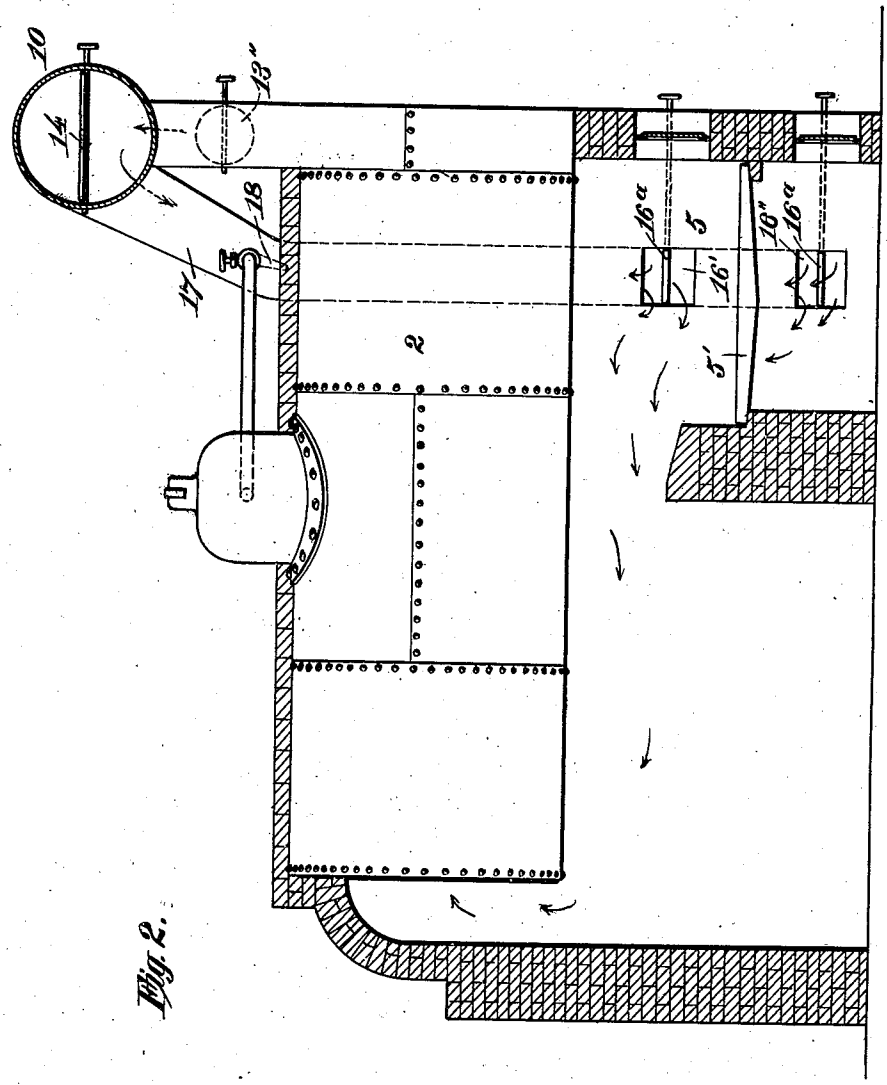


Fig. 2.

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UNITED STATES PATENT OFFICE.

ROBERT R. SHIPLEY, OF CHICAGO, ILLINOIS.

SMOKE-CONSUMER.

No. 889,641. Specification of Letters Patent. Patented June 2, 1908.

Application filed July 11, 1907. Serial No. 383,363.

To all whom it may concern:

Be it known that I, ROBERT R. SHIPLEY, a citizen of the United States, residing at 6356 Drexel avenue, in the city of Chicago, county of Cook, and State of Illinois, have invented certain new and useful Improvements in Smoke-Consumers, of which the following is a specification.

My invention relates to boiler furnaces or any others worked by direct firing of coal and has special reference to smoke consuming furnaces.

The objects of my invention are, to provide a battery of two or more boilers and their furnaces, of such improved construction that all or practically all of the smoke will be consumed therein; to provide a battery of boilers and furnaces as mentioned in which but a very small percentage of heat is wasted; and to provide a battery of boilers or furnaces as mentioned of such improved construction that any one or more boilers may be shut down for cleaning or repairs without interfering with the proper operation of the others in the battery.

A further object is to provide a battery of furnaces, as mentioned with a smoke consumer which shall be of small cost to install and of practically no expense to maintain; and further which shall be of such extreme simplicity that any fireman can operate the same.

My invention will be more readily understood by reference to the accompanying drawings forming a part of this specification and in which,

Figure 1 is an end elevation partially in section of a battery of three boilers equipped with a device embodying my invention, Fig. 2 is a vertical longitudinal section through one of the furnaces, the boiler being illustrated in elevation.

Referring to the drawings, 1, 2, and 3 indicate the boilers comprising a battery, 4, 5 and 6 their respective furnaces, of which 4′, 5′ and 6′ are the grates. The boilers may be of any number, style or arrangement, and are each provided with the usual smoke outlet or flue. In the drawings, 7, 8, and 9 indicate the flues of the furnaces 4, 5 and 6 respectively. The flues, 7, 8 and 9 discharge into a common flue, 10 leading to a single stack, 19, which is of sufficient size for the whole battery. If desired, a force draft pipe, 12 may be connected to the end of the common flue, 10. The flues, 7, 8 and 9 are each provided with a damper indicated at 13′, 13″ and 13‴ respectively; and the flue, 10 is provided with dampers, 14 and 15. The damper, 14 is located just behind the entrance of the flue, 8 into the flue, 10 and the damper, 15 is located similarly in regard to the flue, 8.

Between the flues, 7 and the damper, 14, the flue, 10 opens into a downtake, 16; and a similar downtake, 17 is arranged between the flue, 8 and the damper, 15. The lower ends of the downtakes are provided with discharge openings, 16′ and 17′ which enter the furnace of the next succeeding boiler, above the grate, and openings, 16″ and 17″ which enter the furnace below the grate, and each said opening is provided with a damper, 16^a and 17^a by means of which the draft from the downtake is directed above or beneath the grate as desired.

In operating the device, boiler, 1 is fired in the usual manner, with the drafts left open. Dampers, 13′, 13″ and 13‴ are opened and dampers, 14, and 15 are closed. The smoke and gases pass from the boiler, 1 through the flue, 7, into the flue, 10. As the damper 14 is closed the smoke and gas pass through the downtake, 16 and into the furnace, 5, where they are heated to a state of incandescence and nearly or quite consumed. The remainder, together with the smoke and gases from the furnace, 5, passes through the flue, 8 to the flue 10, thence through the downtake, 17 into the furnace, 6, and so on throughout the series of boilers in the battery.

The doors of the furnace, 5 and 6 are kept closed, as no draft is needed, other than the sufficient amount of air to assist combustion, and further these furnaces do not need the usual amount of firing as it is only necessary to keep sufficient incandescent fuel spread on the grates to burn the smoke as it passes through. When necessary, steam or air may be injected into the downtakes from nozzles, 18. The steam or air entrains the smoke and gases and accelerates their passage through the downtakes. From the last furnace, the gases and smoke pass into the flue, 10 and thence to the stack, 19 or condenser, 20.

21 and 22 indicate dampers for directing the gases to one or the other as desired. When the damper, 21 is closed and the dam-

per 22 opened they are forced by steam or air into the tank, 20 and are condensed by a spray 23, or if desired they can be piped through an outlet, 24, to any desired point. In this manner absolutely all smoke is avoided or prevented from passing into the atmosphere.

25 indicates a drain for the tank, 20, to carry off the water from the spray.

When it is necessary to shut down one boiler for cleaning or repair, the others may be kept in operation in the usual manner. Presuming that boiler, 2 is to be cut out, damper, 14 is opened and damper 13″ is closed as are also dampers, 16ª. The gases from the flue, 7, pass by the downtake, 16 to the downtake, 17 and the operation is continued undisturbed.

It is evident that a large percentage of coal is saved and that a very large percentage of heat therefrom is utilized. Further the device can be applied to any type or arrangement of boilers or furnaces that are worked by direct firing of coal and that without resetting or redesigning.

Having described my invention what I claim as new and desire to secure by Letters Patent is:

A plurality of boilers and their furnaces, in combination with a separate flue leading from each of said furnaces, a common flue into which said flues discharge, a stack in communication with said common flue, dampers arranged in said common flue between the entrances of said separate flues, downtakes leading from between said entrances and so arranged that the smoke and gas from each boiler furnace is discharged into the furnace of the next succeeding boiler and a valved fluid pressure nozzle in each of said downtakes between the common flue and the discharge openings for accelerating the downward passage of the smoke and gases, said common flue being arranged above the level of said boilers, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

ROBERT R. SHIPLEY.

Witnesses:

HAROLD B. STEPHENS,

FRANK S. SIGNOR.