A. P. GIBSON & G. SMITH.

SMOKE CONSUMER.

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907,490.

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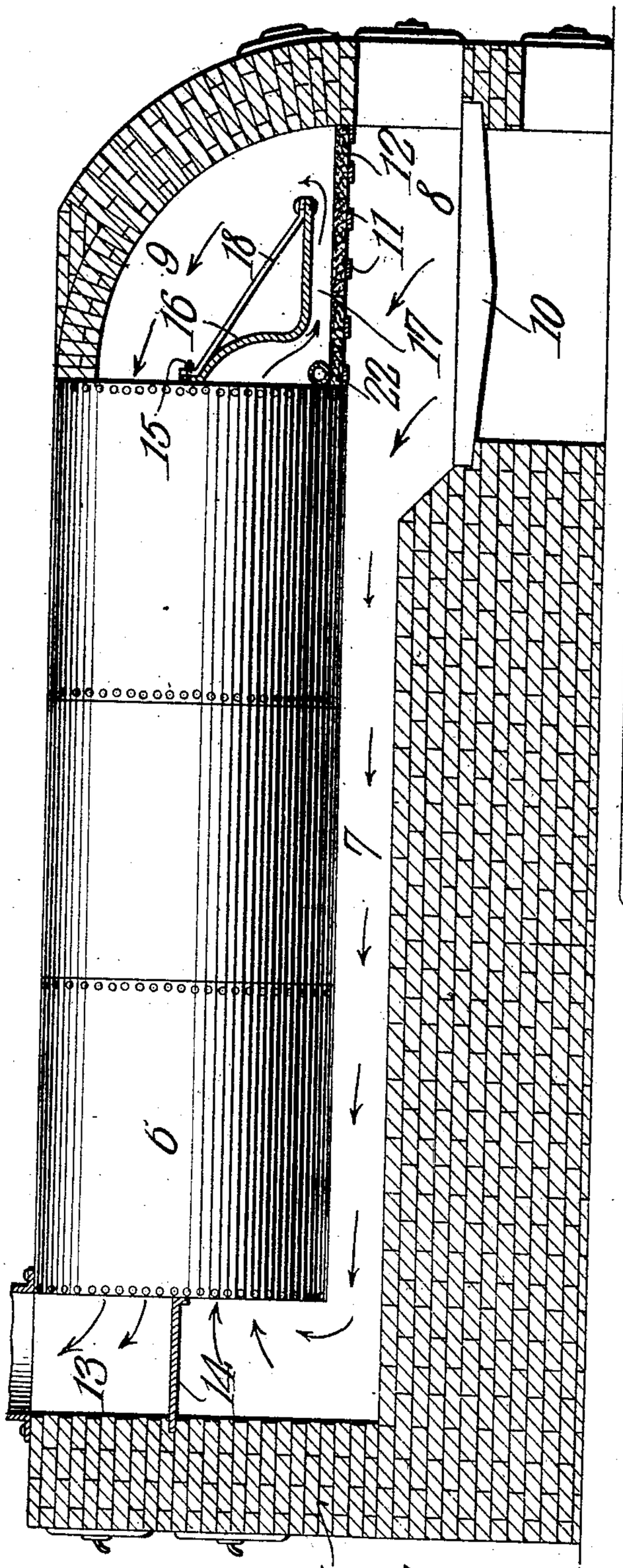

Fig. 1.

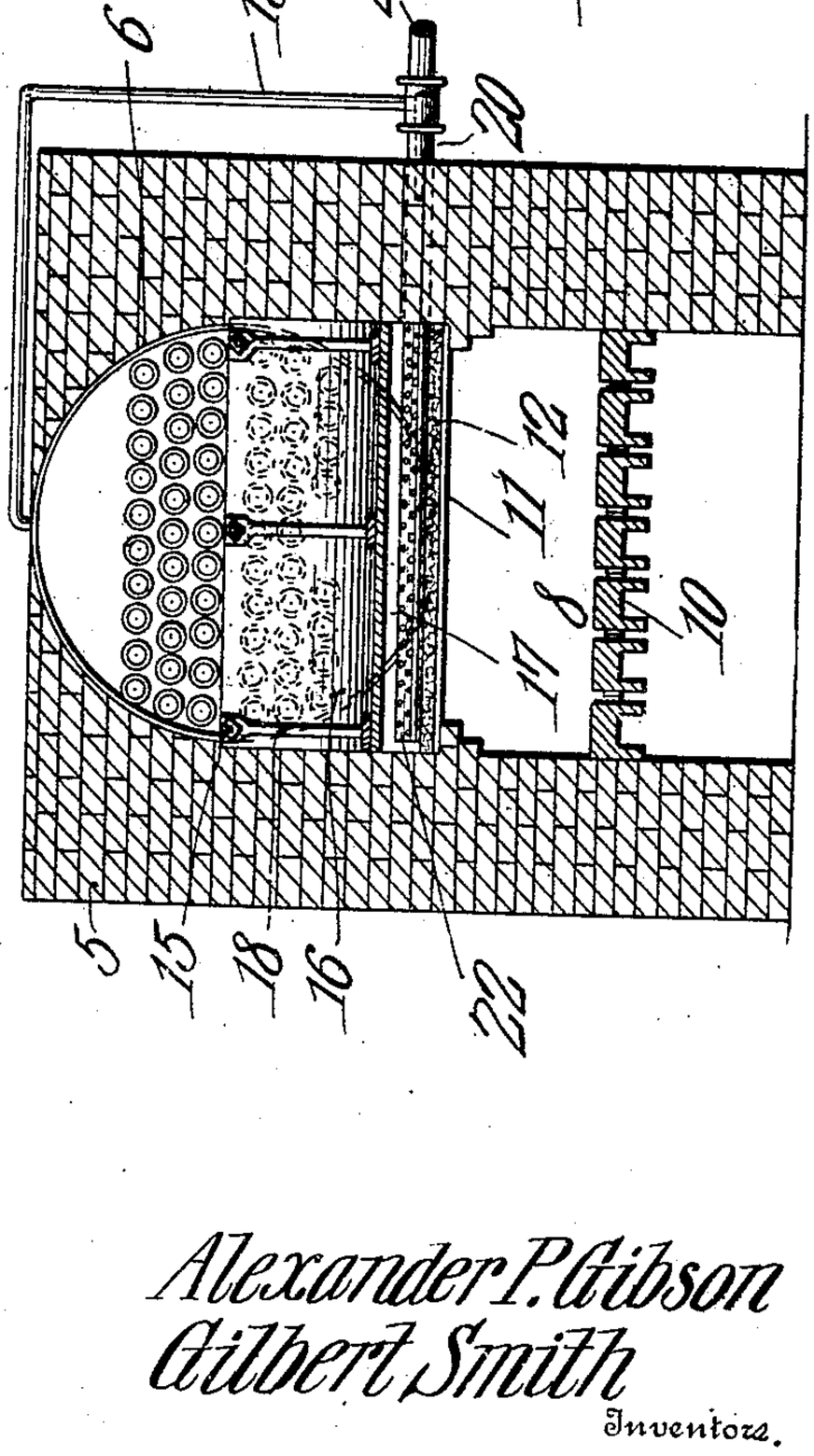

Fig. 2.

Witnesses

E. F. Stewart

L. P. Ackers

Alexander P. Gibson

Gilbert Smith

Inventors.

By Cushman & Co

Attorneys

UNITED STATES PATENT OFFICE.

ALEXANDER P. GIBSON AND GILBERT SMITH, OF ALDERSON, WEST VIRGINIA.

SMOKE-CONSUMER.

No. 907,490. Specification of Letters Patent. Patented Dec. 22, 1908.

Application filed December 7, 1907. Serial No. 405,589.

To all whom it may concern:

Be it known that we, ALEXANDER P. GIBSON and GILBERT SMITH, citizens of the United States, residing at Alderson, in the county of Monroe and State of West Virginia, have invented a new and useful Smoke-Consumer, of which the following is a specification.

This invention relates to smoke consumers.

The object of the invention is to provide a furnace in which complete combustion of gases and other fumes is effected after partial combustion by returning the gases to the point of the most intense heat and then supplying the proper and necessary elements to create perfect combustion.

A further object of the invention is to provide a boiler furnace in which the products of combustion from the fire box are conducted beneath the boiler and thence through the fire tubes in the lower portion of the boiler to the combustion chamber, the waste products being conducted through the upper portion of the boiler and discharged to the atmosphere.

A further object is to provide a plate or shield for deflecting the fumes and gases from the lower portion of the boiler downwardly in contact with the heated floor of the combustion chamber.

A still further object of the invention is generally to improve this class of devices so as to increase their utility, durability and efficiency.

Further objects and advantages will appear in the following description, it being understood that various changes in form, proportions and minor details of construction may be resorted to within the scope of the appended claims.

In the accompanying drawings forming a part of this specification: Figure 1 is a longitudinal sectional view of a boiler furnace constructed in accordance with our invention. Fig. 2 is a transverse sectional view of the same.

In the accompanying drawings in which like characters of reference indicate corresponding parts 5 designates the casing or exterior walls of the furnace preferably formed of masonry as shown, and 6 a fire tube boiler of the ordinary construction, the latter being spaced from the casing to form an intermediate draft flue 7. Arranged at the forward end of the casing and preferably disposed in advance of the boiler is a fire-box 8 which communicates with the draft flue 7 so as to permit the products of combustion from the fire box to pass through the fire tubes in the lower portion of the boiler into the combustion chamber 9. Extending transversely across the top of the fire box in spaced relation to the grate bars 10 are a series of flat bars 11 which form a support for the base or floor 12 of the combustion chamber, said floor being preferably formed of fire-brick or other refractory material. Communicating with the lower portion of the casing is a smoke stack 13 and extending transversely across the space in the rear of the boiler is a partition plate 14 which cuts off communication between the draft flue 7 and said smoke stack and deflects the produts of combustion from the fire-box through the fire tubes in the lower half of the boiler into the combustion chamber.

Arranged within the combustion chamber and secured to the forward flue sheet of the boiler 6 in any suitable manner, as by bolts or similar fastening devices 15, is a shield or plate 16 dividing the flues into upper and lower banks and having its intermediate portion curved laterally and spaced from the flue sheet and thence bent at right angles in parallel relation to the floor 12 of the combustion chamber to form an intermediate passage 17. The deflecting plate 16 is reinforced and strengthened by the provision of suitable inclined braces or bars 18 which extend from the free end of said plate to its point of attachment with the boiler, as shown.

As a means for supplying air to the chamber 9 to promote combustion in the latter there is provided a steam pipe 19 one end of which communicates with the boiler or other suitable source of supply while the other end thereof is provided with a jet 20. The steam jet 20 is disposed within an air conducting pipe 21 the inner end of which is extended within the boiler beneath the plate 16 and is provided with a plurality of perforations 22 through which air is admitted to the combustion chamber.

It will thus be seen that the products of combustion from the fire-box 8 will be conducted through the flue 7 to the plate 14 and thence be deflected laterally through the fire tubes in the lower half of the boiler into the combustion chamber 9. As the fumes discharged at the forward end of the boiler come in contact with the intermediate curved portion of the plate 16 they are de-

flected downwardly in contact with the heated floor 12 of the combustion chamber at the passage 17 and are effectually consumed, the oxygen necessary to promote combustion being supplied to said chamber through the perforations in the tube 21. The products of combustion pass upwardly in the direction of the arrows and are discharged through the fire tubes at the rear end of the boiler into the smoke stack 13 and thence to the atmosphere thus thoroughly heating the water in the boiler and at the same time effectully consuming fumes and gases incident to combustion in the fire-box.

While the device is shown in connection with a stationary boiler it is obvious that the same may be used with equally good results with minor changes in construction on locomotive boilers, stoves, furnaces or wherever a device of this character is found desirable.

Having thus described the invention what is claimed is:

1. In a boiler furnace, a furnace casing having a fire box in one end thereof, a horizontal flue boiler, a partition extending from the forward end of the boiler shell to the corresponding end wall of the casing above the fire-box thereof, a partition extending from the rear end of the boiler shell to the corresponding wall of the casing, the last mentioned partition being so arranged as to direct the products of combustion through the lower set of boiler flues, a deflector arranged at the forward end of the boiler shell in position to direct the products of combustion against the first mentioned partition, the said deflector being so arranged as to permit of the passage of the said products of combustion from beneath it and through the upper set of boiler flues, and an air-supply pipe positioned upon the first mentioned partition and beneath the said deflector.

2. In a boiler furnace, a furnace casing having a fire box in one end thereof, a horizontal flue boiler, a partition extending from the forward end of the boiler shell to the corresponding end wall of the casing above the fire-box thereof, a partition extending from the rear end of the boiler shell to the corresponding wall of the casing, the last mentioned partition being so arranged as to direct the products of combustion through the lower set of boiler flues, a deflector carried at the forward end of the boiler shell and formed with a portion extending downwardly and a portion extending forwardly directly above the first mentioned partition, the forward edge of the said deflector terminating short of the forward end wall of the casing, so as to permit passage of the products of combustion upwardly and through the upper set of boiler flues, and an air-supply pipe arranged transversely of the first mentioned partition at the rear edge thereof and beneath the rear portion of the deflector.

In testimony that we claim the foregoing as our own, we have hereto affixed our signatures in the presence of two witnesses.

ALEXANDER P. GIBSON.
GILBERT SMITH.

Witnesses as to signature of Alexander P. Gibson:

J. E. CRAWFORD,
L. E. JOHNSON.

Witnesses as to signature of Gilbert Smith:

L. R. COLLIER,
D. SWAIN.