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G. H. SELLERS.

MEANS FOR CLEANING ASHES FROM FLUES.

No. 426,648. Patented Apr. 29, 1890.

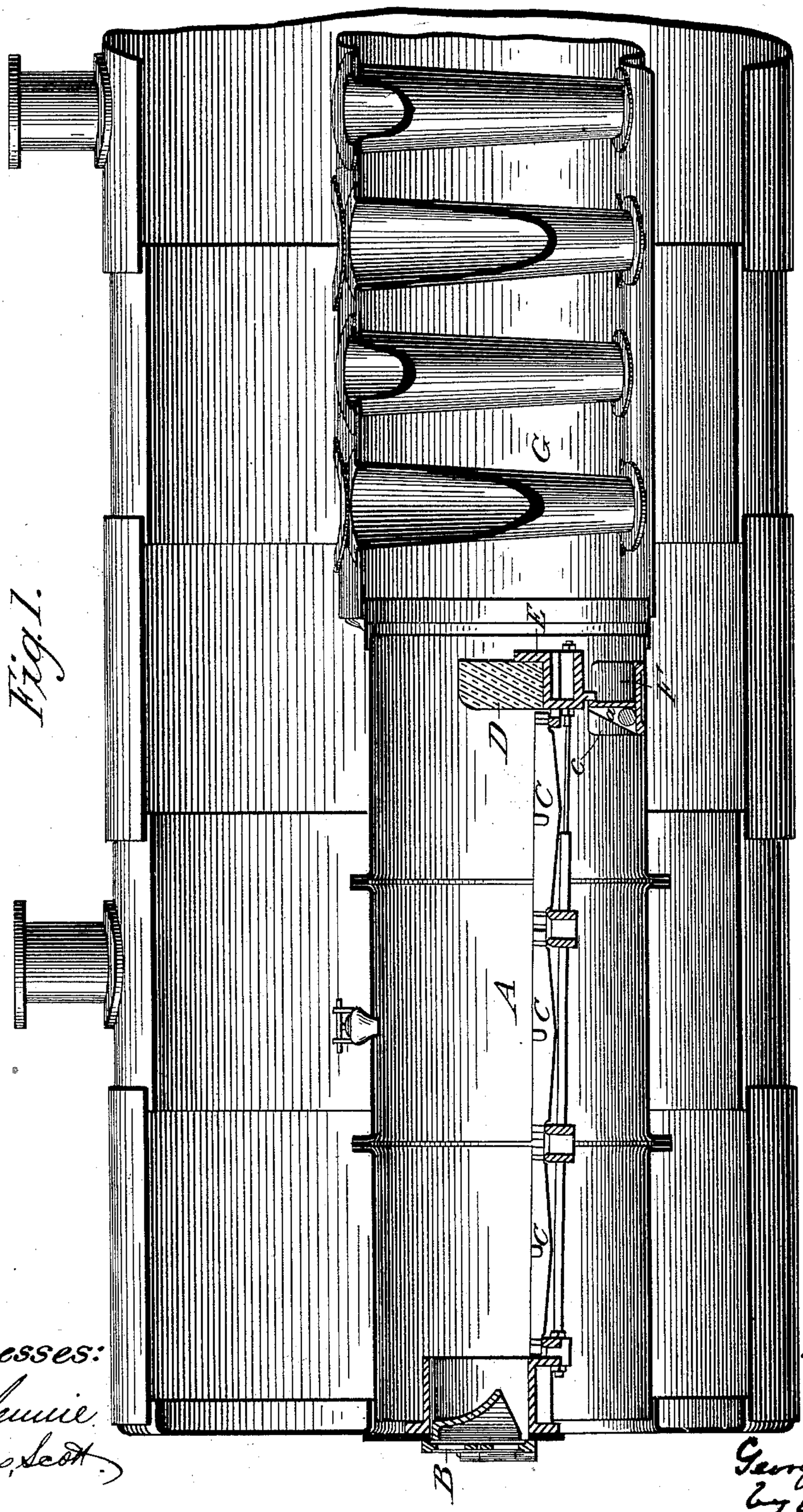

Fig. 1.

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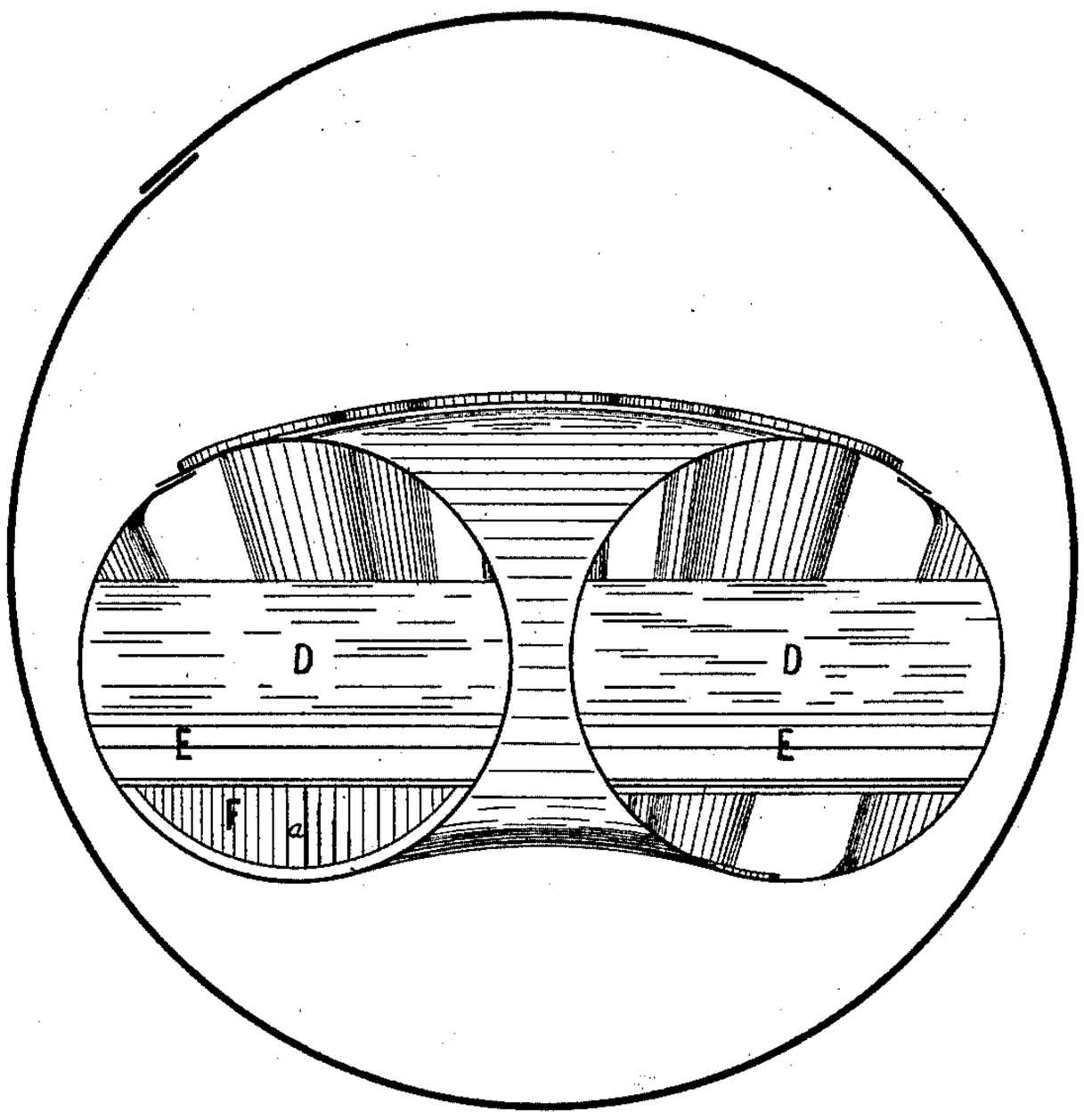
FIG. 2



WITNESSES

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(No Model.)

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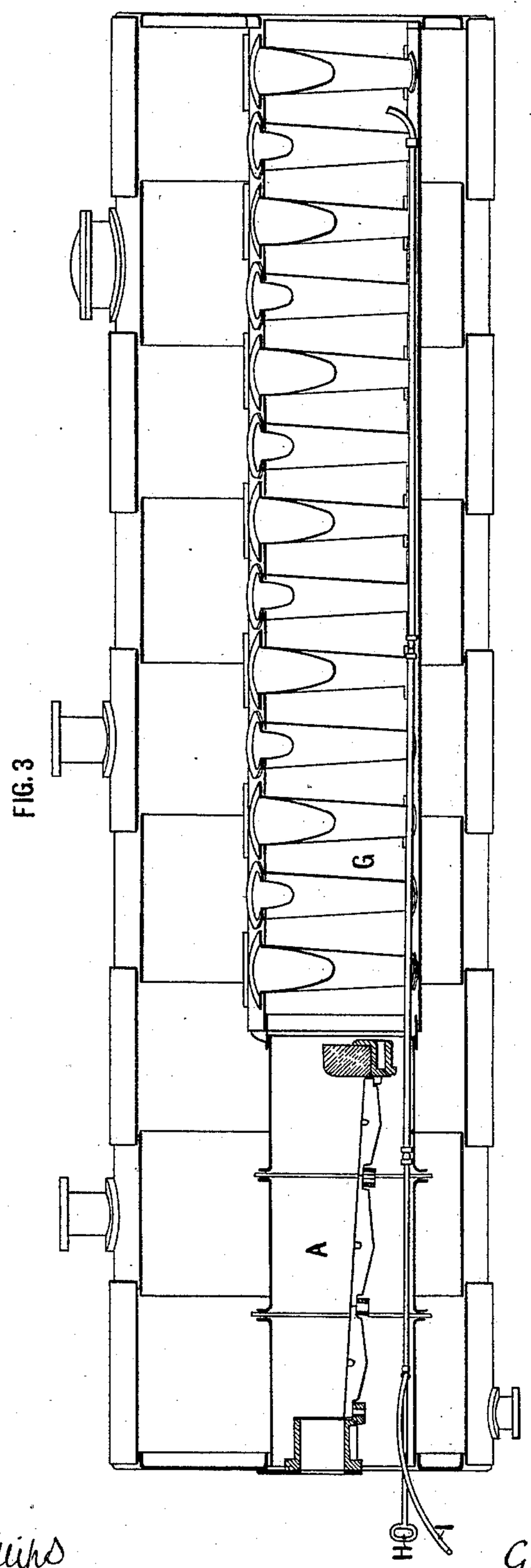

FIG. 3

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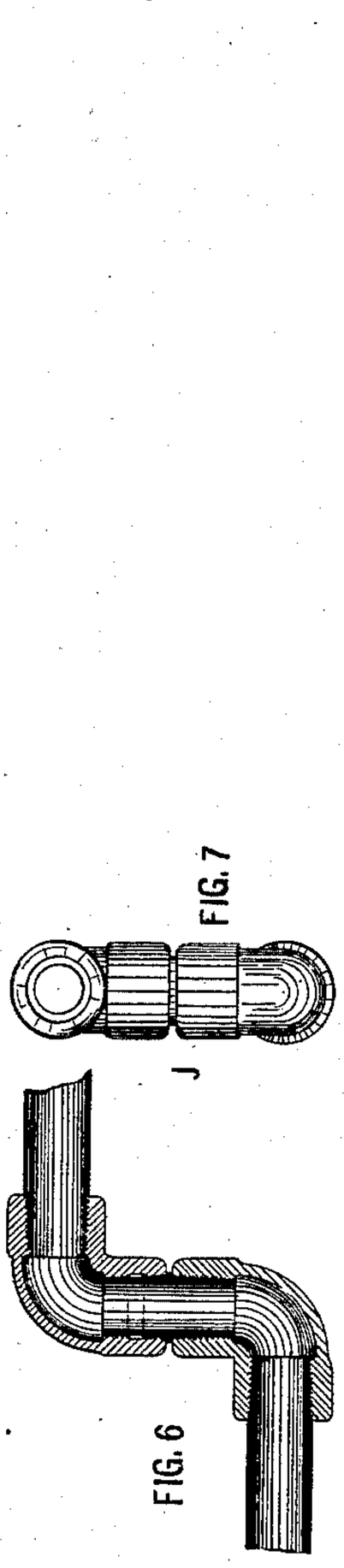

FIG. 7

FIG. 6

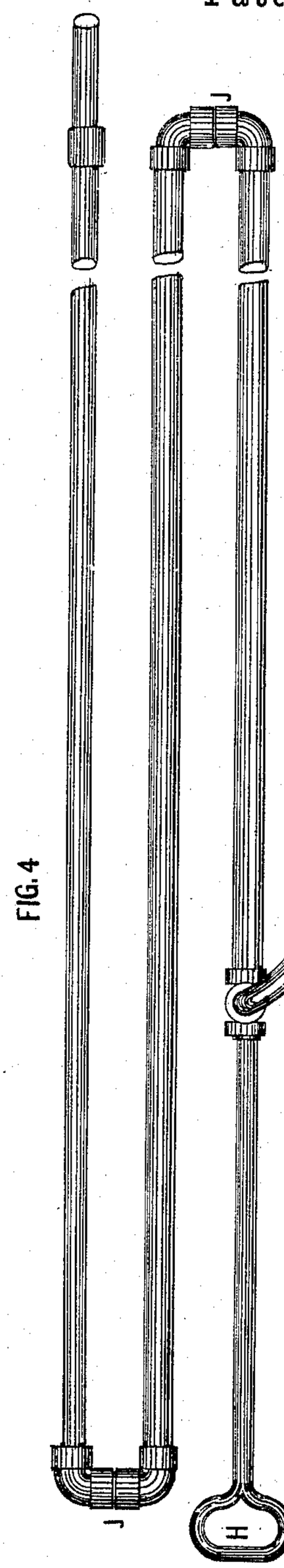

FIG. 4

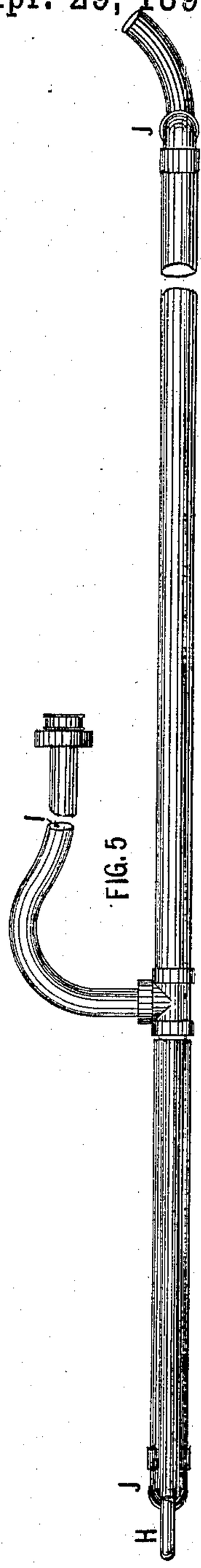

FIG. 5

WITNESSES

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UNITED STATES PATENT OFFICE.

GEORGE H. SELLERS, OF RIDLEY PARK, PENNSYLVANIA, ASSIGNOR TO THE EDGE MOOR IRON COMPANY, OF DELAWARE.

MEANS FOR CLEANING ASHES FROM FLUES.

SPECIFICATION forming part of Letters Patent No. 426,648, dated April 29, 1890.

Application filed March 8, 1889. Serial No. 302,578. (No model.)

To all whom it may concern:

Be it known that I, GEORGE H. SELLERS, of Ridley Park, Delaware county, in the State of Pennsylvania, have invented certain new and useful Improvements in the Means for Clearing the Ashes from the Flue Between the Furnace and the Chimney of Internally-Fired Steam-Boilers, of which improvements the following is a specification.

These improvements relate more particularly to internally-fired steam-boilers provided with vertical water-tubes which cross a flue between the furnace and the chimney, and as they are particularly applicable to the Galloway boiler the drawings represent this type; but they are equally applicable to the Lancashire or to any other form of boiler in which the products of combustion pass through a flue which is partially closed at one end by the bridge-wall of the furnace. When the products of combustion pass directly from the furnace into a flue or tubes both ends of which are unobstructed, there is usually no difficulty in clearing out the ashes by pushing them through the tube; but where they pass into a flue which is obstructed by water-tubes crossing the same there is a larger deposit of ashes in consequence of the obstruction to the current by the water-tubes, and the difficulty of removal is increased from the same cause; but if one end of this flue is closed by the bridge-wall of the furnace this difficulty is greatly intensified. Heretofore the only effectual mode of removing the ashes which accumulate about such water-tubes in a flue closed at one end by the furnace has been by entering the flue when the damper is wide open and the boiler has no fire in it and sweeping the ashes out toward the chimney; but as the periods when such conditions can be obtained are usually too far apart a partial clearing has been effected by passing a steam-pipe over the bridge-wall when the fire is banked, and so manipulating this pipe that a steam-jet issuing from the curved inner end thereof will disturb the ashes and permit the draft of the chimney to carry them out of the boiler. This method is but moderately successful. The top of the bridge-wall is so far above the base of the water-tubes, about which by far the largest proportion of the ashes accumulate, that it is impossible to effectually disturb them. Moreover, it is extremely difficult, even without fire in a boiler, to properly manipulate a long steam-pipe when supported at only one point in its length, as must be the case when it is passed over the top of the bridge-wall, so that the efficiency of the jet will be seriously impaired, while it is impossible to direct it to the proper point.

The object of my invention is to effectually clear out the ashes about the water-tubes of such boilers while the boiler is in active operation, so that this clearing may be performed at any time at the convenience of the operator; to which end my invention consists in providing a bridge-wall removable below the grate-bars, so as to provide an opening as large as possible into the flue beyond the bridge-wall, through which opening and the firing-door a large current of air can pass through the flue; and it further consists in providing a pipe through which steam or compressed air can be passed, suitably jointed, so that it can be passed into and through this opening along the bases of the water-tubes and to the rear end of the boiler, whereby a jet of steam or compressed air can be made to impinge upon the surface of the water-tubes at their bases respectively and consecutively, and so as to sweep the lower surface of the flue effectually, thereby disturbing the ashes at the lowest point, while the large current of air through the fire-door and below the grate-bars sweeps them from the boiler.

In order that my invention may be more clearly understood, reference is now made to the drawings forming part of this specification, in which—

Figure 1 represents a longitudinal vertical section of the furnace end of a Galloway boiler, showing one of the furnaces with its grate-bars and its bridge-wall, with the removable portion of the bridge-wall in place, also the flue beyond the bridge-wall with its vertical water-tubes. Fig. 2 is a transverse section of the furnace end, showing the removable portion of the bridge-wall underneath the grates withdrawn in one furnace and in the other in place. Fig. 3 is a verti-

cal section, longitudinal with the boiler through the axis of one furnace, showing the grate-bars and the bridge-wall with its removable portion withdrawn, also the flue beyond the bridge-wall with its vertical water-tubes and the pipe in position for supplying a jet of steam or compressed air for displacing the ashes. Fig. 4 is a plan of this pipe. Fig. 5 is a side elevation of same. Fig. 6 is a longitudinal section of the joint-connection for same, and Fig. 7 is an end elevation thereof.

In all of the figures similar letters refer to similar parts.

Referring now to Fig. 1, A is the furnace; B, the firing-door; C, the grate-bars; D, the bridge-wall, composed of fire-brick and two iron frames E and F, both of which frames fit the curvature of the furnace which supports them, the lower one F being removable to give a clear opening under the grate-bars to the back flue G, in line with the furnace A, in which flue the vertical water-tubes are shown. In the middle of this lower part of the bridge-wall F and on its outer side is a rib *a*, through which is a hole *c*, into which a hook can be inserted for drawing this part of the bridge-wall out of the furnace when it is desired to remove the ashes, which accumulate more largely immediately behind the bridge-wall than at any other place in the back flue.

In Fig. 2 the rib *a* is shown in the middle of the lower frame F, which is in place, while in the other furnace, where the lower frame is removed, the opening between the vertical water-tubes and the corrugated sides of the back flue is shown, through which opening the pipe hereinafter described is to be passed when the ashes are to be blown out.

As may be observed in the drawings, the lower portion of the bridge-wall is shown removable on the grate side, which enables this portion of the bridge-wall to be taken out of the boiler, whereby an unobstructed passage is afforded for the air to the back flue, while the fire is not disturbed by the removal.

In Fig. 3 a pipe is shown in position along the bottom of the furnace and the back flue to supply a jet of steam or of compressed air, and Figs. 4, 5, 6, and 7 show the construction of this pipe.

H is a handle for manipulating the pipe so as to direct the jet issuing from the curved end thereof to whatever part of the flue it is desired to operate upon. The steam or compressed air which forms the jet is supplied to the pipe through the flexible india-rubber tube I, which has one end connected through a suitable valve to the most convenient source of supply near the front end of the boiler, and as the space between this end of the boiler and one side of the boiler-room is usually so limited that a single pipe of sufficient length to pass through the back flue could not be inserted this pipe is provided with joint-connections J J, which permits it to be folded to diminish its length. The section Fig. 6 shows the construction of these joints, each of which consists of two ordinary elbow-connections united by an ordinary wrought-iron sleeve threaded like the ends of the pipes. Into one of these elbows the sleeve is screwed to a tight fit, the same as the pipes. The other end of the sleeve has a groove turned in it about the middle of its length and to a depth slightly below the bottom of the thread, and into this groove ordinary fibrous steam-packing is wound, after which it is screwed into the elbow nearly to a tight fit, but so that the elbow can freely oscillate about the axis of the sleeve. The packing will prevent the escape of any steam or air, while the joints admit of folding the pipe to any length that may be necessary.

In all boilers there is a damper between the boiler and the chimney to regulate the draft or to cut off the communication with the chimney, when required; but, inasmuch as the construction of this damper forms no part of my present invention, and its operation is well understood, I have not shown it upon the drawings.

The operation of clearing out the ashes from the back flue is as follows: First, remove the lower part of the bridge-wall F and open the firing-door B and the damper, so as to permit the largest possible amount of air to enter the back flue G and to pass freely therefrom to the chimney; second, insert the pipe through the opening under the fixed portion of the bridge-wall to any desired distance into the back flue G, and connect the flexible tube I with the steam-pipe or the compressed air, as the case may be; third, open the valve, which admits the fluid under pressure to this pipe. The steam or air will issue from the curved end of this pipe in a strong jet, which will blow the ashes from before it, which the large volume of air, rushing to the chimney through the fire-door and the opening under the fixed portion of the bridge-wall, will carry out of the back flue. The jet can be directed to any part of the back flue by manipulating the pipe with the handle H, and as this pipe is supported throughout its length on the bottom of the furnace and on that of the back flue the manipulation can be accomplished with great ease, while the efficiency of the apparatus is greatly enhanced by the large volume of air which the opening under the fixed portion of the bridge-wall admits—a volume greatly in excess of that heretofore attainable through the firing-door alone. After the ashes have been thus cleared from the back flue the pipe is withdrawn, the lower part of the bridge-wall F is replaced, the firing-door is closed, and the work of the boiler proceeds as before the operation of clearing the ashes was commenced.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. A steam-boiler provided internally with

a furnace and a flue in line with each other, through which flue all the products of combustion from the furnace are discharged from the boiler, in combination with a bridge-wall, that portion of the bridge-wall beneath the grate-bars being removable, substantially as and for the purpose described.

2. In a steam-boiler, in combination, a furnace, a bridge-wall, that portion of the bridge-wall beneath the grate-bars being removable, and a flue behind said bridge-wall, substantially as and for the purposes described.

3. In a steam-boiler, in combination, a furnace, a bridge-wall, that portion of the bridge-wall below the grate-bars of the furnace being removable on the grate side, and a flue behind said bridge-wall, substantially as and for the purposes described.

4. The hereinbefore-described method of cleaning ashes from a boiler, substantially as described, which consists in inserting in an orifice under the bridge-wall below the grate-bars a pipe adapted to convey air or steam, then passing a jet of air or steam through said pipe, and directing said jet so that the ashes are loosened and brought into the current of air through the orifice under the grate-bars and swept out of said boiler.

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Witnesses:
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EDW. R. HARPER.