No. 871,541. PATENTED NOV. 19, 1907.

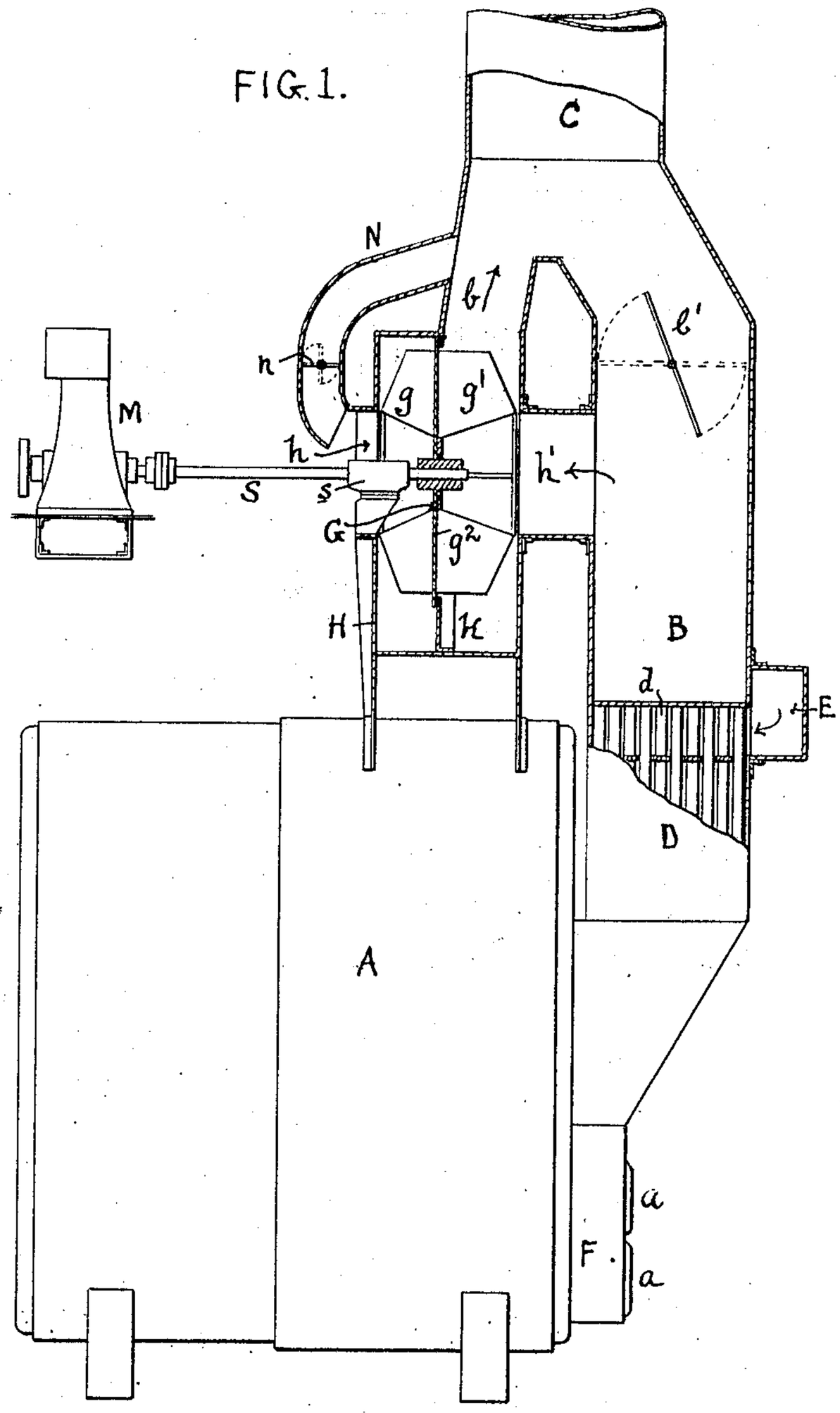
W. C. WALLACE.

AIR DRAFT SYSTEM FOR STEAM BOILERS.

APPLICATION FILED JULY 7, 1906.

3 SHEETS—SHEET 1.

FIG. 1.



WITNESSES

M. E. Keir

William Abbe

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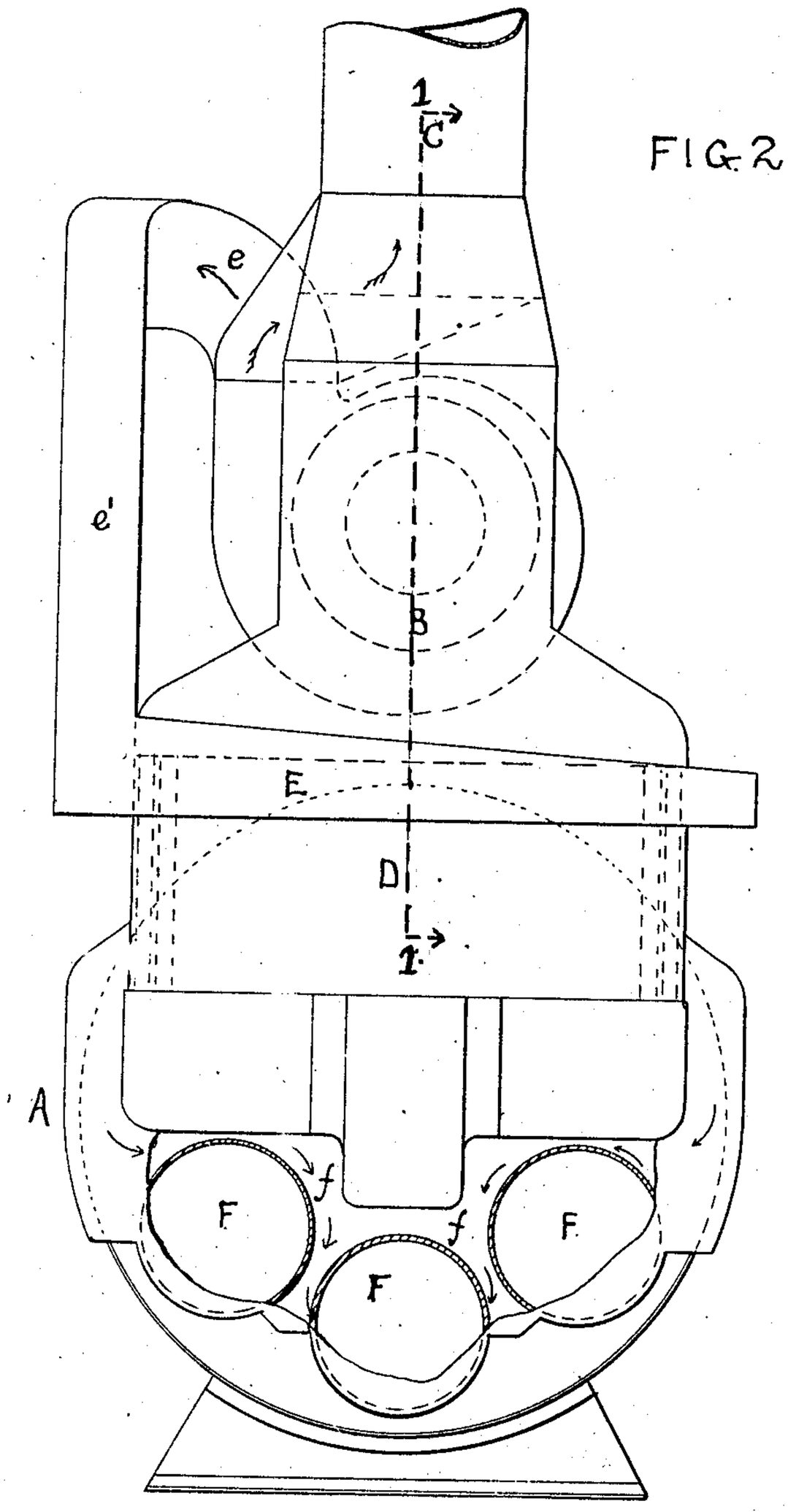
3 SHEETS—SHEET 2.

FIG. 2



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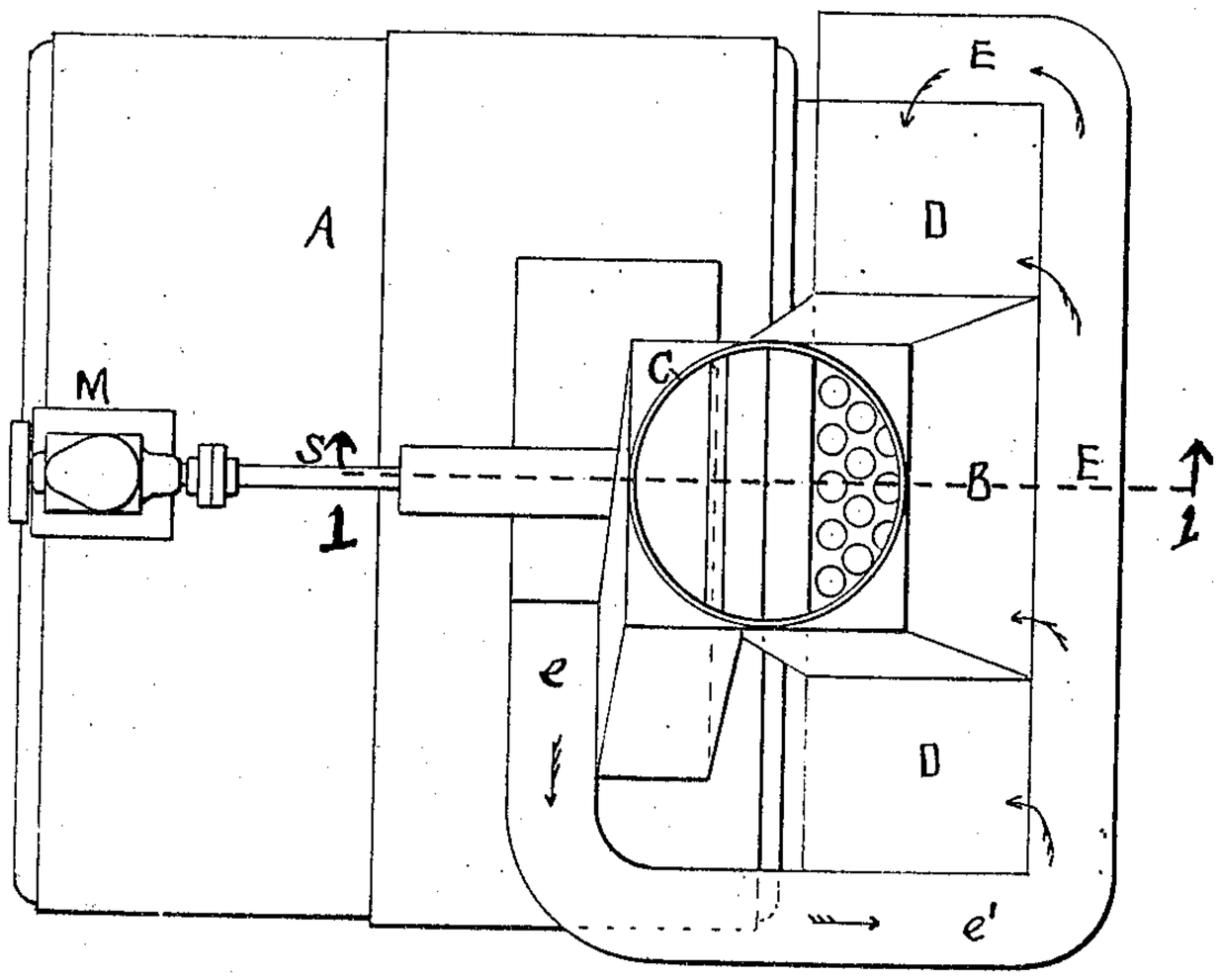
3 SHEETS—SHEET 3.

FIG. 3



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UNITED STATES PATENT OFFICE.

WILLIAM CARLILE WALLACE, OF TENAFLY, NEW JERSEY, ASSIGNOR OF ONE-HALF TO JOHN BROWN & COMPANY, LIMITED, OF SHEFFIELD, ENGLAND.

AIR-DRAFT SYSTEM FOR STEAM-BOILERS.

No. 871,541. Specification of Letters Patent. Patented Nov. 19, 1907.

Application filed July 7, 1906. Serial No. 325,140.

To all whom it may concern:

Be it known that I, WILLIAM CARLILE WALLACE, a subject of the King of Great Britain and Ireland, and a resident of Tenafly, Bergen county, New Jersey, have invented certain new and useful Improvements in Air-Draft Systems for Steam-Boiler Furnaces, of which the following is a specification.

My invention relates more particularly to air draft systems for steam boiler furnaces of that class in which forced draft is combined with suction draft.

The object of my invention is to improve and simplify such apparatus and to so construct it that it will be automatic in its action.

In the accompanying drawings Figure 1 is a side elevation partly in section (on the line 1—1, Figs. 2 and 3) of a marine boiler furnace with my improvements; Fig. 2 is a front elevation partly in section; and Fig. 3 is a plan view.

The boiler A and furnace may be of any usual or suitable construction. It is shown as having the furnace doors at *a* and the smoke flues at B leading up to the chimney or stack C. On the way the products of combustion pass through the tubes *d* of an air heater D, which I prefer to make of the construction forming the subject of my Patent No. 659,561, the air entering the upper part of the heater from the air chamber E, and then descending around the tubes to the air chambers *f* leading to the fire places, or furnaces F, Fig. 2.

On the top of the boiler or on any suitable support I mount a duplex fan G, whose blades are carried on the end of a shaft S mounted in bearings *s* on the frame work, and coupled to the driving shaft of a steam engine or other motor M. The two sets of blades *g*, *g*^{1}, of the fans are separated from each other by a partition *g*^{2}, revolving with the blades. The blades and this partition revolve within a duplex casing H, which on the right hand side has a central inlet *h*^{1} from the smoke flue B and on the opposite side has a central fresh air inlet *h*. The chamber in which the blades *g*^{1} revolve has its discharge outlet at *b* into the smoke stack, while the discharge outlet from the other fan chamber is at *e* into the air duct *e*^{1} leading to the air chamber E. For economy of manufacture in the building of the duplex fan chamber, these two discharge outlets *b* and *e* may be alongside each other as shown, but if preferred, two parts of the fan may discharge at different circumferential points of the fan casing. The central partition *g*^{2} of the revolving part of the fan is preferably arranged to extend radially beyond the fan blades and to overlap a fixed partition *k* in the fan casing H, the revolving partition being on the air-chamber side as that is the side in which there is the greater pressure.

In the smoke flue B, I provide a damper *b*^{1}, by adjusting which the action of the suction part of the fan may be regulated. I may also provide a by-pass pipe N leading from the chimney or smoke flue and opening out near the air inlet *h* to the forced draft part of the fan, this pipe being provided with a damper *n*, on opening which a part of the gases from the smoke flue may be carried back with the draft of fresh air to the furnaces to be consumed. The fresh air is forced by the blades *g* through the air duct *e*^{1} to the chamber E, and thence through the heater D to the furnaces, and on the other hand the blades *g*^{1} suck the gases from the furnaces to give a suction draft in exact proportion to the forced draft, since the two sets of blades of the fan necessarily revolve at the same speed.

I claim as my invention

1. The combination of a furnace having an air heater in the smoke flue with a duplex fan, flue connections whereby one part of the fan applies suction draft to the gases in the smoke flue above the air heater, and with air connections whereby the other part of the fan forces fresh air to the heater and thence to the furnace, said fan comprising a duplex chamber and a fixed partition and revolving blades and a dividing partition revolving with them.

2. The combination of a furnace having an air heater in the smoke flue with a duplex fan, flue connections whereby one part of the fan applies suction draft to the gases in the smoke flue above the air heater, and with air connections whereby the other part of the fan forces fresh air to the heater and thence to the furnace, said fan comprising a duplex chamber and a fixed partition and revolving blades and a dividing partition revolving with them, this dividing partition overlapping the edge of the fixed partition on the fresh air side.

3. The combination of a furnace having an air heater in the smoke flue with a duplex fan, and flue connections to apply suction draft to the gases in the smoke flue above the air heater, and to force fresh air to the heater and thence to the furnace, and a by-pass pipe leading from the smoke flue and opening to the fresh air inlet to the fan and provided with a damper.

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

WILLIAM CARLILE WALLACE.

Witnesses:
C. SEDGWICK,
HUBERT HOWSON.