

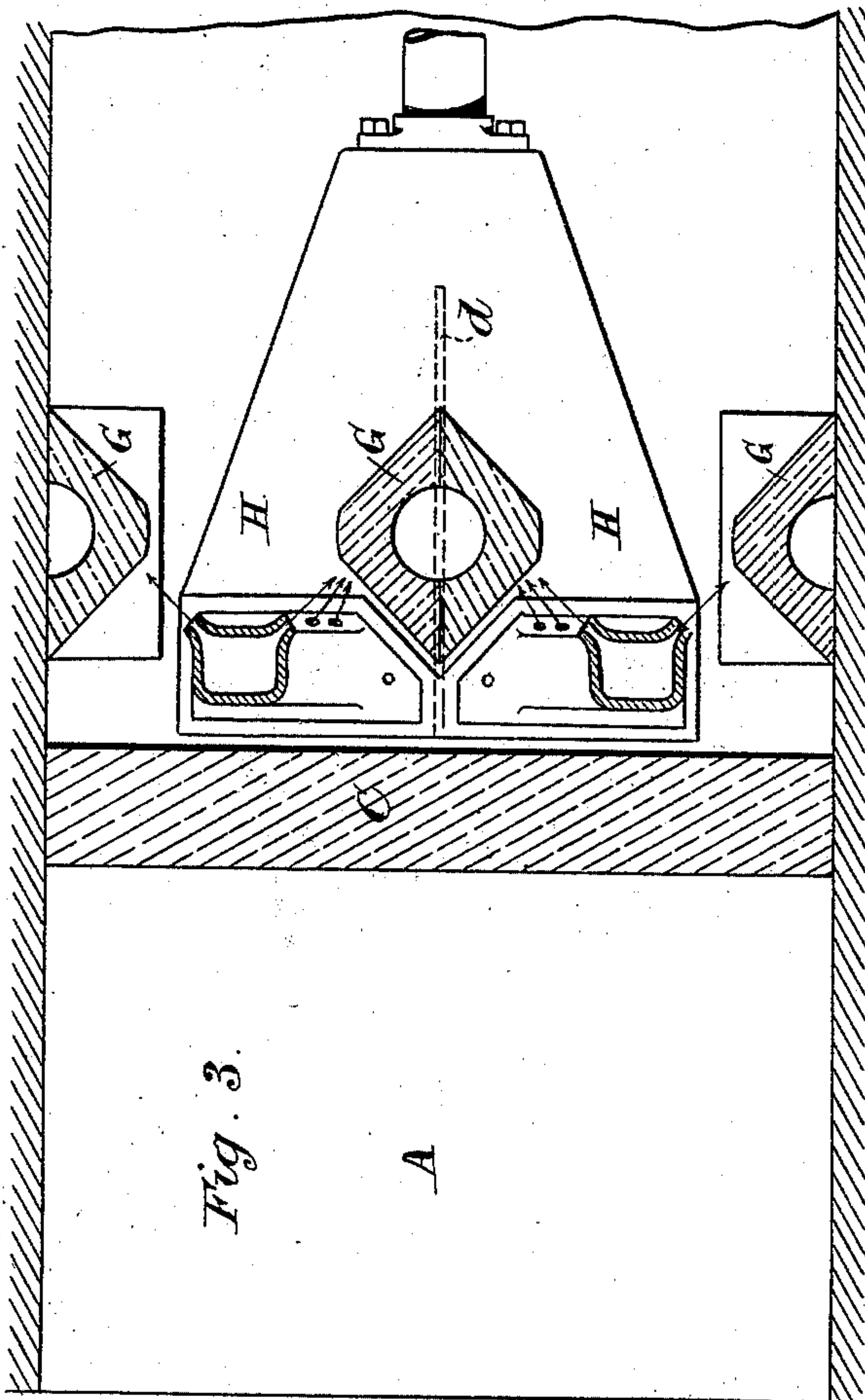
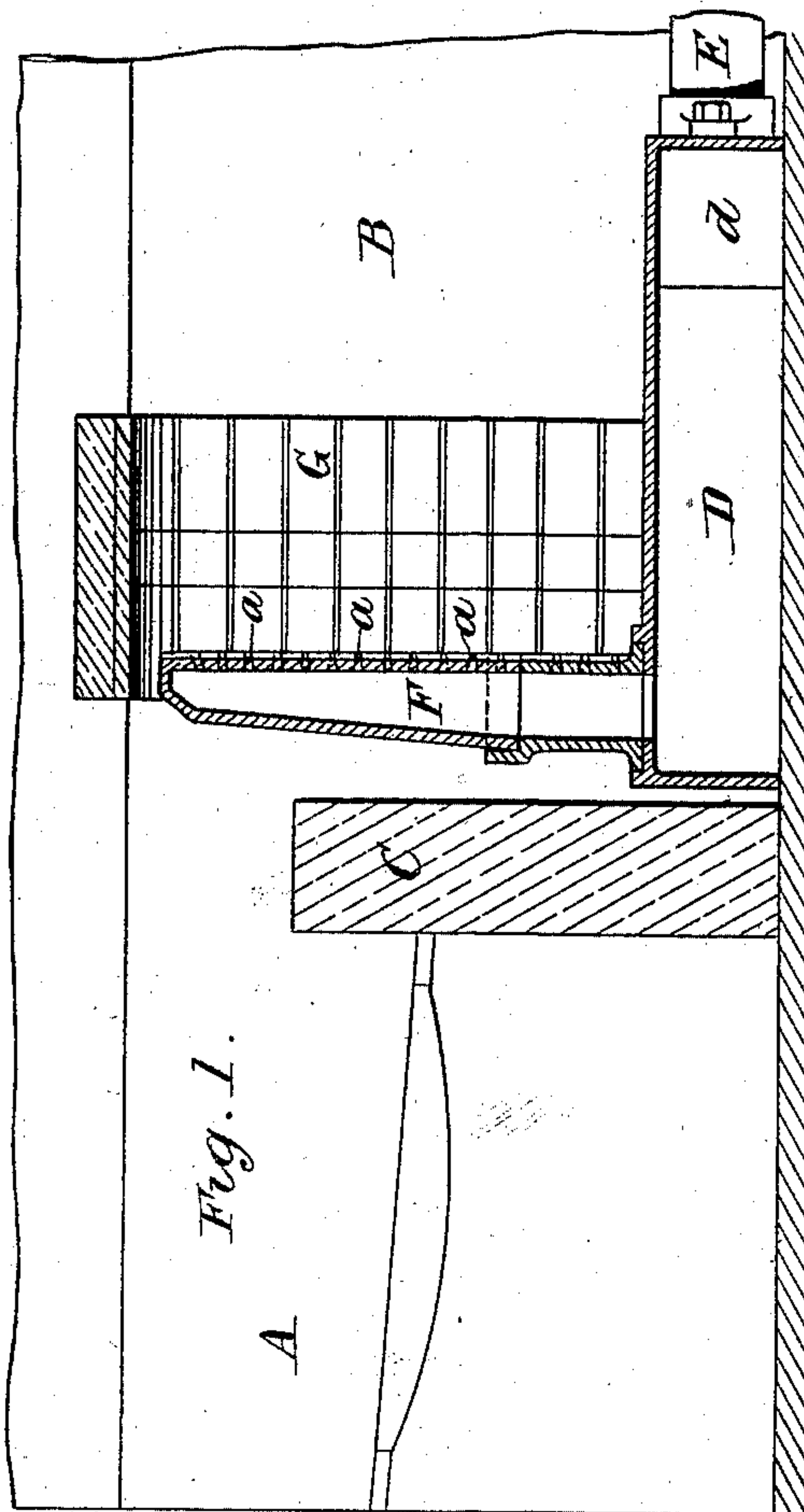
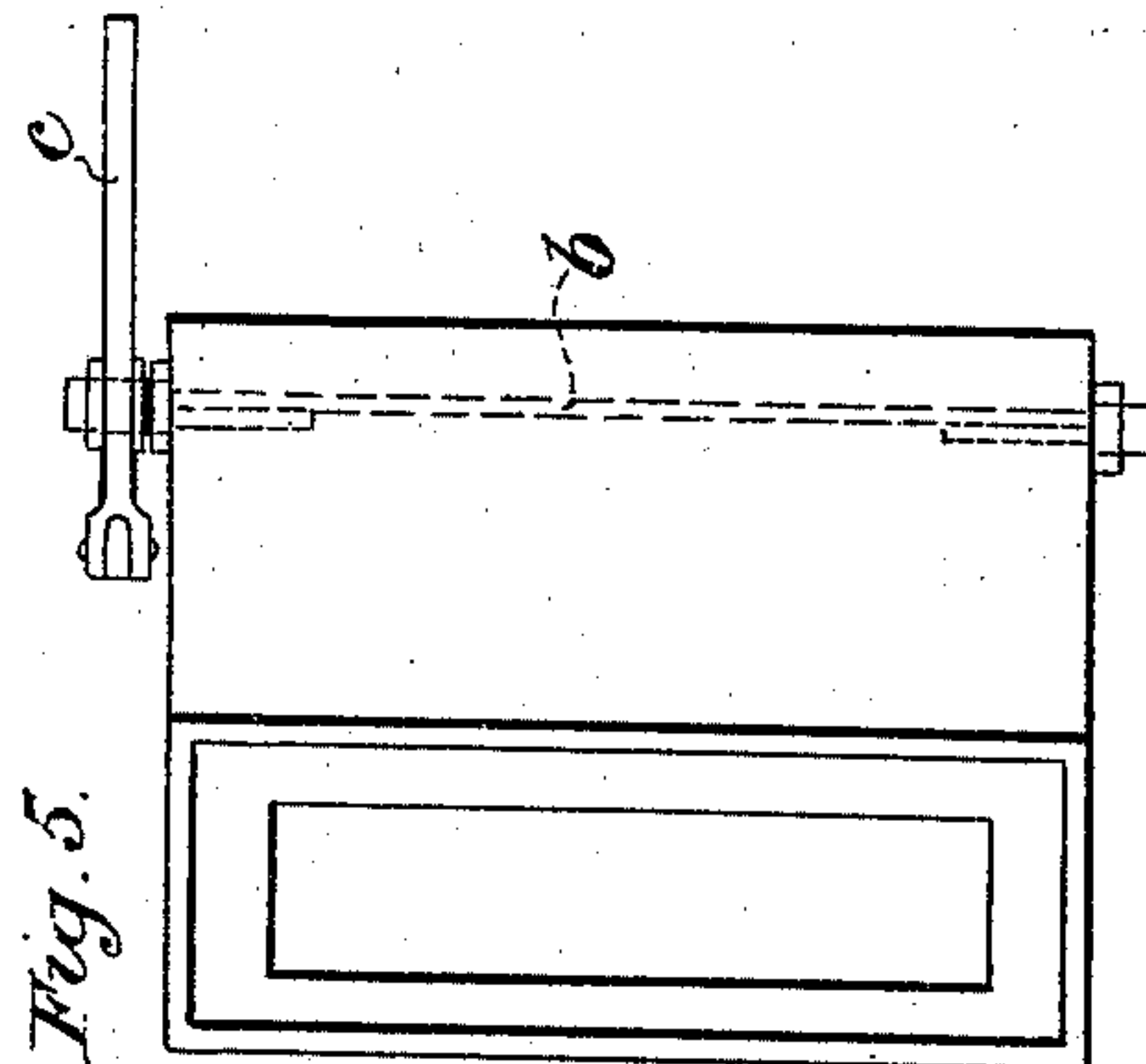
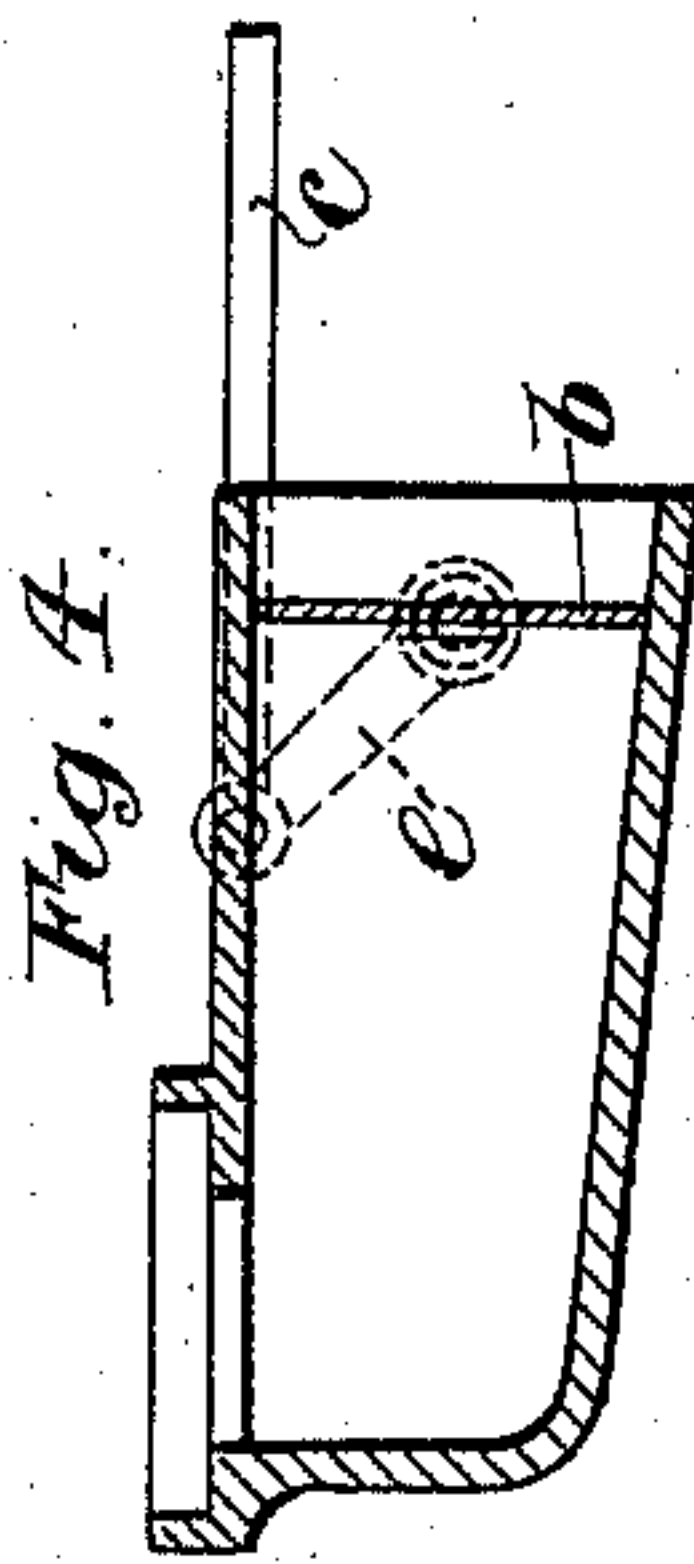
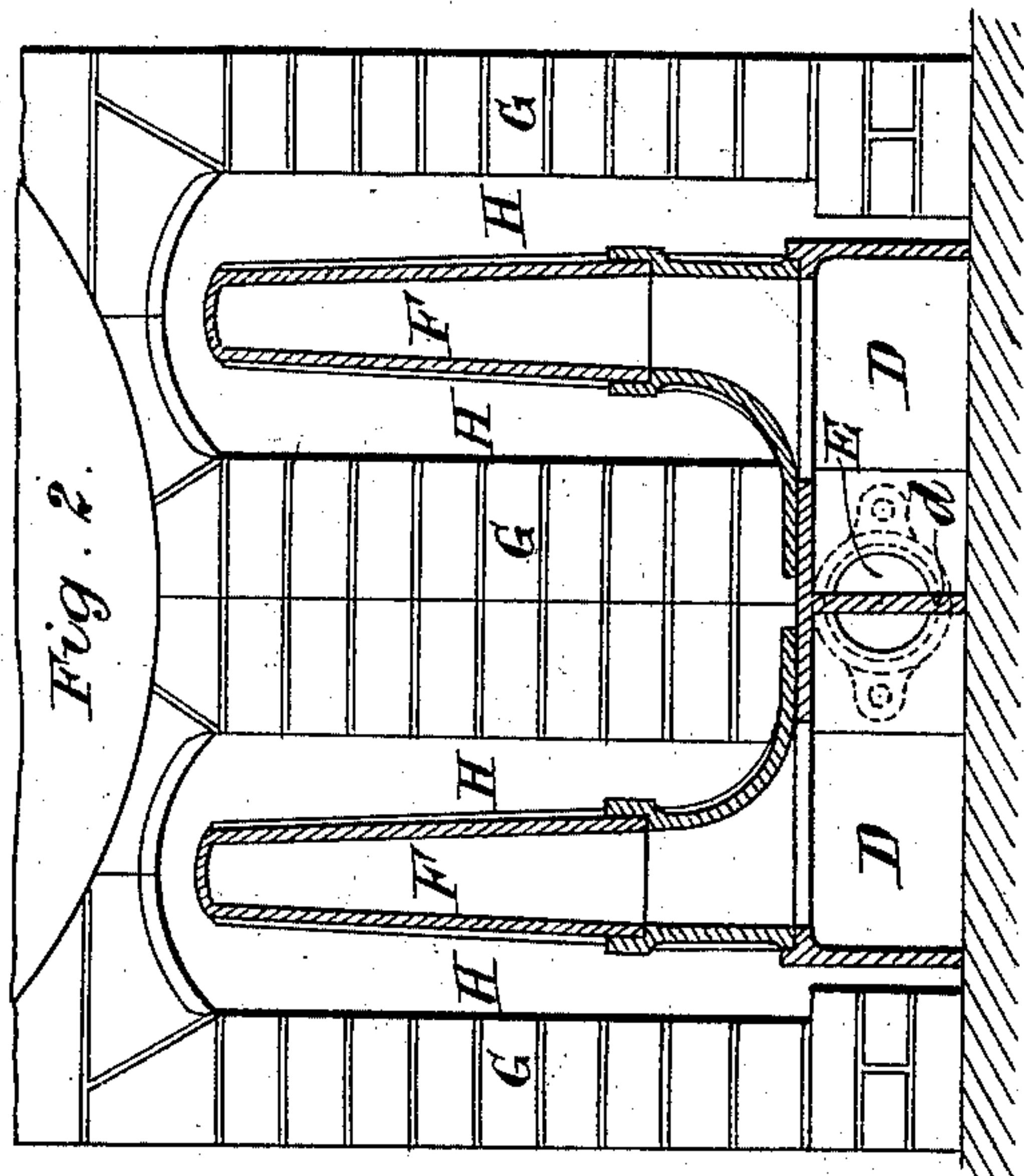
(No Model.)

2 Sheets—Sheet 1.

W. KNEEN.
FURNACE.

No. 505,661.

Patented Sept. 26, 1893.



Witnesses
George Baumann
James Gracie

Inventor
By his Attorneys William Kneen
Horbar and Hawes

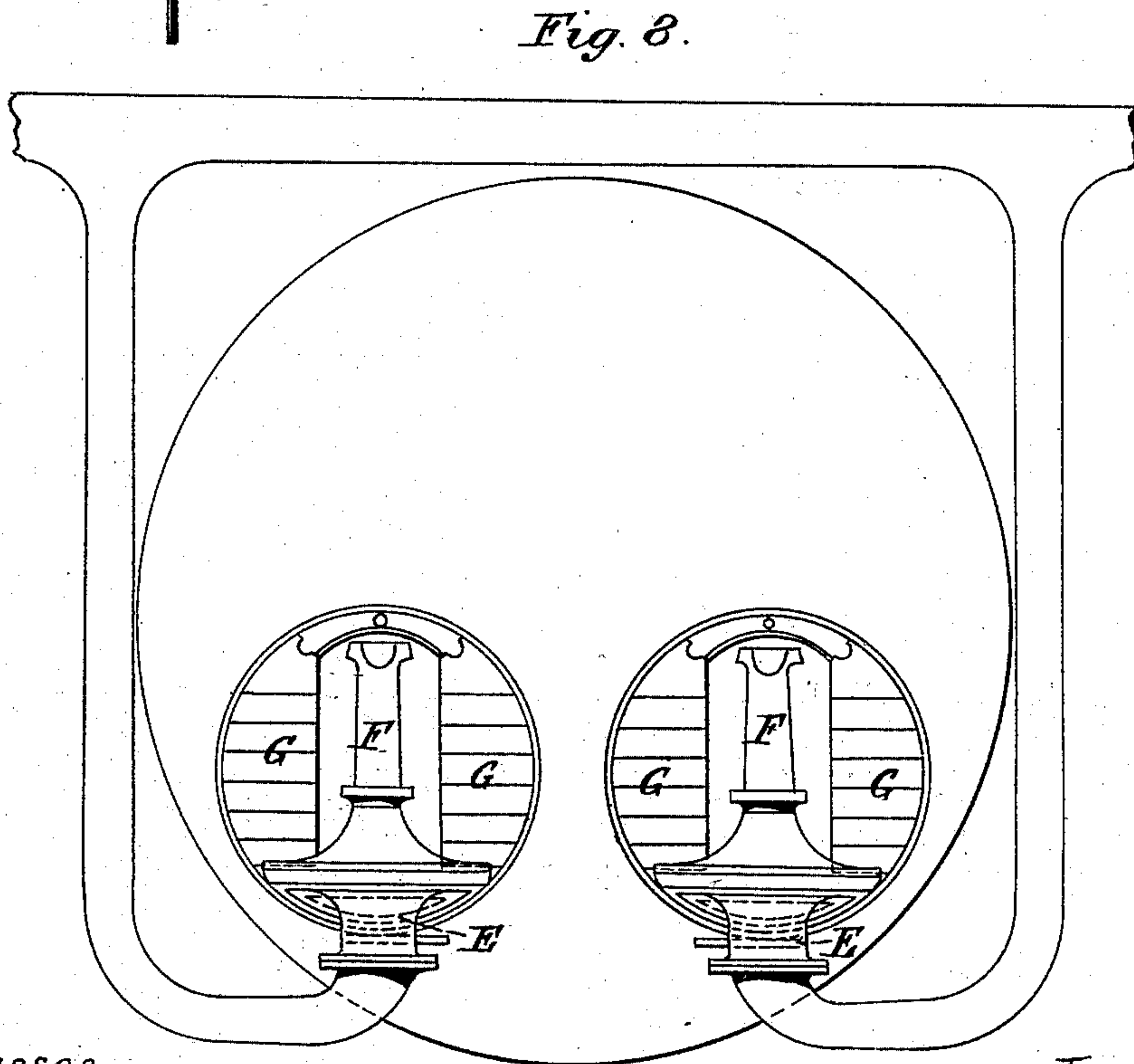
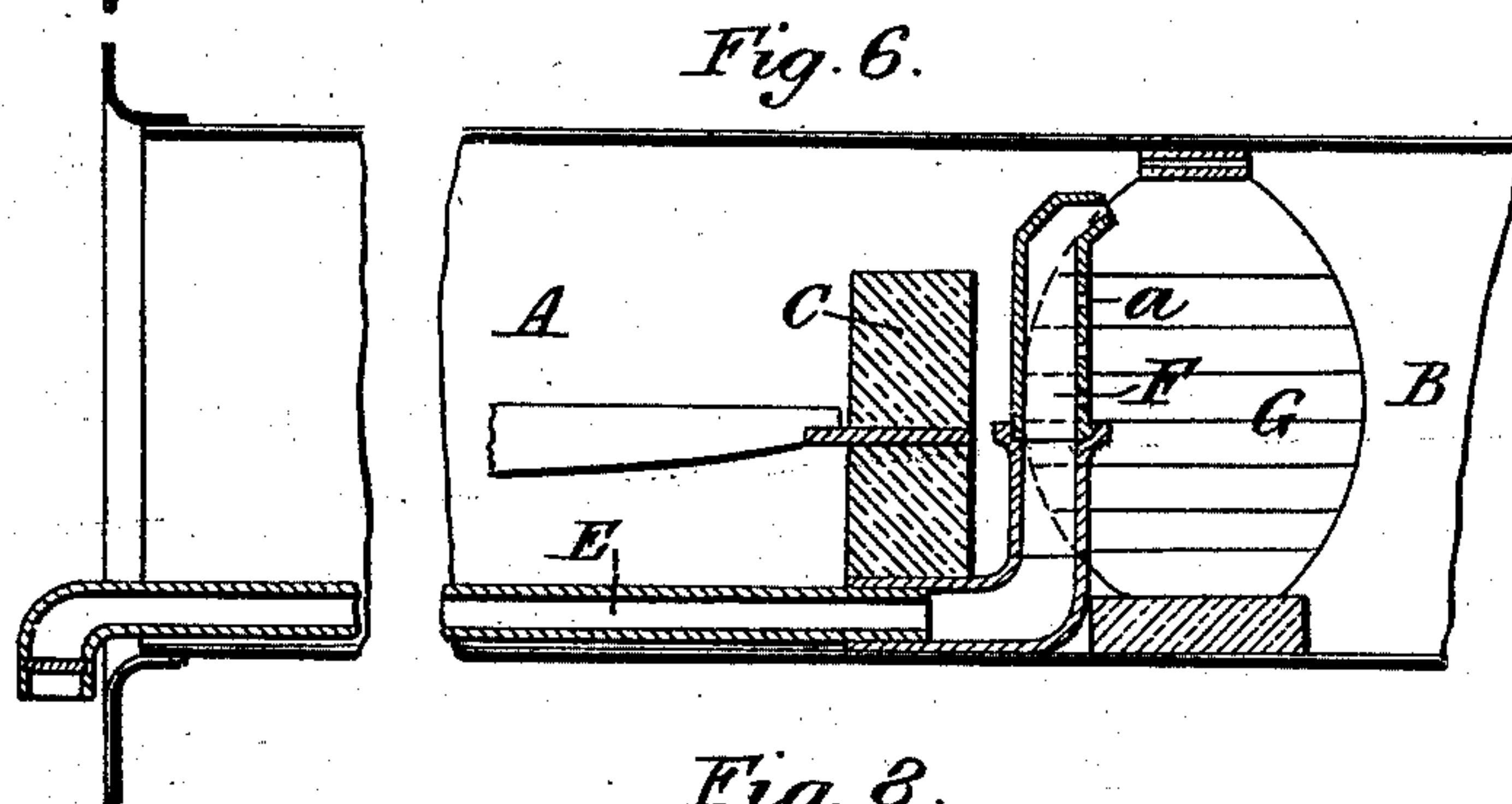
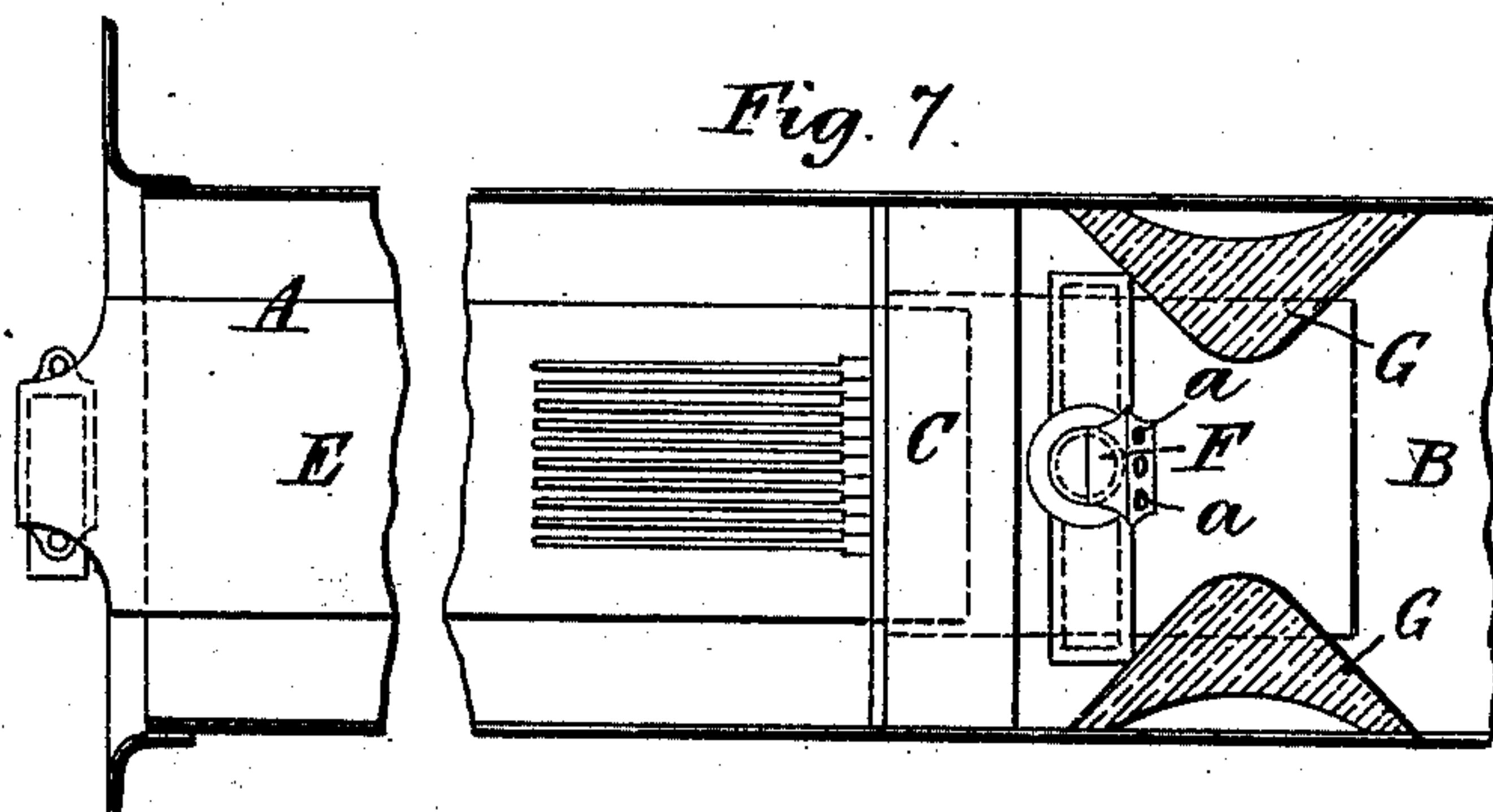
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2 Sheets—Sheet 2.

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George Baumann
James Gracia

Inventor
William Kneen
By his Attorneys,
Horsman and Howard

UNITED STATES PATENT OFFICE.

WILLIAM KNEEN, OF LONDON, ENGLAND.

FURNACE.

SPECIFICATION forming part of Letters Patent No. 505,661, dated September 26, 1893.

Application filed May 3, 1892. Serial No. 431,624. (No model.) Patented in England May 3, 1890, No. 6,876, and in Germany October 15, 1890, No. 56,826.

To all whom it may concern:

Be it known that I, WILLIAM KNEEN, manufacturer, a subject of the Queen of Great Britain and Ireland, residing at 149^A Aldersgate Street, in the city of London, England, have invented certain Improvements in or Connected with Furnaces for Preventing or Consuming Smoke Therein, (for which I have, in conjunction with James Ashworth, of Dalton-in-Furness, in the county of Lancaster, England, obtained patents in Great Britain, No. 6,876, dated May 3, 1890, and in Germany, No. 56,826, dated October 15, 1890,) of which the following is a specification.

15 This invention relates to improvements upon the invention for which a patent was granted to me dated April 27, 1886, No. 340,918, the object of the present invention being to so improve the arrangement there
20 described that the draft is not impeded and more fuel per square foot of the firegrate can be burned than can be burned according to the aforesaid prior arrangement.

According to the present invention the air
25 is forced under pressure through a pipe or passage or pipes or passages into a receiver situated in the combustion chamber behind the bridge and communicating with another passage or other passages provided with out-
30 let orifices presented away from the bridge and so directed that the air from them or from some of them is caused to pass across the direction of the draft of the furnace and to impinge with the hot gases and smoke from
35 the furnace upon blocks or piers which are situated at the sides or at the side and also in the center (transversely) of the combustion chamber the spaces between these piers or blocks being left clear for the draft. The
40 air may be forced into the aforesaid pipe or pipes or passage or passages by means of a fan or any other suitable air forcing device and the air pipes or passages may be led
45 through the ash pit or through other convenient part of or in proximity to the furnace so as to become heated thereby.

I will describe my present invention with reference to the accompanying drawings: Figure 1 of which is a longitudinal sectional
50 elevation, Fig. 2 a transverse section, and Fig. 3 a horizontal section of an outside boiler

furnace provided with my improvements; and Figs. 4 and 5 are respectively a sectional elevation and plan of a modified construction of the air receiver. Figs. 6 and 7 are respectively a horizontal section and a vertical longitudinal section of an internal furnace of a single flued boiler; and Fig. 8 is a front elevation of a double internal flued boiler provided with my improvements. 55

Referring to Figs. 1, 2 and 3 A is the fire place or furnace proper and B the combustion chamber behind the bridge C. At the bottom of the combustion chamber B is an air receiver or chamber D into which air is forced 65 by means of a fan or other air forcing device in connection with a pipe or passage E opening into the said chamber D. The pipe or passage E may lead from the back end of the furnace flue into the chamber D or it may 70 enter and pass through the ash pit or through any other suitable part of the furnace or in proximity thereto so that the air becomes heated before it enters the said chamber. Communicating with the interior of and ex- 75 tending upward nearly to the top of the combustion chamber, from the chamber D behind the bridge C are pipes or passages F having therein outlet orifices *a a* presented away from the bridge and so directed that the air 80 from them or from some of them is caused to pass across the direction of the draft of the furnace as shown by the arrows in Fig. 3 piercing the products of combustion from the fire and impinging in admixture with the said 85 products upon blocks or piers G G which are situated at the sides and in the center of the combustion chamber at the rear of the bridge C, the spaces at H between these piers being left clear for the draft. The piers G may be 90 built up of blocks of refractory material or be molded in one or more pieces as desired and they may be made of fire clay, chrome-iron or other material which will withstand the high temperature. The air receiver or chamber D 95 is preferably strengthened by a mid-feather or partition *d* which also serves to divide the incoming air into two currents toward the pipes or passages F. In cases of furnaces with strong drafts the air receiver or cham- 100 ber D may be provided with a valve *b* as shown in Figs. 4 and 5 for regulating the ad-

mission of air to the interior thereof the said valve being opened and closed more or less as required by means of a lever and rod *c* connected to an arm *e* on the axis of the valve.

5 In Figs. 6, 7 and 8 the air receiver *D* and also the pier or block *G* in the center of the combustion chamber are dispensed with and there is shown only one air pipe or passage *F* in each furnace in communication with the
10 pipe or passage *E* through which the air is forced into the said pipe or pipes *F*. In other respects the arrangement is the same as in Figs. 1, 2 and 3.

I claim—

15 1. In a fire-place or furnace having a bridge and provided with an upright air supply pipe behind the bridge in the combustion chamber, and extending nearly to the top of said chamber, with blocks, piers or projections ad-
20 jacent to the said pipes in the combustion chamber, leaving spaces between them, the said upright pipe or pipes being provided with perforations adapted to direct the air across the line of draft from the fire-place in the said
25 spaces to cause the hot air and gases to im-

pinge on the said piers, substantially as set forth.

2. A fire-place or furnace having a bridge and an air chamber or receiver in the combustion chamber behind the bridge, the said 30 air chamber being provided with a valve *b*, in combination with an upright air tube or tubes in communication at the bottom with the said air chamber and reaching nearly to the top of the combustion chamber, and blocks 35 or piers adjacent to the said upright tube or tubes, the said tubes being provided with perforations, adapted to direct the air across the line of draft from the fire place and against the blocks, substantially as and for the pur- 40 pose set forth.

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

WILLIAM KNEEN.

Witnesses:

WM. JOHN WEEKS,

FRED GOATER,

Both of 9 Birchen Lane, London, E. C.