

(No Model.)

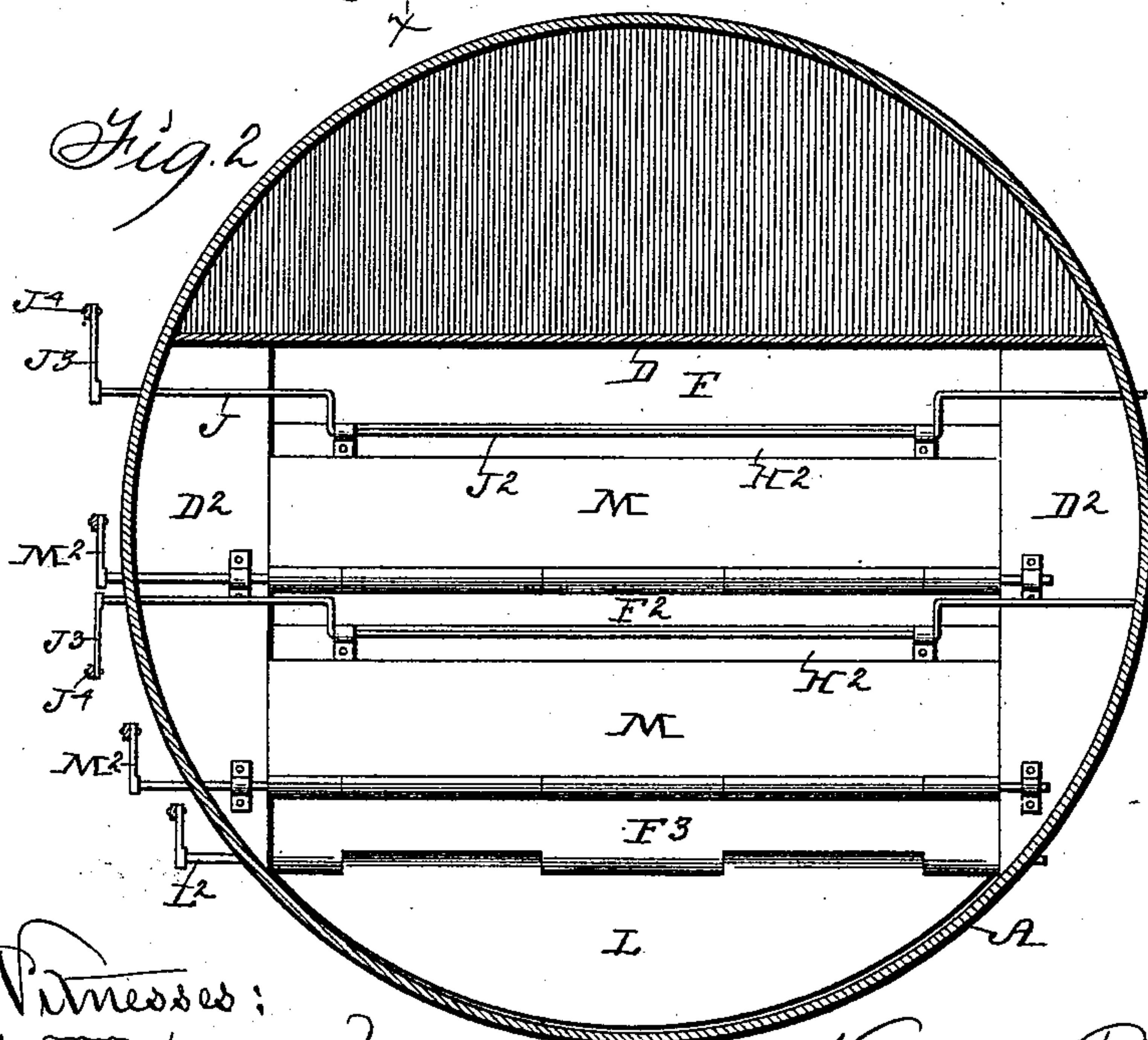
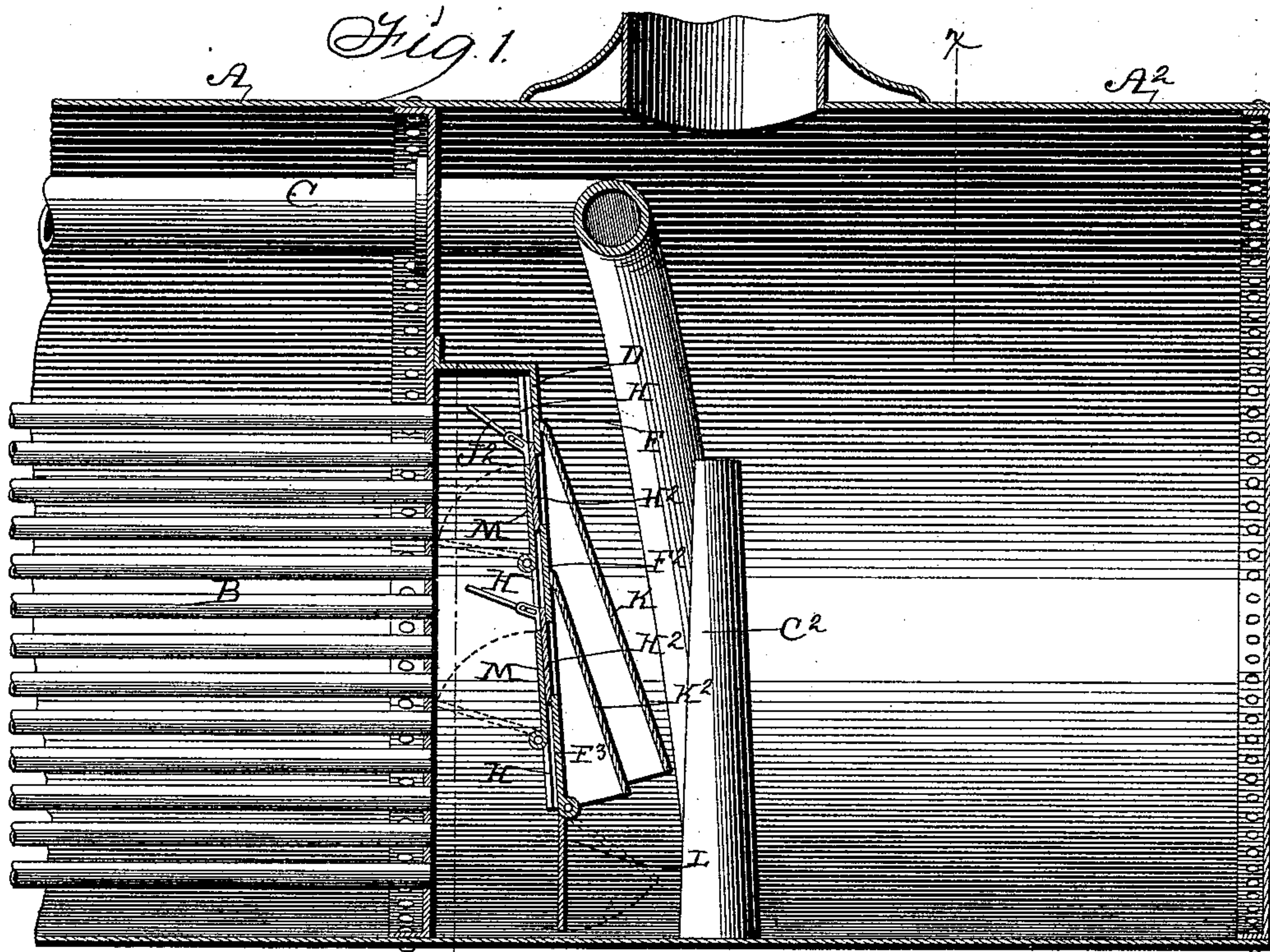
2 Sheets—Sheet 1.

W. BRITTON.

DIAPHRAGM FOR LOCOMOTIVE BOILERS.

No. 539,410.

Patented May 21, 1895.



Witnesses:
W. S. Sankey.
R. H. Orwig.

Inventor: William Britton,
By Thomas G. and J. Ralph Orwig, Attys.

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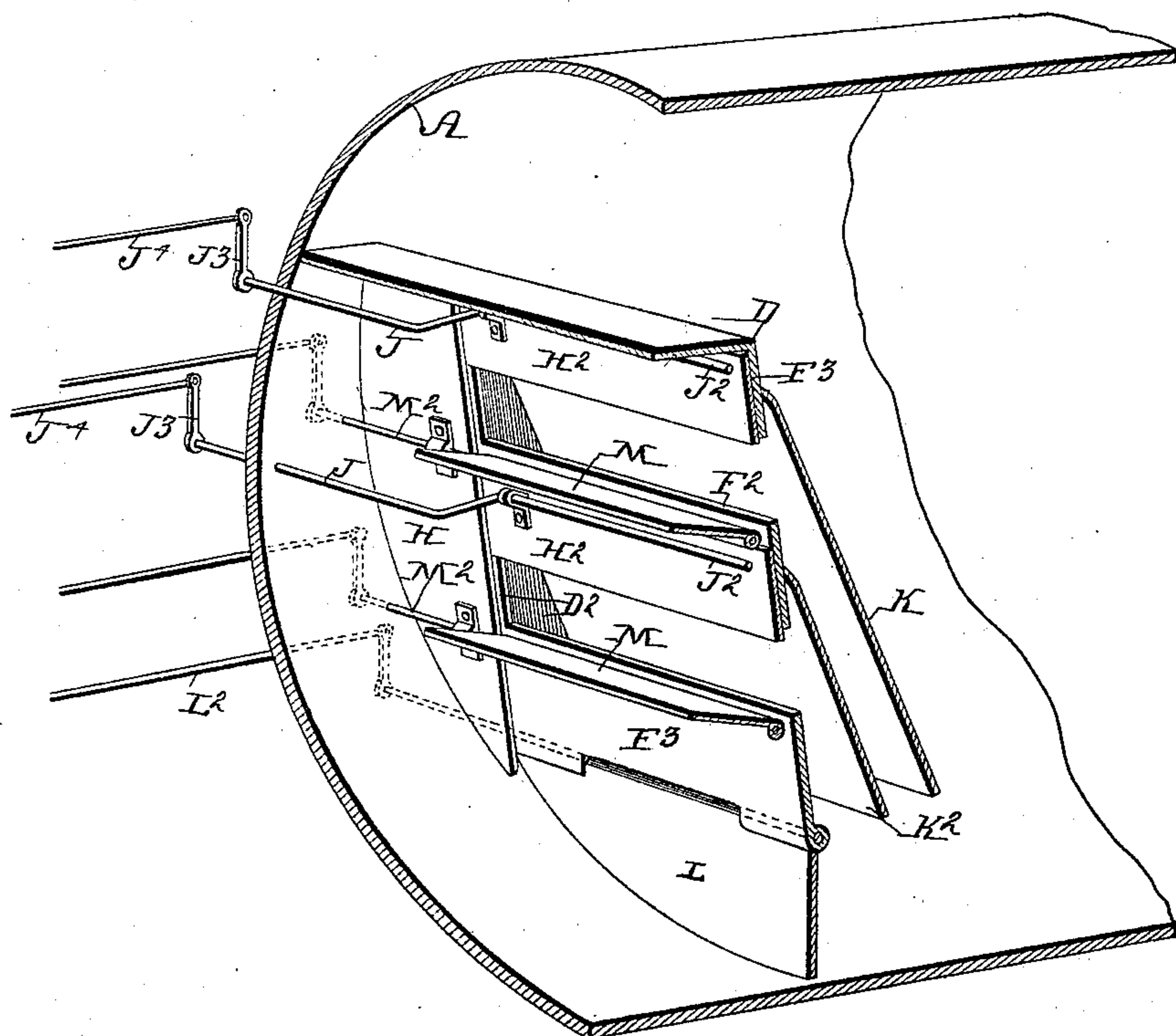
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Fig. 3.



Witnesses: } Inventor: William Britton,
W. J. Sankey }
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UNITED STATES PATENT OFFICE.

WILLIAM BRITTON, OF BOONESBOROUGH, ASSIGNOR OF ONE-HALF TO W. H. SUTTON, OF BOONE, IOWA.

DIAPHRAGM FOR LOCOMOTIVE-BOILERS.

SPECIFICATION forming part of Letters Patent No. 539,410, dated May 21, 1895.

Application filed June 9, 1894. Serial No. 514,114. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM BRITTON, a citizen of Scotland, residing at Boonesborough, in the county of Boone and State of Iowa, have invented a new and useful Diaphragm for Locomotive-Boilers, of which the following is a specification.

The object of my invention is to provide a diaphragm to be located near the front end of a locomotive by which the products of combustion may be deflected downwardly so as not to escape directly to the stack, and so arranged that the draft through either the top, middle or lower sections of the boiler may be regulated independently of the other by an operator in the locomotive cab, so as to cause the fire to burn more freely on the front, central or back portion of the grate and to provide means whereby an approximately equal draft may be maintained through all of the boiler flues under varying conditions and the lodgment of soot and ashes therein by reason of back drafts in some of the flues, be prevented, and further, to generate a maximum of heat with a minimum of fuel and consume its own smoke by providing means whereby the products of combustion may be held in the flues to radiate therefrom and the gases, smoke, &c., be consumed before passing to the stack. With these objects in view my invention consists in the construction, arrangement and combination of a diaphragm in front of a locomotive boiler by which the upper, middle and lower flues may be adjusted independently of each other to regulate the draft there-through, as hereinafter set forth, pointed out in the claims and illustrated in the accompanying drawings, in which—

Figure 1 is a vertical longitudinal sectional view of the forward part of a locomotive and boiler, showing my diaphragm therein. Fig. 2 is a transverse sectional view through the line $x x$ of Fig. 1. Fig. 3 is a sectional perspective view of the diaphragm and accompanying parts.

Referring to the accompanying drawings the reference letter A is used to indicate the locomotive cylinder; A^2 , the smoke box at the front end thereof. B indicates the locomotive boiler of the ordinary construction. C indicates the steam pipe leading forwardly above

the boiler and downwardly in front of the boiler and C^2 indicates the exhaust pipe to discharge upwardly toward the smoke stack, all of the parts mentioned being of the ordinary construction now in general use and a further description of their functions is deemed unnecessary.

The diaphragm is composed of a sheet metal frame D having its top edge fixed to the boiler head, projecting forwardly therefrom and then downwardly at D^2 and fitted close to the sides of the locomotive cylinder.

F, F^2 and F^3 are three cross plates at the top, central and lower portions of the diaphragm formed integral with the side pieces D^2 of the diaphragm.

H indicates a plate located at the sides of the diaphragm and fixed to the back of the post D^2 with a slight space between the two parts and H^2 H^2 are slides with their ends inserted between the parts D^2 and H and adapted to slide vertically therein, to cover the space between the parts F, F^2 and F^3 or to be moved upwardly to overlap the parts F and F^2 . To provide for operating these slides from the cab of a locomotive I have arranged a crank shaft J to extend transversely of the locomotive cylinder and having a crank arm J^2 at its central portion pivoted to the slides and a crank J^3 fixed to its outer end and a rod J^4 fixed thereto and extended into the cab, so that a pull thereupon will move the slide and permit of its accurate adjustment.

K indicates a deflector fixed to the front of the diaphragm to direct the products of combustion passing through the upper opening in the diaphragm downwardly before passing to the flue and K^3 is a like deflector inside of the first to direct the products of combustion from the middle opening downwardly.

L indicates a gate hinged to the bottom of the diaphragm to regulate the size of the passage between the diaphragm and locomotive cylinder a crank shaft L^2 being connected therewith and passed to the side of the engine so that it may be operated from the cab.

M, M, indicate two plates hinged to the sides of the diaphragm at its rear face to swing rearwardly and engage the boiler head so as to cut off communication from the flues downwardly before passing through the opening

in the diaphragm so as to divide the boiler flues into three distinct sections each of which may be controlled independently of each other and the amount of draft therethrough be accurately regulated, cranks M^2 being attached to the plates M whereby the plates may be controlled from the cab.

In practical operation when the fire is being started all of the dampers may be left open and the full draft capacity of the boiler be utilized. Then when it is desired to retain the heat in the boiler flues a greater length of time to allow the smoke, gases, &c., to be consumed and the heat to radiate from the flues, the slides H^2 may be partially or wholly closed, and the draft may be regulated so as to burn the front, middle or back of the fire most rapidly by regulating and adjusting the size of the openings through which the top, middle or lower sets of flues, discharge.

Having thus described my invention, what I claim as new therein, and desire to secure by Letters Patent of the United States therefor, is—

1. The combination with a boiler having a number of rows of horizontal boiler flues therein, of a diaphragm attached to the boiler head above the flues, and having one or more openings therein in alignment with the rows of flues, a plate beneath each opening in the diaphragm adapted to rest against the boiler head and direct all of the products of combustion passing through the boiler flues in alignment with the opening above the plate, through said opening and dampers for closing said openings, for the purposes stated.

2. The combination with a boiler having a number of rows of horizontal boiler flues therein, of a diaphragm attached to the boiler head above the flues and having one or more openings therein in alignment with the rows of flues, a plate beneath each opening in the diaphragm adapted to rest against the boiler head

and direct all of the products of combustion passing through the boiler flues in alignment with the opening above the plate, through said plate, dampers for closing said openings and hoods secured to the front of the diaphragm above each opening leading forwardly and downwardly therefrom, for the purposes stated.

3. The combination with a boiler having a number of rows of horizontal boiler flues of a diaphragm placed in the locomotive cylinder and leading from the top of the lower end of the boiler downwardly to a point near the bottom of the cylinder, and having one or more horizontal openings therein, a slide for each opening arranged to move vertically to wholly or partially close the same, a damper hinged to the rear side of the diaphragm beneath each opening and adapted to rest against the end of the boiler and compel all of the products of combustion passing through the boiler tubes above the damper to pass through the opening above the damper, means for adjusting the said damper and slides independently and a hood for each opening, substantially as and for the purposes stated.

4. An attachment for locomotive boilers, comprising a diaphragm located in advance of the boiler and extending from its top to a point near its lower end, and having one or more horizontal openings therein, a plate hinged to the back of the diaphragm below each opening to be capable of swinging backwardly to rest against the boiler, a damper hinged to the lower edge of the diaphragm and a slide to cover each opening and means for operating said plates damper and slide from a point outside of the locomotive cylinder, for the purposes stated.

WILLIAM BRITTON.

Witnesses:

W. H. SUTTON,
R. F. DALE.