

(No Model.)

2 Sheets—Sheet 1.

J. W. CLOUD.
EXHAUST FOR STEAM ENGINES.

No. 505,190.

Patented Sept. 19, 1893.

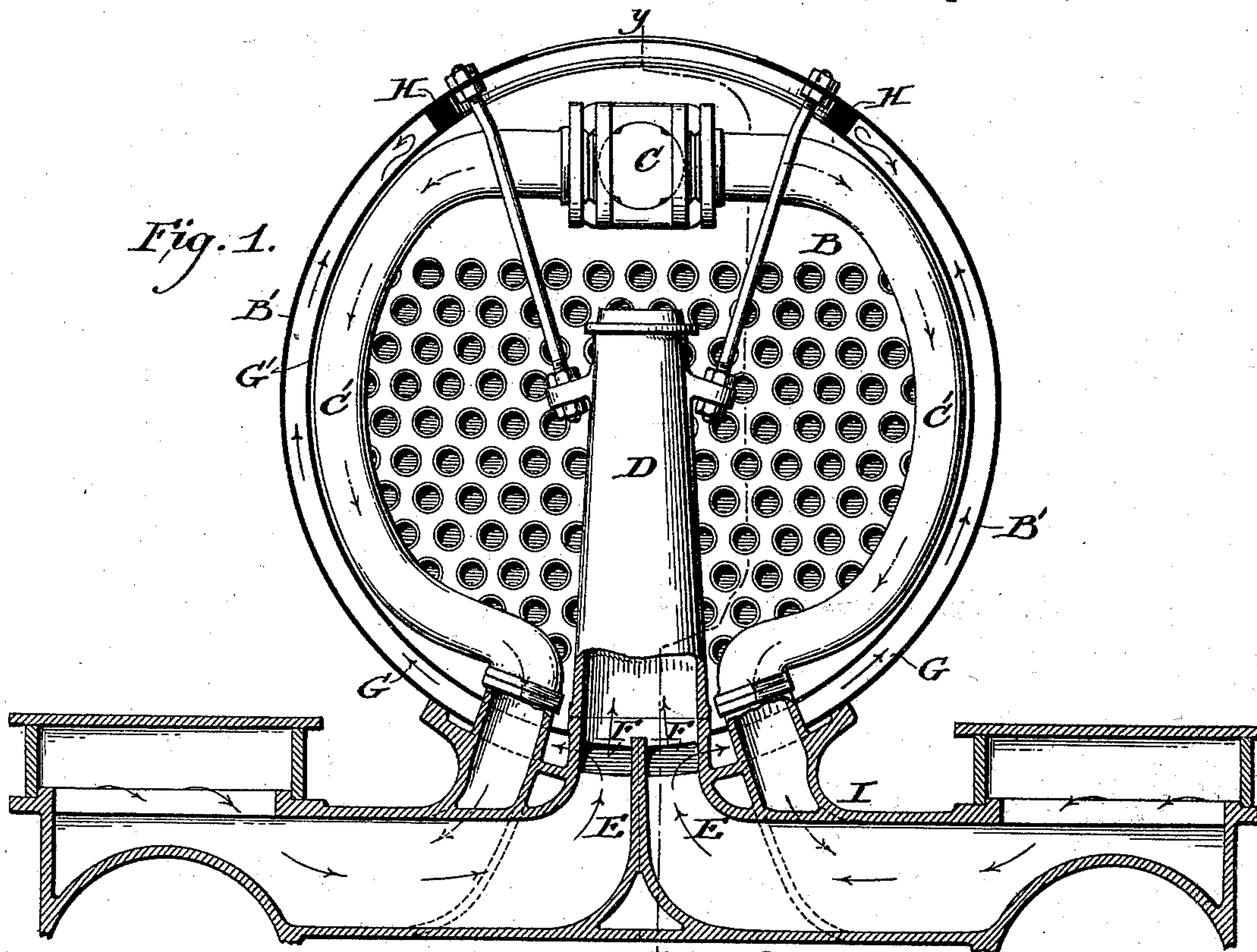
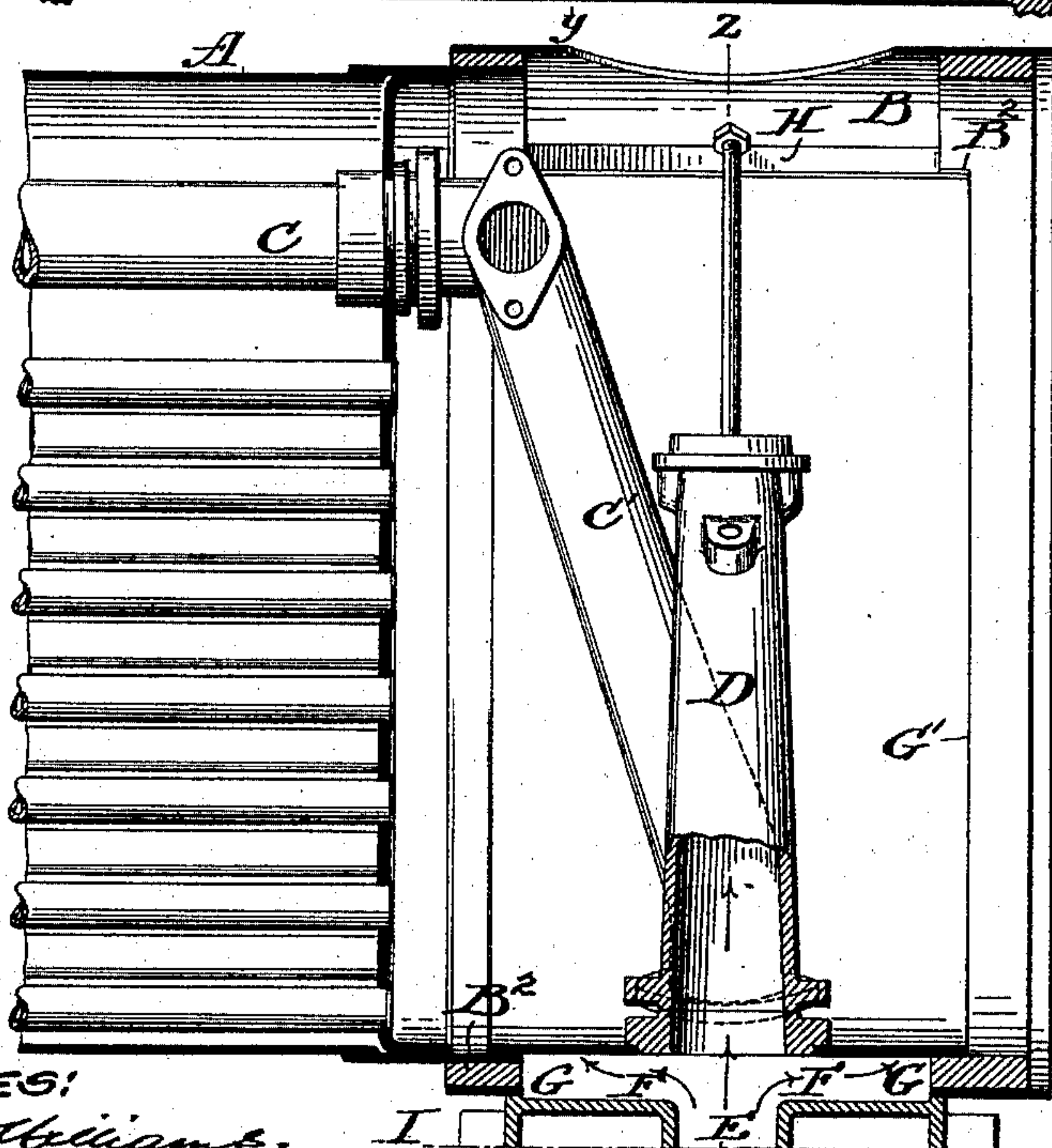


Fig. 2.



WITNESSES:
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INVENTOR:

John W. Cloud
by his atty.
Francis T. Chambers

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Fig. 3.

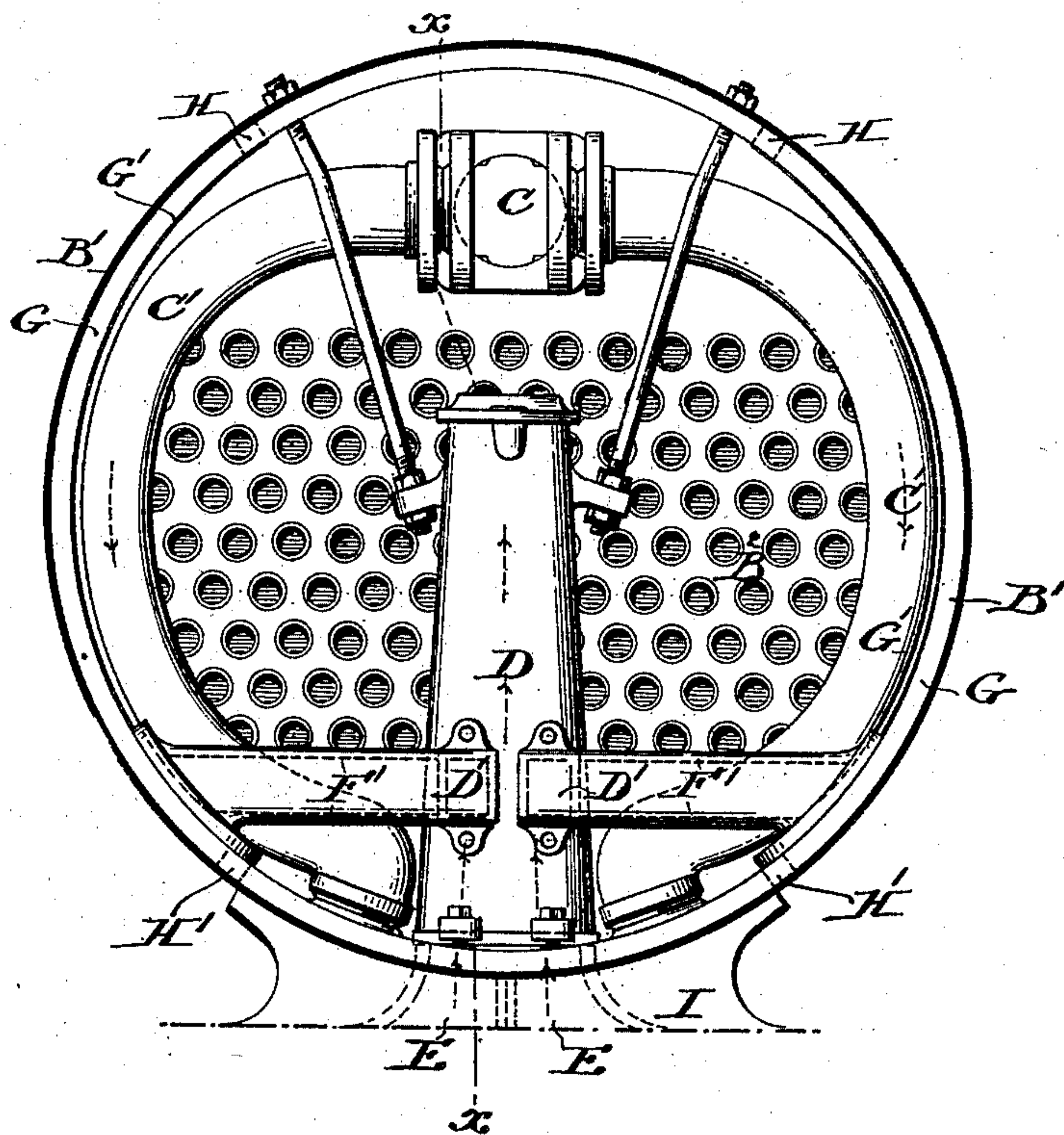
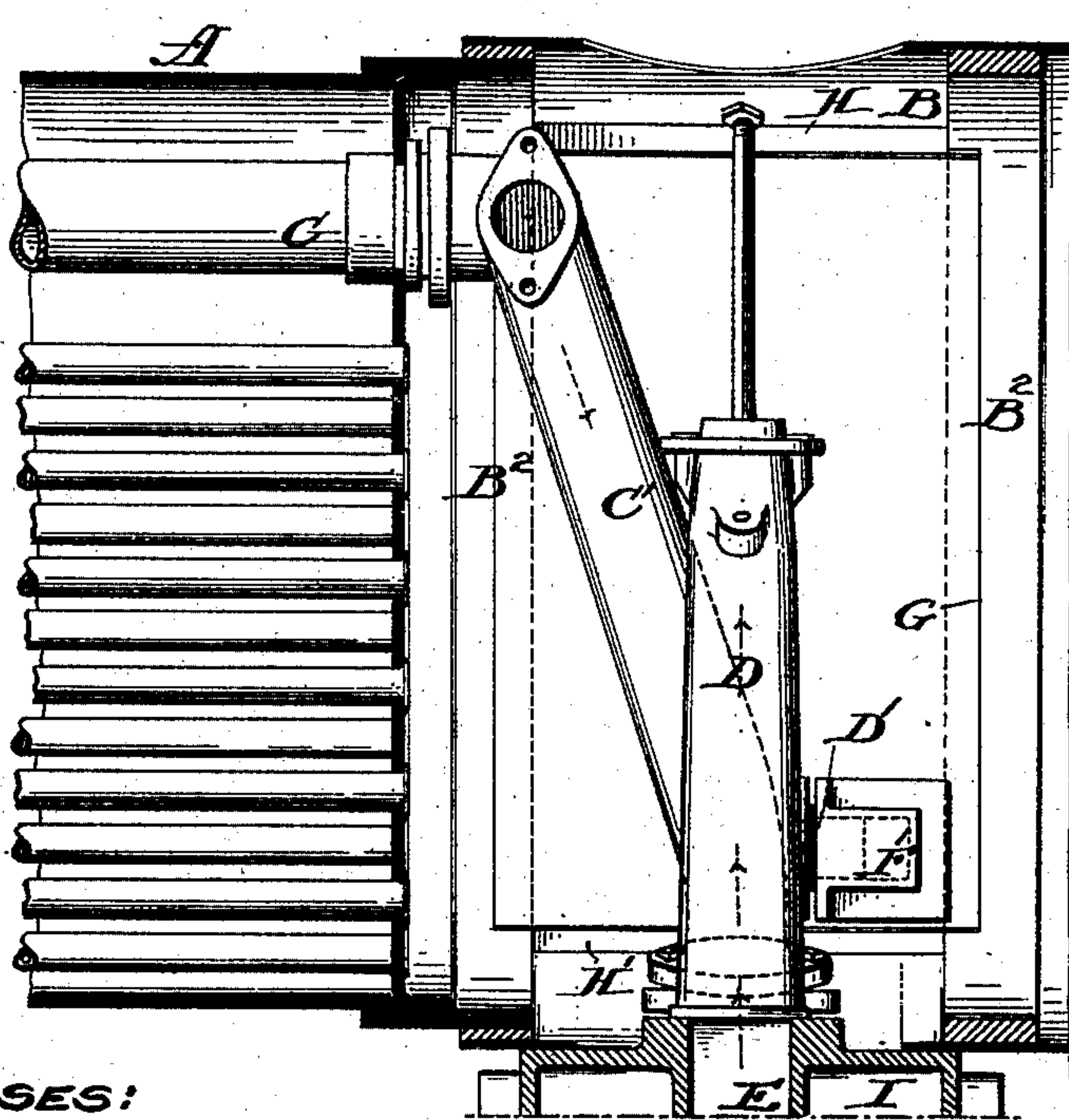


Fig. 4.



WITNESSES:
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INVENTOR:
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UNITED STATES PATENT OFFICE.

JOHN WILLIS CLOUD, OF CHICAGO, ILLINOIS.

EXHAUST FOR STEAM-ENGINES.

SPECIFICATION forming part of Letters Patent No. 505,190, dated September 19, 1893.

Application filed January 9, 1893. Serial No. 457,738. (No model.)

To all whom it may concern:

Be it known that I, JOHN WILLIS CLOUD, a citizen of the United States, residing at the city of Chicago, in the county of Cook and State of Illinois, have invented a certain new and Improved Exhaust for Steam-Engines, of which the following is a true and exact description, reference being had to the drawings which accompany this specification and form a part thereof.

My invention relates to engines in which the exhaust steam is delivered into a smoke box or stack and there utilized for increasing the draft of the furnace. An objectionable feature of this arrangement as heretofore employed has been that the action of the exhaust steam is at times excessive and at other times less than could be desired and the object of my invention is to equalize the action of the exhaust which I accomplish by providing what I call a steam accumulator chamber situated in the smoke box and connected with the exhaust passages below the delivery end of the exhaust nozzle.

My invention is peculiarly adapted for use in connection with locomotive engines, and further details of my improvement consist in the special arrangement of the parts in the locomotive smoke-box, which will best be understood as explained in connection with the drawings, in which—

Figure 1, is an elevation showing the inside of the smoke box and the saddle casting containing the steam passages leading to and from the cylinders. Fig. 2, is a longitudinal section on the line $y-y$ of Fig. 1; Fig. 3, an elevation of the inside of the smoke-box of a locomotive of the usual construction showing a convenient way of applying my invention to it, and, Fig. 4, a longitudinal section on the line $x-x$ of Fig. 3.

A, indicates the shell of the boiler; B, the smoke-box inclosed by the sheet B' which sheet is reinforced by the rings $B^2 B^2$.

C, indicates the dry pipe; $C' C'$, the connections from the dry pipe to the steam passages leading to the cylinders.

D, is the exhaust nozzle connecting as shown with the steam passages $E E$ leading from the cylinders, the steam passages both to and from the cylinders being in the designs shown, formed in the saddle casting indicated by I.

Within the smoke box I form chambers as $G G$. These are formed so as to extend along the rounded sides of the smoke box and be out of the line of boiler flues. Thus they do not impede the draft nor interfere with the proper cleaning of the flues. These chambers may if desired be connected together, although this is not necessary. These chambers are formed between the sheet B' and an internal rounded sheet G' which is riveted to the rings $B^2 B^2$ and at the top to cross-bars $H H$.

In the construction shown in Figs. 1 and 2, openings $F F$ are formed in the saddle casting I so as to open into the chambers $G G$.

Where my invention is to be applied to existing smoke-boxes the necessary connection can be conveniently made as shown in Figs. 3 and 4, openings $D' D'$ being formed in the nozzle D and conduits $F' F'$ secured about these openings and leading therefrom to the chambers $G G$. It will be noticed that in the construction shown in Figs. 3 and 4, the lower ends of the chambers $G G$ are formed by cross-bars $H' H'$ similar to the bars $H H$.

The action of the auxiliary chambers $G G$ will be easily understood. There is more or less resistance to the escape of the exhaust steam through the nozzle which is generally of a tapered form as indicated, and this resistance of course is greater in proportion to the pressure and velocity of the exhaust steam. In consequence of this resistance a portion of the exhaust steam passes through the openings or conduits leading into chambers $G G$ and is so to speak, stored in these chambers under more or less pressure. The quantity and pressure of the steam in the chambers G will also obviously vary with the resistance to the escape of steam through the nozzle. Consequently when the exhaust is excessive a considerable amount will pass into and be stored in the chambers G , and this stored steam will pass backward into the nozzle and escape through the nozzle as the pressure of the exhaust diminishes. Thus the chambers G serve as equalizing devices, storing the excess of steam and giving it out again to the nozzle as the pressure therein diminishes.

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

1. In an engine the combination with the smoke box of an exhaust nozzle opening therein, and an exhaust steam accumulator chamber connected with the nozzle below its delivery end and extending upward therefrom 5 along the sides of the smoke box, substantially as described and so as to be out of line with the boiler tubes and of the line of draft therefrom.
- 10 2. In an engine the combination with the smoke box of an exhaust nozzle opening therein, and exhaust steam accumulator chambers connected with the nozzle below its delivery end and extending upward therefrom in both 15 directions along both sides of the smoke box substantially as described and so as to be out of line with the boiler tubes and with the line of draft therefrom.
3. In an engine the combination of the smoke box, an exhaust nozzle opening therein 20 and an exhaust steam accumulator chamber formed between the sides of the smoke box and curved plates secured inside thereof and connected with the exhaust below the delivery end of the nozzle.

JOHN WILLS CLOUD.

Witnesses:

JOSEPH W. TAYLOR,
CHARLES D. EWER.