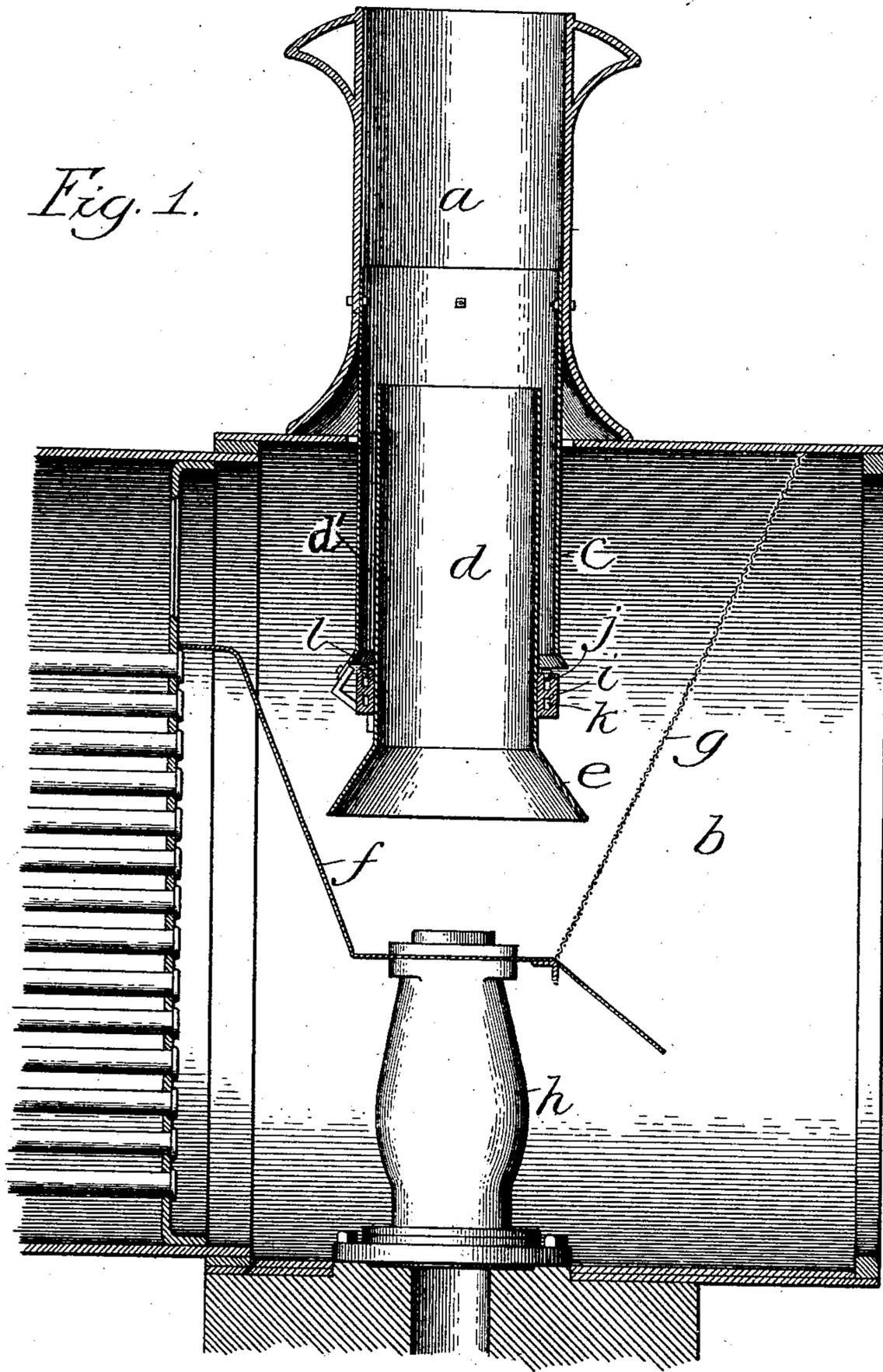


904,614.

G. J. HATZ.  
EXHAUST APPARATUS FOR LOCOMOTIVES.  
APPLICATION FILED JULY 14, 1906.

Patented Nov. 24, 1908.  
4 SHEETS—SHEET 1.

*Fig. 1.*



*Witnesses:*  
*Ed. O. Taylor,*  
*John Enders.*

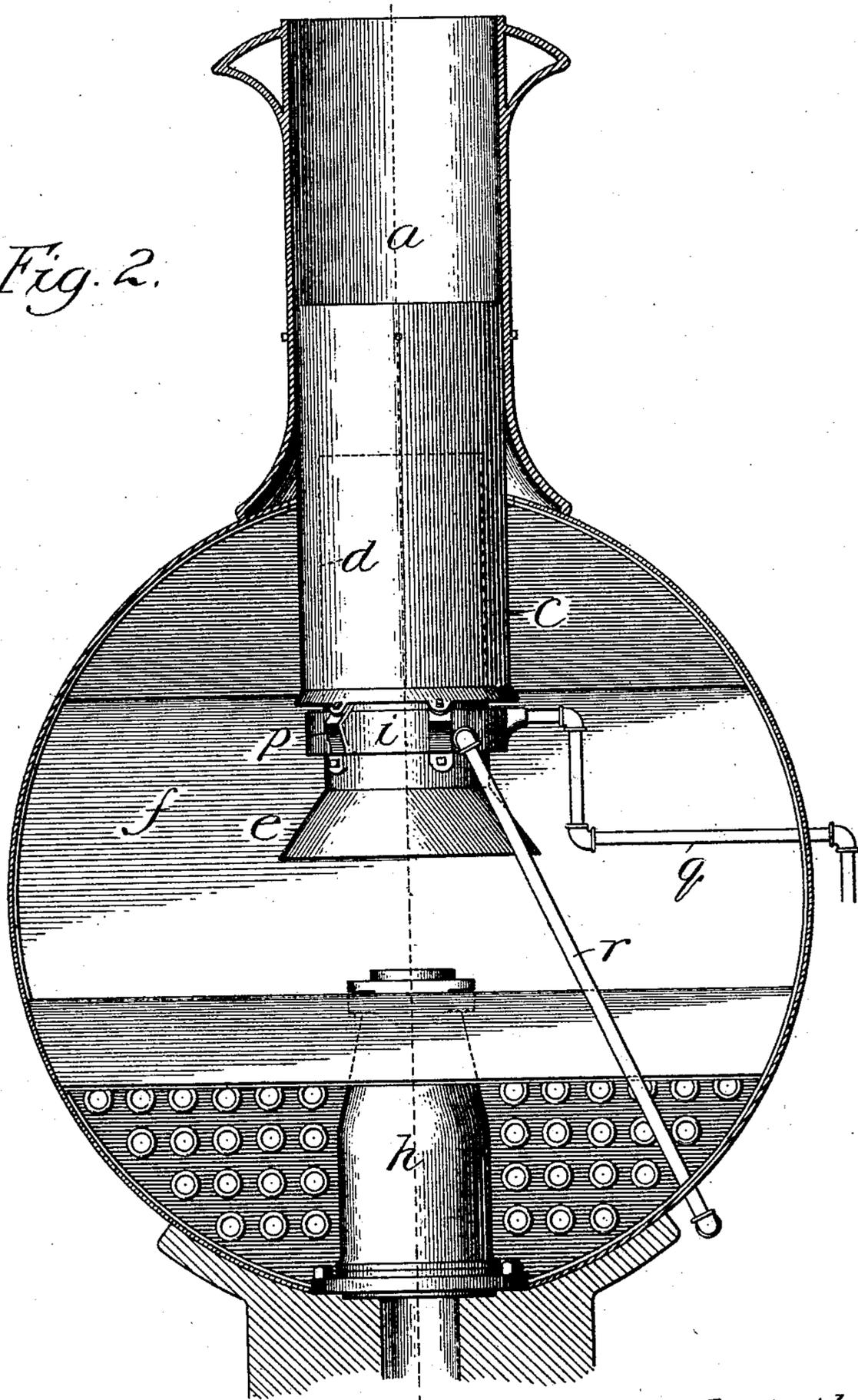
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4 SHEETS—SHEET 2.

*Fig. 2.*



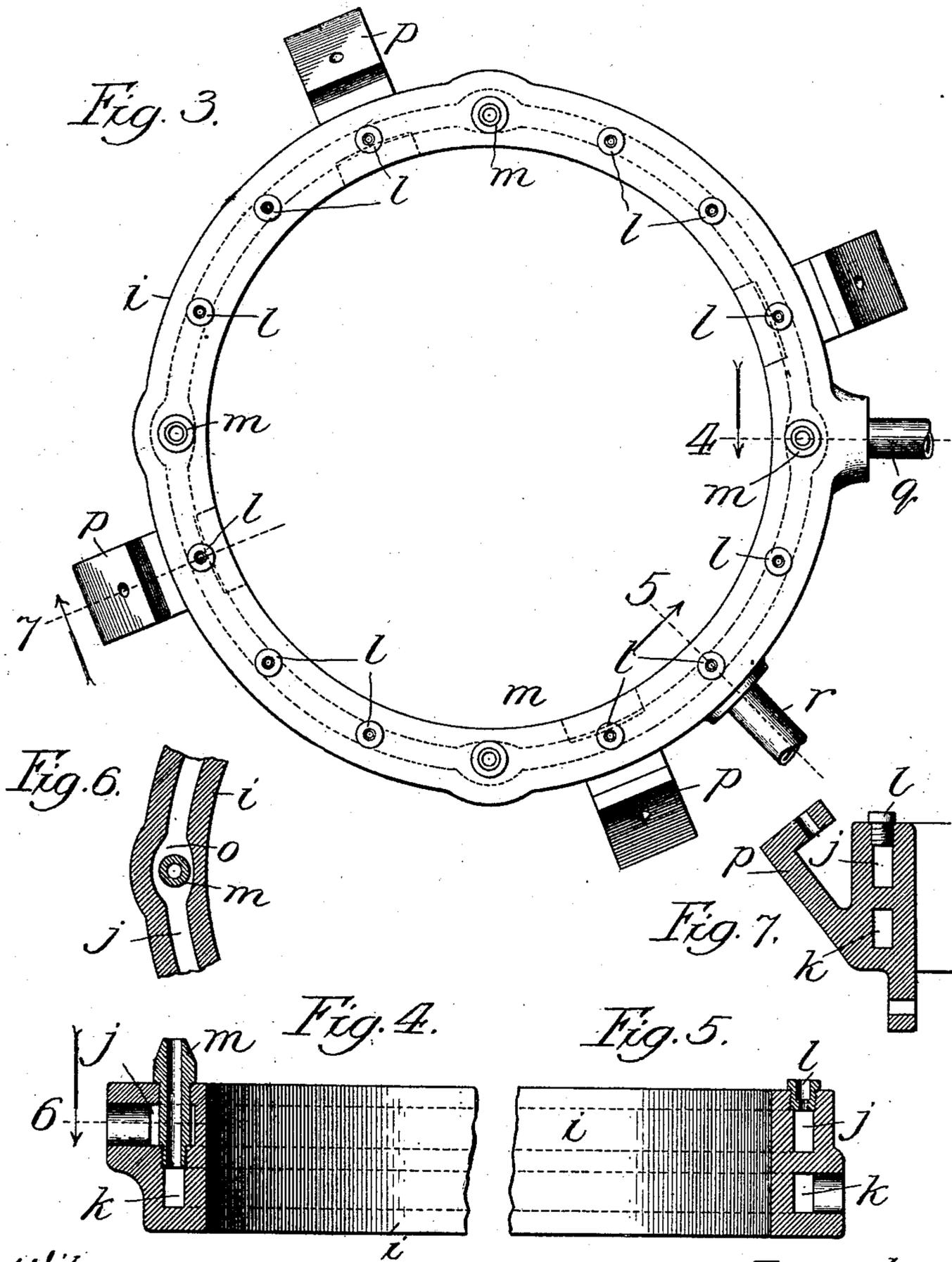
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 4 SHEETS—SHEET 3.



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4 SHEETS—SHEET 4.

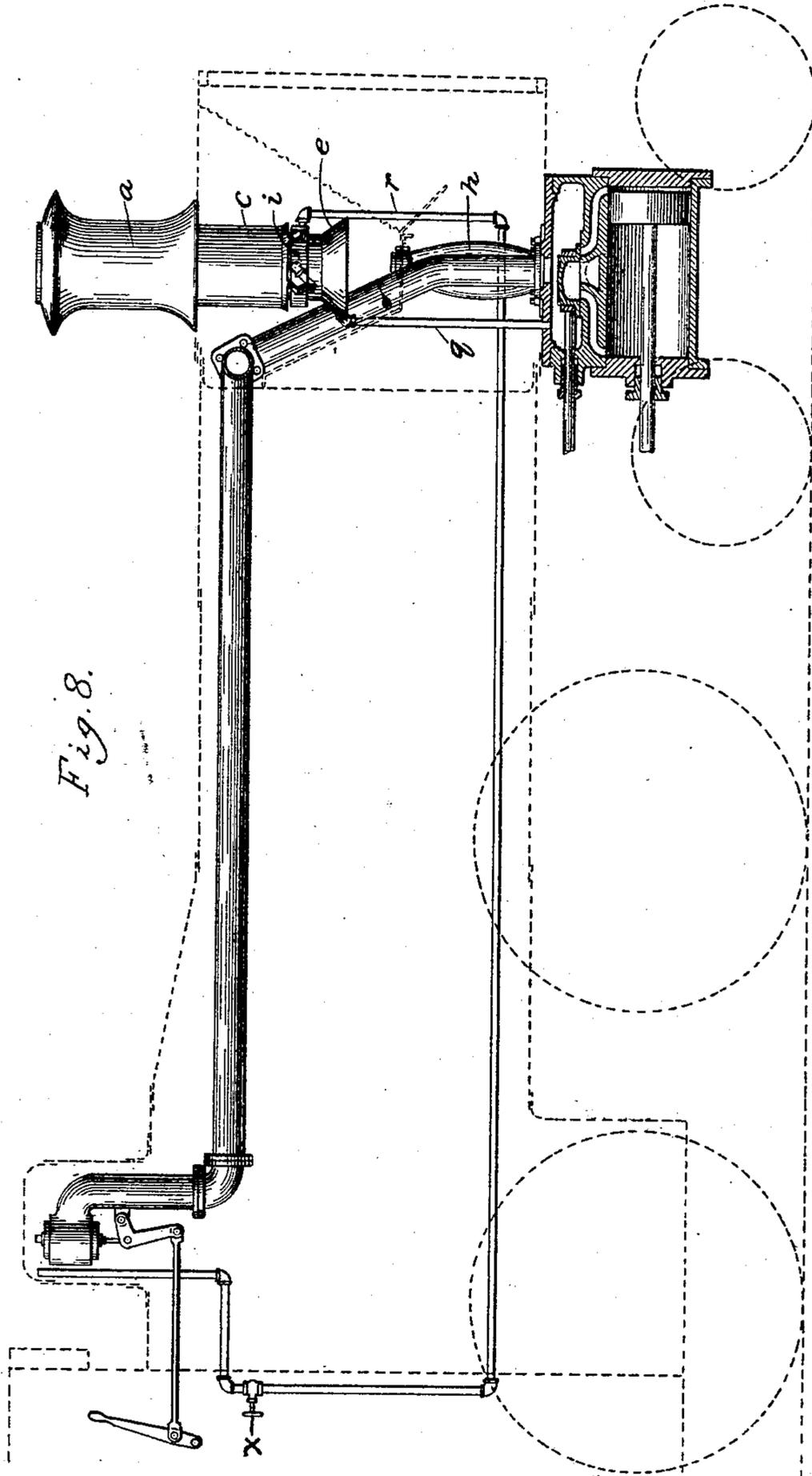


Fig. 8.

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Inventor:  
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By J. F. Sheridan ATT'Y

# UNITED STATES PATENT OFFICE.

GEORGE J. HATZ, OF BLOOMINGTON, ILLINOIS.

EXHAUST APPARATUS FOR LOCOMOTIVES.

No. 904,614.

Specification of Letters Patent.

Patented Nov. 24, 1908.

Application filed July 14, 1906. Serial No. 326,238.

To all whom it may concern:

Be it known that I, GEORGE J. HATZ, a citizen of the United States, residing at Bloomington, in the county of McLean and State of Illinois, have invented certain new and useful Improvements in Exhaust Apparatus for Locomotives, of which the following is a specification.

My invention relates to steam locomotives; and has for its particular object the provision of means for securing efficient and smokeless combustion of the fuel under all conditions.

The invention consists in the combinations and details of construction hereinafter described and claimed; and illustrated in the accompanying drawings forming a part of this specification, in which—

Figure 1 is a sectional side elevation of the forward end of the locomotive taken on the line 1 of Fig. 2; Fig. 2, a partly sectional end view of the forward part of the locomotive; Fig. 3, a plan of my improved pressure jet ring; Fig. 4, a section on line 4 of Fig. 3; Fig. 5, a section on the line 5 of Fig. 3; Fig. 6 a horizontal section through a part of the ring shown in Fig. 3; Fig. 7, a section through Fig. 3 on line 7, showing the supporting means for the ring; Fig. 8, a side elevation showing a locomotive boiler in outline with the essential parts of my invention.

In carrying out my invention, in connection with a railroad locomotive, I preferably—as particularly shown in Fig. 1—provide the usual stack *a* carried upon the forward end of the locomotive and connected directly with the smoke-box *b* through the lower flanged opening of the extending jacket *c* and through the internal cylindrical tube *d*, carrying at its lower end the flaring petticoat portion *e*. Between the jacket *c* and the tube *d* is an annular draft compartment *d'*. The smoke-box *b* is divided into two parts by a substantially U-shaped partition comprising the plate *f* and the screen portions *g*, the latter being adapted to prevent the expulsion of large cinders through the stack. Below the flaring opening of the inner stack tube and directly in line therewith the usual exhaust nozzle *h* is provided, connected in the usual manner with the exhaust of both cylinders, omitted from the drawings. Encircling the inner cylindrical tube *d* and directly below the flanged opening in the extending jacket *c* is the pressure jet ring *i*—particularly illustrated in Figs.

3 to 7—and provided with the annular cavities *j* and *k* situated one above the other,—as shown—and from which lead a plurality of upwardly directed nozzles *l* and *m*. The nozzles *l*—as illustrated in Fig. 5—are connected directly with the upper cavity *j*, while the nozzles *m*—illustrated in Fig. 6—are made long enough to extend entirely through the upper cavity and connect with the lower cavity *k*, the upper cavity being provided with enlargements *o*, where the nozzles pass to maintain the internal cross section substantially the same throughout the circumference. In order to suitably support the ring four lugs *p*, one of which is shown in cross section in Fig. 7, are carried upon the ring portion and are adapted to be secured to the flanged portion of the depending jacket *c*.

Referring to Fig. 2, it will be seen that the upper annular cavity is connected with the steam-pipe *q*, which preferably leads to the cylinder live steam port, and that the lower cavity is connected with the steam-pipe *r*, which may be brought back to the engineer's cab and may be supplied with live steam. By the combination of elements just described, when the locomotive is in motion and being propelled by its own power, live steam from the cylinders is directed into the main stack, by way of the pipe *q* and the plurality of nozzles connected with the upper annular cavity *j*, and the cylindrical chamber between the inner and outer stack casings. By the combined effect of the live steam admitted through the ring *i* and the exhaust steam from the nozzle *h*, the products of combustion are rapidly carried off, and by the application of steam to all parts of the stack live sparks are prevented from passing therethrough during the operation of the engine.

It is very desirable to provide locomotives with some means to force a draft while the engine is not in operation, for example, while the engine is standing in a station. It is particularly desirable in such cases to furnish complete combustion, together with means for extinguishing possible live sparks, so that unnecessary smoke and sparks will not be delivered into the station. In my invention this is accomplished by forcing live steam direct from the boiler through the pipe *r*, the lower annular cavity *k* and the plurality of nozzles issuing therefrom into the space between the two stack portions—

as was described in connection with the upper cavity. This furnishes a readily adjustable forced draft and applies it in such a manner that a minimum amount of steam is caused to produce a maximum draft. The valve *x* in the pipe *r* affords a means for obtaining a draft in this way whenever it is considered desirable.

In the foregoing specification only such parts have been shown and described as are thought to be important or necessary for the complete understanding of my improvements and to sufficiently disclose my invention to enable it to be practiced by those skilled in the art.

It is to be understood that while my improvements are here illustrated and described in connection with a specific form of engine, I do not so wish to limit the scope of my invention, many features of which are applicable to stationary engines and to other types of locomotives.

I claim:

In a device of the class described, a boiler, a cylinder, a steam connection between said boiler and cylinder, a smoke stack, a hollow ring at the base of the smoke stack, a transverse partition dividing said ring to form upper and lower annular chambers, the upper wall of said ring being provided with apertures leading from the upper annular chamber, nozzles extending through said upper annular chamber and communicating through apertures in said transverse partition with the lower annular chamber, a pipe leading from the cylinder live steam port to the upper annular chamber, a pipe leading directly from the boiler to the lower annular chamber, and a valve in said last mentioned pipe.

GEORGE J. HATZ.

Witnesses:

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