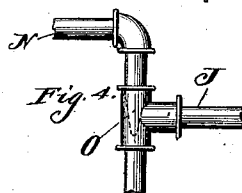
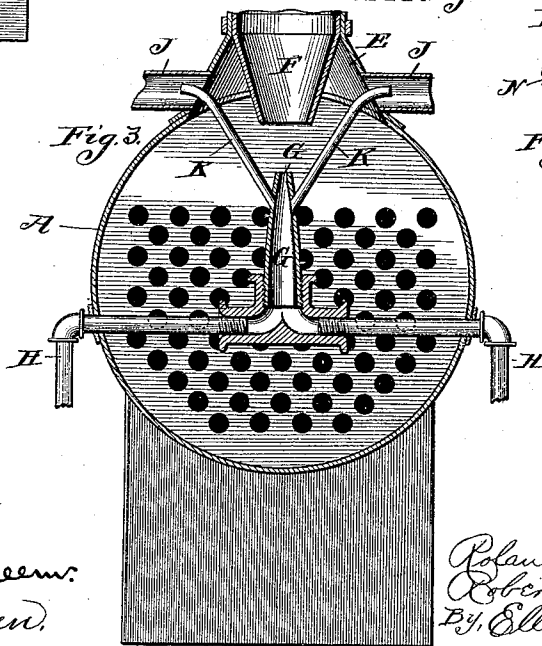
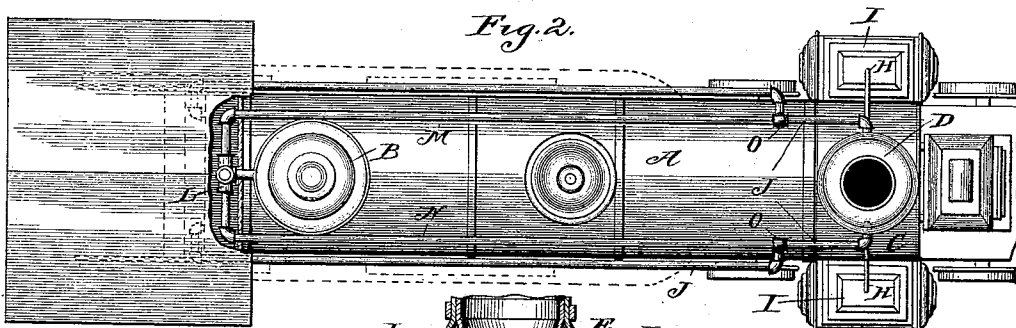
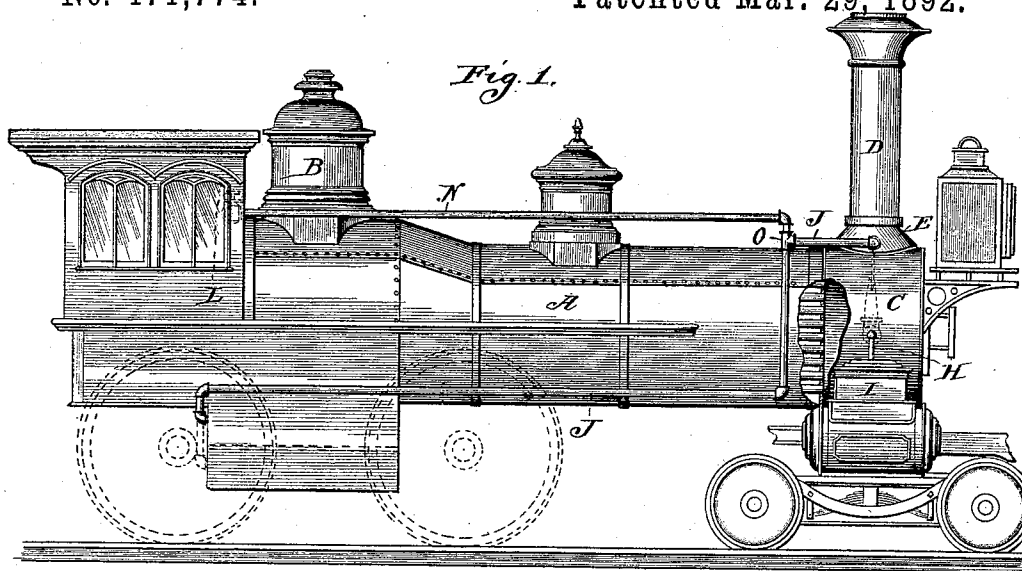


(No Model.)

ROLAND ROGERSON & ROBERT ROGERSON.
SMOKE CONSUMER.

No. 471,774.

Patented Mar. 29, 1892.



Witnesses
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UNITED STATES PATENT OFFICE.

ROLAND ROGERSON AND ROBERT ROGERSON, OF CHICAGO, ILLINOIS.

SMOKE-CONSUMER.

SPECIFICATION forming part of Letters Patent No. 471,774, dated March 29, 1892.

Application filed January 26, 1891. Serial No. 379,043. (No model.)

To all whom it may concern:

Be it known that we, ROLAND ROGERSON and ROBERT ROGERSON, citizens of the United States, and residents of the city of Chicago, county of Cook, and State of Illinois, have invented certain new and useful Improvements in Smoke-Consumers, of which the following is a specification.

This invention relates to improvements in smoke-consumers especially designed for use in connection with locomotives, and has for its prime object to prevent the escape of the smoke and products of combustion through the smoke-stack and to consume them by the fire which produced them without detriment to the draft or steaming qualities of the engine, but, on the contrary, effecting an improvement therein.

Another object is to maintain a constant draft on the fire, whether the engine be standing or running, whereby will not only the production of steam be greatly enhanced, but there will be constant consumption of the smoke, which will thereby be prevented escaping through the smoke-stack without choking the draft.

A further object is to utilize exhaust-steam for creating a draft toward the smoke-stack, in the usual manner, and at the same time for preventing the escape of the smoke and products of combustion through the smoke-stack, and for directing the draft created thereby back toward the fire-box of the engine.

These objects are attained by the devices illustrated in the accompanying drawings, in which—

Figure 1 represents a side elevation of so much of a locomotive as co-operates with our invention, showing devices applied thereto embodying our invention; Fig. 2, a top plan view of the same; Fig. 3, a transverse vertical section through the exhaust head and stack, and Fig. 4 a detail view of the connection between the live-steam pipe and the return draft-pipe.

Similar letters of reference indicate the same parts in the several figures of the drawings.

Referring by letter to the accompanying drawings, A indicates a locomotive-boiler of ordinary construction; B, the steam-dome thereof; C, the exhaust-head or smoke-chamber at the forward end of the boiler; D, the

smoke-stack, and E, the saddle, by means of which the smoke-stack is attached to the exhaust-head.

Within the smoke-stack and projecting down toward the exhaust-head is a deflector F, (see Fig. 3,) having the shape of a funnel or an inverted truncated cone, with its greatest diameter at the top equal to that of the smoke-stack, so as to fit snugly therein and tapering toward the lower end thereof. Obviously, however, when my invention is applied to smoke-stacks of very large diameter filling-rings or any other kind of device may be employed for reducing the diameter of the smoke-stack to receive the deflector. Immediately below this deflector and located within the exhaust-head is the nozzle or discharge end G of the exhaust-steam pipes H, which branch therefrom and lead, respectively, to the steam-chest I of the cylinders. The opening at the lower end of the deflector should be so located and proportioned with relation to the nozzle G that the exhaust-steam escaping from the nozzle will just fill the opening and thus prevent the smoke or products of combustion from the flues of the boiler entering the smoke-stack through the deflector.

The saddle illustrated in the drawings is flaring or tapering from the lower end of the smoke-stack to its point of attachment to the exhaust-head, and, in conjunction with the deflector, which tapers inwardly from above the saddle, forms an angular annular space or chamber above the mouth of the deflector, into which chamber the smoke and other products of combustion under the influence of the exhaust-steam from the nozzle will be forced, glancing along the sides of the deflector and striking against the saddle, because the escape of the exhaust-steam from the nozzle in a strong jet creates a draft in the direction of the jet, and which in the ordinarily-constructed locomotive acts in concert with the draft of the smoke-stack to draw the smoke and other products of combustion into the smoke-stack; but with my invention, while the same draft toward the smoke-stack is created, the jet of steam entirely fills the only opening to the smoke-stack—that is, through the deflector—and the escape of the products of combustion in that

direction is consequently cut off. To provide for the escape of the products of combustion from this chamber and the exhaust-head, the saddle E or the smoke-stack at a point below the attachment of the deflector is connected by two or more return draft-pipes J with the fire-box of the engine, which pipes open so as to discharge the smoke and other products of combustion either directly above the fire, as illustrated by full lines in Fig. 1, or below the fire in the ash-pan, as illustrated by dotted lines in the same figure. Obviously the draft of the fire alone would create considerable draft through these pipes, which in some cases would be all-sufficient to relieve the exhaust-head of the smoke and other products of combustion as rapidly as they accumulated therein, thus producing what might be termed a "revolving draft;" but if the draft of the fire alone is not sufficient it can be so assisted as to effectually accomplish the desired end by the employment of the short pipes K, branching from the nozzle G and opening into the stack ends of the return draft-pipes, as clearly illustrated in Fig. 3, so as to discharge therein a portion of the exhaust-steam and thus create a direct and strong draft in the pipes, operating to draw the smoke and other products of combustion into these pipes. To the same end we provide for the introduction into the return draft-pipes of live steam to be used when the engine is at a standstill and there is no exhaust-steam and comparatively little draft in the smoke-stack. This is accomplished by tapping the steam-dome with a valved pipe L, leading into the engine-cab, as illustrated in Fig. 2, which pipe preferably branches into the two lines M N, connected, respectively, with the return draft-pipes at any desirable point, either near the fire-box or near their point of attachment to the saddle or smoke-stack, as illustrated in the drawings, a convenient form of such connection being illustrated in detail in Fig. 4, which shows the steam-pipe terminating in a nozzle O within the pipe J and directing a jet of live steam along said pipe in a direction leading to the fire-box. Thus when the engine is at a standstill the engineer can open the valve in the pipe L and use live steam for maintaining a constant draft in the return-pipe for relieving the exhaust-head of the accumulating smoke and other products of combustion, and when the engine is running and while it is under way the supply of live steam may be cut off and the exhaust-steam alone utilized, as before described.

We do not desire to limit ourselves to the construction, location, or arrangement of the various elements herein illustrated and described, for obviously many different forms of pipe and other connections may be employed for accomplishing the desired result without departing from the spirit of our in-

vention, and, in fact, numerous modifications of the construction herein shown will be necessary to adapt our invention for use in connection with the many different constructions of locomotives now in use, the pipe and other connections herein shown being more in the nature of diagrammatic illustrations of the invention.

Having described our invention, what we claim, and desire to secure by Letters Patent, is—

1. In a smoke-consumer, the combination, with a locomotive boiler, fire-box, and smoke-stack, of a deflector located in and partially closing the lower end of the smoke-stack, an exhaust-steam nozzle located immediately below and discharging the exhaust-steam directly into said deflector, and return draft-pipes connecting the smoke-stack at a point below the attachment of the deflector with the fire-box, whereby the smoke and other products of combustion are prevented from entering the smoke-stack and are returned to the fire-box, substantially as described.

2. In a smoke-consumer, the combination, with a locomotive boiler, fire-box, smoke-stack, and saddle, of a deflector located in the lower end of the smoke-stack and extending down through the saddle, an exhaust-steam nozzle immediately below and discharging the exhaust-steam directly into said deflector, and return draft-pipes connecting the saddle with the fire-box, substantially as described.

3. In a smoke-consumer, the combination, with a locomotive boiler, fire-box, smoke-stack, and saddle, of a deflector attached to the lower end of the smoke-stack, an exhaust-steam nozzle immediately below and discharging the exhaust-steam directly into said deflector, return draft-pipes connecting the saddle with the fire-box, and branch pipes from the said nozzle opening into the saddle ends of the return draft-pipes, substantially as described.

4. In a smoke-consumer, the combination, with a locomotive boiler, fire-box, smoke-stack, and steam-dome, of a deflector located in the lower end of the smoke-stack, an exhaust-steam nozzle immediately below and discharging the exhaust-steam directly into said deflector, return draft-pipes connecting the smoke-stack at a point below the attachments of the deflector with the fire-box, branches from the said nozzle opening into the stack ends of the return draft-pipes, and a valve-pipe connecting the steam-dome with said return steam-pipes, respectively, at a point between the smoke-stack and the fire-box, substantially as described.

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