

(No Model.)

J. FARRELL, E. GORMAN & E. PURCELL.

DRAFT HOOD AND REGULATOR FOR LOCOMOTIVES.

No. 586,429.

Patented July 13, 1897.

Fig. 1.

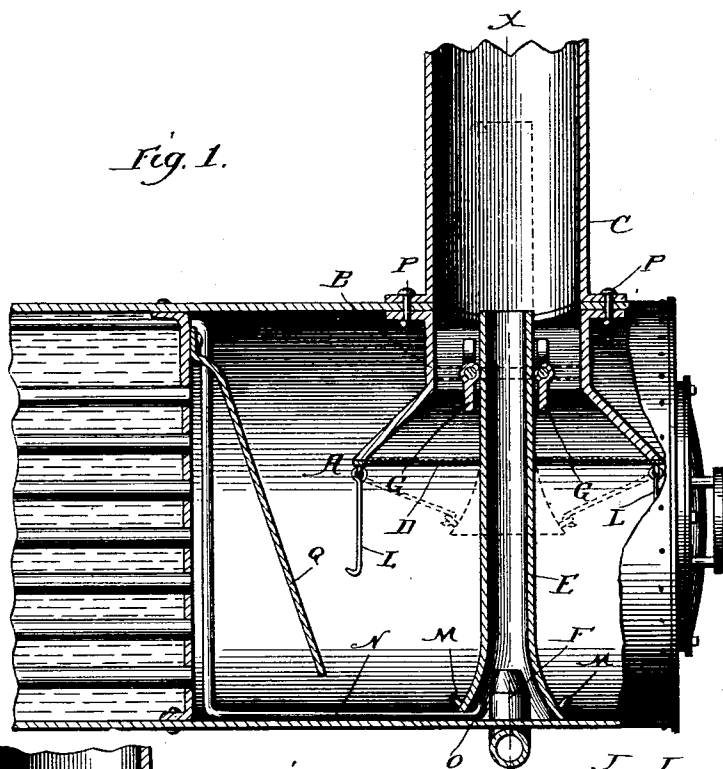


Fig. 2.

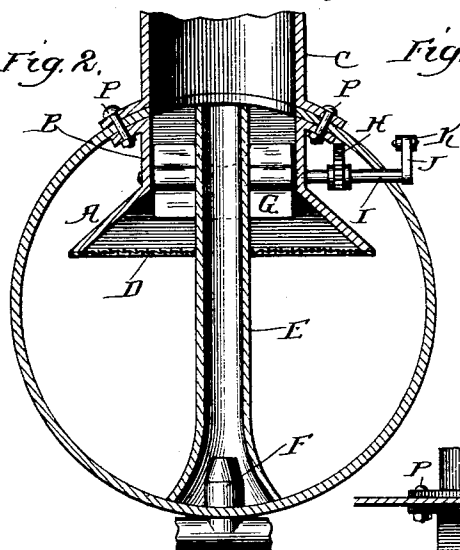


Fig. 3.

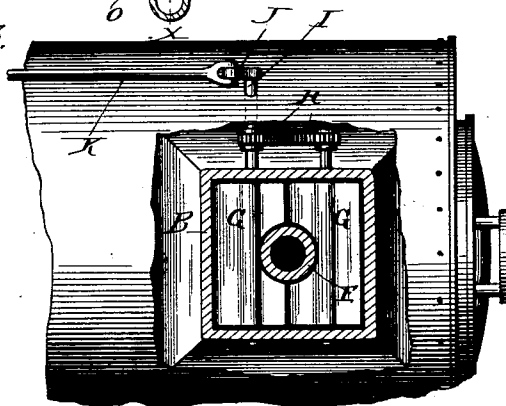
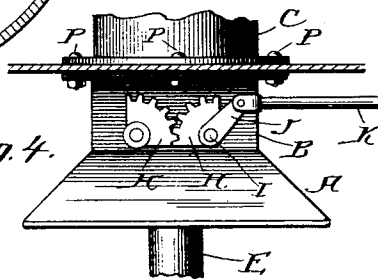


Fig. 4.



Witnesses

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# UNITED STATES PATENT OFFICE.

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## DRAFT HOOD AND REGULATOR FOR LOCOMOTIVES.

SPECIFICATION forming part of Letters Patent No. 586,429, dated July 13, 1897.

Application filed November 27, 1896. Serial No. 613,520. (No model.)

*To all whom it may concern:*

Be it known that we, JOHN FARRELL, EDWARD GORMAN, and EDWARD PURCELL, citizens of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented a certain new and useful Improvement in Draft Hoods and Regulators for Locomotives, of which the following is a specification.

Our invention relates to a new and useful improvement in draft hoods and regulators for locomotives, and has for its object to put under the control of the engineer the amount of draft exerted upon the fire irrespective of the strength of the exhaust.

Heretofore considerable loss of fuel by unnecessary combustion and by agitation has been occasioned in locomotives, since no means were provided for the regulation of the draft through the tubes and from the smoke-stack; but we entirely overcome these disadvantages by so locating the exhaust-hood as to completely inclose the exhaust-tip and providing dampers for the regulation of the passage through the smoke-stack and placing these dampers under the control of the engineer.

In order that those skilled in the art to which this invention appertains may understand how to make and use the same, its construction and operation will now be described in detail, referring to the accompanying drawings, forming a part of this specification, in which—

Figure 1 is a section of the front portion of a boiler and its smoke-chamber, illustrating the arrangement of our improvement therein; Fig. 2, a section at the line *xx* of Fig. 1; Fig. 3, a plan view of a portion of the smoke-chamber, a part thereof being broken away and the draft-hood sectioned at the line *yy* of Fig. 1; and Fig. 4, an elevation of the draft-hood, showing the devices for operating the dampers.

Within the smoke-chamber or spark-arrester A of an ordinary locomotive is secured a draft-hood B, here shown as bolted to the top of the chamber in such manner as to register with the lower end of the smoke-stack C.

This hood is flared at its lower end and covered by a screen or wire-netting D, through which passes the upper portion of the exhaust-hood E. This hood consists of a pipe of considerably less diameter than the diameter of the smoke-stack and has its lower end flared, so as to fit over the exhaust-tip F, as clearly shown in Figs. 1 and 2. Two dampers G are pivoted within the draft-hood and are of such a shape as to close around the exhaust-hood when in a horizontal position and fit the interior of the draft-hood, so as to cut off the passage of the products of combustion after the manner of an ordinary damper, and yet when these dampers are opened to the position shown in Fig. 1 a free draft may be had through the stack.

In order that the dampers may work in unison, the spindle upon which each is hinged is provided with a segmental gear H, and these gears mesh together, as shown in Fig. 4, so that when one damper is swung the other will be swung also in unison therewith. One of the spindles I of the dampers projects through the side wall of the smoke-chamber and has secured thereon an arm J, to which is pivoted the rod K, the latter extending rearward in easy reach of the engineer or fireman, so that one or the other may have control over the draft-passage in the stack.

From this description it will be seen that when a decided draft is needed in the fire-box the dampers are swung to the position shown in Fig. 1, so as to open the passage through the smoke-stack, after which the issuance of the exhaust through the upper end of the exhaust-hood will induce a draft within the smoke-stack, as is well understood; but when the necessity for a strong draft has passed the amount of draft permitted to pass through the smoke-stack, and consequently from the fire-box and through the tubes, may be regulated by the setting of the dampers, while the steam is continued to be exhausted through the stack, and, as is well known, this is of great importance, since when the proper pressure has been reached in the boiler and the locomotive is running with but little motion of its valves, and consequently with but lit-

the consumption of steam, a considerable saving of fuel will be effected by the modifying or cutting off entirely of the draft without opening the feed-door to the fire-box, thus retaining the heat within the fire-box and boiler, while holding the fire in such a condition as to substantially suspend combustion until it is necessary to again materially draw upon the steam-supply, thus necessitating an increase of combustion, which may be had by an increase of draft, brought about by the proper manipulation of the dampers.

It has heretofore been the practice to retard the generation of steam when not needed by reason of reduced consumption by opening the feed-door of the fire-box, with the obvious result of an intruding of cold air, which not only deadened the upper surface of the fire, which should at all times be kept active, but chilled the surfaces of the tubes and tube-plates to an extent which was injurious to these parts, often necessitating the reexpansion of the tubes within the plates, whereas by our arrangement these injurious effects are not permitted and the upper surface of the fire-bed is always maintained in a live and active condition, so that when it is again needed for an increase in the generation of steam it is only necessary to increase the draft therethrough. Another advantage has been observed by the use of this invention, which consists in preventing an undue suction within certain tubes and more evenly distributing the draft within the smoke-chamber, so as to prevent the drawing forward of the smaller particles of fuel from the fire-bed, thus preventing the injurious disturbance of said bed.

For convenience in cleaning the smoke-chamber the exhaust-hood E is arranged so that it may be readily slid upward to the position shown in dotted lines in Fig. 1, where it may be temporarily secured by means of the hooks L, which are adapted to engage with the eyes M, and when the exhaust-hood is in this position free access can be had to the smoke-chamber for cleaning purposes.

It is essential that means be provided for the injection of live steam within the exhaust-hood for the maintaining of a draft to assist in starting the fire, and this we provide for by running the pipe N from the upper portion of the boiler to within close proximity to the exhaust-tip F and providing said pipe with an upturned tip O, so that when steam is permitted to pass therethrough it will be projected upward through the exhaust-hood into the stack, thereby creating the desired draft. A notch is formed in the lower edge of the exhaust-hood, so as to permit it to embrace the pipe N in seating upon the bottom of the smoke-chamber.

In securing the draft-hood within the smoke-chamber we prefer to remove four of

the rivets, which are utilized for the securing of the stack in place, and pass through the holes previously occupied by said rivets the bolts P, which are of sufficient length to pass through the flange of the draft-hood, when nuts are run upon their lower ends, as clearly shown.

In practice from ten to twenty-five per cent. of the fuel now used in a locomotive will be saved, since its combustion is so regulated as to maintain the proper pressure within the boiler and not permit the waste of steam by the blowing off of the safety-valve, and the advantages of our improvement will be especially noticeable in its application to locomotives which make frequent stops, as the engineer has only to close the dampers just prior to shutting off the steam to maintain the previous pressure in the boiler.

Another advantage gained by our improvement is that when the fire is to be fed the dampers may be closed before opening the feed-door, thus retaining the hot gases within the fire-box, tubes, and smoke-chamber and preventing an intruding of cold air during the process of feeding. This, as before described, will prevent the chilling of the surfaces of the boiler as well as the falling of the steam-pressure, thereby saving both fuel and annoyance in having to again raise the boiler-pressure.

A baffle-plate Q is so located as to deflect the products of combustion in their course toward the stack, which will assist in maintaining an equal suction in all of the tubes as well as precipitating the sparks to the bottom of the smoke-chamber.

Having thus fully described our invention, what we claim as new and useful is—

1. In combination with a locomotive-boiler, a draft-hood located within the smoke-chamber and registering with the lower end of the smoke-stack, an exhaust-hood projecting within the draft-hood, and dampers for closing the passage to the smoke-stack around the exhaust-hood, as specified.

2. In combination, a draft-hood secured within the smoke-chamber, an exhaust-hood projecting through said draft-hood and completely surrounding the exhaust-tip, dampers located in the draft-hood so as to regulate the passage therethrough, and means for operating said dampers from the cab of the locomotive, substantially as and for the purpose set forth.

3. In combination with the smoke-chamber of a locomotive-boiler, a draft-hood secured therein so as to register with the smoke-stack, an exhaust-hood projecting through said draft-hood and completely surrounding the exhaust-tip, dampers arranged within the draft-hood so as to regulate the passage therethrough, means for causing the dampers to move in unison, a rod so connected to the

dampers and passing to the cab as to permit the manipulation thereof by the engineer, a screen covering the lower portion of the draft-hood, a live-steam pipe leading to the lower  
5 portion of the exhaust-hood, and means for holding the exhaust-hood in an elevated position for cleaning the smoke-chamber, substantially as shown and described.

In testimony whereof we have hereunto

affixed our signatures in the presence of two or subscribing witnesses.

JOHN FARRELL.  
EDWARD GORMAN.  
EDWARD PURCELL.

Witnesses:

S. S. WILLIAMSON,  
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