

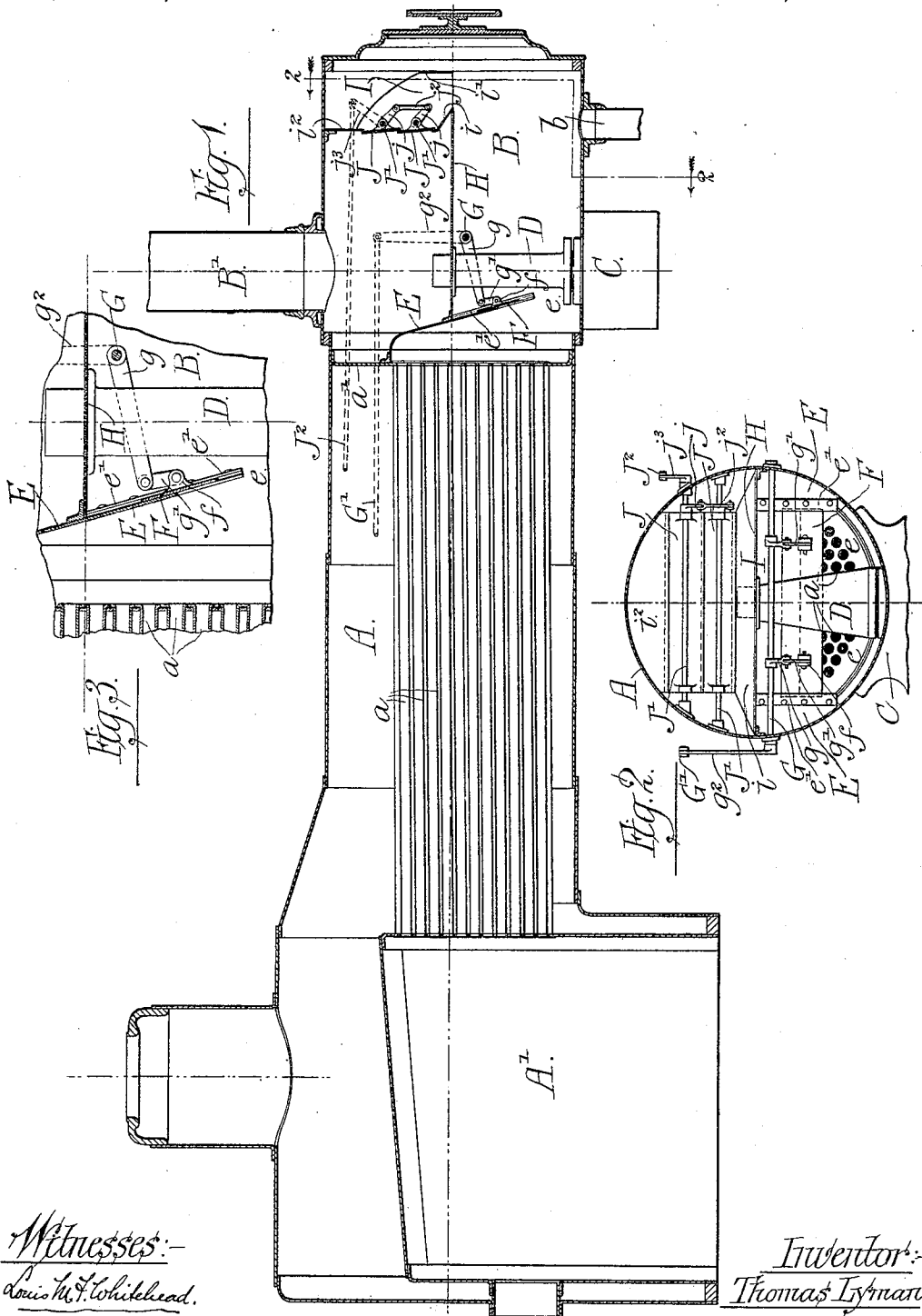
(No Model.)

T. LYMAN.

DRAFT REGULATOR AND SPARK ARRESTER.

No. 461,585.

Patented Oct. 20, 1891.



UNITED STATES PATENT OFFICE.

THOMAS LYMAN, OF BLOOMINGTON, ILLINOIS.

DRAFT-REGULATOR AND SPARK-ARRESTER.

SPECIFICATION forming part of Letters Patent No. 461,585, dated October 20, 1891.

Application filed June 23, 1891. Serial No. 397,182. (No model.)

To all whom it may concern:

Be it known that I, THOMAS LYMAN, of Bloomington, in the county of McLean and State of Illinois, have invented certain new and useful Improvements in a Combined Draft-Regulator and Spark-Arrester; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to a combined draft-regulator and spark-arrester for locomotives, and has for its objects to provide a simple and efficient means for regulating the draft and for preventing at will the discharge of sparks and cinders through the stack, said means being under the control of the engineer, and being adapted to cause, when desired, the discharge of the cinders which may accumulate in the smoke-box.

To these ends the invention consists in certain novel features, which will now be described, and then be specifically pointed out in the appended claims.

In the accompanying drawings, Figure 1 is a central longitudinal vertical section of a locomotive-boiler, fire-box, and smoke-box embodying my invention. Fig. 2 is a transverse sectional view of the same, taken on the line 2 2 of Fig. 1 and looking in the direction of the arrows. Fig. 3 is an enlarged detail view of a portion of Fig. 1.

In the said drawings, A represents the boiler of a locomotive, A' the fire-box, and B the smoke-box. The flues *a* extend from the fire-box through the boiler to the smoke-box in the usual manner, and the smoke-box is provided with the usual stack B', cylinder-saddle C, and exhaust-nozzle D. These parts may be of any approved construction.

E represents a diaphragm attached at its upper rear edge to the flue-sheet *a'* above the flues *a*. This diaphragm extends first horizontally forward a short distance and then downward and slightly forward in an inclined direction almost but not quite to the bottom of the smoke-box, its lateral margins being attached to the side walls of the smoke-box in any suitable manner. The lower portion of this diaphragm is cut away to form an en-

larged passage *e* for the products of combustion, and the said passage is controlled by an adjustable apron or slide F of a shape corresponding to that of the diaphragm E, which in this instance is rectangular and of a size somewhat larger than said cut-away portion, so as to overlap the edges thereof and rest upon the body of said diaphragm at its side and top margins. The diaphragm is provided with guide-stops *e'* to guide the apron F and hold the same in position against the diaphragm. The position of the apron F is controlled by the following mechanism:

G is a transverse rock-shaft mounted in suitable bearings on the smoke-box and provided with arms *g*, which are connected with the apron F, near the ends thereof, by means of links *g'*, pivoted to the free ends of said arms *g* and to lugs *f* on the front of the apron F. One of the ends of the rock-shaft G is extended outside of the smoke-box B, and has secured to it an arm *g''*, to which is connected a rod G', extending rearward to the cab and there operated by means of a hand-grip, lever, or other suitable device.

H represents a horizontal netting attached at its rear edge to the diaphragm E and extending thence longitudinally forward almost but not quite to the front end of the smoke-box and laterally from side to side of the same, the exhaust-nozzle D passing up through and terminating above this netting, as is usual in structures of this character.

From the forward edge of the netting H, which is preferably from ten to twelve inches rearward from the front of the smoke-box, there extends rearward and upward a plate *i*, which, in conjunction with diagonal or flaring side plates *i' i'* and a vertical transverse top plate *i''*, forms a chute I, the lower front mouth of which is formed by the space between the front end of the netting H and the front end of the smoke-box. The upper rear mouth of this chute is controlled by a suitable valve mechanism, the form which I prefer for this purpose being that shown in the drawings, which consists of two overlapping shutters or dampers J J, mounted on parallel transverse rock-shafts J' J', having suitable bearings on the smoke-box. The rock-shafts J' are each provided with an arm *j*, said arms

being connected by a link j^2 , so as to cause the two rock-shafts J' to move in unison. One of said rock-shafts J' is extended outward beyond the smoke-box, where it has secured to it an arm j^3 , to which is connected a rod J^2 , which extends rearward to the cab, where it may be operated in any suitable manner, as by a lever or handle.

The smoke-box is provided with the usual discharge-aperture b for the cinders.

The operation of these devices is as follows: By reason of the partial vacuum formed in the smoke-box by the exhaust-nozzle D the products of combustion are drawn from the fire-box A' through the flues a into the smoke-box B , being deflected and diverted downward toward the bottom of the smoke-box by the diaphragm E and apron F . The cinders are by reason of this deflection and of the eddies incidentally formed as a result of the same deposited on the floor of the smoke-box, being prevented from passing out through the stack by the netting H and by the shutters J , which latter are normally closed, as shown. It will be seen that the draft which is caused by the suction due to the exhaust-nozzle may be regulated in an efficient and simple manner by increasing or diminishing the size of the passage e through the medium of the apron F and its operating mechanism. This passage is, however, never entirely closed, so that there is always a sufficient escape for the products of combustion, while all the necessary draft-regulation is amply provided for.

When it is desired to discharge the cinders which may have accumulated in the smoke-box, this may be done, when desirable or necessary, by discharging them through the stack. To accomplish this the shutters J are opened through the medium of the operating devices provided for that purpose, when the action of the exhaust-nozzle will draw the cinders upward through the chute I into that portion of the space within the smoke-box above the netting H and will discharge them thence through the stack. Provision is thus made for "blowing out" the smoke-box while the locomotive is in motion, the necessity of this operation arising when cinders accumulate in the smoke-box to such an extent as to materially interfere with the draft, while at the same time it is inadvisable or impossible to stop the engine for the purpose of cleaning out the smoke-box in the usual manner. When the locomotive

is at rest, the box may be cleared of cinders in the ordinary way through the aperture b .

What I claim is—

1. The combination, with the smoke-box of a locomotive, of a diaphragm extending from the flue-sheet at a point above the flues downward and forward toward the bottom of the smoke-box and being cut away at its lower margin, an apron mounted to slide on said diaphragm and adapted to be projected beyond said lower margin thereof over the cut-away portion to close the passage between the lower margin and the bottom of the smoke-box, means for operating said apron, a transverse longitudinal netting extending almost to the front of the smoke-box, a chute forming a by-pass around the front end of the netting, and suitable valve mechanism controlling said chute, substantially as described.

2. The combination, with a locomotive smoke-box, of a diaphragm attached at its rear upper margin to the flue-sheet above the flues and extending downwardly and forwardly, a transverse netting extending from said diaphragm almost to the front of the smoke-box, a chute forming a by-pass around the front end of the netting, and a valve mechanism controlling said chute, substantially as described.

3. The combination, with the smoke-box of a locomotive, of a downwardly and forwardly inclined diaphragm attached at its rear upper margin to the flue-sheet above the flues, a transverse netting extending almost to the front of the smoke-box, a chute extending rearwardly and upwardly from the space formed between the netting and the smoke-box front, and a valve mechanism controlling said chute, substantially as described.

4. The combination, with the smoke-box of a locomotive, of a diaphragm extending from the flue-sheet at a point above the flues downward and forward to a point slightly back of the front end of the netting, a plate connecting the front end of the netting and the smoke-box, a valve located therein, and means for operating said valve, substantially as described.

In testimony that I claim the foregoing as my invention I affix my signature in presence of two witnesses.

THOMAS LYMAN.

Witnesses:

C. CLARENCE POOLE,
IRVINE MILLER.