

S. A. HODGMAN.
Locomotive-Boilers.

No. 156,570.

Patented Nov. 3, 1874.

FTGL.

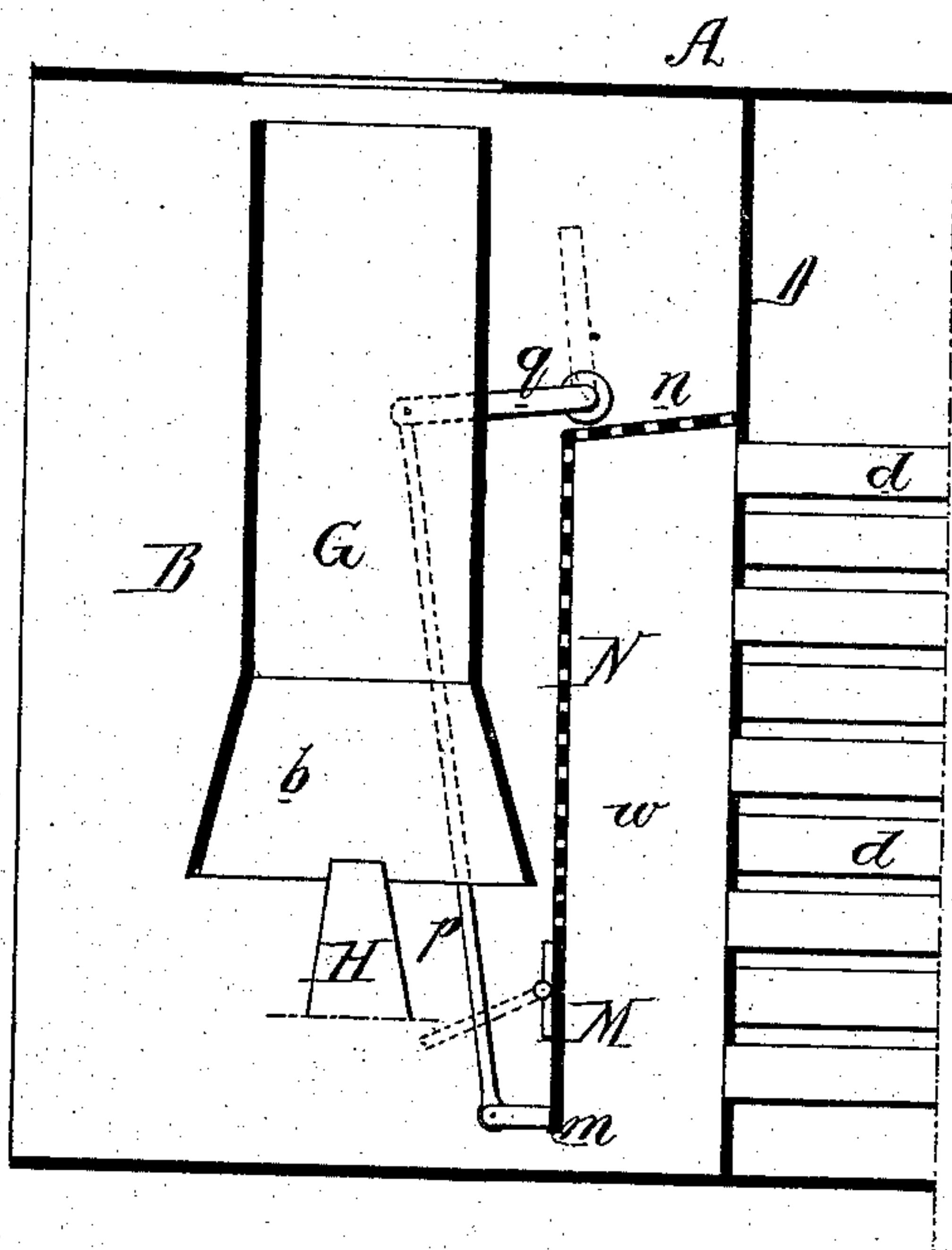
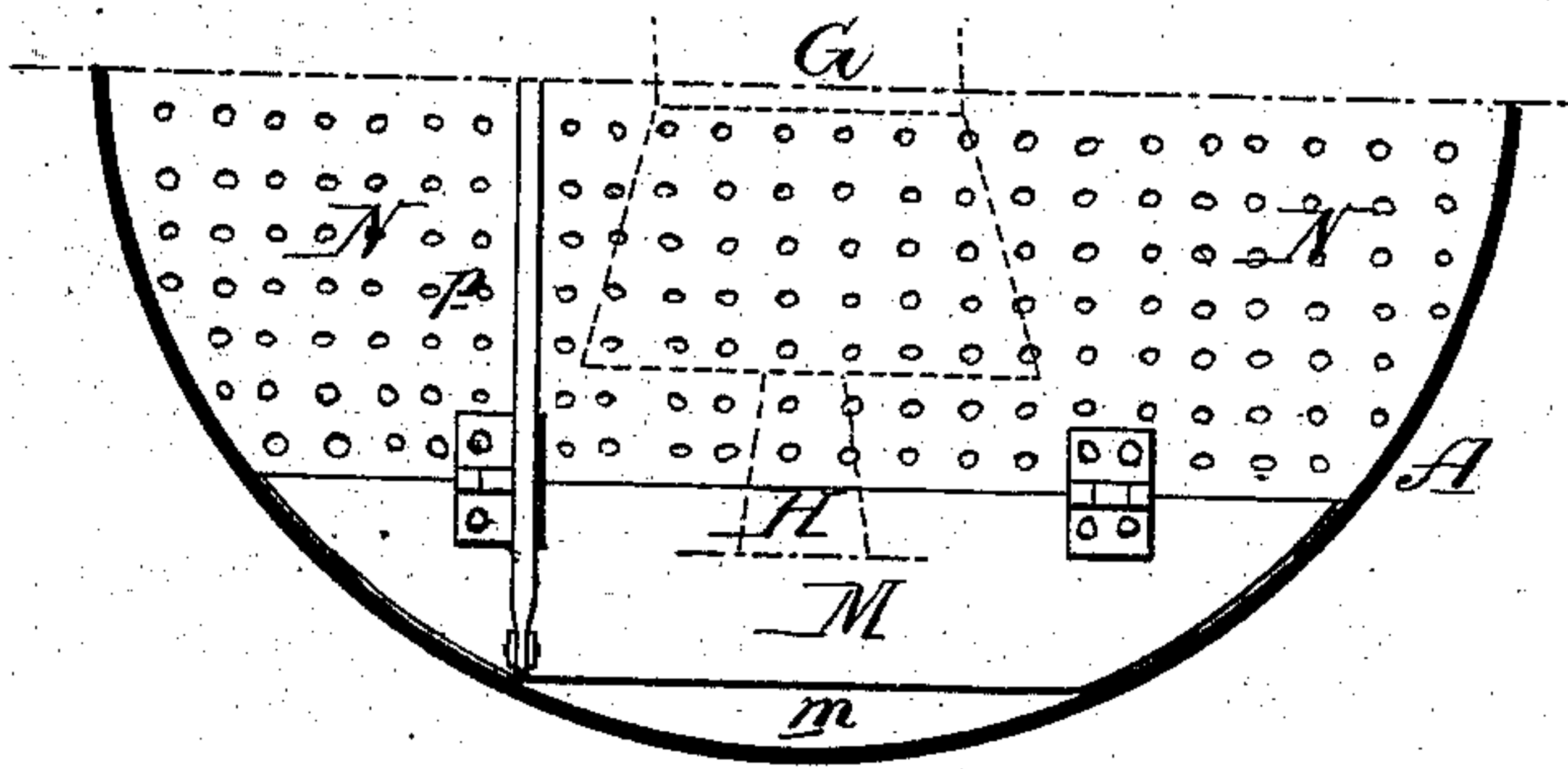


FIG. 2.



witnesses, Harry Smith.
Thomas Milvain

S. A. Hodgman
by his Attor.
Harrison & Son

UNITED STATES PATENT OFFICE.

STILLMAN A. HODGMAN, OF WILMINGTON, DELAWARE, ASSIGNOR TO HIMSELF, ASA O. DENIO, AND EDWARD RUSHTON, OF SAME PLACE.

IMPROVEMENT IN LOCOMOTIVE-BOILERS.

Specification forming part of Letters Patent No. **156,570**, dated November 3, 1874; application filed October 15, 1874.

To all whom it may concern:

Be it known that I, STILLMAN A. HODGMAN, of Wilmington, New Castle county, Delaware, have certain Improvements in Locomotive-Boilers, of which the following is a specification:

The object of my invention is to neutralize the detrimental effect of the violent intermittent discharge of exhaust steam into the chimneys of locomotives, these effects being, first, a waste of fuel amounting to nearly fifty-five per cent., caused by the too rapid passage of the products of combustion through the tubes, and by the premature escape of unconsumed fuel in the condition of gases and ignited sparks; second, the disturbing, or, as it is technically termed, the "drawing" of the fire, and interfering with proper and economical combustion of fuel; and, third, the injurious cutting effect which particles of fuel in rapid motion have on the fire-box and tubes.

Figure 1 in the accompanying drawing is a longitudinal section of the smoke-box end of a locomotive-boiler with my improvements; and Fig. 2, a transverse section of the lower portion of Fig. 1.

A represents the outer shell of the boiler; B, the smoke-box; D, the tube-sheet; *d*, the tubes; G, the petticoat or draft-pipe, having a flaring lower end, *b*, and H the nozzle through which the exhaust steam escapes into the said draft-pipe, and thence into the chimney.

Between the draft-pipe and the tube-sheet is a permanent perforated or wire-gauze screen, N, extending above the upper row of tubes, and united in the tube-sheet by an extension, *n*. The screen terminates below at such a point as to leave a segmental opening, *m*, which forms a direct communication between the smoke-box and the chamber *w* within the screen. To the lower end of the screen is hinged a damper, M, connected by a rod, *p*, to an arm, *q*, which is under the control of the engineer. The damper does not extend downward to the shell of the boiler, for there must always be an open space beneath the lower edge of the said damper for the escape of the sparks as fast as they fall to the bottom of the chamber *w*.

The aggregate area of the perforations in the screen should be much less than the aggregate area of all the tubes, so that the said screen may serve, by checking the draft through the tubes, to obviate the detrimental effects of the violent pulsations of steam above alluded to. It should always be within the power of the engineer, however, to increase the area for the escape of the products of combustion into the smoke-box; hence, the damper M, which can be raised or lowered, as circumstances may suggest to the judgment of the engineer.

Different extents of opening for the escape of the products of combustion are required by different conditions of the fuel in the fire-box, or by the different amounts of duty which the engine has to perform—on starting the engine, for instance, or when it has to ascend or descend steep grades—but under all circumstances there should be an avenue for the free escape of the sparks which fall to the bottom of the chamber *w*, so that the lower tubes may be always clear of obstruction. The draft-pipe too, should be conveniently situated for receiving the sparks. These requirements are fully complied with, as Fig. 1 of the drawing will clearly demonstrate.

Whatever may be the position of the damper, the force of the exhaust steam will always induce the sparks to leave the chamber *w*, and make their way to the flaring end of the draft-pipe, up which and through the chimney they will be forcibly impelled.

I do not claim a perforated screen intervening between the tube-plate and exhaust-pipe of a locomotive-boiler, but—

I claim as my invention—

The combination in a locomotive smoke-box of the permanent perforated screen N, the damper M hinged to the lower edge of the screen, and controlled by the engineer, the opening below the damper, and the draft-pipe G, all as set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

S. A. HODGMAN.

Witnesses:

H. S. TRUITT,
JAMES M. WATSON.