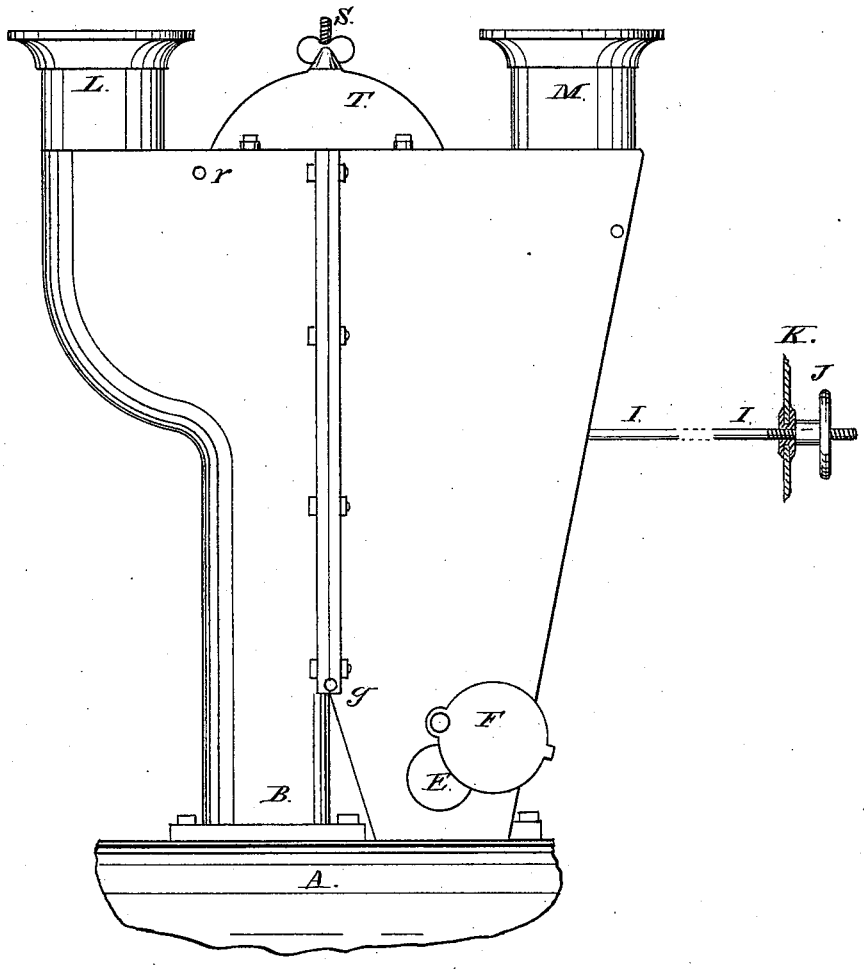
2 Sheets—Sheet 1.

W. M. & A. C. WETHERILL & O. REID.

Locomotive Smoke-Stacks.

No. 212,291. **Patented Feb. 11, 1879.**

Fig. 1.



Attest:
Geo. H. Knight.
Walter Allen

Inventors:
William M. Wetherill
Alex. C. Wetherill
Oscar Reid
By Knight Bros.
Attys.

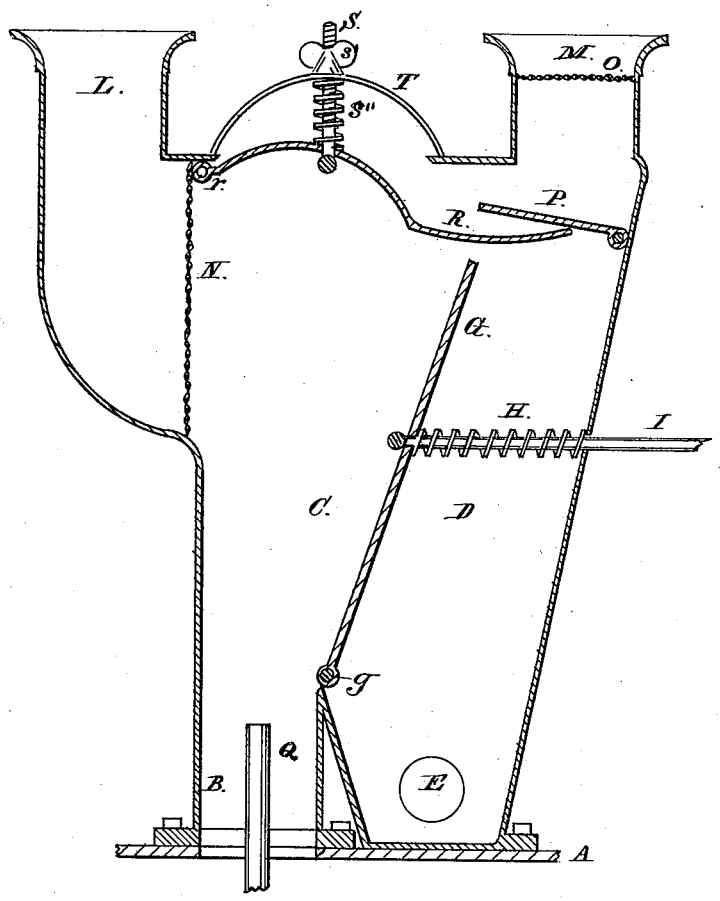
2 Sheets—Sheet 2.

W. M. & A. C. WETHERILL & O. REID.

Locomotive Smoke-Stacks.

No. 212,291. Patented Feb. 11, 1879.

Fig. 2.



Attest:
Geo. H. Knight.
Walter Allen

Inventors:
William M. Wetherill
Alex. C. Wetherill
Oscar Reid
By Knight Bros.
Attys.

UNITED STATES PATENT OFFICE.

WILLIAM M. WETHERILL, ALEXANDER C. WETHERILL, AND OSCAR REID, OF ST. LOUIS, MISSOURI.

IMPROVEMENT IN LOCOMOTIVE SMOKE-STACKS.

Specification forming part of Letters Patent No. **212,291**, dated February 11, 1879; application filed September 20, 1878.

To all whom it may concern:

Be it known that we, WILLIAM M. WETHERILL, ALEX. C. WETHERILL, and OSCAR REID, all of the city of St. Louis, in the State of Missouri, have invented a new and useful Improvement in Locomotive Smoke-Stacks, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification.

Our improvement relates to a smoke-stack having a cinder-box and two vents for the smoke, one of which is shut off by the pressure of the steam-jet when the locomotive is running.

Our improvement consists in the general construction of the stack, as shown, and in the adjustable dampers by which the course of the smoke and capacity of the smoke-chamber are regulated.

In the drawings, Figure 1 is a side elevation. Fig. 2 is a longitudinal section.

A is a portion of the top of the smoke-box of a locomotive. B is the lower portion of the smoke-stack in communication with the smoke-box. The flue B leads into the smoke-chamber C. At the rear of the smoke-chamber C is the cinder-box D for the collection of cinders. The cinders may be discharged through the orifices E, closed ordinarily by caps F. G is a damper or adjustable partition between the smoke-chamber C and the cinder-box D. This damper has capacity for oscillation on the hinge *g* at its lower end, and its position is regulated by a spring, H, thrusting it forward, and a rod, I, around which the spring is coiled, and which extends through the rear side of the cinder-box to the cab of the locomotive, where it has upon it a wheel-nut, J, having bearing against the front wall K of the cab, so that the position of the damper may be regulated by turning the screw-wheel J. L is the front exit of the smoke-stack, and M is the rear exit. N is a wire-gauze placed across the flue to check the escape of cinders from the exit L. The exit M is also provided with gauze O for a similar purpose. The exit L is continually open, permitting the escape of smoke; but when the locomotive is running at ordinary speed the exit M is closed by a valve or damper, P, by the pressure of the exhaust-steam pipe Q. The pressure acts upon the valve P directly, and also acts upon the deflector R, hinged at *r*, and whose end is beneath the valve or damper P. The position of the deflector R when the locomotive is not running is regulated by a screw-rod, S, which passes up through the cap T, and carries a nut, *s*. The rod S is surrounded between the cap and the deflector by a spiral spring, *s''*, tending to hold it in its lower position, but yielding to the pressure of the steam-jet when the locomotive is running, so that then the deflector R is raised and the damper P closed, and at such time the exit of smoke is altogether through L. When the engine is not running, the deflector R and damper P open by their own weight and by the effect of spring *s''* upon the deflector R, and the smoke finds exit through M in addition to L, so that the draft of the fire continues good while the engine is at rest, owing to the increased vent. The capacity of the smoke-chamber C is regulated by the position of the adjustable partition G, which fits the sides and bottom of the chamber, but does not reach the deflector R at its upper end, so that the smoke passes freely over the top of the partition into the cinder-chamber D, where the cinders settle, and are discharged from time to time through the orifices E.

An important advantage secured by our device is that the smoke has means of escape from both chimneys when the engine is standing, so that the fire continues to burn with sufficient energy at that time; but when the engine is running and the steam-jet is in operation the rear jet is partially or fully closed, so as to give the cinders opportunity to subside into the rear chamber. The dampers or valves P R automatically accomplish the above result, and they are made adjustable by the spring S' and nut *s* on the screw-rod S.

The purpose and advantages of the adjustable partition G have already been indicated. Owing to the varieties of fuel used and the varying force of the steam-jet it is considered desirable to have means for the adjustment of the capacity of the smoke-chamber C. This

means is supplied by the partition G. Thus the size of the smoke-chamber is made to suit the amount of the products of combustion escaping from the fire, in addition to which the partition forms a deflector by which the action of the jet upon the valve P may be regulated, so that the valve P is kept wholly closed when the engine is running, or is only closed by each jet and allowed to open slightly between the jets.

We are aware that spark-arresters have been constructed where the smoke-stack is, at the top, in communication with a reservoir parallel thereto, said reservoir being adapted to receive the sparks and prevent their egress by means of deflecting-plates; such we do not claim; but

What we do claim, and desire to secure by Letters Patent, is—

1. A smoke-stack for locomotives having a smoke-chamber, C, and a cinder-chamber, D, formed by the internal partition G, oscillating on hinge *g*, and adjusted in position through the spring H and rod I, substantially as set forth.

2. The combination, in a locomotive smoke-stack, with the adjustable partition G, hinged at its lower end to oscillate in a horizontally-angular direction, of the spring H and adjusting-rod I, substantially as set forth.

3. The combination, in a locomotive smoke-stack, of the two exits L and M, hinged deflector R, and damper P, closing exit M by the pressure of steam from the steam-exhaust pipe, as set forth.

4. The combination, in a stack having two exits, with the damper P, of the adjustable deflector R, closing exit M by the pressure of steam from the steam-exhaust pipe, substantially as set forth.

5. The combination, in a locomotive smoke-stack, of the two exits L and M, chambers C and D, adjustable partition G, adjustable spring-deflector R, and damper P, substantially as set forth.

Witness our hands at St. Louis, Missouri, this 16th day of September, 1878.

WILLIAM M. WETHERILL.
ALEX. C. WETHERILL.
OSCAR REID.

Witnesses:
SAML. KNIGHT,
GEO. H. KNIGHT.