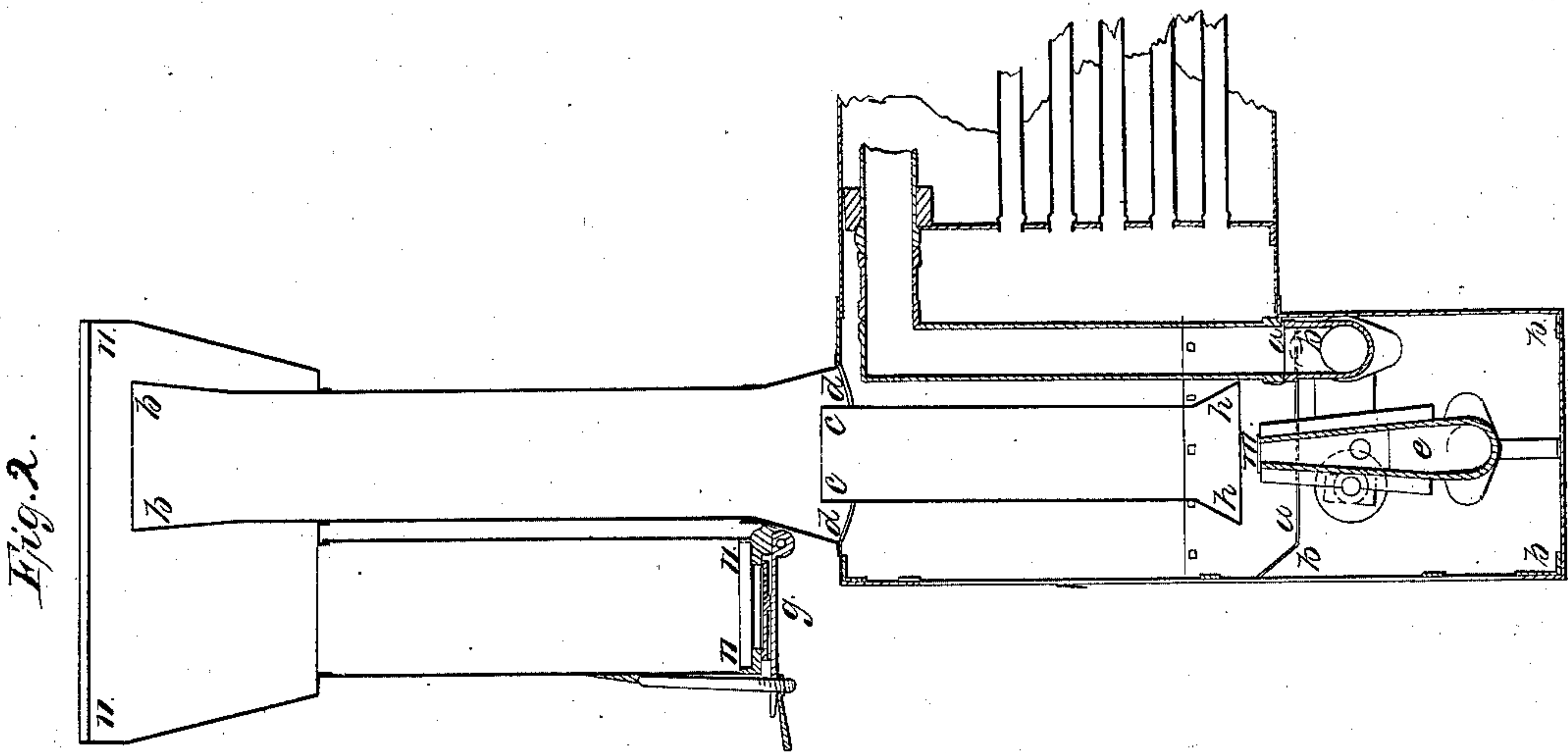
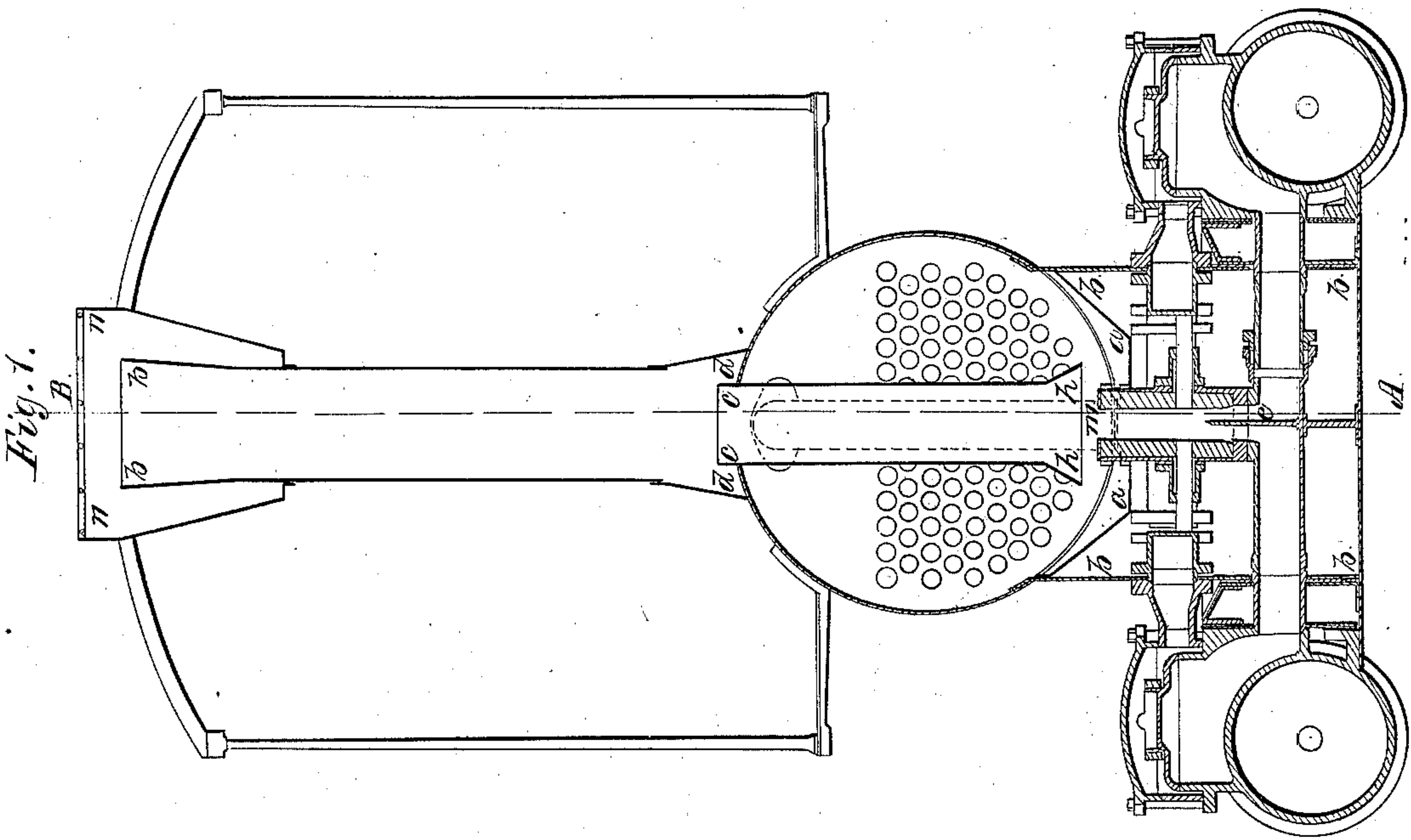


R. Winans,

Exhaust Mechanism for Locomotives.

N^o 21,290.

Patented Aug. 24, 1858.



UNITED STATES PATENT OFFICE.

ROSS WINANS, OF BALTIMORE, MARYLAND.

LOCOMOTIVE-ENGINE.

Specification of Letters Patent No. 21,290, dated August 24, 1858.

To all whom it may concern:

Be it known that I, ROSS WINANS, of the city of Baltimore, in the State of Maryland, have invented a new and useful Improvement in the Construction of Locomotive-Engines, particularly applicable to those having tubular boilers heated by anthracite or bituminous coal; and I do hereby declare that the following is a full, clear, and exact description of my said invention, reference being had to the accompanying drawing, forming part of this specification, in which—

Figure 1, represents a vertical transverse section of the smoke-box and appurtenances of a locomotive engine constructed according to the principle of my invention, and Fig. 2 represents a vertical longitudinal section of the same at the line A B of Fig. 1.

To maintain a sufficiently active combustion of the fuel in such locomotives, it is necessary to create a strong draft by the action of the exhaust steam. By this draft fine particles of coal and cinder are carried from the furnace through the tubes of the boiler into the smoke-box where the draft slackens and they fall to the bottom and accumulate and their accumulation obstructs the draft of the lower flues; besides, the slow combustion which such accumulated particles frequently undergo, injures, by the heat evolved, the steam-pipes, exhaust-pipes and other adjacent parts of the engine. Such an accumulation of coal and cinder in the smoke-box is therefore evidence of a serious defect in its plan of construction.

The main object of my invention is to remedy this among other defects and I accomplish this object by extending a pipe, somewhat more than half the diameter of the base of the chimney, from within the base of the chimney down into the smoke-box to about the level of the lower flues, and placing a concave diaphragm across the smoke-box a few inches below the pendent pipe and arranging the nozzle of the exhaust pipe to extend through the lowest part of this diaphragm and direct a jet of steam up the pendent pipe.

When the particles of coal and cinder enter the smoke-box with the gases, the coarser and heavier portions of them fall down upon the diaphragm whence they are drawn, by the force of the draft, into the pendent pipe, carried up the chimney and discharged at its top into the spark arrester which separates them from the gases and

collects them in a suitable receptacle provided for the purpose until it may be convenient to discharge them. By thus bringing the pendent pipe near the diaphragm or bottom upon which the particles of coal and cinder drop, the draft is made to act upon these particles with the requisite force for carrying them into the chimney without unduly increasing the intensity of the jet by contracting the orifice of the exhaust-nozzle and thereby impeding too much the passage of the exhaust steam from the engine.

To bring the particles of coal and cinder still more effectually within the power of the draft, the diaphragm, upon which the particles of coal and cinder drop, is made to incline or slope toward the exhaust nozzle to cause the particles to run down by their own weight immediately under and about the lower end of the pendent pipe, so that the current of the draft cannot enter the pipe without catching them and sweeping them along with it.

In the example represented in the accompanying drawing, the smoke-box has a diaphragm *a b* extending across it a little below the level of the lower tubes of the boiler and about four inches below the lower end of the blast-pipe. The exhaust-nozzle *m* extends through the diaphragm and directs its jet into the blast-pipe. This exhaust-nozzle is of the variable variety, that is to say, it is constructed in such manner that the size of its orifice can be changed at will by the engine-man to increase or diminish the intensity of the jet of steam and correspondingly to vary the draft. As however this form of exhaust, which was devised by me and heretofore patented, is well known to locomotive builders, I do not deem it necessary to describe it more particularly.

The pendent blast-pipe *c c h h* over the nozzle of the exhaust-pipe, extends upward from near the bottom of the smoke-box and enters the lower end of the chimney. The lower end *h h* of the blast-pipe is enlarged by making it flaring or bell-mouthed: the lower end of the chimney is also enlarged, in a similar manner, having an annular space *d d* surrounding the upper end of the blast-pipe, through which the draft can enter the chimney direct from the upper part of the smoke-box. The chimney is surmounted by a spark arrester and has a receptacle, *n n n n*, connected with it to receive the sparks or particles of coal intercepted by

the screen of the spark-arrester. This receptacle for sparks is fitted, at its lower extremity, with a door, *g*, through which the accumulated particles may be removed from
5 time to time when the engine is stopped and as this receptacle is deep and closed at its lower end to prevent the entrance of air, the sparks are speedily extinguished from a want of air to burn them.

10 I do not limit myself to the precise form and construction of the parts which I have described as these may be varied without affecting the principle of my invention, but

What I claim as my invention and desire
15 to secure by Letters Patent is,

1. The combination with the smoke-box of a locomotive steam engine, of a blast-pipe extending from within the lower end of the chimney downward to near the lower
20 flues; an annular space between the upper

end of the blast-pipe and the chimney; a diaphragm near the lower end of the blast-pipe and between the latter and the bottom of the smoke-box, and a nozzle directing a
jet of steam into the blast-pipe; the several 25 elements of the combination being arranged and operating substantially as described.

2. I also claim the construction of the diaphragm with its upper surface sloping toward the exhaust-nozzle, to cause the coals 30 and cinders to run down by their own gravity beneath the blast-pipe, thereby bringing them within the sweep of the draft and so rendering their discharge more speedy and more certain.

ROSS WINANS.

Witnesses:

GEO. A. LEPPER,
JOHN I. SNYDER.