D. HARRIGAN.

Exhaust-Pipe for Locomotives.

No. 217,458. Patented July 15, 1879.

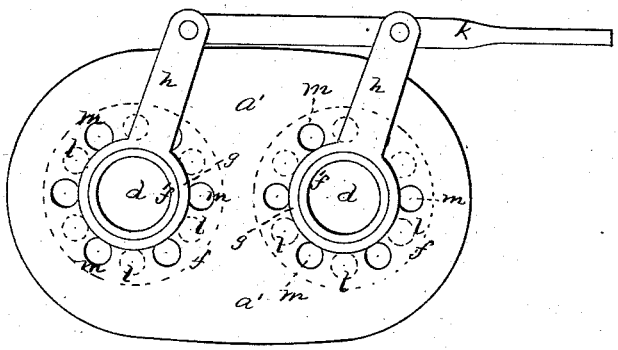

Fig. 1.

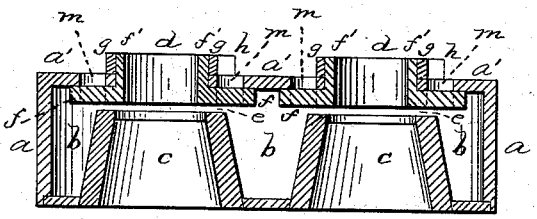

Fig. 2

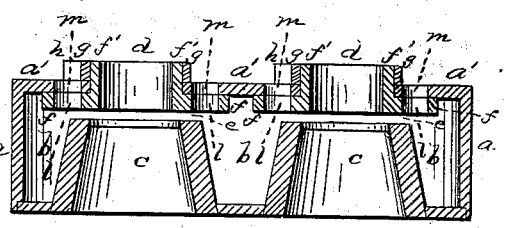

Fig. 3.

WITNESSES

Jas. M. Reed Jr.

L. B. M. Williams

Dennis Harrigan. INVENTOR

By his Attys.

Henry W. Williams & Co

UNITED STATES PATENT OFFICE.

DENNIS HARRIGAN, OF SOMERVILLE, MASSACHUSETTS, ASSIGNOR OF ONE-HALF HIS RIGHT TO JOHN F. CROCKETT, OF LACONIA, NEW HAMPSHIRE.

IMPROVEMENT IN EXHAUST-PIPES FOR LOCOMOTIVES.

Specification forming part of Letters Patent No. **217,458**, dated July 15, 1879; application filed December 20, 1878.

To all whom it may concern:

Be it known that I, DENNIS HARRIGAN, of Somerville, in the county of Middlesex and State of Massachusetts, have invented a new and useful Improvement in Exhaust-Pipes for Locomotives, of which the following is a specification.

This invention is an improvement more especially on the exhaust-pipe patented January 23, 1877, by James C. Farmer; and it consists in removing the tip or nozzle from said pipe, and applying a rotating disk provided with openings which are coincident or not, according to the position of the disk, with corresponding openings in the top of the pipe around the main passage.

By this means an extremely practical variable exhaust is produced, very simple in construction, affording no space for the collection of ashes, &c., and still retaining the advantages of the "relief-chamber."

The object of a variable exhaust is so well understood as to require no explanation here.

In the accompanying drawings, Figure 1 is a plan view of a pair of exhausts placed in a common chamber. The dotted lines show the shape of the disks. Fig. 2 is a longitudinal vertical section of the same, the disks being in a position to close the holes in the top of the exhaust, and thus drive the fire, the dead steam being obliged to pass through the central passages. Fig. 3 is a longitudinal vertical section of the same in the opposite position of Fig. 2.

Similar letters of reference indicate corresponding parts.

a represents the sides, and *a'* the top, of the chamber *b*. *c c* are the cones through which the steam enters, a space, *e*, being left to allow it to pass into the chamber *b*. *d d* are the direct central openings through which the mass of the steam passes out and creates the desired draft. Thus far there is nothing new in itself considered in the exhaust. In order to make this exhaust a variable one, I have added the following improvements, viz: the flat circular disks *f*, placed directly beneath the top *a'*, and surrounding the openings *d*. The disks *f* extend up (*f'*) into and around the inner edges of said openings *d*, and, by means of the levers *h* (the inner ends *g* of which are fixed to the parts *f'* of the disks) and the connecting-rod *k*, are rotated by the engineer.

The disks are provided with openings *l*, and the tops *a'* of the exhaust with corresponding openings *m*.

To create a strong blast, rotate the disk into the position shown in Figs. 1 and 2, so that the steam is all driven through the central openings, *d*. To lessen the draft, rotate the disks into the position shown in Fig. 3, so that the openings *l m* coincide and allow some of the steam to pass through them.

Of course I am aware that variable exhausts having coincident openings in the cones and sleeves in the tip or nozzle are not new. This exhaust does not rely on a rotating sleeve, which gives great opportunity for the deposit of ashes, but has a small thin disk set close under the top, cheap in construction, and leaving no space for deposit. Hence the wear is very slight, and but little space is occupied, thus giving ample opportunity for the cones and chamber below. The disk may be applied to the top of the tip or nozzle of the exhaust, if a tip or nozzle be used.

Having thus fully described my improvement, I do not claim, broadly, the application of a disk to an exhaust, nor a disk provided simply with a circle of ports; but

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

In a variable locomotive-exhaust, the top of which is provided with a central opening surrounded or partially surrounded with ports, the combination, with the top *a'*, provided with the ports *m* and central opening, *d*, of the rotating disk *f*, provided with a corresponding central opening, and having such central opening surrounded or partially surrounded by corresponding ports *l*, substantially as and for the purpose herein set forth.

DENNIS HARRIGAN.

Witnesses:

HENRY W. WILLIAMS,

B. W. WILLIAMS.