D. ALLARD.

DRAFT REGULATOR AND SPARK ARRESTER.

No. 180,696. Patented Aug. 8, 1876.

Fig. 1.

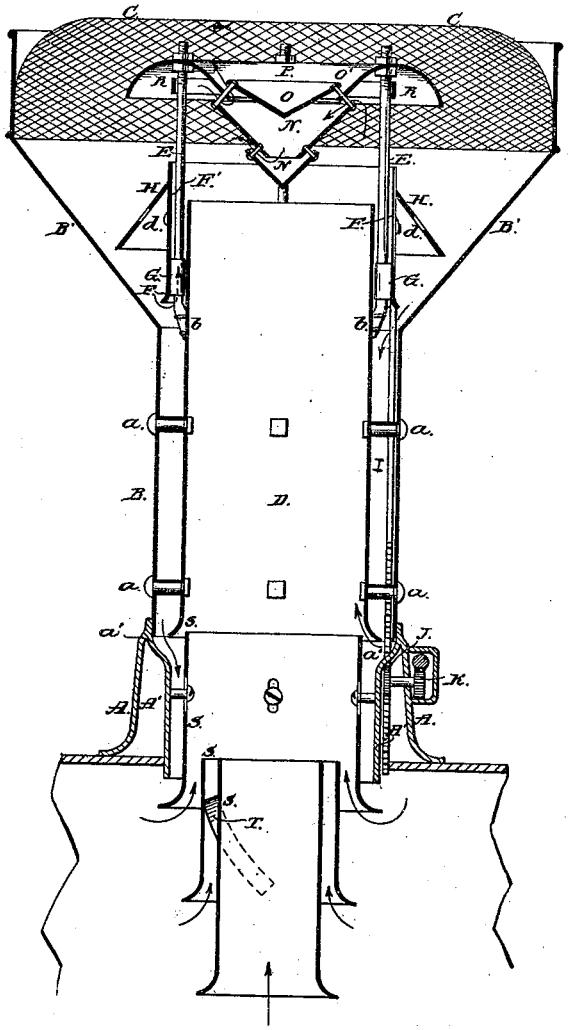
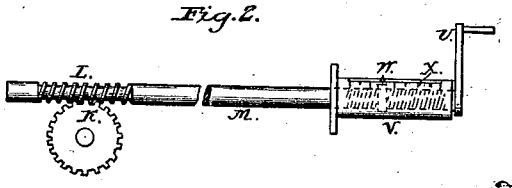


Fig. 2.



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DERRICK ALLARD, OF ST. ALBANS, VERMONT.

IMPROVEMENT IN DRAFT-REGULATORS AND SPARK-ARRESTERS.

Specification forming part of Letters Patent No. **180,696**, dated August 8, 1876; application filed July 22, 1876.

To all whom it may concern:

Be it known that I, DERRICK ALLARD, of St. Albans, in the county of Franklin and State of Vermont, have invented certain new and useful Improvements in Draft-Regulators and Spark-Arresters for Smoke-Stacks, of which the following is a specification:

My invention relates to certain improvements in draft-regulators and spark-arresters for the smoke-stacks of locomotive and other engines, as will be fully hereinafter set forth.

In the drawing, Figure 1 is a central vertical section of my invention, and Fig. 2 a detached view of a portion of the devices for actuating the draft-regulator.

A is a base-piece, consisting of the outer portion A and an inner portion or drip, A′, the portion A′ being beveled, as at *a*′, for dropping the sparks down into the smoke-box, as shown in the drawing, and is securely attached to the boiler or smoke-box. B is the smoke-stack proper, provided with the usual upper flaring portion B′ and a netting or hood, C. D is an inner tube, securely attached to the smoke-stack B by means of bolts *a*. These bolts are each surrounded by a short sleeve, of a length equal to the distance at which the tube D and stack B are to be kept apart, so that when the bolts are properly screwed up the said tube will be held securely in place. At the upper portion of the tube D are secured, by means of bolts *b*, bars or rods E, which support the spark-arresting devices in the upper part of the smoke-stack, and upon which the draft-regulator F slides by means of sleeves G. This draft-regulator consists of an annular tube of a diameter slightly larger than that of the tube D, and is provided on its outside with a beveled flange, H, with perforations *d*. I is a rod, secured to the regulator F by means of bolts, and provided at its lower end with ratchet-teeth, which mesh with the teeth of a cog-wheel or pinion, J, on the side of the base A. This pinion is operated through the intermediary pinion K, secured on its shaft, and a worm-gear, L, on the end of the rod M, which extends into the cab of the locomotive, where it is provided with a crank, so that it can be operated by the engineer. The draft-regulator F is movable and adjustable vertically, and greater or less draft is obtained at will, as greater or less space is allowed above its upper end. An annular space, F′, between the draft-regulator and the tube D, allows for the gravitated sparks, &c., to return to the draft and be consumed, and the escape of exhaust-steam when the draft is shut off. N N is a double cone, which may be plain or corrugated spirally, as shown in the Letters Patent granted to me the 28th day of December, 1875, No. 171,594. Immediately above this double cone is another cone, O, secured to the spark arrester or deflector P, the latter consisting of a concavo-convex annular ring supported by the bars or rods E. Between the deflector P and cone O there is an annular space, O′, for increasing the draft and facilitating the escape of exhaust-steam. The purpose of these devices is to give a whirling inward and outward motion to the sparks, and thus break them up, so that they can escape through the hood or netting C. To further assist in breaking up the sparks, I employ an annular ring, R, slightly larger in diameter than the cone N N, all of which is clearly shown in the drawing. The ring R can be used with equal effect when one or more cones are used. At the bottom of the base A is a series of concentric tubes, S S S, for drawing up the sparks and cinders that may be drawn down the outside of the tube D. Between these tubes S S S may be inserted spirally-arranged metal strips T, for the purpose of assisting in carrying or drawing up the sparks or cinders. These concentric tubes S S are vertically adjustable, and, in connection with the surface *s* of the tube D and the end of the drip-pipe, form facilities for regulating the draft at this point. The rod M, for actuating the pinions J and K, extends back to the cab of the locomotive, and is provided with a crank, U. Around the end of said rod, within the cab, is a sleeve, V, having an opening or slot on its upper side, through which projects the end of a loose nut, W, which works in a worm formed on the end of said bar M. The sleeve V is graduated, as at X, and the whole of this device is so arranged that by revolving the rod M the worm will force the loose nut back in proportion to its revolution, and said nut, pointing to the graduations on the sleeve, will show the height to

which the draft-regulator has been moved, as said regulator is actuated by a similar worm on the other end of the bar M meshing in with pinion-wheels, which mesh with the ratchets on the bar secured to said draft-regulator.

It will be seen that the sparks, cinders, and other products of combustion carried up through the tube D will be arrested and deflected by the cones and spark-arrester, and rapidly whirled about, so as to be broken finely, so as to escape through the hood or netting. Any of the sparks or cinders that may be drawn down between the tube D and the smoke-stack are caused to be carried upward by the tubes S S S, when the operation is again repeated, and so on continually. The directions taken by the sparks are shown by the arrows.

What I claim is—

1. In a smoke-stack, the combination of the tube D, inverted cones N N O, and deflector P, substantially as specified.

2. The combination of the tube D, cone or cones N, ring R, and deflector P, substantially as set forth.

3. The combination of the tube D and adjustable draft-regulator F, provided with flange H, having the perforations *d*, as specified.

4. The combination of the tube D, adjustable draft-regulator F, and annular space F′, substantially as described.

5. The combination of the tube D, adjustable draft-regulator F, having perforated flange H, deflector P, cone O, and annular space O′, as and for the purpose specified.

6. In combination with the tube D, the series of concentric tubes S S S, made adjustable, as and for the purpose described.

7. In a smoke-stack, the series of concentric tubes S, having spiral strips between them, in combination with an inner tube, as described.

8. The base-piece A, having drip A′, beveled at *a*′, as and for the purpose described.

9. The combination of the tube D, cones N N O, deflector P, and tubes S S S, substantially as specified.

10. In a smoke-stack, the combination of an adjustable draft-regulator with an indicating device, substantially as specified.

11. The combination of the sleeve V, graduated as described, the loose nut W, the rod M, having the worms at each end, the pinions J and K, and rod I, attached to the regulator F, all arranged and operating as set forth.

In testimony that I claim the foregoing I have hereunto set my hand in the presence of the subscribing witnesses.

DERRICK ALLARD.

Witnesses:
JOS. L. COOMBS,
W. K. COHEN.