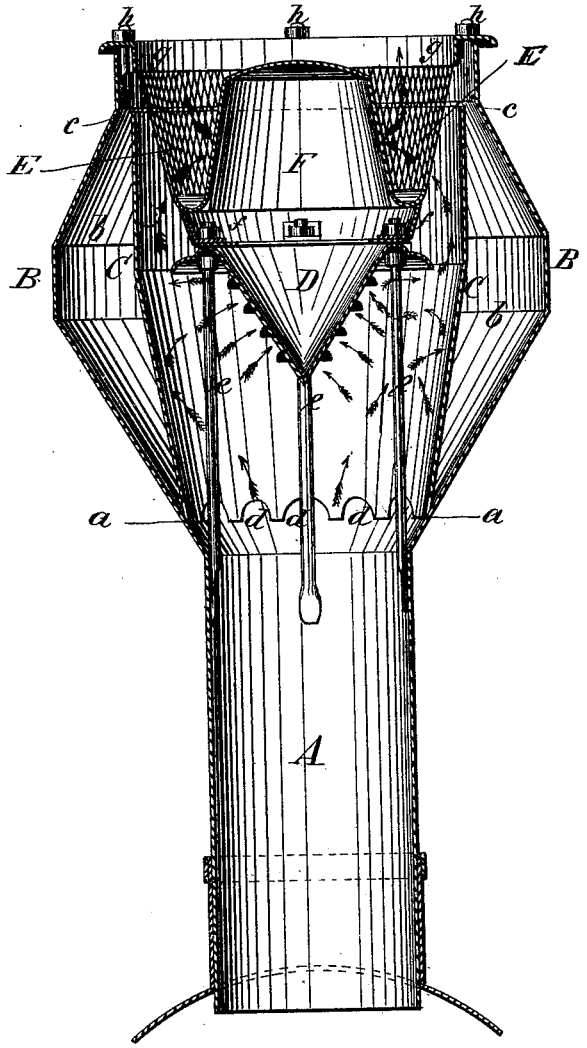
J. R. FISH.

Smoke-Stack for Locomotives.

No. 213,407. Patented Mar. 18, 1879.



WITNESSES:

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JOHN R. FISH, OF GRAND RAPIDS, MICHIGAN.

IMPROVEMENT IN SMOKE-STACKS FOR LOCOMOTIVES.

Specification forming part of Letters Patent No. **213,407**, dated March 18, 1879; application filed October 4, 1878.

To all whom it may concern:

Be it known that I, JOHN R. FISH, of Grand Rapids, in the county of Kent and State of Michigan, have invented a new and Improved Smoke-Stack for Locomotives, of which the following is a specification:

The object of this invention is to furnish a stack for locomotives that will make a better draft for the fire, and will effectually arrest the sparks and prevent them from being thrown out to the annoyance of passengers and train-men.

It consists of a novel arrangement of deflectors and spark-arresters within the stack, whereby but little obstruction is offered to the draft, while at the same time the emission of live sparks is effectually prevented.

In the accompanying drawings, a vertical and longitudinal section of my improved stack is shown.

Similar letters of reference indicate corresponding parts.

Referring to the drawings, A is the throat of the stack. B is the enlarged double conical head, both of which are of the ordinary well-known construction.

Within the stack is placed a shell, C, forming a cylindrical deflector, extending from near the top of the stack downward to any point on the head, as at the line *a a* or within the throat, as may be preferred, so as to get the proper angle of deflection.

Between the deflector and the stack is a space, *b*, opening above at *c*, between the shell and stack, and communicating with the throat through openings *d d d*, &c., made in the bottom of the deflector C, as clearly shown.

Within the cylindrical deflector is placed an inverted conical deflector, D, sustained in place by the rods *e e e*, &c., fastened at their lower ends to the inside of the throat, and on the base of this cone is secured a crown, *f*. On this crown is placed the spark-arrester E. The lower edge of the spark-arrester is fastened to the upwardly-curved flange of a shield, F, inclosed by the spark-arrester, and rising to a line even with the upper edge of the spark-arrester, which is in turn fastened to the flanged crown *g*, and this in turn is secured to the top of the stack by bolts *h*, fixed to the stack and passed through the flange, as clearly shown in the drawings.

The operation of my improvement is as follows: The smoke, steam, &c., arising from the throat spread out into a cone and strike the sides of the deflector C, are deflected to the inverted cone D, and from thence thrown back to the deflector C at a higher point, are then again deflected, and rise through the spark-arrester E, as clearly indicated by the arrows.

In the several obstructions thus met with by the ascending smoke, steam, &c., the heavier cinders, being deprived of their momentum, are thrown down, while the lighter sparks in their winding way are deprived of their life, so that those which pass through the gauze spark-arrester are so nearly dead as to be no longer annoying.

Another important effect produced is this: The exhaust-steam being ejected with considerable force in its deflection from the upper part of the deflector C is apt to be thrown across from one side to the other, and thus interfere with the draft. To prevent this is the object of the shield F, inclosed by the spark-arrester E. When the steam, smoke, &c., has passed the inverted cone D, and, striking the deflector C, is driven through the spark-arrester, it comes in contact with the exterior of the shield F, and is ejected upward and out of the stack. All cinders, dust, &c., carried up by the draft that fall in the space *b*, between the deflector C and outer stack B, are delivered back into the stack by falling down and through the openings *d*, and thence into the throat.

The increased draft-capacity of the stack enables the exhaust-nozzles to be opened one-fourth ($\frac{1}{4}$) of an inch more than they can be in stacks of the old construction.

It will be found that great economy in the consumption of fuel is obtained by the use of my stack.

These improvements can be readily applied to any stack now in use, and they are applicable to either wood or coal burning engines.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. As an improvement in stacks for locomotives, the conical deflector D, provided with crown *f*, placed on the base thereof, in combination with the deflector C and spark-arrester E, with or without the shield F, substantially as described.

2. As an improvement in locomotive-stacks, the spark-arrester E, placed above the deflecting-cone D, fastened at bottom to the flange of shield F, and at top to the crown *g*, with or without the shield F, in combination with deflector C, opening *c*, space *b* between deflector C and stack, openings *d*, and throat A, substantially as described.

JOHN RANDOLPH FISH.

Witnesses:
JOHN A. BOSSLER,
JOHN J. DE JONGE.