N. IRVING.

Locmotive Smoke Stack.

No. 165,930. Patented July 27, 1875.

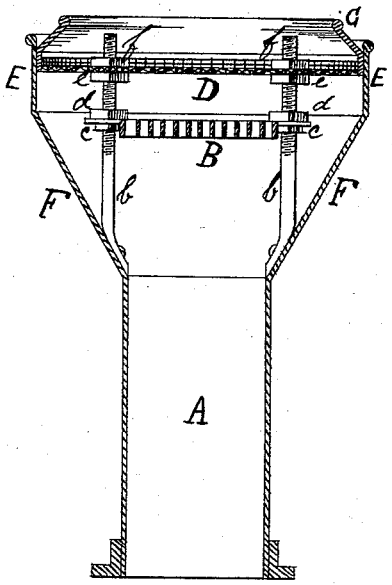

FIG. 1.

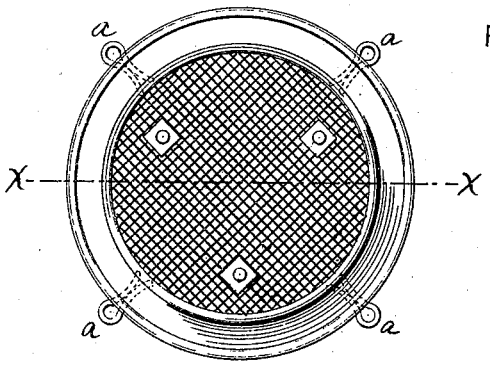

FIG. 2.

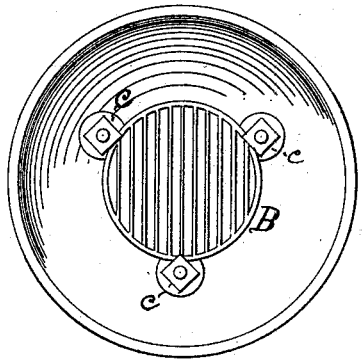

FIG. 3.

WITNESSES:
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UNITED STATES PATENT OFFICE.

NICHOLAS IRVING, OF SUSQUEHANNA DEPOT, PENNSYLVANIA.

IMPROVEMENT IN LOCOMOTIVE SMOKE-STACKS.

Specification forming part of Letters Patent No. **165,930**, dated July 27, 1875; application filed April 21, 1875.

To all whom it may concern:

Be it known that I, NICHOLAS IRVING, of Susquehanna Depot, in the county of Susquehanna and State of Pennsylvania, have invented certain new and useful Improvements in Smoke-Stacks for Locomotives; and I do hereby declare that the following is a full, clear, and exact description thereof, that will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

The same letters and figures of reference are used to indicate the corresponding parts.

After describing the invention, its nature and extent will be shown in the claims.

Figure 1 is a vertical sectional view taken through the line *x x* of Fig. 2, which is a top view. Fig. 3 is a bottom view taken below the fine iron grate B.

A shows the stack-waist; B, the fine iron grate; C, the removable taper collar; D, the fine wire-netting; E, the straight rigid collar, which is bolted to the lower flare F; and *b b b* are rods bolted to the lower part of the inside of the flare F. These rods support the iron grate B and the wire-cloth D, commonly called the diaphragm. The upper part of these rods is provided with a male screw, and the iron grate and diaphragm are kept in place by the nuts *c c*, *d d*, *e e*, and *f f*, respectively placed below and above both grate and diaphragm. The bolts *a a* perforate both the fixed collar E and the removable taper collar C, and firmly hold the taper collar C over the diaphragm D. The bolts *a a* also hold the diaphragm in position.

The stacks generally in use are not provided with my fixed collar E, but have what is called the "upper flare" bolted to the "lower flare" by flanged edges, between which the wire-cloth is placed. The cone is supported on suitable studs attached to the waist by rivets. There is another stack in use which aims to overcome these evils in a different manner. Instead of the wire-cloth and cone, a fine cast-iron grate is substituted. But the use of this grate is growing into disuse, as it is found ineffective and impractical to master the defects complained of. These essential parts are more or less varied in shape and size, and in coarseness of grate and mesh of wire-cloth. Where wire-cloth is used the cone is used when anything is used in connection with the wire-cloth; but when a grate is used the cone is seldom or never used. The wire-cloth and grate combined have hitherto never been used. When stacks are constructed in the usual manner, the great difficulty has been to remove the diaphragm for repairs or renewal. When some forty or fifty bolts have to be removed from the flanges where the upper and lower flares are connected, it becomes a work of no little importance.

I am aware that the upper and lower flares have been hinged together and secured by bolts in the usual manner, and also provided with the cone; but the upper flare, hinged in this manner, has been found to be possessed of serious evils, not the least of which is its liability to become detached, and the awkward manner of getting at the diaphragm; and it does not reduce the labor of removing the bolts. Below the wire-cloth diaphragm, and on the same studs *b b*, I attach the iron grate B, which does not extend across the lower flare, but only has a diameter equal to the stack-waist A. I entirely do away with the cone.

The advantage of using the grate, as it appears in my invention, will more fully appear when the fact is stated that while it causes the larger cinders to be more effectually broken up than the cone can do, on account of presenting a surface at right angles with this line of motion, it also allows the steam to escape more freely in the same line, and thus reduces the back pressure. The taper collar C can be easily removed and replaced by a single man. The usual upper flare is large and cumbersome, and can only be handled by several men, requiring much time to remove the large number of bolts connecting it to the lower flare. The fixed collar E serves to keep in place the movable taper collar.

I do not claim either the cone or any of its modifications in combination with the wire-

cloth diaphragm as my invention. Neither do I claim as my invention either the grate or diaphragm by itself.

Having now fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a smoke-stack, the combination of the grate B, diaphragm or netting D, taper collar C, and fixed collar E, arranged relatively to each other as shown, and for the purpose specified.

2. The taper collar C and fixed collar E, in combination with the diaphragm or netting D, substantially as described and set forth.

In testimony that I claim the foregoing I have hereunto set my hand this 19th day of April, 1875.

NICHOLAS IRVING.

Witnesses:

JOSEPH R. BRAVO,

EPHRAIM I. CARR.