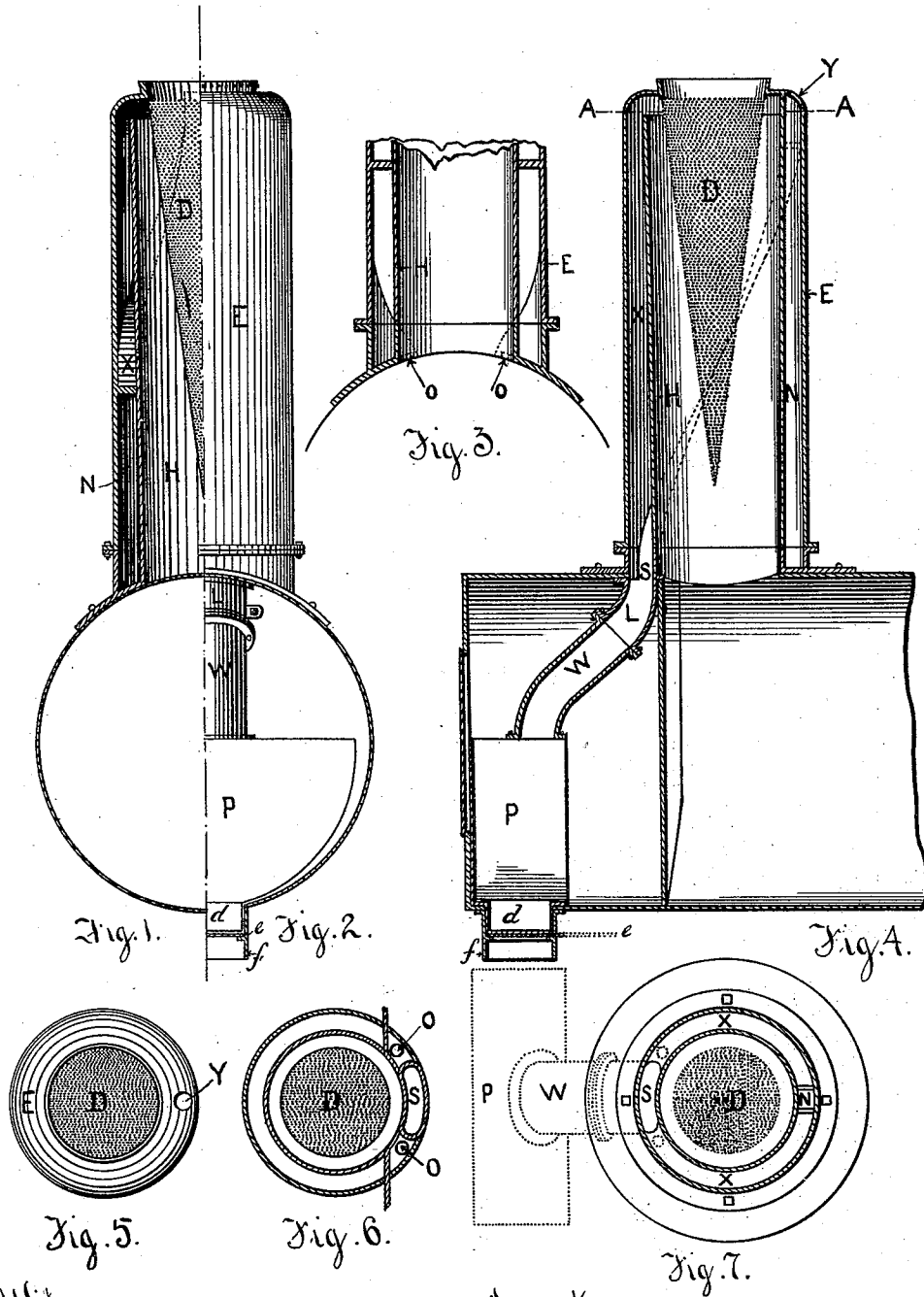


(No Model.)

J. J. SULLIVAN.
LOCOMOTIVE SAFETY SMOKESTACK.

No. 477,389.

Patented June 21, 1892.



Witnesses

A. A. Vostburg
H. S. Hulslander

Inventor

John J. Sullivan

UNITED STATES PATENT OFFICE.

JOHN J. SULLIVAN, OF SCRANTON, PENNSYLVANIA.

LOCOMOTIVE SAFETY SMOKE-STACK.

SPECIFICATION forming part of Letters Patent No. 477,389, dated June 21, 1892.

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To all whom it may concern:

Be it known that I, JOHN J. SULLIVAN, a citizen of the United States of America, residing at the city of Scranton, in the county of Lackawanna and State of Pennsylvania, have invented a new and useful Locomotive Safety Smoke-Stack, of which the following is a specification.

My invention relates to improvements in locomotive smoke-stacks in which, first, a free draft is created; second, sparks and live coals and most of the dust and culm are prevented from escaping from the top of the smoke-stack, and, third, reduce the amount of coal used. I attain these objects by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a vertical section of the smoke-stack, cone, and rim of the boiler, looking from the rear. Fig. 2 is a vertical section of the smoke-stack, looking from the front. Fig. 3 is a broken vertical section of the smoke-stack, showing the chutes and gas-outlets. Fig. 4 is a vertical section side view of the smoke-stack, cone, spark-chutes, spark-box, and front end of the boiler. Fig. 5 is a cross-section of the top of the smoke-stack and cone. Fig. 6 is a cross-section of the bottom of the smoke-stack, looking up. Fig. 7 is a cross-section of the smoke-stack, taken at A A, as shown in Fig. 4.

Referring to the drawings, like letters of reference indicate corresponding parts.

The letter D shows section of the cone, which is to be made of cast-iron, wrought-iron, or steel, and if made of cast-iron it should be made of four parts—the point of one piece and the body in three pieces—in order to guard against the expansion and contraction caused by the heat, the different pieces to be bolted together. The letter *a* shows the spark-chutes, and letter H the inside cylinder. Letter N shows the gas and smoke chamber under the chutes.

In Fig. 2 the letter E shows the outside cylinder. The letter L shows a section of the chute and how attached to the smoke-box. The letter W shows a section of pipe forming the chute and where attached to the spark-box, (shown by letter P.) The letter *d* shows the outlet of the spark-box. The letter *e* shows

the lever on the slide, (shown by the letter *f*.) This slide is for the purpose of allowing the cinders and ashes to drop through.

In Fig. 3 the letter H shows the inside cylinder, and the letter E the outside cylinder. The letters O O show escape of gas under the chutes, the dotted lines showing the position of the spark-chutes.

In Fig. 4 the letter Y shows the gas and smoke outlet. Letters A A show the place of cut-off or cross-section, as shown in Fig. 7. Letter D shows a vertical section of the cone inside of the smoke-stack. The letter X shows chute for sparks. The letter E shows the outside cylinder. The letter H shows the inside cylinder. The letter N shows the gas and smoke chamber. The dotted lines show the position and form of the spark-chutes. The letter S shows the opening in the base of the stack. The letter L shows section of the pipe forming the chute. The letter W shows another section of the pipe forming the chute, the two sections being bolted together, and also shows how it is fastened to the bottom of the stack and to the top of the spark-box by means of bolts. The letter P shows the position of the spark-box. The letters *d*, *e*, and *f* show the same as the same letters show in Fig. 2.

In Fig. 5 the letter D shows the cone, the letter Y the position of the pipe for the escape of the gas and smoke, and the letter E the top of the outside rim of the smoke-stack, there being a space between the outside cylinder of the stack and the top or cap of the stack of one-fourth of an inch or more all the way around the stack, the top or cap to be bolted to the outside cylinder, and the two cylinders of the stack to be made of cast-iron, wrought-iron, or steel.

In Fig. 6 the letter D shows the cone. The letters O and O show vent-holes for the escape of gas and smoke under the spark-chutes. The letter S shows the opening in the bottom of the stack for sparks, culm, and dust to drop through.

In Fig. 7 the letter D is a section of the cone. The letters X X show the position of the chutes for sparks. The letter N shows an opening for the gas and smoke to escape. The letter S shows the opening through the

base and bottom of the stack. The letter W shows the pipe connecting the base and bottom of the stack with the spark-box, (shown by the letter P.) The dotted holes show the vent for the escape of gas and smoke under the chutes. The square holes are bolt-heads, showing where the smoke-stack is fastened to the base.

The invention operates as follows: The draft carries the live coals, cinders, culm, and sparks up the inside of the inside cylinder, striking the cap or top of the stack. They are deflected downward between the inside and outside cylinders onto the spiral spark-chutes, thence into the spark-pipe, and thence into the spark-box, whence they are removed through the opening *d*.

I know that an inverted perforated cone has been used in connection with locomotive smoke-stacks, but not in combination with the

mechanism such as I have shown in my designs and descriptions of a safety smoke-stack.

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

In a locomotive safety smoke-stack, the combination of an inverted perforated cone D, with the inside cylinder H and the outside cylinder E of the smoke-stack connected by the spiral spark-chutes X, the gas and smoke chamber N, the gas and smoke outlet Y, the gas-escape O O, the pipe L and W, the spark-box P, the outlet *d*, the lever *e*, and the slide *f*, all arranged substantially as shown, and for the purposes specified herein.

JOHN J. SULLIVAN.

Witnesses:

W. S. HULSLANDER,
A. A. VOSBURG.