

J. E. SAMPSEL.
Smoke-Box and Stack for Locomotive.

No. 227,657.

Patented May 18, 1880.

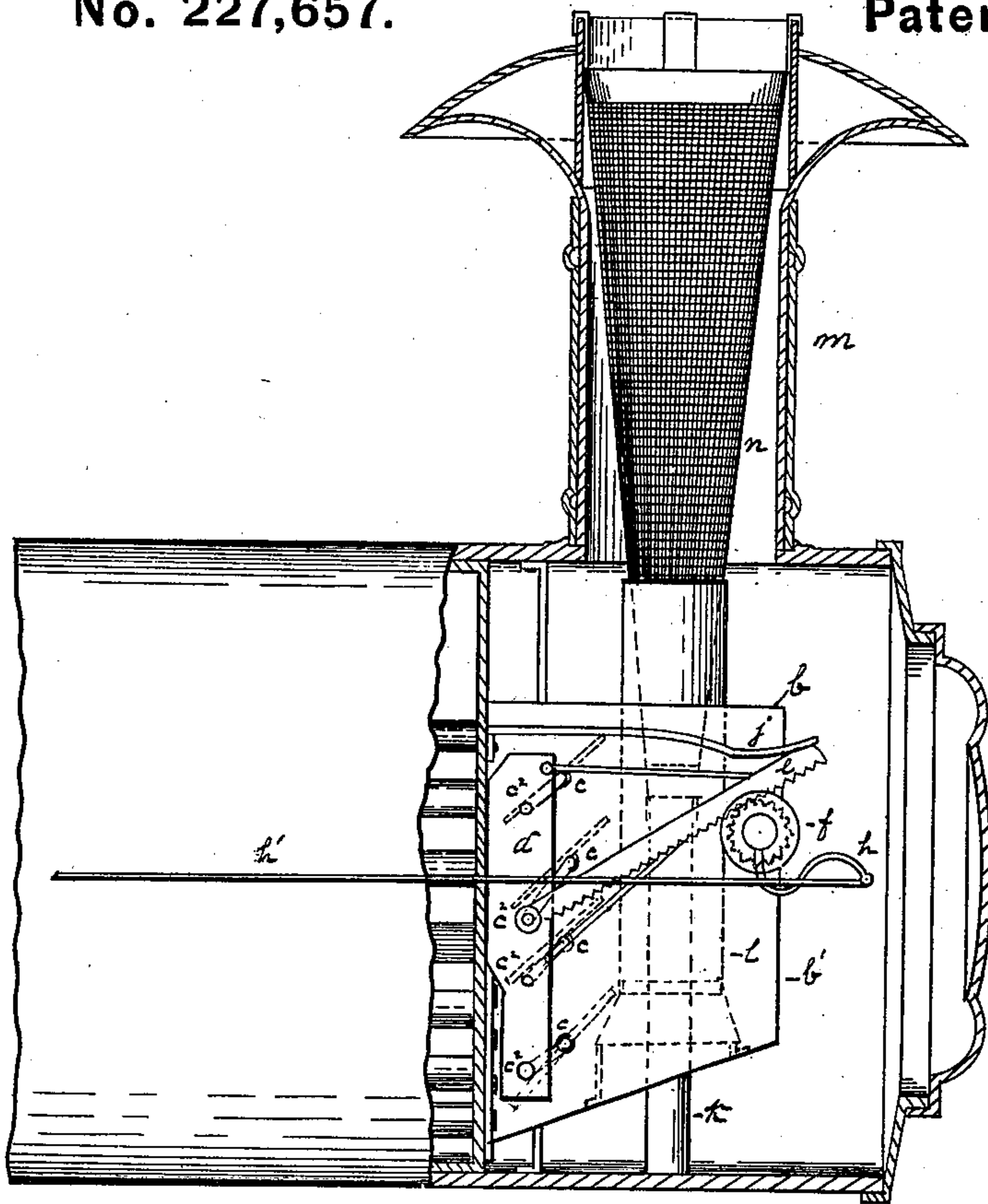


Fig. 1.

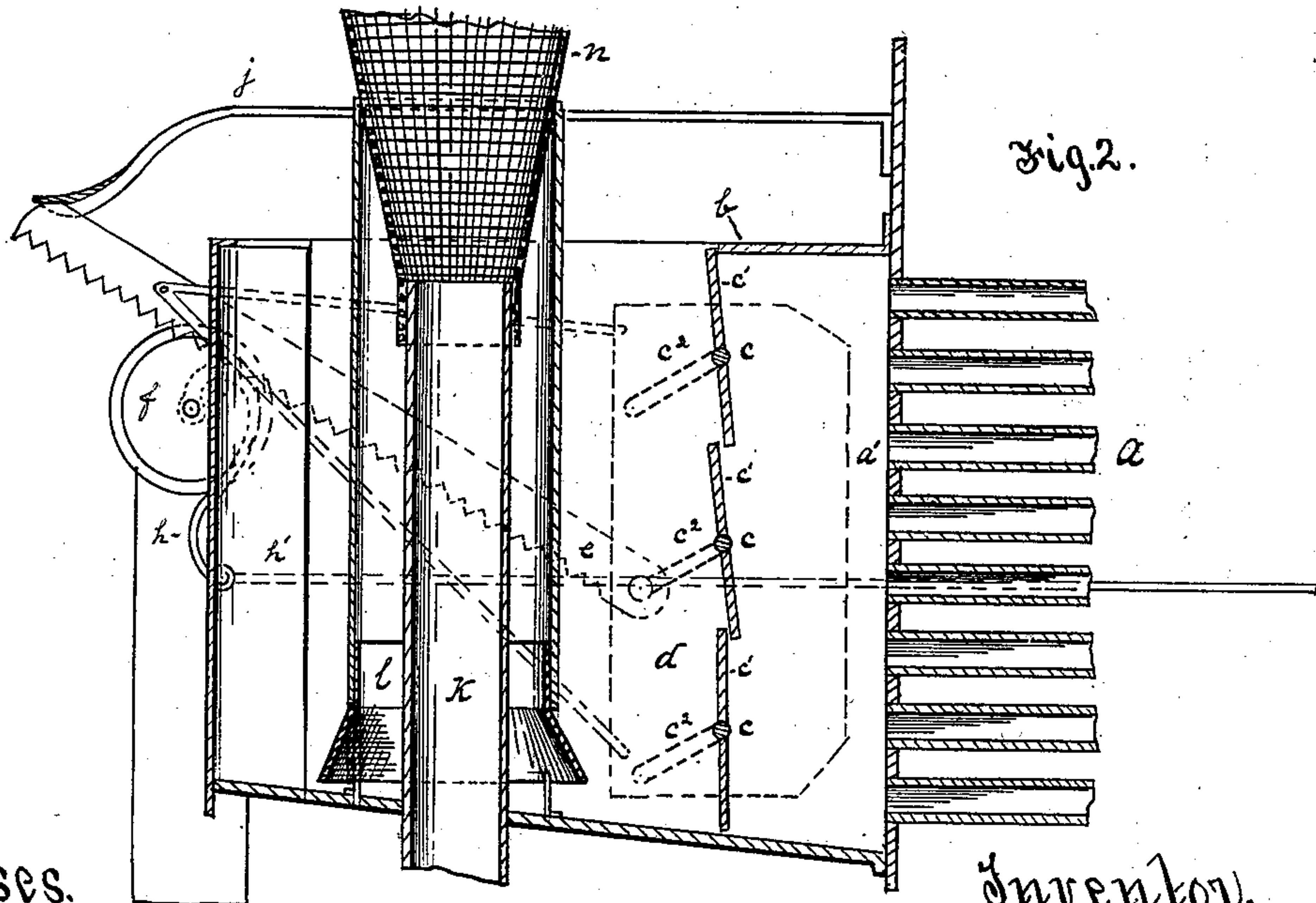


Fig. 2.

Witnesses.

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L. C. Titler.

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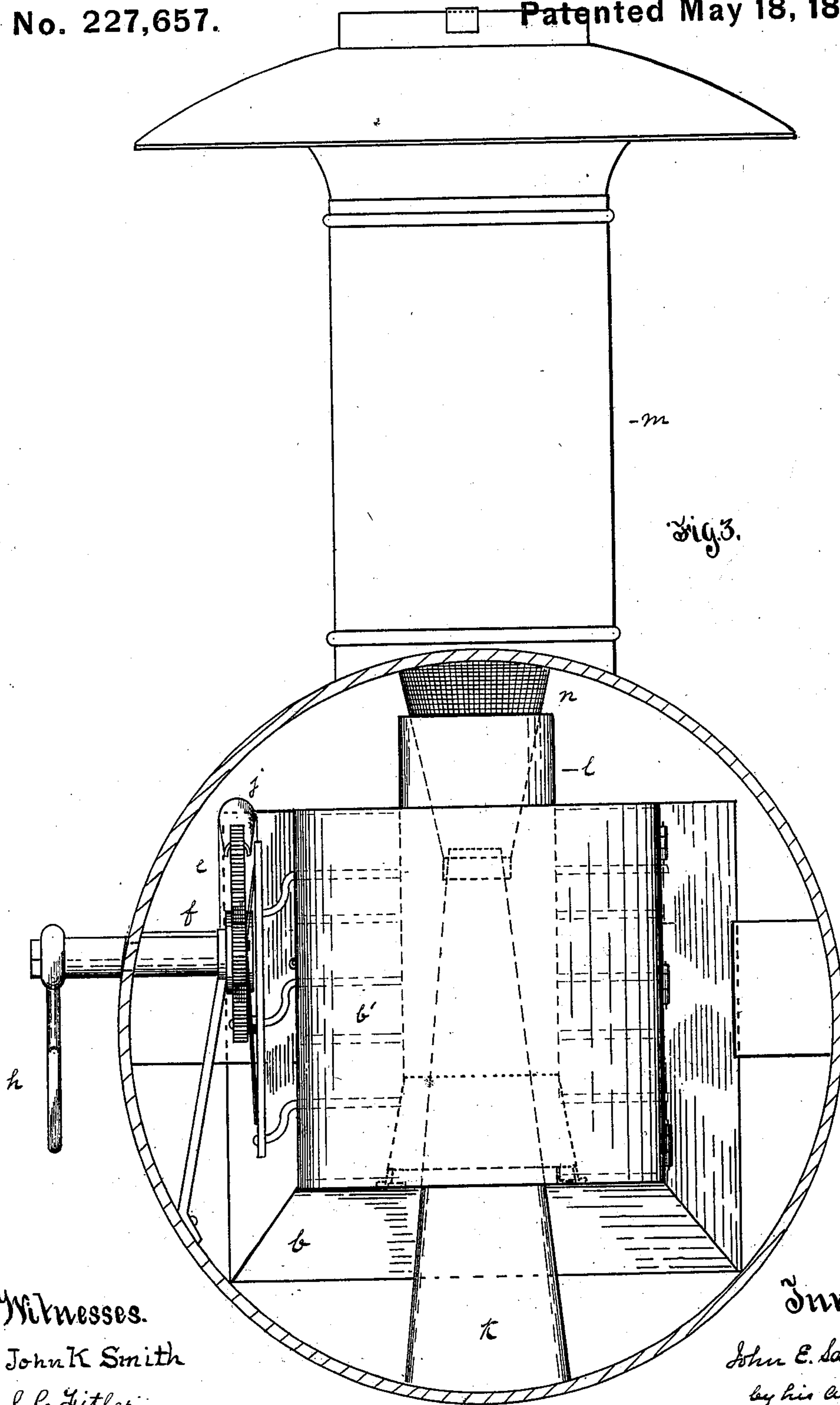
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UNITED STATES PATENT OFFICE.

JOHN E. SAMPSEL, OF CONNELLSVILLE, PENNSYLVANIA.

SMOKE BOX AND STACK FOR LOCOMOTIVES.

SPECIFICATION forming part of Letters Patent No. 227,657, dated May 18, 1880.

Application filed February 9, 1880.

To all whom it may concern:

Be it known that I, JOHN E. SAMPSEL, of Connellsville, in the county of Fayette and State of Pennsylvania, have invented a new and useful Improvement in Smoke Boxes and Stacks for Locomotive-Engines; and I do hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to an improvement in the smoke box and stack of locomotive-engines, and has for its object the regulating of the draft through the flues, smoke-box, and stack, and the free exhaust through the stack of the products of combustion, with the extinguishing of the sparks and the comminution of the cinders.

Heretofore, although numerous devices have been employed as spark-arresters, the regulation of the draft has occupied but a secondary position, and in most, if not all, of the said devices the draft through the flues and stack has been obstructed to a material degree. This has been caused not only by the appliances used for arresting the sparks, but also by the accumulation of cinder and dirt therein.

My invention consists in the arrangement and construction of an adjustable damper placed in the smoke-chamber before the flues which lead from the fire-box, devices for adjusting the same, and a steam-exhaust pipe opening into the smoke-chamber at or near the top row of flues.

I will now describe my invention, so that others skilled in the art may manufacture and use the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a side elevation, partly in section, of the smoke box and stack of a locomotive-engine, showing my invention. Fig. 2 is a sectional view through the middle of the smoke-chamber, showing my invention. Fig. 3 is a front elevation, partly in section, of the smoke-chamber and stack of a locomotive-engine, showing my invention.

Like letters refer to like parts wherever they occur.

a are the flues leading from the fire-box to the smoke-chamber. Around and before the openings *a'* of these flues in the smoke-chamber extends a box, *b*, open at the top from

about six inches from the flue-openings *a'*, and closed in front by a door, *b'*, which is fastened by a latch or bolt. The sides and bottom of this box taper inward slightly from the flue-openings *a'*. It may be constructed of sheet-iron, large enough to inclose all the flue-openings, and extending forward in the smoke-chamber to or nearly to the front of the smoke-chamber.

Extending transversely across the box *b*, about six inches from the flue-openings *a'*, are three or more rods, *c*, one above the other, at equal distances from each other and from the top and bottom of the box *b*. To these rods *c* are attached fans or shutters *c'*, extending along the rods *c*, across the box *b*, and up and down from the rods *c* about three or more inches, so as to form, when shut, a close screen or partition in front of the flue-openings. The rods *c* turn in and extend from one side of the box *b*. To the ends of these rods, which extend outside of the box *b*, are fastened cranks or arms *c''*, the other ends of which cranks are hinged to the plate or connecting-rod *d*, which extends vertically along the outside of the box *b*. To this plate or connecting-rod *d* is hinged the cogged arm *e*, which extends forward to the cog-wheel *f* on the side of the smoke-chamber, the axle of which wheel extends through the side of the smoke-chamber, where it is provided with a crank, *h*, to which crank is hinged the rod *h'*, which leads back to the cab.

The cogged arm *e* is held down against the cogged wheel *f* by a spring-arm, *j*. By pushing the rod *h'* forward the cog-wheel moves the cog-arm *e*, which causes the rods *c* to turn, and thereby opens the wings or shutters *c'*. By a reverse movement of the rod *h'* the shutters can be closed again, either completely, so as to entirely shut off the draft through the flues *a*, or partially, so as to lessen the draft.

k is the steam-exhaust pipe, which extends from the bottom of the smoke-chamber up into the box *b* to about the height of the top row of the flues *a*, (about two feet or more from the bottom of the smoke-chamber.) The height of this exhaust is regulated according to the quality of fuel used. Around and over this exhaust-pipe *k* is the lift-pipe *l*, which extends from about two inches from the bottom of the box *b* to about the top of the smoke-chamber.

From the top of the stack *m* extends the conical spark-arrester *n*, the larger end of which is fastened to the top of the stack *m*, while the lower and smaller end fits tightly around over the exhaust-pipe *k* in the lift-pipe *l*.
 5 This spark-arrester may be constructed of wire-gauze or perforated metal.

The operation of my invention is as follows: The steam passing from the exhaust-pipe *k* causes the products of combustion to pass from
 10 the flues *a* through the box *b*, and either up under the bottom of the lift-pipe *l* or through the opening in top of the box *b* up into the stack, in either of which cases the products of combustion must pass through the meshes of the
 15 spark-arresters *n*, while the steam has a free vent into and through the stack. By means of the shutters or wings *c'* the draft from the fire-box may be regulated.

20 The rod *h'*, by which the damper is adjusted from the cab, may, if desired, be attached to the reversing-lever, so that when the engine is at full-stroke the damper is closed, or partly closed, and the draft thereby lessened, and
 25 when the engine is cut back the damper is opened and the draft increased accordingly, as the exhaust then is not as hard on the fire as when it is at full-stroke.

The advantages of my invention are, first,
 30 that by means of the damper the draft from the fire-box through the flues into the smoke-chamber may be regulated so as to economize the fuel, prevent the discharge of large quantities of dirt and cinder into the smoke-chamber, and also to prevent the cracking and
 35 warping of the flues, for now, in locomotive-engines not provided with my invention, when it is desired to lessen the heat the door of the fire-box is opened and the cold air passing
 40 over the fire into the hot flues cools them suddenly, thereby often warping and cracking them, involving expensive and costly repairs, while in my invention by simply closing the damper the heat of the fire is diminished
 45 without injury to the flues or fire-box; second, that in the use of a steam-exhaust leading to about the top row of flues, and having an unobstructed discharge into the stack and from thence into the open air, the exhaust-steam
 50 causes a free and even draft through the flues leading from the fire-box, instead of, as is now often the case, choking and working back in the flues, and also a much cheaper grade of fuel may be used; third, that the use of the
 55 spark-arrester leading from the top of the stack and fitting around the exhaust allows a clear and free discharge of the smoke and fine dirt through the stack, and at the same time effectually prevents the discharge of sparks
 60 and large cinder into the open air.

Having thus described my invention, what

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

1. In a locomotive-engine, the combination of the exhaust-pipe, extending up to a point
 65 at or above the top row of flues, and the lift-pipe, inclosing the exhaust-pipe and extending from near the bottom of the smoke-chamber to a point at or near the top of the smoke-chamber, substantially as and for the purpose
 70 specified.

2. In the smoke-chamber of a locomotive-engine, a damper consisting of a box or casing, partially open at the top, and adjustable
 75 shutters or wings passing across the box, said box being so arranged as to inclose the flue-openings, substantially as and for the purpose specified.

3. The combination, in a locomotive-engine, of a steam-exhaust pipe which extends up to
 80 or above the top row of flues, a conical wire-gauze spark-arrester fitting inside the upper portion of the smoke-stack and extending thence down to and fitting around the exhaust-pipe at a point above the level of the flues,
 85 and a lift-pipe inclosing the exhaust-pipe and extending to or near to the top of the smoke-chamber, substantially as and for the purpose specified.

4. In a locomotive-engine, the combination
 90 of a damper consisting of a box or casing, partially open at the top, placed before and around the flue-opening in the smoke-chamber, and adjustable wings or shutters, a steam-exhaust pipe leading from the bottom of the smoke-
 95 chamber into the box or casing of the damper, and discharging upward into the smoke-stack from a point at or above the top row of flues, a spark-arrester consisting of a wire-gauze or perforated metal cone leading from the stack
 100 to and fitting around the steam-exhaust pipe, and a lift-pipe extending from a point at or near the bottom of the damper box or casing upward around the steam-exhaust pipe and spark-arrester to a point at or near the top of
 105 the smoke-chamber, substantially as and for the purpose specified.

5. In the smoke-chamber of a locomotive-engine, the combination of a casing or box
 110 placed before and around the flue-openings, adjustable wings or shutters hinged to a connecting-rod, which rod is hinged to a lever working in and between a cog-wheel and spring, and a rod or lever leading from the cab to said cog-wheel, substantially as and for
 115 the purpose specified.

In testimony whereof I, the said JOHN E. SAMPSEL, have hereunto set my hand.

JOHN E. SAMPSEL.

Witnesses:

JAMES H. PORTE,
 JNO. K. SMITH.