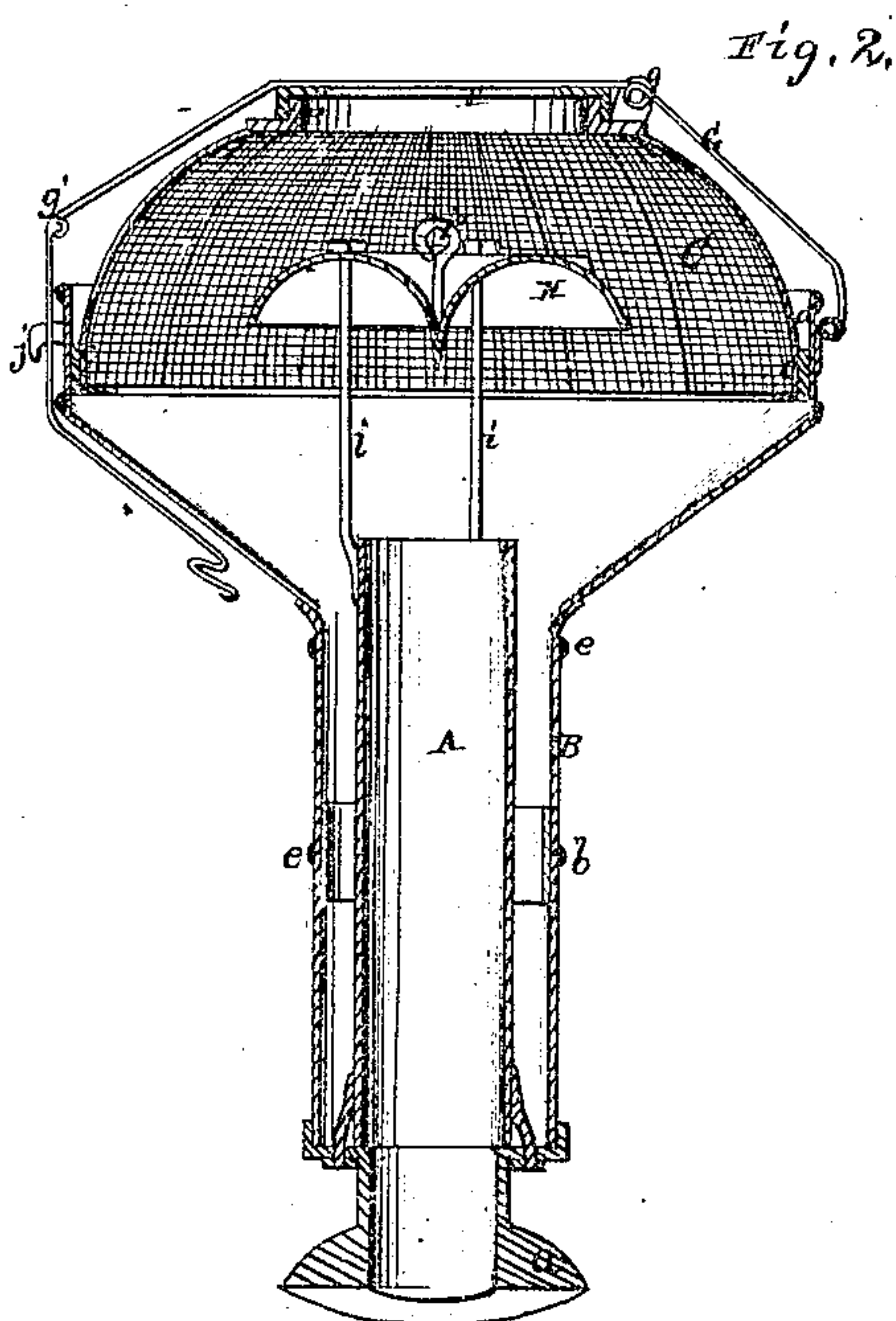
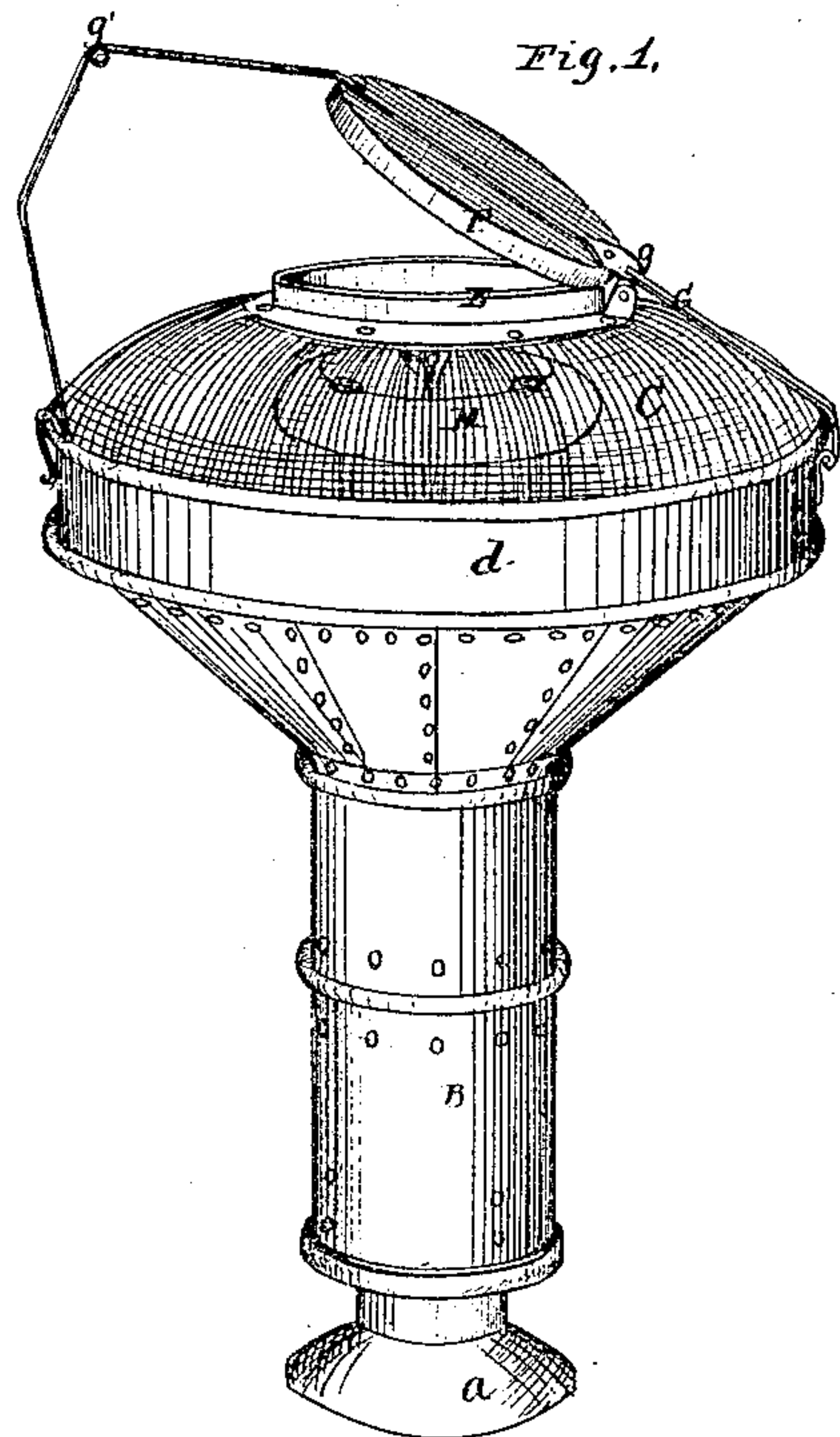


*H. Mackinnon,*

*Spark Arrester.*

*No. 102,020.*

*Patented Apr. 19, 1870.*



*Witnesses.*  
*Geo. W. Libbitt*  
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*by Geo. W. Libbitt*



# United States Patent Office.

HECTOR MACKINNON, OF CLEVELAND, OHIO.

Letters Patent No. 102,020, dated April 19, 1870.

## IMPROVEMENT IN SMOKE-STACKS.

The Schedule referred to in these Letters Patent and making part of the same

I, HECTOR MACKINNON, of Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Smoke-Stacks for Locomotives, of which the following is a description.

The nature of this invention relates to certain improvements in the construction of a smoke-stack for locomotive-engines, for the prevention of the escape of sparks, and is so arranged that the top of the bonnet may be opened, if necessary, to increase the draught in the fire, without any liability of the escape of sparks of fire, rendering this stack perfectly free from the dangers of setting fire to surrounding objects. It is also very readily got at for cleaning or repairs.

The invention consists in the combination of an outer casing of peculiar construction, an inner pipe, a deflector, a hinged lid, and a jointed strap for retaining the lid in an open or closed position, as hereinafter more fully described.

In the accompanying drawings—

Figure 1 is a perspective view.

Figure 2 is a vertical section.

A represents a straight pipe for conveying off the smoke and exhaust steam of a locomotive-engine, and is secured to a saddle, *a*, attached to the boiler.

Surrounding the pipe A, and resting on a flange of the saddle, is a larger pipe, B, the upper portion of which is formed in a funnel-shape, quite flaring, and terminates at its outer edge with an upright flange, *d*. The use and object of this form of outside case of locomotive stack will be hereinafter shown.

A bonnet, C, made of wire-cloth, and having a strong hoop or band, *c*, secured to its lower edge, sits within the flange *d*, and is provided with an opening in the top and center of about one-third the size of the bonnet, said opening having a suitable ring or collar, E, secured within it.

The opening is covered with a cap, F, fitting over the ring E, the top of the cap being also of wire-cloth.

Over the top of the bonnet is placed a strap or band of iron, G, hinged at one side of the flange *d* of the outer pipe B.

There is also a hinge-joint at *g*, where the band is secured to the bonnet. Then the band is secured to the cap F, and then passes over and down under the flaring top of the pipe B, terminating in a hook.

There is also a hinge-joint in the band at *g'*.

It also has a hole in it, which catches on a hook, *j*, at the side of the flange *d*, for latching it down.

Secured to the pipe A by rods *i i*, and at a suitable distance above it, is a cone, H, having its apex downward and sides flaring. The cone is about as large as the opening in the top of the bonnet, and is directly under it.

The operation of this stack is as follows:

The smoke and exhaust steam issuing from the pipe A strikes the under side of the cone H, and, by

its peculiar form, causes the sparks contained in the smoke to be turned downward with great force, and, falling upon the inner surface of the flaring portion of the pipe B, become broken into small particles, and thence they fall down between the two pipes A and B, thence through openings in the bottom of the pipe A, made for that purpose, into the smoke-arch below. Should any of the fine particles escape through the bonnet, they have lost their power to ignite. The smoke and steam escape through the bonnet C.

Sometimes the bonnet becomes clogged with the accumulation of oil, from the exhaust steam and particles of cinder and dirt obstructing the draught, when it becomes necessary, in order for an engineer to raise the required quantity of steam, to lift the bonnet, when, in the use of the old stack, the sparks would escape; but, by my method of construction and arrangement, the cap F may be raised to uncover the opening over the cone only, to increase the draught, without changing the effect on the sparks or fine cinders.

By making the upper part of pipe B flaring, in the form shown, I make a much neater-appearing stack, and, at the same time, provide a place on which the sparks and cinders shall fall so as to reduce them to fine particles, and they are readily disposed of, and will not retain fire so long.

By this arrangement the stack is rendered perfectly safe, and possesses the advantage of permitting the top of the bonnet to be opened to increase the draught, if necessary, without the danger of sparks escaping.

Whenever it becomes necessary to clean the inside of the bonnet, it may be lifted out, turned over on the hinge at the side of the stack, when the whole inside of the stack and bonnet is exposed, and may be readily got at.

If the pipe A requires cleaning or repair, it may be loosened at the bottom by removing the nuts, when it can be lifted out by the loop *p* in the cone H.

A joint is made in the pipe B, at *b*, by which the lower portion may be removed, and replaced by a new piece, when worn or rusted out, without the necessity of throwing aside the whole stack.

Strong hoops *e e* of half-round iron are shrunk on outside the pipe B, making the joints tight, and holding all firmly together.

I do not claim an outer casing with flaring and open top, a deflector, or a hinged lid, as features new in themselves; but

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

The combination of the outer casing B, the upper portion of which is made as described, with wire-gauze C, the pipe A, deflector H, hinged lid F, of gauze, and the jointed strap G, all constructed, arranged, and operating substantially as described.

Witnesses: HECTOR MACKINNON.

GEO. W. TIBBITTS,  
WELLS PORTER.