

(Model.)

W. M. K. THORNTON.
Spark Arrester.

No. 229,207.

Patented June 22, 1880.

Fig1.

Fig2.

Fig3.

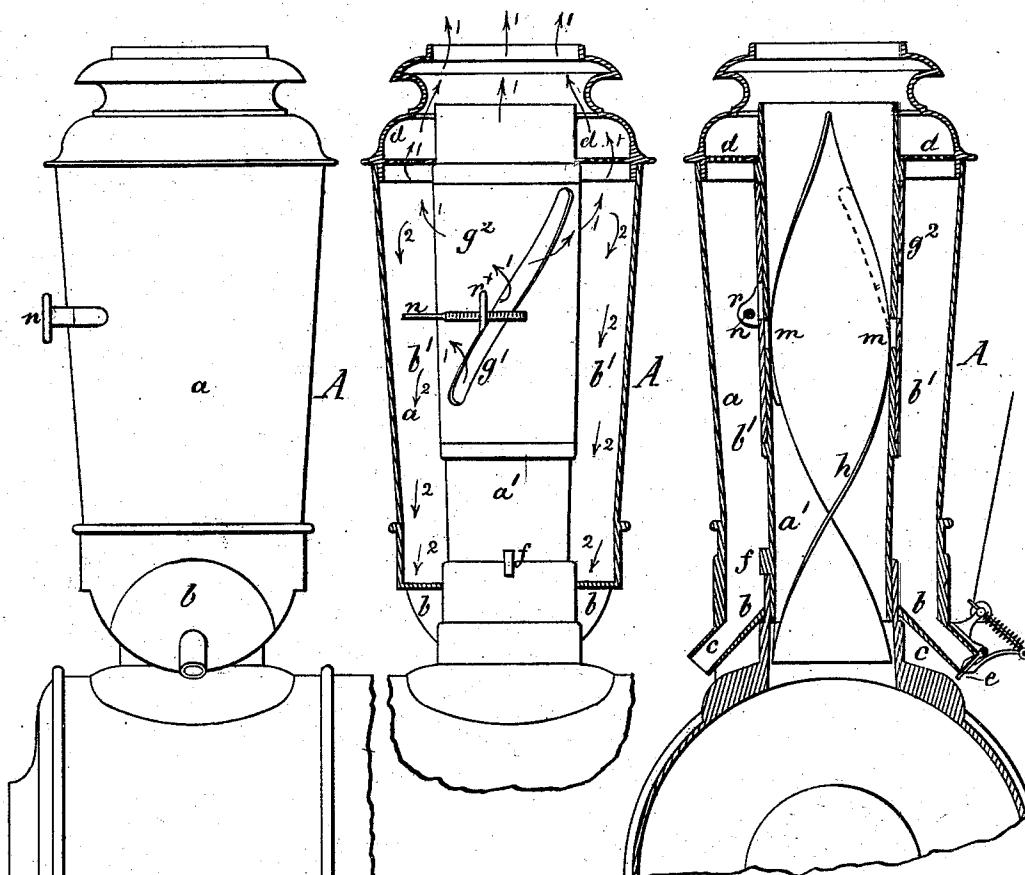
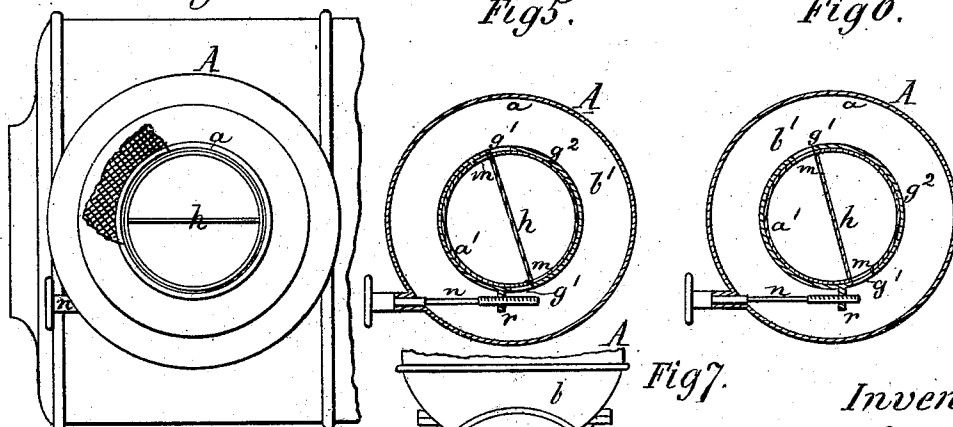


Fig4.

Fig5.

Fig6.



Witnesses:
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UNITED STATES PATENT OFFICE.

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SPARK-ARRESTER.

SPECIFICATION forming part of Letters Patent No. 229,207, dated June 22, 1880.

Application filed April 2, 1880. (Model.)

To all whom it may concern:

Be it known that I, WILLIAM M. K. THORNTON, a citizen of the United States, residing at St. Louis, in the county of St. Louis and State of Missouri, have invented a new and Improved Spark-Arrester for Locomotives; and I do hereby declare that the following is a specification thereof.

My invention relates to spark-arresters applied within the smoke-stack of a locomotive; and the objects of my improvements are, first, to provide spiral or diagonal escape-passages in the central pipe, through which the exhaust passes on its way out of the stack, said passages being in close relation to the spiral partition commonly used in the said pipe, and the sparks, as they are revolved by the said partition, being caused, by the pressure of the exhaust centrifugal force and their greater specific gravity as compared with the exhaust-steam, to pass through the spiral or diagonal passages into the spark-receiving chamber around the said central pipe, and deposit in the bottom chamber or chambers thereof, to be withdrawn or conducted away in any of the ordinary modes, either upon the railroad-track or back into the fire-box; second, to provide the central pipe, in which the spiral partition is formed, and through which the spiral or diagonal passages are cut, with a sleeve-valve in which diagonal or spiral passages are cut on lines which coincide with the lines of the passages in the central pipe, said sleeve being connected with an adjusting-screw which has its bearing in the outer cylinder of the smoke-stack, this construction and arrangement of the sleeve-valve enabling the engineer to increase or decrease the size of the spark-escape passages in the central pipe, as the necessities of the case may require, and also to close said passages completely whenever desirable; third, to provide for the free escape of exhaust-steam, which may flow along with the sparks into the spark-receiving chamber, this provision being by passages outside of the central pipe, near the top thereof, and by open netting or wire-gauze between the outer and inner cylinders of the smoke-stack. I attain these objects by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a side elevation of my improved

smoke-stack, with spark-arrester within it. Fig. 2 is a vertical longitudinal section of the outer cylinder, and an elevation of the central pipe and its sleeve-valve. Fig. 3 is a vertical central transverse section of the outer cylinder and central pipe, the spiral partition being in elevation. Fig. 4 is a top view with a portion broken out to show the wire gauze or netting. Fig. 5 is a horizontal section on the plane of the adjusting-screw, the spark-escape passages being closed. Fig. 6 is a similar section, the passages being open. Fig. 7 is a detail view, showing a modification of the cinder-discharging device.

Similar letters refer to similar parts throughout all the views of the drawings.

The smoke-stack A is fitted upon the collar or crown-plate of the locomotive in any approved manner.

At the base of the outer cylinder, *a*, spark-chambers *b b*, provided with discharging-pipes *c c*, are formed, said chambers being continuations of the spark-receiving chamber *b'*, formed between the central smoke and exhaust pipe *a'* and the wire-gauze partition *d*, as shown.

In Fig. 3 one of the discharge-pipes *c* is represented as provided with a spring-valve, *e*, which may be opened by a cord or rod under the control of the engineer, and which valve will close itself when the cord or rod is released.

In Fig. 7 the pipe *c* is shown as adapted for carrying the sparks down to the track and there discharging them, and in the same figure is illustrated, by a branch pipe, *e'*, how the sparks might be connected with a pipe leading to the fire-box and discharging the cinders therein.

The central pipe, *a'*, is extended down into the collar or crown-plate and coupled to the same within the outer cylinder by a lug, *f*, which is formed on the pipe and rests upon the upper edge of the collar, as shown. Any other suitable means of connection may be adopted. This pipe *a'* enlarges gradually as it extends up into the cylinder *a*, which also gradually enlarges toward its upper end.

The upper end of the central pipe is reduced in thickness beyond where it abuts against the frame of the wire gauze or netting *d*, and also between the points against which the sleeve-

valve g^2 abuts, and by this means collars are formed for the wire gauze or netting frame and for the sleeve-valve to fit against, as shown. The top or hood of the stack is made of a diameter sufficient to form room for the frame of the wire-gauze and a free escape-passage all round outside of the central pipe, a' . In this cap or hood the wire gauze or netting frame is applied in any suitable manner, and the cap and netting may be removed together.

The central pipe, a' , is provided with a spiral partition, h , which extends along its whole length, or nearly so, and by means of this partition the sparks and other matters of exhaust are caused to revolve in their passage through the central pipe. Along the spiral line of the partition spiral or diagonal slits are cut through the pipe a' , as indicated at $m m$, and in the sleeve-valve g^2 , which is on the outside of the pipe and covers the slits m , other spiral slits, $g' g'$, corresponding with those m , are cut, as shown.

On the sleeve-valve g^2 a lug, r , with a screw-threaded hole through it, is provided, and through this lug a screw-rod, n , is screwed, said rod having its head outside of the outer cylinder, a , and its support upon the cylinder, as shown.

By turning the rod with the hand or otherwise the sleeve-valve can be made to turn around the central pipe, a' , more or less, and thus the passages formed by the slits $m m$ may be made to coincide with the passages formed by the slits g to a greater or less extent, and the escapes for sparks thereby either widened or diminished in width, as required.

The sparks and other matters of exhaust, on entering the central pipe, a' , are given a spiral turn, and as the exhaust rises the sparks

and steam are pressed into the spark-chamber b' through the passages m and g , and the sparks descend into the chambers b' , while the steam and gases pass out through the central pipe, and through the wire gauze or netting and the passage above it.

The spiral arrangement of the spark-escape passages prevents deleterious rapid wear of the surfaces, as the sparks do not strike squarely or at right angles upon any of the surfaces, they taking a gradually-curving course in their passage into the spark-chamber.

The arrows No. 1 indicate the course of the steam and lighter gases, and the arrows No. 2 the course of the sparks and heavier matters of exhaust.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The smoke-stack provided with a central pipe having spiral or diagonal slits or openings g' through it on the spiral lines of the spiral partition of the pipe, substantially as and for the purpose described.

2. The combination of the sleeve-valve having spiral passages g' through it, the central pipe having similar slits or openings g' , and the adjusting device, substantially as and for the purpose described.

3. The combination of the outer cylinder, a , provided with wire-gauze frame or partition d , the central pipe having spiral slits or openings g' and a spiral partition, and the adjustable sleeve-valve, substantially as and for the purposes herein described.

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Witnesses:

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