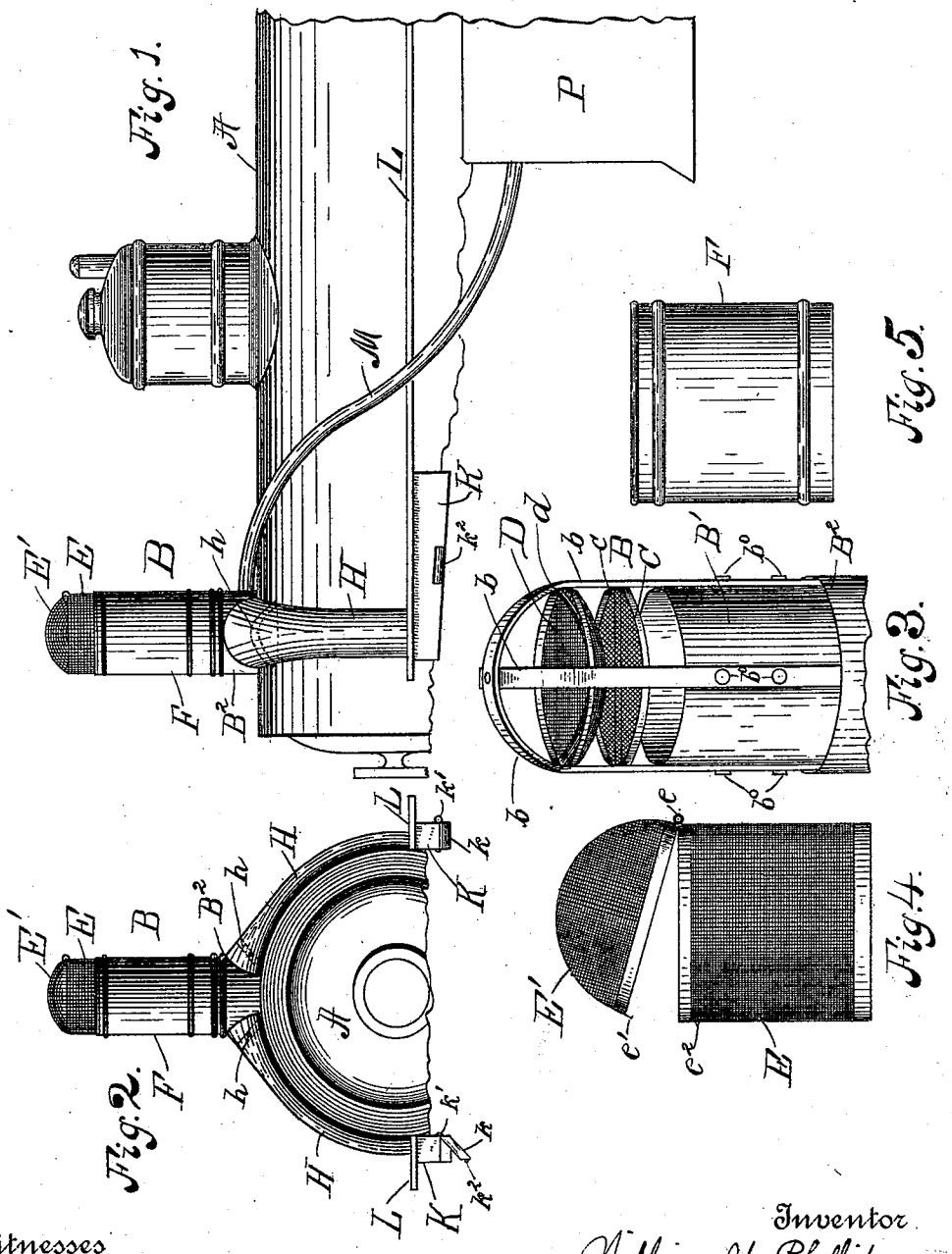
(No Model.)

W. H. PHILLIPS.

SPARK ARRESTER.

No. 544,629. Patented Aug. 13, 1895.



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UNITED STATES PATENT OFFICE.

WILLIAM HOLMAN PHILLIPS, OF PERRY, MISSOURI.

SPARK-ARRESTER.

SPECIFICATION forming part of Letters Patent No. 544,629, dated August 13, 1895.

Application filed July 11, 1895. Serial No. 555,625. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM HOLMAN PHILLIPS, a citizen of the United States residing at Perry, in the county of Ralls and State of Missouri, have invented certain new and useful Improvements in Spark-Arresters; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to improvements in spark-arresters for use on locomotives; and it consists of certain novel features hereinafter described and claimed.

Reference is had to the accompanying drawings, in which the same parts are indicated by the same letters throughout the several views.

Figure 1 represents a side elevation of a portion of a locomotive fitted with my improved spark-arrester. Fig. 2 represents an end view of the device shown in Fig. 1, as seen from the left of the said figure. Fig. 3 represents a perspective view showing the upper end of the smoke-stack with the cylindrical screen and outer cylinder removed. Fig. 4 represents a side elevation of the dome-shaped cylindrical screen used in my invention, and Fig. 5 represents a side elevation of the outer cylinder which incloses the lower portion of the cylindrical screen.

A represents the exterior of the ordinary locomotive-boiler provided with a smoke-stack B of the same general nature as that ordinarily in use, but provided with the spark-arresting attachments, which will be hereinafter more fully described. This smoke-stack consists of an inner funnel B′ and an outer funnel comprising the base portion B^2, reaching only part of the way up on the inner funnel, and the cylindrical sleeve F, which fits down over the top of the base portion B^2. This outer funnel is separated from the inner funnel by the metal bars or ribs *b*, of which there are three or more, but preferably four, as shown in Fig. 3. Above the top of the inner funnel B′ are placed at a suitable distance therefrom a lower and coarse screen C and an upper and finer screen D, which screens are at some distance apart and are secured to the ribs *b*, while they are themselves stiffened with cross-ribs *c* and *d*, respectively. The upper screen D is convex from below so as to deflect laterally the finer particles of solid matter that pass through the coarse screen C, which is preferably a flat screen placed at right angles to the axis of the smoke-stack.

The cylindrical screen E is slipped over the ribs *b*, and at its lower portion is still further spaced therefrom by means of the studs b^0 projecting from the said ribs, whereby a greater annular space is obtained between the inner funnel and the said cylindrical screen. The upper part of this cylindrical screen is made in the form of a dome-shaped cap E′, hinged to the cylindrical part at *e* and fastened by means of the latch and catch *e′* and e^2, as shown in Fig. 4. This hinged cap not only renders it possible to obtain access to the interior of the smoke-stack and so to clean out the various screens from time to time, but it also enables the fireman to get a better draft when starting fires; but it would rarely be necessary to lift the cap for this purpose.

The cylindrical sleeve F is fitted over the cylindrical screen E and is spaced at a sufficient distance from said screen to allow the smoke to rise in the annular space between the two.

The cinders which are caught in the annular space between the inner funnel B′ and the screen E fall down into the annular space between the said inner funnel and the outer funnel B^2 and are directed either through the passages H to the boxes K or through the pipe M to the fire-box P. These passages H are controlled by dampers *h*, so that all of the cinders may be deflected into the pipe M when desired. The cinders when they are allowed to pass through these passages H enter the boxes K, placed beneath the foot-board L. These boxes are provided with bottoms *k*, hinged at *k′* and provided with latches k^2 for holding the same closed when desired. It would generally be preferable to leave these boxes open in damp weather, as shown to the left in Fig. 2; but they might be kept closed and emptied periodically, if preferred. It

will thus be seen that the herein-described apparatus will prevent the escape of sparks or large particles of solid matter of any kind from the furnace, while the smaller particles that will be able to get through the various screens will be so small that they will cool rapidly on reaching the atmosphere and will do no injury.

While I have described my invention as applied to locomotives, it will be obvious that it can be applied to fixed or portable engines of any description.

It will be obvious that various modifications of the herein-described apparatus might be made which could be used without departing from the spirit of my invention.

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

1. In a spark arrester the combination with a furnace, an inner funnel leading therefrom, an outer funnel inclosing said inner funnel, ribs separating the two and extending above the top of the inner funnel, a screen secured a short distance above the top of the inner funnel, and between said ribs, a screen provided with a cylindrical base and dome-shaped cap, fitting over said ribs, and a sleeve inclosing the lower portion of said outer screen with an annular space between said sleeve and said screen, and means for carrying off the cinders caught between said inner funnel and said cylindrical screen, substantially as described.

2. In a spark arrester, the combination with a furnace, of an inner funnel leading therefrom, an outer funnel inclosing said inner funnel with a cylindrical screen between the two funnels, and separated from each by an annular space, ribs attached to the inner funnel and extending above the top thereof, a screen secured a short distance above the top of the inner funnel and between said ribs, a second screen placed above said lower screen and also between said ribs, a dome-shaped screen placed over said ribs and inclosing the two screens last mentioned, and means for carrying off the cinders caught between said inner funnel and said cylindrical screen, substantially as described.

3. In a spark arrester, the combination with a furnace, of an inner funnel leading therefrom, an outer funnel inclosing said inner funnel with a cylindrical screen between the two funnels and separated from each by an annular space, ribs attached to the inner funnel and extending above the top thereof, a coarse screen secured a short distance above the top of the inner funnel and between said ribs, a finer screen made convex downward and placed above said lower screen and also between said ribs, a dome-shaped screen placed above said ribs and on top of said cylindrical screen, and means for carrying off the cinders caught between said inner funnel and said cylindrical screen, substantially as described.

4. In a spark arrester, the combination with a furnace, of an inner funnel leading therefrom, an outer funnel inclosing said inner funnel, with a cylindrical screen between the two funnels and separated from each by an annular space, ribs attached to the inner funnel and extending above the top thereof, a screen secured a short distance above the top of the inner funnel, and between said ribs, a dome-shaped screen placed over the top of said ribs, and a pipe leading to the fire box from the base of the annular space between said inner funnel and said cylindrical screen, substantially as described.

5. In a spark arrester, the combination with a furnace, of an inner funnel leading therefrom, an outer funnel inclosing said inner funnel with a cylindrical screen between the two funnels, and separated from each by an annular space, ribs attached to the inner funnel and extending above the top thereof, a screen secured a short distance above the top of the inner funnel and between said ribs, a second screen placed above said lower screen and also between said ribs, a dome-shaped screen placed over said ribs and inclosing the two screens last mentioned, and a pipe leading to the fire box from the base of the annular space between said inner funnel and said cylindrical screen, substantially as described.

6. In a spark arrester, the combination with a furnace, of an inner funnel leading therefrom, an outer funnel inclosing said inner funnel, with a cylindrical screen between the two funnels and separated from each by an annular space, ribs attached to the inner funnel and extending above the top thereof, a screen secured a short distance above the top of the inner funnel, and between said ribs, a dome-shaped screen placed over the top of said ribs, and a pipe leading to the fire box from the base of the annular space between said inner funnel and said cylindrical screen, cinder passages leading down to either side of the locomotive, dampers controlling said passages, and boxes with hinged bottoms connected to said passages, substantially as described.

7. In a spark arrester the combination with a furnace, of an inner funnel leading therefrom, an outer funnel inclosing said inner funnel, with a cylindrical screen between the two funnels and separated from each by an annular space, ribs attached to the inner funnel, and extending above the top thereof, a screen secured a short distance above the top of the inner funnel, and between said ribs, a finer screen made convex downward and placed above said lower screen, and also between said ribs, a dome-shaped screen placed above said ribs and on top of said cylindrical screen, a pipe leading to the fire box from the

base of the annular space between said inner funnel and said cylindrical screen, cinder passages leading from said annular space down to either side of the furnace, dampers controlling said passages, and boxes with hinged bottoms connected to said passages, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

WM. HOLMAN PHILLIPS.

Witnesses:
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