

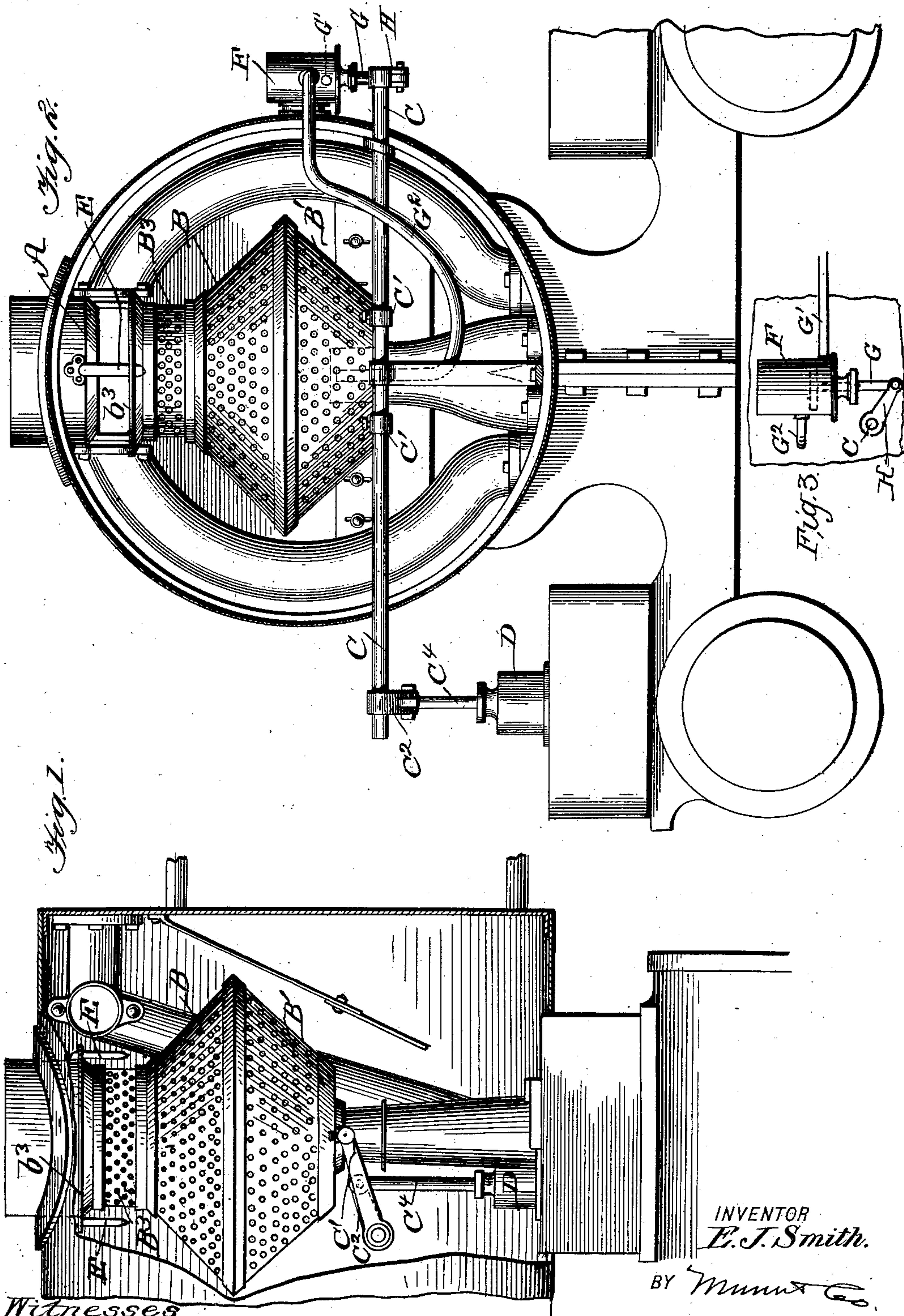
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Patented Apr. 29, 1902.

E. J. SMITH.
SPARK ARRESTER.

(Application filed June 15, 1901.)

(No Model.)



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EDWARD JAMES SMITH, OF HIGH SPRINGS, FLORIDA.

SPARK-ARRESTER.

SPECIFICATION forming part of Letters Patent No. 699,031, dated April 29, 1902.

Application filed June 15, 1901. Serial No. 64,693. (No model.)

To all whom it may concern:

Be it known that I, EDWARD JAMES SMITH, of High Springs, in the county of Alachua and State of Florida, have invented a new and useful Improvement in Spark-Arresters, of which the following is a specification.

My invention is an improvement in spark-arresters designed especially for use on locomotives, and has for an object to provide a simple novel automatically-operating construction by which the engine will be given a natural draft except when steam is applied to the cylinders.

It is well known that artificial or forced draft is what causes a locomotive to throw fire or sparks, and this draft is only on when the throttle is open and steam is in the cylinders. I therefore provide means operated by the steam for adjusting the spark-arresting devices in position to guard the stack, permitting the arresting devices to adjust clear of the stack when the throttle is closed, so a free, open, and unobstructed natural draft is had when the engine is drifting or rolling or in firing up a cold engine.

The invention consists in certain novel constructions and combinations of parts, as will be hereinafter described and claimed.

In the drawings, Figure 1 is a side view, part in section, showing my invention in place with the arresting devices closed with respect to the stack. Fig. 2 is a cross-sectional view showing the arresting devices in opened position, and Fig. 3 is a detail side elevation illustrating the means for operating the arresting-screen by the blower.

By my invention I provide a spark-arresting screen which is movable to and from a position to guard the entrance to the stack; also, means for automatically adjusting the said screen to such position by the force of the steam when the engine is working.

In general respects the engine may be of ordinary construction. The stack or its saddle has a depending tubular flange or portion A within the smoke-box and preferably tapered to form a close joint with the spark-arresting screen or cage B when the latter is adjusted to the closed position shown in Fig. 1, in which position it guards the entrance to the stack.

The screen B may be made of reticulated

wire, perforated plate, or other foraminous material and is preferably composed of the tapering base and upper sections B' B², united at their bases, and the cylindrical top section B³, having a top rim registering with the inlet to the stack and movable in closed position to guard said opening, as will be understood from Fig. 1. The form of the screen or cage is such as to provide a large screening-surface, as will be readily understood. When in the position shown in Fig. 2, which is that maintained by the screen when the engine is at rest or drifting or rolling, the screen is lowered clear of the inlet-opening to the stack, leaving the latter clear and offering no obstruction to the free natural draft of the engine. To close the screen, I provide means for positively lifting it from the position shown in Fig. 2 to that shown in Fig. 1 by the action of the steam when the throttle is opened. This is preferably accomplished by connection with one of the steam-chests and by the mechanism shown and consisting of a cross-shaft C, which is provided with a crank arm or arms C' for supporting and operating the screen, the shaft being extended beyond the boiler and having above the steam-chest a crank-arm C², to which is connected a rod C⁴, leading from a piston operating in a cylinder D, mounted on the steam-chest. By this means when steam is admitted to the chest it will by entering the cylinder D operate the piston therein to set the parts to the position shown in Fig. 1 and hold them in such position until the steam is cut off, when the arresting-screen will unseat itself and drop to the position shown in Fig. 2, leaving the entrance to the stack entirely unobstructed. Thus when the engine is at rest or is drifting or rolling there is no obstruction to the free natural draft; but the instant the forced draft is started by admitting steam to the engine the spark-arresting screen is automatically adjusted to guard the stack. I thus work the arrester to guard the stack when steam is admitted to the steam-chest.

The arrester and the depending stack-flange are formed with turned joints, so they will fit close together in the closed position shown in Fig. 1.

The automatic spark-arrester is adapted to either wood or coal burning engines with ex-

tension front ends and straight stacks and permits of the use of any kind of wire-netting and perforated or slotted steel. There is no trouble whatever to get an engine hot when
 5 fire is first started, as the engine has the same unobstructed natural draft as though there were nothing in the front at all, there being no obstructions to the draft whatever. The improved device can be put in at a very little
 10 expense and is so constructed that all steam-pipe joints are in sight when front door is opened, enabling a mechanic to locate a leaky steam-pipe joint without removing anything. The arrester can be taken out in a few min-
 15 utes after the engine is cool enough for a man to get into the smoke-box. The arrester can also be made in two pieces, and one man can handle any part of it

My improvement will permit the use of
 20 either coal or wood without any changes whatever, unless one wishes to use the brick arch in the fire-box. I use a table-grate when necessary for both wood and coal. For wood-burning engines I may use perforated steel
 25 from one-sixteenth inch to one-eighth inch perforation, No. 10 wire gage, and for coal-burning engines I may use slotted-steel slots one-eighth inch and three-eighths inch or one-half inch long, as may be desired.

30 For guiding the arresting-screen I prefer to provide guide pins or rods E, which extend alongside the section B³ of the screen and through a flange b³ at the upper end of same, guiding the screen as it is moved ver-
 35 tically.

To avoid any possibility of sparks being discharged when the engine is at rest or drifting, when the blower is put on I prefer to provide a small cylinder F on the opposite side
 40 from the cylinder D and connect its piston-rod G with a crank H on the shaft C, a pipe G' being arranged to couple the said cylinder F with the blower-pipe, so that when the blower is opened or put on steam will pass to
 45 the cylinder F and raise its piston. After this piston has traveled a short distance to raise the screen I employ a little opening with a half-inch pipe G² from the cylinder F into the smoke-box for a blower. When the
 50 blower is applied, I use a three-quarter-inch pipe from boiler-head to cylinder to charge the cylinder and a half-inch pipe to take it

from the cylinder into the stack to act as a blower, so the arrester will be forced to position to guard the stack when forced draft
 55 is being used either from cylinder when engine is working or from blower when blower is being used with engine at ease or standing, these being the ways in which artificial draft is created. 60

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

1. A locomotive spark-arrester comprising in combination with the stack, an arresting-
 65 screen composed of the tapering base and upper sections united at their bases, the cylindrical section extending from the reduced end of the upper tapered section and registering with and movable into and out of position to
 70 abut and guard the lower end of the stack, an operating-shaft having a crank-support for the arresting-screen and an operating-crank, a piston connected with said operating-crank, and the cylinder in which said
 75 piston operates, said cylinder being mounted on the locomotive steam-chest substantially as set forth.

2. A spark-arrester for locomotives having a movable screen, devices for adjusting the
 80 screen to position to guard the stack when the engine is working and devices for adjusting the screen to such position when the blower is in operation substantially as set forth. 85

3. The combination in a locomotive of the smoke-stack, the screen movable into and out of position to guard the stack, a transverse shaft extending across the locomotive adjacent to said screen and provided at its
 90 middle with means for operating the screen, and at its opposite ends with crank-arms, a cylinder connected with the blower and having a piston connected with one of the crank-arms of the shaft, and a cylinder having a
 95 piston connected with the opposite crank-arm of the shaft, said cylinder being mounted on and in communication with the steam-chest of the locomotive, substantially as set forth.

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Witnesses:

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