J. Cummings, Jr.,

Spark Arrester,

No. 5,690, Patented Aug. 1, 1848.

Fig. 1

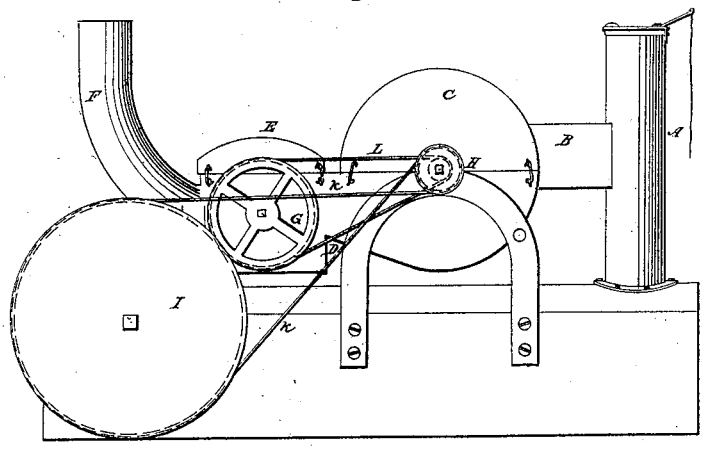


Fig. 3

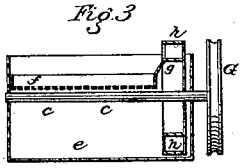
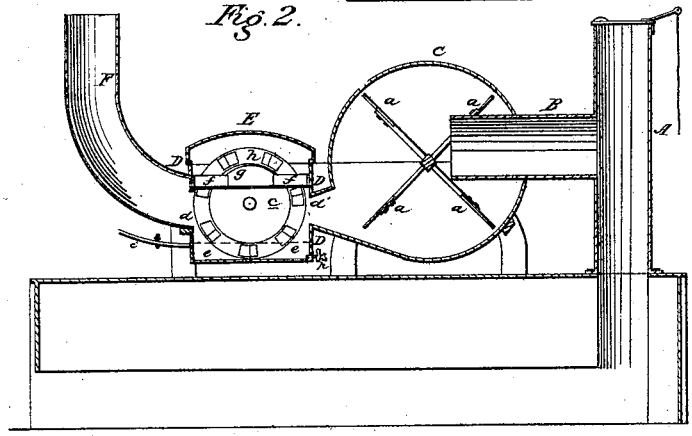


Fig. 2.



UNITED STATES PATENT OFFICE.

JAMES CUMMINGS, SR., OF CANONSBURGH, PENNSYLVANIA.

SPARK-ARRESTER.

Specification of Letters Patent No. 5,690, dated August 1, 1848.

To all whom it may concern:

Be it known that I, JAMES CUMMINGS, Sr., of Canonsburgh, in the county of Washington and State of Pennsylvania, have invented a new and useful Mode of Arresting and Extinguishing Sparks from Locomotives or Other Steam-Engines, of which the following is a full and exact description, reference being had to the annexed drawings of the same, making part of this specification, in which—

Figure 1 is a longitudinal elevation. Fig. 2 is a longitudinal vertical section. Fig. 3 is a transverse section on the dotted line *x x* of Fig. 2.

Similar letters in the several figures refer to corresponding parts.

My invention consists in connecting with the chimney of a steam engine an apparatus for producing a shower of water or watery spray (which is constant while the machine is in operation) through which the smoke and sparks are caused to pass in a horizontal current by the action of a revolving fan. In their passage through the shower the sparks, soot, ashes, dust and other solid substances which usually accompany the smoke in an ignited state are extinguished and precipitated into a well or cistern of water at the bottom of the shower vessel leaving the smoke to pass off into the atmosphere in a purely gaseous form.

A, Fig. 1, is the smoke pipe or chimney provided with a hinged lid to cover its top when the arrester is in operation, but which is opened to allow the smoke and sparks to pass off in the usual manner when the arrester is not in use, as during the operation of kindling the fire, &c.

B is a horizontal pipe joined to the chimney and to the fan case and terminating near the axis of the fan centrally between the two sets of arms and fans which revolve on either side of it. It is for the purpose of conveying the smoke into the fan case and should be of the same capacity of the chimney where it is practicable to make it as large.

C is the case within which the fan revolves; it is divided at the center, the lower half being stationary, connected on one side with the pipe B and on the other with the shower vessel, there being in it a horizontal opening on the side adjacent to and corresponding with, a similar opening in the shower vessel, its area being equal to that of a transverse section of the pipe. The upper half is removable for the purpose of giving free access to the fan and is secured to the lower half by hasps or otherwise.

D is the shower vessel made of a rectangular or other suitable form; it contains in one end a bucket wheel *h* for the purpose of raising water from a cistern or well *e* in its bottom to a trough or tray *f* placed in a horizontal position near its top, the bottom of said tray being perforated with numerous small holes through which the water, after being raised, runs down again into the cistern *e* in the form of a shower. In its side adjacent to the fan is a horizontal opening *d'* corresponding with the opening in the fan case, and a similar opening *d* in the opposite side corresponding to the opening in the lower end of the escape pipe. It is covered by a lid E which is secured by hasps and hinges or otherwise so that it may be removed to give access when desirable to the spray trough, bucket wheel, and other portions of its interior.

F, the pipe through which the smoke escapes into the atmosphere after it has been deprived of the sparks, &c., in the manner above described.

G, H and I are pulleys constructed in the usual mode, I being the driver of H, which is fixed upon the fan shaft, and H the driver of G, which is secured to the wheel shaft. I is connected with and revolved by the engine and by means of the band K drives the pulley H; and H by means of the band L drives G; the said pulleys being relatively of such size as will give the proper motion to the fan, and bucket-wheel, respectively.

a, *a*, Fig. 2, is a double radial fan of the ordinary form of construction, having a space in the middle between the two sets of arms and fans for the smoke pipe B; and which, by being rapidly revolved withdraws the smoke from the chimney and forces it through the aperture *d'*, through the spray or shower *c*, through the aperture *d* into the escape pipe F through which it passes off into the atmosphere. The fan can be revolved with a greater or less velocity so as to cause an increased or diminished draft in the furnace, by any of the known means that may be deemed most appropriate.

e is the well or cistern which is supplied with water and into which the sparks, soot, ashes, &c., are precipitated by the shower, which, when they have accumulated in suffi-

cient quantity are drawn off along with the water through an aperture made in the bottom, by withdrawing a plug *p* or by other means. The supply of water is effected by means of a pipe *i* leading to the water tank of the engine, or otherwise.

f, the spray trough or shower tray into which the water is discharged from the wheel *h*. A part *g* of one end of the tray next the wheel projects beyond the rest toward the wheel at an angle of elevation of about 45° forming an apron upon which the water, when it shoots from the buckets, strikes, and is deflected in a horizontal direction toward the opposite end of the trough, whereby the water will be evenly spread over its bottom producing a uniform shower throughout the space the trough covers, its bottom being either reticulated, or perforated with numerous small holes.

h is the bucket-wheel made in the manner represented in the drawing, or in any of the various ways in which bucket wheels are usually made for raising water; or in any convenient way; it revolves in the spray vessel, on an axis placed transversely through the same; its lower buckets being constantly immersed in the cistern to be filled while the upper buckets are constantly discharging their contents into the spray trough. In forming the buckets it is necessary to have reference to the point of elevation on the wheel at which the apron of the spray trough is placed in order that they may discharge the water upon it.

The frame work, pipes, cases, fan, spray trough and bucket-wheel are all made of iron or other suitable material, and of any convenient and proper size and proportion.

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

The method of extinguishing and arresting sparks as they pass from the smoke-pipe of a locomotive or other engine by forcing them through a perpetual shower of water by means of the before described combination of the revolving double fan, perforated spray trough, revolving elevating bucket wheel, and cistern arranged in the manner above described or in any other mode substantially the same by which analagous results are produced.

JAMES CUMMINGS, Sr.

Witnesses:

Adam Harbison,

John E. Black.