No. 883,791. PATENTED APR. 7, 1908.

J. E. DEMPSTER.

SPARK ARRESTER.

APPLICATION FILED NOV. 21, 1907.

2 SHEETS—SHEET 1.

Fig. 1.

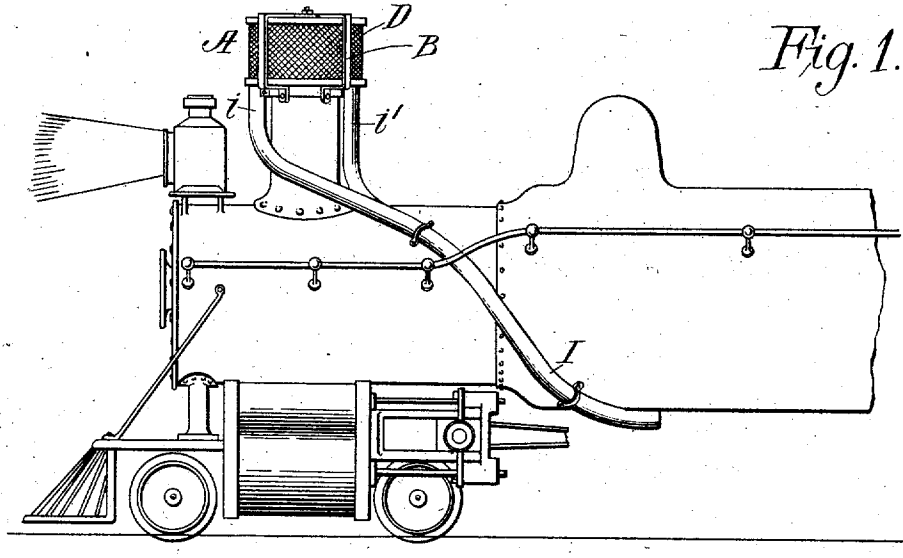


Fig. 2.

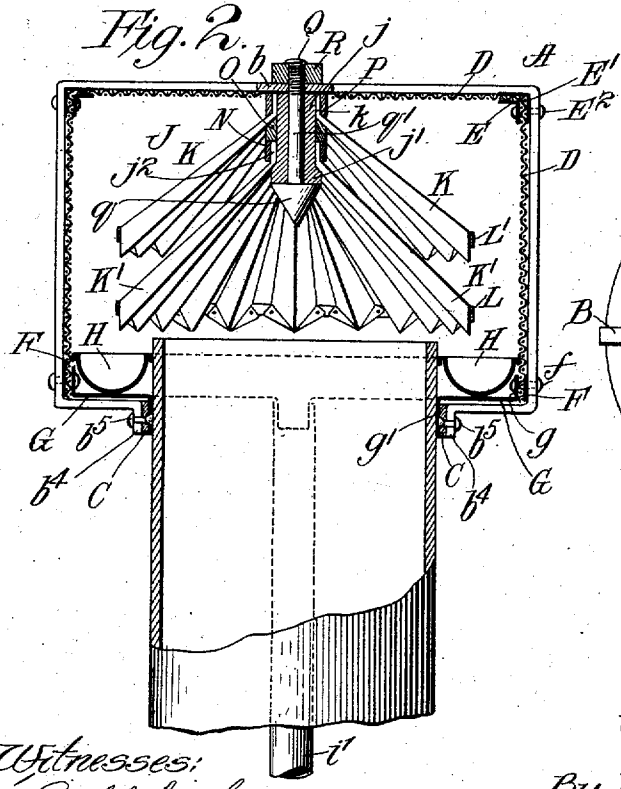
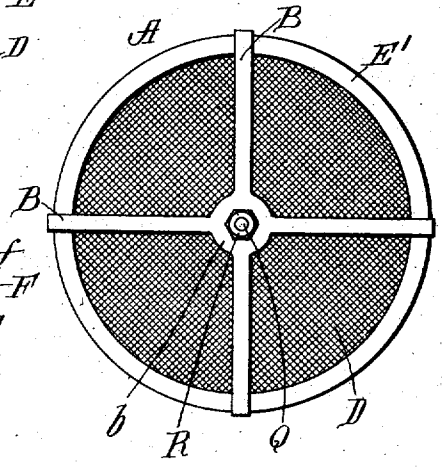


Fig. 3.



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2 SHEETS—SHEET 2.

Fig. 4.

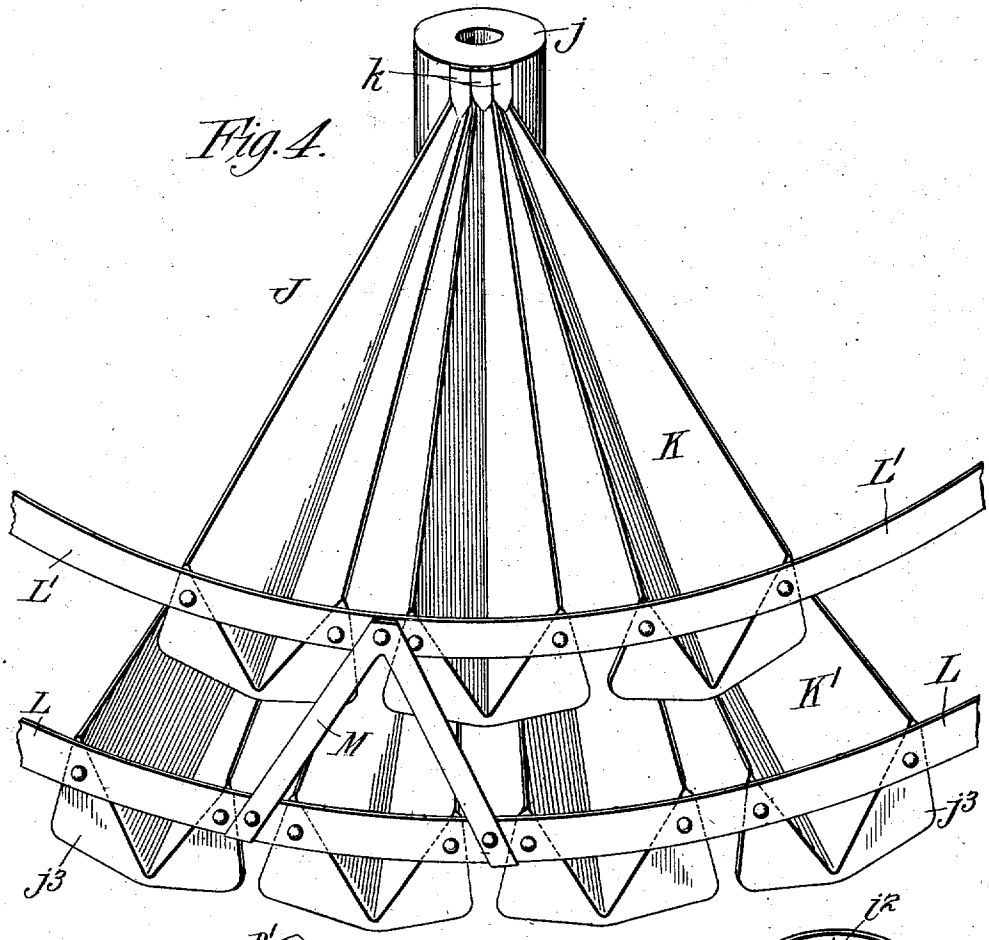


Fig. 5.

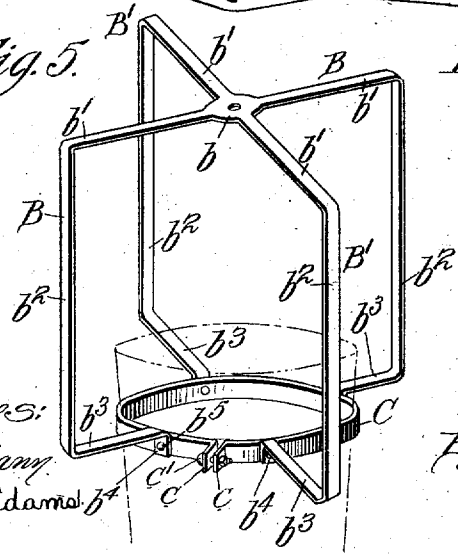
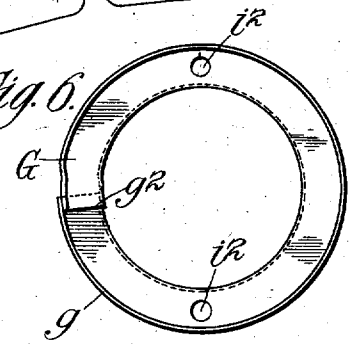


Fig. 6.



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UNITED STATES PATENT OFFICE.

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SPARK-ARRESTER.

No. 883,791. Specification of Letters Patent. Patented April 7, 1908.

Application filed November 21, 1907. Serial No. 403,196.

To all whom it may concern:

Be it known that I, JOHN E. DEMPSTER, a citizen of the United States, residing in Mayodan, in the county of Rockingham and State of North Carolina, have invented certain new and useful Improvements in Spark-Arresters, of which the following is a specification.

The object of my invention is to provide improved means for preventing sparks and hot cinders from passing to the outside from the stack or chimney of a furnace.

My invention especially relates to that class of spark arresters which are applied to the smoke stacks of locomotive engines and will be herein shown and described as so applied.

According to my invention I provide a reticulated hood adapted to be secured to the upper end of the smoke stack and within which is arranged a baffling device which is so constructed as not to interfere with a proper draft through the stack but which impedes the passage of sparks and hot cinders through the hood. This baffling device preferably comprises two sets or series of radially arranged downwardly extending troughs spaced apart to permit the passage of smoke and air to a sufficiently free extent but which is so arranged as to break the force of the cinders passing through the hood and to catch such as rebound from the hood or are otherwise arrested therein. These troughs are provided on their upper faces with channels in which the cinders are conveyed beyond the top margin of the stack to an annular receiving trough arranged below them in the lower part of the hood. This annular trough is connected with a pipe which conveys the cinders to some remote place, preferably beneath the boiler in rear of the front truck of the engine.

In the accompanying drawings, Figure 1 shows a side elevation of the front portion of a locomotive engine with my improved spark arrester applied thereto. Fig. 2 is a view on an enlarged scale and in vertical section through the upper portion of a locomotive smoke stack with my improved spark arrester applied thereto. Fig. 3 shows a top plan view of the spark arrester. Fig. 4 is a detail view on an enlarged scale and in perspective of a portion of my improved spark arrester. Fig. 5 is a detail view in perspective showing a part of the framework of the hood and illustrating the manner in which it is applied to the locomotive stack. Fig. 6 is a top plan view of the annular bottom plate of the hood frame.

My improved spark arrester is adapted to be attached to the upper part of the smoke stack of a locomotive engine. It may be clamped to the outside of the stack and does not require any change in the stack itself and no part of the device passes into the stack, all of which is clearly indicated in Fig. 2.

I provide a hood, A, which is preferably of cylindrical form and comprises a frame supporting reticulated fabric. Preferably this reticulated fabric is made of steel wire of sufficient gage to provide the requisite strength and durability.

As shown in the accompanying drawings, the frame is formed from strap-iron. Two strips, B, B′, are crossed at b, where they are welded together. The upper horizontal portions, b' of the strips extend outwardly from the central portion b a sufficient distance to give the required diameter to the hood, such diameter being slightly greater than the diameter of the stack. From the upper horizontal arms b', the strips extend downwardly at b^2 to give the requisite height to the hood and from the lower portions of the vertical parts, b^2, the strips extend inwardly at b^3 and are connected to an annular strap or band C which has outwardly projecting parallel flanges or lugs c which are bolted together as indicated at c'. By this construction I provide a frame for the cage or hood which affords the requisite strength to support the reticulated material D. Preferably this reticulated material is arranged inside the frame illustrated in Fig. 5 and is secured thereto at the top by means of annular angle-irons E, E′, and bolts E^2. The reticulated material extends across the top of the hood and all sides thereof. It is clamped around the outer edge of its upper horizontal portion and the upper part of its vertical portion between the annular angle-irons E, E′, the bolts E^2 serving to secure it to the vertical portions

of the frame parts B, B′. At its lower end the cylindrical part of the reticulated material is clamped between an annular metal strip F and the outer vertical portion g of an annular angle-iron G which constitutes the bottom of the hood. The bolts f serve to attach the strip F and the angle-iron G to the frame parts B, B′ and hold the lower portion of the reticulated part D of the hood firmly connected with the frame. The lower ends of the frame straps B, B′, are bent downwardly, as indicated at b^4 and are firmly attached to the ring C by the bolts b^5. The downwardly projecting annular flange g' of the angle-iron G is also attached to the ring C by the polts b^5, as clearly shown in Fig. 2.

H indicates an annular trough supported by the angle iron G and is adapted to collect the sparks and cinders arrested by the hood and to deliver them to a conveyer pipe I. This pipe may deliver the cinders and sparks at any desired place. It is preferably connected with the trough H at both front and rear thereof by branch-pipes i, i', as indicated in Fig. 1. In Fig. 6, the exit holes i^2 from the annular angle-iron G are also illustrated. It will be observed that the hood can be applied to the upper part of the stack by merely slipping the ring C down over the stack and then by means of the bolt c' clamping the ring thereon. Other means may, however, be used for attaching the hood to the stack, but it is desirable that the clamping means should be adjustable to accommodate stacks of slightly different diameter or tapering stacks. By reference to Fig. 5 it will be observed that the ring C may be opened out sufficiently to pass over the upper end of the tapered stack and then compressed around that portion of the stack of smaller diameter and clamped thereon.

In Fig. 6 the angle-iron G is shown in plan and as will be there seen, it has an overlapping portion g^2 to provide for expansion and contraction for the purposes of adjustment above referred to. The trough H may be made of thin sheet metal and has sufficient elasticity to permit it to yield to compression when being applied to a stack and it will adapt itself to stacks of varying diameters or to tapered stacks.

The baffling device J is of novel construction and in practice has been found to work most efficiently. It comprises a central portion or hub j, from which radiate baffling arms K, K′, made in the form of troughs and which serve the double purpose of baffling the cinders which enter the hood and of catching them and conveying them to the trough H. The hub j is formed with an annular shoulder j' to provide a rest for the inner ends of the lower set or series of troughs K′. Each of the troughs K′ is triangular in cross-section and is preferably made wider at its outer end than at its inner end. At its inner end each trough K′ is formed with an upturned portion j^2 which rests against the vertical face of the hub j above the shoulder j' while the portion of the trough immediately below this upturned portion rests directly on said shoulder. The troughs or baffle sections extend outwardly and downwardly towards the annular trough H, terminating some distance above said trough and their outer ends are formed with outwardly projecting flanges j^3 which are secured to an annular hoop or band L.

The upper set or series of baffle sections or troughs K are similarly formed in this respect and are attached to another hoop or band L′, the two bands L, L′ being connected and held apart by means of braces M in the manner indicated in Fig. 4. Any suitable number of braces may be employed for this purpose, only one of them being shown in the drawings. The upper portions j^2 of the troughs K′ are arranged close together side by side as indicated in Fig. 4 and over the portions j^2 is applied a ring N which serves to firmly hold the upper ends of the troughs in place. Immediately above the ring N and the upper ends of the troughs K′ is applied another ring O which rests on the upper edge of the ring N and the portions j^2 of the troughs K′. This ring O has an inclined upper surface on which rest the upper portions of the troughs K and around the upper ends k of these troughs is applied a ring P which serves to hold the troughs K firmly in connection with the hub j. The baffling device is connected with the hood frame by means of a bolt Q which is formed with a tapered head q and the shank q' of which extends up through the part b of the frame and is provided with a clamping-nut R. By this means the baffling device is suspended centrally within the hood and the troughs are held centrally above the smoke stack.

This construction enables me to conveniently assemble the various parts of the baffle though other means may be provided for doing so. The baffling device is in the form of a canopy which overhangs the top of the smoke stack. Each set or series of troughs is arranged to have spaces between them and there is a space between the upper and lower series. Above each space between two troughs in the lower series K′ is arranged a trough in the upper series K. The products of combustion are in this way deflected in various directions as they pass through the baffling device without injuriously impeding the draft and such sparks or cinders as are not collected by the upper series of troughs fall into the lower series.

The manner in which my improved spark

arrester may be applied to the stack of a locomotive has already been described. When in use the products of combustion pass from the stack against the baffling device which does not injuriously impede the passage of smoke, gases, etc. but cinders and other solid matter will strike against the inclined lower faces of the troughs and their passage through the hood will be impeded and their direction of movement spread or changed. Such sparks as strike the sides of the reticulated hood will fall directly into the trough H, while the sparks that strike the top of the hood will rebound into the troughs K or K′, and are conveyed along the channels in the troughs beyond the top margin of the stack and deposited in the trough H. Such sparks or cinders as do not pass directly to the upper set of troughs K will pass between them and will be caught by the lower set of troughs K′ which, it will be observed, are arranged immediately below the spaces between the upper series of troughs. When the locomotive is in motion, there is a draft horizontally through the hood which tends to carry the sparks to either the rear or front side of the hood according to the direction in which the locomotive may be moving and there is apt to be an accumulation of more sparks at either the front or rear part of the hood for this reason. In order to accommodate this the discharge-pipe I is connected with the receiving trough H at both front and rear of the hood.

I claim as my invention:

1. A spark-arrester comprising a reticulated hood, means for attaching it to a smoke-stack and a baffling-device suspended from the upper central part of the hood comprising a series of radially-arranged, downwardly-inclined troughs above the stack with intervening spaces for the passage upwardly between them of the products of combustion, having channels on their upper sides in which the sparks are conveyed beyond the top margin of the stack.

2. A spark-arrester comprising a reticulated hood, means for attaching it to a smoke-stack, a trough in the lower portion of the hood surrounding the upper end of the stack, a discharge-pipe connected with said trough and a baffling-device supported within the hood over the smoke-stack comprising a series of radially-arranged, downwardly-inclined troughs with intervening spaces for the passage upwardly between them of the products of combustion and having channels on their upper sides in which the sparks are conveyed beyond the top margin of the stack.

3. A spark-arrester comprising a reticulated hood and a baffling device supported therein comprising a series of radially-arranged, downwardly-inclined troughs, triangular in cross-section, with intervening spaces for the passage upwardly between them of the products of combustion and which have channels on their upper sides in which the sparks are conveyed beyond the top margin of the stack.

4. A spark-arrester comprising a reticulated hood adapted to be attached to a smoke-stack, a receiving-trough arranged in the lower part of the hood around the upper end of the smoke-stack and a baffling-device supported within the hood comprising a series of troughs, triangular in cross-section, extending downwardly and in an inclined direction outwards from the central portion of the hood beyond the top margin of the stack towards the receiving-trough and which have intervening spaces for the passage upwardly between them of the products of combustion.

5. A spark-arrester comprising a reticulated hood adapted to be secured to a smoke-stack, a receiving-trough arranged in the lower portion of the hood and a baffling-device comprising two series of troughs arranged one above the other over the smoke-stack, each of said trough-members having a channel on its upper side in which the sparks are conveyed beyond the top margin of the stack and each trough-member extending radially in an inclined direction downwards and outwards from the central portion of the hood.

6. A spark-arrester comprising a reticulated hood adapted to be secured to a smoke-stack and a baffling-device comprising a central hub supported centrally within the hood above the smoke-stack, two series of troughs arranged one above the other, extending radially downwards in an inclined direction towards the sides of the hood beyond the top margin of the stack and arranged one above the other, means for spacing the two series a suitable distance apart and for securing them to the hood and means for separating the troughs in each series to provide spaces between them for the passage upwardly of the products of combustion from the stack.

7. A spark-arrester, comprising a hood composed of a frame-supporting reticulated material and provided with a clamping-ring at its lower end and having also an adjustable bottom part to accommodate stacks of different sizes, an annular trough detachably supported within the hood and a baffling-device arranged centrally within the hood above the stack comprising radially-arranged troughs having channels on their upper sides which deliver to said receiving-trough.

8. The combination with a smoke-stack of a baffling-device supported above the upper end of the stack comprising two series of

troughs arranged one above the other, each trough in each series extending radially outwards and downwards in an inclined direction and having a channel on its upper side and each series of troughs having a space between each two adjacent troughs for the upward passage of the products of combustion, the troughs in the upper series being arranged immediately above said intervening spaces in the lower series and both series of troughs being arranged to deliver beyond the top margin of the stack.

In testimony whereof, I have hereunto subscribed my name.

JOHN E. DEMPSTER.

Witnesses:

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