

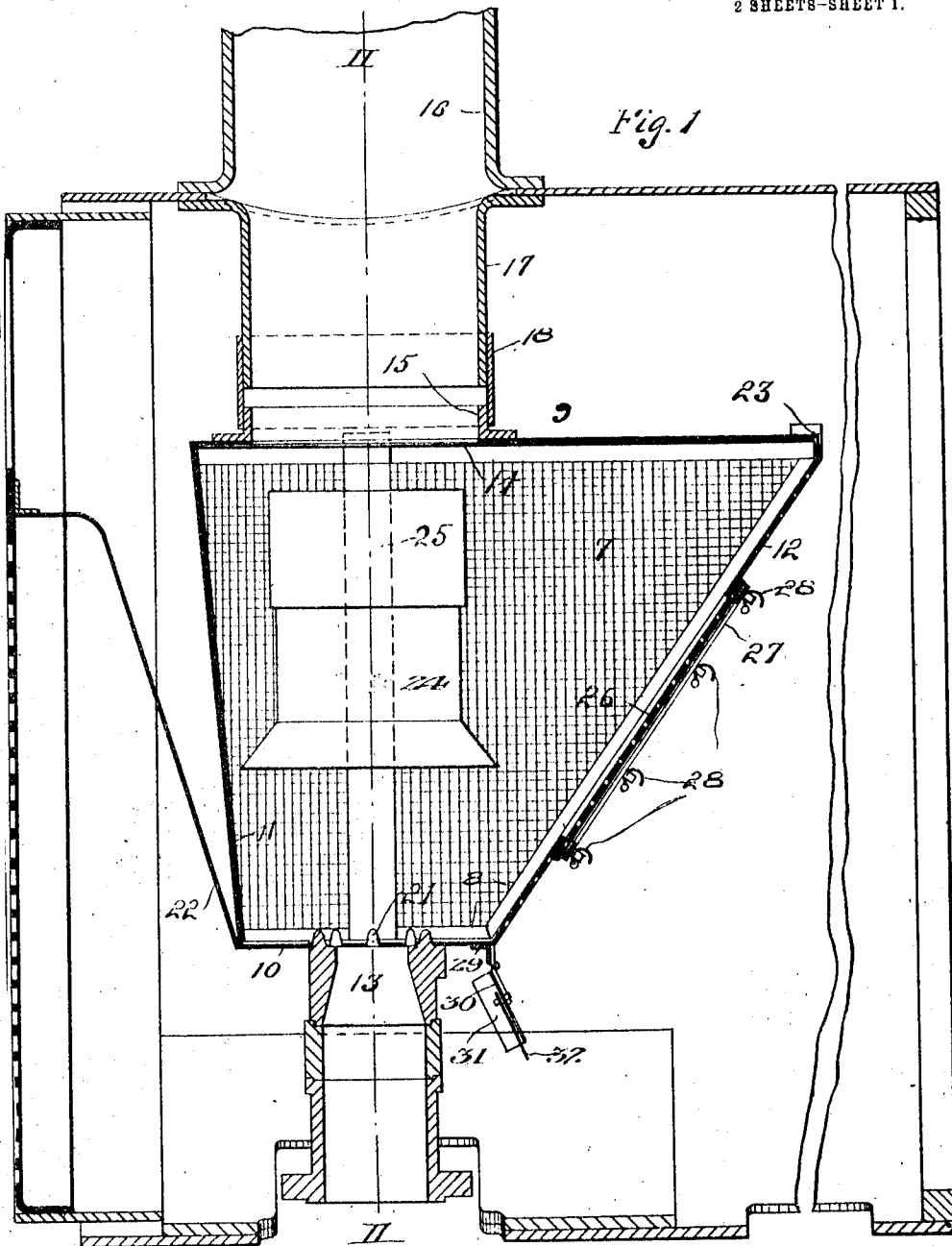
F. SLATER.
SPARK ARRESTER.

APPLICATION FILED JULY 7, 1911.

1,026,834.

Patented May 21, 1912.

2 SHEETS-SHEET 1.



WITNESSES

W. Herbert Foxkes
Hans L. Lechner

INVENTOR

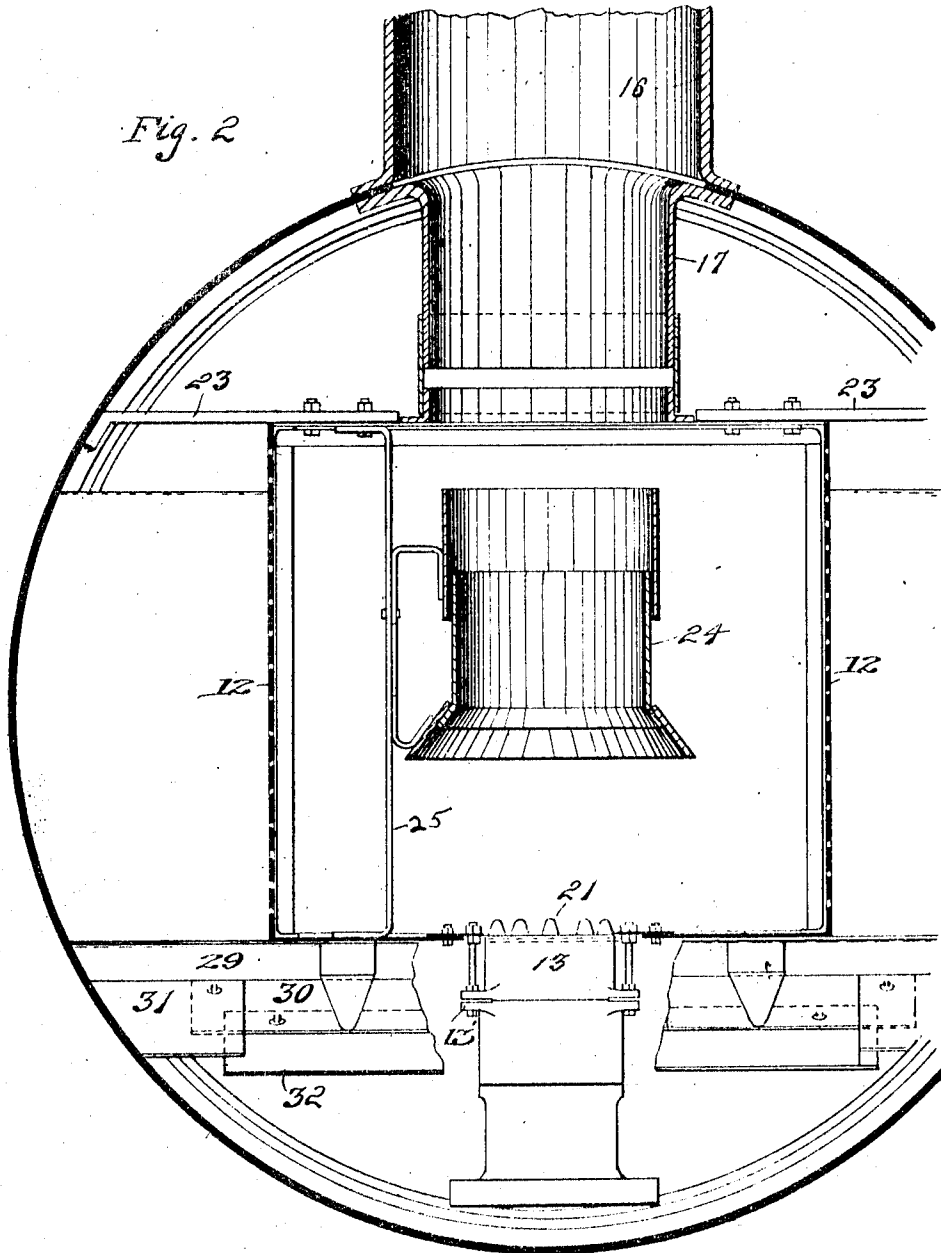
Frank Slater
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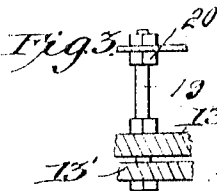
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2 SHEETS-SHEET 2.



WITNESSES:
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UNITED STATES PATENT OFFICE.

FRANK SLATER, OF ESCANABA, MICHIGAN.

SPARK-ARRESTER.

1,026,834.

Specification of Letters Patent.

Patented May 21, 1912.

Application filed July 7, 1911. Serial No. 637,362.

To all whom it may concern:

Be it known that I, FRANK SLATER, a citizen of the United States, residing at Escanaba, in the county of Delta and State of Michigan, have invented certain new and useful Improvements in Spark-Arresters, of which the following is a specification.

My invention has reference to spark arresters and is applicable particularly to locomotives. It has for its primary objects; the provision of an improved spark arrester, shutting off all communication between the boiler chamber and the stack, save through screened openings; and the provision of a spark arrester of the type specified, which can readily be removed bodily from the smoke box; these together with such other objects as may hereinafter appear or are incidental to my invention, I attain by means of a construction illustrated in preferred form in the accompanying drawings, wherein,

Figure 1 is a longitudinal section through the smoke box of the locomotive showing my improved spark arrester in position herein.

Figure 2 is a section on the line II—II of Figure 1.

Figure 3 is a sectional view of a detail of my invention.

Heretofore it has been found a matter of difficulty to provide a spark arrester which is effective in operation and at the same time of simple construction and yet easily and readily removed bodily for purposes of repair or replacement. Owing to the prevalence of forest and prairie fires particularly, and of other fires occurring in the vicinity of the railroads' right-of-way, it has become incumbent upon the railroads to show by the best evidence possible that these fires were not negligently caused by the emission of sparks of a dangerous size from their locomotive stacks. By the introduction in courts of spark arresters as evidence, it follows that the arrester must be so constructed that no pipes pass through the netting or the frame work, and that the frame and netting be readily removable bodily so that it can be shown that the netting and frame is intact.

The removable feature which I attach to my device permits the prompt replacement of another arrester in place of the one removed, and this replacement does not in any way restrict or impair the usefulness of

either the engine or the spark arrester by reason of the transfer. It has been found, that after removing spark arresters of the rigid types now in use, that the structures thereof are so mutilated that their value as evidence is substantially affected; their usefulness is destroyed; their replacement a matter of difficulty. It is the chief object of applicant's invention to provide a compact removable structure which will meet and overcome these various conditions.

Referring to the drawings it will be seen that carrying out my invention, I have provided a spark arrester 7, of a box like shape, comprising a frame 8 composed of angle irons, a top plate 9, a bottom plate 10, and a rear or back plate 11. These plates are riveted to the frame, and the open sides and front of the frame are covered with a screen or netting 12 which may be secured in any preferred manner. The bottom plate 10 has an opening fitting the tip of the exhaust nozzle or pipe 13 and the top plate 9 is provided with an exhaust opening 14 over which is mounted a sleeve or flange 15. The smoke stack 16 has an extension 17 which is secured at the top of the boiler shell and projects downwardly toward and adjacent the flange or sleeve 15. A collar 18 slidably fits over the stack extension 17 and the sleeve 15 having a slip connection therewith. This collar protects and covers the open space between the extension and the sleeve, preventing the admission of any sparks or cinders of a dangerous size. The bottom plate 10 is secured to the flange of the exhaust pipe by means of bolts and nuts in the manner indicated in Figure 3. The bolts 19 pass through the flanges 13'—13' of the exhaust pipe 13 and are held in place by the nuts 20. On the tip of the exhaust pipe is an annular series of nozzle tips 21 which engage and register with the opening in the bottom plate 10. These nozzle tips tend to hold the spark arrester in position. The plate 22, which is the usual diaphragm extending across the smoke box, also serves to support the bottom plate; and at the top of the arrester I have provided a strap or bar 23 at the forward end which abuts the walls of the smoke box and holds the arrester against lateral displacement, thereby relieving the bottom plate 10 of any undue stress. This strap or bar 23 may be in one part, or it may be in two parts as shown in Figure 2, the latter being the preferred means. By the pro-

vision of the mechanism just described, I am enabled thereby to reduce the number of bolts and nuts which would ordinarily be employed to hold the arrester in position and thus make the removal of the spark arrester intact a comparatively simple matter.

Within the arrester I have provided a petticoat 24 which is adjustably mounted on the strap 23 in the manner indicated in Figure 2. This petticoat directs the exhaust steam from the pipe 13, upwardly into the extension 17 and to the stack, and thereby creates an effective draft. It is made adjustable to meet varying conditions. Access to the interior of the arrester for adjusting the petticoat or any other purpose is had through the door 26 provided in the netting of the front side of the arrester. This door is a portion of netting held in position by means of a rectangular frame 27 and the hooks 28. The front end of the supporting plate or diaphragm 22 is supported by means of the angle 29 to which is hinged a stress plate 30 which is in turn secured by bolts to brackets 31. A plate 32 is adjustably mounted on the plate 30 to vary the draft as required.

The gases and solid products of combustion from the fire box passing through the boiler tubes are first carried against the plate 22 and are deflected downwardly and forwardly toward the front end of the smoke box, and then by reason of their natural velocity upwardly around the spark arrester the gases pass freely through the screen while the cinders will be thrown back thereby.

It will be seen that no sparks of any appreciable size whatever will escape from the smoke box to the outside, as the openings in the nettings are small enough to prevent their passage. By my construction all communication from the fire box and boiler chamber to the stack is shut off, save for the screened openings of the spark arrester. None of the steam pipes pass through the netting; and the arrester is firmly but simply held in the position so that it can be readily removed bodily. The removal of the structure is simple; the nuts 20 are removed and then the frame lifted clear of the nozzle tips 21. This upward movement is permitted by the sliding up of the collar 18 to clear the sleeve 15 and as the bar 23 is placed at the forward end of the arrester it does not in any way hinder the removal. In case the bars 23 should bind they can be taken out by removing the nuts. Other advantages will present themselves to those skilled in the art.

Having thus described my invention and illustrated its use, what I claim as new and desire to secure by Letters Patent is the following:—

1. The combination with a locomotive smoke box, an exhaust nozzle having up-

wardly projecting engaging means on its end, and an outlet pipe, of a removable screening box with an outlet at its upper end having a slip collar connection with the outlet pipe whereby the screening box may be moved upward, and having an inlet at its lower end in telescopic relation with the projecting means on the end of the exhaust nozzle, the said upwardly projecting engaging means terminating adjacent the bottom of the screening box so that the screening box and nozzle may be disengaged by a limited vertical movement of the box, and detachable means for holding the screening box against vertical movement.

2. The combination with a locomotive smoke box, an exhaust nozzle having upwardly projecting engaging means on its end, and an outlet pipe, of a removable screening box having an outlet, a slip collar having sliding connection with the said screening box outlet and the outlet pipe, whereby the screening box may be moved upward, the said screening box having an inlet at its lower end in telescopic relation with the said upwardly projecting means on the end of the exhaust nozzle, and the said upwardly projecting means terminating adjacent the bottom of the screening box so that the box and nozzle may be disengaged by a limited vertical movement of the screening box, and detachable means for securing the screening box to the nozzle.

3. The combination with a locomotive smoke box, an exhaust nozzle, and an outlet pipe, of a removable screening box with an outlet at its upper end having a slip detachable connection with the outlet pipe, whereby the box may be moved upward, and having a bottom plate with an inlet opening and resting removably upon the extreme end of the said nozzle, and means for detachably clamping the said bottom plate to the nozzle.

4. The combination with a locomotive smoke box, an exhaust nozzle, and a downwardly projecting outlet pipe, of a removable screening box comprising a metal frame-work, top, back and bottom of solid plates, and sides and front of foraminous material, an outlet pipe carried by the top plate, a slip collar connecting said last mentioned outlet pipe and the said downwardly projecting outlet pipe, the said bottom plate resting for free vertical movement upon the extreme end of the nozzle, and detachable means for clamping the box in position upon the nozzle.

5. The combination with a smoke box, an outlet pipe, and exhaust nozzle, of a foraminous metal screening box with its walls permanently secured together and having an outlet provided with a detachable slip collar connection with the outlet pipe permitting vertical movement of the box, and

with a bottom plate fitting telescopically over the end of the nozzle and freely removable therefrom laterally when the box is moved upwardly as permitted by the slip collar connection, and releasable means for clamping the screening box upon the top of the nozzle.

6. The combination with a smoke box, an outlet pipe, and exhaust nozzle, of a foraminous metal screening box with its walls permanently secured together and having an outlet registering with the outlet pipe but spaced away from such pipe, and with a bottom plate fitting telescopically over the end of the nozzle and freely removable therefrom by a slight vertical movement, a detachable connection between the said outlet and the said outlet pipe permitting the said vertical movement, and releasable means for clamping the screening box upon the top of the nozzle.

7. The combination with a smoke box, an outlet pipe, and exhaust nozzle, of a foraminous metal screening box with its walls permanently secured together and having an outlet registering with the outlet pipe, and with a bottom plate fitting around the extreme end of the nozzle and freely removable therefrom, fixed arms carried by the box with their outer ends in engagement with the walls of the smoke box but freely movable therealong, a detachable connection between the said outlet and the said outlet pipe, and releasable means for clamping the box upon the top of the nozzle.

8. The combination with a smoke box, stack, and exhaust nozzle, of a foraminous

metal screening box having an outlet therein, a telescopic outlet pipe comprising the members 17 and 18 registering with such outlet, said box having a bottom plate fitting over the end of the nozzle and freely removable therefrom, so that limited vertical movement of the screening box clear of the end of the nozzle telescopes one member of the outlet pipe into the other member and upon a further movement of the member 18 permits the withdrawal of the screening box intact.

9. The combination with a smoke box, stack, and exhaust nozzle; of a removable screening box having an outlet opening therein, a collapsible outlet pipe comprising the members 17 and 18 registering with the said outlet, which provide closed means of communication from the said opening to the stack, the screening box having a bottom plate telescopically fitting over the end of the nozzle and freely removable therefrom, so that vertical movement of the screening box limited in scope to clear the end of the nozzle, collapses together the members of the outlet pipe and upon a further movement of the member 18 permits the withdrawal of the screening box intact, and detachable means for clamping the screening box over the end of the nozzle.

In testimony whereof, I have hereunto signed my name in the presence of the two subscribed witnesses.

FRANK SLATER.

Witnesses:

CHARLES M. FROST;
JOE VIELMETTE.