

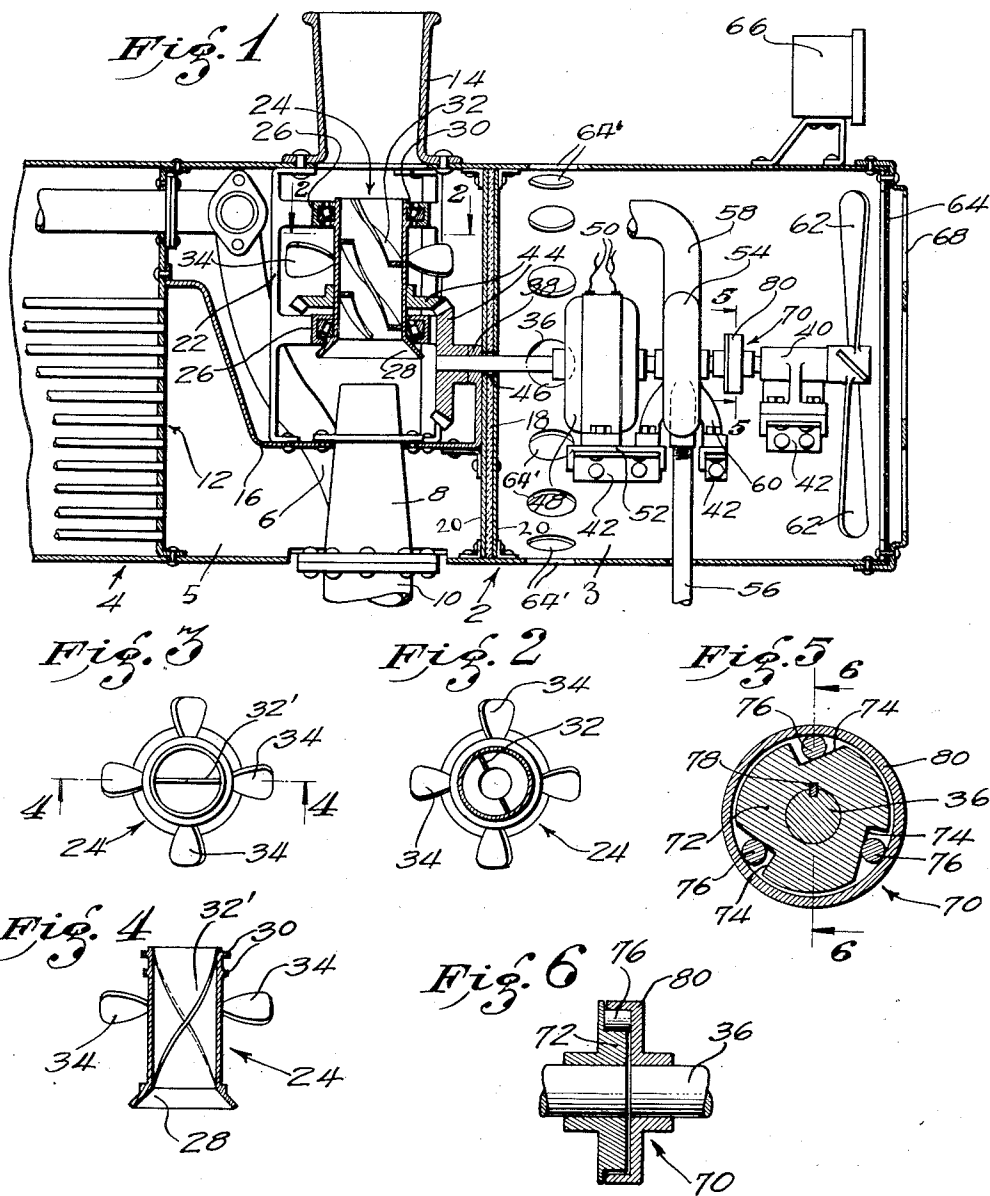
Dec. 17, 1935.

C. R. LYONS

2,024,531

ELECTRICAL BOOSTER

Filed Nov. 2, 1934



Inventor

C. R. LYONS

By

Fred D. Day

Attorney

## UNITED STATES PATENT OFFICE

2,024,531

## ELECTRICAL BOOSTER

Claude R. Lyons, Los Angeles, Calif.

Application November 2, 1934, Serial No. 751,155

6 Claims. (Cl. 290—4)

My invention relates to electrical boosters, and more particularly to such an apparatus adapted to be positioned in the smoke box of a locomotive, whereby electricity may be generated for lighting or other purposes, and by the use of power ordinarily wasted and/or not availed of.

It accordingly is an object of my invention to provide a novel form of apparatus, which may be positioned in the conventional smoke box of a locomotive, and with but slight changes in structure thereof, and which may make use of power, such as that obtained from the fluid pressure formed by or issued from the conventional exhaust nozzle associated with said smoke box, to operate a suitable electric generator, also positioned in said smoke box, or elsewhere, whereby an electric current may be generated for lighting purposes or other uses, with power ordinarily wasted and/or not used, or with minimum power consumption, and withal no back pressure or other losses to the engines associated with said locomotive.

It is also within the province of my invention to provide a novel form of apparatus for actuating a conventional or other form of electric generator by plural or selectively operated mechanisms, where one or more of said mechanisms are idle, and one or more active, and also to provide an additional mechanism, which may be operated when said other mechanisms are idle, such, for example, as utilizing for said purpose the air or wind pressure, as when a locomotive is coasting or moving down grade.

It is also an object of my invention to provide a novel form of electric generator actuating mechanism, such as a modified form of locomotive petticoat, equipped not only with suitable means whereby said petticoat may be operated by the exhaust from the exhaust nozzle of a locomotive, but also provided with means, whereby when said petticoat is operated, a draft may be created so that back pressure losses on the engines of said locomotive will be reduced to a minimum.

A further object of my invention is to provide a novel modification of the smoke box of a locomotive whereby the wind or air pressure created by a locomotive in coasting or going down grade may be used to actuate a suitable propeller to operate in turn an electric generator for lighting or other purposes.

The above and further objects and advantages of my invention as will hereinafter more fully appear, I attain by the construction described in the specification, and illustrated on the drawing forming a part of my application.

Reference is had to the accompanying drawing, in which similar reference characters denote similar parts. In the drawing,

Fig. 1 is a fragmentary cross-sectional view of a locomotive, and more particularly that of its smoke box, showing my invention applied thereto.

Fig. 2 is a cross-sectional view, taken on the line 2—2, Fig. 1.

Fig. 3 is a top plan view of a modified form of rotatable petticoat, such as shown in Fig. 1.

Fig. 4 is a cross-sectional view, taken on the line 4—4, Fig. 3.

Fig. 5 is a cross-sectional view, on a somewhat enlarged scale, taken on the line 5—5, Fig. 1, looking in the direction of the arrows, and

Fig. 6 is a similar view, taken on the line 6—6, Fig. 5.

Describing my invention more in detail, I modify or alter the usual smoke box 2 of the locomotive 4 but slightly, said smoke box having associated therewith in a conventional manner the steam piping 6 leading from the steam dome of the locomotive to the cylinders, said smoke box also having associated therewith the exhaust nozzle 8, connected to the exhaust pipe 10, as is usual, and adapted to force the smoke from the boiler 12 out through the stack 14. The customary table plate, diaphragm and apron are, however, omitted, for reasons to be set forth. The parts are assembled with the usual angle iron and rivet construction shown in Fig. 1 of the drawing. Since all of the structural features thus far described are conventional and are not claimed herein, except as they enter into the combination with my invention, further description and illustration are not deemed necessary.

For the purpose of retaining the heat from the exhaust gases in the boiler, and that resulting from the exhaust steam from the nozzle 8, a suitable partition 18, equipped on both sides with suitable heat insulating material, such as asbestos or the like 20 may be provided, which partition divides the smoke box 2 into a front compartment 3 and a rear compartment 5.

The framework 22 in which the petticoat 24 is mounted is modified somewhat, since said petticoat is different than heretofore proposed, being rotatable, as presently to be more particularly described, said petticoat being mounted for rotation in suitable anti-friction bearings 26, which may in practice take any form desired, said petticoat, also, being provided with the usual flared inlet 28.

As just stated, the petticoat 24 is rotatable in 55

the bearings 26, and is equipped with suitable flanges 30 to coact with said bearings for said purpose; and to provide a means whereby said petticoat may be rotated, the inner surface thereof may be provided with suitable vanes 32 of warped or other form, so that as the exhaust from the nozzle 8 enters said petticoat, the latter will be given a rotary movement. Of course, the vanes 32 may be positioned in any way in practice preferred, depending upon whether a clockwise or counter-clockwise rotation is desired, either of which, or both, are within the province of my invention. In Figs. 3 and 4 I have illustrated an alternative form of vanes 32', said vanes being continuous instead of the plurality disclosed in Fig. 1. The bearings 26 may consist of balls, and one set of said balls may, if desired, be of different size than the other.

If desired, I may provide the external surface of the rotatable petticoat 24 with a set of blades 34 of any preferred number, the function of said blades being that as the petticoat 24 is rotated an additional draft may be created within the smoke box 2, so that if there are any back pressure engine losses they will be nullified or reduced to a minimum to correspond with the direction of rotation of the petticoat 24 so that an upward draft will be created when said petticoat is rotated. The vanes 32 and 32' as well as the blades 34 may in practice be constructed of any preferred material, and may be associated with the petticoat 24 in any way desired.

The smoke box 2 is also provided with a shaft 36, adapted to be rotated by the mechanisms hereinafter to be more particularly described, said shaft being rotated in suitable bearings 38 and 40, held in position in said smoke box by any preferred means, such as the angle irons or supports 42, riveted or otherwise held in said smoke box. Since said bearings and the means for supporting same within the smoke box 2 may be any in practice preferred, and, except as they enter into the combination with my invention may be more or less conventional, further description and illustration are not deemed needed. Further, any preferred number of such bearings may be provided.

Any suitable means for rotating the shaft 36 by the rotatable petticoat 24 may be provided. In the present instance I have shown the meshing bevel gears 44, for this purpose, although any other desired mechanical movement may be substituted therefor, and still remain within the province of my invention. As seen in Fig. 1, the shaft 36 may extend through a hole or opening 46 in the partition 18, which partition may effectively prevent the heat in the compartment 5 from reaching the compartment 3.

Positioned in any desired manner preferred in the compartment 3 is any preferred form of electric generator 48, having leads 50 from which the electric current may be fed to a lighting system for the train and locomotive, or for any purpose in practice preferred, said generator being actuated by the rotation of the shaft 36, and may be mounted upon a suitable support or standard 52, which support or standard may in turn be mounted in the compartment 3 in any manner in practice preferred, as by the conventional angle iron and rivet construction 42.

As will be clear, should the locomotive be idle, and the petticoat 24 stationary, some other means or mechanism must be provided to operate the generator 48 so as not to interrupt the electric current supply. To this end, I may provide

any preferred form of mechanism, such, for example, as the live steam turbine 54, of any preferred form, which turbine may have a live steam inlet pipe 56, equipped with a suitable control valve in the cab of the locomotive, and an exhaust pipe 58, leading to the stack 14 or elsewhere. Said turbine, also, may be mounted upon a suitable support or standard 60, and may also be associated with the smoke box as the support or standard 52, as by the angle iron and rivet construction.

The turbine 54, of course, rotates the shaft 36 in the same direction as that of the petticoat 24.

It will thus be seen that I make use of energy that is ordinarily lost in locomotive practice; that is, the power that may be developed from the exhaust issuing from the exhaust nozzle 8, to generate electrical energy which in the usual practice requires an additional expensive equipment, thus providing a marked saving. Moreover, the installation of my invention in locomotives may be done at a comparatively slight expense, and may be accomplished in a short period of time.

Another important feature of my invention is the utilization of an energy which is ordinarily wasted; that is to say, the wind or air pressure developed by the locomotive in coasting or when going down grade. To this end, I may provide the shaft 36 with a suitable propeller 62, which, if desired, may also be positioned in the compartment 3, although that is not essential, the air or wind pressure entering said smoke box 2 through a suitable screen means 64, the front of the locomotive being equipped with a suitable grill 68, to permit the entry of said air or wind which circulates through the compartment 3 and out of the rear end thereof through air outlets 64' in the rear end of said compartment. I prefer to mount the headlight 66 as shown in Fig. 1. Since the riveting, angle irons, and the like, depicted in Fig. 1 may be conventional, and form no part of my invention, specific reference thereto and description thereof are not deemed needed.

Obviously, the propeller 62 must have a direction of rotation corresponding to that of the turbine 54, so that the shaft 36 will by said mechanisms be rotated in the same direction to provide for a proper operation of the petticoat 24, when said generator is not driven by steam, since said mechanisms will be idle, when the propeller 62 is operated. Some means must therefore be provided so that said operation will be accomplished.

I accordingly provide the clutch 70, which may in practice take any form desired. Such a clutch is more particularly illustrated in Figs. 5 and 6 in which a suitable rotor or internal member 72 provided with suitable inclined cut-out portions 74, housing the clutch elements 76, keyed as at 78 to the shaft 36, and coacting with the external member 80, so that as the elements 76 automatically engage internally in the narrow end of the cut-out portions 74 and with the external member 80, the propeller 62 will drive the shaft 36 in the same direction as the turbine 54 and the petticoat 24 drive the generator 48. Should the petticoat 24 or the turbine 54 be selectively rendered active the clutch elements 76 automatically drop in the under parts of the cut-out portions 74, and the propeller 62 will, of course, remain idle.

If desired, the compartment 3 may be detachably associated with the compartment 5,

or by a suitable hinge construction, either placed internally or externally with respect to either or both of said compartments, so said compartment 3 may be removed or opened, so access may be had thereto for repair purposes or other reasons.

In accordance with the provisions of the patent statutes, I have described the principle of operation of my invention together with the construction and means which I now consider to represent the best embodiment thereof; but I desire to have it understood that the construction and means shown is only illustrative, and that the invention can be carried out by other constructions and other means.

I claim as my invention:

1. In a locomotive, a rotatable petticoat mounted in the locomotive smoke box in position to be rotated by the exhaust steam from the exhaust steam nozzle of the locomotive, means on said petticoat for increasing the draft through the locomotive boiler when said petticoat is rotated, a generator, means to enable said petticoat to operate said generator, and means for operating said generator to operate said petticoat.

2. In a locomotive, a rotatable petticoat mounted in the locomotive smoke box in position to be rotated by the exhaust steam from the exhaust steam nozzle of the locomotive, means on said petticoat for increasing the draft through the locomotive boiler when said petticoat is rotated, a generator, means to enable said petticoat to operate said generator, and means, operated by the live steam of the locomotive for operating said generator.

3. In a locomotive, a rotatable petticoat mounted in the locomotive smoke box in position to be rotated by the exhaust steam from the exhaust steam nozzle of the locomotive, means on said petticoat for increasing the draft through the locomotive boiler when said petti-

coat is rotated, a generator, including its shaft, means whereby said generator shaft is operated by said petticoat, and means, operated by the live steam of the locomotive for operating said generator shaft.

4. In a locomotive, a rotatable petticoat mounted in the locomotive smoke box in position to be rotated by the exhaust steam from the exhaust steam nozzle of the locomotive, means on said petticoat for increasing the draft through the locomotive boiler when said petticoat is rotated, a generator including its shaft, intermeshing gears on said petticoat and said generator shaft, whereby said generator is rotated by the rotation of said petticoat, and means, operated by the live steam of the locomotive, for rotating said generator shaft.

5. In a locomotive, a rotatable petticoat mounted in the locomotive smoke box in position to be rotated by the exhaust steam from the exhaust steam nozzle of the locomotive, means on said petticoat for increasing the draft through the locomotive boiler when said petticoat is rotated, a generator including its shaft, means whereby said generator shaft is operated by said petticoat, and a steam turbine for rotating said generator shaft.

6. In a locomotive, a rotatable petticoat mounted in the locomotive smoke box in position to be rotated by the exhaust steam from the exhaust nozzle of the locomotive, a generator including its shaft, means whereby said generator shaft is rotated by said petticoat, means, operated by the live steam of the locomotive for rotating said generator shaft, a fan, including its shaft, mounted at the forward end of the locomotive, and a clutch for clutching said fan shaft to said generator shaft for enabling said fan to rotate said generator shaft and said petticoat.

CLAUDE R. LYONS.