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G. BELLUZZO

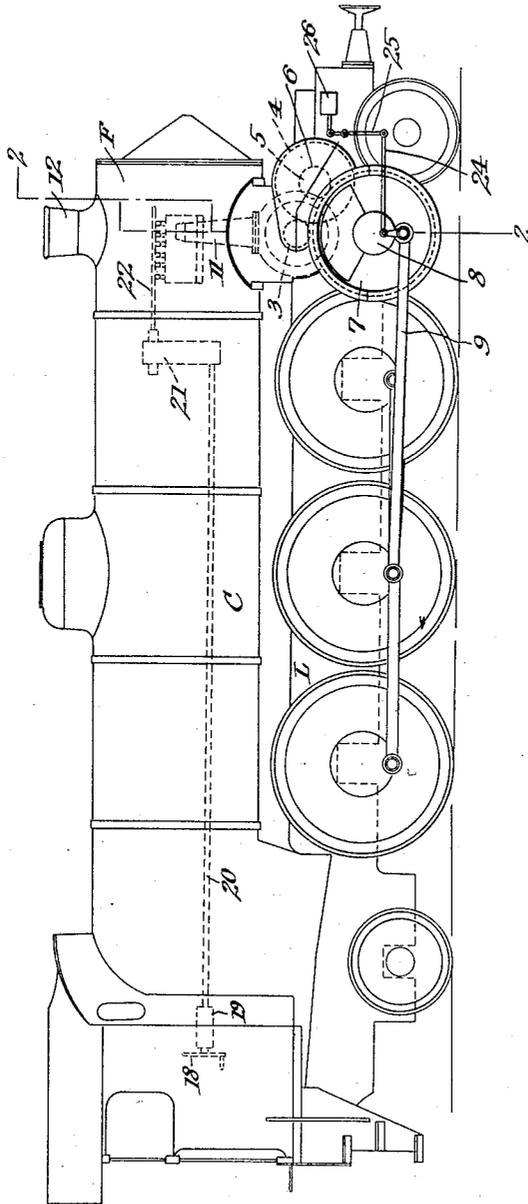
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TURBINE LOCOMOTIVE

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2 Sheets-Sheet 1

Fig. 1.



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UNITED STATES PATENT OFFICE

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TURBINE LOCOMOTIVE

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The present invention is related to a new plant arrangement intended to alter the general structure of the conventional locomotive to such a small extent as to allow any type of piston engine locomotive being rebuilt into a turbine locomotive with a moderate expense and with few and very simple structural changes.

Generally, the invention comprises the positioning of a steam turbine within a steam locomotive and operatively connecting the same to the usual driving wheels of the locomotive. The turbine is the rotor type having admission valves for controlling the forward and backward movement of the locomotive, said admission valves being located outside of the body of the locomotive. Attention is called to the fact that the turbine is disposed transversely of the locomotive and at the forward end thereof within the smoke-box of the boiler.

The advantages of my invention are manifold, as will be apparent from the more detailed description thereof hereinafter set forth.

Other secondary features form also a part of the present invention and they will be particularly specified hereafter.

In the attached drawings:

Fig. 1 is a side view of the turbine locomotive;

Fig. 2 is a cross sectional view of the same, taken on line 2—2 of Figure 1;

Fig. 3 is a vertical sectional view in part taken on the line 3—3 of Figure 2;

Fig. 4 is a plan view in part of the rotor of the turbine showing diagrammatically the steam pipes for controlling the forward and backward movement of the turbine.

In the embodiment shown the turbine is fitted on the front of boiler (C) and in the smoke-box (F) between the two side frames (L). On shaft (2) of the turbine are keyed two pinions (3) meshing with two wheels (4) of a counter shaft (5) on which are keyed two other pinions (6) and two wheels (7) transmit power to a jack-shaft (8) appropriately balanced with balance weights adapted for transmitting its motion through connecting rods (9) to the central driving

axle of the locomotive. The body of the turbine is bolted to the side frames and the lower half of its casing offers two saddles (10) on which the boiler is fixed.

The exhaust steam of the turbine discharges to the smoke stack (12) through an exhaust cone (11), causing a draft for the boiler. The live steam for feeding the turbine comes from the collector (13) of the locomotive and through two large pipes (14) is brought to a cylindrical valve chest (15) mounted outside the smoke box, and in which are six valves governing the admission of live steam to as many pipes, four of which (16) go to the forward motion distributing vanes and two (17) go to the backward motion distributing vanes of the turbine, which, as stated above, is provided with rotors for forward and rotors for backward motion. The regulation of the speed and the reversal of the engine's motion is controlled from the cab, by means of a hand wheel (18), a screw (19) and a rod (20), as in conventional locomotives and by means of a transmission with geared sector contained in box (21) and a shaft (22) on which are mounted six cams controlling the opening of the six above mentioned valves.

From jack-shaft (8) and by means of connecting rod (24), crank (23), crank pin to match and of a lever-arm (25) the motion for a pump (26) is taken, said pump being fixed on the side frame of the locomotive and used for circulating the lubricating oil for the turbine and the gearing.

When the turbine has to be taken down for inspection or repair it is not necessary to take down the boiler, as, by opening the front door of the smoke box, free access is given to the turbine whose upper half cover can be taken out of said smoke box door. The rotor, after having been lifted clear of its bearings can be taken out from apertures (27) cut in the sides of the smoke box in correspondence to saddle (10): said apertures are normally closed by tight metal sheets.

Of course the various accessory parts and devices, may vary in design and structure according to locomotive types to be built or

rebuilt, without exceeding of course the limits of the present invention.

What I claim is:

- 5 1. A locomotive with a single steam turbine, comprising a rotor with a number of wheels adapted respectively to control the forward motion and the backward motion of the locomotive by operating the respective admission valves, characterized by the feature that said turbine is placed transversely
10 on the front of the engine, inside the smoke-box of the boiler, the casing of the turbine providing a saddle for supporting said smoke-box, said turbine casing being mounted and
15 secured to the side frames of the locomotive and being provided with a spur wheel reduction gearing, with at least one countershaft driving, by means of connecting rods, one pair of the coupled driving wheels.
- 20 2. In a locomotive, a turbine secured to the side frames thereof, a casing for the turbine, the lower portion of said casing forming saddles to support the boiler of said locomotive, and means to operatively connect said turbine
25 with the driving wheels of the locomotive.
3. In a locomotive, a turbine positioned in the smoke-box thereof, and means in the sides of the smoke-box to allow access to and extraction therefrom of the turbine.
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4. In a locomotive, a turbine positioned in the smoke-box thereof, and doors in the sides of the smoke-box to allow access to and extraction therefrom of the turbine.
- 35 In testimony whereof I have hereunto set my hand.

GIUSEPPE BELLUZZO.

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