

April 12, 1932.

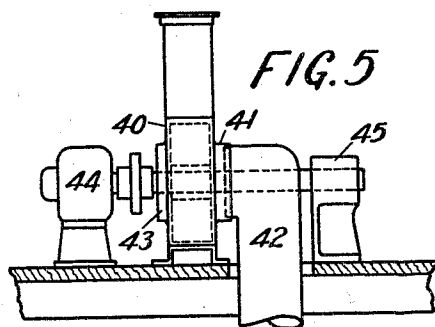
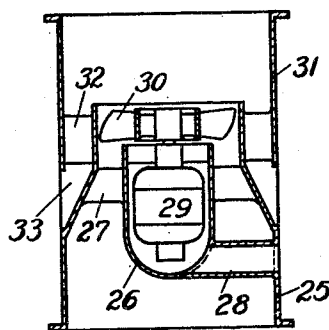
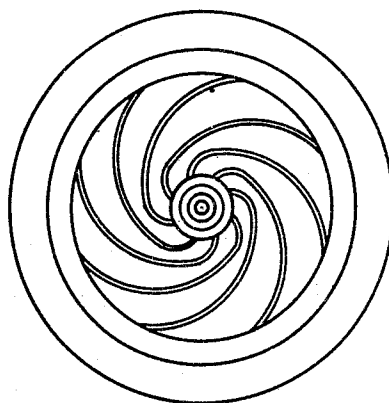
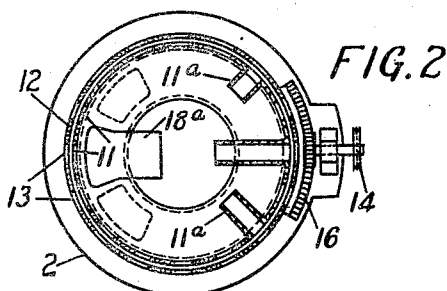
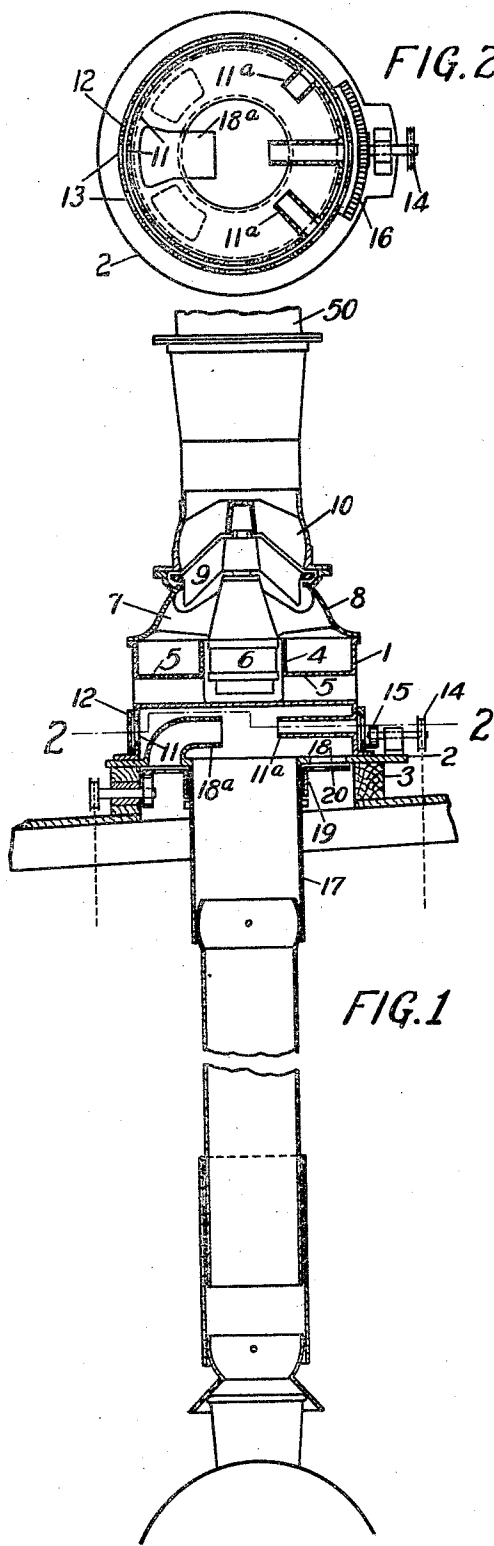
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1,853,336

SMOKE DILUTING AND DRAFT INDUCING APPARATUS

Filed Aug. 4, 1930

2 Sheets-Sheet 1



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SMOKE DILUTING AND DRAFT INDUCING APPARATUS

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2 Sheets-Sheet 2

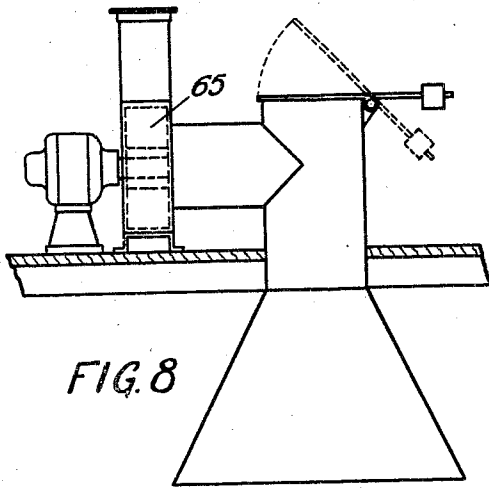


FIG. 8

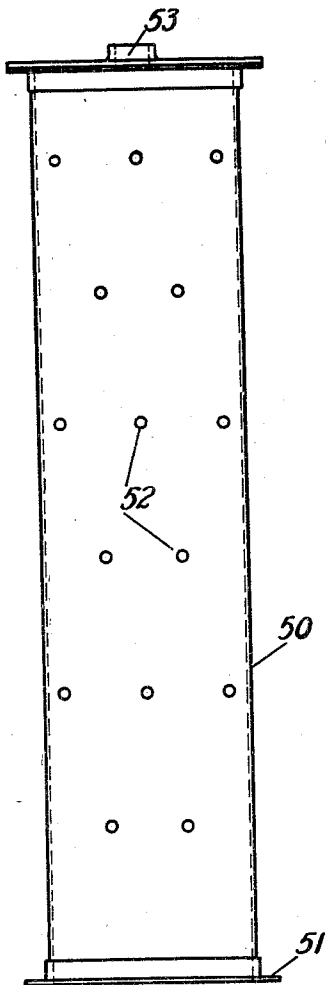


FIG. 6

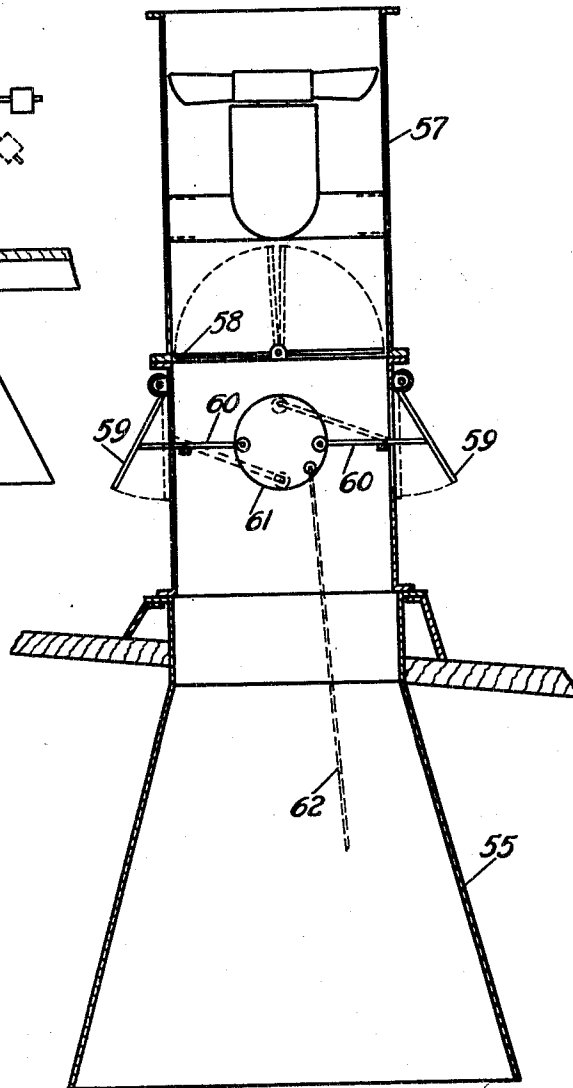


FIG. 7

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UNITED STATES PATENT OFFICE

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SMOKE DILUTING AND DRAFT INDUCING APPARATUS

Application filed August 4, 1930. Serial No. 473,066.

This invention relates to an equipment for inducing draft through the locomotive furnace and for conducting the products of combustion from the stacks of locomotives and discharging them into the atmosphere, but is capable of general use, particularly certain parts of it. In railroad yards where engines are kept under steam and move about there is always much smoke, but when an engine is being drafted starting with a fresh fire, black smoke emanates from the stack for a short period of time. This is particularly the case when an engine is being drafted by means of an exhaustor instead of by means of steam which discolors the smoke. When several engines are thus being drafted and grouped closely together as in a roundhouse or on special tracks outside of the roundhouse, the smoke is concentrated in a comparatively small area, and while the smoke thus made is only a very small portion of the total smoke in the railroad yard, it is localized and often objection is made to it.

The main object of this invention is to dilute the smoke by providing an exhaustor which not only furnishes a draft for the locomotive but at the same time draws in air from either the inside or the outside of the roundhouse so that the gases of combustion are mixed with diluting air and the mixture discharged at high velocity from the exhaustor and thereby diffused, or discharged through a large number of small orifices. In the latter case it may not always be necessary to dilute the gases with air, depending upon the number and size of orifices and their distance apart.

Other objects and advantages of the invention will appear hereinafter.

Reference is to be had to the accompanying drawings, in which

Fig. 1 is an elevational view, partly in section, of a preferred form of the apparatus showing the uptake pipe in position over the locomotive stack;

Fig. 2 is a sectional view on the line 2—2 of Fig. 1;

Fig. 3 is a plan view of the mixer of Fig. 1;

Fig. 4 is a diametrical sectional view of a modification of the exhaustor;

Fig. 5 is a side view of another modification using the centrifugal type of exhaustor;

Fig. 6 is a side view of a discharge pipe 50 which may be connected to the outlet of either Fig. 1, Fig. 4 or Fig. 5;

Fig. 7 is a side view showing a modification which utilizes the smoke jack of a roundhouse, and

Fig. 8 is a similar view of another modification which, like Fig. 5, uses a centrifugal exhaustor.

Referring to Fig. 1 the exhaustor has an inlet casing 1 which is fastened to a plate 2 covering a hole in the roof of the roundhouse within the frame 3. It is shown as taking products of combustion from a telescoping smoke jack. The inlet casing 1 is provided with an inner casing 4 connected to the outer wall of the casing by tubes 5 conducting cooling air to the inner casing 4 in which the motor 6 of the exhaustor extends. The motor frame is supported by ribs 7 from the exhaust casing 8. The fan 9 of the exhaustor is fastened to the end of the shaft of the motor and discharges into a mixing casing 10. The inlet casing 1 below the tubes 5 is provided with slots 11, Fig. 2, and a shutter 12 having corresponding slots 13 surrounding the lower part of casing 1 and can be moved by means of a wheel 14, pinion 15 and rack 16 so as to control the amount of air taken from the outside of the roundhouse into the exhaustor.

To the plate 2 is connected the gas intake 17 from the locomotive stack which may be of any type. The plate 2 also is provided with radial slots 18 and has a shutter 19 with corresponding slots 20 so that when the shutter is open, air from the roundhouse is drawn into the casing 1, thereby ventilating the roundhouse, but when closed only outside air is taken into the casing 1 thereby keeping the heat in the roundhouse when desired.

Some of the slots 11 in the casing 1 and some of the slots 18 in the plate 2 may be provided with conduits 11^a and 18^a respectively extending into the casing 1 for varying distances so that the diluting air is mixed with the gases on the inlet side of the exhaust fan, whereby the inlet casing becomes a mixing casing, at the same time helping out the mixer

at the discharge end of the fan, or making it unnecessary.

Instead of fastening the exhauster to a plate 2, as shown in Fig. 1, it may be used as a portable blower and put on top of a locomotive stack on engines in the yard or suitably supported from an I-beam or rail as shown in my Patent No. 1,669,455, issued May 15, 1928.

In Fig. 4 the exhauster has a casing 25 which may be connected to the plate 2 of Fig. 1. Inside of this casing is spaced a casing 26 being connected with the casing 25 by arms 27 and by a tube 28, providing cooling air for the motor 29 within the casing 26. A fan 30 is fastened to the end of the motor shaft and handles the gases of combustion and the cooling air. Around the upper part of the casing 25 is another casing 31 fastened to the casing 25 by arms 32 thus forming an annular air intake 33, the suction being created by the velocity of the gases passing through the fan 30. The diluting air does not pass through the exhaust fan but is drawn in by the velocity of the gases of combustion. A mixer like that shown in Fig. 3, or of any other form, can be attached to the discharge of the exhauster to mix the gases with the air.

In Fig. 5 the exhauster has a casing 40 with an inlet 41 to which is connected the gas uptake 42 and an inlet 43 which is open to the atmosphere and preferably provided with a shutter (not shown) so as to control the amount of diluting air. The fan is driven by a motor 44 and has a bearing 45 for the other end of the fan shaft. The gases of combustion enter on one side and the diluting air on the opposite side, a mixer (not shown) to be applied to the discharge side of the exhauster for mixing the air with the gases.

The outlet stack shown in Fig. 6 is provided with a flange 51 at the bottom to be bolted to the outlet flange of either exhauster shown in Fig. 1, Fig. 4 or Fig. 5, with or without a mixer, and in such case the gases are put under pressure inside of the stack 50 and discharged through holes 52 and a comparatively small outlet 53 at the top.

In the modification shown in Fig. 7 the usual smoke jack 55 of the roundhouse is utilized. In this case the products of combustion are discharged into the smoke jack by means of an exhauster placed on top of the smoke stack of a locomotive or by means of steam discharged through the smoke stack. An exhauster 57 is placed on top of the smoke jack. This exhauster has double inlet damper 58 which is closed when the exhauster is not in operation. The top of the smoke jack is provided with side dampers 59 which normally hang open when the exhauster is not in operation and through which the gases from an engine standing under the jack are emitted, but when the exhauster 57 is in operation the

dampers 59 are wholly or partly closed by the suction created by the exhauster. The dampers 59 may be held partly open by providing stops consisting of links 60 operated by a crank disc 61. In the position of the links shown in dotted lines, the dampers can close entirely and when the crank disc is turned 90° the dampers 59 are held open as far as possible. The crank disc 61 may be operated by means of a rod 62. Therefore, not only the products of combustion discharged into the smoke jack will be discharged into the atmosphere by the exhauster 57, but air from the roundhouse, of course, will be drawn in with it, thereby diluting the products of combustion and also any air from the outside which is permitted to enter through the dampers 59. The outlet stack shown in Fig. 6 may, of course, be connected to the outlet of the exhauster 57 directly or to a mixer connected to the outlet of the exhauster.

The modification shown in Fig. 8 does not vary in principle from that shown in Fig. 7 the difference merely being that a centrifugal exhauster 65 is used, placed to the side of the jack, and that the top of the jack is provided with a damper which may be controlled similarly to the dampers 59 in Fig. 7.

Certain elements and combinations are shown, but not claimed herein, because they are claimed in my copending divisional application, Serial No. 180,018, filed March 31, 1927, and the combination between the dampers 58 and 59 in Fig. 7 is not claimed herein, as it is claimed in my co-pending application, Serial No. 587,736, filed Jan. 20, 1932.

Although I have illustrated and described several forms of the invention I am aware of the fact that modifications may be made therein by any person skilled in the art without departing from the scope of the invention as expressed in the claims. Therefore I do not wish to be limited in this respect but what I do claim is:—

1. In a roundhouse equipment, the combination of an exhauster, means for conducting products of combustion to the exhauster and means for introducing air into said products for the purpose of discoloring them.

2. In a roundhouse equipment, the combination of an exhauster, means for conducting products of combustion to the exhauster and means for diluting said products with air taken from the inside of the roundhouse for the purpose of discoloring said products.

3. In a roundhouse equipment, the combination of an exhauster, means for conducting products of combustion to the exhauster and means for diluting said products with air taken from the outside of the roundhouse for the purpose of discoloring said products.

4. In a roundhouse equipment, the combination of an exhauster, means for conducting products of combustion to the exhauster and means for diluting said products with air

taken from the inside and outside of the roundhouse for the purpose of discoloring said products.

5 5. In a roundhouse equipment, the combination of an exhauster, means for conducting products of combustion to the exhauster, means for inducing air from the inside of the roundhouse into the exhauster, and means for dispersing the mixture into the atmosphere outside the roundhouse.

15 6. In a roundhouse equipment, the combination of an exhauster, means for conducting products of combustion to the exhauster, means for inducing air from the outside of the roundhouse into the exhauster, and means for dispersing the mixture into the atmosphere outside the roundhouse.

20 7. In a roundhouse equipment, the combination of an exhauster, means for conducting products of combustion to the exhauster, means for inducing air from the inside and outside of the roundhouse into the exhauster, and means for dispersing the mixture into the atmosphere outside the roundhouse.

25 8. In a roundhouse equipment, the combination of an exhauster, means for conducting products of combustion to the exhauster and means at the discharge end of the exhauster for discharging the products of combustion through a large number of small orifices.

30 9. In a roundhouse equipment, the combination of an exhauster, means for conducting products of combustion to the exhauster, means for inducing air from the inside or outside of the roundhouse into the exhauster, means for mixing said air with the products of combustion and means for discharging the mixture through a large number of small orifices.

35 10. In a roundhouse equipment, the combination with a smoke jack, of an exhauster connected to said jack to conduct products of combustion therefrom and means for diluting said products of combustion with air from the inside of the roundhouse.

40 11. In a roundhouse equipment, the combination with a smoke jack, of an exhauster connected to said jack to conduct products of combustion therefrom and means for diluting said products with air taken from the outside of the roundhouse.

45 12. In a roundhouse equipment, the combination with a smoke jack, of an exhauster connected to said jack to conduct products of combustion therefrom diluted with air from the inside of the roundhouse and means for inducing air from the outside of the roundhouse into the exhauster.

50 13. In a roundhouse equipment, the combination with a smoke jack, of an exhauster connected to said jack to conduct products of combustion therefrom and means for discharging said products through a large number of small orifices.

55 14. In a roundhouse equipment, the com-

bination with a smoke jack, of an exhauster connected to said jack to conduct products of combustion therefrom, means for diluting said products with air taken from the outside of the roundhouse, and means for dis- 70 charging said products and diluting air through a large number of small orifices.

15. In a roundhouse equipment, the combination with a smoke jack, of an exhauster connected to said jack to conduct products of 75 combustion therefrom diluted with air from the inside of the roundhouse, means for inducing air from the outside of the roundhouse into the exhauster and means for discharging said products and diluting air 80 through a large number of small orifices.

16. In a roundhouse equipment, the combination of an exhauster, means for conducting products of combustion to the exhauster, means for diluting said products with air 85 and means for dispersing the mixture into the atmosphere outside of the roundhouse.

17. In a roundhouse equipment, the combination of an exhauster, means for conducting products of combustion to the exhauster, 90 means for diluting said products with air for the purpose of discoloring said products and means for dispersing the mixture into the atmosphere outside of the roundhouse.

18. In a locomotive drafting equipment, 95 the combination of an exhauster for conducting products of combustion from the stack of a locomotive, means for connecting the exhauster to a locomotive stack, means for inducing air into the exhauster for dilut- 100 ing the products of combustion, and means for dispersing the mixture into the atmosphere outside of the roundhouse.

19. In a locomotive drafting equipment, the combination of an exhauster for con- 105 ducting products of combustion from the stack of a locomotive, means for connecting the exhauster to a locomotive stack, means for diluting the products of combustion with air for the purpose of discoloring said products, 110 and means for dispersing the mixture into the atmosphere outside of the roundhouse.

20. The method of drafting a locomotive which consists in exhausting the products of combustion and introducing air into them 115 for the purpose of discoloring them.

In testimony whereof I have hereto affixed my signature.

FRANS H. C. COPPUS.

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