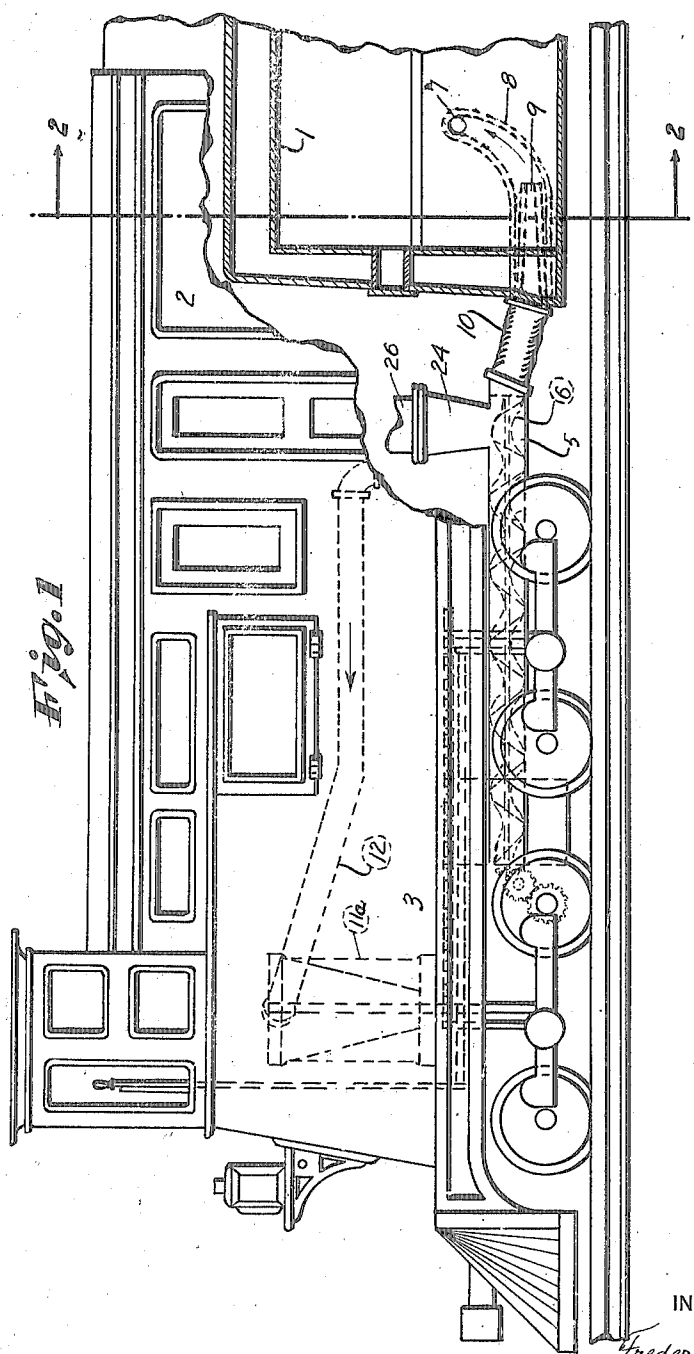


Jan. 9, 1923.

1,441,864.

F. L. McGAHAN.
MEANS FOR TREATING STEAM AND CINDERS.
FILED JUNE 16, 1919.

5 SHEETS--SHEET 1.



INVENTOR:

BY

BY *Frederick L. Mc Gahan,*
Hugh N. Wagner,
ATTORNEY.

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5 SHEETS—SHEET 2.

Fig. 2

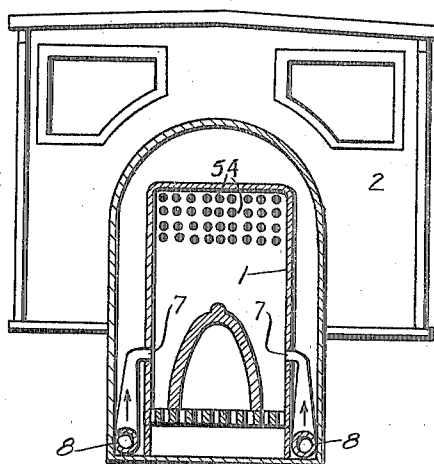
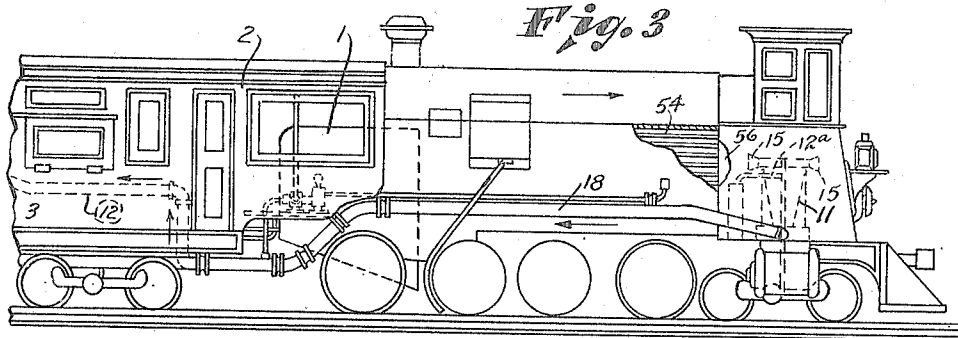


Fig. 3



INVENTOR:

Frederick L. McGahan

BY

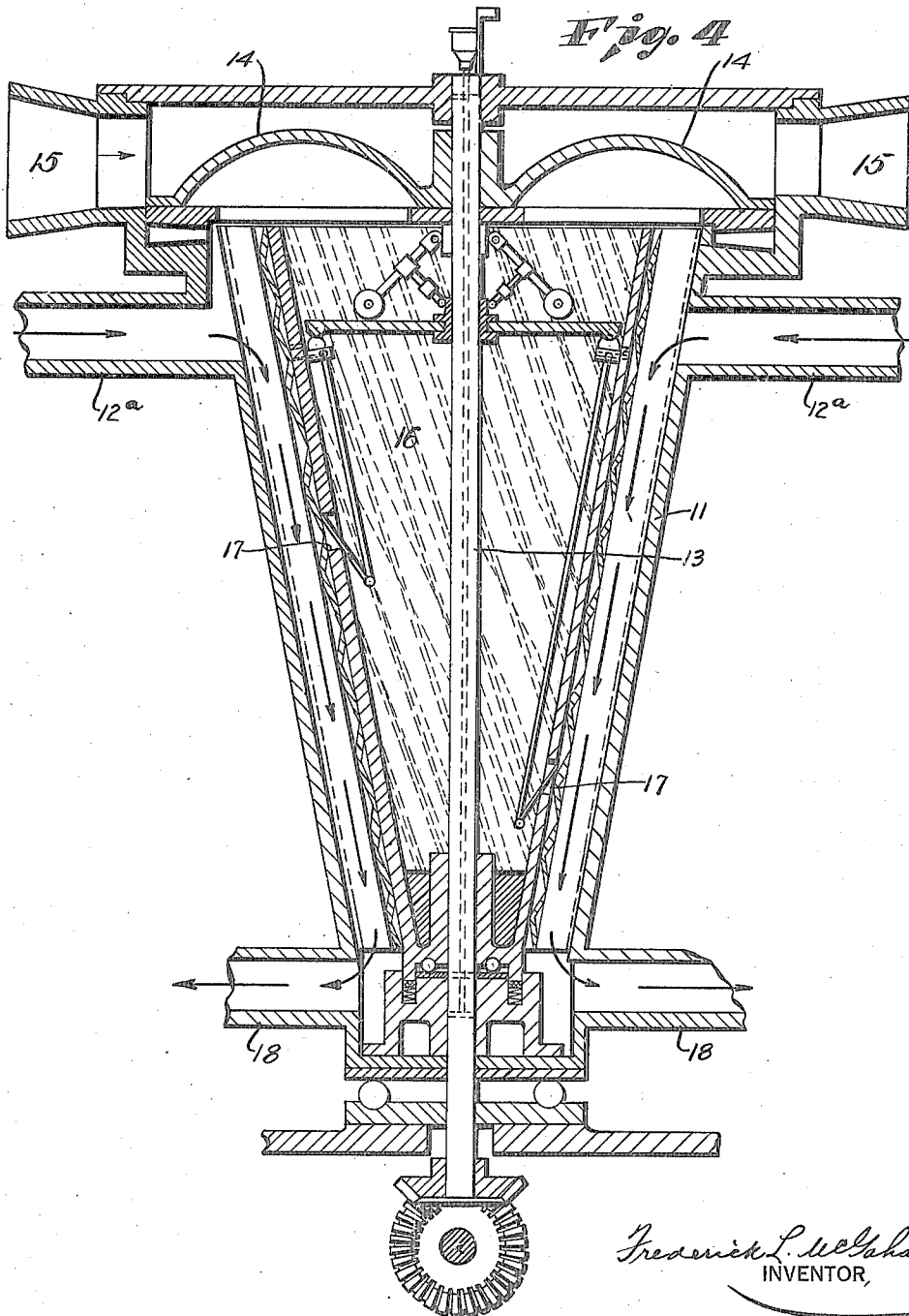
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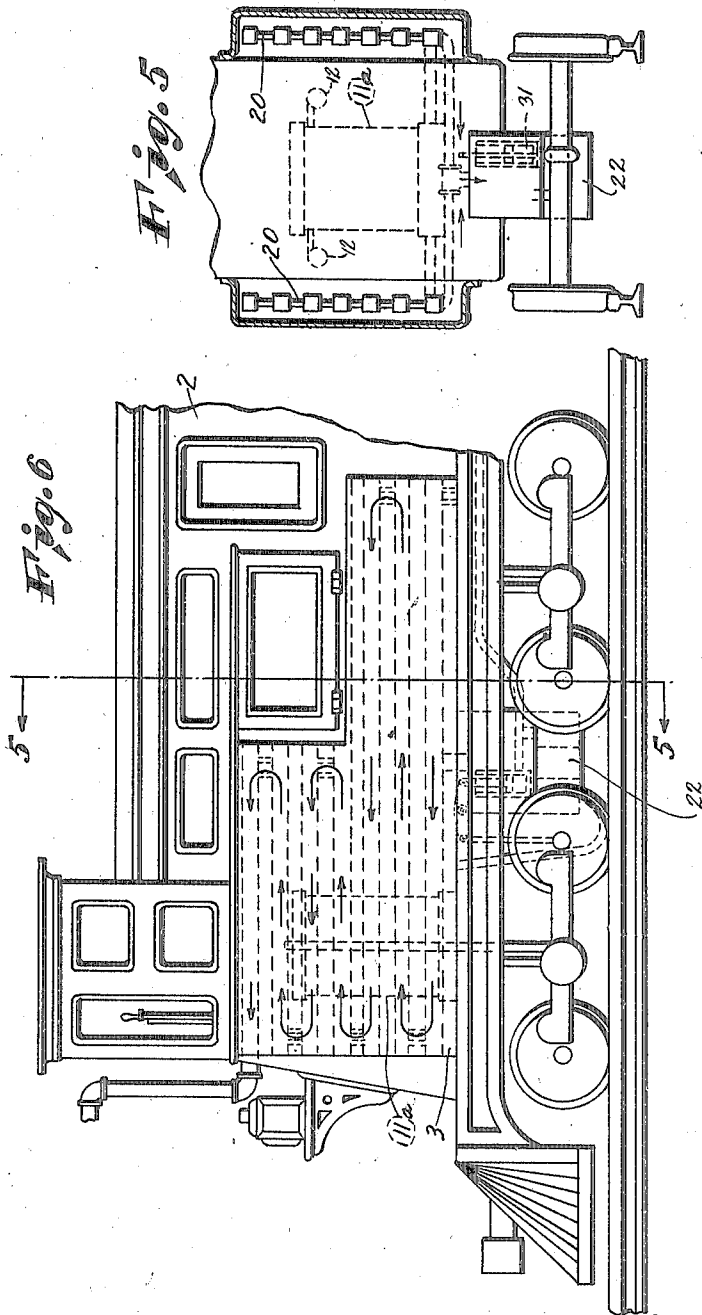
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5 SHEETS—SHEET 4.



INVENTOR:

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BY

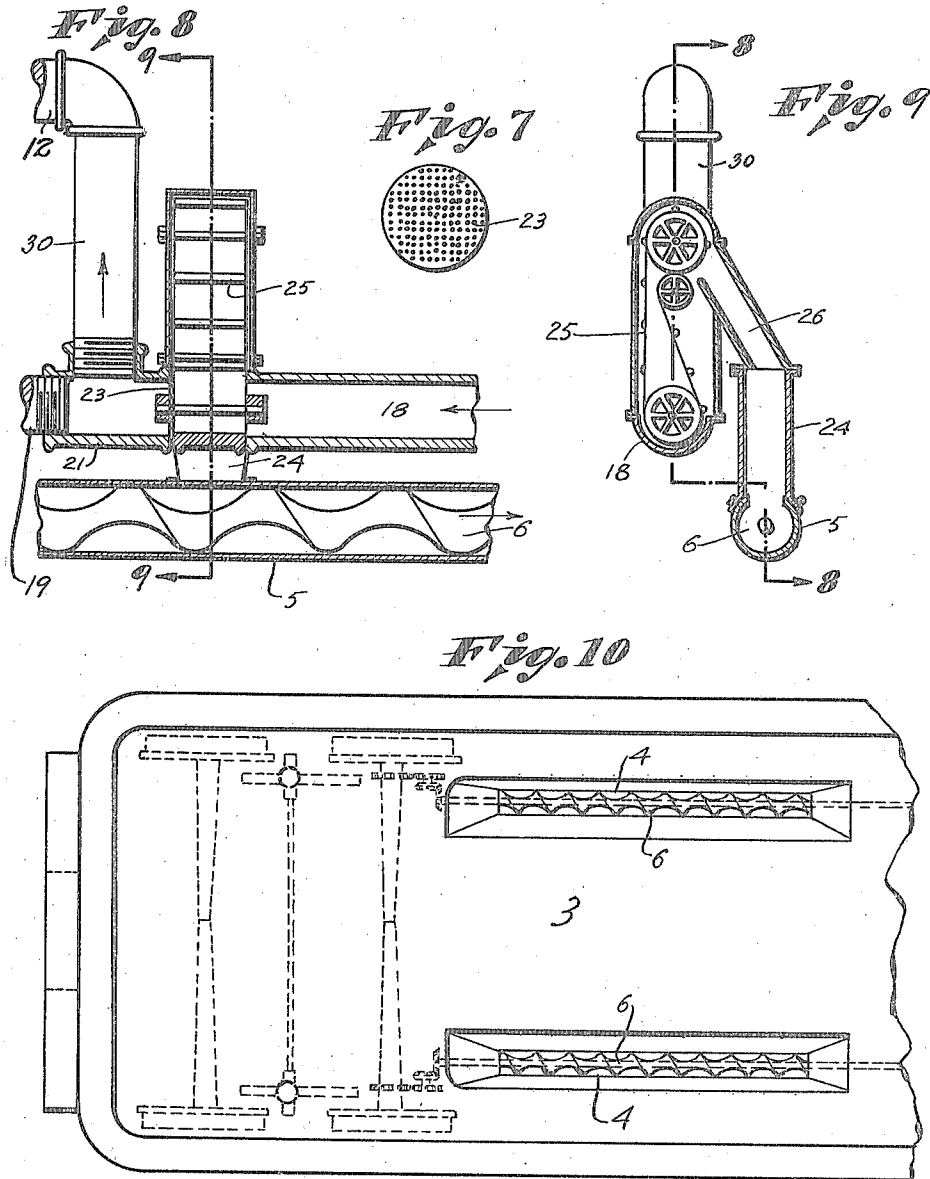
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1,441,864.

5 SHEETS—SHEET 5.



INVENTOR:
Frederick L. McGahan
BY *Hugh N. Wagner*
ATTORNEY.

UNITED STATES PATENT OFFICE.

FREDERICK L. MCGAHAN, OF LOS ANGELES, CALIFORNIA; VIOLA K. WALKER, ADMINISTRATRIX OF SAID FREDERICK L. MCGAHAN, DECEASED, ASSIGNOR TO THE PURPOSED MIND DEVELOPMENT SECURITY ASSOCIATION OF THE WORLD, A TRUST COMPANY.

MEANS FOR TREATING STEAM AND CINDERS.

Original application filed January 3, 1918, Serial No. 210,146. Divided and this application filed June 16, 1919. Serial No. 304,453.

To all whom it may concern:

Be it known that I, FREDERICK L. MCGAHAN, a citizen of the United States, residing at the city of Los Angeles, in the county of Los Angeles and State of California, have invented certain new and useful Improvements in Means for Treating Steam and Cinders, of which the following is a specification.

This invention is subject-matter divided from the application of the same inventor for patent Serial No. 210,146, filed January 3, 1918 for locomotive, which matured into Patent 1,292,399, dated January 21, 1919, and relates more particularly to the mechanism for the return of cinders to the fuel supply and of steam condensed to water to the water tank after purification.

In the accompany drawings forming part of this specification, in which like numbers of reference denote like parts wherever they occur,

Figure 1 is a fragmentary side elevation of tender end of a locomotive broken away to show parts of this present invention, other parts of which are shown in dotted lines;

Figure 2 is a sectional view on the line 2—2 in Figure 1, and shows the fire-box;

Fig. 3, is a partial side elevation of a locomotive showing the inlet from the smoke box to the turbine.

Figure 4 is a sectional view through the turbine 11 and fan that operate the suction system;

Figure 5 is a vertical sectional view on the line 5—5 of Fig. 6, parts being shown in elevation showing the relation of the condensing coils to other parts;

Figure 6 is a side elevation of a locomotive tender showing the said condensing coils;

Figure 7 is a side elevation of the separating screen or spark-arrester;

Figure 8 is a sectional view on the line 8—8 in Figure 9;

Figure 9 is a sectional view on the line 9—9 in Figure 8; and

Figure 10 is a plan view of the tender illustrating the screws of the automatic fuel-feed and the openings in the floor of the

tender enabling the fuel to fall around the said screws.

The fire-box 1 is located in the usual relation to the cab 2, and fuel, preferably pulverized, is contained in the tender 3 having slots 4 in its floor opening into conveyors 5 containing endless screws 6.

Nozzles 7 open into the inside of fire-box 1, and are themselves integral with or connected with pipes 8, which are in telescopic connection with pipes 9, which are connected by flexible joints 10 to conveyors 5. In the practice of the invention of this patent, the screws 6 may or may not be used. If the said screws are used, it will be in combination with the suction device herein described. The turbine 11 is driven by steam entering it through pipes 12^a leading from the exhaust of the ordinary driving engine of the locomotive. Rotation of turbine 11 continuously drives shaft 13, while the locomotive is traveling, and therewith fan 14. (See Fig. 4.)

Fan 14 thus exerts continuous suction upon inlets 15, which communicate with the smoke box 56 that is in communication with the fire-box 1 through the fire tubes 54. This suction draws pulverized fuel through nozzles 7 into the interior of fire-box 1, and, in so doing, draws sparks or burning cinders through the fire tubes 54 into inlets 15, which pass through the chamber 16 of the turbine 11 and out through the opening 17 and through the exhaust pipes 18 together with the exhaust steam from the turbine 11.

The water of condensation formed in the pipes leading to the T-connection 21 flows directly through pipe 19 to the filter 22, while the steam passes by way of the vertical pipe 30 and the horizontal pipes 12 to turbine 11^a from which it passes to the condenser 20, the water of condensation passing to the filter 22.

It will thus be seen that the exhaust steam from the usual driving engine of the locomotive passes through the pipes 12^a to actuate the turbine 11 and thereby operate the fan 14 to draw the products of combustion from the locomotive fire-box through the fire tubes and into the smoke-box 56 and

thence through inlets 15 into the interior of the turbine 11 where the products of combustion mix with the steam. This mixture of steam and products of combustion
5 then exhausts into pipe 18.

Pipe 18 contains the spark-arrester 23, which causes the stoppage of the cinders and, in a manner about to be described, their deposit through hopper 24 into the
10 conveyors 5 (see Figs. 7, 8 and 9), whence they are either forced by screws 6 or sucked, as hereinbefore described, through nozzles 7 back again into the fire-box 1. The steam continues on through pipes 30 and 12 to ac-
15 tuate the low pressure turbine 11^a which drives the wheels of the tender 3 and the screws 6, as described in the said patent for locomotive, 1,292,399.

Elevator 25 is so arranged as to carry
20 away all cinders stopped by spark-arrester 23, and to dump them into run 26, which leads to hopper 24 (see Figures 1, 8, and 9), from whence they fall by gravity into conveyors 5.

25 There may be one or a plurality of conveyors 5 and the parts illustrated in connection therewith, as, for instance, in Figure 10.

A pump 31, shown in Figure 5, and driven
30 through suitable gearing with a driven part of the locomotive, such for instance as the truck wheels, is provided for pumping the water from the filter 22 back to the boiler.

Having thus described this invention, I
35 hereby reserve the benefit of all changes in form, arrangement, order, or use of parts, as it is evident that many minor changes may be made therein without departing from the spirit of this invention or the scope
40 of the following claims.

I claim:

1. In a locomotive having a boiler, the combination of a fire-box, a source of pul-
45 verized fuel connecting therewith having spouts for the said fuel communicating with the interior of the said fire-box, suction

means for drawing the fuel through the said spouts into the fire-box, a rotatable member having a chamber therein, means for admitting steam into the said chamber to
50 rotate said rotatable member, means for carrying smoke, cinders, and sparks from the fire-box to and into the said chamber, thereby mixing the said smoke and steam, and a return system to the fire-box for the
55 cinders and sparks, and to the boiler for the steam, the said return system consisting of suitable pipes, a steam condenser, a filter, and a pump.

2. In combination a boiler, a fire box, a
60 source of fuel supply, means for delivering the fuel from said supply to the fire box, means for moving the products of combustion from the fire box, a means for mixing steam with the products of com-
65 bustion removed from the fire box, a separator, means for carrying the products of combustion, smoke, sparks and cinders to said separator whereby the products of combustion, sparks and cinders, are sepa-
70 rated out from the steam and water of condensation, means for returning the separated products of combustion, cinders, and sparks back to the fire box and the water of condensation back to the boiler. 75

3. In combination a boiler, a fire box, a
source of fuel supply, means for delivering the fuel from said supply to the fire box, means for drawing the products of com-
80 bustion, sparks, cinders, and smoke from the fire box and mixing the same with steam, a return system to the fire box for the products of combustion, cinders, and sparks and to the boiler for the steam, said system com-
85 prising a separator for removing the products of combustion, cinders, and sparks from the steam and its water of condensation.

In testimony whereof I hereunto affix my signature.

FREDERICK L. MCGILLAN.