

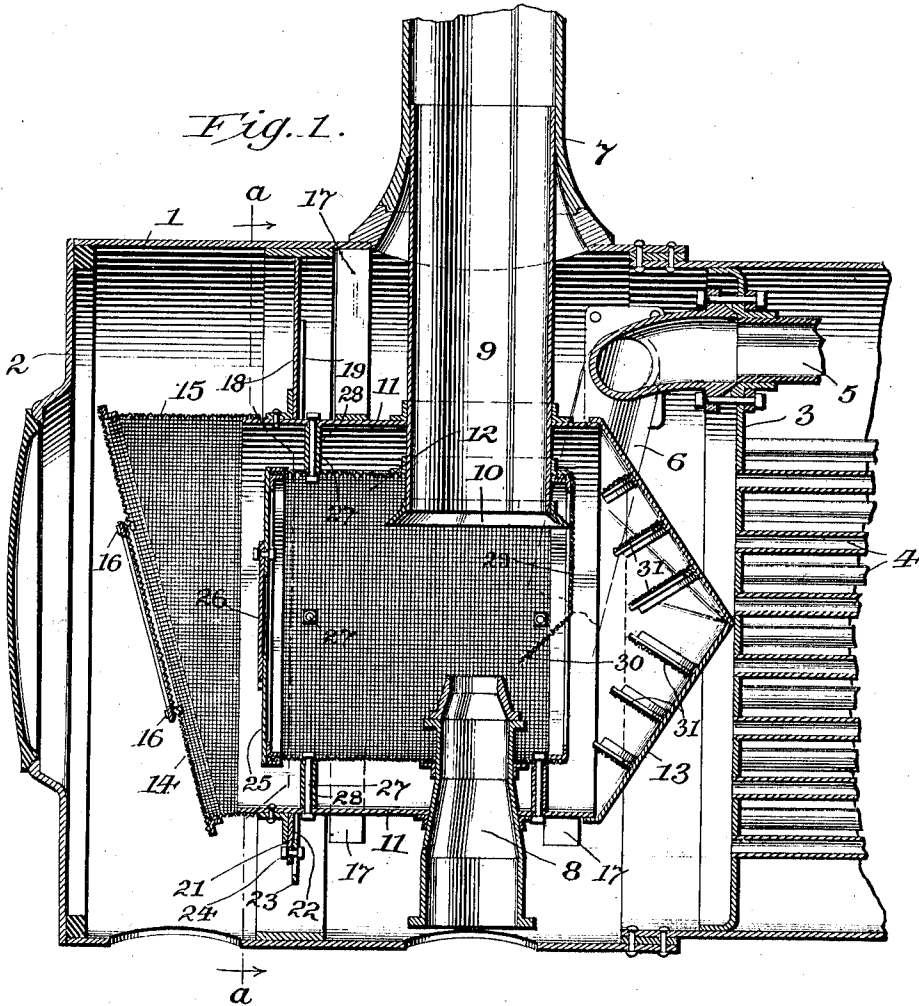
G. J. HATZ.
LOCOMOTIVE.

APPLICATION FILED APR. 18, 1910.

974,486.

Patented Nov. 1, 1910.

2 SHEETS—SHEET 1.



Witnesses:

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Inventor:

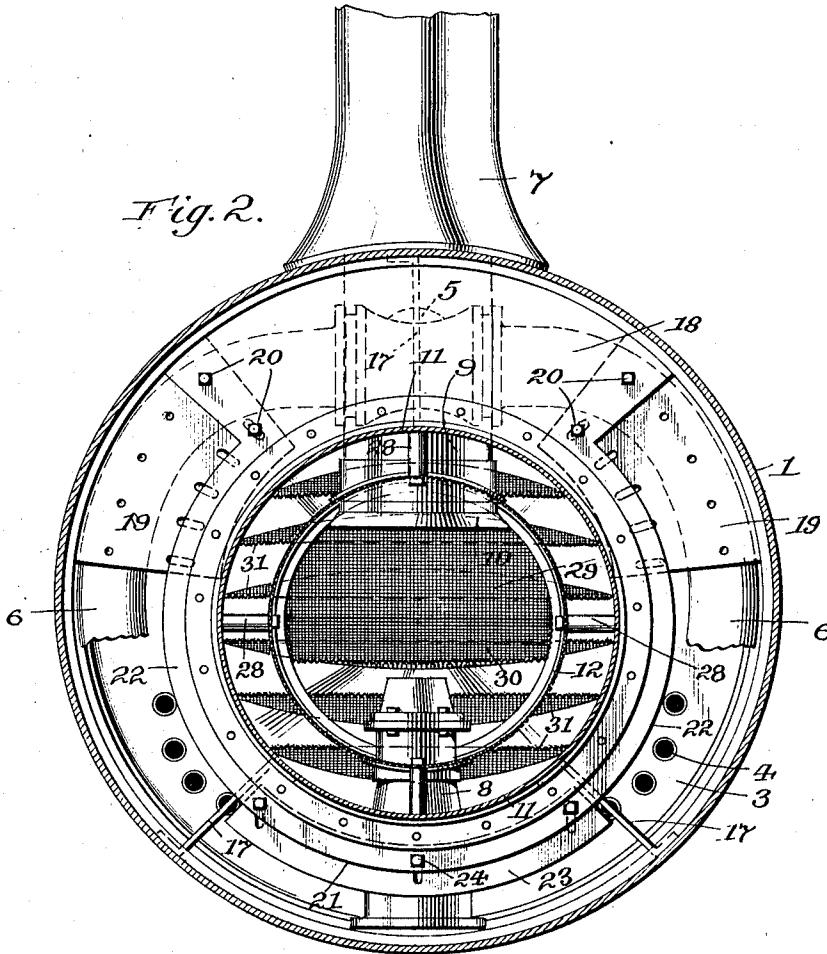
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2 SHEETS—SHEET 2.



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UNITED STATES PATENT OFFICE.

GEORGE J. HATZ, OF OMAHA, NEBRASKA.

LOCOMOTIVE.

974,486.

Specification of Letters Patent.

Patented Nov. 1, 1910.

Application filed April 18, 1910. Serial No. 556,097.

To all whom it may concern:

Be it known that I, GEORGE J. HATZ, a citizen of the United States, residing at Omaha, in the county of Douglas and State of Nebraska, have invented certain new and useful Improvements in Locomotives, of which the following is a specification.

This invention relates to locomotives, and particularly to an improved arrangement of the front end, whereby more uniform draft is secured in the fire box, and whereby the danger of emitting large and live sparks is reduced to a minimum.

In the various front end arrangements heretofore devised, the path traveled by the products of combustion has not been sufficiently tortuous to completely break up the cinders and sparks which are inevitably drawn through the boiler tubes, and the result has been either to discharge such sparks, or cinders in a burning condition, or else to cause their retention in the smoke box unduly, thus necessitating too frequent cleaning or causing the burning out of the smoke box.

By my invention the products of combustion are caused to pursue a circuitous path in the smoke box with frequent and sudden changes in direction, so that while the draft of the locomotive is not impaired the cinders are completely broken up and extinguished prior to their discharge through the stack.

A structure embodying the various features of the invention is illustrated in the drawings, wherein:

Figure 1 is a longitudinal vertical section on the center line of the smoke box of a locomotive, showing the invention applied; and Fig. 2 is a section on line *a-a* of Fig. 1.

In the drawings 1 represents the smoke box, 2 the front cover plate thereof, 3 the front tube sheet of the boiler in which the boiler tubes 4 are expanded, 5 is the main steam pipe, and 6 are the branch steam pipes leading to the admission sides of the cylinders.

7 is the stack of the locomotive and 8 is the exhaust nozzle, bringing steam from the cylinders.

All the above enumerated parts are essentially identical with those in ordinary use on steam locomotives.

As is usual in locomotive construction, the exhaust nozzle 8 and the stack 7 are alined.

In the present construction an extension draft pipe 9 is provided which is connected

with the stack and extends downward to a point a short distance above the exhaust nozzle 8, and is provided at its lower extremity with a flaring rim 10. This extension pipe 9 passes through and makes close joints with two cylindrical drums or shells 11 and 12, which are concentric with each other and substantially concentric with the smoke box 1. Thus the flaring mouth 10 of the draft pipe 9 is within the drum 12, and all gases passing out through the stack 7 are drawn from the interior of the drum 12. Similarly the exhaust nozzle 8 extends through the walls of the two drums, making close joints therewith and terminating at a point within the inner drum, as clearly indicated in the drawings. The outer drum 11 is constructed of sheet metal or plate and at its rear is closed by a conical head 13, also of plate, having its convex side toward the tube sheet. The head 13 thus serves as a deflector plate for the gases discharged from the front ends of the boiler tubes, and has a tendency to equalize the draft upon these various tubes. In the construction shown the apex of the conical head 13 is in contact with the tube sheet and this is the usual construction.

The forward end 14 of the drum 11 and a portion of the sides of the drum adjacent the forward end, as at 15, are constructed of netting or perforated sheet metal or analogous material, so that gases from the boiler tubes first pass around the drum 11, and then enter through the foraminous portion of the drum. A portion of the end 14 is removably mounted with bolts 16 to give access to the interior of the drum. The drum is supported in position by wrought-iron braces 17, and further by the baffle plate 18, at its upper side. This plate 18 extends through only a portion of the circumference of the annular space intervening between the drum 11 and the smoke box walls 1. In order to vary its effect upon the draft it is provided with adjustable extension plates 19, at either side. These plates 19 are held by the bolts 20 to the baffle plate 18 and may be attached thereto at various positions so as to vary the total width of this baffle at will. A second baffle 21 is suspended from the lower side of the drum 11 and extends a part of the radial distance from the drum to the walls of the smoke box 1, and through only a part of the circumference of the annular space intervening between the drum and the smoke box. The

baffle 21 consists essentially of a plate 22 attached directly to the drum 11, and an extension plate 23 held to the plate 22 by bolts 24. The holes for the bolts 24 are elongated to form slots, so that the plate 23 is adjustable vertically to vary the extent of the baffle. Thus the baffle 18 prevents the passage of gases forward over the top of the drum 11, the circumferential range of this baffle being adjustable, while the baffle 21 being also adjustable may produce any desired restriction within a limited range to the flow of gases past the under side of the drum.

The drum 12 is constructed entirely of foraminous material, with the exception of the front plate 25, which is of sheet metal and is provided with a removable door or cover 26 to permit access to its interior. It is supported within the drum 11 in any suitable manner, bolts 27 with distance pieces 28 being indicated in the drawings. The drum 12 is partially open at its rear side, the netting 29 forming this portion being inclined inward as at 30 and terminating at a point adjacent the tip of the exhaust nozzle 8. Below this point the drum is open. To enter this open portion of the drum, the products of combustion must pass through the rear portion of the drum 11, and a series of shelves or baffles 31, also of foraminous material intercept and tend to disintegrate any cinders that may be carried by the gases. Thus the products of combustion passing through the head 14 of the drum 11, either pass through the sides of the drum 12 or the rear thereof to its interior, and are then drawn up through the extension draft pipe 9 and stack 7 to the atmosphere by the action of the blast from the exhaust nozzle 8.

From the above description it will be obvious that the smoke and cinders are caused to pursue a tortuous path and pass through many nettings. Because of the various changes in direction the cinders are thrown against various obstructions so that they are rapidly disintegrated and broken up, with the result that by the time they are discharged from the stack they are practically extinguished, or if not extinguished so small in size as to burn up before doing any damage. As a result of this action, it is possible to use rather coarse netting and consequently, although the gases pursue a longer course, it is, nevertheless relatively free. Thus the draft is not impeded and there is less tendency for cinders to be deposited in the smoke box.

The provision of the conical head 13 tends to equalize the draft effect upon the various boiler tubes. The shelves 31 are particularly advantageous because the larger particles, from their greater momentum, will be thrown to the rear of the drum 11 and successively against these shelves, until they are effectually broken up. The adjustable fea-

tures of the two baffle plates permit a nice adjustment of these plates to the particular locomotive.

It is to be understood that in designing the structure these baffles can be proportioned so as to be approximately correct for the particular locomotive, the adjustable feature thus serving to permit variations that actual operation indicates to be desirable. Thus the exact proportions indicated in the drawings are given as merely illustrative, and the baffle 21 as well as the baffle 18 may be made to embrace a greater or less proportion of the circumference of the annular space between the drum 11 and the smoke box 1, according to the particular design and requirements of the locomotive.

Although I have described in detail the various features of the structure it is to be understood that minor variations can of course be made without departing from the spirit of the invention.

Having thus described my invention, what I claim is:—

1. The combination of a smoke box; a plurality of drums located therein, each drum having one closed end, the said drums being mounted one within another with the closed end of one adjacent the open end of the next and with spaces intervening between their walls to form a sinuous smoke passage from the smoke box to the innermost drum; and a smoke stack adapted to carry smoke from the innermost drum.

2. The combination of a smoke box; a plurality of drums, located therein, each drum having one closed end, the said drums being mounted one within another with the closed end of one adjacent the open end of the next, and with spaces intervening between their walls to form a sinuous smoke passage from the smoke box to the innermost drum; screens of foraminous material in the open ends of said drums; and a smoke stack connected to said innermost chamber.

3. The combination of a smoke box; a plurality of drums, located therein, each drum having one closed end; the said drums being mounted one within another with the closed end of one adjacent the open end of the next, and with spaces intervening between their walls to form a sinuous smoke passage from the smoke box to the innermost drum; screens of foraminous material in the open ends of said drums; baffles of foraminous material in said sinuous passage; and a smoke stack connected to said innermost chamber.

4. The combination of a smoke box; a plurality of drums, located therein, each drum having one closed end, the said drums being mounted one within another with the closed end of one adjacent the open end of the next, and with spaces intervening between their

walls to form a sinuous smoke passage from the smoke box to the innermost drum; screens of foraminous material in the open ends of said drums; baffles of foraminous material in said sinuous passage; baffle plates within the smoke box and outside said drums; means for adjusting the area of said baffle plates; and a smoke stack connected to said innermost chamber.

10 5. The combination of a smoke box, a drum in said smoke box having one closed end; a screen of foraminous material in the open end of said drum; baffles of foraminous material upon the interior of the closed end
15 of said drum adapted to receive and disintegrate the larger cinders; and means for withdrawing smoke from said drum at a point adjacent the baffles.

20 6. The combination of a smoke box; a drum mounted therein closed at its rear end and open at its forward end; a screen of foraminous material in the open end of said drum; a second drum within the first closed at its forward end and open at its rear end;
25 a screen of foraminous material extending partially across the open end of said second drum; and a smoke stack connected to said second drum.

30 7. The combination of a smoke-box; a drum mounted therein closed at its rear end and sides and open at its forward end; a screen of foraminous material, in said open end; a second drum within the first closed at its forward end and having sides of forami-

nous material; a screen of foraminous material extending partially across the open end of said second drum; and a smoke stack connected to said second drum. 35

8. The combination of a smoke box; a drum mounted therein closed at its rear end
40 and sides and open at its forward end; a screen of foraminous material, in said open end; baffles of foraminous material within said drum at its rear end; a second drum within the first closed at its forward end and
45 having sides of foraminous material; a screen of foraminous material extending partially across the open end of said second drum; and a smoke stack connected to said second drum. 50

9. The combination of a smoke box; a drum therein having its forward end open and its rear end closed by a conical head adapted to serve as a deflector to gases entering the smoke box; a screen of foraminous material in said open end; a plurality of
55 baffles of foraminous material disposed within said drum upon the conical head thereof and adapted to receive and disintegrate the larger cinders; and a smoke stack for with-
60 drawing smoke from said drum.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

GEORGE J. HATZ.

Witnesses:

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CORNELIUS J. CAREY.