

T. R. DAWSON.

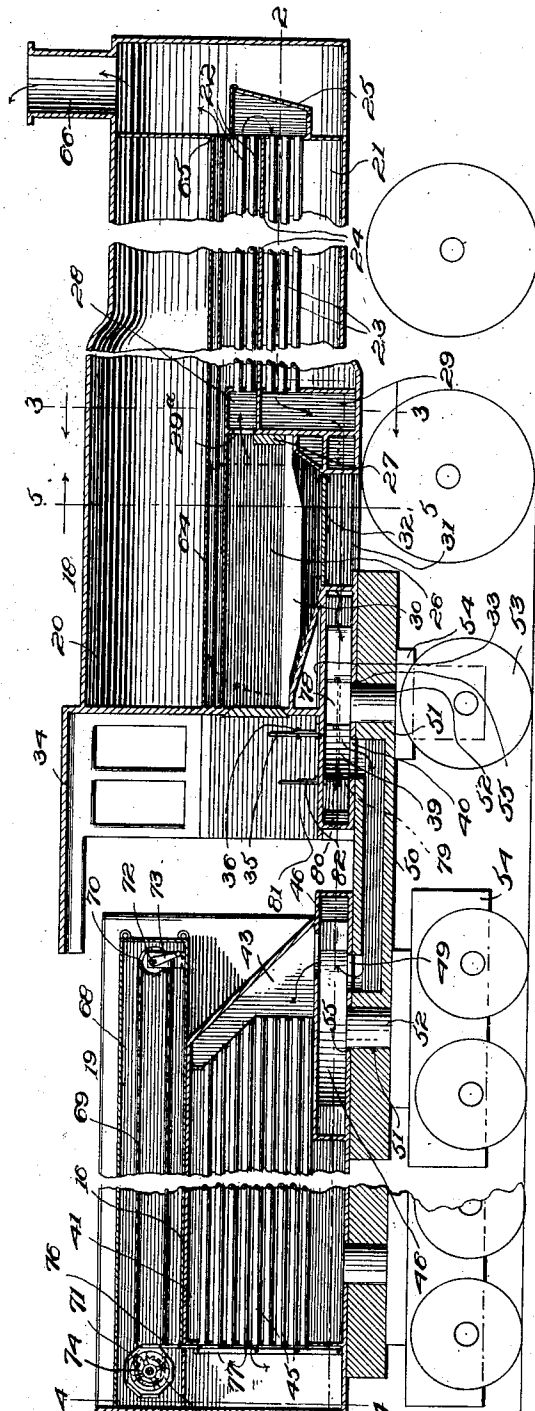
LOCOMOTIVE.

APPLICATION FILED MAY 10, 1911.

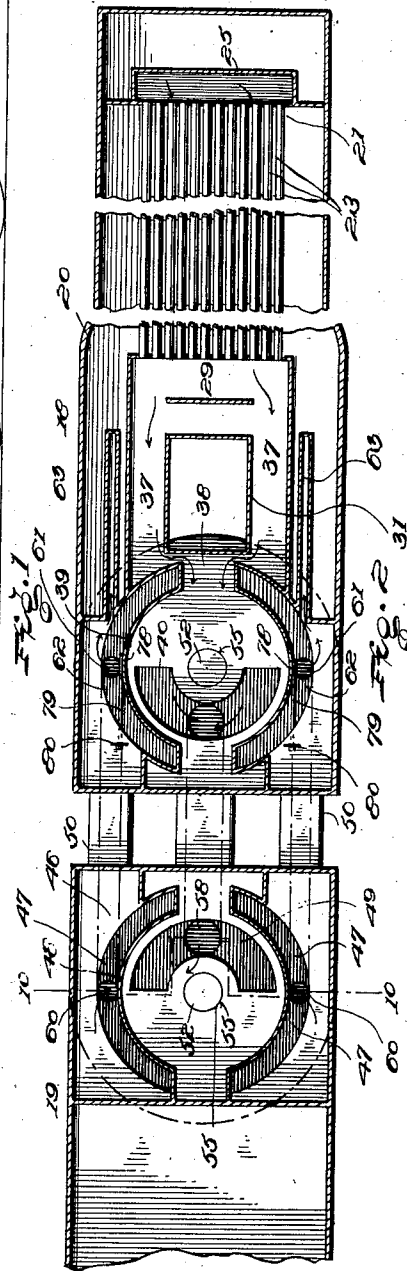
1,021,455.

Patented Mar. 26, 1912.

4 SHEETS—SHEET 1.



Witnesses
J. R. Mue
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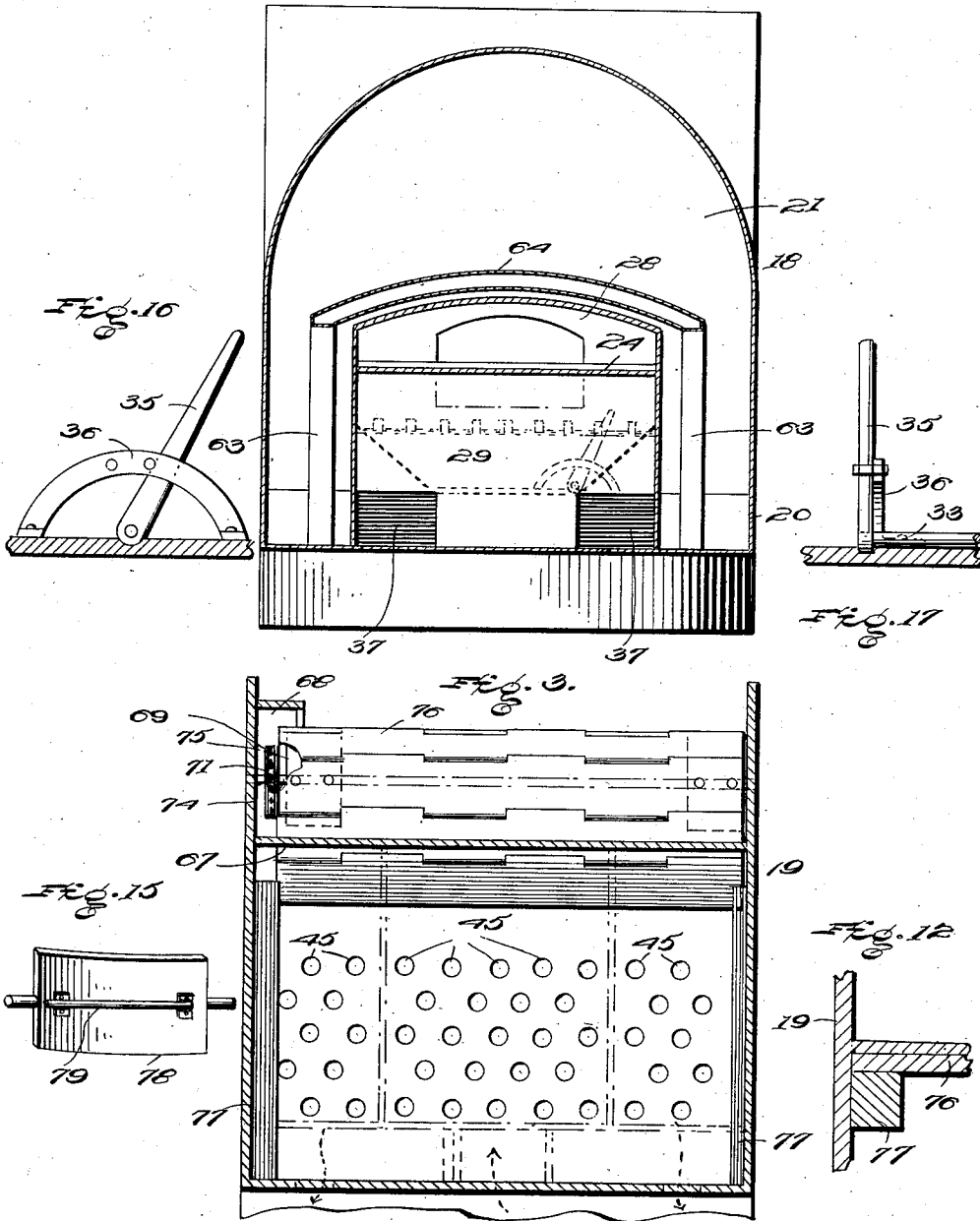
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4 SHEETS—SHEET 2.



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4 SHEETS—SHEET 3.

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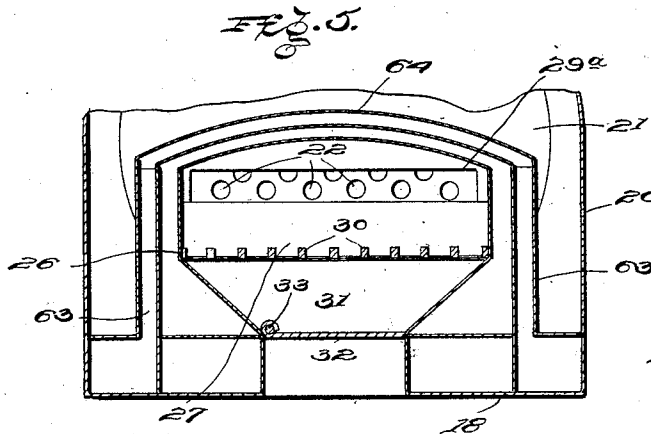
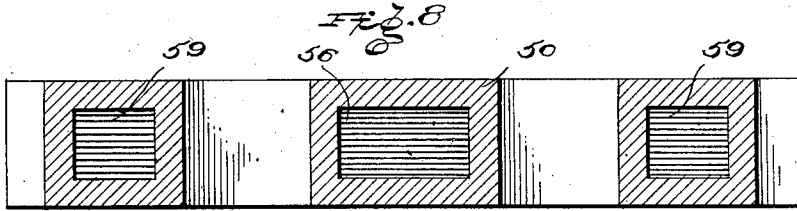
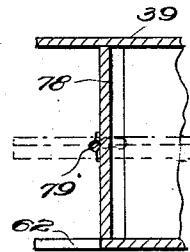
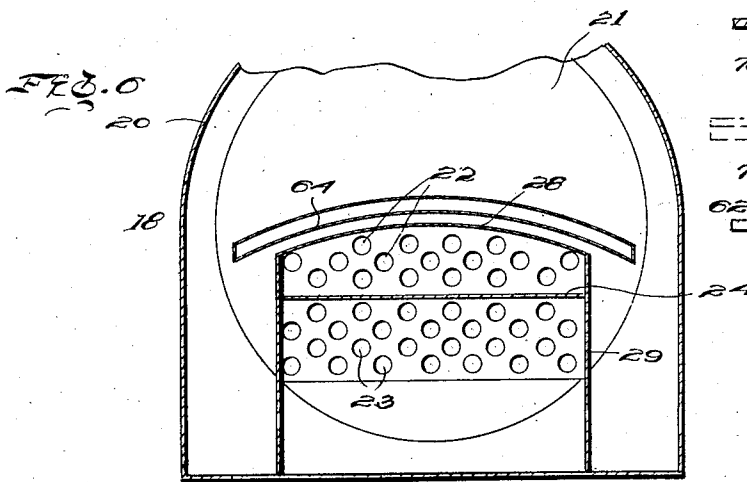


FIG. 14



WITNESSES

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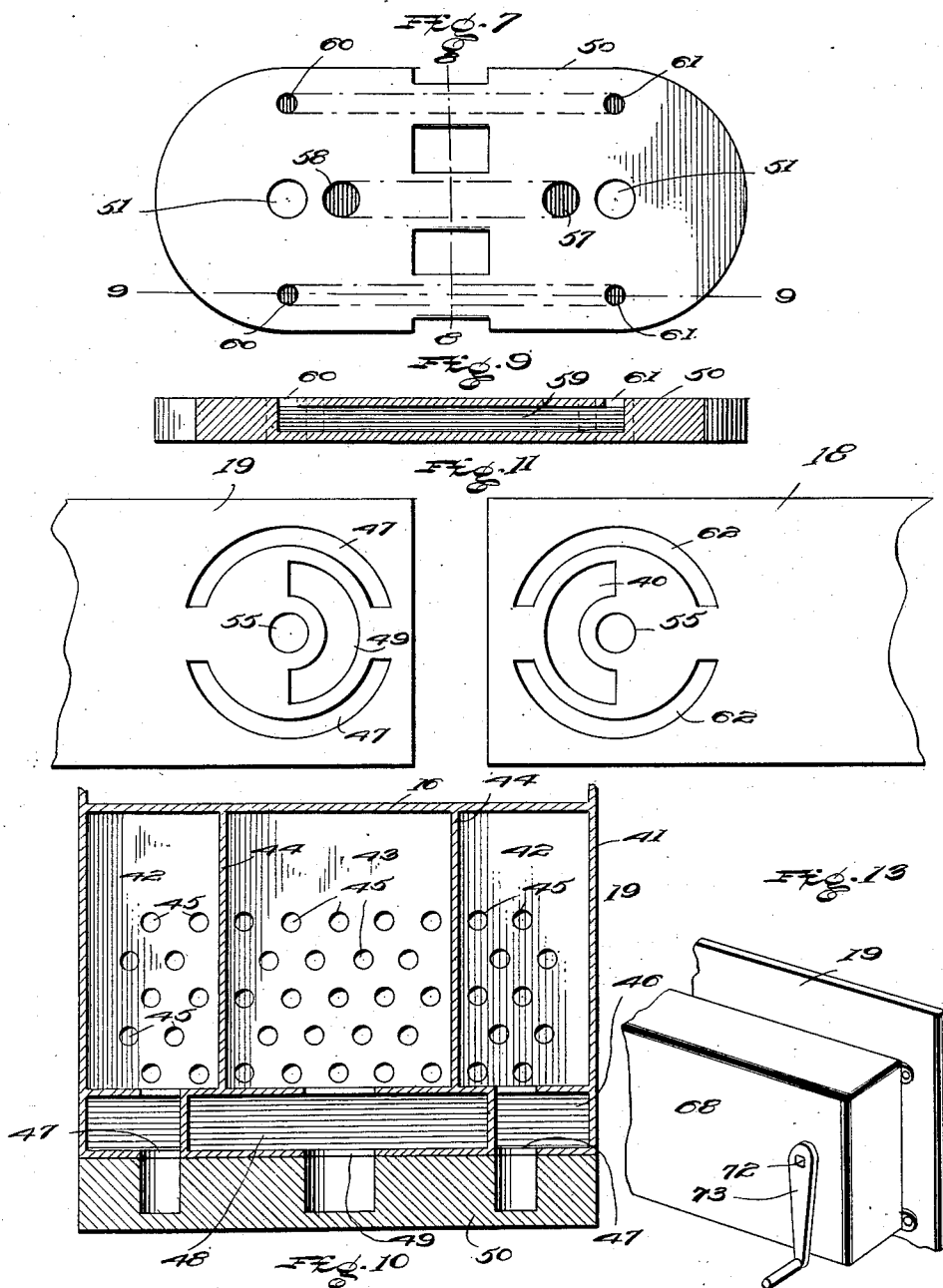
By E. O. Croomey Attorney.

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APPLICATION FILED MAY 10, 1911.

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4 SHEETS-SHEET 4.



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UNITED STATES PATENT OFFICE.

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LOCOMOTIVE.

1,021,455.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, THOMAS RUSSELL DAWSON, a citizen of the United States of America, residing at Barnesboro, in the county of Cambria and State of Pennsylvania, have invented certain new and useful Improvements in Locomotives, of which the following is a specification, reference being had therein to the accompanying drawing.

10 This invention relates to locomotives, and the principal object of the same is to provide means whereby the heated gases from the fire box are conducted to the boiler and thence to and through the tender to heat the water therein, and returned to the body of the locomotive and discharged into the smoke stack.

In carrying out the object of the invention generally stated above, a novel system of flues is provided and said flues include means whereby the flow of heat may be cut off from the tender; means whereby the flow of heat through the tender may be regulated, and means for placing the flues of the locomotive and the tender in communication, said means being so constructed that the locomotive and tender can have the usual relative movements such as are necessary traveling over curved portions of a railroad.

30 A preferred and practical embodiment of the invention is shown in the accompanying drawings, wherein:

Figure 1 is a vertical longitudinal sectional view of a locomotive constructed in accordance with this invention. Fig. 2 is a horizontal sectional view taken on the line 2—2, Fig. 1. Fig. 3 is a transverse vertical sectional view taken on the line 3—3, Fig. 1, looking toward the rear. Fig. 4 is a transverse vertical sectional view taken on the line 4—4, Fig. 1. Fig. 5 is a transverse vertical sectional view taken on the line 5—5, Fig. 1. Fig. 6 is a transverse vertical sectional view similar to Fig. 3, looking toward the front of the locomotive. Fig. 7 is a top plan view of the flue-carrying coupler for the tender and engine. Fig. 8 is a transverse vertical sectional view taken on the line 8—8, Fig. 7. Fig. 9 is a longitudinal vertical sectional view taken on the line 9—9, Fig. 7. Fig. 10 is a transverse

vertical sectional view taken on the line 10—10, Fig. 2. Fig. 11 is a fragmentary detail top plan view of the flue plates of the engine and tender. Fig. 12 is a detail fragmentary sectional view showing the guiding means for the slidable flexible door at the rear of the tender. Fig. 13 is a fragmentary detail perspective view of the casing that incloses the mechanism for adjusting the flexible door of the tender. Fig. 14 is a fragmentary sectional view showing one of the flues and a controlling door or damper therefor. Fig. 15 is a detail perspective view of the door or damper shown in Fig. 12. Figs. 16 and 17 are side and end elevations, respectively, of hand levers for operating the flue dampers.

The improved locomotive comprises the engine 18 and tender 19, which, so far as general appearances are concerned, may be of the usual or any preferred construction. The engine 18 is equipped with the usual boiler shell 20 that incloses the boiler 21 in which heat-conducting tubes are arranged, said tubes being divided into upper and lower sets of tubes 22 and 23 by the central partition plate 24. The forward end of the boiler carries a casing 25 that places the outer ends of the tubes 22 and 23 in communication, said casing 25 being located within shell 20 and causes the heated gases from the upper tubes to pass into the lower tubes 23. The fire box 26 has a forward bridge wall 27 and a casing is arranged in front of said wall. Said casing is divided into upper and lower compartments 28 and 29 by the rear end of partition plate 24. The upper set of tubes 22 extends into compartment 28 and said compartment has a passage 29^a that communicates with the fire box 26. The lower set of tubes 23 communicates with the lower compartment 29. The fire box 26 is provided with a grate 30 and below said grate with a hopper-shaped outlet 31, the discharge from which is controlled by a pivotally mounted door 32. An operating rod 33 is provided for said door, said rod extending into the cab 34 and carrying a hand lever 35 that is pivotally mounted on a stand 36.

The compartment 29 has its base portion

in communication with passages 37 that extend on opposite sides of the outlet 31 of the fire-box 26, and communicate with a reduced passage 38 that leads into a chamber 39 formed in the base of the rear portion of the engine 18. Said chamber 39 is provided with a semi-circular rear outlet 40 in its bottom.

The tender 19 has its water tank 41 divided into independent side and central longitudinal compartments 42 and 43 by the partition plates 44 and each compartment is provided with tubes 45. The ends of the tubes 45 extend through the end walls of the tank 41. The forward end of the tender 19 has a base chamber 46 therein which extends beneath the forward portion of the tank 41 and is in direct communication with the forward ends of the side compartments 42. At each side, the chamber 46 is provided with a semi-circular outlet 47. Chamber 46 is centrally partitioned to provide a circular casing 48 that is in direct communication with the forward end of central compartment 43. The bottom of casing 48 is provided with a semi-circular inlet opening 49.

A flue frame 50 connects the chamber 39 of the engine 18 with the casing 48 of the tender 19. Said flue frame 50 is flat and has end openings 51 through which the pivot studs 52 of the rear truck 53 of the engine and the front truck 54 of the tender project, said studs pivotally engaging the central openings 55 of the chamber 39 and casing 48, so that the necessary relative movements of the frame 50, engine 18 and tender 19 are permitted, such as are necessary incidental to rounding curves.

The flue frame 50 is provided with a central longitudinal flue 56 having an open forward end 57 that is at all times in communication with the semi-circular outlet 40 of chamber 39, and an open rear end 58 that is at all times in communication with the semi-circular inlet opening 49 of casing 48. Side flues 59 extend longitudinally through frame 50 and have their rear open ends 60 at all times in communication with the semi-circular side outlet openings 47 of the chamber 46 and their forward open ends 61 at all times in communication with the semi-circular inlet openings 62 at the bottoms of the side flues 63 that surround chamber 39 and which communicate with the arched flue 64 that surrounds the boiler and which has its open forward end 65 beneath the smoke stack 66. This arrangement of flues, causes the heat to normally circulate from the firebox 26 through the upper set of boiler flues 32, thence through the lower set of boiler flues 33 to the chamber 39. From

chamber 39, the heat flows through the central flue of frame 50 to and through the flues of the central compartment 43 of the tender 19 and returns through the tubes of the side compartments 42 and passes through the side flues of said frame 50 and enters the side flues 63 of the engine 18 and passes through the arched flue 64 and escapes through the stack 66. By this means, the heated gases are caused to pass through the boiler twice and through the tank of the tender twice, thereby generating steam in the boiler and heating the water in the tank of the tender.

The top portion of the tender 19 is provided with a flat plate 67 that forms the bottom of a coal bunker, and at one side of said bunker, a casing 68 is provided that incloses a sprocket chain 69 that connects forward and rear sprockets 70 and 71. Forward sprocket 70 is mounted on a shaft 72, one end of which projects beyond the inner wall of casing 68 and is equipped with a crank handle 73 by means of which said shaft may be manually rotated. The rear sprocket 71 is fast on a shaft 74 that extends transversely across the rear of tender 19 adjacent and above the rear end of the tank 41. A drum 75 is fast on shaft 74 and has a flexible damper 76 wound thereon that is formed of a plurality of hinged sections. The damper 76 is slidable between guiding cleats 77 and the rear end of tank 41 and can be manually adjusted by manipulating crank handle 73 so that it will close some, or all, of the rear ends of the flues that extend through the compartments of said tank.

The inner walls of flues 63 of the engine 18 have dampers 78 pivotally mounted therein which are operated by the rods 79 that connect with the cranks 80 of the hand levers 81 that are pivotally connected to the stands 82 in the cab 84.

It will be understood that by opening the dampers 78 and closing the damper 76, drafts from the chamber 39 to the side flues 63 will be created so that the heat from the firebox 26 instead of passing through the tender will pass from the said chamber 39, through flues 63 and 64 to the stack 66. And as the levers which control the dampers 76 and 78 are located within easy reach of the engineer and fireman, it will be clear that the manipulation of said dampers is facilitated.

From the foregoing description, it will be seen that this invention provides means whereby the circulation of heat through the boiler and water tank is at all times under the control of the engineer and fireman, and that the arrangement of flues in the engine and tender and the flue frame which connects the same is such that the circulation of

heat through the boiler and tender can be continued irrespective of the relative positions of said tender and engine.

What I claim as my invention is:—

5 1. A locomotive comprising an engine provided with a fire box and boiler, said boiler being provided with upper and lower sets of conducting passages for heated gases, means for delivering heat from the
10 fire box to the upper passages of the boiler, means for conducting heat from the upper passages to the lower passages, a chamber in the engine provided with an outlet, a stack for the engine, flues surrounding the
15 chamber and communicating with said stack, a tender provided with a water tank, means for dividing said tank into independent heat-conducting compartments, a casing in said tender and provided with a
20 bottom inlet opening, said casing being provided with an outlet that communicates with one of said compartments and inlets that communicate with the other compartments, said casing being provided with a bottom in-
25 let, and a flue frame pivotally connecting the engine and tender and provided with flues for placing the side flues of the engine in communication with the bottom outlets of the tender chamber and a flue for placing
30 the outlet of the engine chamber in communication with the bottom inlet of the tender casing.

2. A locomotive comprising an engine provided with heat-circulating and discharg-
35 ing flues, a tender provided with heat-circulating means, means pivotally connected to the engine and tender and provided with a flue for placing the circulating flues of the engine in communication with the heat-circulating means of the tender and with flues
40 for conducting the heat from the tender to the discharging flues of the engine, a damper for preventing heat passing through the circulating means of the tender, and dampers
45 for placing the circulating flues of the engine in direct communication with the discharging flues.

3. A locomotive comprising an engine provided with a firebox and boiler, upper
50 and lower independent heat-conducting means in the boiler, a chamber in the engine receiving the heat from the lower heat-conducting means, independent heat-discharging means in the engine, a tender provided
55 with a water tank, means for circulating heat through said tank, and a heat conductor pivotally connected to the engine and tender and provided with means for placing the chamber in communication with the
60 heat-circulating means of the tender and said circulating means in communication with the heat discharging means.

4. A locomotive comprising an engine provided with heat-circulating flues and independent discharge flues, dampers con- 65 trolling the communication between said flues, manually-controlled means for operating said dampers, a tender provided with heat-circulating flues, manually-operating means for controlling the circulation through 70 the tender flues, and means for placing the circulation flues and discharge flues of the engine in communication with the flues of the tender.

5. A locomotive comprising an engine 75 provided with boiler-heating flues and independent heat-discharging flues, a tender provided with a water tank, means for dividing the water tank into independent heat passages, a casing provided with outlets 80 that communicate with two of said passages and an independent inlet that communicates with one of said passages, and a heat conductor pivotally connected to the engine and tender and provided with a flue for con- 85 necting the heating flues of the engine with the inlet of said casing and independent flues for connecting the outlets of said casing with the said discharging flues.

6. A locomotive comprising an engine 90 provided with a firebox and boiler, means for dividing said boiler into upper and lower heat passages, means for conducting heat from the firebox to the upper heat passages, a chamber, means for conducting heat from 95 the lower passages to said chamber, discharge flues in said engine, a tender provided with heat-circulating means, and means for placing the said chamber in communication with said heat-circulating means 100 and said heat-circulating means in communication with said discharge flues.

7. A locomotive comprising an engine provided with independent heat circulating and discharge flues a tender provided with 105 heat circulating flues, a flue frame provided with end openings, means in said openings for pivotally connecting said frame to the tender, and engine, and independent flues in said frame for placing the 110 circulating flues of the engine in communication with the circulating flues of the tender and said tender flues in communication with the discharge flues of the engine.

8. A locomotive comprising an engine 115 provided with heat circulating and discharge flues, means for connecting said flues, a tender provided with heat circulating means, means pivotally connected to the engine and tender and provided with a flue 120 for placing the circulating flues of the engine in communication with the heat circulating means of the tender and with flues for conducting the heat from the tender to the dis-

charge flues in the engine and means for preventing circulation of heat in said tender.

9. A locomotive comprising an engine provided with a fire box and boiler, said
5 boiler being provided with upper and lower sets of conducting passages for heated gases, means for delivering heated gases from the fire box to the upper passages of the boiler, means for conducting heat from the upper
10 passages to the lower passages, a tender provided with a water tank, means for di-

viding said tank into independent heat conducting compartments, and a flue frame pivotally connecting the engine and the tender. 15

In testimony whereof I hereunto affix my signature in presence of two witnesses.

THOMAS RUSSELL DAWSON.

Witnesses:

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ROBERT RUSSELL.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."