No. 681,760. Patented Sept. 3, 1901.

C. VANDERBILT.

TENDER FOR LOCOMOTIVES, &c.

(Application filed May 31, 1901.)

(No Model.) 11 Sheets—Sheet 1.

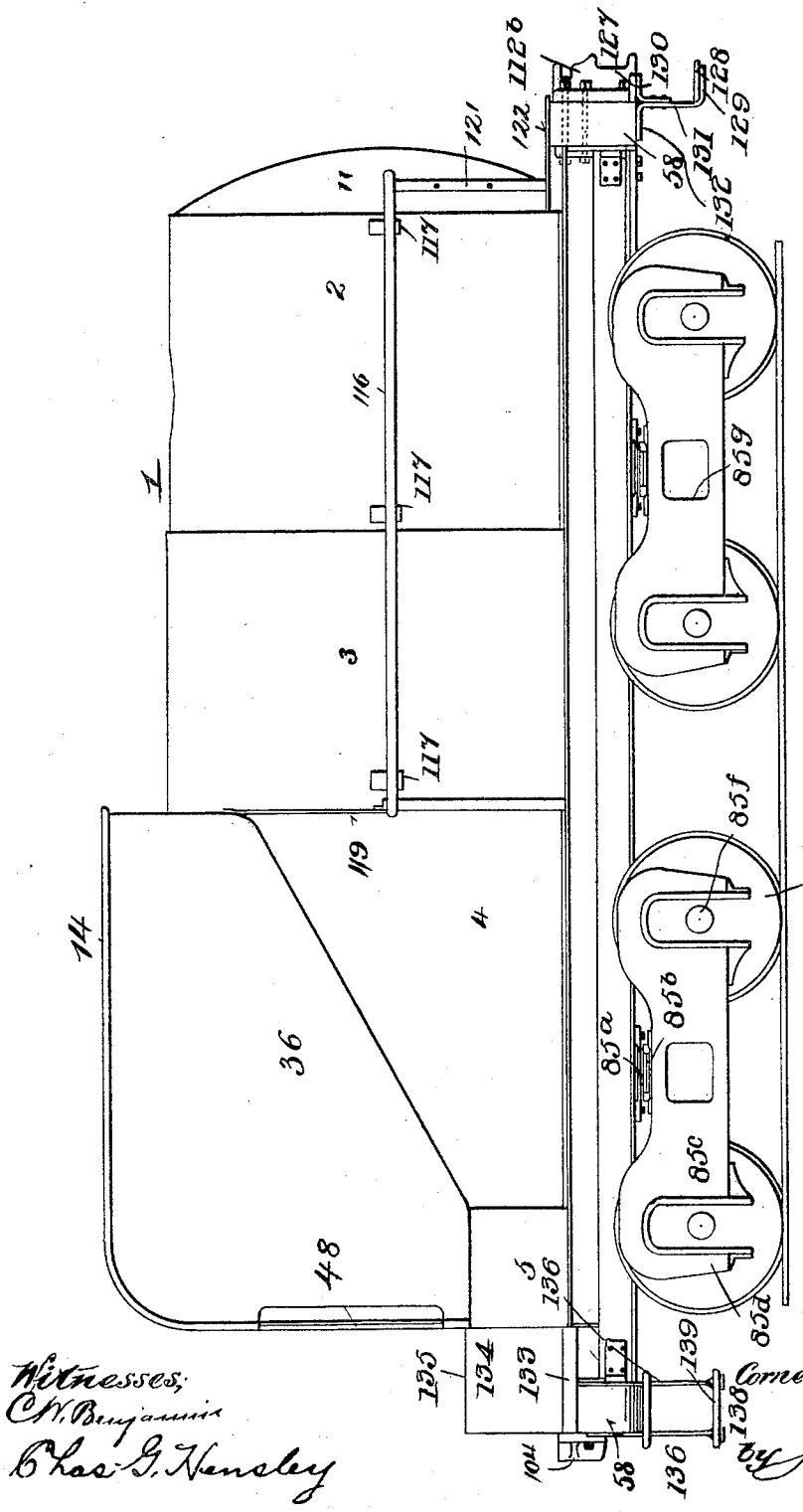

Fig. 1.

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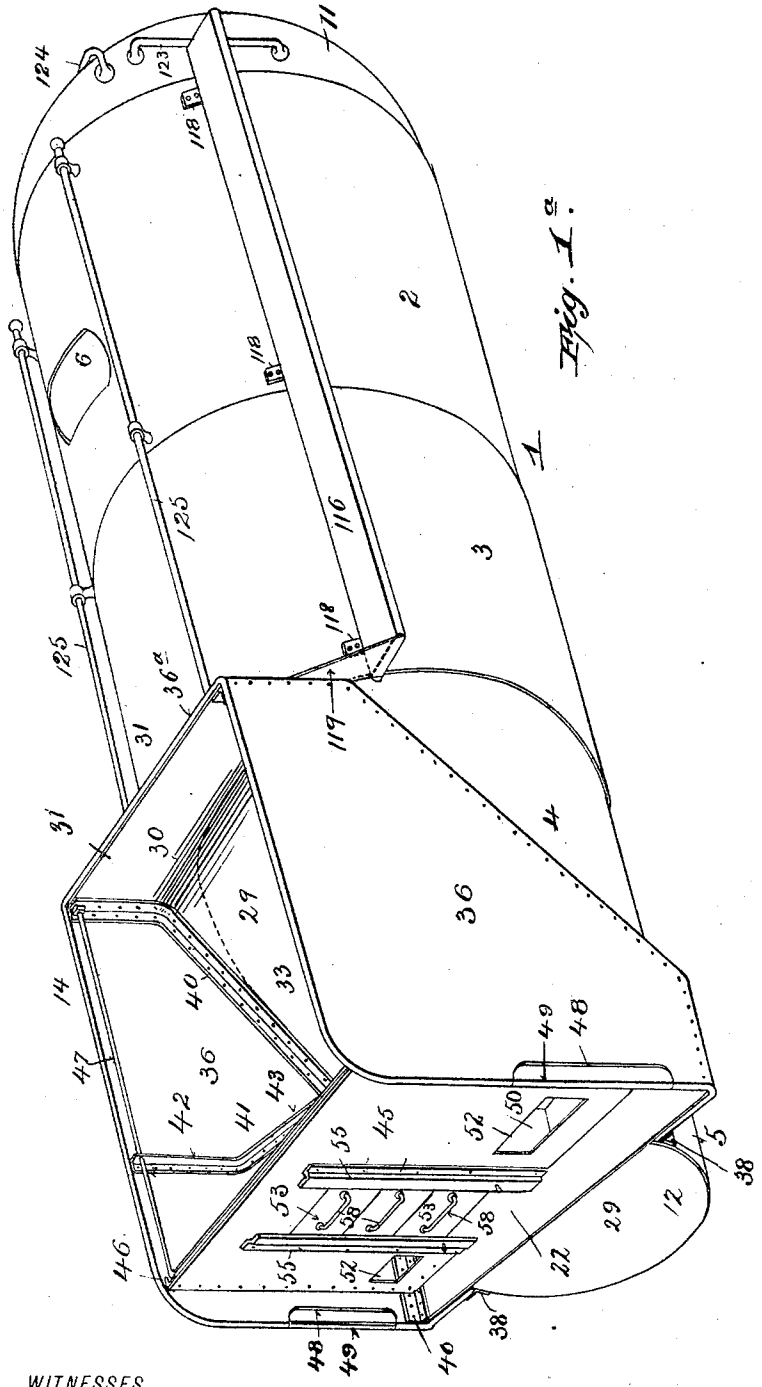

Fig. 1a.

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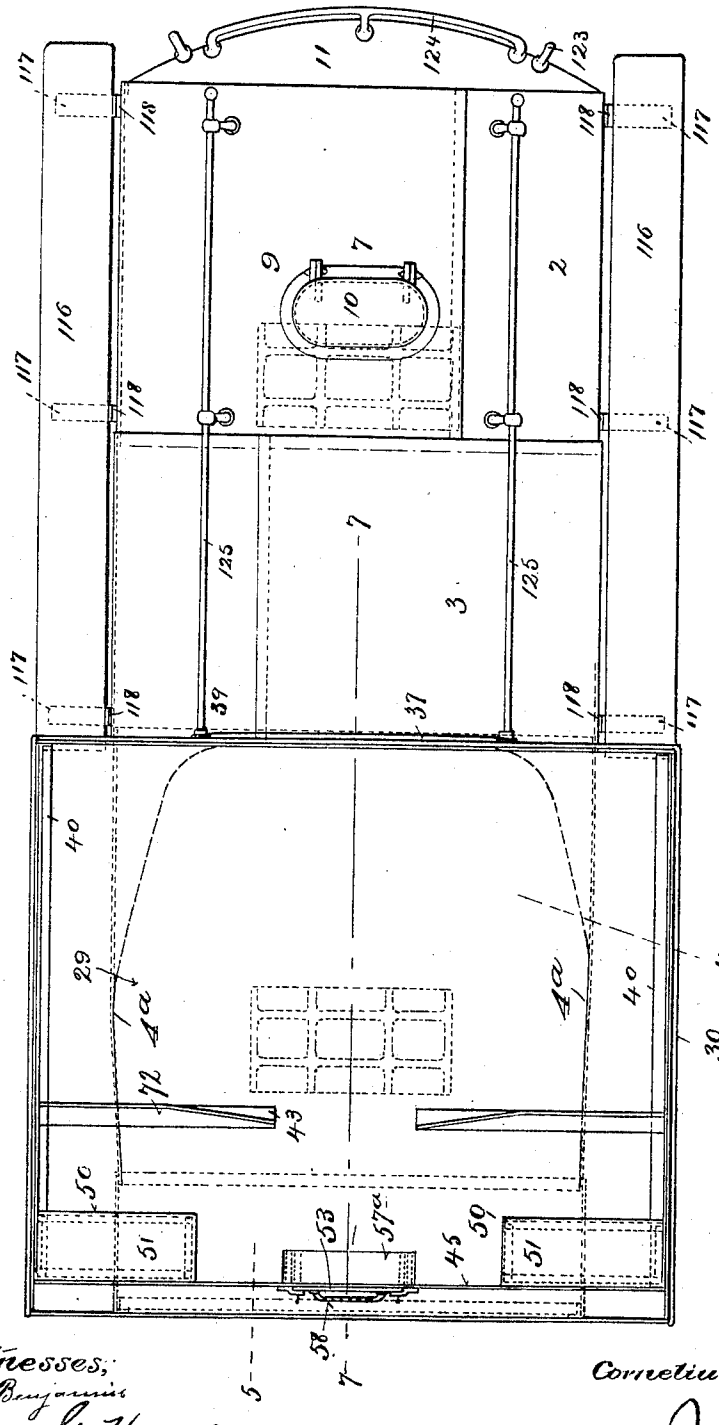

Fig. 2.

Witnesses;
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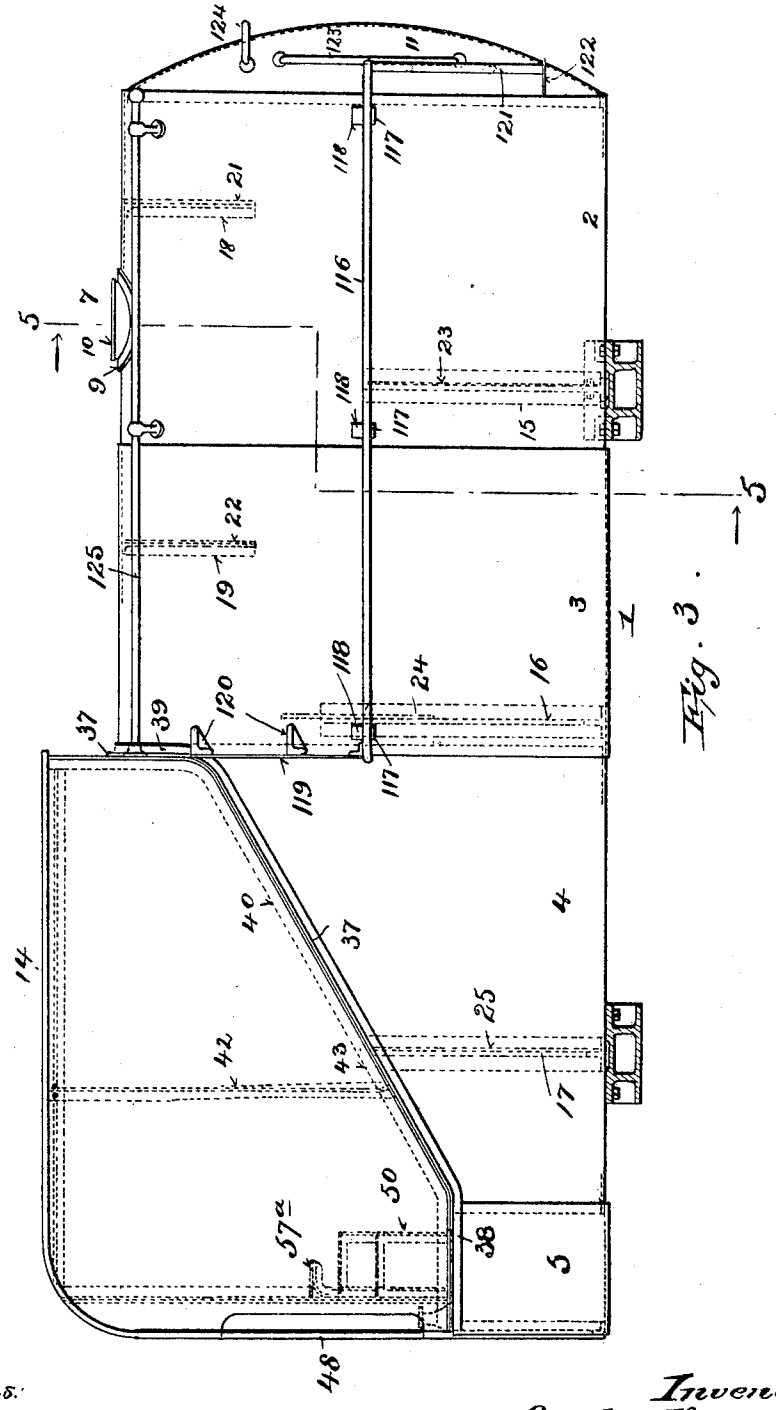

Fig. 3.

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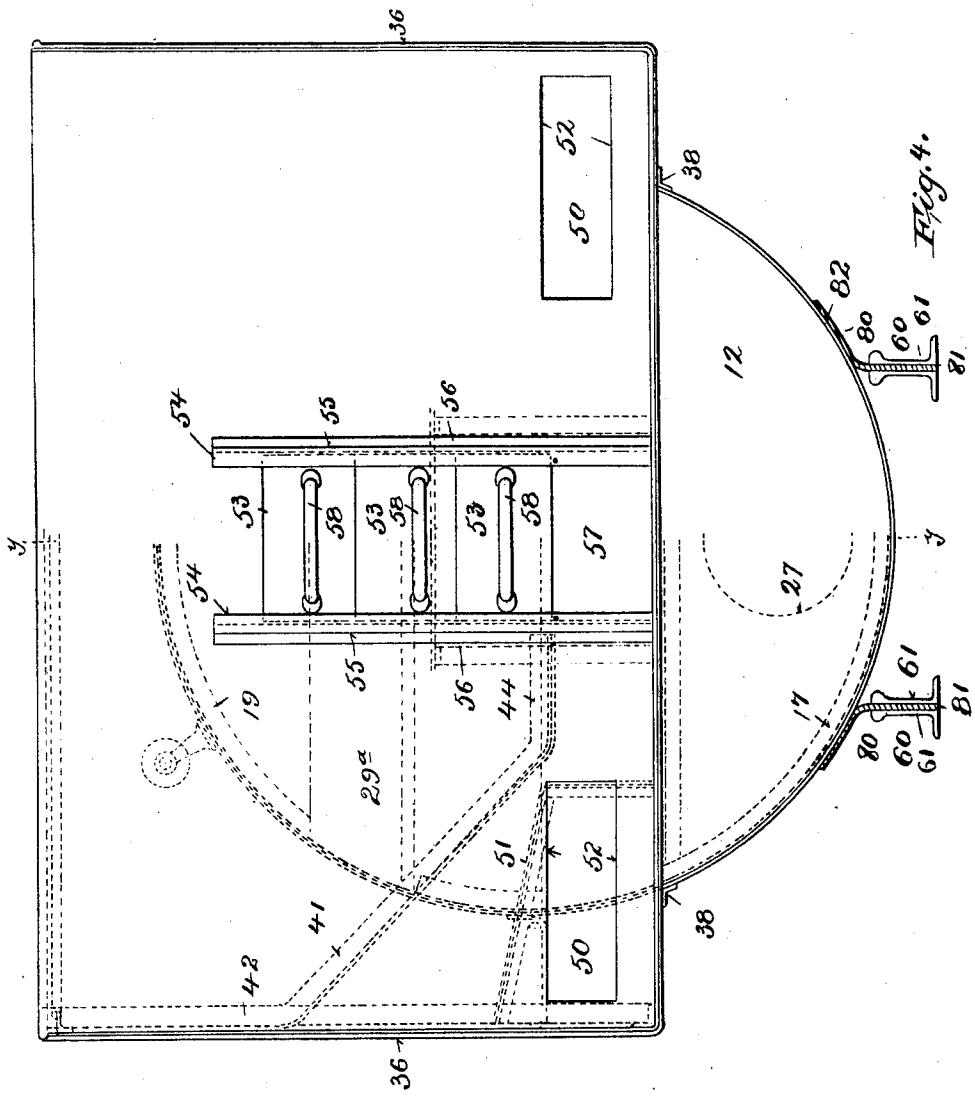

Fig. 4.

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Fig. 5.

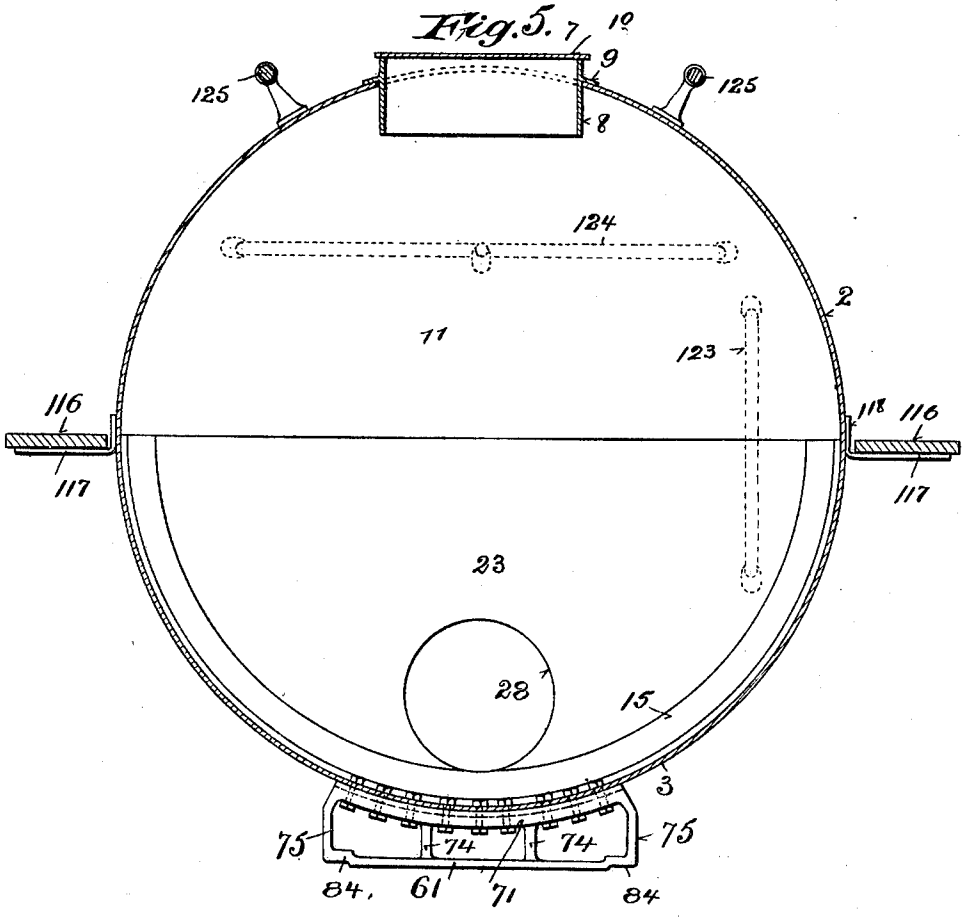

Fig. 6

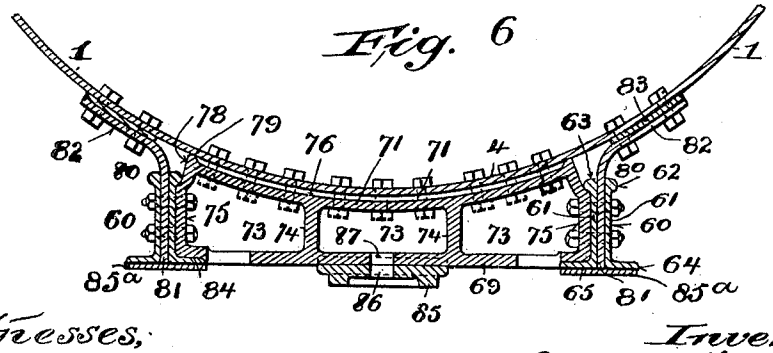

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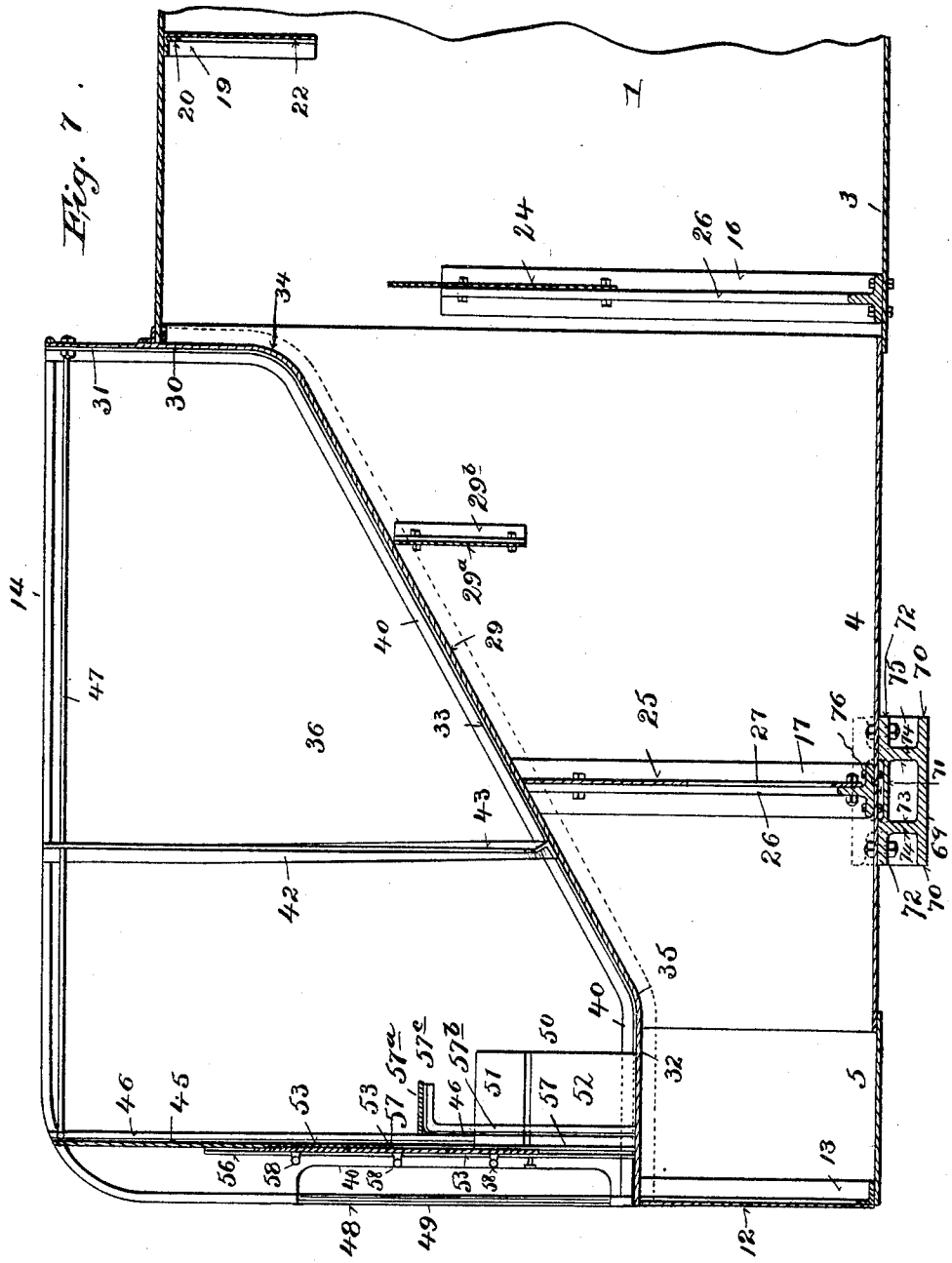
Fig. 7.



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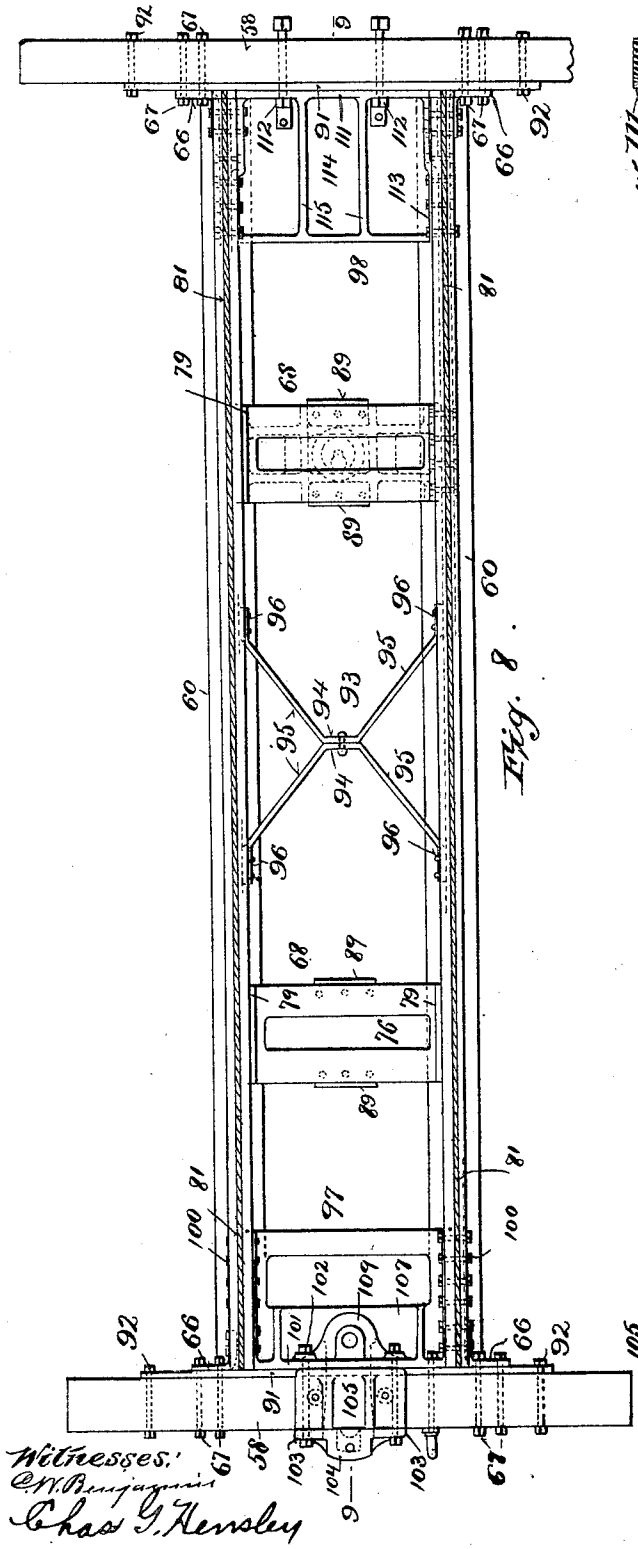

Fig. 8.

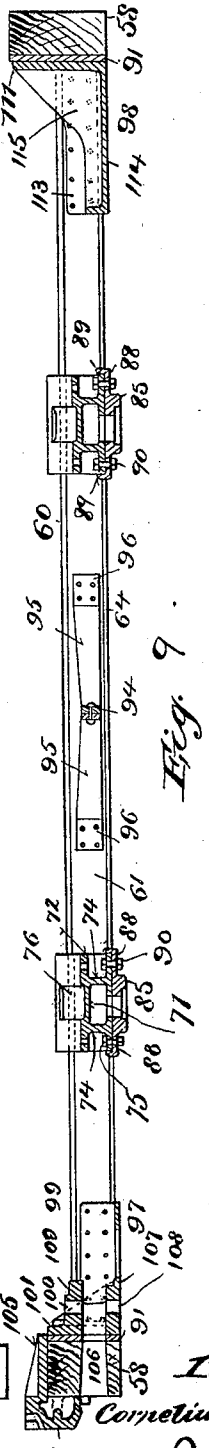

Fig. 9.

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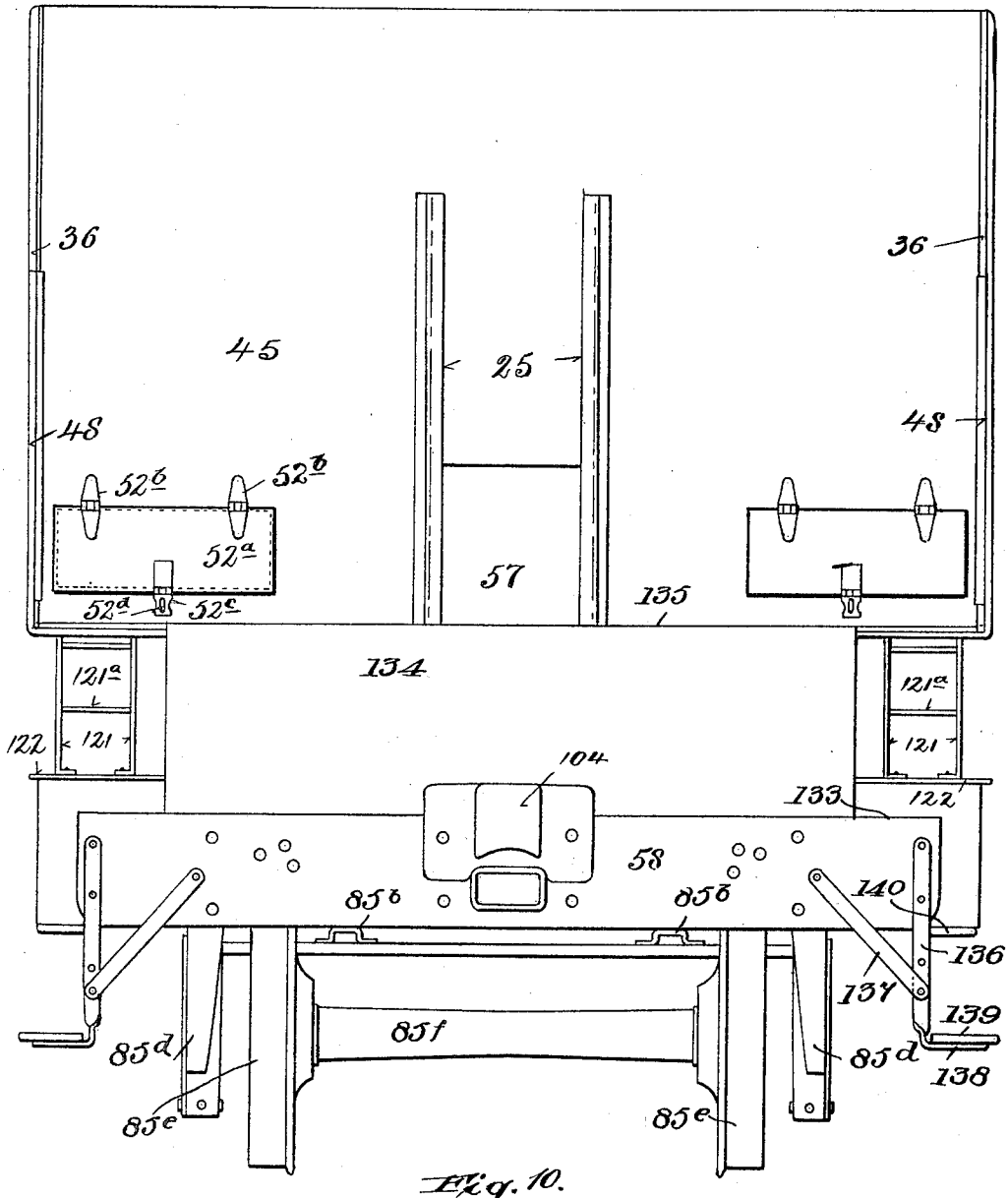

Fig. 10.

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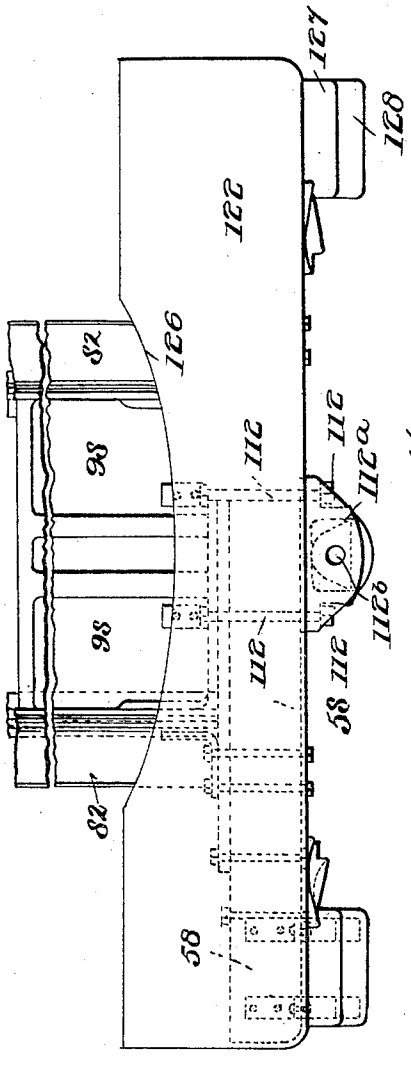

Fig. 11

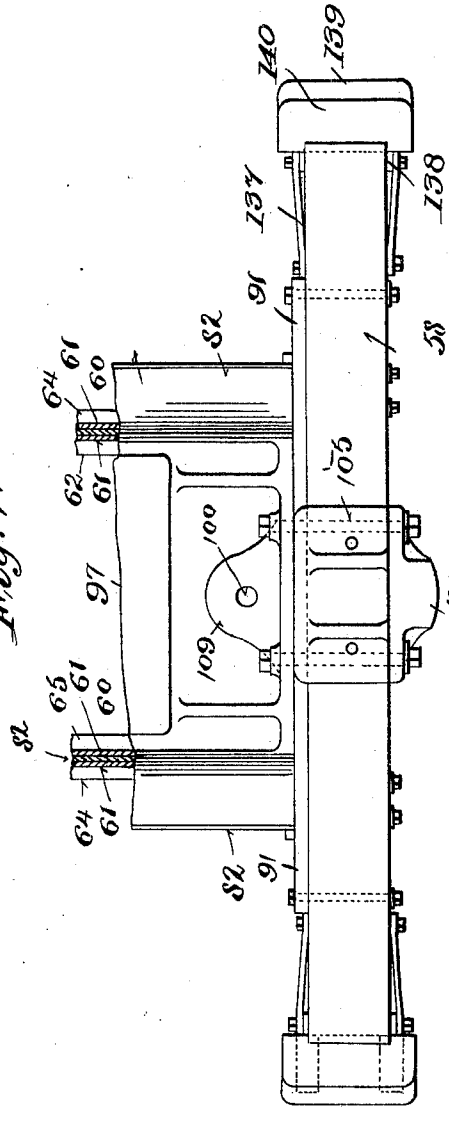

Fig. 12

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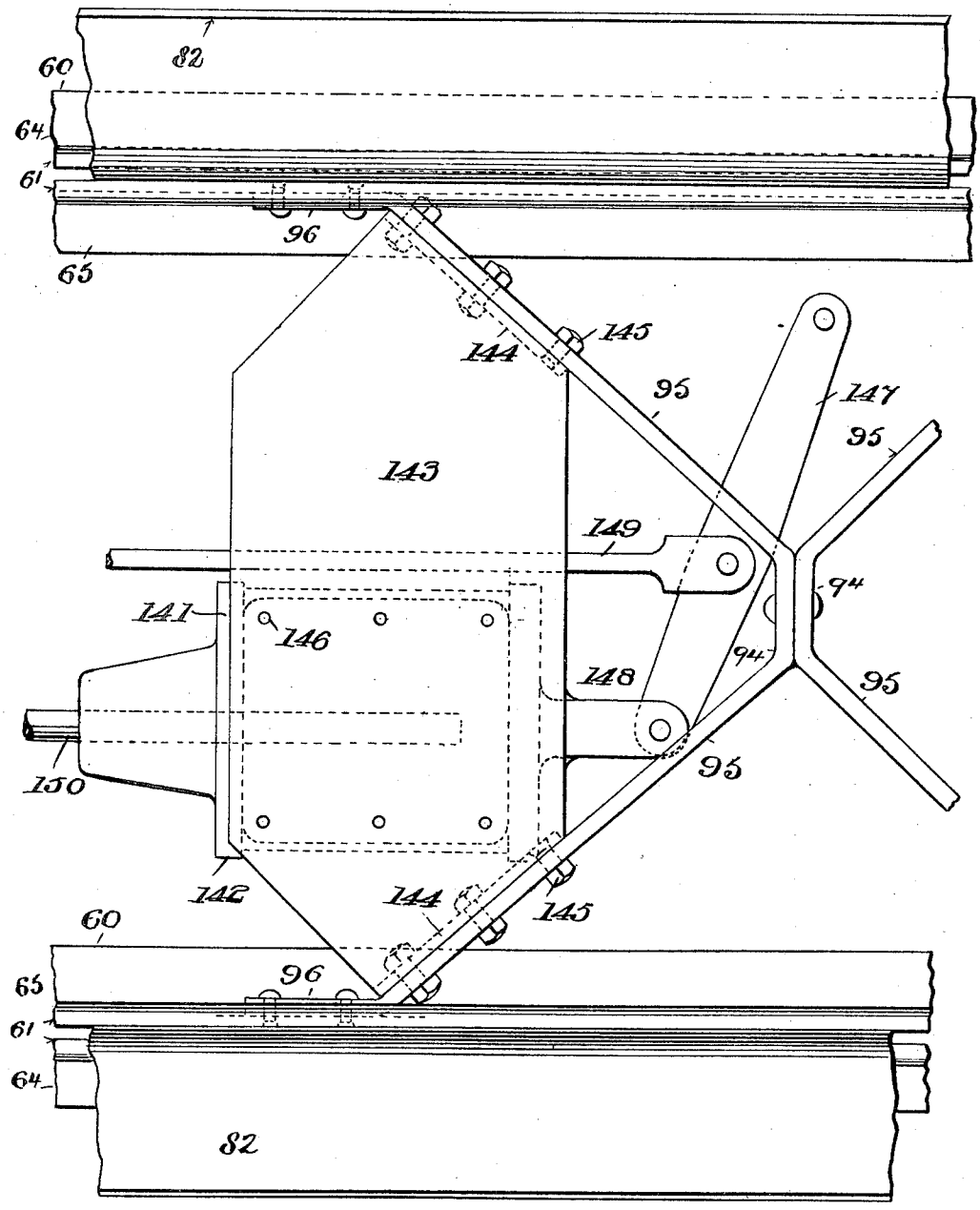

Fig. 13.

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UNITED STATES PATENT OFFICE.

CORNELIUS VANDERBILT, OF NEW YORK, N. Y.

TENDER FOR LOCOMOTIVES, &c.

SPECIFICATION forming part of Letters Patent No. 681,760, dated September 3, 1901.

Application filed May 31, 1901. Serial No. 62,465. (No model.)

To all whom it may concern:

Be it known that I, CORNELIUS VANDERBILT, mechanical engineer, a citizen of the United States, residing at 15 Washington Square, North, in the city of New York, borough of Manhattan, county and State of New York, have invented certain new and useful Improvements in Tenders for Locomotives and the Like, of which the following is a specification.

My invention relates to improvements in the construction of tenders for locomotives, although in certain aspects the hereinafter-described improvements may be otherwise employed; and it has for its object to produce a tender (or structure for kindred uses) wherein greater carrying capacity for both fuel and water is obtained, the cost of construction and maintenance reduced, facility of construction increased, the utilization of commercial forms of iron made a leading feature, and lightness and strength, together with economy in handling and carrying both the fuel and water, are all secured. I obtain these several results by means of the construction hereinafter described, and which constitutes a preferred form or embodiment of my invention, and finally pointed out in the claims.

In the drawings forming part of this specification, Figure 1 is a side elevation of a complete locomotive-tender embodying my improvements. Fig. 1ª is a perspective view diagrammatically illustrating the general construction of the body portion of the tender. Fig. 2 is a plan view. Fig. 3 is a side elevation and a transverse sectional elevation of the body-bolsters. Fig. 4 is an end elevation showing a transverse section of the framing. Fig. 5 is a transverse sectional elevation, enlarged, on the line 5 5, Fig. 3. Fig. 6 is an enlarged sectional elevation through the bolster, sills, and a portion of the tank, taken substantially on the line 6 6, Fig. 3. Fig. 7 is an enlarged sectional elevation through the fuel-box and a portion of the tank on the line *y y*, Fig. 4. Fig. 8 is a plan view of the body-framing. Fig. 9 is a longitudinal sectional elevation on the line *x x*, Fig. 8. Fig. 10 is an enlarged front elevation of Fig. 1. Fig. 11 is an enlarged plan view of the rear end of the tender-framing, showing the platform over the end sill and the ends of the longitudinal sills. Fig. 12 is a like view of the front end of the tender-framing; and Fig. 13 is an enlarged plan view of a portion of the tender-framing, showing the support for the brake-cylinder.

Similar numerals of reference indicate corresponding parts throughout the several views.

I shall first describe my improvements in connection with the body portion—that is, the fuel-box and the water-tank.

At 1 is the water-tank, cylindrical in form and built up in the conventional manner by the rings 2 3 4 5, riveted together, provided with the usual manhole 6 for permitting the entry of a filling-pipe, which hole is provided with a cover 7, comprising a cap having a downwardly-extending annular flange 8, Fig. 5, an outwardly-extending flange 9, and a crown-piece 10, the outwardly-extending flange 9 resting on top of the body of the tank. The rear end (considered in respect to the location of the engine) of the tank has the conventional header 11, riveted to the ring 2, and the forward header is built up, Fig. 7, by the segmental plate 12, secured to the ring 5 by the segmental rib 13, of angle-iron. The front ring or course 5 is of smaller diameter than the courses 2 and 3, and the course 4 from the point 4ª, as shown in dotted lines in Fig. 2, is reduced in diameter, thereby narrowing the front end of the tank for a portion of the distance below the fuel-box, to be described. The advantage of the cylinder water-tank is very great in that it not only economizes the space used for a given quantity of water, but does away with much of the structural material ordinarily used in framing and bracing, the cylindrical form acting largely as a self-supporting beam to sustain the tender load, which includes not only the weight of the tank itself and its load of water, but that of the fuel-box and coal-hopper, hereinafter to be described, and in addition brings about a great saving in dead-weight over the ordinary tender. At the forward end of the tender—that is, at the end presented next to the locomotive—is the fuel-box 14, adapted to carry wood, coal, or other fuel, and the rings 4 5, plate 12, and rib 13 are so formed as to provide a downwardly

and forwardly inclined inset to receive the fuel-box. The floor of the fuel-box, which includes the upper surface of the tank at this end, is inclined, so as to permit the ready feeding forwardly of the fuel contained in the fuel-box, while the longitudinal area, as the longitudinal area of the tank as I have designed it, is fully preserved, (of course with the exception of that portion taken up by the superposed fuel-box.) The transverse area of the fuel-box may be the full width allowed for clearance and, as shown, is greatly increased over that of the tank by extending it laterally beyond the tank (or it may have any desired lateral dimension relative to the tank, as the same width, &c.) and vertically by utilizing a large portion of the vertical area of the tank for its reception. The fuel-box is so constructed that it will have a containing-space elevated above the tank and within its vertical dimensions, the latter to any desired degree, and a lateral dimension greater than that of the tank, the result being that the usual fuel-carrying capacity is greatly increased, while the containing capacity of the tank is greatly augmented, thereby permitting the engine to make longer runs, &c., without refueling or watering, and the fuel-box is supported upon and within the longitudinal limits of the tank—that is to say, when compared with prior structures of this kind, weight for weight, and considering the available space my invention results in greater carrying capacity for both water and fuel, less amount of metal employed in the construction, thereby economizing in its cost, &c., and the available space is utilized to a greater advantage. Of course it will be understood that I do not limit myself to the particular details of construction; but I prefer those hereinafter illustrated, as they have produced satisfactory results.

As to the tank, each of the concentric rings or courses 2 3 4 (forming part of the tank-sheeting) is provided with segmental stays (shown in dotted lines in Fig. 3) comprising the segmentally-disposed T-irons 15 16 17, riveted to the sheeting, thereby materially strengthening the tank against lateral and compressing strains. In the means which I have provided for supporting the tank upon a suitable frame and the latter upon a suitable truck I have included body-bolsters to which the tank is securely fixed, and, as illustrated in Figs. 3 and 6, the tank is laterally stayed directly over these bolsters, which latter are located adjacent the ends of the tank, and it is further stayed intermediate of the bolsters, the lateral flanges of the stays being bolted or otherwise secured to the sheeting of the tank, as shown in Fig. 7. In addition to the stays 15 16 17 I employ stays 18 19, of T-iron, and which are segments of and rigidly secured to the tank at its upper section, specifically to the rings 2 3, Fig. 3. To the flanges 20 of these stays are secured cross-plates 21 22, which further stay the tank and perform another useful function, hereinafter described. The stays 15, 16, and 17 are also provided with cross-plates 23 24 25, bolted to their flanges 26. The plate 24 is affixed to the stay at the upper part only, so as to leave a drainage-space. The plates 23 25 are provided with holes 27 28 for drainage, and the plates 21 22 do not drop or extend to the upper line of the plates 23 24 25. Under the septum 29 is located a plate 29^a, bolted to short segmental stays 29^b, which are in turn fixed to the ring or course 4 of the tank, the plate 29^a extending entirely across the tank, as does the plates 21 22 23 24 25. The object of this latter construction is to efficiently brace and stay the tank and to provide means for preventing the water in the tank from acquiring, as a single unit or body, a momentum, owing to the motions of the tank in use, which would possibly, owing to the increased capacity of the tank, subject the same to abnormal strains, the plates acting as dividing septums and dashers, the passage of the water from one end of the tank to the other in draining or filling being left unobstructed, as above described, the plates 25 29^b in particular protecting the septum 29. The flooring of the superposed fuel-box, or, in other words, the septum interposed between the containing-space of the tank and the superposed fuel-box, is defined by a horizontally-disposed plate 29, extending completely across the tank and outwardly therefrom and having the rear vertical section 30 extending from a point within the tank upwardly above it, as at 31, the lower horizontal section 32 extending inwardly from the front plate 12 to a sufficient distance inside the tank to give the septum the desired inclination to the intervening and connecting inclined portion 33, the inclination being within the vertical and longitudinal limits of the fuel-box, the union of the vertical, horizontal, and inclined sections being made on curved lines, preferably, as at 34 35, instead of angles for the more ready feeding of the fuel and for strength, the forward horizontal section 32 providing a landing for the fuel and for other purposes hereinafter described. This plate (generically 29) constitutes the rear and bottom of the fuel-box, from which extends at each side the side plates 36, made to conform at their rear and bottom edges to the conformation given to the septum and the end cross-plate 36^a forming part of the side plates. The side plates and end plate 36^a may be made separate from and riveted to the septum and the whole fuel-box stayed, as hereinafter described; but I prefer that the portions comprising the septum and the sides and the rear plates be made separate and riveted and disposed generally as shown and described. The segmental stay 17, with its plate 25, is located within the tank at the forward end over the bolster, the plate and the stay forming a vertical support at this point for the base of the fuel-box, to the bottom of which the plate 25

extends. The respective rings or courses of the tank, or, in other words, its sheeting, is, as before stated, cut to conform to the shape of the lower plane of the fuel-box, as shown in Fig. 7, and the fuel-box is bodily seated within this cut-away portion. To firmly secure the fuel-box to the tank, an angle-iron strip comprising the side sections 37 38, Fig. 3, lying under the fuel-box septum and conforming to its shape, and the segmental section 39, passing over the tank-sheeting, the vertical web of which is secured fast to the tank-sheeting, to the front and side plates, and to the elevated end of the fuel-box and to the septum. This angle-iron strip not only secures the fuel-box to the tank, but firmly supports the fuel-box upon the tank, the affixture of the strip to the curved portion of the tank-sheeting distributing the strains and stress from the box evenly throughout the tank. Interiorly the fuel-box is braced, Figs. 1 and 7, by the angular braces 40, set in each side corner of the box and made of angle-iron, and their flanges are secured to the side plates 36 of the box, to the front plate 30, and to the septum 29, and at 41 are the further lateral braces of angie-iron having vertical section 42, secured through one of their flanges to the side plates 36, a downwardly-inclined section 43 and a horizontal and transverse section 44, Fig. 4, secured to the septum 29, the horizontal section 44 not extending completely across the bottom of the septum, as shown in Fig. 4, to provide clearance for the passage of the fuel, the brace being located in line with and the inner horizontal end being secured to the inclined section of the septum. At 45 is the front plate of the fuel-box, secured to the side plates 36 by the angle-iron strips 46 and which extend down to the septum, its lower corners lying within the angle of the side braces 40. To longitudinally stay the upper section of the fuel-box, I employ two tie-rods 47, which respectively extend between the front plate 45 and the rear plate 30, passing through the flange of the stay 41 42, and for convenience of location pass their ends through the transversely-disposed flanges of the braces 40 and tie-strips 45, as shown in Figs. 1 and 7. The front vertical edges of the box side pieces are recessed, as at 48, and a bar 49 crosses the recess and is secured to the side pieces to provide a grab-handle. At each front corner of the fuel-box are rectangular-shaped tool boxes or receptacles 50, built up suitably by plates and angle-iron uniting-strips, the outer end and front faces of which abut, respectively, against the side plate 45 of the fuel-box, the the upper or crown plate 51 of which is inclined downwardly and inwardly to allow the fuel to ride down, the front plate 45 being apertured, as at 52, Figs. 1 and 4, to allow access to the interior of these corner-boxes. A door 52^a is pivoted over the apertures 52 by the hinges 52^b, secured to the front plate 45, as shown in Fig. 10, and the plate 52 carries the hasp 52^c and the plate 45 the staple 52^d for locking the door 52^a to the plate 45. To gain access to the interior of the box for the purpose of removing the fuel, such as coal, while the latter is at different levels, I provide a door made up of sections 53, the separate sections being capable of upward and downward movement in a guideway formed by the offset flanges 54 of the angle-iron bars 55, the outer flanges 56 of which are secured to the front plate 45, at each side of an aperture 57 therein. At 57^a is a step or shelf located at the upper limits of the opening 57 and extending transversely over and at the rear of the opening and which is there supported by the angle-irons 57^b, secured to the front plate 45 at the side of the opening 57, the arms 57^c of the irons 57^b extending inwardly therefrom and directly supporting the step or shelf. In this way the coal or other fuel in the box is prevented from jamming in front of the door-opening 57 and allows of the free use of a shovel at this point. The part 57^a also forms a foot-plate for gaining access to or from the fuel-box. Each of the sections is provided with a longitudinal grab-handle 58, that they may be operated separately. These handles may also be used as steps, by means of which it is possible to gain access to the steps 57^a over the fuel-box to the running-board. The tank has other accessories, which will be described later on. In addition to the improvements in the tender itself (considering its fuel and water carrying elements as a separate part of the invention) I have devised an improved frame for supporting the tender, the object of which is to secure lightness of construction, compactness of parts consistent with requisite strength to resist vertical and all necessary strains and to permit the tank to be supported low relative to the center of gravity of the trucks upon which the tender may be supported, whereby an increase in the dimension of the tank vertically and transversely may be had, and providing a more stable support for the tank and fuel-box. The frame, Figs. 6, 7, 8, and 9, comprises substantially the end sills or buffer-beams 58 and the longitudinal or side sills 60. Each of the latter is made in two parts or sections and of what is known as "bulb-iron," each section having a vertical web 61, oppositely disposed, an upper bulb 62 63, and lower flanges 64 65, extending in opposite directions. In other words, the sills are substantially of rail-form split vertically through the center. These sills are secured closely adjacent each other, as shown in Figs. 6 and 8, extend to and at their ends are secured to the end sills or buffer-beams between the outer limits or ends of the latter, partly by means of angle-irons or brackets 66, bolts 67, passing through the brackets and the sills tying them in place. In addition to tying the longitudinal sills together at the

ends I interpose between the sills 60 the body-bolsters, identified generically by the reference character 68, and between the body-bolsters and the end sills the side sills are connected transversely by the parts shown in Figs. 8 and 9 and further parts located between the bolsters, all of which will be hereinafter described. The bolsters by reference to Figs. 5, 6, and 7 will be seen to comprise a casting 68, having a base-plate or web 69, with flanges 70, all on a horizontal plane. an upper curved plate or web 71, with curved flanges 72, two longitudinal and vertical compression-webs 73, transverse intermediate compression-webs 74, and vertical end webs 75. The upper curved web or plate 71 is inset or channeled, as shown at 76 in Figs. 6 and 8, and the end webs 75 are inset at 78 and provided with upwardly-extending ridges 79, upon which, as well as the flanges 72, as shown in Figs. 5 and 7, the tank-sheeting rests. Coextensive with the side sills and extending from between the sill-sections upwardly and outwardly toward the tank, to which they are secured, as shown in Fig. 4, and at the outer ends conforming substantially to the contour of the tank, as shown clearly in Fig. 6, are metal plates or wings 80, which comprise, respectively, the vertical section 81, interposed between the sill-sections 61 and the upper section 82, curved to the shape of the tank, and between the outer ends 82 of these plates or wings and the under side of the tank at the rings 2 and 4, where the diameter is reduced, is a filling-plate 83. The lower corners of the bolster are inset, as at 84, to receive the flanges 65 and allow of the end webs of the bolster being received within and abut directly against the face of the inner side sill-section, the upper inset 78 receiving the bulbs 63, bolts extending through the flanges 72 of the upper curved plate or web 71 of the bolster and the tank-sheeting, others through the end webs 75, the sill-section 60, and the wing-section 61, and others through the wing-sections 82. The liner-plates and the tank-sheeting secure all these parts together, as clearly shown in Fig. 6, whereby a cradle is formed partly by the side sills and the bolster and the metal sheets or wings, which substantially form continuations of the bolster ends and sills, thereby firmly seating the tank upon the bolster and firmly tying all the parts together transversely and longitudinally. A body center-bearing of conventional form, having the annular center flange 85, an aperture 86 alining with the apertures 87 in the base-plate 69 of the bolster, the lipped flanges 88, the lips 89 of which engage the sides of the bolster base-plate, is firmly secured to the flanges of the base-plate by bolts 90, Fig. 9. At 85^a are body side rub-plates adapted to engage in the usual manner suitable side bearings mounted upon a bolster (indicated generically by the numeral 85^b in Fig. 1) carried by a truck, in which the side frames are shown at 85^c, axle-box yokes or pedestals 85^d, wheels 85^e, and axles 85^f, the particular type of truck herein diagrammatically illustrated being known as the Fox pressed steel, with rigid or non-pivotal bolsters and semielliptic springs seated in the recess 85^g in the side frames, the weight of the tender being taken on the truck center-bearing. By means of the peculiar construction of body-framing, including the body-bolsters, the entire superstructure may be placed very low, the framing extending down within the plane of the vertical limits of the truck-wheels, as shown in Fig. 1. I prefer to bolt all of the before-mentioned bolster parts together, as shown in Figs. 6 and 9, instead of riveting the same. Between the ends of the longitudinal sills are interposed sill-plates 91, against which the ends of the composite longitudinal sills 60 abut, bolts 67 92 passing through the ends of these plates and the end sills, the angular brackets 66, the arms of which are respectively secured to the vertical walls of the outer sections of sills and interposed end sill-plates. Intermediate of the bolsters is a two-part tie-brace 93, having transverse section 94, secured together face to face, outwardly-diverging sections 95, and longitudinal ends 96, secured to the vertical web 61 of the inner sill-sections. At the ends of the longitudinal sills are secured transversely-extending castings 97 98, the casting or stiffener 97 having vertical side webs 99, rigidly secured to the sill-sections 61 by bolts 100, which pass through said webs, the several longitudinal sill-sections, and the wing-sections 81, as indicated in Fig. 8, and a transversely-disposed vertical web 101, with bolts 102 passing through said web, the sill-plate 91, the end sill, and through the wings or flanges 103 of the buffer-block 104, the latter having a horizontal flange 105 lying on top of the end sill, to which it is secured by bolts. The end sill (the one adjacent the engine) is pierced by a hole 106, as are the sill-plate 91 and web 101, and from the front vertical web 101 of the casting 97 extends a further web 107, which forms the base-web of said casting and having an aperture 108, and from the web 101 above the base-web extends outwardly another web 109, provided with an aperture 110, alined with the aperture 108, both for the purpose of receiving and coupling a pin, through which the frame can be directly coupled with the engine. At the other end of the frame is interposed the casting 98, having a vertical web 111, abutting against the end sill-plate 91, and through both of which and the end sill bolts 112 extend for the purpose of securing these parts and a buffer and draw-block 112^a, having an opening 112^b for the insertion of a coupling-pin, to the end sill; also, side webs 113, rigidly bolted to the vertical webs 61 of the longitudinal sills, a base-web 14, and a strengthening-rib 115, extending between the base-web and the vertical web. At each side of the

tank and extending between its rear end and the rear end of the fuel-box is a running-board 116, supported upon outwardly-extending brackets 117, having arms 118, riveted to the tank-sheeting, and between the front end of the running-boards and the back plate 30 of the fuel-box extends a plate 119, provided with steps 120 to allow access to or from the fuel-box, the ends of the running-boards extending beyond the cylindical portion or ring 2 of the tank, so as to be adjacent to the end sills 58 of the frame, and from the rear ends of the running-boards depends a step or ladder pendant 121, Fig. 3, from the end of the running-board and body to a step-plate 122, located adjacent to the plane of the end sills, allowing access from the said sills to the running-board and thence along the running-board to the top of the tank and to the fuel-box. The step-plate 122 (shown in plan in Fig. 11) extends entirely across the top of the end sill 58 and has its inner edge recessed at 126 to permit it to fit snugly up against the curved end or header 11 of the tank, thereby providing a platform over the end sill at this end, from which depend steps 127 128, secured, respectively, to the arms 129 130 of the hangers 131, which are secured by the arm 132 to the under side of the end sill 58, as shown in Fig. 1, the arm 131 being a separate angular bracket riveted to the vertical part 131. At suitable places at the end of the tank are disposed, both horizontally and vertically, grab-handles 123 124, and above the running-boards 116 are the longitudinal hand-rails 125, secured by suitable arms to the tank. Over the end sill 58, at the front end of the frame and extending inwardly to the front header 12—that is, extending closely up to the end course 5—is a plank 133, Fig. 1, forming a platform and step at this end, and superposed over this platform is a plate-like box forming a step 134, its top 135 forming a further step at its upper surface and a continuation of the horizontal end 32 of the septum 29, thereby providing a standing-space outside of the fuel-box within easy access of the cab-flooring of the locomotive, and to each side of the end sills 58 at this end are secured hangers 136 137, the lower end of the hangers 137 being secured to the vertical rise of the hangers 136, as shown in Fig. 10, the latter having arms 138, supporting the step 139, and secured to the arms 136 is a further step 140, providing access from the ground to the step 140, to the step 133, and thence to the platform 135. My present improvements also embody means for supporting the brake-cylinder of a suitable air-brake mechanism. The brake-cylinder 141 is formed with the flat top 142, and extending between the angular members 95 of the intermediate frame-bracing, Fig. 13, is a plate 143, having depending flanges 144, (shown in dotted lines,) which are secured to the angular members 95 by the bolts 145, the plate 143 having apertures 146, permitting the affixture of the brake-cylinder to the supporting-plate 143. At 147 is a conventional brake-lever pivoted to an arm 148, extending from the brake-cylinder, to which is secured the conventional brake-rod 149, and at 150 is the brake-cylinder piston-rod, all in conventional form and for well-understood purposes. In this manner the brake-cylinder is advantageously supported and located for the purposes of utilization of power, convenience of application of the same to the brake mechanism, and the application of strains incidental to the support and the operation of the brake mechanism.

Having described my invention, I claim—

1. In a locomotive-tender, the combination with a cylindrical tank, having a depression formed within its vertical limits at one end, and a fuel-box superposed above said depressed end, substantially as described.

2. In a locomotive-tender, the combination with the cylindrical tank, of an inclined depression formed within its vertical limits at one end, and a fuel-box superposed upon said tank over said inclined depression, the latter forming the bottom of the box, substantially as described.

3. The combination in a locomotive-tender, of the tank having a depression at one end, and a fuel-box superposed over said depression having defining-walls transversely of greater width than the diameter of the tank, and extending above the tank, substantially as described.

4. The combination with the tender, of the tank having an end inclined to the vertical, and a rectangular fuel-box superposed over said inclined end, and having a bottom or septum dividing the tank and box extending transversely beyond the tank, and perpendicular sides and an end extending above said tank, substantially as described.

5. In a locomotive-tender, the combination with a tank, of an inclined septum, formed within the vertical limits of the tank at one end, and extending transversely beyond the tank, plates extending perpendicularly from said septum outside of the tank's diameter, and above the tank, and an end plate connecting the side plates and extending above the tank, substantially as described.

6. In a locomotive-tender, the combination with a tank, of an inclined septum formed within the vertical limits of the tank at one end, and extending transversely beyond the tank, plates extending perpendicularly from said septum outside the tank's diameter and above the tank, an end piece connecting the side plates and extending above the tank, and a perpendicular front plate having an aperture opening into the space between the said plates.

7. In a locomotive-tender, the combination with the tank, having closed ends, an inclined septum formed at one end of the tank within its vertical limits and extending from one end of the tank inwardly and upwardly and trans-

versely beyond the sides of the tank, longitudinal and transverse walls rising from the transverse ends of said septum above the tank, the front wall being inset from the end of the tank, and an aperture formed in the inset wall leading into the space between said walls, substantially as described.

8. In a locomotive-tender, the combination with the tank, the fuel-box superposed over one end of the tank, an inclined septum dividing the box from the tank, and having a horizontal terminating-plate, the box having the front end plate, boxes located in the front corners of the fuel-box at each side of its longitudinal center, the terminating-plate forming the bottom of said box, an aperture in the front plate leading into the fuel-box, and separate apertures in the said front plate at each side of the first-mentioned aperture leading into said separate boxes, substantially as described.

9. In a locomotive-tender, a superposed fuel-box at one end, an inclined bottom dividing the fuel-box from the tank, and a forward horizontal extension of said bottom, separate boxes located at the front corners of the fuel-box, and at each side of the longitudinal center, said boxes having top plates inclined downwardly and inwardly in a plane transverse to the longitudinal axis of the tank, substantially as described.

10. In a locomotive-tender, comprising a tank and a superposed fuel-box, separate boxes located at the front corners of the fuel-box and at each side of its longitudinal center, the bottom of said box being formed by said septum, and transversely disconnected and inwardly and downwardly inclined top plates for said boxes, substantially as described.

11. In a locomotive-tender, the combination with the tank, and superposed fuel-box, a septum dividing the tank from the fuel-box, a brace extending transversely of the tank and beneath said box, and upwardly from the bottom of the tank, substantially as described.

12. The combination with the tank, of the superposed fuel-box, a septum extending between the fuel-box and the tank, a brace extending transversely of the tank, and upwardly from its bottom, and a bolster secured to the tank extending transversely thereof, and located in line with said brace, substantially as described.

13. The combination with the tank, of a fuel-box, and a dividing-septum, of a plate extending transversely within the tank, and secured thereto below and in line with the septum, said plate having an aperture, substantially as described.

14. The combination with the tank, of the fuel-box, the dividing-septum, the segmental and flanged ribs secured within the tank below the septum and intermediate of its longitudinal limits, and a plate secured to said flange and extending transversely of the tank within the same to the septum, said plate having an aperture, substantially as described.

15. The combination with the tank, of the fuel-box, the dividing-septum, the segmental and flanged rib secured within the tank below the septum and intermediate of its longitudinal limits, and a plate secured to said flange and extending transversely of the tank within the same to the septum, said plate having an aperture, and a transverse bolster secured to the exterior of the tank below said rib and plate, substantially as described.

16. In a locomotive-tender, the fuel-box having an inclined bottom with a front horizontal extension, an aperture in the front plate, means for increasing or diminishing the area of said aperture, and a plate as 57^a, extending between the transverse limits of the said aperture.

17. The front plate 45 of the tender having an opening 57, combined with the steps 57^a and the strips 57^b secured to the plate at the sides of said opening and having the arms 57^c supporting the steps.

18. In a locomotive-tender, the combination of a frame comprising longitudinal sills, cross-sills, a circular tank superposed on the frame and having a series of segmental and concentric ribs secured within said tank and to its shell intermediate of the cross-sills, substantially as described.

19. In a locomotive-tender, the combination with the frame and the tank, of a plurality of dasher-plates extending from the top and bottom of the tank in transverse disalinement with each other, and at an angle to the plane of the tank-sheeting, substantially as described.

20. In a locomotive-tender, the combination with the frame and the tank, of a series of exterior septums disposed at an angle to the plane of the tank-sheeting, and drainage-holes formed in said septums near the bottom of the tank, substantially as described.

21. In a locomotive-tender tank, the combination with a frame and the tank, of a series of sheets transversely disposed across the lower interior area of the tank, and further sheets likewise disposed within the upper interior area of the tank, and in perpendicular disalinement with the first-mentioned sheets, substantially as described.

22. The combination with the tank, the transverse bolsters, the longitudinal sills secured to the ends of the bolsters, and wings extending upwardly from said sills to the tank, substantially as described.

23. The combination with the tank, of a framework for the same comprising the end sills, transverse bolsters, the longitudinal sills extending between the end sills and secured to the ends of the bolsters, and wings extending outwardly from the longitudinal sills to the tank, substantially as described.

24. The combination with the tank, of a frame for the same comprising the transverse end sills, transverse intermediate bolsters re-

cessed to receive the tank, longitudinal sills secured to the ends of the bolsters, and wings extending from the longitudinal sills upwardly and outwardly to the tank, substantially as described.

25. The combination with the tank, a frame for the same comprising the end sills, the intermediate transverse bolsters, longitudinal sills secured to the ends of the bolster and end sills, wings extending outwardly from said longitudinal sills to the tank, and the filling-plates interposed between the ends of said wings and tank, substantially as described.

26. The combination with the tank having courses of different diameter, of the bolsters, the longitudinal sills secured to the ends of the bolsters, end sills connecting the longitudinal sills, wings secured to the longitudinal sills coextensive with the tank and extending upwardly thereto, and filling-plates coextensive with the minor courses interposed between the wings and the tank, substantially as described.

27. The combination with the tank, of a frame therefor comprising end sills, longitudinal sills extending between the end sills, intermediate bolsters having curved upper sections extending between the sides of said longitudinal sills secured thereto, and extending below said sills, the tank resting within the curve of said bolsters, and end castings secured between the vertical sides of the ends of said longitudinal sills and abutting against the sides of the end sills, substantially as described.

28. The combination with the tank, and a frame therefor comprising the longitudinal sills, the end sills, end castings secured to the end sills and longitudinal sills, and bolsters located intermediate of the end sills and castings, and a brace extending between the longitudinal sills intermediate of the bolsters, substantially as described.

29. The frame comprising the end sills, the duplex longitudinal sills, the wings having a vertical section interposed between the sill-sections, each wing having outwardly-extending upper sections, bolsters extending between the inner sill-sections, the ends of the bolsters the longitudinal sill-sections, and the vertical wing-sections being secured together, and a tank secured on said bolster and to the upper wing-sections, substantially as described.

30. The combination with the tank, and a frame comprising cross-bolsters, the two longitudinal sills secured to the ends of the bolster, the wings secured between the sill-sections, and extending upwardly to the tank, and the filler-plate interposed between the upper ends of the wings and the tank, and secured thereto, substantially as described.

31. The combination in a locomotive-tender, the fuel-box superposed over a depression in one end of the tank, running-boards at the sides of the tank extending from its rear end to the fuel-box, steps leading from the running-board to the fuel-box, and steps below the running-boards at said rear end, substantially as described.

32. In a locomotive-tender, the combination with the cylindrical tank, having one end of reduced diameter transversely, an inclined top plate over the reduced end, and a fuel-box disposed vertically and transversely over the inclined plate and reduced end, substantially as described.

33. The combination with the angular members 95 of the intermediate brace of the tender-framing, of the plate 143 secured to said angular members, and a brake-cylinder secured to the horizontal face of said plate, substantially as described.

34. The combination with the end sill 58, of the plate 122 superposed thereover, the tender-framing, the tank supported thereon, the end of the tank being located adjacent the said plate, and steps depending from the end sill below said plate, substantially as described.

35. In a locomotive-tender, the combination with the end sill 58, the tender-framing, the fuel-box having the horizontal portion 32 of its flooring, the riser 134 having the platform 135 on the end sill in line with the flooring 32, and steps secured to the ends of the end sill 58 below the platform, substantially as described.

Signed at the city, county, and State of New York this 29th day of May, 1901.

CORNELIUS VANDERBILT.

Witnesses:

L. A. SHEPARD,

CHAS. G. HENSLEY.