

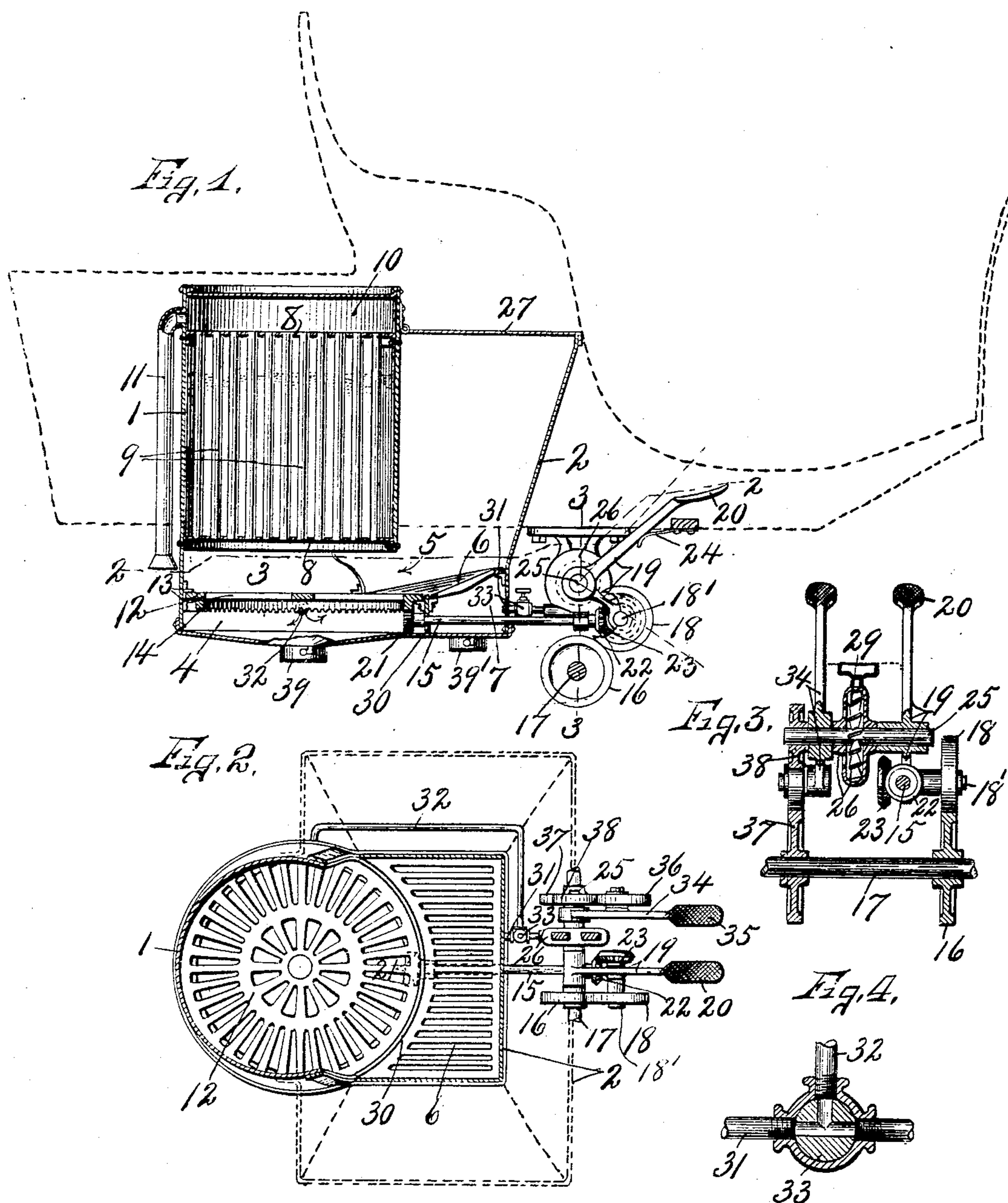
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Patented July 8, 1902.

H. K. HESS.
STEAM PROPELLED VEHICLE.

(Application filed Jan. 14, 1902.)

(No Model.)



WITNESSES:

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STEAM-PROPELLED VEHICLE.

SPECIFICATION forming part of Letters Patent No. 704,254, dated July 8, 1902.

Application filed January 14, 1902. Serial No. 89,713. (No model.)

To all whom it may concern:

Be it known that I, HENRY K. HESS, of Philadelphia, in the county of Philadelphia, in the State of Pennsylvania, have invented new and useful Improvements in Steam-Propelled Vehicles, of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

This invention relates to improvements in steam-propelled vehicles, having reference more particularly to the steam-generator and the means for producing combustion.

One of the objects of this invention is to provide a closed coal-bunker at one side of the steam-generator adapted to discharge into the combustion-chamber of said generator and having a grate in its base for supporting the fuel and forming the base of an auxiliary combustion-chamber, so that the products of combustion pass through the upright flues of the boiler.

Another object is to provide the generator and coal-bunker with separate sub air-chambers connected to an air-feed in such manner that air may be introduced into either or both of the subchambers.

A further object is to provide the combustion-chamber of the generator with a revolving grate extending under the coal-bunker and forming a portion of its bottom wall, whereby the fuel from said bunker may be evenly distributed over the entire surface of the grate, at the same time facilitating the feed of the fuel to the grate.

Another object is to provide means actuated by the engine and controlled from the seat of the vehicle for revolving the grate when desired; and a still further object is to provide means also actuated by the engine and controlled from the seat of the vehicle for introducing air into one or both of the subchambers of the generator and coal-bunker.

To this end the invention consists in the combination, construction, and arrangement of the parts of a steam-propelled vehicle, as hereinafter fully described, and pointed out in the claims.

Referring to the drawings, Figure 1 is a longitudinal vertical section of a steam-generator and coal-bunker, showing the mechanism for introducing air into the subchambers of each and also showing the mechanism for re-

volving the grate, the body of the vehicle being shown in dotted lines. Figs. 2 and 3 are sectional views taken, respectively, on lines 2-2, 3-3, Fig. 1. Fig. 4 is a sectional view through the valve for controlling the air-feed to each of the subchambers of the generator and coal-bunker.

Similar reference characters indicate corresponding parts in all the views.

This invention is adapted more particularly for the use of charcoal or the cheaper grades of anthracite or bituminous coal, being especially arranged for burning charcoal; and it consists, essentially, of a steam-generator 1 and a coal-bunker 2, arranged side by side, the steam-generator 1 being provided with a combustion-chamber 3 and a subchamber 4, and the coal-bunker 2 is preferably arranged in front of the generator and is provided with a discharge-opening 5, a grate 6, and a sub air-chamber 7.

The generator 1 may be of any desired size, form, or construction, but preferably consists of an upright cylindrical shell having opposite end heads 8 and 8, connected by upright flues 9, the lower ends of which communicate with the combustion-chamber 3 and the upper ends communicate with a smoke-chamber 10, having an external downwardly-extending conduit 11 for conducting the waste products beneath the body of the vehicle and at the rear of the generator. It is evident, however, that the smoke-chamber may be provided with an upwardly-extending conduit discharging above the vehicle-body, or it may be provided with upwardly and downwardly extending conduits.

The combustion-chamber 3 is arranged beneath the lower head 8, is formed of equal or greater area than the cross-sectional area of the generator, and is separated from the subchamber 4 by a revolving grate 12. This revolving grate is preferably arranged substantially horizontal, although it may be inclined, if desired, and it is usually mounted between suitable bearings 13, consisting of flanges projecting inwardly from the downwardly-extending walls of the shell of the boiler and is provided on its lower face with a circular rack 14, said grate being usually formed of greater area than the cross-sectional area of the boiler and extends beneath the lower end

of the coal-bunker, so as to form a part of the bottom wall of said bunker. Any desired means may be employed for the rotation of the grate for the purpose of distributing the fuel fed from the bunker 2 over the entire surface of the grate, it being understood that the revolving of the grate acts as a conveyer for the purpose of such distribution. As seen in the drawings, this means of revolving the grate consists of a rotary horizontal shaft 15, a gear or friction-wheel 16, mounted upon the driving-shaft, as 17, of the engine, (not illustrated,) and an additional gear or friction-wheel 18, mounted upon a rock-arm or bell-crank 19 and having means, as a treadle 20, in proximity to the seat. The inner end of the shaft 15 is provided with a gear 21, meshing with the circular rack 14 of the grate 12, the opposite end of said shaft being provided with a bevel-gear 22, meshing with an additional bevel-gear 23, which is secured to the spindle or shaft 18' of the gear or wheel 18, it being understood that the shaft for supporting said gear or friction-wheel 18 and the gear 23 is journaled upon one arm of the bell-crank lever 19. This bell-crank lever is held in its normal inoperative position by any desired means, as a spring 24, secured to any part of the vehicle in such manner as to normally force the wheel 18 out of engagement with the wheel 17.

The bell-crank lever 19 is pivotally mounted upon a shaft 25, usually arranged beneath the crank-shaft, said shaft being preferably journaled in a frame 26, secured to the body of the vehicle.

It is apparent from the foregoing description that when sufficient steam is generated to operate the engine and it is desired to feed fuel from the bunker 2 over the entire surface of the grate 12 the operator depresses the treadle 20, and thereby forces the gear or wheel 18 into engagement with the wheel 17 of the engine crank-shaft, whereby rotary motion is transmitted to the grate 12 by means of the gears 23 and 22, shaft 15, and gear 21, meshing with the rack 14, and as soon as the pressure is released from the pedal 20 the spring 24 serves to throw the gear 18 out of engagement with the gear 17, whereupon the rotary motion of the grate ceases.

The coal-bunker 2 is arranged at one side of the generator 1, preferably in front of the same, is closed at its upper end by a movable closure or door 27, and serves as a magazine-feed to discharge the fuel by gravity through the discharge-opening 5 at its base and into the combustion-chamber 3.

The grate 6 at the base of the coal-bunker is preferably fixed and forms a continuation of the grate 12, said grate 6 being usually inclined upwardly from the grate 12 for the purpose of facilitating the gravity feed of the fuel to the combustion-chamber and at the same time acting to sift the dust from the coal before being fed into the combustion-

chamber. The primary object of this grate, however, in the base of the coal-bunker is to permit the use of the base of the coal-bunker as a combustion-chamber—that is, the fuel may be ignited upon the grate 6—and owing to the fact that the bunker is closed at its upper end, so as to prevent the passage of air there-through, the products of combustion are carried under the boiler and upwardly through the flues, and it is thus apparent that a large combustion-chamber is afforded extending not only under the boiler itself, but under the body of the fuel in the bunker.

The subchambers 4 and 7, which are arranged, respectively, beneath the grates 12 and 6, not only serve to receive the ashes and dust from the combustion-chambers in said generator and bunker, but also act as air-chambers to receive air from a suitable blower 29. These chambers are separated from each other by a partition 30, which is here shown as consisting of a part of the shell of the generator surrounding the ash pit or chamber 4, the front portion of the shell being extended forwardly beneath the coal-bunker and is cut away for forming the opening 5.

The means for introducing air into the chambers 4 and 7 preferably consists of the blower 29, which is mounted upon the shaft 25 within the frame or casing 26 and is connected by conduits 31 and 32 to the chambers 7 and 4, a suitable valve 33 being connected in said conduits for controlling the air-feed to said chambers 7 and 4. This valve is so arranged as to permit the air to be introduced into either one or both of the chambers 4 and 7, a detail of this valve being shown in Fig. 4, which is believed to be sufficient to illustrate its operation.

Mounted upon the shaft 25 is a bell-crank lever 34, similar to the lever 19, one arm being provided with a pedal 35, and the other arm is provided with a gear or friction-wheel 36, adapted to engage gears or friction-wheels 37 and 38, secured, respectively, to the crank-shaft 17 and the upper shaft 25 in such manner that as the pedal 35 is depressed against the action of a spring similar to the spring 24 the gear or friction-wheel 36 is caused to simultaneously engage the gears 37 and 38, whereby rotary motion is imparted to the fan or blower from the crank-shaft 17 of the engine when said engine is in motion.

Inasmuch as the engine is usually connected to the driving-gear of the vehicle by a clutch or other means, whereby the engine may be operated independently of the running-gear, it is apparent that when the engine is thrown out of connection with the running-gear of the vehicle only a slight degree of steam-pressure is required from the generator to operate the engine, which in turn may operate the blower or revolve the grate 12 when desired.

In order to permit the ashes or dust to be removed from the chambers 4 and 7, I usually provide the bottom wall of each of said cham-

bers with suitable openings having removable caps 39 and 39', by the removal of which the dust or ashes may be readily taken out.

The operation of my invention will now be readily understood upon reference to the foregoing description and the accompanying drawings, and it will be understood that some change may be made in the detail construction and arrangement of the parts without departing from the spirit thereof—as, for instance, the grate 6 may be arranged horizontally instead of an incline—and other means other than shown may be employed for introducing air into the chambers 4 and 7 and also for revolving the grate without departing from the spirit of this invention.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. The combination of a vehicle-body, a steam-generator mounted on the body, a coal-bunker located by the side of the generator, a rotary grate beneath the steam-generator, an additional grate beneath the bunker arranged to discharge the fuel upon the former grate, an air-chamber beneath one of the grates and means for supplying air to said chamber.

2. The combination of a vehicle-body, a steam-generator mounted on the body, a coal-bunker located by the side of the generator, a rotary grate beneath the steam-generator, an additional grate beneath the coal-bunker arranged to discharge fuel onto the rotary grate, an air-chamber beneath the said additional grate, and means for supplying air to said air-chamber.

3. The combination of a vehicle-body, a steam-generator mounted on the body, a coal-bunker located by the side of the generator, a rotary grate beneath the steam-generator, a grate beneath the bunker inclining downwardly toward the rotary grate to discharge the fuel thereon, an air-chamber beneath the inclined grate, and means for supplying air to the air-chamber.

4. The combination of a vehicle-body, a steam-generator mounted on the body, a coal-bunker located by the side of the generator, a rotary grate beneath the steam-generator, an inclined grate beneath the coal-bunker arranged to discharge onto the rotary grate, air-chambers beneath said grates and means for supplying air to said chambers.

5. The combination of a vehicle-body, a steam-generator and engine mounted on the body, a coal-bunker situated at one side of the steam-generator, a rotary grate beneath the generator, a second grate beneath the coal-bunker arranged to discharge fuel onto the rotary grate, connections between the engine and grate to rotate the grate, and means in proximity to the seat of the vehicle for making and breaking said connections.

6. The combination of a vehicle-body, a steam-generator and engine mounted on the body, a coal-bunker situated at one side of the steam-generator, a grate beneath the generator, a second grate beneath the bunker arranged to discharge onto the former grate, an air-chamber beneath the second grate, means actuated by the engine to supply air to the air-chamber, and additional means in proximity to the seat of the vehicle to control the action of the former means.

7. In a steam-propelled vehicle, the combination with a vehicle-body and having a combustion-chamber in its base, of a steam-generator mounted on the body, and a closed coal-bunker located at the side of the generator and opening at its base into the combustion-chamber for feeding and burning the fuel at the junction of the bunker and combustion-chamber and preventing the combustion of the fuel in the bunker and means the vehicle controlled by the operator for feeding air to the combustion-chamber.

8. In a steam-propelled vehicle, the combination with a vehicle-body, of a steam-generator mounted on the body, an air-tight coal-bunker located at the side of the generator and provided with an inlet-opening for the fuel and a discharge-opening leading to the combustion-chamber of the generator, a closure for the inlet preventing the entrance and exit of air or gases to or from the bunker, a grate and subchamber in the base of the burner, and an air-feeding mechanism connected to the subchamber and controlled by the operator for feeding air to said subchamber.

In witness whereof I have hereunto set my hand this 28th day of December, 1901.

HENRY K. HESS.

Witnesses:

MILTON WOLF,
WM. A. SHRYOCK.