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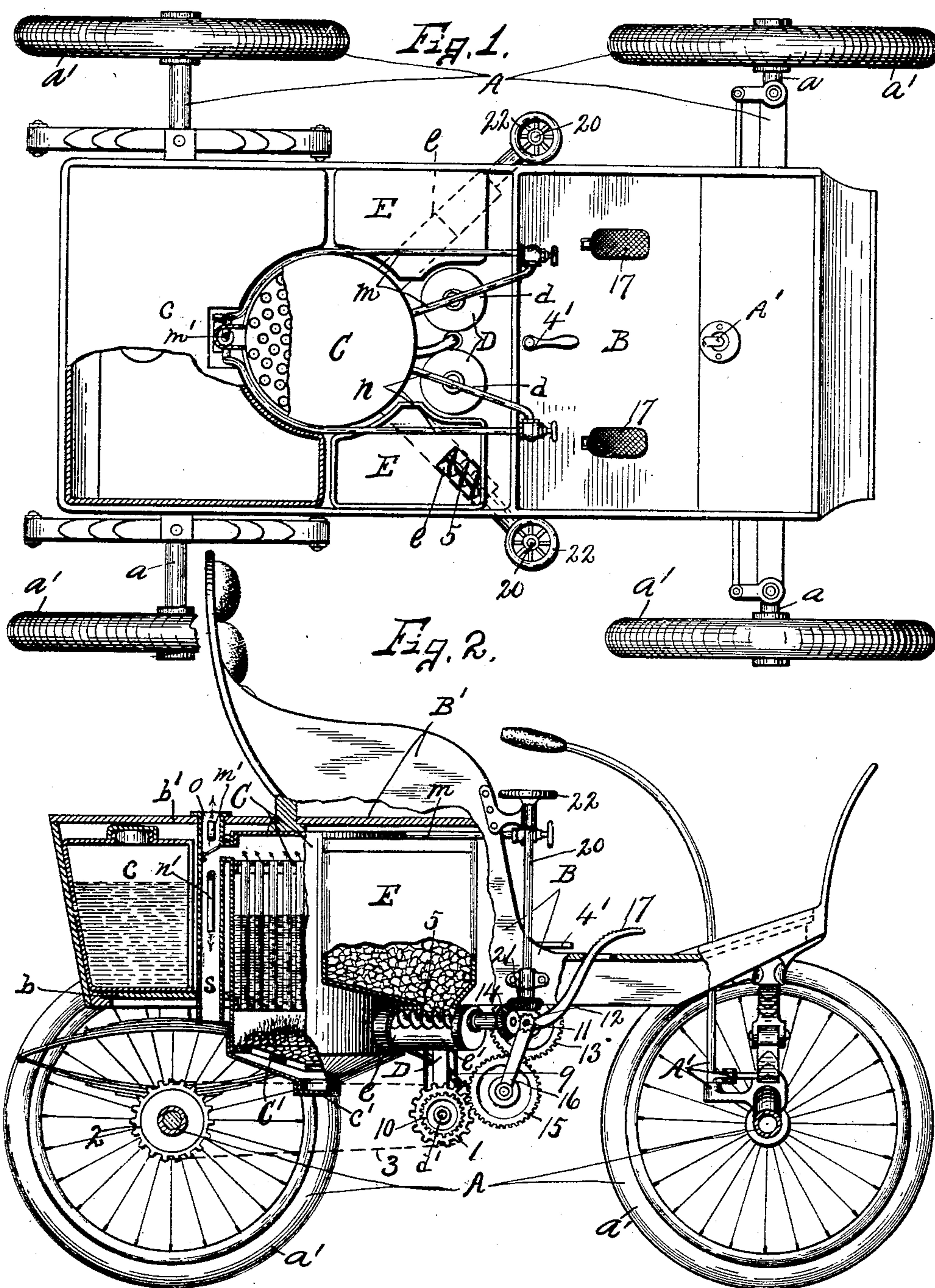
Patented July 8, 1902.

H. K. HESS.
STEAM PROPELLED VEHICLE.

(Application filed Nov. 15, 1901.)

(No Model.)

2 Sheets—Sheet 1.



WITNESSES:
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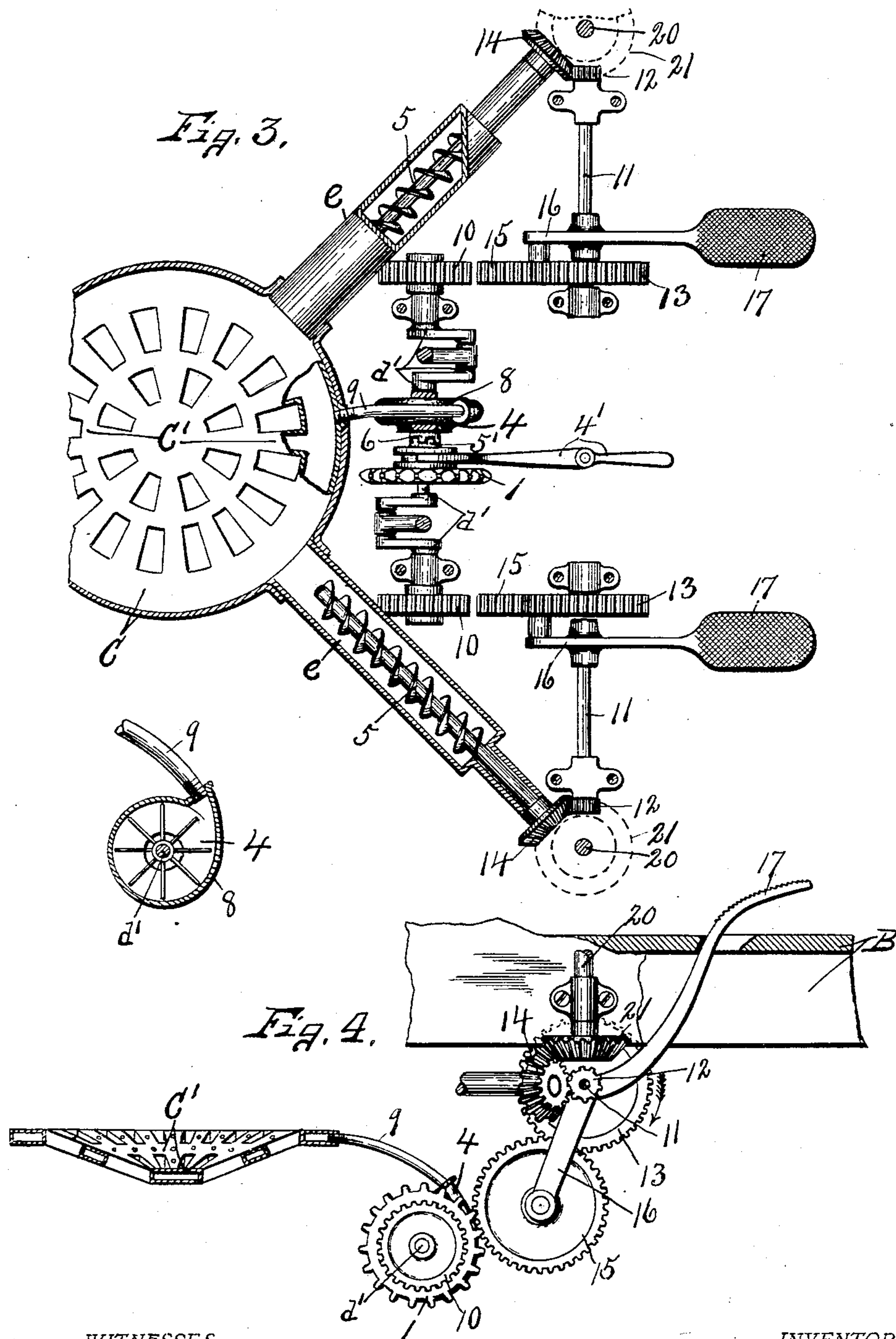
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UNITED STATES PATENT OFFICE.

HENRY K. HESS, OF PHILADELPHIA, PENNSYLVANIA.

STEAM-PROPELLED VEHICLE.

SPECIFICATION forming part of Letters Patent No. 704,253, dated July 8, 1902.

Application filed November 15, 1901. Serial No. 82,376. (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.

My invention relates to improvements in steam-propelled vehicles, having particular reference to means for producing combustion.

One of the objects of this invention is to provide an air-blast mechanism operated by the engine independently of or simultaneously with the vehicle-driving mechanism, whereby the steam may be more quickly raised to the desired or maximum pressure and by which the cheaper grades of coal or charcoal may be successfully employed as fuel.

Another object is to provide mechanism whereby the fuel may be automatically fed to the combustion-chamber by the engine either when the vehicle is in motion or at rest.

A further object is to provide the fuel-conductor leading from the bunkers to the combustion-chamber with a subchannel to receive any excess of fuel which may be fed to the combustion-chamber beyond its capacity.

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, Figures 1 and 2 are respectively top, plan, and side elevation of a steam-propelled vehicle embodying my invention, the seat being broken away to disclose the underlying parts in Fig. 1 and portions of the vehicle-body, boiler, and one of the coal-bunkers being broken away in Fig. 2. Fig. 3 is a plan of the detached mechanism for carrying out the objects of my invention, showing particularly the crank-shaft of the engine and the fuel and air-feed mechanisms connected thereto, a portion of the burner being also shown. Fig. 4 is a side elevation of the parts seen in Fig. 3, the grate being shown in section.

Similar reference characters indicate corresponding parts in all the views.

In the drawings I have shown the running-

gear A, having a vehicle-body B, upon which is mounted the boiler C, an engine D, fuel-bunkers E, means for feeding the fuel to the combustion-chamber of the boiler, and additional means for feeding air to the fuel.

The running-gear A and body B may be of any desired form or construction adapted to the purposes for which the vehicle is used, the running-gear being here shown as comprising front and rear axles *a*, having wheels *a'* and a suitable steering device *A'*, and the body B is suitably supported on the running-gear and is provided with a seat *B'* and lower and upper decks *b b'*.

The boiler C is preferably supported in the body of the vehicle between the decks *b b'*, extends beneath the lower deck, and is preferably of the upright-flue type, having a smoke-chamber at its top and a combustion-chamber in its base adapted for burning charcoal or other cheap coal fuel. A hollow perforated grate *C'* is preferably supported in the combustion-chamber and is adapted to be connected to a fan or other air-blast device, whereby air is forced into the hollow grate and upwardly through the perforations for facilitating the ignition and combustion of the fuel. This grate is preferably hopper shape, beneath which is an ash-box having a discharge-opening and a movable closure *c'* therefor, said closure serving as an ash-pan, which may be removed when necessary. The boiler C is partially surrounded by a water-reservoir *c*, which is suitably connected to supply water to the boiler when needed and is preferably arranged between the decks of the body at the rear and sides of the boiler.

In Fig. 1 I have shown two steam-cylinders *d d'* of the engine D, which receive steam from the boiler C, and their pistons are connected to rotate a suitable shaft *d'*, which form the direct means of driving the various parts of my invention presently described and also for propelling the vehicle.

The fuel-bunkers E are preferably mounted in the body of the vehicle at opposite sides of the boiler and engine and are each connected independently to the combustion-chamber by conductors or chutes *e*. These chutes are usually arranged substantially horizontal and are each provided with a lengthwise opening for the infeed of the fuel

and with a substantially parallel subchannel e' , which is adapted to receive any fuel which may be fed to the combustion-chamber in excess of the capacity of said chamber.

5 The construction and mechanism thus far described refer mostly to the general structure of the vehicle, while the mechanism which I am about to describe relates more specifically to the mechanism for carrying out the
10 objects of my invention, comprising, first, power-transmitting mechanism, as sprockets 1 and 2 and a chain 3, detachably connected to the engine for propelling the vehicle; second, a fan or blower 4, actuated by the engine to force air into the combustion-chamber;
15 third, screw-feeds 5 for feeding the fuel from the bunkers to the combustion-chamber, and means for driving the screw from the engine independently of the other mechanisms.
20

The sprockets 1 and 2 are mounted, respectively, on the rear axle and on the crank-shaft d' , being connected by the chain 3, so that when the sprocket 2 is locked to the
25 shaft d' the vehicle may be propelled forwardly or backwardly by the engine. The sprocket 2 is preferably loose on the shaft d' and is adapted to be moved endwise on said shaft by any manually or mechanically operated means, as a lever 4', said sprocket being
30 provided with a clutch-face 5', movable into and out of engagement with a clutch-section 6, which is locked to the shaft to rotate therewith.

35 The fan or blower 4 is preferably secured to the crank-shaft d' to rotate therewith and is usually inclosed in a suitable case 8, fixed to the body of the vehicle and connected by an air-conduit 9 to the interior chamber of
40 the hollow grate C' for the purpose of forcing air upwardly through the perforations into the fuel in the combustion-chamber. This feature of my invention permits the use of any grade of coal and is especially adapted
45 for the use of the cheaper grades of anthracite or charcoal to lessen the cost of operating and also to reduce the normal load of the vehicle. Another advantage of this construction is that the fan may be operated by the engine
50 independently of the running-gear with a very light steam-pressure to quickly and automatically increase the combustion of fuel, and thereby raise the steam-pressure to the desired limit with but very little loss of time,
55 this being accomplished by shifting the clutch-section 5' out of engagement with the section 6.

The screw 5 is revolvably mounted in the upper portion of the chute e above the channel e' and is adapted to be rotated by the engine either simultaneously with or independently of the running-gear of the vehicle, being controlled by the operator from the seat of the vehicle. In carrying out this part of
60 my invention I provide the crank-shaft d' with gears 10 and mount upon the body of the vehicle additional revolvable shafts 11, one

for each feed-screw. Fixed to each of these shafts 11 are gears 12 and 13, the gear 12 meshing with a bevel-gear 14 on the screw-shaft, and the gear 13 normally mesh with
70 a gear 15, which is mounted upon a rock-arm 16, loosely journaled on the shaft 11 and adapted to be manually operated by any suitable means, as a pedal 17, for forcing the gear
75 15 into and out of mesh with the gear 10. The rock-arm 16 is so arranged that the gear 15 normally gravitates out of mesh with the gear 11, and the pedal being arranged in proximity to the seat within easy reach of the
80 foot of the operator it is apparent that when desired to operate the feed-screw to feed fuel from the bunkers it is simply necessary to depress the pedal 17 to connect the engine-shaft to the feed-screw, said pedal being held
85 in this position by the foot or other means until the required amount of fuel is fed to the combustion-chamber. Should an excess of fuel be fed beyond the capacity of the combustion-chamber, it is retained in the sub-
90 channel e' of the chute e .

Although I have shown and described a blower for forcing air into the combustion-chamber at a point beneath the fuel, I may employ the exhaust or live steam from the
95 boiler to create a suction or draft in the smoke-chamber or smoke-discharge conduit or conduits for the purpose of drawing air into the combustion-chamber, and in Figs. 1 and 2 I have shown steam-pipes m , leading from the
100 boiler and discharging into smoke-flues o and s , extending from the smoke-chamber of the boiler above and beneath the upper and lower decks of the vehicle-body. The steam-pipe m has an upward extension m' within
105 the branch smoke-conduit o and discharges above the upper deck b' , and the conduit n has a downward extension n' , discharging into the branch smoke-conduits s and beneath the lower deck b , each of these steam-con-
110 duits being provided with a valve w , arranged in proximity to the seat B' , whereby the operator may readily control the air-draft.

These features of my invention add materially to the economy, safety, and convenience of the operation of automobiles, the
115 primary aim of all these improvements being to obviate the use of explosive gases and poisonous odors and to simplify the manipulation of the machine, so that any person of
120 ordinary intelligence or skill may operate the same and repair any ordinary damage thereto.

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

1. A vehicle comprising a running-gear and body, a steam-generator and engine mounted on the body, means actuated by the engine and connected to the generator to force air into the combustion-chamber, and additional
125 means controlled by the operator for connecting and disconnecting the engine and running-gear independently of the former means.
2. The combination with a running-gear

and body of a vehicle, of a steam-generator and engine mounted on the body, the generator having a coal-burner, a fan connected to the engine and discharging into the burner, and movable means controlled by the operator to connect or disconnect the engine and running-gear and to drive the fan independently of the running-gear by the engine.

3. A steam-propelled vehicle comprising a running-gear and body, a steam-boiler and engine mounted on the body, a coal-burner for the boiler, a fan driven by the engine and discharging air to the burner, and driving mechanism connecting the engine and running-gear and having a clutch whereby the fan may be operated by the engine without propelling the vehicle.

4. A steam-propelled vehicle comprising a running-gear and body, a steam-boiler and engine mounted on the body, a coal-burner for the boiler, a fan driven by the engine and discharging air to the burner, driving mechanism connecting the engine and running-gear and having a clutch whereby the fan may be operated by the engine without propelling the vehicle, and means in proximity to the seat of the vehicle for controlling the clutch.

5. In a steam-propelled vehicle, a steam-generator and an engine mounted on the vehicle, a clutch-section connected to the engine, an additional clutch-section connected to the running-gear of the vehicle, manually-operated means for moving one section into and out of engagement with the other, and a blower actuated by the engine independently of the running-gear of the vehicle and discharging air into the burner of the generator.

6. In a steam-propelled vehicle, a steam-generator and an engine mounted on the vehicle, the generator having a coal-burner, clutch-sections connected to the engine and running-gear, means for moving one of the sections into and out of engagement with the other, and a blower actuated by the engine independently of the running-gear and discharging into the burner.

7. In a steam-propelled vehicle, the combination with a steam-generator and an engine, a fuel-bunker discharging into the combustion-chamber, means on the vehicle actuated by the engine to feed the fuel to the combustion-chamber, and an air-feed device actuated by the engine to force air into said chamber.

8. In a steam-propelled vehicle, the combination with a steam-generator and an engine, a fuel-bunker discharging into the combustion-chamber, means on the vehicle actuated by the engine to feed the fuel to the combustion-chamber, and an air-feed device actuated by the engine to force air into said chamber, manually-operated means on the vehicle to disconnect the fuel-feed from the engine, a blower operated by the engine, and vehicle-propelling mechanism operated by the en-

gine independently of the fuel-feed mechanism.

9. In a steam-propelled vehicle, the combination with a steam-generator, and an engine mounted on the vehicle, of a fuel-bunker and a channel leading from the bunker to the combustion-chamber of the generator, a fuel-feed in said channel and of less cross-sectional area than the channel for the purpose described, means to actuate the feed, said feed being of such construction and arrangement relative to the channel that lumps of fuel, as coal, or charcoal, may be fed to the combustion-chamber and retained in the channel when fuel is fed to the combustion-chamber beyond its capacity.

10. A steam-propelled vehicle comprising a running-gear and body, an engine and boiler mounted on the body, a fuel-bunker and a channel connecting the fuel-bunker with the combustion-chamber of the boiler, a feed-screw rotatable in the channel and of less cross-sectional area than said channel, means to rotate the screw having a device in proximity to the seat for controlling its rotation.

11. In combination with a running-gear and body of a vehicle, an engine and boiler mounted on the vehicle, mechanism adapted to be thrown into and out of connection with the engine for propelling the vehicle, a fan actuated by the engine independently of the running-gear, a fuel-bunker, a feed-channel connecting the bunker to the combustion-chamber of the boiler, a rotary screw-feed in the channel of less cross-sectional area than the channel, and mechanism adapted to be thrown into and out of connection with the engine for operating the screw-feed independently of or simultaneously with the operation of the running-gear.

12. The combination with the running-gear and body of a vehicle, a steam-generator and an engine mounted upon and connected to propel the vehicle, a smoke-conduit leading from the smoke-chamber of the generator, a steam-conduit discharging into the smoke-conduit for the purpose described and provided with means in proximity to the seat for controlling the passage of steam to the smoke-conduit, a fuel-bunker mounted on the vehicle-body, a conduit connecting the fuel-bunker to the combustion-chamber of the generator, a rotary screw-feed in said conduit for feeding the fuel from the bunker to the combustion-chamber, and mechanism adapted to be thrown into and out of connection with the engine for controlling the operation of the screw.

In witness whereof I have hereunto set my hand this 11th day of November, 1901.

HENRY K. HESS.

Witnesses:

E. M. HESS,

RICHARD TAYLOR.