P. J. GRIFFIN

STEAM DRIVE FOR AUTOMOBILES.

APPLICATION FILED MAR. 6, 1917.

1,330,863.

Patented Feb. 17, 1920.

2 SHEETS—SHEET 1.

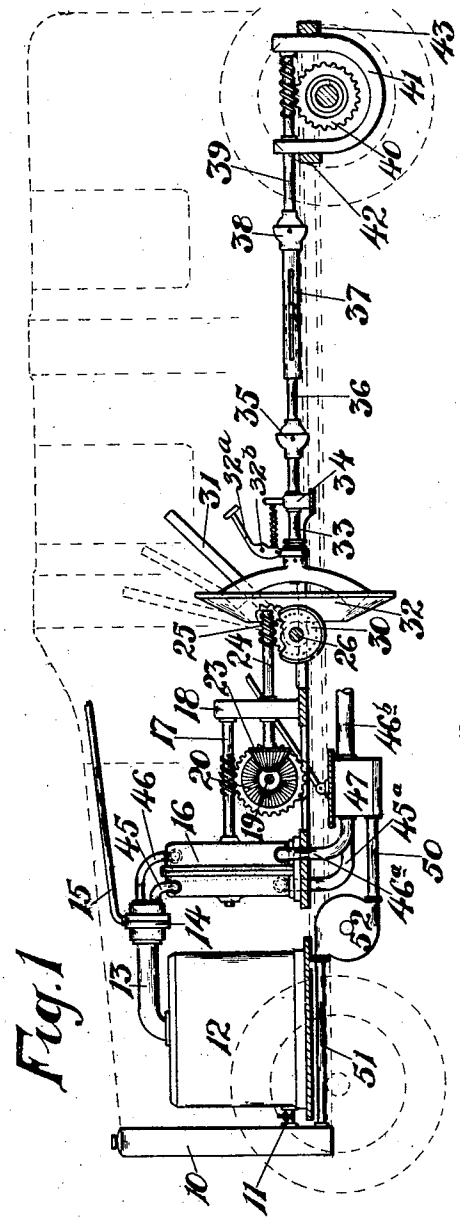

Fig. 1

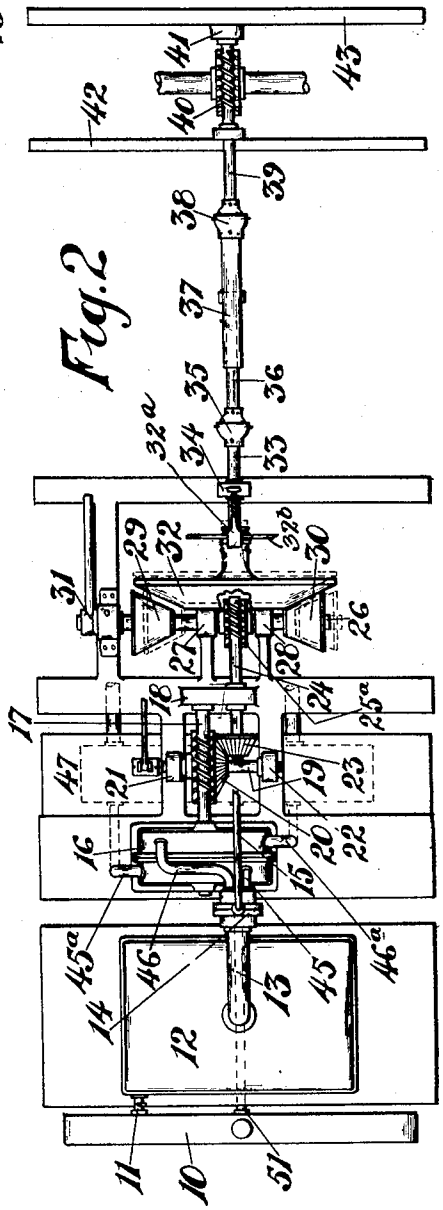

Fig. 2

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Fig. 3

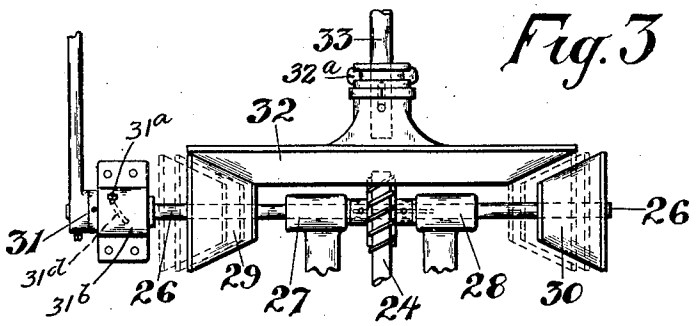


Fig. 4

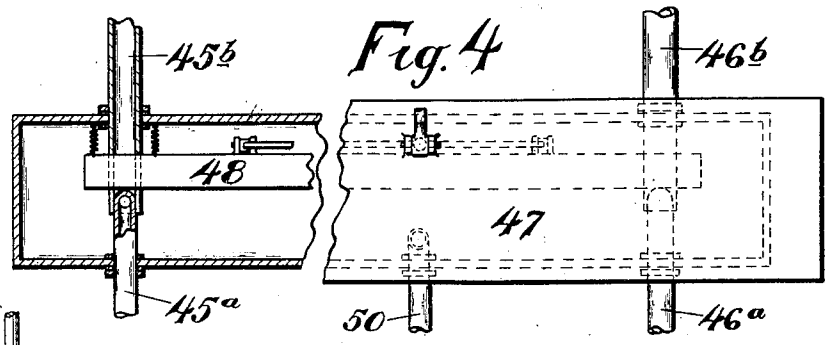


Fig. 3a

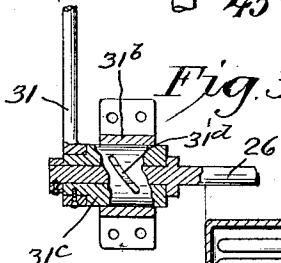


Fig. 5

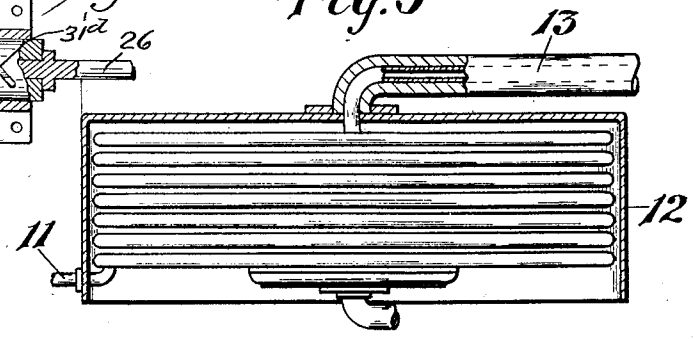
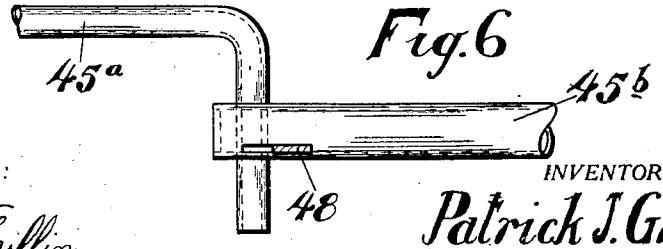


Fig. 6



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STEAM-DRIVE FOR AUTOMOBILES.

1,330,863. Specification of Letters Patent. Patented Feb. 17, 1920.

Application filed March 6, 1917. Serial No. 152,891.

To all whom it may concern:

Be it known that I, PATRICK J. GRIFFIN, a citizen of the United States, and a resident of Dorchester, in the county of Suffolk, in the State of Massachusetts, have invented certain new and useful Improvements in Steam-Drives for Automobiles, of which the following is a specification, reference being had to the accompanying drawings.

The object of this invention is to provide simple, effective and reasonably cheap means whereby a vehicle may be propelled, at a smaller cost than is required to operate the existing types of gasolene and steam plants, this improved type of drive eliminating the present expensive transmission gearing.

In the drawings hereunto annexed, Figure 1 is a side elevation of my improved mechanism with the chassis and body proper shown in dotted lines, for the purpose of greater clearness, it being understood however that the various worm drives, bevel gears, etc., are to be inclosed in oil or grease and therefore will require individual casings. Fig. 2 is a plan view of the mechanisms and shows the several bases or supports for said mechanisms in their respective positions.

Fig. 3 is a relatively enlarged view of the frictionally acting power transmitter, showing in dotted lines the different positions assumed by the rolling contacts while in their forward, reverse, and neutral positions, Fig. 3ª is a relatively enlarged detail view, partly in section, of the means provided for moving longitudinally the shaft 26. Fig. 4 is a partial sectional plan view of the exhaust, condensation, and conveying mechanism. In Fig. 5 I have shown a preferred type of boiler and steam superheater, and Fig. 6 is a diagrammatic view of a simple construction whereby the steam may either be conducted into a condenser (as indicated by Fig. 4) or exhaust directly into the atmosphere.

The construction as herein disclosed may be altered or redesigned, so far as the claims hereunto appended permit, inasmuch as the several parts are of standard or readily recognized construction.

Referring now to the drawings, the numeral 10 denotes a radiator of any suitable design having a connection 11 with an oil burning boiler 12. The said boiler embodies a heat-insulated steam conveying pipe 13 which terminates in a two-way valve 14 of any acceptable construction which is regulated by means of a manually operated rod 15 in order to direct the flow of steam into a reversible turbine 16. In the operation of the said turbine I have found it necessary to provide for the vacuum caused by the reversible rotors and, to that end, I have planned so that the air may have easy access to the turbine, as will be described more fully hereinafter.

A centrally located, worm-geared, shaft 17, journaled in the turbine housing and in a bearing 18, serves to transmit the revolutions of the turbine rotor to a shaft 19 which has fixedly secured thereto a bevel gear 20 and the said gear-supporting shaft is journaled in and supported by bearings 21 and 22. In mesh with the gear 20 is a second bevel gear 23 which is fixed on a shaft 24 which is journaled through and supported by the bearing 18 and has mounted on its otherwise free end a worm gear 25.

The last named worm gear is in mesh with a relatively larger gear 25ª located upon a shaft 26 which is supported by bearings 27 and 28, the said shaft 26 serving in effect as a means upon which disks 29 and 30 (operated by the lever and gear shift 31), are thrust into and out of contact with an enlarged disk 32 which is slidably fixed upon a shaft 33 that is journaled in a bearing 34 and has a universal joint connection 35 secured to its rear end to which is connected a shaft 36, which is slidably mounted in a sleeve 37 and engageable therewith by pin-and-slot connection or otherwise. Fixedly secured to the rear end of the said sleeve is a second universal joint connection 38 which in turn embraces a counterpart that is connected with a shaft 39 which last named shaft is turned so as to receive a worm which actuates a worm gear 40 that is located upon the rear axle of the vehicle.

The manner of sliding the shaft 26 longitudinally will be best understood by reference to Figs. 3 and 3ª of the drawings, where

it will be seen that a pin 31[a] is fixedly mounted in a bearing or journal box 31[b] said pin extending into a diagonal slot 31[d] in a collar 31[c] which latter is secured rigidly to handle 31 and has loosely journaled therein the shaft 26, the arrangement of the described parts being such that, when the handle 31 is rocked, the pin 31[a] which is held rigidly in its position, causes the collar 31[c] to move a limited distance endwise, carrying with it the shaft 26.

As above stated, the friction disk 32 is slidably mounted on shaft 33, the hub of said disk being formed with an annular groove (see Fig. 3) in which groove is located the forked end portion of an operating lever 32[a] which is fulcrumed at 32[b] in such manner that the rocking of said lever will result in sliding the disk 32 on shaft 33.

A bearing 41 serves to support and "take up" the end thrust of the shaft 39 and is fastened, by means of plates 42 and 43, to the chassis of the vehicle.

The motor 16, which I have already referred to briefly, is of the reversible rotor type, that is to say the rotor is provided on its opposite faces with, oppositely pitched blades or buckets, the steam being discharged upon the blades at one side through pipe 45 and exhausted through pipe 45[a], and steam being discharged upon the blades at the other side through a pipe 46 and exhausted through a pipe 46[a]; the intake pipes 45 and 46 being branched from the two-way valve 14. When it is desired to drive the motor in one direction as, for example "clock-wise" the valve 14 is partly rotated so as to connect pipe 45 with the steam supply pipe 13 and when it is desired to reverse the direction of rotation of the rotor, the valve is adjusted to connect the intake pipe 46 with the rotor and to shut off, at the same time, the steam supply from pipe 45. The speed at which the rotor is driven may be readily controlled by simply regulating the volume and resulting force of the steam admitted through the pipe 45, or the pipe 46 as the case may be.

Ordinarily, it is to be understood, the motor may be driven continuously and the starting, stopping, slowing-down and speeding-up of the vehicle should be controlled by the friction drive which includes the conical rolls 29 and 30 and the co-acting beveled wheel 32, as I will now explain.

Assuming that the shaft 24 is being revolved clock-wise and it is desired to drive the vehicle ahead at slow speed, the rolls 29 and 30 being in the positions shown in full lines in Fig. 2, the larger roll (32) is forced forward on shaft 33 until it engages, and is set in revolution by, the roll 30.

Should it be desired to increase the rotary speed of roll 32, the shaft 26 is slid longitudinally in its bearings, by means of the lever 31 and the roll 32 is advanced until it again contacts with the said roll 30, as will be understood by reference to Fig. 2 of the drawings.

If it is desired to reverse the direction of rotation of roll 32 and the mechanism connected therewith, it is only necessary to slide the roller shaft 26 far enough to carry the roll 30 out of contact with the larger roll 32 and, by the same movement, move the roll 29 into frictional engagement with the said larger roll.

It will be obvious that the described variable speed friction drive could be dispensed with and the shaft 36 be connected directly with the shaft 24, in which case the starting, stopping, reversing, and variations of speed could be controlled by the proper manipulations of the two-way valve 14 but, in such an event, the sudden starting or reversing of the rotor might result in stripping the reducing gears in the train drive, so I prefer to provide, as a precautionary and safety measure the friction control which includes the rolls 29, 30 and 32.

In Fig. 4 I have shown a, partial sectional, plan view of a condenser 47 which is so constructed as to allow the steam from the turbine to exhaust directly into the atmosphere or to baffle and condense the said steam. The turbine exhaust pipes 45[a] and 46[a] are directly connected to the condenser and embody adjustable extensions 45[b] and 46[b], the construction of the said exhausts being such that, when a cut-off or baffle-plate 48 is moved laterally the steam may be directed into the air or into the condenser, (see Fig. 6 in which the said cut-off plate is adjusted to allow the steam to pass into the condenser).

For the purpose of utilizing the condensed steam again I have connected the radiator 10 and the condenser 47 with pipes 50 and 51 in which I have provided a pump 52. The said pump draws the water from a certain predetermined level in the condenser, through the pipe 50 and forces it (the water) into the radiator 10 through the pipe 51.

The drive, as shown and described, provides what may be referred to as a specially flexible drive which is prompt to respond to changes of direction or speed without the shocks which are incidental to the gearing of ordinary transmission mechanism.

Having thus described my invention I claim as new and wish to secure by Letters Patent:—

1. A drive for motor vehicles comprising, in combination, a reversible steam driven rotor operable through a range of speed in either direction, a boiler, a conduit between the boiler and the rotor, a controlling valve in said conduit controlling the admission

of steam and the direction of rotation of the rotor, and driving connections between the rotor and the vehicle wheels, said drive including a condenser, connecting conduits between said condenser and said rotor, adjustable means, operably connected to said connecting conduits for directing the exhaust into the air or into the condenser, and means connecting the condenser to said boiler for returning the resultant exhaust steam to said boiler.

2. A drive for motor vehicles comprising in combination, a reversible fluid driven rotor operable through a range of speed in either direction, a fluid generator, a conduit between the generator and the rotor, a valve in said conduit, controlling both the admission of fluid and the direction of rotation of the rotor, a change-speed gearing intermediate the rotor and the vehicle wheels, and operably connected to the rotor and the vehicle wheels, and reduction gearing associated with said change speed gearing.

3. A drive for motor vehicles comprising in combination, a reversible steam driven rotor operable through a range of speed in either direction, a steam boiler, a conduit between the boiler and the rotor, a valve on said conduit controlling both the admission of steam and the direction of rotation of the rotor, condensing means connected to said rotor, and conduits between the condensing means and the boiler, a change speed gearing intermediate the rotor and the vehicle wheels, and operably connected to the rotor and the vehicle wheels, and reduction gearing associated with said change speed gearing.

PATRICK J. GRIFFIN.