E. A. HALBLEIB.

SPEED GOVERNOR FOR MOTOR VEHICLES.

APPLICATION FILED AUG. 4, 1911.

1,055,741.

Patented Mar. 11, 1913.

2 SHEETS—SHEET 1.

Fig. 1.

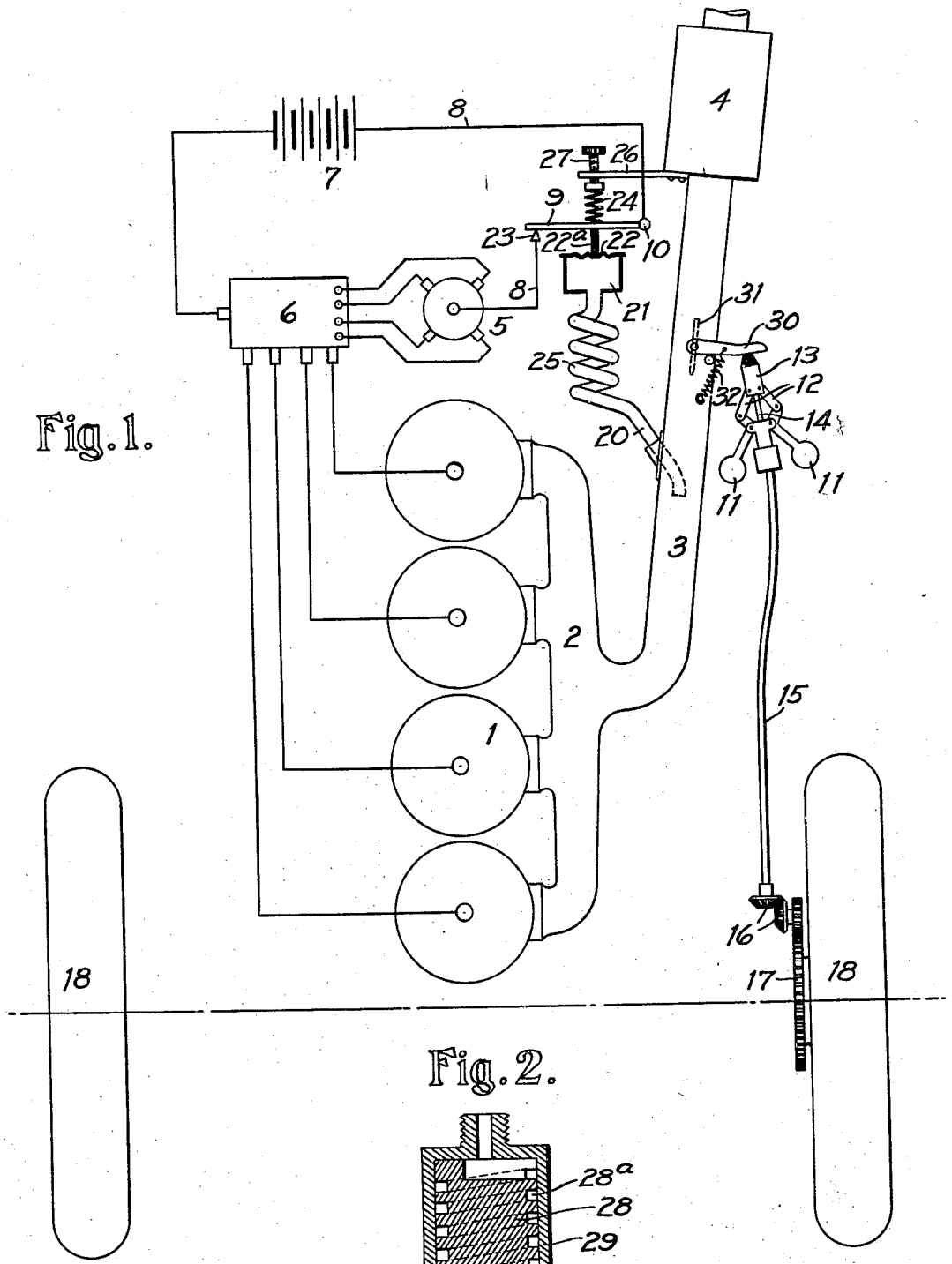

Fig. 2.

Witnesses:

Clarence W. Carroll

H. Gurnee

Inventor:

Edward A. Halbleib

by Osgood Davis & Dorsey

his attorneys

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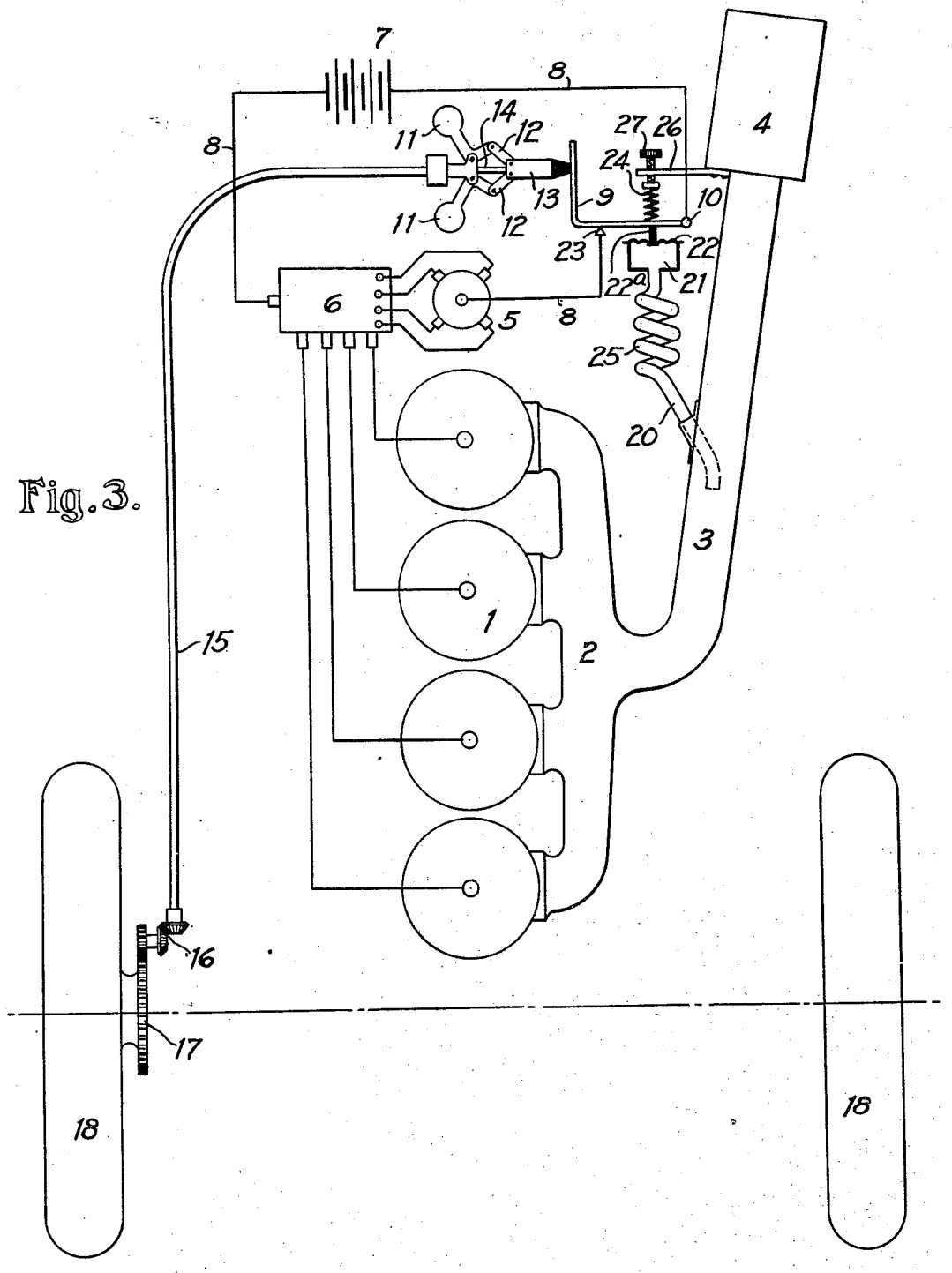
Fig. 3.



Witnesses:

Clarence W. Carroll

D. Gurnee

Inventor:

Edward A. Halbleib

by Osgood Davis Wood

his attorneys

UNITED STATES PATENT OFFICE.

EDWARD A. HALBLEIB, OF ROCHESTER, NEW YORK, ASSIGNOR TO NORTH EAST ELECTRIC COMPANY, OF ROCHESTER, NEW YORK.

SPEED-GOVERNOR FOR MOTOR-VEHICLES.

1,055,741. Specification of Letters Patent. Patented Mar. 11, 1913.

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To all whom it may concern:

Be it known that I, EDWARD A. HALBLEIB, a citizen of the United States, and resident of Rochester, in the county of Monroe and State of New York, have invented certain new and useful Improvements in Speed-Governors for Motor-Vehicles, of which the following is a specification.

This invention relates to improvements in speed governors, the invention being particularly useful in connection with motor-vehicles, but being also adapted for use in connection with internal-combustion engines used for various other purposes.

One object of the invention is to produce a device which will automatically govern or limit the speed of an internal-combustion engine, and which is simple in construction, and does not necessitate the use of constantly-moving mechanism. To this end I dispense with the usual centrifugal mechanism and employ instead, as the controlling force of the governor, the back-pressure produced in the exhaust-pipe or duct of the engine, this back-pressure being utilized through a movable diaphragm, or equivalent device, to cut out the power-impulses, or otherwise retard the operation of the engine, when the back-pressure rises to a degree corresponding to a predetermined speed in the engine.

Another object of the invention, relating particularly to its use upon a motor-vehicle, is to so control the engine as not only to limit the latter to a predetermined speed in itself, but also to limit the vehicle, as a whole, to a predetermined speed of movement not necessarily dependent upon the predetermined speed of the engine. To this end I employ a centrifugal mechanism, or equivalent device, operated by a moving part of the vehicle and so interconnected with the engine-governing device as to retard the operation of the engine, whatever the speed of the latter may be, when the vehicle as a whole attains a predetermined speed.

In the drawings:—Figure 1 is a diagrammatic plan-view of a motor-vehicle equipped with this improvement; Fig. 2 is a longitudinal section of one of the parts indicated in Fig. 1; and Fig. 3 is a diagrammatic plan-view of a modified construction.

The invention is represented in the drawing as applied to an engine having the usual cylinders 1 and exhaust manifold 2 with a discharge pipe 3 that leads to a muffler 4. The timer 5 and the spark coil 6 are connected as usual with the battery 7 in the primary circuit 8, but the circuit instead of being grounded as usual, includes within it a circuit-breaker 9 which is pivoted at 10 and rests at its free end on the contact 23. This circuit-breaker serves to cut out temporarily the ignition of the engine under the influence of the speed-controller.

In previous speed-governors for internal combustion engines it has been customary to control the speed of the engine, either by throttling the gas supply or by cutting out the ignition through the mechanical action of some part that is revoluble with or driven by the engine. The speed-controller which I have devised is broadly new in that it is adapted to be operated by the exhaust from the engine.

In the embodiment of the invention disclosed in the drawings, a pipe 20 is tapped into the exhaust pipe 3 between the engine and the muffler 4, and this pipe leads into a chamber 21. This chamber is closed by a diaphragm 22, to which a stem 22^a is attached that bears against the circuit-breaker 9, so that an outward movement of the diaphragm forces the circuit-breaker away from the contact 23, and breaks the circuit. The speed-controller is operated whenever the speed of the engine reaches the point where the exhaust cannot discharge from the muffler without creating a back pressure in the pipe 20 sufficient to move the diaphragm 22. When the circuit is broken by the movement of the diaphragm in the manner described, the engine runs under momentum, exhausting unexploded gas till the pressure in the pipe 20 is relieved, whereupon a spring 24 closes the circuit-breaker. The spring 24 is suitably supported above the switch, as by a bracket 26, so that it bears against the switch and opposes the action of the diaphragm 22. The pressure of the spring is adjusted by an adjusting-screw 27 which is screwed into the bracket 23 and bears on the spring, so that the speed-controller may be made to operate at different pressures in the pipe 20, and accordingly at different speeds of the engine.

In order not to subject the diaphragm to the pulsations of the exhaust a tortuous passage 25 is provided in the pipe 20 which

maintains a uniform pressure against the diaphragm by retarding the passage of the gas. A simple way to make this passage, as shown in Fig. 2 is to cut a spiral groove 28ª around a cylinder 28 and inclose the latter in a tightly fitting casing 29.

In addition to, or in place of, the adjustable means provided by the screw 27 for establishing the point at which the speed controller will operate to break the circuit, automatic means are provided which are controlled by the speed of the vehicle. In Fig. 1 a centrifugal governor is shown that has weighted arms 11, 11, connected by links 12, 12, with a sliding collar 13 that is located on a spindle 14. The spindle 14 is rotated by a flexible shaft 15 that is connected by gears 16 and 17 with one of the road wheels 18 of the vehicle. The sliding collar 13 engages an arm 30 that operates a damper 31 in the discharge pipe 3, against a spring 32 that tends normally to hold the damper open as shown in Fig. 1.

When a predetermined speed is exceeded by the vehicle, the weighted arms 11, 11 fly outwardly and move the collar 13 so that it presses against the arm 30 and closes the damper more or less according to the speed of the vehicle and the corresponding movement of the weighted arms 11, 11. The closing of the damper chokes the discharge pipe 3 and consequently brings the pressure of the exhaust gases to bear upon the diaphragm 22. When the speed of the vehicle is reduced the weighted arms resume their normal positions and the spring 32 opens the damper, thus relieving the pressure on the diaphragm 22 and permitting the spring 24 to close the circuit-breaker 9 and reëstablish the primary circuit of the ignition system.

In Fig. 3 the centrifugal governor just described is combined with the speed controller operated by the exhaust from the engine, by operating directly on the circuit-breaker, so that a movement of the collar 13 under centrifugal action of the weighted arms 11, 11 causes the circuit-breaker to be moved away from the contact 23, thus breaking the circuit. The free end of the circuit-breaker, beyond the contact 23, is bent at right angles, and the sleeve 13 moves in a direction at right angles to the line of movement of the stem 22ª carried by the diaphragm 22. When these two speed-controlling devices both operate directly to break the primary circuit it is evident that the circuit will not be reëstablished till both the speed of the vehicle and the speed of the engine have fallen below the prescribed limit. This is important because the speed of the vehicle may, under certain conditions, be below the prescribed limit and yet the speed of the engine may be so high as to be injurious to the mechanism, as, for example, on mounting the crest of a hill when the load on the engine is suddenly relieved, or when, in shifting gears, the engine is permitted to overspeed before taking up the load. Again, these combined controls come into action in running down hill with the engine at high gear, when it may happen from the gear ratio that the speed of the vehicle may exceed the prescribed limit, though the engine may be working below the limit prescribed for it.

I claim:—

1. The combination, with an engine of the explosion type including a duct for carrying away the gases exhausted from it, of an ignition system, a switch in the circuit of the system, means adapted to operate upon the switch to open the circuit under pressure of the exhaust, and means whereby pressure of the exhaust is brought to bear upon the operating means when the speed of the engine becomes excessive.

2. The combination, with an engine of the explosion type including a duct for carrying away the gases exhausted from it, of an ignition system, a switch in the circuit adapted to break the circuit when subjected to a predetermined pressure, and circuit controlling means subjected to the pressure of gases exhausted from the motor, and adapted to be operated thereby to move the switch to break the circuit, when the speed of the engine becomes excessive.

3. The combination, with an engine of the explosion type including a duct for carrying away the gases exhausted from it, of an ignition system, a spring controlled switch in the circuit of the system adapted to break the circuit when subjected to a predetermined pressure, and means subjected to the pressure of gases exhausted from the motor and adapted to be operated thereby to move the switch to break the circuit, when the speed of the engine becomes excessive.

4. The combination, with an engine of the explosion type including a duct for carrying away the gases exhausted from it, of an ignition system operated by an electric circuit, a switch therein adapted to break the circuit, and means whereby the pressure of the gases exhausted from the engine is brought to bear upon said switch.

5. The combination, with an engine of the explosion type including a duct for carrying away the gases exhausted from it, of an ignition system operated by an electric circuit, a spring controlled switch therein adapted to be opened to break the circuit, means adapted to receive the fluid pressure of the exhaust and to transmit it to the switch to open the latter, and a connection between said switch operating means and the duct for conducting the exhaust from the engine.

6. The combination, with an engine of

the explosion type including a duct for carrying away the gases exhausted from it, of an ignition system operated by an electric circuit, a switch therein adapted to be opened to break the circuit under predetermined pressure, means whereby pressure of the exhaust is brought to bear upon said switch, and means for regulating the pressure required to operate the switch.

7. The combination, with an engine of the explosion type including a duct for carrying away the gases exhausted from it, of an ignition system operated by an electric circuit, a switch therein adapted to be opened to break the circuit under predetermined pressure from the exhaust, means adapted to receive the fluid pressure of the exhaust and transmit it to the switch to open the latter, and a tortuous passage connecting said means with the duct for conducting the exhaust gases from the engine.

8. The combination, with an engine of the explosion type including a duct for carrying away the gases exhausted from it, of a system of ignition, a switch in the circuit of the system, a circuit-controller having a diaphragm adapted to move under fluid pressure and having also a part adapted to be moved with said diaphragm to open the switch, and connections between said circuit-controller and the duct for conducting the exhaust from the engine.

9. The combination, with an engine of the explosion type including a duct for carrying away the gases exhausted from it, of a system of ignition, a switch in the circuit of the system, a circuit-controller having a diaphragm adapted to move under fluid pressure and having also a part adapted to be moved with said diaphragm to open the switch, and a tortuous passage connecting said means with the duct for conducting the exhaust gases from the engine.

10. The combination, with a motor-vehicle having an engine of the explosion type, of a system of ignition, a switch in the circuit of the system, means adapted to operate upon the switch to open the circuit, means whereby the switch-operating means is operated when the speed of the engine becomes excessive, and automatic means controlled by the speed of the vehicle regulating the operation of said switch-operating means.

11. The combination, with a motor-vehicle having an engine of the explosion type including a duct for carrying away the gases exhausted from it, of an ignition system operated by an electric circuit, a switch therein, means whereby the exhaust is brought to bear upon the switch to break the circuit, and automatic means controlled by the speed of the vehicle for regulating the pressure of the exhaust upon the switch operating means.

12. The combination, with a motor-vehicle having an engine of the explosion type including a duct for carrying away the gases exhausted from it, of an ignition system operated by an electric circuit, a switch therein, means for moving the switch to open it adapted to be operated by the gases exhausted from the engine and having a connection with the duct that conducts the exhaust gases from the engine, and automatic means controlled by the speed of the vehicle for restricting the discharge of gases through said duct whereby the pressure of the gases on the switch operating means is regulated.

13. The combination, with a motor-vehicle having an engine of the explosion type including a duct for carrying away the gases exhausted from it, of an ingition system operated by an electric circuit, a switch therein, means whereby the exhaust is brought to bear upon the switch to break the circuit, a damper in the exhaust duct, automatic means controlled by the speed of the vehicle for regulating the damper, and a pipe connecting the switch operating means with the exhaust duct at a point between said damper and the engine.

14. The combination, with a motor-vehicle having an engine of the explosion type including a duct for carrying away the gases exhausted from it, of an ignition system operated by an electric circuit, a switch therein, means whereby the exhaust is brought to bear upon the switch to break the circuit, a damper in the exhaust duct, and a centrifugal governor having a connection with one of the road wheels of the vehicle for regulating the damper.

15. The combination, with an engine of the explosion type, of governing-means operable to reduce the power-impulses of the engine, and pneumatic mechanism connected with the exhaust-duct of the engine and with said governing-means, said mechanism being thus subjected to back-pressure from the exhaust-duct and operating, when subjected to a predetermined back-pressure, to throw the governing-means into operation to reduce the power-impulses of the engine.

16. The combination, with an engine of the explosion type, of governing-means operable to reduce the power-impulses of the engine, pneumatic mechanism connected with the exhaust-duct of the engine and with said governing-means whereby said mechanism is subjected to back-pressure from the exhaust-duct, said mechanism operating, when subjected to a predetermined back-pressure from said exhaust-duct, to throw the governing-means into operation to reduce the power-impulses of the engine, and means for variably throttling the exhaust-duct so as to vary the

back-pressure therein and regulate the operation of the governing-means.

17. The combination, with a motor-vehicle having an engine of the explosion type, of a speed-governor for the engine controlled by variations in the pressure of the exhaust from the engine and adapted normally to govern the engine to a predetermined speed, and means actuated by a moving part of the vehicle for reducing the speed of operation of the engine upon the attainment of a predetermined speed in the vehicle and regardless of said predetermined speed of the engine.

EDWARD A. HALBLEIB.

Witnesses:

C. W. CARROLL,

D. GURNEE.