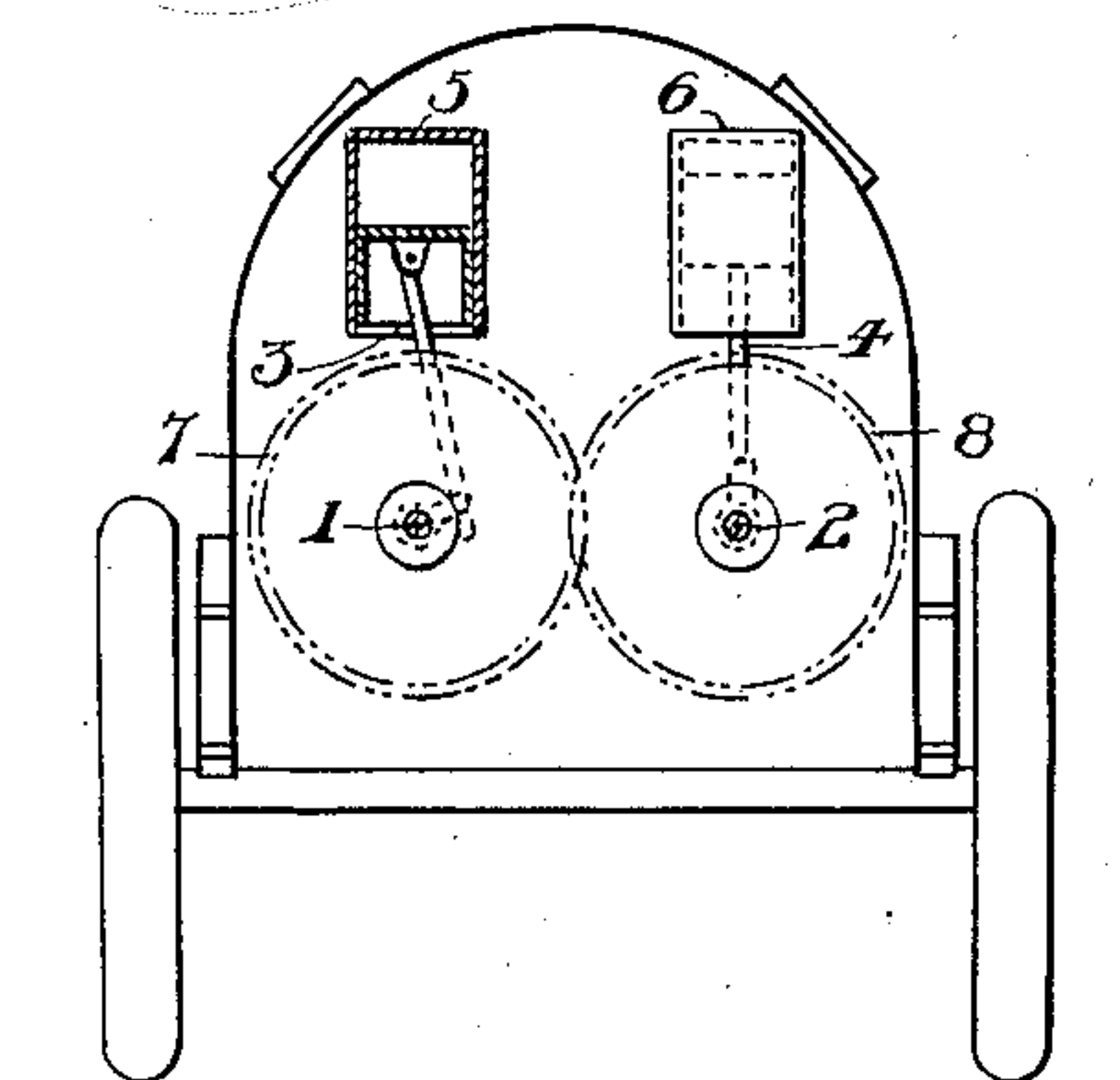
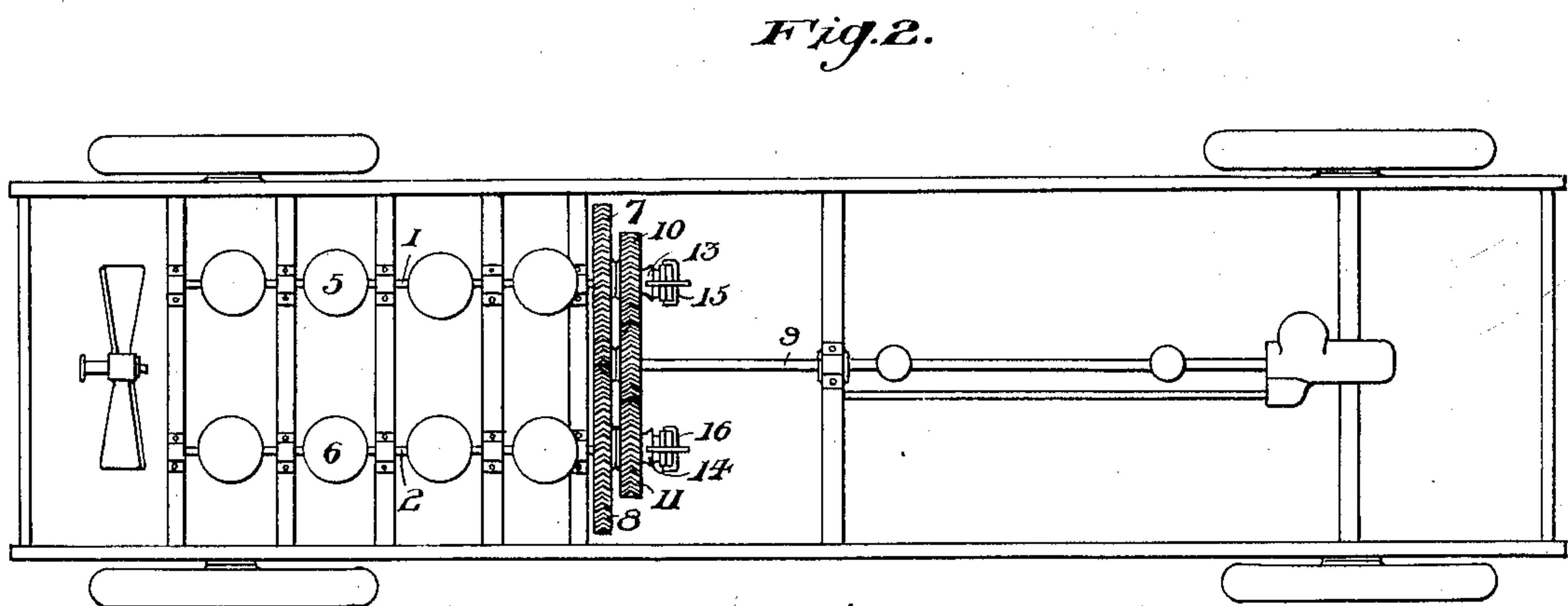
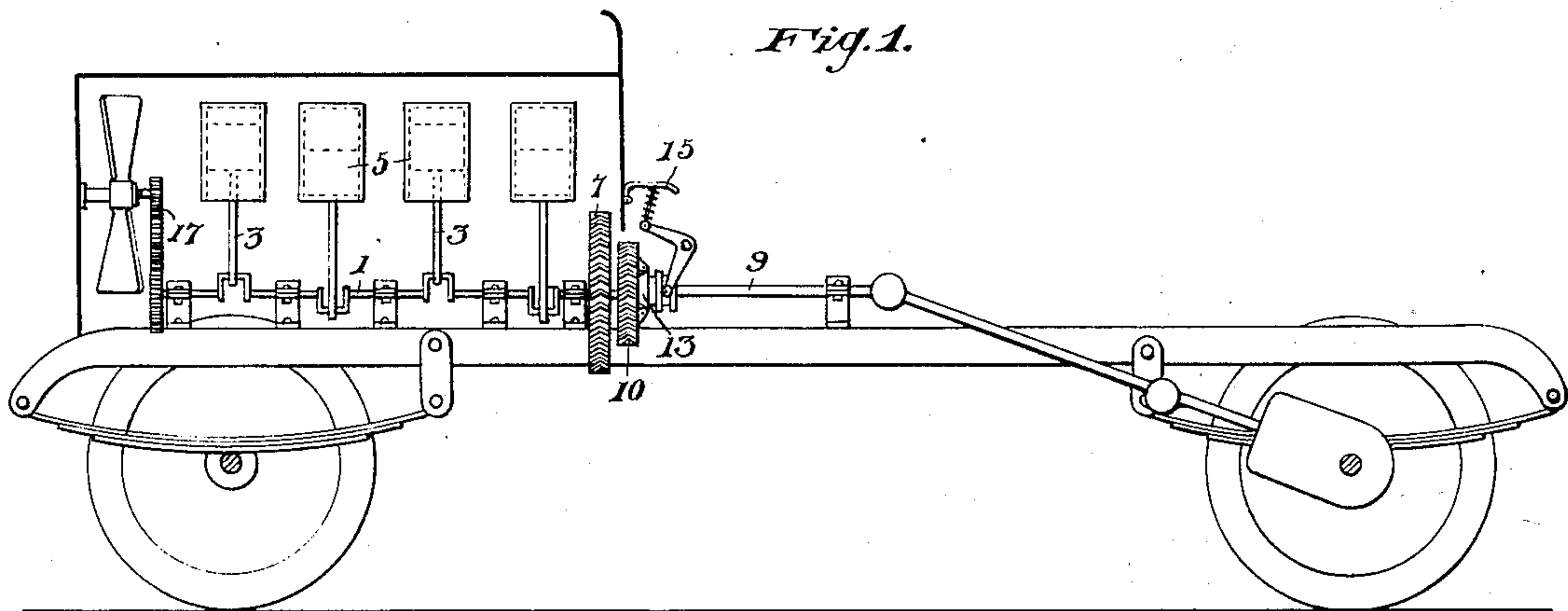


No. 891,051.

PATENTED JUNE 16, 1908.

G. ENGEL.
AUTOMOBILE CONSTRUCTION.
APPLICATION FILED SEPT. 6, 1906.



Witnesses:

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UNITED STATES PATENT OFFICE.

GODFREY ENGEL, OF PITTSBURG, PENNSYLVANIA.

AUTOMOBILE CONSTRUCTION.

No. 891,051.

Specification of Letters Patent.

Patented June 16, 1908.

Application filed September 6, 1906. Serial No. 333,456.

To all whom it may concern:

Be it known that I, GODFREY ENGEL, a citizen of the United States, residing at Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Automobile Construction, of which improvement the following is a specification.

The objects of this invention are to obtain a maximum of power by increasing the number of cylinders while maintaining the ordinary dimensions of a multi-cylinder vehicle; to eliminate dead centers obtain a wide range of speed without the use of cumbersome speed-gear; to simplify the control of the speed; to lessen the liability of shocks in the cylinders; and finally to dispense with the use of heavy fly-wheels.

The invention contemplates the employment of multi-cylinders, preferably eight, divided into two equal rows, and two crank-shafts, operated synchronously and preferably in opposite directions. The power of both shafts may be communicated from either of them so that the vehicle may be readily propelled forward or backward. The cranks of the two shafts are so formed that at least some one of them will always be in such position relative to its respective piston rod that starting may be effected without cranking, dead centers being avoided, and the use of heavy fly-wheels eliminated. The two rows of cylinders and the two crank-shafts will be much lighter in weight and occupy less space as compared with a lesser number of cylinders constructed to develop the same amount of power.

The invention will be hereinafter fully set forth and particularly pointed out in the claims.

In the accompanying drawings, Figure 1 is a side elevation showing one set of engines and driving gear. Fig. 2 is a plan view showing two sets of engines twin crank-shafts, gear, clutches and drive shafts. Fig. 3 is a transverse section on line 2—2 of Fig. 2 showing the two sets of engines in elevation, the twin crank-shafts, and the driving shafts with the gears and clutch mechanism.

Referring to said drawings, 1 and 2 are twin crank-shafts, to each of which is connected a plurality of pistons, 3, 4, operable in cylinders, 5, 6. In the drawings I have shown four cylinders to each shaft, but the

number of cylinders may, however, be varied according to the power required. The two sets of motors and their crank-shafts are preferably disposed at the front of the vehicle frame, at either side of the longitudinal center. At their rear ends said crank-shafts are provided with intermeshing herring bone or spur gears 7 and 8, which confine the said crank-shafts to the same relative angular velocity and position, and transmit motion therefrom to the driving shaft 9 by means of gears 10 and 11, which are normally loosely mounted on said crank-shafts and intermesh with the gear 12 which is rigidly secured on the driving shaft. The latter is disposed centrally and longitudinally at the rear of the frame, and is shown as connected with the axle of the drive wheels. The gear wheels 10 and 11 are adapted to be fixed to their respective shafts by means of any suitable clutches, such as 13, 14, which are preferably operable by means of foot levers 15 and 16. The lever 15 when in its elevated or released position causes the clutch 13 to engage and fix the gear 10 upon its shaft whereby power from the two crank-shafts is transmitted to cause the vehicle to move backward. The foot lever 16 when in a similar position throws out clutch 14. In other words, when the foot lever 15 is compressed (by foot pressure or other means) its clutch is disengaged, while when lever 16 is compressed it causes clutch 14 to fix the gear 11 upon its shaft for propelling the car forward. When both clutches are released the driving mechanism is in position for effecting the reverse or backward movement of the car.

It is obvious that any preferred form of power transmitting mechanism may be used, the invention not being limited to that shown.

It will be noted that the described arrangement of cylinders and crank-shafts permits of the employment of a greater number of cylinders than has heretofore been possible without materially increasing the area of the front end of the vehicle, and also enables me to avoid dead centers and make the cylinder shocks considerably less than in a four-cylinder car of like power. The elimination of dead centers allows of starting up without cranking the engine. In other words, the employment of twin sets of motors, preferably four to a set, insures at least

one of the cranks of one shaft or the other always being at an angle to the direction of motion of its respective piston, so that the engine may be set in motion upon an explosion occurring in such cylinder. The motors may be operated at even a very slow speed without the use of a fly-wheel, and the change of direction of travel of the car may be quickly and easily effected. The speed of the car is entirely dependent upon the speed of the engines, and may be increased or lowered without the use of interposed variable speed gears. By reason of the increased power obtained from the twin series of motors a car may be driven up grades without change of gear. This construction is equally applicable to motor vehicles having change gears, the latter only being used exceptionally.

It is obvious that the arrangement of the cylinders or engines may be varied, and that instead of using clutch mechanism for transmitting the power and movement from the engines or motors to the car other means may be employed; and also that instead of running the crank-shafts in opposite directions they may be caused to revolve in the same direction, but it is always preferable that the joint power of the two shafts be communicable to the driving shaft.

The means for supplying gasoline to the engines; the construction of the engines; the spark generation; the steering gear, and all other parts of the motor vehicle may be of known construction.

I claim as my invention:

1. In a motor vehicle, the combination of a twin engine having multiple cylinders arranged in two rows, each row being connected to a separate crank-shaft, the said crank-shafts being geared one with the other, and means independent of the gearing between the crank shafts for transmitting power from said crank-shafts to the driving agency of the vehicle.

2. In a motor vehicle, the combination of a twin engine having multiple cylinders arranged in two rows, each row being connected to a separate crank-shaft, the said crank-shafts being geared one with the other, and means for alternately transmitting power from said crank-shafts to the driving mechanism of the vehicle.

3. A motor vehicle comprising, in combination, two crank-shafts, two series of motors, one series for each crank-shaft, said crank-shafts being geared together, a driving shaft, and means for communicating the power of both crank-shafts from either of them to the driving shaft.

4. A motor vehicle comprising, in combination, two crank-shafts, two series of motors, one series for each crank-shaft, said crank-shafts being geared together to operate in opposite directions, a driving shaft,

and means for communicating the power of both crank-shafts from either of them to the driving shaft.

5. In a motor vehicle, the combination with a vehicle frame, of two motors disposed at the front thereof at either side of its longitudinal center, a pair of longitudinal shafts driven by said motors, a driving shaft disposed centrally and longitudinally at the rear of the frame, gearing intermediate said motor shafts and the driving shaft, and means for throwing such gearing in operative connection with said motor shafts.

6. In a motor vehicle, the combination with a vehicle frame, of two motors disposed at the front thereof at either side of its longitudinal center, a pair of longitudinal shafts driven by said motors, a driving shaft disposed centrally and longitudinally at the rear of the frame, intermeshing gear-wheels carried by said motor shafts, gearing intermediate said motor shafts and the driving shaft, and means for throwing such gearing in operative connection with either of said motor shafts.

7. In a motor vehicle, the combination with a vehicle-frame, of two series of motors disposed at either side of the longitudinal center of the vehicle-frame, a pair of longitudinal crank-shafts driven by said motors, said shafts being designed to operate synchronously, a driving shaft disposed centrally and longitudinally of the frame, and means for communicating the power of both crank-shafts from either of them to the driving-shaft.

8. In a motor vehicle, the combination with a vehicle-frame, of two series of motors disposed at either side of the longitudinal center of the vehicle-frame, a pair of longitudinal crank-shafts driven by said motors, said shafts being designed to operate synchronously, intermeshing gear-wheels carried by said crank-shafts, a driving shaft disposed centrally and longitudinally of the frame, and means for communicating the power of both crank-shafts from either of them to the driving shaft.

9. In a motor vehicle, the combination with a vehicle frame, of two crank-shafts arranged side by side at the front of the frame at either side of its longitudinal center, two series of motors in parallel rows, one series for each crank-shaft, said crank-shafts operating synchronously, a driving shaft disposed centrally and longitudinally at the rear of the frame, and means for communicating the power of both crank-shafts to the driving shaft, the cranks of said shafts being arranged so that some one of them will always be in such position as to enable the motors to be started without cranking.

10. In combination, two series of motors, placed side by side, a pair of crank-shafts driven by said motors and in gear with each

other, a driving shaft, and means for communicating the power of both crank-shafts to the driving shaft, the cranks of said shafts being arranged so that some one of them will
5 always be in such position as to enable the motors to be started without cranking.

11. In combination, two series of motors, placed side by side, a pair of crank shafts driven by said motors, a driving shaft, and
10 means for synchronizing said crank shafts and communicating the power of both of

them to the driving shaft, the cranks being arranged relatively so that the starting torque will always act upon said cranks.

In testimony whereof, I have hereunto 15 signed my name in the presence of two subscribing witnesses.

GODFREY ENGEL.

In the presence of—

CLARENCE A. WILLIAMS,

JOHN H. RONEY.