

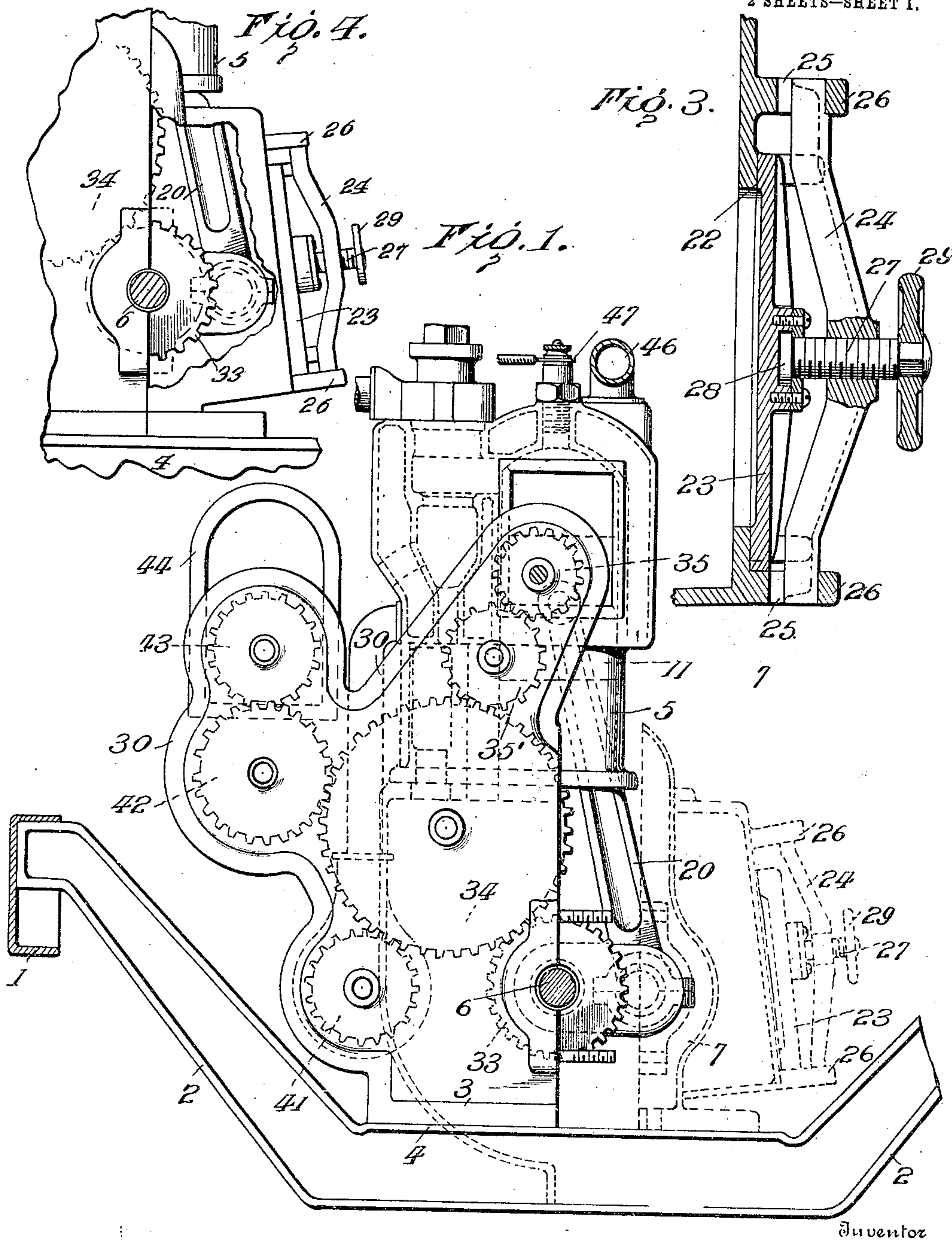
No. 808,423.

PATENTED DEC. 26, 1905.

A. WINTON.  
VERTICAL EXPLOSIVE ENGINE.

APPLICATION FILED NOV. 12, 1904.

2 SHEETS—SHEET 1.



Witnesses

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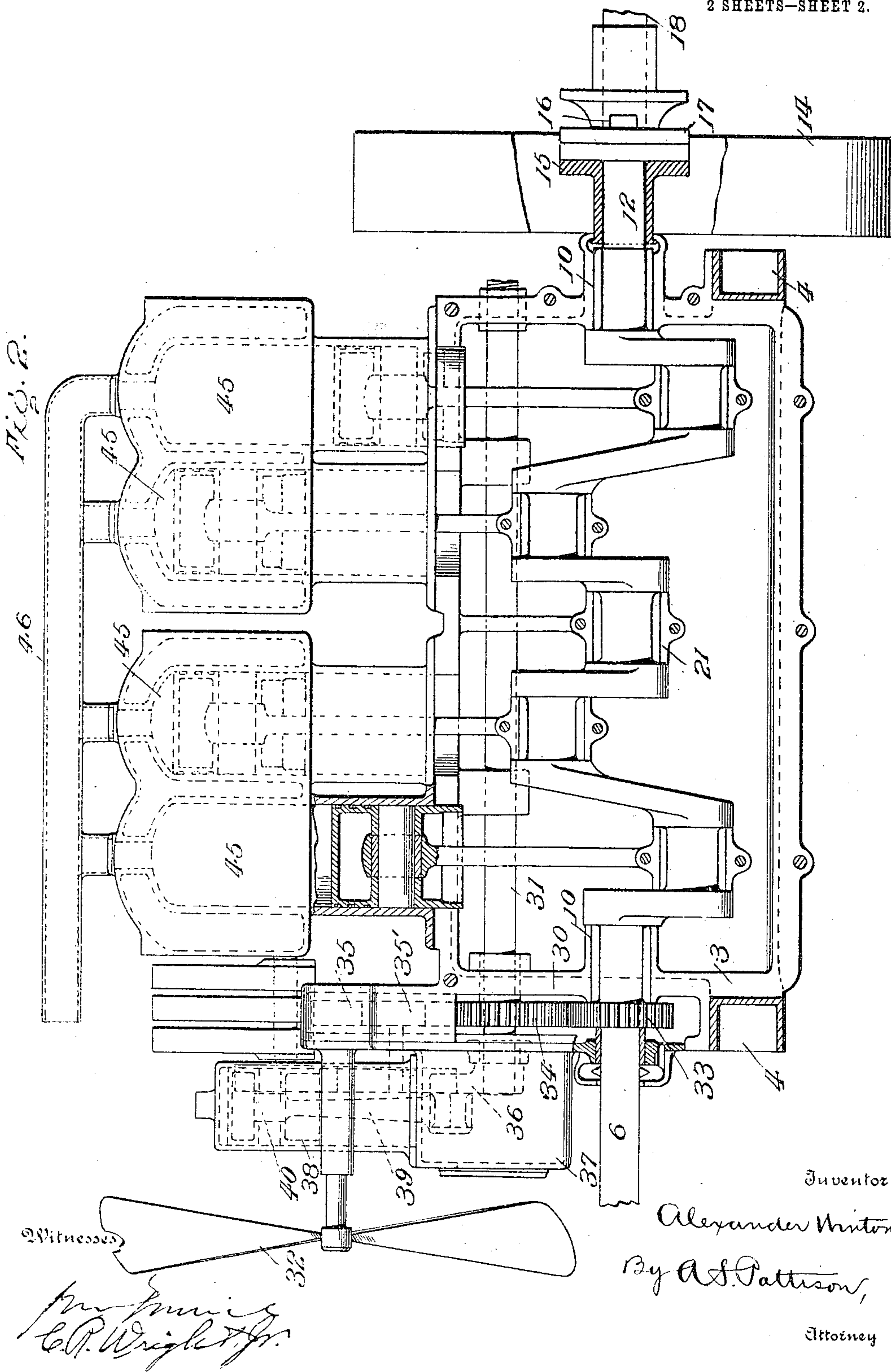
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# UNITED STATES PATENT OFFICE.

ALEXANDER WINTON, OF CLEVELAND, OHIO.

## VERTICAL EXPLOSIVE-ENGINE.

No. 808,423.

Specification of Letters Patent.

Patented Dec. 26, 1905.

Application filed November 12, 1904. Serial No. 232,488.

*To all whom it may concern:*

Be it known that I, ALEXANDER WINTON, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Vertical Explosive - Engines, of which the following is a specification, reference being had therein to the accompanying drawings.

10 This invention relates to improvements in vertical explosive-engines especially intended for use in motor-driven vehicles or automobiles.

One object of my present construction is to 15 permit the ready removal of any moving portion of the motor through the side of the crank-case and to provide the crank-case with a section or chamber inclosing the driving-gears for the water-pump and fan of the 20 cooling system and further pertains to certain details of construction hereinafter pointed out whereby certain advantages which will be explained are attained.

In vertical motor construction as heretofore used two methods of support have been 25 employed. In both instances the crank-case has been split horizontally at the crank-shaft center. One method is supporting the motor from the lower half of the crank-case, which 30 requires the removal of the heavy cylinders and the disconnecting of all water, gasoline, and carbureter connections in order to either inspect or remove those portions of the motor which are located within the crank- 35 case, and which experience teaches need frequent inspection, and need to be removed in the event of a necessary substitution of any of the parts, which method is exceedingly difficult owing to the weight of the upper por- 40 tion of the crank-case and the cylinders carried thereby. This makes the inspection or substitution of a part by a driver when on the road very impractical and in many cases im- 45 possible. The other method of support is from the upper half of the crank-case, and in this event it is necessary for the person removing the lower half of the crank-case to either use a pit, or when a pit is not accessi- 50 ble—as, for instance, when on the road—requiring the person removing the lower half to lie upon his back under the machine. This latter position is awkward and difficult, and when the lower half has been removed the oil always present in the crank-case is prob- 55 ably, and, indeed, usually at least partly de-

posited upon the person removing the lower half of the crank-case. By the special construction hereinafter shown and described these disadvantages are obviated, and the driver is able to readily inspect, adjust, or re- 60 move the crank-shaft, the connecting-rods, or the piston while in an upright position at the side of the vehicle, and this can readily be done by one person without the use of any special appliance and at any place. These 65 advantages of inspection, adjustment, and removal of the parts of a vertical explosive-motor are believed to remove the recognized objections to such form of motor, while all of the inherent advantages thereof remain. 70

The above-recited disadvantages in the method of construction and support of a vertical motor have been recognized for years; but so far as I am aware they have not heretofore been overcome by a special construction of the motor, as hereinafter disclosed.

In the accompanying drawings, Figure 1 is a front end elevation of a motor-frame embodying my invention and my improved method of support. Fig. 2 is a side elevation 80 of my improved motor construction, showing the side thereof removed and the bearings and motor-support in section. Fig. 3 is a detached sectional view of my improved removable inspection-cap. Fig. 4 is a detail view of the removable cap or cover for the crank-case.

In carrying out this invention the vehicle is provided with suitable longitudinal beams 1 and with cross-drop motor-supporting 90 frames or beams 2. These drop beams or frames 2 (of which there will be a suitable number to properly and effectively support the motor) are, as shown in Fig. 1, of a diverging-U shape, the ends of the said frames 2 95 being suitably connected with the longitudinal beams 1 of the vehicle-frame.

In my improved motor construction the crank-case has a lower portion 3 bolted to the horizontal part 4 of the beams 2 and ex- 100 tends upward to the lower end of the cylinders 5. As shown, one side of the lower portion 3 of the crank-case ends in a line vertically over the center of the crank-shaft 6 and becomes in a sense an immovable portion of 105 the crank-case in that it is bolted to the drop-frame 4 and is not to be removed so far as the inspection, adjustment, or substitution of any of the parts therein is concerned.

From the foregoing it will be observed that 110



the crank-case is constructed with an open side extending from the lower ends of the cylinders to the horizontal portion of the beam 2, and that the cylinders are supported  
 5 by the permanent part 3 of the crank-case. This open side of the crank-case is closed by a removable cap or cover 7, which is held in the position shown in solid lines, Fig. 1, by four bolts 8, and the removable portion 7  
 10 carries the caps 9 for the end bearings 10 of the crank-shaft.

By reference to Fig. 1 it will be observed that the lower portion 3 of the crank-case is located to one side of the center of the beam  
 15 or frame 2 and practically occupies all of the horizontal portion 4 at that side of said center, whereas there is considerable space of the horizontal portion 4 outside of the outer edge of the removable cap portion 7. This  
 20 enables the cap portion 7 by the removal of the four bolts before mentioned to be slid sidewise sufficiently to enable it to be removed bodily upward and free of all parts of the motor casting or frame or other parts of  
 25 the vehicle. When thus removed, the connecting-rod bearings can be readily adjusted or the connecting-rods, together with the piston 11, removed from the motor through the side of the crank-case and with-  
 30 out disturbing the crank-shaft, since the crank-shaft is located at a distance below the lower end of the cylinder 5 to permit such removal.

By reference to Fig. 2 it will be noted that  
 35 the rear end 12 of the crank-shaft projects through the crank-case and to which extension is connected the fly-wheel 14, and this extension 12 carries the fly-wheel hub 15. A slot 16 receives a transverse projection  
 40 carried by the disk 17, which has projections at right angles upon opposite sides, the other projection being carried by the adjacent end of the drive-shaft 18. The vehicle drive-shaft 18 will be connected in any suitable  
 45 manner with the rear driving-axle of the vehicle, and this is not here shown, as it is unnecessary to the understanding of the present invention and has no special relation thereto beyond what is readily known and  
 50 understood by those skilled in the art. The removable cap portion 7 being removed, as previously described, and the crank-shaft turned so that the slot 16 and projection 17 are in a horizontal position the crank-shaft  
 55 can be readily removed by disconnecting the caps 19 of the connecting-rods 20 and the removable cap for the center bearing 21 of the crank-shaft.

To still further provide for a quick inspection of the connecting-rod bearings and the portions within the crank-case, the removable cap portion 7 is provided with one or more inspection-openings 22, which are closed by quickly-removable covers 23. The  
 65 special form of clamp for these covers here

shown consists of a transversely-arranged bar 24, which has its ends adapted to engage openings 25, formed in lugs 26, projecting outwardly from the removable cap portion 7. Passing through the center of the bar 24  
 70 is a screw 27, adapted to engage a recess 28 formed in the cover 23, and the outer end of this screw is provided with an operating-wheel 29. By turning upon the screw the cover will be tightly clamped to position.  
 75 By turning outward or loosening the screw the bar 24 can be moved endwise to disengage one of its ends from the lug 26, and the cover then removed, the engaging end of the bar acting as a fulcrum.  
 80

My improved crank-case is provided at its forward end with an extension or chamber 30, which contains the gearing for the cam-shaft 31 and the cooling-fan 32. This gearing consists of a pinion 33, fast to the crank-shaft, which meshes with a gear 34, fast to the cam-shaft 31, and this gear 31 is in mesh with the fan-gear 35. Also in this improved construction the cam-shaft 31 passes longitudinally through the upper end of the  
 90 crank-case and has its forward end projecting and carrying a crank-arm 36, and this crank-arm 36 is located in a chamber or box 37, which is formed as a part of or suitably clamped to the said extension or chamber  
 95 30, and supported upon this box or chamber 37 is an air-pump cylinder 38. The pitman or connecting-rod 39 connects the crank-arm 36 with the pump-piston 40. The object of this air-pump is to provide a pressure-gov-  
 100 ernor for the motor by means of which the driver controls the speed of the engine, and therefore the speed of the car, the air from the said pump acting upon the motor inlet-valves (not here shown) in a manner fully  
 105 illustrated and described in one of its forms in my United States Patent No. 626,122, dated May 30, 1899, and need not be further illustrated or described herein. Also located in this extension 30 of the crank-case is the  
 110 gear 41 for the water-pump, which meshes with the cam-shaft gear 34. Also an idler-gear 42 is located in this extension and engages a magneto-gear 43, also located in the extension, and this latter gear being placed  
 115 on the shaft of a magneto 44 of any desired form for the purpose of providing an electric current for ignition purposes.

From the foregoing it will be observed that all of the gears for the coöperating parts of  
 120 the motor are located practically in the crank-case or extension thereof, so that they are inclosed against dirt and dust and receive ample lubrication from the oil that is within the crank-case and provides a com-  
 125 pact arrangement of these gears. In order to permit ready access to these gears for any desired purpose, the front end of the crank-case is removable, as shown.

As here shown, my invention is especially 130



adapted for use in connection with a multiple-cylinder engine consisting of a plurality of cylinders arranged longitudinally of the vehicle, the number of cylinders 5 here illustrated being four.

The pipe 46, extending over the tops of the cylinders, is a portion of the water-line for cylinder-cooling purposes, and the member 47 in Fig. 1 is the projecting end of any suitable form of sparking plug for ignition purposes.

By reference to Fig. 2 it will be noticed that the lower portion 3 of the crank-case extends downward between the drop frames or beams 2, which is a desirable arrangement.

Having thus described this invention, what is claimed, and desired to be secured by Letters Patent, is—

1. A vertical explosive-motor for motor-vehicles comprising a vertically - arranged crank-case with an open side ending at practically the center of the crank-shaft axis and cylinders supported by the upper portion of the crank-case and partly overhanging the open side of the case, the said crank-case forming an immovable support for itself and the cylinders with their cooperating parts, and a removable cap portion for the open side of the crank-case adapted to be laterally removed therefrom, whereby access to the crank-case can be readily obtained from the side thereof for the purpose of inspection, adjustment or substitution of the parts therein, substantially as described.

2. A vertical explosive-motor and support construction for motor-vehicles comprising transversely-arranged drop-frames, a vertically-arranged crank-case with an open side having the vertical wall of its open side in a line substantially at the vertical center of the axis of the motor crank-shaft, motor-cylinders supported by the upper portion of the crank-case and overhanging the open side of the crank-case, the crank-case immovable from the transverse beams when in operative position, and a removable cap portion for the open side of the crank-case, whereby convenient and ready access is permitted to the crank-case from the side thereof for the purpose of inspection, adjustment or substitution of any of the parts located therein, substantially as described.

3. A vertical explosive-motor and support construction for motor-vehicles comprising a transverse drop supporting-frame, a vertically-arranged crank-case having an open side with the edge wall of the open side located in a vertical line practically coincident with the center of the axis of the motor crank-shaft, motor-cylinders supported by the upper portion of the crank-case and overhanging the open side thereof, and a removable cap portion for the open side of the case with its outer portions sufficiently removed from the upwardly-extending parts of the supporting - frame to permit a lateral movement

enough to prevent interference in the parts of the crank-case bearing or movable part of the motor to allow it to be removed, whereby convenient and ready access to the interior of the crank-case for the purpose of inspection, adjustment or substitution of the parts therein is obtained, substantially as described.

4. A vertical explosive-motor construction comprising a vertically-arranged crank-case with an open end, the wall of the open end being substantially in a vertical line with the center of the axis of the crank-shaft of the motor for the purpose described, motor-cylinders supported by the upper portion of the crank-case and overhanging the open side thereof, the said crank-case immovably supported when in operative position, the crank-case provided with crank-shaft bearings, and a laterally-removable cap portion for the open side of said case whereby ready and convenient access is permitted to the crank-case from the side thereof for the inspection, adjustment or substitution of the parts located therein, substantially as described.

5. A vertical explosive-motor construction comprising a vertically-arranged crank-case having an open side with the wall thereof substantially in a line with the center of the axis of the crank-shaft, the crank-case carrying crank - shaft bearings, motor - cylinders supported by the upper portion of the crank-case and overhanging the open side thereof at a point sufficiently above the said crank-shaft bearings to permit the removal of the cylinder - piston with connecting - rod attached thereto through the open side of the crank-case without disturbing the crank-shaft or its bearings, and a removable cap portion for the open side of the crank-case substantially as described.

6. A vertical explosive-motor construction comprising a vertically-arranged crank-case with an open side, the wall of the open side of the crank-case being substantially in a vertical line with the center of the axis of the crank-shaft, motor-cylinders supported by the upper portion of the crank-case and overhanging the open side thereof, a removable cap portion adapted to be bolted in position to close the open side of the crank-case, the removable cap portion having an inspection-opening and a removable cover therefor whereby the parts in the crank-case may be quickly inspected from the side of the motor without removing the said closing-cap portion of the open side of the crank-case, substantially as described.

7. A vertical explosive-motor construction comprising a vertically-arranged crank-case with an open side the wall of which is located substantially in a vertical line with the center of the axis of the crank-shaft, transversely - arranged drop supporting - frames, the said crank-case attached to the drop frames at a point to bring the outer wall of



the open side of the crank-case outside of the center of the supporting-frame, motor-cylinders supported by the upper portion of the crank-case and overhanging the open side thereof, a laterally-removable cap portion for the open side of the crank-case, the location of the crank-case thus being such that the removable cap portion is capable of a lateral movement to permit its removal without interfering with the said drop-frame, substantially as described.

8. A vertical explosive-motor and support construction comprising a supporting-frame, a vertically-arranged crank-case having an open side, the case provided with crank-shaft bearings, the outer edge of the wall of the open side of the case being substantially in a vertical line with the center of said bearings, motor-cylinders supported by the upper portion of the crank-case and overhanging the open end thereof, and a removable cap portion for the open side of the crank-case so located when in normal position as to be capable of sufficient lateral movement without interference with any part of the supporting-frame to permit it to be removed from its closing position of the open side of the crank-case, substantially as described.

9. A vertical explosive-motor construction comprising a vertically-arranged crank-case with an open side, crank-shaft bearings for the crank-case and located therein so that the outer edge of the open side of the case is substantially in a vertical line with the center of the said bearings, a removable cap for the open side of the crank-case, a transversely-arranged drop supporting-frame, the crank-case so located on the supporting-frame that sufficient lateral movement of the removable cap portion is permitted to allow the cap to be removed laterally without interference with the upwardly-extending adjacent portion of

the supporting drop-frame, substantially as described.

10. A vertical explosive-motor construction comprising a vertically-arranged crank-case having an open side, motor-cylinders supported by the upper portion of the crank-case and overhanging the open side thereof, a removable cap portion for the open side of the crank-case, the front end of the crank-case having an extension forming a gear-chamber, a cam-shaft passing longitudinally through the upper portion of the crank-case and extending into the said gear-chamber, a crank-shaft passing through the gear and crank case, a pinion on the crank-shaft within the gear-case, a water-pump gear, and a fan-gear also located within said gear-case, and a gear carried by the cam-shaft meshing with the crank-shaft gear and in turn driving the water-pump and fan gears, substantially as described.

11. An improved vertical explosive-motor construction comprising a vertically-arranged crank-case having an open side, crank-shaft bearings connected to said case with their center substantially in a line with the outer edge of the wall of the open side of the case, motor-cylinders supported by the upper portion of the case and overhanging the open side thereof, a removable cap portion for the open side of the crank-case for the purpose described, the forward end of the crank-case provided with an extension forming a gear-case, the outer wall of said gear-case extension being removable to permit access to said gears, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

ALEXANDER WINTON.

Witnesses:

HAROLD B. ANDERSON,  
HARRY L. OWESNEY.