

J. SPRINGER.
AUTOMOBILE.

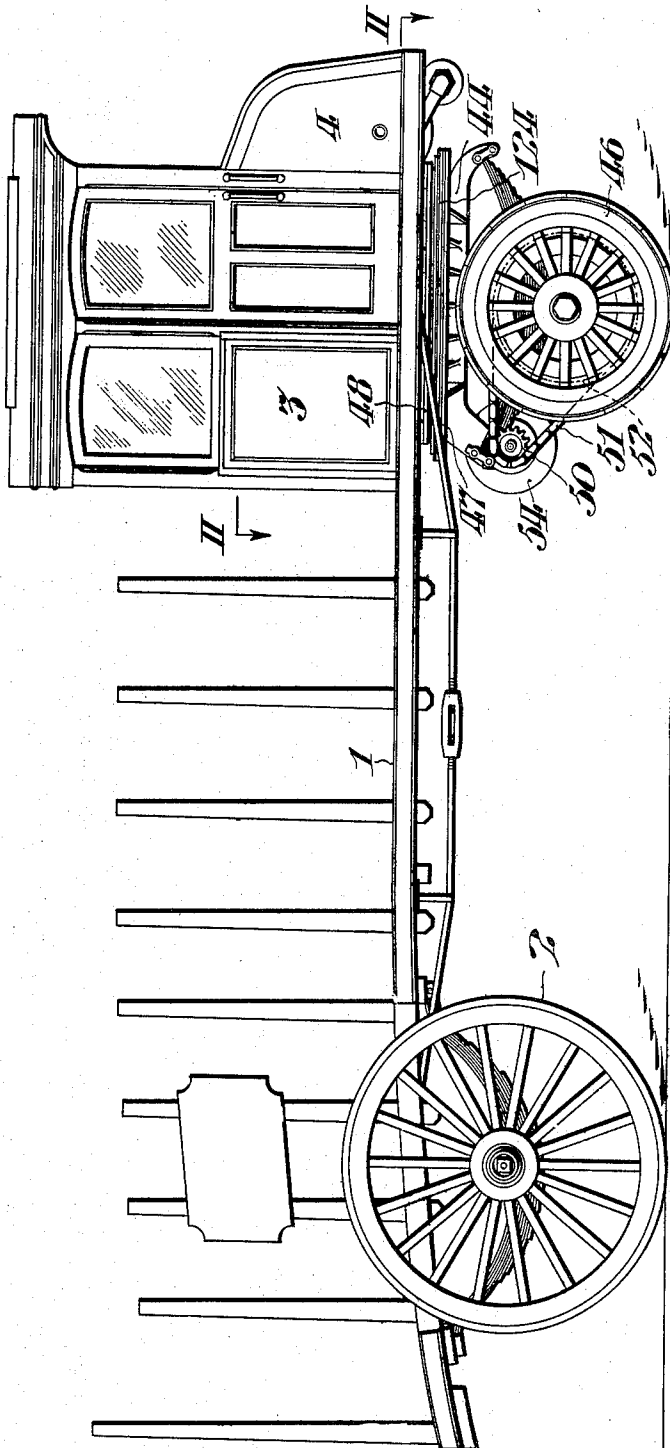
APPLICATION FILED APR. 13, 1908. RENEWED MAR. 16, 1912.

1,043,163.

Patented Nov. 5, 1912.

8 SHEETS—SHEET 1.

FIG. 1.



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8 SHEETS—SHEET 2.

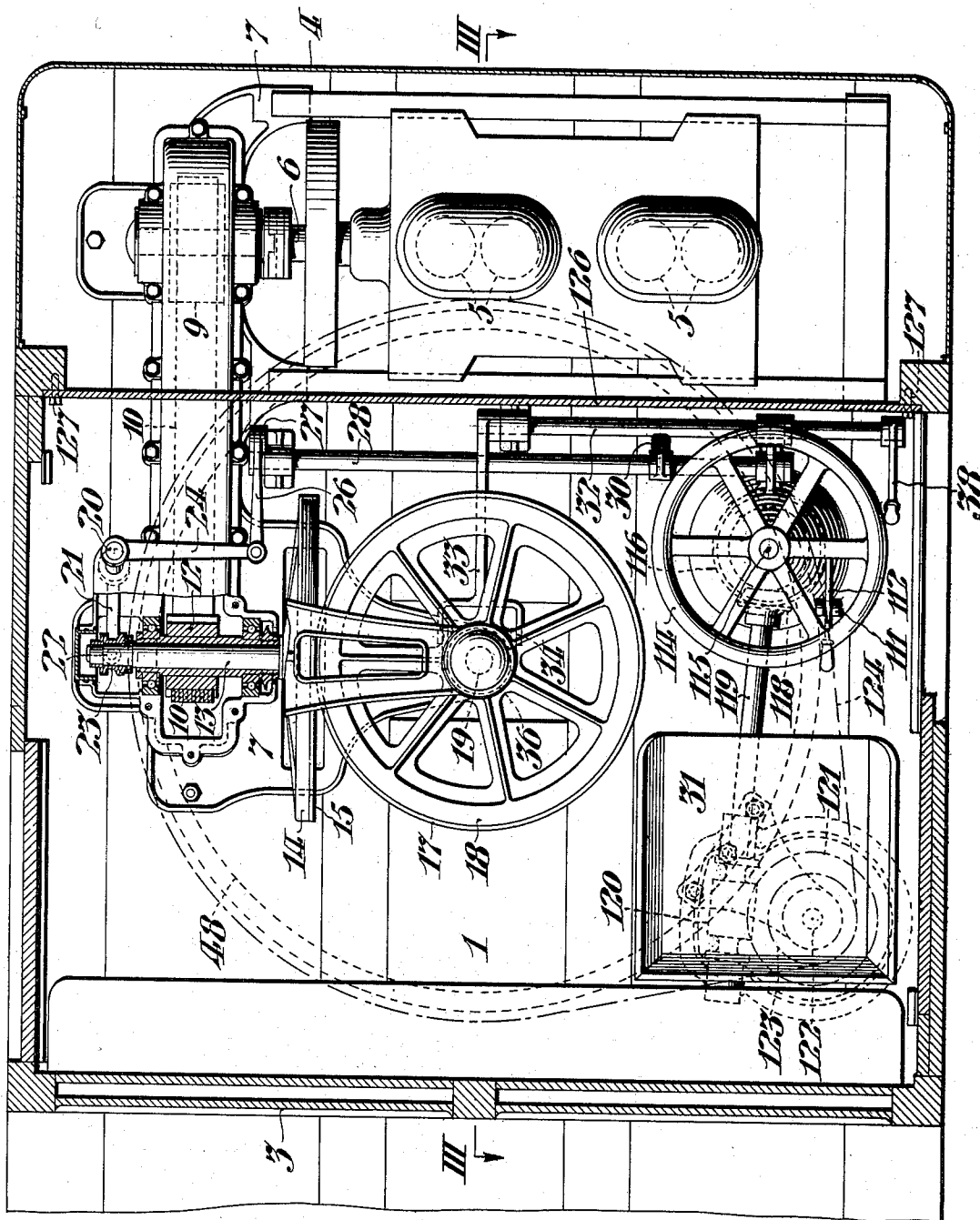


FIG. II

WITNESSES:

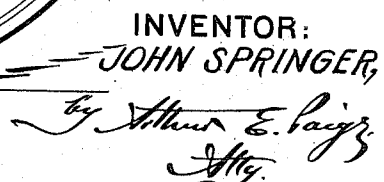
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8 SHEETS—SHEET 3.



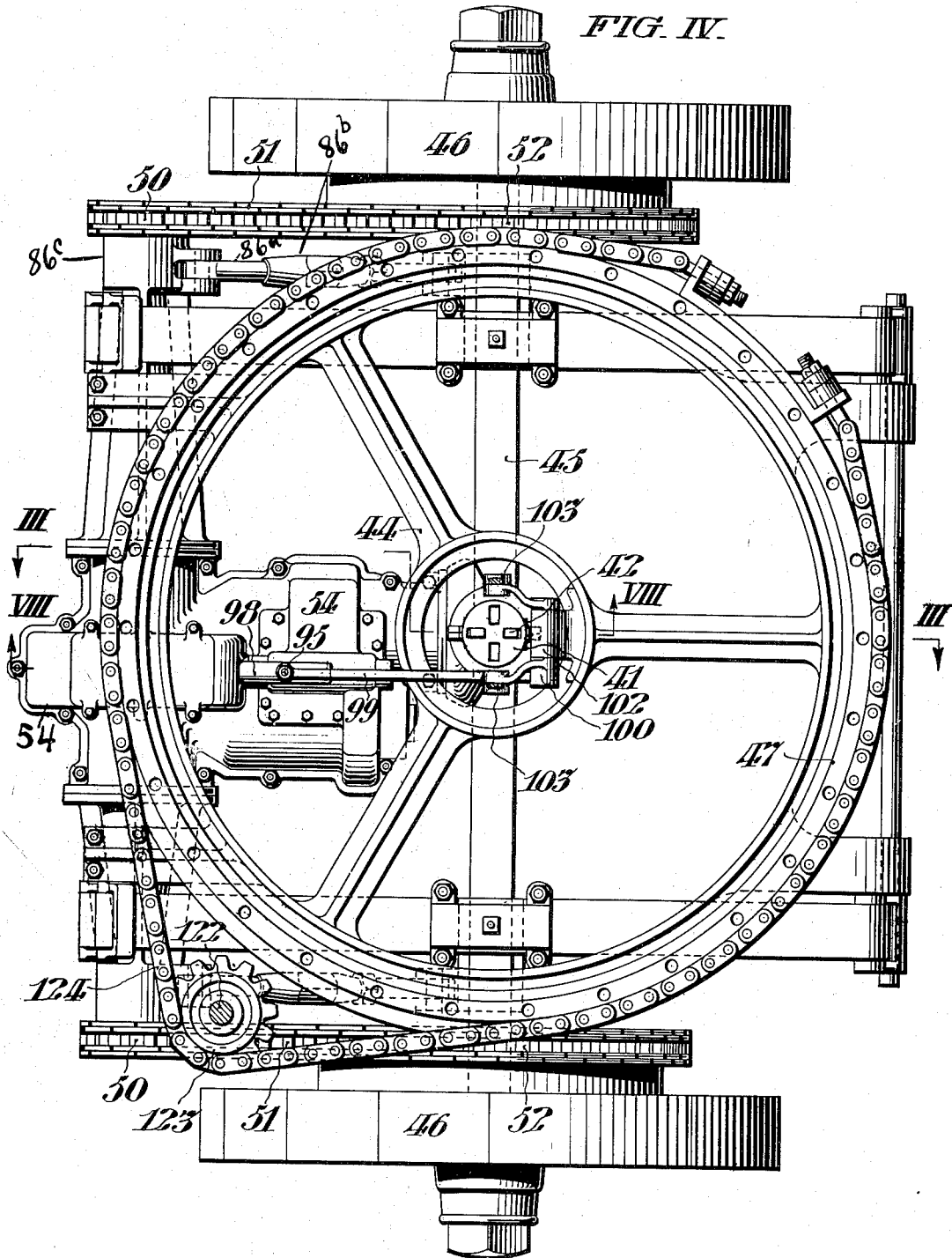
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8 SHEETS—SHEET 4.



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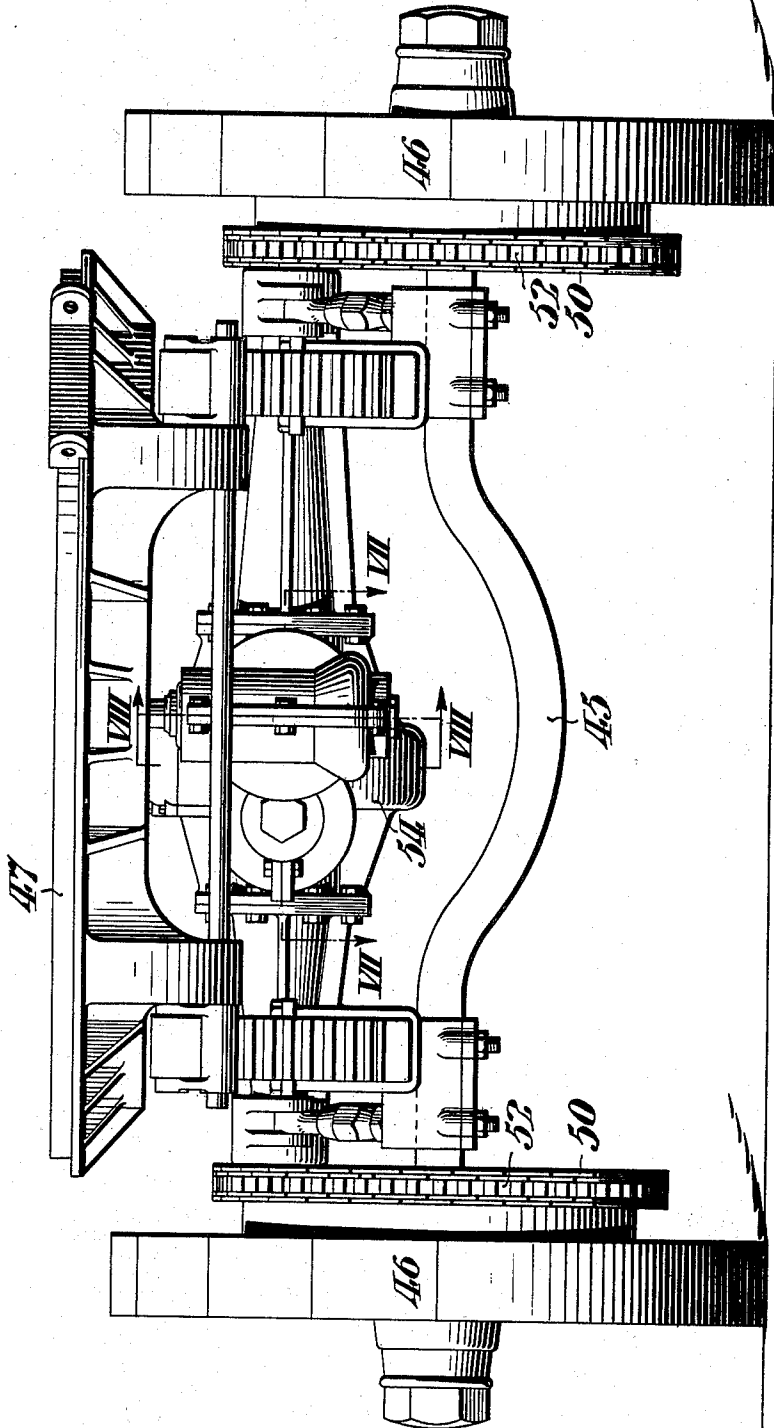
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8 SHEETS—SHEET 5.

FIG. V.



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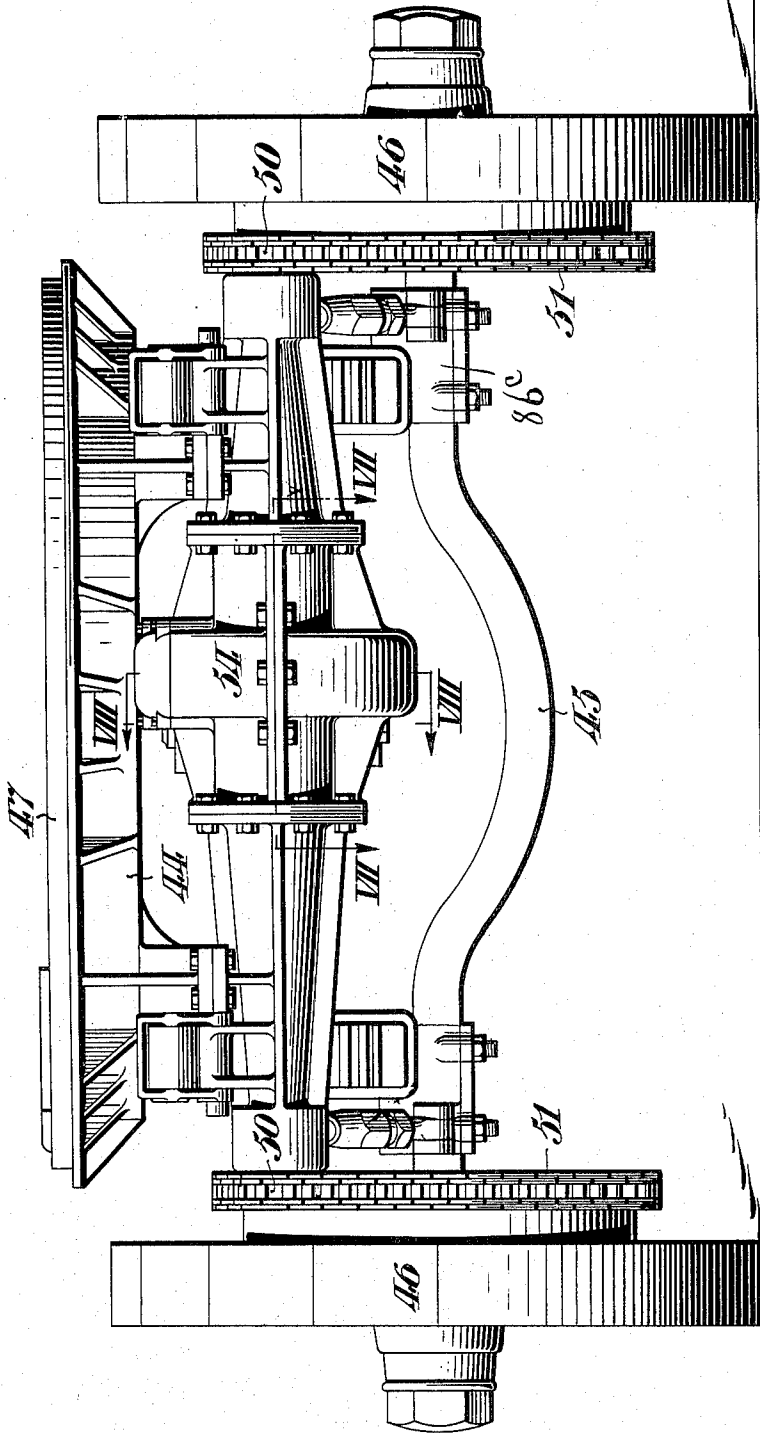
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8 SHEETS—SHEET 6.

FIG. VI.



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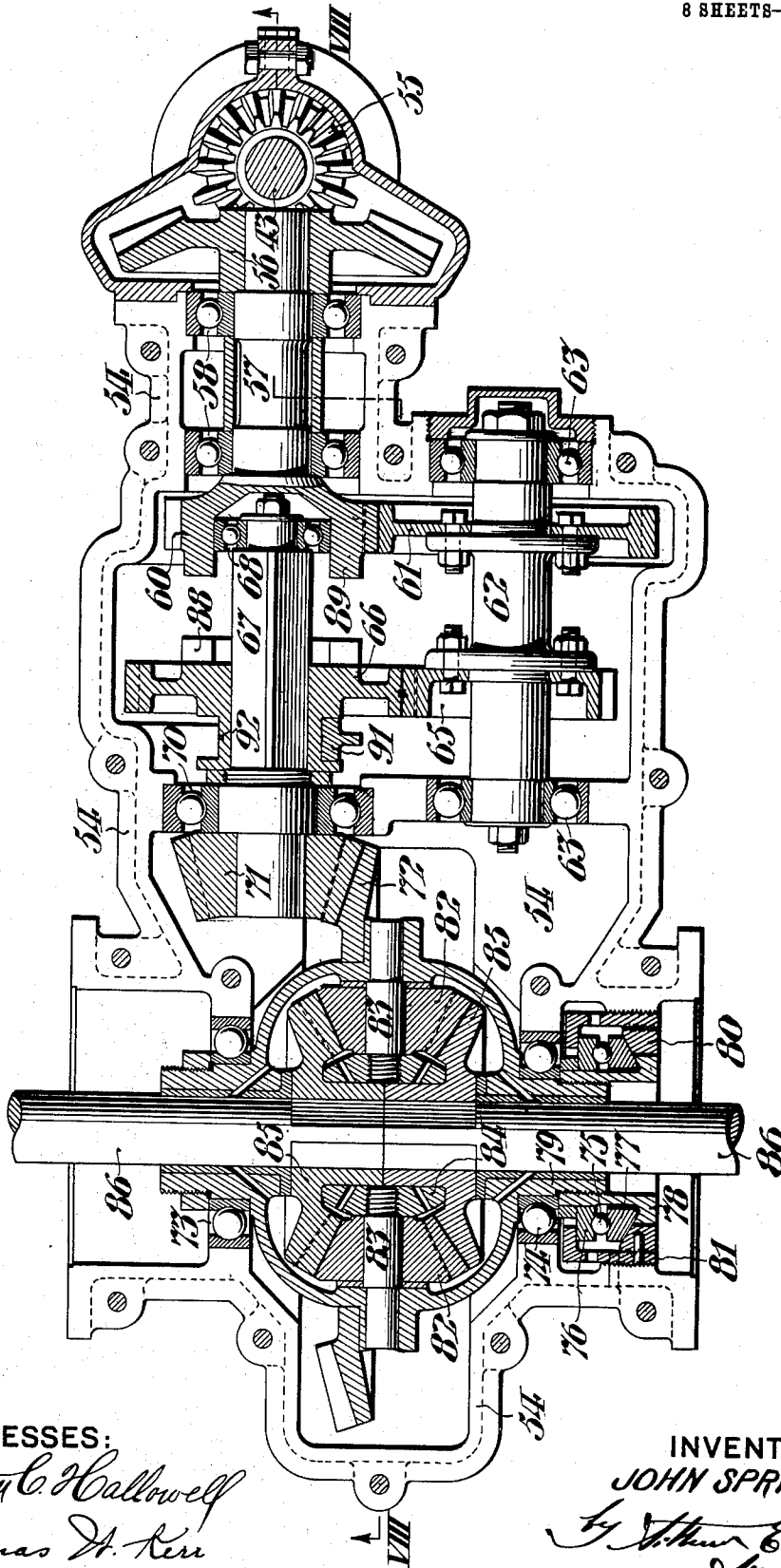
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8 SHEETS—SHEET 7.

FIG. VII.



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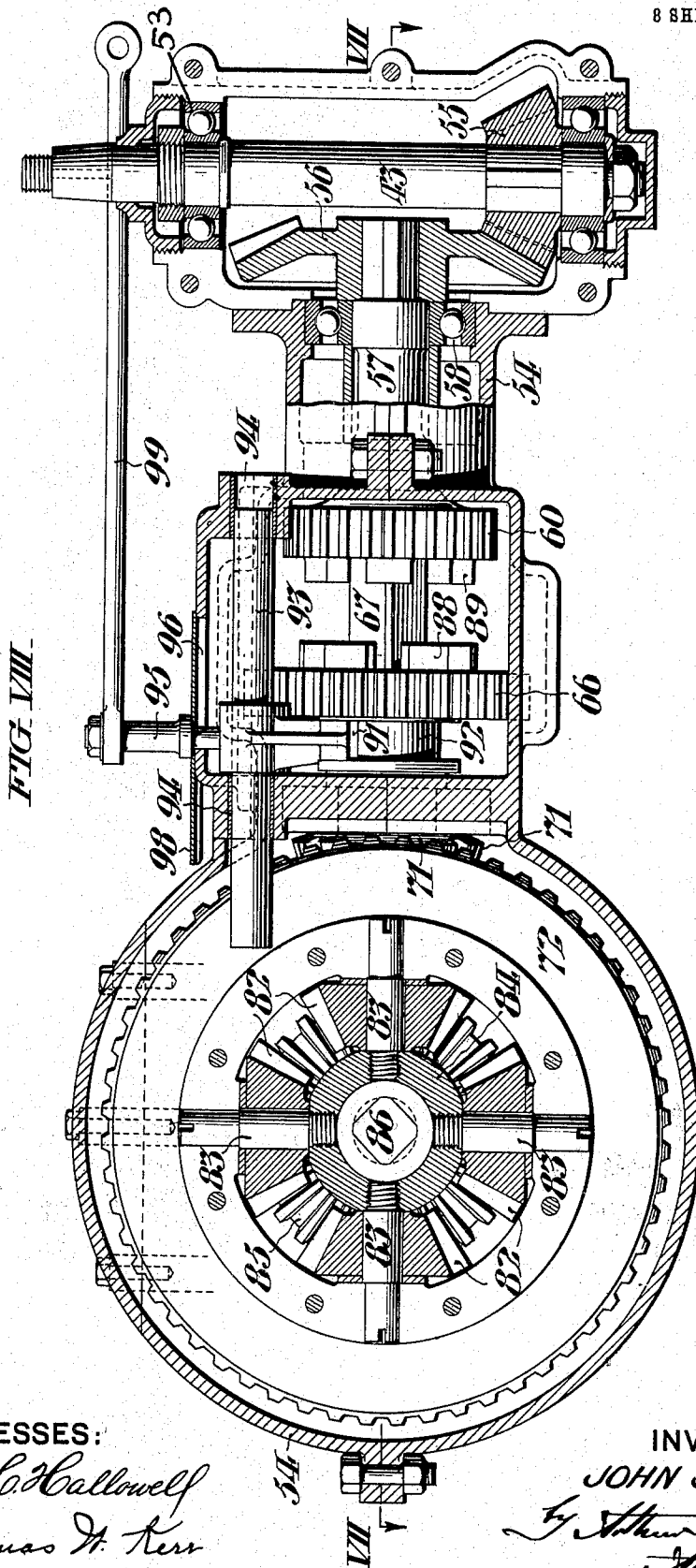
J. SPRINGER.
AUTOMOBILE.

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8 SHEETS—SHEET 8.



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UNITED STATES PATENT OFFICE.

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AUTOMOBILE.

1,043,163.

Specification of Letters Patent.

Patented Nov. 5, 1912.

Application filed April 13, 1908, Serial No. 426,666. Renewed March 16, 1912. Serial No. 684,223.

To all whom it may concern:

Be it known that I, JOHN SPRINGER, of Trenton Junction, in the county of Mercer, and State of New Jersey, have invented a certain new and useful Improvement in Automobiles, whereof the following is a specification, reference being had to the accompanying drawings.

My improvement is particularly applicable to a self propelled vehicle, comprising a dirigible fore truck pivotally connected with the vehicle body and provided with road wheels, whereby the vehicle may be both steered and driven.

The form of my invention hereinafter described comprises the combination with a vehicle body, of a truck frame having a detachable pivotal connection with said body, and dirigible road wheels; variable speed gearing in said truck arranged to drive said road wheels and comprising a vertical rotary shaft in concentric relation with said pivotal connection; an internal combustion motor in said body detachably operatively connected with variable speed friction gearing, in said body, detachably operatively connected with said vertical shaft; and, steering gear operatively connecting said body and truck.

My invention comprises the various novel features of construction and arrangement hereinafter more definitely specified.

In the drawings, Figure I, is a side elevation of an automobile conveniently embodying my improvement. Fig. II, is a fragmentary plan sectional view of said automobile taken on the line II, II, in Fig. I. Fig. III, is a fragmentary vertical sectional view of said automobile, taken on the line III, III, in Figs. II and IV. Fig. IV, is a plan view of the truck detached from the vehicle body. Fig. V, is a front elevation of the truck. Fig. VI, is a rear elevation of the truck. Fig. VII, is a plan sectional view of the gearing in the truck, taken on the line VII, VII, in Figs. III, V, and VI. Fig. VIII, is a vertical sectional view of the gearing in the truck, taken on the line VIII, VIII, in Figs. IV, V, VI, and VII.

In said figures; the vehicle body comprises the platform 1, having the ordinary rear road wheels 2; and provided at its front with the cab 3, and motor casing 4. Said casing 4, incloses an internal combustion motor which may be of any suitable

construction and which, as shown, comprises four cylinders 5, and a main rotary crank shaft 6, removably supported by means of bolts upon the frame 7, mounted on said vehicle body. Said main motor shaft 6, is operatively connected with the sprocket wheel 9, which is detachably operatively connected, by the sprocket chain 10, with the sprocket wheel 12, on the counter-shaft 13, of the variable friction gearing, which is also supported by said frame 7. Said counter-shaft 13, carries the friction disk 14, having its plane aluminum face 15, presented for frictional engagement with the peripheral paper face 17, of the friction wheel 18, carried by the vertical shaft 19. Said friction disk 14, is provided with means whereby the operator may press it against and withdraw it from said wheel 18, comprising the rock shaft 20, having the bifurcated arm 21, pivotally engaging the trunnions 22, of the collar 23, on said counter-shaft 13. The arm 24, on the upper end of said rock shaft 20, is pivotally connected by the link 26, with the arm 27, on the rock shaft 28, and the latter is provided with the lever treadle 30, conveniently accessible from the operator's seat, 31. Said friction wheel 18, is provided with means arranged to shift it radially with respect to said disk 14, by sliding it longitudinally on said shaft 19, to thus vary the ratio of the engaged surfaces of said wheel and disk and consequently the speed of the automobile. Said means comprises the rock shaft 32, having the bifurcated arm 33, pivotally connected by the links 34, with the trunnions 35, on the collar 36 operatively connected with the hub 37, of said wheel 18. Said rock shaft 32, is provided with the lever handle 38, which is conveniently accessible from the operator's seat 31. As shown in Fig. III, said vertical shaft 19, is provided at its lower end with the yoke 40, which is detachably engaged by the coupling member 41, with the yoke 42, on the vertical shaft 43. Said shaft 43, is supported in alinement with said shaft 19, in the frame 44, of the fore truck comprising the stationary axle 45, provided with the dirigible supporting and driving wheels 46, and pivotally connected with the vehicle body 1, by the annular plate 47, which engages a corresponding annular plate 48, which is rigidly connected with said body 1; said pivotal connection being

concentric with said alined vertical shafts 19 and 43, the plates 47 and 48 are held together by means of a key-plate 48^a bolted to the plate 47. The axle 45 is connected to the annular plate 47 by means of supporting springs 45^a, links 45^b and depending brackets 45^c.

Referring to Figs. I, IV, and VI; it is to be understood that said central vertical shaft 43, is operatively connected with the two opposite sprocket wheels 50, at the rear of said truck frame 44, which are connected, by the driving chains 51, with the sprocket wheels 52, respectively carried in rigid relation with said supporting wheels 46, and such connection is effected as follows:—Said shaft 43, has the ball bearings 53, in the gear casing 54, and is provided at its lower end with the beveled gear wheel 55, engaging the beveled gear wheel 56, on the shaft 57, which has the ball bearings 58, in said casing 54. Said shaft 57, has at its inner end the gear wheel 60, engaging the gear wheel 61, on the counter-shaft 62, having the ball bearings 63, in said casing 54. Said shaft 62, has the gear wheel 65, engaging the gear wheel 66, on the shaft 67, which extends in axial alinement with the shaft 57, and has the ball bearings 68, at one end mounted in said gear wheel 60, and, the ball bearing 70, at the other end, supported by said casing 54. Said shaft 67, has the beveled gear wheel 71, engaging the beveled gear wheel 72, of the differential gearing, which has the ball bearings 73, 74 and 75 in said casing 54. Said bearings 73, and 74, support said gear wheel 72, laterally, but said bearing 75 supports it against axial thrust in both directions. The race rings 76, and 77, being both free to turn relatively to said wheel 72; the sleeve 78, is so set on the hub 79, of said gear 72, and the collar 80, is so set in the bushing 81, in the casing 54, as to permit said rings 76, and 77 to move axially just enough to permit one of them to turn freely while the other is frictionally engaged, in accordance with the direction of thrust upon said gear 72. Said gear wheel 72, carries the four beveled pinions 82, mounted on the radial studs 83, which are rigidly connected at their inner ends with the sleeve 84, shown in Figs. VII and VIII encircling the hubs of the beveled gears 85, which are respectively rigidly connected with the alined but separate and relatively rotatable differential gear shafts 86, carrying said opposite sprocket wheels 50, which are operatively connected with the vehicle supporting and driving wheels 46, as above described. The ends of that portion of the gear box 54 in which the shafts 86 are carried are maintained the proper distance from the stationary axle 45 by the adjustable radius rods 86^a having turn buckles 86^b therein and being connected to

the gear box 54 and the axle 43 by means of the journal bearing brackets 86^c. Said shaft 67, is squared, for engagement with the gear wheel 66, which is adapted to slide axially thereon and is provided with the clutch lugs 88, arranged to engage the clutch lugs 89, on said gear 60, when shifted toward the right hand side of Fig. VII; so that the shafts 57, and 67, then turn together. The gear wheel 66, being thus disengaged from the gear wheel 65, the latter and its shaft 62, are rotated idly, and the vehicle supporting wheels 46, are driven at a higher speed than when said gear 66, is engaged as shown. Said gear wheel 66, is arranged to be shifted back and forth to render said counter gear operative or inoperative by means of the yoke 91, which engages the corresponding annular recess in the hub 92, of said gear wheel 66, as shown in Fig. VII, and is carried in rigid relation with the shaft 93, which, as shown in Fig. VIII, is mounted to reciprocate longitudinally in bearings 94, in said casing 54. As shown in Figs. III, IV and VIII, said yoke 91, is provided with the stud 95, extending through the slot 96, in said casing 54, and carrying the cover 98, which maintains said slot closed regardless of the traverse of said stud. Said stud 95, is pivotally connected by the link 99, with the bell crank lever 100, which is fulcrumed at 101, in the bracket 102, in the truck frame 44, and pivotally connected by the links 103, with the collar 105, which is mounted to slide vertically on said shaft 19. Said collar 105, has its circumferential groove 106, engaged by the roller 107, on the lever arm 108, which is rigidly connected with the rock shaft 109, and, the latter has, at its opposite end, the arm 110, pivotally connected by the link 111, with the hand lever 112, which is conveniently accessible from said operator's seat 31.

The fore truck above described may be turned with the road wheels 46, in either direction, to steer the vehicle, by means of the hand wheel 114, shown in Fig. II, on the shaft 115; said shaft 115, having, at its lower end, the beveled gear wheel 116, engaging the gear wheel 118, on the shaft 119, carrying the worm 120, engaging the worm gear 121, on the vertical shaft 122, having at its lower end, the wheel 123, engaging with the flexible connector 124, engaging the annular flange 47, on said fore truck.

Referring to Fig. II; it is to be noted that the partition 126, which separates the cab 3, from the motor casing 4, is preferably formed of a material which is a poor conductor of heat, and is detachably connected with the frame of the cab 3, conveniently by bolts 127, so that it may be removed during cold weather to permit the atmosphere of the cab to be warmed by the heat from the engine; said partition being retained in the

position shown in Fig. II, only when it is desired to exclude the heat of the engine from the cab.

I do not desire to limit myself to the specific details of construction and arrangement above described, as it is obvious that various modifications may be made therein without departing from the essential features of my invention as defined in the appended claims.

I claim:—

1. In an automobile, the combination with a body; of a motor in said body; variable speed friction gearing comprising a vertical shaft in the body; a sprocket chain operatively connecting said motor with said friction gearing; a truck frame having a pivotal connection with said body, co-axial with said vertical shaft; a nonrotatable axle connected with said truck frame by springs and links permitting relative vertical movement of said frame and axle; supporting wheels on said axle, having respective sprocket wheels; two differential gear shafts journaled in said truck frame in alinement with each other and parallel with said axle; sprocket pinions on said differential gear shafts, respectively in alinement with said sprocket wheels; sprocket chains operatively connecting said pinions and sprocket wheels to drive the latter; adjustable radius rods, pivotally connecting said frame and axle; differential gearing connecting said differential gear shafts; a vertical shaft in said truck frame, co-axial with said pivotal connection and detachably, operatively connected with said vertical shaft in said body; variable speed gearing connecting said vertical shaft in said truck with said differential gearing; and, steering gear operatively connecting said body and truck, substantially as set forth.

2. In an automobile, the combination with a body; of a motor in said body; variable speed friction gearing comprising a vertical shaft in the body; a sprocket chain operatively connecting said motor with said friction gearing; a truck frame having a pivotal connection with said body, co-axial with said vertical shaft; a nonrotatable axle connected with said truck frame by springs and links permitting relative vertical movement of said frame and axle; supporting wheels on said axle, having respective sprocket wheels; two differential gear shafts journaled in said truck frame in alinement with each other and parallel with said axle; sprocket pinions on said differential gear shafts, respectively in alinement with said sprocket wheels; sprocket chains operatively connecting said pinions and sprocket wheels to drive the latter; adjustable radius rods, pivotally connecting said frame and axle; differential gearing connecting said differential gear shafts; a vertical shaft in said

truck frame, co-axial with said pivotal connection and detachably connected with said vertical shaft in said body; means connecting said vertical shaft in said truck with said differential gearing; and, steering gear operatively connecting said body and truck, substantially as set forth.

3. In an automobile, the combination with a body; of a motor in said body operatively connected with variable speed gearing comprising a vertical shaft in the body; a truck frame having a pivotal connection with said body, co-axial with said vertical shaft; a nonrotatable axle connected with said truck frame by springs and links permitting relative vertical movement of said frame and axle; supporting wheels on said axle, having respective sprocket wheels; two differential gear shafts journaled in said truck frame in alinement with each other and parallel with said axle; sprocket pinions on said differential gear shafts, respectively in alinement with said sprocket wheels; sprocket chains operatively connecting said pinions and sprocket wheels to drive the latter; adjustable radius rods, pivotally connecting said frame and axle; differential gearing connecting said differential gear shafts; a vertical shaft in said truck frame, co-axial with said pivotal connection and detachably, operatively connected with said vertical shaft in said body; means connecting said vertical shaft in said truck with said differential gearing; and, steering gear operatively connecting said body and truck, substantially as set forth.

4. In an automobile, the combination with a body; of a motor in said body operatively connected with a vertical shaft in the body; a truck frame having a pivotal connection with said body, co-axial with said vertical shaft; an axle connected with said truck frame by springs permitting relative movement of said frame and axle; supporting wheels on said axle, having respective sprocket wheels; two differential gear shafts journaled in said truck frame in alinement with each other and parallel with said axle; sprocket pinions on said differential shafts respectively in alinement with said sprocket wheels; sprocket chains operatively connecting said pinions and sprocket wheels to drive the latter; adjustable radius rods pivotally connecting said frame and axle; differential gearing connecting said differential gear shafts; a vertical shaft in said truck frame, co-axial with said pivotal connection and detachably, operatively connected with said vertical shaft in said body; means connecting said vertical shaft in said truck with said differential gearing; and steering gear operatively connecting said body and truck, substantially as set forth.

5. The combination with a vehicle body; 130

of a truck having a detachable pivotal connection with said body, and, supporting wheels; variable speed gearing in said truck, arranged to drive said wheels and comprising a vertical rotary shaft in co-axial relation with said pivotal connection; an internal combustion motor in said body, connected to said variable speed gear by means of said shaft, variable speed friction gearing detachably connecting said vertical shaft to said motor; and, steering gear operatively connecting said body and truck, substantially as set forth.

6. In an automobile, the combination with a body; of a motor in said body operatively connected with a vertical shaft in said body; a truck frame having a pivotal connection with said body, co-axial with said vertical shaft; an axle attached to said truck frame; supporting wheels on said axle having respective sprocket wheels; two differential gear shafts journaled in said truck frame parallel with said axle; sprocket pinions on said shafts in alinement with said sprocket wheels; sprocket chains operatively connecting said pinions and sprocket wheels to drive the latter; a shaft extending transversely to said differential gear shafts and journaled in said truck frame between said wheels and operatively connected with the differential gear-shafts; a vertical shaft in said truck frame, co-axial with said pivotal

connection and detachably, operatively connected with said vertical shaft in said body; and, steering gear operatively connecting said body and truck, substantially as set forth.

7. The combination with a vehicle body, of a frame on said body, a motor on said frame, comprising a main rotary shaft, a variable speed friction gearing supported independently of said main shaft but in detachable operative connection therewith, and comprising a vertical shaft, a truck frame having a detachable pivotal connection with said body, co-axial with said vertical shaft, and supporting wheels, a vertical shaft in said truck frame in alinement with said vertical shaft in said vehicle body, a detachable connection between said two vertical shafts, and means operatively connecting the vertical shaft in said truck frame with said supporting wheels, whereby said truck may be removed and replaced in operative relation with said friction gearing without disturbing the latter, substantially as set forth.

In testimony whereof I have hereunto signed my name at Philadelphia, Pennsylvania, this 10th day of April, 1908.

JOHN SPRINGER.

Witnesses:

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