

J. ZIEG.
MOTOR.

APPLICATION FILED NOV. 16, 1908.

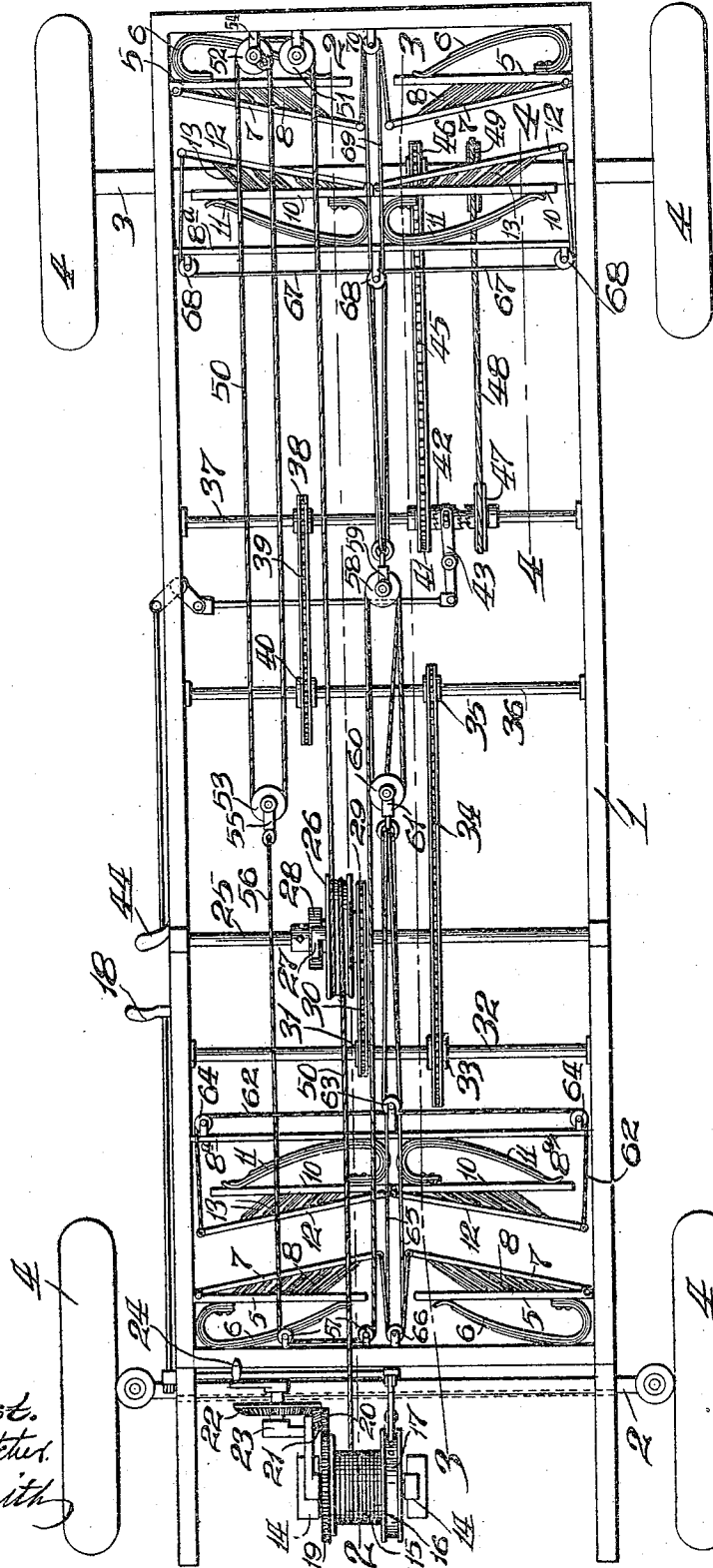
949,951.

Patented Feb. 22, 1910.

2 SHEETS—SHEET 1.

Fig. 1.

attest.
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2 SHEETS—SHEET 2.

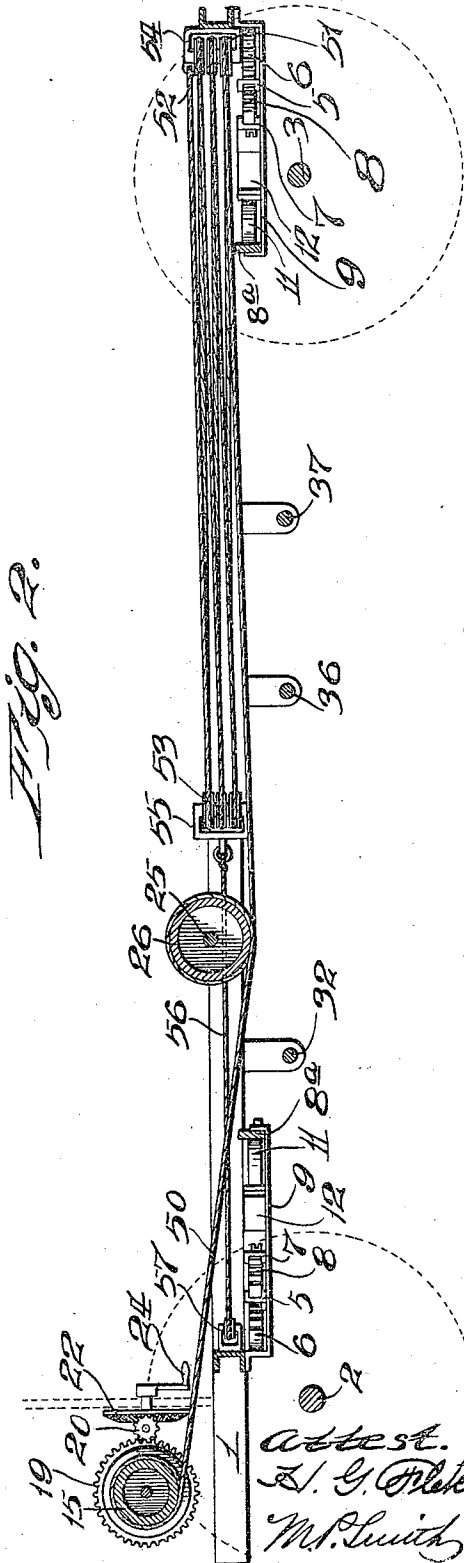


Fig. 3.

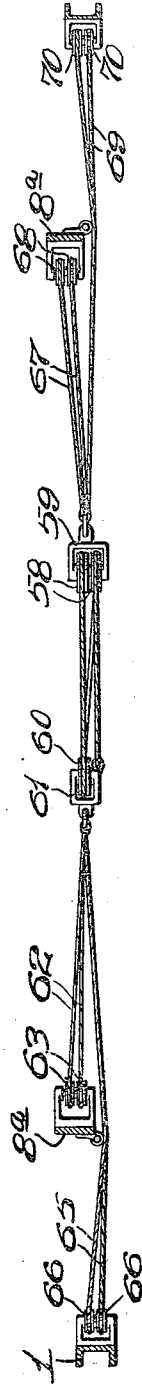
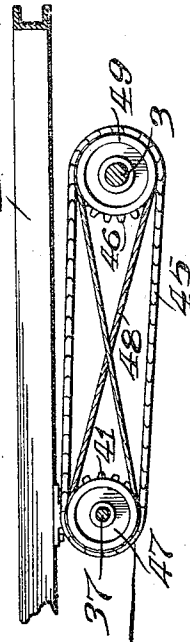


Fig. 4.



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UNITED STATES PATENT OFFICE.

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MOTOR.

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, JOSEPH ZIEG, a citizen of the United States, and resident of St. Louis, Missouri, have invented certain new and useful Improvements in Motors, of which the following is a specification, containing a full, clear, and exact description, reference being had to the accompanying drawings, forming a part hereof.

My invention relates to motors, the object of my invention being to construct a motor especially adapted for vehicles wherein springs under tension are used for furnishing the motive power, and which motor is equipped with simple means whereby the springs are readily compressed to store power therein, and which means is readily controlled by the operator.

To the above purposes, my invention consists in certain novel features of construction and arrangement of parts which will be hereinafter more fully set forth, pointed out in the claims, and illustrated in the accompanying drawings, in which:

Figure 1 is a plan view of the frame of a vehicle having my improved construction of motor thereon; Fig. 2 is a vertical section taken on the line 2—2 of Fig. 1; Fig. 3 is an enlarged detail section taken on the line 3—3 of Fig. 1; and Fig. 4 is a detail section taken on the line 4—4 of Fig. 1.

Referring by numerals to the accompanying drawings: 1 designates the frame of a vehicle, which is mounted in the usual manner upon front and rear axles 2 and 3, provided with the usual supporting wheels 4 those on the rear axles being the driven wheels. Hinged to the side rails of the frame 1 at points adjacent the ends thereof are bars 5, the free ends of which terminate adjacent the longitudinal center of the frame, and interposed between the ends of the frame 1 and these bars 5 are leaf springs 6. Hinged to the outer ends of the bars 5 and projecting inward toward the longitudinal center of the frame 1 are secondary bars 7, against which bear the free ends of leaf springs 8, the opposite ends of which are fixed to the bars 5.

8^a designates cross bars, the ends of which are rigidly fixed to the side rails of the frame 1 a short distance away from the front and rear end rails of said frame, and fixed to these cross bars 8^a and to the end rails of the frame 1 are metal plates 9, which form bottoms for the compartments in which

all of the springs of the vehicle are located. Hinged to each one of these plates 9 a short distance away from the cross bars 8^a and in the longitudinal center of the frame 1 are bars 10, the outer ends of which terminate adjacent the side rails of the frame 1, and bearing against the outer ends of these bars 10 are the free ends of heavy leaf springs 11. Secondary bars 12 are hinged to the inner ends of the bars 10, and bearing against said secondary bars are the free ends of leaf springs 13, the opposite ends of which are fixed to the bars 10. Journaled in bearings 14 fixed to the front end rail of the frame 1 is a drum 15, one end of which carries a friction brake wheel 16, around which passes a friction band 17, which is connected to and operated in the usual manner by a lever 18 on the side of the frame 1 convenient to the operator's seat. Carried by the opposite end of the drum 15 is a gear wheel 19, with which meshes a pinion 20. Journaled in suitable bearings and formed integral with this pinion 20 is a beveled pinion 21, which meshes with a large beveled gear wheel 22, the shaft of which is mounted in suitable bearings 23, and located on the shaft carrying this beveled gear wheel 22 is a crank handle 24. Located adjacent the center of the frame 1 and arranged for rotation in suitable bearings is a transversely disposed shaft 25, on which is loosely mounted a drum 26, and carried by said drum is a pawl 27, the point of which is adapted to engage the teeth of a ratchet wheel 28, which is rigidly fixed on the shaft 25. Carried by the drum 26 is a sprocket wheel 29, and operating thereon is a sprocket chain 30, which passes around a small sprocket wheel 31 fixed on a shaft 32, which latter is arranged for rotation in suitable bearings carried by the frame 1, and said shaft being located a short distance in front of the shaft 25. Fixed on the shaft 32 is a large sprocket wheel 33, around which passes a sprocket chain 34, which latter drives a small sprocket wheel 35 fixed on the transversely disposed shaft 36 arranged for rotation in suitable bearings on the frame 1, and said shaft 36 being located a short distance to the rear of the shaft 25.

Arranged for rotation in suitable bearings on the frame 1 and located a short distance to the rear of the shaft 36 is a shaft 37, and fixed thereon is a small sprocket wheel 38, driven by a sprocket chain 39 which

passes around a large sprocket wheel 40 fixed on the shaft 36. Loosely mounted on the shaft 37 is a sprocket wheel 41, the hub of which is provided with a clutch face adapted to be engaged by the face of a clutch 42, which is arranged to rotate with and slide upon the shaft 37, and which clutch is connected in the usual manner to the end of an operating lever 43, and which lever is connected to and actuated by a lever 44 arranged on the frame 1, convenient to the operator's seat. Passing around the sprocket wheel 41 is a sprocket chain 45, which passes around a sprocket wheel 46 fixed upon the rear axle 3. Loosely mounted upon the shaft 37 and on the opposite side of the clutch 42 from the sprocket wheel 41 is a pulley 47, and operating thereon is a twisted cable or belt 48, which passes around a corresponding pulley 49 fixed on the rear axle 3, and the hub of the pulley 47 is provided with a clutch face adapted to be engaged by one of the faces of the clutch 42, and which last mentioned construction provides means whereby reverse motion is imparted to the rear axle 3. Fixed to the drum 15 is one end of a cable 50, which extends to and passes once or twice around the drum 26, said cable extending from said drum to and around a pulley 51 arranged on the rear end rail of the frame 1, and said cable extends from thence around two sets of pulleys 52 and 53, there being three pulleys in each set, and the pulleys 52 being journaled in a block 54 fixed to the rear end rail of the frame 1 adjacent the pulley 51, and the set of pulleys 53 being carried by a block 55 which travels backward and forward near the center of the frame 1. The end of the cable 50 opposite the end connected to the drum 15 is attached to the rear end rail of the frame 1 adjacent the block 54. Fixed to the block 55 bearing the pulleys 53 is one end of a cable 56, which extends to the front end of the frame 1 and around a pair of pulleys 57 arranged on the front end rail of said frame, and said cable extending from thence rearward to and around the upper one of a pair of pulleys 58 arranged in a block 59, said cable passing from thence around a single pulley 60 carried by a block 61 in front of the block 59, and said cable passing from the pulley 60 to and around the lower one of the pair of pulleys 58, and the end of said cable extending from thence to the block 61, to which it is fixed.

Secured to the block 61 are the ends of a pair of cables 62, which extend forward around a pair of pulleys 63, journaled on the cross bar 8^a adjacent the front end rail of the frame 1, and from this pair of pulleys 63 the cables 62 extend outward in opposite directions around pulleys 64 journaled at the ends of the cross bar 8^a just mentioned, and the forward ends of said

cables 62 are attached to the outer ends of the pair of secondary bars 12 at the forward end of the frame 1. The second pair of cables 65 are attached to the block 61 and extend from thence forward around a pair of pulleys 66 journaled at the center of the front end rail of the frame 1, and from thence said cables 65 extend rearward and are attached to the pair of secondary bars 7 at the forward end of the frame 1. A pair of cables 67 are attached to the block 59 and extend from thence around suitably located pulleys 68, and the opposite ends of said cables are attached to the outer ends of the pair of secondary bars 12 at the rear end of the frame 1. A second pair of cables 69 are attached to the block 59 and extend from thence rearward around a pair of pulleys 70 carried by the rear end rail of the frame 1, and the ends of said cables are secured to the inner ends of the pair of secondary bars 7 at the rear end of the frame 1.

To compress and store power in all of the springs, which power is utilized in driving the vehicle, the crank handle 24 is engaged, and by rotating the shaft carrying the beveled wheel 22 rotary motion is imparted to the drum 15 through the medium of the pinion 20 and gear wheel 19, and as said drum 15 is rotated the cable 50 will be wound thereon, which action draws the block 55 carrying the pulleys 53 rearward, or toward the block 54, and as a result the cable 56 will be pulled in such a manner as to draw the blocks 59 and 61 together, which action necessarily draws all of the cables 62, 65, 67 and 69, and as the ends of all of these last mentioned cables are connected to the ends of the secondary bars 7 and 12, said bars will be swung upon their hinges in such a manner as to compress all of the springs 6, 8, 11 and 13, thereby storing power therein. During this operation of compressing the springs, the drum 26 will rotate freely upon the shaft 25 without imparting movement thereto, owing to the ratchet and pawl connection between said drum and shaft. After all of the springs have been compressed to the proper degree, the various parts are held against reverse movement by the engagement of the brake band 17 upon the brake wheel 16, which prevents the drum 15 from rotating, and when said brake band is released by means of the lever 18, the combined power stored in the various springs is exerted upon the various secondary bars and cables to cause the cable 50 to unwind from the drum 15, and as this action takes place the drum 26 will necessarily be rotated, and as the pawl 27 carried by said drum engages the teeth of the ratchet wheel 28, said ratchet wheel and the shaft 25 carrying the same will be rotated. The rotary motion thus obtained

is transmitted by means of the sprocket chains 30, 34 and 39 to the shaft 37, and when the clutch 42 is thrown into engagement with the hub of the sprocket wheel 41, the rotary motion will be transmitted from the shaft 37 to the rear axle 3 of the vehicle by means of the sprocket chain 45, and as a result the vehicle will be driven forward. The various sprocket wheels located on the shafts 25, 32, 36 and 37 and rear axle 3 are made in proper and proportionate sizes in order to obtain the proper speed for the rear axle.

When all of the springs are compressed to store power therein, the block 55 is drawn rearward into a position adjacent the series of pulleys 52, and the pulleys 58 and 60 occupy positions immediately adjacent each other at the center of the frame, and as the vehicle is moved forward as a result of the power exerted by the springs, the pulleys 58 and 60 will gradually move away from one another and the pulley 55 will gradually move forward through the frame of the vehicle.

The operator of the vehicle, by means of the lever 18 which actuates the brake band 17, controls the speed of the vehicle, and when it is desired to cause the vehicle to run backward, the operator, by means of the lever 44, shifts the clutch 42 into engagement with the clutch face on the hub of the sprocket wheel 47, and as the cable 48 operating on the pulleys 47 and 49 is crossed, a reverse motion will be imparted to the rear axle 3, resulting in the backward travel of the vehicle.

A motor of my improved construction can be very cheaply manufactured and operated, and the springs furnishing the motive power for the motor can be readily compressed, owing to the great leverage obtained by the use of the blocks and cables and the gearing used in imparting rotary motion to the drum 15.

I claim:

1. In a motor of the class described, a frame, a shaft rotatably mounted in the frame, a series of compression-springs arranged on each end of the frame, a shaft arranged adjacent the center of the frame, a drum arranged on said shaft, a cable arranged to wind upon said drum, connections between said cable and the springs whereby the same are simultaneously compressed to store power therein, a drum arranged at the forward end of the frame and upon which the forward portion of the cable is adapted to wind, and a driving connection from the

shaft at the center of the frame to the first mentioned shaft.

2. In a motor of the class described, a frame, a shaft rotatably mounted in the frame, a series of compression-springs arranged on each end of the frame, a shaft arranged adjacent the center of the frame, a drum arranged on said shaft, a cable arranged to wind upon said drum, connections between said cable and the springs whereby the springs are simultaneously compressed to store power there-in, a drum arranged at the forward end of the frame and upon which the forward portion of the cable is adapted to wind, and a reversible driving connection from the shaft at the center of the frame to the first mentioned shaft.

3. In a motor of the class described, a frame, a shaft rotatably mounted in the frame, a series of compression-springs arranged on each end of the frame, a shaft arranged adjacent the center of the frame, a drum arranged on said shaft, a cable arranged to wind upon said drum, connections between said cable and the springs whereby the springs are simultaneously compressed to store power there-in, a drum arranged at the forward end of the frame and upon which the forward portion of the cable is adapted to wind, means for holding the drums against rotation and a reversible driving connection from the shaft at the center of the frame to the first mentioned shaft.

4. In a motor of the class described, a frame, a shaft rotatably mounted in the frame, a series of compression-springs arranged on each end of the frame, a shaft arranged adjacent the center of the frame, a drum arranged on said shaft, a cable arranged to wind upon said drum, connections between said cable and the springs whereby the springs are simultaneously compressed to store power there-in, a drum arranged at the forward end of the frame and upon which the forward portion of the cable is adapted to wind, means for holding the drums against rotation and means for controlling the rotary speed of the drums and a reversible driving connection from the shaft at the center of the frame to the first mentioned shaft.

In testimony whereof, I have signed my name to this specification, in presence of two subscribing witnesses.

JOSEPH ZIEG.

Witnesses:

M. P. SMITH,
E. L. WALLACE.