O. M. FEIGHTNER.

STEERING APPLIANCE.

APPLICATION FILED JAN. 22, 1917.

1,364,872.

Patented Jan. 11, 1921.

3 SHEETS—SHEET 1.

FIG. 1.

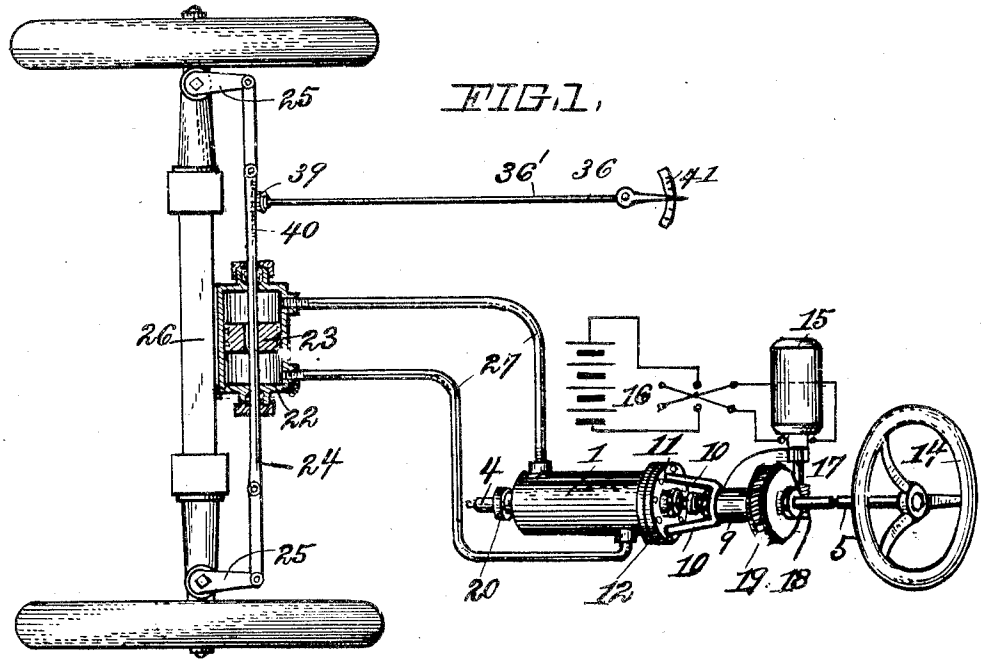
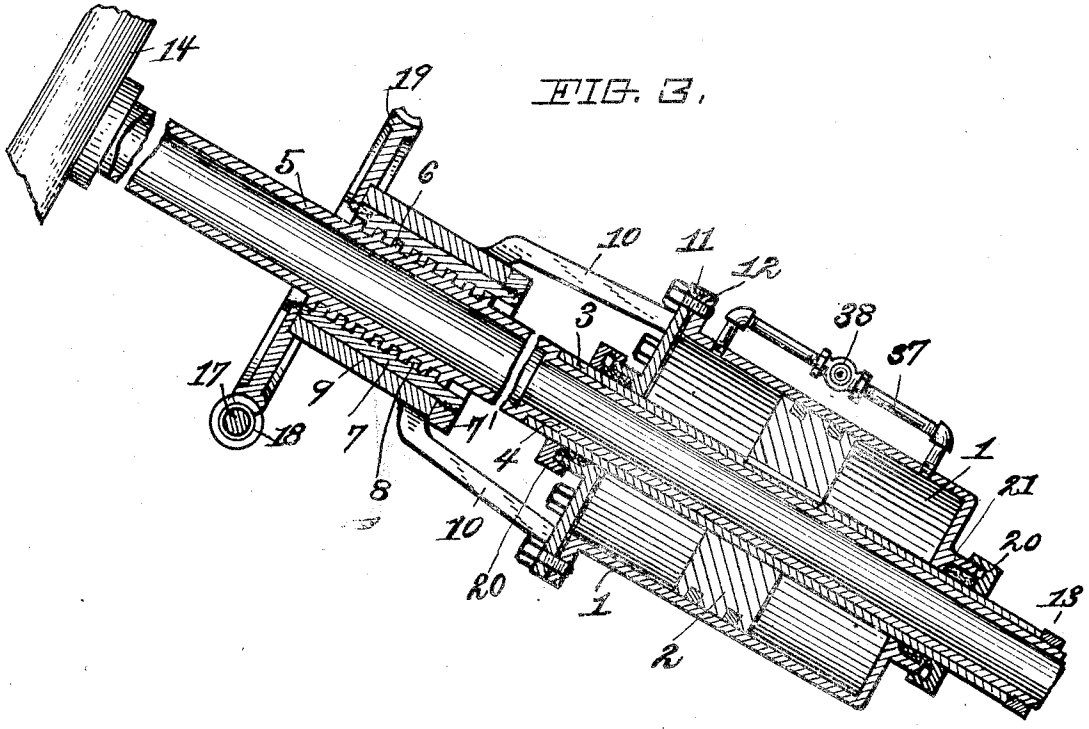


FIG. 3.



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3 SHEETS—SHEET 2.

FIG. 4.

FIG. 2.

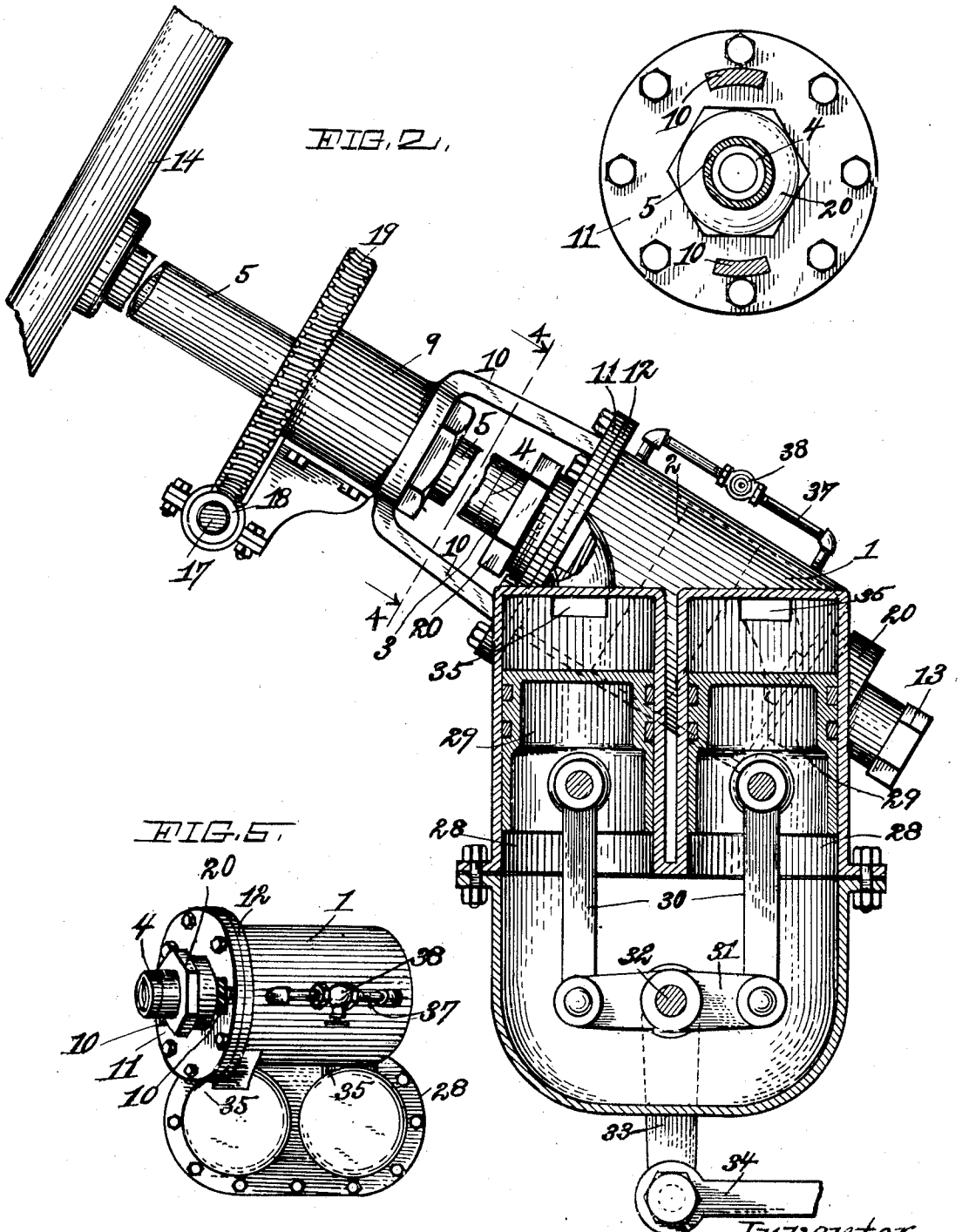

FIG. 5.

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3 SHEETS—SHEET 3.

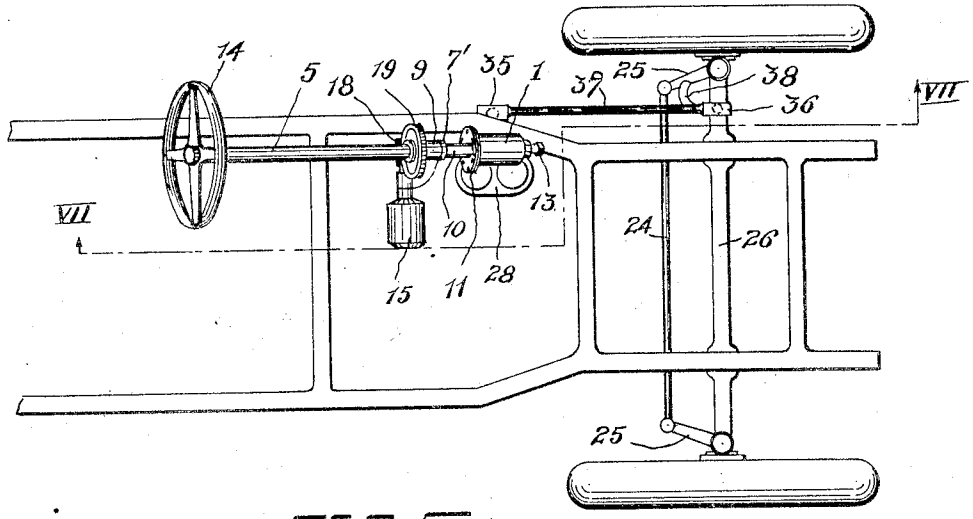

FIG. 6.

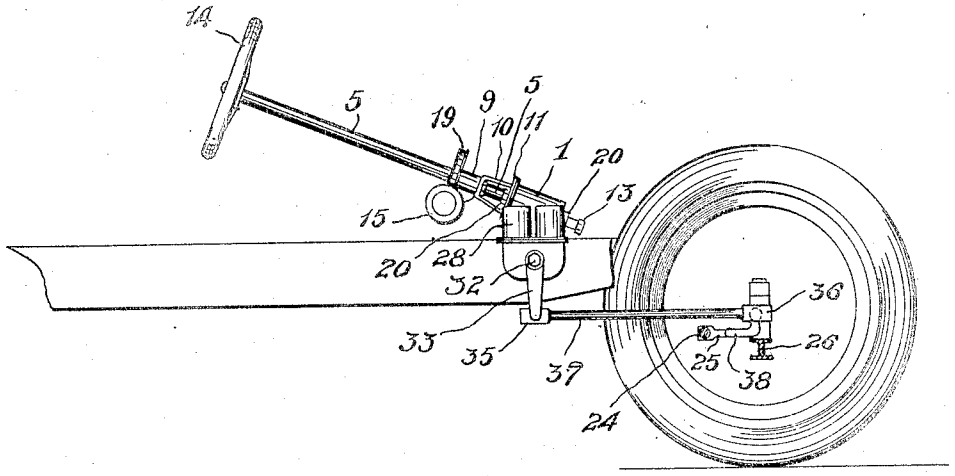

FIG. 7.

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UNITED STATES PATENT OFFICE.

ORRIE M. FEIGHTNER, OF CLEVELAND, OHIO.

STEERING APPLIANCE.

1,364,872. Specification of Letters Patent. Patented Jan. 11, 1921.

Application filed January 22, 1917. Serial No. 143,679.

To all whom it may concern:

Be it known that I, ORRIE M. FEIGHTNER, a citizen of the United States, resident of Cleveland, county of Cuyahoga, and State of Ohio, have invented new and useful Improvements in Steering Appliances, of which the following is a specification, the principle of the invention being herein explained, and the best mode in which I have contempleted applying that principle, so as to distinguish it from other inventions.

My invention relates to steering appliances and particularly to that class of such devices in which the result is effected by fluid pressure.

The annexed drawings and the following description set forth in detail certain means embodying my invention, the disclosed means, however, illustrating only a few of the various mechanical forms in which the principle of the invention may be employed.

In said annexed drawings:

Figure 1 represents a plan view of one form of my improved steering appliance as applied to an automobile; Fig. 2 represents a central vertical section of another form thereof, showing some features in side elevation; Fig. 3 represents a central longitudinal section of the elements shown in elevation in Fig. 2; Fig. 4 represents a transverse section taken in the plane indicated by the line 4—4, Fig. 2; Fig. 5 represents a plan view of the compression cylinders shown in Fig. 2; Fig. 6 represents a plan view of the form of appliance shown in Fig. 2, as applied to an automobile; and Fig. 7 represents a longitudinal section, taken in the planes indicated by the lines VII—VII, Fig. 6.

In the annexed drawings a compression cylinder is indicated at 1 with a piston 2, the latter being secured to a sleeve 3 mounted on the reduced portion 4 of a hollow steering rod 5 formed with an external threaded portion 6. Said steering rod 5 is longitudinally movable within a sleeve member 7 formed with a coöperating internal threaded portion 8. A cylindrical exterior member 9 surrounding the sleeve member 7 is formed with two arms 10 and a plate 11, of which the latter is bolted to a flange 12 of the cylinder 1 to form one head of said cylinder. A nut 7′ is screwed tightly up against the member 9 and upon the sleeve member 7. The sleeve 3 is held in position by a nut 13 relatively to the longitudinal movement of the rod 5. A hand wheel 14 is shown attached to the steering rod 5. Furthermore, a motor 15 is provided having reversing mechanism 16, motor shaft 17, provided with a worm 18 adapted to mesh with gear wheel 19 secured to sleeve member 7. Said motor and allied mechanisms may be utilized to effect the longitudinal movement of the steering rod 5 in lieu of the steering wheel 14. When the steering rod 5 is actuated by the motor, said steering rod is prevented from turning by means of the operator holding the hand wheel 14. Nuts 20 mounted upon the sleeve 3 are secured to bosses 21 upon the cylinder 1.

Referring particularly to Fig. 1, a second compression cylinder 22 is shown secured to the axle 26 of an automobile, said cylinder 22 being provided with reciprocable piston 23, said cylinder and piston being intersected by a rod 24 pivoted to steering arms 25 secured to the steering knuckles of axle 26. Furthermore, the piston 23 is secured to the rod 24 so as to be longitudinally movable within the cylinder 22 upon the actuation of said rod 24. A pair of liquid passages 27 intersect the cylinders 1 and 22 upon either side of the pistons 2 and 23 thereof, respectively. An indicator denoting angularity is shown at 36 and a by-pass at 37, the latter being provided with a valve 38 for position adjustment of the piston 2. The indicator 36 is provided for the purpose of greatly assisting the operator or driver, especially when he is required to move his car forward or reverse in order to extract the car from a congested condition, said indicator being attached to the front axle 26 by a suitable bearing (not shown) which carries the flexible shaft 36′ of the indicator provided with a gear segment 39 whose radius is equivalent to the length of the steering arms 25, said gear segment 39 being engaged with a rack 40 which is carried upon the rod 24. An indicating dial and needle 41 is connected to the flexible shaft 36′ and placed in any convenient position in plain view of the driver. The flexible shaft 36′ may also be directly connected to the steering knuckles at the axle position of the latter and in this latter arrangement the indicator 36 may be operated without the segment 39 and the rack 40 previously described.

It is evident from the foregoing description and the accompanying drawing that

the actuation of the rod 5 either by means of the steering wheel 14 or the motor 15, will effect, through the pressure of the liquid contained in cylinders 1 and 22 and passages 27, the desired turning action of the steering knuckles secured to the axle 26. The pressure of the liquid on the faces of the pistons 2 and 23 will prevent said pistons from rotating.

A second form of my improved steering appliance is shown in Figs. 2, 6 and 7, said form being particularly adapted both for use on an automobile, and on a shaper, planing machine or other tool operated by belt, motor or similar power. The claims of this application are limited to constructions adapted for use on an automobile. When this type of steering appliance is designed for automobile use, the appliance is placed upon the frame members of the automobile and connected by the link 33, hereinafter more fully mentioned to the steering arms of the front axle with ball and socket connections 35 and 36. A rod 39 is connected to the link 33 by the ball and socket connection 35 and a curved arm 38 is connected to the rod 39 by the ball and socket connection 36 and also rigidly secured to one of the steering arms 25. In this form of device a compound cylinder member 28 is provided which carries the cylinder 1 previously described, said relation being plainly shown in Fig. 5, said compound cylinder member 28 being provided with two reciprocable pistons 29 connected by links 30 and yoke 31, to either end of which yoke said links are pivoted. The yoke 31 is secured to a shaft 32 to which is also secured a link 33. This link 33, when the appliance is used on a shaper, planing machine or other tool, is connected to a crank arm 34, Fig. 2, which in turn is actuated by a crank (not shown) the revolving of which effects the reciprocations of the planer or other tool being used. It is evident from an inspection of Fig. 2 that the compound cylinder member 28 comprises two liquid containing compartments within which the pistons 29 reciprocate and a lower compartment within which the pivotal action of the aforementioned links 30 and 33 and yoke 31 takes place. In this form of the device, the cylinder members 1 and 28 are adapted to be placed in the frame of the shaper or other tool and the piston 2 connected by a rod (not shown) to the ram of the tool. As plainly shown in said Fig. 2, liquid passages 35 intersect the cylinder 1 upon either side of the piston 2 and the respective liquid containing compartments of the cylinder member 28.

When the last mentioned type of steering appliance is utilized for transmitting power to the ram of a shaper or other tool requiring a reciprocating motion, the action of the appliance is reversed, the power being applied to the yoke 31 by means of crank and connecting rod, said crank causing the yoke 31 to rock and thereby cause the pistons 29 which are connected to yoke 31 to reciprocate in reverse directions, thus causing fluid to enter into the container 1 on one side of the piston 2, forcing said piston to the opposite side of said cylinder 1. In this form of device the piston 2 is connected to a rod (not shown) which intersects the cylinder 1, which rod is attached to the ram of the shaper or other tool. As mentioned above in this form of appliance, the cylinder members 1 and 28 will be secured to the column or frame of the tool. Furthermore, as will be evident, in this form of device the motor 15, gear wheel 19, steering wheel 14 and all connected parts are eliminated. In this form of device the aforementioned by-pass 37 with its valve 38 is very essential for adjusting purposes inasmuch as the said valve may be opened and the position of the ram of the tool may be adjusted to any extreme or intermediate point within the limits of the mechanisms.

What I claim is:—

1. In steering appliances, the combination of steering means and a steerable member; a reciprocable member connected to said steerable member; a fluid container; reciprocably movable non-rotatable means disposed in said container and connected to said first-mentioned reciprocable member; fluid passages intersecting said container upon both sides, respectively, of said non-rotatable means; and non-rotatable means adapted to be reciprocated by said steering means and affecting the pressure in said fluid passages, respectively.

2. In steering appliances, the combination with a steerable member; of a steering rod, means adapted longitudinally to reciprocate the latter, a fluid container through which said rod passes, a longitudinally-movable, non-rotatable piston mounted upon said rod within said container, and fluid passages intersecting said container upon both sides of said piston and operatively connected to said steerable member.

3. In steering appliances, the combination with a motor, a steering rod, an axle and wheels; of a fluid container, a piston within the latter adapted to be reciprocated by the pressure of the fluid in said container, means connecting said axle and said piston, inlet and outlet fluid passages intersecting said fluid container upon opposite sides of said piston, a screw member formed upon said steering rod, a coöperating longitudinally fixed second screw member adapted to be actuated by said motor, and means adapted, upon the movement of said steering rod, to affect the fluid pressure in said fluid passages, said rod being adapted to be prevented manually from rotating.

4. In steering appliances, the combination with a motor, a steering rod, an axle and wheels; of a fluid container, a piston within the latter adapted to be reciprocated by the pressure of the fluid in said container, means connecting said axle and said piston, a second fluid container and piston, said last-named piston being secured to said steering rod, fluid passages connecting said containers upon opposite sides of said pistons, respectively, a screw member formed upon said steering rod, and a coöperating longitudinally fixed second screw member adapted to be actuated by said motor, said rod being adapted to be prevented manually from rotating.

5. In steering appliances, the combination with a motor, a longitudinally movable steering rod and hand wheel, an axle and wheels; of a fluid container, a piston within the latter adapted to be reciprocated by the pressure of the fluid in said container, means connecting said axle and said piston, a second fluid container and piston, said last-named piston being mounted upon said steering rod, fluid passages connecting said containers upon opposite sides of said pistons, respectively, a screw member formed upon said steering rod exteriorly of said second-named fluid container, and a coöperating fixed second screw member adapted to be actuated by said motor.

6. In steering appliances, the combination with a motor, a steering rod and hand wheel, an axle and wheels; of a fluid container, a piston within the latter adapted to be reciprocated by the pressure of the fluid in said container, means connecting said axle and said piston, a second fluid container and piston, said last-named piston being mounted upon said steering rod, fluid passages connecting said containers upon opposite sides of the said pistons, respectively, a screw member formed upon said steering rod exteriorly of said second-named fluid container, and a longitudinally fixed gear wheel mounted upon said steering rod and provided with an extended internally-threaded hub member coöperating with said steering rod screw member, said gear wheel being operatively connected to said motor.

Signed by me, this 9″ day of January, 1916.

ORRIE M. FEIGHTNER.