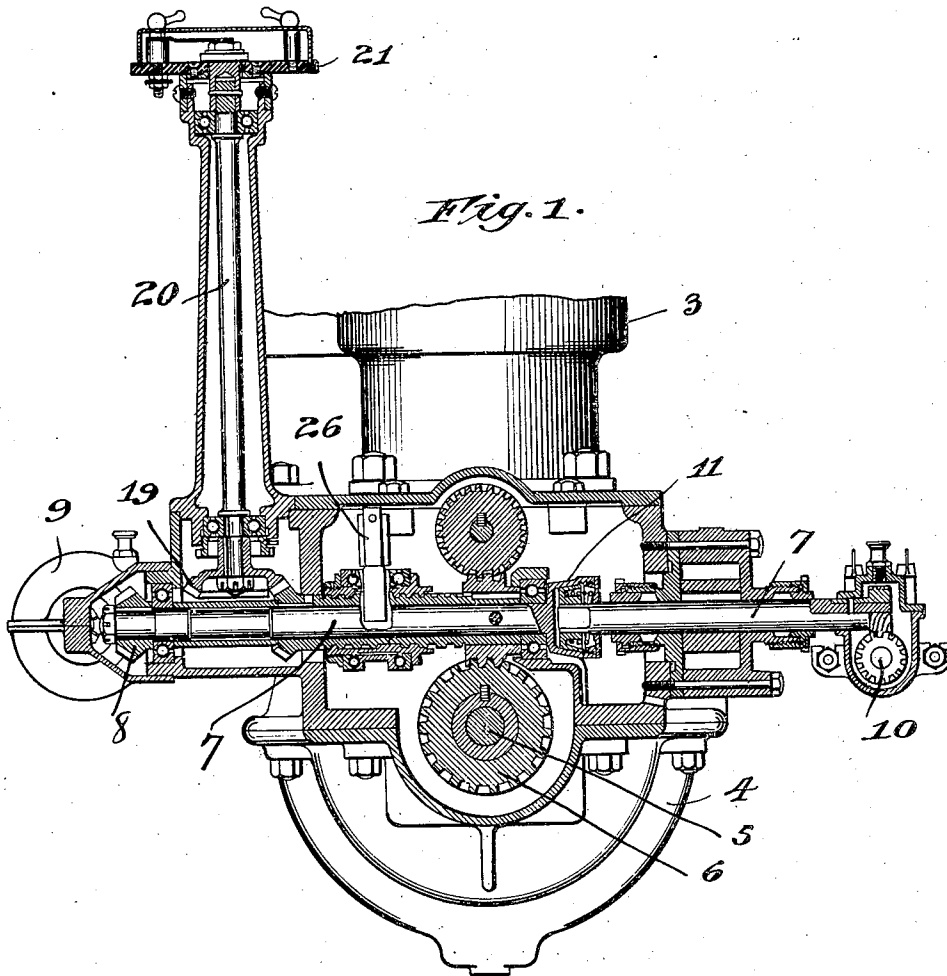


E. J. GULICK.
MECHANICAL MOVEMENT.
APPLICATION FILED JULY 11, 1907.

1,007,097.

Patented Oct. 31, 1911.

2 SHEETS—SHEET 1.



Witnesses,
J. S. Mann
James R. Offield

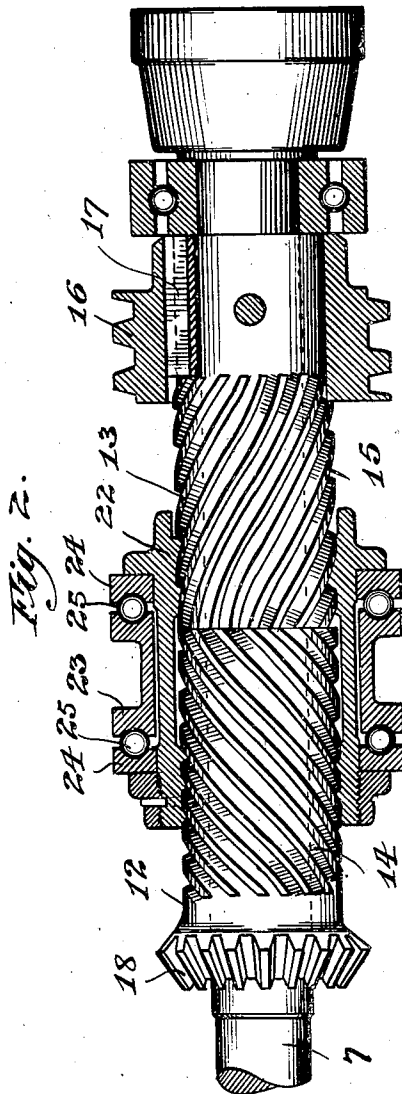
Inventor,
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Edward J. Gulick.
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UNITED STATES PATENT OFFICE.

EDWARD J. GULICK, OF MISHAWAKA, INDIANA, ASSIGNOR TO THE SIMPLEX MOTOR CAR COMPANY, OF MISHAWAKA, INDIANA, A CORPORATION OF INDIANA.

MECHANICAL MOVEMENT.

1,007,097.

Specification of Letters Patent.

Patented Oct. 31, 1911.

Application filed July 11, 1907. Serial No. 383,251.

To all whom it may concern.

Be it known that I, EDWARD J. GULICK, a citizen of the United States, residing at Mishawaka, in the county of St. Joseph and State of Indiana, have invented certain new and useful Improvements in Mechanical Movements, of which the following is a specification.

The invention relates in general to a mechanical movement, but in its chief intended application constitutes what is commonly known as a spark advancer for automobiles, although it is obvious that the invention may be used in various ways to accomplish the same movements as hereinafter set forth.

The principal object of the invention is to afford a convenient and positive means for advancing or retarding the firing of the charge in the respective cylinders of a gasoline engine, and a further object is in providing a mechanical movement whereby the advancing or retarding of the firing may be accomplished by a movement through a minimum amount of space.

The invention consists broadly in providing a driven shaft in a motor vehicle with two reversely threaded sleeve members, one of which is rigidly secured to the shaft and the other loosely mounted thereon, and a collar engaging the spiral grooves in both members and capable of being moved longitudinally relative to the shaft, for the purpose of accomplishing the objects set forth.

In the accompanying drawings, Figure 1 is a vertical section of the crank chamber and mechanism therein of one type of gasoline engine, as well as the connecting parts therewith, my invention being embodied therein; and Fig. 2 is a sectional elevation of my invention.

Referring now more specifically to the drawings, 3 represents the cylinder of an engine having a crank case 4 secured thereto, and 5 is the crank shaft driven by the engine having a spiral gear 6 thereon. Suitably journaled in the engine base is a shaft 7, one end of which is provided with a gear 8 adapted to drive a magneto 9, the other end being adapted to drive a rotary pump, the driving shaft of which is shown at 10, the shaft being divided and coupled together by means of a pump clutch coupling designated as a whole 11. Mounted on the shaft 7 are two sleeves 12 and 13, be-

ing spirally threaded, as shown at 14 and 15, which threads are reversely arranged relative to each other. The sleeve 13 is rigidly mounted upon the shaft 7, and has a spiral gear 16 keyed thereto by means of the key 17 that is driven by the gear 6, while the sleeve 12 is loosely journaled on the shaft 7 and is provided with a bevel gear 18 intermeshing with a bevel gear 19 at the lower end of a vertical shaft 20 that drives what is commonly known as a timer, designated as a whole at 21. It is not thought necessary to go into detail as to the connecting mechanism of the pump or to the magneto, nor as to the operation of the timer, as these features are well understood in the art and constitute no part of this invention, it being sufficient to state that the function of the timer is to assure the proper firing of the charge in the respective cylinders of the engine, which is governed by the rotation of the crank shaft in respect to the timer, so the description will therefore be confined to the means for advancing or retarding the timer by the vertical shaft 20, and the connecting parts with the two sleeves. Mounted upon the two sleeves, having teeth adapted to engage in the spirals thereof, is a collar or nut 22 that is rotated by the sleeve 13 and drives the sleeve 12. The collar 22 is adapted to be moved longitudinally relative to the two sleeves while rotating, and for this purpose a ring 23 is revolubly mounted between the two annular bearing surfaces 24 on the collar, and interposed between the ring and bearing surfaces are the ball bearings 25. An arm, herein shown as 26, is adapted to encircle or partially encircle the ring and by means of proper connections is moved longitudinally relative to the spiral sleeves by means of suitable intermediate connections (not shown) attached to the steering column of the vehicle.

From the foregoing it will be seen that a longitudinal movement of the collar 22 to the left, as shown in Fig. 2, effects a rotary movement of the sleeve 12 through a certain angle depending upon the extent of longitudinal movement of the collar; this movement resulting by reason of the engagement of the teeth on the left-hand end of the collar with the spiral grooves of the sleeve. Now, if the movement of the collar were simply a plain longitudinal sliding

movement, the sleeve 12 would be rotated through a certain angle which we may assume, for the purpose of illustration, to be forty-five degrees, but by reason of the engagement of the teeth at the right-hand end of the collar with the spiral grooves of the sleeve 13, and the further fact that the sleeve 13 is locked against yielding movement relatively to the collar by the spiral gears 6 and 16, the sliding movement of the collar to the left is accompanied by a rotary movement of the collar relatively to the sleeve 13 by reason of the spirals thereon. This results in imparting to the sleeve 12 a turning movement under a given longitudinal travel of the collar considerably greater than would be the case if the collar had a simple sliding movement; which increase, where the spirals on sleeve 13 have the same pitch as those on sleeve 12 would be double the angular turning movement of the sleeve 12, making it, in the illustration assumed, a turning movement of ninety degrees instead of forty-five degrees. If the spirals on sleeve 13, which may be said to be the actuating sleeve, have a greater pitch than those on the sleeve 12, as herein shown, the increased angular movement imparted to sleeve 12 is somewhat less than assumed in the illustration, but nevertheless a substantial increase. Obviously, this same increased angular movement of sleeve 12 for a given extent of longitudinal movement of collar 22 takes place in the opposite direction when the collar 22 is moved back or to the right. Hence, the employment of the reverse spirals in association with a longitudinal movement of collar 22 reduces the extent of longitudinal movement of the collar required to effect any given angular adjustment of the timer, as compared with a construction wherein the collar has only a simple longitudinal movement instead of a combined longitudinal and rotary movement, as in the present

case. It can be thus readily seen that the means for quickly and positively advancing the timer through the vertical shaft 20 is accomplished much more speedily than if only one sleeve were used, as well as affording a positive drive for the timing mechanism.

It is obvious that various minor structural changes might be made in my invention without in any way departing from the spirit thereof, and that instead of loosely mounting the sleeve 12 on the shaft 7, said sleeve might be secured rigidly thereto and the sleeve 13 loosely mounted on said shaft, the construction herein shown being employed only when the mechanism is connected in the manner shown.

Therefore without confining myself to the specific details, I claim:

1. A mechanical movement comprising, in combination, a shaft, a pair of reversely threaded sleeve members mounted thereon, one of said sleeve members being secured thereto and the other sleeve member rotatably mounted thereon, and a collar provided with teeth engaging the threads on both of said sleeve members and movable longitudinally relatively thereto, substantially as described.

2. A mechanical movement comprising, in combination, a shaft, a pair of reversely threaded sleeve members mounted thereon, one of said sleeve members being rotatable thereon, means for driving the other sleeve member, a collar provided with teeth engaging the threads on said sleeve members, and means for moving said collar longitudinally relatively to said sleeve members, substantially as described.

EDWARD J. GULICK.

Witnesses:

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