

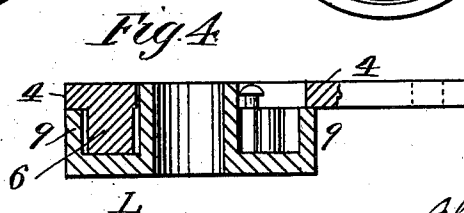
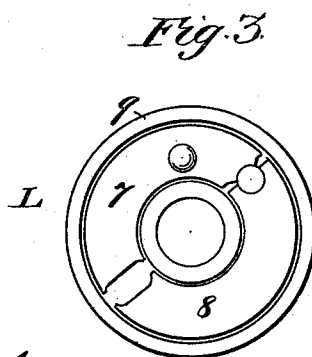
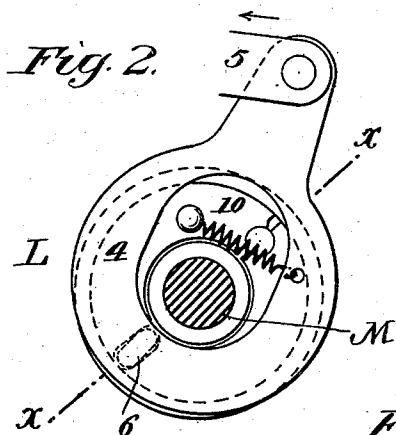
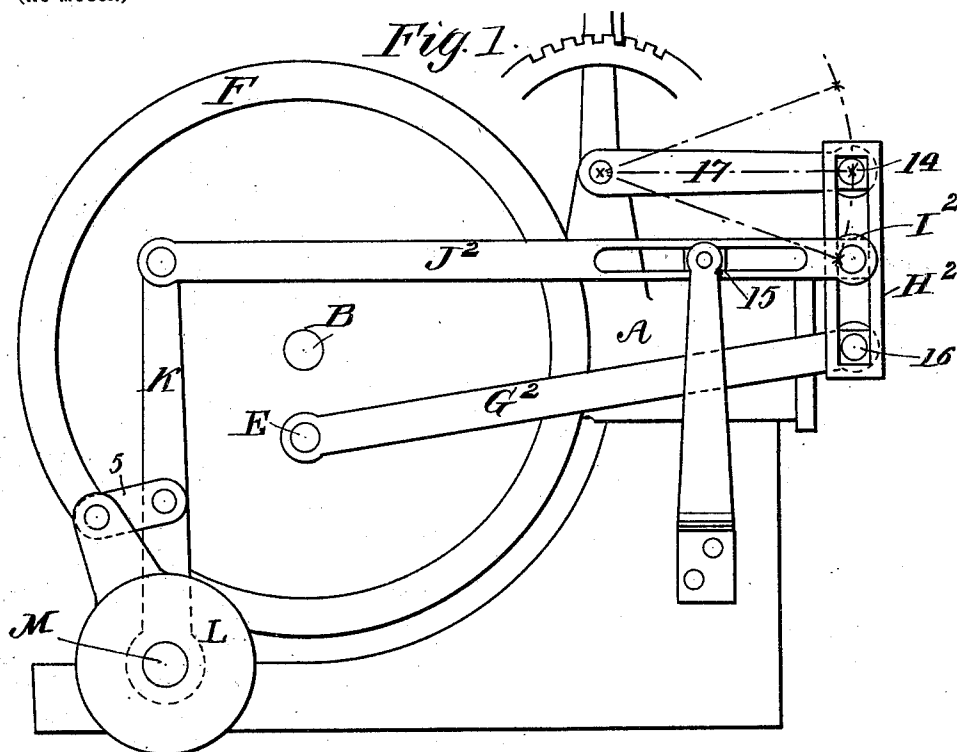
No. 668,172.

Patented Feb. 19, 1901.

A. FISCHER & A. T. OTTO.
SPEED CHANGING MECHANISM.

(Application filed Nov. 28, 1896.)

(No Model.)



WITNESSES

Harry F. South.
J. Kennedy.

INVENTORS:

Alexander Fischer
and BY Albert T. Otto,
Henry F. Parker,
ATTORNEY

UNITED STATES PATENT OFFICE.

ALEXANDER FISCHER AND ALBERT THEODORE OTTO, OF NEW YORK, N. Y.

SPEED-CHANGING MECHANISM.

SPECIFICATION forming part of Letters Patent No. 668,172, dated February 19, 1901.

Application filed November 28, 1896. Serial No. 613,723. (No model.)

To all whom it may concern:

Be it known that we, ALEXANDER FISCHER and ALBERT THEODORE OTTO, citizens of the United States, and residents of New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Speed-Changing Mechanism, of which the following is a specification.

Our invention relates to speed-changing mechanism for varying the relative rate of revolution of a driving and a driven part wherein the variation may be produced while the mechanism is in motion.

Our invention is especially applicable to road-vehicles wherein a small motor is used, being driven at a high and practically uniform speed, while the leverage of the motor on the traction-wheels must be varied to compensate for the extreme variation in natural grades and for the different conditions of roads; and our invention is also applicable for the purpose of starting and stopping the vehicle without interrupting the motion of the motor.

Our invention consists in certain novel features of reciprocating clutch-actuating mechanism, hereinafter described and claimed, wherein a high-speed rotary motion is converted into a low-speed rotary motion through a mechanism reciprocating under variable movement, which may be varied from a maximum stroke to an elimination of stroke while the machine is in motion.

The preferred form of apparatus embodying our invention is illustrated in the accompanying sheet of drawings, in which—

Figure 1 is a side elevation of an engine with our invention applied thereto. Fig. 2 is a side elevation, on an enlarged scale, of a clutch suitable for use with our invention, showing the reverse side. Fig. 3 is an internal view of the same, and Fig. 4 is a cross-section on line *x x* of Fig. 2.

Throughout the drawings like reference characters indicate like parts.

We have shown our invention applied to a horizontal engine having the cylinder A, the shaft B, and the combined fly-wheel and crank-disk F. The crank-pin E is set in the crank-disk, and to this crank-pin the driving-rod G² is journaled in the usual way. The other end of the driving-rod G² is con-

nected to the adjustable swinging link H² by means of the pivot 16. The link H² is suspended by means of a pivot 14 at its upper end from the adjustable hanger 17, the other end of which is pivoted to the engine-frame by shaft *x*. The connecting-rod J² has the pivot-block I² upon its outer end, which pivot-block engages a slot in the link H². This connecting-rod J² reciprocates and oscillates slightly about the slide-block 15, which meshes with a longitudinal slot shown in the connecting-rod and which is pivoted to a fixed projection from the engine-frame, as shown. The other end of the connecting-rod J² is pivoted to the clutch-lever K, which has its lower end loosely mounted, so as to vibrate freely on the driven shaft M.

Any suitable form of clutch may be employed to transmit motion from the clutch-lever K to the driven shaft M when said clutch-lever moves in one direction and to release said driven shaft M when the clutch-lever moves in the opposite direction. We have illustrated a preferred form of such clutch, which is more fully described in United States Letters Patent No. 432,473. Without going more in detail into the description of said clutch, we may say that it is composed of a clutch-disk L, rigidly fastened to the driven shaft M and rotating therewith. This disk has a circular flange 9, within which are confined two semicircular clutch-segments 7 and 8, which are pivotally connected at one end, as best shown in Fig. 3, and have between their other ends a projection 6, of oblong cross-section, carried by the clutch-plate 4. This clutch-plate 4 has a projecting lug which is connected by means of the link 5 with the clutch-lever K. A spiral spring 10 connects the two clutch-segments 7 and 8 and tends to draw them together. The mode of operation of the clutch results from the fact that when the clutch-lever K moves in a direction to draw the link 5 in the direction indicated by the arrow in Fig. 2 the clutch-plate 4 is moved in a direction to cause its projection 6 to expand the segments 7 and 8 and cause them to grip the inner surface of the flange 9 on the clutch-disk L; but the movement of the clutch-lever K in the opposite direction being limited by the pin on the segment 7 to which the spring 10 is secured the projection

6 no longer tends to expand the segments, and the spring 10 draws the segments together, thereby freeing them from the flange 9 and permitting the reverse motion of the clutch-lever K and clutch-plate 4 to occur without compelling the clutch-disk L to follow. The slight degree of motion of the plate 4 with reference to the clutch-disk L and segments 7 and 8 necessary to cause the spreading of the segments is permitted by reason of the fact that said plate has an oval opening through which the shaft M and the boss of the clutch-disk L pass without touching said plate 4 except on the lower side of the boss, as shown in Fig. 2. Such being the action of the reciprocating clutch, the operation of our invention is as follows: The position of the lever 17 may be controlled by means of the usual reversing-lever and notched segment, (indicated in Fig. 1,) so as to raise and lower the link H^2 in such manner that it may engage the slide-block I^2 of the connecting-rod J^2 at any point in the length of the slot in said link. The parts being in the position shown in Fig. 1, with the slide-block I^2 at middle position of the link H^2 , the reciprocation of the pivot 16 of the driving-rod G^2 will be transmitted to the connecting-rod J^2 at half-speed and with half-amplitude. This reciprocation of the connecting-rod 2 will cause a corresponding vibration of the clutch-lever K, and the driven shaft M will be given intermittent impulses of rotation of corresponding speed. If the hanger 17 and link H^2 are lowered, the amplitude and speed of these impulses will be correspondingly reduced until they reach zero, when the pivot 14 coincides with the pivot of

the slide-block I^2 . Conversely, if the link is raised the amplitude and speed of the motor impulses will be increased until they reach a maximum, when the pivot 16 at the end of the driving-rod G^2 coincides with the pivot of said slide-block I^2 .

It is evident, of course, that the clutch apparatus herein disclosed may be duplicated and a number of clutches arranged to operate on the same shaft M.

It is evident, of course, that various changes may be made in the details of construction illustrated without departing from the spirit and scope of our invention. Other forms of engine and clutches might be employed and the means of shifting the link H^2 might be varied; but all such modifications would still be within the limits of our invention.

Having, therefore, described our invention, what we claim as new, and desire to protect by Letters Patent, is—

In a speed-changing mechanism, the combination of a vibrating link, an adjustable fulcrum for said link, a driving-crank, a driving-rod pivoted to the free end of the link and to the crank, a slide-block in said link, a driven shaft, a reciprocating clutch therefor and a reciprocating rod pivoted at one end to the clutch-lever, and at the other end to the slide-block.

Signed at New York, in the county of New York and State of New York, this 31st day of October, A. D. 1896.

ALEXANDER FISCHER.

ALBERT THEODORE OTTO.

Witnesses:

W. D. FORBES,

GUSTAVE PETERSON, Jr.