C. DE LUKACSEVICS.

SPEED CHANGING AND REVERSING DEVICE.

APPLICATION FILED MAR. 5, 1909.

1,129,651.

Patented Feb. 23, 1915.

3 SHEETS-SHEET 1.

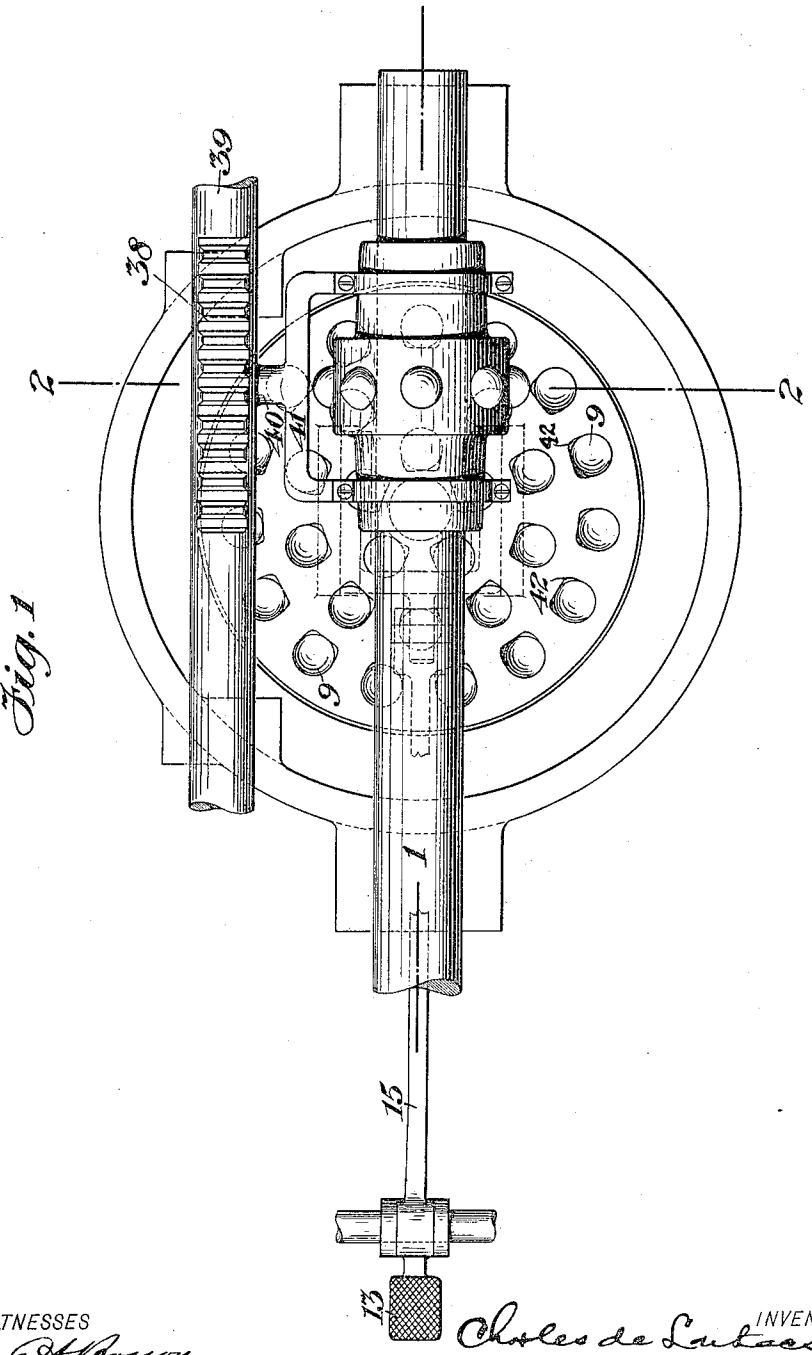


Fig. 1

WITNESSES

Thos. A. Brown

Harvey F. Miller.

INVENTOR

Charles de Lukacsevics

BY

George H. Stockbridge

his ATTORNEY

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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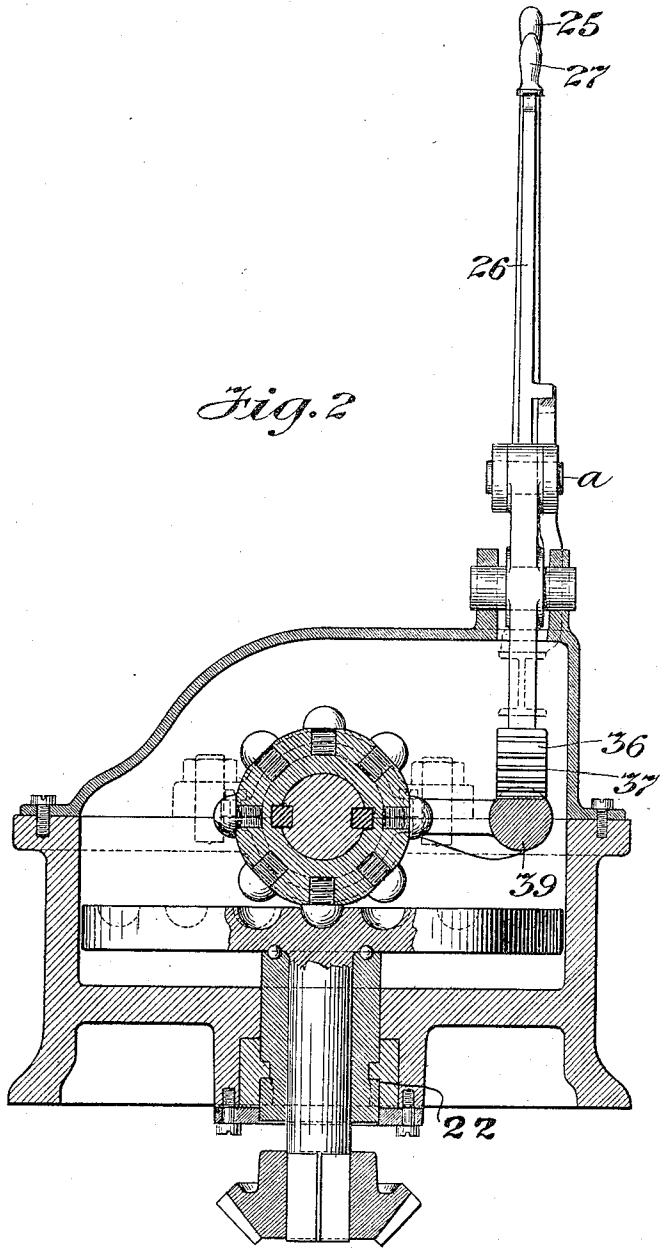
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3 SHEETS—SHEET 2.

Fig. 2



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Thos. D. Brown

Harvey T. Miller.

INVENTOR

Charles de Lukacsevics

BY

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his ATTORNEY

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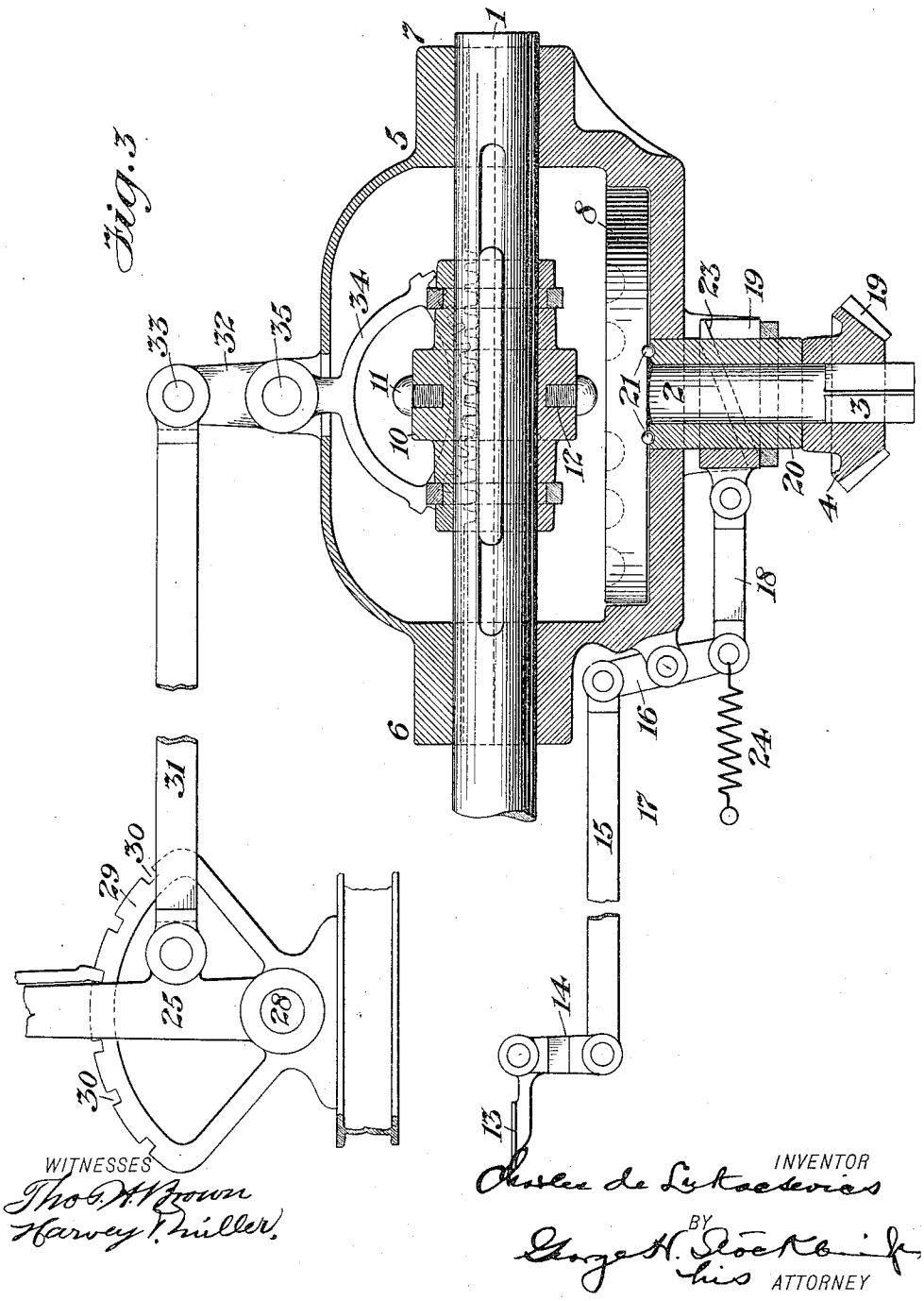
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3 SHEETS—SHEET 3.

Fig. 3



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Thos. H. Brown

Harvey Miller.

INVENTOR

Charles de Lukacsevics

BY

George H. Stockbridge

his ATTORNEY

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

CHARLES DE LUKACSEVICS, OF BROOKLYN, NEW YORK, ASSIGNOR TO GEORGE W. MORGAN, OF NEW YORK, N. Y.

SPEED-CHANGING AND REVERSING DEVICE.

1,129,651. Specification of Letters Patent. Patented Feb. 23, 1915.

Application filed March 5, 1909. Serial No. 481,358.

To all whom it may concern:

Be it known that I, CHARLES DE LUKACSEVICS, a citizen of the United States, and resident of Brooklyn, county of Kings, State of New York, have invented certain new and useful Improvements in Speed-Changing and Reversing Devices, of which the following is a specification.

The present invention concerns itself with improvements in speed changing and reversing devices applicable to a great variety of uses. Among such uses may be mentioned the changing of speeds or reversing of direction of automobiles, although other uses will suggest themselves to those skilled in the art.

By means of this invention it is possible to maintain a connection between the driving mechanism and the driven mechanism while at the same time it is also possible without stopping the motor to run the apparatus at different speeds whether in the original direction of motion or in the opposite direction.

I have illustrated my invention in the accompanying drawings, in which—

Figure 1 is a plan of my gear changing apparatus; Fig. 2 is a vertical section and part elevation thereof, the section being taken along lines 2—2 in Fig. 1; and Fig. 3 is a vertical section taken on a line at right angles to that on which the section of Fig. 2 is taken.

In the drawings, 1 is the driving shaft here represented as a horizontal shaft and 2 is a shaft driven from shaft 1 and here represented as a vertical shaft. The lower end of the shaft 2 is squared as shown at 3 and carries a bevel wheel, 4, for engagement with the particular gear which it is intended to drive from the shaft 1. Such a gear (not shown) may be a bevel wheel corresponding to 4 and mounted on the axle of an automobile or on any other shaft which it is desired to drive. At one portion of the shaft 1 is erected a housing, 5, having end pieces, 6 and 7, which may constitute main or supporting journals for the shaft. In the hollow interior of this housing I arrange, as here shown, a horizontal disk, 8, having recesses, 9, 9, arranged in concentric order as clearly shown in Fig. 1. The shaft 2 is secured to the bottom of the disk 8 and is adapted to move up and down therewith, as will appear later on.

To coöperate with the disk 8 I arrange upon the shaft 1 a hub, 10, which is adapted to be reciprocated by mechanism presently to be described. This hub 10 carries a series of buttons, 11, which, by coöperating with the recesses or indentations 9 or rather with the walls thereof, may be said to constitute the teeth of a gear mechanism. I find it convenient to make these buttons in the form of screw heads on screw shafts, 12, which may be screwed into the hub 10, although I do not limit myself to this mode of construction. It is evident that should the disk 8 be lifted into engagement with the hub 10 so that the buttons 11 would enter successively the openings or recesses 9 in any given series on the disk, then the rotating of the shaft 1, assuming that the hub 10 rotates with it, would cause a rotation of the disk 8 and the shaft 2 and consequently of the gear wheel 4 and the mechanism driven thereby. In order to let this process go forward properly, it is necessary that the recesses 9 should be so spaced as to correspond to the distances apart of the buttons 11 on the hub 10. Assuming now that the hub may be moved into any one of three different positions on the shaft 1 corresponding to the three different series of recesses in the disk 8, it is evident that the said disk would be rotated at different speeds according to whether the hub was so arranged for its buttons to engage with the inner series of openings or the outer series or the intermediate series, the speed being fastest in the first instance, slowest in the second instance, and intermediate in the third instance. The number of series of recesses in the disk 8 may be varied to correspond to the number of speeds desired.

I will now describe the means whereby the disk 8 may be lifted into engagement with the buttons 11 on the hub 10.

In Fig. 3 I show the pedal, 13, adapted to operate a lever, 14, and a link, 15, pivoted thereto. The opposite end of the link is pivoted to an arm, 16, adapted to move around a pivot, 17, attached to the housing 5. The lower end of the arm 16 is pivoted to a link, 18, attached to a yoke, 19. This yoke 19 surrounds a sleeve, 20, about the

shaft 2 which sleeve is externally squared and passes through a squared opening in the bottom of the housing 5. The sleeve 20 is connected with the disk 8 through ball bearings shown at 21 to relieve friction. Now, the outside of the sleeve 20 is grooved on opposite sides, as shown at 22 in Fig. 2, such groove extending at a right angle with the horizontal as can be seen by inspecting the dotted lines in Fig. 3. In these grooves lie lugs, one of which is shown at 23 in Fig. 3, the opposite one (not shown) being cut away in that figure but occupying the same angular position. A spring, 24, pulling on the lower end of the arm 16 tends to draw the yoke 19 toward the left in Fig. 1 whereupon the lugs 23 in grooves 22 urge the sleeve 20 upward until engagement is made with the teeth on the hub 10. Accordingly, when the pedal is not operated by the chauffeur or driver of the automobile, if that is the use to which the apparatus is put, the device is in operating condition and the shaft 2 is rotated intermediately from the shaft 1, it being understood that the hub 10 and its connected structure is feathered to the said shaft so as to rotate with it but also so as to be free to move longitudinally upon it. It should be further understood that the gear wheel 4 does not move upward with the shaft 2 but remains fixed to the squared lower end thereof as clearly shown in Fig. 2. If, now, the operator wishes to change the speed of the apparatus, he presses on the pedal 13 thereby pushing the yoke 19 toward the right and through the medium of the lugs 23 in the slots 22 depressing the disk 8 and releasing it from engagement with the hub 10. This operation can be performed instantaneously by a quick movement on the pedal. After having done this, the operator by means of the shifting apparatus now to be described, can move the hub 10 to any one of a number of positions thereby bringing it into engagement with another series of recesses and change the speed at will. This shifting apparatus consists of the following parts: One of these is a handle, 25, along side which is arranged a long bar, 26, with a handle, 27, by operating which the long bar can be released in a manner now well understood. The lower end of the lever 25 is pivoted at 28 and is adapted to travel along side a segment, 29, having notches, 30, 30, with which the lock bar 26 is adapted to engage when released. The lever 25 is connected by a link, 31, with a crank, 32, pivoted at 33 and coöperating with a yoke, 34, mounted on a pivot, 35, above the housing 5. This yoke 34 is formed into a segment, 36, having teeth, 37, engaging with a rack, 38, on a longitudinally movable shaft 39. The latter is joined by a neck, 40, with a yoke, 41, having at its ends rings, 42, 42, which surround, without binding, extensions of the hub 10. Thus, by a proper manipulation of the lever 25 the hub 10 can be moved lengthwise into positions represented by different notches 30, 30 on the segment 29, which positions would correspond to the three positions provided for engagement with the three series of recesses in the disk 8.

Another view of the present invention which has not yet been described is its adaptability to produce not only variable speeds of rotation but also reversals of the movement of the driving shaft. This is usually accomplished by simply shifting the hub 10 with its buttons 11 to opposite sides of the center of the disk 8. In other words, it being assumed that the shaft 1 rotates in a given direction, the hub 10 will also rotate in the same direction but whether or not the driving shaft shall continue to rotate in the same direction or be reversed in direction depends upon which side of the center the hub 10 with its engaging buttons lies. It is not thought necessary to enlarge upon this feature which is obvious from inspection. I may say, however, that the segment 29 is here shown as provided with six notches, three of which, toward the right would correspond to three different speeds of rotation of the disk 8 in a given direction, while the other three toward the left would correspond to three different speeds of rotation of the same disk in the opposite direction.

In order to prevent unnecessary friction as the buttons 11 are entering or leaving the recesses 9, I provide slight enlargements of the recesses at critical points, as shown, for example, at 42, 42, in Fig. 1.

Plainly, the buttons now appearing on the hub 10 might be replaced by recesses or indentations in said hub and the buttons might be placed upon the disk 8, the only requisite being that the engagement between the buttons and the recesses should be brought about by the sliding movement of the hub.

I claim as my invention:

1. In a speed changing mechanism, a driving shaft, a hub slidably mounted thereon, a disk adapted to engage with the hub, a support for the disk having an angular or inclined surface on one of its sides, and means coöperating with said angular surface for moving the disk into and out of engagement with the hub, said means comprising a member having a lug adapted to engage said angular surface throughout the entire length thereof.

2. In a speed changing mechanism, a driving shaft, a hub slidably mounted thereon and a disk adapted to engage with the hub, in combination with means for moving the disk into and out of engagement with the hub, said means consisting of a rectangular

support for the disk having angular notches in opposite sides thereof, a yoke having lugs lying in said angular notches, a spring adapted to move the yoke in one direction and a pedal with intermediate mechanism adapted to move the yoke in the opposite direction.

Signed at New York, in the county of New York, and State of New York, this 1st day of March, A. D., 1909.

CHARLES DE LUKACSEVICS.

Witnesses:

ALEXANDER BEGG,

GEORGE H. STOCKBRIDGE.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."