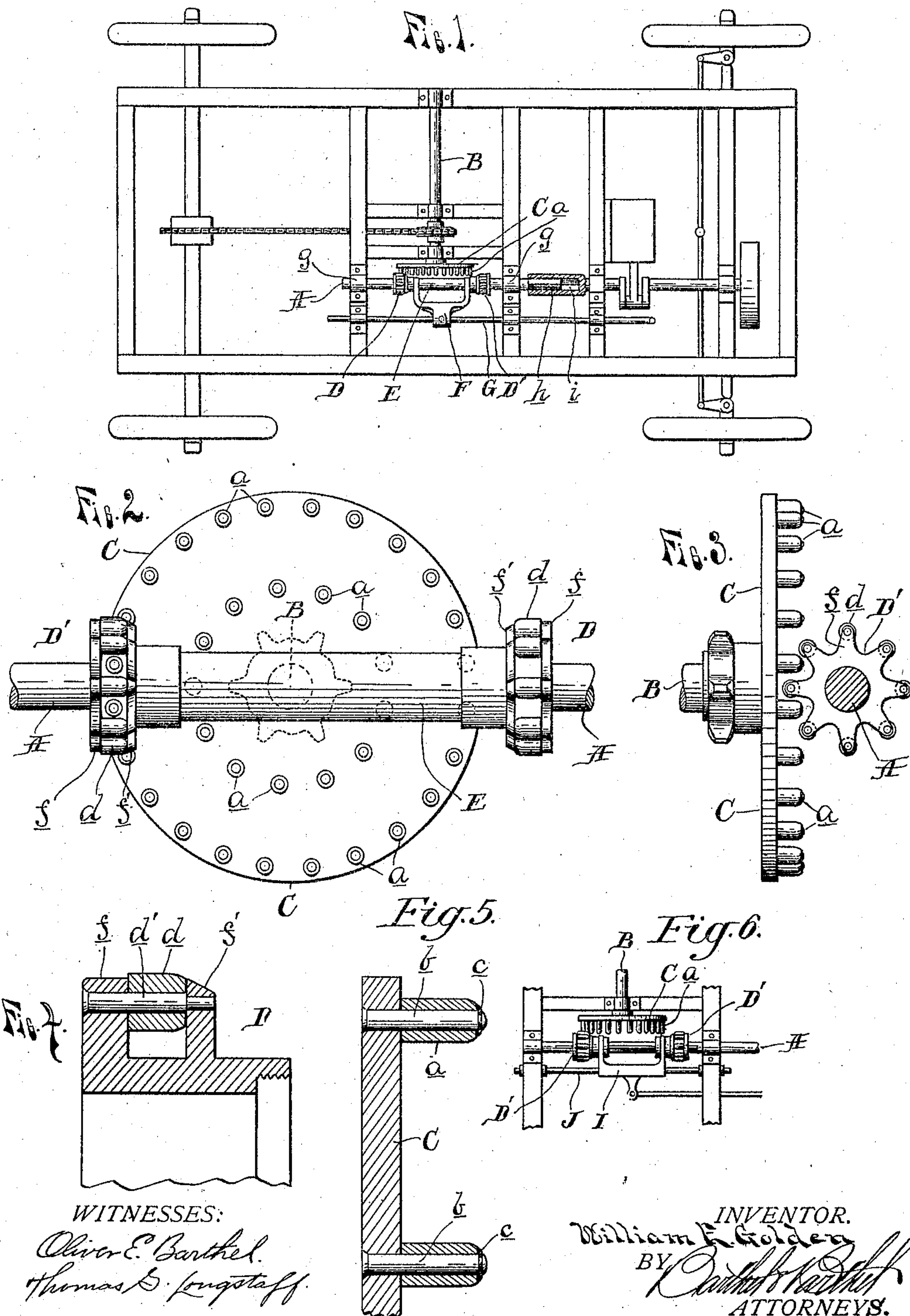


No. 824,110.

PATENTED JUNE 26, 1906.

W. E. GOLDEN.
 ROLLER TOOTH VARIABLE DRIVING GEAR.
 APPLICATION FILED AUG. 19, 1905.



WITNESSES:

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UNITED STATES PATENT OFFICE.

WILLIAM E. GOLDEN, OF DETROIT, MICHIGAN.

ROLLER-TOOTH VARIABLE DRIVING-GEAR.

No. 824,110.

Specification of Letters Patent.

Patented June 26, 1906.

Application filed August 19, 1905. Serial No. 274,825.

To all whom it may concern:

Be it known that I, WILLIAM E. GOLDEN, a citizen of the United States of America, residing at Detroit, in the county of Wayne and State of Michigan, have invented certain new and useful Improvements in Roller-Tooth Variable Driving-Gear, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to driving-gear for use on automobiles, marine vessels, and wherever it is desirable to transmit a varying speed in one direction or the other, and in describing my invention with special reference to an automobile it is to be understood that it is not confined to such use at all.

My invention involves the use of roller-teeth angle-gearing of a novel character, all in the manner more fully described hereinafter and shown in the accompanying drawings, in which—

Figure 1 is a diagram plan of an automobile drive mechanism embodying my invention. Fig. 2 is an elevation of the part of the drive-gear to which my invention has reference. Fig. 3 is an elevation thereof at right angles to Fig. 2. Fig. 4 is a section through the axis of one of the roller-teeth of one of the drive-pinions. Fig. 5 is a similar section of the crown-wheel. Fig. 6 is a diagrammatic plan view of a modification of the gear.

In the drawings, A is the driving-shaft, to which motive power is conveyed from the motor, and B is the driven shaft, receiving motion from the driving-shaft through the medium of my variable driving-gear in the following manner. Upon the driven shaft B is secured the crown-wheel C, which carries two or more concentric series of roller-teeth *a*, sleeved upon stub-shafts *b*, which are tapped and secured by rivet-heading or otherwise into the disk-shaped shroud of the wheel. The roller-teeth are free to revolve upon their stub-shafts. They are wholly or partly of conoidal shape, and they are retained in position upon the stub-shafts by small washers *c*, secured to the ends of the stub-shafts.

D and D' are two like drive-pinions each carrying a circumferential set of roller-teeth *d*, similar to the roller-teeth of the crown-wheel C and adapted to form therewith an angle-gear of well-known character. The roller-teeth *d* are sleeved upon studs *d'*, which are secured in shrouds *f f'*, formed upon the periphery of the hub of the pinions.

The shrouds *f*, as well as the shrouds *f'*, are discontinuous—that is to say, each roller is carried by individual shrouds, one at the small end and the other at the larger end of the roller, in such manner that they form interdenal spaces corresponding to those between the rollers, the spaces between the shrouds being preferably wider and deeper than the interdenal spaces formed between the rollers themselves.

The shrouds *f*, which are adjacent to the large ends of the roller-teeth, are preferably made heavier than the front shrouds *f'*, and the latter are beveled off at their outer ends, as shown, in conformity with the shape of the rollers. The studs *d*, which carry the roller-teeth, may be secured in the shrouds by rivet-heading or in any other suitable manner, the ends of the studs passing into the shrouds *f'* being preferably reduced in size.

As shown in Figs. 1 and 2, the two pinions are made fast upon the driving-shaft A. They are preferably also connected by a sleeve E, and when so arranged the driving-shaft is slidingly supported in suitable bearings *g* and has a squared end *h*, engaging into a socket *i*, carried at the end of the motor-shaft, all so arranged that when the driver-shaft is shifted endwise the pinions D D' are carried with it, suitable devices being provided, such as a sliding yoke F, which is fastened to the push-and-pull rod G, which connects it with an actuating-lever. (Not shown.)

With this form of gear the pinions D D' may not only cooperate with one set of teeth on the crown-wheel and produce a forward or back motion, but there may be additional sets of teeth upon suitably smaller circles for the pinions to engage with, the drawings showing one, with which either pinion may be thrown into gear, and thus produce a higher speed either for the forward or back motion, although in practice the change of speed is generally confined to the forward motion only, and for this reason it is not paramount that the pinion D' should have the shrouds *f* cut away in the same manner as the pinion D.

My invention may be modified in several particulars. For instance, it will be seen that the shrouds *f'* for the pinions are not absolutely necessary, but for constructive reasons I prefer to have them. As shown in Fig. 5, the pinions D D' may both be slidingly carried and engage upon a feather on the driving-shaft and be jointly carried by a yoke I, which slides upon a guide-rod J and

is connected with an actuating push-and-pull rod. The driving-shaft thus may be made a mere continuation of the motor-shaft.

Having thus fully described my invention, what I claim is—

1. In a variable drive-gear, the combination of a driving and a driven gear-wheel revoluble in planes at right angles to each other and having intermeshing conoidal roller-teeth and means for shifting the driving gear-wheel axially in either direction, the driving gear-wheel having its roller-teeth wholly supported by individual shrouds forming open intervals between the rollers through which the roller-teeth of the driven gear are adapted to pass in and out of mesh with those of the driving-gear in shifting the same.
2. In a variable drive-gear, the combination of a driving and a driven gear-wheel revoluble in planes at right angles to each other and having intermeshing conoidal roller-teeth and means for axially shifting the driving gear-wheel in either direction, said driving gear-wheel having its roller-teeth journaled upon pins secured at opposite ends in individual shrouds forming open intervals between the rollers.
3. In a variable drive-gear, the combination of a driving and a driven gear-wheel revoluble in planes at right angles to each other and having intermeshing conoidal roller-teeth and means for axially shifting the driving gear-wheel, the latter having its roller-teeth carried between individual shrouds separated by open spaces through which the roller-teeth of the driven gear may pass out of mesh with those of the driven gear in shifting the driven gear in either direction.
4. In a variable drive-gear, the combination with a driving and a driven shaft journaled at right angles to each other, of a crown-wheel on the driven shaft having an inner and outer series of conoidal roller-teeth, and

a shifting pinion on the drive-shaft having a series of conoidal roller-teeth adapted to intermesh with either series of teeth on the crown-wheel, the said shifting pinion having its roller-teeth wholly supported by individual shrouds forming open spaces between the rollers through which the roller-teeth of the crown-wheel are adapted to pass in shifting the pinion.

5. In a variable drive-gear, the combination with a driving and a driven shaft journaled at right angles to each other, of a crown-wheel on the driven shaft having two concentric series of conoidal roller-teeth, of two shifting pinions carried by the drive-shaft each having a series of conoidal roller-teeth adapted to intermesh with the roller-teeth of the crown-wheel and transmit motion thereto in opposite directions respectively, said pinions having their roller-teeth wholly supported by individual shrouds forming open intervals between them through which the roller-teeth of the crown-wheel are adapted to slide in and out of engagement with the pinions in shifting the same.

6. In a variable drive-gear, the combination with a driving and a driven shaft journaled at right angles to each other, of a crown-wheel having an inner and outer series of conoidal roller-teeth and a shifting pinion carried by the drive-shaft and adapted to intermesh with either series of roller-teeth on the crown-wheel said pinion having conoidal roller-teeth supported between two annular series of individual shrouds forming open intervals between the roller-teeth, the extremities of the shrouds at the small end of the rollers being beveled off in conformity with the shape of the rollers.

In testimony whereof I affix my signature in presence of two witnesses.

WILLIAM E. GOLDEN.

Witnesses:

OTTO F. BARTHEL,
OLIVER E. BARTHEL.