

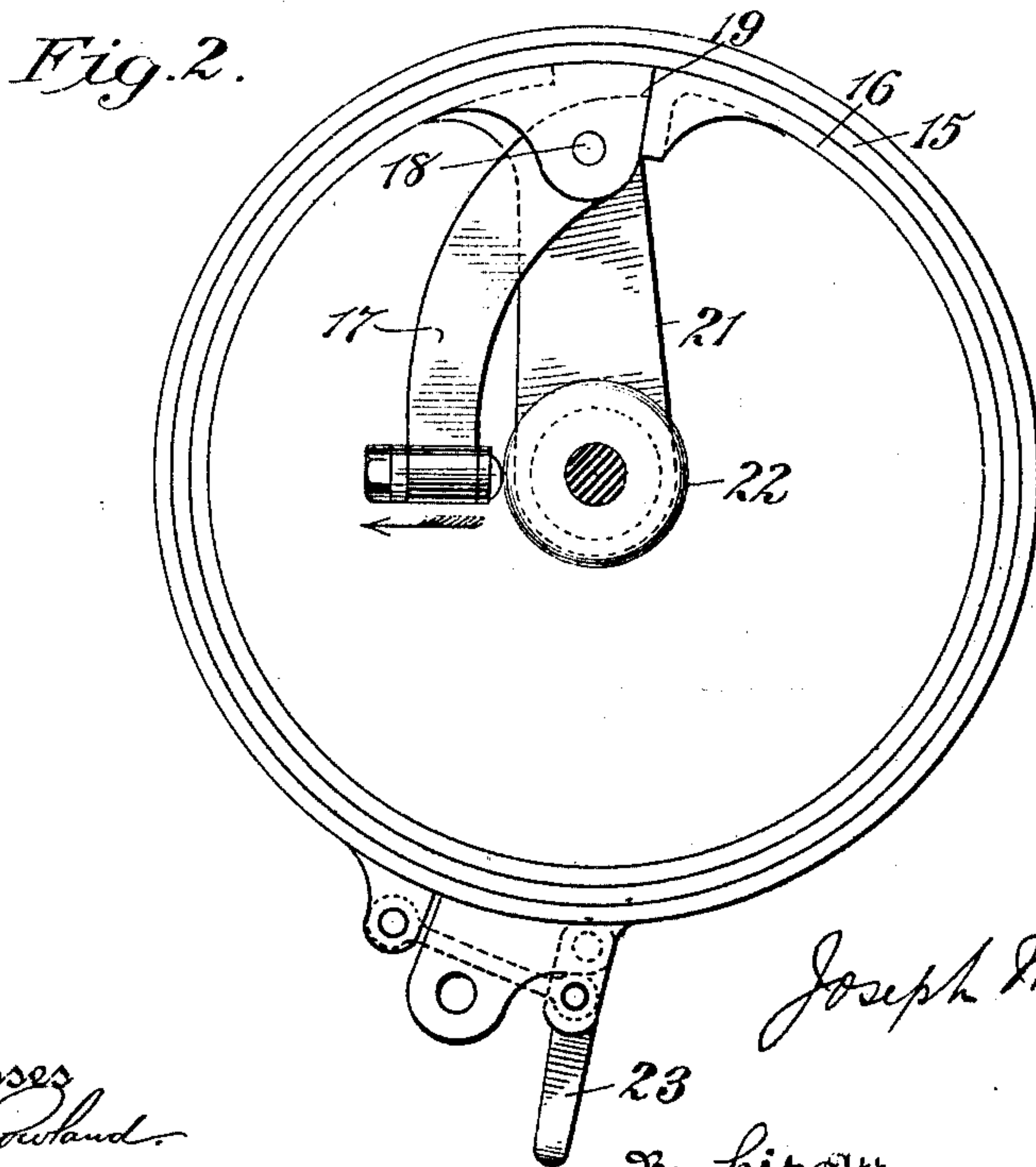
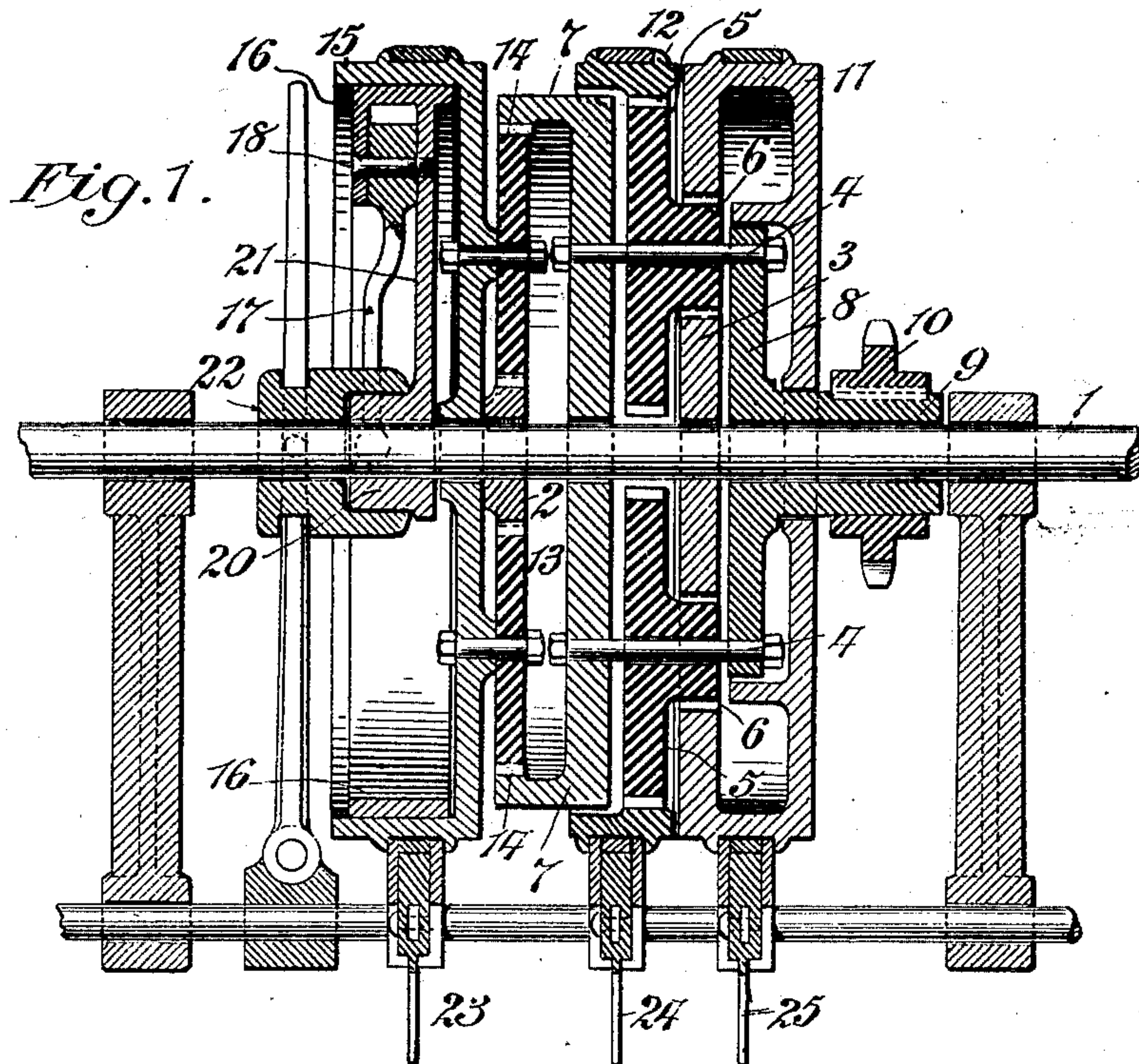
No. 716,930.

Patented Dec. 30, 1902.

J. M. OUGH.
VARIABLE SPEED GEAR.

(Application filed Mar. 20, 1901.)

(No Model.)



Witnesses
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UNITED STATES PATENT OFFICE.

JOSEPH M. OUGH, OF SAN FRANCISCO, CALIFORNIA.

VARIABLE-SPEED GEAR.

SPECIFICATION forming part of Letters Patent No. 716,930, dated December 30, 1902.

Application filed March 20, 1901. Serial No. 52,055. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH M. OUGH, a citizen of the United States, residing in the city of San Francisco, in the county of San Francisco and State of California, have invented a certain new and useful Improvement in Variable-Speed Gear, of which the following is a specification.

My present invention has relation to a novel combination of planetary gears, particularly for use on automobiles, whereby a number of successively higher forward speeds and a single backward speed may be obtained within a small compass from a driving-shaft moving with a constant velocity.

My invention is illustrated in the accompanying drawings, wherein—

Figure 1 is a vertical longitudinal section of my gearing combination; and Fig. 2 is an end view of the same.

The driving-shaft 1 carries the gearing, which is impelled by one of the two driving-pinions 2 and 3, fast on the shaft. Upon a number of pivots 4, arranged symmetrically around the shaft 1, are mounted double orbital pinions 5 and 6. The ends of the pivots 4 are carried on disks 7 and 8, turning loosely upon the shaft 1. The hub 9, attached to the disk 8, carries the sprocket-wheel 10 or other driven part fast on said hub.

A drum 11, turning loosely upon the hub 9, carries an internal gear constantly engaging with the orbital pinions 6. The drum 11 overhangs and contains the bearing-disk 8, and within the drum an annular flange fits over said disk, as shown, whereby greater solidity and accuracy of centering is secured in spite of possible wear through long use. The pinions 5 carry a similar drum 12, having another internal gear constantly meshing with said pinions 5 and carried by them. The use of the two drums and the double orbital gears as distinguished from a single drum and gear in this connection is not essential to my invention in its broader aspect.

Around the driving-pinion 2 are symmetrically-arranged orbital pinions 13, constantly engaging with said pinion 2 and with a surrounding internal gear 14 within a flange on the disk 7. The pinions 13 turn upon pivots carried by the drum 15, which turns loosely upon the shaft 1.

The drum 15 is provided with a deep flange, as illustrated, within which a spring clutching-rim 16 is placed. This rim tends normally to assume a form permitting the drum 15 to rotate loosely around it. One end of the rim 16 carries the lever 17, pivoted, as at 18, and so placed that its shorter end 19 tends to expand the rim and clutch the drum 16, when the longer end of said lever is moved outward from the shaft or with the arrow in Fig. 2.

The hub 20 is keyed to the shaft 1, and the rim 16 is carried on said hub by the arm 21. The tapered annular cam 22 fits over said hub 20 and when moved inward to the position shown in Fig. 1 causes the end of the lever 17 to ride on its outer surface, and thus act to tightly engage the rim 16 and drum 15 by friction, forcing said drum to rotate in unison with the driving-shaft 1 through the arm 21 and rim 16. Around the three drums 15, 12, and 11 are placed strap-brakes, respectively operated in a well-known manner by tightening-levers 23, 24, and 25.

To drive the sprocket 10 forward at the lowest speed, the drum 11 is held fixed by means of the brake-lever 25, when the driving-pinion 3 will cause pinions 6 to follow the internal path provided by the internal gear surrounding them, and thus produce orbital movement of the pivots 4, which rotate the disk 8, hub 9, and sprocket-wheel 10. Similar operation will produce increased forward speed when the drum 12 is held fixed, drum 11 being released. For full forward speed the clutching-rim 16 is expanded, as above described.

For reverse movement the drum 15 is held fixed, when the pinion 2 will rotate the pinions 13, which being fixed will operate upon the internal gear 14 to reverse the motion transmitted to the hub 9 and wheel 10.

It will be seen that by the use of the construction above described great freedom in relation to ratio of backing to forward speed is obtained. In the form shown the backing speed will be less than the forward speed, which is the preferred condition for automobile work.

What I claim is—

1. In a variable-speed gearing, a driving-shaft, a driving-pinion fast thereon, two sets

of orbital gears one of which sets meshes with
said pinion, an internal gear surrounding and
meshing with the other set of orbital gears
and means for fixing said internal gear; in
5 combination with a bearing-disk on each side
of all of said orbital pinions and supporting
the same, a loosely-mounted rotary drum
overhanging one of said bearing-disks, an in-
ternal gear on said drum meshing with the
10 orbital gears over the driving-pinion, there
being a circular flange within said member
projecting over said bearing-disk, means for
fixing said drum and power-transmitting
means attached to said last-named bearing-
15 disk.

2. A driving-shaft, a driving-pinion fast

thereto, two internal gears for forward move-
ment, a double orbital gear one member of
which engages with said driving-pinion and
each of which meshes with one of said inter- 20
nal gears; in combination with two loosely-
journalled disks carrying said orbital gears,
power-transmitting means on one of said
disks, an internal gear on the other of said
disks, means engaging with said last-named 25
internal gear for producing reverse move-
ment and separate fixing means for each of
said first-named internal gears.

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Witnesses:

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