

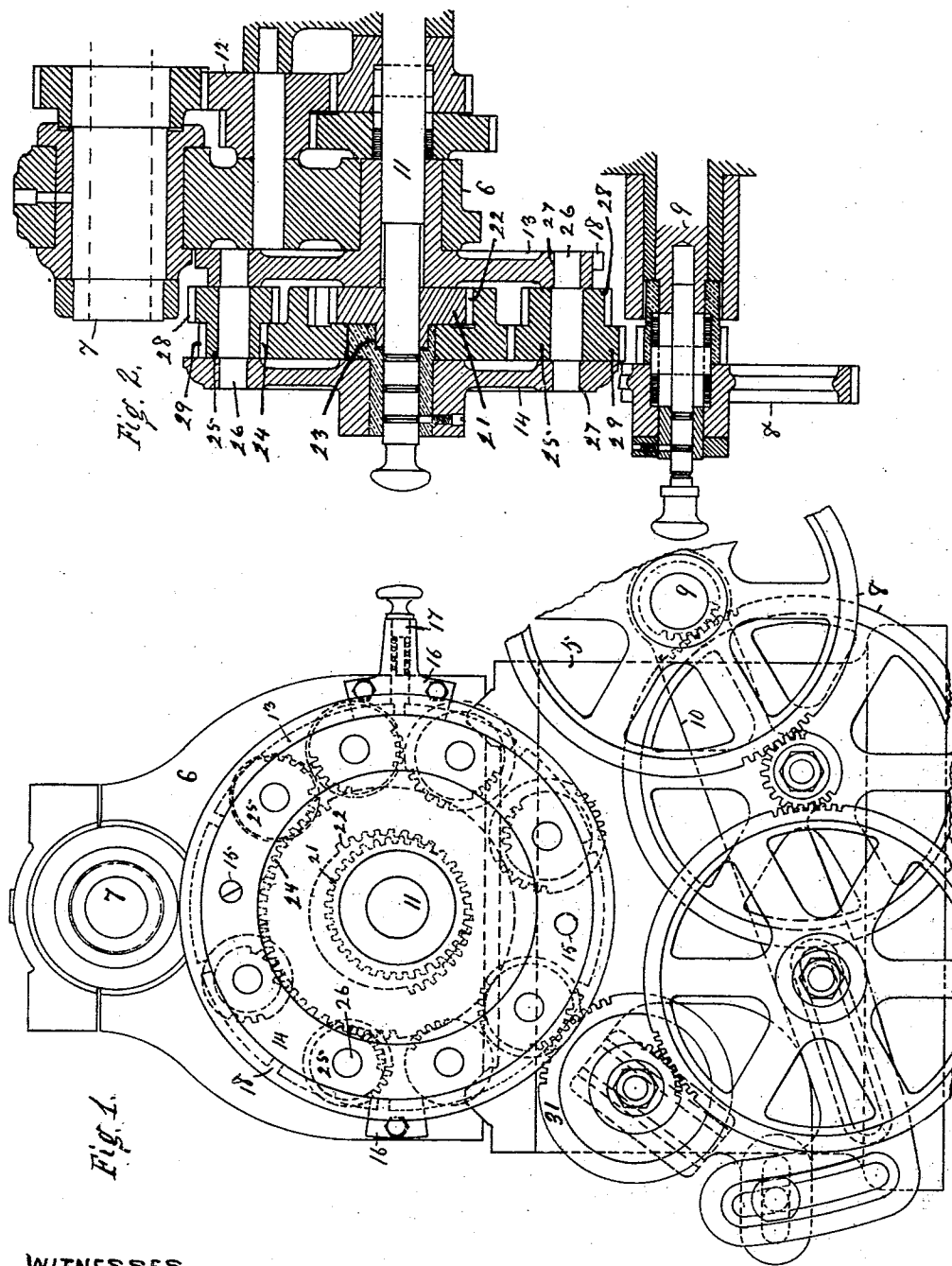
No. 684,433.

Patented Oct. 15, 1901.

H. R. ISLER.
DIFFERENTIAL SPEED MECHANISM.

(Application filed Feb. 4, 1901.)

(No Model.)



WITNESSES.

John Francis.
J. M. Trembley.

Herman R. Isler. INVENTOR.
By Robert S. Carr. Atty.

UNITED STATES PATENT OFFICE.

HERMAN R. ISLER, OF HAMILTON, OHIO, ASSIGNOR TO CHARLES F. HILKER,
OF SAME PLACE.

DIFFERENTIAL-SPEED MECHANISM.

SPECIFICATION forming part of Letters Patent No. 684,433, dated October 15, 1901.

Application filed February 4, 1901. Serial No. 46,027. (No model.)

To all whom it may concern:

Be it known that I, HERMAN R. ISLER, a citizen of Switzerland, and a resident of Hamilton, Ohio, have invented certain new and useful Improvements in Differential-Speed Mechanism, of which the following is a specification.

My invention relates to differential-speed mechanism of the class adapted to use on engine-lathes or elsewhere; and the objects of my improvement are to provide a series of differential pinions graduated in size which are mounted in continuous engagement with a drive-gear and means to move and maintain either of the pinions in engagement with a driven gear. These objects are attained in the following-described manner, as illustrated in the accompanying drawings, in which—

Figure 1 is an end elevation of my device attached to an engine-lathe; and Fig. 2 a diametrical section of Fig. 1, showing also a sectional view of the lead-screw.

In the drawings, 5 represents the lathe-bed, 6 the head-stock, 7 the live-spindle, 8 a train of gears communicating with the lead-screw 9, and 10 the quadrant, all constructed and arranged in the ordinary manner.

Shaft 11, journaled in fixed bearings, is driven by the live-spindle through intermediate gears 12, and disks 13 and 14, secured together by means of screws 15, are mounted to turn on said shaft and maintained in position thereon by means of buttons or guides 16, which are secured to the head-stock and in movable engagement with the edge of the contiguous disk 13. Spring-actuated catch 17, preferably mounted on one of the guides, is arranged to detachably engage with either of the notches 18, formed in the periphery of the said disk, and lock it in a predetermined position of radial adjustment. Spur-pinion 21, splined on shaft 11 between the disks, engages with and rotates internal gear 22, which is mounted to turn on spindle 23. Said spindle projects from the inner side of the outer disk 14 and eccentric to shaft 11, which is extended therethrough. Spur-gear 24, preferably formed on the internal gear and concentric thereto, is in continuous engagement with a series of differential or step pinions 25, which are mounted between the disks to rotate on the respective shafts 26. Said shafts

are journaled at their ends in bearings 27, formed in the respective disks to register with each other and at intervals in a circle concentric to shaft 11. Steps 28, forming one end of said pinions, are uniform in size, and steps 29, preferably integral therewith, are graduated in size to compensate for the eccentricity of gear 24 to shaft 11 or the circle of the bearings 27 at the point where they respectively engage with said gear. Driven gear 31 is journaled at a fixed point, and said pinions may be simultaneously moved with the step 28 on any one of them into engagement therewith by means of the adjustment on shaft 11 of the disks, where it is maintained by the engagement of catch 17 with the corresponding notch 18 in the edges of the inner disk 13. As the steps 28 of uniform size are driven by the respective steps 29, which are each of a different size, the speed of driven gear 31 will be changed in relation to that of the driving-pinion 21 in a predetermined ratio proportionate with the difference in the size of the steps on the pinion in engagement therewith.

By mounting shafts 26 in a series of respective bearings, which may be formed in the disks at intervals in a circle concentric to gear 24, the pinions may be reversed on the shafts with steps 29 thereon within a circumscribed circle described concentric to shaft 11.

The differential motion imparted to gear 31 by the pinions is communicated to the lead-screw by a train of gears 8 in the usual manner.

By the displacement of guides 16 from engagement with the inner disk 13 the disks, together with the gears therein, may be removed or replaced without disturbing the assemblage of parts, and screws 15 may be removed for the purpose of substituting other pinions for those on shafts 26 or for changing said shafts to a different series of bearings (not shown) formed in the disks.

Having fully described my improvement, what I claim as my invention, and desire to secure by Letters Patent of the United States, is—

1. The combination with a driven shaft, a drive-gear and a series of differential pinions concentric thereto to rotate on their respective shafts, and means for simultaneously

55

60

65

70

75

80

85

90

95

100

moving said pinions and means for holding the same removably in their adjusted positions, all substantially as shown and described.

- 5 2. The combination with a drive-shaft, a pinion thereon, a disk removably mounted on the shaft and adjustable thereon, a spindle projecting from the disk eccentric to the shaft, and a combined internal and external
10 gear rotated on the spindle by the pinion, of a series of idle pinions of different size mounted on the disk and engaging with the gear, a corresponding series of pinions of uniform size respectively carried thereby in the line
15 of a circumscribed circle concentric to the shaft, and means adapted to lock the disk with any one of the pinions thereon in the same predetermined position.

- 20 3. The combination with a rotative shaft, an adjustable disk removably mounted thereon, a drive-pinion on the shaft, and an internal gear mounted on the disk eccentric to the shaft and engaging with the pinion, and an external gear formed thereon, of a series of
25 differential pinions mounted on the disk in engagement with the external gear, the shafts

of the differential pinions being arranged in a circle concentric to the said shaft, and the said pinions movable by means of the disk through a circumscribed circle concentric to the shaft, and means to lock the disk with the pinions successively in the same position of predetermined adjustment. 30

4. The combination with a drive-pinion, a gear mounted to turn eccentric thereto and driven thereby, disks secured together and mounted to turn on their shaft, and means for adjustment of said disks, a series of pinions of different size and driven by the gear and carried by shafts arranged in a circle concentric with the main shaft 11, of a series of pinions of uniform size carried by the respective former pinions and concentric therewith, and means to simultaneously move and maintain the said pinions with any one of them in a position of predetermined adjustment within a circumscribed circle concentric to the drive-pinion. 35 40 45

HERMAN R. ISLER.

Witnesses:

ARTHUR LETHERBY,
R. S. CARR.