No. 814,986. PATENTED MAR. 13, 1906.

C. J. REED.

STOP MECHANISM FOR EXPANSIBLE PULLEYS.

APPLICATION FILED JUNE 28, 1904.

Fig. 2.

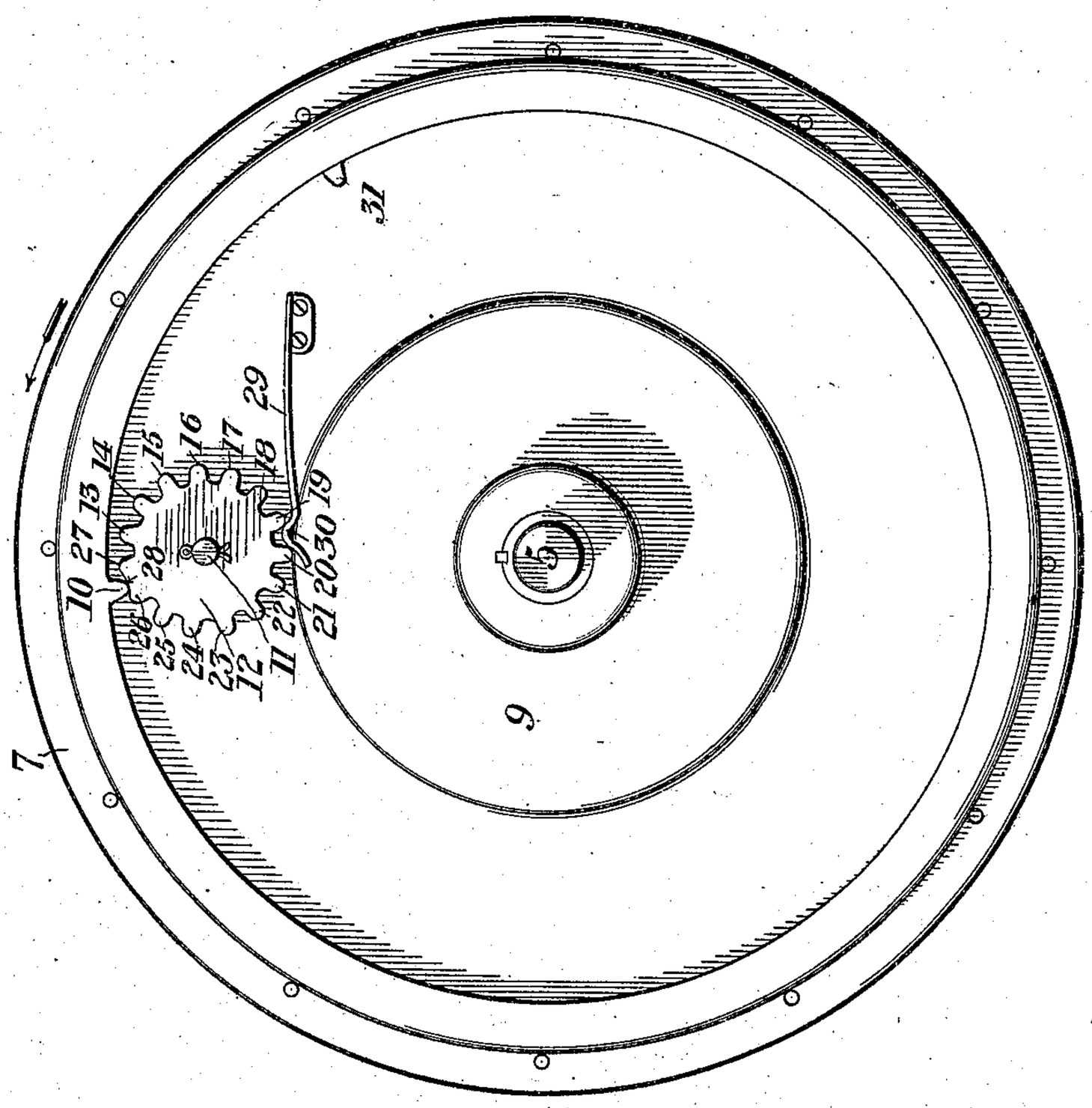

Fig. 1.

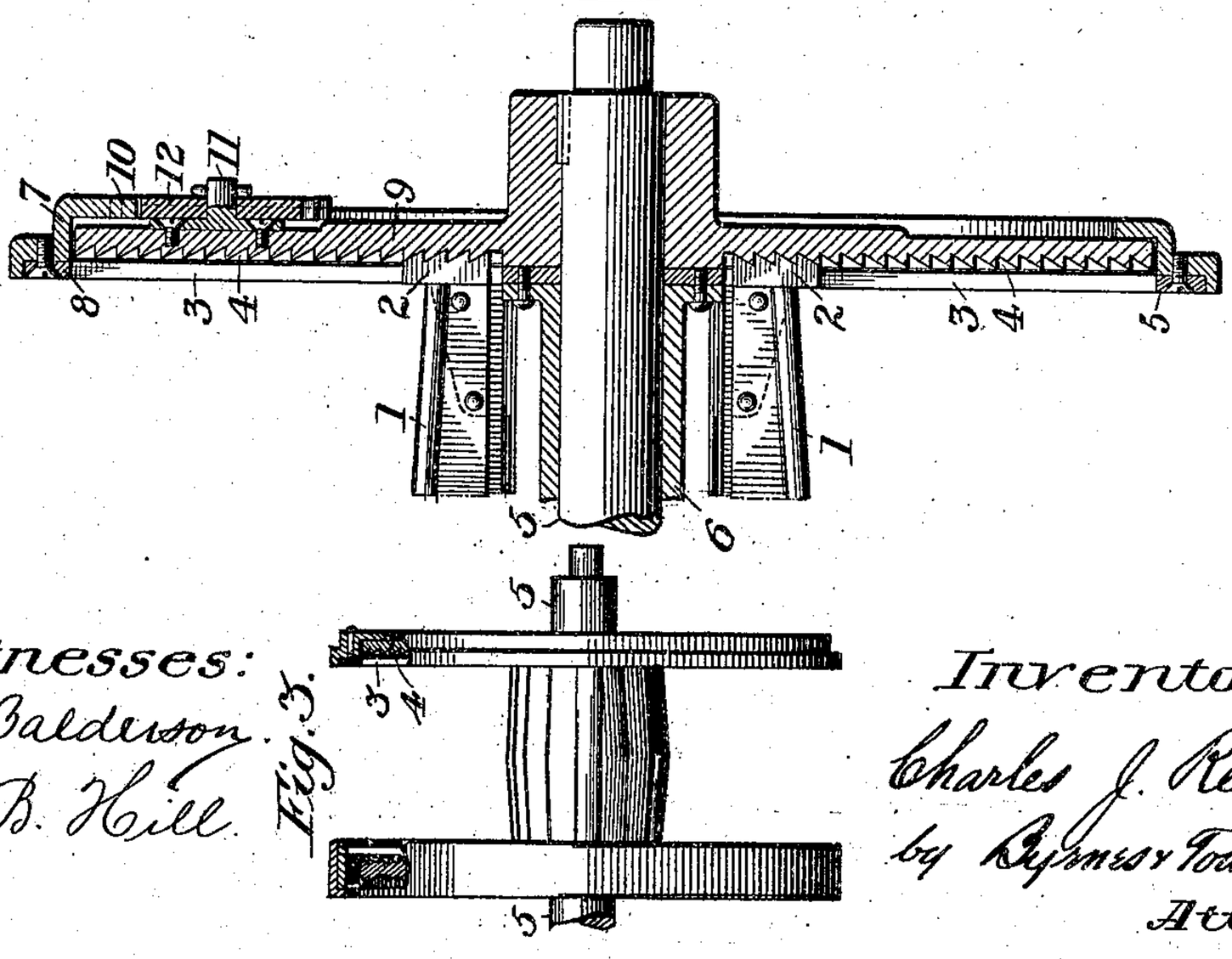

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Fig. 3.

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UNITED STATES PATENT OFFICE.

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STOP MECHANISM FOR EXPANSIBLE PULLEYS.

No. 814,986. Specification of Letters Patent. Patented March 13, 1906.

Application filed June 28, 1904. Serial No. 214,507.

To all whom it may concern:

Be it known that I, CHARLES J. REED, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Stop Mechanism for Expansible Pulleys, of which the following is a specification.

In United States Patents Nos. 758,474 and 758,561, granted to me April 26, 1904, I have shown and claimed a mechanism for transmitting power from a driving to a driven shaft and enabling the speed of the driven shaft to be varied with reference to that of the driving-shaft, comprising a double pulley placed between and belted to pulleys on the driving and the driven shafts. Each drum of the double pulley consists of a set of radially-adjustable rim-sections the ends of which pass through radial slots in circular guide-plates and have teeth entering spiral grooves in circular adjusting-disks. Differential-gear mechanism is provided to rotate the guide-plates with reference to the adjusting-disks, thereby simultaneously moving either set of rim-sections inwardly and the other outwardly, contracting one drum and expanding the other. The shaft of the double pulley is carried by rock-arms to compensate for changes in the working length of the belts by which it receives and transmits power.

The present invention relates to expansible pulleys, especially of the type shown in these patents, and specifically to stop devices for positively limiting the travel of the rim-sections in the spiral grooves of the adjusting-disks when shifted to their outermost or innermost position.

Referring to the accompanying drawings, Figure 1 is a vertical axial section of one end of an expansible pulley. Fig. 2 is an end elevation of the pulley; and Fig. 3 is a side elevation, partially in vertical section, of one drum of a double pulley on a reduced scale.

The pulley which has been chosen to illustrate the invention comprises a circular series of radially-adjustable rim-sections 1, having toothed ends 2, which pass through radial slots 3 in the guide-plates and enter spiral grooves 4 in the adjusting-disks. The adjusting-disks are preferably keyed or otherwise fixed on the pulley-shaft 5, and the guide-plates of each pulley-drum are secured to the flanged ends of a sleeve 6, which is revolubly supported on the pulley-shaft between a pair of the adjusting-disks, as shown in my specified patents. In constructing and operating pulleys of this type it is found that when the rim-sections reach their outermost or innermost position they are liable to be forcibly pressed against the ends of the radial guide-slots or against one another by the wedging action of the spiral grooves. They thus bind between the guide-plates and adjusting-disks and render it difficult to again rotate these with reference to each other. The present invention is a mechanism to stop the rotation of the guide-plates just before the rim-sections reach either end of the guide-slots or at any predetermined position. For this purpose a flanged ring 7 is screwed to the periphery of the end guide-plate 8 and extends over and incloses the outer edge of the end adjusting-disk 9. This ring is provided with a single tooth 10, which projects radially inward. Screwed to the outer face of the adjusting-disk 9 is a plate carrying a journal 11, on which is mounted a pinion 12. This pinion has thirteen perfect teeth 13 to 25 and two imperfect teeth 26 27, between which is a concave blank portion 28. A spring-detent 29 is secured to the adjusting-disk 9 and has a bent free end 30 in position to enter the space between two teeth of the pinion, and thereby normally hold it against rotation. The number of perfect teeth on the pinion is one less than the number of revolutions the adjusting-plate is to make with reference to the guide-plate. The spiral groove in the adjusting-plate 9 winds outward in a clockwise direction.

In Fig. 1 the rim-sections are shown in their innermost position, having been brought to this position by rotating the guide-plate 8 in a clockwise direction, as viewed from the end of the pulley, until the tooth 10 enters the space between the teeth 26 27 of the pinion. The blank 28 thereupon prevents further rotation of the pinion and guide-plates at the predetermined point. To shift the rim-sections outward, the guide-plate 8 is rotated in a contra-clockwise direction as viewed from the end of the pulley and indicated by the arrow in Fig. 2. Each rotation of the guide-plate moves the rim-sections outward by the distance of one thread and simultaneously

rotates the pinion 12 through a predetermined angle. When the guide-plate has made the predetermined number of revolutions, bringing the rim-sections to their outermost position, the tooth 10 on the guide-plate will again come in contact with the blank 28 and prevent further rotation of the pinion and guide-plate in that direction. In this operation the tooth 10 strikes successively the alternate pinion-teeth 13 to 27 and 14 to 24 and finally the blank 28. The spring-stop 29 prevents any accidental rotation of the pinion until the pulley-adjusting mechanism is put into operation and overcomes the resilience of the spring.

The total number of teeth in the pinion 12 and the number moved at each contact of the tooth 10 may be varied in order to produce a greater or less number of revolutions before the blank 28 engages the tooth 10.

An additional tooth 31 on the flange 7 may be located in any desired part of the circumference to act in conjunction with the tooth 10 to produce a fraction of a complete revolution in addition to any given number of revolutions. If, for example, the angular distance between the teeth 10 and 31 is sixty degrees, rotation of the guide-plate in the direction of the arrow will cause tooth 31 to strike pinion-tooth 13 and tooth 10 to strike pinion-tooth 15 in one revolution. The teeth 31 and 10 will thereafter successively strike the alternate pinion-teeth from 17 to 27 and from 14 to 24 until the tooth 31 finally strikes the blank 28 after seven complete revolutions plus an arc of sixty degrees, or one-sixth of a revolution. Evidently the supplemental tooth 31 may be so located as to limit the partial revolution to any desired predetermined angle.

I claim—

1. An expansible pulley, comprising rim-sections, guide-plates and adjusting-disks, said plates and disks relatively revoluble, and a stop mechanism consisting of an incomplete pinion and a tooth engaging said pinion, one member of said stop mechanism carried by an adjusting-disk and the other member carried by a guide-plate, as set forth.

2. An expansible pulley, comprising rim-sections, guide-plates and adjusting-disks, said plates and disks relatively revoluble, and a stop mechanism consisting of an incomplete pinion and a tooth engaging said pinion, one member of said stop mechanism carried by an adjusting-disk and the other member carried by a piece which extends from a guide-plate past the edge of said disk, as set forth.

3. An expansible pulley, comprising rim-sections, guide-plates and adjusting-disks, said plates and disks relatively revoluble, and a stop mechanism consisting of an incomplete pinion and a tooth engaging said pinion, said pinion carried by an adjusting-disk and said tooth carried by a guide-plate, as set forth.

4. An expansible pulley, comprising rim-sections, guide-plates and adjusting-disks, said plates and disks relatively revoluble, and a stop mechanism consisting of an incomplete pinion and a tooth engaging said pinion, said pinion journaled on the outer face of an adjusting-disk and said tooth carried by a piece which extends from a guide-plate past the edge of said disk, as set forth.

5. An expansible pulley, comprising rim-sections having toothed ends, radially-slotted guide-plates and spirally-grooved adjusting-disks receiving the ends of said rim-sections, said plates and disks relatively revoluble, and a stop mechanism consisting of an incomplete pinion and a tooth engaging said pinion, one member of said stop mechanism carried by an adjusting-disk and the other member carried by a guide-plate, as set forth.

6. An expansible pulley, comprising rim-sections having toothed ends, radially-slotted guide-plates and spirally-grooved adjusting-disks receiving the ends of said rim-sections, said plates and disks relatively revoluble, and a stop mechanism consisting of an incomplete pinion and a tooth engaging said pinion, said pinion journaled on the outer face of an adjusting-disk and said tooth carried by a piece which extends from a guide-plate past the edge of said disk, as set forth.

7. An expansible pulley, comprising rim-sections, guide-plates and adjusting-disks, said plates and disks relatively revoluble, and a stop mechanism consisting of an incomplete pinion and a tooth engaging said pinion, one member of said stop mechanism carried by an adjusting-disk and the other member carried by a guide-plate, and a spring-actuated detent for said pinion, as set forth.

8. An expansible pulley, comprising rim-sections, guide-plates and adjusting-disks, said plates and disks relatively revoluble, and a stop mechanism carried by a guide-plate and adjusting-disk and consisting of an incomplete pinion and two spaced teeth in position to engage said pinion, as set forth.

9. An expansible pulley, comprising rim-sections, guide-plates and adjusting-disks, said plates and disks relatively revoluble, and a stop mechanism consisting of an incomplete pinion journaled on the outer face of an adjusting-disk and two spaced teeth in position to engage said pinion and carried by a guide-plate, as set forth.

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

CHARLES J. REED.

Witnesses:
LOUIS DU HADWAY,
WILLIAM H. REMSEN.