No. 698,103. Patented Apr. 22, 1902.

N. CHRISTENSON.

SPEED CHANGER.

(Application filed Sept. 20, 1901.)

(No Model.)

Fig. 1.

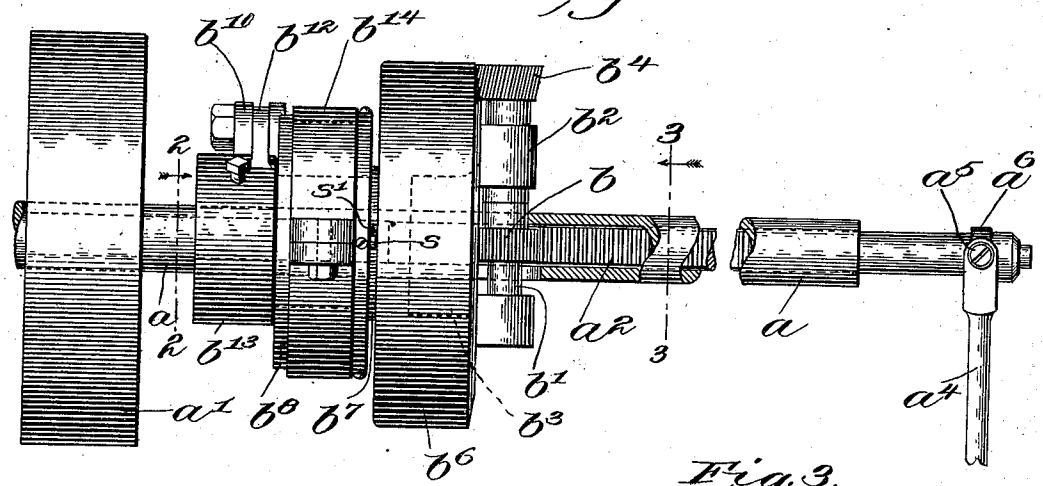


Fig. 2.

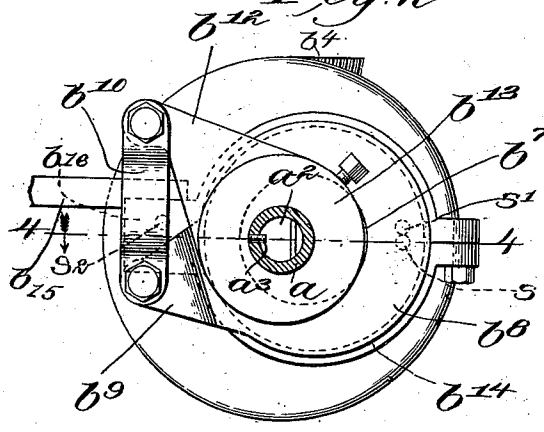


Fig. 3.

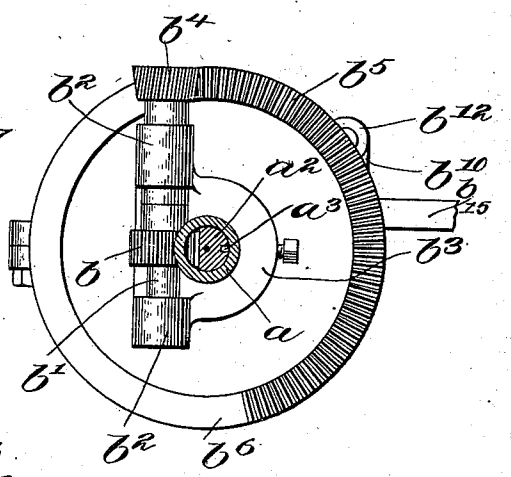
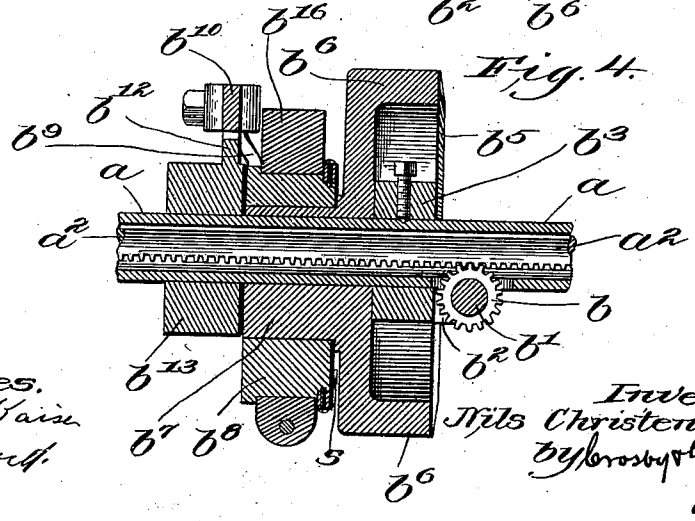


Fig. 4.



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

UNITED STATES PATENT OFFICE.

NILS CHRISTENSON, OF LYNN, MASSACHUSETTS, ASSIGNOR OF ONE-HALF TO JULIUS W. A. LUNDSKOG, OF LYNN, MASSACHUSETTS.

SPEED-CHANGER.

SPECIFICATION forming part of Letters Patent No. 698,103, dated April 22, 1902.

Application filed September 20, 1901. Serial No. 75,802. (No model.)

To all whom it may concern:

Be it known that I, NILS CHRISTENSON, a citizen of the United States, and a resident of Lynn, county of Essex, State of Massachusetts, have invented an Improvement in Speed-Changers, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

My invention is a speed-changer, the object thereof being to produce an exceedingly compact and simple speed-changer capable of varying the throw or coming to a dead-center, as required, without stopping the driving-shaft.

The various advantages and constructional details of my invention will be pointed out in the course of the following description, reference being had to the accompanying drawings, in which I have illustrated a preferred embodiment of my invention.

In the drawings, Figure 1 represents in side elevation, partly broken away, a shaft provided with my invention. Fig. 2 is a sectional view on the line 2 2, Fig. 1, looking toward the right. Fig. 3 is a sectional view on the line 3 3, Fig. 1. Fig. 4 is a horizontal sectional view taken on the line 4 4, Fig. 2.

While my invention may be applied to any of the usual situations, I have illustrated it for convenience as applied to a line-shafting a, provided with a driving-pulley a'. At its right-hand portion the shaft a is made hollow to contain a longitudinally-movable rack-bar a^2, keyed within the shaft a, as indicated at a^3, said rack-bar being actuated by any suitable means, as by a lever a^4, pivoted at a^5 to a collar a^6 on said rack-bar, although any other actuating means may be employed. The rack-bar a^2 is in mesh with a pinion b, fast on a shaft b', mounted in bearings b^2, secured by a collar b^3 to the shaft a. The shaft b' at its outer end is provided with a miter-gear b^4, meshing with teeth b^5 at the periphery of a block or gear b^6, mounted loosely on the shaft a and provided on its opposite face with an eccentric b^7. On the eccentric b^7 is mounted a second eccentric b^8, free to turn thereon. From the outside eccentric b^8 projects an integral arm b^9, connected by a link b^{10} to an arm b^{12}, projecting from a hub b^{13}, secured fixedly to the shaft a, so that the outside eccentric b^8, although free to change its position toward and from the shaft a according to the position to which the inner eccentric b^7 may be moved, is not free to rotate on said shaft, but because of the link connection with said shaft occupies invariably substantially the same position with relation to said shaft; but the inner eccentric b^7 is always free to be rotated with relation to the shaft a, said rotation being accomplished by the rack-and-pinion movement explained.

Preferably stops are provided for permitting the relative rotation of the two eccentrics, there being herein shown for this purpose a stop s on the eccentric b^8 and opposite stops s' s^2 projecting from the eccentric carrier or block b^6, so that when the eccentric b^7 is rotated a half-turn one way or the other one or the other of these stops s' s^2 will prevent the further rotation of the eccentric b^7 with relation to the eccentric b^8 by contacting with the stops.

Surrounding the eccentric b^8 is an eccentric-strap b^{14}, from which reciprocatory motion may be communicated in any suitable manner, as by pivoting an arm b^{15} to a knuckle b^{16} thereon.

In operation if an extreme throw of the arm b^{15} is required the two eccentrics are brought into the relative position shown in Fig. 2, and if, on the other hand, the arm b^{15} is to be brought at rest without stopping the rotation of the shaft a the eccentric b^7 is simply given a half-turn to the left, Fig. 2, thereby causing its thick portion to offset the corresponding thick portion of the eccentric b^8, and thus bring the eccentric-strap b^{14} into eccentric position with relation to the driving-shaft a, and all the intermediate variations in throw of the arm b^{15} are secured by moving the eccentrics to correspondingly intermediate positions between the two extremes. All these movements are accomplished with extreme ease simply by shifting the lever a^4, and thereby moving longitudinally the rack-bar a^2 as desired.

I do not limit myself in all respects to the details shown and described, as various changes and modifications can be resorted to within the spirit and scope of my invention.

I am aware that various individual parts of the mechanism are old—as, for instance, longitudinally-movable rack-and-pinion devices have been before employed and single eccentrics have been employed—and accordingly I do not claim the same broadly.

Having described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. A speed-changer comprising a rotary shaft, an eccentric carried thereby and held against rotation thereon and a second eccentric carried by said shaft and rotatable with relation thereto for changing the radial position of the first eccentric, and means for positively rotating said second eccentric.

2. A speed-changer comprising a rotary shaft, an eccentric carried thereby and non-rotatable thereon, a second eccentric carried by said shaft and rotatable thereon in engagement with said first eccentric, and a rack-and-pinion device for positively rotating said second eccentric, and means for operating said rack-and-pinion device independently of the rotation of said shaft.

3. A speed-changer comprising a rotary shaft, an eccentric rotatably mounted on said shaft, a second eccentric mounted on said first eccentric and within which said first eccentric is independently movable, an eccentric-strap mounted on said second eccentric, means connected therewith for transmitting motion, and means for positively moving said first eccentric independently of said shaft.

4. A speed-changer comprising a rotary shaft, two eccentrics mounted one on the other and carried by said shaft, and means for rotating the inner eccentric independently of said shaft and of the other eccentric, said means including a gear carried by said shaft and connected with said inner eccentric and a rack and pinion for driving said gear, said rack being movable longitudinally of said shaft.

5. A speed-changer comprising a rotary shaft, two eccentrics mounted one on the other and carried by said shaft, means permitting the outer eccentric to move outwardly and inwardly with relation to said shaft and requiring the shaft and said outer eccentric to rotate in unison, and means for rotating the inner eccentric independently of said shaft and of the other eccentric, said means including a gear carried by said shaft and connected with said inner eccentric and a rack and pinion for driving said gear, said rack being movable longitudinally of said shaft.

6. A speed-changer comprising a rotary shaft, two eccentrics mounted one on the other and carried by said shaft, an arm extending from the outer eccentric, a hub and arm fixed on said shaft adjacent thereto, and a link connecting said two arms, and means for rotating the inner eccentric independently of said shaft and of the other eccentric.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

NILS CHRISTENSON.

Witnesses:

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