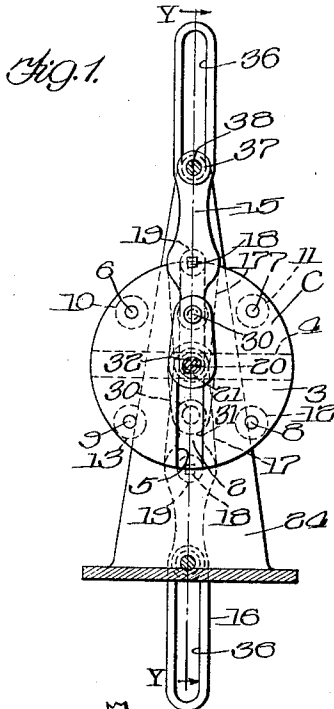
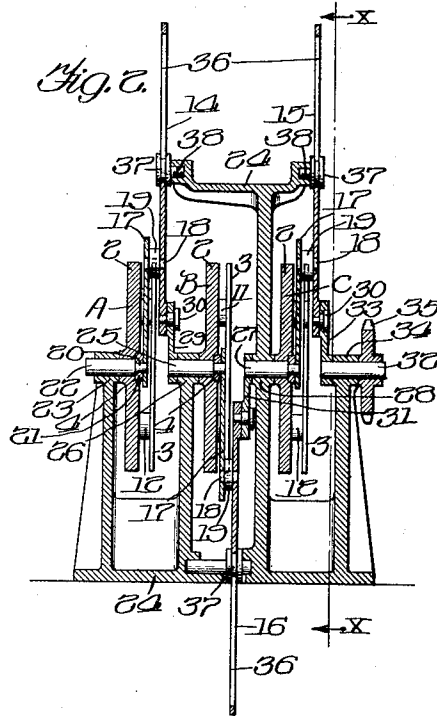
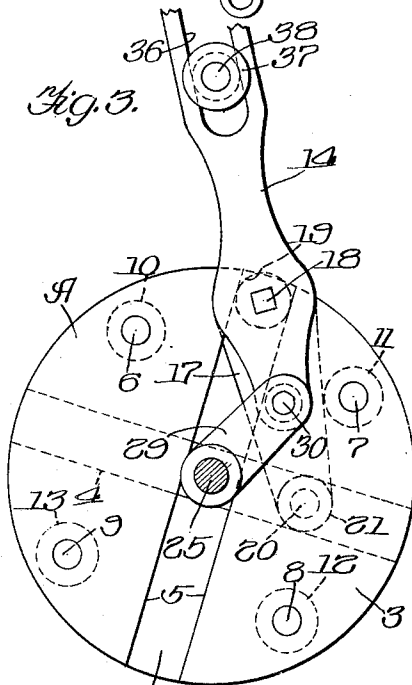
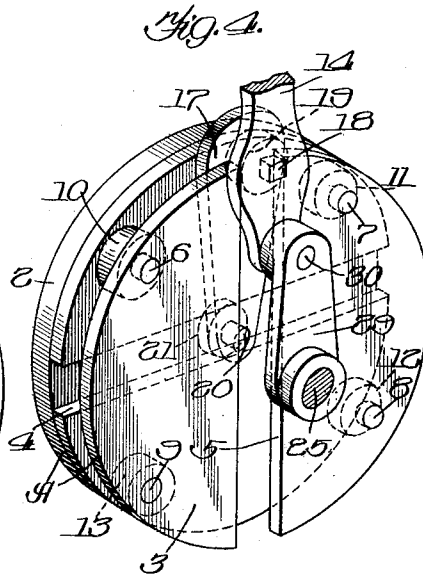


E. G. JOHANSON.
 MULTIPLE SPEED GEARING.
 APPLICATION FILED NOV. 24, 1913.

1,113,641.

Patented Oct. 13, 1914.



Witnesses:
 J. B. Nelson Jr.
 Edwin B. Nelson

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UNITED STATES PATENT OFFICE.

EMIL G. JOHANSON, OF CHICAGO, ILLINOIS.

MULTIPLE-SPEED GEARING.

1,113,641.

Specification of Letters Patent.

Patented Oct. 13, 1914.

Application filed November 24, 1913. Serial No. 802,613.

To all whom it may concern:

Be it known that I, EMIL G. JOHANSON, a subject of the King of Sweden, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Multiple-Speed Gearing, of which the following is a specification.

My invention relates to the type of mechanism in which several reciprocal movements are imparted to a pitman at each revolution of a disk or wheel to which said pitman is attached by slidably mounted wrist-pins or pivots which move diametrically at right angles to each other across the axis of the disk while describing separate circles which touch each other at said axis, two such circles being described by each wrist-pin at each complete revolution of the disk. When these wrist-pins are mounted in slide-blocks moving in disk grooves crossing each other in the same plane, the slide-blocks must be considerably longer than the widths of their respective grooves, so that each block in crossing the groove of the other block will be held in alinement with its own path and thus prevented from colliding with the sides of the intersecting groove. This slide-block arrangement tends to produce binding, or undue friction, between the block and the groove in which it moves, which materially discounts this movement in practical use.

The object of the present invention is to overcome the objections referred to and make it possible to use antifriction rollers instead of slide-blocks, and the invention therefore consists in the novel construction, combination and arrangement of parts hereinafter described in detail, illustrated in the accompanying drawing and incorporated in the appended claims.

In the drawing Figure 1 is substantially a section taken on the line X—X of Fig. 2. Fig. 2 is a section taken on line Y—Y of Fig. 1. Fig. 3 is an enlarged side view of a portion of the parts shown in Figs. 1 and 2. Fig. 4 is an enlarged perspective view of one of the combination disks and its immediately associated parts, partly broken away.

In the several views are shown a set of three compound disks, each of which consists of two disks together serving to impart the movement imparted by the single disk shown in for instance Patent No.

468,624, of February 9, 1892, but, unlike said patent, each of these two disks has but a single diametrical slide or roller way or groove, and the wrist-pin slide bearing is therefore relieved of the problem of crossing an intersecting groove. The three compound disks shown in Fig. 2 are labeled A, B, and C and the two disks of which each said compound disk is composed are numbered 2 and 3, respectively. In the inner face of the disk 2 is a groove 4 which extends diametrically across the disk, and in the disk 3 is a groove 5 similarly arranged but at right angles to the groove 4. As shown the disk 3 is a thin disk and its groove 5 separates the disk into two halves, these halves being secured to the disk 2 by means of rivets 6, 7, 8 and 9 passing through spacers 10, 11, 12, and 13 interposed between the disks.

The disks A, B and C are provided with pitmen 14, 15 and 16, the arrangement for each pitman being shown on an enlarged scale in Figs. 3 and 4. Referring to the pitman 14 as seen in Fig. 4, this has an extension 17 which is connected with the body portion 14 by means of a short cross bar 18 secured at its ends rigidly to the parts 14 and 17. Between these parts on said bar is journaled a roller 19 which moves in the slot 5 and on the free end of the extension 17 is journaled on a stud 20 secured to said extension, a roller 21 which moves in the slot 4. The compound disk A is mounted on a shaft 22 journaled in bearings 23 on a frame 24. The disk B has a similar shaft 25 and bearing 26 and the disk C has a shaft 27 and a bearing 28 on said frame. Power is transmitted to or from the disk A by means of a crank which is secured to to be rotated by, or to transmit rotation to, the shaft 25, said crank 29 being pivoted at 30 to the lower end of the pitman 14. The disk B is similarly connected with the shaft 27 of the disk C through a crank 31, and the disk C is again similarly connected with a shaft 32 through a crank 33. The shaft 32 is journaled in a bearing 34 on the frame 24 and has secured thereto a sprocket wheel, gear wheel or pulley 35, which, in the arrangement shown in Fig. 2, is adapted to transmit motion to all of the disks from any suitable source of power connected with said wheel 35. When power is transmitted from the shaft 32 its speed is doubled in the shaft 25 and wheel B from which power may be

taken by belt, teeth or sprockets on the wheel, or through its pitman 16. Again the speed of the shaft 22 is made double that of the speed of shaft 25 and power may be transmitted either from the wheel A or its pitman 14. Of course when the movement is actuated by power applied to the shaft 22 the speed will be reduced in like ratios. These disks may be arranged compactly so as to increase or decrease speed within a comparatively small space. In each pitman is a slot 36 which is engaged by an anti-friction roller 37 mounted on a stud 38 arranged on the frame 24, which supports the pitman for reciprocal movements. Reciprocating motions can therefore be imparted directly by the pitman or pitmen while rotary motion or motions can be transmitted at the same time from the disk or disks.

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

1. In combination, a rotatable member, a pitman, a pair of wrist-pins connected with said pitman and rotary member to rotate with and reciprocate on the latter in non-intersecting paths, and means for transmitting the movements of said pitman into rotary movement in a second rotatable member.

2. In combination, a rotary element, a pair of non-intersecting slideways arranged at right angles to each other on said element, a pitman pivotally and slidably mounted in said slide-ways at one end and slidably mounted at the other end, a second rotary element, and means for rotating same by said pitman.

3. The combination with a rotatably mounted member and means for rotating same, of a pitman slidably mounted at one end and having a pair of wrist-pins on its other end, anti-friction rollers on said wrist-pins, and slide-ways in said member in which said rollers move in non-interfering paths at right angles to each other which cause said wrist-pins to each describe two

revolutions for each revolution of said member.

4. The combination with a shaft of several disks secured to said shaft to rotate therewith, each disk provided with a slideway arranged at right angles to the slideway of the other disk, a pitman mounted at one end for sliding longitudinal movement and having a pair of wrist-pins mounted on its opposite end slidably mounted in said slide-ways.

5. The combination with a series of members such as A, B and C having a common axis of rotation, but each rotatable independently of the other members, each of said members being composed of a pair of disks each provided with a slideway arranged at right angles to the slideway of the other disk, a pitman for each of said members, said pitman having thereon a pair of wrist-pins mounted for to and fro movement in said slideways, means for rotating the first of the series of said members, and means for converting the pitman movement of the latter into a rotary movement in the second member, and so on.

6. The combination with a plurality of rotatably mounted members A, B and C, of a pair of slide-blocks for each said members, said slide-blocks mounted to move at right angles to each other in non-intersecting paths diametrically across the face of the member, a pitman having wrist-pins pivoted to said slide-blocks and mounted at one end for sliding movement, and a crank connection between the pitman of one member with the next adjacent member for rotating the latter.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

EMIL G. JOHANSON.

Witnesses:

JNO. H. NELSON, Jr.,

EDWIN B. NELSON.