No. 755,051. PATENTED MAR. 22, 1904.

H. J. SCHMICK.

RADIOHELICAL CAM GEARING.

APPLICATION FILED JULY 16, 1903.

NO MODEL. 3 SHEETS—SHEET 1.

Fig. 1.

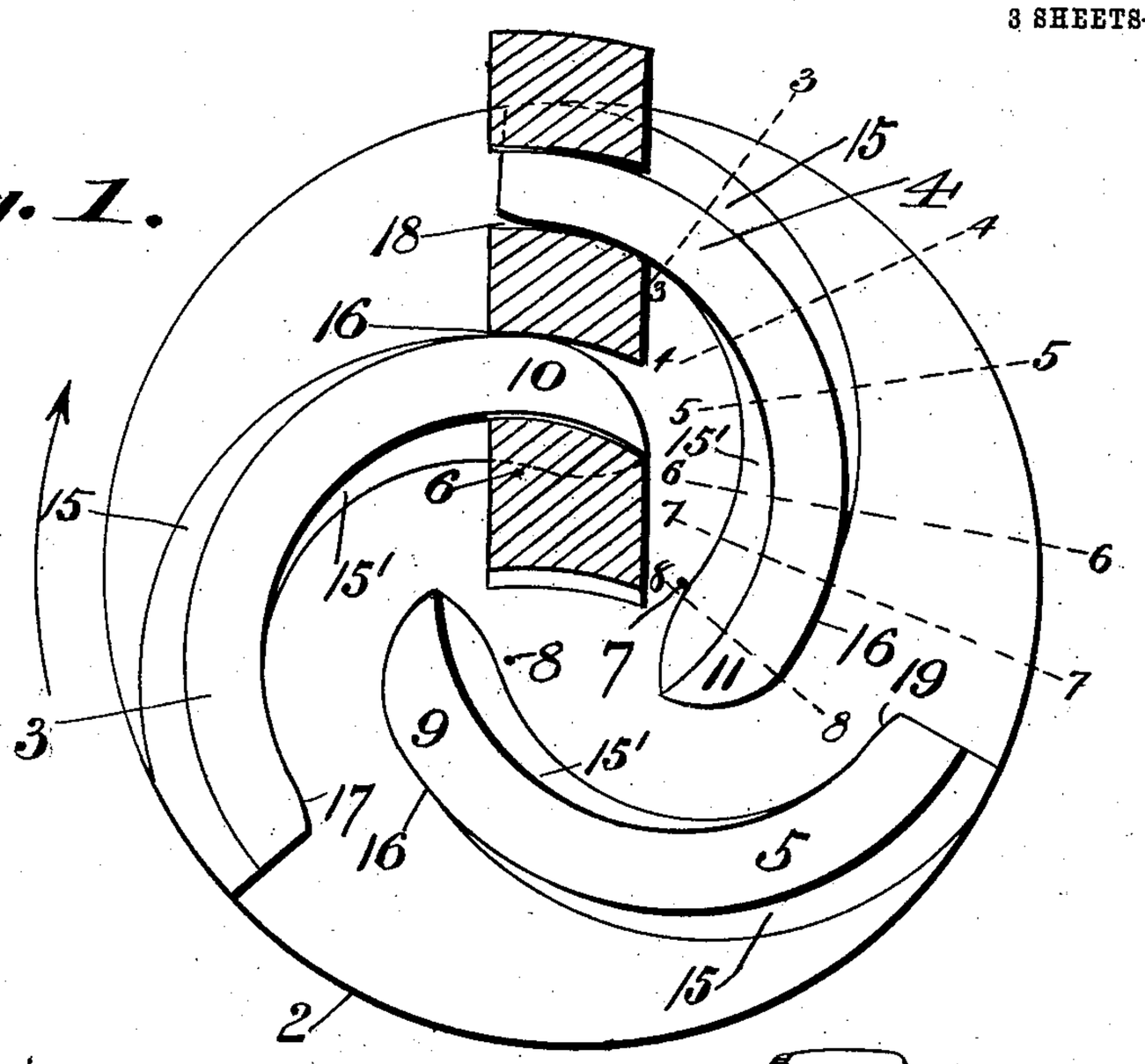
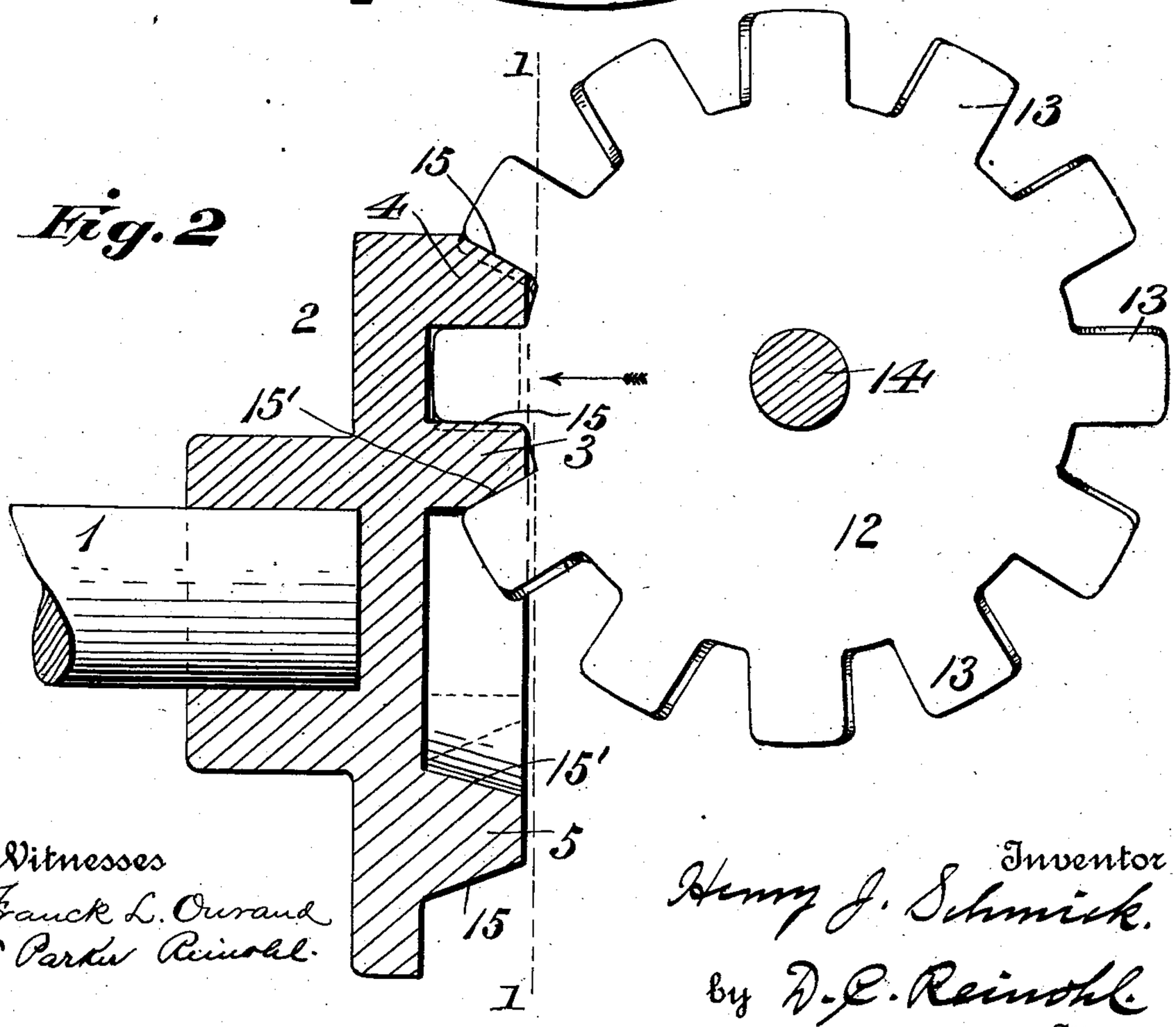


Fig. 2



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NO MODEL. 3 SHEETS—SHEET 2.

Fig. 3

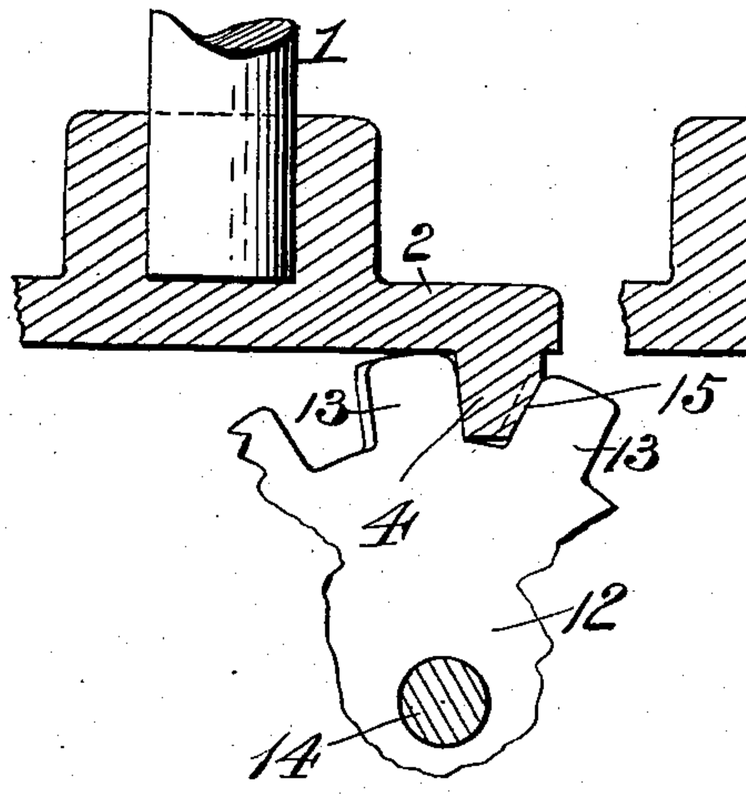


Fig. 4.

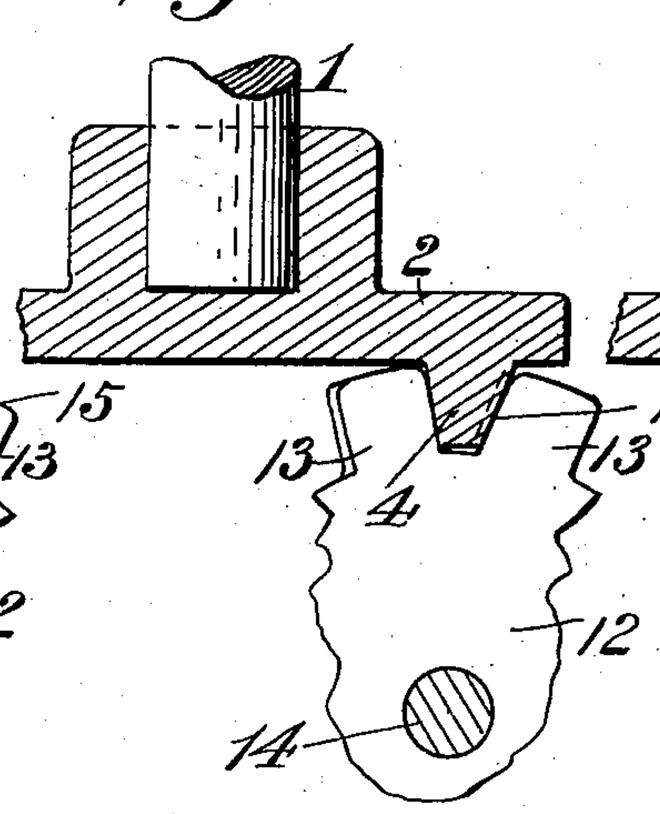


Fig. 5.

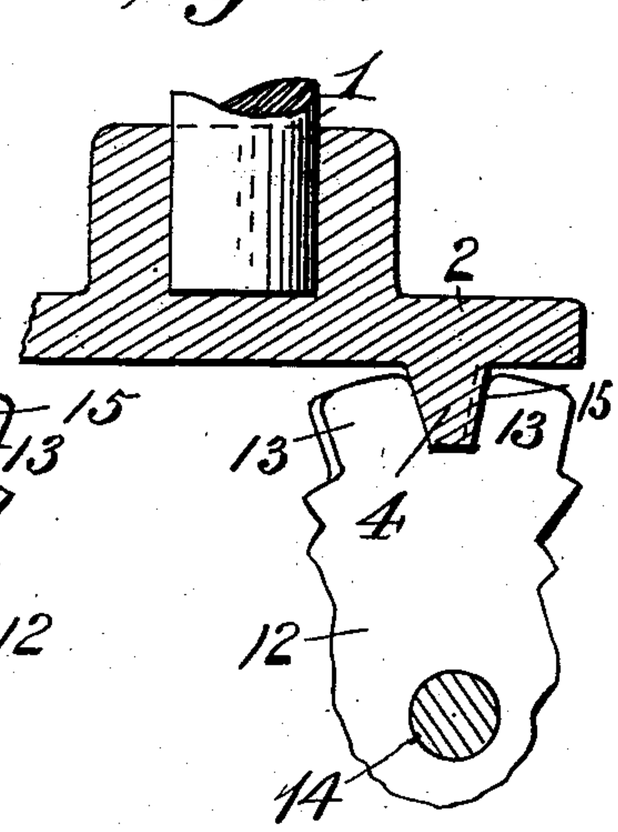


Fig. 6.

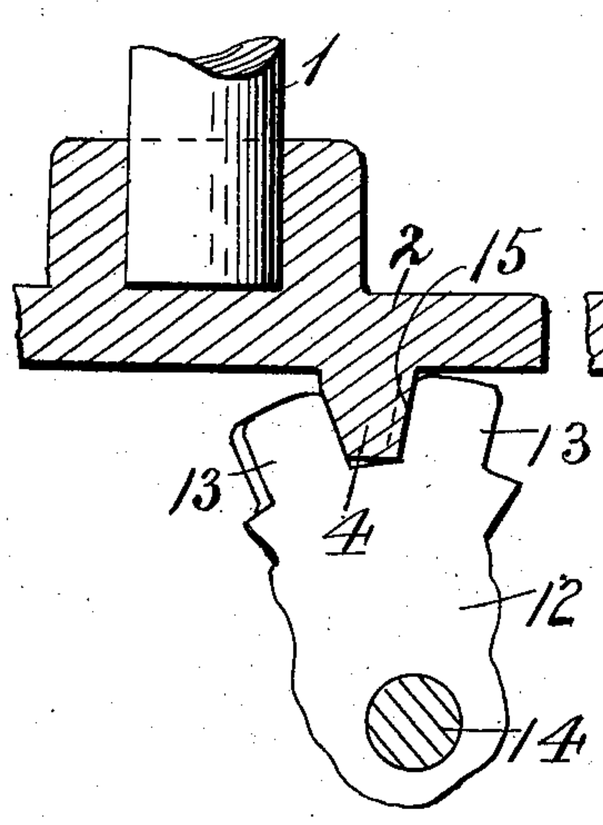


Fig. 7.

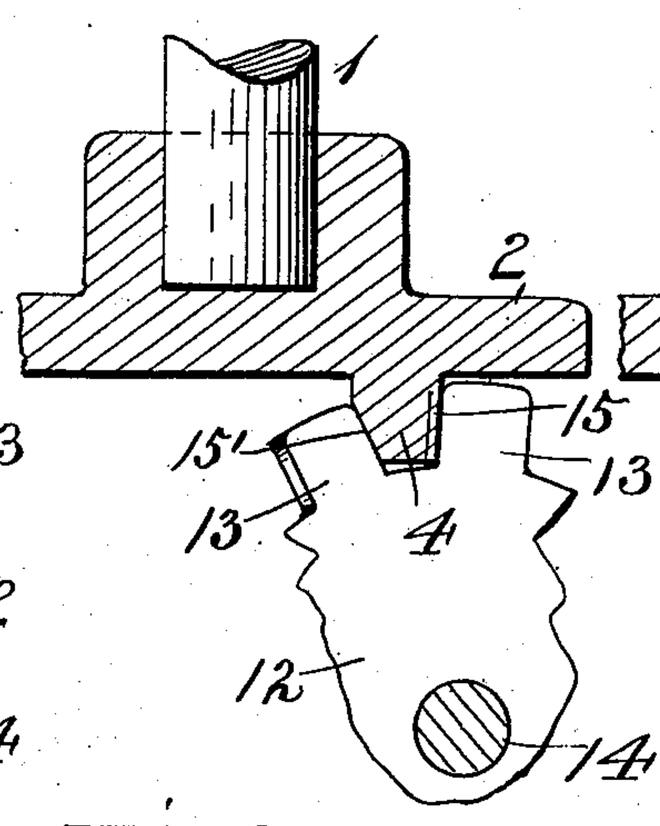


Fig. 8.

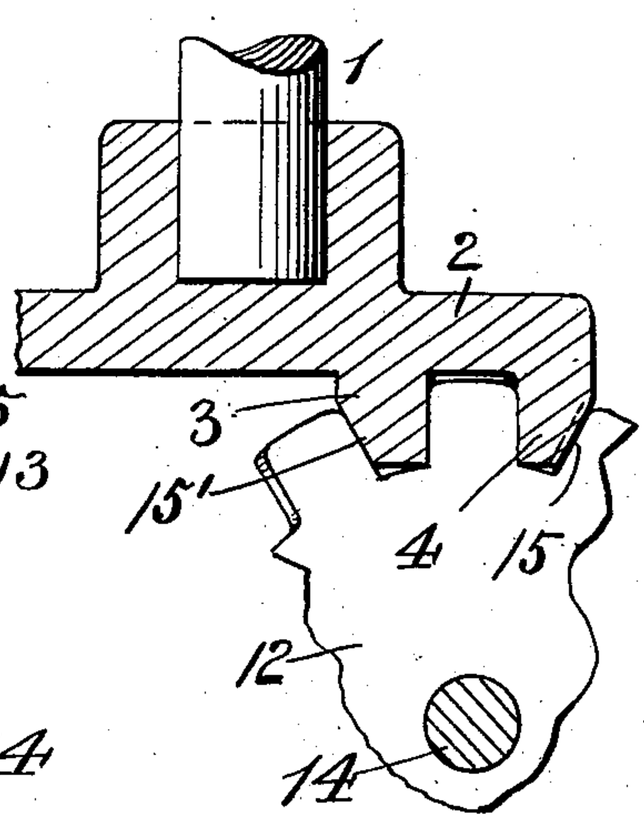
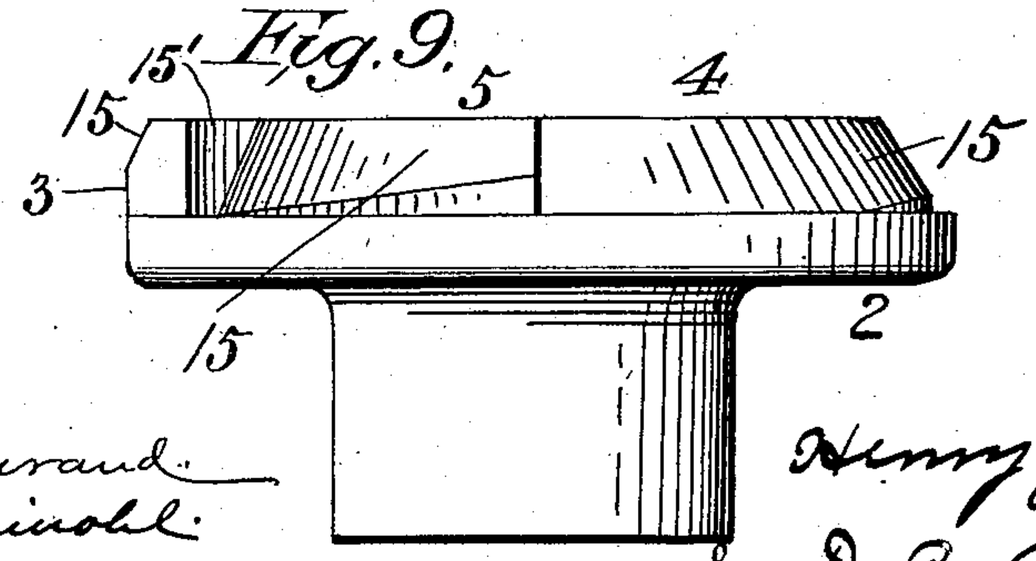


Fig. 9.



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RADIOHELICAL CAM GEARING.

APPLICATION FILED JULY 16, 1903.

NO MODEL. 3 SHEETS—SHEET 3.

Fig. 10.

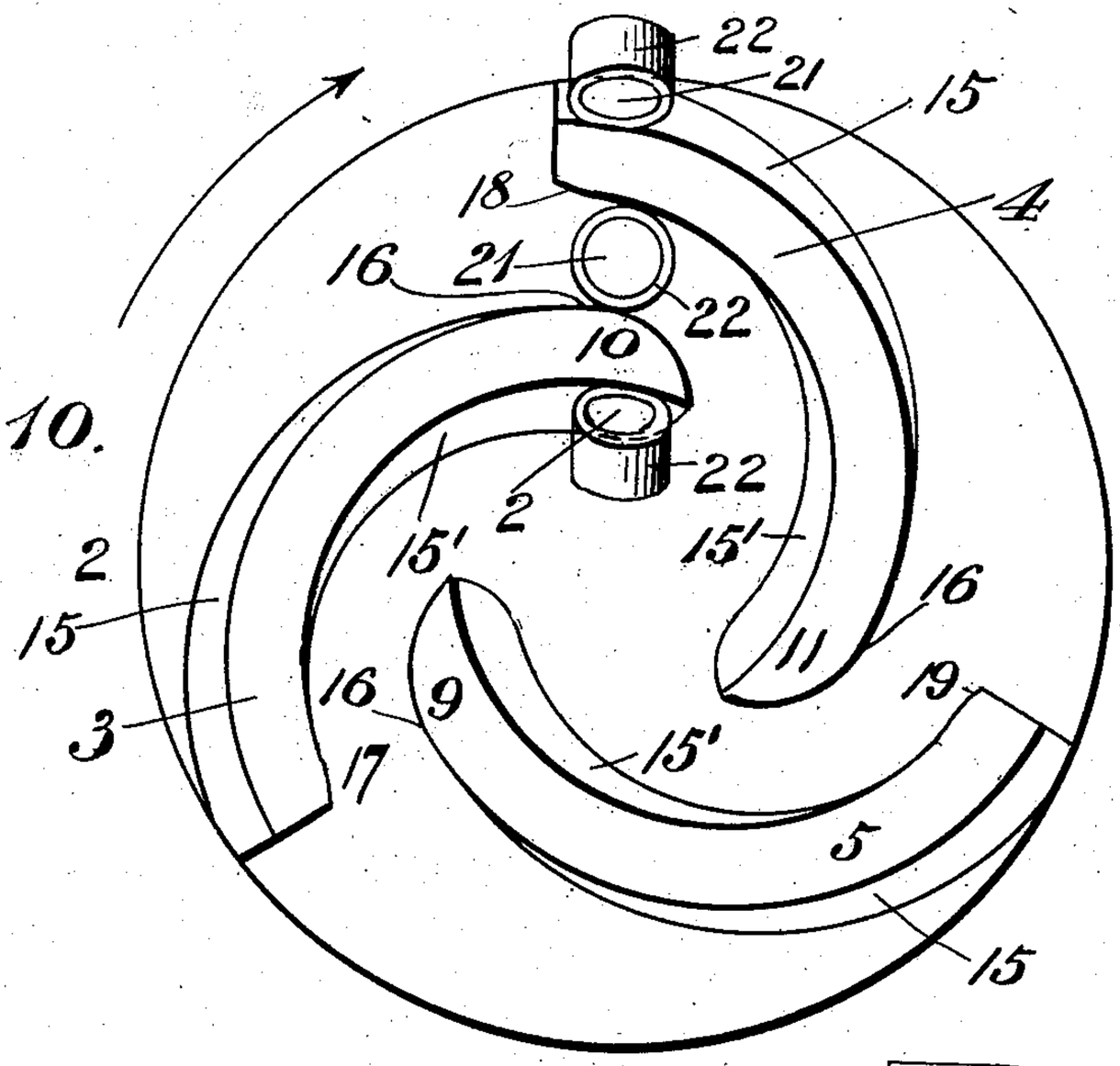
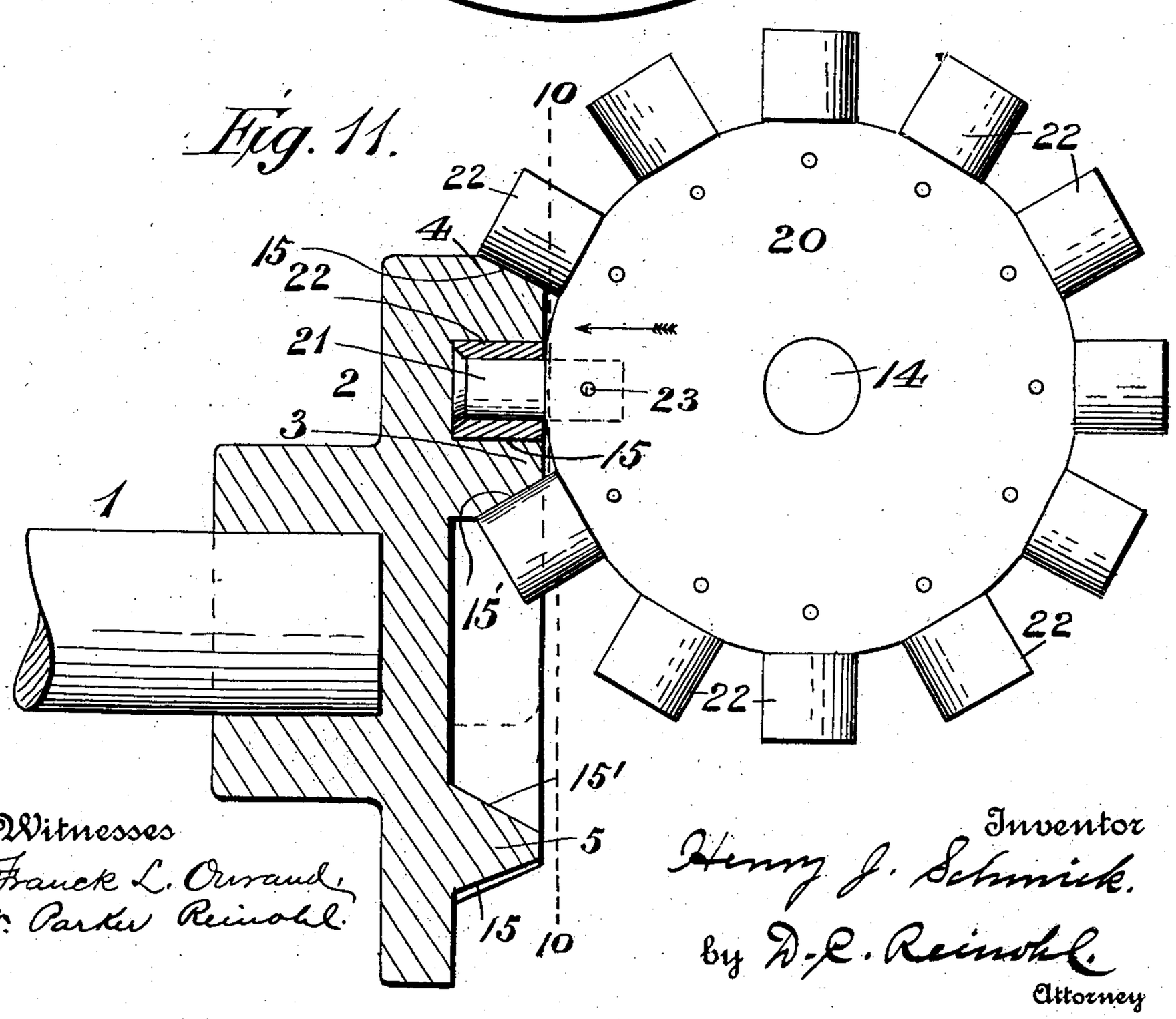


Fig. 11.



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No. 755,051. Patented March 22, 1904.

UNITED STATES PATENT OFFICE.

HENRY J. SCHMICK, OF HAMBURG, PENNSYLVANIA.

RADIOHELICAL CAM-GEARING.

SPECIFICATION forming part of Letters Patent No. 755,051, dated March 22, 1904.

Application filed July 16, 1903. Serial No. 165,733. (No model.)

To all whom it may concern:

Be it known that I, HENRY J. SCHMICK, a citizen of the United States, residing at Hamburg, in the county of Berks and State of Pennsylvania, have invented certain new and useful Improvements in Radiohelical Cam-Gearing; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to means for transmitting power and converting motion, has for its object the transmission of the maximum power from a shaft revolved in a given direction to a shaft revolved in a direction at a right angle to the former or power-driven shaft without sacrificing or reducing the speed of the driven shaft, and the invention consists in certain improvements in construction in the "radiohelical cam" for which Letters Patent of the United States were granted to me on the 20th day of May, 1901, and numbered 675,020, which improvements will be fully described in the following specification and claims.

For the purpose of distinguishing the construction of my gearing it has been designated as "radiohelical" cam-gearing, and in this construction the working members on the head are approximately the thickness of the spaces between the peripheral members on the disk or wheel driven by the head and its working members, and their engaging surfaces are of varying angularity to produce continuous leverage on the peripheral members of the disk or wheel driven thereby.

In the accompanying drawings, which form part of this specification, Figure 1 represents an elevation taken on line 1 1, Fig. 2, looking in the direction of the arrow and showing the relation and position of the radiohelical members in connection with the toothed wheel; Fig. 2, a vertical longitudinal section showing the toothed wheel in side elevation; Fig. 3, a detail section on line 3 3, Fig. 1, part of the cam head or disk being broken away and showing the angular engaging surface of the one cam or working member in contact with one of the teeth or peripheral members of the gear-wheel. Figs. 4, 5, 6, 7, and 8 are like views, respectively, on like lines on Fig. 1, and Fig. 9 a side elevation of the head separated from the revoluble member or gear-wheel, and are on a reduced scale compared with Figs. 1 and 2. Fig. 10 represents an elevation taken on line 10 10, Fig. 11; and Fig. 11, a vertical longitudinal section showing a modification of the peripheral members on the gear-wheel.

Reference being had to the drawings and the designating characters thereon, the numeral 1 indicates a shaft to be driven by any suitable or preferred motor or from any source of power; 2, a head secured to the shaft to revolve therewith and on one side or face of which are a series of radiohelical members 3 4 5, arranged in the same vertical plane, and are of the same pitch or curve on their outer or working surfaces, each working surface being a segment of a circle struck or described from a different radial point 6 7 8 equidistant from the center of the head 2, each member being approximately as thick as the teeth and the space between the teeth or peripheral members on the gear-wheel, and is so arranged with reference to the adjacent members that they overlap each other by the inner ends 9, 10, and 11, extending beyond the outer ends of the next member in succession, leaving spaces between them for the passage of a tooth or peripheral member of the gear-wheel, as shown in Figs. 1, 2, 10, and 11.

12 indicates a gear wheel or disk having teeth or peripheral members 13, and is supported on a power-transmitting shaft 14 at a right angle to the shaft 1, and the wheel 12 is directly opposite the transverse center of the head 2, and to effect constant engagement of the working surface of the radiohelical members with the teeth 13 of the wheel 12 the outer or engaging surface 15 is made angular in transverse section of the members and of a constantly-increasing pitch from the root or point of engagement 16 with a tooth, and the inside surface 15′ of said member is inclined

in the same ratio, but in the reverse direction, to prevent binding of the next tooth thereon as the head revolves. The inside of each member 3 4 5 is cut away at 17 18 19 to afford ready passage over and release from the outer surface of the teeth 13, the teeth being concavo-convex in cross-section and the curves of the teeth corresponding with the curved lines of the members 3, 4, and 5. In the revolution of the head 2 the inner end of one of the radiohelical members engages one side of a tooth on the wheel 12 just as the outer end of an adjacent member is passing out of engagement with an adjacent tooth, so that the leverage of the said members operating consecutively with the teeth 13 of the wheel 12 is continuous, as in the use of a screw, in which the inclines of the threads of the screw are continuously pushing against the threads of the nut. As soon as one of the members has reached a point in the revolution of the head that it can no longer effectively act upon a tooth of the wheel 12 the next member on the head in succession instantly engages the next tooth on the wheel and continues the revolution of the wheel, the constant leverage of the members being effected by the constantly-varying angle of the working surfaces on the outside of said members.

The helical members on the head 2 may be varied in number and in pitch, according to the speed and power required, a reduction in the pitch of the members producing a corresponding reduction in the speed of the wheel 12 and an increase in the pitch producing the opposite effect. This variation in the number and the pitch of the members necessitates a corresponding variation in the number and pitch of the teeth on the wheel 12.

It will be observed that the continuously-increasing leverage of the members 3 4 5 from the time they engage the teeth 13 consecutively produces a constant increase of power exerted upon the wheel 12 and its shaft without sacrificing the speed of said members in their revolution, for the reason that the speed of the members on their outer or working surfaces increases from the center of the head 2 to the highest point of the members—the periphery of the head—in its rotation.

It is obvious that the head may be revolved in either direction toward the right or the left, as occasion may require, and it may be reversed when desired when the members engaging the teeth on the wheel 12 serve as a brake to retard or stop the machine, car, or vehicle to which the gearing is applied.

In Figs. 10 and 11 I have shown a modification of the peripheral members on the driven wheel. In this instance a disk 20 is provided with radial studs 21 on its periphery, on which are mounted revoluble sleeves 22 to reduce the friction between the members 3 4 5 and the peripheral members to the minimum. These studs are inserted in holes in the periphery of the disk and secured by transverse pins 23.

Having thus fully described my invention, what I claim is—

1. A driving-shaft, a member supported thereon and provided with a plurality of separate radiohelical working members having transverse angular engaging surfaces on their outer sides; in combination with a revoluble member provided with peripheral radial members engaged successively by the angular surfaces of said working members, and a power-transmitting shaft.

2. A driving-shaft, a member supported thereon and provided with a plurality of separate radiohelical working members having transverse angular engaging surfaces on both sides thereof; in combination with a revoluble member provided with peripheral radial members engaged successively by the angular surfaces of said working members, and a power-transmitting shaft.

3. A driving-shaft, a member supported thereon and provided with a plurality of separate radiohelical working members having engaging surfaces of varying angularity on their outer sides; in combination with a revoluble member provided with peripheral radial members engaged successively by the angular surfaces of said working members, and a power-transmitting shaft.

4. A driving-shaft, a member supported thereon and provided with a plurality of radiohelical working members having engaging surfaces of varying angularity on both sides thereof; in combination with a revoluble member provided with peripheral radial members engaged successively by the angular surfaces of said working members, and a power-transmitting shaft.

5. A driving-shaft, a member supported thereon and provided with a plurality of radiohelical working members having oppositely-inclined transverse angular engaging surfaces on opposite sides thereof; in combination with a revoluble member provided with peripheral radial members engaged successively by the angular surfaces of said working members, and a power-transmitting shaft.

6. A driving-shaft, a member supported thereon and provided with a plurality of radiohelical working members overlapping each other at their adjacent ends and whose adjacent overlapping sides are vertical and then incline in opposite directions, throughout the length of the members; in combination with a revoluble member provided with peripheral radial members engaged successively by said working members, and a power-transmitting shaft.

7. A revoluble member provided with pe-

ripheral radial members; in combination with a driving-shaft, a member supported thereon and provided with a plurality of radiohelical working members of a thickness approximately equal to the width of spaces between said peripheral members, and having angular surfaces engaging the peripheral members.

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

HENRY J. SCHMICK.

Witnesses:
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W. PARKER REINOHL.