May 5, 1931. H. A. YEIDER 1,804,138

REVERSING GEAR MECHANISM

Filed March 27, 1929

Fig. 1.

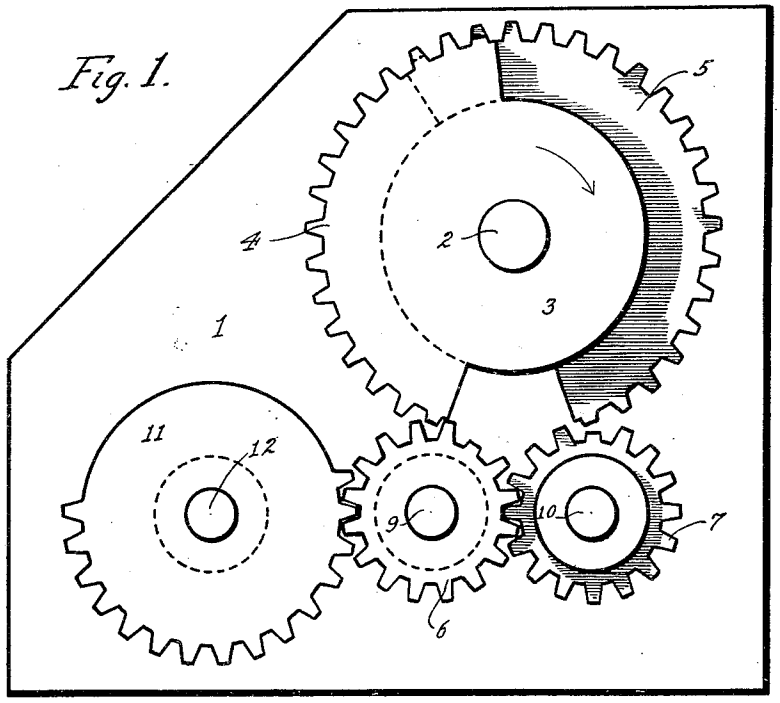


Fig. 2.

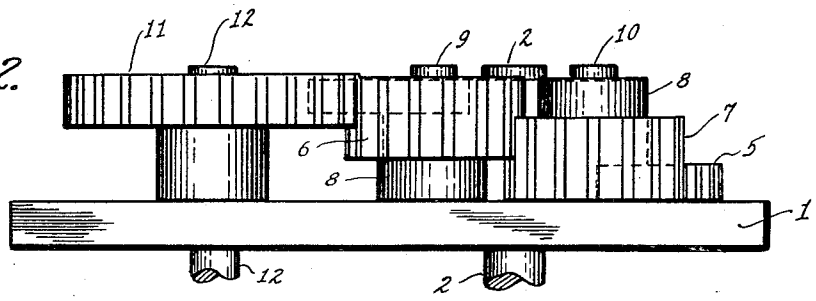


Fig. 3.

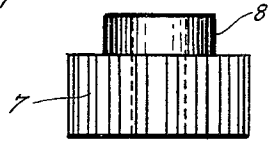
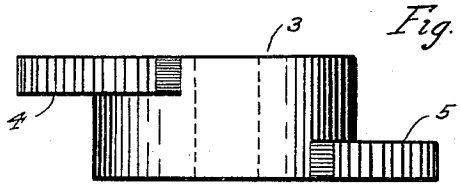


Fig. 4.



INVENTOR.

HARRY A. YEIDER,

BY Rice, Rice & Hann,

ATTORNEYS.

Witness:

G. C. Redding

Patented May 5, 1931 1,804,138

UNITED STATES PATENT OFFICE

HARRY A. YEIDER, OF GRAND RAPIDS, MICHIGAN, ASSIGNOR TO AUTOMATIC MUSICAL INSTRUMENT COMPANY, OF GRAND RAPIDS, MICHIGAN, A CORPORATION OF DELAWARE

REVERSING GEAR MECHANISM

Application filed March 27, 1929. Serial No. 350,163.

This invention relates to gearing of the type wherein continuous rotating motion is translated into alternate rotation in opposite directions.

The main objects of this invention are to provide an improved gearing for translating continuous rotated motion into alternate rotation in opposite directions for various uses; to provide a gear train of this character particularly suitable for imparting a substantially 180° alternate rotation to a shaft such as that upon which the variable condensers of a radio receiving set are mounted; and, to provide a gear train of this character which is simple in construction and efficient in operation.

An illustrative embodiment of this invention is shown in the accompanying drawings, in which:

Fig. 1 is a plan view of my improved gearing mounted upon a base plate.

Fig. 2 is a view in elevation of the same.

Fig. 3 is a view in elevation of one of the intermediate gears.

Fig. 4 is a view in elevation of the driving gear which continuously rotates in one direction.

In the construction shown in the drawings, a base plate 1 has a continuously rotated shaft 2 journaled thereon upon which is keyed a driving gear wheel 3. The gear wheel 3 is provided with toothed segments 4 and 5 located on the circumferentially different peripheral portions of the said gear wheel. The segment 4 extends slightly less than one-half the circumferential distance around the wheel, and the segment 5, slightly more than one-half said distance, said segments having three teeth in overlapping relationship. The first and last teeth on each of the segments are cut away to substantially one-half the height of the remaining teeth.

The segments 4 and 5 are spaced apart axially with respect to the face of the gear wheel, as shown most clearly in Fig. 4 of the drawings. In this instance the axial spacing is substantially equal to the axial width or face of the segments themselves.

A pair of intermediate gear wheels 6 and 7 are journaled on the base plate 1 in position to mesh with and be driven by the segments 4 and 5 respectively of the gear wheel 3. The width of the face of the intermediate gear wheels 6 and 7, as shown most clearly in Fig. 3, is substantially equal to the width of the face of either of the segments 4 or 5 plus the axial spacing of said segments and each of the intermediate wheels is provided with a hub portion 8 which has an axial length substantially equal to the width of either of the segments 4 or 5. These two intermediate gears are identical in construction and when assembled on their studs 9 and 10 respectively, the gear 6 is mounted with the hub on the underside and the gear 7 with the hub on the top side. The position of the studs 9 and 10 is such that when the intermediate gears are mounted thereon, a portion of the face of each gear meshes with a similar portion of the face of the other intermediate gear, as shown in Fig. 2. With such an arrangement the intermediate gears 6 and 7 are always in mesh with each other at the point of axial spacing of the segments 4 and 5 on the driving gear 3, and the remainder of the face of each gear wheel is engaged and driven by the segments 4 and 5 respectively. One tooth on each of gears 4 and 5 is cut away to substantially one-half the height of the remaining teeth, and these gears are meshed with each other and with their respective segments so that the mutilated teeth cooperate to secure reverse rotation of the intermediate gears with a minimum of lag between movements in opposite directions.

A driven gear 11 is keyed to a shaft 12 journaled on the base plate 1 and has gear teeth thereon which continuously mesh with the intermediate gear 6.

In the operation of this gear train, the driving gear 3 is continuously rotated in a direction indicated by the arrow in Fig. 1 of the drawings. The segment 4, as it rotates, passes over the gear teeth on the gear 7 without meshing therewith and meshes and drives the intermediate gear 6 for approximately one-half revolution of the driving gear 3. Such rotation of the

intermediate gear 6 will impart rotation to the driven gear 11 in one direction.

As the segment 4 passes out of mesh with the intermediate gear 6, immediately thereafter the segment 5 engages and meshes with the intermediate gear 7 which, by reason of its continuous meshing with the intermediate gear 6, will rotate the intermediate gear 6 in a direction opposite to that in which it was rotated when in mesh with the segment 4. The intermediate gear 6 in turn will reverse the direction of rotation of the driven gear 11 and revolve it in a direction opposite to which it was being revolved when the intermediate gear 6 was in mesh with the segment 4. The mutilated teeth on the segments and gears cooperate so that there is very little lag between the reversing operations.

As the segment 5 approaches the intermediate gear 6, it will pass underneath the gear teeth thereon by reason of the fact that said gear teeth are held in spaced relation to the base plate 1 by its hub 8 which hub is of substantially the same or slightly greater axial length than the width of the face of the segment 5.

Immediately after the last tooth on the segment 5 passes from mesh with the intermediate gear 7, the first tooth on the segment 4 will again engage the intermediate gear 6 and again reverse its direction of rotation, thus reversing the direction of rotation of the driven gear 11.

In the particular embodiment shown, the ratio of the gearing is such that the driven gear 11 will be alternately revolved approximately 180° of rotation, this being particularly desirable for use in rotating the variable condensers of radio receiving sets as ordinarily constructed at the present time.

Although but one specific embodiment of this invention has been herein shown and described, it will be understood that numerous details of the construction shown may be altered or omitted without departing from the spirit of this invention as defined by the following claims.

I claim:

1. A gear train comprising a driving gear wheel continuously rotating in one direction, said driving gear having two segments of teeth thereon spaced apart axially of the gear and each segment located on circumferentially different peripheral portions of the gear wheel with respect to each other, a pair of gears having intermeshing teeth located in the axial space between said segment, one of said pair of gears being arranged to mesh with one of said segments and the other one of said pair of gears being arranged to mesh with the other of said segments.

2. A gear train comprising a driving gear wheel continuously rotating in one direction, said driving gear having two segments of teeth thereon spaced apart axially of the gear and each segment located on circumferentially different peripheral portions of the gear wheel with respect to each other, a pair of intermediate gears, a portion of the face of each of said intermediate gears overlapping and intermeshing, the remaining portions of said intermediate gear faces being in position to engage and intermesh with said segments respectively and a driven gear meshing with one of said intermediate gears for being alternately revolved in opposite directions.

3. A gear train comprising a driving gear wheel continuously rotating in one direction, said driving gear having two segments of teeth thereon spaced apart axially of the gear and each segment located on circumferentially different peripheral portions of the gear wheel with respect to each other, a pair of intermediate gears meshing with each other, one of said intermediate gears being arranged to mesh with one of said segments and the other intermediate gear being arranged to mesh with the other of said segments, the peripheral disposition of said segments being such that immediately upon disengagement of one of said segments with its intermediate gear, the other said segment will engage and revolve its intermediate gear thereby reversing the direction of rotation of said first-mentioned intermediate gear and a driven gear meshing with one of said intermediate gears for being alternately revolved in opposite directions.

4. A gear train comprising a driving gear wheel continuously rotating in one direction and having two segments of teeth spaced apart axially of the gear and located on circumferentially different peripheral portions of the gear wheel and having the same radius, and a pair of intermeshing gears one of said pair being arranged to mesh with one of said segments and the other one of said pair being arranged to mesh with the other of said segments.

In testimony whereof I have hereunto set my hand at Grand Rapids, Michigan, this 23rd day of March, 1929.

HARRY A. YEIDER.