

Sept. 18, 1962

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3,054,489

ONE DIRECTION DRIVING UNIT

Filed Oct. 21, 1960

2 Sheets-Sheet 1

FIG. 1.

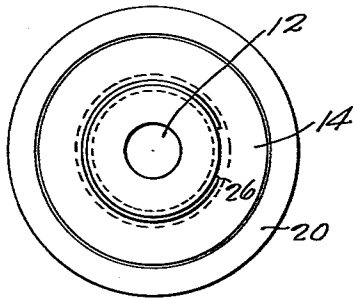


FIG. 2.

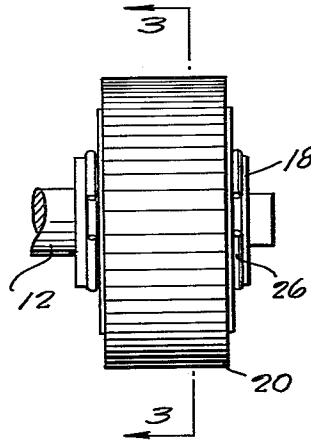


FIG. 3.

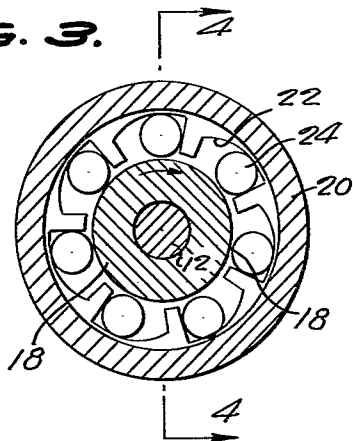


FIG. 4.

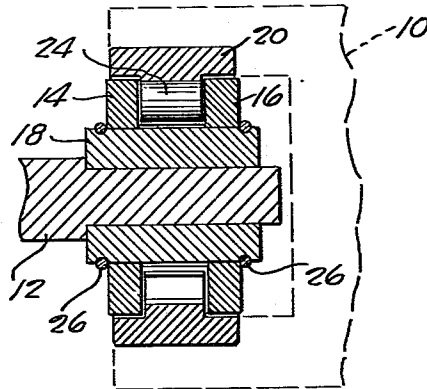
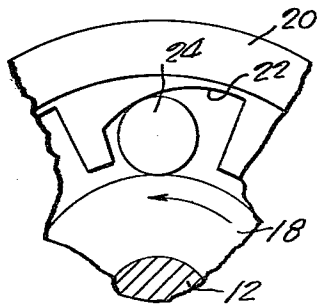


FIG. 5.



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FIG. 6.

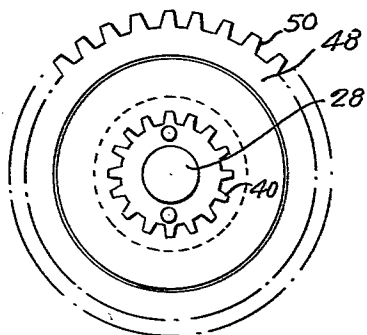
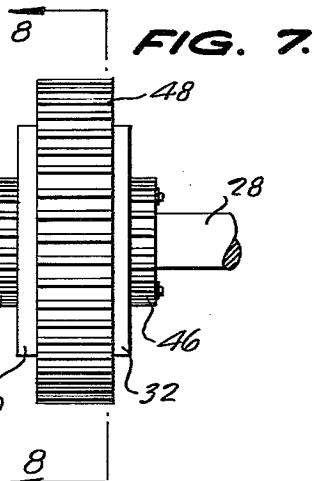


FIG. 8.

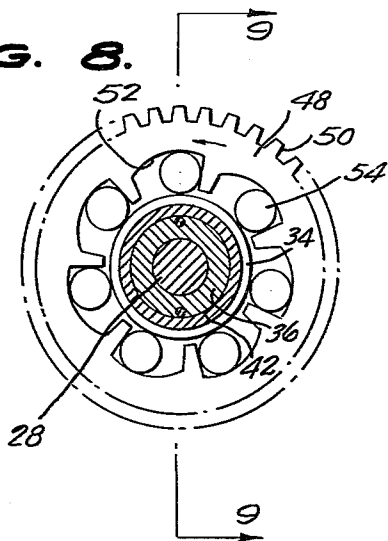


FIG. 9.

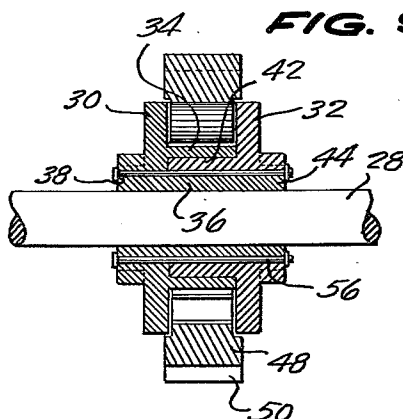
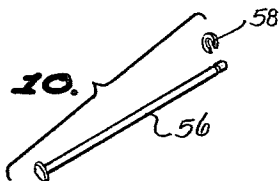


FIG. 10.



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ONE DIRECTION DRIVING UNIT

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3 Claims. (Cl. 192-45)

The present invention relates to a unit for driving a shaft or a gear in one direction only.

An object of the present invention is to provide a one-way drive unit for watches, clocks, and timing devices generally, which unit permits driving of a shaft or a gear in one direction only.

Another object of the present invention is to provide a one direction driving unit which may be manufactured in miniature and one which has wide application in industry for including in the drive mechanism of watches, clocks, or timing devices, in which it is advantageous to have means for preventing the rotation of a shaft or gear in one direction while permitting it to be rotated in the other direction.

These and other objects and advantages of the present invention will be fully apparent from the following description when taken in conjunction with the annexed drawings, in which:

FIGURE 1 is an end view of the driving unit according to the present invention;

FIGURE 2 is a side elevational view;

FIGURE 3 is a view taken on the line 3-3 of FIGURE 2;

FIGURE 4 is a view taken on the line 4-4 of FIGURE 3, the dotted line showing designating a bearing block or the like;

FIGURE 5 is a fragmentary view on an enlarged scale, showing how the hub means is locked against rotation;

FIGURE 6 is an end view of a modified form of the unit according to the present invention;

FIGURE 7 is a side elevational view of the assembly shown in FIGURE 6;

FIGURE 8 is a view taken on the line 8-8 of FIGURE 7;

FIGURE 9 is a view taken on the line 9-9 of FIGURE 8; and

FIGURE 10 is an exploded isometric view showing the means for securing the hub rings of the embodiment of the invention shown in FIGURES 6 to 9, inclusive.

Referring in greater detail to the drawings in which like numerals indicate like parts throughout the several views, in FIGURES 1 to 5, is shown a first embodiment of the one direction driving unit according to the present invention and in which the dotted line showing in FIGURE 4 designates a bearing block for support of a rotatable shaft, the bearing block being designated by the numeral 10 and the shaft by the numeral 12.

A pair of rings 14 and 16 are arranged in side by side spaced relation, and a hub means 18 extends through the rings 14 and 16 and connects the rings 14 and 16 together. The shaft 12 constitutes a driven element drivingly received within the hub means 18.

A band 20 is circumposed about the hub means 18 and has a plain outer periphery serving as a bearing.

Means is provided operatively connecting the band 20 to the hub means 18 for rotation of the hub means 18 in one direction relative to the band 20. Specifically, this means embodies a plurality of cam surfaces arranged

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in spaced relation about the inner periphery of the band 20, as shown in FIGURE 3 and designated by the reference numeral 22.

This means also includes a plurality of rollers 24 disposed between the cam surfaces 22 and the hub means 18.

A snap ring 26 is used to secure each of the rings 14 and 16 to the adjacent portion of the hub means 18, as shown in FIGURES 2 and 4.

With reference to FIGURES 6 to 10, inclusive, a second form of the driving unit according to the present invention is shown in which there is a shaft 28 on which is mounted a pair of rings 30 and 32 arranged in side by side spaced relation.

The ring 30 is formed on its inner face with a pair of concentrically arranged annular flanges 34 and 36 and on its outer face with a hub portion 38 having the outer periphery thereof provided with gear teeth, as at 40 in FIGURE 6.

The ring 32 is provided with a single annular flange on its inner face, as at 42, received between the flanges 34 and 36 of the ring 30.

The ring 32 is provided on its outer face with a portion 44 having the outer periphery thereof provided with spaced gear teeth, as at 46 in FIGURE 7.

A band 48 is circumposed about the hub means formed by the flanges 34, 36, and 42, and has on its outer periphery a plurality of gear teeth 50 extending thereabout.

The inner periphery of the band 48 is provided with a plurality of cam surfaces 52 and a plurality of rollers 54 are disposed between the flange 34 and the cam surfaces 52, these cam surfaces 52 and rollers 54 constituting means operatively connecting the band 48 to the hub means for rotation of said hub means in one direction relative to the band.

A pair of lock pins 56 extends from the ring 30 to the ring 32 and each is provided with a groove inwardly of one end thereof receiving a split washer 58 in the conventional manner.

In use, the unit shown in FIGURES 1 to 5, inclusive, may be employed as a bearing support for a shaft 12 with the shaft 12 and hub means 18 permitted to rotate in the direction of the arrows shown in FIGURE 3 but stop from rotating in the direction of the arrows shown in FIGURE 5 due to the working action of the rollers 24 between the hub means 18 and the cam surfaces 22.

In the form of the invention shown in FIGURES 6 to 10, inclusive, if the shaft 28 is fixed, the band 48 will be permitted to rotate in the direction of the arrows shown in FIGURE 8 but will be prevented from rotating in the opposite direction due to the engagement of the rollers 54 with the cam surfaces 52.

The form of the invention shown in FIGURES 6 to 10, may be employed with a gear driving the rings 30 and 32 and in mesh with the teeth 40 and 46 of the rings 30 and 32, respectively, and motion transmitted to the band 48 by the working action of the rollers 54 and engagement of the latter with the cam surfaces 52 and the outer periphery of the flange 34. Upon rotation of the rings 30 and 32 in the opposite direction, the band 48 is free to stand still or flow freely about the rings 30 and 32.

What is claimed is:

1. In a one-direction driving unit, a pair of rings arranged in side-by-side spaced relation, a pair of concentrically-arranged annular flanges projecting from the face of one of said rings adjacent the other of said rings, a sin-

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gle annular flange projecting from the face of the other of said rings adjacent said one of said rings and received between said pair of flanges, pin means securing said rings together, said pair of flanges and said single flange together forming a hub means, a driven element drivingly received within said hub means, a band circumposed about said rings, and means operatively connecting said band to said hub means for rotation of said hub means in one direction relative to said band.

2. The direction driving unit according to claim 1 10 wherein said last-named means embodies a plurality of cam surfaces arranged in spaced relation about the inner periphery of said band, and rollers disposed between said surfaces and the flange of said pair of flanges remote from said single flange.

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3. The direction driving unit according to claim 2 wherein said band is provided on its outer periphery with gear teeth extending therearound.

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