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2,705,428

CLOCK DETENT MECHANISM

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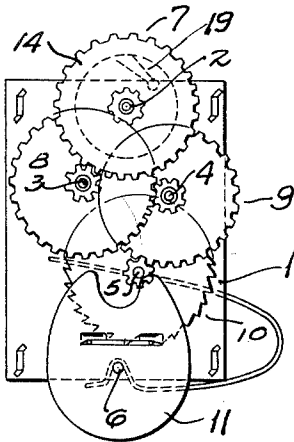


FIG. 1

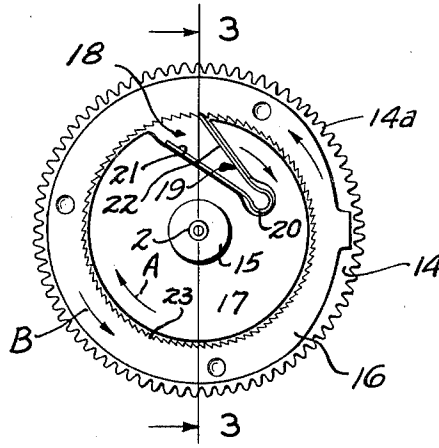


FIG. 2

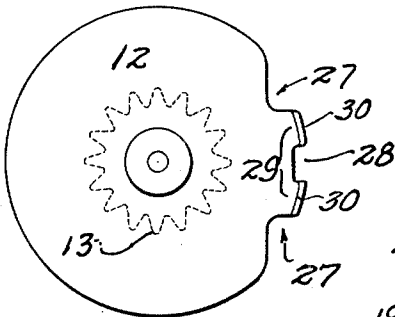


FIG. 4

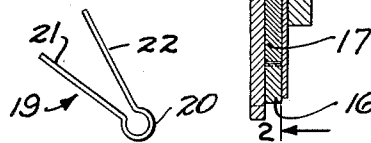


FIG. 6

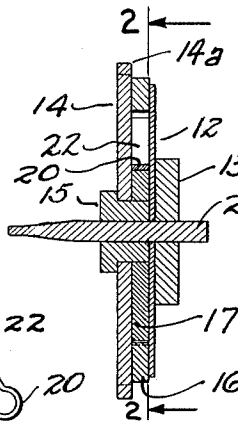


FIG. 3

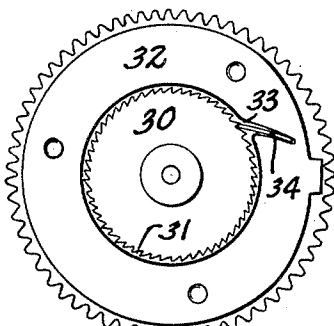


FIG. 7

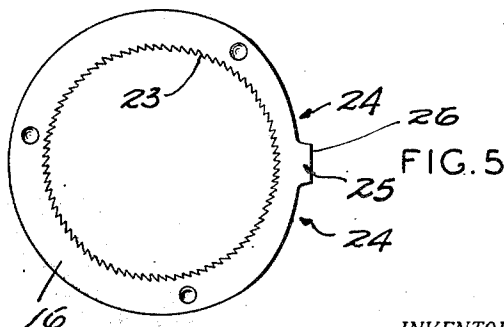


FIG. 5

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CLOCK DETENT MECHANISM

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6 Claims. (Cl. 74—575)

The invention relates to ratchet structure and more particularly to a ratchet structure adapted for use in a clock mechanism, although not limited to such use.

Reference is made to Patent No. 2,302,131, issued to the present applicant November 17, 1942 and showing a ratchet mechanism embodied in the timing clock of an electric toaster.

The present invention comprises a ratchet structure which may be used similarly and embodies improvements upon the structure illustrated and described in the above-mentioned patent.

One of the objects of the invention is to produce a simple, inexpensive ratchet and associated structure which will be accurate and durable, as is particularly required for a timing clock of the class referred to.

It is important to prevent lost motion between the ratchet connected parts so that the setting of the device for a timing operation will be accurate and successive settings will be substantially identical in operation to produce uniform results in toasting or other operations.

Another object is to maintain accuracy in the ratchet structure, irrespective of wear on the ratchet teeth or pawl which, as in previous structures, may result in undesirable lost play between the ratchet connected parts.

Another object is to form a thinner ratchet structure than the usual ratchet wheel and pawl carrying disc disposed side by side.

These and other detailed objects, as will appear from the following description, are attained by the structure described below, reference being had to the accompanying drawings, in which:

Figure 1 is a side view of a clock mechanism embodying a chain of gears, including a composite gear wheel and embodying the ratchet structure of this invention.

Figure 2 is a side view of the composite gear wheel of Figure 1, drawn to an enlarged scale, with a plate removed to better illustrate the ratchet structure. This view is taken on line 2—2 of Figure 3.

Figure 3 is a transverse section taken on the line 3—3 of Figure 2, but includes the plate removed in Figure 2.

Figure 4 is a side view of the inner face of the plate removed from Figure 2.

Figure 5 is a side view of the toothed member of the ratchet.

Figure 6 is a detail of the ratchet spring pawl.

Figure 7 corresponds generally to Figure 2, but illustrates another form of the invention.

The clock-work mechanism shown in Figure 1 preferably includes a pair of plates 1, spaced apart and apertured to form bearings for the shafts 2, 3, 4, 5, and 6 of a chain of gears and pinions 7, 8, 9, a scape wheel 10, and a balance wheel 11. The upper member 7 of this chain is a composite ratchet-gear-pinion wheel embodying the present invention and comprising an outer plate 12, having a pinion 13 fixed thereon, and outer plate 14, having a bushing 15 fixed therein, and intermediate ratchet structure including a central disc 17, having a smooth periphery, and a flat ring 16 having a series of ratchet teeth 23 on its inner periphery and forming a bearing for disc 17. Disc 17 has a deep V-shaped recess 18 extending diagonally of the disc radii and widened at its inner end. A V-shaped spring 19 formed of flat metal with its width disposed perpendicularly to the face of the disc has its doubled end 20 widened seated in the inner end of the recess and thereby retained against movement lengthwise and outwardly of the recess. One leg 21 of the spring bears against one side of the recess and ter-

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minates short of the disc periphery, the other leg 22 of the spring projects beyond the periphery of the disc with its end received in the space between the successive ratchet teeth 23. Each tooth 23 has one face extending substantially radially of the ring and another face inclined to the ring radius.

Ring 16 has its outer periphery gradually recessed at 24 (Figure 5) to provide a projection 25, the outer edge 26 of which is a portion of the normal outer periphery of the ring. Plate 12 has its outer periphery recessed at 27 and 28 (Figure 4) to form two projections 29, the ends of which are flanged at 30 to overlie the outer periphery of ring 16 and to receive projection 25 between them.

With the parts assembled as best indicated in Figures 2 and 3, plates 12 and 14 may be rotated freely relative to each other when turned in the direction indicated by the arrows A and B, Figure 2, during which movement the projecting end of spring leg 22 will ride over the inclined faces of teeth 23. The plates will be held against relative rotation in directions opposite to arrows A and B by the engagement of the projecting end of spring leg 22 with the radially disposed face of a tooth 23. It will be understood that the interengagement of projections 25 and 30 provide for the unitary rotation of plate 12 and ring 16.

The flat parts are easily stamped from sheet metal or otherwise produced and the spring pawl 19 is readily formed from flat strip spring material. The end of the pawl which engages teeth 23 is always well seated in the space between successive teeth, even though its edge should wear substantially with continued use, and there will never be any lost play between members 16 and 17 as is possible with a spring pressed pawl, as has been used on some earlier structures for the same general purpose.

Hence, the pawl point does not require initial shaping or subsequent grinding to maintain the ratchet in satisfactory condition. The ratchet parts are flat and lie in the same general plane and the entire composite gear wheel, including the ratchet, are relatively thin but of adequate strength for its intended functioning, but few parts are required to produce the assembly.

Figure 7 illustrates a similar structure in which the inner disc member 30 has a toothed periphery 31 and the outer ring member 32 has a recess 33 receiving the flat spring 34 which projects beyond the inner periphery of the ring into engagement with the toothed periphery 31. This arrangement operates substantially the same as that previously described and possesses the same general advantages.

The details of the structure may be varied otherwise than as shown without departing from the spirit of the invention and the exclusive use of those modifications coming within the scope of the claims is contemplated.

What is claimed is:

1. A ratchet drive structure comprising a round central member, a ring member surrounding said central member, said members having radially opposing surfaces forming sliding bearings for the members on each other, one of said surfaces being provided with a series of ratchet teeth, the other member having a portion slotted inwardly from the periphery of the member, and a spring having a portion seated against the inner end of said slotted portion and having an end projecting from the slotted portion into abutting engagement with said ratchet teeth to transfer thrust between said members.

2. A ratchet drive structure as described in claim 1 in which the members consist solely of relatively thin plates and the ratchet teeth slotted portion and spring are in the same general plane.

3. A clockwork ratchet structure comprising a round, central, flat sheet disc member, a flat sheet ring-like member fitting around said central disc member and being of like thickness with the sides of said members being substantially flush with each other, the opposing peripheries of said members forming a radial bearing for one member on the other, one of said peripheries consisting of ratchet teeth, there being an elongated recess extending inwardly from the tooth-opposing periphery of the other member, and an elongated spring positioned in said recess with one end and its elongated sides confined by the inner end and sides of said recess, respectively, and with its

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outer end projecting from the periphery of the recessed member and engaging the teeth of the opposing periphery, said spring constituting a thrust transmitting element between said members when they are rotated relatively in one direction about their axis and constituting a free-running ratchet pawl during reverse relative movement of said members.

4. A ratchet structure comprising a round, central, flat disc member, a flat ring-like member surrounding said central member, said members having radially opposing edges, the edge of one member being provided with a series of teeth, there being a V-shaped recess in the other of said members, the sides of said recess diverging in the plane of the members and towards the member edge opposing said teeth, said recess being widened near the converging ends of its sides, and an elongated V-shaped spring received in said recess with legs extending along the sides of the recess and with their converging ends merging in a semi-circular portion fitting in said widened part of the recess and restraining lengthwise movement of the spring, one of said spring legs terminating inwardly of the end of the recess and the other spring leg terminating outwardly of the end of the spring recess and constituting a tooth-engaging pawl.

5. A ratchet structure as described in claim 4 in which the recess is elongated from the periphery of the disc member chordally of the same and the teeth are formed on the internal periphery of the ring-like member.

6. A clockwork structure having mounting parts with opposing parallel flat surfaces spaced apart, a shaft ex-

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tending through said parts normal to said surfaces, a flat disc member mounted on said shaft between said parts and bearing against one of said surfaces, a flat, ring-like member surrounding said disc member and bearing against said surface, the opposing peripheries of said members forming a radial bearing for one member on the other member, the periphery of one of said members comprising a series of ratchet teeth and the other of said members having an elongated recess extending inwardly of the member from its tooth opposing periphery, and an elongated spring pawl in said recess with one end seated against the inner end of the recess and its other end projecting from the outer end of said recess and engaging said teeth, said pawl constituting a sole, circumferential-thrust-transmission element between said members.

References Cited in the file of this patent

UNITED STATES PATENTS

305,635	Schinneller	Sept. 23, 1884
661,838	Adams	Nov. 13, 1900
797,745	Pitman	Aug. 22, 1905
1,032,455	Waskom	July 16, 1912
1,493,559	Norden	May 13, 1924
2,024,115	Schwartz	Dec. 10, 1935
2,302,131	McCullough	Nov. 17, 1942

FOREIGN PATENTS

567,312	Great Britain	Feb. 7, 1945
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