July 6, 1943. A. A. OVERBURY 2,323,415

INTERMITTENT DRIVE GEARING

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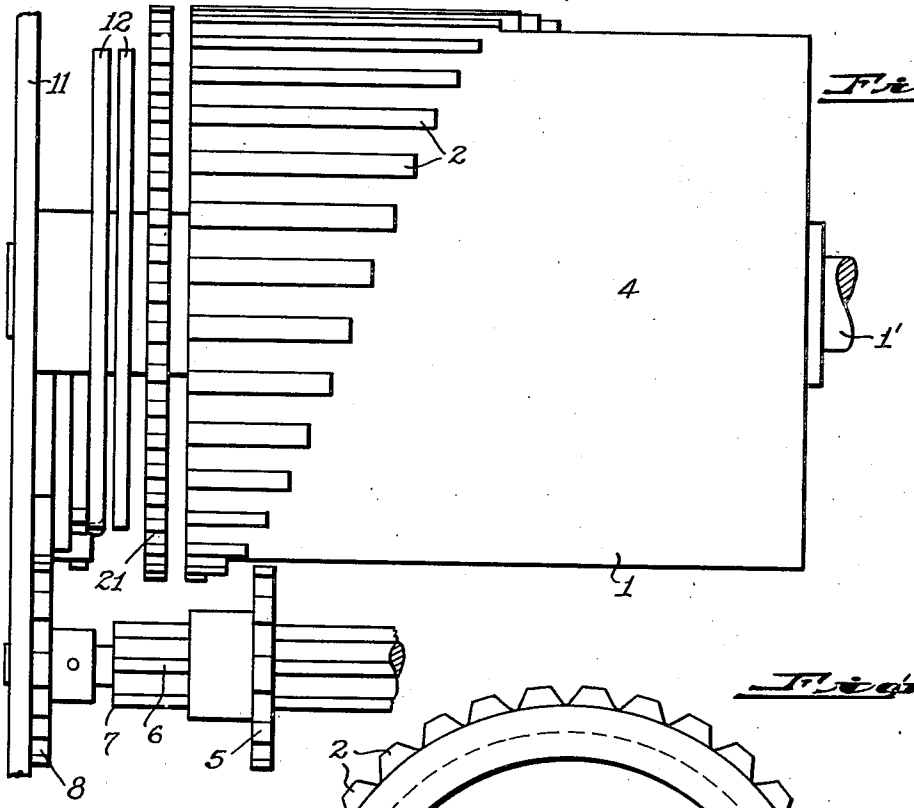


Fig. 1.

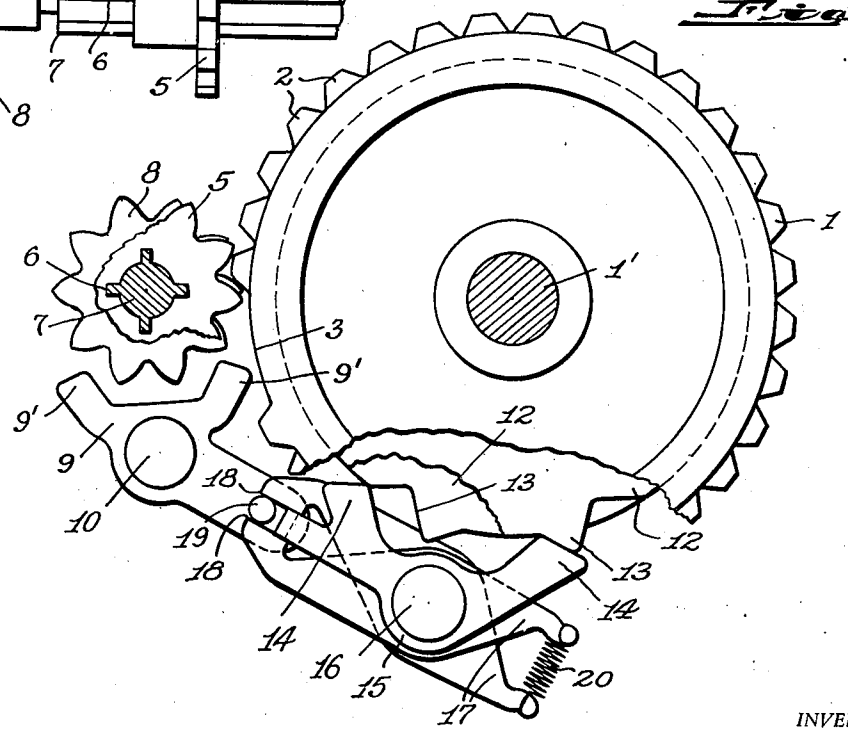


Fig. 2.

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INTERMITTENT DRIVE GEARING

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4 Claims. (Cl. 74—435)

The invention relates to intermittent drive gearing wherein the teeth of the drive gear pass from meshing engagement with those of the driven gear following each rotation of the former so that as a result the driven gear will be subject to some overthrow, an object of the invention being to provide means for automatically and intermittently rotatably adjusting the driven gear with respect to the drive gear to insure meshing engagement of the teeth of the gears. Other objects and advantages will appear hereinafter or will be obvious.

The invention consists in the novel construction and combinations of parts as hereinafter set forth in the claims.

In the accompanying drawing:

Figure 1 is a plan view of the invention, with parts broken away.

Figure 2 is a right side elevation of the invention, as shown in Figure 1, with parts broken away, and parts removed.

In the drawing, the numeral 1 designates a mutilated gear of the drum type, having a plurality of teeth 2 (shown as thirty in number), in an unbroken series, and of variable length, there being an untoothed portion 3 of the drum between the first and the last teeth of the series and an untoothed longitudinal portion 4 of the drum due to the variable length of the teeth. The teeth of the drive gear 1 will upon successive rotations thereof have intermittent meshing engagement with the teeth of a driven pinion 5 whereby the latter will be subject to some overthrow following each rotation of the drive gear.

The pinion 5 has longitudinal slidable splined engagement 6 with the shaft 7 thereof and may be intermitently rotated to a variable extent upon successive rotations of the drum gear dependent upon the location of the pinion longitudinally of its shaft, inasmuch as should the pinion be located at one end of its shaft (the left hand end as shown in Fig. 1), all of the thirty teeth of the drum gear will engage those of the pinion during a rotation of the former, whereas should the pinion be located at the opposite end of its shaft, only one of the teeth of the drum gear will engage those of the pinion during a rotation of the former.

In order to insure the meshing engagement of the teeth of the drum gear and the pinion following each rotation of the former, means described as follows are provided for automatically and intermittently rotatably adjusting the pinion with respect to the drum gear:

A locator gear 8 is fast to the shaft 7 of the pinion and is similar to said pinion with respect to dimensions and number of teeth. The radial disposition of the locator gear upon shaft 7 is shown as slightly different from that of the pinion. A double finger device or lever 9 is fulcrumed at 10 to the stationary framing 11 and has one arm thereof provided with two diverging spaced fingers 9', located upon opposite sides of its fulcrum adjacent said locator gear, said finger lever being spring retracted and adapted upon actuation thereof successively in opposite directions by means to be described to rotatably adjust the locator gear and consequently the pinion for the purpose stated.

A pair of plates 12 are located side by side upon and fast to the shaft 1' of the drum gear and have each a cam tooth 13, these teeth being positioned to act successively, during a rotation of the drum gear, upon two cam teeth 14 of a rocker lever 15, said teeth 14 being located upon opposite sides of the fulcrum 16 of the rocker lever. The rocker lever has flexible spring retracted actuating connection with the double finger lever 9 through the medium of twin levers 17 the oppositely disposed spaced faces 18 of similar arms of which contact the opposite sides of a transverse pin 19 of the tail arm of said finger lever, one arm of said rocker lever having the free end portion thereof located between and contacting said opposite faces 18. The oppositely disposed spaced tail arms of the twin levers 17 are connected by a retracting spring 20.

Should the locator gear and consequently the pinion be located in approximately correct position following a rotation of the drum gear for proper meshing engagement with the teeth of the latter upon a succeeding rotation thereof so that the locator gear will need only a slight adjustment rotatably, the first actuation of the rocker lever 15 by one of the cam teeth 13 and of the finger lever will complete the requisite adjustment of the locator gear, and of the pinion. Should the point of a tooth of the locator gear lie below the point of the finger 9' first engaging the locator gear so that there will be clashing of finger and tooth without any rotative adjustment of the locator gear, completion of the first actuation of the rocker lever following this clashing by this tooth 13 contacting one of the cam teeth 14 of said lever will result in the actuation of one of the twin levers 17 against the tension of its retracting spring 20 and no harm will be done due to the yielding of the parts stated. In this case, the pinion will be rotatably adjusted for the purpose stated by the

succeeding action of the other cam tooth 13 upon the other cam tooth 14 of the rocker lever rocking the latter and the finger lever in the opposite direction. This is due to the spacing of the fingers 9' of the lever 9, since if one tooth of the locator gear is located in such position opposite the inner point of one finger 9' as to cause this clashing, the inner point of the other finger 9' will lie in such position between two adjacent teeth of the locator gear as to effect the requisite rotative adjustment without any such clashing or interference.

A gear for driving the drum gear 4 is shown at 21.

The use of this invention has the advantage of doing away with the need for an overthrow check with its consequent drag upon the mechanism.

In addition to providing against overthrow of the driven pinion, the invention is useful in certain applications thereof in completing a partial step of advance of the pinion. This condition may arise in cases where the driven pinion is moved axially during the rotation of the drum gear, so that the pinion may be shifted from engagement with a tooth of the drum gear at a time when a partial step of movement only has been transmitted to the pinion. In such a case the finger device will operate to accurately locate the pinion by imparting thereto a forward or a retractive movement according to the extent to which the pinion has been advanced by the drum gear.

A further advantage of the invention over the usual spring detent or overthrow check resides in the provision against leaving the finger device in engagement with the point of a tooth of the locator gear, thus preventing jamming and breaking of parts.

By the use of this invention the driven pinion will be accurately located during rotation of the drum gear in either direction, but the invention is specifically designed to provide for absolutely accurate meshing of the teeth of pinion and drum gear during rotation of the drum gear in a given direction. For this purpose the finger device, having located the pinion, is withdrawn or restored to normal position during the time that the longest tooth of the drum gear is coming into mesh with the teeth of the driven pinion. Thus there is no possibility of the teeth of the pinion clashing with those of the drum gear under any conditions, during rotation of the drum gear in the given direction.

I claim:

1. The combination with intermittent drive gearing having a driven gear and a mutilated drive gear; of means for automatically rotatably adjusting the driven gear with respect to the drive gear during the intermissions of the drive to insure meshing engagement of the gears following such intermissions including a spring retracted finger device and means for intermittently actuating said finger device.

2. The combination with intermittent drive gearing having a driven gear and a mutilated drive gear; of means for automatically rotatably adjusting the driven gear with respect to the drive gear during the intermissions of the drive to insure meshing engagement of the gears following such intermissions including a spring retracted finger device and means for intermittently actuating said finger device first in one direction and then in another direction.

3. The combination with intermittent drive gearing having a driven gear and a mutilated drive gear; of means for automatically rotatably adjusting said driven gear with respect to said drive gear during the intermissions of the drive to insure meshing engagement of the gears following such intermissions including a finger device, a rocker device having spring retracted actuating connection with said finger device and means for intermittently actuating said rocker device.

4. The combination with intermittent drive gearing having a driven gear and a mutilated drive gear; of means for automatically rotatably adjusting the driven gear with respect to the drive gear during the intermissions of the drive to insure meshing engagement of the gears following such intermissions including a double finger device, a double rocker device having flexible spring retracted actuating connection with said finger device, and means for intermittently actuating said rocker device first in one direction and then in another direction.

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