

Oct. 14, 1947.

L. F. REINHOLD
COUNTER RESET DEVICE

2,429,136

Filed Aug. 6, 1943

3 Sheets-Sheet 1

Fig. 1.

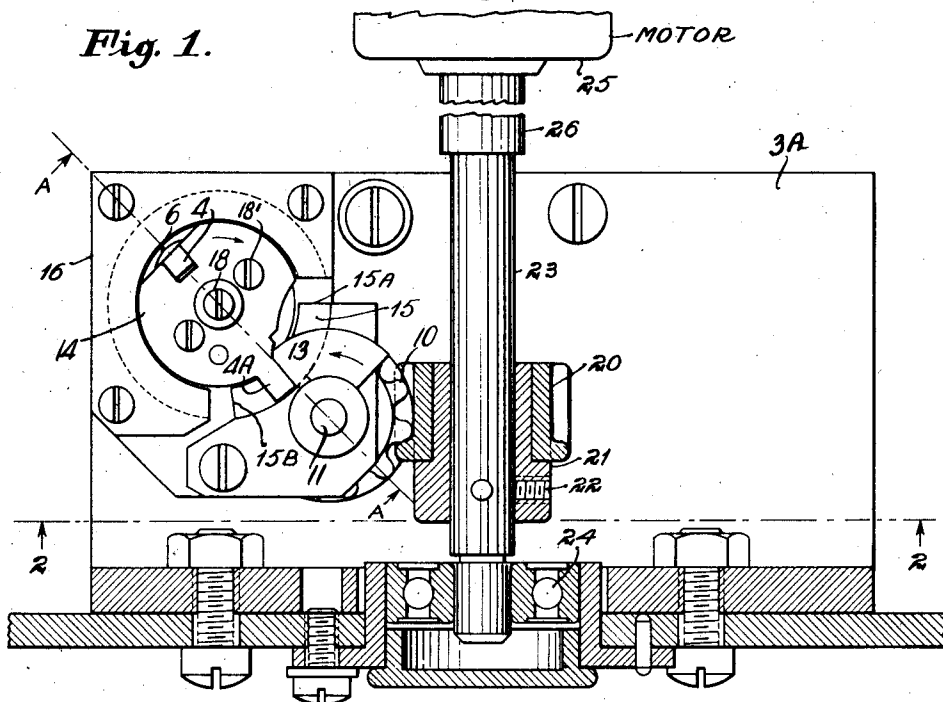
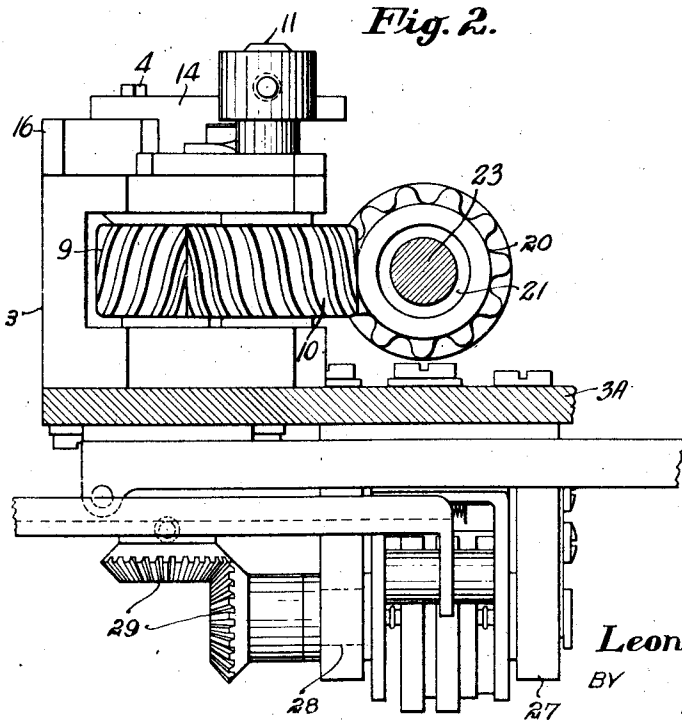


Fig. 2.



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3 Sheets-Sheet 2

Fig. 3.

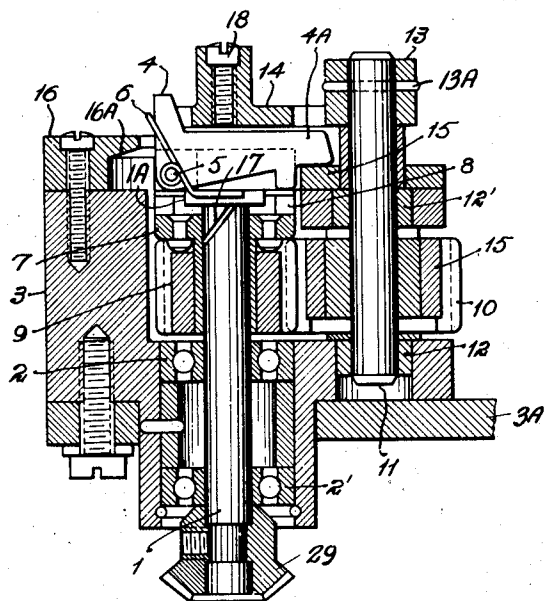


Fig. 4.

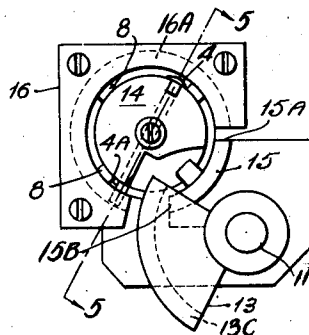


Fig. 5.

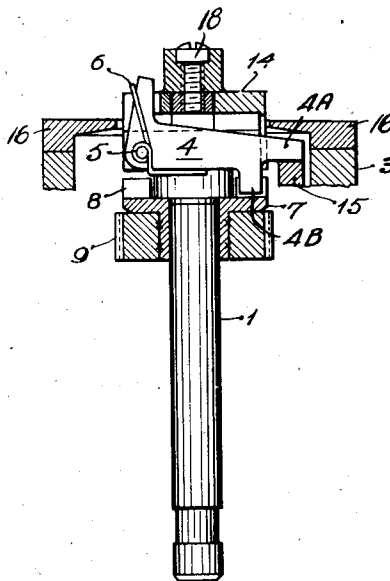
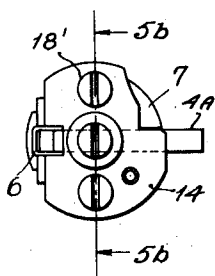


Fig. 5a.



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3 Sheets-Sheet 3

Fig. 5b.

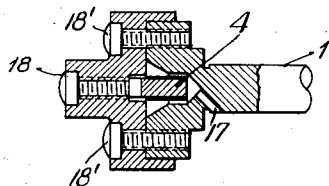


Fig. 6a.



Fig. 6.

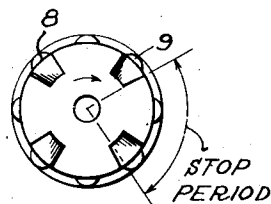


Fig. 7.

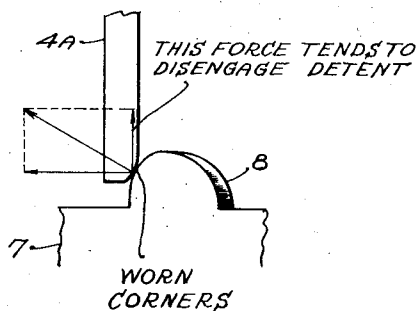
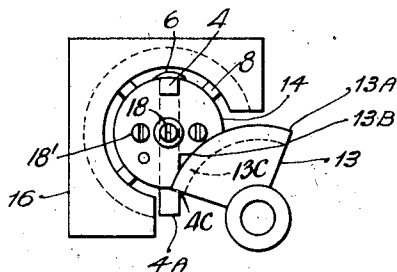


Fig. 8.



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UNITED STATES PATENT OFFICE

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COUNTER RESET DEVICE

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4 Claims. (Cl. 74—125.5)

1

This invention relates to a new and useful automatic counter reset device which is particularly adapted for use in the operation of telemeter systems.

An object of this invention is to simplify and improve automatic counter reset devices.

Another object is to provide an automatic counter reset device with a stop period of a certain time interval after a predetermined setting has been obtained by the counter.

A feature of this invention is the arrangement of an intermittent drive mechanism with a mechanical reset counter.

The operation of a mechanical automatic counter used as a visual numbering device for the printing of selected characters or data requires a stop period of a certain time interval for printing of the data, and therefore a rest period is required for a complete turn of the counterwheel shaft for resetting the counter or numbering wheels to their original zero position.

The driving device for these mechanical numbering or counter printers must therefore be so arranged that the driven counterwheel shaft is at rest for a predetermined time and then followed by a movement sufficient to make a complete turn of 360 degrees. The device of this invention meets these conditions with positive action.

This invention will best be understood by referring to the accompanying drawing in which:

Fig. 1 is a plan view of the reset mechanism of this invention,

Fig. 2 is a side elevation partly in section the section being taken on line 2—2 of Fig. 1,

Fig. 3 is a cross-section taken on line A—A of Fig. 1,

Fig. 4 is a detailed view showing the cam mechanism of this invention,

Fig. 5 is a cross-section of a portion of Fig. 4, the section being taken on line 5—5,

Fig. 5A is a plan view of Fig. 5,

Fig. 5B is a partial section of Figs. 5 and 5A,

Fig. 6 is a plan view of a toothed sleeve, showing the shape of the teeth,

Fig. 6A is a partial side view of Fig. 6,

Fig. 7 is an enlarged detailed view showing the effect of wear on the teeth of the sleeve in Fig. 6, and

Fig. 8 is a plan view showing the reset device in its locked position.

Referring now in detail to the drawings, an intermittently driven shaft 1 having an upper portion 1A of increased diameter is mounted in two ball-bearings 2 and 2' which are held within a frame member 3. The upper portion 1A of

2

shaft 1 is slotted as indicated in Fig. 5 to mount a detent member 4 which is pivoted at its fulcrum point by means of a pin 5. A spring 6 engages the upper extending portion of detent 4 to give it a downward motion when allowed to do so as it rotates above the frame 3. A movable sleeve 7 is arranged around shaft 1 just below the shoulder portion 1A and the detent 4. The sleeve 7 is provided with four upwardly projecting teeth 8, although any other number of teeth may be employed depending upon the desired stop period. The sleeve 7 is arranged to rotate freely on shaft 1. A helical gear 9 is fixed to rotate with sleeve 7. A helical gear 10 is arranged to mesh with gear 9 and is fixed to a second shaft 11 which rotates in bearings 12 and 12'. A cam 13 is fixed by a pin 13A to shaft 11 at the upper portion thereof. A cam follower 14 is arranged to engage with cam 13 in a certain predetermined angular position relative to the center of shafts 1 and 11. Cam follower 14 is fixed to the upper portion of shaft 1 by two screws 18. Located intermediate the center of shafts 1 and 11 is an arc-shaped or curved incline 15 which in conjunction with a guide plate 16 forms a circular path to guide detent 4. The guide plate 16 has an undercut circular portion 16A which guides the extreme projecting end 4A of detent 4 to prevent it from disengaging with tooth 8 should the corners be worn away, as is shown in Fig. 7. The upper end of shaft 1 is provided with an oil inlet 17 which lubricates the detent 4 and sleeve bearing 7 as well as bearings 2 and 2'. A machine screw 18 covers the upper portion of the oil inlet 17. The screws 18' fasten cam plate 14 to enlarged portion 1A of shaft 1, as indicated in Figs. 5A and 5B. A third helical gear 20 meshes at a right angle with gear 10 and is secured by means of a bushing 21 and set screw 22 to a rotatable clutch shaft 23. The forward end of shaft 23 is arranged to rotate in ball-bearing 24. The opposite end of the shaft 23 is connected to a suitable rotatable device or motor 25 which may be provided with a clutch 26. The forward portion of frame member 3 and beneath plate portion 3A there is provided with a mechanical counter 27 having a reset shaft 28 which is geared to the intermittent shaft 1 by means of a pair of beveled gears 29.

In the particular embodiment shown in this device, the intermittent shaft 1 dwells for approximately one-fifth of the rotation of shafts 11 and 23 during a complete recording cycle; or in other words, shaft 1 dwells slightly less than 72 degrees of the rotation of the shaft 11. The

gear 9 has twelve teeth and gear 10 has fifteen teeth, thus giving a gear ratio of four-fifths of the whole recording cycle. Of course, it is to be understood that other gear ratios may be provided to give a shorter or longer period of dwelling for shaft 1, depending upon the individual requirements of the telemeter apparatus.

In the operation of this device, reference is first made to the showing of Fig. 1, in which position the cam 13 is shown as just engaging the cam follower 14. Secondly, in Fig. 4 the cam 13 is shown as being completely disengaged from cam follower 14 and the detent member at 4A, engaging the tooth 8 to start the rotation of the driven shaft 1. Thirdly, the showing of Fig. 8 indicates the cam in position to lock the cam follower 14 (which is a rest position for shaft 1) during which time the printing of selected characters or data is made. Referring now to Fig. 4, which shows the cam disengaged from the cam follower 14 and with detent 4 positioned as shown, the cam 13 is now beyond the engaged position of cam follower 14. In this position the detent 4 does not have its projecting end 4A resting upon the incline 15, but by action of spring 6 is lowered to be engaged with teeth 8 of sleeve 7 as shown by Fig. 5. When the gear 10 and cam 13 are rotated counterclockwise, as indicated by the arrow in Fig. 1, gear 9 and its attached sleeve 7 and cam follower 14 will rotate clockwise. By means of the detent 4, which is pivotally fixed to the upper portion of the intermittently driven shaft 1 and engaged with teeth 8 on sleeve 7, shaft 1 rotates clockwise until the end 4A of detent 4 enters the lower portion of the curved inclined plane 15 at a point 15A. At this point, as the detent 4 moves upward on the incline 15 clockwise from point 15A, the action is such that the detent 4 is withdrawn from engagement with the teeth 8 on sleeve 7. Rotary motion of shaft 1 would normally stop here if it were not for the action of cam 13 picking up the cut away portion of cam follower 14 and thus carrying it to a position where the detent 4 leaves the end of the upper portion of the incline 15 at the end 15B and the detent end 4A is forced down by spring 6. The under side slope of cam 13 also causes detent 4 to drop down. However, because the orientation of the teeth 8 on sleeve 7 is such at this instant, detent 4 cannot immediately come into engagement with one of the teeth 8 and there will be no drive between detent 4 and sleeve 7. Therefore, shaft 1 will now be stopped in rotation and will remain in this position (which is shown by Fig. 8) until the detent 4 is again actuated by teeth 8 (as is shown by Fig. 4). This time interval is a function of the gear ratio of gears 9 and 10 and the number of teeth 8 on sleeve 7. During the stop period, shaft 1 is locked in position by means of cam 13 and cam plate 14, as shown by Fig. 8, because cam 13 rotates along a circular cut-out portion in cam follower 14. When point 13A of cam 13 reaches point 13B on cam follower 14, one tooth 8 on sleeve 7 actively engages the detent 4 and carries shaft 1 around again, thus repeating the recording cycle. To prevent the detent 4 from failing to drop due to grease, sticky oil, dirt, or a broken or fatigued spring 6 and thus missing the engagement with sleeve 7, a slope 13C is added to the inner side of cam 13 which is parallel with and follows the same slant as that of incline 15. During the intermittent or stop period, this slope slides over detent 4 so as to press it down, as will be seen at 4C in Fig. 8.

The sleeve 7 is so oriented on shaft 1 and its teeth 8 are so shaped that at the moment when detent 4 drops in between the teeth 8 on sleeve 7, the depending portion 4B will engage with sleeve 7. To prevent the detent 4 from dislodging itself from engagement with a tooth on sleeve 7 by upward movement while the shaft 1 is rotating, a guide plate 15 is added. This disengagement would result if and when detent 4 and a tooth 8 should wear away, as is illustrated in Fig. 7.

Should it be desired to reverse the direction of incline of plate 15 and the slope 13C of the cam 13, then the direction of rotation of gears 9 and 10 and shaft 1 will also have to be reversed.

If a different rest period is desired the ratio of the gears must be changed and also the shape of cams 13 and 14 should be altered slightly.

While I have indicated and described a system for carrying my invention into effect, it will be apparent to one skilled in the art that my invention is by no means limited to the particular devices shown and described, but that many modifications may be made without departing from the scope of my invention.

What I claim is:

1. An intermittent drive comprising a frame member, a driving shaft mounted for rotation within said frame member, a driven shaft mounted for rotation within said frame member, a cam secured to said driving shaft, a cam follower secured to said driven shaft, said cam follower having means for engaging said cam, a toothed sleeve surrounding said driven shaft, a detent pivoted to said driven shaft, said detent having means to engage said toothed sleeve, means for rotating said driving shaft and said sleeve, an inclined plane located in a position on said frame member such as to disengage said detent from said toothed sleeve when said cam follower is engaged by said cam thereby causing said driven shaft to intermittently stop rotation.

2. An intermittent drive comprising a frame member, a driving shaft mounted for rotation within said frame member, a driven shaft mounted for rotation within said frame member, a cam secured to said driving shaft, a cam follower secured to said driven shaft, said cam follower having means for engaging said cam, a toothed sleeve surrounding said driven shaft, a detent pivoted to said driven shaft, said detent having means to engage said toothed sleeve, means including gears for rotating said driving shaft and said sleeve, a curved inclined plane located in a position on said frame member such as to disengage said detent from said toothed sleeve when said cam follower is engaged by said cam thereby causing said driven shaft to intermittently stop rotation.

3. An intermittent drive comprising a frame member, a driving shaft mounted for rotation within said frame member, a driven shaft mounted for rotation within said frame member, a cam secured to one end of said driving shaft, a cam follower secured to one end of said driven shaft, said cam follower having means for engaging said cam, a toothed sleeve surrounding said driven shaft, a detent pivoted to said driven shaft, said detent having means to engage said toothed sleeve, a detent guide plate secured to said frame member to intermittently keep said detent engaged with said toothed sleeve, and an inclined plane located in a position on said frame member to disengage said detent from said toothed

5

sleeve when said cam follower is engaged by said cam thereby causing said driven shaft to intermittently stop rotation.

4. An intermittent drive comprising a frame member, a driving shaft mounted for rotation within said frame member, a driven shaft mounted for rotation within said frame member, a cam secured to one end of said driving shaft, a cam follower secured to one end of said driven shaft, said cam follower having means for engaging said cam, a toothed sleeve surrounding said driven shaft, a detent pivoted to said driven shaft, said detent having means to engage said toothed sleeve, means for rotating said driving shaft and said sleeve, a spring for forcing said detent to engage said toothed sleeve, an inclined plane located in a position on said frame member such as to disengage said detent from said

6

toothed sleeve when said cam follower is engaged by said cam thereby causing said driven shaft to intermittently stop rotation.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,697,836	Richards	Jan. 1, 1929
2,048,194	Moreno	July 21, 1936
1,600,414	Lake	Sept. 21, 1926

FOREIGN PATENTS

Number	Country	Date
144,953	Germany	Mar. 25, 1936