Dec. 29, 1931. U. KOHLER 1,838,843

CLOCKWORK DRIVING MECHANISM IN TACHOMETERS AND THE LIKE

Filed March 9, 1931

Fig. 1.

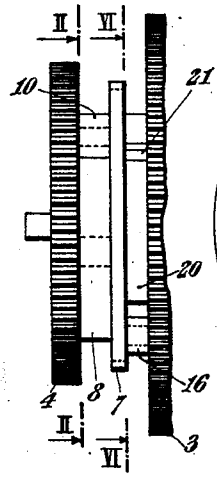


Fig. 2.

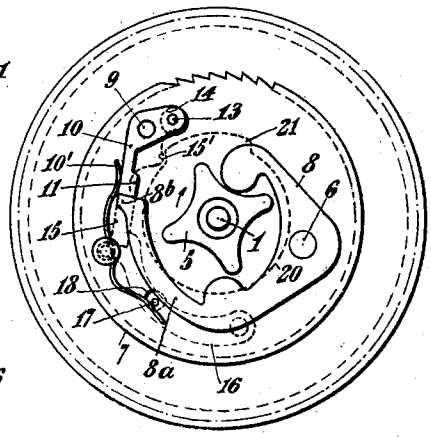


Fig. 3.

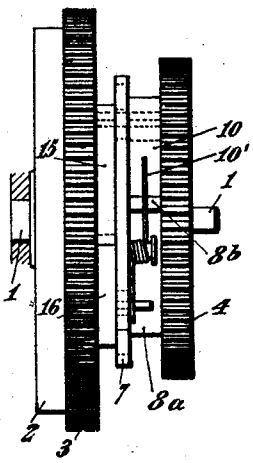


Fig. 6.

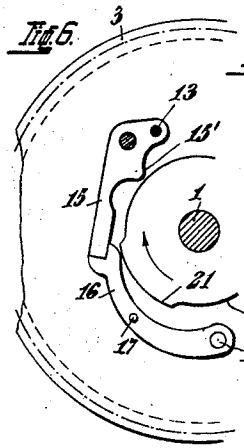


Fig. 4.

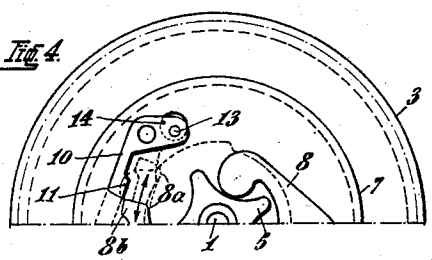


Fig. 7.

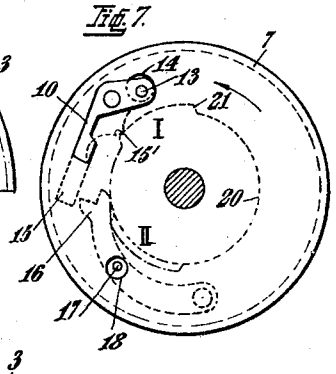
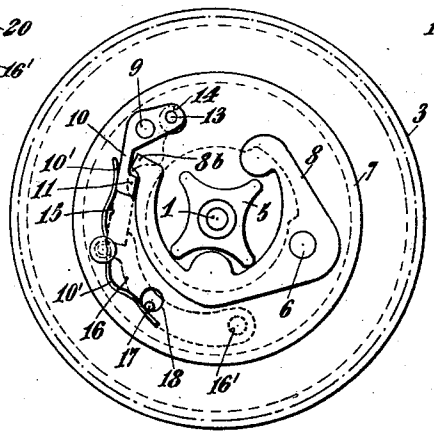


Fig. 5.



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UNITED STATES PATENT OFFICE

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CLOCKWORK DRIVING MECHANISM IN TACHOMETERS AND THE LIKE

Application filed March 9, 1931, Serial No. 521,376, and in Switzerland March 15, 1930.

This invention relates to clockwork driving mechanism in tachometers and the like, and has for its object to provide an improved construction such that only a quite small predetermined tension of the main spring is required for driving the clockwork.

According to the invention there is provided a clockwork driving mechanism comprising a rotary escapement device whereof an escapement wheel is rigidly connected with a driving wheel arranged on a mainspring loading-shaft, and whereof a pawl is controlled by a releasing member which is itself controlled by a part rotating with a main-spring barrel, so that when the driving or main spring is loaded after a predetermined angular movement of the part rotating with said barrel in relation to the ratchet wheel, the releasing device becomes inoperative in relation to the said pawl and the escapement device is thereby disengaged.

According to a feature of the invention, the pawl aforesaid is constructed in the form of an escapement anchor and the escapement wheel as a star wheel, the said pawl and releasing member being mounted on a locking wheel that is fast on said loading-shaft and is held against rearward rotation.

According to a further feature of the invention, the said pawl is formed with an extension or tail-piece that reaches to the side of the loading-shaft diametrically opposite the pivot of the pawl, and the releasing member is formed as a two-armed lever controlled by a retardation catch which is itself controlled in such a manner by a cam on the spring barrel aforesaid that the releasing member, after release of the said pawl by the retardation catch, is prevented from returning into its locking position until after a predetermined rotation of the cam in relation to the ratchet wheel the retardation catch is caused to release the releasing member.

Other features of the invention will be described hereinafter and pointed out in the claims.

One embodiment of the invention is diagrammatically illustrated by way of example in the accompanying drawings, wherein:—

Figure 1 shows one form of driving mechanism according to the invention in side elevation as viewed from the right-hand side of Figure 2,

Figure 2 is a cross-section taken on the line II—II in Figure 1,

Figure 3 is a side elevation as viewed from the left-hand side of Figure 2,

Figures 4 and 5 are sections similar to Figure 2, but showing various parts in different positions, and

Figures 6 and 7 show details in various positions.

Like reference characters designate like parts throughout the several views.

Referring to the drawings, a spring-barrel 2 is free to rotate on a shaft 1 for winding or loading a driving or main spring, not shown, in the barrel. The inner end of this main spring is attached to the shaft 1 and its outer end is firmly connected to the periphery of the barrel. A ring 3 of teeth on the barrel drives a time shaft, not shown, of a clockwork.

A spur gear 4 carrying a four-point star wheel 5 is freely rotatable on the loading shaft 1 and is driven by the shaft of the tachometer which is to be measured. This star wheel 5 together with an escapement anchor 8 forms a rotary escapement device, the anchor 8 being mounted at 6 on a locking wheel 7 that is fast on the shaft 1 and prevented from rotating backwards.

The one arm of the anchor 8 has a lug or tail piece 8*a* that extends to the side of the shaft 1 diametrally opposite the pivot pin 6, which lug has at its free end a tooth 8*b*. The anchor 8 with its lug 8*a*, 8*b* constitutes the pawl aforesaid of the rotary escapement device, whereof the star wheel 5 constitutes the escapement wheel.

The locking pawl 8, 8*a*, 8*b* is controlled by a two-armed releasing lever 10 fulcrumed on the locking wheel 7 at 9. This releasing member 10 has at one end an inwardly directed tooth 11. One end of a spring 10′ mounted on the locking wheel 7 tends to hold the tooth 11 of the releasing member 10 in

the path of movement of the tooth 8*b* of the pawl 8. The inner end position of the releasing member 10 is determined by a stop pin 13 which passes with play through a hole 14 in the locking wheel 7 and engages with a lever 15 fulcrumed also at 9 but at the other side of the locking wheel 7. The lever 15 is controlled by a locking lever 16 constituting the retardation catch aforesaid which is fulcrumed at 16′ on the locking wheel 7.

The other end of the spring 10′ presses inwards a pin 17 of the catch 16 that extends through a hole 18 in the locking wheel 7 and the catch 16 is thus held with its free shouldered end in the path of a rise or projection 21 of a cam 20 fast on the barrel 2.

The lever 15 has a lug 15′ extending within range of the rise 21. If the main spring is loaded sufficiently and the rise 21 of the cam 20 coacts with the lug 15′ (position I in Figure 7) the releasing member 10 will be disengaged, that is moved from its position shown in Figure 2 into that shown in Figures 4 and 7. Under the influence of the spring 10′ the catch 16 swings inwards at once and takes under the lever 15 so that the releasing member 10 coupled with the lever 15 is prevented from moving into the path of the pawl 8, 8*a*, 8*b* (and thus engaging with the escapement device) when the rise 21 of the cam moves away from under the lug 15′ in consequence of the main spring starting to unwind. After the disengagement of the releasing member the pawl 8, 8*a*, 8*b* meets with no resistance during the continued rotation of the wheel 4 and star wheel 5, but swings idly to and fro between its two end positions. The coupling between the driving wheel 4 and barrel 2 is thus disconnected until the main spring has unwound so far that the cam 20, 21 forces the lever 16 outwards (Figure 6). Under the influence of the spring 10′ the releasing member returns into the path of movement of the locking pawl 8, 8*a*, 8*b* which is then prevented from swinging to and fro and drives the locking wheel 7 and with it the shaft 1 under the influence of the main spring. When the locking wheel 7 has rotated approximately one revolution in relation to the spring barrel 2, and the main spring is thus fully wound up and loaded to a maximum, the rotary escapement device is disengaged afresh by the cam 20, 21.

When the above described clockwork drive is employed it is possible to use a definitely predetermined and small mean tension of the main or driving spring so that in spite of the non-uniform rotation of the driving wheel 4 corresponding to the speed at any time of the vehicle a quite uniform driving force can be exerted on the clockwork.

The invention is not restricted to the precise constructional details enumerated.

I claim:—

1. A clockwork driving mechanism comprising in combination a shaft, a barrel freely rotatable about the same, a spring having one end connected to said shaft and its other end connected to the barrel, a driving wheel on the shaft, and a rotary pawl-and-ratchet device comprising a ratchet-wheel firmly connected with said driving wheel, and a pawl coacting with the ratchet-wheel, a releasing member arranged to engage and be disengaged from said pawl, and a member rotatable with said barrel and arranged to control said releasing member so that when said spring is loaded after a predetermined angular movement of said member about the shaft in relation to said ratchet-wheel, the releasing member is moved out of engagement with said pawl and the pawl-and-ratchet device thereby becomes operative.

2. A clockwork driving mechanism comprising in combination a shaft, a barrel freely rotatable about the same, a spring having one end connected to said shaft and its other end connected to the barrel, a driving wheel on the shaft, a locking wheel free to rotate on the shaft in only one direction, a rotary escapement device comprising a star wheel firmly connected to said driving wheel, and a pawl pivoted on said locking wheel and coacting with said star wheel, a releasing member pivoted on said locking wheel and arranged to control said pawl, and a member rotatable with said barrel and arranged to control said releasing member so that when said spring is loaded after a predetrmined angular movement of said member about the shaft in relation to said escapement wheel, the releasing member is moved out of engagement with said pawl and the escapement device thereby becomes operative.

3. A clockwork driving mechanism comprising in combination a shaft, a barrel freely rotatable thereon, a spring connected at one end to the shaft and at its other end to the barrel, a driving wheel on the shaft, a locking wheel free to rotate on the shaft in only one direction, a rotary escapement device comprising a star wheel rigidly connected to said driving wheel, and a pawl pivoted on said locking wheel and coacting with said star wheel, a cam rotatable with said barrel, a releasing member in the form of a two-armed lever pivoted on said locking wheel and having one arm arranged to control said pawl, and a retardation catch mounted on said locking wheel and arranged to control the other arm of said lever, which catch is so controlled by said cam that the releasing member, after being moved into its releasing position in which it is disengaged from said pawl, is prevented from returning into its locking position until, after a predetermined rotation of the cam in relation to the star wheel, the catch is caused to release the releasing member.

4. A clockwork driving mechanism com-

prising in combination a shaft, a barrel freely rotatable thereon, a spring connected at one end to the shaft and at its other end to the barrel, a driving wheel on the shaft, a locking wheel free to rotate about the shaft in only one direction, a rotary escapement device comprising a star wheel rigidly connected to said driving wheel, and a pawl pivoted on said locking wheel at one side of the shaft and coacting with said star wheel, which pawl has a tailpiece extending around said shaft to a situation opposite the pivot of the pawl, a cam rotatable with said barrel, a releasing member in the form of a two-armed lever pivoted on said locking-wheel, one arm of which lever is spring pressed and arranged to lock and release said tail-piece, a control member carried by the barrel and arranged to coact with the second arm of said lever extending through the locking wheel, and a spring-controlled retardation catch mounted on said locking wheel and arranged to engage the said second arm of the lever and hold the latter against its spring out of engagement with said tail-piece, and a pin on said catch extending through the locking wheel and controlled by said cam.

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