

F. R. ALFORD.
KEYLESS WINDING APPARATUS FOR CLOCKS.
APPLICATION FILED JAN. 19, 1912.

1,049,285.

Patented Dec. 31, 1912.

2 SHEETS—SHEET 1.

Fig. 2.

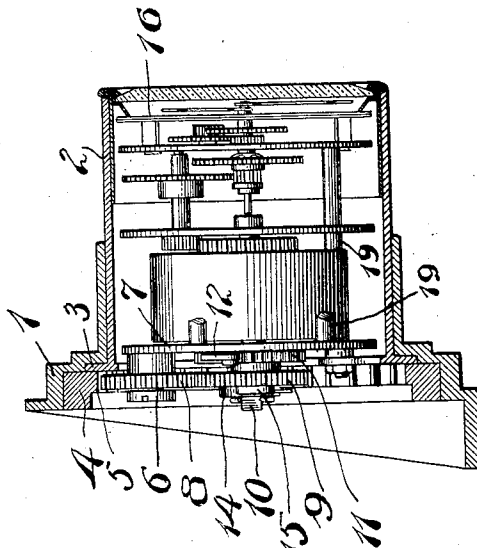
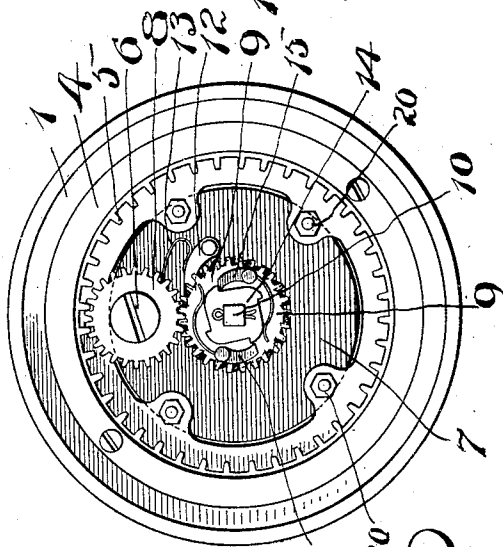


Fig. 1.



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2 SHEETS—SHEET 2.

Fig. 5.

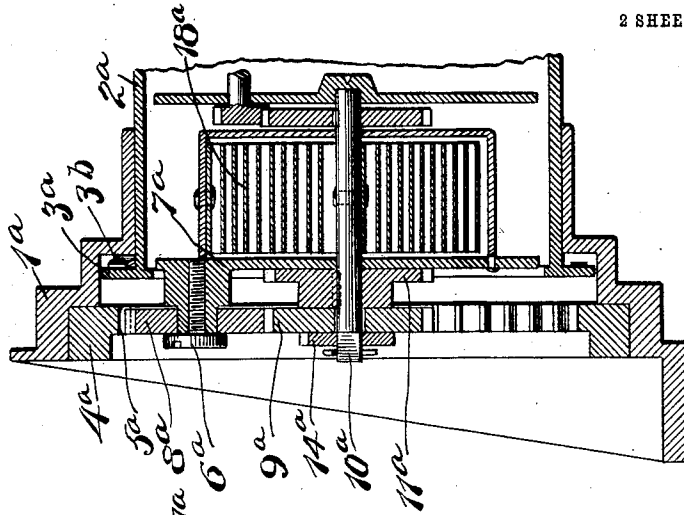


Fig. 4.

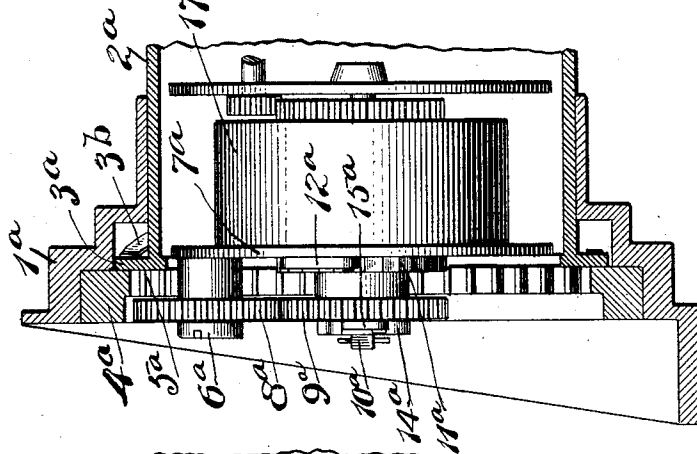
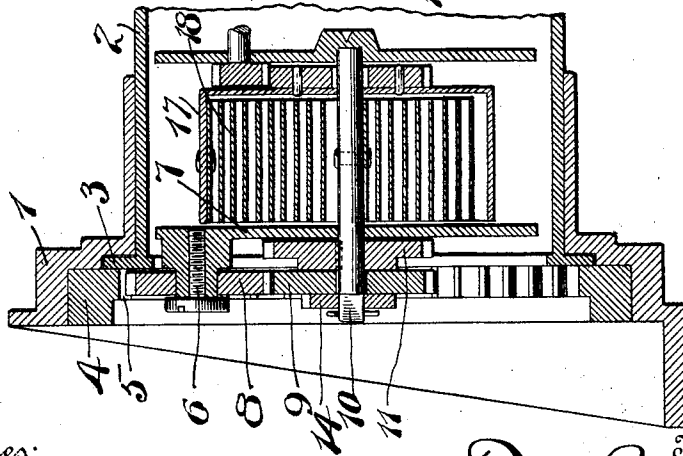


Fig. 3.



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KEYLESS WINDING APPARATUS FOR CLOCKS.

1,049,285.

Specification of Letters Patent.

Patented Dec. 31, 1912.

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To all whom it may concern:

Be it known that I, FRANK R. ALFORD, a citizen of the United States, residing at Winsted, Litchfield county, Connecticut, have invented certain new and useful Improvements in Keyless Winding Apparatus for Clocks, of which the following is a full, clear, and exact description.

My invention relates to clocks, and particularly to what may be termed keyless winding apparatus therefor.

The object of the invention is to provide a simple, effective and durable winding mechanism for clocks, whereby the main spring thereof may be wound up without the use of a key.

In the accompanying drawings Figure 1 is a rear end elevation of a clock constructed to embody my invention in one form. Fig. 2 is a longitudinal section, partly in elevation. Fig. 3 is a relatively enlarged sectional view of certain parts. Fig. 4 is a sectional view of a modification showing certain parts in elevation. Fig. 5 is a sectional view of the same modification showing the parts in a different position.

I will first describe the construction shown in Figs. 1 to 3. 1 is the main frame or support. 2 represents a cylindrical clock casing rotatably mounted in the frame 1. The frame 1 is provided with an internal shoulder, against which bears an annular flange 3 at the rear end of the case 1, to prevent the longitudinal separation of the parts 1 and 2. 4 is a ring standing at the rear of the flange 3. This ring may be detachably secured, whereby when removed, the case 2 may be removed from the frame 1 rearwardly. The ring 4 is provided with internal gear teeth 5. 6 is a pivot mounted upon the back of the clock case 2, or some part rigidly connected therewith, such as the plate 7. Mounted upon the pivot 6 is an idler gear 8. This gear 8 meshes with a gear 9, which is concentrically mounted for rotation around a central main spring arbor 10. Back of the gear 9 and fixed upon the arbor 10 is a ratchet wheel 11. 12 is a pawl arranged to coact with the ratchet wheel 11, said pawl being mounted upon the back of the plate 7 and being pressed by a spring 13 into yielding engagement with said ratchet wheel 11. 14 is a ratchet fixed on the outer end of the arbor 10, and 15 is a pawl mounted upon the gear 9 and ar-

ranged to coact with the ratchet 14, being suitably spring-pressed against said ratchet. In the present instance I have shown two pawls 15, and I have shown the ratchet 14 as being provided with four teeth. The central arbor 10 is suitably connected with the main spring in any suitable way. The usual clock mechanism is provided and is associated with the main spring, but inasmuch as no novelty is claimed for the clock mechanism *per se*, it will be unnecessary to describe the same, although it is conventionally shown in Fig. 2. The pinion 8, in the form shown in Figs. 1, 2 and 3, is always in mesh with the ring gear 4, and likewise the gear 9. By preference, the teeth 5 on the ring 4 are spaced apart so as to take into every other notch progressively in the gear 8, and it should be understood in the preferable construction that an uneven number of teeth are provided on the gear 8, as shown, whereby in operation, as the gear teeth of the gears 4—8 are caused to mesh, the teeth 5 will, in one complete revolution of the gear 8, mesh with every other tooth thereof, and on the next succeeding revolution of gear 8, owing to its uneven number of teeth, will mesh with the odd teeth not engaged during the first revolution. The teeth of the gear 4 will, therefore, in a series of revolutions of the gear 8, intermesh with every space between the teeth on the gear 8, thereby securing uniform wear. Although no claim of novelty is made for any particular parts of the clock mechanism or train, it is obvious that said clock mechanism, including the dial 16, will turn bodily with the case 2 in whichever direction the latter is turned, and it is also obvious that said case 2 may be rotated in either direction.

Operation: Assuming the main frame 1 is secured rigidly to a suitable support, for example, the dashboard of a carriage (in the event the clock is to be used as a carriage clock)—to wind the clock the user grasps the case 2, and, in this instance, rotates it clockwise. The effect of this rotation will be to carry around the idler 8 in a planetary course. This movement of the idler will cause a rotation of the gear 9 in a direction to rotate the arbor 10, through the medium of the pawl 15 and ratchet 14, so as to wind up the main spring. As the winding arbor rotates, the

ratchet wheel 11 rotates with it, the pawl 12 snapping over the teeth therein in the usual manner and holding said ratchet and arbor against rearward rotation relatively to the plate 7 or clock case 2. When the main spring is fully wound, it may happen that the dial 16 will be found to be inverted, or out of the proper position to be viewed in the customary manner. To restore the dial to its customary position, with the numeral 12 uppermost, merely requires a partial reverse rotation of the case 2. This reverse rotation is permitted by reason of the fact that the reverse planetary movement of the gear 8 simply turns the gear 9 freely on the arbor, the pawls 15 snapping over the teeth of the ratchet 14. These pawls 15 carried by the gear 9 will, therefore, in one direction of movement, act as driving dogs to rotate the spring winding arbor, and in the reverse direction of movement, slip freely over the teeth of the ratchet 14 and permit the proper positioning of the dial face of the clock without unwinding the main spring which is held in its tensioned position by means of the case-carried pawl 12 engaging the ratchet wheel 11. A distinct advantage is gained by causing the dial and clock case or winding barrel to move bodily, since no wear occurs on the dial.

I have now described my invention as applied to a direct winding movement, in which the winding barrel or clock case 2 has no longitudinal shifting movement in the frame 1, and in which the main spring unwinds from its outer end. In certain types of clock movement it may be desirable to have the train of winding gears normally out of mesh, so that as the main spring runs down, the central spring arbor may turn in said case. Where such a provision is desirable, it is obvious that means should be provided to enable said gears to be normally out of mesh and to be meshed only when it is desired to wind up the main spring. To that end I have shown such a construction in Figs. 4 and 5, in which 1^a is the main frame rotatably supporting the winding barrel or clock case 2^a. 3^a is the flange or annular shoulder on the inner end of the case 2^a. 4^a is the internal ring gear having teeth 5^a. 8^a is the idler on pin 6^a mounted on plate 7^a and arranged to couple the fixed gear 4^a with the gear 9^a rotatably mounted upon the spring arbor 10^a. In this form of mechanism, the barrel 2^a has a sliding or longitudinal movement sufficient to permit the engagement and disengagement of the idler 8^a with the gear 4^a. The normal position of the parts is as shown in Fig. 4, a spring or equivalent device 3^b holding the shoulder or flange 3^a near to or against the internal gear 4^a, as shown, in which position the gear 8^a is out of mesh with the teeth on the ring 4^a, so that the

spring arbor 10^a may freely unwind as the clock is running down. In this position, also, the barrel 2^a may be freely turned to position the dial properly with the numeral 12 uppermost, as before described. When it is desired to wind the clock, the user exerts an outward pull upon the winding barrel 2^a, which causes the shifting of said barrel longitudinally in the frame 1^a and brings the gear 8^a into mesh with the teeth on the gear ring 4^a. A rotation of the case or barrel 2^a then winds the arbor 10^a. As soon as the winding barrel is released, the spring 3^b shifts the said barrel in the main support or frame 1^a from the position indicated in Fig. 5 (namely, the winding position) back to the normal position indicated in Fig. 4. In the modified form of construction there is distinct advantage in so arranging the parts that when the winding is to occur, the winding barrel 2^a must be pulled out, instead of pushed in, because, any mark on the outer side of the case 2^a occasioned by winding or turning said case or barrel 2^a within the supporting frame 1^a will be hidden when the winding barrel is shifted back into the case. Broadly speaking, however, it is immaterial whether it requires a pulling-out movement to intermesh the winding gears, or a pulling-in movement.

From the foregoing it will be observed that my invention is applicable to a clock having a main spring which unwinds either from its outer or its inner end. In the form shown in Figs. 1 to 3, in which the spring unwinds from its outer end, the spring barrel 17 is secured to the outer end of the main spring 18, but is free to move independently of the plate 7, the said plate 7 being rigidly held in any suitable manner, as by stanchions 19, to which the plate 7 is bolted and secured by nuts 20 (see Figs. 1 and 2). In Figs. 4 and 5, the spring barrel 17^a is secured to the main spring 18^a, as before, and is also secured to the plate 7^a, said plate 7^a in this instance being rotatable independently of the frame of the clock mechanism, since in this case the plate, together with the aforesaid ratchet 11^a, the arbor 10^a, gear 9^a, ratchet 14^a and pawls 15^a turn bodily as the main spring 18^a is being unwound from its inner end. It will be understood in all cases that the main spring is held against too rapid unwinding by the usual clock escapement mechanism, which need not be described.

It should be understood that this winding mechanism is not necessarily limited to use in connection with clocks.

What I claim is:

1. In a clock, the combination of a main support including a gear, a case rotatably mounted in said support, and carrying the clock dial and clock works including a main

spring winding arbor, driving connections between said arbor and the first mentioned gear operable by the rotation of the case, said connections being operable in one direction of rotation of the case to turn said arbor on its own axis within the case to thereby wind its spring, and means locking said arbor against unwinding movement and permitting the reverse rotation of the case and the dial and clock works carried thereby without turning said arbor on its own axis relative to said case, thereby permitting the proper positioning of the clock dial without unwinding the main spring.

2. In a clock, the combination of a main support including a gear, a case rotatably mounted in said support and carrying the clock dial and clock works including a main spring winding arbor, a gear revolubly mounted on said arbor, driving connections between said arbor gear and said first mentioned gear, said connections being operable by the rotation of the clock case to rotate said arbor gear, driving connections between said revolubly mounted arbor gear and said arbor operable in one direction of rotation of the case to turn said arbor and thereby wind its spring, and means constructed and arranged to permit the reverse rotation of said case without turning said arbor on its own axis relative to said case to thereby permit the proper positioning of the clock dial without disturbing the tension of the wound main spring.

3. In a clock, the combination of a support including a gear, a case rotatably mounted in said support and carrying the clock dial and clock works including a main spring winding arbor, a pawl and ratchet connection between said arbor and said case, a gear revolubly mounted on said arbor, intermediate gear connections carried by the case connecting said arbor and main support gears and operable by the rotation of the case to rotate said arbor gear, a ratchet carried by said arbor, a cooperating pawl carried by said revolubly mounted arbor gear and operable in one direction of rotation of the case to turn said arbor to thereby wind its spring, said arbor being held against relative movement, upon the reverse rotation of the case and arbor gear, by said pawl and ratchet connection between said arbor and said case, and said arbor gear-carried pawl riding freely over its ratchet during such reverse rotation to thereby permit the proper positioning of the clock dial without disturbing the tension of the wound main spring.

4. In a clock, the combination of a support including a gear, a clock-containing case mounted to rotate in said support and adapted to be shifted longitudinally therein, a main spring winding arbor carried by said case, driving connections between said

arbor and the first mentioned gear operable by the rotation of the case, said connections being operable in one direction of rotation of said case to turn said arbor on its own axis within the case to thereby wind its spring, and means constructed and arranged to permit the reverse rotation of the case without turning said arbor on its own axis relative to said case, thereby permitting the proper positioning of the clock dial, and said connections being arranged for operative connection and for disconnection when said case is moved longitudinally in its support.

5. In a clock, the combination of a support, including a gear, a clock-containing case mounted to rotate in said support and to be shifted longitudinally therein, a main spring winding arbor carried by said case, a gear connection between said arbor and said first mentioned gear, and means for normally holding said gears out of connection.

6. In a clock, the combination of a support including an internal gear, a case rotatably mounted in said support and carrying the clock dial and clock works including a main spring winding arbor, driving connections between said main spring winding arbor and said internal gear operative in one direction of rotation of said case relative to said internal gear to rotate said arbor on its own axis and relative to said case thereby winding its spring, and means constructed and arranged to permit said case to be rotated in an opposite direction relative to said internal gear without rotating the arbor on its own axis relative to said case thereby permitting the proper positioning of the clock dial without disturbing the tension of the wound main spring.

7. In a clock, the combination of a support including an internal gear, a clock-containing case rotatably mounted in said support, a main spring winding arbor carried by said case, driving connections between said main spring winding arbor and said internal gear operative in one direction of rotation of said case relative to said internal gear to rotate said arbor on its own axis and relative to said case thereby winding its spring, and means constructed and arranged to permit said case to be rotated in an opposite direction relative to said internal gear without rotating the arbor on its own axis relative to said case thereby permitting the proper positioning of the clock dial, said case also having a longitudinal shifting movement in said support whereby said gears may be operatively connected and may be disconnected.

8. In a clock, the combination of a support, including an internal gear, a clock case rotatably mounted in said support, a main spring winding arbor carried by said

case, a gear connection between said main
spring winding arbor and said internal gear
and arranged to rotate said arbor relatively
to said case when said case is rotated rela-
5 tively to said internal gear in one direction,
means constructed and arranged to permit
said case to be rotated in an opposite direc-
tion relatively to said internal gear with-
out rotating the arbor relatively to said
10 case, said case also having a longitudinal

shifting movement in said support whereby
said gears may be connected and discon-
nected, and means normally positioning
said case to hold said gears in disconnected
relation.

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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents,
Washington, D. C."
