No. 755,903. PATENTED MAR. 29, 1904.

W. M. MATHESON.

STEM WINDING WATCH.

APPLICATION FILED SEPT. 26, 1903.

NO MODEL.

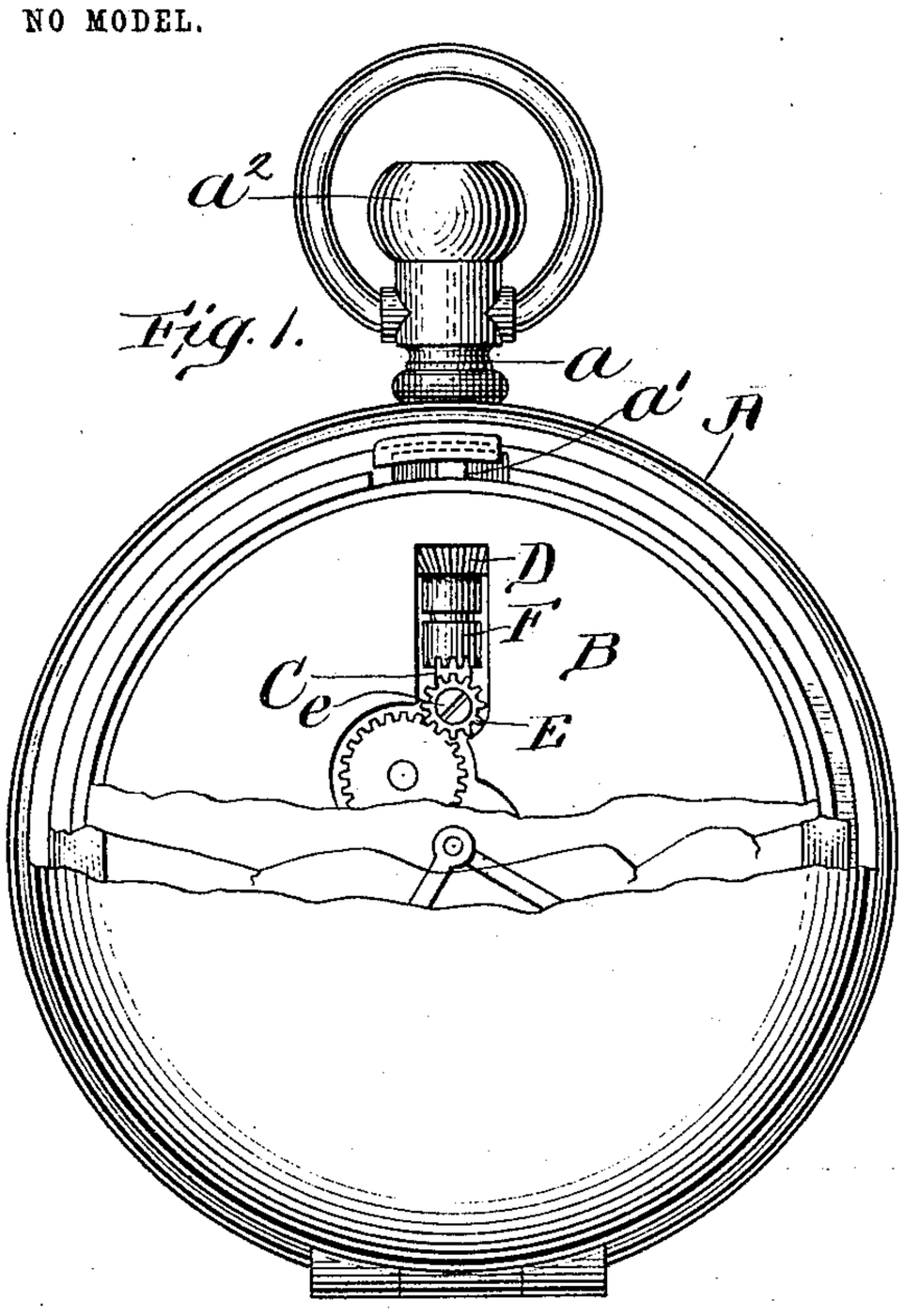

Fig. 1.

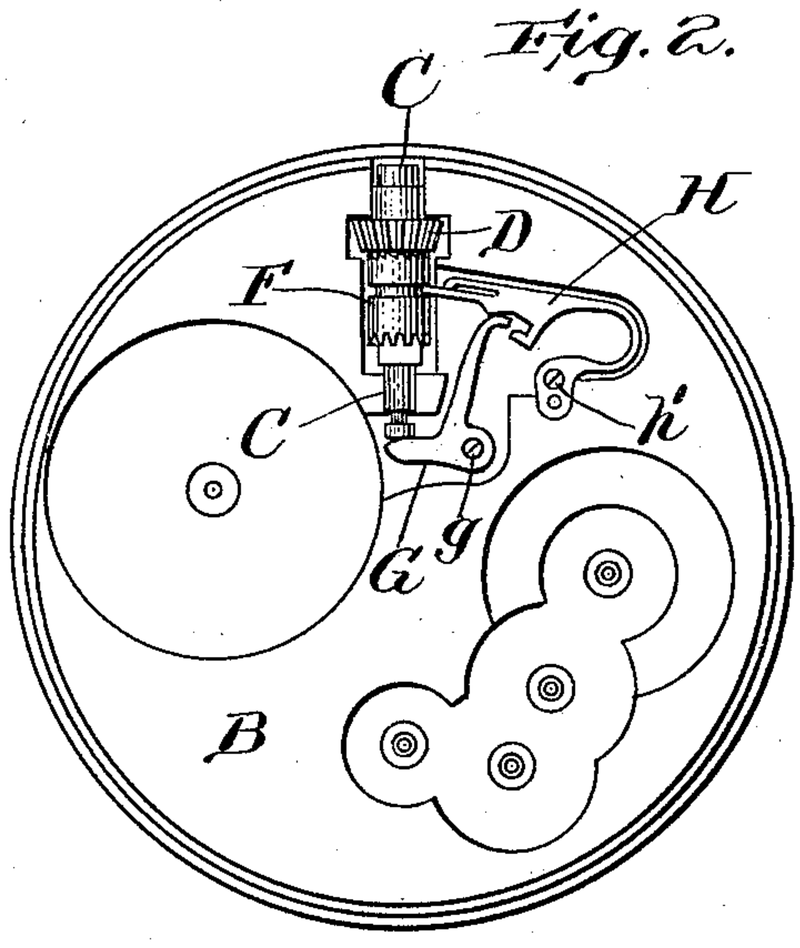

Fig. 2.

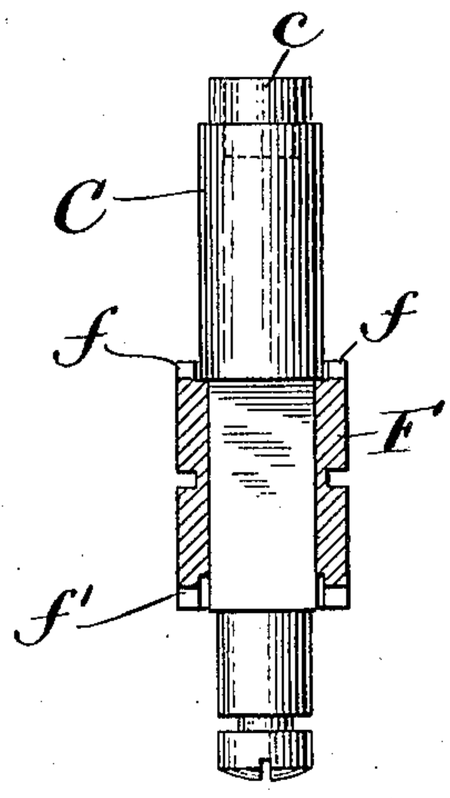

Fig. 3.

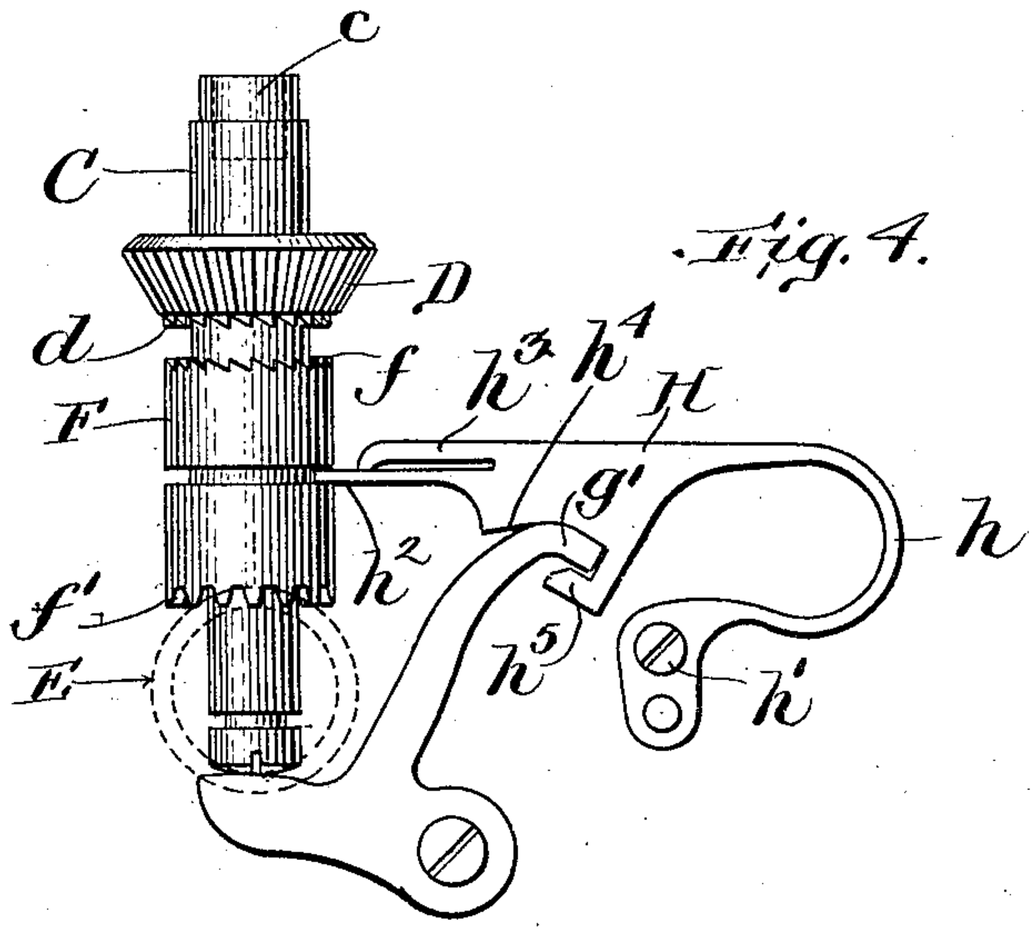

Fig. 4.

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No. 755,903. Patented March 29, 1904.

UNITED STATES PATENT OFFICE.

WILLIAM M. MATHESON, OF WALTHAM, MASSACHUSETTS, ASSIGNOR TO UNITED STATES WATCH COMPANY, OF WALTHAM, MASSACHUSETTS, A CORPORATION OF NEW JERSEY.

STEM-WINDING WATCH.

SPECIFICATION forming part of Letters Patent No. 755,903, dated March 29, 1904.

Application filed September 26, 1903. Serial No. 174,693. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM M. MATHESON, a citizen of the United States, and a resident of Waltham, in the county of Middlesex and State of Massachusetts, have invented new and useful Improvements in Watches, of which the following is a specification.

My invention relates to timepieces, and particularly to stem winding and setting mechanisms for watches.

In watches of the class indicated it is customary to employ a clutch mounted to slide longitudinally on an arbor journaled on the frame of the movement, but rotatable with the arbor, the arbor being controlled and operated by means of the stem of the watch. This clutch is engaged by a spring-arm operated by endwise movement of the arbor acting through a lever to shift the clutch endwise in either direction on the arbor. When thus shifted endwise in one direction, the clutch was caused to engage the winding mechanism and when shifted in the opposite direction to engage the setting-train. That end of the clutch which engaged the winding mechanism was made with ratchet-teeth for engaging a ratchet forming part of the winding mechanism, and the other end of the clutch was made with a crown-gear for engaging one of the gears of the setting-train. It has been found necessary in the constructions heretofore used to make the spring-arm very strong in order that when the clutch was in engagement with the gear of the setting-train the resistance to movement offered by the setting-train would not cause the crown-gear upon the clutch to ride upon the teeth of the gear of the setting-train with which it engaged in operation, which would result in the teeth of the clutch sliding over the teeth of the gear of the setting-train. As a result when the spring-arm was operated by endwise movement of the arbor to shift the clutch endwise on the arbor into engagement with the winding mechanism the ratchet-teeth of the clutch were held against the ratchet of the winding mechanism with much more force than was necessary to insure their engagement. This unnecessary pressure of the clutch against the ratchet of the winding mechanism not only caused undue wear between those parts, but it also caused a disagreeable rasping noise and vibration when these two parts were turned relatively during the winding operation, which was highly objectionable.

My invention has for its object to improve the construction of stem winding and setting mechanisms for timepieces, and particularly to obviate the objections above noted.

In my improved stem winding and setting mechanism a rotatable and endwise-movable arbor is provided that is journaled on the frame of the movement, and this arbor at its inner end engages a lever through which endwise movement of the arbor operates a spring-pressed arm fastened to the frame of the movement. This spring-pressed arm differs from those heretofore used in that it carries a supplemental spring engaging a clutch mounted to slide longitudinally on the arbor and to rotate therewith. This spring-pressed arm also carries an abutment at one side of the supplemental spring, so arranged that when the spring-pressed arm is moved in one direction by the lever and acts through the supplemental spring to shift the clutch into engagement with the winding mechanism the light supplemental spring is unsupported by the abutment, and therefore holds the ratchet-teeth of the clutch very lightly and yieldingly in engagement with the ratchet of the winding mechanism, so that the objectionable rasping noise and vibration above referred to is obviated. When, however, the spring-pressed arm is moved in the opposite direction and acts through the supplemental spring to shift the clutch into engagement with the hand-operating mechanism, the abutment supports the supplemental spring, so that it is unyielding or stiffer, and the whole force of the spring-pressed arm is brought to bear upon the clutch, and the gear-teeth of the latter are thereby prevented from sliding over the teeth of the gear of the setting-train with which they coöperate. Thus the result is that the clutch is held lightly in engagement with the winding mechanism by the lever acting through the spring-pressed

arm upon the unsupported supplemental spring which engages the clutch, while the clutch is held in engagement with the hand-operating mechanism with much greater force by the spring-pressed arm acting through the abutment, which prevents the supplemental spring from yielding, and this is a distinguishing feature of my invention.

Another feature of my invention consists in providing means to automatically lock or hold the clutch in engagement with the setting-train and to automatically free said clutch when the lever is operated to shift the clutch out of engagement with said mechanism. In the best form of my invention this holding means consists of a hook on the spring-pressed arm coöperating with a hook on the lever to lock the spring-pressed arm and clutch in position when the clutch is in engagement with the hand-operating mechanism and which automatically free said parts when the lever is operated by endwise movement of the arbor to shift the clutch out of engagement with the hand-operating mechanism.

In the drawings, Figure 1 is an elevation, partly broken away, of a watch embodying one form of my invention. Fig. 2 is an elevation of part of the movement of the watch shown in Fig. 1 and as viewed from the opposite side. Fig. 3 is an elevation, on an enlarged scale, showing the clutch hereinafter described and its operating means. Fig. 4 is a detail of the arbor and clutch shown in Fig. 3.

Having reference to the drawings, A represents the case, and B the movement, of a watch, said movement being mounted, as usual, within case A. The case A is provided with a stem a, in which is mounted a push-pin a', provided with a head a^2 at its outer end, by which it is operated. Push-pin a' is yieldingly held by the usual spring-catch (not shown) in either one of its positions.

Journaled in bearings on the movement B is a rotatable and endwise-movable arbor C, on which is loosely journaled the driving-pinion D of the winding mechanism of the watch. Near the other end of arbor C is the driving-gear E of the hand-operating mechanism, said gear being journaled on a stud e, fixed to movement B. The middle portion of arbor C is made square in cross-section and has mounted on it a clutch or toothed sleeve F, shaped interiorly to fit the squared part of arbor C and to slide freely thereon longitudinally of the arbor. One end of clutch F is made with ratchet-teeth for engaging a crown-ratchet d, provided on the pinion D, while the opposite end of clutch F is made with a crown-gear f' for engaging the gear E. The outer end of arbor C is made with a square socket c to receive the inner squared end of the push-pin a', and at its inner end said arbor engages one arm of a bell-crank lever G, fulcrumed at g to movement B. The other arm of bell-crank lever G engages a spring-pressed arm H, provided at one end with a bent spring part h, fixed at h' rigidly to the movement B, and at its other or movable end said arm is provided with a light supplemental spring h^2, engaging the clutch F, and also an abutment h^3 at one side of the supplemental spring h^2. That part of the spring-pressed arm H engaged by lever G is made with a cam-surface h^4, which rests against the end of the coöperating arm of lever G. This coöperating arm of lever G is made with a hook g', adapted to interlock, as hereinafter described, with a hook h^5 on the spring-pressed arm H. When arbor C is in its innermost position, lever G and arm H occupy the positions shown in Fig. 2, with teeth f of clutch F held lightly and yieldingly in engagement with the ratchet d by supplemental spring h^2, so that when said clutch is rocked with arbor C to operate the winding mechanism there is very little, if any, rasping noise or vibration. When arbor C is allowed to move outwardly, the spring part H moves said arm and clutch F inwardly toward the position shown in Fig. 4, and during this movement the cam-surface h^4, acting on lever G, moves the latter, with said arm, so that when the teeth f' reach the gear E the hook g' has entered into engagement with the hook h^5. This interlocking of the hooks g' and h^5 hold the teeth f' positively in engagement with the gear E, so that clutch F cannot yield longitudinally and permit teeth f' to slide over the teeth of gear E. During the movement of clutch F toward gear E and also while said clutch is held in engagement with said gear spring h^2 is backed up and supported by the abutment h^3, carried by arm H, so that the full strength of spring h is applied to shift the sleeve toward gear E, and, moreover, when hooks g' and h^5 are interlocked arm H cannot yield under pressure from clutch F. Preferably the engagement of the hooks g' and h^5 serves as a stop to limit the movement of clutch F toward gear E, thus preventing undue grinding between said gear and clutch.

I claim—

1. In a stem winding and setting mechanism, in combination, winding mechanism; setting mechanism; a rotatable and endwise-movable arbor; a clutch on the arbor for engaging the winding and setting mechanisms; a lever operated by endwise movement of the arbor; a spring-pressed arm operated by said lever; a supplemental spring controlled by said spring-arm and in engagement with said clutch, and an abutment at one side of the supplemental spring to reinforce the latter when the clutch is moved in one direction and to leave it free when the clutch is moved in the other direction.

2. In a stem winding and setting mechanism, in combination, winding mechanism; setting mechanism; a rotatable and endwise-movable arbor; a clutch on the arbor for engaging the winding and setting mechanisms; a lever op-

erated by endwise movement of the arbor; a spring-pressed arm operated by said lever, a supplemental spring controlled by said spring-arm and in engagement with said clutch, and an abutment at one side of the supplemental spring to reinforce the supplemental spring when the clutch engages the setting mechanism.

3. In a stem winding and setting mechanism, in combination, winding mechanism; setting mechanism; a rotatable and endwise-movable arbor; a clutch on the arbor for engaging the winding and setting mechanisms; a lever operated by endwise movement of the arbor; a spring-arm operated by said lever, said arm being provided at its free end with a supplemental spring in engagement with said clutch and with an abutment at one side of the supplemental spring to reinforce the supplemental spring when the clutch engages the setting mechanism.

4. In a stem winding and setting mechanism, in combination, winding mechanism; setting mechanism; a rotatable and endwise-movable arbor; a clutch on the arbor for engaging the winding and setting mechanisms; a lever operated by endwise movement of the arbor; a spring-pressed arm operated by said lever to shift the clutch endwise on the arbor, and means to automatically lock this spring-arm when the clutch is in engagement with the hand-setting mechanism and to automatically free it when the lever is operated to shift the clutch out of engagement with the hand-setting mechanism.

5. In a stem winding and setting mechanism, in combination, winding mechanism; setting mechanism; a rotatable and endwise-movable arbor; a clutch on the arbor for engaging the winding and setting mechanisms; a hooked lever operated by endwise movement of the arbor; and a spring-pressed arm operated by said lever to shift the clutch endwise on the arbor, said arm being provided with a hook coöperating with the hook on the lever to hold the arm and clutch in position when the latter is in engagement with the setting mechanism.

6. In a stem winding and setting mechanism, in combination, winding mechanism; setting mechanism; a rotatable and endwise-movable arbor; a clutch on the arbor for engaging the winding and setting mechanisms; a hooked lever operated by endwise movement of the arbor; and a spring-arm operated by said lever, said arm fastened at one end to the frame of the mechanism and engaging the clutch at its free end, said free end being provided with an abutment for reinforcing that end when the arm is moved in one direction, and with a hook coöperating with the hooked lever to hold the arm and clutch in position when the latter is in engagement with the setting mechanism.

Signed by me at Boston, Massachusetts, this 16th day of September, 1903.

WILLIAM M. MATHESON.

Witnesses:
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