

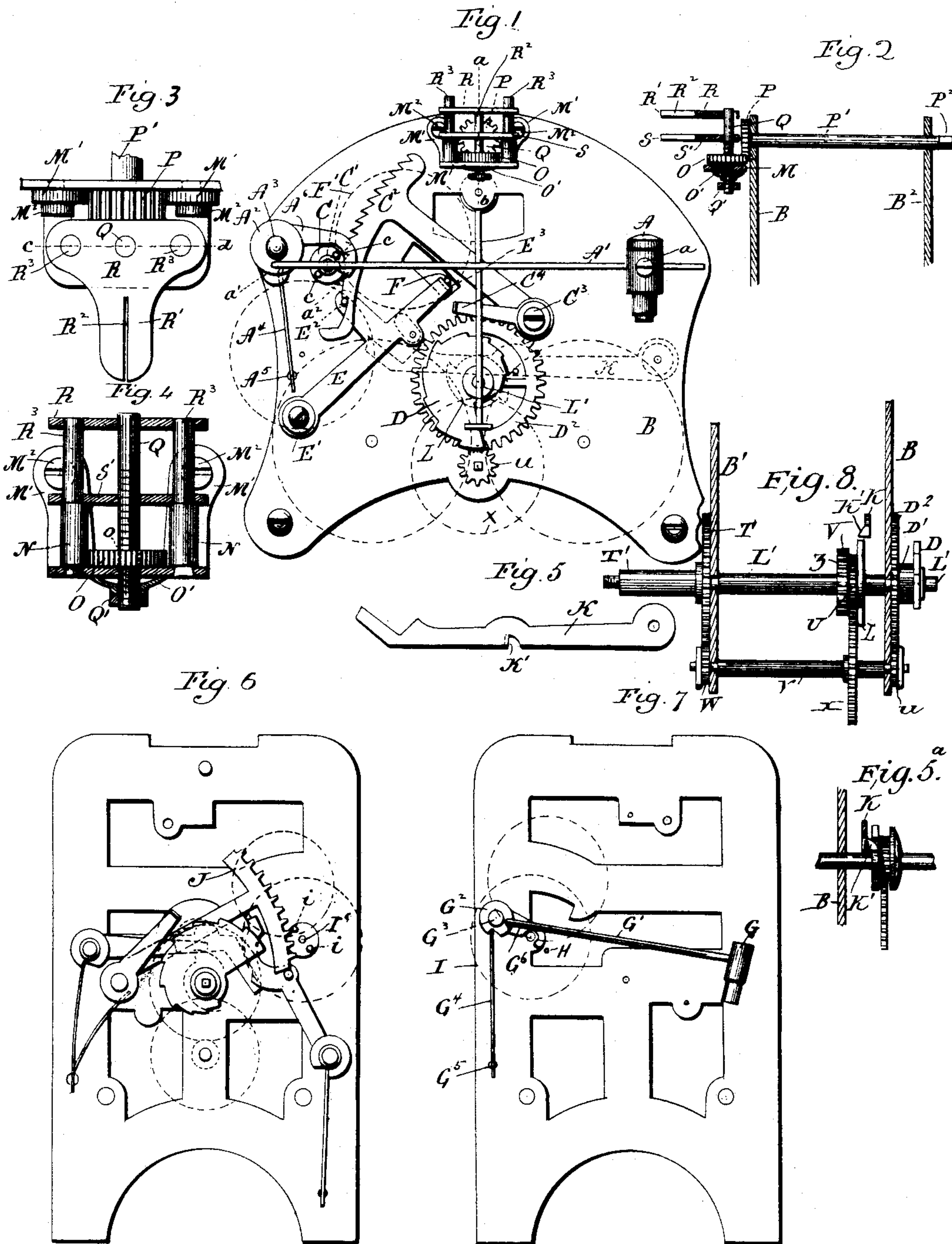
No. 610,753.

Patented Sept. 13, 1898.

A. BANNATYNE.
REPEATING CLOCK.

(Application filed June 8, 1896.)

(No Model.)



Witnesses.
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ARCHIBALD BANNATYNE, OF WATERBURY, CONNECTICUT, ASSIGNOR TO
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REPEATING CLOCK.

SPECIFICATION forming part of Letters Patent No. 610,753, dated September 13, 1898.

Application filed June 8, 1896. Serial No. 594,720. (No model.)

To all whom it may concern:

Be it known that I, ARCHIBALD BANNATYNE, of Waterbury, in the county of New Haven and State of Connecticut, have invented a new
5 Improvement in Clocks; and I do hereby declare the following, when taken in connection with the accompanying drawings and the letters of reference marked thereon, to be a full, clear, and exact description of the same, and
10 which said drawings constitute part of this specification, and represent, in—

Figure 1, a view in front elevation of one form which a clock-movement containing my invention may assume; Fig. 2, a partial
15 view thereof in vertical section on the line *a b* of Fig. 1; Fig. 3, a detached enlarged plan view of the regulating device; Fig. 4, a sectional view thereof on the line *c d* of Fig. 3; Fig. 5, a detached view of the lifting and
20 warning lever; Fig. 5^a, a detail view showing the turn-back cam in elevation and the lifting and warning lever in cross-section; Figs. 6 and 7, views in front and rear elevation of one of the modified forms which my improve-
25 ment may assume; Fig. 8, a partial view in vertical central section on the line *a b* of Fig. 1.

My invention relates to an improvement in clocks, the object being to improve them in the respect of their striking and regulating mechanisms, whereby simplicity of construction,
30 convenience of adjustment and attention, and accuracy of performance are secured.

With these ends in view my invention consists in certain details of construction and
35 combinations of parts, as will be hereinafter described, and pointed out in the claims.

The first part of my invention relates to an improvement in striking mechanisms of the rack-and-snail type, with the particular ob-
40 ject of locating the hammer and hammer-tail outside or in rear of the rear movement-plate, whereby they are so exposed as to be readily accessible for attention.

As shown in Fig. 1 of the drawings, the
45 hammer *A* is adjustably secured by means of a set-screw *a* to a horizontally-arranged hammer-wire *A'*, the inner end of which is rigidly connected with an oscillating hub *A*², mounted upon a horizontal screw *A*³, projecting rear-
50 wardly from the rear movement-plate *B*. A

hammer-spring *A*⁴, supported at its lower end in a stud *A*⁵, mounted in the said plate *B*, engages at its upper end with a pin *a'*, mounted in the hub *A*², and exerts a constant effort to
55 turn the hub inward and depress the hammer. A sheet-metal hammer-tail *A*⁶, preferably formed of hardened metal, such as steel, is rigidly connected with the hub and constructed with a downwardly-hooked outer end
60 having an operating-face *a*², which is engaged for lifting the hammer-tail, and hence oscillating the hub and lifting the hammer, by means of the gathering-pins *c c*, which are
65 mounted in a gathering-pin collet *C*, rigidly secured to the projecting rear end of the arbor *C'*, which is in reality the arbor of the third wheel of the striking-train, but which for convenience of description I shall speak of as the "gathering-pin" arbor. The said
70 pins *c c* coact simultaneously with their action upon the operating-face *A*² of the hammer-tail *A*⁶ with the rack *C*², which is hung upon a screw *C*³ and furnished with a yielding arm *C*⁴, coacting with the snail *D* in the
75 usual manner of rack-and-snail mechanisms. I also employ a locking-lever *E*, mounted to swing upon a screw *E'* and furnished with a stop-pin *E*², which coacts with the teeth of
80 the rack, and with an inwardly-turned stop-finger *E*³, which coacts in the usual manner with a stop-pin *F*, carried by the fourth wheel
85 *F'* of the strike-train. Under my improved construction, therefore, the gathering-pins *c c* not only coact with the rack to lift the same
90 in the ordinary manner of gathering-pins, but also simultaneously coact with the hammer-tail to lift and release the hammer, which is therefore virtually operated by the gathering-pin arbor, which is the same thing as the
95 third-wheel arbor.

By making each gathering-pin lift the rack coincident with its coaction with the hammer-tail I am enabled to secure perfect harmony throughout between these two operations, whereby the hammer will be left in its
95 dropped position or at rest when the rack is at rest, this being necessary to the reliable and accurate performance of the clock, for if the hammer is not at rest when the rack comes to
100 rest the power of the hammer-spring will not

be taken off at such time from the strike-train. If the power of the hammer-spring is left upon the strike-train, the same will have to be operated by the spring of the time-train against the load represented by the power of the hammer-spring, which will be very likely to prevent the strike-train from getting up momentum enough after warning to effect the operation of striking. Under my improvement, however, the rack and hammer not only act in perfect unison, but stop in perfect unison. My improvement, furthermore, avoids the necessity of setting the rack, locking-lever, hammer, and gathering-pins so as to act in unison, inasmuch as they are constructed and arranged so that they come into right relations for acting in unison in the initial assemblance of the clock-movement, whereby a great saving of skilled labor is effected. Here it may be said that as heretofore constructed clocks of this character have had to be accurately set, so as to bring the rack, hammer-tail, locking-lever, and gathering-pins into right relations for operating in unison. Moreover, the setting operation just mentioned has been difficult of prosecution, as some of the parts have been located between the movement-plates and some outside of the same. On account of locating the hammer and rack upon the outer face of the rear plate of the movement-frame the rack, gathering-pins, and hammer are of very easy access in being set for simultaneous operation, as above set forth.

In the modified construction shown in Figs. 6 and 7 of the drawings the hammer G is secured to a hammer-wire G', attached to an oscillating hub G², supported upon a pivot G³, and engaged for operation by the free upper end of a hammer-spring G⁴, the lower end of which is secured to a fixed stud G⁵. The hammer-tail G⁶ is secured to the said hub and has its inner end turned inwardly in position to be engaged and lifted by a stop-pin H, mounted in the hub of the third wheel I of the strike-train, the said wheel being in turn mounted upon the gathering-pin arbor I', which operates the hammer through the said wheel and pin, and therefore virtually directly. The said gathering-pin arbor is furnished at its forward end with two gathering-pins i i, which coact with the rack J of a rack-and-snail mechanism located outside and in front of the front movement-plate of the clock.

In the operation of the rack-and-snail mechanism (shown by Figs. 6 and 7) the hammer is operated not directly by the gathering-pins, but through the gathering-pin arbor. This modified construction has in common with the construction first described the advantage of locating the hammer to the rear of the rear movement-plate and making it accessible for attention. It has the further advantage of permitting the hammer and rack to be worked in very close harmony, an advantage also possessed by the other construc-

tion. As herein shown, the lifting and warning lever K is made from a single piece of sheet metal and constructed with an integral beveled lifting-tooth K', extending inward from it at a right angle and coacting with the said cam. Then when the center arbor L' is turned back for shifting the minute and hour hands of the clock the teeth of the cam engage with the beveled face of the said tooth and crowd the same forward, the whole lever springing throughout its length to allow the tooth to get out of the way of the cam, which is thus permitted to be "turned back," as the expression is, without disturbing the striking mechanism. The warning and unlocking action of this lever is well understood and does not need detailed description.

The next feature of my invention to be described is a regulating device for regulating the action of the clock mechanism by raising and lowering the pendulum, so as to virtually increase or decrease the swinging length of the pendulum-rod. In carrying out this feature of my invention I employ what I term a "frame-plate" M, provided with two corresponding supporting-arms M' M', by means of which it is secured by screws M² M² to the apex of the rear movement-plate B, the said plate and arms being bent at a right angle to each other and the plate standing in a horizontal plane, while the arms stand in a vertical plane. This plate supports two vertically-arranged guiding pins or studs N N, which have their lower ends riveted into it. Between the lower ends of these studs and bearing upon the upper face of the plate is located a pinion O, having a central internally-threaded opening o and secured in place by means of a spring-washer O', the said pinion being meshed into by the tooth of a vertically-arranged pinion P, located between the supporting-arms M' M' and secured to the projecting rear end of the regulating-arbor P', the forward end of which projects through the front movement-plate B' and is squared, as at P², for the reception of a key, by means of which it is turned for regulating the performance of the clock. As the pinion O is turned in one direction or the other it operates to raise or lower a long vertically-movable externally-threaded post Q, the lower end of which passes downward through the pinion and is furnished with a stop-nut or washer Q'. The upper end of the said post Q supports a vertically-movable suspension-plate R, formed with a forwardly-projecting tongue R', having a slit R² for the reception of the flattened upper end of the suspension-spring of the pendulum-rod, which is not shown. The said plate is formed with two perforations R³ R³, receiving the reduced upper ends of the guiding-studs N N, which guide the said plate as it is moved up and down through the medium of the said post, whereby the flattened portion of the suspension-spring of the pendulum-rod is moved up and down through a slit S, corresponding to the slit R², located below

the same and formed in the forwardly-projecting tongue of a fixed suspension-plate S', corresponding in shape to the plate R, arranged in a horizontal plane and supported
5 in a fixed position upon the guiding-pins N N, which are shouldered for the purpose, as clearly appears in Fig. 4.

It will be readily understood that although the actual length of the suspension-spring of
10 the pendulum-rod is not changed it is virtually shortened or lengthened by raising or lowering it, and thus changing its length below the plate S', below which it is free to swing.

15 My improved regulating device is very simple to construct and may be entirely assembled before it is applied to the clock-movement. It further has the advantage of being accurate and so "slow" in its action
20 that an inexperienced person may turn the regulating-arbor one way or the other without materially disturbing the regulation of the clock.

Another feature of my invention relates to
25 the location of the snail and snail-wheel and to means for driving the same. With reference now to Fig. 8 of the drawings, it will be seen that the snail D is connected by means of a hub D' with a snail-wheel D², the said snail
30 and snail-wheel being mounted upon the rear end of the center arbor L', which for this purpose is extended rearward through the rear movement-plate B, as well as forward in the usual manner through the forward move-
35 ment-plate B'. The said snail and snail-wheel are therefore located outside of the rear movement-plate and are very easy of access for setting the snail in right relation to the hour-wheel T, which is mounted upon
40 the forwardly-projecting end of the center arbor and furnished with a hub T', to which the hour-hand is attached. The snail-wheel D² before mentioned meshes into a snail-wheel pinion u, mounted upon the projecting
45 rear end of supplemental arbor v, the projecting forward end of which carries the hour-wheel pinion W, which is meshed into by the hour-wheel T. The arbor v is mounted in the rear and front movement-plates B and
50 B' at a point below the center arbor L' and carries the minute-wheel X, which meshes into the cannon-pinion U, mounted in the usual manner upon the center arbor, which also carries the pinion Z, which is meshed
55 into by the second-wheel (not shown) of the time-train. It will be noted that under this construction and arrangement the snail, snail-wheel, and snail-wheel pinion are located upon the outside of the rear movement-plate
60 and that the hour-wheel and hour-wheel pinion are located on the outside of the front movement-plate, while the minute-wheel is located between the two movement-plates. This is a very advantageous construction, as
65 it insures the harmonious performance of the snail with reference to the hour-hand and also enables the snail to be readily got at for

the purpose of setting it with relation to the hour-hand and also for the purpose of removing it in taking the movement apart. 70

In view of the foregoing it will be understood that some changes in the construction herein shown and described may be made, and I would therefore have it understood that I do not limit myself thereto, but hold myself at liberty to make such changes and alterations as fairly fall within the spirit and scope of my invention. 75

Having fully described my invention, what I claim as new, and desire to secure by Letters Patent, is— 80

1. In a clock having a rack-and-snail striking mechanism, the combination with an arbor of the strike-train, of a gathering-pin carried by the said arbor, a hammer having a hammer-tail, and a rack, the said hammer-tail and rack being constructed and arranged to be simultaneously acted upon by the gathering-pin which lifts or "gathers" the rack at the same time it lifts the hammer into position for striking. 85 90

2. In a clock having a rack-and-snail striking mechanism, the combination with an arbor of the strike-train, of a gathering-pin carried by the said arbor, a rack, and a hammer having a hammer arm or wire, a hub to which the said arm or wire is secured, and a sheet-metal hammer-tail secured to the said hub, which is mounted for oscillation upon the rear or outer face of the rear face of the clock-movement, the said rack and hammer-tail being constructed and arranged to be simultaneously operated upon by the said gathering-pin which lifts or "gathers" the rack at the same time it acts through the hammer-tail to lift the hammer into its striking position. 95 100 105

3. In a clock having a rack-and-snail striking mechanism, the combination with an arbor of the strike-train projecting at its rear end through the rear plate of the clock-movement, of a gathering-pin carried by the said projecting end of the said arbor, a rack located upon the outer face of the rear movement-plate, and a hammer also located upon the outer face of the said rear movement-plate and provided with a hammer-tail, the said rack and hammer-tail being constructed and arranged to be simultaneously acted upon by the gathering-pin which lifts or gathers the rack at the same time that it lifts the hammer into its striking position. 110 115 120

4. A pendulum-regulating device for pendulum-clocks, having a frame-plate, two vertically-arranged guiding-studs secured by their lower ends thereto, a pinion located between the lower ends of the said studs, supported upon the said plate and formed with an internally-threaded central opening, a vertically-movable threaded post passing through the said pinion, and raised and lowered by the revolution thereof, a suspension-plate secured to the upper end of the said post, guided by the upper ends of the said 125 130

studs, and adapted to receive the upper end
of the suspension-spring of a pendulum-rod,
a fixed suspension-plate located in a horizon-
tal plane below the said suspension-plate, sup-
ported by the said studs, and having a slit
5 formed in it for the reception of the said
spring, and means for rotating the said pin-
ion for raising and lowering the post and
hence the movable suspension-plate, whereby
10 the pendulum-spring is raised and lowered
with respect to the fixed suspension-plate.

5. In a clock having a rack-and-snail strik-
ing mechanism, the combination with the
front and rear movement-plates thereof, of a
15 center arbor mounted in the said plates and
extending forward of the front plate, and
rearward through the rear plate, a snail and
snail-wheel mounted upon the projecting rear
end of the arbor, an hour-wheel mounted

upon the projecting forward end of the arbor, 20
a supplemental arbor mounted in the plates,
and also projecting at its ends through the
same, a snail-wheel pinion mounted upon the
projecting rear end of the supplemental ar-
bor, and meshed into by the snail-wheel, an 25
hour-wheel pinion mounted upon the project-
ing forward end of the said supplemental ar-
bor, and meshing into the hour-wheel, and a
minute-wheel mounted upon the supplement-
tal arbor and meshing into a cannon-pinion 30
on the center arbor, substantially as set forth.

In testimony whereof I have signed this
specification in the presence of two subscrib-
ing witnesses.

ARCHIBALD BANNATYNE.

Witnesses:

CLIFFORD H. HALL,
GEORGE W. WATSON.