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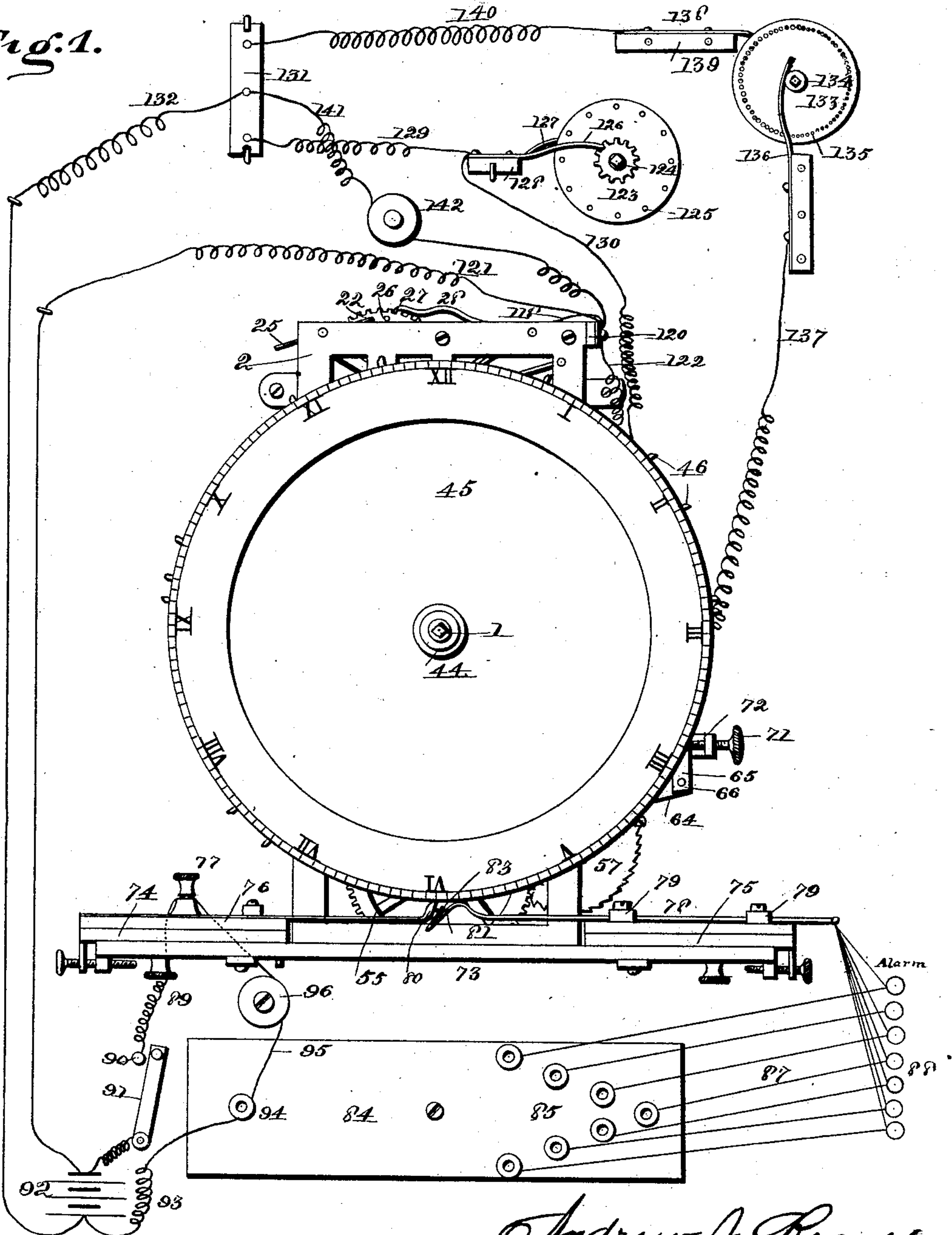
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A. J. REAMS.  
ELECTRIC PROGRAMME CLOCK.

No. 367,663.

Patented Aug. 2, 1887.

Fig. 1.



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(No Model.)

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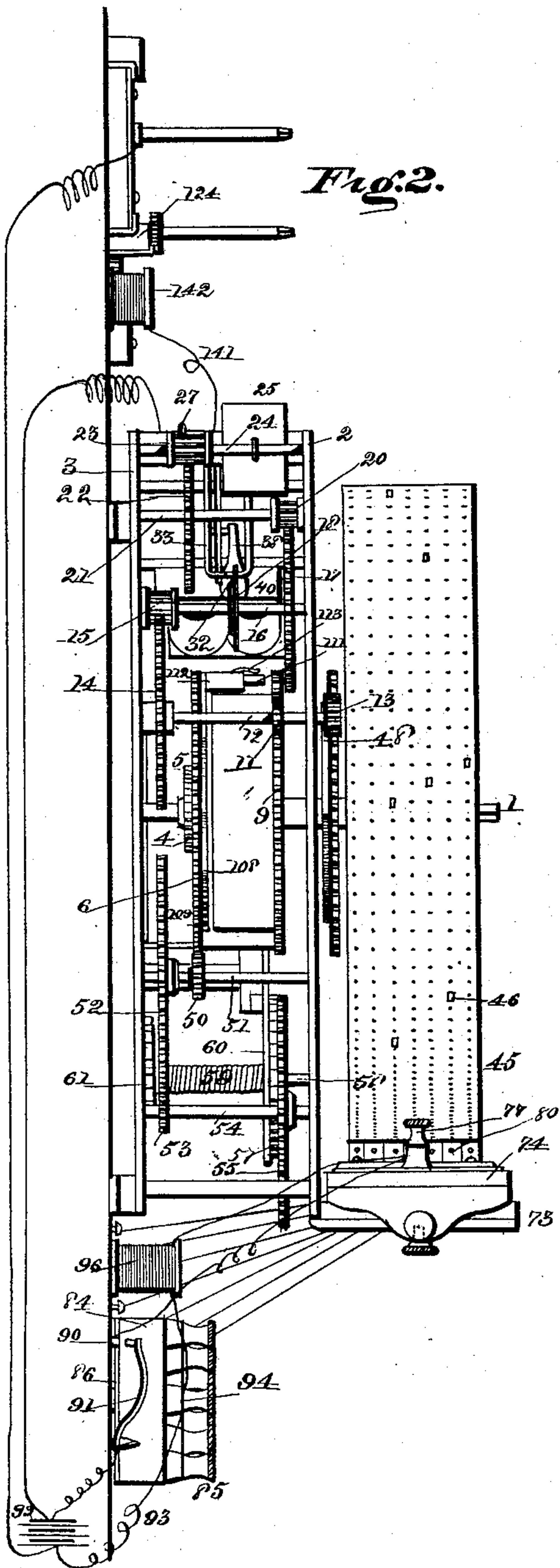
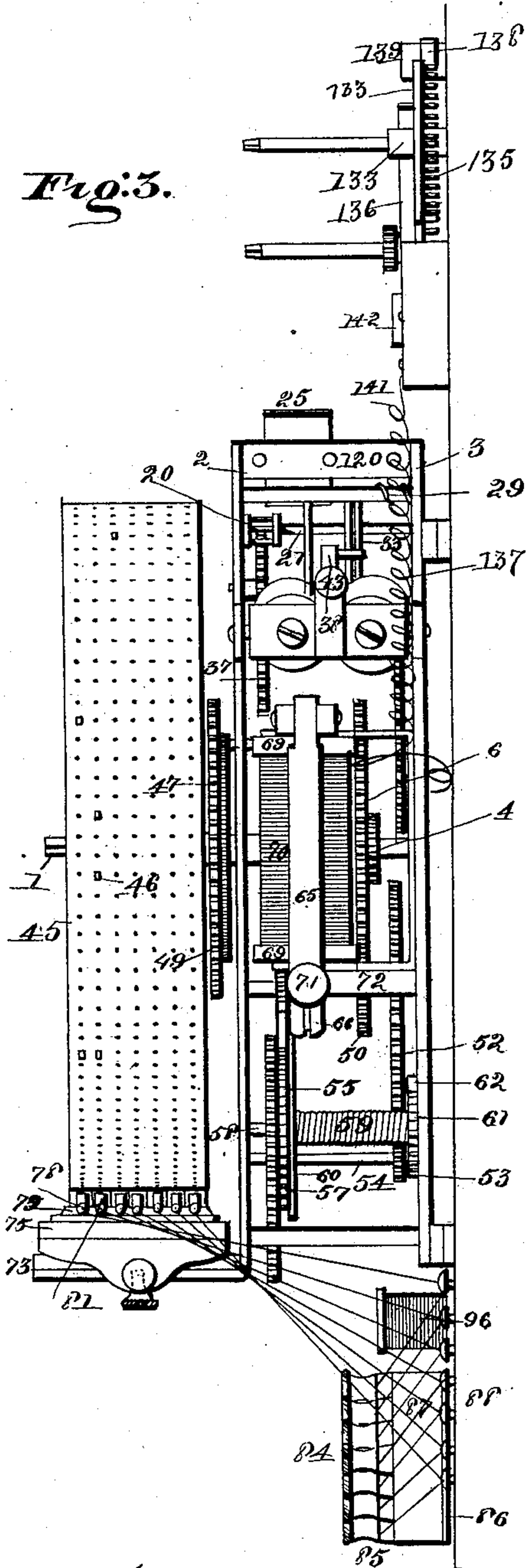


Fig. 2.

Fig. 3.



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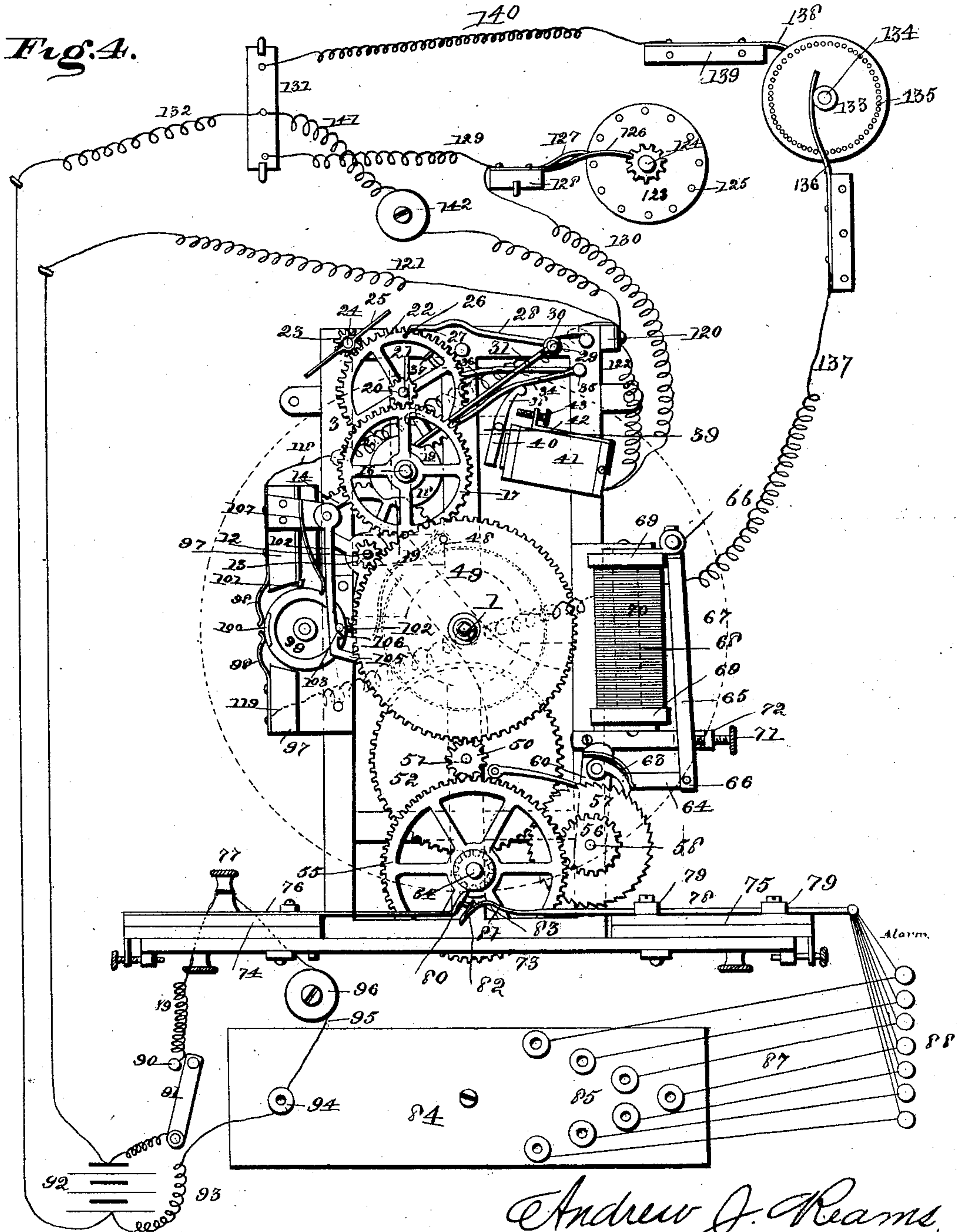
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4 Sheets—Sheet 4.

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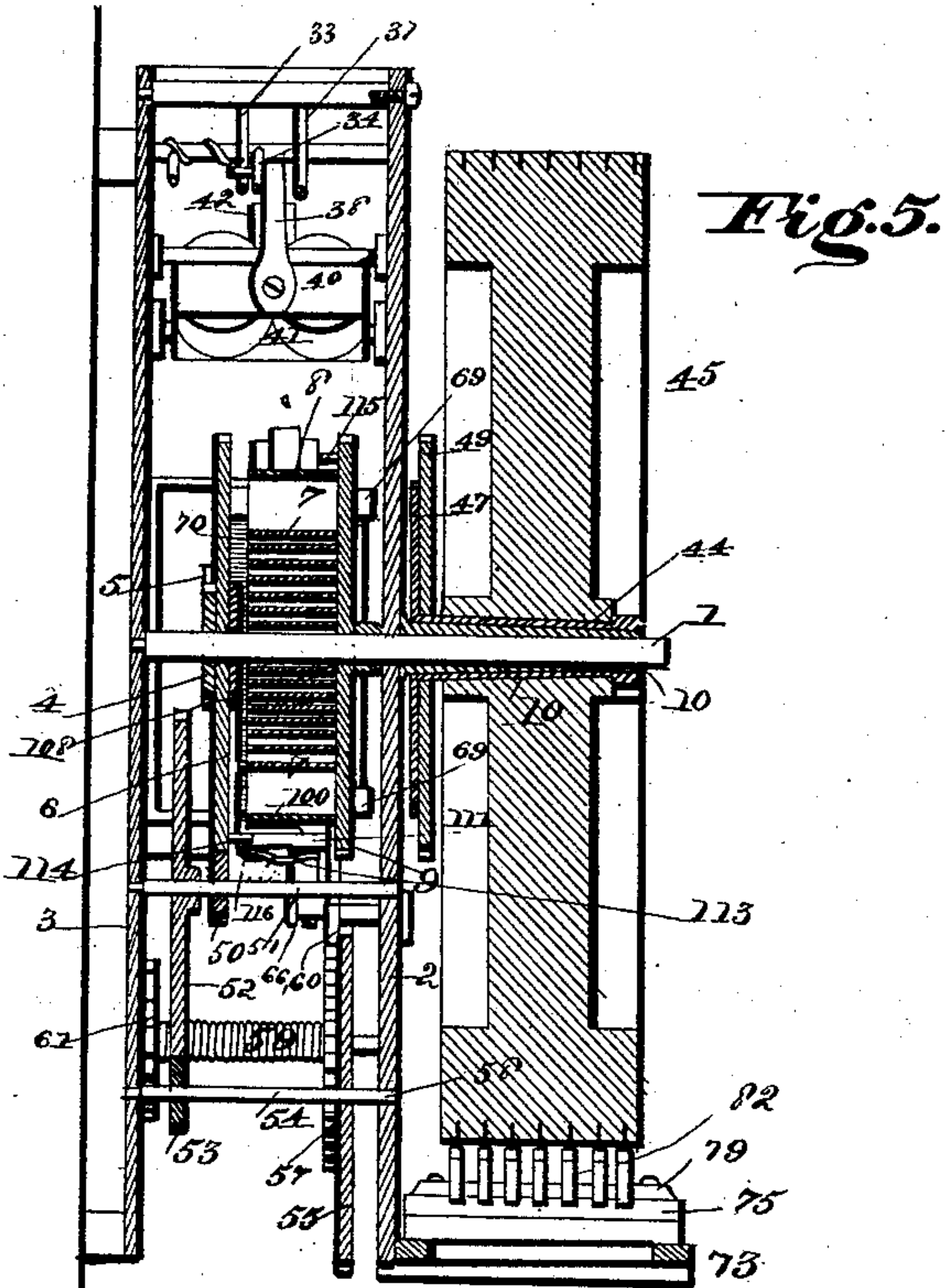


Fig. 6.

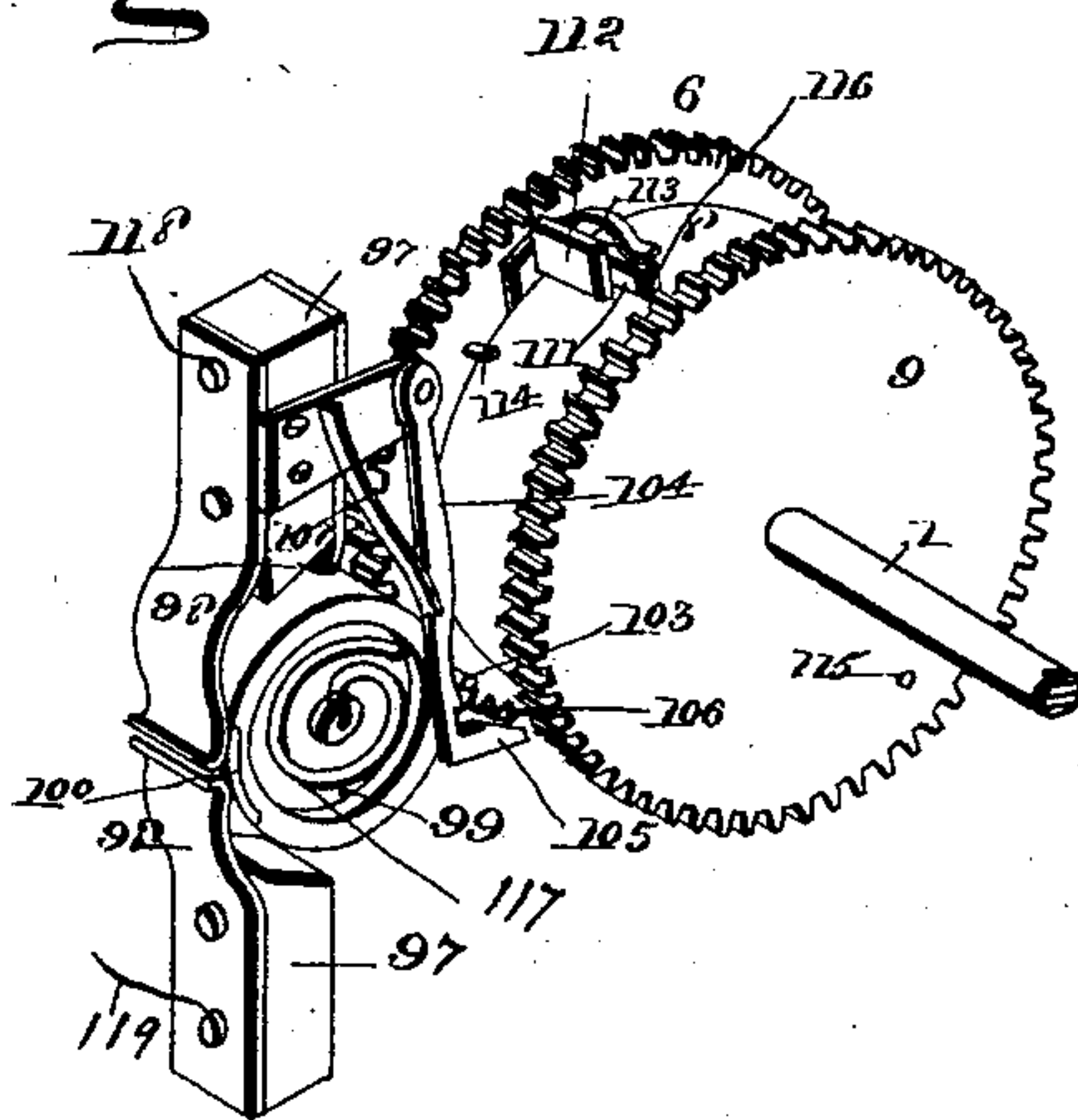
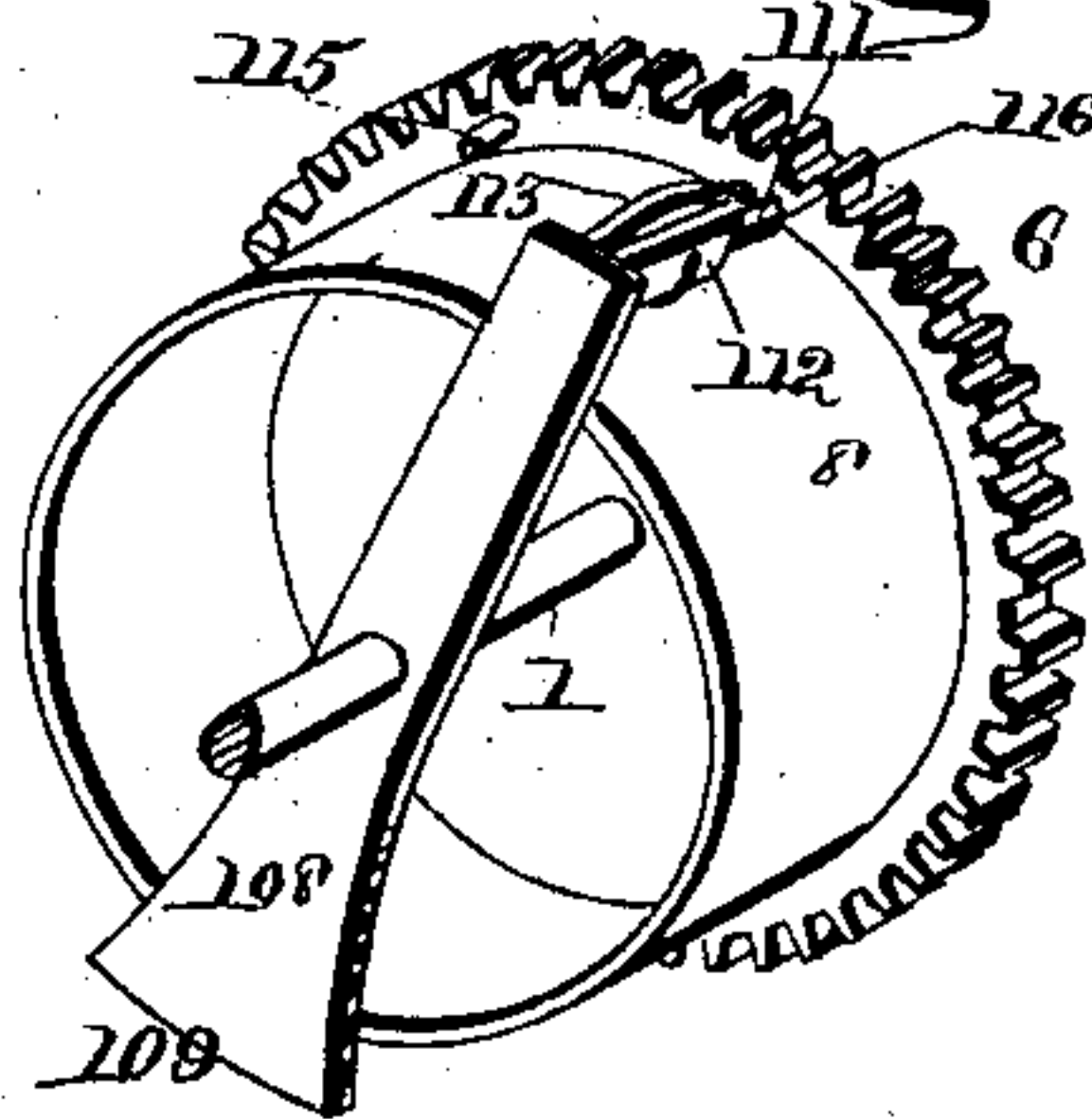


Fig. 8.





# UNITED STATES PATENT OFFICE.

ANDREW J. REAMS, OF AUGUSTA, KANSAS.

## ELECTRIC PROGRAMME-CLOCK.

SPECIFICATION forming part of Letters Patent No. 367,663, dated August 2, 1887.

Application filed March 7, 1887. Serial No. 230,035. (No model.)

*To all whom it may concern:*

Be it known that I, ANDREW J. REAMS, a citizen of the United States, and a resident of Augusta, in the county of Butler and State of Kansas, have invented certain new and useful Improvements in Electric Programme-Clocks; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification, and in which—

Figure 1 is a front view of my improved programme-clock. Fig. 2 is an edge view seen from the side having the circuit-breaker, the latter being removed. Fig. 3 is a side view seen from the other side. Fig. 4 is a front view, with the cylinder and the frame shown in dotted lines. Fig. 5 is a vertical axial sectional view. Fig. 6 is a detail view of the circuit-breaking mechanism and the spring-barrel and its cog-wheels. Fig. 7 is a top view of the shelf having the strips, and Fig. 8 is a perspective detail view of the spring-barrel and the arm.

Similar numerals of reference indicate corresponding parts in all the figures.

My invention has relation to that class of clocks which are placed upon an electric circuit and operated by the current from the circuit, which current is made and broken suitably by a central clock; and, furthermore, it has relation to that class of clocks in which a cylinder having plugs inserted removably at given points in its periphery is revolved by the works and may make and break local circuits having suitable alarms, and it contemplates certain improvements upon the programme-clock for which Letters Patent No. 349,605 were granted to me on the 21st day of September, 1886, and upon the clock for which I have made application for Letters Patent, Serial No. 218,659, filed November 11, 1886; and it consists to that end in the improved construction and combination of parts of such a clock having means for releasing the works at regular intervals, moving the cylinder having the plugs, and having means for winding the works of the clock by the breaking and making of the currents in main-line wires ex-

tending from a central clock, as hereinafter more fully described and claimed.

In the accompanying drawings, the numeral 1 indicates the main arbor, which is suitably journaled in the front and back pieces, 2 and 3, of the frame. The inner portion of this arbor has a small ratchet-wheel, 4, secured to it, which wheel is engaged by a spring-pawl, 5, pivoted upon the rear side of a cog-wheel, 6, journaled upon the arbor. The inner end of a clock-spring, 7, is secured to the shaft, and the outer end of this spring is secured to a barrel or casing, 8, secured upon the inner side of a cog-wheel, 9, journaled upon the arbor. A sleeve, 10, projects out from the front of the frame, forming a bearing for the arbor.

The forward cog-wheel upon the main arbor meshes with a pinion, 11, upon a shaft, 12, journaled in the frame, and this shaft is provided at its forward end, outside of the front frame, with a pinion, 13, and at its inner end with a cog-wheel, 14, which again meshes with a pinion, 15, upon a shaft, 16, in the frame, which shaft is provided with a cog-wheel, 17, at its forward end and with a disk, 18, at its middle, the said disk having two diametrically-opposite notches, 19, in its periphery. The cog-wheel upon the shaft meshes with a pinion, 20, upon a shaft, 21, and this shaft has at its inner end a cog-wheel, 22, which meshes with a pinion, 23, upon a shaft, 24, having a fan, 25, secured upon it.

The cog-wheel 22 is provided upon its rear face with a laterally-projecting stud, 26, which is engaged by the downwardly-bent end 27 of an arm, 28, projecting from a rock-shaft, 30, having a spring, 29, for forcing the arm downward, and the rock-shaft is provided with another arm, 31, having a laterally-bent end, 32, engaging the notches in the disk, and an arm, 33, having a bent end which rests upon an arm, 34, projecting from a shaft, 35, having a spring for forcing the arm down, and having another arm, 36, formed with an upwardly-bent end having an inclined stop, 37, upon its end. The arm 34 bears against the upper arm of an armature-lever, 38, secured to a rock-shaft, 39, and having its armature 40 attracted by an electro-magnet, 41, secured in the frame.

An arm, 42, projects above the inner ends of the electro-magnets and has a set-screw, 43,



passing through it, which screw bears with its inner end against the upper arm of the armature-lever, limiting the throw of the said lever and preventing it from being tilted with its armature out of the limit of attraction of the magnets.

The sleeve or hub 44 of the cylinder 45, having the removable plugs 46, is journaled upon the bearing-sleeve 10 for the main arbor, and this sleeve is provided with a ratchet-wheel, 47, upon its inner end, which is engaged by a spring-pawl, 48, upon the inner face of a cog-wheel, 49, journaled upon the sleeve or hub 44 and meshing with the pinion upon the front side of the front of the frame.

The cog-wheel 6 upon the inner portion of the main arbor meshes with a pinion, 50, upon a shaft, 51, having a cog-wheel, 52, which meshes with a pinion, 53, upon a shaft, 54, having a cog-wheel, 55, meshing with a pinion, 56, upon the forward face of a ratchet-wheel, 57, upon a shaft, 58, having a spring, 59, coiled upon it, one end of which spring is secured to a balanced lever or arm, 60, while the other end is secured to a ratchet-wheel, 61, upon the inner end of the shaft engaged by a pawl, 62.

The lever or balanced arm 60 has a spring-pawl, 63, engaging the ratchet-wheel, and an arm, 64, is pivoted to the upper end of the arm and to the lower end of an arm or lever, 65, of soft iron, pivoted at its upper end between lips 66, secured to the upper end of an electro-magnet, 67, secured in the frame. This magnet consists of a tube, 68, having collars 69 at its ends and having the coil 70 wrapped around it between the collars, and the lever 65 is attracted by the collars when the tube is magnetized by the circuit in the coil being closed and will tilt the spring-pawl 63 and its arm back, whereupon the spring coiled around the shaft will again force the arm and pawl forward, giving the ratchet-wheel a part revolution, the tension of the spring being adjusted by means of the ratchet-wheel and pawl upon the rear end of the shaft.

The throw of the armature lever is limited by a set-screw, 71, passing through an arm, 72, projecting from the frame, and it will be seen that the arm and pawl may be rocked and the ratchet-wheel partly revolved each time the lever is attracted by the magnet, the ratchet-wheel revolving the inner cog-wheel upon the main arbor, and thus revolving the shaft or arbor and winding the spring, the cog-wheel revolving the arbor by having the pawl engaging the ratchet-wheel upon the same.

The shelf 73 below the cylinder is of the same construction as the shelf described in the above-referred-to application, having the insulating-blocks 74 and 75, and having the slitted plate 76 upon the insulated block 74 provided with the binding-post 77; but the other insulated block, 75, has a number of rods, 78, corresponding in number to the number of strips formed in the slitted plate, secured upon the upper side by means of cross strips

79, of an insulating material. The ends of the strips of the slitted plate are provided with obliquely-projecting studs or contact-points, 80, and the ends of the rods upon the insulated block are flattened, as shown at 81, and bent upward and thereupon downward, forming inclined portions 82, having contact-strips 83, preferably of platinum, secured with their lower ends to them, the upper ends of the contact-strips projecting out from the inclined portions of the flattened rods.

A switch-board, 84, is secured below the shelf and has a number of binding-posts, 85, at one end, having their inner ends in contact with a metallic backing, 86, upon the inner side of the switch-board, and wires 87 are secured to these posts and have suitable electro-magnetic alarms, 88, upon them, and have their other ends secured to the outer ends of the rods in the same manner as the strips have the wires and alarms in the application above referred to.

The binding-post 77 upon the slitted plate has a wire, 89, attached to it, which wire passes to a contact-point, 90, having the free end of a pivoted switch-strip, 91, registering with it, and the other end of the wire is attached to the pivoted end of this switch-strip 91, and passes to one pole of a battery, 92, which has a wire, 93, attached to its other pole and passing to a binding-post, 94, at the other end of the switch-board. A German-silver shunt-wire, 95, is secured to this binding-post, and at its other end to the binding-post upon the slitted plate, being wrapped around a spool, 96, at its middle; and it will be seen that by having this shunt-wire the current in the wires will be closed when a contact-point of the slitted plate is brought into contact with one of the contact-strips upon the rods, without creating any spark between the contact-point and strip, thus preventing any oxidation of the latter parts.

Two insulating-blocks, 97, are secured at the side of the main arbor and its barrel, and have strips 98 secured upon their outer sides, the meeting ends of these strips being curved slightly outward, and these curved ends of the strips are normally in contact with the periphery of a disk or cylinder, 99, having a metallic segment, 100, inserted into its periphery, the disk being made of an insulating material. The disk has a stud, 101, projecting upward from its periphery and normally bearing against the inner end of the upper insulated block. A stud, 102, projects inward from the periphery of the disk diametrically opposite to the segment, while a stud, 103, projects from the outer face of the disk at the same point as the inwardly-projecting stud. An arm, 104, is pivoted above the disk, and has an inwardly-projecting slightly beveled end, 105, and an inwardly-projecting shoulder, 106, beveled upon the upper side and rectangular at its under side, the said shoulder normally supporting the laterally-projecting stud 103 of the disk upon its upper inclined side,



and the arm 104 is provided with a spring, 107, which forces the arm inward against the stud upon the outer side of the disk.

An arm, 108, is pivoted at its middle upon the main arbor between the barrel and the inner cog-wheel, and this arm has one end, 109, enlarged, and formed with a counterpoise, 110, while the other end, 112, is bent to project over the periphery of the spring-barrel, and has an arm, 111, pivoted upon one side at one end and provided with a spring, 113, forcing the arm toward the face of the barrel.

The inner faces of the two cog-wheels upon the main arbor are provided near their peripheries each with an inwardly-projecting stud, 114 and 115, which may respectively engage the edge of the bent portion of the pivoted arm or lever upon the arbor and the free end of the small arm pivoted upon the end of the lever, and the side of this small arm, which faces in the direction of the revolution of the cog-wheels, is beveled, as shown at 116.

The insulated disk or cylinder 99 is provided at its shaft or pivotal bolt with a spring, 117, preferably a spiral or helical spring, which spring is secured to the disk and to the shaft or bolt, returning the disk to its normal position if it is turned upon the shaft or bolt.

Two wires, 118 and 119, are secured to the strips upon the insulated blocks, and one of these wires, 118, which is secured to the upper strip, passes over to a switch-plate, 120, secured to and insulated from the clock-frame and having one wire, 121, secured to it and passing to the pole of the battery connected to the slitted strip, and one wire, 122, passing to the electro-magnet operating the releasing mechanism. The other wire, 119, passes from the lower insulated strip to the electro-magnet operating the winding mechanism.

A disk, 123, having a metallic hub, 124, and having studs 125 projecting from one face near the periphery, is connected to the works of a main regulating-clock, revolving once in an hour and having twelve studs, so that it will move the space of one stud every five minutes. Two strips, 126 and 127, bear, respectively, against the hub of the disk and toward the studs upon the same, and are secured upon an insulating-block, 128, and these strips have wires 129 and 130 attached to them, one wire passing to the electro-magnet operating the releasing mechanism and the other wire extending to a switch-plate, 131, having a wire, 132, passing to the pole of the battery connected to the lower switch-board.

A disk, 133, is suitably connected to the works of the main clock, and is formed with a hub, 134, and with pins or studs 135, projecting from its face near the periphery, and an insulated spring or strip, 136, is in contact with the hub, and has a wire, 137, extending to the winding-magnet, while another strip or spring, 138, projects toward the studs and is secured to an insulating-block, 139, and has a wire, 140, which passes to the switch-plate

131. A German silver shunt-wire, 141, is connected to this switch-plate and to the switch-plate upon the frame, and is wound upon a spool, 142, suitably supported.

It will now be seen that when the works of the main clock revolve, the disk 123, having the twelve studs, will be moved the space of one stud every five minutes, said disk revolving with the minute-hand, and by bringing a stud in contact with the end of the strip or spring 127 the circuit is closed in the electro-magnet, releasing the works, attracting the armature of the same, and raising the stop-arm, allowing the train of wheels to revolve, carrying the cylinder forward one space, so that a plug in the periphery of the cylinder may depress the strip registering with it and close the alarm-circuit when it arrives at the proper point in the same manner as in the former clocks. The shunt will prevent sparks from being formed between the ends of the insulated strips or springs and the pins upon the disks of the main clock, preventing oxidation of the points of the springs and of the studs or pins.

As the disk 123 of the regulating-clock is revolved, it will close the circuit when the pins strike the spring, and, the circuit being closed, the armature-lever 65 will be attracted by the electro-magnet 67 at the side of the clock, causing the spring-pawl engaging the ratchet-wheel of the winding mechanism to be moved over the periphery of the wheel, so that the coiled spring upon the shaft of the ratchet-wheel will force the pawl and the arm forward, drawing the ratchet-wheel with it, when the circuit is again broken and the lever released. In this manner the spring 7 will continually be wound automatically, the cog-wheel 6 upon the inner end of the main arbor revolving in the same direction as the forward cog-wheel, 9, which is moved by the spring.

The stud 114 upon the face of the inner cog-wheel will engage the projecting end of the arm 108, pivoted upon the main arbor, and will carry it with it as it revolves, and at last the bent end of the arm or lever will be brought to the side at which the insulating-disk 99 is journaled, when the said end will bear against the inwardly-projecting stud 102 and rotate the disk until the stud 103 is caught by the end of the pivoted spring-arm 104, which will stop the lever and hold it. As the disk 99 is rotated, the metallic segment in the periphery of the disk will be turned out of contact with the lower strip, breaking the current and stopping the winding mechanism. As now the forward cog-wheel, 9, upon the arbor is revolved, the stud 115 upon the inner face of this cog-wheel will reach the end 112 of the lever 108 and force it downward, throwing the pivoted spring-arm 104 sufficiently far out to allow the forwardly-projecting stud 103 to slip upward by the shoulder 106 upon the spring-arm, the spring 117 upon the disk 99 and shaft throwing the disk back into its normal position, closing the circuit again. In



this manner, overwinding of the spring 7 will be prevented, and at the same time the clock may continue to go without the necessity of winding it, it being only necessary to wind the clock once, when the electric winding mechanism will keep the clock wound, the number of pins or studs upon the disk and the number of its revolutions in a certain space of time being regulated so as to wind the spring as much as it will be unwound by operating the train.

It will be seen that, if desired, a number of these clocks may be operated by one main regulator-clock, and that any number of alarms may be operated from one of the clocks, so that the clock may be useful in schools, hotels, or other places where it is desired to have an alarm sounded at a certain hour, only one of the alarm-operating clocks being necessary in each building, while one main clock or regulator may operate the clocks in a number of buildings. By turning the switch-strip near the battery off to one side, the local circuit may be broken, so that battery-power may be saved when the clock is not to be used. By having the wires from the battery passing to the switch-strips the same battery may be used for the releasing and for the winding mechanism, and by having two sets of wires passing from the batteries the same batteries may be used for the main-line circuit operating the releasing and winding mechanisms, as well as for the local circuits having the alarm-bells upon them.

Having thus described my invention, I claim and desire to secure by Letters Patent of the United States—

1. In a programme clock, the combination of a clock having a cylinder upon the main arbor of its train, provided with series of removable and insertible plugs, and having an electro-magnet operating the releasing and stopping mechanism of the clock, electrodes of a number of small local circuits brought into contact by the plugs upon the cylinder, and a main clock having a disk revolved by it and provided with a hub and laterally-projecting studs, and having two springs secured upon an insulating-block and bearing against the hub and toward the studs upon the disk, and having wire connections to the electro-magnet in the local clock, as and for the purpose shown and set forth.

2. In a programme-clock, the combination of a clock having a cylinder in its works operating a number of local alarm-circuits, and having an electro-magnet for releasing and stopping the works, and having an electro-magnet operating the mechanism for winding the spring, with a main or regulator clock having means for at regular intervals closing the circuit for the releasing-magnet and for at regular intervals closing the circuit for the winding-magnet, as and for the purpose shown and set forth.

3. In a programme clock, the combination of a clock-work having a cylinder in its works operating a number of local alarm-circuits, and having an electro-magnet operating the mech-

anism releasing and stopping the works, and having an electro-magnet operating the mechanism for winding the spring, switch-plates having each a wire from the poles of a battery secured to them, disks connected to and revolved by a main clock, and having each a projecting hub and laterally-projecting studs near their periphery, two insulated springs, respectively, in contact with the hub of a disk and projecting to the studs of the same, and having a wire attached to the releasing-magnet and to one switch-plate, two insulated springs, respectively, in contact with the hub of the other disk and projecting to the studs of the same, and having wires attached to their ends and to the winding-magnet and to the switch-plate, having the wire from the registering-spring of the other disk attached to it, and wires respectively passing from the releasing-magnet and winding-magnet and secured to the other switch-plate, as and for the purpose shown and set forth.

4. In a programme clock, the combination of a revolving cylinder having insertible and removable plugs in series of equidistant sockets in its periphery, a longitudinally-slitted plate at the united ends of a number of normally-open circuits, having the ends of its strips bent upward and provided with obliquely-projecting studs or contact-points upon the under sides, and strips at the other ends of the circuits and formed with downwardly-inclined ends provided with contact-springs secured to the ends of the inclined portions, and having the upper ends projecting upward from the said portions registering with the points upon the other strips, as and for the purpose shown and set forth.

5. In a programme clock, the combination of a revolving cylinder having insertible and removable plugs in series of equidistant sockets in its periphery, a longitudinally-slitted plate at the united ends of a number of normally-open circuits, having the ends of its slits bent obliquely upward and provided upon their under sides with oblique contact-points, and a number of rods at the ends of the circuits, clamped between insulating blocks and strips and having their inner ends flattened and bent in a V shape, and provided upon the upper inclined faces of the outer inclined portions with contact-springs secured at their lower ends, and having their free ends projecting out from the faces registering with the contact-points, as and for the purpose shown and set forth.

6. In a programme clock, the combination of a main arbor having the end of a spring secured to it and having a cog-wheel secured upon it, a reducing train of cog-wheels and pinions, a ratchet-wheel having a pinion upon its shaft meshing with the reducing-train, a lever pivoted upon the shaft of the ratchet-wheel and having a counterbalanced arm and a spring-pawl upon the other arm engaging the ratchet-wheel, a spring wrapped around the shaft of the ratchet-wheel and se-



cured at one end to the lever and at the other end to a ratchet-wheel, revolving upon the shaft and having a pawl engaging it, and an electro-magnet having its armature-lever connected by an arm to the arm having the spring-pawl, as and for the purpose shown and set forth.

7. In a programme-clock, the combination of a main arbor having the end of a spiral spring secured to it, and having a cog-wheel upon it provided with a spring-pawl engaging a ratchet-wheel upon the arbor, a reducing-train meshing with the cog-wheel and having a ratchet-wheel at its other end, a lever having a spring-pawl engaging the ratchet-wheel and having means for throwing it forward, and an electro-magnet having ears at its upper end and having its armature-lever pivoted at its upper end between the ears and having a connecting-arm from its lower end to the lever having the pawl, as and for the purpose shown and set forth.

8. In a programme-clock, the combination of a main arbor having the inner end of a clock-spring secured to it, a spring-barrel having the outer end of the spring attached to it, and having the main wheel of the clock-works secured to one side and provided with an inwardly-projecting stud upon its inner face near the periphery, a winding cog-wheel upon the arbor having an inwardly-projecting stud upon its face near the periphery, an electro-magnet having a suitable mechanism for making and breaking the current in its coil and having means attached to its armature for revolving the winding-wheel, a lever pivoted at its middle upon the arbor, and having a counterpoise at one arm and having the end of the other arm bent over the periphery of the spring-barrel, and provided with an arm pivoted with one end upon the face of the bent portion and provided with a spring holding it parallel with the face of the barrel, two strips secured upon insulated blocks and having the wires of the electro-magnet secured to it and having their meeting ends projecting near to each other, a disk or cylinder of non-conducting material having a metallic segment in its periphery bearing against the ends of

the strips, and having a spring at its axis for revolving it into its normal position, and provided with an upwardly-projecting stop-pin and with a stud projecting at a point diametrically opposite to the segment and a pin projecting from the face at the same point, and an arm having its lower end bent inward toward the spring-barrel and having a shoulder upon its inner edge beveled upon the upper side and engaging the pin upon the face of the disk and having a spring forcing it inward, as and for the purpose shown and set forth.

9. In a programme-clock, the combination of a shelf having a longitudinally-slitted plate and a number of rods, and having means for bringing the ends of the strips of the slitted plate in contact with the ends of the rods, a switch-plate having a binding-post provided with a wire passing to one pole of a battery, and having a number of binding-posts at the other end having wires attached to them provided with suitable electro-magnetic alarms and attached to the ends of the rods, a wire passing from the other pole of the battery to the slitted plate, and a shunt-wire passing from the binding-post of the switch-plate to the slitted plate, as and for the purpose shown and set forth.

10. In a programme clock, the combination of a switch-plate having wire connection to one pole of a battery, two circuit making and breaking devices having each one wire passed to the switch-plate, a switch-plate having a wire passing to the other pole of the battery, two electro-magnets operating the winding and the work-releasing mechanisms of the clock and having each one wire passed to the last-mentioned switch-plate and one wire passed to the circuit making and breaking mechanisms, and a shunt-wire passing from one switch-plate to the other, as and for the purpose shown and set forth.

In testimony that I claim the foregoing as my own I have hereunto affixed my signature in presence of two witnesses.

ANDREW J. REAMS.

Witnesses:

W. J. SPEER;  
W. C. WELCH.