

908,376.

E. P. BAIRD.
CALL REGISTER.
APPLICATION FILED JULY 31, 1908.

Patented Dec. 29, 1908.
4 SHEETS—SHEET 1.

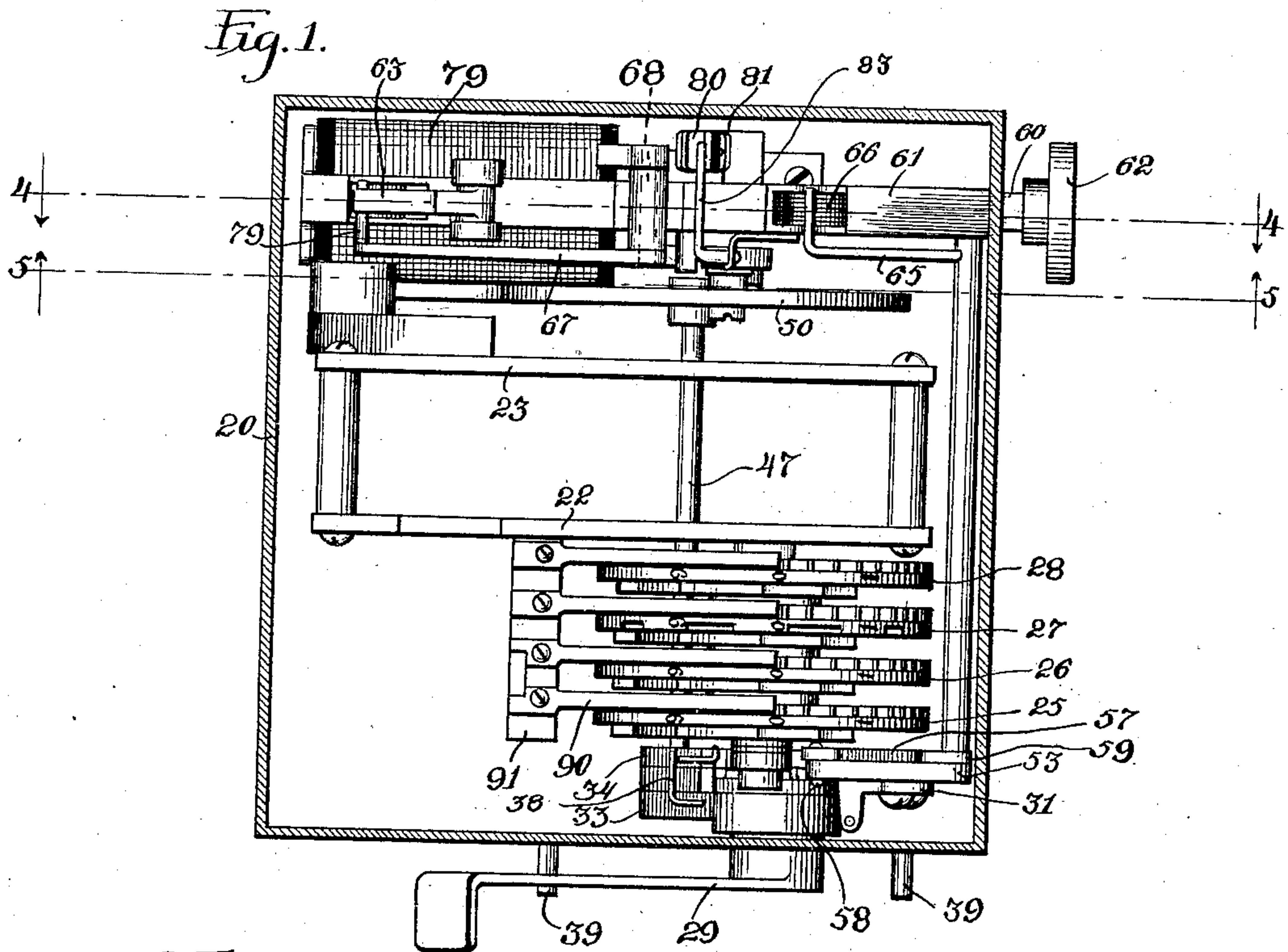
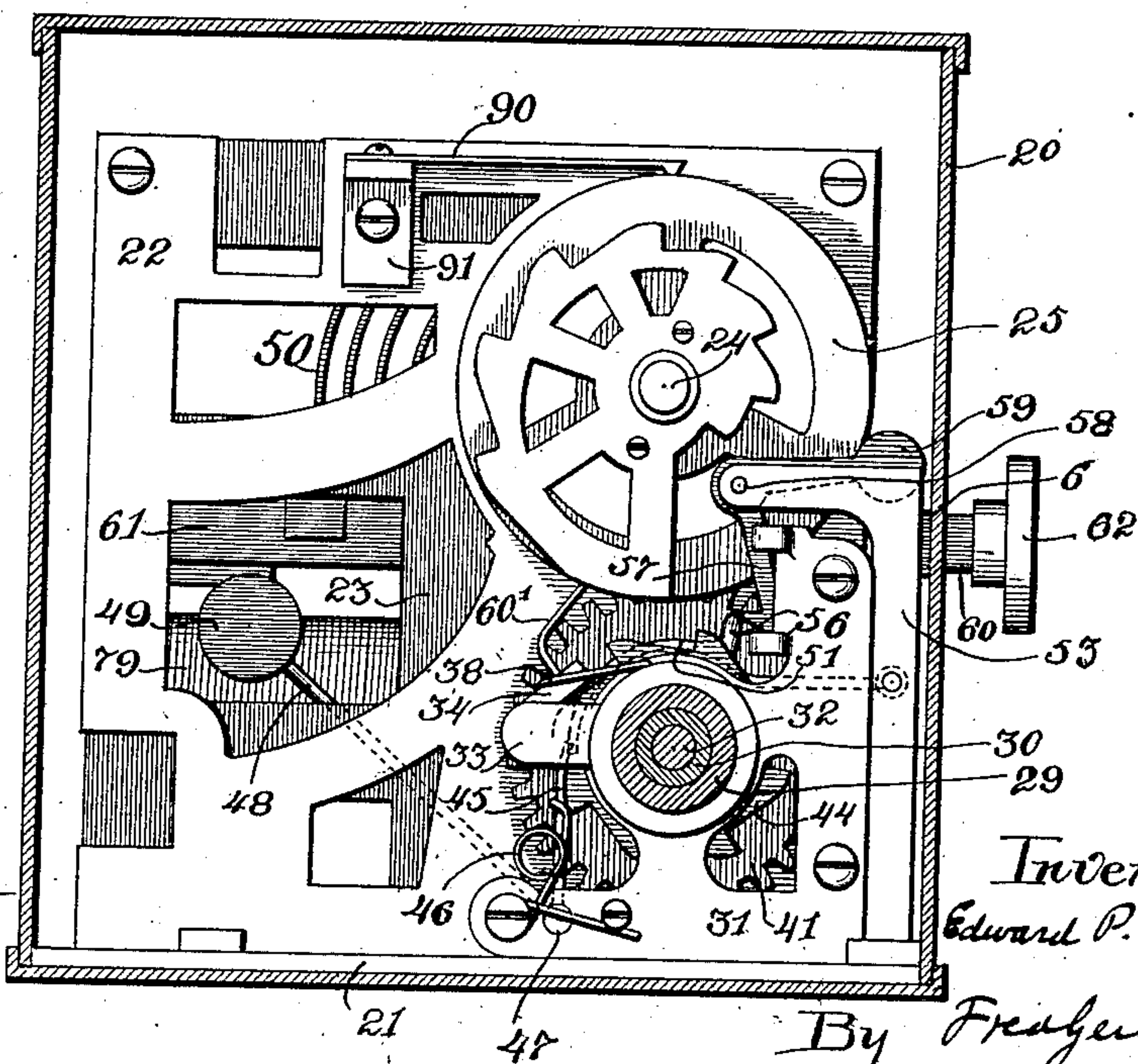


Fig. 2.



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Fig. 3.

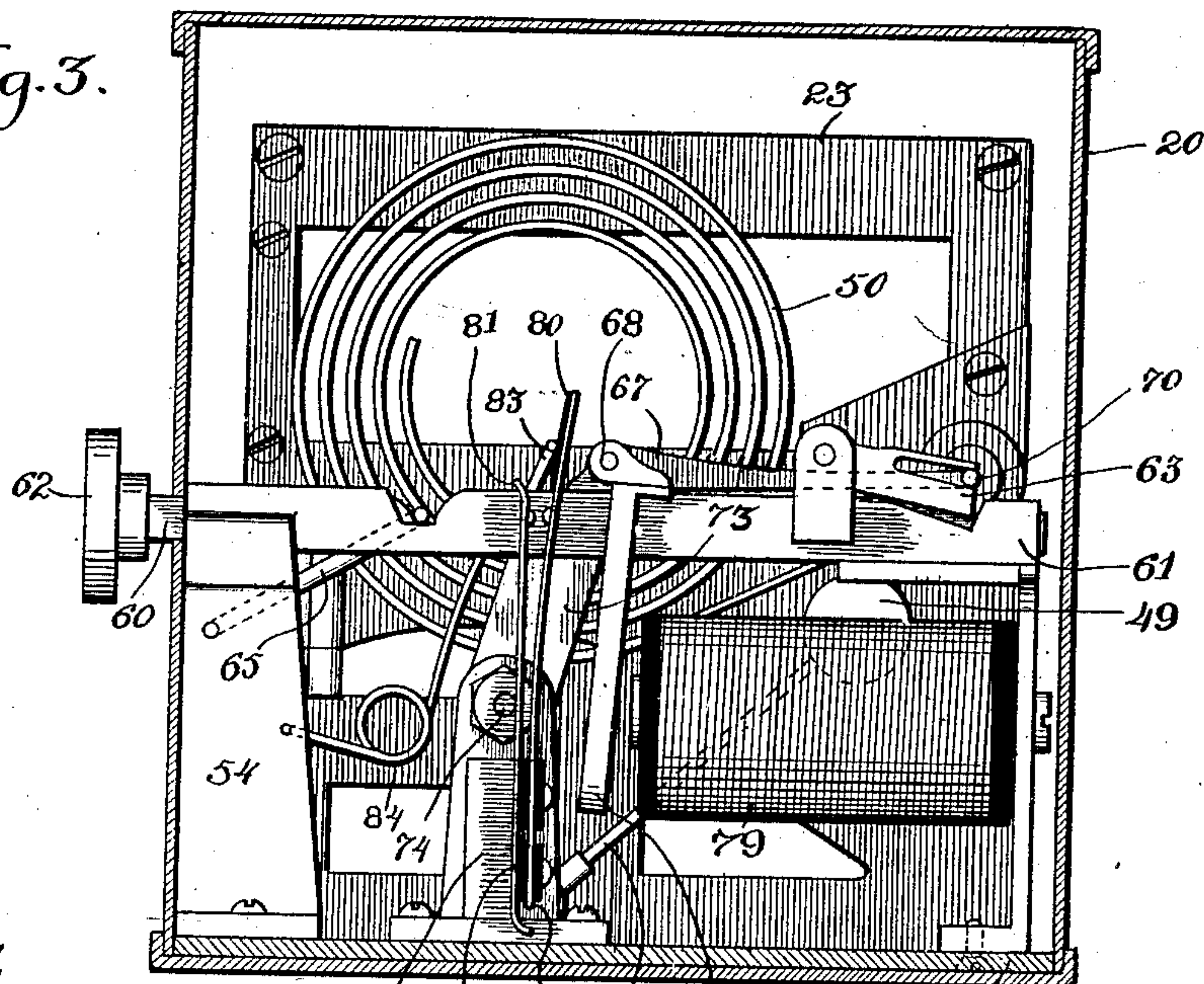


Fig. 4.

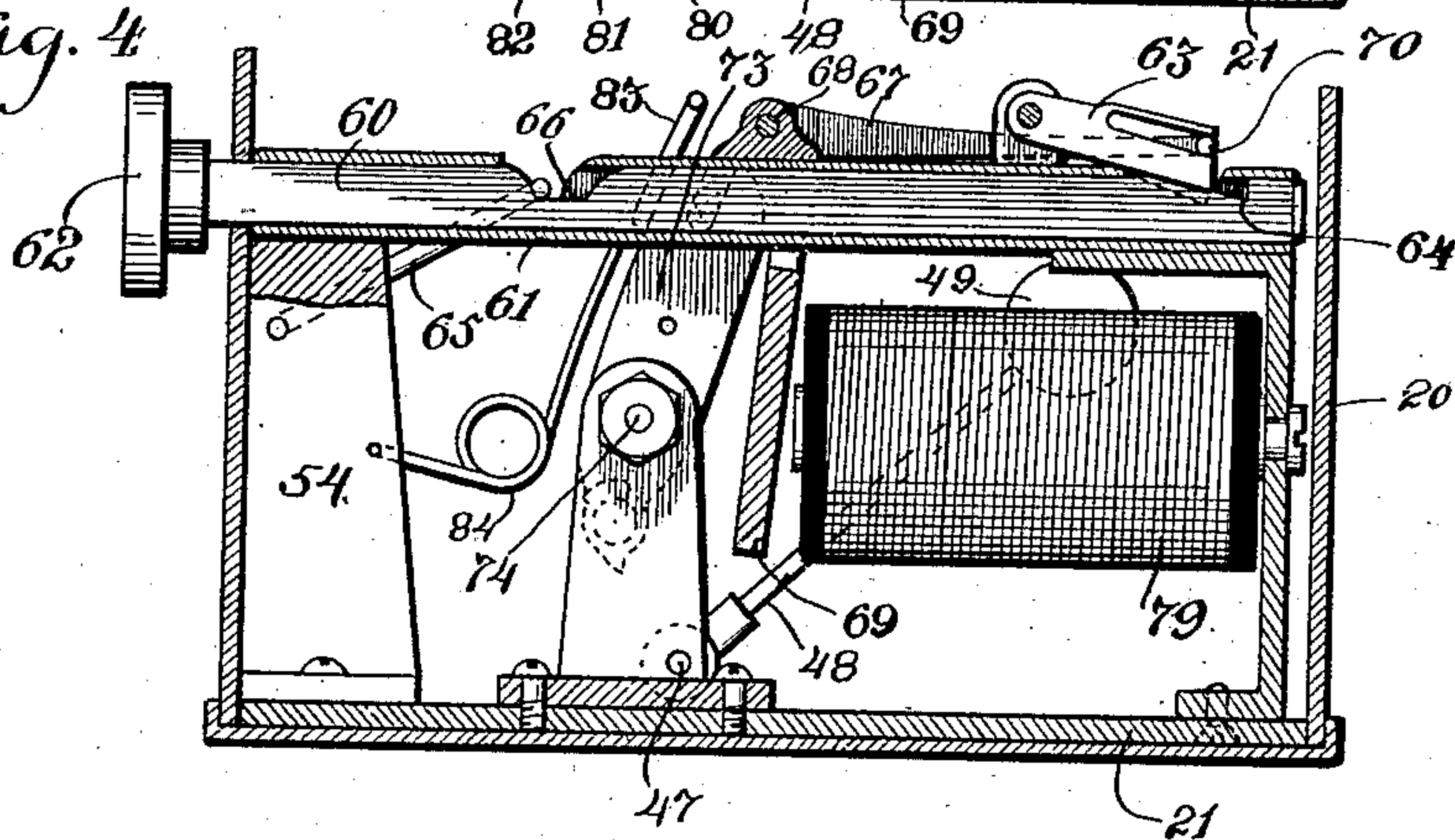
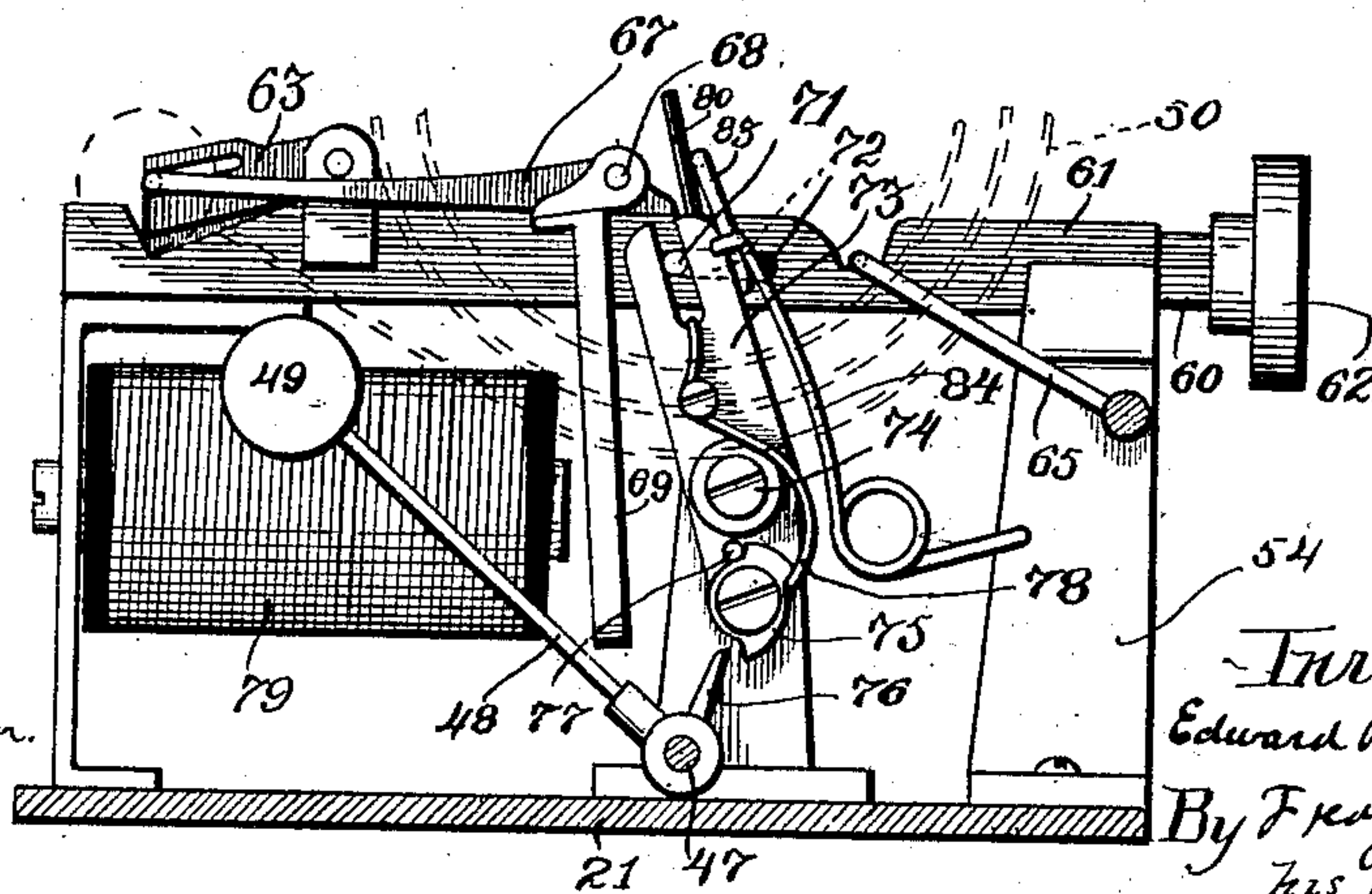


Fig. 5.



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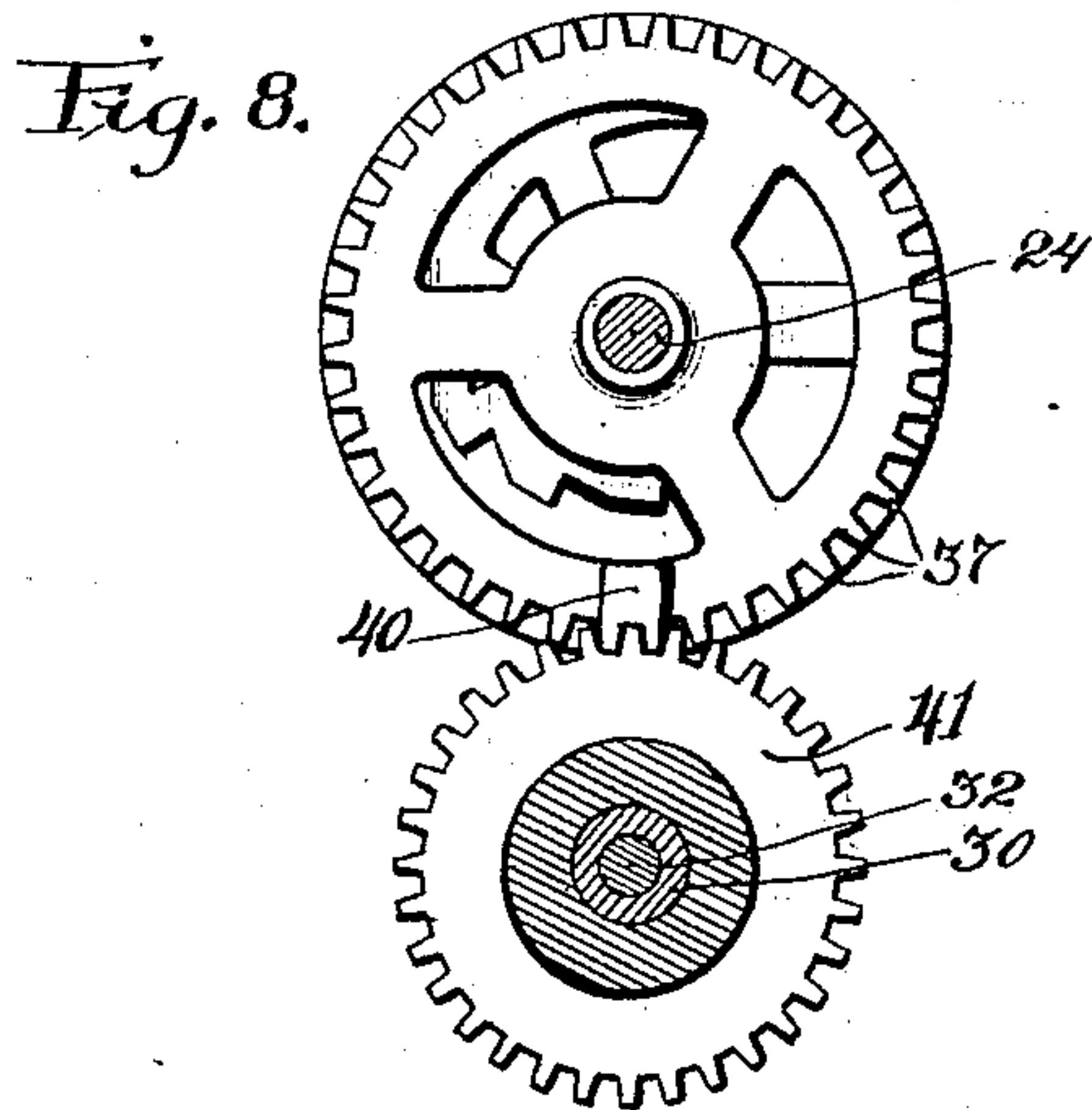
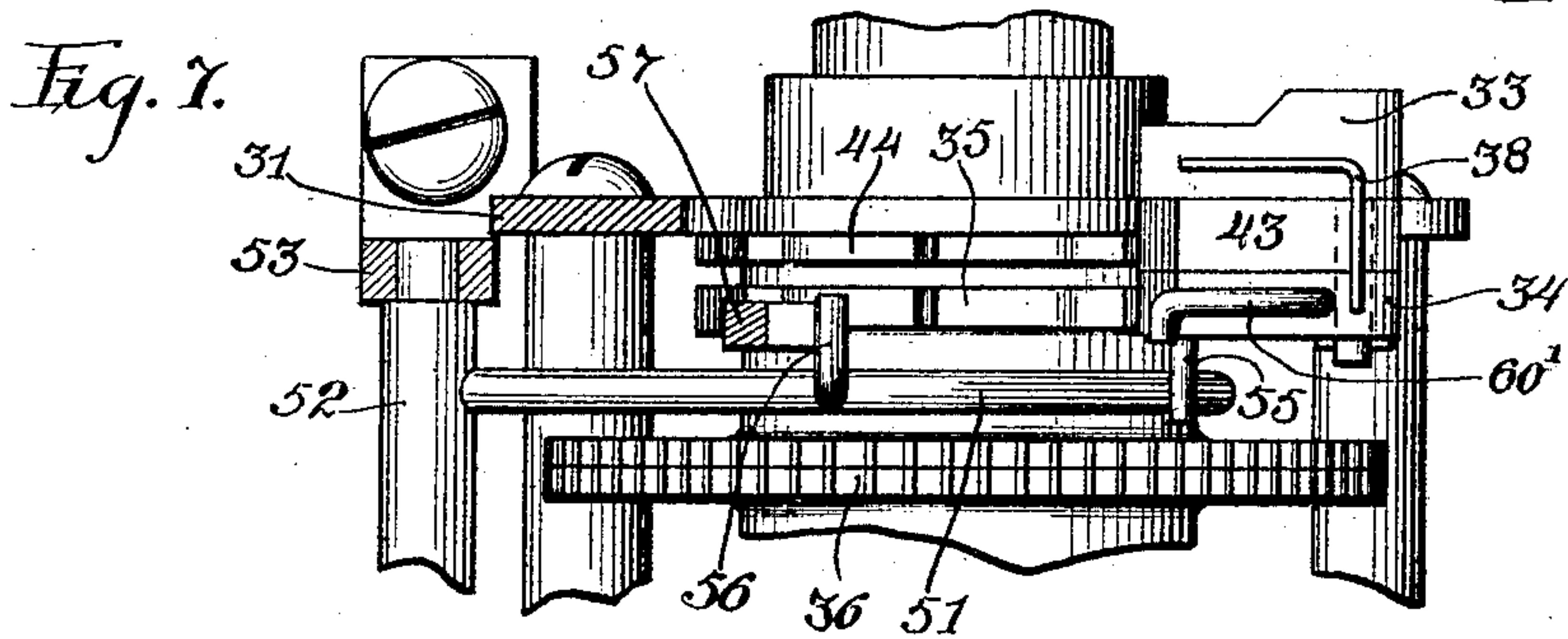
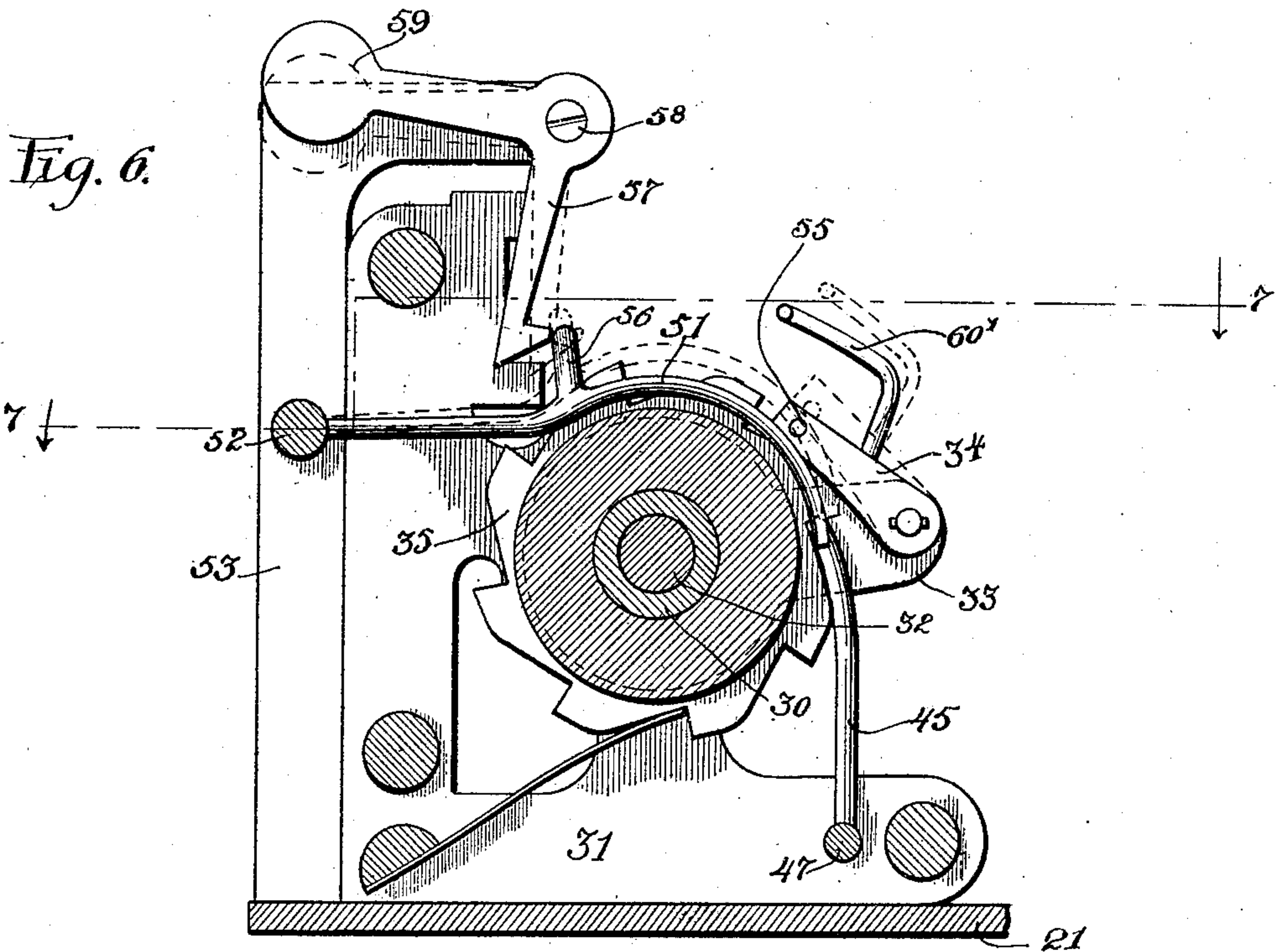
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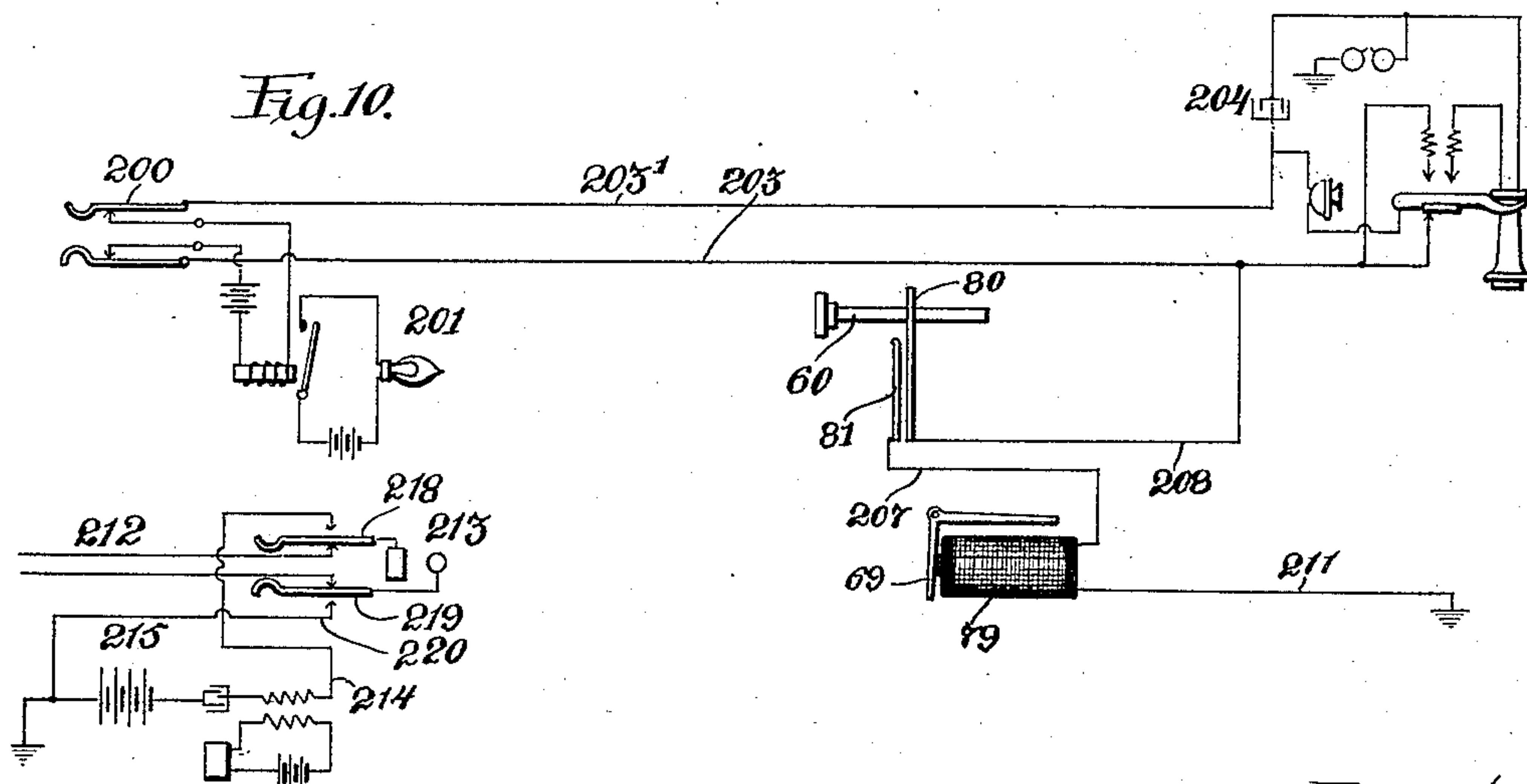
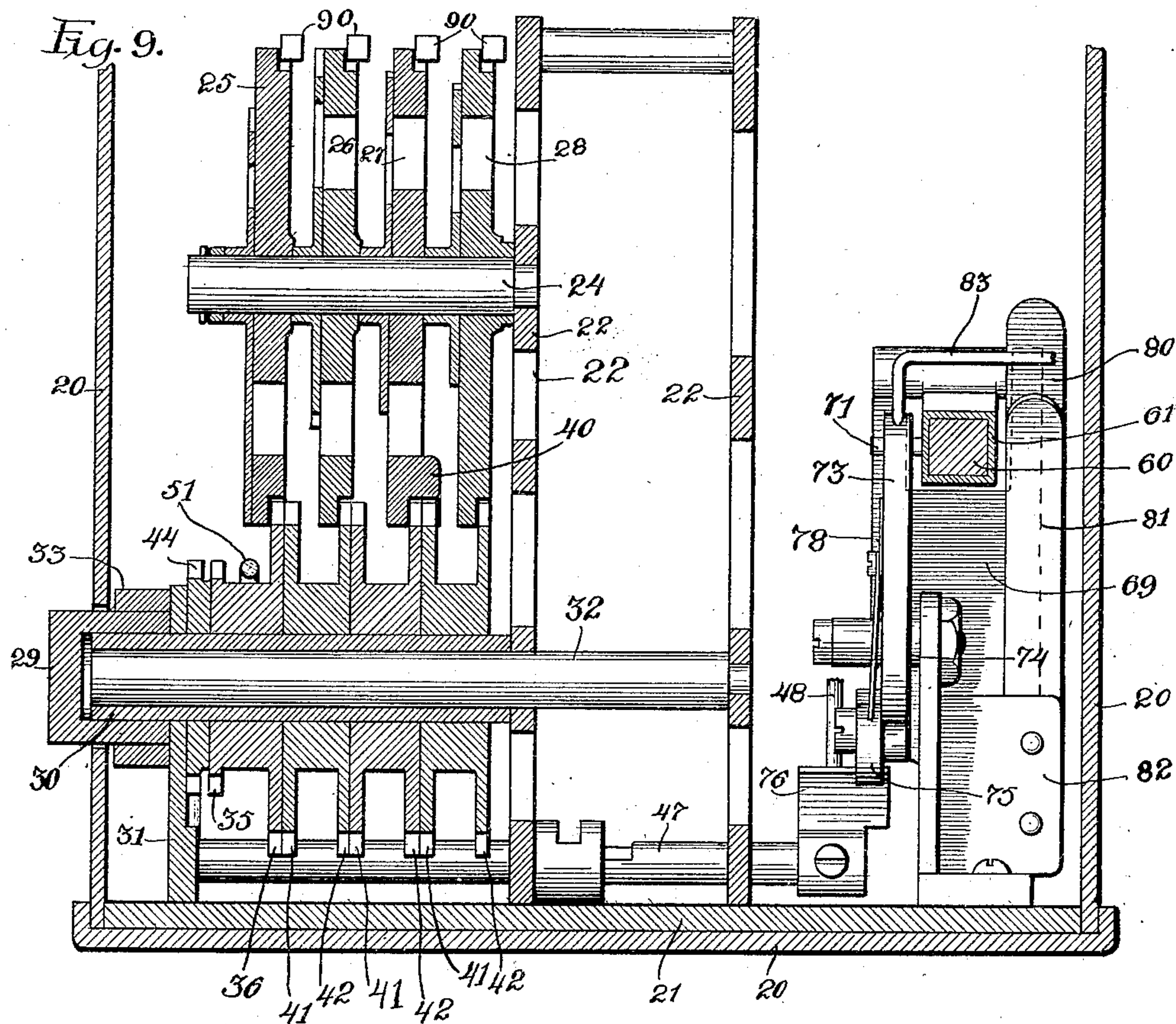
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APPLICATION FILED JULY 31, 1908.

Patented Dec. 29, 1908.
4 SHEETS—SHEET 4.



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UNITED STATES PATENT OFFICE.

EDWARD P. BAIRD, OF EVANSTON, ILLINOIS, ASSIGNOR TO BAIRD MANUFACTURING COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

CALL-REGISTER.

No. 908,376.

Specification of Letters Patent.

Patented Dec. 29, 1908.

Original application filed July 11, 1902, Serial No. 115,110. Divided and this application filed July 31, 1908.
Serial No. 446,270.

To all whom it may concern:

Be it known that I, EDWARD P. BAIRD, a resident of Evanston, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Call-Registers, of which the following is a full, clear, and exact description.

The invention relates to registering-devices, *e. g.*, those employed for indicating the number of calls made at the sub-station of a telephone system, and this application is a division of the subject-matter set forth in an application filed by me in the United States Patent Office July 11, 1902, Serial No. 115,110.

One of the objects of the invention is to provide an improved telephone call register embodying mechanism for rendering the register advancing-mechanism inoperative, in event the desired service cannot be given, so that the patron, when next operating the advancing mechanism will signal the exchange operator but will not advance the register.

The invention consists in the several novel features hereinafter set forth and more particularly defined by claims at the conclusion hereof.

In the drawings: Figure 1 is a plan view, the inclosing case being shown in section. Fig. 2 is a side elevation, the inclosing case being shown in section. Fig. 3 is a view in side elevation showing the opposite side of that shown in Fig. 2. Fig. 4 is a section taken on line 4—4 of Fig. 1. Fig. 5 is a view in vertical section on line 5—5 of Fig. 1. Fig. 6 is a detail section upon an enlarged scale of the mechanism for holding the register-advancing pawl in inoperative position, so that the register will not be advanced by the actuating-lever. Fig. 7 is a section on line 7—7 of Fig. 6. Fig. 8 is a detail view showing one of the indicator wheels of the register and the device whereby movement is imparted to the indicator-wheel for the next higher denomination. Fig. 9 is a view in vertical transverse section taken through the indicator-wheels. Fig. 10 is a diagrammatic view of a telephone-system having the improved registering device associated therewith.

The register is located at a sub-station and usually inclosed in a case 20 of any suitable

construction. For convenience in construction, the several parts of the device are sustained upon a base-plate 21 and by a frame comprising vertical members 22 and 23. A shaft or stud 24 is secured in frame-member 22 and on said shaft indicator or counter-wheels in desired number are journaled. Four indicator-wheels 25, 26, 27 and 28, are provided for indicating respectively, units, tens, hundreds and thousands. The indicating-characters or numerals are displayed on the periphery of each wheel and it will be understood that a side-opening (not shown) will be provided at any convenient place so the record indicated by the register may be ascertained at the sub-station where the register is located.

Each of the indicator-wheels is yieldingly held in position by a spring-detent 90, secured to a bracket 91 (Figs. 1 and 2). The mechanism for advancing the register step-by-step comprises an operating-lever 29 disposed outside of the case (Fig. 1) so it can be manually shifted. Said lever is rigidly secured to a sleeve 30 which is journaled in a fixed bracket 31 and on a shaft 32 (Fig. 9). A crank-arm 33 (Figs. 1, 2, 6, and 7) is rigidly secured to actuating-lever 29 and a pawl 34 is pivotally secured to the free end of said arm. Pawl 34 is adapted to successively engage the teeth of a ratchet-wheel 35 which is rigidly secured or integrally formed with a gear-wheel 36 meshing with gear-teeth 37 of indicator-wheel 25. A spring 38 holds pawl 34 normally in engagement with ratchet-wheel 35. The throw of actuating-lever 29 is limited by suitable stops 39, so that during each oscillatory shift of the actuating-lever, the pawl 34 will advance ratchet-wheel 38 a sufficient distance to advance indicator-wheel 25 one step and to expose the succeeding indicating numeral or character thereon. Each of the indicator-wheels is provided with a projecting tooth 40 (Figs. 8 and 9) which is adapted to engage a gear-wheel 41 rigidly secured to or integrally formed with a gear-wheel 42 which engages the gear-teeth 37 for operating the indicator-wheel for the next higher denomination and to advance said gears one step and impart a corresponding shift to the indicator-wheel for the next higher denomination, thus serving as means for intermittently operating the indicator-

wheels of the higher denominations one step for each complete revolution of the indicator-wheel for the next lower denomination. Gear-wheels 36, 42 and 41 are free to revolve on sleeve 30.

When the registering-device is associated with a telephone-system to record the number of calls, the subscriber actuates the lever 29 after the central-operator has answered the calling-signal. Said operator is informed of the actuation of the registering-device and the advance thereof by a device for producing an audible signal which is simultaneously actuated with the registering-device. Said signaling-mechanism comprises a pawl 43 (Figs. 2 and 7) which is pivotally sustained at the distal end of crank-arm 33 and adapted to successively engage the teeth of a tappet-wheel 44 which is revolubly mounted on sleeve 30, so that said tappet will be advanced one step for each operation of actuating-lever 29. An arm 45 is normally held in engagement with tappet 44 (Fig. 6) by a spring 46 (Fig. 2) which holds said arm normally in position to be shifted by the tappet-wheel 44 and restores the arm to normal position after each operation of the signaling-device. Arm 45 is secured to a transverse rod or shaft 47 extending to the opposite side of the case, and journaled in frame-members 22 and 23. Rod 47 is provided with a striker-lever 48 to the end of which a striker 49 is secured to engage and vibrate a gong or sound producing body 50.

The operation of the mechanism thus far described will be as follows: A patron desiring telephone service will communicate with the central-office in the usual manner and inform the operator of the number of the connection desired. The exchange-operator will then direct the patron to "register" by pulling the actuating-lever forward. Such forward shift of the actuating-lever will rock arm 33 and cause pawl 34 to advance ratchet-wheel 35 and cause a corresponding rotation of the gear-wheel 36 to correspondingly shift indicator 25. After each complete revolution of one of the indicators, the indicator for the next higher denomination will be advanced one step through the medium of carrying-tooth 40 and gear-wheels 41 and 42. Simultaneously with the shift of ratchet-wheel 35, pawl 43 will advance tappet 44 one step and such shift will cause one of the teeth thereof to rock arm 44 against the force of spring 46. During the latter part of the advance of tappet 44, arm 45 will be released from the tooth and spring 46 will quickly shift arm 45, striker-lever 48, and striker 49 to cause the striker to engage and vibrate gong 50 and thus produce an audible signal. The apparatus is usually secured to the back-board of a telephone-set so audible-signals produced in the apparatus will be clearly conducted by the transmitter of the

telephone and the telephone line to the operator at the central office. Such signal informs the central operator that the register has been actuated to record the call. The central operator will then ascertain if the desired connection can be made. If the desired connection is given, no further operation of the register or by the central operator is necessary. As, however, the desired connection cannot always be made, it is necessary to provide means whereby the subscriber will be credited with the call already registered, to compensate for the overcharge. In registering-devices embodying the invention, the register is allowed to remain in its advanced position and mechanism is provided whereby the succeeding operation of the actuating-lever 29 will produce the audible signal without advancing the register. The means for preventing the advance of the register, comprises a lifter 51 (Figs. 6 and 7) secured to a cross-rod or shaft 52 which is journaled in a bracket 53 and a standard 54. Lifter 51 is extended into position to engage a stud 55 on pawl 34 and is adapted to hold said pawl out of engagement with ratchet-wheel 35 to render the actuating-lever 29 inoperative to advance the register. Lifter 51 is provided with an extension 56 adapted to be held by a detent 57 pivotally secured as at 58 to bracket 53. A weight 59 holds the detent normally in position to engage the lifter. A trip-arm 60' for engaging detent 57 to release the lifter is secured to pawl 34. When said pawl is held in raised position by the lifter 51 so that ratchet-wheel 35 will be inoperative by said pawl, and the actuating-lever 29 is operated to shift said pawl, the trip-arm 60' will engage the detent 57 to release the lifter. Thus said arm 60' causes the lifter to be restored to normal position and the pawl 34 to be restored into operative position when the actuating-lever and signaling mechanism have been operated once while the pawl 34 is inoperative. Lifter 51 is manually shifted by the patron under control of the operator at the central office. A rod 60 (Fig. 4) is slidably mounted in a guide 61 which is sustained by standards 54 and 55. Rod 60 is projected through the case and its terminal is provided with a handle or knob 62 whereby it may be pulled outwardly. A latch 63 normally secures rod 60 against sufficient longitudinal movement to shift lifter 51, said latch being arranged to engage a notch 64 formed in rod 60.

Lifter-rod 52 is provided with an arm 65 extended into position to be engaged by a cam 66 formed on rod 60. Latch 63 is under control of the central-operator and is shifted to release rod 60 by an armature-operated releasing-lever 67 which is pivotally sustained as at 68. An armature 69 is secured to lever 67 and a projecting terminal 70 of

said lever engages the bifurcated terminal of latch 63. A stud 71 (Fig. 5) is secured to one side of rod 60 and extends through an elongated slot 72 formed in guide 61, to engage and shift a striker operating lever 73 which is pivotally sustained at 74. A dog 75, pivotally secured to the lower end of lever 73, is adapted to engage an extension 76 of the striker-lever 48 and is held normally against a stop 77 by a spring 78 so that during the forward shift of rod 60 said dog will be positively shifted to operate the extension 76 on the striker-lever and during its retraction it will ride over said extension of the striker-lever. Thus, when the rod 60 is operated to render the register advancing-means inoperative, lever 73 and dog 75 will operate the striker 49 to produce an audible signal.

Electro-magnetic means for controlling the operation of the rod 60 to render the register advancing-means inoperative, is provided so that an operator at the distant station can control the operation of the mechanism for rendering the register inoperative by the advancing-means. This electro-magnetic means comprises a magnet 79 conveniently sustained in case 20 and an electric circuit in which said magnet is interposed. Electro-magnet 79 serves to shift armature 69 to operate the releasing-lever 67 and latch 63, to permit actuation of rod 60 and the parts controlled thereby. The electric circuit in which said magnet is included, is normally open at the sub-station, being connected to a switch comprising two spring-contacts 80 and 81 (Fig. 3). These contacts are conveniently secured to a terminal-block 82 of insulating material and are insulated from each other. Lever 73 is provided with an extension 83 which normally engages a strip of insulating material secured to the projecting terminal of contact-spring 80 and holds such spring away from contact-spring 81. Rod 60 has an initial limited movement independent of latch 63, during which contacts 80 and 81 are brought into engagement to close the electric circuit wherein the releasing-magnet 79 is included. When rod 60 is pulled forward, arm 83 will promptly permit contacts 80 and 81 to engage each other to close the electric circuit so that when current is impressed into the line in which the electric magnet 79 is interposed, armature 69 will be attracted by said magnet and cause releasing-lever 67 to disengage latch 63 from rod 60 and permit further forward movement of the rod. When the rod is moved further forward, cam 66 will raise arm 65 to rock lifter-arm 52 and raise lifter 51 into position to cause its extension 56 to be caught and held by detent 57. While the lifter is in raised position (dotted lines Fig. 6), the curved inner end thereof will retain pawl 34 out of engagement with ratchet 35 and hold

it free to move independently of the ratchet during the succeeding operation of actuating-lever 29.

During the forward shift of rod 60, stud 71 will shift lever 73 to cause dog 75 to shift and release striker lever 48 so that gong 50 will be actuated to produce an audible signal, thus informing the central operator that the mechanism for actuating the register has been set to render the register inoperative during the succeeding operation of the actuating-lever. A spring 84 restores rod 60, lever 73 and the switch to normal position after each operation of said rod.

The operation of the mechanism for preventing the advance of the register during a single succeeding shift of the actuating-lever will be as follows: The operator at the central office will impress current into the line in which the magnet 79 is included and request the patron to pull rod 60. During the initial forward shift of rod 60, stud 71 will shift lever 73 and switch-arm 83 will permit the flexible contact-springs 80 and 81 to engage each other, thus closing the normally open circuit at the sub-station. Current will then pass through magnet 79 and armature 69 will be attracted thereby. Such operation of the armature will rock releasing-lever 67 to lift latch 63 out of notch 64 and then rod 60 will be free to be pulled forward. During such further forward movement of said rod, cam 66 will engage and rock arm 65 and oscillate the lifter-rod 52 to raise lifter 51 until detent 57 catches and retains extension 56 of the lifter. In raised position, the lifter 51 will engage stud 55 to hold pawl 34 disengaged from ratchet-wheel 35 and the lifter will be held in raised position by detent 57. The mechanism for advancing the register step-by-step will then be inoperative to effect advance of the register. During the forward shift of rod 60, stud 71 will shift lever 73 and cause dog 75 to operate the striker-lever 48 so that the striker 49 will, under the force of spring 46, actuate gong 50 to produce a signal. When rod 60 is released, spring 84 will restore rod 60, lever 73 and connected parts to normal position. During the retraction of rod 60, dog 75 will be free to travel over arm 76 of the striker-lever and switch-arm 83 will separate spring-contacts 80 and 81 from each other. Lifter 51, rod 52 and arm 65 will remain in shifted position until the register-advancing mechanism is again operated. The audible signal produced by gong 50 during the forward shift of rod 60 will indicate to the operator at the central office that the advancing-mechanism has been set and rendered inoperative to effect advance of the register during the succeeding shift of the advancing mechanism. When service is again desired, the patron will effect communication with the central office in the usual manner. When directed

to "register" the patron will shift actuating-lever 29 as heretofore. Pawl 34, being disengaged from ratchet-wheel 35, will not advance the register and pawl 46 will advance tappet-wheel 44 to effect operation of striker-lever 48 to indicate to the operator at the central station that the register advancing-mechanism has been operated. During the latter part of the forward shift of the actuating-lever 29 trip-arm 60' on pawl 34 will engage and shift detent 57 to release lifter 51 and thus restore the lifter to normal position so that the advancing-mechanism will be again placed in operative relation with respect to the register.

In Fig. 10 of the drawings, the electromagnet for controlling the operation of the mechanism for rendering the register inoperative by the advancing-means, is illustrated as connected to a telephone-system. The exchange is equipped with a switch-board comprising a spring-jack 200 and a line-signal 201 and the exchange is connected to the sub-station at which the register is located, by branch-conductors 203, 203'. The sub-station is shown as provided with a telephone-set 204 of usual arrangement and construction. Contact-spring 80 is connected by a conductor 208 to one of the line-conductors and contact-spring 81 is connected by a conductor 207 to relay 79, and a conductor 211 connects said relay with ground. At the central-station, a key-switch, comprising springs 218 and 219 is included in the usual conductors 212 of a cord-loop which terminates in a switch-play 213. One side of battery 215 is connected by a conductor 214 with a contact-terminal adjacent spring 218 and the other side of the battery is connected by a conductor 220 with a contact-terminal adjacent spring 219 of the key-switch. Battery 215 is also connected with ground.

When it is desired to release rod 60 so the register advancing-mechanism will be rendered inoperative during the succeeding operation, the operation of the system will be as follows, viz: The central-operator (assuming block 213 to have been inserted in spring-jack 200) will shift the key-switch of the cord-loop so springs 218 and 219 will be brought into contact with conductors 214 and 220 respectively. Current will then pass over a circuit as follows: ground at central-office, battery 215, conductor 214, spring 218 of the key-switch, sleeve of play 213, conductor 208, to spring 80 and when the patron pulls rod 60 current will pass from spring 80 to spring 81 and thence through conductor 207, relay 79 and conductor 211 to ground. Passage of current over this circuit will actuate the relay 79 to cause the rod 60 to be released so that the register advancing-mechanism will be rendered inoperative as hereinbefore described.

The improved mechanism for registering telephone calls is simple in construction, and provides convenient means whereby credit may be given at the substation for a call if the desired service cannot be given. It is of further advantage because a request to register can be made at the outset, and before the central operator ascertains whether or not the desired service can be given, so that if the desired service can be given, the operations necessary by the central-operator will be the same as in a system in which the calls are not registered.

The invention is not to be understood as restricted to the details described since these may be modified within the scope of the appended claims without departing from the spirit and scope of the invention.

Having thus described the invention, what I claim as new and desire to secure by Letters Patent, is:

1. The combination with a telephone call register, of means for advancing the register, means for rendering the register inoperative by the advancing means, and electro-magnetic means for controlling the operation of the means for rendering the register inoperative.
2. The combination with a telephone call register, of means for advancing the register, and means under control of an operator at a distant station for rendering the register inoperative by the advancing-means.
3. The combination with a telephone call register, of means for advancing the register step-by-step, means for rendering the advancing-means inoperative to effect the advance of the register during the succeeding operation of the advancing-means and means under control of an operator at a distant station for controlling the operation of the register by the advancing-means.
4. The combination with a telephone call register, of means for advancing the register step-by-step, means for rendering the register inoperative by the advancing-means during a succeeding operation of the advancing-means, and means for rendering the advancing-means operative to advance the register during said succeeding operation of the advancing-means.
5. The combination with a telephone call register, of means for advancing the register step-by-step, means for rendering the register inoperative by the advancing-means, and means for restoring the advancing means into operative relation with the register when the advancing-means is operated without advancing the register, so that the register will be rendered operative when the advancing-means has been operated once without registering.
6. The combination with a telephone call register, of means for advancing the register step-by-step, means for rendering the register

inoperative by the advancing-means, means for restoring the advancing-means into operative relation with the register when the advancing-means is operated without
 5 advancing the register, and means under control of an operator at a distant station for controlling the operation of the means which renders the register inoperative by the advancing-means.

10 7. The combination with a telephone call register, of means for advancing the register step-by-step, means for rendering the advancing-means inoperative to effect the
 15 advance of the register, means for manually shifting said latter means, and means under control of an operator at a distant station for controlling the operation of said manually shiftable means.

20 8. The combination with a telephone call register, of means for advancing the register step-by-step, means for controlling the operation of the register by said advancing-means, means for manually shifting said controlling-means, controlling-means for said shifting-
 25 means comprising a relay, an electrical circuit in which said relay is interposed and a normally open switch operated by said shifting means.

30 9. The combination with a telephone call register, of means for advancing the register step-by-step, a signal-device operated by the advancing-means, means for rendering the register inoperative by the advancing-means, and means for operating the signal device
 35 when the advancing-means is rendered inoperative.

40 10. The combination with a telephone call register, of means for advancing the register step-by-step, a device for producing an audible signal operated by the advancing-means, mechanism for rendering the register inoperative by the advancing-means, and means for operating the signal device when the register is rendered inoperative.

45 11. The combination with a telephone call register, of means for advancing the register step-by-step, means for rendering the register inoperative by the advancing-means, and a signal-device actuated when the register is
 50 advanced and also when the register is rendered inoperative.

55 12. The combination with a telephone call register, of means for advancing the register step-by-step, means for rendering the register inoperative by the advancing-means, a signal device actuated by the advancing-means when the register is operated and electro-magnetic means for controlling the means
 60 for rendering the register inoperative by the advancing-means.

65 13. The combination with a telephone call register, of means for advancing the register step-by-step, means for rendering the advancing-means inoperative to effect the advance of the register, a device for producing

an audible signal actuated when the register is advanced and electromagnetic means for controlling the operation of the means which renders the register inoperative by the advancing-means.

70 14. The combination with a telephone call register, of means for advancing the register step-by-step, means for rendering the advancing-means inoperative to advance the register, a signaling device operated by the
 75 advancing-means when the register is operative and when the register is inoperative by said advancing-means, and electro-magnetic means for controlling the operation of the means which renders the register inoperative
 80 by the advancing-means.

15. The combination with a telephone call register, of mechanism for advancing the register step-by-step, means whereby said register may be rendered inoperative by said
 85 mechanism, said means comprising mechanism whereby the patron can manually shift said means, and means whereby the manual shift can be controlled, said controlling-
 90 means comprising a relay included in an electric-circuit normally open at the sub-station.

16. The combination with a telephone call register, of mechanism for advancing the register step-by-step, means whereby said register may be rendered inoperative by said
 95 mechanism, said means comprising mechanism whereby the patron can manually shift said means, and means whereby the manual shift can be controlled, said controlling-
 100 means comprising a relay included in an electric-circuit and a normally open switch operated by said shifting-means.

17. The combination with a telephone call register, of mechanism for advancing the register step-by-step, means whereby said device may be actuated, means whereby said register may be rendered inoperative by said
 105 actuating-means, controlling-mechanism comprising a relay, and a latch controlled by said relay, a circuit wherein said relay is interposed, a normally open switch at the sub-
 110 station, for controlling the passage of current through said relay, means whereby said switch may be shifted to cause passage of current over said circuit when the registering
 115 device is to be rendered inoperative by the actuating-means, and a source of current for said circuit.

18. The combination with a telephone call register, of means for advancing the register
 120 step-by-step, a signaling device operated when the register is advanced, means for rendering the register inoperative by the advancing-means, means for rendering the register operative by the advancing-means
 125 when the advancing-means is operated once, and electro-magnetic means for controlling the operation of the means which renders the register inoperative by the advancing-means.

19. The combination with a telephone call 130

register, of manually operated means adapted to compensate for a registered overcharge, and electrical means under control of central station to govern said manually operated
5 means.

20. The combination with a telephone call register, of manually-operated means to register a charge, means to compensate for a reg-

istered overcharge, and a signal device adapted to be actuated when either of said means 10 is operated.

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