

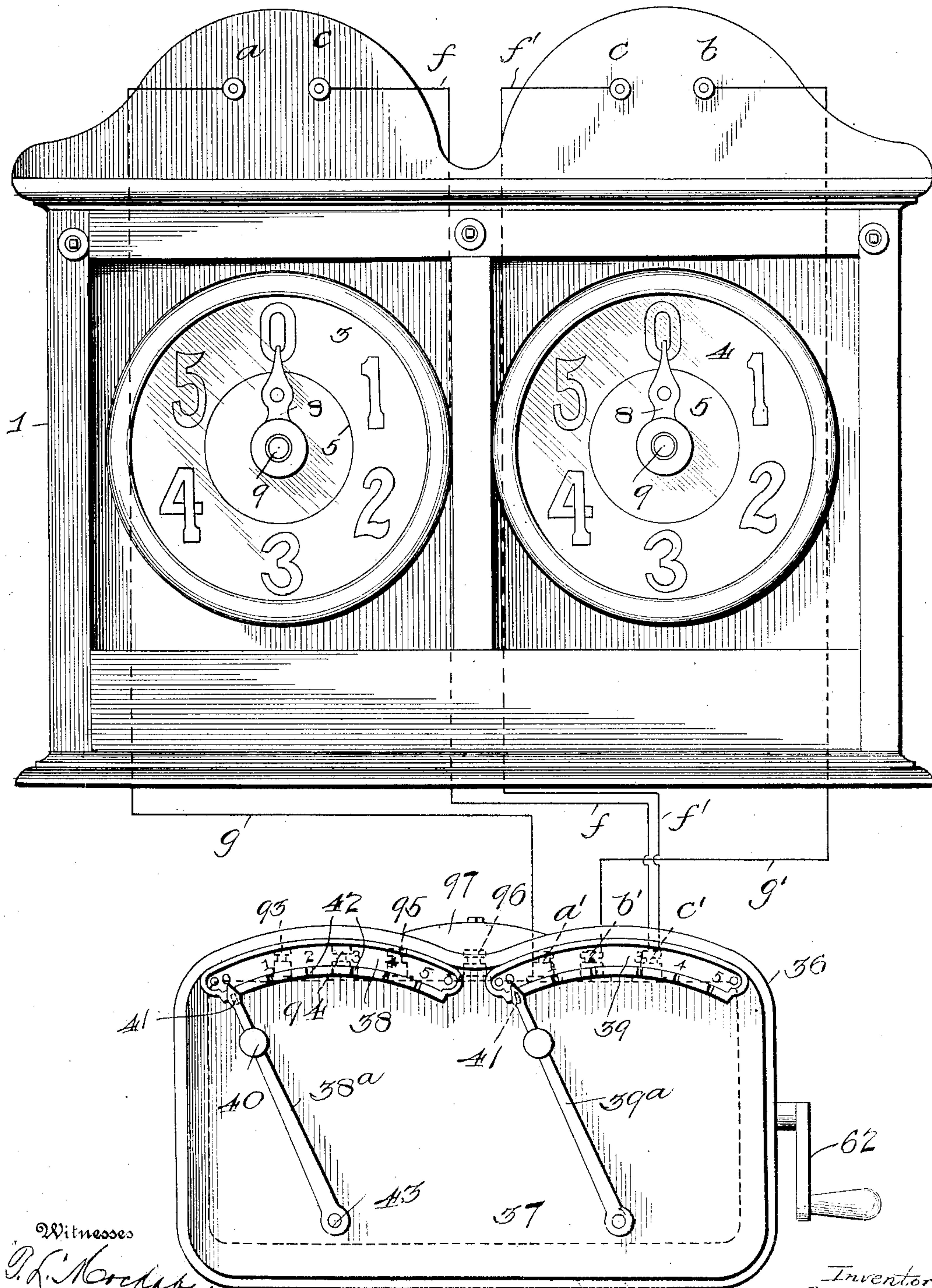
No. 828,000.

PATENTED AUG. 7, 1906.

P. E. TARLTON.
FIRE ALARM SYSTEM.
APPLICATION FILED JUNE 10, 1905.

7 SHEETS—SHEET 1.

Fig. 1.



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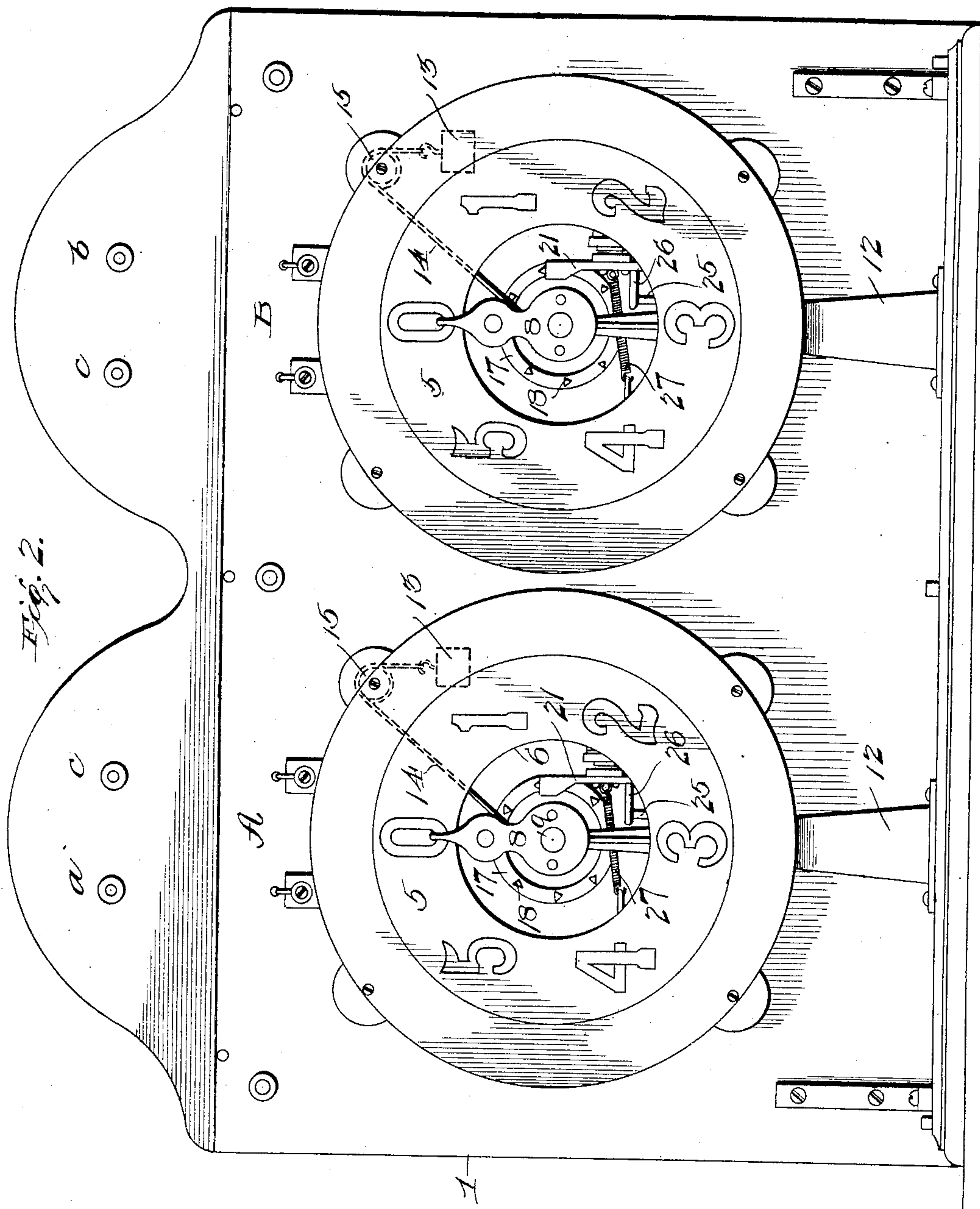
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7 SHEETS—SHEET 2.



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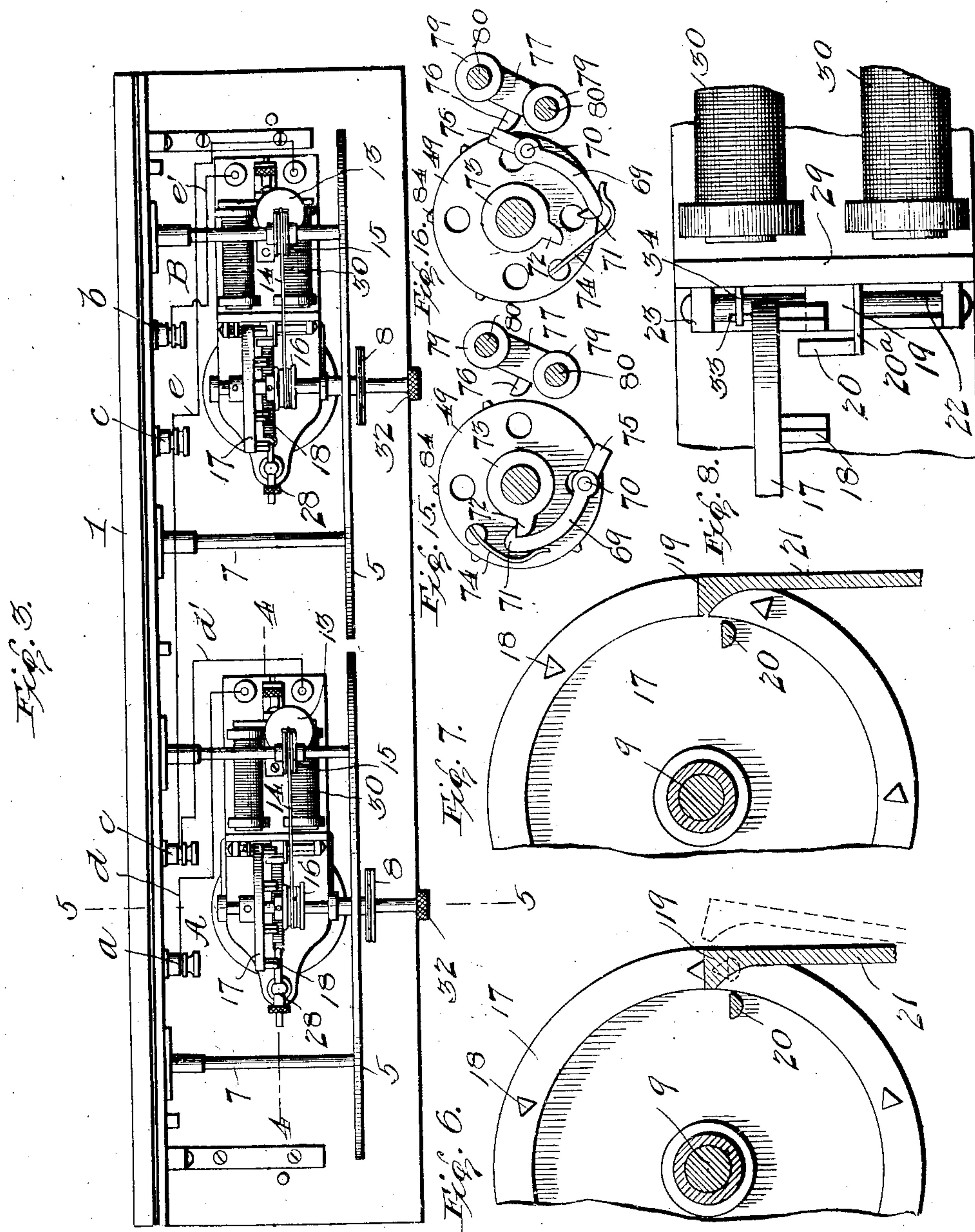
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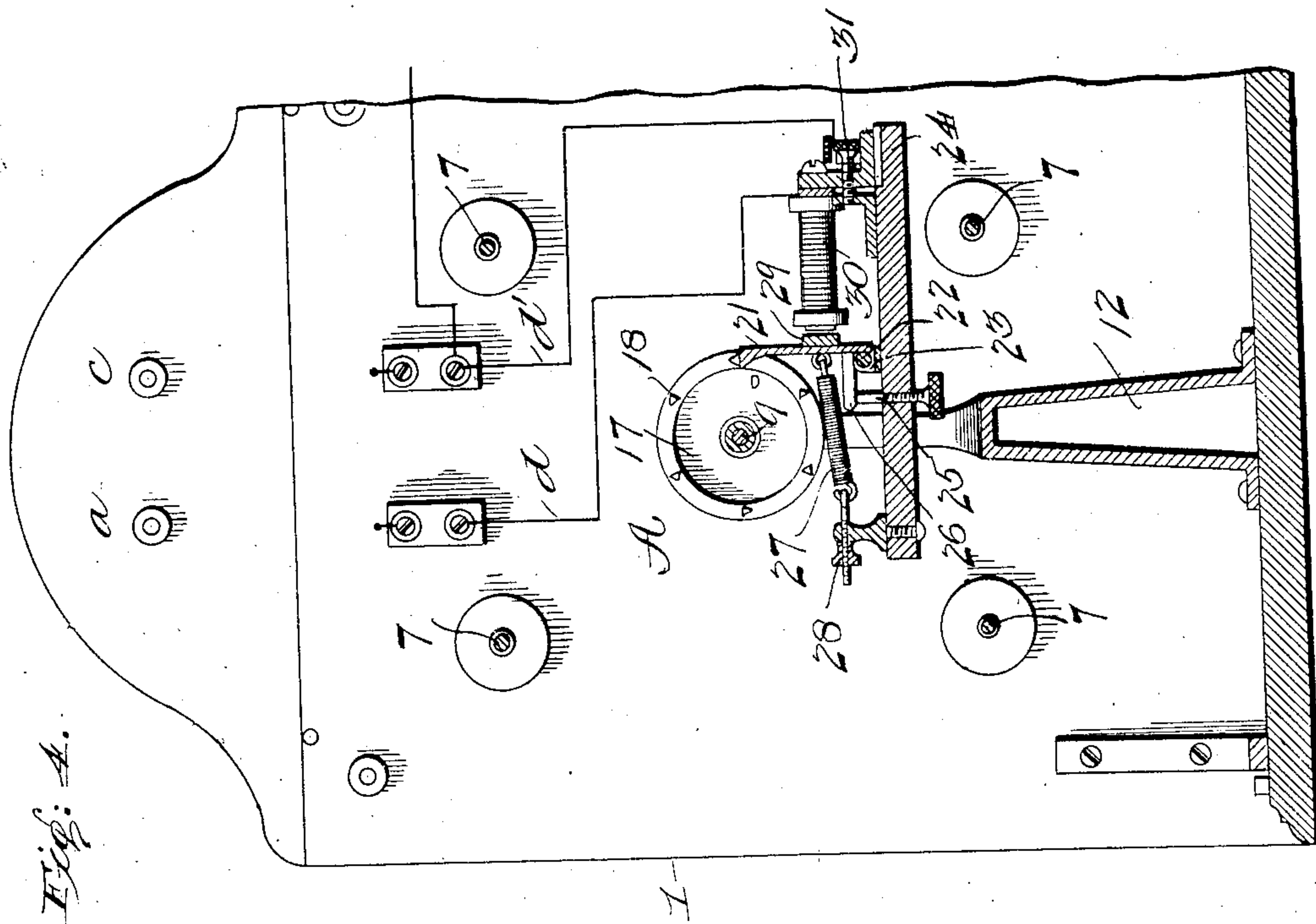
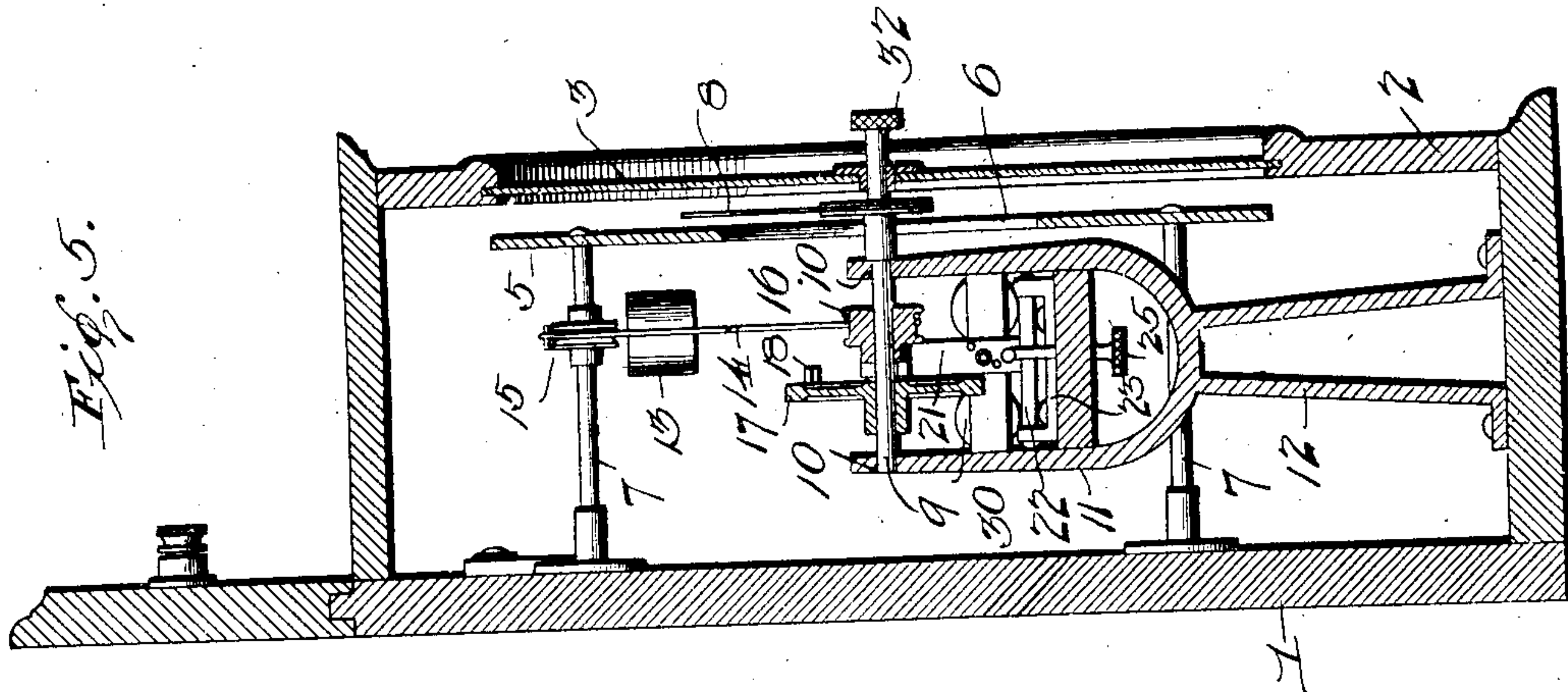
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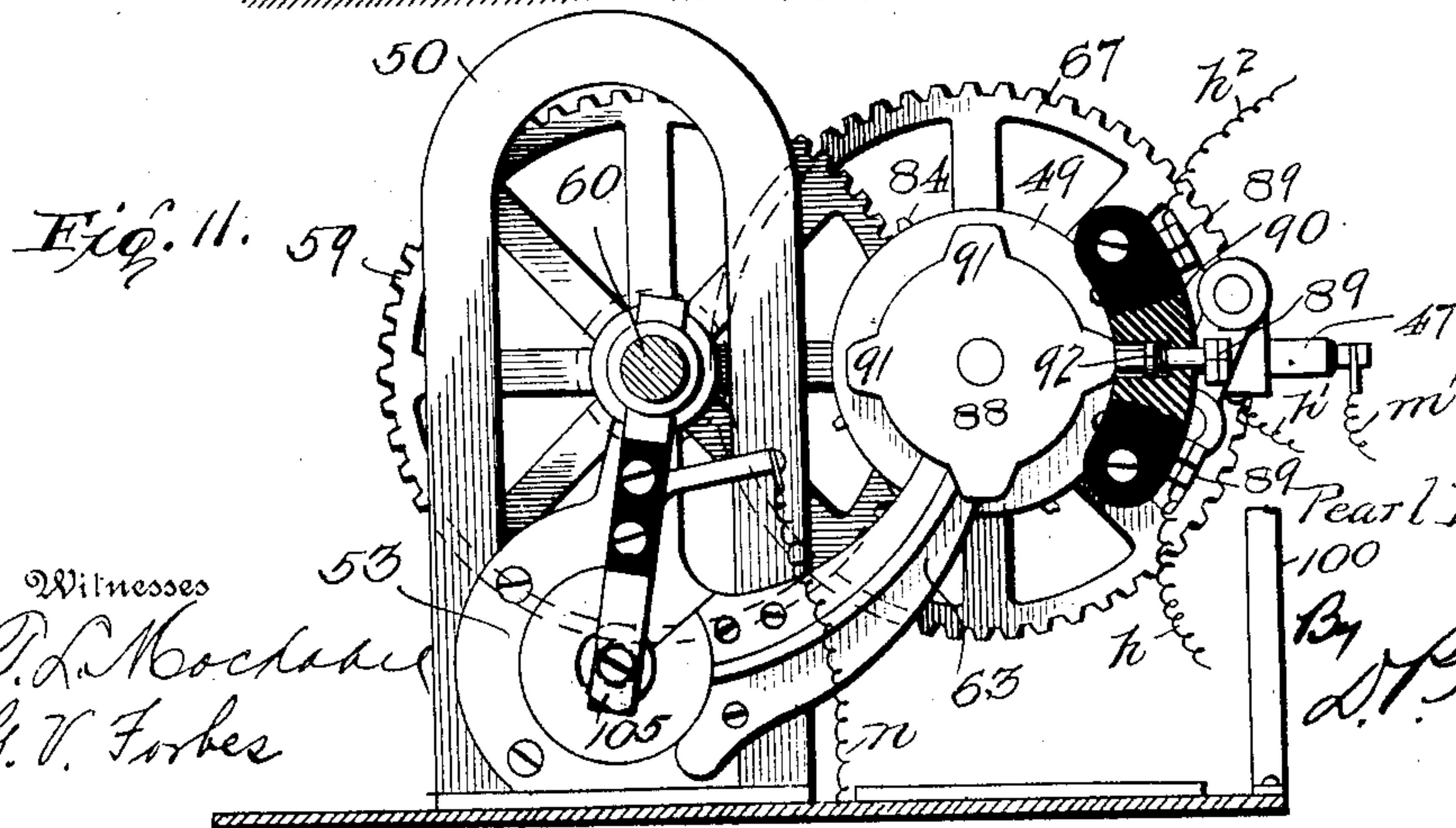
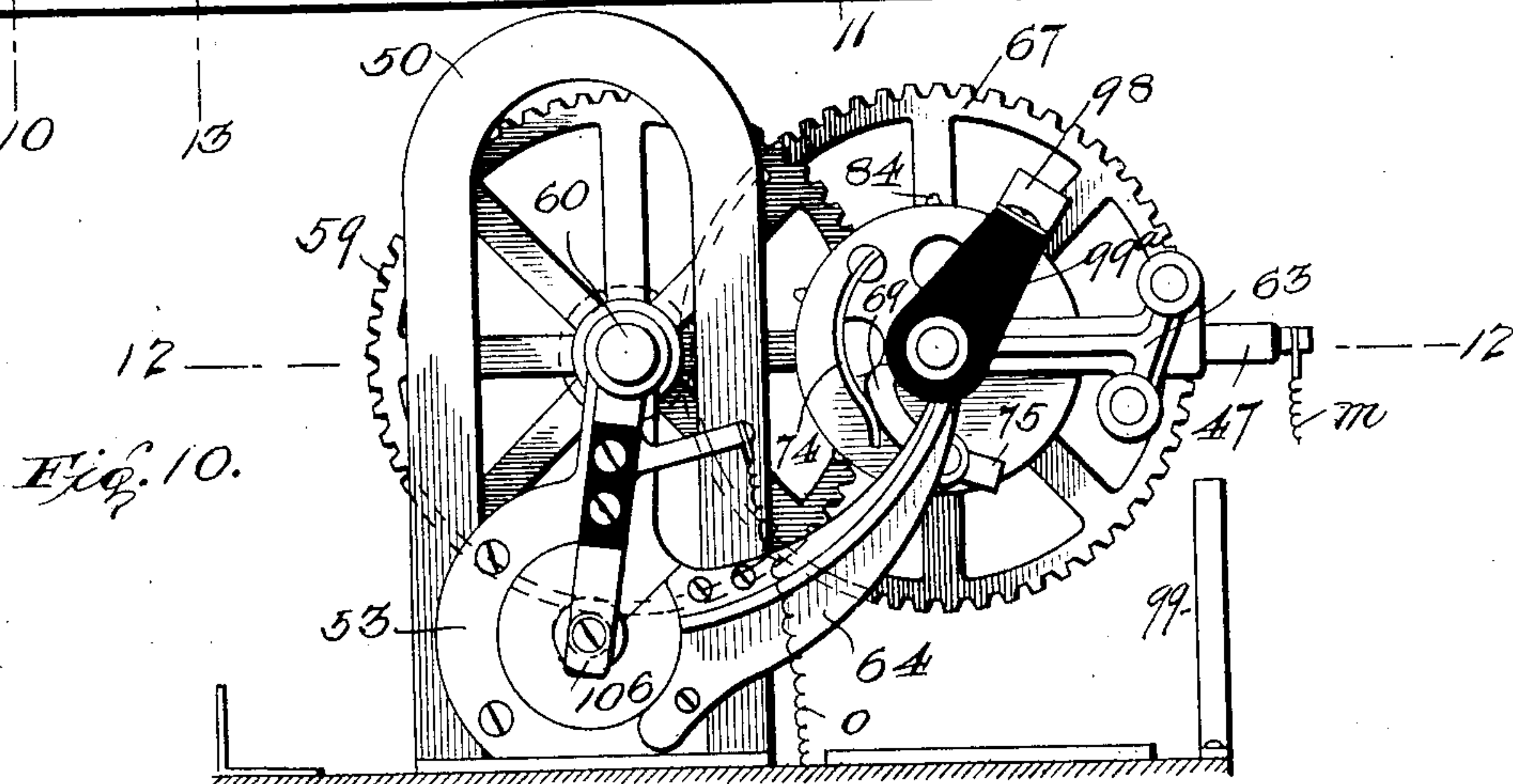
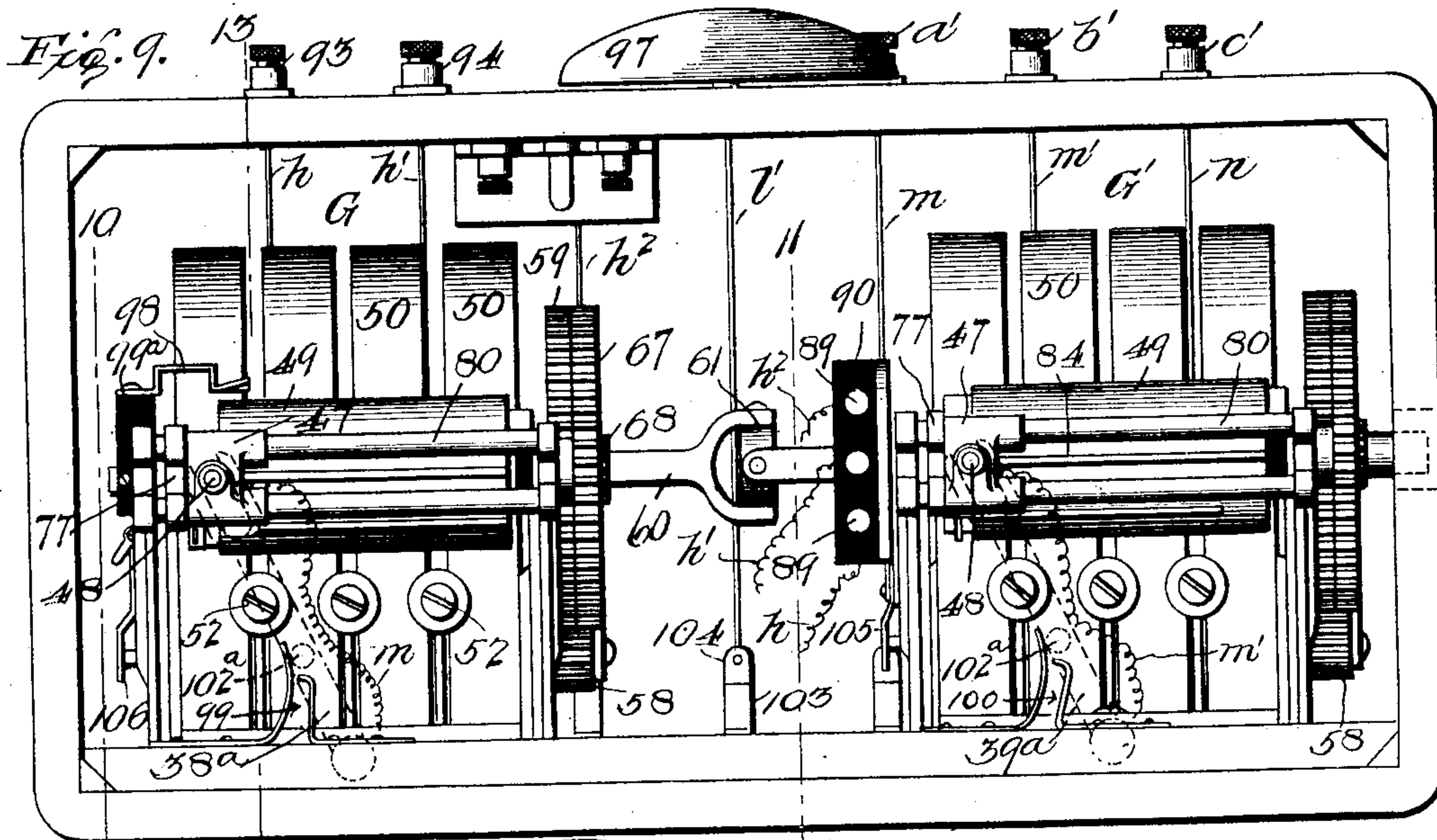
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FIRE ALARM SYSTEM.
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7 SHEETS—SHEET 6.

Fig. 12.

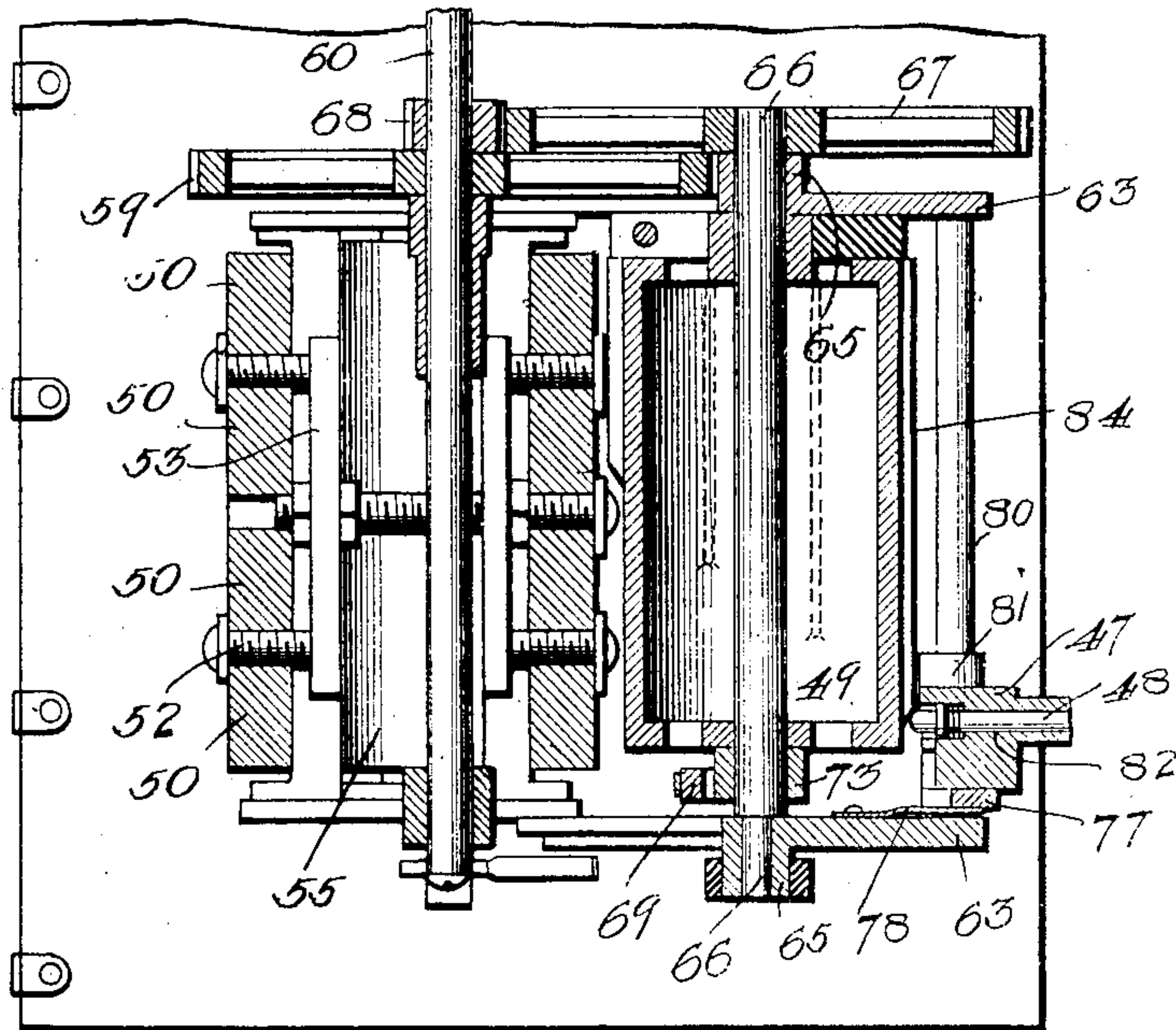
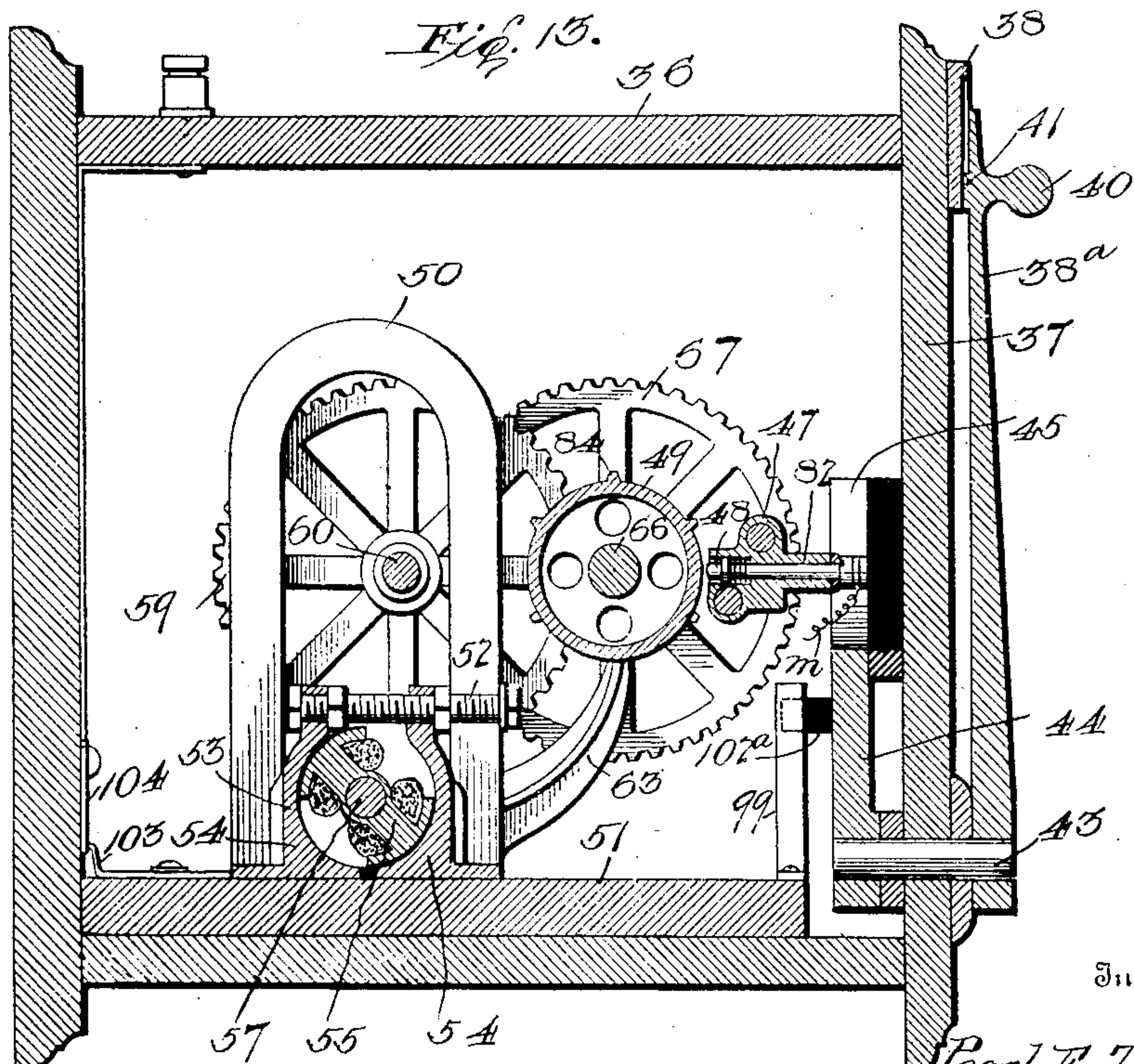


Fig. 13.



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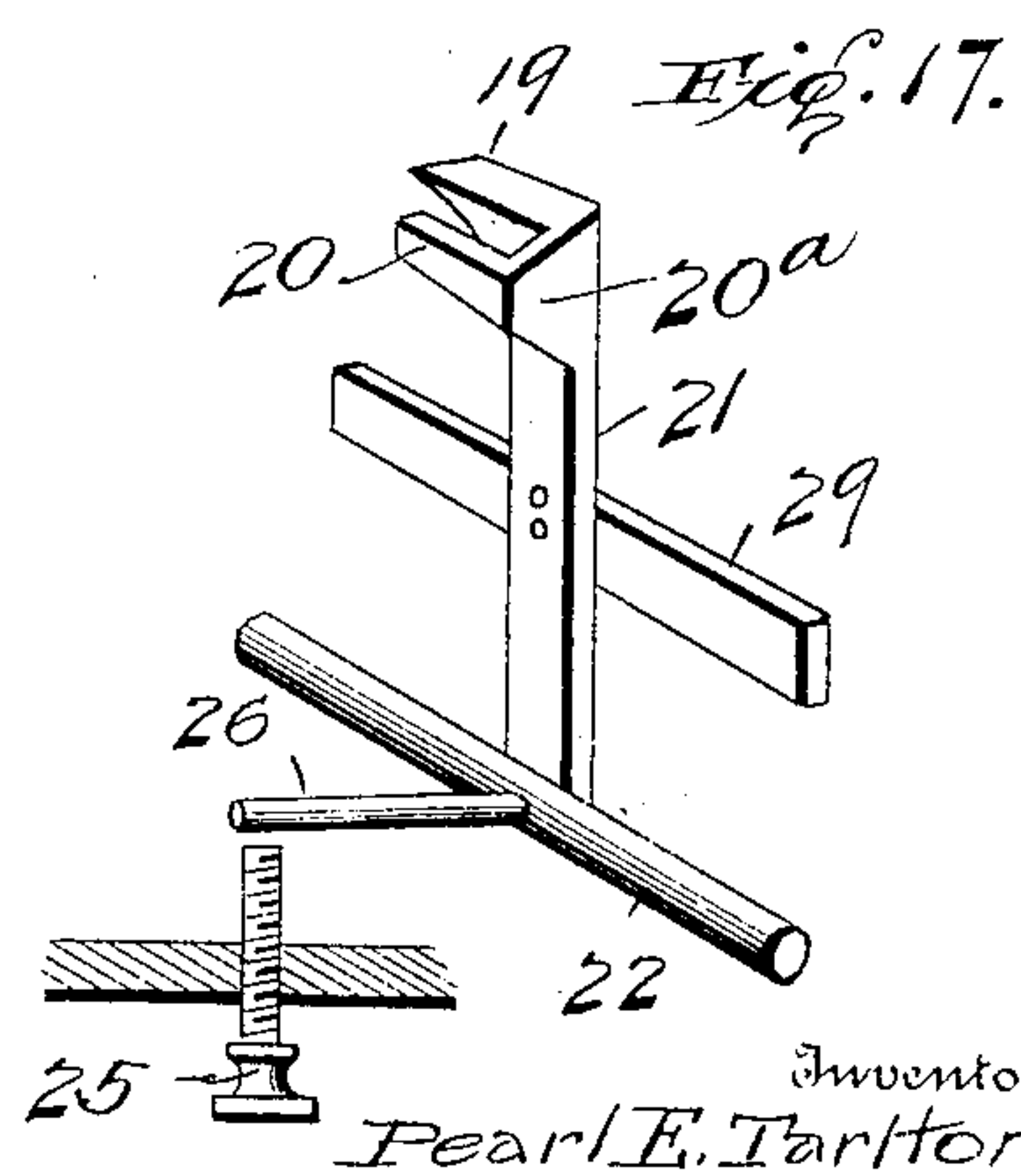
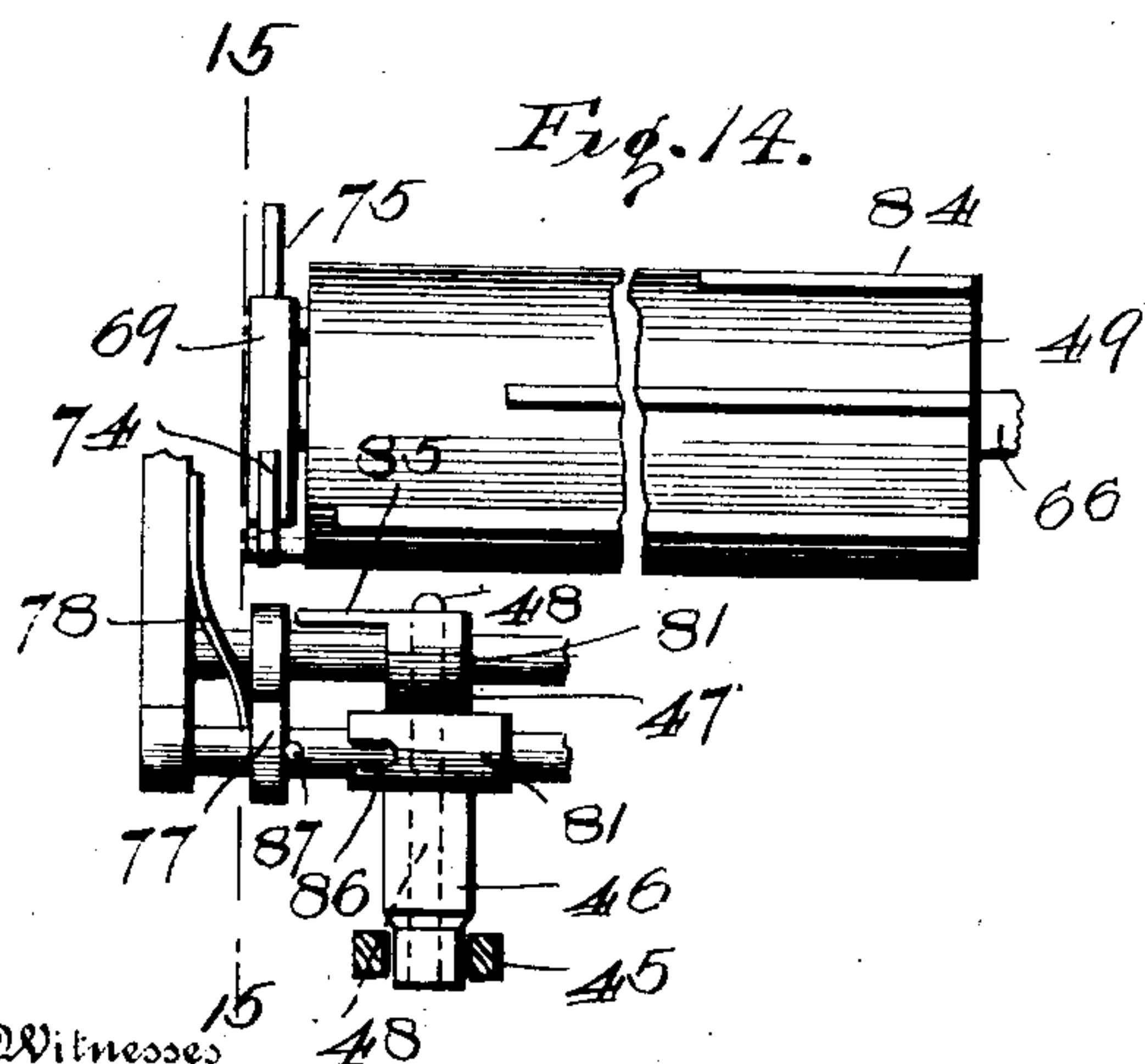
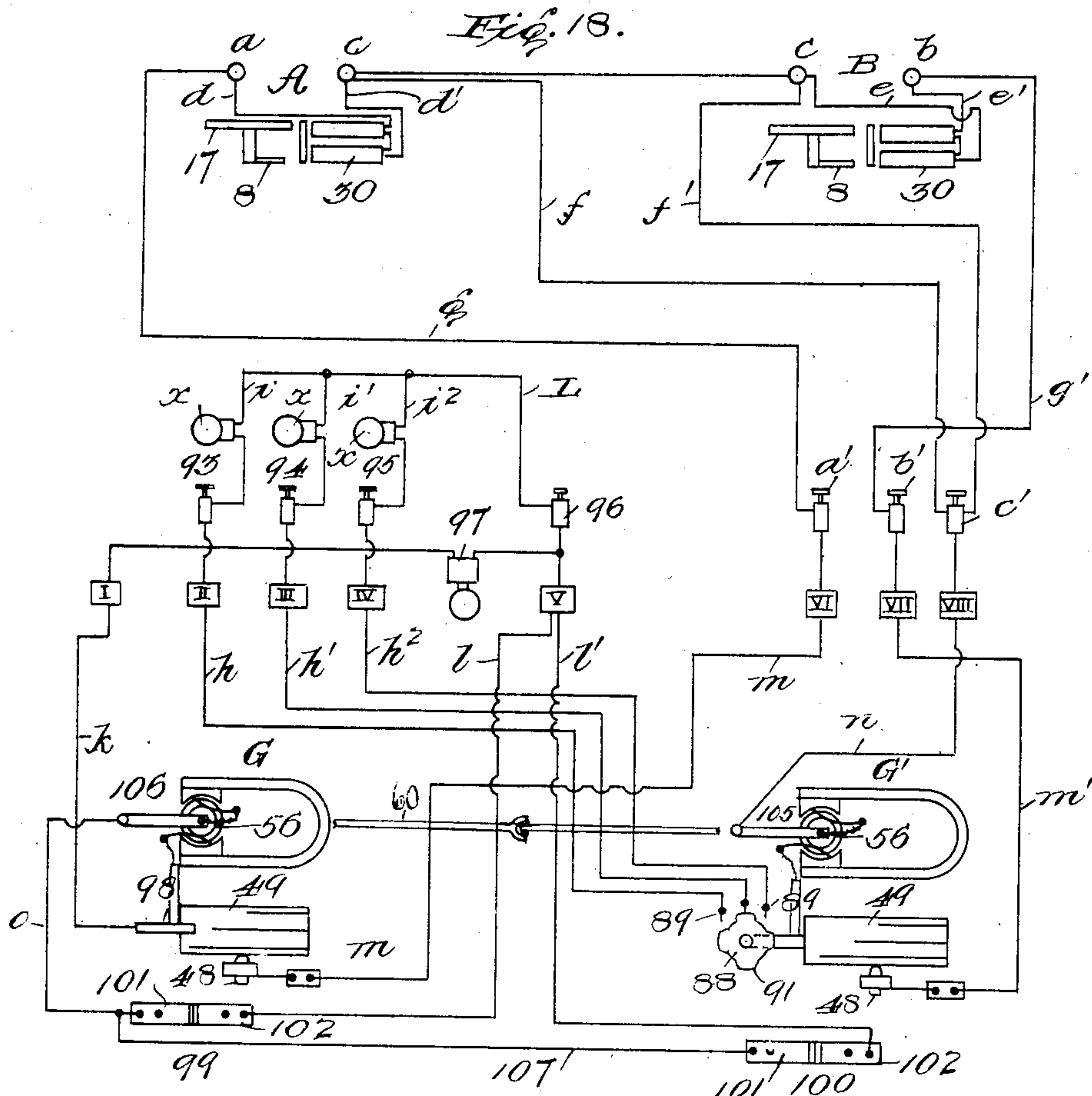
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FIRE ALARM SYSTEM.
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7 SHEETS—SHEET 7.



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UNITED STATES PATENT OFFICE.

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FIRE-ALARM SYSTEM.

No. 828,000.

Specification of Letters Patent.

Patented Aug. 7, 1906.

Application filed June 10, 1905. Serial No. 264,587.

To all whom it may concern:

Be it known that I, PEARL E. TARLTON, a citizen of the United States, residing at Ada, in the county of Hardin and State of Ohio, have invented certain new and useful Improvements in Fire-Alarm Systems, of which the following is a specification.

This invention relates to electric signaling systems, and has special reference to an improved fire-alarm system or apparatus comprising simple and practical means for accurately sounding a fire-alarm and operating a suitable fire-district indicator to exhibit at a station or stations the number of the fire-district for which the alarm is given.

To this end the invention primarily involves an improved indicator mechanism embodying means for indicating the numbers of various fire-districts in a municipality or town and a magneto-electric generating mechanism operatively related to said indicator mechanism and comprising means for first selecting the number of the fire-district for which the alarm is to be given and then controlling the indicator mechanism to be operated in such manner as to indicate that number.

A special object of the invention is to provide an indicator mechanism wherein one indicator or plurality of indicator mechanisms may be operated separately or synchronously, according to the number to be indicated.

A further object of the invention is to provide novel improvements in the magneto-electric generating mechanism whereby line alarms or gongs will be sounded during the operation of the apparatus and also whereby a generator indicating-signal will be sounded after the proper number of turns of the generator have been made, thus indicating to the operator that the complete operation of the indicator mechanism has been effected.

With these and other objects in view, which will more readily appear to those familiar with the art as the nature of the invention is better understood, the same consists in the novel construction, combination, and arrangement of parts, which will be hereinafter more fully described, illustrated, and claimed.

The essential features of the invention involved in carrying out the objects above indicated are necessarily susceptible to a wide range of structural modification without de-

parting from the scope of the invention; but a preferred embodiment of the latter is shown in the accompanying drawings, in which—

Figure 1 is a complete elevation of the entire apparatus consisting of the generating and indicator mechanisms. Fig. 2 is a front elevation of the indicator mechanism, showing the case-cover removed to more clearly expose the parts of the separate indicators which are arranged in tandem. Fig. 3 is a top plan view of the construction shown in Fig. 2. Fig. 4 is a vertical sectional view through one of the indicators on the line 4 4 of Fig. 3. Fig. 5 is a cross-sectional view through one of the indicators on the line 5 5 of Fig. 3, but illustrating the cover-case in position to show more clearly the relation of the window and the exterior setting-knob for each indicator. Figs. 6 and 7 are enlarged detail views showing different positions of the escapement-wheel and release-pallet of each indicator. Fig. 8 is an enlarged fragmentary plan view of a section of an escapement-wheel and the electrical controlling means therefor. Fig. 9 is a front elevation of the electromagnetic generator mechanism with the front cover and selecting-pointers removed. Fig. 10 is a sectional view on the line 10 10 of Fig. 9, exposing in end elevation one of the magneto-electric generators. Fig. 11 is a similar view on the line 11 11 of Fig. 9, exposing in end elevation the other of the electromagnetic generators. Fig. 12 is a horizontal sectional view on the line 12 12 of Fig. 10. Fig. 13 is a vertical cross-sectional view on the line 13 13 of Fig. 9. Fig. 14 is a fragmentary plan, showing more clearly the operative relation of the circuit-controlling drum, the shiftable contact-brush, and the clutch device for the circuit-controlling drum. Figs. 15 and 16 are detail sectional views on the line 15 15 of Fig. 14, showing different positions of the clutch device for the circuit-controlling drum. Fig. 17 is a detail in perspective of the electrically-controlled release-pallet of each indicator. Fig. 18 is a diagrammatic view showing the circuit-wire connections of the system.

Like reference characters designate corresponding parts in the several figures of the drawings.

As pointed out in the statement of invention, the latter includes in its general organi-

zation two separate operatively-related mechanisms—namely, a magneto-electric generating mechanism and an indicator mechanism, the latter being arranged at a suitable station or stations on the line and set into operation from a distance by the generating mechanism to provide or indicating the number of the fire-district for which the alarm may be sounded.

In its preferable adaptation the indicator mechanism includes two separate indicators (designated in their entirety, respectively, by the letters A and B, and of duplicate construction and action, though capable of being operated either separately or synchronously.) Both of the indicators A and B are designed to be housed within any suitable casing 1, provided with a box-cover 2, having in the front wall thereof the separate windows 3 and 4, which are arranged in spaced relation and designed to respectively lie in front of the dial 5 of the separate indicators A and B, as plainly shown in Figs. 1 and 5 of the drawings. This construction provides for a thorough housing and protection of the indicator mechanism while at the same time freely exposing to view the numbered dial 5 of each indicator. Inasmuch as each of these indicators is of duplicate construction and action, a specific description of one will suffice for the other.

Referring particularly to the construction of each indicator, it will be observed, as stated, that the same includes as a part thereof the dial 5, which is preferably in the form of a stationary ring having an open center 6 and held supported immediately behind one of the front windows of the casing 1 through the medium of a plurality of circularly-grouped and horizontally-arranged supporting-arms 7, which may be conveniently secured at what may be termed their "inner" ends to the back of the casing 1 and at their front ends to the dial or dial-ring 5, although any other equivalent supporting means may be utilized for holding the dial 5 in place.

The dial 5 of each indicator is provided upon the front face thereof exposed through the adjacent window with a series of properly-spaced numerals arranged in clockwise order—i. e., from left to right—and playing over the numbered face on the dial is an indicating-hand 8, having an operative movement from left to right, like the hand of a clock and secured fast on the indicator-shaft 9, arranged horizontally and journaled in suitable bearings 10, provided in the opposite arms of a carrying-yoke 11, arranged at the upper end of a supporting-pedestal 12, which may be conveniently mounted on the base of the casing 1.

The indicator-hand 9 of each indicator is designed to be rotated in one direction under the influence of suitable shaft-actuating or shaft-rotating means, such as a spring or

weight, but preferably through the employment of an operating-weight 13, suspended from one end of a flexible operating-cord or equivalent connection 14, passed over a guiding-wheel 15, which may be conveniently journaled on one of the supporting-arms 7 for the dial. The other end of the flexible operating-cord or equivalent connection 14 winds and unwinds on a spool 16, made fast on the indicator-shaft 9 between the arms of the yoke 11, and at one side of the spool 16 said shaft has mounted fast thereon an escape-wheel 17, having projected from one side thereof near its periphery a circular series of regularly-spaced stop-pins 18. These stop-pins are preferably of a triangular form to present flat bases adapted to be arrested upon the separate spaced detent elements 19 and 20 of an electrically-controlled release-pallet 21. The upper end of the release-pallet 21 is widened to provide the detent element 19, while the detent element 20 consists of a separate finger offset from the pallet 21 by a bracket-arm 20^a and lying in spaced parallel relation with the detent element 19, but in a lower plane than the latter, so that as the pallet 21 is retracted in a direction away from the escape-wheel the stop-pin 18 upon the detent element 19 is displaced from the latter and drops onto the other secondary detent element 20 and is arrested by the latter until the return movement of the pallet carries the said stop-pin into the interval between the two detent elements, and thus entirely clears or frees the escape-wheel, as may be plainly seen from Figs. 6 and 7 of the drawings.

The electrically-controlled release-pallet is pivotally supported at its lower end, as at 22, in a bearing-bracket 23 upon the insulated mechanism-base 24, mounted in a horizontal position within the carrying-yoke 11, projecting beyond opposite sides of said yoke. The amplitude of movement of the release-pallet 21 is controlled through the medium of an adjusting-screw 25, extending up through the base 24, and engaged by a stop-arm 26, offset from the pallet 21 and above its pivotal point 22. The said pallet is normally drawn in a direction toward and in engagement with the escape-wheel through the medium of a retracting-spring 27. This retracting-spring is connected at one end to the pallet 21, and at its other end to a tension-adjuster 28, mounted upon the mechanism-base 24. The movement of the pallet in the opposite direction is electrically controlled, the electric controlling means consisting of an armature 29, carried by the pallet, and a pair of electric release-magnets 30, mounted upon the base 24 and having an adjusting device 31 connected therewith to provide for properly setting the same in relation to the armature controlled thereby.

In the operation of each indicator just de-

scribed the circuit is intermittently closed and opened through the electric release-magnets 30, thus causing an intermittent oscillation of the release-pallet 21 with the result of permitting the escape-wheel to be actuated under the influence of its actuating device to provide for turning the hand 8 around the dial to the number which is to be indicated. After each indicator has been thus operated the hand is turned back to the zero or starting point through the medium of a setting device preferably consisting of an exterior setting-knob 32, projecting through the center of the casing-window in front of the dial and suitably fitted on the outer end of the indicator-shaft 9. The indicating-hand is arrested at the zero-point when turned backward by the device or knob 32 by means of a stop projection 33, carried by the escape-wheel 17 and adapted to come into engagement with a corresponding projection 34, carried by the release-pallet of the armature, which is rigid therewith, as may be plainly seen from Fig. 8 of the drawings.

Usually in operating the system it is preferable to control and read the separate indicators A and B in unison. Hence while each indicator is separately controlled in the sense of the operator selecting the number to be indicated it will be understood that in indicating a district whose number is greater than five (which is the highest numeral shown in the drawings) the hand of one indicator will point to one digit of the number and the hand of the other indicator to the other digit of the same number—for instance, one dial indicating "2" and the other "4," which indicates that the alarm is given for fire-district number "24." Any suitable wiring for accomplishing this result may be resorted to; but for purposes of illustration there is shown in the drawings a simple wiring for the indicator mechanism which consists in providing the case of the indicator mechanism with the binding-posts *a*, *b*, and *c*, as shown in Figs. 2 and 18 of the drawings. The magnets 30 of indicator A have one terminal connected by the magnet-wire *d* to the binding-post *a*, and the other terminal connected by the magnet *d'* with the binding-post *c*. For the indicator B the terminals of the magnets 30 have a magnet-wire connection *e'* with the binding-post *b*, and a wire connection *e* with the binding-post *c*. The binding-posts *c* are in a common return-circuit including common-return-wire connections *f* and *f'*, and a return-wire binding-post *c'*, forming a part of a group of binding-posts *a'*, *b'*, and *c'*, fitted on the case 36 of the generating mechanism now to be described. These binding-posts *a'*, *b'*, and *c'*, show the points of connection for wiring the generating mechanism with the corresponding binding-posts of the indicator mechanism, and at this point it will be observed that the binding-post *a* for the indi-

cator A has an indicator-wire connection *g* with the binding-post *a'* of the generating mechanism, while the binding-post *b* of the indicator B has a corresponding indicator-wire connection *g'* with the binding-post *b'* of the generating mechanism. The relation of these wire connections to those of the generating mechanism will be pointed out in the description of the diagram hereinafter referred to.

The generating mechanism as an entirety is housed within the case 36, arranged at any suitable point from which an alarm is to be sent in. The case is closed at one side by a cover 37, upon which are mounted separate dial-segments 38 and 39, which dial-segments are numbered corresponding to the numbers on the indicator-dials 5. Over the said dial-segments are arranged to work, respectively, the separate selecting-pointers 38^a and 39^a. These separate selecting-pointers 38^a and 39^a respectively control the separate indicators A and B—i. e., to provide means for setting the apparatus to any number desired to be indicated on the dials of the separate indicators. Each of the selecting-pointers 38^a and 39^a is in the form of a swinging lever-arm provided at a convenient point with a manipulating-button 40 and having at its free end the holding element 41, adapted to have a snap engagement with catch-notches 42, provided on the dial-segments 38 and 39 to provide means for holding the selecting-pointers in their adjusted positions, said pointers having a sufficient spring to permit of being forced out of and into the notches, while at the same time obtaining a firm interlocked connection therewith while at rest. Each of the selecting-pointers 38^a and 39^a has a fast connection at one end with the outer end of a short rock-shaft 43, extending through the cover 37 and carrying upon its inner end at the inner side of the cover a swinging shifter-arm 44, having an insulated carrier-fork 45, adapted to loosely engage over a shifting extension or arm 46 of a sliding brush-holder 47, carrying a shiftable contact-brush 48, cooperating with a rotary circuit-controlling drum 49, constituting a part of a circuit-controlling device associated with and forming a part of the magneto-electric generators G and G', mounted within the case 36 and coupled together for synchronous operation, while at the same time being individually related, respectively, to the separate indicators A and B of the indicator mechanism. The selecting-pointer 38^a is associated with the shiftable contact-brush for the magneto-electric generator G, and the selecting-pointer 39^a is similarly associated with the shiftable contact-brush for the magneto-electric generator G'.

The generators G and G' are substantially of duplicate construction, and referring particularly to such construction it will be ob-

served that each generator embodies the general features of an ordinary magneto-electric generator—namely, that of a rotary armature rotating between the poles of a permanent magnet—and from the commutator of each armature the current is taken by brushes in the usual manner. It is preferable in carrying out the present invention to employ in the construction of each of the generators a plurality of permanent field-magnets 50 of the inverted-horseshoe type and arranged in upright position upon the mechanism-base 51, mounted within and on the bottom of the generator-case 36. The series of permanent horseshoe-magnets 50 of each generator G and G' may be conveniently secured in place through the medium of a plurality of retaining-bolts 52, arranged in the intervals between the separate magnets 50 and having their heads tightened up against the outer sides of said magnets. The inner portions of the retaining-bolts 52, extending transversely across the interval between the opposite or vertical legs of the field-magnets, are suitably bolted to the armature-casing 53, arranged between the opposite poles of the series of magnets and essentially consisting of the separate pole-pieces 54 of an approximately semicircular form and in firm metallic contact with the ends of the magnets which are seated upon the said pole-pieces. The rotating armature 55 is of common construction, the same having the usual metallic body and pole-pieces and the ordinary windings of wire. The said rotating armature 55 of each generator carries the usual commutator 56, Fig. 18, and is mounted upon the armature-shaft 57. This shaft has mounted on one end thereof the armature-pinion 58, meshing with a gear-wheel 59, mounted on the main operating-shaft 60. The gearing for the armatures of both generators is the same and is therefore similarly lettered; but in the practical construction of the apparatus it is preferable to provide each generator with its motion-operating-shaft section 60, extending longitudinally through the group of field-magnets 50 and to couple the contiguous ends of the-shaft section 60 for each generator by means of a shaft-coupling connection 61 of suitable type, as plainly shown in the drawings. At one end of the generator-case 36 the motion-operating shaft 60 is extended through such end of the case and is designed to have attached thereto an operating-crank 62, as plainly shown in Fig. 1 of the drawings.

Inasmuch as each of the generators is equipped with a circuit-controlling device of the same construction and action, a description of one will suffice for the other, and, referring particularly to the drawings, it will be observed that the circuit-controlling device for each generator is supported at one side of the generator by means of a bracket-frame 63, which may be conveniently mounted di-

rectly on the end portions of the armature-casing 53, as may be best seen in Figs. 10, 11, and 12 of the drawings. This bracket-frame 63 is of a skeleton construction essentially consisting of opposite end bracket-arms 64 and suitable frame-pieces connected with the same; but for the purposes of the present invention it is only essential for the bracket-frame 63 to be provided with suitable bearing-supports for the rotary circuit-controlling drum 49 and a suitable guide or guides for the sliding brush-holder 47, which carries the shiftable contact-brush 48. To this end the bracket-frame 63 is provided at opposite ends thereof with bearings 65 for the drum-shaft 66, which derives its motion from a gear-wheel 67, mounted on one end thereof and meshing with a driving-pinion 68, mounted on the main operating-shaft section 60. The said drum-shaft 66 provides a support for the circuit-controlling drum 49, which is loosely mounted on the shaft, but is designed to be coupled thereon through the medium of a clutch device consisting of a pivotal coupling-dog 69, pivotally mounted on one end of the drum, as at 70, and provided at one side in its pivotal support with an engaging hook 71, adapted to be normally pressed into engagement with the fixed clutch-shoulder 72, provided on the collar 73, mounted fast on the shaft 66 at the end of the drum carrying the pivotal clutch-dog 69. The engaging end of the hook 71 is pressed directly into engagement with the fixed clutch-shoulder 72 through the medium of a presser-spring 74, and at the side of its pivot opposite the engaging hook 71 the dog 69 is provided with a trigger-finger 75, adapted to move into engagement with a fixed tapped projection 76, carried upon a trip-plate 77, normally held in the circular path of movement of the clutch-dog 69 and its trigger 75 through the medium of an adjusting-spring 78, interposed between the said trip-plate 77 and the adjacent fixed member of the bracket-frame 63. The said trip-plate 77 of the clutch device just described is provided at its end with the slide-collars 79, respectively, and slidably engaging the pair of guide-rods 80, carried by the bracket-frame 63 at one side of the circuit-controlling drum 49. The said pair of guide-rods are arranged in spaced parallel relation, respectively, one above the other and preferably in different vertical planes to provide for properly positioning the parts carried thereby. In addition to constituting the guiding-support for the trip-plate 77 of the clutch device the said guide-rods 80 also provide a guiding-support for the sliding brush-holder 47. This brush-holder 47 essentially consists of a body portion having the separate sleeve members 81, slidably engaging the separate guide-rods 80 and the offstanding shifting extension 46, which engages in

the carrier-fork 45 of the selecting-pointer hereinbefore referred to. The body portion of the sliding brush-holder 47 also is provided therein with a guiding-opening 82, accommodating the yielding spring-projecting contact-brush 48, whose inner end is normally projected by spring-pressure into the path of the graduated contact projections or ribs 84, provided on the surface of the drum 49. The outer end of the spring-pressed contact-brush 48 has a wire connection therewith forming a part of the electrical circuit herein-after specifically referred to. In addition to its function of carrying the contact-brush 48 the sliding or shiftable brush-holder 47 also provides for the tripping of the clutch device after each operation of the apparatus. To this end the brush-holder 47 is preferably provided at one side thereof with a bracing-finger 85, adapted to move beneath the tappet projection 76 of the trip-plate 77, and the uppermost sleeve 81 of the brush-holder body is notched at one end, as at 86, to take over and work past a stop-pin 87, against which the plate 77 is normally moved by the pressure of its adjusting-spring 78. (See Fig. 14.) When a selecting-pointer is moved back to zero, the trip-plate is carried by the brush-holder 47 out of contact with and to one side of the plane of the clutch-dog on the adjacent end of the drum 49. When the trip-plate is moved to this position, the tappet projection 76 is free to engage with the clutch-dog of the drum and take up the rotation of the latter when the crank is operated.

The rotary circuit-controlling drum of each generator is in the circuit with one of the terminals of the armature-winding, or, in other words, with one of the brushes of the commutator 56, so that when one of the contact bosses or ribs 84 is moved in contact with the inner end or nose of the brush 48 the circuit is closed for the purpose of operating the escapement of the indicator, and to provide for operating the escapement of the indicator the number of times to correspond with the number to be indicated on the dial the circuit-controlling drum 49 is provided on the periphery thereof with the same number of contact-ribs 84 as the numbers on the dial of the indicator. These contact-ribs are arranged in what may be termed a "stepped" or "graduated" order—i. e., the same are of progressively-decreasing length with reference to the end of the drum where the shiftable contact-brush lies at its starting or zero point. The said contact-ribs are raised a sufficient distance above the periphery of the drum-body to move in easy contact with the brush 48 and are arranged in regularly-spaced parallel relation. By reason of the stepped order or progressively-decreasing length of the contact-ribs 84 it will be obvious that in selecting a number on either of the dial-segments 38 or 39 to be indicated it is necessary

to move the selecting-pointer a sufficient distance to carry the shiftable contact-brush to a position where it will contact with that number of ribs 84 corresponding to the number to be indicated. For instance, if the number "2" is to be indicated on the dial of the indicator the contact-brush is shifted to a position where it will contact with only two of the ribs 84. This is controlled entirely by the selecting-pointers 38^a and 39^a and the dial-segments 38 and 39, which determine the correct positions of the shiftable contact-brushes according to the numbers selected for indication upon the separate indicators of the indicator mechanism.

One of the features of the invention resides in providing means for sounding line alarms or gongs while the apparatus is in operation. This is conveniently accomplished by the employment of a circuit-breaker device operated in connection with one of the circuit-controlling drums. This circuit-breaker device essentially consists of a contact-wheel 88, mounted fast on one end of one of the drum-shafts 66, and a plurality of separate circuit-closing pins 89. The said circuit-closing pins 89 are slidably and yieldingly mounted in an insulated holding-block 90, supported on one end of the adjacent bracket-frame 63 and adapted to be engaged by the peripheral contact-bosses 91, projecting from the periphery of the wheel 88. Any desired number of the contact-bosses may be provided on the fast contact-wheel 88 and are successively moved into contact with and past the separate individual circuit-closing pins 89, whose active ends are projected under the influence of adjusting-springs 92 and are arranged on the arc of a circle, as plainly shown in Fig. 11 of the drawings. Each of the circuit-closing pins 89 of the circuit-breaker device 88 89 has a separate wire connection therewith.

Rererring particularly to diagrammatic view Fig. 18 of the drawings, these separate wire connections are designated, respectively, by the reference characters h , h' , and h'' , which have connections with binding-posts 93 94, and 95 on the case 36 of the generating mechanism. The binding-posts 93, 94, and 95 have similar multiple or parallel connections i , i' , and i'' with the line-wire L, which has a return connection with the binding-post 96, also upon the generator-case 36. Each of the connections i , i' , and i'' have included therein a line alarm or gong x , and it will be obvious that any number of these line alarms or gongs may be employed, according to the number of contacts in the circuit-breaker device 88 89, and which alarms or gongs will be sounded during the operation of the apparatus to send in an alarm to the indicator mechanism.

Another feature of the invention resides in the employment of a generator-signal 97,

preferably in the form of a magneto-electric bell, mounted in or on the case and one of whose terminals has a wire connection k with a spring contact-brush 98, mounted on an insulated holder or support 99^a, arranged on the bracket-frame 63 of one of the generators and overhanging one end of the circuit-controlling drum of that generator. The overhanging end of the contact-brush 98 is adapted to be engaged by the longest contact-rib 84 once in each complete rotation of the drum 49, so that when such drum has completed one rotation the long contact-rib 84 thereof will come in contact with the brush 98 and close the circuit through such brush, the wire connection k , the generator-signal 97, and the return-wire connection l , which return-wire connection is in circuit with the commutator 56 of the generator with which the signal spring contact-brush 98 is associated. The completion of this circuit gives an alarm or signal which indicates that the proper number of turns of the generator have been made to provide for the operation of the indicators A and B, according to the said position of the shiftable contact-brushes 83.

The circuit-wire connections for the generating and indicating mechanisms include the separate oppositely-arranged safety circuit-closers 99 and 100, disposed in approximate relation respectively to the separate generators G and G'. The circuit-closers 99 and 100 are of duplicate construction, each consisting of a pair of normally contacting spring contact-plates 101 and 102, spring contact-plate 101 projecting above the end of the contact-plate 102 and adapted to be engaged by the insulated opening-button 102^a, carried at the inner side of the swinging shipper-arm 44 of each selecting-pointer. By reason of this construction and arrangement when the selecting-pointers are swung back to the zero-point both of the circuit-closers 99 and 100 are opened, thus preventing the electrical operation of the apparatus until the selecting-pointers are moved to a number-indication of the dial-segment and in thus moving away from the zero-point permit the springs 101 of the safety circuit-closers to move back into contact with the other opposing springs 102.

To provide for the convenient mounting of the parts within the case 36 of the generating mechanism, the various wire connections for the generating mechanism are fitted to or embedded in the mechanism base 51 and at their leading-out or leading-in ends are connected to contact-springs 103, secured on the base 51 adjacent to the back edge thereof, as plainly shown in Figs. 12 and 13 of the drawings, and when said base is fitted in position within the case 36 are designed to contact with correspondingly-positioned contact-plates 104, fitted to the back of the case 36; but as the wire connections with the plates

104 are practical continuations of those connected with the springs 103 similar reference characters are employed in the diagrammatic Fig. 18. Also in this connection it will be observed that the continuations of the wires connected with the contact-plates 104 are connected with the various binding-posts 93 94 95 96 a' b' c' . For convenience in following out the circuits the several points of connection 103 104 are additionally designated in the diagrammatic Fig. 18 by the characters I II III, &c.

Referring to the wiring not mentioned heretofore, it is to be observed that the shiftable contact-brush 48 for the generator G has a follower-wire connection m , which permits the free shifting of the brush, and the continuation of this wire connection m is connected with the connecting-point VI. The corresponding follower-wire connection m' for the brush of the generator G' connects with the connecting-point VII, and from thence to the binding-post b' . The return binding-post c' connects with the point VIII, and from thence through the wire n to the insulated contact-brush 105 in metallic contact with the end of the armature-shaft of the generator G'. A corresponding or similar contact-brush 106 is in contact with one end of the armature-shaft of the generator G and has a wire connection o with the contact 101 of the circuit-closer, which has connected therewith the wire connection l' , previously referred to, while a corresponding wire connection l' connects the contact 102 of the other circuit-closer 100 with the connecting-point V and with the binding-post 96, as plainly shown in the diagram. A branch return-wire connection 107 connects the contact 101 of the circuit-closer 100 with the corresponding contact of the circuit-closer 99' of the wire connection o for such contact.

Referring more particularly to the general operation of the system or apparatus, assuming that an alarm is to be sent in for fire-district 23; the selecting-pointer 38^a of generator G is swung over the dial-segment 38 to number "2" on such segment and the pointer 39^a of generator G' is swung over to the number "3" point on the dial-segment 39. This adjustment of the selecting-pointers positions the shiftable contact-brushes for the generators G G' so that the same will be respectively engaged by two and three of the contact-ribs of the respective controlling-drums 49. Then the operator grasps the crank-handle 62 and rotates the main operating shaft-section 60, which in turn transmits motion to the armatures and circuit-controlling drums of the separate generators G and G'. Under such conditions the action of each generator is as follows: In the generator G as the circuit-controlling drum 44 thereof rotates it successively carries two of its ribs 84 in contact with the brush 48. At each of

these contacts the circuit is completed from the armature of the generator through the contact-drum, brush 48, wire *m*, point VI, binding-post *a'*, wire *g*, wire *d*, magnets 30, wire *d'*, return-wire *f*, binding-post *c'*, wire *n*, brush 105, and shafting to armature for generator G. At each closing of the circuit thus described the magnets 30 operate the escapement device in the manner described and cause the hand of the indicator A to move to number "2" on the dial for that indicator. During the same operation three of the contacts 84 of the controlling-drum of generator G' successively contact with the brush 48 for that generator and three times close the following circuit: from armature of generator G' to drum 49 of that generator, contact-brush 48, wire *m'*, binding-post *b'*, wire *g'*, wire *e'*, magnets 30 of indicator B, wire *e*, binding-post *c*, wire *f'*, return binding-post *c'*, wire *n*, contact-brush 105, and armature of generator G'. The successive closing of this circuit operates indicator B three times, and thus causes the hand thereof to move to number "3" on the dial. During this same operation the line-alarm circuits are closed intermittently through the wires *h h' h²* and *i i' i²* to the line-wire L and return through wire *l* or *l'* and safety circuit-closers 99 and 100, wire *o*, brush 106, and frame to armature of generator G' to drum 49 of said generator G', contact-wheel 88, circuit-closing pins 89. When the circuit-controlling drums have made one complete revolution, the generator-signal circuit comes into play in the manner previously described and sounds the bell or signal 97, thereby indicating that a sufficient number of turns have been made for the generator-operating shaft. Also when each circuit-controlling drum makes a complete rotation the trigger-finger 75 of the pivotal clutch-dog 69 is carried into engagement with and against the fixed tappet projection 76 of the trip-plate 77, which causes the clutch-dog to become disengaged from the clutch-shoulder 72, thereby stopping the rotation of the drum, while that of the shaft 66 and its collar 73 continues. After thus using the apparatus the pointers are moved back to zero, thus carrying with the same the brush-holders 47, which move against the trip-plates 77 and release the dogs 69 of the clutch devices, thereby permitting the springs 74 to readjust the hooks 71 into the path of the fixed clutch-shoulders 72. At the same time both safety circuit-closers 99 and 100 are opened up, as already referred to.

From the foregoing it is thought that the construction, operation, and many advantages of the herein-described fire-alarm system will be readily apparent without further description, and it will be understood that various changes in the form, proportion, and minor details of construction may be resorted to without departing from the scope of the in-

vention or sacrificing any of the advantages thereof.

In connection with the operation of the foregoing circuits it should be stated that the controlling-drums 49 of the separate generators G G' are set so as to operate out of unison—*i. e.*, only one of the shiftable contact-brushes makes contact with its respective drum at one time, so that the circuits for the indicators A and B are opened and closed alternately. By reason of this arrangement there is no interference of circuits, and it should be further noted that the terminals for the armature-winding of each generator are respectively connected to the armature-shaft and the frame of the generator. To illustrate this, the conventional brushes are diagrammatically indicated in Fig. 18 of the drawings. Hence by suitable insulation the shafting and metal frame parts of the generators are utilized as parts of the circuits.

Having thus described the invention, what is claimed, and desired to be secured by Letters Patent, is—

1. In a fire-alarm system, an electromagnetic indicator, a magneto-electric generator having a circuit-controlling device comprising a rotary drum provided with stepped contacts, means for rotating said drum, means for stopping the drum at the completion of one revolution, a shiftable contact-brush, and a selector for positioning the brush; and circuit-wire connections between the indicator and generator.

2. In a fire-alarm system, an electromagnetic indicator, a magneto-electric generator having a circuit-controlling device comprising a rotary drum provided with stepped contacts, means for rotating said drum and for causing the same to automatically stop at the completion of one revolution, a shiftable brush cooperating with the contacts, and a selector for positioning the brush; and circuit-wire connections between the indicator and generator.

3. In a fire-alarm system, an electromagnetic indicator, a magneto-electric generator having a circuit-controlling device comprising a rotary drum and having stepped contacts, means for rotating the drum with the armature of the generator, means for automatically clutching and unclutching the drum to effect its rotation and also the stoppage thereof at the completion of one revolution, a shiftable brush cooperating with the contacts, and a selector for positioning the brush; and circuit-wire connections including the indicator, the generator, and the circuit-controlling device.

4. In a fire-alarm system, an electromagnetic indicator, a magneto-electric generator having a circuit-controlling device comprising a rotary drum provided with stepped contacts, means for rotating the drum with the armature, a clutch device for the drum com-

prising means for causing the same to stop at the completion of one revolution, a shiftable contact-brush, and a selector for positioning the brush; and circuit-wire connections including the indicator, the generator and the circuit-controlling device.

5. In a fire-alarm system, an electromagnetic indicator, a magneto-electric generator having a circuit-controlling device comprising a rotary drum provided with stepped contacts, means for rotating the drum with the armature, a clutch device comprising means for automatically stopping the drum at the completion of one revolution, a shiftable contact-brush, and a selector for the brush, the movement of the brush to a zero or initial position providing means for tripping the clutch device to its clutching position; and circuit-wire connections including the indicator, the generator and the circuit-controlling device.

6. In a fire-alarm system, an electromagnetic indicator, a magneto-electric generator having a circuit-controlling device comprising a rotary drum provided with stepped contacts, means for rotating the drum with the armature, a clutch device including a trip member and comprising means for automatically stopping the drum at the completion of one revolution, a shiftable brush-holder carrying a contact-brush for the stepped contacts, and a selector for positioning the brush-holder and moving the same against said trip member; and circuit-wire connections including the indicator, the generator and the circuit-controlling device.

7. In a fire-alarm system, an electromagnetic indicator, a magneto-electric generator having a circuit-controlling device comprising a rotary drum provided with stepped contacts, a clutch device including the clutch elements carried respectively by the drum and its shaft, and a trip member for releasing one of the clutch elements, a shiftable brush-holder carrying a contact-brush and movable against said trip member to reset the clutch, and a selector for positioning the brush-holder; and circuit-wire connections including the indicator, the generator, and the circuit-controlling device.

8. In a fire-alarm system, an electromagnetic indicator, a magneto-electric generator having a circuit-controlling device comprising a drum-shaft geared with the generator-shaft, a rotary drum loose on the shaft and provided with stepped contacts, a clutch device including separate clutch elements carried respectively by the drum and its shaft, and a movable trip member normally in the path of one of the clutch elements to release the same at each complete revolution of the drum, a shiftable brush-holder movable against said trip member, and a selector for positioning the brush-holder; and circuit-wire connections including the indicator, the generator, and the circuit-controlling device.

9. In a fire-alarm system, an electromagnetic indicator, a magneto-electric generator having a circuit-controlling device comprising a drum-shaft geared with the generator-shaft, a rotary drum loosely mounted on the shaft and provided with stepped contacts, a clutch device including a fixed clutch-shoulder on the drum-shaft, a spring-pressed pivotal clutch-dog pivotally mounted on the drum, and a shiftable trip member mounted on a fixed support and having a tappet for engagement with the clutch-dog to release the same from the fixed clutch-shoulder, a shiftable brush-holder movable against said trip member to release the clutch-dog after a complete revolution of the drum, and a selector for positioning the brush-holder; and circuit-wire connections including the indicator, the generator and the circuit-controlling device.

10. In a fire-alarm system, an electromagnetic indicator, a magneto-electric generator having a supporting-frame and a circuit-controlling device carried by the latter, said circuit-controlling device comprising a drum-shaft having a fixed clutch-shoulder, a rotary drum loose on the shaft and provided with stepped contacts and a pivotal spring-pressed clutch-dog cooperating with said shoulder and provided with a trigger, a spring-pressed trip-plate slidably mounted on the supporting-frame and having a fixed tappet projection normally lying in the path of the trigger of the clutch-dog, a shiftable brush-holder also slidably mounted on the supporting-frame and movable against said trip-plate, said brush-holder carrying a contact-brush cooperating with the contacts, means for rotating the drum-shaft, and a selector for positioning the brush-holder; and circuit-wire connections including the indicator, the generator, and the circuit-controlling device.

11. In a fire-alarm system, an electromagnetic indicator, a magneto-electric generator having a bracket-frame provided with a pair of guide-rods, a drum-shaft supported on the frame and geared with the generator-shaft, a rotary drum loose on the shaft and provided with stepped contacts, a clutch device including a fixed clutch-shoulder on the shaft, a spring-pressed pivotal clutch-dog on the drum, and a spring-pressed trip-plate slidably mounted on the guide-rods and normally lying in the path of the clutch-dog, a shiftable brush-holder having separate sleeve portions slidably engaging the separate guide-rods and movable against the trip-plate to reset the clutch, said brush-holder carrying a contact-brush, and a selector for positioning the brush; and circuit-wire connections including the indicator, the generator, and the circuit-controlling device.

12. In a fire-alarm system, an electromagnetic indicator, a magneto-electric generator

having a circuit-controlling device comprising a single rotary drum having on the periphery thereof a series of spaced contact-ribs of progressively decreasing length and
 5 arranged in stepped order, a shiftable brush coöperating with said contacts, and a selector for positioning said brush, and a clutch comprising means for coupling the drum to its shaft and also for automatically releasing
 10 the drum from its shaft at the completion of one revolution; and circuit-wire connections including the indicator, the generator, and the circuit-controlling device.

13. In a fire-alarm system, an electromagnetic indicator, a magneto-electric generator having a circuit-controlling device comprising a rotary drum provided with a plurality of contacts, means for automatically stopping the drum at the completion of one revolution, a shiftable brush, and a selector for
 20 positioning the brush; and circuit-wire connections between the indicator, the generator, and the circuit-controlling device, and including a normally closed safety circuit-closer, said circuit-closer being engaged and opened by the selector when the latter is moved to the zero position.

14. In a fire-alarm system, an electromagnetic indicator, a magneto-electric generator
 30 having a circuit-controlling device comprising a single rotary drum provided with a plurality of contacts, means for rotating the drum and also for automatically stopping its rotation, a shiftable brush coöperating with
 35 the contacts, a dial correspondingly numbered to the dial of the indicator, and a selecting pointer playing over said dial and operatively connected with the brush for positioning the same; and circuit-wire connections between the indicator, the generator,
 40 and the circuit-closing device.

15. In a fire-alarm system, an electromagnetic indicator, a magneto-electric generator having a circuit-controlling device comprising a rotary drum provided with contacts, a shiftable brush-holder carrying a contact-brush and provided with a shifting extension, a numbered dial, a swinging selector playing over said dial and carrying a forked
 50 shifter-arm engaging said shifting extension of the brush-holder, said shifter-arm also carrying an insulated opening-button; and circuit-wire connections between the indicator, the generator, and the circuit-controlling device, and including a normally closed safety circuit-closer engaged and opened by said opening-button when the selector is moved to the zero position.

16. In a fire-alarm system, an electromagnetic indicator, a magneto-electric generator, having a circuit-controlling device comprising a rotary drum provided with stepped contacts, means for rotating said drum, means for stopping the drum at the completion of
 60 one revolution, a shiftable contact-brush,

and a selector for positioning the brush; circuit-wire connections between the indicator and generator, and a generator-signal including an alarm and a local circuit for the alarm adapted to be closed by one of the
 70 drum-contacts after a complete revolution of the drum.

17. In a fire-alarm system, an electromagnetic indicator, and a magneto-electric generator having a circuit-controlling device
 75 comprising a rotary contact-drum, a shiftable brush for the drum, selecting means for the brush, means for stopping the rotation of the drum at the completion of one revolution thereof, and a generator-signal including an alarm and a local circuit for the alarm having a spring contact-brush arranged to be engaged by one of the drum-contacts after a complete revolution of the drum; and circuit-wire connections between the indicator,
 80 the generator, and the circuit-controlling device.

18. In a fire-alarm system, an electromagnetic indicator, and a magneto-electric generator in circuit with the indicator, said generator having means for successively sounding a plurality of line-alarms during the operation of the apparatus, and also having separate means for sounding a generator-signal after a complete operation of the indicator.
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19. In a fire-alarm system, an electromagnetic indicator mechanism, and a generating mechanism comprising separate magneto-electric generators in circuit with the mechanism, a generator-signal including a local signal-circuit controlled by one of the generators, and a line-alarm including a plurality of alarm-circuits controlled successively by the other of said generators.
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20. In a fire-alarm system, an indicator mechanism, and a generating mechanism in circuit with the indicator mechanism and comprising separate magneto-electric generators each having a circuit-controlling device, a generator-signal including a local circuit controlled by the circuit-controlling device of one generator after a complete operation thereof, and a line-alarm consisting of a plurality of alarms and local circuits therefor controlled successively by the circuit-controlling device of the other generator at intervals during the operation of the latter.
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21. In a fire-alarm system, an indicator mechanism, a generating mechanism comprising separate magneto-electric generators each having a circuit-controlling device consisting of a contact-drum and a shiftable contact-brush, a generator-signal including a local alarm-circuit having a single contact-brush engaged by a contact of the drum of one generator at each complete revolution of said drum, and a line-alarm consisting of a plurality of alarms and circuits therefor, and a circuit-breaker device comprising a plural
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contact-wheel mounted upon the drum-shaft of the other circuit-controlling device, an insulated holding-block, and a group of yieldable spring-projected circuit-closing pins engaged by the contacts of said wheel.

22. In a fire-alarm system, an indicator mechanism, a generating mechanism comprising separate magneto-electric generators, each having a circuit-controlling device consisting of a rotary contact-drum, a shiftable brush therefor, and a selector for positioning the brush; circuit-wire connections between the indicating mechanism, the separate generators, and said circuit-controlling devices, line-alarm circuits, a local-generator signal-circuit, and separate normally closed safety circuit-closers included in the return connections for the aforesaid several circuits and adapted to be opened and held opened by the selectors when moved to the zero position.

23. In a fire-alarm system, an indicator mechanism comprising separate indicators each having a hand-controlling escapement device, and a generating mechanism comprising separate magneto-electric generators having independently-adjusted circuit-closing devices respectively in circuit with the separate indicators.

24. In a fire-alarm system, an indicator mechanism comprising separate electro-magnetic indicators each having a hand-controlling escapement device, and a generating mechanism comprising separate magneto-electric generators coupled together for operation in unison and both having circuit-controlling devices consisting of a rotary con-

tact-drum, a shiftable brush therefor, and a selector for positioning the brush, said separate generators being respectively in circuit with the separate indicators and having a common circuit-return connection.

25. In a fire-alarm system, an indicator comprising a casing having a window with a central opening therein, a stationary dial-ring supported at the inner side of the window, a forked supporting-pedestal arranged within the casing, an indicator-shaft journaled in the arms of the pedestal-fork and carrying a hand located between the window and the dial-ring, a detachable exterior setting-knob extending through the central opening of the window and connected to the outer end of the indicator-shaft, a weighted actuating connection for the shaft having a guiding-support above the plane of the shaft, an escape-wheel mounted on the shaft at one side of the actuating connection therefor, an insulated mechanism base secured horizontally within the fork of the supporting-pedestal, a release-pallet pivotally supported on the base and coöperating with the escape-wheel, yielding means for moving the pallet in one direction, release-magnets on the base for moving the pallet in an opposite direction, and a generator having an operating-circuit including said release-magnets.

In testimony whereof I affix my signature in presence of two witnesses.

PEARL E. TARLTON.

Witnesses:

J. G. PARK,

FRANK KAUFMANN.