

No. 716,897.

Patented Dec. 30, 1902.

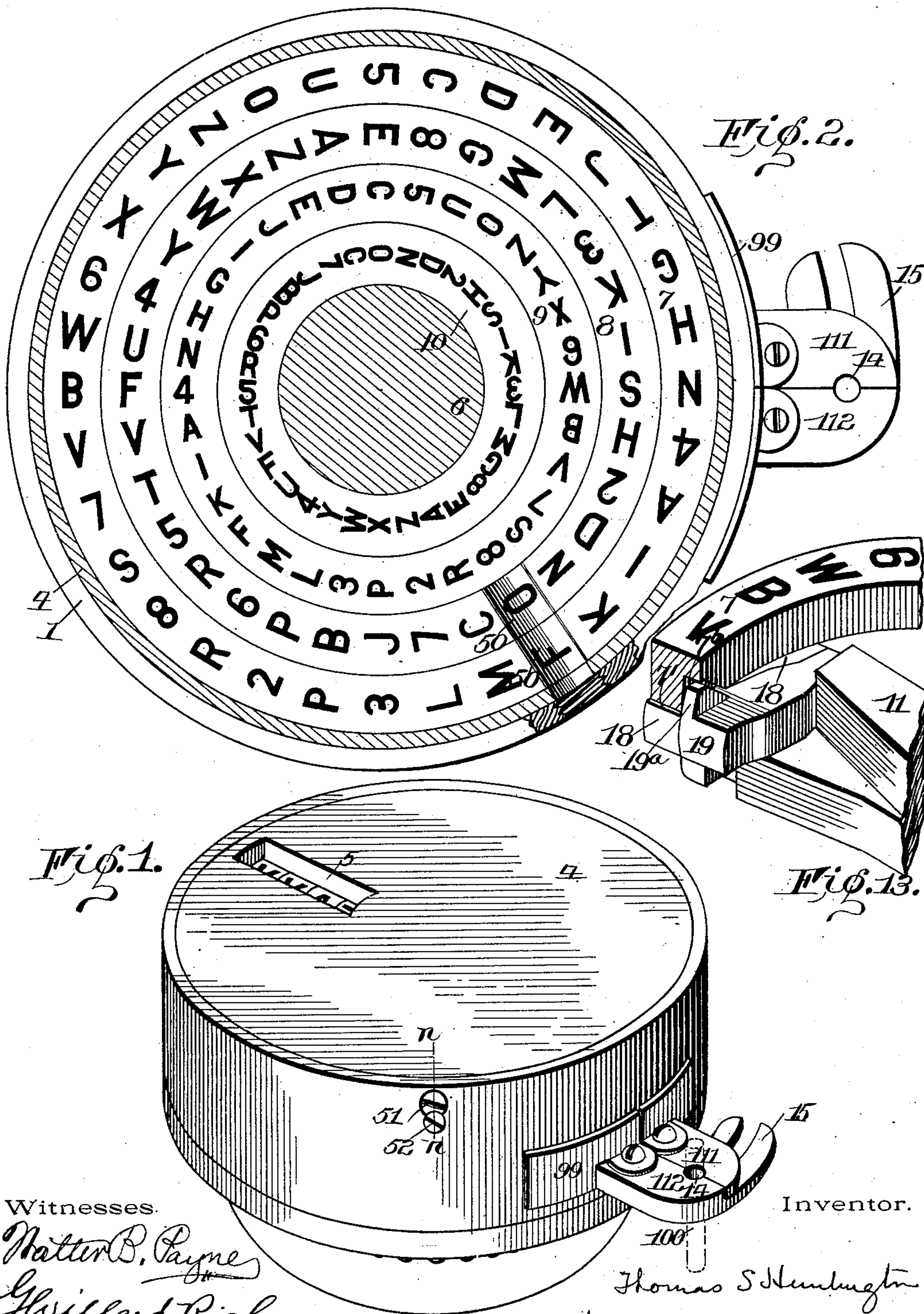
T. S. HUNTINGTON.

FARE REGISTER.

(Application filed Dec. 13, 1901.)

(No Model.)

4 Sheets—Sheet 1.



Witnesses.

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FARE REGISTER.

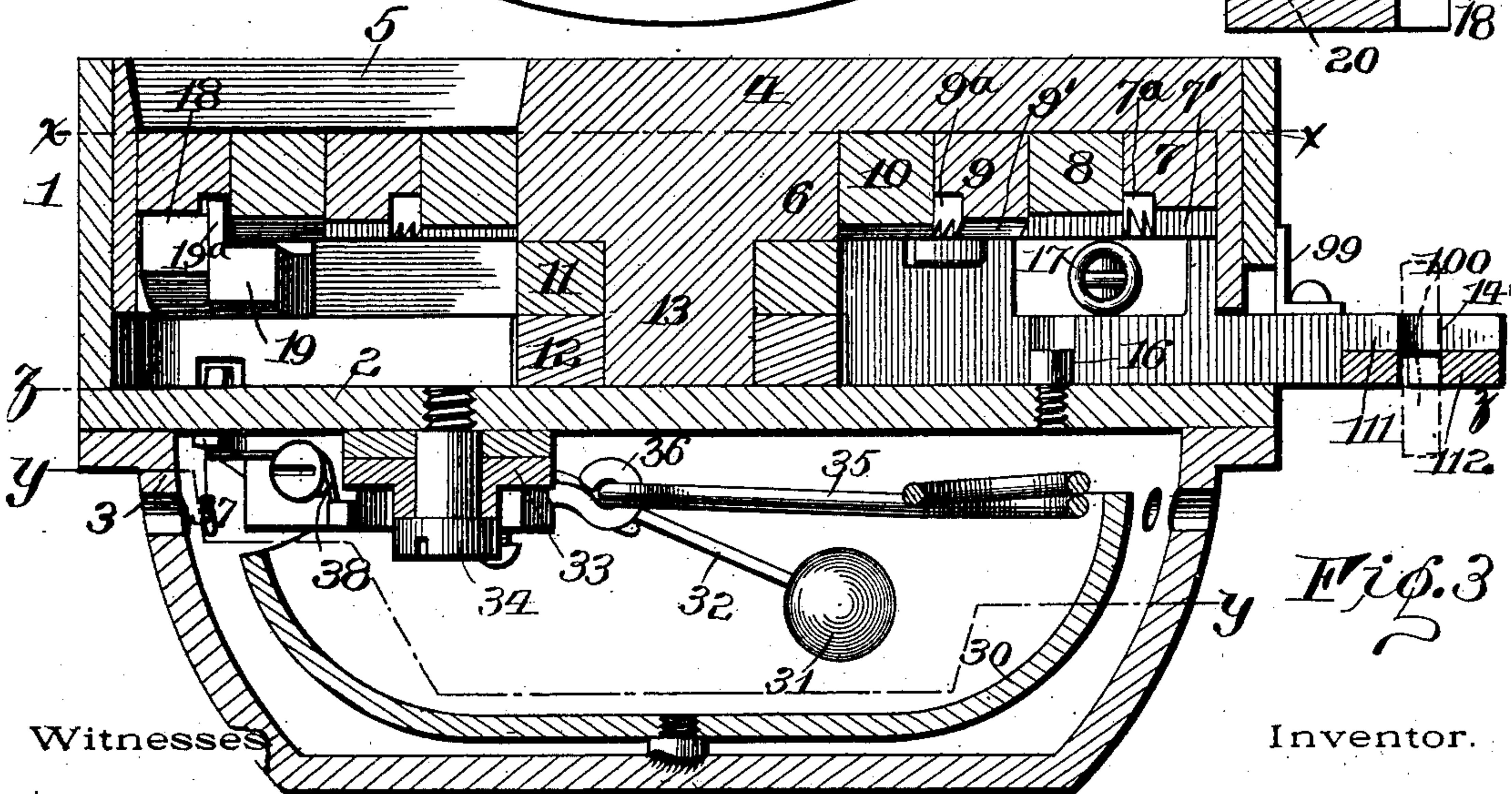
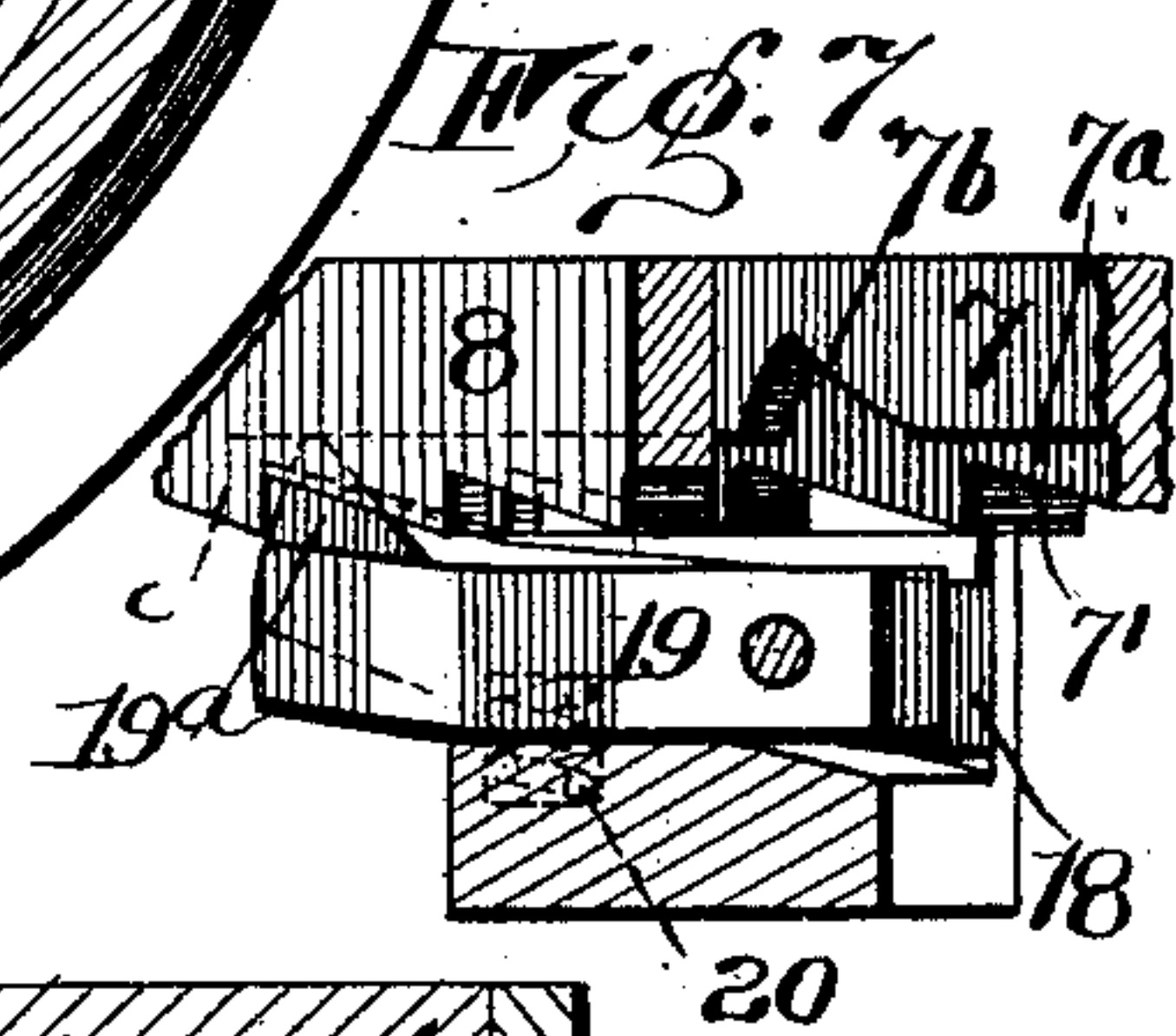
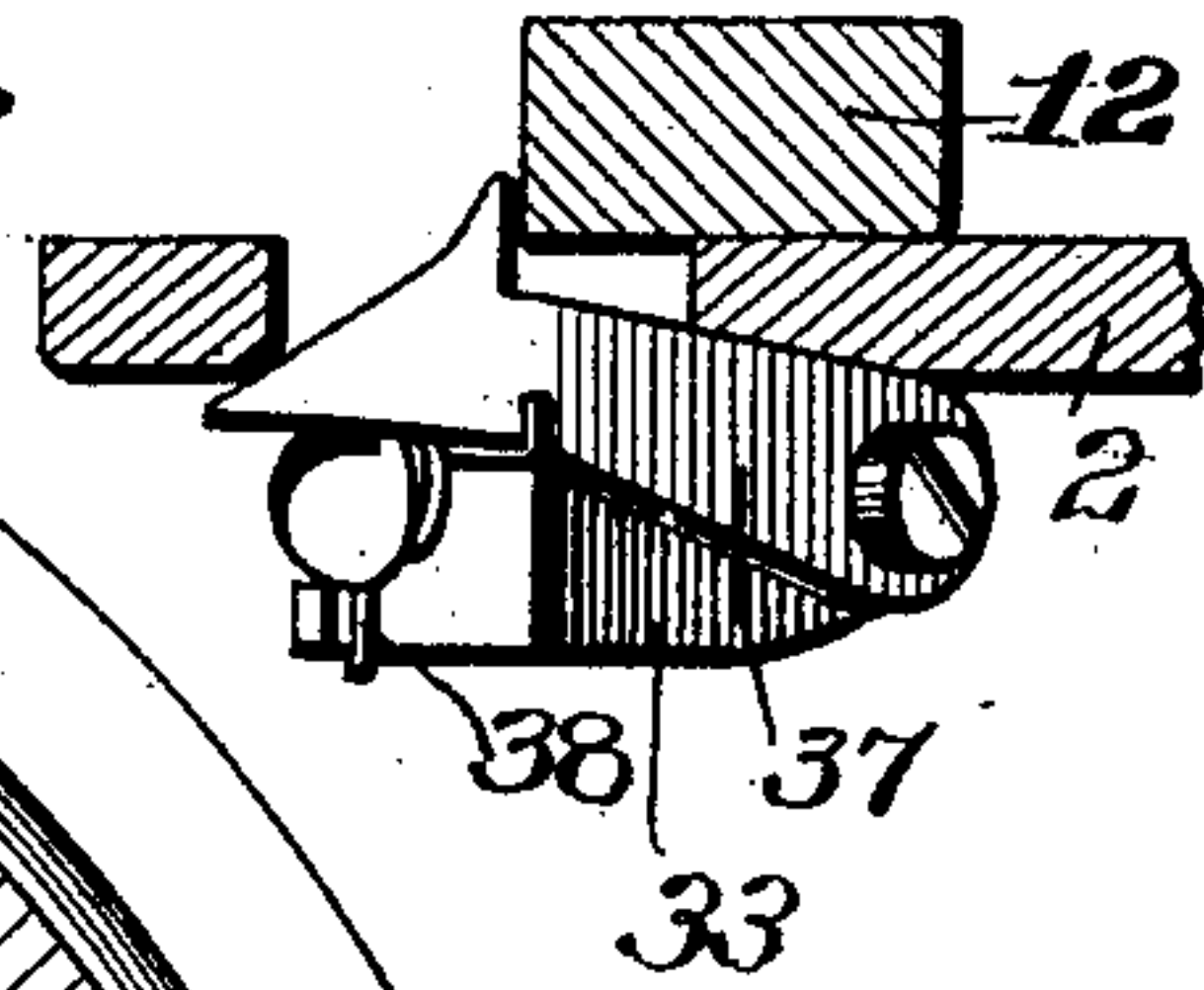
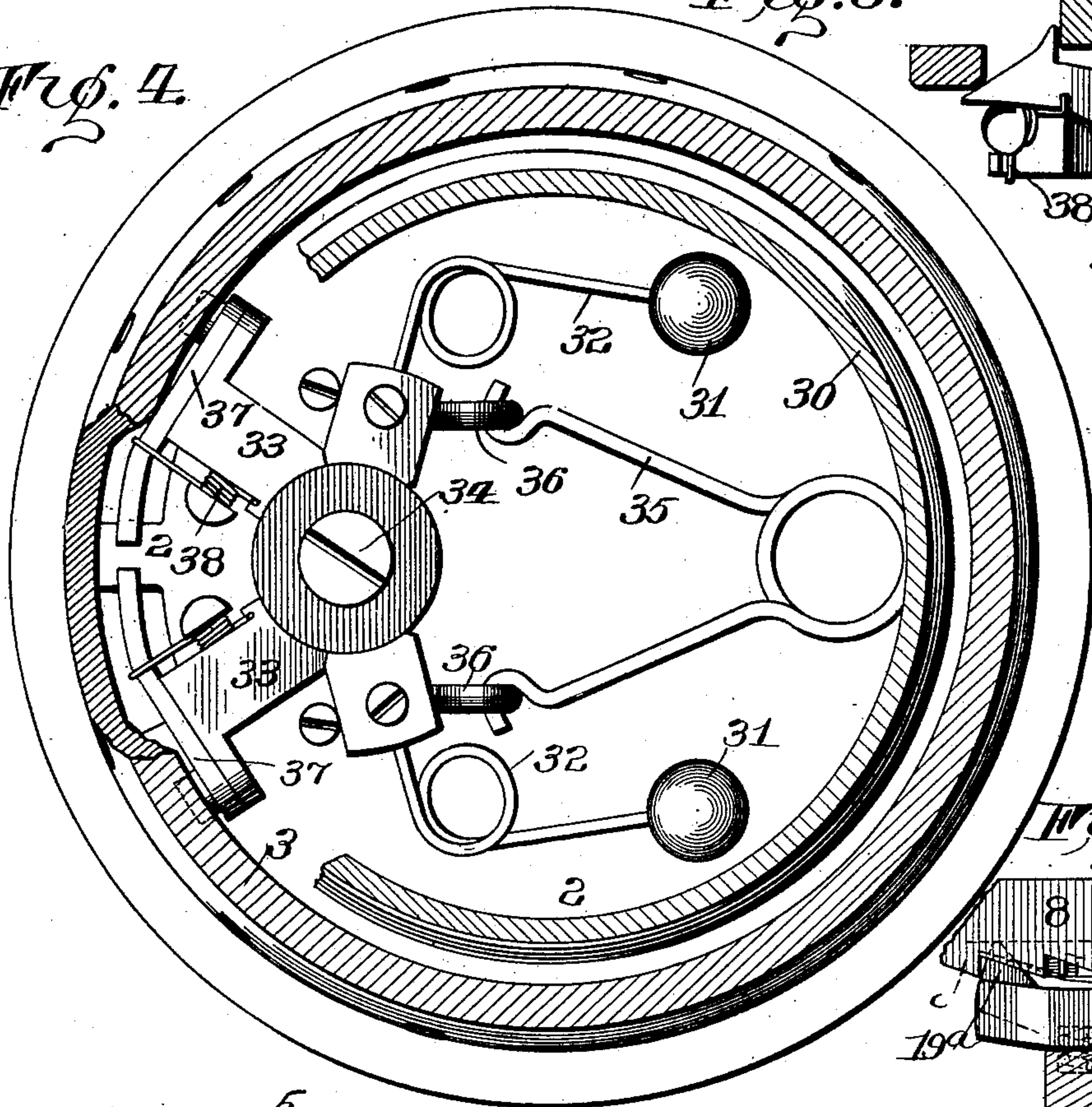
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Fig. 4.

Fig. 8.



Witnesses

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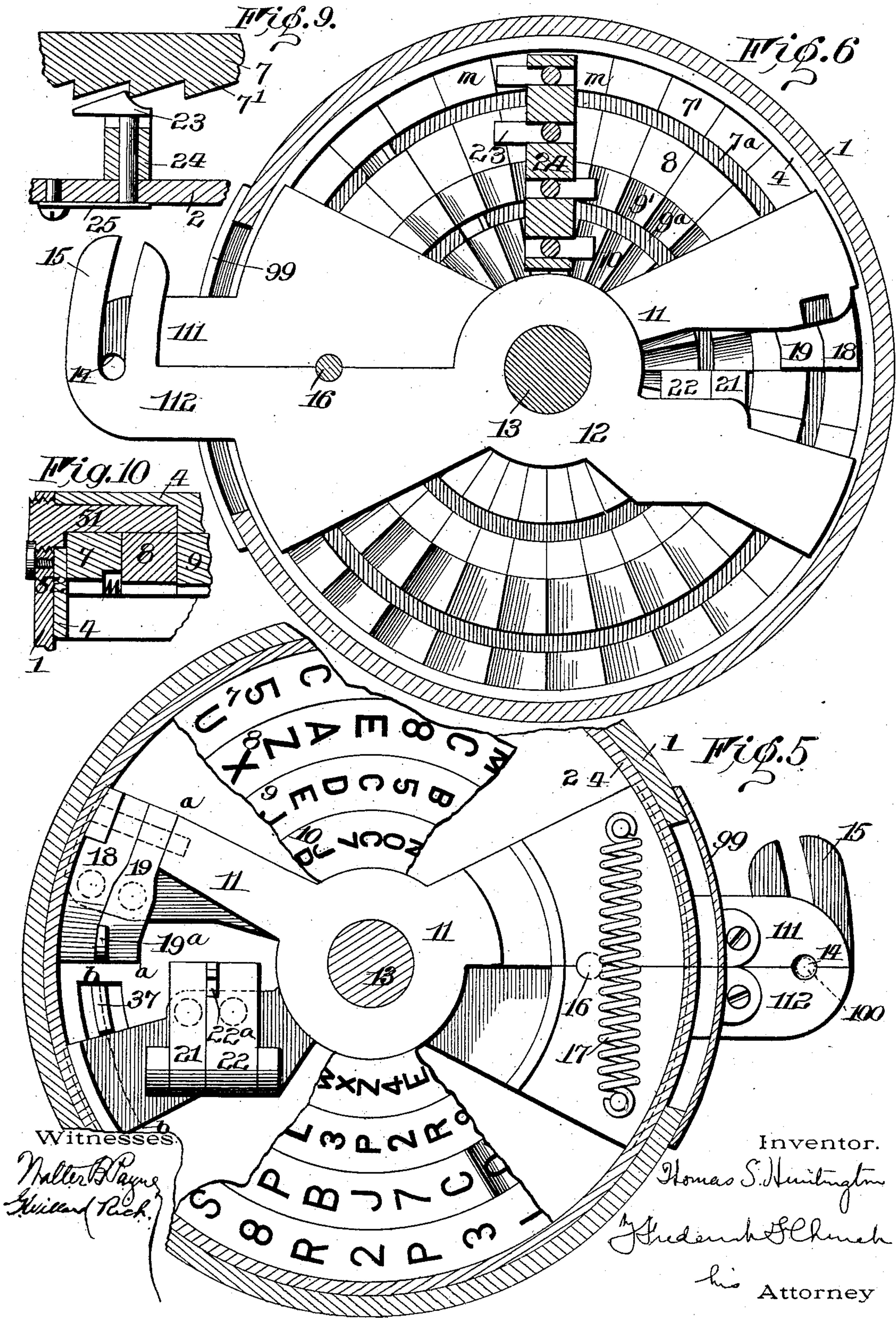
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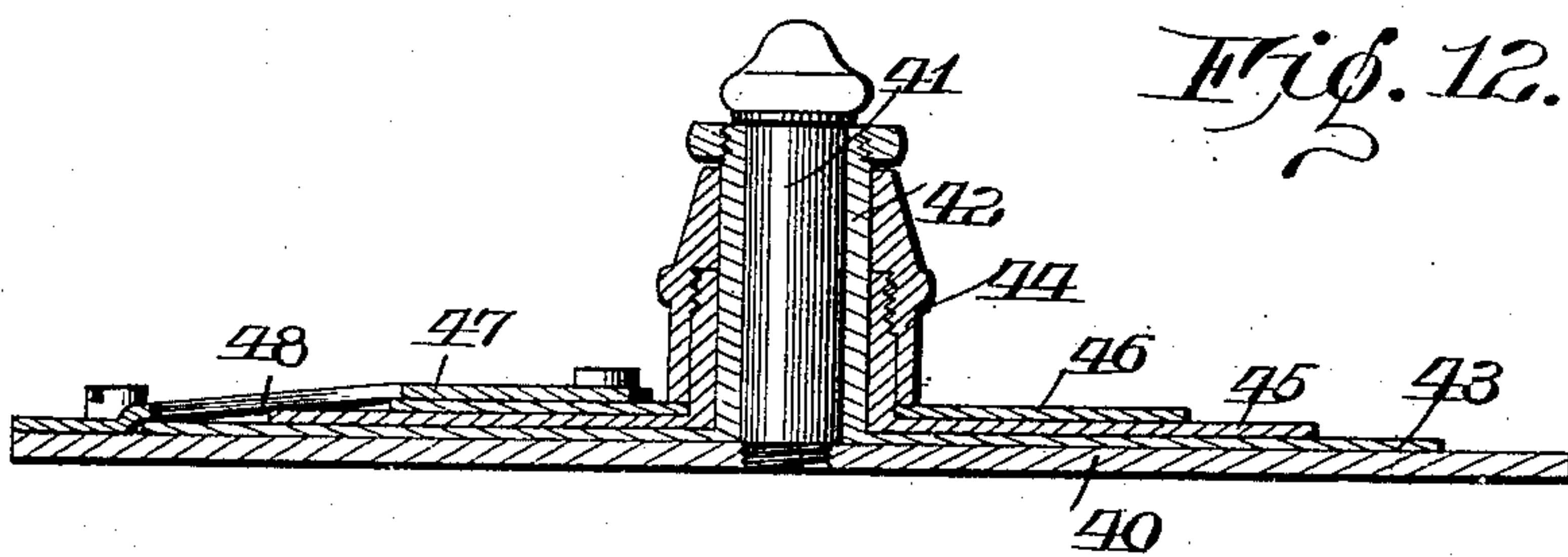
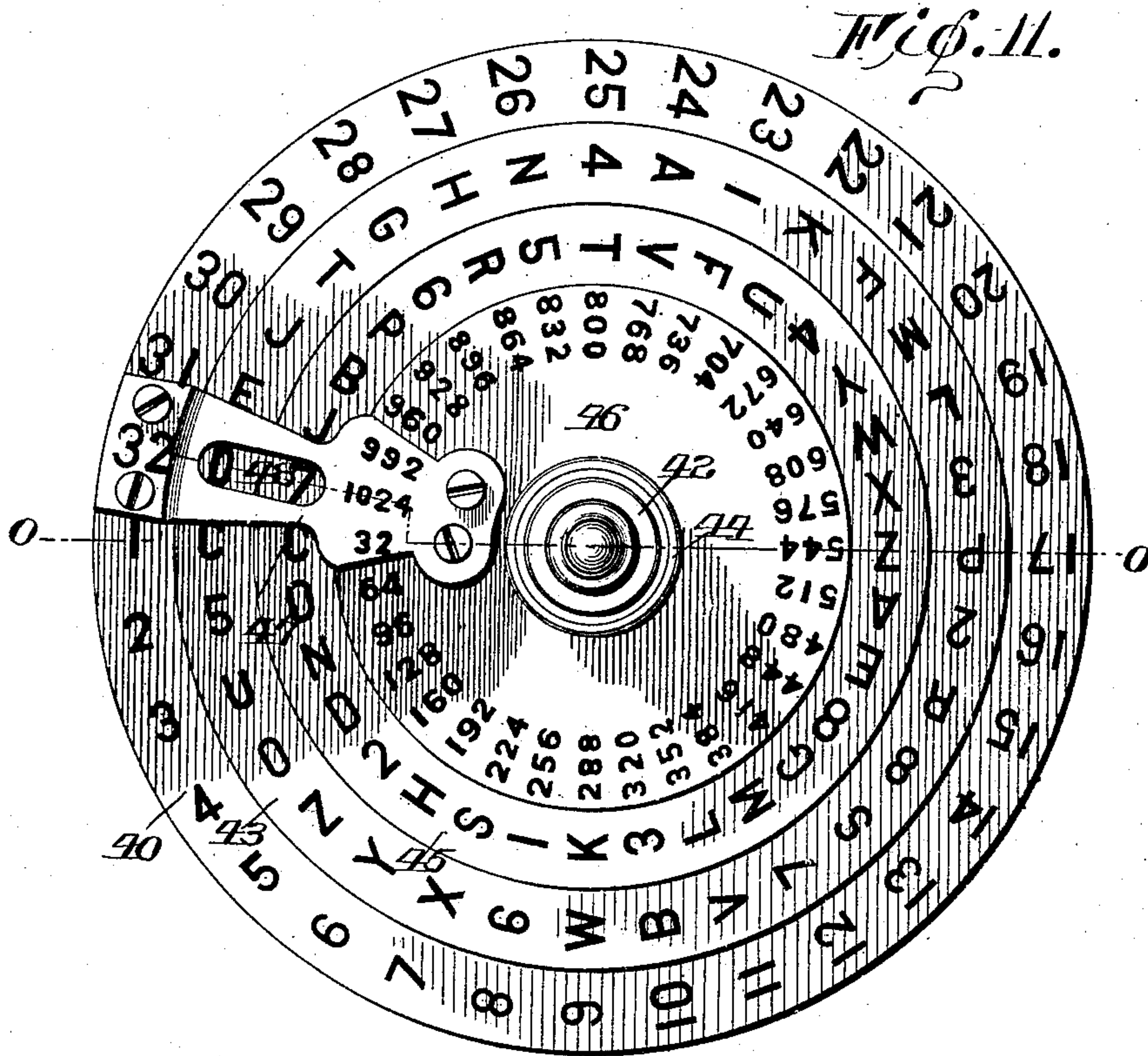
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(No Model.)

4 Sheets—Sheet 4.



Witnesses.

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# UNITED STATES PATENT OFFICE.

THOMAS S. HUNTINGTON, OF NEW YORK, N. Y.

## FARE-REGISTER.

SPECIFICATION forming part of Letters Patent No. 716,897, dated December 30, 1902.

Application filed December 13, 1901. Serial No. 85,741. (No model.)

*To all whom it may concern:*

Be it known that I, THOMAS S. HUNTINGTON, of the city, county, and State of New York, have invented certain new and useful Improvements in Fare-Registers; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a part of this specification, and to the reference-numerals marked thereon.

My present invention relates to registers, and particularly to that class employed for registering fares in street-railway cars, and has for its object to provide means for indicating the number of operations of the register between two readings of the same, the number of operations or registrations being capable of ascertainment only by the person having in his possession the key to the particular register or series of registers, whereby there is no opportunity for collusion between the person collecting the fares and operating the register and the one whose duty it is to take the readings of the register, say, at the end of a trip to the detriment and financial loss of the railroad company or party in whose interest the register is employed.

Heretofore the fare-registers in general use on street-railways have embodied generally a mechanism adapted for operation by the conductor collecting fares and which shows upon its face the number of operations or fares collected, and at the end of each trip or other predetermined period a reading is taken by an inspector, and oftentimes "spotters" or detectives are employed upon the cars to note whether or not the conductor operates the register for each fare collected, and the inspector, knowing the number of operations of the register, which is also apparent to the conductor, is in a position, if inclined to be dishonest, to collaborate with the conductor and after calling the attention of the latter to discrepancies between the number of passengers carried and the amount of money collected by him and the indications upon the register to divide the difference between the amount registered and the amount known to have been collected from passengers, while the amount turned in to the company by the conductor will agree with the amount indicated by the register only. By

the employment of the method and apparatus hereinafter described the inspector or person taking the readings from the register cannot determine the number of operations thereof, nor can the conductor, and it can only be determined by the person knowing the starting-point of the register and having access to the key or translating device, which is kept in the possession of one or more confidential officers of the company, to whom the various readings of the register are delivered by the inspector, so that there is no possibility of collusion between persons outside of the office of the company, which would enable the collector or conductor or any one co-operating with him to appropriate to his own use any fares collected, assuming, of course, that the register is operated once for each fare collected, which latter fact is readily ascertainable by spotters or detectives or the passengers themselves.

In carrying out my invention I employ a plurality of wheels or other movable parts movable step by step by the conductor and having suitable indicia thereon, preferably arbitrary and other than the ordinary consecutive numbering, the combinations of which will indicate to a person having in his possession the key or translating device the number of operations of the register between any two given readings, but which will not indicate on its face to a person not having the key this fact, and which register does not therefore require to be reset, each reading constituting the beginning of a new arithmetical notation. Where more than two wheels or movable parts are employed and the relations between these parts is not known, the difficulties of translating without the employment of the key are immeasurably increased.

The particular embodiment of my invention hereinafter described is but one of many forms which could be employed for carrying out the objects above stated, but is the best known to me at the present time and combines simplicity of construction with accuracy of operation, although I do not desire to confine my invention to this particular embodiment, as many other forms will readily suggest themselves to those skilled in the art.

In the accompanying drawings, Figure 1 is



a perspective view of a register embodying my improvements; Fig. 2, a plan view of the same with the front of the casing removed; Fig. 3, a vertical sectional view; Fig. 4, a horizontal sectional view on the line *yy* of Fig. 3; Fig. 5, a horizontal sectional view on the line *xx* of Fig. 3 with portions of the registering-wheels broken away to show the operating parts. Fig. 6 is a horizontal sectional view on the line *zz* of Fig. 3 looking upward; Fig. 7, a sectional view on the line *aa* of Fig. 5; Fig. 8, a sectional view on the line *bb* of Fig. 5; Fig. 9, a sectional view on the line *mm* of Fig. 6; Fig. 10, a sectional view on the line *nn* of Fig. 1; Fig. 11, a plan view of a translating-key for the register; Fig. 12, a sectional view thereof on the line *oo* of Fig. 11; and Fig. 13, a perspective sectional view of one of the wheels or rings, showing the transferring devices.

Similar reference-numerals in the several figures indicate similar parts.

The main frame or casing of the register (indicated by 1) is preferably circular in form and is provided with a bottom plate 2, beneath which latter is arranged a supplemental perforated casing 3, containing the bell or alarm instrument. The front of the casing is closed by a circular plate or cover 4, having a suitable aperture 5, preferably extending radially, through which the marks or indications upon the registering-wheels may be viewed. In the present embodiment I have shown a duplex register—that is, one adapted to register two classes of fares—say five-cent and three-cent—and have arranged the registering wheels or rings concentrically around a single axis formed by a central circular boss or projection 6 on the front plate 4, the two outer and adjacent rings or wheels 7 and 8 constituting one register—say for five-cent fares—and the two inner rings or wheels 9 and 10 constituting the register, say, for three-cent fares. The characters upon the outer flat surfaces of these rings or wheels 7 to 10, inclusive, are entirely arbitrary, as shown in Fig. 2, and may consist of numerals, letters, or arbitrary characters of whatever nature desired. The wheels 7 and 9 of the two registers are what may be denominated “units-wheels,” inasmuch as they are adapted to be moved one step each time a fare of the appropriate class is collected by the conductor, and motion is communicated to the wheels 8 and 10 to move the same one step or unit of movement for each complete revolution of the units-wheel of one of the registers. The transferring mechanism or the means communicating motion to the second wheel of each register operates said wheels preferably at other than every tenth movement of the unit, and in the particular mechanism shown the inner or second wheel of each register is operated one tooth or unit of movement when the units-wheel has been operated thirty-two times. The means for causing the appropriate operation of the second of the register-

wheels may be of any suitable construction; but I prefer to employ what is usually employed in so-called “deep-tooth” registers, and the under sides of the rings 7 and 9 are therefore each provided with ratchet-teeth (indicated by 7' and 9') and also with grooves 7<sup>a</sup> and 9<sup>a</sup> on their lower faces and near their inner peripheries, and extending from these grooves are deep notches 7<sup>b</sup> and 9<sup>b</sup> for the reception of the carrying-tooth of the actuating-pawl.

11 indicates the pawl-carrier or actuator for the outer wheels or five-cent register, and 12 the pawl-carrier or actuator for the inner wheels, said actuators or pawl-carriers being formed of oscillatory arms or levers movable on centers concentric with those of the registering-wheels and preferably provided with apertures, through which passes a boss or journal 13, formed on the inner side of the boss 6 of the front plate. The actuating-levers 11 and 12 are superposed, as shown in Fig. 3, and have the operating ends 111 and 112 extending to the exterior of the casing and formed with semicircular recesses on their proximate sides, leaving a space 14 between them for the application of an actuating hook or pin 100, (see dotted lines,) the lower arm 112 having a slotted extension 15 for guiding the actuating pin or projection 100 and preventing its displacement when it is moved in opposite directions to actuate either the actuator 11 or 12. Segmental cover-plates 99 are attached to the actuators to cover the opening into the casing.

16 indicates a stop-pin for coöperating with the actuators 11 and 12 and arranged between them, and 17 is a spring connecting and holding them normally against said stop in a central or neutral position.

Pivoted to the rear ends of the actuator 11 are the operating-pawls 18 and 19, the free engaging ends of which are moved toward the wheels by springs 20, Fig. 7, the pawl 18 being adapted to engage with the teeth 7' on the wheel 7 and the pawl 19 being adapted to engage when permitted to do so with the teeth 9'. This pawl 19 is provided with the extension 19<sup>a</sup>, operating in the groove 7<sup>a</sup> in the wheel, adapted to coöperate with the deep tooth or notch 7<sup>b</sup> in the wheel 7 to allow the pawl to engage a tooth or wheel 8 at the proper time and move the wheel 8 the distance of one tooth. The actuator 12 is also provided with a pawl 21, corresponding to the pawl 18, and a pawl 22, corresponding to the pawl 19, having the tooth or extension 22<sup>a</sup> and operating in a similar manner on the wheels 9 and 10 to rotate them in the opposite direction from the wheels 7 and 8. All of the register-wheels are maintained in position and retained from backward movement by pawls 23, having extensions operating through a block or arm 24 in the casing and contacting with leaf-springs 25, as shown in Fig. 9. From this construction it will be seen that when the free end 111 of the actuator 11 is moved, say upwardly in



Fig. 5, the wheel 7 will be moved a space of one tooth and retained, this operation bringing one of the marks or characters thereon into position beneath the observation-aperture, and also that when this wheel has made a complete revolution and the deep notch or recess 7<sup>b</sup> is brought into position to permit the pawl 19 to engage the wheel 8 the latter will be moved the space of one tooth, and as the actuator returns to normal position under the influence of its spring the pawl 19 will by engaging in the shallow groove 7<sup>a</sup> be moved out of engagement and can only engage a tooth of the wheel 8 again when the wheel 7 has completed another revolution. The same operation takes place with the wheels 9 and 10 when the actuator 12 is moved in the opposite direction.

The bell or alarm mechanism located within the supplemental casing 3 embodies a bell 30, with which is adapted to cooperate bell hammers or strikers 31, mounted on spring-arms 32, attached to bell-crank levers 33, pivoted at 34 to the under side of the main casing and held yieldingly away from each other by the spring 35, the arms of which cooperate with loops or eyes 36, attached to the levers 33. Pivoted upon the outer ends of the levers 33 are pawls 37, the upper ends projecting laterally of the levers and through the bottom plate 2 of the casing and into the path of movement of the actuators 11 and 12, respectively, as shown in Fig. 8, said pawls being moved vertically by the springs 38, attached to the levers 33. (See Figs. 4 and 8.) The lower inclined ends of the pawls 37 are adapted to contact with the sides of the aperture in the bottom plate 2 to cause the automatic release of the pawls from the actuators 11 and 12 when the latter have moved sufficiently far to insure the operation of the register-wheels, the construction being such that when either of the actuators 11 and 12 is moved to operate the register the bell-hammer through the mechanism described will be drawn back and released about the time the registration is completed, thereby sounding an alarm, which is a warning to the conductor and passenger that a registration has been effected. Any other suitable form of alarm mechanism could be employed, if desired, or the actuation of the different actuators might cause different audible signals to be given, thereby indicating which register had been operated.

As before stated, the marks or indications on the registering-wheels are entirely arbitrary and might be letters, figures, or signs arranged in any desired sequence, it being sufficient that one registering-wheel is moved a distance equal to the distance between two of these indications each time a fare is registered and that the other or complementary wheel moved the distance of one space or tooth when one complete revolution of the first or units wheel has been made. In the construction shown the deep tooth or notch

7<sup>b</sup> in the wheel 7 is arranged beneath the character "V;" but this might be changed, as desired.

In use the register is placed in the car and the conductor operates one or the other of the actuators 11 or 12, according to the fare received, in the usual manner, as by separate straps or cords, extending in opposite directions from the pin arranged between the levers, and the only indication he has of what the register is doing is that derived from hearing the alarm sounded and seeing the units-wheels move. At the end of the route either the conductor himself or an inspector makes a note of the characters appearing in the opening in the casing and delivers this data to the proper officer, which is then compared with the indications appearing on the register when it was delivered into the custody of the conductor, and the number of operations or fares registered is then determined. For the purpose of facilitating these computations and enabling the proper officer to readily determine the number of operations of the register I employ the translating-key (illustrated in Figs. 11 and 12) and embodying a base-plate or portion 40, having a vertically-extending post 41, on which is mounted the sleeve 42, attached at its lower end to a plate or disk 43, having characters near its outer edge corresponding with those on the units-wheels 7 and 9 of the register. Surrounding the sleeve 42 is another sleeve 44, attached at its lower end to a disk or plate 45, slightly smaller than the disk 43 and having near its periphery characters corresponding with those upon the secondary or inner rings 8 and 10 of the registers. 46 indicates a stationary plate slightly smaller than the disk 45 and secured to the base-plate 40 by any suitable device, such as a bridge-piece 47, extending over the peripheries of the disks 43 and 45 and connecting the two stationary plates and having a slot or aperture 48 therein. The outer portion of the base-plate 40 is provided with numerals from "1" (which is opposite the aperture or index-point 48) in the bridge-piece up to "32" in the present instance, this being the number of teeth upon the units-wheel of the counter. The inner stationary plate 46 is provided near its outer edge with a series of radially-extending numerals corresponding in number with the numerals on the other disk and plate, the ratio between the values of these numbers being equal to the number of teeth and characters upon the units-wheel of the register, in the present instance being thirty-two, which latter is the first number in line with the index-slot. Thus the aperture 48 constitutes the zero of the index, the outer figures "1" to "32" indicating the progressions of the outer or units wheel of the counter, and the numerals on the inner plate or disk 46 will indicate the sum or value of the progressions or movement of the inner or second wheel of the register.

In using the register and key the inspector



in the office of the railway company notes the characters appearing on the two outer wheels and the two inner wheels of the register at the time that the car is delivered to the conductor, at which time we will say the characters "M" and "2" are visible on the two outer wheels. At the close of the trip or day he finds that the characters "S" and "I" on the two outer wheels of the register are visible, and in order to determine the number of operations of the register by means of the key he turns both plates 43 and 45 of the latter so that the characters "S" and "I" are at the zero-point or are visible through the aperture 48 in the bridge-piece, and then notes the figure on the plate 40 opposite the letter "M," which would be "7," and he also notes the number on the inner stationary plate 46 opposite the character "2" on the plate 45, which would be "928," the sum of which would be nine hundred and thirty-five, indicating the number of operations of the register. Thus it will be noted the figure opposite the starting number or character on the inner disk 45 indicates the number of movements of the second register-wheel 8 or 10 multiplied by thirty-two, and the figures opposite the starting character on the outer disk 43 indicate the number of operations of the units-wheel less than thirty-two, or less than a complete revolution thereof. If in the operation of the register the outer or units wheel is moved less than thirty-two times, but sufficiently far to cause the deep notch 7<sup>b</sup> in the second wheel to be turned by the latter, said inner wheel having moved a distance sufficient to indicate "32" or other ratio between the wheels, difficulty might be encountered in transcribing the results, as in using the key the inner indicator-disk would show a movement of one step, indicating thirty-two fares, which would of course show improper results. Therefore in transcribing the record by the use of the key the inspector will note whether or not the character over the deep tooth 7<sup>b</sup> or transfer portion of the outer or units wheel (in the present instance it is under the letter "V") is between the character of the last reading of the register and the character of the first reading considered in the direction of the rotation of the indicator-wheel, and if he finds that the character "V" is between these he will subtract the ratio between the two register-wheels, or thirty-two, in order to obtain the correct reading, thus, for instance, assuming that the reading of the register was "X G" when it was delivered to the conductor and when returned it was "B M." When the key was set to translate this reading with "B M" at the zero-point, the character "X" on the outer disk would be opposite "29," indicating twenty-nine fares, and the letter "G" on the inner index-wheel 45 would be opposite "32," which might indicate that sixty-one fares had been registered; but the inspector will note that the outer registering-wheel 7

rotates to the left and the character "V" over the transfer tooth or notch is between the last reading "B" and the first reading "X," and it is therefore necessary to subtract thirty-two, or the ratio between the two wheels, which will properly indicate that but twenty-nine operations of the register have been made.

It will be noted that the indications or characters on the inner wheels 9 and 10 are relatively the same as those on the outer wheel, considering the direction of rotation—that is, the progression from "V" is "7 S 8 R 2," &c., and that therefore the same key or index is used to translate the number of operations of this register.

It will be understood that instead of employing a register or registers having wheels with concentric axes any other form could be employed or any desired form of transmitting and operating mechanism besides those shown could be used, and the broad idea of the invention is not dependent, therefore, upon any particular form of register, though, of course, for simplicity of construction and compactness of operating parts I prefer that shown herein.

In connection with the general type of register shown or any other having annular or continuous rotary parts I employ a locking mechanism for preventing unauthorized access to the interior of the casing, and which locking mechanism can only be operated to remove the cover when the counting wheels or parts are in a certain definite and predetermined relation to each other, after the manner of the notched disks or tumblers of a permutation-lock, this feature being valuable, particularly in a register the operations of which indicate money values, as even if the combination or permutation which would permit the unlocking were known the operations indicating money values would have to be made before the unlocking could take place. In the present embodiment this is accomplished by forming in the outer wheels or disks 7 and 8 notches or recesses 50, extending radially thereof, and which, we will say, are upon or between the indications "F O" on the two wheels, as shown in Fig. 2. The cover or lid of the casing is secured by means of a rotary part, such as a small quick-thread screw 51, extending from the outer periphery of the casing through the flange on the lid or cover and having its inner end extended toward the center and cut away on one side, as shown in Fig. 10, so that when the screw is inserted to fasten the parts together and turned the flattened or cut-away portion will extend over the surfaces of the wheels and will prevent the turning backward and removal of the screw until the notches or recesses in the wheels 7 and 8 are brought beneath the extension of the screw to permit it to be turned the necessary distance to release it from the casing and permit the removal of the lid or cover. In order



to prevent the accidental movement of this locking-piece 51, I prefer to secure it by a small screw 52, engaging its head, as shown. Instead of providing a screw 51, as shown, any movable part which by a partial turn would prevent the withdrawal of the securing means might be employed, as will be understood.

It is desirable in a register employing arbitrary characters on the movable parts or wheels that the ratio between the wheels be other than decimals, as the characters do not at any time indicate numerals, but simply serve to show the relative number of operations from a predetermined point or reading of the characters on the two wheels. It is found that employing two wheels with thirty-two characters upon them is amply sufficient for indicating the probable operations between two readings—to wit, one thousand and twenty-four. If desired, however, three or more wheels could be employed in the register and a suitable key having three plates or disks used for translating; but this seems to be an unnecessary complication, for the reasons above stated, and while I prefer the concentric-axis type of register on account of the comparatively small space it occupies other forms could be used to good effect.

I do not claim herein the alarm mechanism nor the locking mechanism for the registering-wheels shown, as these will form the subject-matter of divisional applications.

I claim as my invention—

1. In a register, the combination of a primary movable member or wheel having arbitrary characters thereon other than consecutive numerals, and a secondary movable member or wheel also having arbitrary characters thereon other than consecutive numerals, said secondary movable member having a definite ratio of intermittent movement relative to the movement of the primary member.

2. In a register, the combination of a primary movable member or wheel having arbitrary characters thereon other than consecutive numerals, and a secondary movable member or wheel also having arbitrary characters thereon other than consecutive numerals, said secondary movable member having a definite ratio of intermittent movement relative to the movement of the primary member other than a decimal.

3. In a register, the combination with a primary movable member or wheel having arbitrary characters thereon other than consecutive numerals and movable step by step the distance between the characters, of a secondary movable member or wheel also having arbitrary characters thereon other than consecutive numerals, and connections between the members for causing the movement of the secondary member a distance equal to that between the characters thereon at each complete revolution of the primary member.

4. In a register, the combination with the

casing, of two concentric wheels or rings having indications on one face and operating-teeth on the other, one of said wheels having a recess therein, adjacent its teeth, of an oscillatory actuator pivoted on a center concentric with that of the wheels and pawls carried by the actuator for operating the wheels one of which is adapted to engage the recess in one wheel to permit the actuation of the other at predetermined intervals.

5. The combination with two sets of concentric rings or wheels movable in opposite directions, each ring having indications on one face and operating-teeth on the other, each pair of rings constituting a register, of two actuators movable in opposite directions and each connected to and operating one set of register-wheels and transfer devices between the wheels of each register.

6. The combination with two sets of concentric rings or wheels, each ring having indications on one face and operating-teeth on the other, each set of rings constituting a register, of two copivotal oscillatory actuators movable in opposite directions from a central position, and pawls carried by each actuator for operating one ring of its register.

7. The combination with two sets of concentric rings or wheels each having indications on one face and operating-teeth on the other, one ring of each pair having a notch and each set of rings constituting a separate register, of two copivotal and superposed oscillatory actuators each having a pair of pawls for cooperating with its register-rings, one of said pawls being adapted to cooperate at intervals with the notch of the adjacent ring.

8. The combination with the casing, two sets of concentric rings, each ring having the indications on one face and the operating-teeth on the other, and each set constituting a separate register, and retaining-pawls for the rings, of the two oscillatory actuators pivoted on a center coincident with that of the rings, and having pawls cooperating with the teeth on the rings, and means for operating the actuators toward each other.

9. The combination with the casing, and a boss or axis therein, and a pair of concentric rings around the boss having the indications on one face and teeth on the other, one of said rings having the notch, of an oscillatory actuator pivoted on a center coincident with that of the rings, a pawl on the actuator for cooperating with the teeth on one of the rings and another pawl cooperating with the ring and adapted to engage the other ring when engaged with the notch in the first-mentioned one.

10. In a register, the combination with the casing, and two register-wheels therein, of two register-actuators pivoted concentrically with each other and with the wheels and movable in opposite directions from a central point, pawl-and-ratchet connections between the actuators and register-wheels, one of said



actuators having a segmental guide extending past the other and an operating member in said guide and arranged to operate either actuator.

5 11. The combination with the casing, a centrally-arranged journal or projection and a plurality of concentrically-arranged rings having indications on their outer faces, of a pair of actuators pivoted on the central journal and movable in opposite directions from a central position, connections between the actuators and rings for moving the latter step by step when the former are oscillated, and means for returning the actuators to normal position.

12. The combination with the casing, the cover therefor having a slot therein and the central journal extension, of the concentric rings around the journal extension having the indications on their outer faces, and the oscillatory actuator pivoted on the extension and operative connections between the latter and one of the rings.

13. In a register, the combination with the casing, a pair of concentric register-wheels therein having the indications on one face and the axially-extending teeth on the other, one of said wheels having a deep notch therein, of a concentrically-pivoted actuator and a pawl thereon movable axially of the wheels and normally engaging the teeth of the wheel having the notch.

14. In a register, the combination with the casing, two pairs of concentric register-wheels therein each having indications on one face and axially-extending ratchet-teeth on the other, one wheel of each pair having a deep notch, of a pair of actuators pivoted concentrically of the wheels having pawls thereon movable axially of the wheels and normally engaging the teeth of the wheels having the notches, one of said actuators having a segmental guide thereon extending past the

other actuator and an operating member in said guide adapted to coöperate with and move either actuator.

15. In a register, the combination with the casing and concentric register-rings therein, having the characters on one face and the teeth on the opposite face, of two independent superposed actuators pivoted on a center coincident with the rings having pawls for independently engaging the latter.

16. In a register, the combination with a plurality of concentric rings having indications on one face and teeth on the other, of two actuators pivoted on axes coincident with that of the rings, the pawls on said actuators coöperating with the rings and the retaining-pawls in the casing movable axially of the rings to hold the latter.

17. In a register, the combination with the register-wheels, of the pivoted actuators having pawls for engaging the wheels, one of said actuators having the segmental slot concentric with the pivot, and the operating member arranged in the slot and coöperating with both members.

18. In a register, the combination with the casing, a plurality of concentric rings having teeth on their rear side and means for operating them, of the spring-operated retaining-pawls engaging the teeth and sliding bodily axially of the wheels.

19. In a register, the combination with a plurality of concentric rings having teeth on their rearsides and means for operating them, of the arm or block having recesses therein, the retaining-pawls having stems operating in the recesses and the springs operating on the stems and projecting the pawls into engagement with the teeth on the rings.

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