

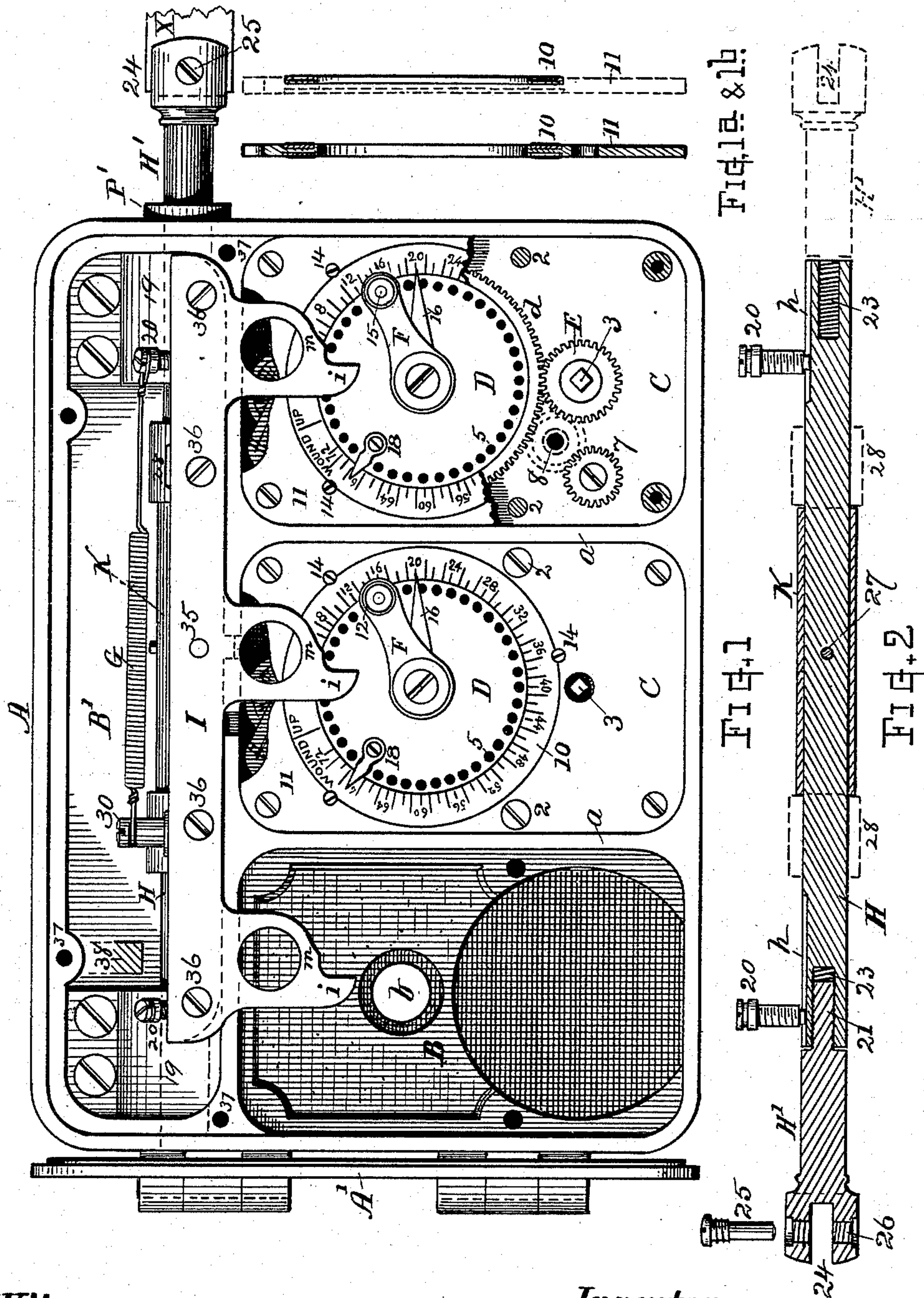
(No Model.)

3 Sheets—Sheet 1.

F. H. BLAKE.
TIME LOCK.

No. 526,555.

Patented Sept. 25, 1894.



Witnesses.

William B. Herring
J. B. Barton

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(No Model.)

3 Sheets—Sheet 2.

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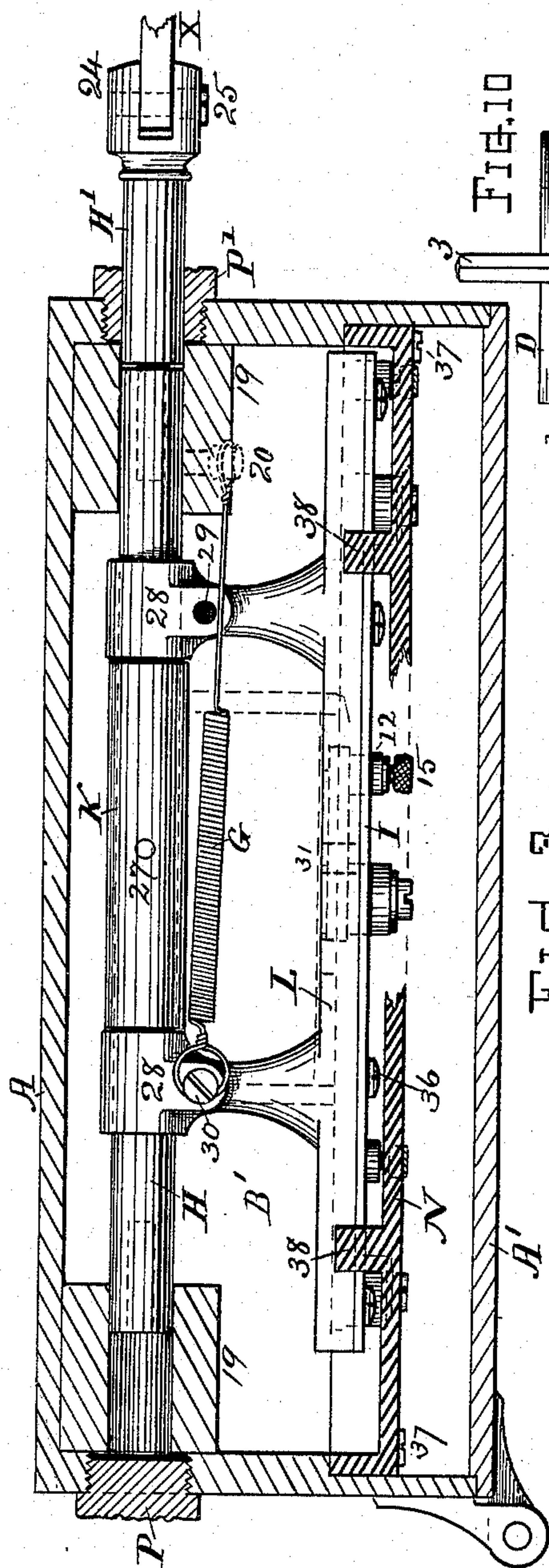


FIG. 3

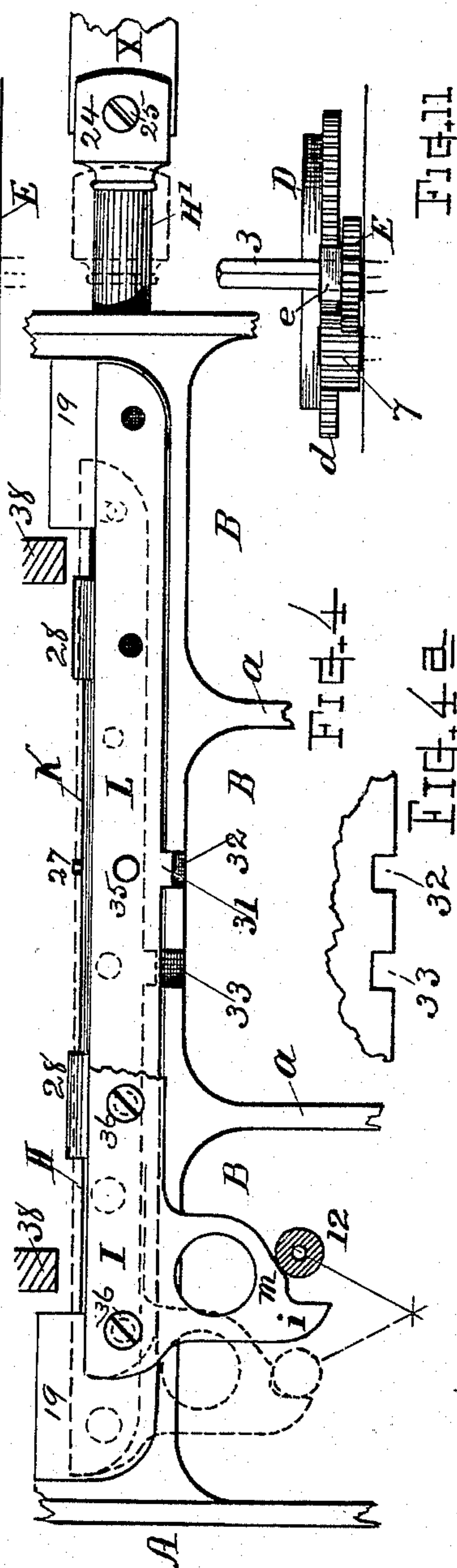


FIG. 4

FIG. 5

Witnesses.

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(No Model.)

3 Sheets—Sheet 3.

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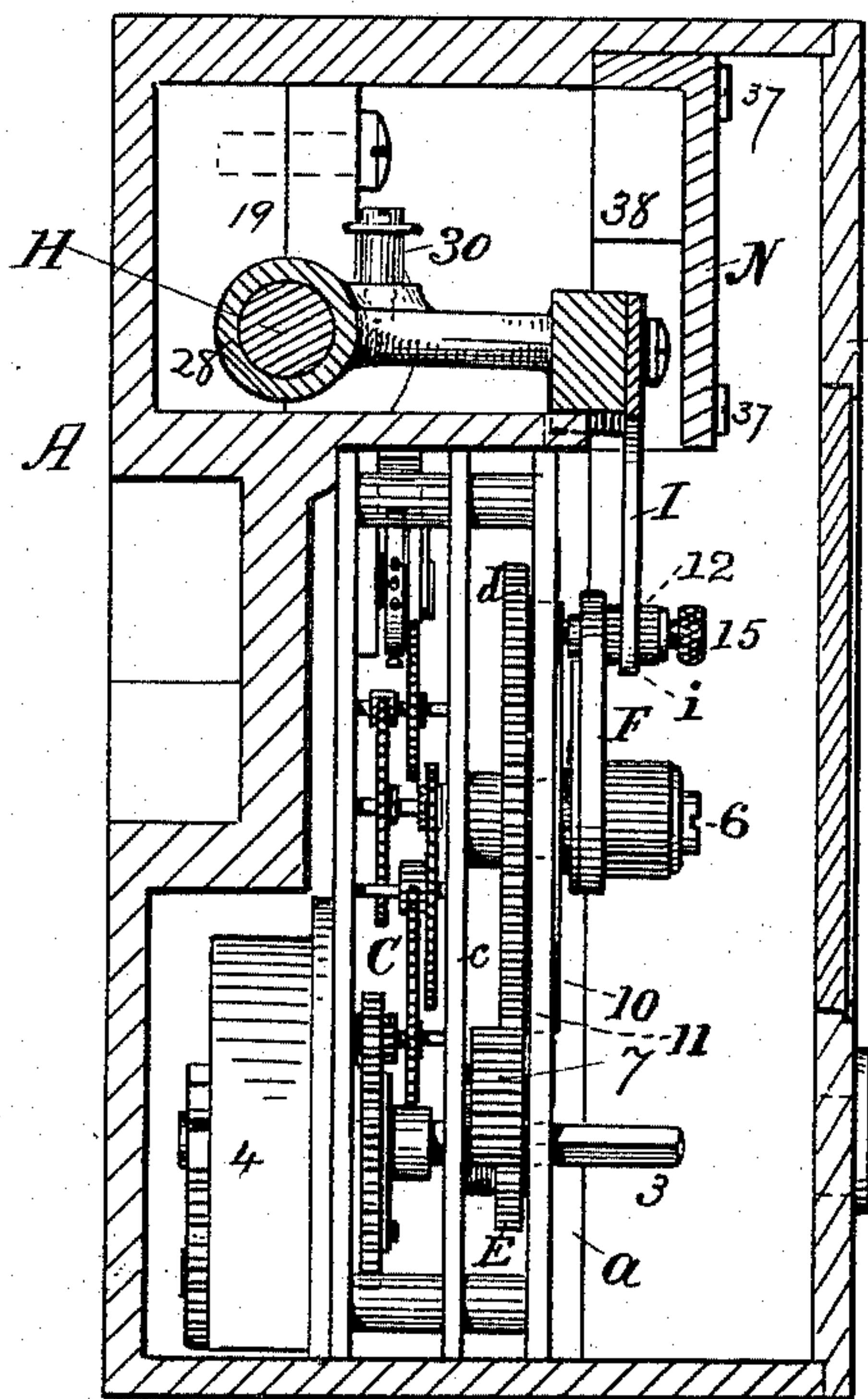


FIG. 5

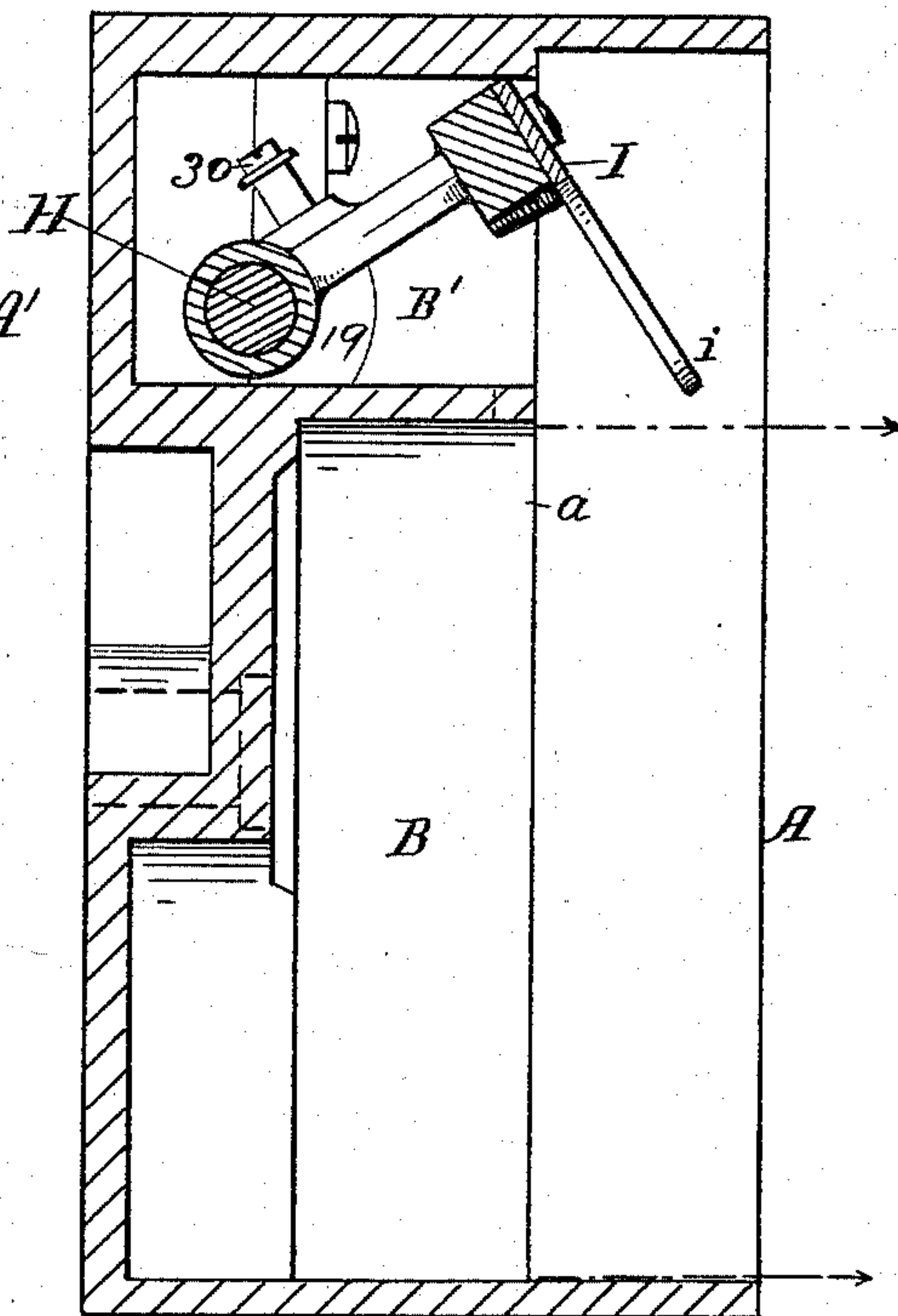


FIG. 6

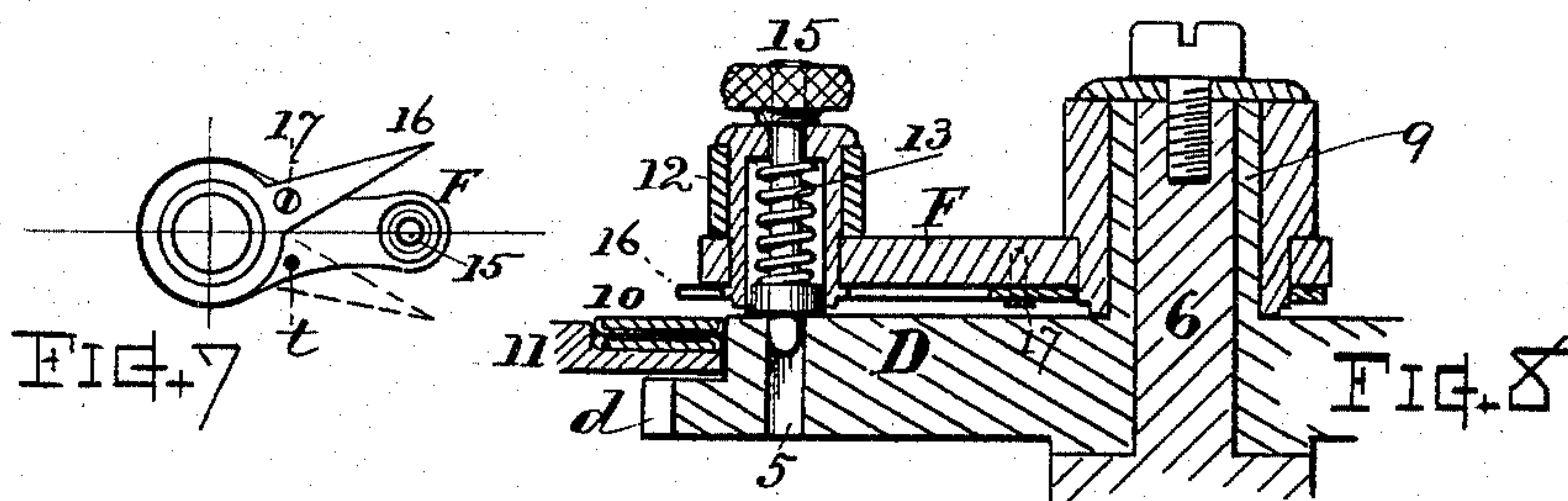


FIG. 7

FIG. 8

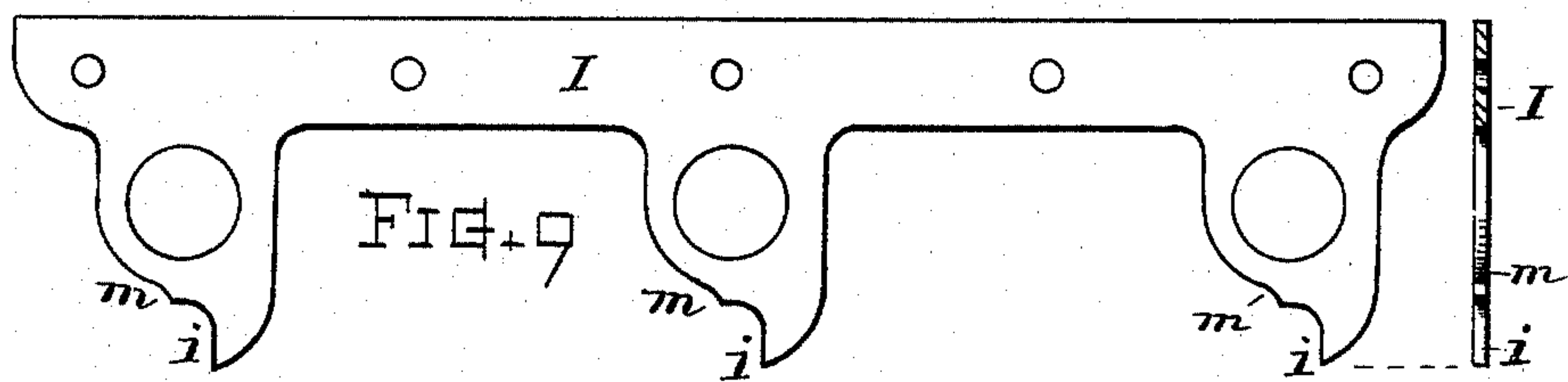


FIG. 9

Witnesses.

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UNITED STATES PATENT OFFICE.

FRED H. BLAKE, OF WORCESTER, MASSACHUSETTS.

TIME-LOCK.

SPECIFICATION forming part of Letters Patent No. 526,555, dated September 25, 1894.

Application filed June 25, 1894. Serial No. 515,577. (No model.)

To all whom it may concern:

Be it known that I, FRED H. BLAKE, a citizen of the United States, residing at Worcester, in the county of Worcester and State of Massachusetts, have invented a new and useful Improvement in Time-Locks, of which the following, together with the accompanying drawings, is a specification sufficiently full, clear, and exact to enable persons skilled in the art to which this invention appertains to make and use the same.

The object of my present invention is to provide a time-lock which is completely reversible by simple adjustment of parts for either right or left doors, without necessitating reconstruction of mechanism or change in the running direction of the chronometric movement; also to provide a time-lock having facilities of adjustment for accurately setting the actuating appliances carried by the chronometric movement in relation to the indicating dials, for severally corresponding with the throw-off detents that control the unlocking action; such adjustment being independent of the winding of said chronometric movements.

Another object is to provide facilities for independently adjusting the dial relatively to the time-disk and the engaging face of the throw-off detent.

Another object is to provide the unlocking-bar with facilities for adjusting its extension to render the action operative precisely at the zero point of the timing mechanism.

I attain these objects by mechanism organized for operation as explained in the following detailed description; the particular features of invention or subject-matter claimed being hereinafter definitely specified.

In the drawings, Figure 1 is a front view of a time-lock embracing my invention; showing it with the name-plate omitted, one of the movements removed from its cell, and a portion of the face-plate of one time movement broken away to reveal the parts beneath. Figs. 1^a and 1^b show respectively a reversible dial plate and reversible dial for the time setting movements. Fig. 2 is a longitudinal section of the unlocking-bar and its adjustable extension-end; also showing the guide and pivot screws. Fig. 3 is a horizontal sec-

tion through the upper part of the lock case, showing a plan of the unlocking-bar and gravity-bar as in locked position. Fig. 4 is a sectional view showing the front of the gravity-bar, its fence and a portion of the retracting plate, with dotted lines indicating the action. Fig. 4^a is a plan view of a portion of the casing showing the notches for engaging the gravity-bar-fence. Fig. 5 is a vertical section through the lock at the side of the time movement. Fig. 6 is a vertical section of the case, with the name-plate removed, and showing the gravity-bar as elevated to permit the removal and introduction of the time-movements into their cells. Fig. 7 is a bottom view of the setting arm and its setting index, illustrating the manner of its adjustment for the right or left action. Fig. 8 is an enlarged central section of the actuator or setting-arm and devices for adjusting and retaining the same relatively to the time disk. Fig. 9 is a separate front view and section of the plate in reversed position. Figs. 10 and 11 are bottom views of the time disk, gears and winding arbor, illustrating the respective adjustments for right and left action.

As heretofore practiced it has been customary when time-locks are intended for either right or left safe doors, to have the entire lock and the time movements made specially therefor; either with a right hand construction or a left hand construction. No time-lock previous to my invention, so far as I am aware, has ever been made with mechanism that could be readily reversed so as to be used in either right or left position without reconstructing the mechanism. In my improved mechanism I provide facilities whereby, by a few simple and easily effected adjustments the lock and time mechanisms are rendered available for either right or left positions, while preserving, in all particulars, the same mechanical operation and efficiency of action in the mechanism in each instance. These adjustments consist in a simple transposition of an adjustable extension on the unlocking-bar; reversal of the engaging plate; reversal of the dial; shifting the index on the actuator or setting-arm, and the inversion and adjustment of gears that move the time-disk; all of which adjustment can be accomplished in a

few minutes of time and simply by removal and replacement of a few screws; thus enabling my time-lock to be applied to any safe door without reference to whether said door is a left or a right door.

My improved time-lock may be attached to the door of the safe by any suitable connecting means; but as herein shown the lock case is provided with holes through its back for the accommodation of the attaching bolts, or screws, the heads of which will lie against the interior of the case.

The bolt-work for securing the safe door may be of well known or any suitable construction to be practically guarded or controlled by the time-lock. Such bolt-work is not herein shown as its structure is not an essential part of my present invention; but it will be understood to be operative in corresponding order with the movement of the unlocking-bar herein shown. The connection therewith may be made in any suitable manner; usually, as in the present instance, to its head by a link, as X; the bolt-work being in locked position when the unlocking-bar is projected, as shown at the right in Figs. 1, 3, and 4, and released when said unlocking-bar is retracted to the position indicated by dotted lines on Fig. 4. In said Figs. 1, 3 and 4 a right hand arrangement is shown, but for left hand arrangement the projection of the unlocking-bar would be toward the left and its retraction toward the right, the engagement plate being then reversed, or as placed in Fig. 9. The operation is substantially the same whether right or left.

Referring to parts, A indicates the lock-case which is formed with an upper chamber B' extending across the interior and with a plurality of lower recesses or cells B of proper size and shape to receive the several time-movements C. These recesses are separated from each other by partitions *a* that form solid barriers between and severally isolate the time-movements, and are formed integral with the main body of the casing. The case is provided with a suitable door A' with holes therein for the winding-key and a glazed portion for closing the front. At the back of the cells or recesses are arranged holes *b* for the bolts by which the lock is secured to the safe door. The frames for the time movements are made to fit the cells, as shown, and are secured therein by the screws 2.

Three time movements are preferably employed, of similar size and construction. Hence a description of one will give an understanding of all. Said movements consist of a suitable chronometric train of gearing operated by a main spring and controlled by an escapement, balance and regulating devices of well known kind.

The winding arbor 3 is preferably disposed at the lower part of the mechanism and projects forward as indicated, to receive the winding key, while the main-spring is arranged within the barrel 4 on the back of the frame;

a circular cavity being provided therefor in the lock-case at the rear lower part of the cell.

Above the winding arbor there is arranged a rotatable disk D which is herein termed the time-disk. It is mounted to revolve upon a suitable axis or forwardly projecting stud 6 fixed in the front frame *c*, and having at the back a circular flange with gear teeth *d* about its periphery. The face of said revoluble time-disk is provided with a circular row of pin-holes or perforations 5. The time-disk D is rotated from a gear E arranged on the winding-arbor 3, said gear meshing either directly with the teeth of the time-disk, or through an intermediate change-gear 7 according as a right or left action of the lock is desired.

The gear E is formed with a hub *e* at one side and is removably fitted with a square central opening upon the winding arbor. The change-gear 7 is made with teeth double the width of the teeth of gear E, and is mounted on a stud that can occupy two positions, viz: first, with said gear 7 out of mesh with the disk-gear and gear E; and, second, at the position 8 when said gear will be in mesh with the arbor-gear E and time-disk gear *d*. (See dotted lines, Fig. 1.) Thus when the time-lock is for right hand action the gear is placed on the arbor with its toothed portion at the front, (see Fig. 10) and its teeth engage direct with the time-disk-gear; but when the time-lock is for left hand action the gear E is slipped off the arbor and replaced with its hub at the front, thereby offsetting its toothed portion back from the plane of the time-disk-gear, (see Fig. 11) and the change-gear 7 is moved into mesh with the said gears by placing its stud in the hole 8, to act as an intermediate. Then the time-disk is caused to have an opposite direction of rotation from that indicated in Fig. 1. By this construction the same timing movement serves for actuating either right or left unlocking mechanism, while the right or left action in the unlocking action is attained without change in the winding or running direction of the chronometric train. This feature of my invention of providing means for reversing the direction of motion between the chronometric train and the lock-actuating member is of considerable practical importance in time-lock construction and admits of reversibility of the lock-controlling mechanism to meet any situation without necessitating a variety of specially designed chronometric movements.

The time-disk D is surrounded by a non-rotatable annular dial 10 attached to or formed upon the dial-plate 11, which plate is arranged slightly forward of the front frame *c* and covers the gears E, *d*, and 7, as indicated.

The face of the dial is graduated from zero to seventy-two hours, (or other number of hours if preferred) the two points being located at some distance apart on the circle and a "wind up" mark delineated on the dial circle between them, as shown. This dial may be attached to the dial-plate by screws 14

which permit adjustment thereof to bring the zero point and unlocking motion exactly to correspond with each other.

The dial is best made reversible with a graduated face on each of its opposite sides, one reading toward the left and the other toward the right, so that by simply turning it the other side outward it will accommodate a reverse rotation of the time disk. Such reversible dial may be made as indicated in Fig. 1^a or 1^b, either as a full face plate having an annular dial formed on or fixed to each of its sides so as to reverse by turning the whole plate; or as an annular double-faced ring attached to the plate and reversible thereon by detaching and replacing it. The plate 11 is best recessed for the reception of the annular dial.

F designates the lever or arm by which the unlocking devices are actuated from the time mechanism, and by means of which the setting of the mechanism is effected so that it will act for unlocking the safe at any given limit of time. Said arm is mounted to swing free upon the forwardly projecting hub 9 of the time-disk, its outer end traversing the circle of the dial. It is provided at its outer end with a contact-roll 12 and a retractible setting-pin 15, the point of which enters any of the several holes 5 in the time-disk for retaining the actuator-arm as set in relation thereto. The setting-pin 15 has a knob or handle on its outer end by which said pin can be retracted from its engagement with the time-disk and the setting of the arm conveniently effected in either direction about the circle. A spring 13 is combined therewith which tends to throw said setting-pin into engagement with the hole in the time-disk and retain the arm at position of adjustment. The detail of these parts is best shown in Fig. 8.

The actuator arm F is provided with an index 16 which is arranged in the manner shown in Fig. 7, with a ring portion surrounding the hub of the arm, and a screw or stud 17 for retaining it in proper relation; said arm being adjustable either to the right or left (see dotted lines) by simply removing the screw 17 and shifting it to the screw-hole T at the opposite side of the arm, thus changing the part for right or left use.

The main spring is wound up to a positive stop and the working of the lock is performed under the most powerful condition of the spring. The time-disk has attached to it a pointer 18 for showing to what extent the main spring is wound. Said pointer will stand at the mark on the dial indicated by the words "wound up" (see Fig. 1) when the main-spring is completely wound up to the full extent of the stop, and from said mark the pointer 18 gradually passes around to zero as the main-spring becomes exhausted. The main-spring is, however, made of sufficient length and strength to carry the parts beyond the zero mark for a sufficient distance to avoid any liability of the time-move-

ment giving out before the actuator arm has effected the unlocking.

H indicates the unlocking-bar, which I arrange to slide endwise in bearings 19 within the upper chamber of the case; the end extending through an opening in the side of the case; and the bar, or an adjustable extension forming a part of the bar, projecting therefrom sufficiently for connection with the bolt-work to be operated by the time-lock mechanism. A longitudinal groove *h* is formed in the bar, and a screw 20 is fitted in the bearing, the point of which enters said groove and prevents the rotation of the bar. A portion of the unlocking-bar is best made as a detachable extension H' which is provided with a screw-threaded stem 21 that screws into either of the screw-threaded openings 23 which are formed axially in each end of the bar, so that said extension can be used at the right or left end of the unlocking-bar. The end of the extension is fitted with a head, slot or jaws 24 for engaging with the bolt-work at X, with a transverse hole 26 there-through for the joint-pin 25. Said opening is screw-threaded in each jaw, and the joint-pin 25 is formed with a screw-threaded neck and a plain shaft, (see Fig. 2) said pin being thus adapted for insertion at either side of the jaw. This construction permits adjustment in the length of the bar by screwing the stem 21 in or out a one-half turn, or more, and re-inserting the joint-pin 25 which can be screwed in whichever side of the bar-head may be at the front. The thread on the extension stem 21 being fine, and it being thus adjustable by half turns, affords a very accurate adjustment in the length of the unlocking-bar H and consequent perfection of action. The central part of the bar H is surrounded by a sleeve K confined thereon by a pin 27, or in other manner.

L indicates a moderately heavy auxiliary bar which I term the gravity-bar disposed forward of, and connected with the unlocking-bar H by hinge attachment which admits of the bar L rising and falling freely. The connection is preferably made by two arms having sockets or bearings 28 that loosely surround the bar H at either end of the sleeve K which is confined on the unlocking-bar by its pin 27. The arms of the gravity-bar are each provided with a hole 29 for the reception of a screw-stud 30, between which screw-stud and the screw or stud 20 fixed in the bearing the spring G can be strained for normally drawing the gravity-bar and unlocking-bar in a direction toward its locked position. Said spring can readily be changed from right to left action by moving the screw-stud 30 to the right or left arm and carrying the end of the spring to the screw 20 at the opposite end of the case.

The gravity-bar L is provided on its lower side with a lug or fence 31 which engages with one of the notches 32 or 33 formed in the horizontal partition, or portion of the case

upon the top of which said gravity-bar rests when in normal or depressed position. (See Figs. 4 and 4^a.) The function of this fence and notches is to positively lock or retain the gravity-bar and unlocking-bar from backward movement so long as said gravity-bar remains in its normal position, thus preventing the forcing back of the unlocking-bar by any external pressure against it, or by reaction from the bolt-work.

A feature of my invention is that the spring G is not absolutely essential for retaining the unlocking-bar in locked position, and the lock may be operated without said spring, but it is preferably employed simply as a convenience for moving the parts toward their locked position; at which position the unlocking-bar is positively held by the fence of the gravity-bar.

I indicate a detachable reversible engaging-plate secured upon the face of the gravity-bar by a centering stud 35 and screws 36 disposed in a manner that will permit of the ready removal and reversal end for end of said engaging plate. The plate is best composed of a thin flat plate of hardened steel or other suitable material about one-sixteenth of an inch, more or less, in thickness, and formed as shown in Figs. 1 and 9, with dependent projections on its lower edge which correspond in relative position to the relative positions of the several time-movements. Each of said projections is provided with a cam surface *m* and a detent *i* located in proper position to engage with and be acted upon by the roll 12 or the end of the actuator-arm F of the respective time-movements as the latter is moved around by control of the chronometric mechanism. The cam surface *m* of the plate I is of such form and dimension that it acts in conjunction with the movement of the actuator-arm to lift the gravity-bar and thereby release the fence 31 from the notch 32 as the actuator-arm advances toward the zero point of the time-dial, and previous to said actuator-arm or its roll coming into contact with the detent *i* for moving the parts. An open space is preferably formed through each of the projections of the engaging plate, through which can be more readily observed the escapement action of the time-movements; the upper edges of the dial-plate and the front frame being cut away sufficiently to reveal the top portion of the balance-wheel.

A guard or name-plate N is arranged across the upper interior or forward of and above the plate I, and secured in position by screws at 37. Said plate or guard is provided on its rear side with lugs 38 that extend over the gravity-bar and serve as stops to prevent said gravity-bar L and engaging plate I from swinging too far away from the time movements in case the lock is inverted or from any other cause. By removing said guard or name-plate N from the lock-case the gravity-bar and plate I can then be swung upward as indicated in Fig. 6, so that either of the time-

movements can be individually removed by a straight movement to the front, as indicated by dotted lines, or replaced in their cells without interfering with the detents *i*, first removing the screws 2 which retain the time movements within the cells.

A screw-threaded stopper P and a threaded bushing P' are provided for fitting the holes in the ends of the case through which the unlocking-bar passes. Said stopper and bushing are interchangeable with each other, and can be shifted when it is desired to place the extension H' at the opposite end of the bar H.

In the operation, the time-movements are wound by a suitable key applied to the arbors 3, to the full limit of the stop; at which limit the pointers will stand at the "wound up" mark on the dial. The attendant then by taking hold of the setting-pin places the actuator-arm with its index at the number of hours back from the zero point corresponding to the length of time which it is desired should elapse before the lock is to be opened.

It will be noticed that in setting the timer the arm F can be moved freely in either direction, thus enabling the attendant to readily set the timer either backward or forward from any given point permitting re-adjustment in case the arm is moved too far.

Each of the timing actuators is set in like manner, and as the last one is adjusted the unlocking-bar is moved forward by the spring G (or by hand if it is preferred to omit the spring) and the gravity-bar then falls into place with its fence engaging in the notch 32, there resisting any backward thrust on the unlocking-bar. The safe door can then be closed and the bolt-work shot into locked position. As the time-disk moves around carrying the actuator arm toward the zero mark on the dial, the roll 12 is brought into contact with the cam *m* of the engaging plate lifting the plate and gravity-bar and releasing the fence 31 from the notch 32 and maintaining the same elevated while by further movement of the arm the roll strikes the detent *i* and forces back the engaging-plate and gravity-bar, the arms of which acting against the sleeve K fixed on the unlocking-bar cause the retraction of said bar and the release of the bolt-work.

If it is desired to temporarily close the safe without putting the timing mechanism into immediate control, the back notch 33 enables the banker to keep the time-lock in an unlocked position after the timers are set and started by simply dropping the fence 31 into said back-notch. Then when finally closing the door for the night he simply raises the gravity-bar and lets it, together with the unlocking-bar, slide to the locked position and drop the fence into notch 32. This is a great convenience and a feature of considerable importance.

I claim as my invention and desire to secure by Letters Patent—

1. A lock-case for time-locks, formed with

an upper chamber for the unlocking-bar and its connections, and a plurality of separate recesses or cells for time-movements, having solid partitions between the same; in combination with the unlocking-bar disposed in said chamber, a displaceable engaging-plate connected with said unlocking-bar, and the series of time-movements respectively inclosed in the separate cells, the partitions and case walls closely surrounding and inclosing the time-movement frames, substantially as set forth, said parts and their fastenings arrange to permit the placement in or removal from its cell of either one of the time-movements, individually, without detachment of the lock-devices, when the lock-case is upon the door.

2. In a time-lock, the end-wise movable unlocking-bar, the auxiliary or gravity-bar laterally hinged thereon, and an engaging-plate having a lifting cam surface and a detent thereon fixed to said gravity-bar, in combination with timing mechanism carrying a revolvable actuator that engages said cam surface and detent by revolving action, for the purposes set forth.

3. In a time-lock, the combination with the unlocking-bar, of the gravity-bar and means for positively locking said bar when the unlocking-bar is at forward or locked position, and means controlled by the time-movement for releasing said lock preparatory to the retraction of the unlocking-bar.

4. In a time-lock a gravity-bar working in conjunction with the unlocking-bar, and provided with a fence that normally engages by the fall of said gravity-bar, in combination with the lock-case having a recess therein for the engagement of said fence, for the purpose set forth.

5. The engaging-plate formed of thin flat metal having its edge shaped with projections or contact detents, as described, and adapted for use in right or left position, in combination with the unlocking-bar, controlling actuators and timing mechanisms in a time-lock.

6. In a time-lock the combination of a plurality of timing movements having facilities for reversing the direction of rotation of their actuator-arms or contact members, the unlocking-bar, the gravity-bar mounted to swing on said unlocking-bar, and a reversible engaging-plate detachably secured to said gravity-bar, and provided with a series of depending projections having cam surfaces and detents that severally engage the chronometrically operated actuator-arms, substantially as set forth.

7. In a time-lock, the time mechanism provided with the rotatable time-disk having a circular row of pin-holes, the actuator-arm mounted on the central hub of said time-disk to swing in either direction and provided with a setting index, a spring-pressed setting-pin for engaging said pin-holes, and a contact roll or stud carried by said arm, in combina-

tion with the stationary graduated dial, the engaging plate having the cam surface and detent, the gravity-bar carrying said plate and an unlocking-bar connected with said gravity-bar, substantially as set forth.

8. In a time-lock, the combination with the unlocking or lock-actuating member and the chronometric train or timing movement, of means for reversing the direction of motion comprising an adjustable interjacent gear between said chronometric train and lock-actuating member, for the purpose set forth.

9. In a time-lock, in combination with the chronometric movement, and a revolvable time-plate or disk carrying the setting and tripping devices; an operating gear adjustable or invertible on the power arbor, and the double-thick change gear and its axis-stud adapted for placement at positions of engagement or non-engagement with said time-disk-gear and invertible gear, substantially as set forth.

10. In a time-lock, the combination of an unlocking-bar having a detachable reversing extension-end, a gravity-bar loosely mounted by hinging joints on said unlocking-bar, a sleeve fixed thereon between said joints, a reversible engaging plate attached to the face of said gravity-bar, and a timing mechanism for actuating said parts, provided with means for reversing the direction of motion of the time-disk without changing the direction of the winding and chronometric action, and a reversible dial or dial-plate, for the purposes set forth.

11. A reversible dial or dial-plate for a time-lock, said dial having its opposite faces graduated or figured with right and left graduations, respectively, for the purpose set forth.

12. The time-setting index adjustable to either right or left position in its connection with the actuator-arm that carries the setting-pin and contact-stud, in combination with the time-indicating dial, the time-disk and the engaging detent in a time-lock, for the purpose set forth.

13. In a time-lock the unlocking-bar provided with axially threaded openings at its ends, and a detachable end-extension fitted with a threaded stem that screws into either of said threaded openings and is adapted for connection with either end of said unlocking-bar; in combination with the lock-case having bearings and opposite openings for said bar therein, and reversible time-controlled mechanism for operating said bar, substantially as set forth.

14. The extension-end H' having the head or jaw 24, its sides fitted with threaded openings 26 for receiving the joint-pin 25 at either side of the jaw; and a threaded stem 21 that adjustably screws into an opening 23 in the end of the unlocking-bar, in combination with the bolt-work-link X, the unlocking-bar and its actuating mechanism in a time-lock, for the purpose set forth.

15. In a time-lock, the combination with the lock-case having opposite openings for the unlocking-bar, and the unlocking-bar having an adjustable end-extension, of the stopper
5 P and bushing P' adapted for interchangeably closing said openings, substantially as set forth.

16. In a time-lock the combination with the time-movement actuator-arm, the unlocking-
10 bar and its auxiliary or gravity-bar having a lug or fence that engages a notch in the lock-case when the bars are at locked position, of a back-notch to which said fence can be transferred for temporary retention of the

bars at unlocked position, substantially as 15 set forth.

17. The guard or name-plate having backward lugs or stops thereon, in combination with the upwardly swinging gravity-bar, the unlocking-bar and engaging-plate, said lugs 20 intercepting or limiting upward movement of said gravity-bar, for the purpose set forth.

Witness my hand this 19th day of May, A. D. 1894.

FRED H. BLAKE.

Witnesses:

CHAS. H. BURLEIGH,
SIMEON E. KINA.