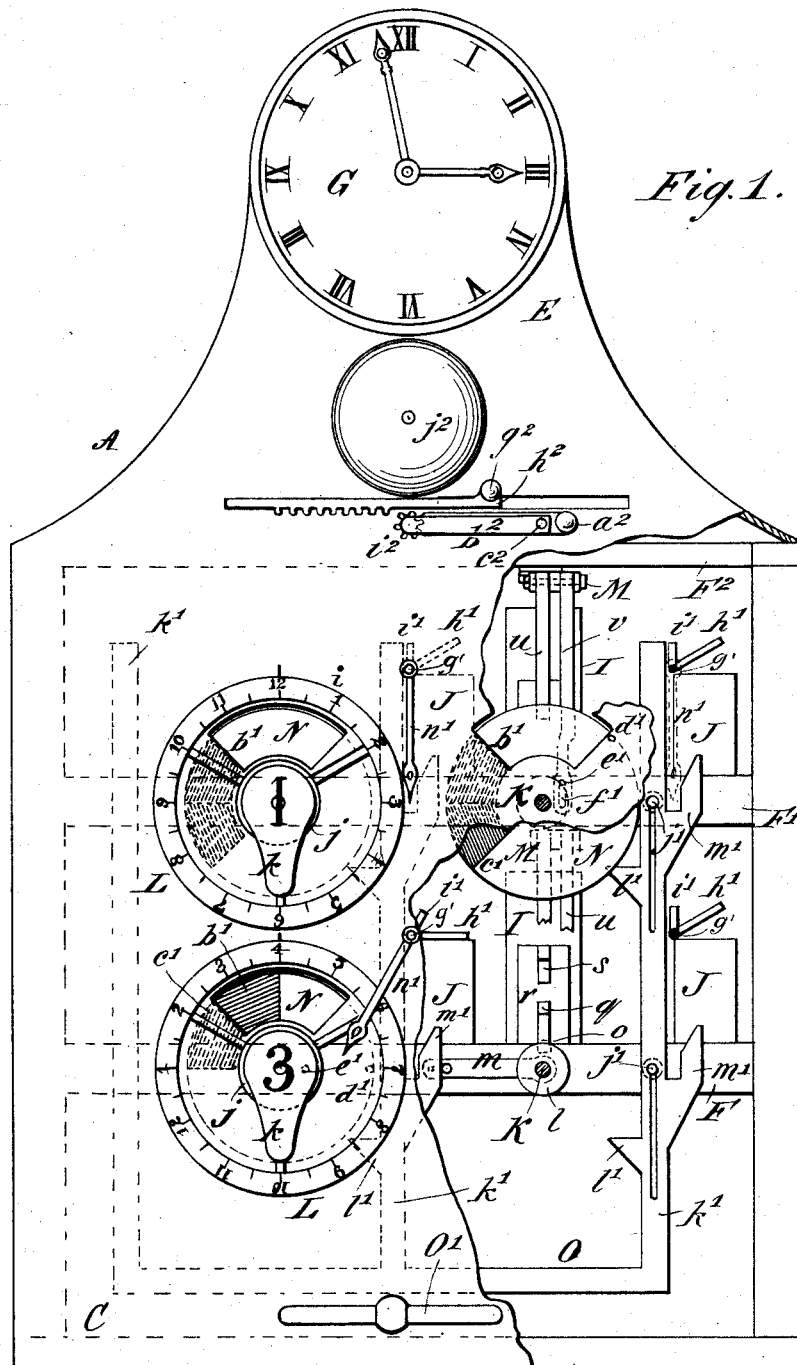


N. H. SUREN.

ELECTRIC TIME ALARM AND ANNUNCIATOR.

No. 422,654.

Patented Mar. 4, 1890.



WITNESSES:

Donn Twitchell
C. Sedgwick

INVENTOR:

N. H. Suren

BY

Munn & Co.

ATTORNEYS.

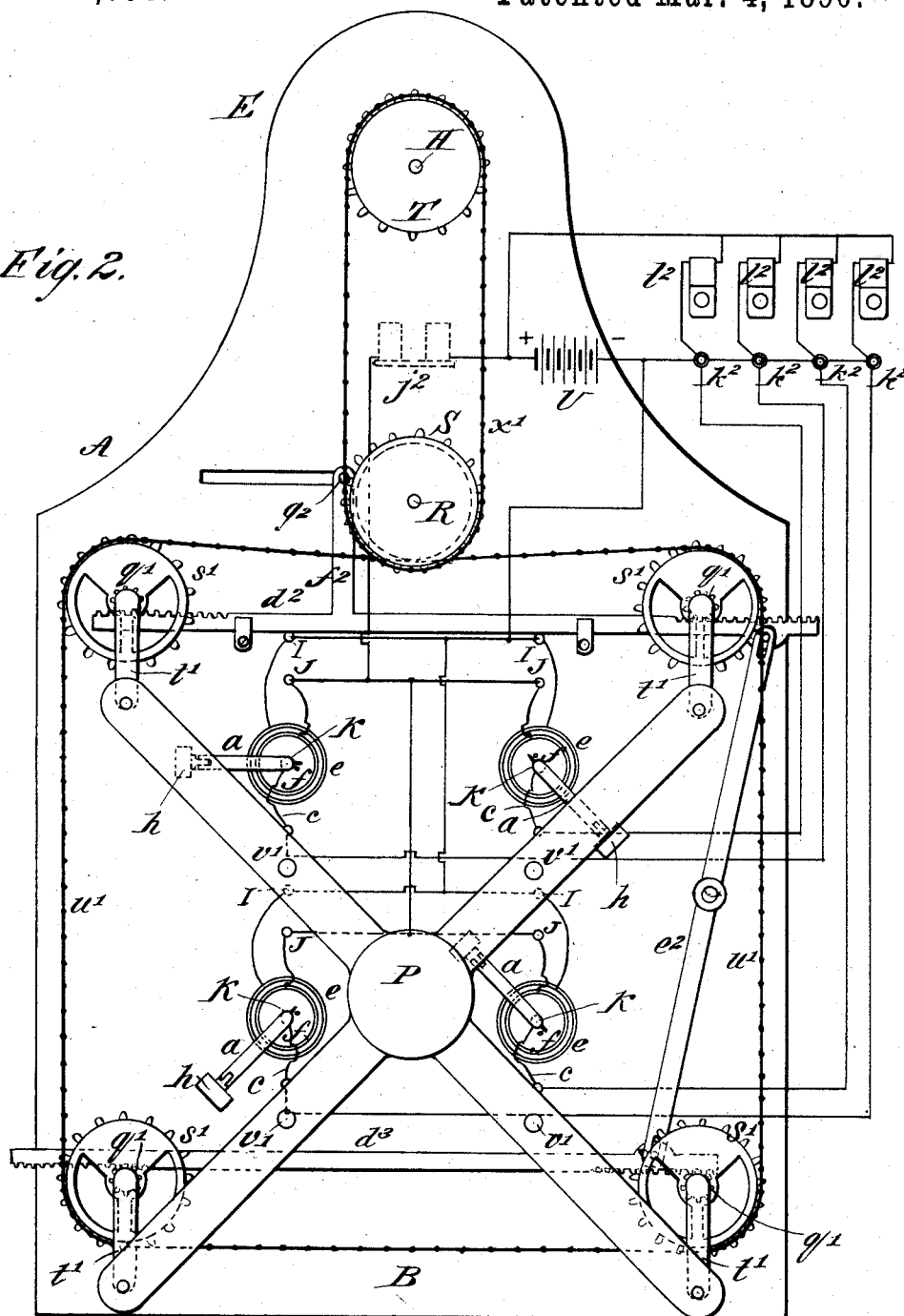
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Fig. 2.



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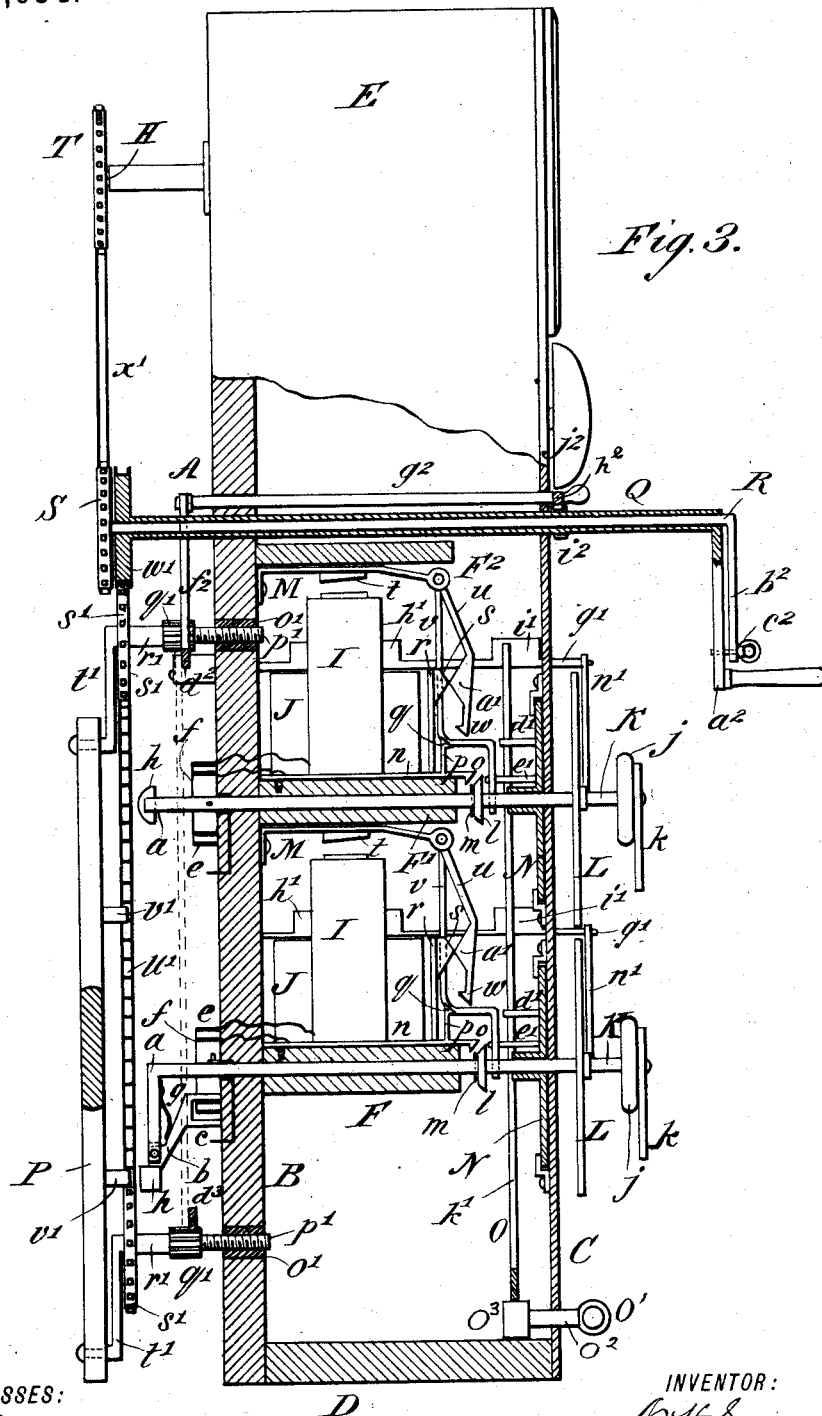
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INVENTOR:

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UNITED STATES PATENT OFFICE.

NATHAN H. SUREN, OF FORT WORTH, TEXAS.

ELECTRIC TIME-ALARM AND ANNUNCIATOR.

SPECIFICATION forming part of Letters Patent No. 422,654, dated March 4, 1890.

Application filed December 10, 1888. Serial No. 293,068. (No model.)

To all whom it may concern:

Be it known that I, NATHAN H. SUREN, of Fort Worth, in the county of Tarrant and State of Texas, have invented a new and Improved Electric Time-Alarm and Annunciator, of which the following is a specification, reference being had to the annexed drawings, forming a part thereof, in which—

Figure 1 is a front elevation of my improved electric time-alarm and annunciator with parts broken away to show the interior construction. Fig. 2 is a rear elevation showing the circuits diagrammatically, and Fig. 3 is a side sectional elevation.

Similar letters of reference indicate corresponding parts in all the views.

My invention relates to a combined call and annunciator system by which any number of signals can be sent automatically or manually and various signals received through the annunciator, the apparatus serving to send signals to or from any number of distant points on the circuit at any time.

It also relates to a device whereby a fire-alarm signal may be sent to every point on the circuit. This particular feature of my invention is especially applicable to hotels and other buildings where annunciators are used.

My invention consists in the combination, with a clock and an electric generator, of a series of circuits and alarm devices, as hereinafter described, and pointed out in the claims.

It also consists in mechanism by means of which contacts may be formed for each branch of the circuit simultaneously, all as hereinafter more fully described.

The casing A, in which the mechanism of my improved electric time-alarm and annunciator is contained, is formed of the back piece B, the front plate C, the bottom board D, the curved elevated top E, and the cross-pieces F F' F², for supporting the parts of the mechanism. In the upper portion E of the casing A is placed a clock-movement G, having the hour-hand arbor H prolonged beyond the back of the casing A. In the present case I have shown the mechanism adapted to four circuits only; but the system may be extended to include any desired number of circuits.

Upon the cross-pieces F F' are arranged

straight electro-magnets I and the annunciator-magnets J. Under each magnet I is arranged a shaft K, which extends through the casing A and projects beyond the rear thereof, where it is provided with an arm *a*. In the end of the arm *a* is pivoted an obliquely-arranged forked lever *b*, which extends inward toward the back piece B and the shaft K, the fork *c* of the said lever *b* extending over the annular concentric contact-pieces *e* *f*, secured to the back piece B, the forked end of the said lever being pressed by a spring *g*, which causes its fork to normally contact with the inner contact-piece *f*. The outer and shorter arm of the forked lever *b* extends beyond the end of the arm *a* and is provided with a convex head *h*.

To each of the shafts K is attached a dial L, consisting of a flat ring *l*, supported by arms from the said shafts. On each shaft K is also secured a hand-wheel *j*, by which it may be turned and pushed in the manner presently to be described, and outside the wheel *j* a pendant *k* is loosely pivoted to the end of the shaft K, the said pendant bearing the annunciator-number; as shown in Fig. 1. This pendant, having its center of gravity below its pivot, always maintains its vertical position without regard to the position of the shaft K.

Upon the shaft K, within the casing A, is secured a beveled disk *l*, with its larger side toward the front of the casing A, and between the said beveled disk and the edge of the cross-piece F is placed a spring *m*, which tends to press the shaft K toward the front of the casing, said spring being secured at one end to the edge of the cross-piece, as shown in Fig. 1. To the top of the cross-piece F is secured a spring *n*, provided with a catch *o*, capable of engaging the periphery of the beveled disk *l* on the shaft K. It is also furnished with a right-angled arm *p*, extending upward and carrying a catch *q*. To the cross-piece F is also secured a standard *r*, to which is attached a beveled cam *s*.

To the back piece B of the casing A is secured a right-angled armature-spring M, carrying an armature *t* opposite the pole of the magnet I, the said armature-spring M being prolonged beyond the armature *t* and pivotally connected with an angled rod *u* and

with an offset slotted rod v . The lower end of the rod u is provided with a catch w , which is capable of engaging the catch q . It also carries a beveled cam a' , which is adapted to slide upon the beveled cam s .

In the front plate C, above each shaft K, is formed a sectoral opening, and behind the front plate C, concentric with the shafts K, are arranged disks N, provided with colored sectors $b'c'$. The sectoral openings in the front plate C include about one-quarter of a circle, and the colored sectors $b'c'$ each cover one-eighth of the surface of the disk N. Pins $d'e'$ project from the rear face of each disk N, the pin e' entering the slot f' in rod v , as shown in dotted lines in Fig. 1.

Above the magnets J are arranged the rock-shafts g' , each rock-shaft carrying an armature h' within the field of its magnet J, also a wing i' , adjoining the inner surface of the front plate C.

Within the casing A is arranged a frame O, which is capable of being moved up and down upon studs j' , projecting from the edges of the cross-pieces F F' by the cross-lever O', attached to the rock-shaft O² in the bottom of the casing A, the said frame O being slotted to receive the studs, the said rock-shaft O² being provided with an arm O³, for engaging the frame O when the shaft O² is turned. The vertical arms k' of the frame O are provided with lugs l' , which are adapted to engage the pins d' of the disks N when the said frame O is raised. The vertical arms k' of the frame O are also provided with right-angled fingers m' , having beveled ends, which are capable of engaging the wings i' of the shafts g' . The outer end of each shaft g' is provided with a pointer n' , which is capable of moving over the dial L when the armature h' is acted upon by the magnet J.

In the back piece B are inserted internally-threaded sleeves o , which receive threaded studs p' , (in the present case four in number.) Each stud p' is provided with a pinion q' , which is fixed to the stud, and which is capable of turning the stud in the manner presently described.

Outside of the pinion q' and upon the end of the stud p' is placed a sleeve r' , carrying a sprocket-wheel s' and a crank t' . The four sprocket-wheels s' are connected by a chain w' , which causes them to rotate together, and upon the cranks t' are placed the arms of an X-shaped frame P. The frame P carries four studs v' , which are distant from the centers of the shafts K an amount equal to the length of the crank t' , so that when the said cranks t' are revolved simultaneously each stud d' is made to describe a circle of the same radius as that of the cranks, so that when the shaft K is moved forward, so as to bring the disk l into engagement with the catch o , the convex heads h of the levers b will be in the paths of the said pins v' .

In the upper portion of the casing A is journaled the tubular shaft Q, carrying at its

rear end a sprocket-wheel w' , which engages the chain w' . In the tubular shaft Q is placed the shaft R, carrying upon its rear end the sprocket-wheel S, which receives motion from a sprocket-wheel T on the arbor H of the clock G through the endless chain x' . The free end of the tubular shaft Q is provided with a crank a^2 , by which it may be turned, and the corresponding end of the shaft R is furnished with an arm b^2 , through the end of which passes a pin c^2 , which enters a hole in the crank a^2 , so that in the normal working of the apparatus the shafts Q R will revolve together.

In guides upon the back piece B are placed rack-bars d^2d^3 , which are oppositely arranged with respect to each other and which engage the pinions q' . The rack-bars d^2d^3 are connected by a lever e^2 , which communicates motion from the upper rack-bar d^2 to the lower rack-bar d^3 and causes the said rack-bars to move in opposite directions when the upper one is moved. The upper rack-bar d^2 is provided with an arm f^2 , which extends upwardly and carries a rod g^2 , which extends through the casing A and projects beyond the front thereof, where it is attached to rack-bar h^2 at the front of the casing. The tubular shaft Q is provided with a pinion i^2 , which is capable of engaging the rack-bar h^2 and of moving it forward.

Each inner contact f is connected with one terminal of the adjacent annunciator-magnet J, and the outer annular contact e is connected with one terminal of the adjacent magnet I. The remaining terminal of each annunciator-magnet J is connected with the alarm-bell magnet j^2 , which in turn is connected with the positive pole of the battery U. The remaining terminal of each magnet I is connected with the negative pole of the battery and with a series of push-buttons k^2 . A series of electric bells l^2 is connected with the positive pole of the battery U, and also, through the push-buttons k^2 , with the shaft K, one bell being connected electrically with each shaft K. The push-buttons k^2 are provided with back contacts, which form a direct connection from the shafts K to the bells, and with front contacts, which form a connection between the conductors extending from the shafts K and the battery U.

The operation of my improved electric time-alarm and annunciator is as follows: The dial L behind the pendant k , representing the room of the person who desires to be called, is turned until the mark of the hour at which the call is to be made is below the mark upon the front plate C. This brings the arm a at the back of the casing A into a position corresponding with the position of the same mark upon the dial of the clock G. At the same time the shaft K is pushed forward, bringing the beveled disk l into engagement with the catch o . This operation carries forward the arm a , so that the convex head h of the lever b is in the path of the stud v' , which

is to operate the lever *b*. The frame *P*, by virtue of its connection with the hour-hand arbor of the clock *G*, is made to revolve synchronously with the hour-hand of the clock, thus causing the studs *v'* carried thereby to occupy the same positions relative to the shafts *K* as the end of the hour-hand occupies in relation to the hour-hand arbor *H*. It will thus be seen that the studs *v'* exactly copy the movements of the hour-hand, and the arms *a* when adjusted occupy the position of the figure on the dial representing the hour at which the call is to be made, so that when one of the studs *v'* in its revolution strikes the convex head *h* of the lever *b* the convex head *h* will be pushed forward toward the back piece *B*, thereby turning the lever *b* on its pivot, so as to remove the forked end of the said lever from the inner contact-piece *f* and bring it into contact with the outer contact-piece *e*, thereby completing the circuit through the connections already described. The current will then flow from the positive pole of the battery *U* to the call-bell *l*² in the room where an alarm is desired, through the push-button *k*² to the shaft *K*, thence through the arm *a*, the lever *b*, the contact *e* to the magnet *I*, thence back to the negative pole of the battery. The magnet *I* being energized, the armature *t*, attached to the spring-arm *M*, is drawn down, thereby carrying the catch *w* downward into engagement with the catch *q* on the spring *n*. At the same time the rod *v*, by engagement with the pin *e'* on the disk *N*, turns the said disk so as to display the two sectors of color through the aperture in the front plate *C* of the casing *A*. The appearance of these colored sectors indicates to the attendant at the office that the instrument has caused the alarm and that the occupant of the room in which the alarm is made has not replied. The alarm continues to sound until the occupant of the room rises and pushes the button *k*², or until the stud *v'* slips off from the convex head *h* of the lever *b*. In either case the circuit of the magnet *I* is broken. When the circuit is broken by pushing the button *k*², the current ceases to flow through the magnet *I*. When the spring-arm *M* is released, the catch *w* is drawn upward, lifting the catch *o* from the beveled disk *l*, allowing the spring *m* to push the shaft *K* forward, breaking the contact between the lever *b* and the outer contact-piece *e* and restoring the contact between the said lever and the inner contact-piece *f*. As the catch *w* moves upward, the engagement of the cam *a'* with the cam *s* causes the catch *w* to release the catch *q*, thus allowing the spring-arm *n* to return to its normal position. At the same time the rod *v* engages the pin *e'* from the opposite side and returns the disk *N* toward its point of starting; but, owing to the loss of motion by virtue of the slot *f'* in the rod *v*, the disk *N* is turned only so far as is necessary to obscure only one half of the colored portion thereof, allowing the other half to remain visi-

ble through the opening of the front plate *C*, thus indicating to the attendant that the alarm has been given and has ceased. The button *k*² when pushed completes the circuit from the negative pole of the battery through the shaft *K*, through the lever *b*, contact *e*, annunciator-magnet *J*, and through the electric bell *j*² of the annunciator back to the battery. The current flowing through the annunciator-magnet *J* attracts the armature *h'* and turns the shaft *g'* so as to cause the pointer *n'* to point toward the figure representing the room in which the call is made. The shaft *g'*, having a small amount of friction in its bearings, retains the position in which it is placed by the action of the magnet *J* when the current ceases, so that the pointer continues to point to the number until replaced by the attendant in a manner presently to be described. The electric bell *j*² continues to ring so long as the push-button *k*² is pressed.

When the attendant desires to replace the parts of the annunciator and alarm mechanism which have been moved in the operation of making a call, the lever *O'* is turned, throwing up the frame *O*, thereby bringing the lugs *l'* into engagement with the pins *d'*, projecting from the rear surface of the disks *N*, causing the said disks to display a blank space in the front plate *C*. At the same time the angled fingers *m'* engage the wings *i'* of the shafts *g'*, returning the pointer *n'* to a vertical position.

When the occupant of a room desires to make a signal at the office, he presses the button *k*², thereby sending a current through the annunciator magnet and bell only, when the only effect produced is the turning of the shaft *g'*, so as to cause the pointer *n'* to point to the number representing the room.

A fire-alarm is given by causing several separate and distinct signals to be sent through all of the circuits connected with the apparatus. This is effected by removing the pin *c*² from the arm *b*², thereby detaching the calling mechanism from the clock-movement, then drawing forward the rack-bar *h*² until it is in engagement with the pinion *i*² on the tubular shaft *Q*. When this is done, the sprocket-wheels *s'* may be turned by means of the crank *a*², carried by the tubular shaft *Q*. At the same time the rack-bar *h*² will be carried forward, thereby moving the rack-bars *d*² *d*³ through the medium of the bar *g*², arm *f*², and the lever *e*², connecting the said rack-bars *d*² *d*³. These rack-bars being in engagement with the pinions *q'* on the screw-threaded studs *p'*, their movement causes the said threaded studs to turn, carrying the sleeves *r'* and the cranks *t'* attached thereto, together with the X-shaped frame *P*, toward the back piece *B*, thereby bringing the studs *v'* into position to strike the convex heads *h* of the levers *b* as the said frame *P* is turned. By this arrangement once during each revolution of the frame *P* the levers *b* are operated so as to

make and break the alarm-circuit of each room. Any of the dials which are set for a call will be released by the first action of the magnet *I* on completing and breaking the circuit in the manner described.

After the fire-alarm has been given the parts may be returned to their normal positions by reversing the position of the crank *a*². It is obvious that the said crank *a*² may be turned in either direction any number of revolutions without affecting the rack-bar *h*² after the last tooth of the said rack-bar passes beyond the pinion *i*².

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. In an electric time-alarm and annunciator, the combination, with a clock, of one or more movable auxiliary dials, a circuit-controlling lever connected with each dial and movable therewith, and a lever-operating frame taking motion from the hour-hand arbor of the clock and arranged to move the circuit-controlling lever or levers, substantially as specified.

2. In an electric time-alarm and annunciator, the combination, with the clock *G*, provided with an elongated hour-hand arbor *H*, of the sleeves *r*¹, having cranks *t*¹, the frame *P*, mounted upon the cranks *t*¹ and carrying studs *v*¹, the circuit-controlling levers *b*, adapted to be moved by the studs *v*¹, and means, substantially as described, for imparting motion from the hour-hand arbor *H* to the cranks *t*¹.

3. In an electric time-alarm and annunciator, the combination of the frame *P*, adapted to be moved circularly by the hour-hand arbor *H*, the shafts *K*, provided with arms *a*, the spring-pressed levers *b*, having convex heads upon one end and a fork upon the opposite end, the annular contact-pieces *f e*, the beveled disk *l*, secured to the shaft *K*, the spring *m*, the catch *o*, adapted to hold the disk *l* against the pressure of the spring *m*, and the circuit-wires and alarm-bell, substantially as specified.

4. In an electric time-alarm and annunciator, the combination of the shaft *K*, provided with the arm *a*, the dial *L*, attached to the said shaft, the hand-wheel *j*, the pendant *k*, the lever *b*, pivoted in the arm *a* and provided with a convex head upon one end and a fork upon the other end, the contacts *e f*, the beveled disk *l*, the spring *m*, the catch *o*, the frame *P*, adapted to be moved circularly by the clock and provided with the studs *v*¹, the disk *N*, provided with different-colored sectors and furnished with pins *d' e'*, the spring armature-arm *M*, the slotted rod *v*, adapted to engage the pin *e'*, the replacing-frame *O*, and the electric generator and circuit wires, substantially as specified.

5. In an electric time-alarm and annunciator, the combination, with the contact-carrying shaft *K*, of the beveled disk *l*, secured to the said shaft, the spring *m*, arranged to press the shaft forward, the spring *n*, provided with the catches *o q*, the electro-magnet *I*, the spring armature-arm *M*, carrying the armature *t*, the bent catch-arm *u*, furnished with the cam *a'* and catch *w*, and the stationary cam *s*, substantially as specified.

6. In an electric time-alarm and annunciator, the combination of the frame *P*, adapted to be moved circularly by a clock and provided with studs *v*¹, the shafts *K*, each provided with an arm *a* and carrying the levers *b* and beveled disk *l*, the spring *m*, the contacts *e f*, the annunciator electro-magnet *J*, the shaft *g'*, furnished with the armature *h'* and wing *i'*, the pointer *n'*, carried by the shaft *g'*, the dial *L*, the disk *N*, provided with different-colored sectors, an alarm-bell and push-button placed at a distant station, an electric generator, and electric circuits, substantially as specified.

7. In an electric time-alarm and annunciator, the combination of the cranks *t*¹, the sleeves *r*¹, the sprocket-wheels *s*¹, the chain *u'*, the tubular shaft *Q*, the sprocket-wheel *w*¹, placed thereon and adapted to engage the chain *u'*, the shaft *R*, encircled by the tubular shaft *Q* and furnished with the arm *b*², the sprocket-wheel *S*, attached to the shaft *R*, the crank *a*², attached to the tubular shaft *Q*, the sprocket-wheel *T* on the hour-hand arbor *H* of the clock, the chain *x'*, engaging the sprocket-wheels *S T*, the circuit-controlling levers *b*, and the circuit-wires, substantially as specified.

8. In an electric time-alarm and annunciator, the combination, with the screw-threaded studs *p'*, the pinions *q'*, mounted thereon, the rack-bars *d² d³*, the lever *e*², connecting the said racks, the rack-bar *h*², connected with the rack-bar *d²*, the pinion *i*², and the tubular shaft *Q*, substantially as specified.

9. In an electric time-alarm and annunciator, the combination, with the pendants *k*, of the annunciator-magnets *J*, the pointers *n'*, the shafts *g'*, the armatures *h'*, attached to the said shafts, the wings *i'*, mounted on the shafts *g'*, the apertured front plate *C*, the disks *N*, furnished with colored sectors and provided with pins *d' e'*, the electro-magnet *I*, the spring armature-arm *M*, the slotted rod *v*, connecting with the said arm and receiving the pin *e'* in its slot, and the replacing-frame *O*, furnished with lugs and angled fingers *m'*, substantially as specified.

NATHAN H. SUREN.

Witnesses:

GEO. M. HOPKINS,
E. M. CLARK.