

No. 704,733.

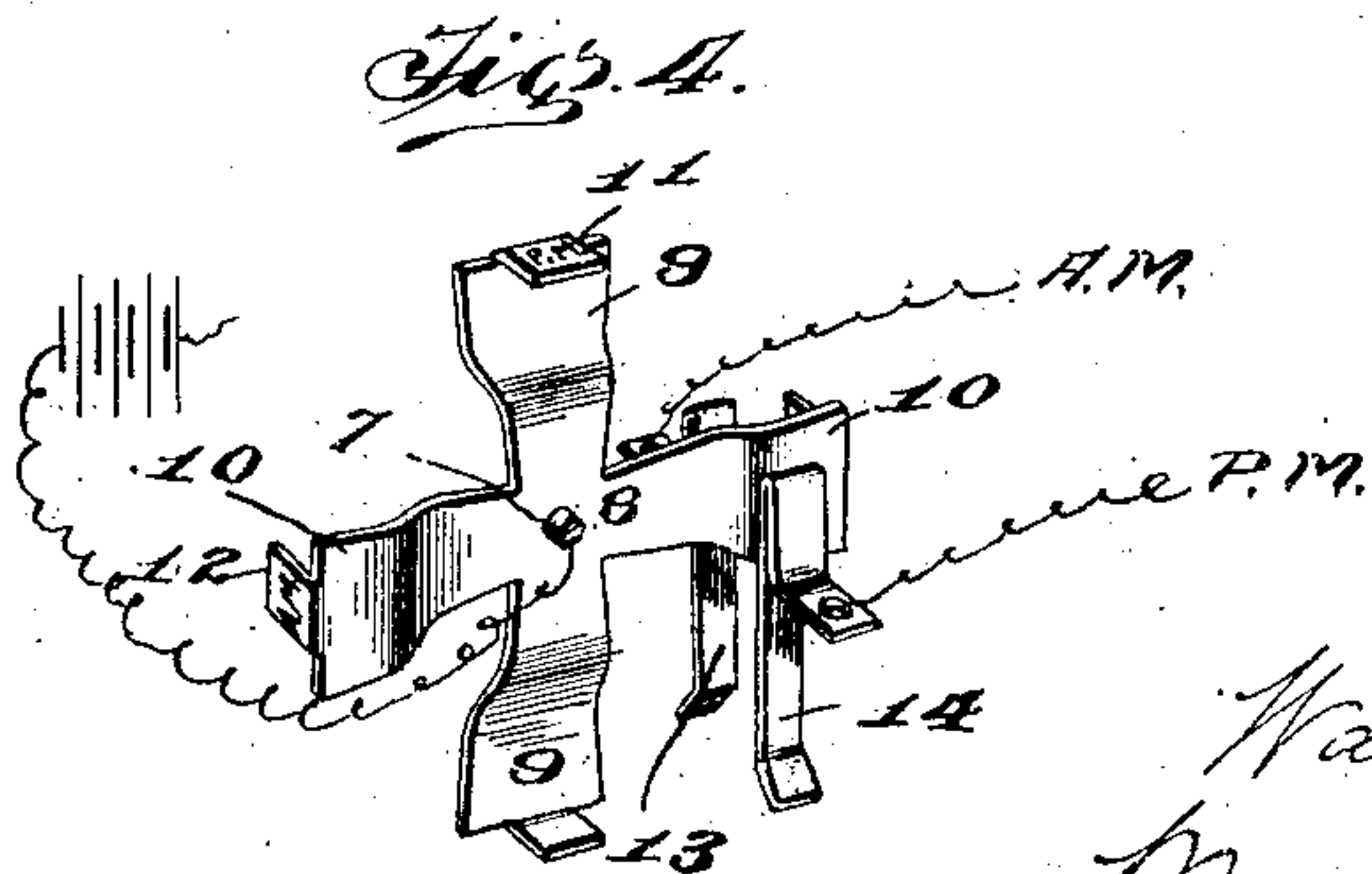
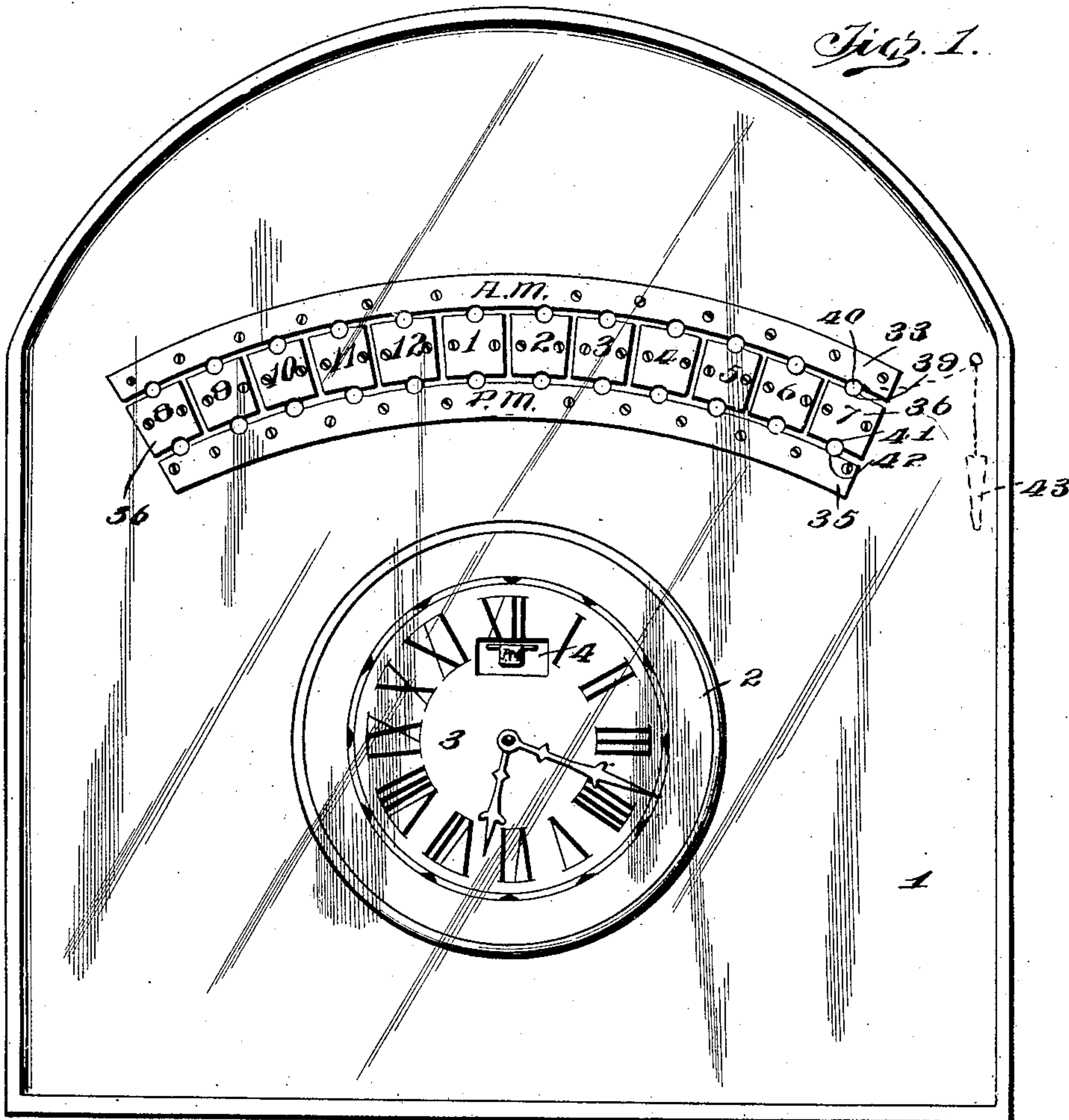
Patented July 15, 1902.

W. C. BETHEL.  
ELECTRIC ALARM CLOCK.

(Application filed Feb. 7, 1902.)

(No Model.)

2 Sheets—Sheet 1.



Witnesses  
L. G. Handy  
Edgar M. Kitchen

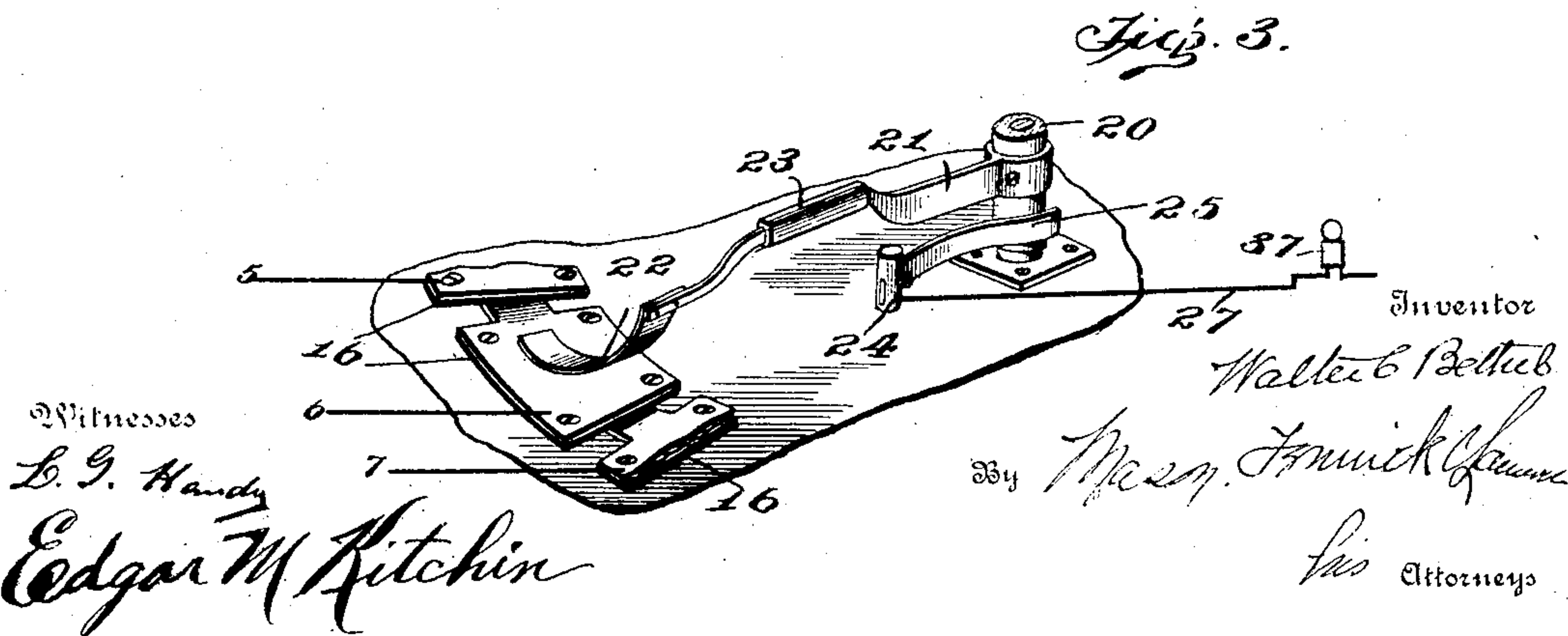
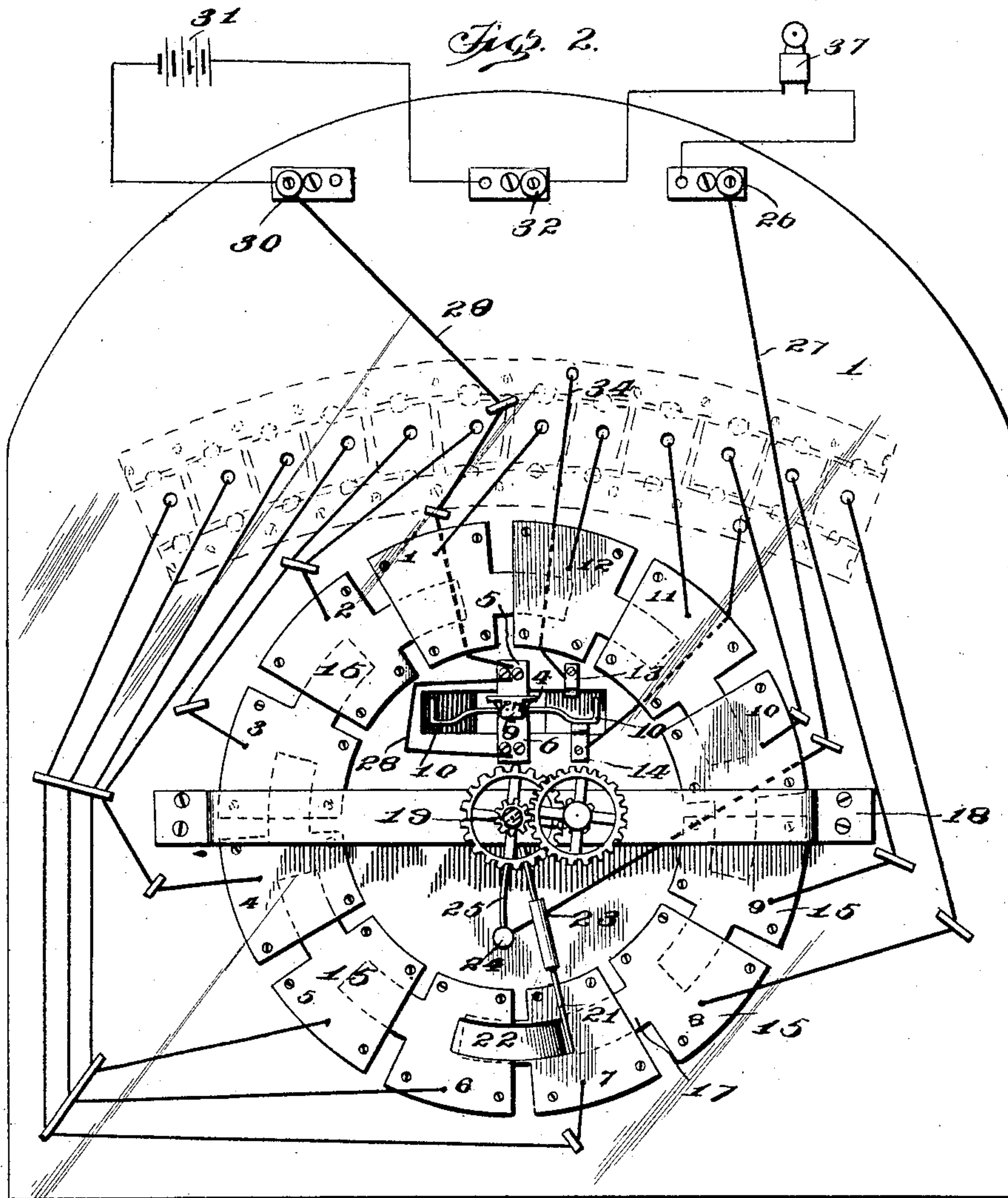
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2 Sheets—Sheet 2.





# UNITED STATES PATENT OFFICE.

WALTER C. BETHEL, OF SEATTLE, WASHINGTON.

## ELECTRIC ALARM-CLOCK.

SPECIFICATION forming part of Letters Patent No. 704,733, dated July 15, 1902.

Application filed February 7, 1902. Serial No. 93,066. (No model.)

*To all whom it may concern:*

Be it known that I, WALTER C. BETHEL, a citizen of the United States, residing at Seattle, in the county of King and State of Washington, have invented certain new and useful Improvements in Electric Alarm-Clocks; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

The present invention relates to improvements in alarm-clocks, and more particularly to those of the electrical type.

The object in view is the production of a clock provided with means whereby a continuous alarm may be given at any desired time, the mechanism having been previously set and the results accomplished through the medium of electricity.

With these and other objects in view the present invention consists in certain novel constructions, combinations, and arrangements of parts, as will be hereinafter fully described.

In the accompanying drawings, Figure 1 represents a view in front elevation of a clock, illustrating one embodiment of my invention. Fig. 2 represents a rear elevation of the same, some of the clock mechanism being omitted for permitting illustration of the surrounding parts. Fig. 3 represents an enlarged detail perspective view of the contact-brush, its supporting-arm, and surrounding parts. Fig. 4 represents a similar view of the circuit-closing wheel and the contact-studs.

Referring to the drawings by numerals, 1 indicates any suitable support for retaining a clock, as 2, having any preferred form of dial 3, apertured, as at 4, for purposes hereinafter mentioned. Secured above and below the aperture 4 on the rear face of support 1 are suitable brackets of electrical conducting material, as 5 and 6, forming bearings for a suitable shaft, as 7, carrying an electric contact-wheel, as 8. The wheel 8 is provided with radially-projecting arms 9 and 10. The arms 9 are bent upwardly intermediate their length and extend upon a higher horizontal plane thence to their outer end, and are each provided with a depending tab, as 11, designed to be provided with suitable indicating-marks, as "P. M.," or other suitable in-

dications, as will be hereinafter mentioned.

The arms 10 are bent downwardly intermediate their length and extend thence into a lower horizontal plane to their outer end and are each provided with an upwardly-extending tab, as 12, for receiving suitable indicating-marks, as "A. M.," or other indications, for purposes hereinafter signified.

It will be seen that the wheel 8 is mounted in such position that as the same is rotated the tabs 11 and 12 are successively brought within the aperture 4, so as to be apparent to an observer looking at the face of the clock. Above the aperture 4 and secured to the rear face of support 2 is a suitable contact-stud, as 13, preferably formed of a spring and designed to contact with the upper horizontal portion of arms 9 as the wheel 8 is rotated, the spring of said stud assuring effectual contact between said parts. Secured to the rear face of support 1 below aperture 4 is a similar spring contact-stud 14, arranged to contact with the lower horizontal portion of the arms 10 as the wheel 8 is rotated, it being apparent that the arms 9 and 10 will be alternately brought into contact with the studs 13 and 14 upon rotation of said wheel 8. Arranged in a circle and secured to the rear face of support 1 are a number of segmental plates of electrical conducting material, as at 15. These plates 15 are arranged to correspond in number to the number of hours or divisions thereof upon the dial 3 and may be of any desired multiple, the present illustration showing but twelve of said plates, each of the plates being provided with a number agreeing with its corresponding indicating-numeral upon said dial 3. The present illustration only presents twelve of the plates 15; but of course twenty-four, forty-eight or any other corresponding fractional portion of the hour may be indicated by said plates. Each of the plates 15 is provided beneath its under face with a suitable strip of insulating material, as 16, and each of said plates is formed upon one of its edges with a projecting lug, as 17, designed to be passed beneath the insulating-plate 16 of the preceding plate 15.

Any suitable clock mechanism may be employed; but the same has been omitted from the drawings, as it forms no part in the present invention, only that portion of such mech-



anism being shown as is necessary to illustrate clearly the operation of the present device. Any suitable bracket, as 18, may be secured to support 1 for retaining the minute-hand shaft 19 and the inclosing sleeve 20 for operating the hour-hand in position. The shaft 19 and bracket 18 are designed to carry suitable gearing meshing with the usual form of gear carried by the hour-hand-operating sleeve 20 for rotating the same in any suitable and preferred manner. An arm, as 21, is clamped about sleeve 20 and projects radially therefrom, carrying at its outer end an electric contact-brush, as 22, said arm 21 and sleeve 20 being of conducting material. Any suitable insulation, as 23, may be placed upon a portion of arm 21 at the desired point for purposes hereinafter mentioned. A suitable stud, as 24, projects outwardly from the rear face of support 1 and carries a spring, as 25, contacting with sleeve 20, the said spring-stud being electrically connected with a suitable binding-post by a wire or other suitable means, as 27. It will thus be seen that as the clock mechanism operates the arm 21 will be carried about, causing the brush 20 to successively contact with the plates 15, the said brush being of spring material and dropping from one plate sharply into contact with the lug 17 of the next succeeding plate, so as to produce a sudden and perfect connection between the plate and the brush.

Bracket 6 is electrically connected with bracket 5 by a wire or other suitable means, as 28, and bracket 5 in turn is connected by wire or other means, as 29, electrically with a binding-post, as 30, said binding-post being similarly connected to one pole of any preferred form of battery 31, the opposite pole of said battery being connected in turn with a binding-post 32.

Preferably on the front of the support 1 is arranged a plate, as 33, connected by wire or other suitable electrical conducting means, as 34, to contact-stud 13. Preferably arranged beneath the plate 33 is another similar plate, as 35, electrically connected with stud 14. Interposed between these plates 33 and 35 and spaced apart from each other is a series of small plates, as 36, corresponding in number to the number of plates 15. Each of the plates 36 is electrically connected with a corresponding plate 15. In order that a clear understanding of the operation of the present mechanism may be had, I have enumerated the said plates 36 by numerals "1," "2," "3," "4," "5," "6," "7," "8," "9," "10," "11," and "12" and correspondingly numbered the plates 15, so that the plate 36, marked "1," is electrically connected with plate 15, also marked "1," and so on throughout the twelve plates.

I prefer in operation to connect binding-posts 26 and 32 to any suitable bell, lamp, or other electric signaling or alarm apparatus, as 37.

As the arm 21 is moved about by the rota-

tion of sleeve 20 the insulation 23 is brought into contact with the arm 9 or 10, as the case may be, of wheel 8, which projects in the path of movement of arm 21, so that as the said arm 21 moves onwardly the arm 9 or 10 will be passed forwardly and the wheel 8 rotated for a quarter of a circle, moving the arms 9 or 10, contacting with the studs 13 or 14, out of contact therewith and moving the succeeding arms 9 or 10 into contact with its corresponding studs 13 or 14, the arms 9 or 10 being so arranged that the circuit-closing wheel 8 will be caused to alternately contact with the studs 13 and 14.

The plate 33, which is connected with a contact-stud 13, is preferably marked "A. M.," as it represents a portion of the circuit closed by the arm 9 during the hours before the sun passes the meridian, and the plate 35 is preferably marked "P. M.," as it forms a part of the circuit completed by the arms 10 when brought in contact with stud 14 during the afternoon. Each of the plates 36 is formed with a notch, as 39, designed to register with a corresponding notch 40 in plate 33. Each of said plates 36 is also formed with a second notch, as 41, registering with its respective notch 42 in plate 35, and when it is desired to close the circuit through the plate 33 and one of the plates 36 a suitable plug, as 43, is passed between the registering notches 39 and 40 for closing the circuit between the respective plate 36 and said plate 33. A similar plug may be passed between notches 41 and 42 in contact with the edge of the respective plate 36 and plate 35 for closing the circuit therebetween when desired.

In operation when it is desired to effect the alarm 37 the plug 43 is placed, say, for example, between plate "1" of plate 36 and plate 33, one of arms 9 extending into aperture 4. It being, for instance, one o'clock p. m. when the plug is placed in position, the arm 21 will be swung by the movement of the sleeve 20 past the wheel 8, moving arm 9 out of aperture 4 and into contact with stud 13, and the arm will continue its movement with the sleeve 20. The brush 22 is brought by the movement of arm 21 sharply into contact with the plate 15, marked with the numeral "1," the insulation 23 having prevented electrical contact between arm 21 and arm 9 of wheel 8'. The lugs 17 of plates 15 are designed to receive the blow of the brush 22 and form a perfect sharp contact therewith. When the brush 22 is connected with said plate 15, the circuit will be completed and the alarm mechanism 37 operated. The course of the circuit will be as follows: Starting with the battery it passes to binding-post 30, thence to brackets 5 and 6, through wheel 8 and arm 9 thereof to stud 13, thence to plate 33, through plug 43, through plate 36, marked with the numeral "1," through the brush 22, arm 21, sleeve 20, spring 25, stud 24, and to the binding-post 26, from which point it passes through the signaling



or alarm apparatus 37 to binding-post 32 and back to the battery 31. The alarm mechanism 37 will of course continue to operate until the brush 22 is moved off of the plate 15; but the plug 43 is intended to be removed, so as to prevent the continued operation of the said alarm mechanism.

It will be apparent from the drawings and the foregoing description that the arms of wheel 8 will always be in the proper position relative to the position of the hands of the clock 2, the arm 21 moving said wheel 8 a quarter of a rotation at each time it passes said wheel, so that during the hours before the meridian is passed by the sun one of the arms 9 will extend into aperture 4, and after it passes said meridian one of the arms 10 will extend into said aperture 4, so that the circuit-closing wheel 8 has the circuit closed between the battery 31 and the plate 33 during the hours of the forenoon and is automatically moved to break said circuit as the hour-hand passes the indication of the twelfth hour of the day, so that such circuit is broken and the circuit between the battery and the plate 35 is closed and remains closed for the remaining twelve hours of the day.

It will of course be seen that although I have only illustrated a number of plates 15 and of plates 36 corresponding to the hour indications on the dial 3, yet it is within the scope of the present invention and it is my intention when desired to increase the number of said plates to correspond with any fraction of the hour indications—as, for instance, one plate 15 and a corresponding plate 36 for each of the minute indications on said dial.

Although I have specifically set forth one particular embodiment of the present invention, I do not desire to be understood as confining myself to the exact limits of the present disclosure, but shall feel at liberty to deviate therefrom with respect to all minor details within the spirit and scope of the present invention.

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

1. In an electric alarm-clock, the combination with the hour-hand-operating means thereof, of an arm carried thereby, a contact-brush carried by said arm, contact-plates corresponding in number relative to the time indications on the dial of said clock designed to be contacted by said brush, and a wheel having radial arms for closing an electric circuit through said plates and brush and alarm mechanism to be operated, the arm of said wheel extending in the plane of movement of said arm substantially as described.

2. In an electrical alarm-clock, the combination with a suitable support, of an hour-hand-operating means carried thereby, a series of plates secured to said support, a second series of plates secured to said support, a plate spaced from said second series, and a

wheel rotating in timed relation to the movement of said hour-hand-operating mechanism for alternately establishing electric communication through one of the first series of plates, and through one of the second series of plates, whereby when communication is established between said first-mentioned plate and one of the plates of one of said series relative to the position of said hour-hand-operating mechanism, electric communication will be established through said hour-hand-operating means, and through any suitable alarm device, substantially as described.

3. In an electric alarm-clock, the combination with a suitable hour-hand-operating mechanism, of an arm carried thereby, a plate representing the hours of the forenoon, a plate representing the hours of the afternoon, means operated by said arm for establishing electric communication with the respective forenoon or afternoon plates according to the position of the said hour-hand, and a contact-wheel rotating in timed relation to the movement of said hour-hand-operating mechanism for closing the electric circuit for passing the current through a suitable alarm mechanism at predetermined times, substantially as described.

4. In an alarm-clock, the combination with any suitable support, of a circuit-closing wheel mounted thereon, two plates carried by said support, means for moving said circuit-closing wheel for causing electric communication through one of said plates, and then through the other thereof relative to the position of the hands of said clock, and means for closing the circuit of electricity through either of said plates through any suitable alarm mechanism, substantially as described.

5. In an alarm-clock, the combination with a suitable support, of means carrying the hands of the clock supported thereby, a contact-wheel carried by said support, an arm carried by said hand-operating means designed to operate said contact-wheel, plates representing the forenoon and afternoon, means for establishing communication from said contact-wheel alternately with said plates relative to the position of the said hands, and means for establishing electric communication with any desired alarm mechanism, at a predetermined time through one of said plates, substantially as described.

6. In an alarm-clock, the combination with a suitable support, of clock-hand-operating means, an arm carried thereby, a contact-wheel carried by said support and provided with radially-extending arms designed to project into the path of movement of said first-mentioned arm, whereby said wheel will be rotated a quarter of a circle at each rotation of said first-mentioned arm, studs designed to contact with the alternate arms of said contact-wheel, plates carried by said support, means establishing electric communication between each of said contact-studs and one of said plates, and means for establishing



electric communication through one of said plates and through any suitable alarm mechanism at predetermined times, substantially as described.

5 7. In an alarm-clock, the combination with a suitable support, of a contact-wheel mounted thereon, provided with radially-extending arms, contact-studs designed to contact alternately with the arms of said wheel as the  
10 same rotates, means for establishing electric communication through said wheel and one of said studs and through any suitable alarm mechanism, at a predetermined time, and means for rotating said wheel relative to the  
15 movement of the hands of said clock, substantially as described.

8. In an alarm-clock, the combination with a suitable support, of a contact-wheel mounted thereon and provided with radially-extending arms, each alternate arm being bent laterally in an opposite direction to the next  
20 succeeding arm, so that the said arms will move in different horizontal planes, studs mounted above and below said wheel and designed to contact with the respective alternate arms thereof, means for establishing  
25 electric communication through said wheel and one of said studs, through any suitable alarm mechanism at a predetermined time, and means for rotating said wheel relative to  
30 the movement of the hands of said clock, substantially as described.

9. In an alarm-clock, the combination with a suitable support provided with a dial and  
35 means for operating the clock-hands, the said dial being formed with an aperture, of a contact-wheel provided with radially-projecting arms designed to be moved successively in said aperture, means for establishing electric  
40 communication through one of the arms of said wheel, and through any desired form of alarm apparatus relative to the position of the respective arms of said wheel, and means for rotating said wheel corresponding to the move-  
45 ment of the hands of said clock, substantially as described.

10. In an alarm-clock, the combination with a suitable support, of a series of plates arranged on the rear face thereof, a correspond-  
50 ing series of plates secured upon said support,

a comparatively long plate arranged above and a similar plate arranged below said second series of plates, means for establishing electric communication between said last-mentioned plates, means for establishing elec- 55  
tric communication between each of said first-mentioned plates and its corresponding plate of the second-mentioned series of plates, and means for establishing electric communication through one of the first-mentioned series 60  
of plates, through its corresponding plate of the second-mentioned series, and through an alarm device relative to the position of the hands of said clock, substantially as described.

11. In an alarm-clock, the combination with 65  
a suitable support, of means for operating the hands of said clock, a series of plates secured to said support, having insulating-strips beneath the same, a laterally-projecting lug  
70 formed upon each of said plates, extending beneath the insulating-strip of the preceding plate, a contact-brush, means for bringing the same successively into contact with such  
plates relative to the movement of the hand-  
operating means, and means for establishing 75  
electric communication through said plates and through a suitable alarm device at a predetermined time, substantially as described.

12. In an alarm-clock, the combination with  
80 a suitable support, of an hour-hand-operating means carried thereby, an arm carried by said operating means, a series of plates arranged in a circle on said support, each of said plates being provided with a lug extending beneath  
85 the next preceding plate and insulated therefrom, a brush carried by said arm and designed to contact with a portion of each of said lugs and each of said plates successively as the arm is moved with the movement of said  
hand-operating means, and means for estab- 90  
lishing electric communication through said arm and brush, through the lug and plate contacted thereby, and through a suitable alarm device, substantially as described.

In testimony whereof I hereunto affix my 95  
signature in presence of two witnesses.

WALTER C. BETHIEL.

Witnesses:

G. WARD KEMP,  
C. S. GLEASON.