

No. 677,946.

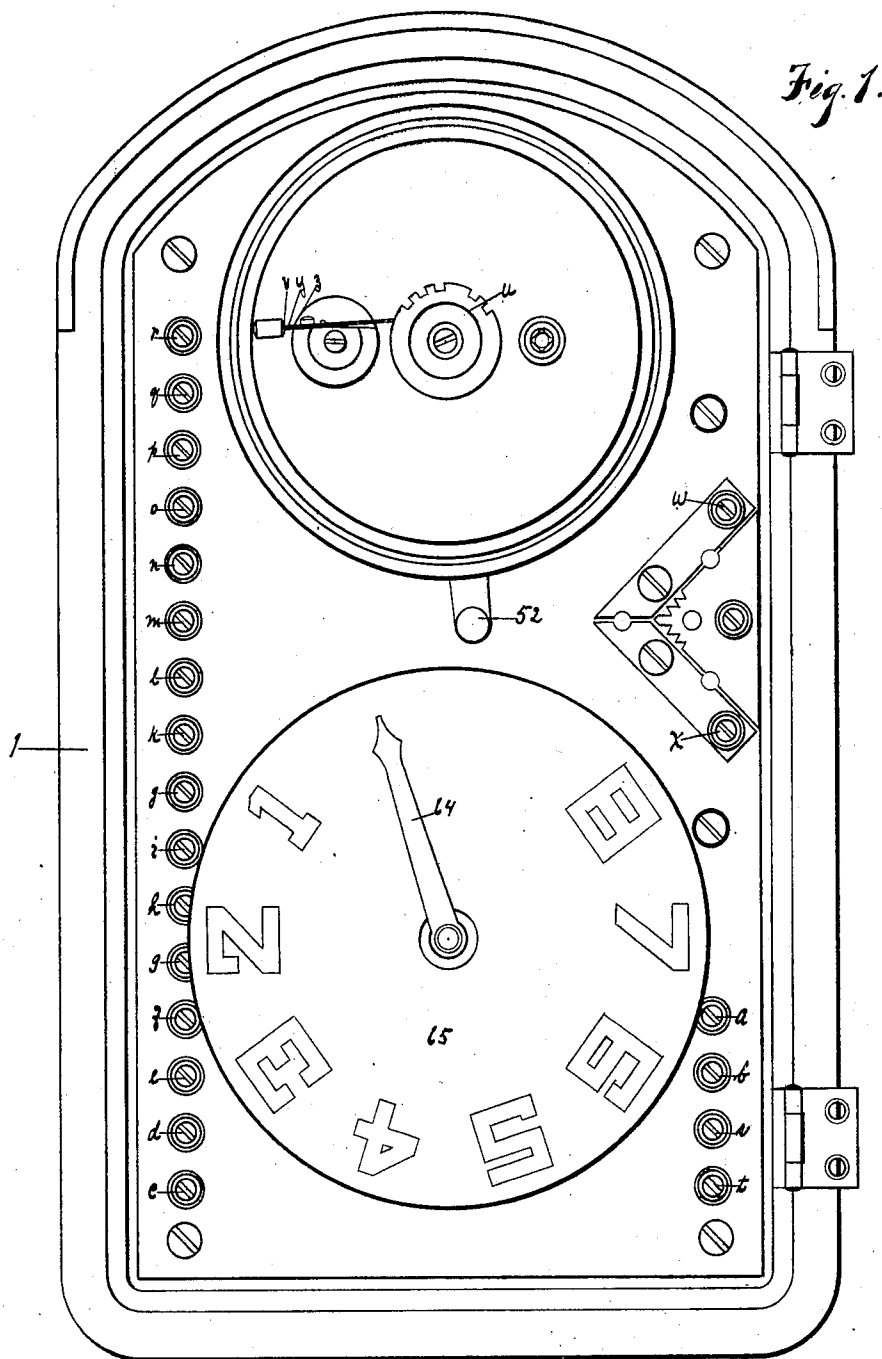
Patented July 9, 1901.

H. CORTLAND & J. T. HUME.
AUTOMATIC FIRE ALARM SYSTEM.

(Application filed Dec. 30, 1899.)

(No Model.)

5 Sheets—Sheet 1.



Witness.
W. R. Evans
E. Chikote

Inventors
Harvey Cortland
John T. Hume
By William Webster
Attorney

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Fig. 2.

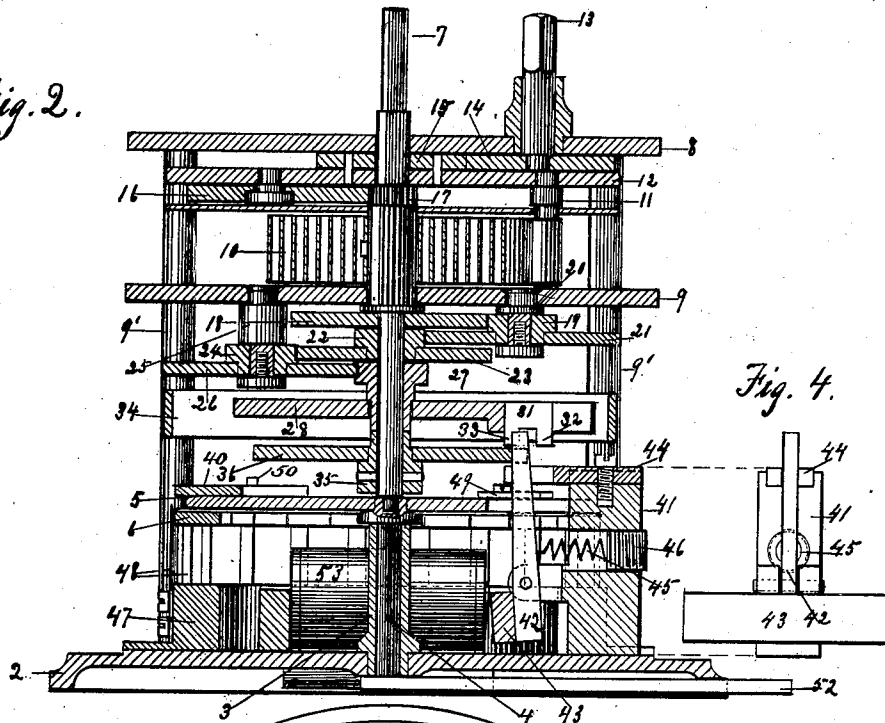
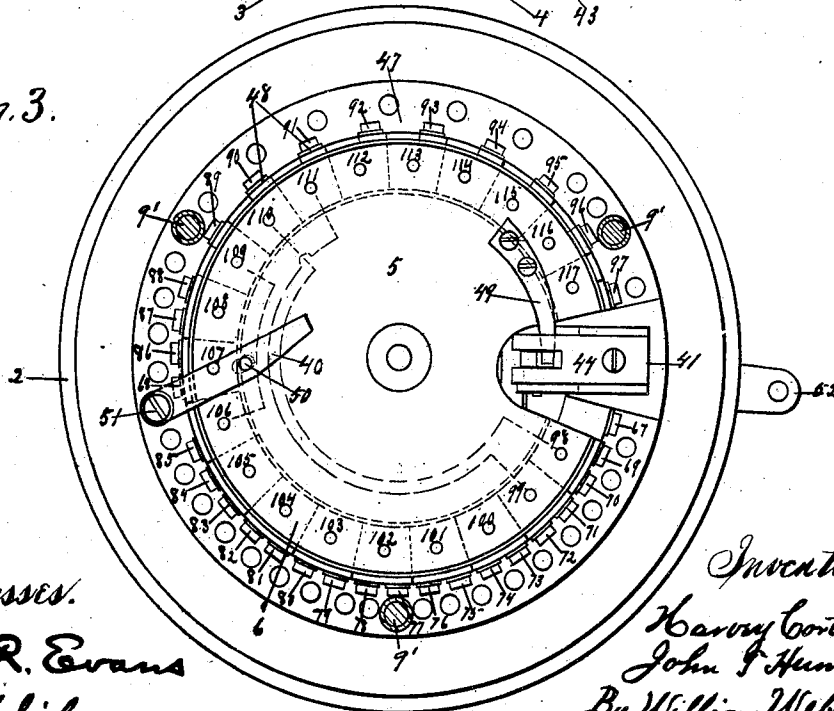


Fig. 4.

Fig. 3.



Witnesses.

W. R. Evans
C. Chilcote

Inventors.

Harvey Cortland
John T. Hume
By William Webster
Attorney

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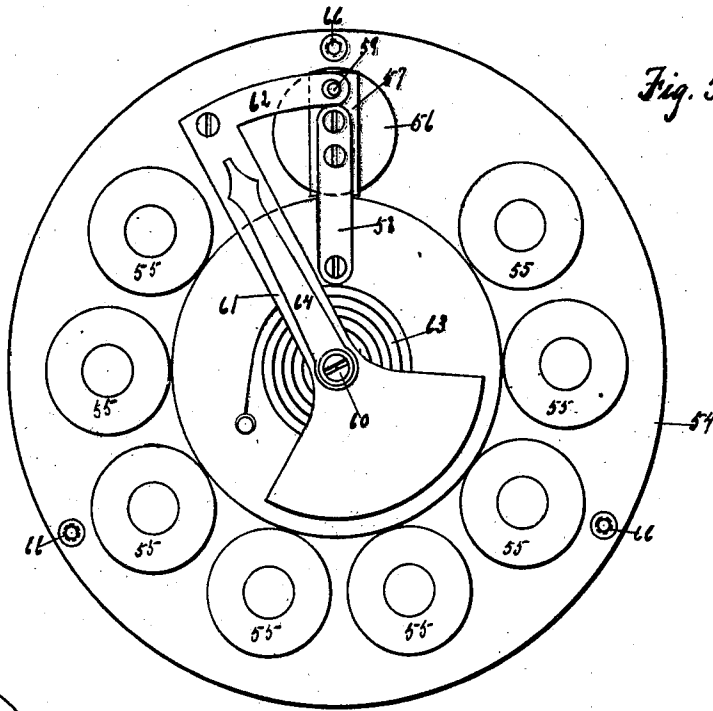


Fig. 5.

Fig. 7.

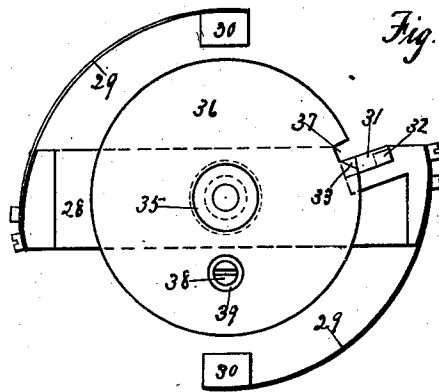
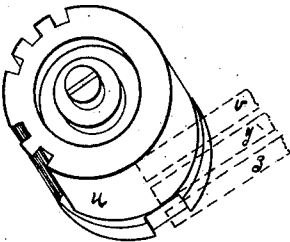


Fig. 6.

Witnesses
W. R. Evans
E. Chilcote

Inventors
Harvey Cortland
John T. Hume
By William Webster
Attorney

No. 677,946.

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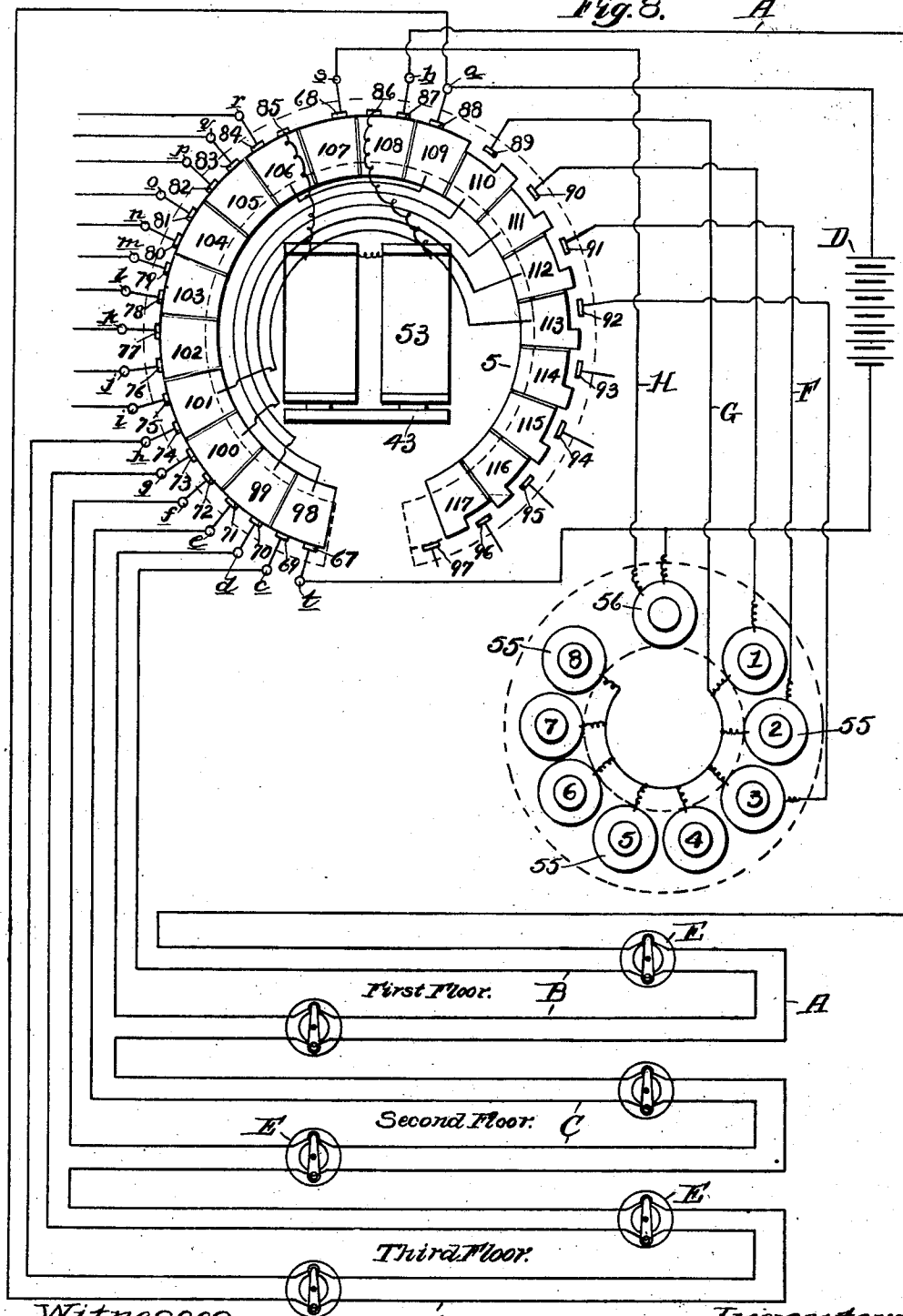
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5 Sheets—Sheet 4.

Fig. 8.



Witnesses.
C. J. Webster
Geo. H. Scott

Inventors.
Harvey Cortland
J. T. Hume
By William H. Miller
Attorney.

No. 677,946.

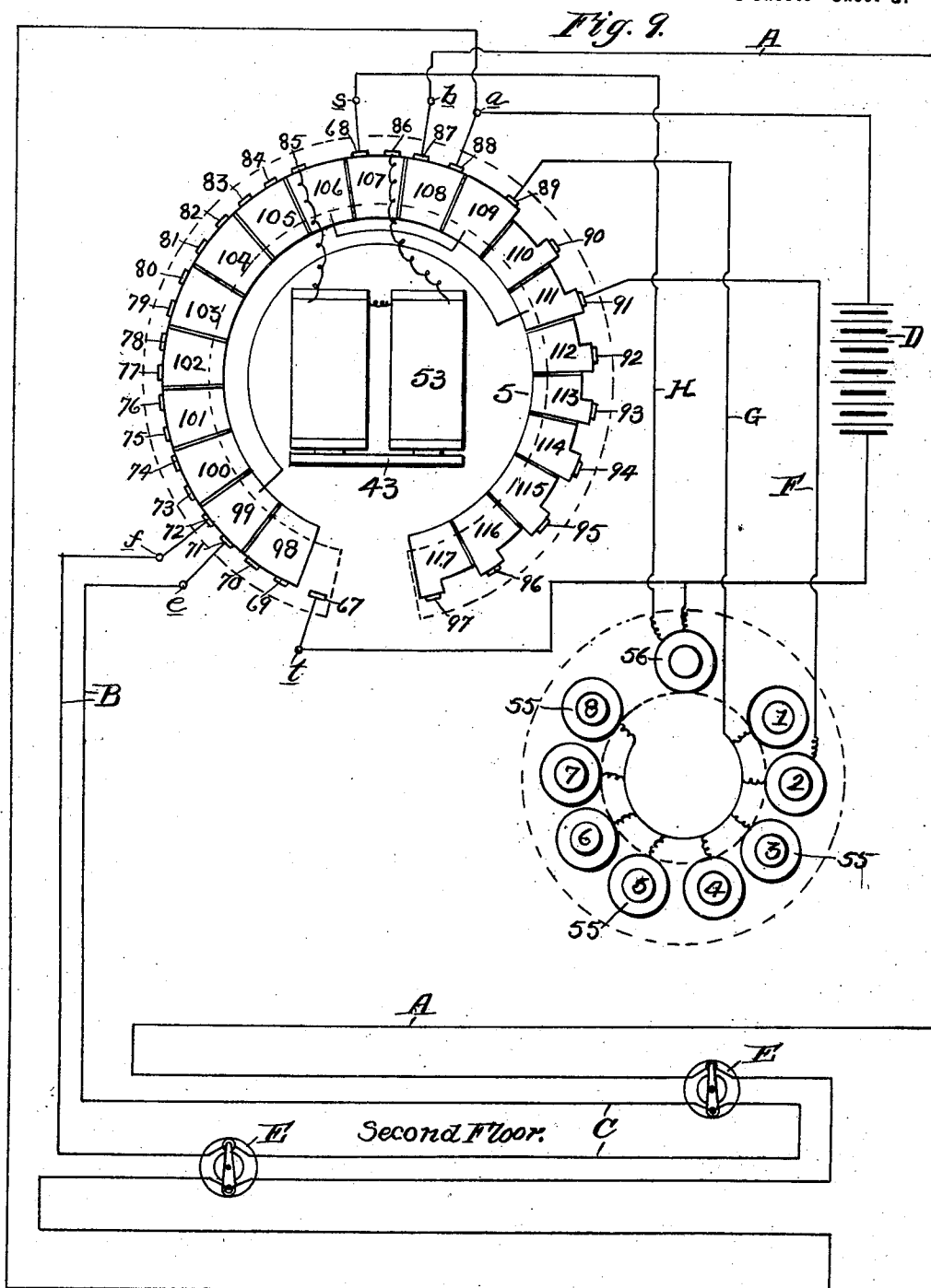
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5 Sheets—Sheet 5.



Witnesses.
C. J. Webster.
Geo. H. Scott

Inventors.
Harvey Cortland
J. T. Hume
By William Webster
Attorney.

UNITED STATES PATENT OFFICE.

HARVEY CORTLAND AND JOHN T. HUME, OF PITTSBURG, PENNSYLVANIA;
SAID HUME ASSIGNOR TO SAID CORTLAND.

AUTOMATIC FIRE-ALARM SYSTEM.

SPECIFICATION forming part of Letters Patent No. 677,946, dated July 9, 1901.

Application filed December 30, 1899. Serial No. 742,060. (No model.)

To all whom it may concern:

Be it known that we, HARVEY CORTLAND and JOHN T. HUME, citizens of the United States, and residents of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented an Improvement in Automatic Fire-Alarm Systems, of which the following is a specification.

Our invention relates to an automatic fire-alarm system, and has for one object to provide a system in which an alarm may be transmitted to a central station with an annunciator in coaction to indicate the location of the fire within the building.

15 A further object is to provide for sending in an alarm in case of a broken wire.

A further object is to provide an automatic switch whereby the wiring of the system is changed from a multiple, thereby allowing 20 an alarm to be transmitted even with one or more wires broken.

A further object is to provide means whereby a signal may be transmitted to the central station in the event of one of the line-wires 25 breaking.

The invention consists in the parts and combination of parts hereinafter described and claimed.

In the drawings, Figure 1 is an elevation 30 showing the controller and annunciator within the box, the cover of the box being removed. Fig. 2 is a central vertical section of the controller mechanism. Fig. 3 is a top plan view of the switch mechanism. Fig. 4 35 is a detailed view showing the stop-lever in front view. Fig. 5 is a plan view of the annunciator with the dial removed. Fig. 6 is a detail of the governor and stop. Fig. 7 is a perspective view showing the brake-wheel 40 and brushes. Fig. 8 is a diagrammatic illustration of our system when the parts are in a normal position. This view illustrates the controller and indicator mechanism necessary to operate in an eight-story building and the wiring necessary for three of the stories, 45 this being deemed sufficient to illustrate the invention. Fig. 9 is a like view when the parts are in an operative position, the wiring for the second floor only being shown.

50 1 designates the box in which the controller and annunciator are housed. The controller

comprises a base 2, having a sleeve 3, in which is journaled a shaft 4, upon which is mounted a disk 5, carrying a plurality of insulated contact-plates 6. In the upper end of shaft 55 4 is journaled the lower end of the main shaft 7 of the driving mechanism, the upper end being journaled in plate 8 and having a central bearing in plate 9. The stationary parts are sustained by posts 9'. Shaft 7 is driven 60 by a spiral spring 10, secured at one end to the shaft and at the opposite end to a stud 11 upon plate 12. The spring is wound by means of a square shaft 13 and gears 14 and 15, gear 15 being secured to plate 12, the said 65 plate revolving with the gear, thereby winding the spring. Loosely journaled on a stud on plate 12 is a planetary gear 16, said gear meshing with gear 17, keyed to shaft 7, gear 16 having one or more of its teeth uncut, 70 thereby forming a stop limiting the revolution of gear 16, plate 12, and shaft 7, one revolution of gear 16 winding spring 10 sufficient to give the desired number of revolutions to shaft 7, the stop also acting when 75 gear 16 revolves in a reverse direction when the spring is unwound. Below plate 9 is a train of gearing comprising a gear 18, fast upon shaft 7, which meshes with pinion 19, journaled upon a stud 20, there being a gear 80 21 fast upon the hub of pinion 19. Gear 21 meshes with pinion 22, loosely mounted on shaft 7, and upon the hub of which is secured a gear 23, meshing with pinion 24, journaled on stud 25. Fastened to pinion 24 is a 85 gear 26, which meshes with pinion 27, loosely mounted on shaft 7. Secured to pinion 27 is a speed-regulator comprising bar 28, to which is secured spring-arms 29, having weights 30 upon their free ends. Secured to bar 28 is a 90 stop-piece 31, having two depending projections 32 and 33, the purpose of which will be hereinafter described. Speed is regulated by means of frictional contact of the spring-arms 29 with an annular ring 34, said arms 95 being forced outward by centrifugal force acting on the weights 30. Secured to the shaft 7 is a hub 35, to which is secured a disk 36, having a notch 37 in its periphery and having a stud 38 upon its lower side, upon 100 which is journaled a roller 39, adapted to engage with a lever 40, Fig. 3, as the disk is re-

volved. Upon the base 2 is a standard 41, having inwardly-projecting ears, in which is pivoted a lever 42, the lower end of which carries armature 43, the upper end being adapted to engage with the projections of stop-piece 31, being guided in its movement by the slotted piece 44. Pressing against the lever 42 is a spring 45, adjusted as to tension by hollow screw 46. Secured to the base 2 is an insulating-ring 47, carrying a plurality of brushes 48, adapted to make contact with contact-plates 6. Upon the upper side of disk 5 is secured a finger 49, adapted to pass in the rear of lever 42, for a purpose to be hereinafter described. There is also secured upon disk 5 a stud 50, engaging in a slot in the lever 40, one end of the lever 40 being pivotally secured upon stud 51, said stud being secured to base 2, whereby when roller 39 contacts with the free end of lever 40 plate 5 is moved axially, thereby changing the position of contact-plates 6 with relation to the brushes and causing finger 49 to pass in rear of lever 42. To the lower end of shaft 3 is secured a lever 52, adapted to be actuated manually to return plate 5 and contact-pieces 6 to their original position. Upon base 2 is secured an electromagnet 53, adapted when energized to attract the armature 43, thereby operating lever 42 against the action of spring 45. The annunciator comprises a base 54, upon which are mounted the solenoids 55, one of which, a solenoid 56, is adapted to operate a locking-armature 57, mounted upon a flexible arm 58, carrying the locking-stud 59. In the center of this base is mounted a stud 60, upon which is pivotally secured an arm 61, carrying at its outer end an armature and an angular locking portion 62, provided with an orifice at its outer end, into which the locking-stud 59 may engage. A spiral spring 63 is secured to the base at one end with the opposite end secured to arm 61, the purpose of which is to rotate the arm 61 when released by the locking-magnet 56. Secured slightly above arm 61 and moving therewith is a pointer 64, adapted to indicate upon a dial 65, supported upon posts 66, the location of the fire.

The purpose of the invention is to give an alarm in case of fire or if a wire is cut or broken or the current-supply should fail. In order to accomplish this, the connections of the switching mechanism are so arranged that in the normal position the wiring of a building is all in series, while if these conditions change the connections are so changed that the wires are in multiple. In the view shown the controller is adapted for wiring an eight-story building. In wiring a building there is a wire A run in series through all the floors of the building, beginning at binding-post *a*, Fig. 1, and returning to binding-post *b*. Commencing at binding-post *c* and running through the first floor parallel with the series wire is an annunciator-wire B, the return end of which is brought to binding-post *d*, this

arrangement being carried out throughout the several floors, as for second floor a wire C beginning at binding-post *e* and ending at *f* and *c*. Brush 67 is connected to binding-post *t*. Brush 68 is connected to one terminal of magnet 56, the other terminal being connected to binding-post *t*. Brush 69 is connected to binding-post *c*, brush 70 to binding-post *d*, brush 71 to binding-post *e*, brush 72 to *f*, 73 to *g*, 74 to *h*, 75 to *i*, 76 to *j*, 77 to *k*, 78 to *l*, 79 to *m*, 80 to *n*, 81 to *o*, 82 to *p*, 83 to *q*, 84 to *r*, 85 to one terminal of electromagnet 53, the other terminal of said magnet being connected to brush 86. Brush 87 is connected to binding-post *b*. Brush 88 is connected to binding-post *a*. Brush 89 is connected to the return-wire of the annunciator-magnets. 90 is connected to magnet of numeral 1 of the dial. 91 is connected to the magnet of numeral 2 of the dial, 92 to that of numeral 3, 93 to that of 4, 94 to that of 5, 95 to that of 6, 96 to that of 7, and 97 to that of 8. In the normal position of the switch-brushes 88 89 90 91 92 93 94 95 96 97 are out of contact with plates 108 109 110 111 112 113 114 115 116 117, as shown in Fig. 8. Brushes 67 and 69 are connected by contact-plate 98. 70 and 71 are connected by plate 99, 72 and 73 by plate 100, 74 and 75 by plate 101, 76 and 77 by plate 102, 78 and 79 by plate 103, 80 and 81 by plate 104, 82 and 83 by plate 105, 84 and 85 by plate 106, and 86 and 87 by plate 108. Plate 98 is connected with plate 110. Plate 99 is connected with 111, plate 100 with 112, 101 with 113, 102 with 114, 103 with 115, 104 with 116, 105 with 117, and 106 with 109. The battery D is connected to posts *a* and *t*, respectively, the current starting from the battery D, passing to binding-post *a* through the series wire A to binding-post *b*, thence to brush 87, across contact 108 to brush 86, through electromagnet 53 to brush 85, across contact-plate 106 to brush 84, from brush 84 to binding-post *r*, through annunciator-wire of eighth floor to binding-post *q* to brush 83, across contact-piece 105 to brush 82, from brush 82 to binding-post *p*, thence through the annunciator-wire of the seventh floor back to binding-post *o*, brush 81 and in similar manner back to brush 69, across contact-plate 98 to brush 67, thence to binding-post *t* and back to the battery. This results in energizing electromagnet 53, attracting armature 43, causing the upper end of lever 42 to move outwardly, engaging with the projection 32 of stop-piece 31. The controller is now in condition to give an alarm in case of a broken wire or a fire.

The controller may be operated by any thermostatic or other circuit-closing device E, automatic or manual. The thermostats are connected in multiple with the series and annunciator wires, respectively, of the building. In the event of fire the thermostat closes, short-circuiting electromagnet 53, thereby demagnetizing said magnet, thus allowing spring 45 to force lever 42 out of engagement with projection 32 until it strikes the edge of

disk 36, releasing the train of gearing, allowing shaft 7 to revolve, carrying with it disk 36, causing roller 39 to move lever 40, disk 5, attached contact-plates, and passing finger 5 49 in rear of lever 42. When the switch is thus moved to its second position, the wiring of the building is connected in multiple. The annunciator connections are made by brushes 89 to 97, inclusive, making contact with plates 10 109 to 117, inclusive, as shown in Fig. 9, thus energizing electromagnet 53, holding lever 42 against finger 49, thus preventing the lever from dropping into slot 37 and stopping the mechanism by engagement with projection 15 33. The spring 10 will rotate shaft 7 until stopped by the planetary gear 36. When plate 5 is moved into the position shown in Fig. 9, one or more of the thermostats E have been operated on by the thermic conditions 20 of the surrounding atmosphere. When the current is short-circuited from the series wire A to the thermostatic circuit, the current will then pass from the battery D, through the circuit A, through the thermostat, through the thermostat-wire, and to 25 plate 99—that is, if the thermostat acted upon is located upon the second floor of the building. From plate 99 the current passes to plate 111, through their connection into wire 30 F, and to the solenoid 55, which attracts the pointer to the numeral upon the dial indicating the second floor, through the indicator return-wire G, to plate 89, to plate 106, through their connection, to brush 85, through magnet 53, to brush 86, to brush 68, to binding-post s, through wire H, to solenoid 56 to the 35 return-wire from post t to the battery. The current thereby energizes magnets 53 56 and the magnet 55, controlled by the thermostat or thermostats, acted upon, and thereby releases the pointer of the indicator and stops the same at the desired point. To the upper 40 end of shaft 7 is fastened a break-wheel U, bearing against which are the brushes v, y, and z, to which are attached the line-wires w and x, said wires leading to the fire or point where the signal is to be given. When in a normal position, however, should a wire break or the source of current become weak or cut 50 off magnet 53 is demagnetized, thus permitting the series of movements previously described, except when disk 36 makes one revolution. Lever 42 is forced into slot 37 by spring 45, thereby engaging with projection 55 33 of stop-piece 31, thus stopping the mechanism with the wiring connected in multiple and having sent in a trouble-alarm. The object of the break-wheel U and its brushes v, y, and z is to send the signal to the central 60 office. In the normal condition of the line to

the central station this is accomplished by the brushes v and y passing over the notches in said break-wheel, brushes v and y being connected to binding-post w and x.

What we claim is—

1. In an automatic fire-alarm system a controller provided with a plurality of brushes and movable contact-plates so arranged as to connect the wiring of the system in series, when in one position, and means whereby the 65 contact-plates are moved automatically to a second position thus connecting the wiring in multiple. 70

2. In an automatic fire-alarm system a controller provided with a plurality of brushes 75 and movable contact-plates so arranged as to connect the wiring of the system in series when in one position, and means whereby the contact-plates are moved automatically to a second position, thus connecting the wiring 80 in multiple, an annunciator connected therewith by means of said plurality of brushes and contact-plates, so arranged that the annunciator is normally out of circuit and when the switch is moved to its second position the 85 annunciator is operatively connected.

3. In an automatic fire-alarm system an annular insulating-ring, a plurality of brushes secured thereto, a disk having a plurality of 90 insulated contact-plates thereon, a lever pivotally secured at one end and extending centrally of the disk, a stud upon the disk and a slot in the lever in which the stud moves, a spring-actuated train of gearing having a roller to contact with the lever to move the 95 disk.

4. In an automatic fire-alarm system an annular insulating-ring, a plurality of brushes secured thereon, a disk having a plurality of 100 insulated contact-plates thereon adapted to contact with the brushes, an electromagnetically-operated stop-lever, a finger fastened to said disk and adapted to pass in the rear of said lever when the disk is moved, and means for moving the disk, and a stop for engage- 105 ment with the lever.

5. In an automatic fire-alarm system a controller, a spring-actuated train of gearing, a speed-governor mounted upon the shaft thereof having depending projections, a stop-lever 110 and means for urging the lever into engagement with one or the other of the projections.

In testimony whereof we have subscribed our names in the presence of two subscribing witnesses.

HARVEY CORTLAND.
JOHN T. HUME.

Witnesses:

W. C. BARR, Jr.,
WILLIAM WEBSTER.