A. GOLDSTEIN.

ELECTRICAL SYSTEM FOR THE SUPERVISION OF WATCHMEN.

APPLICATION FILED JULY 22, 1910.

Patented Jan. 17, 1911.

982,052.

2 SHEETS—SHEET 1.

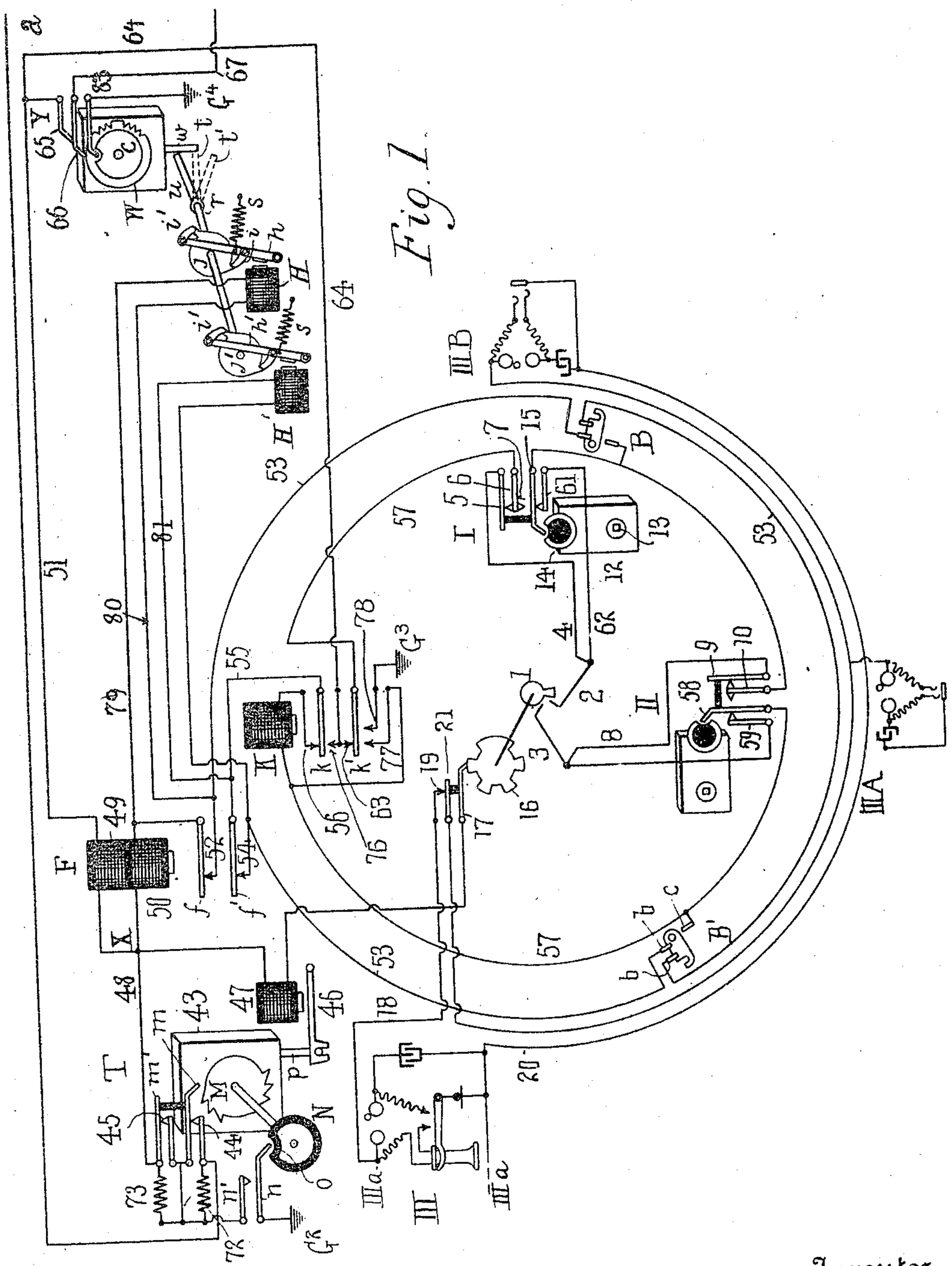

Fig. 1.

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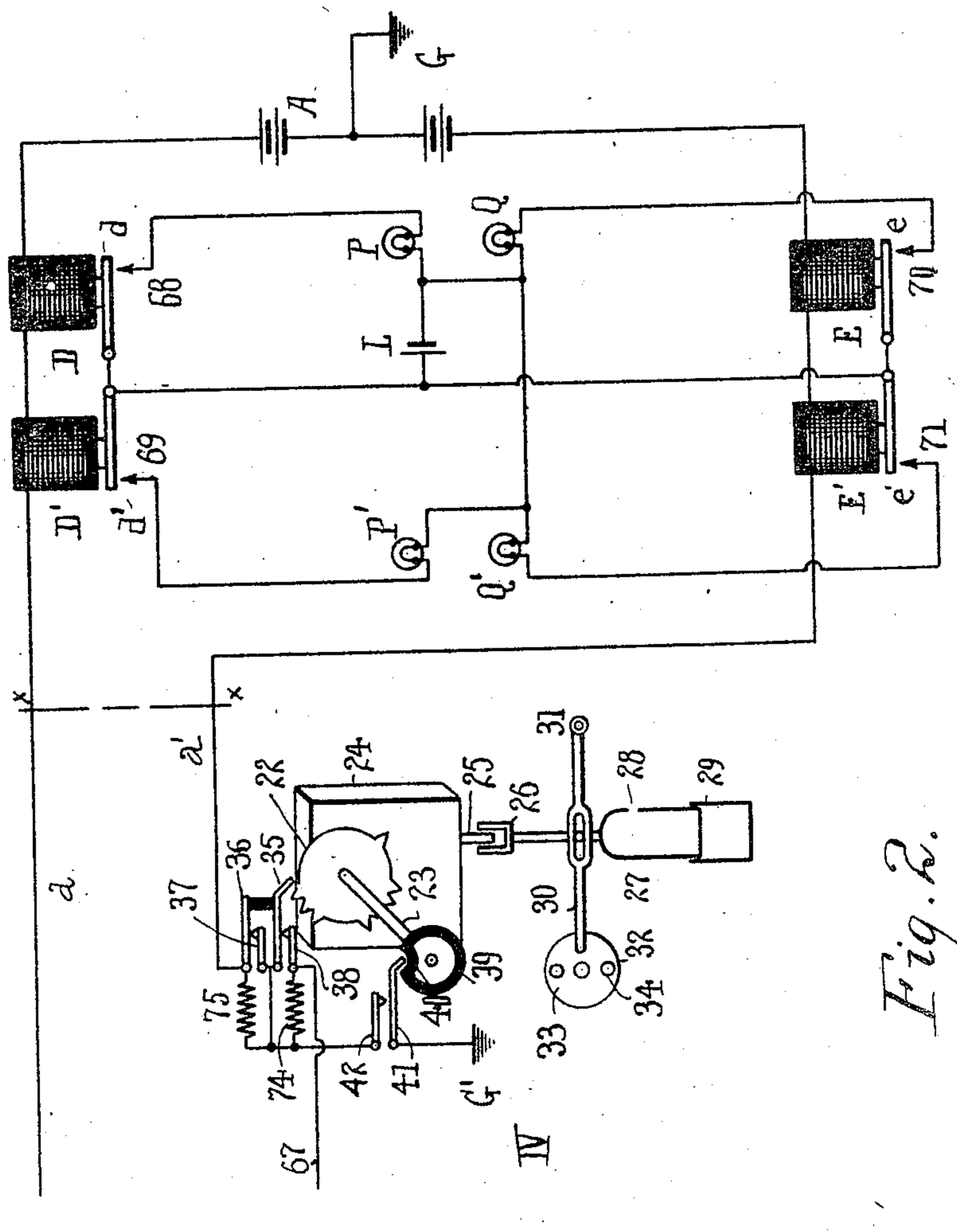

Fig. 2.

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UNITED STATES PATENT OFFICE.

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ELECTRICAL SYSTEM FOR THE SUPERVISION OF WATCHMEN.

982,052. Specification of Letters Patent. Patented Jan. 17, 1911.

Original application filed May 10, 1910, Serial No. 560,534. Divided and this application filed July 22, 1910. Serial No. 573,170.

To all whom it may concern:

Be it known that I, ALBERT GOLDSTEIN, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented a certain new and useful Improvement in Electrical Systems for the Supervision of Watchmen, of which the following is a specification.

The invention is an electrical system for the supervision of watchmen. It is a central station system in contradistinction to a local system; or, in other words, the watchman is under the constant supervision at all times of a person posted at a central station. It operates automatically at certain times to send in tell-tale signals unless the watchman goes to the several sub-stations on the premises to be protected and prevents this operation. This is the opposite method to that hitherto employed, wherein the watchman is himself required to send in the signals, or make a record to be examined at some future time. It also provides means for telephonically communicating with the watchman as soon as a tell-tale signal comes in. Hence the determination of whether a watchman has done his duty through the night, for example is not a matter for the next morning, but one of immediate discovery. He cannot miss a sub-station on his rounds without that fact being instantly known, and inquired into. To the device which watches the watchman there is added a device which watches it, so that any failure of the former immediately results in a warning signal being sent to the central station; and again the watchman can be called upon to discover and remove the cause of the trouble. In association with the watch system there is also provided a fire alarm system, whereby, upon the occurrence of a fire, the watchman can instantly send in a signal, and this fire signal is differentiated from the watch or supervision signals, so that its nature is at once recognized. And finally, provision is made for the operation of the fire alarm system despite troubles on the wires on the protected premises, and for preventing the transmission of false alarms, due to accidental wire crossings or like occurrences.

In another application for Letters Patent, Serial No. 560,534, filed May 10, 1910, of which my present application is a division, I have described and claimed the watchman's supervisory system herein set forth, so that my present application relates more particularly to the said supervisory system in combination with a telephone or fire alarm system.

The accompanying drawing is an electrical diagram, showing the entire system. The two sheets are to be placed together, Figure 2 on the right of Fig. 1.

For convenience of description, I will assume that there are two sub-stations (there may be any number) in a given building, from which signals will be automatically and alternately sent to the central station at intervals of thirty minutes apart. At each substation there is a device which is manually controlled by the watchman for preventing the transmission of said signals. Obviously, the watchman must arrive at each sub-station before the moment when the signal will be automatically sent, and must, to prevent such transmission, operate the controlling device. If he does not do this, then the simple fact that a signal is received at the central station shows that the watchman has neglected to arrive at the sub-station at the proper time. The watchman may then be called up on the telephone, provided for the purpose, and his excuse for the dereliction demanded. If no reply is received to the telephone call, then the usual practice of sending a "runner" to the protected premises to discover the cause of the trouble can be resorted to.

I will first describe the mechanism whereby the signal is automatically sent, and also the means whereby the watchman prevents that transmission.

The automatic transmission of signals.—I and II are the two sub-stations which the watchman must visit successively at intervals, say, of 30 minutes. 1 is a cam disk which is kept in rotation by any suitable clock mechanism, and which, at intervals of thirty minutes, closes contact with switches 2 and 3, connected respectively to sub-stations I and II. When contact is made with switch 2, local circuit is closed by way of wire 4, to switch 5, and contact 6, to wire 57, and then by automatic means a signal is sent to line and so to the receiving station; and similarly when contact is made with switch 3, another local circuit is closed by way of wire 8, to switch 9, and contact

10, to wire 57, and then, as before, the automatic means operates to send the signal to line and so to the central station.

The watchman's signal preventing devices.—In order to prevent a signal from being sent, the watchman must reach the proper sub-station before the moment arrives for its automatic transmission, and must operate the preventive means there located. Any suitable clockwork mechanism contained in a case 12 sets in rotation a cam 14 when released by the insertion by the watchman of a key, for example, in an opening 13. While the cam 14 is at rest, the end of a switch 15 enters a notch in its periphery, and as switch 15 is mechanically connected to switch 5, the local circuit, already described, is normally kept closed. But as soon as the cam 14 begins to rotate, the switch 15 is raised and the local circuit is broken between switch 5 and contact 6. The wire 57 is not broken because switch 15 now touches contact 7. The period of rotation of cam 14 is to be made long enough to keep the local circuit open during the period while the cam 1 is in contact with switch 2. Hence the signal is not transmitted. The watchman then goes to sub-station II in proper season, and perform the same operation. Consequently, so long as he visits these sub-stations and operates his preventive devices, no tell-tale signal arrives at the central station, but should he fail to arrive and act at the proper time at either sub-station, then, as stated in the beginning, the signal will automatically be sent in. If the watchman is not to be kept under supervision continually night and day, but only, say, during the night and throughout the 36 hours intervening between Saturday night and Monday morning, I provide a disk 16 which, by suitable clock-work mechanism, is caused to make one rotation in a week. This disk is in circuit with disk 1, and has on its periphery suitably disposed projections of proper length which keep the circuit closed at switch 17 over the night hours, and over the Saturday to Monday interval, the bent end of the switch 17 at other times entering the spaces between said projections and so breaking the circuit.

The telephonic inquiry.—It has been stated that in case a signal is received indicating failure on the part of the watchman, he may be called on the telephone and asked to explain. The telephone connections are as follows: At III is a set of standard telephone receiving devices connecting with the regular telephone line III^{a}. One terminal of the telephone line connects by wire 18 to contact 19. The other terminal connects by wire 20 to two local telephone transmitting stations III^{A} and III^{B}, and finally, to switch 21 which is mechanically connected to switch 17. The stations III^{A} and III^{B} are preferably situated at the watchman's stations I and II, and each is provided with the usual bell, condenser, induction coil and jack, so that the watchman can connect to either of them a portable telephone transmitter and receiver, which he carries always with him. It will be obvious that when the circuit is closed by disk 16, the telephone circuit is also closed, and in this way, the telephonic devices are made ready for use during the period while the watchman is under supervision. Hence during the supervised time, all of the bells at the telephone stations III, III^{A}, III^{B} will respond to a call from the central station, and this call the watchman can answer at the station III^{A} or III^{B} which happens to be nearest him at the moment, by connecting in his portable telephone.

The supervising transmitter.—I have now described the device which watches the watchman. I will now describe the supervising transmitter, or, in other words, the device which watches the watching device. This is shown at IV, and its purpose is to send in a signal automatically in case of a failure of the driving mechanism which rotates disk 1, in which event, of course, the apparatus would no longer be operative, and hence it might be inferred at the central station that the watchman was alert and doing his duty, when in fact the reverse might be true.

22 is a code wheel, fast on shaft 23, which is rotated by clock-work mechanism in the case 24. Said clock-work mechanism is normally wound, but is prevented from operating by the following means: 25 is the pallet tail which, when the clock-work is running, vibrates to and fro. This tail is held from movement and the clock-work so arrested by its entrance into a sleeve 26 carried on the end of a rod which extends upwardly from the dash pot bell 27. The bell 27 has a small side vent 28, and is received in the cup 29. A pin on the rod enters a slot in the lever 30, which is pivoted to any suitable support at 31. The free end of lever 30 extends in front of a disk 32 which is intermittently rotated by the same mechanism which drives the disk 1, so that (under the time conditions previously assumed) a half revolution is made every half hour. On the disk 32 are two pins 33, 34, disposed 180° apart. When one of the pins 33, 34 comes under the lever 30, it lifts said lever, and so raises the bell 27 out of its cup 29. As the pin passes from under the lever, the bell descends, imprisoning the air which can now escape only slowly through the vent 28. By suitably adjusting the size of the vent, the time period of the descent of the bell can be regulated. If now, the driving mechanism of disk 1 should fail, disk 32 will not be rotated, and hence the bell 27 will be allowed to sink to the bottom of its cup, thus

withdrawing the sleeve 26 from the pallet tail 25, and freeing the clock-work mechanism of code wheel 22. Said wheel controls the connected switches 35, 36 to make and break contact at 37 and 38. On the shaft of wheel 22 is a disk 39 having a rim of insulating material and a notch 40 in said rim into which enters the bent end of a switch 41, which is connected to ground at G'. Switch 41, when its bent end enters notch 40, breaks contact with switch 42, and is raised to close said contact to ground when said disk rotates.

The main transmitter.—This is shown at T. It comprises a code wheel M rotated by any suitable clock-work mechanism in the case 43. Said wheel operates the switches *m*, *m'* to break circuit at the contacts 44, 45. On the shaft of wheel M is a disk N having a rim of insulating material and a notch *o* in said rim into which enters the bent end of a switch *n*, which is connected to ground at G^2. Switch *n*, when its bent end enters notch *o*, breaks contact with switch *n'*, and is raised to close said contact to ground when said disk rotates. The pallet tail *p* of the driving mechanism of wheel M is normally held, and said mechanism is so prevented from operating by engagement in a notch in the end of a pivoted lever 46, which is controlled by the magnet 47, which magnet, when energized, lifts said lever to free said pallet tail.

The metallic watch circuit.—All of the apparatus on the right of line *x*, *x*, Fig. 2, is located at the receiving or central station, and all on the left is located at the transmitting or protected station. The source of current A is here shown in two sections, with a connection to ground G between them.

The magnet F is a neutral magnet having two coils 49, 50, and controls the switches *f* and *f'*. The magnet K controls the switches *k* and *k'*. The magnets D, D', E, E' control the translating mechanism at the central or home station. Magnets D' and E' are to be made relatively weaker than magnets D and E. Hence if two sets of impulses, one set stronger than the other set, be successively transmitted, all of the magnets D, E, D', E' will be capable of responding to the stronger set of impulses; but only D', E' will respond to the weaker set. Magnet D controls switch *d* to open and close contact at 68, and magnets D', E, E' control switches *d'*, *e*, *e'* to open and close contact at 69, 70, 71. The contacts 69 and 71 are in local circuit with battery L and lamps P', Q'. The contacts 68, 70 are in local circuit with battery L and lamps P, Q. The said lamps constitute translating devices for the signals transmitted through magnets D, D', E, E'. The metallic circuit proceeds as follows: from source A, to magnet D, magnet D', line member *a*, contact 44, switch *m*, contact 45, switch *m'*, wire 48, to junction X, where the circuit divides into a line branch and a local branch, which branches are reunited at junction Y. Tracing, first, the line branch, the circuit is as follows: from junction X, to coil 49 of neutral magnet F, by wire 51, to junction Y. The house branch proceeds from junction X, to coil 50 of neutral magnet F, to switch *f*, contact 52, wire 53, (which forms an outer loop extending through the protected premises) contact 54, switch *f'*, wire 55, switch *k*, contact 56, magnet K, wire 57 which forms an inner loop and includes in series the watchman's sub-stations II and I, as follows: in sub-station II, to switch 58, contact 59, to switch 3, wire 8, switch 9, contact 10, to sub-station I. In sub-station I, to switch 15, contact 61, wire 62, switch 2, wire 4, switch 5, contact 6, and thence to switch *k'*, contact 63, wire 64, to junction Y. The line and house branches having united at junction Y, the circuit continues to contact 65, switch 66, wire 67, contact 38, switch 35, contact 37, switch 36, line member *a'*, magnet E', magnet E, to source A.

The operation of the apparatus so far as described is as follows: The magnets D, D', E, E' and K are all normally energized from the central source A. The magnets 47 and F are not energized, F being balanced. I will now assume that the watchman being due at sub-station I, for example, at a given time, fails to go there, and hence does nothing to prevent warning of that fact being automatically transmitted to the receiving station. This transmission takes place in the following way: Disk 1 makes contact with switch 2. Circuit is then established through magnet 47, the coil terminals of which are respectively connected to junction X and to switch 17. Magnet 47 raises lever 46, freeing the clock-work mechanism of code wheel M. The transmitter T is bridged between contact 44 and switch *m'* by a connection containing resistances 72, 73, which connection is connected through contact *n'* and switch *n* to ground at G^2. The code wheel M in rotating intermittently, brings these resistances into the circuit and so sends to line a succession of weak impulses, which will operate only the magnets D', E', and produce visual signals at the lamps P', Q'. These are the tell-tale signals which show the dereliction of the watchman, and upon receiving them, the attendant at the receiving station at once calls up the watchman by telephone in the manner already described.

The arrangement of resistances 74, 75 and ground connection at the supervising transmitter at IV is the same as just explained, so that when this transmitter is caused to operate, as already described, it also sends in similar weak signals, affecting only magnets D', E'. In this event, the attendant

calls up the watchman by telephone and directs him to wind up the actuating mechanism of disk 1, which may have run down, or otherwise remedy the trouble.

The fire alarm connections.—The object of the part of the system now to be described is to enable the watchman to send in fire alarm signals in case of necessity. This he does by means of hand switches, any number of which may be used throughout the building to be protected. Two of said switches are here shown at B and B′. The pivoted hand lever B is normally in wiping contact with the plate terminals *b*, *b* of wire 53, and when operated, meets the plate contact *c* connected to wire 57, before it opens circuit at said terminals. When the lever B makes contact at C, thus producing a crossing between wires 53 and 57, the magnet K, which is normally energized, becomes short-circuited, fails, and its switches *k*, *k′* break circuit at 56 and 63, and close circuit at 76, 77 and 78. It has already been explained that magnet K is in series with coil 50 of neutral magnet F which is normally balanced. The removal of the resistance of magnet K now unbalances magnet F, causing switches *f* and *f′* to open contact at 52 and 54, and so bringing magnets H and H′ into the following circuits: Magnet H. From junction X, to coil 50 of magnet F, wire 79, magnet H, wire 80, wires 53, switch B, wire 57, switch *k′* contact 78, to ground G³. Magnet H′. From junction Y, to wire 64, contact 76, switch *k* wire 55, wire 81, magnet H′, wire 53, switch B, wire 57, switch *k′*, contact 78, to ground G³. The magnets H and H′, thus being energized, attract pivoted levers *h*, *h′* against the action of their retracting springs *s*, *s*. On each of these levers are two pawls *i*, *i′*, which engage shouldered disks *j*, *j′* on the shaft *r*. The disk shoulders are so placed as that, when the magnets operate, only the lower pawls *i* act on the disks *j*, *j′* to turn them. This brings the upper pawls *i′* into position to engage the shoulders on the upper edge of the disks. By this time, the hand lever B has moved out of contact with the terminals *b*, *b*, thus breaking the circuit and deënergizing magnets H, H′, which release their levers *h*, *h′*, so that said levers are brought back to their original position by the retracting springs *s*, *s*. But because the upper pawls *i′* are now in engagement with the disks, this movement of the levers rotates the disks still farther in the same direction. The object of this construction is simply to cause an arm *u* on the end of the shaft *r* to move over its path in two steps. Against this arm bears the pallet tail *w* of the clock-work mechanism of a code wheel W which, in this way, is normally prevented from operating. When the arm *u* makes its first step to the position indicated by dotted lines *t*, it does not release said pallet tail, but on making its second step to the position shown in dotted lines at *t′*, it does effect such release. Going back, therefore, to the hand switch B, the initial movement of that switch into contact with *c*, but without breaking contact at terminals *b*, *b*, determines, through the devices described, the first step of arm *u*. The movement of B continued, breaks contact at terminals *b*, *b* and this determines the second step of arm *u* and consequent release of wheel W. Metallically connected to wheel W is a disk C having a notch in its periphery into which enters the bent end of switch 83, connected to ground at G⁴. When the disk C is at rest, this ground connection is broken. When disk C rotates, the switch 83 bears on its circumferential edge and establishes such ground connection. Switch 66 bears on wheel W.

From the foregoing it will be seen that the operation of lever B by the watchman causes the release of wheel W, which now becoming connected to ground, sends its signal impulses to line. These impulses are much stronger than those sent by the transmitters at T and IV, and hence all four of the magnets D, D′, E, E′ and all four of the lamps P, Q, P′, Q′ respond. The code on wheel W is preferably different from that on wheels M and 22.

The reason for providing two magnets H, H′ is to insure the transmission of the fire signal in case of trouble on either loop wire 57 or 53, for its will be evident that if one of said wires is impaired, only the magnet H or H′, as the case may be, will be under the control of lever B, and will still remain operative to turn its associated disk.

The reason for constructing the device so that the arm *u* has to make two steps before releasing the driving mechanism of wheel W is to reduce the danger of a false alarm, such as otherwise might be given if some single accidental trouble, such as a cross between the loops 57 and 53, could set free the mechanism by causing the arm *u* to move over a single step.

It is, of course, to be understood that sufficient lag is to be given to magnet K to prevent it becoming deënergized by the ordinary code signals sent over the system. Obviously, also, any trouble on loops 53 and 57 will unbalance magnet F, which will thereupon put magnets H, H′ in circuit ready to actuate the release mechanism of the fire alarm wheel W upon the operation of any lever B, B′.

Instead of levers B, B′, any other signal initiating devices may be used, such as thermostats, organized to perform the same two steps.

I claim:

1. An electrical supervision system comprising (1) a line circuit, a transmitter

automatically operating at certain time intervals and for certain time periods to send signals over said line, a translating device at the supervising station, and a telephone circuit; and, (2) at the supervised station, telephonic apparatus, and manually controlled means for preventing said signal transmission during said periods; and (3) an automatically operating device for intermittently connecting said telephone circuit and apparatus to line.

2. An electrical supervision system comprising (1) a line circuit, a transmitter automatically operating at certain time intervals and for certain time periods to send signals over said line, a translating device at the supervising station, and a telephone circuit; and, (2) at each of a plurality of supervised stations, telephonic apparatus, and successively operable manually controlled means for preventing said signal transmission during said periods; and (3) an automatically operating device for intermittently connecting said telephone circuit and apparatus to line.

3. An electrical supervision system comprising a line circuit and in said circuit an automatically operating transmitter, a translating device, a second transmitter, and a manually operable circuit closer disposed in a crossing between the line members and at the supervised station for independently controlling said second transmitter.

4. An electrical supervision system comprising a line circuit and in said circuit an automatically operating transmitter, a translating device, a second transmitter, and a plurality of manually operable circuit closers, each independently controlling said second transmitter and disposed in crossings between the line members at the supervised station.

5. An electrical supervision system comprising a line circuit and in said circuit an automatically operating transmitter, two translating devices, a second transmitter, and means at the supervised station for independently controlling said second transmitter: the said transmitters respectively sending impulses of different strengths: one of said translating devices being responsive to relatively weak impulses sent by the first-named transmitter, and both of said devices being responsive to the stronger impulses sent by the second transmitter.

6. An electrical supervision system comprising a line circuit and in said circuit an automatically operating transmitter, a second transmitter, means at the supervised station for independently controlling said second transmitter, and selective devices at the supervising station for indicating signals respectively sent by said transmitters.

7. An electrical supervision system comprising a source of current at the supervising station, a line circuit, an automatically operating transmitter, a second transmitter, translating devices selectively controlled by said transmitters, means for preventing the operation of said second transmitter, and a manually controlled releasing device for said preventive means.

In testimony whereof I have affixed my signature in presence of two witnesses.

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Witnesses:

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