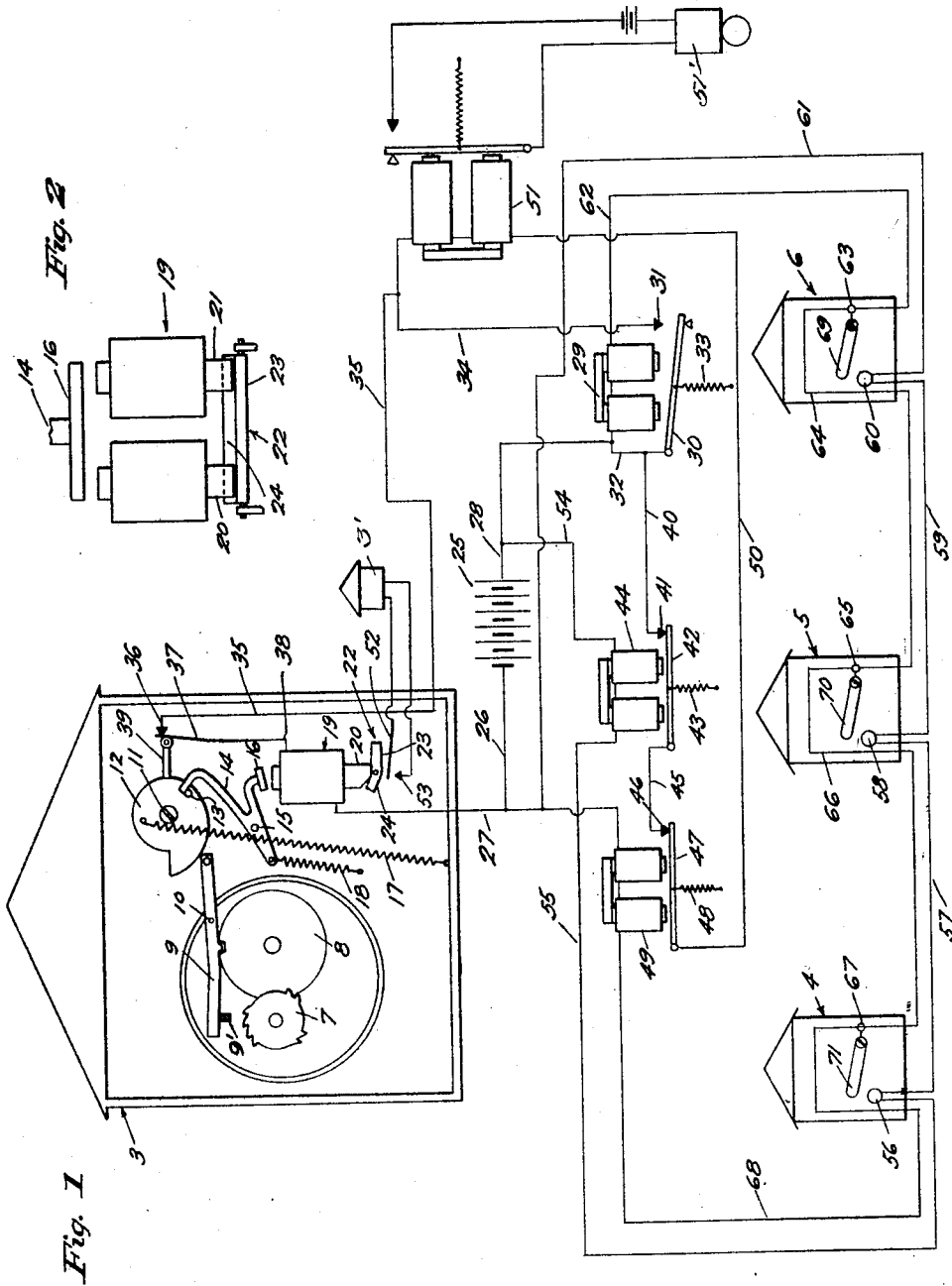


L. DEGEN.
 SIGNAL TRANSMITTING SYSTEM.
 APPLICATION FILED MAY 2, 1918.

1,324,732.

Patented Dec. 9, 1919.



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 by Mettall and Wallace
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UNITED STATES PATENT OFFICE.

LEWIS DEGEN, OF PASADENA, CALIFORNIA.

SIGNAL-TRANSMITTING SYSTEM.

1,324,732.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, LEWIS DEGEN, a citizen of the United States, residing at Pasadena, in the county of Los Angeles and State of California, have invented new and useful Improvements in Signal-Transmitting Systems, of which the following is a specification.

This invention relates to a signaling system especially adapted for sending fire alarms; and pertains particularly to a signal system having auxiliary boxes located remote from a sub-station for actuating the sub-station signal mechanism, and to means for sending a call to the central station in case of trouble in the auxiliary box circuits.

The objects of this invention are first, to provide novel means to trip the sub-station box from the auxiliary box; and second, to provide means to actuate a signaling mechanism upon trouble occurring in the auxiliary box circuit.

I accomplish these objects by means of the embodiment of my invention illustrated in the accompanying drawing, in which:

Figure 1 is a diagrammatic sketch of the system. Fig. 2 is an enlarged side view of the tripping coil and no-current release.

A sub-station box, such as is ordinarily installed in the street, is indicated by 3. Auxiliary boxes, such as are usually installed in buildings, are indicated by 4, 5 and 6. Electrical circuits connect the sub-station and auxiliary boxes.

Referring more particularly to the sub-station box 3 a character wheel is indicated by 7. Suitable mechanism, such as a spring motor is contained within the box and serves to operate the character wheel. A control wheel 8 has a recess therein for engagement by the lug of a trip lever 9. The usual hand lever 9' for manually operating the box is shown in section. The particular mechanism of the transmitter forms no part of this invention, and, therefore, will not be further described. Lever 9 is pivoted at 10 and extends outside of the shell. Mounted upon an arbor 11 is a cam 12 so constructed that upon rotation of the cam it will engage the end of lever 9, and the lever will be turned to release control wheel 8. Secured to the cam is a pin 13, which is adapted to be engaged by the end of a catch lever 14. Catch lever 14 is pivoted at 15 and has an arm with an armature 16 at one end thereof. A spring 17 is secured to the

cam 12 so that it tends to rotate the cam, and thereby trip the lever 9. Attached to an arm of catch 14 is a spring 18, which tends to hold the end of the catch in front of pin 13 so as to prevent rotation of the cam. Tripping coil 19 has a double pole electro-magnet disposed so as to act upon armature 16. Referring particularly to Fig. 2, it will be noted that the cores 20 and 21 are connected magnetically by a pivoted yoke 22. These cores are beveled as best shown in Fig. 1 so that if the arm 23 of the yoke drops downwardly away from the cores, the arm 24 will engage the beveled portion, thereby completing the magnetic circuit through the yoke. Arm 23 is pulled into contact with the cores 20 and 21 on energization of the electromagnet 19. The armature is overbalanced so that arm 23 tends to drop away from the magnet cores. The structure of the magnet cores and armature is such that the reluctance of the magnetic circuit is less with arm 23 in contact with the cores than with arm 24 in contact therewith. Thus, when there is no magnetism or only a very small amount in the cores, the arm 23 will drop, and when the magnetism is increased the arm 23 is drawn to the cores and the armature restored.

The source of electrical energy for the system comprises a battery 25, which has a conductor 26 connected to a conductor 27, the latter being connected to one terminal of the electro-magnet 19. The positive terminal of the battery has a conductor 28 connected thereto, the other end thereof being connected to the terminal of a non-sensitive relay 29. The relay 29 has an armature 30 forming a contact to engage a contact 31. Armature 30 is connected to conductor 28 by means of conductor 32. A spring 33 tends to hold armature 30 out of engagement with contact 31. Contact 31 is connected by conductor 34 to a conductor 35. Conductor 35 leads to a contact 36. A spring contact finger 37 is arranged to engage with contact 36. A conductor 38 connects contact 37 with the other terminal of coil 19. Mounted upon cam 12 is an arm 39 which holds finger 37 in engagement with contact 36, when the cam is in the position shown in Fig. 1.

It is evident that, when contact 30 of the non-sensitive relay engages contact 31, current will flow through the electro-magnet

coils 19; and the resistances are so proportioned that sufficient magnetism will be created in the electro-magnet 19 to pull the armature 16 downwardly and thereby pull the catch 14 from the pin 13. The spring 17 then turns the cam bringing the high portion against the end of the trip lever 9 actuating the latter and setting the signal transmitter in operation. The movement of the cam causes the arm 39 thereon to move so as to permit spring contact 37 to break contact with contact 36, thereby opening the circuit and preventing further current from passing through the circuit. This prevents exhaustion of the battery 25.

Conductor 40 connects conductor 32 and a contact 41. A pivoted armature 42 forms the cooperating contact for contact 41. Spring 43 tends to hold contact 42 out of engagement with contact 41. Contacts 41 and 42 form the switch of a sensitive relay 44. A conductor 45 connects 42 and a contact 46. Pivoted armature contact 47 is arranged to engage contact 46, and has a spring 48 tending to hold contact 47 out of engagement with contact 46. A sensitive relay 49 controls the operation of contact 47. Conductor 50 connects contact 47 and the terminal of the coils of a local alarm relay magnet indicated by 51, which controls a local alarm, here shown as a bell 51'. Conductor 34 is extended to connect the other terminal of electromagnet 51 to conductor 35. Normally, contacts 46 and 47 are in engagement and contacts 41 and 42 are in engagement. There is, therefore, a shunt circuit around contacts 30 and 31 of the non-sensitive relay.

In practice the tripping coil will have a resistance of about 30 ohms, the non-sensitive relay a resistance of 20 ohms, and the local alarm relay a resistance of 600 ohms. It is obvious that there is a current of small magnitude flowing through the coil 19. This is a test current and is sufficient to hold the no-current release armature 22 in the position shown in Fig. 1. If there is a break in the circuit last described, which may be due to the opening of the circuit at either contacts 46 and 47, or contacts 41 and 42, or a failure of the battery, or a break in wires 27 or 35 the no-current release armature will drop. Arm 23 will engage a spring contact 52 and move the same into engagement with a contact 53, thereby closing a circuit which includes these contact points. Normally contacts 52 and 53 are out of engagement. The circuits including contacts 52 and 53 lead to and control an auxiliary signal sending mechanism 3', which may be of the same type as box 3, but the specific type of this mechanism forms no part of my invention and will not be described. The local alarm circuit forms

no part of my invention and it also will not be described.

Connected to conductor 23 is a conductor 54, which leads to one terminal of the sensitive relay coil 44. A conductor 55 connects the other terminal of coil 44 to a contact 56 in the auxiliary box 4. Conductor 57 connects contact 56 and a similar contact 58 in auxiliary box 5. A conductor 59 connects contact 58 with a contact 60 in auxiliary 6. Leading from contact 60 to conductor 27 is a conductor 61. This forms a circuit from the positive terminal of battery 25 through the sensitive relay coil 44 into each of the auxiliary boxes and then to the negative terminal of the battery 25.

A conductor 62 is connected to a terminal of the non-sensitive relay coil 29 and leads to a binding post 63 in the auxiliary box 6. Conductor 64 connects binding post 63 and a binding post 65 in auxiliary box 5. Conductor 66 connects binding post 65 and a binding post 67 in auxiliary box 4. Leading from binding post 67 to a terminal of the sensitive relay coil 49 is a conductor 68. This completes a circuit from the positive terminal of battery 25 through the non-sensitive relay magnet 29, each of the auxiliary boxes, to the sensitive relay magnet 49 and back to the negative terminal of battery 25.

In practice the sensitive relay magnets will have a resistance of about 900 ohms each. It is obvious that a small test current will flow through each of the two circuits last described. The magnetic flux created in the sensitive relay magnets 44 and 49 is sufficient to hold the contacts 42 and 47 in their closed position. If there is a break in either of the circuits containing the sensitive relay magnet, either contact 42 or 47 will be released, and the test circuit through the tripping relay coil broken, so that the no-current release armature will drop and actuate the trouble signal sending mechanism.

Connected to binding post 63 is a switch arm 69 arranged to be moved into engagement with contact 60 in box 6. Similarly there is a switch arm 70 in box 5 arranged to engage with contact 58. In box 4 there is a similar arm 71.

Suppose box 4 is operated by pulling the arm 71 so that it engages contact 56. Current will then flow from the positive side of battery 25 through conductor 28, non-sensitive relay coil 29, conductors 62, 64, 66, arm 71, contact 56, conductors 57, 59, 61, 27 and 26 to the negative side of the batteries. The only resistance element in circuit is the non-sensitive relay coil. A relatively large current then flows through the circuit last described, and energizes electro-magnet 29 sufficiently to pull contact 30 into engage-

ment with contact 31, completing a low resistance circuit through the tripping coil 19, and resulting in the actuation of the substation box. It is obvious that pulling
 5 either of the other auxiliary boxes completes a like circuit.

Suppose the conductors 66 between boxes 4 and 5 breaks, boxes 5 and 6 will still be operative. However, contact 47 will open
 10 the circuit in which it is included, and break the test circuit so that no current flows through the tripping coil 19. The no-current release armature will be operated thereby, sending a trouble call to the central station. The arm 24 of the no-current release
 15 armature closes the magnetic circuit of relay electro-magnet 19 so that if either boxes 5 or 6 are operated, sufficient magnetic flux will be created to act upon armature 16.
 20 Suppose the conductor 57 between boxes 4 and 5 is broken, boxes 5 and 6 will still be operative. However, the circuit through sensitive relay magnet 44 will be broken, and contact 42 will break the test circuit.

25 In a like manner the flow of current under conditions of a breakage in other wires of the auxiliary box circuit may be traced.

What I claim is:

1. In a signaling system, a main circuit
 30 comprising a tripping coil, a normally open non-sensitive relay controlling said circuit by closure thereof, and a source of electrical energy; a first branch circuit controlling said non-sensitive relay by energization
 35 thereof and comprising an element of high resistance, and said source of electrical energy; a second branch circuit comprising said source of electrical energy; and an auxiliary switch bridged across said second
 40 branch circuit and said first branch circuit intermediate said non-sensitive relay and said element of high resistance so that upon closing said auxiliary switch the coil of said non-sensitive relay will be in a circuit including said source of electrical energy, said
 45 element of high resistance being shorted.

2. In a signaling system, a main circuit comprising a tripping coil for controlling a signal transmitting mechanism, a nor-

mally open non-sensitive relay, and a source
 of electrical energy; a first branch circuit
 comprising the coils of said non-sensitive
 relay, the coils of a normally closed high
 resistance sensitive relay, and said source
 of electrical energy; a second branch cir-
 55 cuit comprising the coils of a normally closed high resistance sensitive relay, and said source of electrical energy; a third
 branch circuit comprising the circuit
 closers of said sensitive relays, comprising
 60 said tripping coil, and said source of electrical energy; and an auxiliary switch bridged across said first branch circuit intermediate
 the sensitive relay and non-sensitive relay
 therein and said second branch circuit so
 65 that upon closing said auxiliary switch the coil of said non-sensitive relay will be in a circuit including said source of electrical energy and having the coils of said sensitive relays shorted.

3. In a signaling system, a main circuit
 comprising a tripping coil for controlling a
 signal transmitting mechanism, a normally
 open non-sensitive relay and a source of
 electrical energy; a first branch circuit com-
 75 prising the coils of said non-sensitive relay, the coils of a normally closed high resistance sensitive relay, and said source of electrical energy; a second branch circuit comprising the coils of a high resistance sensitive relay, and said source of electrical energy; a third
 branch circuit comprising the circuit closers
 of said sensitive relays, said tripping coil,
 said source of electrical energy, and the coil
 of a local alarm relay; and an auxiliary
 85 switch bridged across said first branch circuit intermediate the sensitive relay and non-sensitive relay therein and said second
 branch circuit so that upon closing said
 auxiliary switch the coil of said non-sensi-
 90 tive relay will be in a circuit including said source of electrical energy and having coils of said sensitive relays shorted.

In witness that I claim the foregoing I have hereunto subscribed my name this
 25th day of April, 1918.

LEWIS DEGEN.