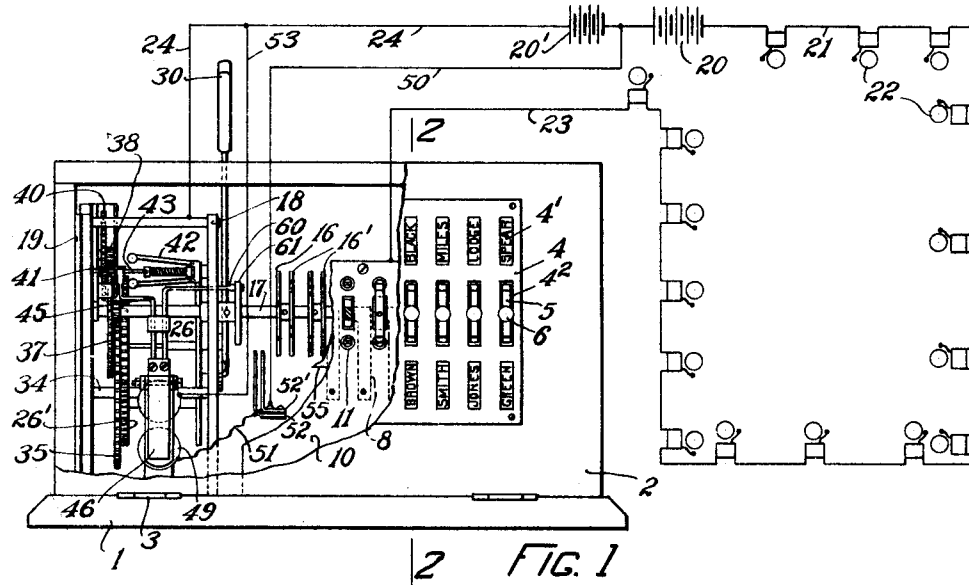
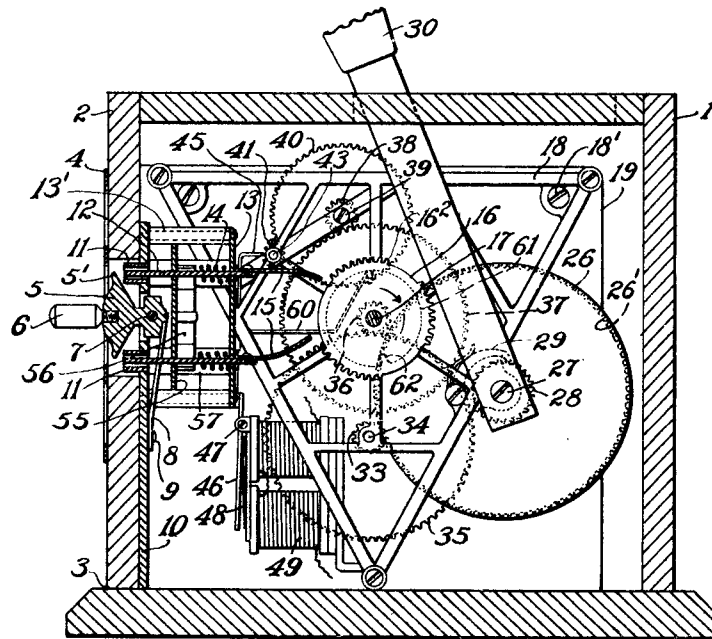


A. F. BOARDMAN.
 SEARCH CALL APPARATUS.
 APPLICATION FILED SEPT. 26, 1912.

1,079,467.

Patented Nov. 25, 1913.

2 SHEETS-SHEET 1.



WITNESSES
 Victoria London
 Vera E. Fogg

FIG. 2

INVENTOR
 Arthur F. Boardman
 BY *Wm. S. Spear*

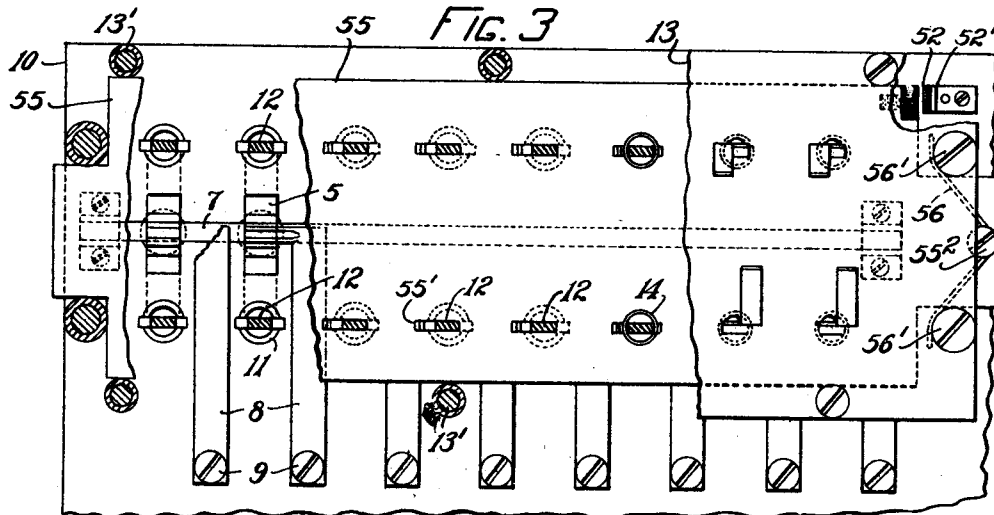
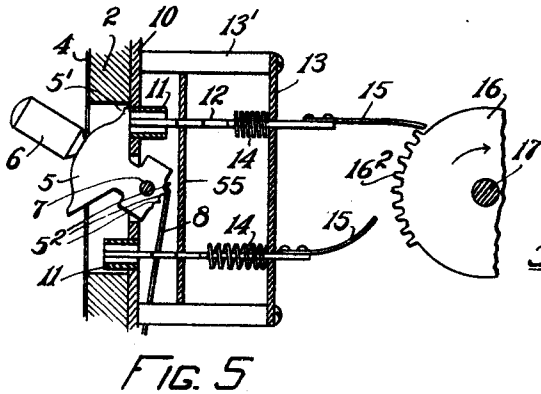
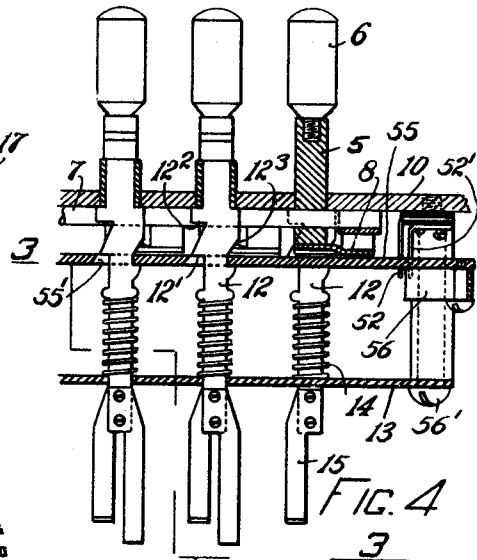
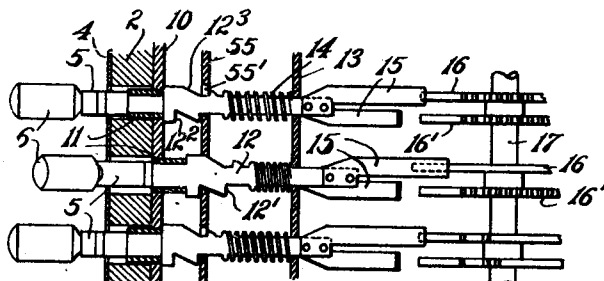
ATTY.

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2 SHEETS—SHEET 2.



WITNESSES
 Victoria London
 Vera E. Fogg

FIG. 6

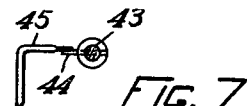


FIG. 7

INVENTOR
 Arthur F. Boardman,
 BY *Wm. S. Spaulding*
 ATT'Y.

UNITED STATES PATENT OFFICE.

ARTHUR F. BOARDMAN, OF ARLINGTON, MASSACHUSETTS, ASSIGNOR OF ONE-HALF TO HIMSELF, AND ONE-HALF TO JAMES R. MURPHY, OF BOSTON, MASSACHUSETTS.

SEARCH-CALL APPARATUS.

1,079,467.

Specification of Letters Patent.

Patented Nov. 25, 1913.

Application filed September 26, 1912. Serial No. 722,452.

To all whom it may concern:

Be it known that I, ARTHUR F. BOARDMAN, a citizen of the United States, residing at Arlington, county of Middlesex, Commonwealth of Massachusetts, have invented certain new and useful Improvements in Search-Call Apparatus, of which the following is a specification.

This invention relates to signaling devices and particularly to a search call system the object of which is to provide means whereby a central operator may send distinctive signals simultaneously to a plurality of different signaling devices effectively disposed to cover a given territory for the purpose of locating a person whose exact whereabouts within that territory is unknown.

In large factories or plants it is frequently the duty of those in responsible positions to leave their offices or desks to visit other rooms, departments or buildings, and as it would be impossible or inadvisable for them to leave behind any memorandum of where they could be found at any particular time, it is necessary that some system should be devised whereby they will receive a call wherever they may at that moment be located. To perform this service I employ at a central station a mechanism which permits the operator to send any one of a group of signals through all the departments likely to be visited, each of the distant stations being equipped with a similar annunciator which will give notice, preferably to the ear, so that only the party desired will respond.

In the simplification of my device I have provided double acting signal levers, by which I am able to double the effective range of my sending apparatus without materially increasing the size of the board or the reach of the operator.

The apparatus illustrated in the accompanying drawings which are to form part of this specification, comprises a series of bells located at the various points to audibly cover the given territory. They are electrically connected to the central operating station, and each is adapted to simultaneously and intermittently repeat the signal transmitted from the central station. The means of differentiating between these signals comprises a series of rotating disks, the peripheries of each being provided with a series of contact points or teeth such that each disk will repeat a different signal, as

for instance two successive rings when that individual is required whose call number is two, and so on through the series of digits up to nine and when the number reaches two or more digits the call is divided as is customary in fire alarms and other circuits.

In the preferred form of construction shown I have sought simplicity and compactness of construction combined with the greatest ease and accuracy of operation and have illustrated means whereby each calling lever may transmit a plurality of predetermined signals. It is further desirable and in fact necessary that no second call may be made while the first is in operation, and I have therefore devised locking means which will automatically render every signaling handle except the one in use temporarily inoperative. Of the plurality of signals which each handle is capable of transmitting, I have so devised the mechanism that it can send but one signal at a time, therefore no special locking mechanism would be necessary except for the purpose of locking the other handles which might otherwise be free to operate.

In the drawings: Figure 1 is a front elevation of my invention partly broken away and showing the circuits in diagram. Fig. 2 is a cross section on the line 2—2 of Fig. 1. Fig. 3 is an inside view of my locking mechanism. Fig. 4 is a partial plan view of Fig. 3, Figs. 5 and 6 are sectional details showing one lever in operating position with the adjacent keys locked, and Fig. 7 is a detached detail of the governor lock.

The box 1 which contains the signaling mechanism is provided with a door 2 hinged at 3 on which is mounted a plate 4 provided with a series of openings 4¹ and 4², the former of which may be employed to hold a series of name plates indicative of the individuals on the call list. The signaling circuits are each controlled through that handle 6 which is adjacent to the name plate. The openings 4² of the plate 4 register with corresponding openings in the cover 2 to provide an aperture for the operation of the signaling lever 5. The levers 5 are pivoted on a common rod 7, which is preferably mounted in bearings on the plate 10 secured within the cover 2. A leaf spring 8 secured at 9 to the plate 10 has its free end so formed as to engage with either of the three locking detents 5² (see Fig. 5) on the 11

lever 5 for retaining the handle 6 in any of its three positions as will be later described.

Directly above and below each lever 5 and slidably mounted in the plate 10 is a short cylinder 11 within which has been firmly secured a bar 12, which bar extends within and through the plate 13 mounted upon the plate 10 by bolts 13¹. Springs 14 operate to maintain the sleeves 11 in the position shown in Fig. 2 as will be better understood by reference to Figs. 4 and 6; and each of the bars 12 is provided with a spring contact 15 adapted under certain conditions to electrically engage the teeth 16² on a series of signaling disks 16 and 16¹, said disks being fast upon a shaft 17 which is mounted upon a frame 18 which is secured to the plate 19 within the box 1 by bolts 18¹. The electrical contact before referred to causes the batteries 20 and 20¹ to send periodical impulses through the wire 21 and the bells 22, which are mounted in a series thereon, the return wire being connected to the plate 10 and the wire 24 connecting the battery 20¹ and the frame 18 thereby completing the circuit.

The operation of the electrical contacts before referred to depends upon the rotation of the shaft 17 by a gear train turned by a motor spring 26. The heavy motor spring 26 is mounted in the frame 18 on a spindle 27 and is retained by a ratchet 28 and a pawl 29 the handle 30 projecting through the top of the box providing means for winding the spring when required. The gear 26¹ which is mounted with the spring 26 engages a pinion 33 on an auxiliary shaft 34, said shaft supporting a second gear 35 which through engagement with the pinion 36 on the shaft 17 causes the rotation of the latter together with its series of disks 16 and 16². On the shaft 17 is also a gear 37 engaging the pinion 38 on an auxiliary shaft 39 and another gear 40 on said shaft 39 engages a pinion 41 on the governor shaft 43 for rotating the ball governor 42. On the shaft 43 is a fixed pin 44 (see Fig. 7) so positioned as to be engaged by a wire 45 which is connected to an armature 46 pivoted at 47 upon the frame of an electromagnet 49, and normally held away from said electromagnet by a leaf spring 48 (see Fig. 2). A second wire 60 connected to the same armature 46 has its free end adapted to engage a series of notches 62 on a disk 61 which is fast on the shaft 17. The wire 45 serves to control the governor 42 and the wire 60 serves to lock the motor mechanism against rotation.

The circuit which is energized in order to operate the armature 46 is indicated in diagram Fig. 1, and comprises a wire 50 cut in between the two sections 20 and 20¹ of the battery and extending to a leaf spring 52¹ which with its mate 52 is mounted upon the plate 10. The springs 52 and 52¹ are

insulated from the plate 10 and from each other. Contact between the free ends of the springs 52 and 52¹ being caused by the locking plate 55 whenever one of the handles 6 is thrown into either of its operative positions as will be later described. Connection between the leaf spring 52 and the electro-magnet 49, is made by means of the wire 51 and a wire connection 53 completes the circuit to the wire 24 and the battery 20¹.

Referring to Figs. 3, 4, 5 and 6, the method of operating the handle 6 will now be explained. Each of the bars 12 is provided with a series of shoulders 12¹ and 12² and an inclined cam surface 12³. The plate 55 is provided with a series of openings 55¹, one for each bar 12, said openings being adapted under proper conditions to permit the passage therethrough of the corresponding bars 12. Referring to Fig. 4, it will be noticed that any one of the bars 12 may be operated through its corresponding opening 55¹, such operation by reason of the inclined shoulder 12³ causing a lateral movement of the plate 55 so as to lock that particular lever 12 against its shoulder 12² as is illustrated in Fig. 6. In the operation of my machine when any call is being made by the operation of one of the handles 6 all other calls are rendered impossible of operation until that particular handle is brought to its normal or central position as shown in Fig. 2. The locking plate 55 secures this result upon each movement to either of the operating positions of the levers 5, and the detents 5² on the lever 5 operating in conjunction with the spring bar 8 serve to maintain the handle 6 in either of its two operative positions or in its neutral position. In Fig. 5, one of the operating positions of a lever 5 is clearly shown, its projecting flange 5¹ having forced one of the cylinders 11 and bars 12 inward against the action of the spring 14 thereby carrying its contact spring 15 not into contact with its disk 16 itself, but in such a position that upon the rotation of the said disk 16 the successive teeth 16² will form an electrical contact with said spring bar and cause a series of intermittent impulses to be sent through all of the bells 22. As soon as the plate 55 has been moved laterally by the operation of any one of the handles 6 an electrical contact between the spring plates 52 and 52¹ is made, thus closing the shunt circuit through the electro-magnet 49 and operating the armature 46, thereby withdrawing the wire 45 from the path of the pin 44, (see Fig. 7) and the wire 60 from the notch 62 in the disk 61 which it has been occupying, thus allowing the shaft 17 to be rotated by the spring 26 and to bring the teeth 16² of the particular disk 16 which is opposite the spring contact 15 into posi-

tion so as to send the desired impulse through the main circuit.

In Fig. 5 the teeth 16^a are engaged to send the call "nine" through its circuit, it being understood that each disk 16 and 16^a has its own individual call and its own individual spring contact 15 and that each handle is adapted to operate two spring contacts and one each of the disks 16 and 16^a, which latter may be said to form a pair.

The handle 6 once thrown, as seen in Figs. 5 and 6, will remain in that position and continue to send repeated signals through the bells 22, first, because of the continued rotation of the shaft 17 and second, because the actuation of the armature 46 by the electromagnet 49 is permitted by the continual closing of the shunt circuit.

Each of the local signal stations may be provided with a switch or other form of circuit for breaking the main circuit, thus notifying the home operator who will then return the handle 6 to its central or neutral position. This breaks the shunt circuit and causes the wires 45 and 60 to enter into their locking engagement with the motor train. The leaf spring 56 acting in conjunction with the stud 55² and posts 56¹ (see Fig. 3) serves to return the plate 55 to its normal position when the handle 6 is again thrown into mid-position. Although the inclined back of the shoulder 12¹ on the bar 12 would indeed serve to return this plate 55, I find that in practice that it is necessary that this plate 55 should under normal conditions be so positioned as to direct the operation of any of the bars 12, and if it were not for the spring 56 it would be quite apparent that the extreme accuracy and adjustment which would then be required to prevent some one of the shoulders 12¹ of the bar 12 from engaging the plate 55 before the operation of its respective handle 6 would be extremely difficult of attainment.

Various modifications in the details of construction and arrangement of parts as well as variation in the wiring of the circuits may obviously be made, all without departing from the spirit of my invention if within the limits of the appended claims.

What I therefore claim and desire to secure by Letters Patent is:

1. In a signal system of the class described, a plurality of differentiated rotary contact disks arranged in pairs, a plurality of sliding contact points, a plurality of operating levers associated with said sliding contacts to move either of the contact points of a pair into engagement with said disks, means

for locking all of the remaining levers upon the operation of any one of said levers, a normally effective locking mechanism for the contact devices, and a release for said locking mechanism operable upon the movement of said operating means.

2. A signaling device comprising a frame, a plurality of rotatable members having groups of contact points, a motor operatively associated with said members to rotate them, a plurality of pairs of contacts movable into the path of said points, and an operating lever pivoted between the contacts of each pair and effective to move either one or the other of said contacts when rocked in one or the other direction.

3. A signaling device comprising a frame, a plurality of rotatable members having groups of contact points, a motor operatively associated with said members to rotate them, a plurality of pairs of contacts movable into the path of said points, an operating lever pivoted between the contacts of each pair and effective to move either one or the other of said contacts when rocked in one or the other direction, and a normally effective locking device to prevent rotation of said members and a release for said lock operable upon the movement of any one of said contacts.

4. A signaling device comprising a frame, a plurality of rotatable members having groups of contact points, a motor operatively associated with said members to rotate them a plurality of pairs of contacts movable into the path of said points, an operating lever pivoted between the contacts of each pair and effective to move either one or the other of said contacts when rocked in one or the other direction, a sliding locking plate adapted to be moved by any one of said levers and interengaging abutments on said plates and levers for preventing the movement of the rest of the levers after one lever has been moved to slide the plate.

5. In a signaling device a plurality of pairs of movable contacts, an operating lever pivoted between the contacts of each pair and effective to move either one or the other of said contacts when rocked in one or the other direction, and a locking device to prevent the movement of the rest of said contacts upon the operating movement of any one of said levers.

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

ARTHUR F. BOARDMAN.

Witnesses:

VICTORIA LOWDEN,
VERA E. FOGG.