No. 701,783. Patented June 3, 1902.

# W. A. WILLIAMS, O. L. INGRAM & J. B. WILSON.

## TELEPHONE CALL FOR PARTY LINES.

(Application filed Oct. 28, 1901.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1

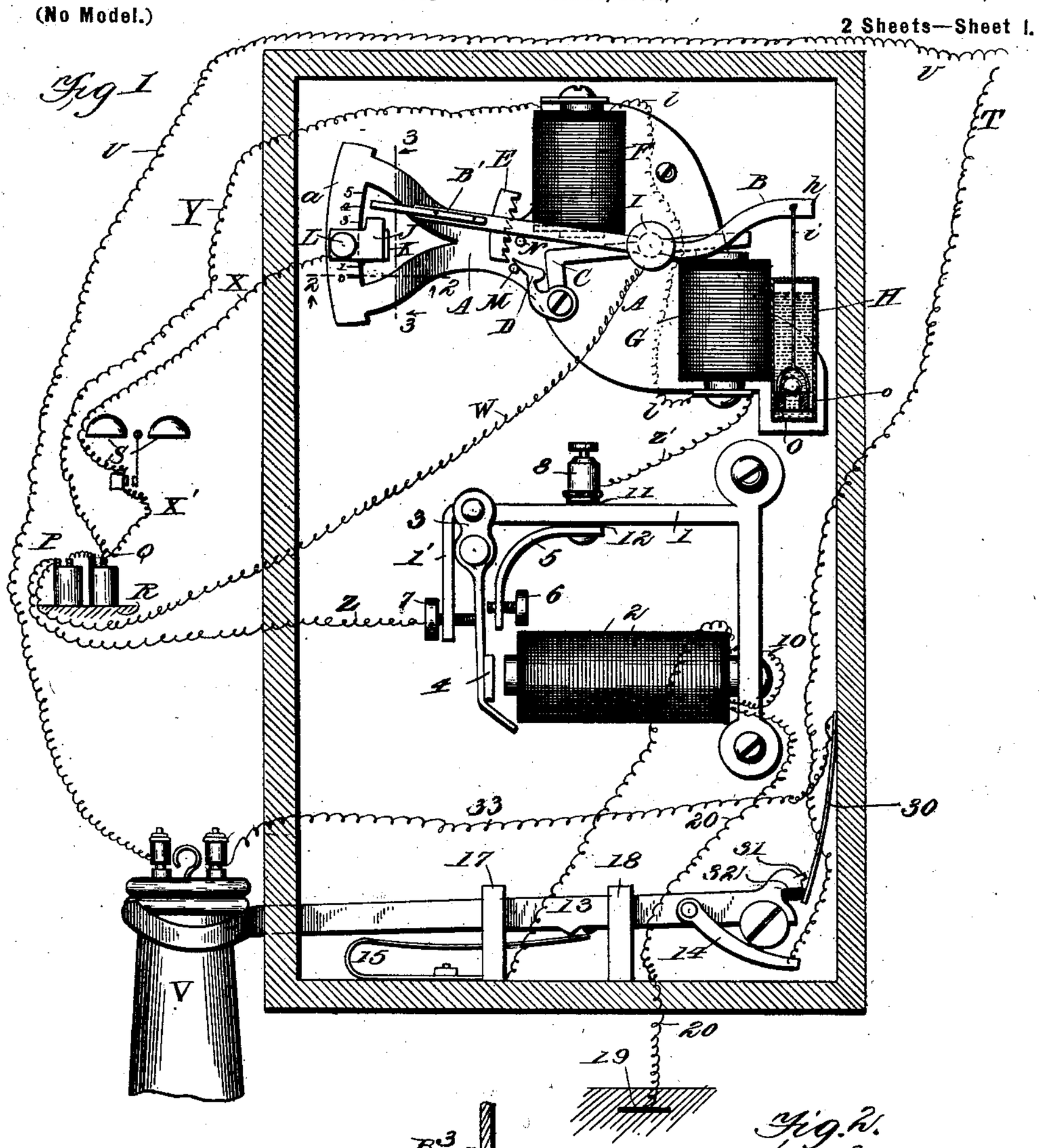



Fig. 3.

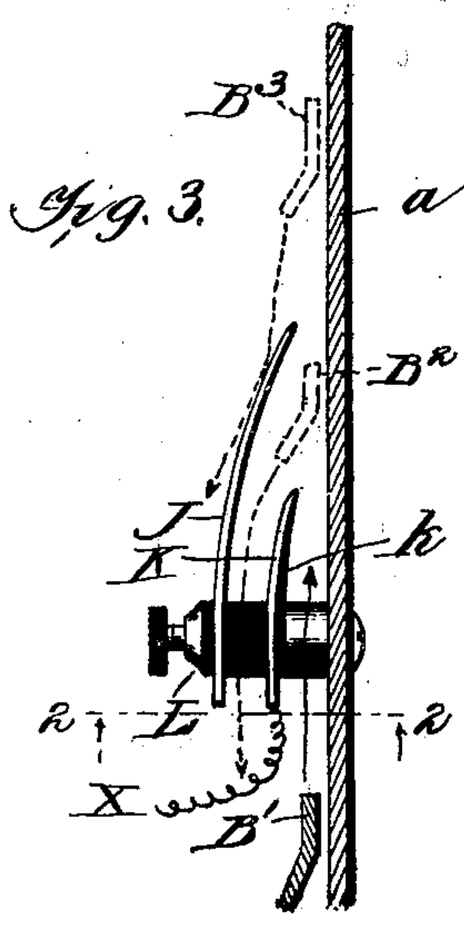
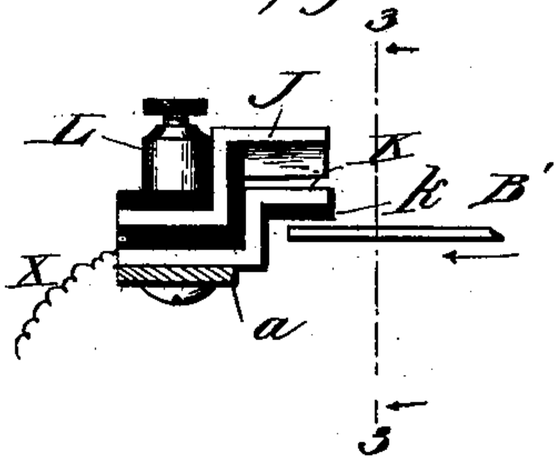



Fig. 2.

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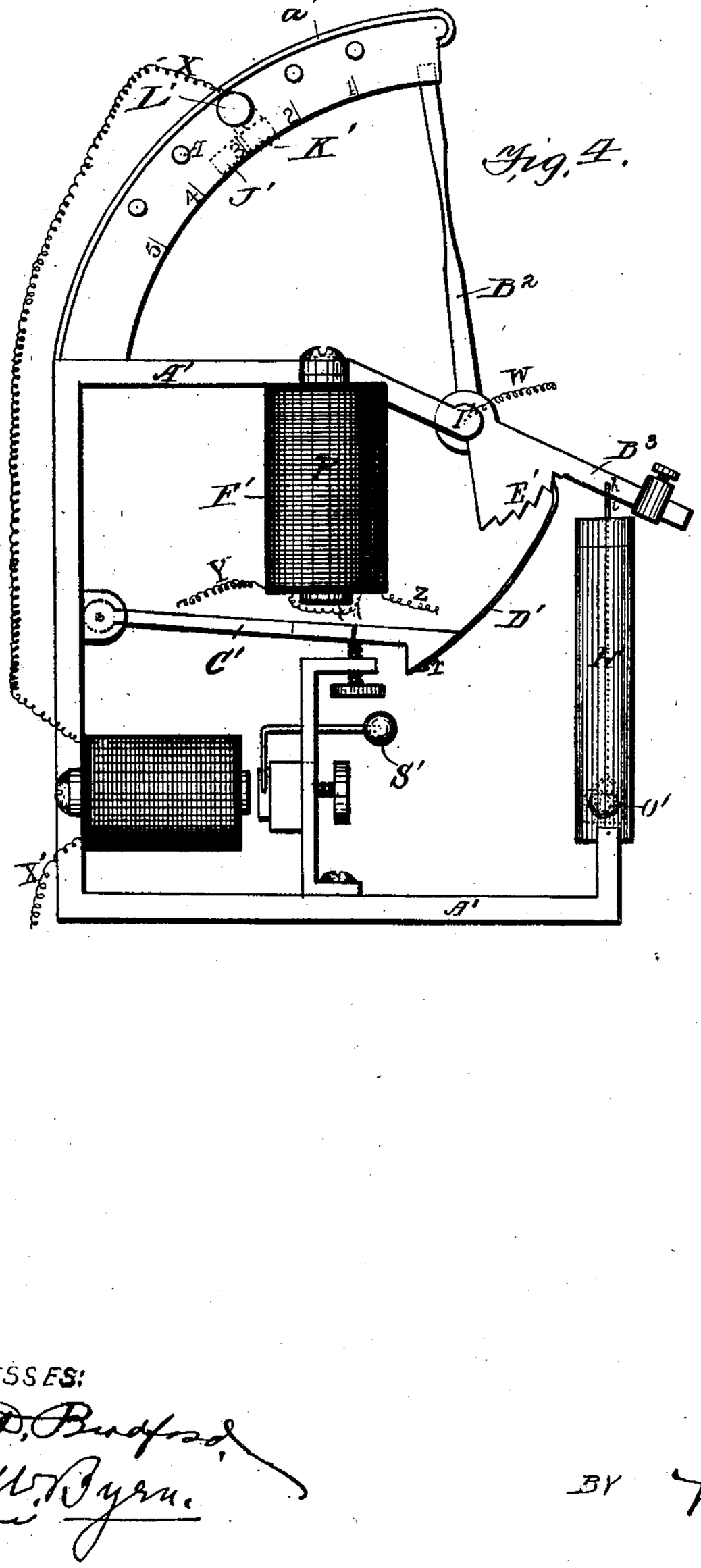


Fig. 4.

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# UNITED STATES PATENT OFFICE.

WILTON A. WILLIAMS, OSCAR L. INGRAM, AND JOHN B. WILSON, OF WALLA WALLA, WASHINGTON.

## TELEPHONE-CALL FOR PARTY-LINES.

SPECIFICATION forming part of Letters Patent No. 701,783, dated June 3, 1902.

Application filed October 28, 1901. Serial No. 80,240. (No model.)

*To all whom it may concern:*

Be it known that we, WILTON A. WILLIAMS, OSCAR L. INGRAM, and JOHN B. WILSON, of Walla Walla, in the county of Walla Walla and State of Washington, have invented a new and useful Improvement in Telephone Calls for Party-Lines, of which the following is a specification.

This invention relates to improvements in telephone systems, and more particularly to that class wherein several stations are located on the same circuit; and the invention has for its object to permit the operator at the central station to call any desired station on a party-line by depressing the usual form of push-button the proper number of times, thus signaling the station required without the call being sounded at the same time at any other station on the line, the duration of each depression of the push-button as it ordinarily is given at central being sufficient to operate this machine.

With the above general object in view this invention consists of an individual telephone-call device embodying certain novel features and arrangements of parts and details of construction hereinafter fully described, illustrated, and claimed.

Reference is to be had to the accompanying drawings, which form a part hereof, wherein—

Figure 1 is a full front view of the invention, showing the construction of the said device and the manner of regulating the electric currents for operating said device, the same being shown in connection with an ordinary receiver-hanger (13) at present in common use and which is no part of this invention. Fig. 2 is an enlarged sectional detail on line 2 2 of Figs. 1 and 3. Fig. 3 is an enlarged sectional detail on line 3 3 of Figs. 1 and 2, and Fig. 4 is a view of a modified arrangement of the device shown in Fig. 1.

In the accompanying drawings similar letters and figures of reference designate corresponding parts of the device on each of the views.

It is intended that the signaling contrivance be operated by local circuits, which circuits are put into operation by means of an electrical selective switch, which switch is operated by the ordinary current from a central station, and which switch thereby closes a local circuit through the signaling device.

In Fig. 1, A designates the frame, to which are attached the principal parts of the contrivance.

The signaling device proper consists of two electromagnets F and G, the armature C, carrying the pawl D, the arm B, carrying the contact-spring B′ and ratchet E, the guard J, the contact-tongue K, and a liquid-cylinder H with slow-moving piston O. As this is the most important part of our call whereby the selection of the station to be called is made, we will first make clear its action. Electrical impulses from a remote point acting through electromagnets F and G work the armature C up and down about its center of oscillation I, and the pawl D on one end of the armature engages a toothed bar or ratchet E and moves it, and consequently the lever B, to which it is attached, with a step-by-step action, so that the left-hand end of lever B is made to rise opposite the graduated arc *a* of the frame A a distance depending upon the number of closures of the current through the magnets F and G. The right-hand end of lever B is connected at *h* to a rod *i*, bearing on its lower end a piston O, playing freely in a cylinder H, which is filled with a liquid—a mixture, for instance, of alcohol and glycerin. This piston has an upwardly-opening ball-valve that allows the piston to descend freely and quickly through the liquid, and this same piston also has a leak-hole *o* through it, opening communication from the upper to the lower side, so that the piston in rising in response to the fall of the longer and heavier end of arm B moves slowly, as the liquid has to pass gradually from the upper side of the piston to its lower side through the hole *o*.

The object of this arrangement is to enable electrical contact to be made by the descent of the longer end of the lever B while it is slowly falling, as will hereinafter appear.

The arc-bar *a* has graduations on it, here shown "1" to "5," and a contact-making device is fixed to the arc-bar at any desired and distinctive point along the same by a set-screw L. This contact-making device coöperates with a spring-arm B′ on lever B. If

this contact-making device is fixed at "2" on the bar *a*, spring-arm B′ will touch it when it (the armature) has been worked with two impulses. If the contact device is located at "3," three impulses of the armature will be required to bring spring-arm B′ into contact with the part K. It will be understood that although only five graduations are shown on bar *a* for five different stations or subscribers any number may be employed, and the position of the contact devices K J on the bar *a* differs for each station or subscriber. At each station the contact K is connected by wire X with a bell S and battery R, and the other side of the battery is connected by wire W to the fulcrum I of arm B, so that when spring B′ on arm B touches the contact device K the battery-circuit is closed through the bell, and the call-signal is given.

We will now explain how the calls are differentiated or individualized, so that one station-bell is not rung by a call for another station.

Referring to Figs. 2 and 3, *a* is the arc-bar, to which by a set-screw L there are attached at any suitable point along the arc-bar two tongues K and J. They are insulated from each other and from all other parts of the device, except that K is attached to the bell-wire X. The under side of K also has an insulating-face of rubber *k*, and the tongue J overlaps the tongue K and extends above it as a protective guard or shield.

Now referring to Fig. 3, if B′ represents the position of spring-arm at one movement of its actuating-armature, $B^2$ at two movements, and $B^3$ at three movements and the contact apparatus K J L is located opposite the position $B^2$ then the second movement of spring-arm puts it in the dotted position at $B^2$, and if the current is not closed again then the spring-arm drifts slowly back from the action of the hydraulic piston and the flared edge of the spring-arm causes it to ride over tongue K and come into metallic contact therewith to close the bell-circuit and give the signal. On the upward stroke from B′ to $B^2$ it will be seen that it passes under tongue K and does not close the circuit on the ascent, because the inner face of K is covered by the non-conducting face *k*. If there should be three closures of the circuit, then the spring-arm rises to the position $B^3$, and as it drifts back, as indicated by the upper arrow, it is prevented from touching any of the subjacent contact-tongues K by riding on to and outside of the insulated guard-tongue J. Instead of having the insulation *k* on the under side of tongue K it could of course just as well be on the top side of spring-arm B′.

It will be seen that the signal is given by the initial part of the return of the arm B′ and that the latter does not close contact with any other station except the one called, because the tongues are differently placed on arc-bars *a* at each of the stations.

We will now describe how the electric impulses are received and directed to effect the above-described result.

In Fig. 1, 1 designates the frame of a relay-switch, which switch consists of a pair of electromagnets 2, an armature-hanger 3, and the armature 4. The details of construction and the operation of these devices are as follows: The electric current from the central station comes over wire T and passing through arms 14 and 13 energizes the electromagnets 2 of the switch, the current passing thence through wire 20 to ground 19. It thus attracts the armature 4 and closes the local circuit from battery R through line Z to binding-post 7, through frame 1, down armature-arm 3, through contact-screw 6, arm 5, binding-post 8, wire Z′ to magnet G, thence through wire *l*, passing beneath frame A, to and through magnet F, thence through wire Y to opposite pole Q of battery R, thereby energizing magnets F and G, attracting armature C, causing pawl D to engage ratchets in bar E. Each pulsation or pressure of the button at central carries the arm B, together with contact-point B′, one step or station. It will thus be seen that the contact-spring B′ may be raised to any position desired before being finally released and may also be retained in any position as long as desired. When finally released, the arm B, carrying contact-spring B′, will slowly descend, being controlled in its downward motion by the piston and valve working in cylinder H, thus allowing the contact-spring B′ to pass over the guard J or under said guard J and over the contact-point K, its course depending upon its position when finally released. When the contact-spring B′ comes in contact with the contact-point K by slowly passing over it in its downward course, a local circuit is formed through the bell S, the circuit being closed from battery R, through line W to binding-post I, through arm B and contact-spring B′ to contact-point K, thence through line X and bell S to the opposite pole of the battery R. The ascent of the contact-spring B′ is beneath the contact-point K, and the under point of said contact-point K being insulated no electrical contact is formed in the upward movement of the spring B′, as hereinbefore described. Now if the contact-point K be placed in the third position or at the third station, and in which event its call would be three pulsations, the contact-spring B′ will not reach it at all in its upward journey if one or two pulsations be sent through the device. Three pulsations, however, will drive the contact-spring B′ to such a position that its downward course will be over contact-point K and yet under the guard J, thus making an electrical connection through the bell while it is thus moving over contact-point K. It will be readily understood that on a party-line the position of contact-point K will be different in each case, and if on any contrivance the contact-point K be placed at

any desired position or station no electrical contact will be made in that contrivance by any other call.

The receiver-circuit is shown by the line 33 to spring 30, which rests against hard-rubber point 32 when arm 13 is in position shown in diagram; but when arm 13 is relieved by removing receiver V from this hanger then contact-point 31 presses spring 30, thus forming circuit from central through line T, arms 14 and 13, through point 31 and spring 30, wire 33, through receiver and line U to central again.

In making use of our invention we do not confine ourselves to the specific arrangement shown in Fig. 1, but may modify it, as shown, for instance, in Fig. 4, in which F′ C′ correspond to magnet F and armature C of Fig. 1, D′ E′ to pawl and ratchet D E of Fig. 1, $B^3$ and $B^2$ to lever B and spring-arm B′ of Fig. 1; $a'$ to arc-bar $a$ of Fig. 1, K′ J′ L′ the adjustable contact-tongues, H′ the hydraulic-cylinder piston, and S′ the bell-hammer. To make this clearer, we would state that the position of the differentiating-switch is shown in dotted lines at J′ K′ and is adjustable on the graduated arched bar $a'$ by the set-screw L′ in any position thereon. X X′ is the bell-circuit, controlling through the electromagnet the bell-hammer S′, (the bell not being shown.) When the current through Y Z energizes electromagnet F, it attracts armature C′ and through spring-pawl D′ and ratchet E′ turns the lever $B^2$ with a step-by-step action to cause it to traverse the switch-support and its differentiating-switch. This lever drifts back from the weight $B^3$ at the end of the lever, and the retardation is effected by the dash-pot or hydraulic cylinder H′.

In referring to our switch-support as being graduated we simply mean that it is divided into spacings which permit the switch to be located at different points along the same, which positions may be indicated by lines, holes, or visual markings, or not, as may be desired.

An important and distinguishing feature of our invention is that every instrument at every station is exactly alike in construction. Every station has only one switch, and that is exactly like every other switch, and each station has only one switch and no superfluous switches or parts which are not in use. This secures the greatest simplicity and economy. The differentiation or selective action, it will be understood, is effected by the different positions on the switch-support of a new and uniform type of switch.

Having thus described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. In a selective call for party-lines, the combination with a graduated switch-support, of a contact-switch adjustably mounted on the said support and arranged to be fixed upon the same in a position for each station peculiar to that station and differing from all other stations, a movable contact-making piece arranged to traverse said support and its switch, a step-by-step actuating mechanism for said movable contact-piece, and an electric circuit with signal devices located therein, said circuit being completed through the switch and contact-making piece, substantially as and for the purpose described.

2. In a selective call for party-lines, the combination with a curved and graduated switch-support; of a contact-switch adjustably mounted on said support and arranged to be fixed thereon in a position for each station, peculiar to that station and different from all other stations, a movable contact-making lever arranged to traverse said curved support for the switch, a step-by-step actuating mechanism for said lever, and an electric circuit with signal device located therein, said circuit being completed through said switch and lever substantially as described.

3. In a selective call for party-lines, the combination with a graduated switch-support; of a contact-switch consisting of a contact-tongue and a guard extending over the same and made longer than the tongue and insulated therefrom, said contact-switch being adjustably mounted on said support and arranged to be fixed thereon in a position peculiar to that station and differing from all other stations, a movable contact-making piece arranged to traverse said switch-support and its switch, a step-by-step actuating mechanism for said movable contact-piece, and an electric circuit with signal device therein, said circuit being completed through the switch and contact-making piece, substantially as described.

4. A selective call for party-lines having the same construction for all stations and comprising a graduated support for a differentiating-switch, and a single differentiating-switch of the same construction for all stations but located on the switch-support at a point thereon peculiar to that one station and differing from all other stations substantially as set forth.

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