

(No Model.)

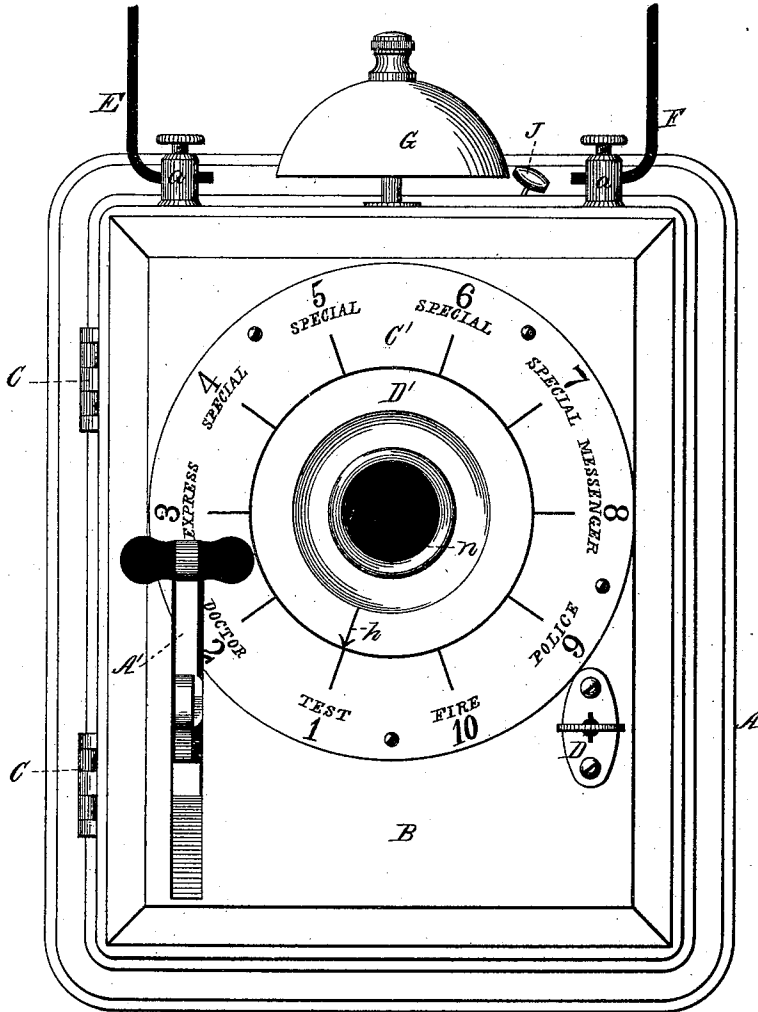
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G. S. NICKUM.
ELECTRICAL CALL BOX.

No. 356,418.

Patented Jan. 18, 1887.

Fig. 1.



Witnesses
W. C. Jirdinstor.
Otto Richter.

Inventor:
Geo. S. Nickum
By his Attorneys
Stenbeck

(No Model.)

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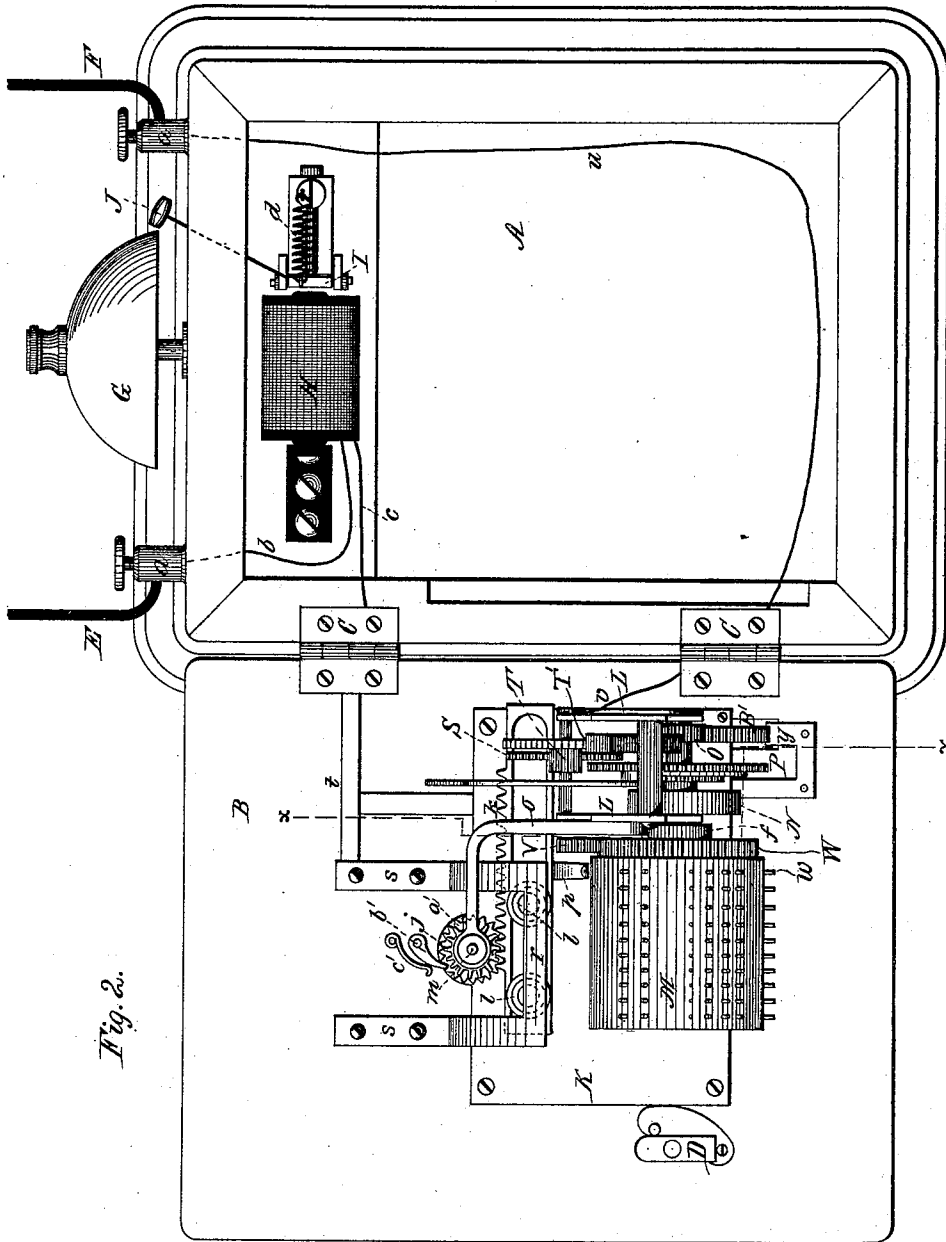


Fig. 2.

Witnesses
W. C. Firdinston.
Otto Richter.

Inventor
Geo. S. Nickum
By his Attorneys
Steinbeck

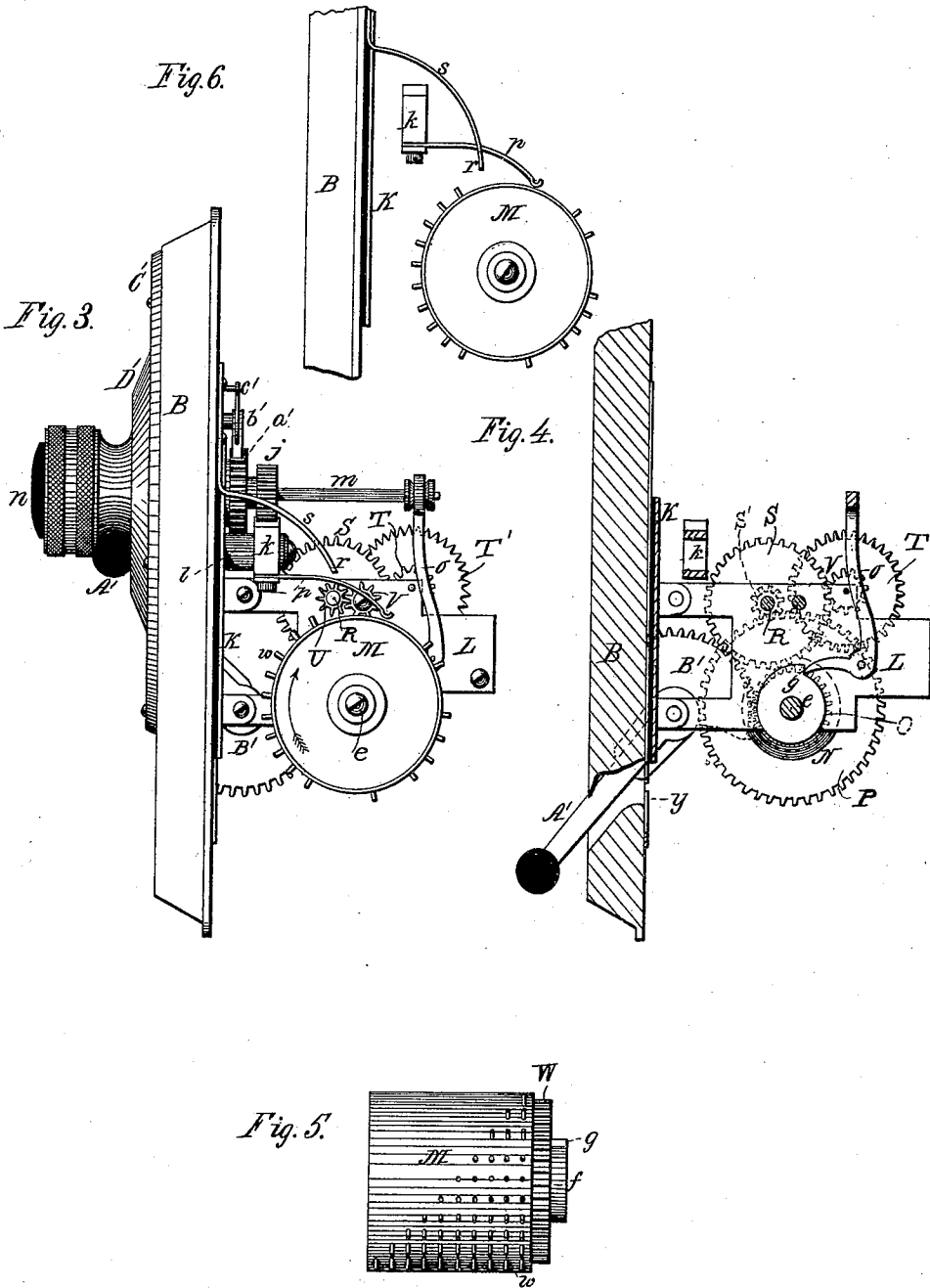
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Otto Richter.

Inventor:
G. S. Nickum

By his Attorneys

Stewart & Beck

UNITED STATES PATENT OFFICE.

GEORGE S. NICKUM, OF DAYTON, OHIO, ASSIGNOR OF ONE-HALF TO E. FOWLER STODDARD, OF SAME PLACE.

ELECTRICAL CALL-BOX.

SPECIFICATION forming part of Letters Patent No. 356,418, dated January 18, 1887.

Application filed February 25, 1886. Serial No. 193,135. (No model.)

To all whom it may concern:

Be it known that I, GEORGE S. NICKUM, a citizen of the United States, residing at Dayton, in the county of Montgomery and State of Ohio, have invented certain new and useful Improvements in Electrical Call-Boxes, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

My invention relates to signal-boxes, used generally in what is known as "district" service, where the wants are made known by certain conventional and predetermined signals.

It has for its object the improvement in the construction of this class of call-boxes, wherein efficiency of operation and simplicity of construction are attained, and by means of which it is almost impossible to send in by mistake any signal but the one desired.

The novelty of my invention will be herein set forth, and specifically pointed out in the claims.

In the accompanying drawings, Figure 1, Sheet 1, is a front elevation of my improved call-box. Fig. 2, Sheet 2, is a corresponding view with the door of the box opened and thrown back to exhibit the operating parts.

Fig. 3, Sheet 3, is an end elevation of the door and the operating parts connected thereto. Fig. 4, Sheet 3, is a detail sectional view through the line *xx* of Fig. 2. Fig. 5, Sheet 3, is a detail plan view of the signal-cylinder.

Fig. 6, Sheet 3, is a detail elevation of a modification, to be referred to more particularly hereinafter.

The same letters of reference are used to indicate identical parts in all the figures.

A represents the box proper, having one of its sides B, preferably the front, secured thereto by hinges C, so that it may be opened to get at the interior, and which when closed may be secured by any suitable lock, D.

E F are the line-wires, with the usual ground and battery connections, and which wires are secured in the usual binding-posts, *a*, upon the top of the box; also secured upon the top of the box is a call-bell, G.

Secured within the upper part of the box so as to be out of the way is an ordinary electro-

magnet, H, connected by a wire, *b*, to the binding-post, to which the line-wire E is secured. The opposite wire, *c*, of the electromagnet is connected to the upper hinge C, as seen in Fig. 2.

I is the usual hinged armature, with a retracting-spring, *d*, and having secured to it the bell-hammer J, which passes up through a slot in the top of the box, and is in working proximity to the bell G.

Secured upon the inside of the door B is a metal plate, K, carrying at one side two vertical frames, L L, which, properly braced together, serve as bearings for the train of operating-gearing which revolves the signal-cylinder M. This operating-gearing is actuated by a clock-spring, N, whose inner end is secured in the usual manner to the sleeve of a ratchet-wheel, the opposite end of which sleeve carries a small winding-pinion, O. The ratchet-wheel is connected by the usual spring-pawl connection to the loosely-mounted pinion P, which latter meshes with a small pinion, S', upon a counter-shaft, R. This shaft carries a large pinion, S, which meshes with the pinion T of an ordinary escapement mechanism, T'. The projecting end of the counter-shaft R carries a small pinion, U, which meshes with a pinion, V, journaled to the side of the frame L. The pinion V is located directly over and engages with a gear, W, secured to or integral with the end of the signal-cylinder M.

The spring-winding lever A' passes through a slot in the door of the box, is pivoted for convenience upon one of the braces of the frame L, and is provided with a segmental rack, B', which meshes with the pinion O.

The signal-cylinder M is journaled so as to revolve upon a stud or spindle, *e*, secured to the frame L, and it has upon its ends, between said frame and the gear W, a hub, *f*, provided with a shoulder or stop, *g*, as seen more particularly in Fig. 4.

Secured upon the outside of the door B is a stationary dial, C', provided in this instance with ten equidistant index-marks, of which the first is marked "Test;" the second, "Doctor;" the third, "Express;" the fourth, fifth, sixth, and seventh, "Special;" the eighth, "Messenger;" the ninth, "Police," and the tenth, "Fire." Concentric with this

stationary dial, after the manner of an ordinary combination safe-lock, is a revoluble dial, *D'*, provided with an indicating mark or arrow, *h*, which, upon revolving said dial, can be brought coincident with any one of the index-marks upon the stationary dial. This dial *D'* has an interior sleeve passing through the box-door and the plate *K*, and by which it is journaled thereto. Just within the plate *K*, and secured upon the end of said sleeve, is a pinion, *j*, which meshes with a slotted horizontal rack, *k*, supported upon lugs *l*, extending from the plate *K*, which lugs extend through the slot in the rack and serve to support the same and cause it to travel in a right line across the face of the plate *K* when the dial *D'* is turned.

Between the pinion *j* and the plate *K* is secured a notched disk, *a'*, upon the sleeve, with which a dog, *b'*, engages, and is held down by any suitable spring, *c'*, the purpose of which is to prevent the jarring out of place or accidental turning of the dial *D'* after the same has been adjusted.

The spindle of the dial *D'*, as well as its sleeve, is hollow to receive a push-rod, *m*, upon the end of which, within the spindle, is a push-button, *n*, against which a recessed retracting-spring bears.

Pivoted upon the frame *L* is a latch, *o*, whose lower end engages with the stop or shoulder *g* upon the hub *f* of the signal-cylinder. The upper end of the latch extends toward and is adjustably connected to the push-rod *m*.

It will be seen from this construction that when the winding-lever *A'* is pulled down to its farthest limit the spring *N* is wound up, and the train of gearing would be at once set in motion by the unwinding of said spring if it were not that the latch *o*, by engaging with the stop *g*, holds the parts locked. Upon pressing in the push-button *n* the latch *o* is disengaged from the stop *g*, and the signal-cylinder, through the medium of the spring and the train of gearing, at once commences and continues one complete revolution, until it is again arrested by the latch *o* re-engaging with the stop *g*.

Secured to the rack *k* in any suitable manner is a spring-brush, *p*, which projects out over and rests upon or comes in close proximity to the top of the cylinder *M*. Just over this brush *p*, and extending the length of the cylinder *M*, is a horizontal metal strip, *r*, suitably connected to the door *B*, in this instance by supports *s*, one of which is connected by a wire or strip, *t*, to the upper hinge *C* of the door, thus establishing direct electric connection between the line-wire *E* and the strip *r*.

By means of the wire *v* within the box electric connection is established from the line-wire *F* to the lower hinge *C*, and from the lower hinge *C*, by means of the wire *v*, to all of the metal parts connected to the plate *K*.

The signal-cylinder *M* is provided with two sets of projecting pins arranged in banks, of

which the first set, *w*, (shown in Fig. 5,) consists of ten horizontal rows, of which the first contains ten pins, the second nine, and so on, decreasing by one pin in each row to the last, which has only one pin. The other set consists of as many banks of horizontal rows as there are figures in the number of the signal which indicates the number of the box. In the present instance the box is numbered 142 and there are three banks of pins, the first bank having one horizontal row of pins, the second four rows, and the third two rows, each row containing ten pins, and extending across the cylinder. In each set the pins in the several perpendicular rows are arranged in line with each other around the cylinder, so that the pins in each row are in direct line with the corresponding pins in the rows above and below it.

The adjustment of the parts is such that when the dial *D'* is rotated so that the index *h* points to any one of the signal-numbers on the stationary dial *C'* the spring-brush *p*, attached to the rack *k*, is moved along the cylinder *M* until it reaches a point in direct line with that perpendicular row of pins in the set *w* which has a number of pins in it corresponding to the number of the signal to which the index *h* is pointed. Thus, if the index *h* be moved around to the signal-number 10 on the stationary dial, the spring-brush *p* will be moved along the cylinder *M* until it reaches a point in line with the perpendicular row of pins in the set *w* which has ten pins in it, being the last row at the end of the cylinder. If the index *h* is moved to 9, the spring-brush will be moved to a point in line with the second row of pins from the end of the cylinder, which has nine pins in it, and so on.

The signal-cylinder *M* is preferably so arranged that when the spring is wound up and the cylinder caused to revolve, the set of pins *w* will pass under the brush *p* first, and the other set second, as is shown in the present instance, though a reversed arrangement may be used, if desired.

It will be seen from this construction that when the signal-cylinder *M* revolves, the brush *p* will be raised successively by each pin which passes under it into contact with the strip *r*, and thus close the circuit and transmit to the receiving-office, first the signal desired to be answered and then the number of the box. Thus, if the index *h* be pointed to signal 10, the brush *p* will be moved along the cylinder *M* until it reaches a point in line with that perpendicular row of pins in the set *w* which has ten pins in it. The cylinder *M* being then revolved, ten pins first pass under the brush *p*, successively raising it into contact with the strip *r* ten times, thus closing the circuit ten times and transmitting to the receiving-office signal 10. The cylinder *M* continues to revolve until the pins in the second set pass under the brush *p*. In this instance, the box being numbered 142, one pin in the first row of

this set passes under the brush *p* and raises it into contact with the strip *r* once, closing the circuit and transmitting the number 1 to the receiving-office. The cylinder *M* continuing to revolve, one pin in each of the four rows in the second bank of this set passes under the brush *p*, raising said brush into contact with the strip *r* and closing the circuit four times, thus transmitting the number 4 to the receiving-office. One pin in each of the two rows of the third bank then passes under the brush *p*, raising it into contact with the strip *r* and closing the circuit twice, thus transmitting the number 2 to the receiving-office. By this operation the number of the signal 10 is first transmitted to the receiving-office and is followed by the number of the box, 142.

In the bottom of the slot through which the winding-lever passes is a spring-strip, *y*, which is electrically connected in any suitable manner with the line-wire *E*. In this instance the connection is made by continuing the strip up between the plate *K* and the door *B*, separating it from the plate *K* by suitable insulating material and connecting it to the strip or wire *t*. This strip is so arranged as to receive the impact of the lower end of the winding-lever *A* when the same has returned back to its normal position of rest after the cylinder *M* has made a complete revolution, thus closing the circuit and enabling an answering-signal to be returned from the receiving-office and sounded upon the bell *G*.

When the winding-lever is depressed, the circuit last described is broken, for the lower end of said lever is removed from contact with the strip *y*.

By the mechanism above described, in so far as it relates to the arrangement of the brush *p* and strip *r*, the box is intended to be used for sending in signals by closing or completing the circuit. When, however, it is desired to be used for sending in signals by the breaking of the circuit, it is only necessary that the strip *r* should be arranged under the brush *p*, as shown in Fig. 6, and remain in constant electrical contact therewith, except at such times as when the cylinder *M* is revolving the banks of pins would lift the brush successively out of contact with the strip *r*, thus breaking the circuit; or the same result could be accomplished without this relative change of locations of the strip *r* and brush *p* by having depressions in the periphery of the cylinder to take the place of the pins, and into which depressions the brush would drop successively to break the circuit as the cylinder revolves, and which additional modification would only require that the brush should remain in constant electrical contact with the strip *r*, except when its end dropped into the depressions. It is also apparent that the electro-magnet *H* and call-bell *G* might be dispensed with, and, furthermore, the push-button, push-rod, and latch *o* might also be dispensed with, in which event, after the dial had been set, it would be

only necessary to pull down the winding-lever and then let it go, whereupon the signal would be sent in in precisely the same manner.

It will be seen from the above description that for sending in any signal desired it is only necessary to operate the winding-lever once instead of a certain number of times, as required by many call-boxes now in use.

In the present instance I have intended the box proper to be made of wood or some other non-conducting material; but it is evident that it might be made of metal by insulating the working parts from it.

I am aware of the construction shown in the patent to J. C. Wilson, June 16, 1885, No. 320,032, wherein a number of contact-springs are employed for throwing into circuit the different contacts, as may be desired. In my construction but a single contact-spring is employed, which is adjustable and can be made to travel to any point desired across the face of the signal-cylinder.

Having thus fully described my invention, I claim—

1. In an electrical call-box, the combination, with a signal-cylinder and means, substantially as described, for revolving the same, of a brush arranged to travel longitudinally across said cylinder, said cylinder and brush having direct electrical connection with one of the line-wires, a revoluble index-dial, with connecting mechanism uniting it to said brush, whereby upon turning said dial the brush is adjusted to any position desired with reference to the signal-cylinder, and a strip electrically connected to the other of the line-wires, and so located with reference to the brush that the revolution of the cylinder causes the intermittent opening and closing of the circuit, substantially as described.

2. In an electrical call-box, the combination, with a signal-cylinder and spring-actuated gearing for revolving the same, of a winding-lever, a brush arranged to travel longitudinally across said cylinder, said cylinder and brush having direct electrical connection with one of the line-wires, a revoluble index-dial, with connecting mechanism uniting it to said brush, whereby upon turning said dial the brush is adjusted to any position desired with reference to the signal-cylinder, a stop for locking the gearing when the spring is wound up, a push-button for releasing said lock, and a strip electrically connected to the other of the line-wires, and so located with reference to the brush that the revolution of the cylinder causes the intermittent opening and closing of the circuit, substantially as described.

3. In an electrical call-box, the combination, with a signal-cylinder and means, substantially as described, for revolving the same, of a brush arranged to travel longitudinally across said cylinder, said cylinder and brush having direct electrical connection with one of the line-wires, a revoluble index-dial, with

connecting mechanism uniting it to said brush, whereby upon turning said dial the brush is adjusted to any position desired with reference to the signal-cylinder, a strip electrically
 5 connected to the other of the line-wires, and so located with reference to the brush that the revolution of the cylinder causes the intermittent opening and closing of the circuit, an
 10 electro-magnet interposed between said line-wire and strip, a signal-bell, and a bell-hammer connected to the armature of said electro-magnet, substantially as described.

4. In an electrical call-box, a spring-driven signal-cylinder provided with two sets of projecting pins arranged in banks of longitudinal
 15 rows, one set of which effects the transmission of the special signal, and the other set of which effects the transmission of the signal announcing the number of the box, in combination with
 20 a circuit breaking and closing brush arranged to travel longitudinally across said signal-cylinder and adjustably connected to an index-dial, whereby upon turning said dial said brush is
 25 caused to come over the rows of pins corresponding with the number to which the index is adjusted, and whereby the revolution of the cylinder effects the vibration of the brush to break and close the circuit.

5. In an electrical call-box, the combination, with a stationary dial-plate, of a concentric revoluble index-dial provided on its inner
 30 side with a pinion, a longitudinally-adjustable rack meshing with said pinion and carrying a

circuit closing and breaking brush arranged to travel longitudinally across the signal-cyl- 35
 nder, and a spring-driven signal-cylinder provided with pins for actuating said brush to break and close the circuit, whereby upon
 40 turning said revoluble dial said brush can be adjusted with reference to said cylinder, as desired.

6. The combination of the spring-driven signal-cylinder M, having a hub, *f*, provided with a stop, *g*, the latch *o*, push-rod *m*, dial
 15 D', push-button *n*, and winding-lever A', substantially as described.

7. The combination of the plate K, lugs *l*, rack *k*, brush *p*, pinion *j*, dial D', and the spring-driven signal-cylinder M, substantially
 50 as described.

8. The combination of the winding-lever A', provided with the segmental rack B', the signal-cylinder-driving gearing, and the circuit-closing strip *γ*, substantially as described.

9. The combination of the concentric dials 55
 C' D', the latter of which is provided with a central push-button, the sleeve upon which it is journaled, the notched disk *a'*, as a retarding arrangement, and spring-dog *b'*, the rod
 60 *m*, latch *o*, and signal-cylinder M, substantially as described.

GEORGE S. NICKUM.

Witnesses:

E. W. RECTOR,
 OTTO RICHTER.