

(No Model.)

B. J. NOYES.
MULTIPLE SIGNAL TRANSMITTER.

No. 539,701.

Patented May 21, 1895.

Fig. 1.

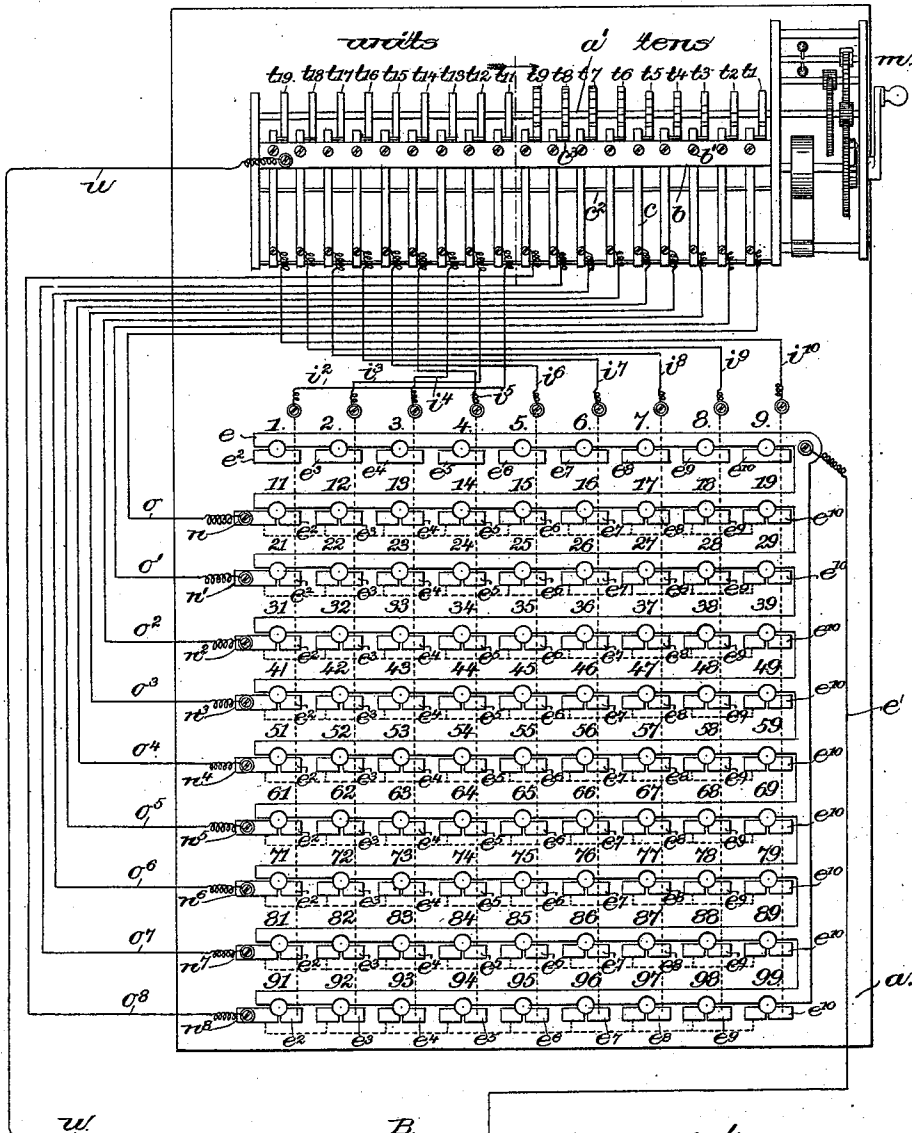


Fig. 2.

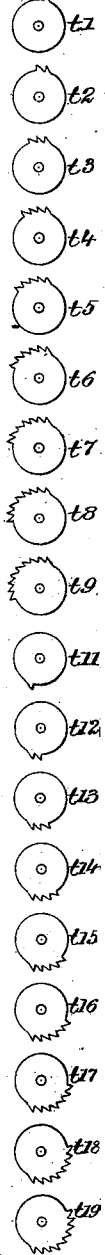


Fig. 3.

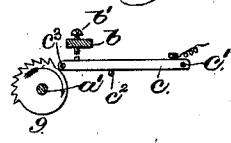


Fig. 4.



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MULTIPLE SIGNAL-TRANSMITTER.

SPECIFICATION forming part of Letters Patent No. 539,701, dated May 21, 1895.

Application filed November 4, 1890. Serial No. 370,204. (No model.)

To all whom it may concern:

Be it known that I, BERNICE J. NOYES, of Boston, county of Suffolk, State of Massachusetts, have invented an Improvement in Multiple Signal-Transmitters, of which the following description, in connection with the accompanying drawings, is a specification, like letters and figures on the drawings representing like parts.

This invention relates to a municipal signaling apparatus in which a series of sub-stations or boxes are in electrical communication with a main or central station, apparatus being provided in the main and sub-stations whereby intercommunication may be had, one form of which is shown and described in United States Patent No. 344,467, dated June 29, 1886, wherein devices are provided for turning in various signals from the sub-stations, some of which are characterized as "special," as a call for the patrol wagon. When such a call comes in to the central office from a particular sub-station communication must be made with the wagon house, the usual way being to transmit thereto from the central station the number of the sub-station from which the call came in. To do this, multiple signal-transmitting apparatus is provided at the main station, one form comprising a shaft rotated by a suitable motor, a series of break-wheels on the shaft, springs or contact pens normally disengaged from the break wheels, but adapted to be pressed into engagement therewith, one at a time, by a selecting shaft or drum having projections which in their different angular positions act on the different springs or pens, the selecting shaft being provided with a pointer co-operating with a dial, to indicate the different signals that will be transmitted in the different positions of the pointer, the different signals being the numbers of the sub-stations communicating with the central station. An apparatus of this kind is of great value, but it is expensive, and requires great nicety of adjustment to operate properly, and furthermore, a wrong number is sometimes transmitted by moving the pointer to one side or the other of the proper number indicated on the dial, and it is further objectionable in that the circuit is completed through the con-

tact springs and break-wheels, as the sparking which frequently occurs upon the disengagement of a wheel and its spring acts to burn or "pit" the wheel and spring, which latter has to be filed or otherwise treated to put it in proper operating condition.

This invention has for its object particularly the production of a multiple signal-transmitter free from the objections set forth, admitting of rapid adjustment, and simple in construction.

In accordance therewith my invention consists, in a multiple signal transmitter, of a units and a tens group of rotatable signal wheels, a normally opening signal key for and adapted to be closed by each signal wheel, and a motor to rotate said wheels in unison, combined with a selecting device including a series of normally open contacts in electrical connection with a battery, a branch wire leading from one member of each key to a group of said contacts, a single wire leading from the other member of all the keys to the battery circuit, and means for closing any one of the contacts of the selecting device, whereby a circuit is completed through one of the signaling keys at each revolution of the wheels, substantially as will be described.

Other features of this invention will be hereinafter described, and particularly pointed out in the claims.

Figure 1 shows, in plan view, a multiple-signal transmitter embodying this invention; Fig. 2, a view showing the signal-wheels, and Figs. 3 and 4 details to be referred to.

I have herein shown the various parts of the apparatus embodying my invention as supported upon a suitable base-plate *a*, of insulating material, which has arranged on it suitable bearings for a shaft *a'* on which a series of signal wheels are fixed. The signal wheels, as herein shown, are represented in two groups, a tens group, as *t'*, *t*², *t*³, *t*⁴, *t*⁵, *t*⁶, *t*⁷, *t*⁸, *t*⁹, and a unit group, as *u*¹, *u*², *u*³, *u*⁴, *u*⁵, *u*⁶, *u*⁷, *u*⁸, *u*⁹. See Figs. 1 and 2. A motor mechanism *m*, of any suitable construction, is employed to rotate this shaft one or more revolutions, as desired, said motor being herein shown as wound by moving the operating lever in one direction, and as operating the shaft as the train spends its force.

A bar *b* of conducting material is secured to the frame above the signal wheels and extending the length of the series, it being provided with a series of screws *b'*, one corresponding to each signal wheel, said screws serving as contact points and projecting below the under side of the bar.

A series of lever *c* are arranged loosely on a rod *c'*, see Figs. 1 and 3, suitably insulated and secured to the frame, there being one lever for each signal wheel. These levers *c* normally rest on a supporting rod *c''*, and each lever has a pin, as *c''*, projecting from it laterally at the end opposite its pivotal point and which lies in the path of movement of the teeth of the signal wheels. The levers *c* are arranged beneath the contact points or screws *b'*, and are each provided with a suitable contact, which, when lifted by the signal wheel in revolving strikes it and closes the circuit at this point, the circuits, hereinafter described, being normally open at such points.

The series of levers *c* and contacts *b'* constitute the circuit closers or signaling keys to co-operate with the signal wheels, as will be described.

Referring to Fig. 2 it will be seen that the signal wheels, which are therein shown as in their relative positions when fast on the shaft *a'*, are so arranged that the projections of the unit group of wheels, *t*¹ to *t*¹⁹ inclusive, will be brought one after another into engagement with their respective levers *c* to close the circuits at the corresponding contacts *b'*, during one-half of a revolution of the shaft; and the projections of the tens group, *t'* to *t'*⁹ inclusive, will similarly operate during the other half of the revolution. It is thus evident that each time the motor *m* is operated the shaft *a'* will revolve, and all the signal wheels will operate their respective signaling keys once for each complete revolution of the shaft.

A device, herein shown as a switch board, and which will now be described, is provided, by which any one particular signal can be transmitted, the particular signals in this instance of my invention consisting of the numbers from 1 to 99 inclusive, with the exception of the number 10 and its multiples. This switch board, as shown in Fig. 1, is also supported on the base *a* and consists of a series of contact plates or bars *e* joined or electrically connected together at one end, and connected by a wire *e'* to one side of the battery *B*.

Secured to the base-plate I have shown a series of contact plates, as *e*², connected by a branch wire *i*² with the lever *c* that co-operates with the signal wheel *t*¹; a series of contact plates *e*³ which are connected by a branch wire *i*³ to the lever *c* which co-operates with the signal wheel *t*²; a series of contact plates *e*⁴ which are connected by a branch wire *i*⁴ with the lever *c* which co-operates with the signal wheel *t*³; a series of contact plates *e*⁵ which are connected by a branch wire *i*⁵ with

the lever *c* which co-operates with the signal wheel *t*⁴; a series of contact plates *e*⁶ which are connected by a branch wire *i*⁶ to the lever *c* which co-operates with the signal wheel *t*⁵; a series of contact plates *e*⁷ which are connected by a branch wire *i*⁷ to the lever *c* which co-operates with the signal wheel *t*⁶; a series of contact plates *e*⁸ which are connected by a branch wire *i*⁸ to the lever *c* which co-operates with the signal wheel *t*⁷; a series of contact plates *e*⁹ which are connected by a branch wire *i*⁹ to the lever *c* which co-operates with the signal wheel *t*⁸; and a series of contact plates *e*¹⁰ which are connected by a branch wire *i*¹⁰ to the lever *c* which co-operates with the signal wheel *t*⁹, the contact plates *e*² to *e*¹⁰ inclusive being thus shown as in connection electrically with the signaling keys operated by the unit group of signal wheels *t*¹ to *t*⁹. This switch board also has a series of contact plates *n* forming a part thereof, adjacent to the second group of contact plates *e*² to *e*¹⁰ inclusive, and connected by a branch wire *o* to the lever *c* which co-operates with the signal wheel *t'*; contact plates *n'* adjacent to the third group *e*³ to *e*¹⁰, and connected by a branch wire *o'* to the lever *c* which co-operates with the signal wheel *t'*²; contact plates *n*² adjacent to the fourth group *e*⁴ to *e*¹⁰, and connected by a branch wire *o*² to the lever *c* which co-operates with the signal wheel *t'*³; contact plates *n*³ adjacent to the fifth group *e*⁵ to *e*¹⁰, and connected by a branch wire *o*³ to the lever *c* which co-operates with the signal wheel *t'*⁴; contact plates *n*⁴ adjacent to the sixth group *e*⁶ to *e*¹⁰, and connected by a branch wire *o*⁴ to the lever *c* which co-operates with the signal wheel *t'*⁵; contact plates *n*⁵ adjacent to the seventh group *e*⁷ to *e*¹⁰, and connected by a branch wire *o*⁵ to the lever *c* which co-operates with the signal wheel *t'*⁶; contact plates *n*⁶ adjacent to the eighth group *e*⁸ to *e*¹⁰, and connected by the branch wire *o*⁶ to the lever *c* which co-operates with the signal wheel *t'*⁷; contact plates *n*⁷ adjacent to the ninth group *e*⁹ to *e*¹⁰, and connected by a branch wire *o*⁷ to the lever *c* which co-operates with the signal wheel *t'*⁸. Contact plates *n*⁸ adjacent to the tenth group *e*¹⁰ to *e*¹⁰, and connected by a branch wire *o*⁸ to the lever *c* which co-operates with the signal wheel *t'*⁹; these latter contact plates *n*, *n'*, &c., and the branch wires electrically connecting with the levers of the signaling keys operated by the tens group of signal wheels *t'* to *t'*⁹. The contact plates are arranged as usual in switch boards, around a hole or socket, into which the plug represented in Fig. 4, may be placed to connect the contact plates. As herein shown the contact plates are arranged in parallel rows, see Fig. 1, adjacent to the contact plates or bars *e*, the numbers from 1 to 99, exclusive of 10 and its multiples, being preferably indicated on the switch board, and for the two-figure numbers the contact plates of the unit group are arranged beside the contact plates of the tens group, so that one

branch of the units group series and one of the tens group series may each be closed at one time by the plug to thus transmit a two-figure number.

5 From an inspection of the drawings it will be clear that the bar *b* is always connected with the battery B by the wire *u*, and the contact plates or bars *e* are also always connected with the battery by wire *e'*, and that each
10 branch circuit or wire *i*², *i*³, &c., is normally open at the contacts *e*², *e*³, &c., and also at the contact *b'* of the corresponding lever *c*, each circuit *o*, *o'*, &c., being normally open at the contacts *n*, *n'*, &c., and also at the contacts of
15 the corresponding levers *c*, and in order to transmit any number the circuit in the branch connecting bar *b* to plates *e* must be closed at one of the contacts *b'* and by the insertion of a plug in the hole corresponding to that number.
20 To transmit signal No. 9, for instance, the plug will be inserted in the switch board at 9, thus closing one normally open point in a branch circuit and the motor will be operated to rotate the signal wheels, and the circuit will be closed by the signal wheel *t*¹⁹ at
25 the other normally open point, so that the current will pass from the battery B over the wire *e'*, plug, inserted at 9, contact plates *e* and *e*¹⁰, branch wire *i*¹⁰, lever *c* raised by wheel *t*¹⁹, contact *b'*, bar *b*, and return to the battery B by the wire *u*, all the other branch
30 wires being open. To transmit the signal No. 29, the plug will be inserted in the switch board at 29 closing one normally open point in each of two branches, and the motor will
35 be operated.

In the first half of the revolution of the shaft *a'* the current passes from the battery B over the wire *e'*, contact plate *e*, contact plate *n'*,
40 branch wire *o'*, lever *c*, which is operated by the signal wheel *t*², corresponding contact *b'*, closing the second open point of one branch, bar *b*, and wire *u*; and in the last half of the revolution, over the wire *e'*, contact plate *e*,
45 contact plate *e*¹⁰, branch wire *i*¹⁰, lever *c*, operated by the signal wheel *t*¹⁹, and contact *b'*, bar *b*, and wire *u*. It will thus be seen without further description that any number represented on the switch can be transmitted by
50 placing the plug in the hole or socket corresponding to such number, so that a wrong number can only be sent by putting the plug in the wrong socket, a mistake very much less likely to occur than moving a pointer too far
55 or not enough, in the desire to send the signal out as soon as possible.

By the construction hereinbefore set forth the current is never passed through the signal

wheels or their shaft, and the screw form of the contacts *b'* makes them rapidly and individually adjustable, so that should any "pitting" occur, it will be very easy to readjust the contacts as necessary. 60

The construction of the switch board is simple and effective, and does away with the great nicety of adjustment necessary in selecting
65 rolls or drums.

It is evident that, while the whole apparatus is herein shown mounted upon a single base, the signal wheels and keys could be
70 mounted on one base and the selecting switch board on another one.

Any suitable receiving instrument may be employed in the circuit to receive the signals transmitted, that forming no part of my invention herein described. 75

I claim—

1. A multiple signal transmitter consisting of a units and a tens group of rotatable signal wheels, a normally open signaling key for
80 and adapted to be closed by each signal wheel, and a motor to rotate said wheels in unison, combined with a selecting device including a series of normally open contacts in electrical connection with a battery, a branch wire leading from one member of each key to a group
85 of said contacts, a single wire leading from the other member of all the keys to the battery circuit, and means for closing any one of the contacts of the selecting device, whereby a circuit is completed through one of the signaling keys at each revolution of the wheels,
90 substantially as described.

2. A multiple signal transmitter consisting of a units and a tens group of rotatable signal wheels, and a signaling key for and to be
95 operated by each signal wheel, and means to rotate the groups of wheels in unison, and branch wires leading from one of the members of each signaling key, combined with switches consisting of series of contact plates,
100 one of the members of each signal key being connected by branch wires to one of the series, the other members of all the keys being connected to the battery, other contact plates connected to the battery circuit, and a movable
105 plug to connect one of the latter plates with one or more plates of the series, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses. 110

BERNICE J. NOYES.

Witnesses:

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EMMA J. BENNETT.