(No Model.) 2 Sheets—Sheet 1.

C. E. SCRIBNER.

AMERICAN DISTRICT ELECTRIC SIGNAL APPARATUS.

No. 512,400. Patented Jan. 9, 1894.

Fig. 1.

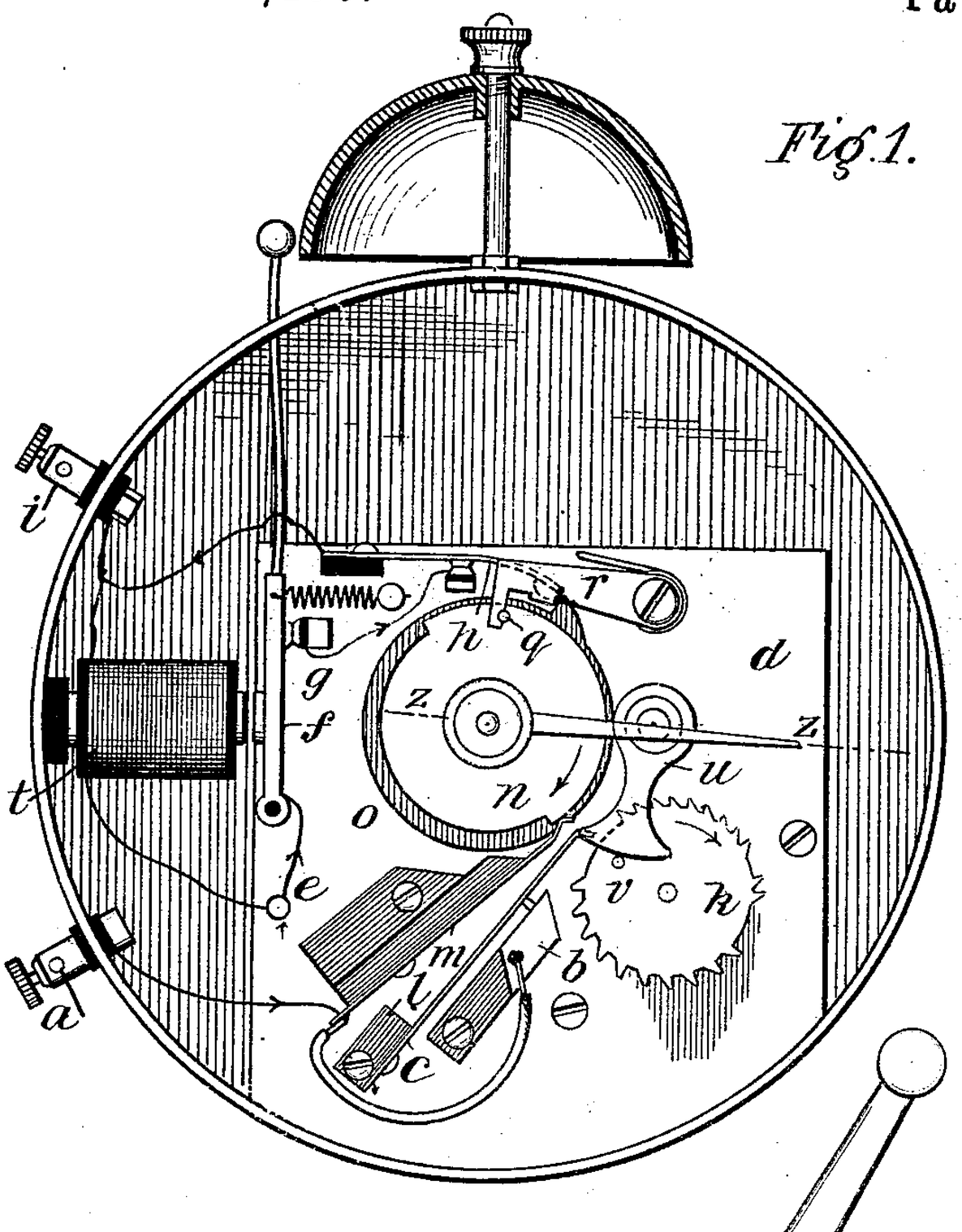


Fig. 3.

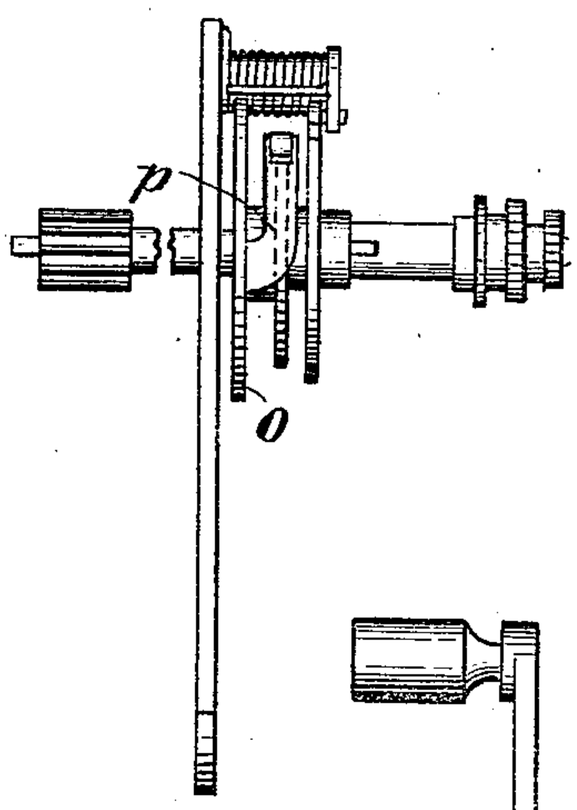


Fig. 2.

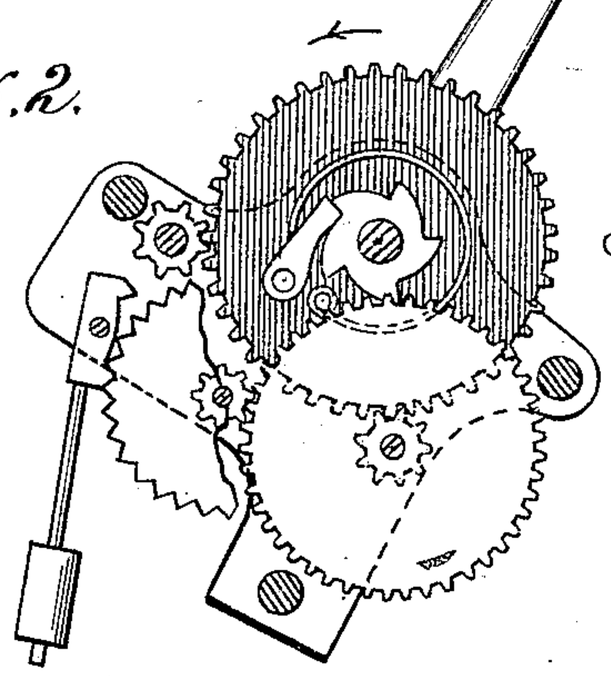
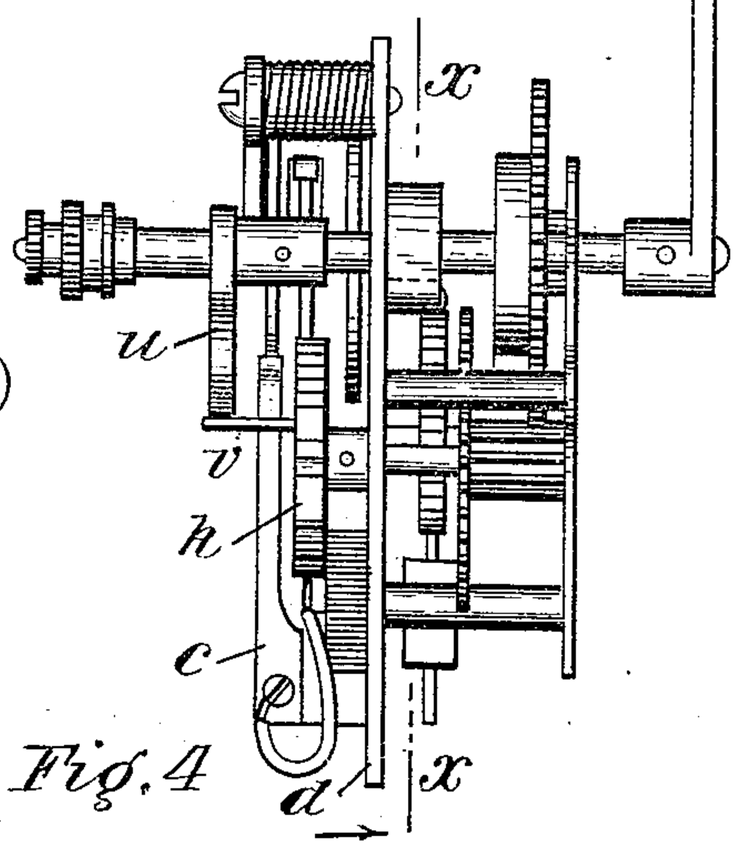


Fig. 4



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(No Model.) 2 Sheets—Sheet 2.

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AMERICAN DISTRICT ELECTRIC SIGNAL APPARATUS.

No. 512,400. Patented Jan. 9, 1894.

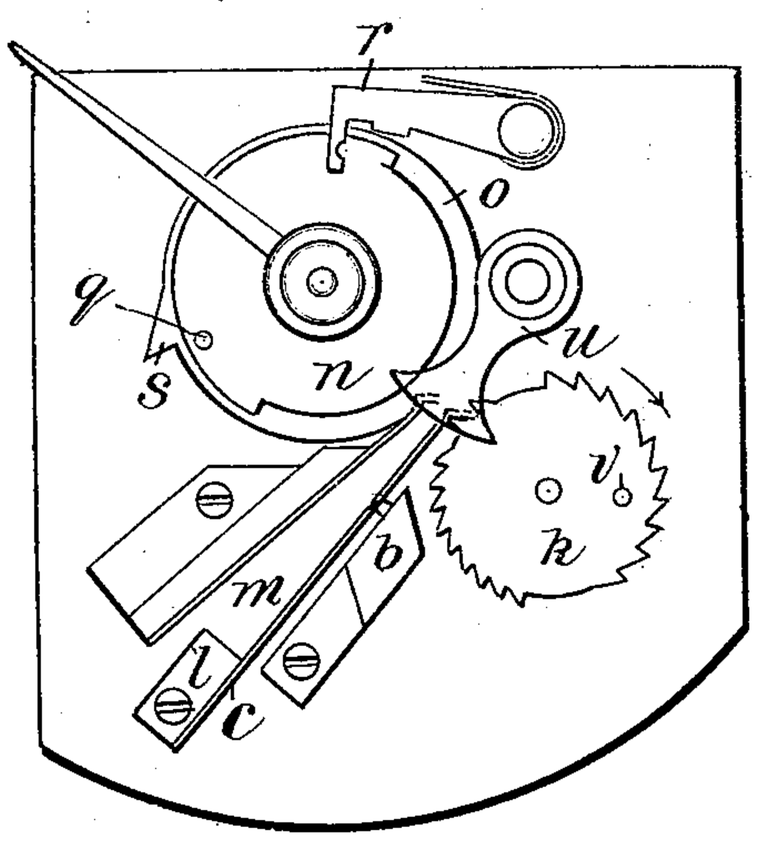

Fig. 5.

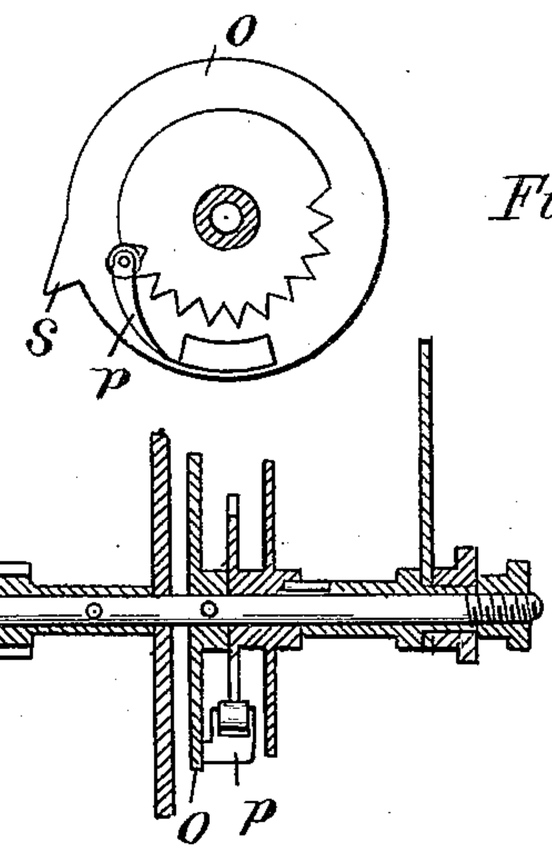

Fig. 7.

Fig. 8.

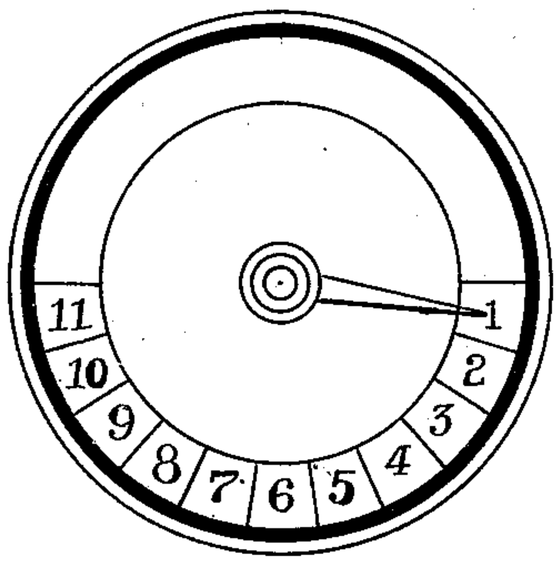

Fig. 6.

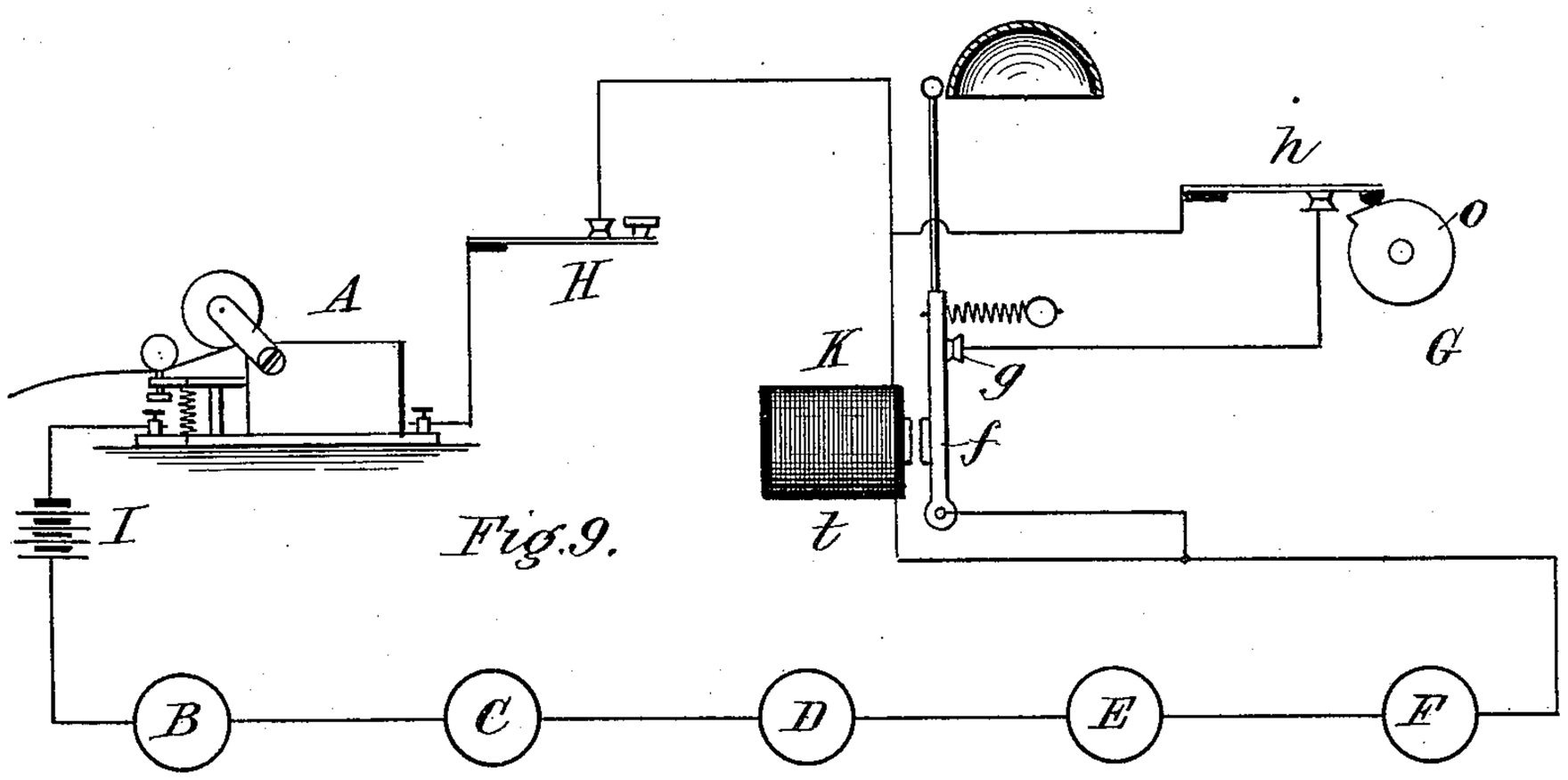

Fig. 9.

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UNITED STATES PATENT OFFICE.

CHARLES E. SCRIBNER, OF CHICAGO, ILLINOIS, ASSIGNOR TO THE WESTERN ELECTRIC COMPANY, OF SAME PLACE.

AMERICAN DISTRICT ELECTRIC SIGNAL APPARATUS.

SPECIFICATION forming part of Letters Patent No. 512,400, dated January 9, 1894.

Application filed December 27, 1886. Renewed May 9, 1893. Serial No. 473,601. (No model.)

To all whom it may concern:

Be it known that I, CHARLES E. SCRIBNER, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in American District Electric Signal Apparatus, (Case No. 122,) of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

My invention relates to the apparatus used in connection with district messenger service systems in which call boxes distributed throughout a certain district are electrically connected with the central station. These boxes are so connected and constructed that several specific signals may be sent in to the central station from any one of the district boxes and there received upon a suitable register, and after the signal is sent, the circuits of the box are automatically brought in position so that a signal sent from the central office may be received at the box to indicate that the central station has received the call. A Morse register may be used at the central station for receiving the calls from the boxes. Quite a large number of boxes may be placed upon a single circuit.

The box which I have invented consists of a clock train, a lever for winding up the spring before each call is sent in, a break wheel provided with notches to indicate the number of the box and the different services required, a shunting device for varying the service signal, tripping and stop mechanism and an electro-magnetic signal receiving device, whereby any one of the several signals may be sent to the central station and an answer back signal received at the box, as will be hereinafter described.

My invention is illustrated in the accompanying drawings, in which—

Figure 1 is a front view of the American district signal box which I have invented, with the dial removed so as to show the interior mechanism and circuits. Fig. 2 is a view of the train upon section line *x*—*x* of Fig. 4. Fig. 3 is a side elevation of the carrier shaft, carrier and pointer mechanism. Fig. 4 is a side elevation of the mechanism of the box. Fig. 5 is a detailed front elevation of the break wheel, the carrier wheel and stop mechanism in the position which they assume after the break wheel has gone a little more than half a revolution. Fig. 6 is a front view of the dial with the pointer set at 1. Fig. 7 is a detailed view of the carrier disk and the engagement wheel which carries the pointer mechanism. Fig. 8 is a detailed sectional view upon a line *z*—*z* of Fig. 1. Fig. 9 is a diagram of an American district circuit extending from the central station through several different stations.

Like parts are indicated by similar letters of reference throughout the different figures.

Referring now to Fig. 9, A is a register at the central station. B, C, D, E, F, and G are different stations upon the same circuit, at each of which is provided one of my signal boxes. H is a key for breaking the circuit at the central station, and I is the battery included in the circuit. K is the electro-magnetic device which is normally shunted out of the circuit, but which is automatically brought into circuit after a call has been sent, so that on opening key H the bell will be rung.

Upon the dial, shown in Fig. 6, are indicated eleven different numbers, and the mechanism of the box is so arranged that on setting the pointer to any one of said numbers and pulling down the lever, and then releasing the lever, the train of wheels will be set in motion and the break wheel will interrupt the circuit at intervals, so as to indicate and register at the central station, not only the particular call, but also the specific number of the box. The call of the box is thus sent in and received upon the register at the central station.

The box is shown in its normal position in Fig. 1. The circuit through the box may be traced from binding post *a* to contact *b* and thence to spring *c*, which is connected with the plate *d*, and thence by connection *e* to

armature lever *f* and thence to contact point *g*, and thence to spring *h*, and thence to binding post *i*, as shown.

The break wheel *k* is provided with teeth, and when the wheel is set in motion these teeth come successively in contact with the spring finger *c*, and thus the spring finger is lifted successively from contact *b*, thus breaking the circuit each time the spring finger is lifted. Dashes and spaces are thus indicated upon the register at the central station corresponding to the number and position of the teeth upon the wheel. The break wheel shown in the drawings is provided with ten notches, each serving to send in the specific service required accordingly as one or more may be included in the circuit. On the opposite side of the same wheel are provided notches which indicate the specific number of the box. In this case the number of the box would be twenty-nine. The connection between spring *c* and point *b* is never shunted, while the number of the box is being sent in, but, as before stated, the pointer may be set so that a shunt will be closed between spring *c* and point *b* while one or more, or all, of the service notches are passing the said spring. Thus during the revolution of the break wheel we may have no service dash at all indicated before the number of the box, or we may have from one to ten service dashes indicated, according to the position in which the pointer is set before the box is turned in. Break wheels and pointer mechanism for setting break wheels have been heretofore used for accomplishing this result. Also apparatus has been employed by which an answer back signal could be received from the central station after the box had been turned in. I accomplish the desired results, however, by mechanism more simple than any heretofore in use, and in a manner never before employed in this class of electric signaling apparatus.

I will now describe the mechanism by means of which I am enabled to shunt the circuit breaker so as to send in the desired service.

Upon the periphery of the wheel I provide ten notches to indicate the service, and other notches to indicate the particular number of the box. Every time the box is turned the break wheel makes a complete revolution, and the contact depending upon the break wheel is opened and closed successively by the notches. Hereinbefore I have traced the circuits from binding post *a* to contact point *b* and thence to post *c* which is in contact with the metallic plate *d*. If, now, a shunt be closed around the spring *c* and point *b* during any portion of the revolution of wheel *k*, it is evident that there will be no break in the circuit of the line caused by the teeth of the wheel lifting spring *c* from said point *b*. In order that this may be done, I provide the contact spring *m* permanently in contact with contact point *b* and the disk *n*, which is permanently in connection with the metallic plate *d*, and, hence, permanently in connection with post *l* which carries spring *c*. Therefore the shunt will be closed when spring *m* rests upon disk *n*. The pointer, the disk *n* and the engagement wheel p^2 are all connected together by a sleeve which is loose upon the carrier shaft, as shown more clearly in Fig. 8. A segment of the disk *n* is cut away, and the spring *m* is so adjusted that it will be carried by the segment of the wheel having the greater radius, but will not make any contact with the similar segment which has been cut away. The carrier disk *o* is pinned to the carrier shaft so as to move with it, and is provided with the spring *p* which is secured rigidly at one end of the carrier disk *o*, and at the other end provided with a roller *p'*, and is so adjusted that the roller presses against the engagement wheel, as shown in Fig. 7. As long as the roller is in engagement with any one of the notches of said wheel, the said wheel will be carried with the carrier disk *o*, and with it the shunting disk *n* and the pointer. By means of the pointer the engagement wheel may be set so that the roller will engage with any one of the notches and will be thus held in said notch, so as to carry the shunting disk until the stop *q* of the shunting disk comes against the trigger *r*. As soon as stop *q* is carried against trigger *r*, the shunting disk *n* will be held so as not to revolve with the carrier shaft until the break wheel *k* has about completed its revolution, whereupon the said trigger *r* is lifted by cam *s* provided upon the carrier wheel, and thereupon the stop *q* passes by the trigger *r* and rests upon the other side thereof, as shown in Fig. 1. This same cam *s*, or a similar cam, serves, at the same time that the trigger is lifted, to separate spring *h* from its opposing contact point and bring the electro-magnet *t* into the circuit. As soon as the electro-magnet *t* is brought into the circuit, the armature *f* of said electro-magnet will be drawn to its poles, thus separating armature *f* from contact point *g* and holding it in this position. Thus when cam *s* passes on so as to permit spring *h* to close again, the shunt around the electro-magnet *t* will be held open at *g*. The current from the battery I at the central station passes through the electro-magnet, and as soon as the key H is opened to break the circuit of said battery, the electro-magnet *t* is demagnetized and armature *f* falls away, and the hammer carried by said armature will strike a blow against the bell. At the same time the armature closes against point *g*. Electro-magnet *t* is thus immediately shunted and no more signals can be received thereby from the central station until the armature is drawn again to its poles.

It is evident that the shunting mechanism and answer back mechanism may be used independently.

The operation of the break wheel and shunt-

ing device is as follows: The wheel and disk revolve in the direction indicated by the arrows in Fig. 1, and when in motion the ten breaks are made first by the ten teeth upon the periphery of the break wheel. Then follows a space, as indicated, after which the number—in this case twenty-nine—is transmitted. When the pointer is set in the position shown in Figs. 1 and 6, the shunting disk *n* and the spring *m* remain in contact during that portion of the revolution of the break wheel when the ten dash teeth are breaking the circuit through spring *c* and contact point *b*. Therefore, those breaks will not be transmitted to the line for the reason that the contact points *c b* are shunted out by the spring *m* resting on disk *n*, as disk *n* revolves with break wheel *k* at the same rate of speed. When break wheel *k* has revolved to a position to begin transmitting the number, disk *n* will have revolved out of contact with spring *m*, thus breaking the shunt around the contact points *c b*. Therefore, the breaks indicating the number will be transmitted to line and will be received upon the register at the central station. If, now, the pointer be set to any of the numbers upon the dial, say, for example, number 4, and the box then started, disk *n* will, in its motion, be four teeth in advance of break wheel *k*, and its periphery will pass out of contact with spring *m* as soon as six of the dash teeth have passed under the spring finger *c*. Therefore, the shunt around the contact points *c b* will be removed in time to admit of four dashes being transmitted by the break wheel, after which the number will be transmitted as before. Thus if the needle be set at the service 11, the disk *n* will pass out of contact with spring *m* in time to permit all of the dashes from break wheel *k* to be transmitted. If the pointer be set at 11, and as the disk *n* travels with break wheel *k*, it is evident that during the revolution the disk *n* would come again into contact with spring *m* before the completion of the revolution. It is to prevent this contact that the stop pin *q* and the trigger *r* are provided. The disk being stopped by this stop mechanism at a point when spring *m* and disk *n* are still out of contact, the disk is held by the stop until after the break wheel has revolved to a point where the number has been completely transmitted, after which, and during the final movement of the train, the stop is thrown out of the way and the disk resumes its motion to the starting point; that is, when the pointer is on the figure 1. It will be seen that the arm *u* is mounted upon the same shaft with the lever. This arm *u*, therefore, is turned with the main shaft through an arc equal to the arc described by the lever when the signal is being turned in. When the lever is turned to wind up the clock spring, this arm or lug *u* is moved away from the pin *v* carried by the break wheel. This arm gradually returns while the signal is being sent in, so as to be in position to arrest the movement of the break-wheel after it has completed its revolution.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. In an American district signal service apparatus, a break wheel and a clock train for moving the same, in combination with a shunting disk adapted to shunt a greater or less number of the service signals, and mechanism for setting the same in different positions, and circuit breaking and closing devices; whereby any one of several designated service signals may be sent to the central station, substantially as described.

2. In a district signal box, the combination with a clock train, of a circuit breaking wheel and a shunting device, said shunting device and break wheel being on different shafts which are carried at the same rate of speed, the shunting disk being mounted loosely on its carrying shaft, and mechanism for setting said shunting device in different positions with respect to the break wheel and circuits; whereby any of several designated signals may be sent, substantially as described.

3. In a district signal box, the combination with a circuit breaking wheel, of an adjustable shunting mechanisn, said circuit breaking wheel and said shunting mechanism being both moved by the same clock train at the same rate of speed, and two circuits, one including the circuit breaking wheel and the other circuit shunting the said circuit breaking wheel and including the said adjustable shunting mechanism; whereby any particular service signal may be sent over the line, substantially as described.

4. The combination with the carrying shaft of the spring rigidly connected therewith and provided with a roller at its free end, and an engagement wheel mounted loosely upon said shaft; whereby while the shaft is turning the engagement wheel is carried by said roller, substantially as described.

5. The combination with the driving shaft, of an adjustable disk mounted loosely thereon, the carrier disk rigidly connected with the carrier shaft so as to move therewith, and the spring *p* which is secured rigidly at one end to the carrier disk and at the other end provided with a roller adjusted to press against an engagement wheel, substantially as described.

6. The combination with the circuit of a signal box, of the spring finger *c* permanently connected with the plate *d*, and a connection from said plate *d* out to the line, a break wheel for operating said spring finger so as to separate said finger at intervals from its normal contact point to break the circuit, and an adjustable shunting mechanism consisting of a disk, a pointer adapted to turn said disk, and a contact spring adapted to make con-

tact with a portion of said disk; whereby a shunt circuit may be closed around the point opened by said spring finger, substantially as described.

7. The combination with a break wheel adapted to be rotated by a clock train, of a circuit breaker adapted to be controlled thereby, a shunt circuit about said circuit breaker, a rotating circuit closing wheel included in said shunt circuit, and means for adjusting the position of said circuit closing wheel to vary the length of time said shunt circuit is closed, substantially as described.

In witness whereof I hereunto subscribe my name in the presence of two witnesses.

CHARLES E. SCRIBNER.

Witnesses:
GEORGE P. BARTON,
WM. M. GILLER.