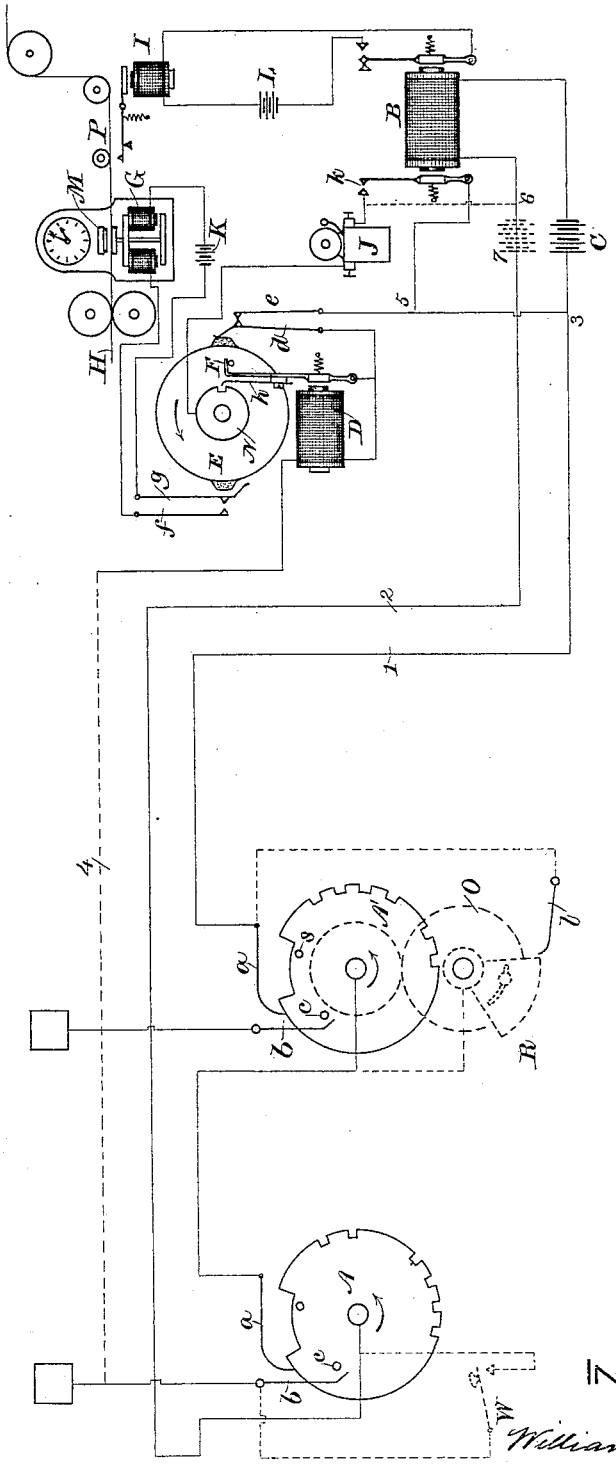
(No Model.)

W. E. DECROW.

SIGNALING TELEGRAPH.

No. 493,253. Patented Mar. 14, 1893.



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SIGNALING-TELEGRAPH.

SPECIFICATION forming part of Letters Patent No. 493,253, dated March 14, 1893.

Application filed November 14, 1892. Serial No. 451,450. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM E. DECROW, a citizen of the United States, residing at Boston, county of Suffolk, State of Massachusetts, have invented a certain new and useful Improvement in Signaling-Telegraphs, of which the following is a specification, reference being made to the accompanying drawing, in which my invention is illustrated in diagram.

My invention relates to a device by which the time when a signal is received and registered at the central station may be automatically recorded on the register strip. The device which I employ for this purpose has the additional function of acting as an indicator to make known any fault in the line by reason of which the register fails to operate, although the box may be pulled and the circuit-breaking wheel act in its normal manner.

My invention more specifically consists in a second circuit which may be a grounded circuit that extends from the different signal boxes to the central station and is there connected with the magnet operating the time stamp. From the magnet it proceeds to the main line so as to form when closed a branch thereof. At each of the signal boxes I provide means for closing this circuit momentarily whenever the box is pulled (such means preferably being automatic) so that the stamp will be actuated at the time that a signal is sent in, although it is entirely independent of the registering apparatus. As this second circuit is independent of the ordinary circuit and the time stamp included therein is also independent of the registering apparatus, it will be possible to have the one act as a check upon the other, that is if the operator sees or hears the stamp operating without the register, he knows that there is a fault in the registering circuit, and vice versa. I furthermore provide means by which the second circuit may at the same time be used to give an indication audibly by operating a signal bell, this bell being usually arranged to act as an emergency bell, that is, the second circuit is only caused to give this audible signal when the signal box is put in a certain condition by the operator who wishes to thereby signify a special call, the ringing of the bell accompanying all signals of one class and remaining silent on all signals of another class.

Referring to the drawing A, A′ represent the circuit breaking wheels of two signal boxes. These wheels are operated by clock-work in a well known manner, and act to interrupt the circuit, in a predetermined way by means of notches in their peripheries which break the connection between the wheels and contact springs *a*, *a*, that normally rest against them to close the main circuit. The signal boxes are in series with one another as shown.

At the central station B is the main relay magnet and the line is normally closed through this magnet and through the series of signal boxes. This line is a metallic circuit comprising the two wires 1 and 2 and includes the main battery C. At each signal box I provide an additional contact spring *b*, and as the wheel rotates the pin *c* strikes this spring *b* and makes a momentary contact therewith. These contact springs *b*, *b* are connected either to ground or to a third wire. This third wire, forming the second or extra circuit, mentioned in the statement of invention, is normally connected at the central station to the main line at the point 3, or it may be connected at the point 6 in which case the battery would be placed at point 7. The circuit itself is marked 4, and its normal course at the central station is through the magnet D and thence through the contact springs *d*, *e* to the point 3, or to point 6 when battery is at point 7.

E is a wheel driven by clock-work and normally locked against rotation by a stop F on the armature of magnet D. The wheel E when released by the action of magnet D makes a complete rotation and in so doing closes the local circuit of battery K by pressing into contact the two springs *f* and *g*. This energizes the magnet G of the time stamp M. The wheel E by its rotation also opens the said second circuit by allowing the contact springs *d* and *e* to fall apart. The armature lever of the magnet D is provided with a contact spring *h* adapted to come in contact with the wheel N, on the same shaft with wheel E when rotated. This wheel N is in electrical connection with the emergency bell J and proceeds thence to the back stop of a spare armature lever of magnet B. The magnet B acts in the usual manner to close the local circuit of battery L through the magnet I of the register,

and at the same time the spare armature lever in falling back makes contact from 5 through to J or an extra relay magnet may be used for the purpose.

Having thus described the apparatus it will be clear what the operation will be when a box is pulled. Supposing the first box having the wheel A to be started so as to rotate in the direction of the arrow, the spring *a* will reach the first long notch in the periphery of the wheel A and the circuit will be interrupted. A break will be made (except in the case to be hereinafter described) and the continued rotation of the wheel will give the desired signal, the circuit being interrupted the desired number of times and the relay magnet B acting at each interruption to close the local circuit of battery L and cause the magnet I to attract its armature and thus make a mark on the register. Before or during (according to location of the pin) the first interruption of the circuit the pin *c* on wheel A will come in contact with the spring *b* and a branch circuit will then be established from the wheel A to the second circuit 4, to magnet D, contact springs *d* and *e* to point 3 or 6 as the case may be, and thence by battery C and magnet B to line. In case the pin *c* on wheel A is so placed that the second circuit is closed when the spring *a* is not over a notch, then the circuits will be as shown, and since the main circuit is closed only a part of the current will be diverted through the second circuit, but it will be sufficient to energize magnet D. If, however, the pin *c* is so placed that it will close the second circuit while spring *a* is over a notch and the main line consequently open, then the whole current will pass through the second circuit and in order to prevent the relay magnet acting the battery will be placed at 7, and the second circuit will join the main line at the point 6. The current in the second circuit will cause magnet D to release wheel E which closes the local circuit of battery K. This energizes magnet G momentarily and causes an impression of the time stamp to be made on the ribbon H which comes from the register P. Immediately thereafter the second circuit will be interrupted by the contact spring *d* falling away from the contact spring *e* and this circuit will not be closed at this point until the wheel has made one complete revolution. It will thus be seen that each time a signal is sent in from any box on the line the second circuit will be automatically closed for a moment so that the time of the signal may be printed on the strip H coming from the register, and the time of its receipt thereby indelibly indicated. It will also be clear that if a box should be pulled and by reason of any fault there should be no response from the relay magnet B, the second circuit will still be closed as described, and the operation of the stamp without any operation of the register will indicate that there is some trouble on the line. In the same way if the register should operate without the time stamp it would be an indication that the second circuit was at fault.

It will be observed that the second circuit is only momentarily closed at the signal box, and is then immediately broken at the springs *d* and *e*. If now I should wish to use the same circuit for giving an emergency signal, from what is known as a multiple signal box, on the bell J, I arrange at each box an apparatus indicated in the dotted lines at the box having the wheel A′. In this arrangement O is a wheel driven from the same clock-work which drives the wheel A′, the wheel O carries a sector R upon which a contact spring *l* bears. The sector R and the contact spring *l* are connected respectively to the opposite terminals of the box so as to form a short circuit whenever they are in contact. By any desired means, however, I change the normal position of the sector R relative to O upon starting the box, so that the short circuit will be interrupted at any desired period after the starting of the apparatus since the position of the sector relative to the wheel O will determine the length of time it will remain in contact to short circuit the apparatus.

By adjusting the position of the sector, I determine the character of the signal to be sent. Thus to send what I term an emergency call, the operator will leave the short circuit open, while for ordinary calls he will leave it closed during the time that the spring *a* is passing the long notch in the wheel A′. The emergency signal will thus be indicated at the central station by the long break and also, as will be immediately explained, by the ringing of bell J.

To cause bell J to ring I place a second pin *s* on wheel A′ that will come into contact momentarily with spring *b* just like pin *c*, but at a subsequent time. This pin will be opposite a notch in the wheel so as to make contact with *b* when the main line is open and the spare armature of B retracted to close the second circuit at *k*. This will include bell J in the said second circuit and the bell will ring when pin *s* strikes spring *b*, the circuit then being from battery (which in this case would be placed at point 7) to point 6, *k*, bell J, wheel N, spring *h*, magnet D, second circuit 4, spring *b*, wheel A′ and by main line wire 2 to battery at 7. If, however, the signal is not to be of the emergency class, the sector R will be turned to short circuit the box during the passage of spring *a* over the long notch, and while pin *s* will strike spring *b*, the circuit of bell J will be open at *k*, by means of the spare armature remaining attracted by magnet B, and the bell will in consequence remain silent.

While in this application I have disclosed an apparatus for sending different classes of signals by a manipulation of short-circuiting sector R and a second circuit I do not herein lay claim to such apparatus apart from the general combination of circuits and other ap-

paratus which forms the specific subject matter of this application, and which is definitely claimed hereinafter.

While I have shown means by which the second circuit is automatically closed whenever a box is pulled, yet it is not essential to my invention that this closure be effected automatically. It may be done by means of a key which the operator will press each time that he pulls the box. Such a key is indicated by the dotted line circuit at the first box, the key being designated as W.

The special function of keeping the contact springs *d* and *e* apart except when everything is at rest is to keep open the second circuit during the time that a signal is being sent so that there will be less danger of the main line being short-circuited by an abnormal ground connection on the main circuit in the event of the ground being used as part of the second circuit. It should, moreover, be noted that at each operation of a signal box the characteristic signal corresponding to the box which is operated will be sent in subsequently to the operation of the devices described in the foregoing specification to which my invention relates. That is, there will be indicated at the central station, first the time at which the message is received, which is effected by the action of the time stamp; second, the character of the message whether it is of the emergency class or not, and lastly the number of the box from which the signal is sent.

What I claim as new, and desire to secure by Letters Patent, is—

1. In a signaling telegraph the combination with the main line, of a second circuit extending to the central station, a time stamp included in said circuit and means for momentarily operating the said circuit at the signal box whenever it is pulled.

2. In a signaling telegragh the combination with a registering apparatus at the central station, of one or more signal boxes for transmitting signals to be recorded by the said register, a second circuit extending from the signal boxes to the central station, a time stamp included in the said circuit adapted to print on the register strip the time at which a signal is received, and means at each signal box for operating the said circuit whenever a signal is sent in.

3. In a signaling telegraph the combination with the main line, including one or more signal boxes, of receiving apparatus at the central station, a second circuit extending from the signal box to the said station, a magnet at the station included in said second circuit, a circuit closing wheel having a detent controlled by the said magnet, and a local circuit including a time stamp controlled by the said wheel.

4. In a signaling telegraph the combination with the main line including one or more signal boxes, of receiving apparatus at the central station, a second circuit extending from the signal boxes to the said station, a magnet at the station included in said second circuit, a circuit closing wheel having a detent controlled by the said magnet, a local circuit including a time stamp controlled by the said wheel, and a circuit breaker included in the said second circuit, and also controlled by the said wheel after its release by the action of the said magnet.

5. In a signaling telegraph the combination of the main line including one or more signal boxes, receiving apparatus at the central station, a second circuit extending from the signal boxes to the said station, a time stamp controlled by the said second circuit, a circuit breaker in said circuit controlled by a magnet therein, and a circuit around the said circuit breaker containing an emergency bell, the latter circuit being controlled by a relay magnet in the main line.

6. In a signal apparatus the combination with the main line including one or more signal boxes, receiving apparatus at the central station, a second circuit including a time stamp at the said station, but remaining normally open and a circuit closing device at each signal box for momentarily closing the said second circuit.

7. In a signaling telegraph the combination with receiving apparatus at the central station, of one or more boxes on the main line, a second circuit connecting said boxes with the central station, means at the boxes for successively operating the second circuit and separate receiving devices at the central station responding respectively to the successive operations of the said circuit.

8. In a signaling telegraph the combination with receiving apparatus at the central station of one or more signaling boxes on the main line, a second circuit connecting said boxes with the central station, means at the boxes for successively and momentarily operating said second circuit, separate receiving devices at the central station responding respectively to the successive operations of the said second circuit, one of said receiving devices being normally included in the circuit, and a circuit changer for subsequently bringing the other device into the circuit.

9. In a signaling telegraph the combination with receiving apparatus at the central station of one or more signal boxes on the main line, a second circuit connecting said boxes with the central station, means for successively and momentarily operating the said second circuit at the boxes, and a time stamp and special signaling device at the central station responding respectively to the successive closures of the said second circuit.

10. In a signaling telegraph the combination with receiving apparatus at the central station of one or more signal boxes on the

main line, an adjustable short-circuting device at the signal box, a second circuit connecting the signal boxes with the central station, means at the box for successively and momentarily operating the said circuit, and separate receiving devices at the central station adapted to be included in the said second circuit, one of the said receiving devices having its circuit controlled by a magnet in the main line.

In testimony whereof I have hereto set my hand this 5th day of November, 1892.

WILLIAM E. DECROW.

Witnesses:
E. M. BENTLEY,
H. J. LIVERMORE.