

F. W. COLE.  
 SUPERVISORY SIGNALING DEVICE FOR CLOCKS,  
 APPLICATION FILED APR. 15, 1910.

997,603.

Patented July 11, 1911.

3 SHEETS—SHEET 1.

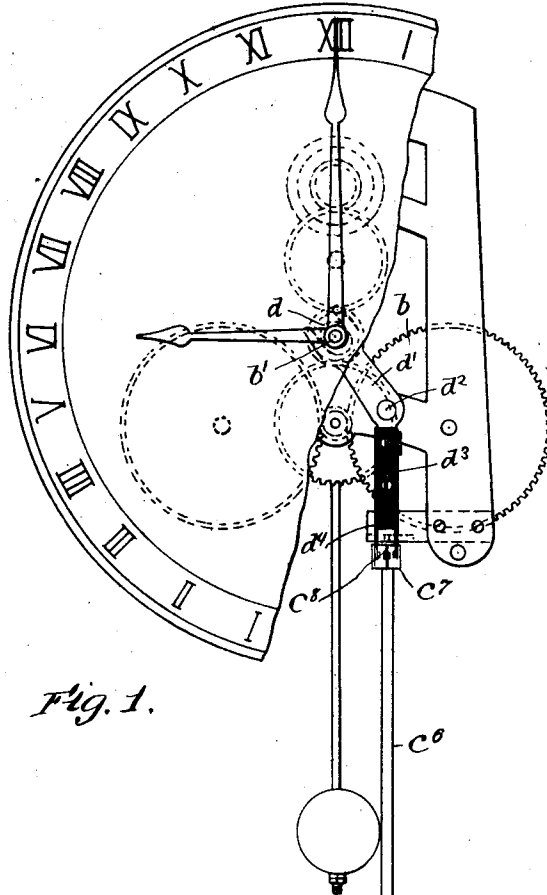


Fig. 1.

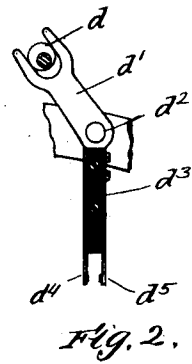


Fig. 2.

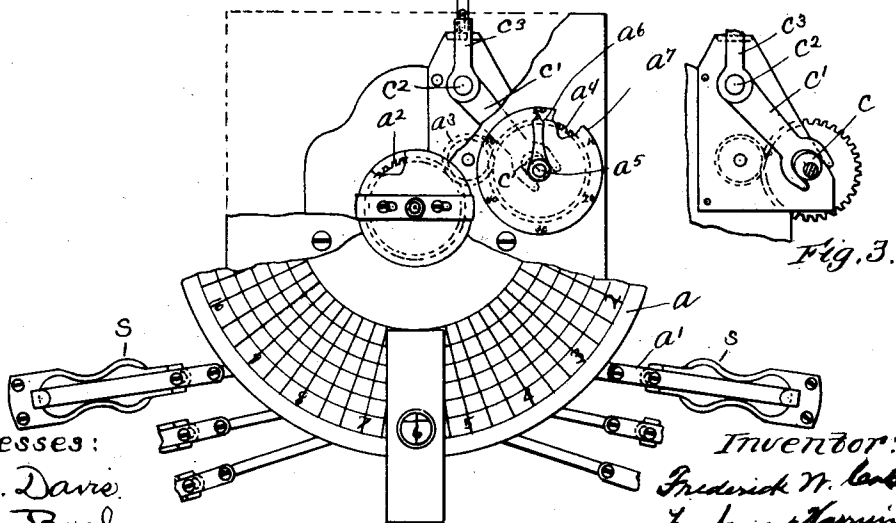


Fig. 3.

Witnesses:  
 H. B. Davis  
 H. A. Boyle

Inventor:  
 Frederick W. Cole  
 by *Hayes & Hamman*  
 attys.

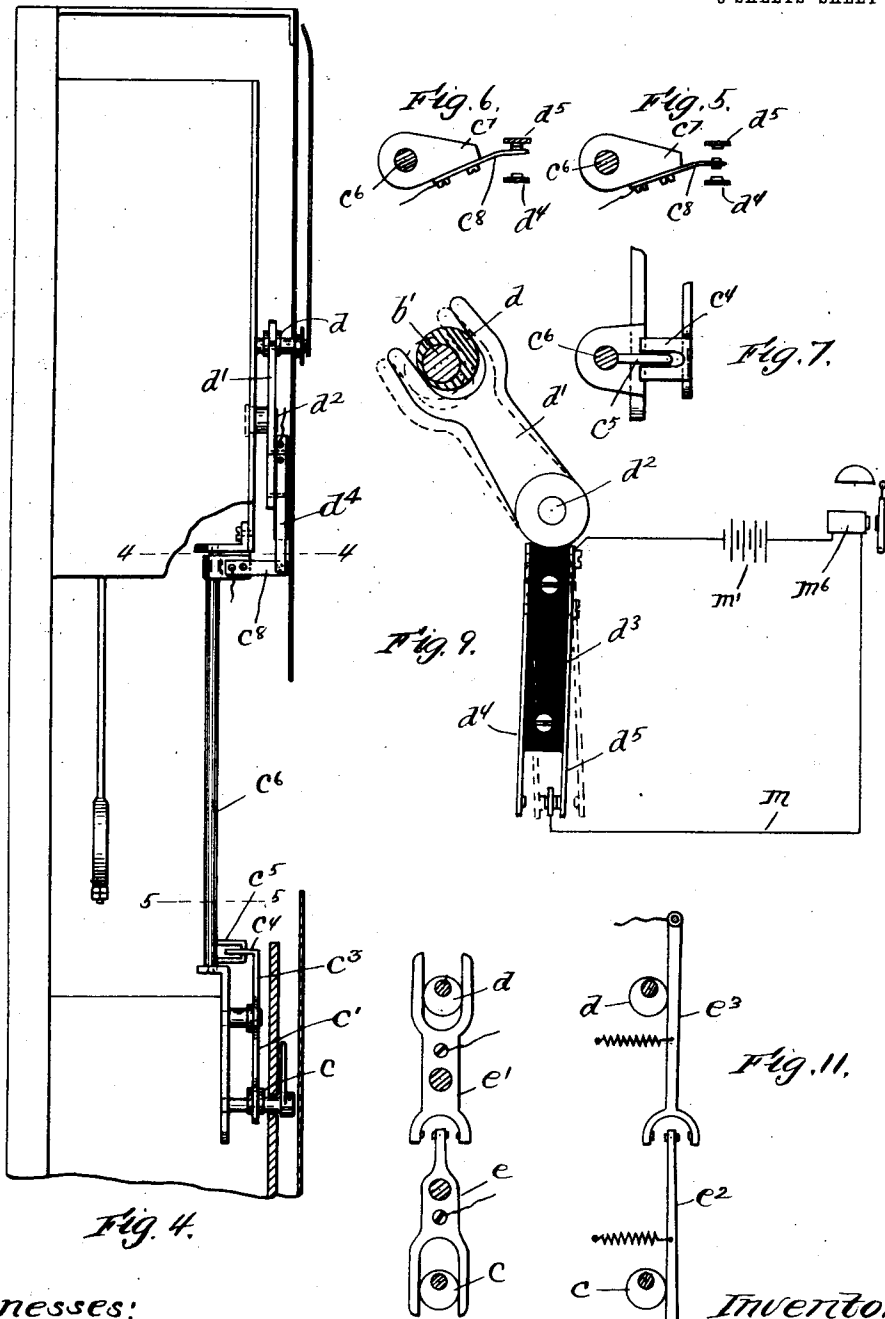
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3 SHEETS—SHEET 2.



Witnesses:  
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Fig. 10.

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3 SHEETS—SHEET 3.

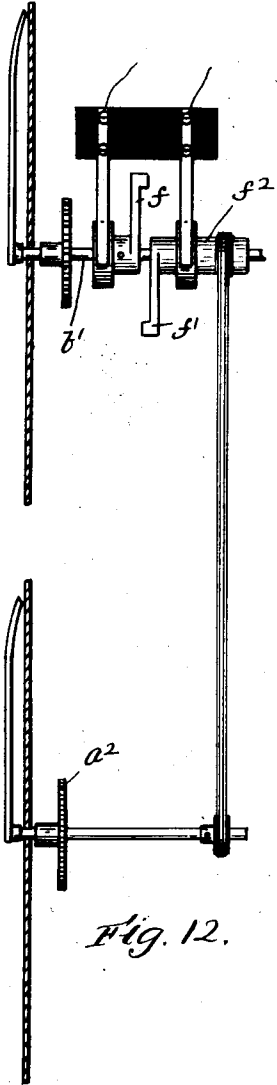


Fig. 12.

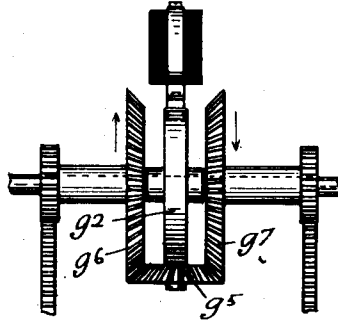


Fig. 13.

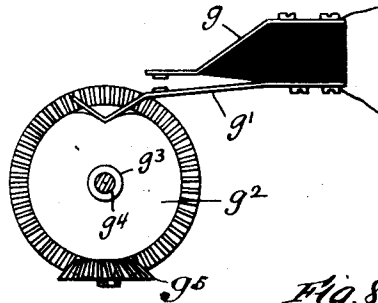


Fig. 14.

Fig. 8.

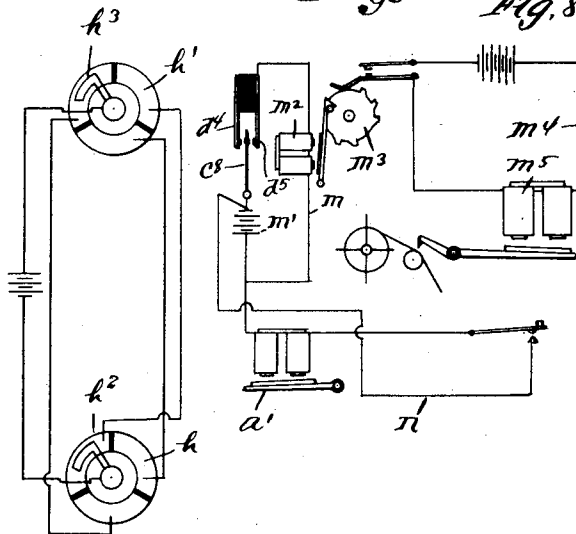


Fig. 15.

Witnesses:  
 H. B. Davis,  
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Inventor:  
 Frederick W. Cole  
 by Hayes & Harrison  
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# UNITED STATES PATENT OFFICE.

FREDERICK W. COLE, OF NEWTON, MASSACHUSETTS, ASSIGNOR TO THE GAMEWELL  
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SUPERVISORY SIGNALING DEVICE FOR CLOCKS.

997,603.

Specification of Letters Patent. Patented July 11, 1911.

Application filed April 15, 1910. Serial No. 555,896.

To all whom it may concern:

Be it known that I, FREDERICK W. COLE, of Newton, in the county of Middlesex and State of Massachusetts, have invented an  
5 Improvement in Supervisory Signaling Devices for Clocks, of which the following is a specification.

This invention relates to supervisory signaling-devices for clocks or other timing-mechanisms, and has for its object to provide a signaling-device adapted to be operated to cause a notification signal to be given or transmitted to a central-station, especially in case the clock or other timing-mechanism becomes disabled. It is of  
15 especial value in connection with automatic fire-alarm and watchman's supervisory signal-systems in which the continual operation of timing-devices is depended upon for sending signals or causing signals to be sent, and also for recording the signals. The invention is also applicable to other systems and apparatus embodying a timing-mechanism, when it is desired that notification  
20 shall be given when said mechanism becomes disabled or runs too fast or too slow.

The invention consists in embodying a timed-supervisory-mechanism in connection with the timing-mechanism, and a signaling-device for indicating the stopping of the timing-mechanism, or of either the timing-mechanism or the timed-supervisory-mechanism, and also for indicating when the timing-mechanism and timed-supervisory-mechanism are running out of synchronism, so that in case of any trouble whereby the timing-mechanism is disabled or its control affected, notification will be  
30 given.

A signaling-device is preferably employed and its circuit is adapted to be operated or controlled by the joint action of said timing-mechanism and timed-supervisory-mechanism, so that it may be operated by either, in case one ceases to operate, or in case they run out of synchronism. The signaling-device employed will preferably be a code-signal transmitter, and in such case several may be connected in a  
40 single circuit connected with a central-station, and when more than one transmitter is employed different identification signals will be sent. The code-signal transmitter is adapted to be released or otherwise operated.  
55

Figure 1 is a front view of a sufficient portion of a watchman's clock to illustrate this invention, together with means embodying this invention for operating a signaling-device in case said clock stops or runs  
60 too fast or too slow. Figs. 2 and 3 are details to be referred to. Fig. 4 is a side view of the parts shown in Fig. 1. Figs. 5, 6 and 7 are details to be referred to. Fig. 8 is a diagram of the circuit to be referred to. Fig. 9 is an enlarged detail of one of the contact-members, together with a diagram  
65 of a circuit having a modified form of signaling-device, and, Figs. 10 to 15 inclusive are details showing modified forms of circuit-operating devices for the circuit of the signaling-device.

$a$  represents the removable dial of any usual or suitable watchman's clock, or equivalent timing-mechanism, and  $a'$  one of several  
75 electro-magnetically operated markers for marking or puncturing the dial or otherwise indicating a signal thereon in response to the operation of a circuit, such as  $n$ , Fig. 8, by a watchman.

$a^2$  represents a toothed wheel which may be secured to the minute-shaft of the timing-mechanism, which is engaged by an idle pinion  $a^3$ , which in turn engages a  
80 toothed wheel  $a^4$ , secured to a shaft  $a^5$ , so that said toothed wheel  $a^4$  revolves in synchronism with the toothed wheel  $a^2$ , making a complete revolution once an hour. A hand  $a^6$  is secured to the shaft  $a^5$  which moves over a small dial  $a^7$ . With the exception of moving the minute hand  $a^6$  to one side of the center of the clock-train and mounting it on an independent shaft instead of connecting it with the shaft bearing the toothed wheel  $a^2$ , the timing-mechanism thus shown is constructed as the ordinary watchman's clock, but is here shown  
85 particularly for illustration. Hence my invention is not limited to any particular construction of timing-mechanism, or to the employment of a dial and cooperating devices whereby it is adapted to serve as a watchman's clock.

$b$  represents one of the train-wheels of a timed-supervisory-mechanism of any usual or suitable construction, and  $b'$  the minute-shaft thereof. A pendulum clock is here shown as the timed-supervisory-mechanism, merely for the purpose of illustration. Said  
90 timed-supervisory-mechanism is timed to  
100  
110

run in synchronism with the aforesaid timing-mechanism, and, as here shown, is designed to be employed as a controller for said timing-mechanism, and also to be controlled by said timing-mechanism. In carrying out this part of my invention, as shown in Figs. 1 to 9, the minute-shaft  $a^5$  of the timing-mechanism and the minute-shaft  $b'$  of the timed-supervisory-mechanism, each having secured to them a disk, and said disks, represented at  $c$  and  $d$ , respectively, are arranged eccentrically on their shafts and in the same relative positions. The eccentric disk  $c$  is embraced by the forked end of a lever  $c'$ , pivoted at  $c^2$ , and having an upwardly extended arm  $c^3$ , provided with a bifurcated laterally extended finger  $c^4$ , which embraces an ear  $c^5$ , arranged at the lower end of and projecting at right angles from an upright shaft  $c^6$ , supported by suitable end bearings, so that as the minute-shaft  $a^5$  revolves, said lever moves back and forth slowly on its pivot, making one complete vibration during each complete revolution of the minute-shaft, and the shaft  $c^6$  correspondingly reciprocates rotarily, moving through a short arc. The eccentric disk  $d$  is embraced by the forked end of a lever  $d'$ , pivoted at  $d^2$ , and having a downwardly extended arm  $d^3$ , composed of insulating material, which bears a pair of contact-pens  $d^4$ ,  $d^5$ , the ends of which are extended below the end of the arm and are spaced apart. As the shaft  $b'$  revolves the lever  $d'$  moves back and forth slowly on its pivot, making one complete vibration during each complete revolution of the disk and the arm  $d^3$  bearing the contact-pens correspondingly vibrates. The upper end of the reciprocating shaft  $c^6$  bears a short arm  $c^7$ , see Figs. 5, 6 and 7, which projects therefrom at right angles, and bears a contact-pen  $c^8$ , which projects into the space between the two contact-pens  $d^4$ ,  $d^5$ , and normally occupies a middle position therebetween.

Assuming the timing-mechanism and timed-supervisory-mechanism to be set at unison, and the contact-pen  $c^8$  disposed midway between the contact-pens  $d^4$ ,  $d^5$ , it will be seen that as long as they run in synchronism, the levers will be moved by the eccentric disks and the relative positions of the contact-pens  $d^4$ ,  $d^5$  and  $c^8$ , will remain unchanged, see Fig. 5, and the circuit  $m$  of the signaling-device will not be operated, but in case the timing-mechanism stops the contact-pen  $c^8$  will cease to move and will be soon overtaken by one of the contact-pens  $d^4$ , or  $d^5$ , and engagement effected, see Fig. 6, whereby the circuit  $m$  see Figs. 8 and 9, including said contact-pens will be operated, and in case the timed-supervisory-mechanism stops the contact-pens  $d^4$ ,  $d^5$ , will cease to move and one of them will be soon overtaken by the contact-pen  $c^8$ , and said circuit

$m$  operated. Or, in case either the timing-mechanism or timed-supervisory-mechanism runs out of synchronism with the other, as for instance, too slow or too fast, the contact-pen will be moved relatively to each other and into engagement to operate said circuit  $m$ . Thus the signaling-device is prevented from operation by the timing-mechanism and timed-supervisory-mechanism, acting conjointly, when running in synchronism, but is permitted or caused to operate whenever either stops or when they run out of synchronism, the means to operate said signaling-device being automatic.

The circuit  $m$ , includes a battery  $m'$ , and may include a releasing-magnet  $m^2$ , see Fig. 8, for a code-signal-transmitting-device  $m^3$ , whereby a code-signal, as for instance an identification-number, will be sent over a circuit  $m^4$ , which will operate the recorder  $m^5$ , or other signaling-device. In lieu of employing a recorder as a signaling-device, the circuit  $m$  may directly include a bell  $m^6$ , or other form of alarm apparatus, see Fig. 9. Thus, in case either the timing-mechanism or timed-supervisory-mechanism stops, or runs out of synchronism with the other, the signaling-device is operated to give notification of the trouble.

In lieu of the means above described for operating the signal-circuit, the form shown in Fig. 10 may be employed, wherein the aforesaid eccentric disks  $c$  and  $d$  are respectively arranged to directly operate pivoted levers  $e$  and  $e'$ , bearing electric contacts for the signal-circuit. Or the form shown in Fig. 11 may be employed wherein the eccentric disks  $c$  and  $d$  respectively operate spring-acting pivoted levers  $e^2$ , and  $e^3$ , bearing electric contacts for the signal-circuit. Or the form shown in Fig. 12 may be employed wherein one of the contact-pens, as  $f$ , for the signal-circuit, is connected with the minute-shaft of the timed-supervisory-mechanism, and its coöperating contact pen  $f'$  is connected to a sleeve  $f^2$  mounted on said shaft, and is operated by the minute-shaft of the timing-mechanism by a belt or other suitable means, said contact-pens being insulated from each other and arranged to engage each other in case either the timing-mechanism or timed-supervisory-mechanism stops or runs out of synchronism with the other. Or the form shown in Figs. 13 and 14, may be employed wherein one of the contact-pens, as  $g$ , for the signal-circuit is fixed and the other, as  $g'$ , is movable, and said movable contact-pen engages a cam-disk  $g^2$  arranged on a sleeve  $g^3$  on a shaft  $g^4$ , and said disk  $g^2$  bears a bevel pinion  $g^5$ , which is interposed between a pair of bevel-gears  $g^6$ ,  $g^7$ , one connected with the minute-shaft of the timing-mechanism and the other with the minute-shaft of the timed-supervisory-mechanism, so that in case either the timing-

mechanism or timed-supervisory-mechanism stops or runs out of synchronism with the other, said bevel-pinion  $g^5$  will travel around the bevel-gears, and the cam disk to which it is connected will be rotated to lift the contact-pen  $g'$  and operate the signal-circuit. Or the form shown in Fig. 15 may be employed, wherein two circularly arranged sets of contact-plates  $h$  and  $h'$ , are provided, one for the timing-mechanism and the other for the timed-supervisory-mechanism, over which move contact-pens or wipers  $h^2$ ,  $h^3$ , which are connected respectively with the minute-shafts of said timing-mechanism and timed-supervisory-mechanism, and said contact-pens are connected in the signal-circuit, as shown, so that said circuit may be operated by either wiper.

From the many modifications shown, it will be apparent that I do not desire to limit my invention to the particular means here shown for operating the signal-circuit, as long as said means is arranged and operated by either the timing-mechanism or timed-supervisory-mechanism, in case the other stops or runs out of synchronism.

I claim:—

1. The combination of a timing-mechanism and a timed-supervisory-mechanism, a signaling-device for indicating the stopping of either, and means, operated by both, acting conjointly, for preventing the operation of said signaling-device and operated by either, exclusively of the other, to operate said signaling-device, substantially as described.

2. The combination of a timing-mechanism and a timed-supervisory-mechanism, a signaling-device for indicating when they run out of synchronism, and means operated by both, acting conjointly, when running in synchronism to prevent the operation of said signaling-device and operated by either when running out of synchronism to operate said signaling-device, substantially as described.

3. The combination with a timing-mechanism, of a timed-supervisory-mechanism, a signaling-device for indicating the stopping of the timing-mechanism, and means operated by the timing-mechanism and timed-supervisory-mechanism, acting conjointly, for preventing the operation of said signaling-device and operated by the timed-supervisory-mechanism, when the timing-mechanism stops, to operate said signaling-device, substantially as described.

4. The combination with a timing-mechanism, of a timed-supervisory-mechanism, a signaling-device for indicating when the timing-mechanism is not running in synchronism with the timed-supervisory-mechanism, and means operated by the timing-mechanism and timed-supervisory-mechanism, acting conjointly, when running in

synchronism, to prevent the operation of said signaling-device and operated by the timed supervisory-mechanism when the timing-mechanism is running out of synchronism with the timed-supervisory-mechanism to operate said signaling-device, substantially as described.

5. The combination with a timing-mechanism, of a timed-supervisory-mechanism, a signaling-device for indicating the stopping of the timed-supervisory-mechanism, and means operated by the timing-mechanism and timed-supervisory-mechanism, acting conjointly, for preventing the operating of said signaling-device and operated by the timing-mechanism when the timed-supervisory-mechanism stops, to operate said signaling-device, substantially as described.

6. The combination with a timing-mechanism, of a timed-supervisory-mechanism, a signaling-device for indicating when the timed-supervisory-mechanism is not running in synchronism with the timing-mechanism, and means operated by the timing-mechanism and timed-supervisory-mechanism, acting conjointly, when running in synchronism to prevent the operation of said signaling-device, and operated by the timing-mechanism when the timed-supervisory-mechanism runs out of synchronism with the timing-mechanism, to operate said signaling-device, substantially as described.

7. The combination with timing-mechanism, of a timed-supervisory-mechanism, an electric signaling-device, a circuit therefor, a circuit-operating device for said circuit comprising two cooperating members, means connecting one of said members with the timing-mechanism, and means connecting the other member with the timed-supervisory-mechanism, said members being normally disengaged and adapted to engage each other when either ceases to operate, substantially as described.

8. The combination with a timing-mechanism, of a timed-supervisory-mechanism, an electric signaling-device, a circuit therefor, a circuit-operating device for said circuit comprising two cooperating members, means connecting one of said members with the timing-mechanism, and means connecting the other member with the timed-supervisory-mechanism, said members being normally disengaged and adapted to maintain their normal relative positions while the timing-mechanism and timed-supervisory-mechanism run in synchronism but to engage each other when they run out of synchronism, substantially as described.

9. The combination of a timing-mechanism and a timed-supervisory-mechanism, a code-signal-transmitting-device, a circuit operated by it, and a signal-receiving instrument controlled by said circuit, and means operated by the timing-mechanism and

timed-supervisory-mechanism, acting conjointly, to prevent the operation of said signal-transmitting device and operated by either, exclusively of the other, to operate  
5 said signal-transmitting-device, substantially as described.

10 10. The combination of a timing-mechanism and a timed-supervisory-mechanism, a code signal-transmitting-device, a circuit operated by it and a signal-receiving instrument controlled by said circuit, means operated by the timing-mechanism and timed-supervisory-mechanism, acting conjointly,  
15 when running in synchronism, to prevent the operation of said signal-transmitting-device and operated by either when running out of synchronism, to operate said signal-transmitting-device, substantially as described.

20 11. The combination with a clock having means for recording watchman's signals, of a signaling-device, and automatic means controlled by the clock to operate said signaling-device when said clock stops, substantially  
25 as described.

12. The combination with a clock having means for recording watchman's signals, of a signaling-device, and automatic means controlled by the clock to operate said sig-

naling-device when said clock runs too slow, 30 substantially as described.

13. The combination with a clock having means for recording watchman's signals, of a signaling-device and automatic means controlled by the clock to operate said sig- 35 naling-device when said clock runs too fast, substantially as described.

14. The combination with a clock of a code-signal-transmitting-device, and automatic means controlled by the clock to op- 40 erate said signal-transmitting-device when said clock stops, substantially as described.

15. In a signal-system, the combination with a continuously-running clock for controlling the sending of signals while in op- 45 eration, and other timing-means cooperating with said clock for causing a notification signal to be sent if said clock stops, but which will be prevented from being sent by the continual operation of the clock, sub- 50 stantially as described.

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

FREDERICK W. COLE.

Witnesses:

B. J. NOYES,  
H. B. DAVIS.