W. L. MILLER.

ELECTRIC SIGNALING SYSTEM.

APPLICATION FILED JUNE 16, 1911.

1,040,378.

Patented Oct. 8, 1912.

2 SHEETS—SHEET 1.

Fig. 1.

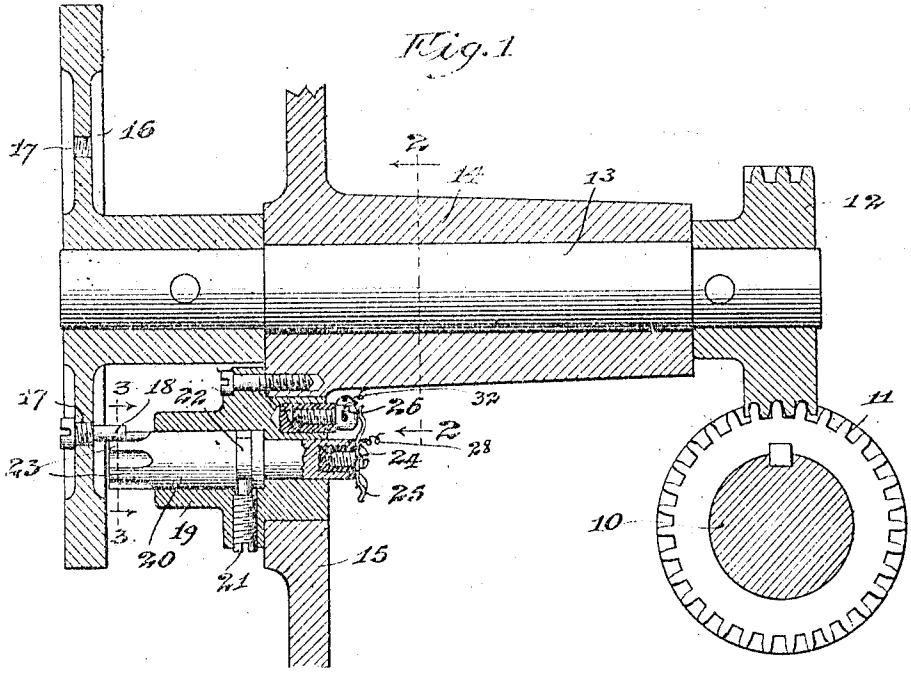


Fig. 2.

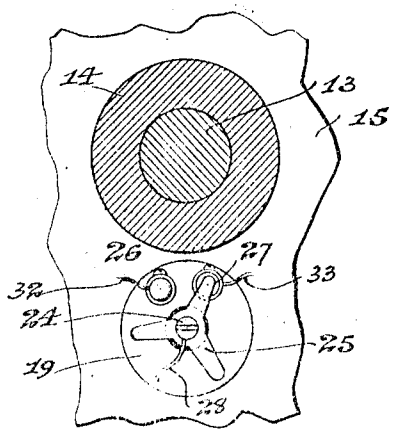
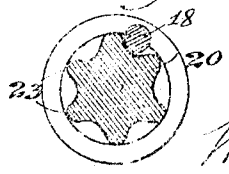


Fig. 3.



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2 SHEETS—SHEET 2.

Fig. 4.

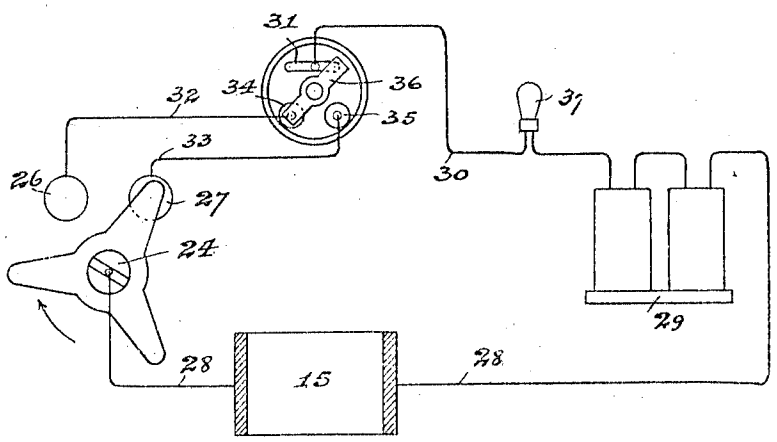


Fig. 5.

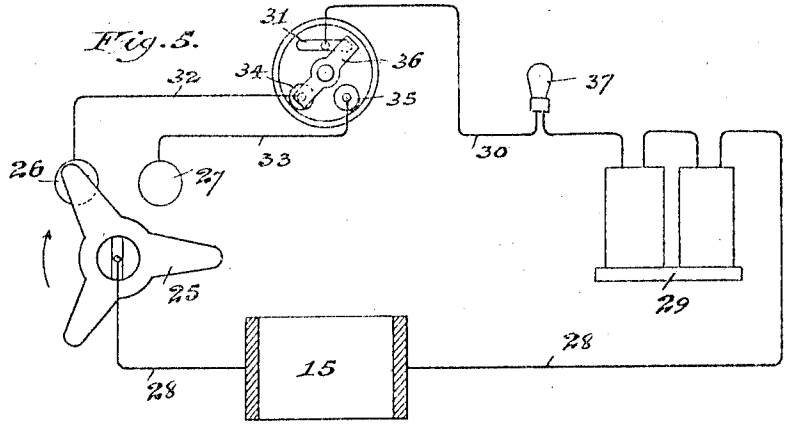
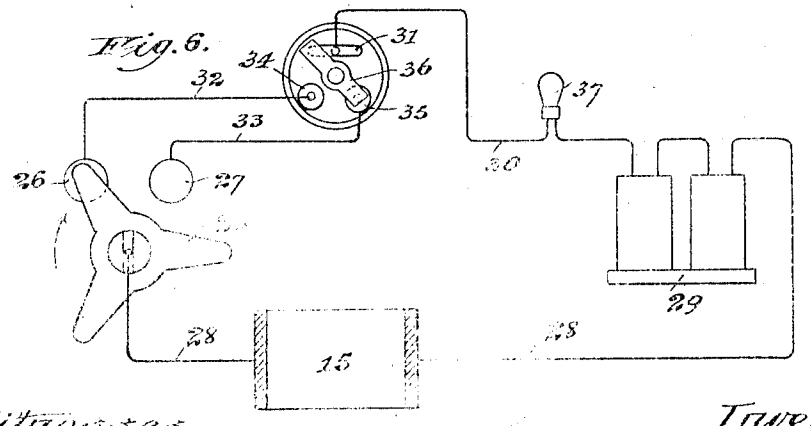


Fig. 6.



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UNITED STATES PATENT OFFICE.

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ELECTRIC SIGNALING SYSTEM.

1,040,378. Specification of Letters Patent. **Patented Oct. 8, 1912.**

Application filed June 16, 1911. Serial No. 633,479.

To all whom it may concern:

Be it known that I, WILLIAM L. MILLER, a citizen of the United States, residing at Madison, in the county of Dane and State of Wisconsin, have invented certain new and useful Improvements in Electric Signaling Systems, of which the following is a specification.

This invention relates to the general art of electric signaling devices, and has reference more particularly to a device or system applicable and constituting an attachment to automatic machines of any and all kinds, such, for instance, as automatic lathes, to indicate, by a signal, to the operator when a given job has been completed by the machine.

The main object of the invention is to render more efficient and economical the service by a single operator of a number of automatic machines; and this the invention accomplishes by means of a reliable and improved signaling mechanism which promptly notifies the operator the instant the machine has completed a job and requires the operator's attention to remove the finished work and supply a fresh blank or stock.

Another object of the invention is to provide a signaling system of the character and for the purpose described such that, after the signal has been given, the operation of opening the circuit to interrupt the signal will put the system in condition to automatically signal the completion of the next job on the same machine.

The invention, its mode of use, and the advantages secured thereby will be more readily understood when considered in connection with the accompanying drawings which illustrate one practical embodiment thereof, and in which—

Figure 1 is a sectional view through a portion of the machine to which the signaling device is applied, more particularly showing the machine-actuated switch and the actuating mechanism thereof. Fig. 2 is a sectional view on the line 2—2 of Fig. 1. Fig. 3 is a sectional detail on the line 3—3 of Fig. 1; and Figs. 4, 5, and 6 are diagrams of the signal circuit and parts contained therein.

Referring to the drawings, 10 designates a shaft constituting either a constantly or intermittently moving element of an automatic machine, such as an automatic lathe, to which is geared, by spiral gears 11 and 12, a shaft 13 journaled in a bearing-boss 14 on one of the side walls 15 of the machine-bed frame. Keyed on the outer end of shaft 13 is a disk 16, in one or more holes 17 of which is secured an inwardly projecting pin or pins 18.

Journaled in a bearing-block 19 secured to or integral with the wall 15 of the frame is a rotary shaft 20, conveniently confined against endwise displacement by a threaded stud 21 engaging an annular groove 22 in said shaft. The outer end of the shaft 20 is given a star-wheel formation, the teeth or points 23 of which are successively engaged by the pin or stud 18 as the latter successively engages the star-wheel during the rotation of the disk 16. The star-wheel is herein shown as formed with six points or teeth, and the disk 16 is provided with a single pin or stud 18, so that, in the instance shown, the shaft 20 is given one-sixth of a turn at each complete revolution of the disk 16, but, of course, the number of teeth or points on the star-wheel and the number of actuating pins or studs may be varied as desired. Secured to the inner end of the shaft 20 by a binding-screw 24, and suitably insulated from said shaft, is a switch-blade 25 herein shown as taking the form of a three-pointed star having spring arms disposed one hundred and twenty degrees apart. Secured in and insulated from the frame adjacent to the inner end of the shaft 20 are two contact plugs or binding-posts 26 and 27, the contact ends of which lie in the paths of the free ends of the arms of the switch-blade 25, said contact plugs being disposed sixty degrees apart in the circular path of the free ends of the spring arms of the switch-blade, so that the successive sixty degree turning movements of the shaft 20

will cause the contact plugs 26 and 27 to be alternately engaged by one of the arms of the switch-blade.

The switch-blade 25 and the contacts 26 and 27 are connected to opposite ends of a circuit such as that diagrammatically represented in Figs. 4, 5, and 6, and consisting of a circuit wire 28 extending from the binding-post 24 of the switch-blade 25 to one pole of a generator herein indicated as a battery 29 (and in which the machine-bed 15 may conveniently be included if desired), a circuit wire 30 extending from the other pole of the generator to a common contact 31 of a manually operable switch, a pair of alternately operative circuit branches 32 and 33 connecting two individual contacts 34 and 35 of said manually operable switch with the insulated contact plugs 26 and 27, respectively, and the switch-blade or bar 36 of said manually operable switch that is shiftable to connect either of the individual contacts 34 and 35 with the common contact 31, as clearly shown in Figs. 5 and 6. At any suitable or convenient point in the circuit lines 28 or 30 (herein shown as in the latter) is interposed a signal, herein shown as a light 37, but which, of course, may be a bell, a horn, a light, a display target, or any electrically energized signaling device desired within the purview of the invention.

The operation will be readily understood from the foregoing description, but may be briefly described as follows: Assuming that the circuit and circuit devices are as shown in Fig. 4, it is manifest that the circuit is interrupted at the manually operable switch, and no signal is displayed by the light 37. The machine having been started in operation upon a given job, it continues in operation until the job has been completed, at which time the disk 16 has made a complete rotation, thereby, at the completion of such rotation, effecting a partial turning movement of the shaft 20 by the engagement of the pin 18 with one of the teeth 23 of the star-wheel. This shifts the switch-blade 25 out of engagement with the contact 27 and brings the next succeeding arm of the switch-blade into engagement with the contact 26, as shown in Fig. 5, thereby closing the circuit and displaying the signal at the lamp 37. This notifies the operator that the machine has completed its work. The operator then manually throws the switch-blade 36 to the other position shown in Fig. 6, which opens the circuit, interrupts the signal, and at the same time primes the circuit for display of the signal upon the completion of the next job by the shifting of the switch-blade 25 to the next position in which the circuit is closed through the contact 27 and branch 33. It will thus be seen that, in the arrangement shown, the opening of the circuit by the operator to cut out the signal sets or primes the system for the automatic display or sounding of the signal at the completion of the next job, which renders the manipulation of the signaling system on the part of the operator a very simple matter. Of course, the number of teeth 23 on the star-wheel of the switch-shaft 20 and the number of arms on the spring switch-blade 25 are immaterial, as is also the number of actuating pins or studs 18 carried by the disk 16 or the extent of rotary movement of said disk between successive actuations of the switch-shaft 20, so long as the feature of the alternating engagement of the switch-blade 25 with the contacts 26 and 27 is preserved in connection with a manually operable switch which directs the current alternately through the branches 32 and 33 of the circuit.

I claim:—

1. In an electric signaling system for application to automatic machines, the combination of a switch comprising a rotary switch-blade actuated always in the same direction from a moving part of the machine and two contacts alternately engaged by said switch-blade, an electric circuit connected at one end to said switch-blade and connected at its other end, by alternately operative branches, to said contacts, respectively, a generator and a signal in said circuit, and a manually operable switch in said circuit adapted to render either of said contacts and branches operative in the circuit, substantially as described.

2. In an electric signaling system for application to automatic machines, the combination of a switch comprising a rotary switch-blade intermittently actuated always in the same direction from a moving part of the machine and two contacts alternately engaged by said switch-blade, a manually operable switch having two individual contacts and a common contact and a switch-blade shiftable to connect either of said individual contacts with said common contact, circuit wires connecting said first-named contacts with the individual contacts of said manually operable switch, respectively, a circuit wire connecting said common contact with said machine-actuated switch-blade, and a generator and signal operatively connected in said last named circuit wire, substantially as described.

3. In an electric signaling system for application to automatic machines, the combination with a movable member geared with, and movable in fixed relation to, a moving element of the machine, of a rotary shaft, coöperating means carried by said movable member and rotary shaft for imparting to the latter intermittent partial turning movements corresponding with successive movements of predetermined fixed extent of said

movable member, an insulated switch-blade carried by said rotary shaft, two insulated contacts alternately engaged by said switch-blade, an electric circuit connected at one end to said switch-blade and connected at its other end, by alternately operative branches, to said insulated contacts, respectively, a generator and a signal in said circuit, and a manually operable switch in said circuit adapted to render either of said insulated contacts and branches operative in the circuit, substantially as described.

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