

Jan. 5, 1943.

E. E. CHILBERG ET AL

2,307,487

RECORDER

Filed June 19, 1940

2 Sheets-Sheet 1

Fig. 1.

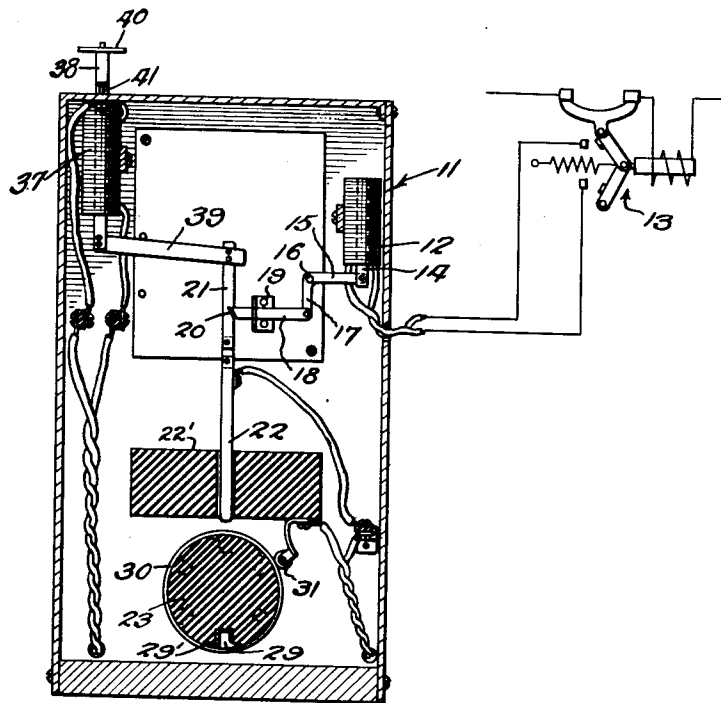
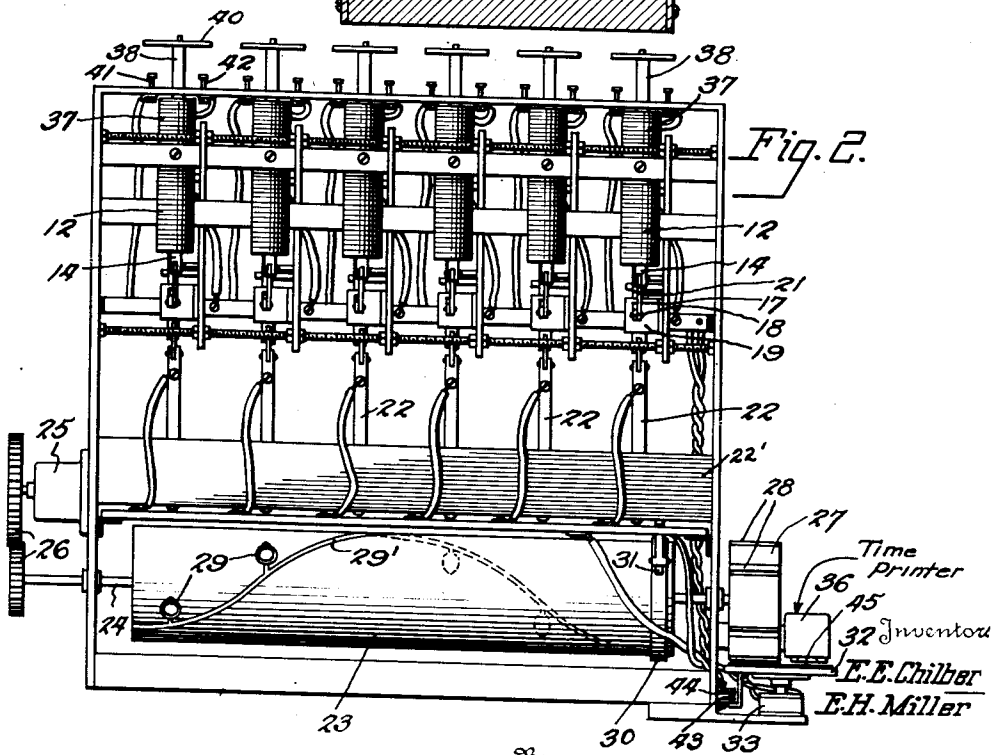


Fig. 2.



By *Mason Fenwick & Lawrence*
Attorneys

2,307,487

RECORDER

Filed June 19, 1940

2 Sheets-Sheet 2

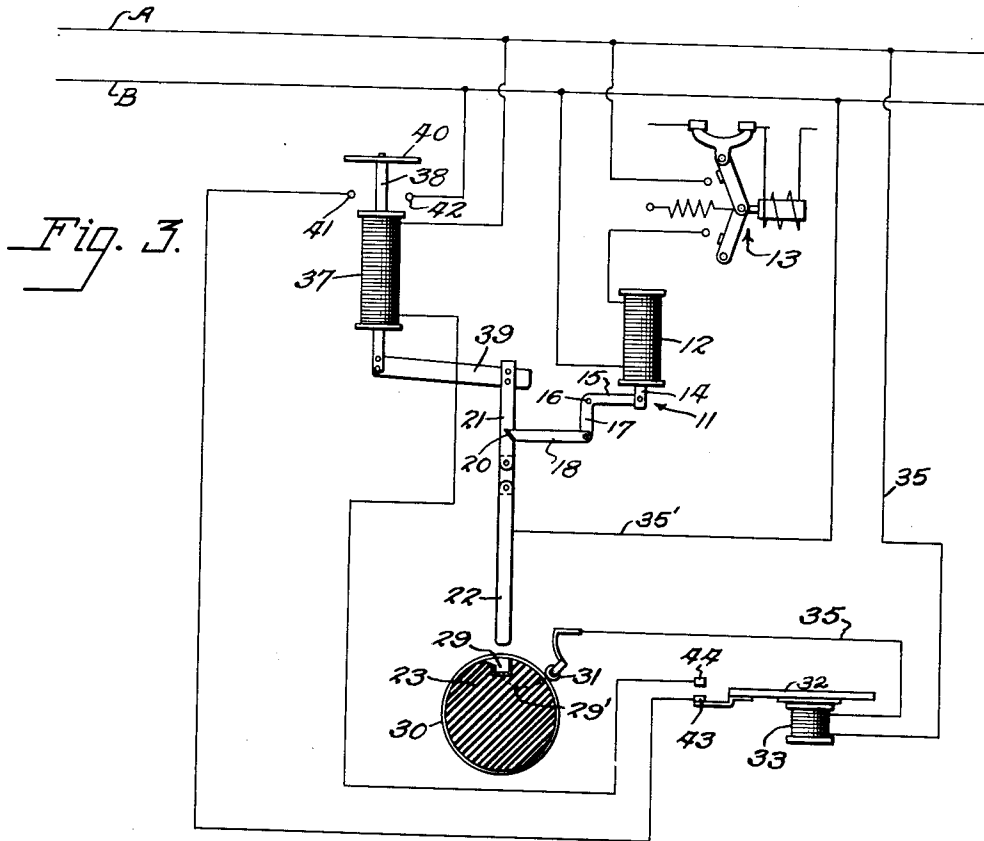
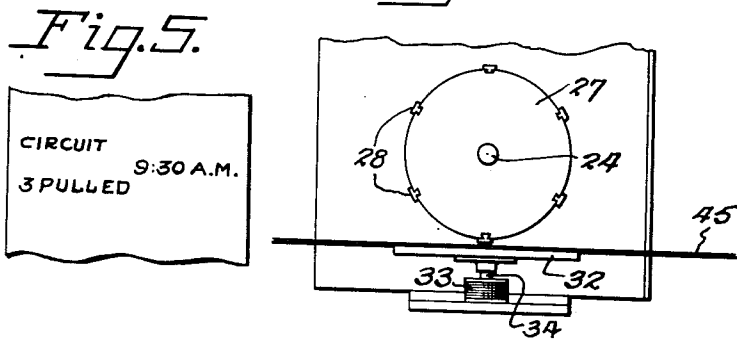


Fig. 4.



Inventors

E. E. Chilberg
E. H. Miller.

By Mason Fenwick & Lawrence
Attorneys

UNITED STATES PATENT OFFICE

2,307,487

RECORDER

Ernest E. Chilberg, Hastings, and Everett H.
Miller, Brady, Nebr.

Application June 19, 1940, Serial No. 341,364

6 Claims. (Cl. 234—5.8)

This invention pertains to recorders operable to record the functional operation of machinery of various kinds. More specifically the invention is directed to recorders, operable to record the operations of a plurality of machines or parts of machinery.

In the preferred practice of the invention it comprises an electrical device with detector mechanism connected with the machinery under control of the device, and operable electrically to detect operations of the machinery. The invention contemplates a printing device electrically driven, which operates upon the closing of a circuit due to the actuation of the detector, to record the condition of the machinery under control of the device. The invention includes a resetting mechanism which responds to the act of recording.

The invention includes detecting and recording mechanism to record the operations of a plurality of machines or parts of machinery. Pursuant to this, the invention comprises a plurality of detector mechanisms, one for each machine or machine part whose operations are to be recorded. The recording mechanism is synchronized with the operation of the detector mechanism to print a record of the machine or piece of machinery actuating a detector. There are a plurality of reset mechanisms, one for each detector mechanism, the several reset mechanisms being operable respectively by the actuation of the printing mechanism.

Attention is now directed to the detailed showing of one practical application of the invention in the drawings, of which:

Figure 1 is a cross-sectional elevation of the device taken on a plane normal to its face;

Figure 2 is a front elevation of the device with the front cover removed;

Figure 3 is a wiring diagram of the device; and

Figure 4 is a detailed view showing the recording mechanism.

Figure 5 is a fragmentary plan of a record sheet showing a typical imprint.

In Figure 1 is seen a recorder control mechanism 11 comprising a solenoid 12 adapted to be energized by the operation of the overload circuit breaker 13. The circuit breaker 13 is operated by some piece of machinery in accordance with some phase of its operation. The particular type of machinery, or particular part of machinery whose operation is to be recorded by the present invention forms no part thereof and, accordingly, this is not shown or described herein. The solenoid 12 surrounds the movable core

or armature 14, pivotally attached to one arm of the bell crank lever 15. The lever 15 is pivoted at 16, its opposite arm 17 being pivotally connected to the trigger latch 18, slidable in the guide member 19. The latch 18 engages the notch 20 of the fall rod 21, which drops when released by the disengagement of the latch 18 from the notch 20. To the lower end of the fall rod 21 is hinged a switch finger 22 which extends downward through a guide rack 22' to engage the surface of the drum 23.

Any number of control mechanisms of the character described, each comprising a circuit breaker, latch mechanism and switch member, may be employed, as illustrated in Figure 2, there being as many used in association in the device as there are machines or parts of machines whose operations are to be recorded. In the embodiment shown, and as illustrated in Figure 2, there are six such mechanisms. Therefore, the shown device is capable of recording the operations of six machines or parts of machinery. Below the switch rods or members 22, and long enough to be engaged by any of the members, is the control rotary drum 23, keyed to the shaft 24 and driven by rotation thereof. The shaft 24 is driven by the motor 25 through the gear train 26.

Keyed to the shaft 24, shown at the opposite end from the motor, is the recording drum 27. The recording drum 27 comprises the printing dies 28 spaced apart circumferentially on the surface of the recording drum 27, as best illustrated in Figure 4. There are as many dies on the drum 27 as there are switch members and their controllers, and in the instant case, as clearly illustrated in Figure 4, there are six printing dies.

Spaced apart longitudinally of the detector drum 23 are the switch contacts or terminals 29, there being one terminal for each contact member 22 in line therewith. Thus, in the instant case there are six terminals 29 on radii of the drum 23, equispaced, and the dies 28 occupy six equispaced radii of the drum 27. The several terminals 29 are electrically connected to each other and with the collector ring 30 by means of the conductor 29'. The contact brush 31, Figure 3, rides in engagement with the collector ring 30.

The reciprocating platen 32, Figures 2-4, is mounted to move into and out of engagement with the printing dies of the recording drum 27. Actuation of the platen 32 is caused by, and takes place when, the solenoid 33 is energized, the platen being mounted on the armature 34 of the

solenoid 33. The solenoid 33 is in circuit through the lines 35, 35', Figure 3, with the power lines A, B, the contact brush 31, ring 30, conductor 29' and the switch finger contacts 22 and terminals 29.

The shaft 24, and with it the drums 23 and 27, respectively, are rotated by the motor 25 through the train of gears 26. When a machine operates to overload its circuit breaker, the coacting latch releasing solenoid 12 is energized to release the latch 18 from the notch 20 and to permit the fall rod 21 to drop. The switch rod 22 thereupon moves downward into contact with and rides on the surface of the drum 23. The drum 23 is constructed of dielectric material and the switch member 22 rides on the surface of the drum without effect until it enters the notch formed by the coacting terminal 29. When in engagement with the terminal 29, the switch member 22 locks the drum 23, and the shaft 24, against rotation. When the switch member 22 engages the terminal 29 it closes the line circuit through the platen actuating solenoid 33, which is thus energized to actuate the armature 34 and to move the platen 32 into engagement with the recording drum 27. Because of the circumferential positions of the terminals 29 relative to the printing dies 28, the platen will move into engagement with that die associated with the switch which has been operated.

A tape or other record receiving strip 45 passes between the drum 27 and the platen 32, and receives an imprint comprising a record indicating which piece of machinery or machine part whose operation, failure to operate or other working phase is being recorded. Juxtaposed to the drum is the horological recording device 36, which may be of any suitable construction. The platen 32 is wide enough to engage the time recorder 36 as well as the machine indicating die 28. Thus, simultaneously with the recording of an operation of a particular machine, and immediately adjacent thereto, there is indicated the time of the recording.

The recorder is useful to record the working functions or work failures or other actions of parts of a machine, or of a number of machines, or for other similar purposes.

The mechanism includes a resetting device which comprises a solenoid 37 for each detector solenoid 12, and incident thereto. The armature 38 of each solenoid 37 is attached to its corresponding fall rod 21, by means of the intermediate cross member 39. Also attached to the armature 38 is the contact member 40 which, when the armature 38 falls, closes contact between the terminals 41, 42, to close the line circuit for the resetting solenoid, see Figure 3. The printing platen 32 of the recording mechanism has attached thereto the contact member 43 movable therewith. The contact member 43 is in line with, and in position to close contact with, the fixed terminal 44 when the platen 32 has moved into printing position and made the record on the recording strip 45, under action of the solenoid 33. Contact between terminals 43 and 44 closes the circuit of the resetting solenoid 37, the armature 38 of which has fallen with the fall rod 21. The closing of the circuit of the resetting solenoid 37 causes the armature 38 to jump to lift the fall rod 21 high enough for the notch 20 to be engaged by the latch 18. This action automatically reopens the circuit of the solenoid 37 by the contact member 40 being brought out of engagement with the terminals

41, 42, and at the same time the circuit of solenoid 33 is opened by disengagement of the contacts 22, 29 resulting in opening of contacts 43, 44.

The hereinbefore description is directed to one preferred practical embodiment of the invention, presenting this embodiment in specific detail. The invention is not limited to the specific structure shown and described, but is susceptible of a number of modifications without departing from the spirit of the invention. The invention is limited by the scope of the accompanying claims.

What we claim is:

1. A device comprising a controller responsive to the operation of machinery, an electric circuit, a combined switch and locking device including a rotary member and combined switch and locking fingers responsive to the action of the controller to engage the rotary member and close the circuit, a rotary recorder member rotated with the rotary member of the locking device, a platen adapted to be cooperatively operated with relation to the rotary recorder member when the circuit is closed, and means for returning the combined switch and locking fingers to inoperative position and thereby break the circuit.

2. A device comprising a controller responsive to the operation of machinery, an electric circuit, a rotary drum having a circuit closing socket, a rotary recorder member movable with the drum and having a printing surface, a platen coactively operated with relation to the rotary recorder member to print a record of the machinery operation, means for operating the platen when a circuit is closed, and means responsive to the action of the controller for closing the circuit including a switch member for interlocking engagement with the socket to close the circuit and lock the drum and rotary recorder member in printing position.

3. A device comprising a plurality of controllers each responsive to the operation of a piece of machinery, an electric circuit, a drum rotatable to different working positions and provided with a plurality of longitudinally and circumferentially spaced contact sockets equal in number to the controllers, a rotary recorder member rotatable with the drum and provided with printing surfaces equal in number to the contacts, circuit control devices equal in number to the controllers and contacts and each including a switch finger responsive to the action of a controller for engagement with a contact socket to lock the drum and recorder member in a printing position and to close said circuit, a platen movable to printing position for coaction with the rotary recorder on the closing of the circuit, and means for moving the platen to printing position when the circuit is closed.

4. A device comprising a plurality of control devices each responsive to the operation of a piece of machinery, means associated with each control device and including an electric conducting switch finger adapted to be set into action on the operation thereof, an electric circuit, a rotary drum provided with contacts equal in number to the controllers adapted to be engaged by the switch fingers, said contacts being included in said circuit, a rotary recorder member rotatable with the drum and provided with circumferentially spaced printing portions equal in number to the contacts, each switch finger being movable when set into action by its controller to engage a coacting contact to close the circuit and lock the drum to hold the rotary recorder mem-

ber in a predetermined printing position, a platen movable to printing position for coaction with the rotary recorder member on the closing of the circuit, and means for operating the platen when the circuit is closed.

5. A device, comprising a plurality of controllers each responsive to the operation of a piece of machinery, having a rotary drum movable to different working positions and provided with a plurality of contacts, one for each controller, said contacts being spaced apart longitudinally and circumferentially of the drum, an electric circuit including said contacts, a rotary recorder member movable with the drum and having circumferentially spaced printing portions corresponding in number to the controllers and contacts, means for rotating the drum and recorder member, switch members responsive to the action of the respective controllers to engage the respective contacts to close the circuit and lock the drum and recorder member against rotation

in different printing positions, a printing platen movable by the closing of the electric circuit into printing position for coaction with the rotary recorder member, and means for operating the platen when the circuit is closed.

6. A device comprising a controller responsive to operation of machinery, an electric circuit, a normally latched automatically operable switch member released for operation by the operation of the controller, a rotatable drum, a recorder member rotatable with the drum, means for rotating the drum and recorder member, said drum having a contact adapted to be engaged by the released switch member to close the electric circuit and lock the drum against rotation when the rotatable recorder member is in printing position, a platen movable into position for coaction with the rotatable recorder member, and means for operating the platen when the circuit is closed.

ERNEST E. CHILBERG.
EVERETT H. MILLER.