

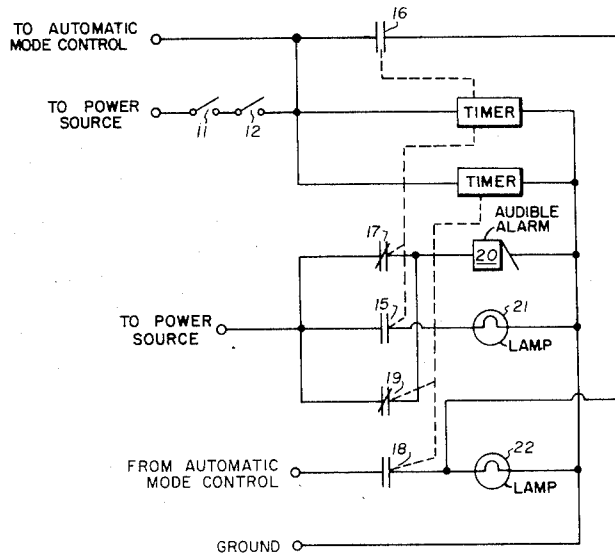
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 [21] Appl. No. **841,048**  
 [22] Filed **July 11, 1969**  
 [45] Patented **Dec. 28, 1971**  
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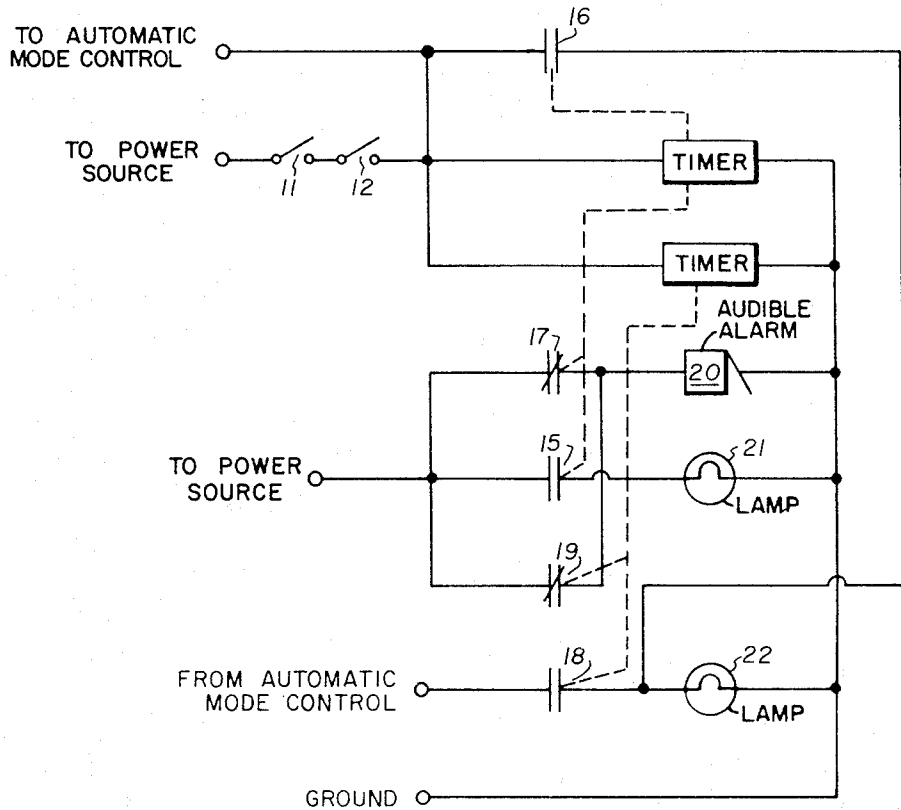
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[54] **SAFETY ALARM**  
 7 Claims, 1 Drawing Fig.

[52] U.S. Cl..... **340/279,**  
 307/142, 317/135, 340/309.4, 340/309.6  
 [51] Int. Cl..... **H01h 47/22**  
 [50] Field of Search..... 317/135;  
 307/133, 134, 141, 141.4, 141.8, 142;  
 340/309.1-309.6, 213; 318/446

**ABSTRACT:** A safety alarm for machines having an "automatic" mode of operation comprising a pair of timers actuated by manually operable switches, the said timers connected in series to prevent the machine from converting to the "automatic" mode of operation until both have timed-out and requiring the uninterrupted manual actuation of said switches during the period of timeout, and audible alarm means energized continuously while the machine is set for "automatic" mode of operation, the said alarm means being deenergized when both timers have timed out.





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SAFETY ALARM

BACKGROUND OF INVENTION

Many machines such as hydraulic presses are provided with electrical controls which permit the press to operate either in manual mode of operation or an automatic mode of operation. During setup or maintenance, the press is set for manual operation. However, if the operator fails to reset the controls from automatic to manual there is great danger of severe injury as the press unexpectedly continues to run after actuation. Thus there is a great need for fail-safe means to prevent unintentional operation of the press in the automatic mode.

The purpose of the safety alarm disclosed herein is to prevent the press from being energized for automatic operation without the conscious, manual actuation of a pair of spaced-apart switches continuously and uninterruptedly for a substantial period of time during which period an audible alarm sounds. This guarantees that the operator will, at all times, be conscious of the fact that the press is set for automatic operation.

SUMMARY OF INVENTION

A safety alarm for converting apparatus from a manual mode of operation to an automatic mode of operation comprising at least one timing means connected in series with means for energizing an automatic mode of operation of the apparatus, manually operable means for energizing the timing means, the timing means timing-out only if the said manually operable means are actuated continuously and uninterruptedly for a significant period of time, the timing means connecting the apparatus to automatic mode of operation only when timed out, and alarm means connected to the timing means, operable when the apparatus is set for automatic mode of operation and the timing means is untimed out.

PREFERRED EMBODIMENT OF INVENTION

These objects and advantages as well as other objects and advantages may be achieved by the safety alarm described and claimed herein a preferred embodiment of which is illustrated in the drawings in which;

FIG. 1 is a schematic wiring diagram of the safety alarm.

Referring now to the drawings in detail, the safety alarm comprises a pair of manually operable switches 11 and 12 connected in series with each other and the safety alarm itself. The switches 11 and 12 are normally physically located on the apparatus and are spaced apart a distance sufficient to require simultaneous actuation by both hands.

The switches 11 and 12 are connected in series with a pair of timers 13 and 14. Each of the timers 13 and 14 has a double-pole double-throw microswitch associated with it. Normally open contacts 15 and 16 are associated with timer 13 as is normally closed contact 17. Normally open contact 18 and normally closed contact 19 are associated with timer 14.

It will be observed that when normally open contacts 15 and 16 of timer 13 and normally open contact 18 of timer 14 are opened, the circuit to the "automatic" mode of operation is interrupted. Both timers 13 and 14 must time out in order to close the normally open contacts 15 and 16 and the normally closed contact 17. Normally open contact 16 of timer 13 and normally closed contact 17 of timer 14 are in series insuring isolation of the "automatic" mode circuit until both timers 13 and 14 time out. The automatic mode control circuit of the apparatus to which the safety alarm is connected provides power to timers 13 and 14 retaining normally opened contacts 16 and 18 in a closed configuration until the automatic mode control circuit is broken by means on the apparatus controlled by the alarm.

An audible alarm 20 is connected in with the "automatic" mode circuit of the apparatus such that the alarm 20 is energized whenever the apparatus is set for automatic operation but is inoperative. The power source to the alarm 20 passes through normally closed contacts 17 and 19 of timers 13 and 14 respectively. Hence, when the timers 13 and 14 time out,

the alarm 20 is deenergized. If either of the timers 13 or 14 fails to time out, the alarm 20 will remain energized and the automatic mode of operation deenergized.

While the safety alarm has been illustrated with two timers 13 and 14 any number of timers can be made to function in the same way. Nevertheless, although a single timer will function in the same way, it will not provide as great reliability as two or more timers. If the single timer should malfunction, the circuit to the automatic mode of operation could be energized unintentionally. In addition, the alarm 20 might well be deenergized by the same malfunction. However, the likelihood of two timers malfunctioning at the same time and in the same manner as to deenergize the alarm is extremely remote thereby providing substantially greater protection.

A pair of pilot lights 21 and 22 are connected to the timers 13 and 14 respectively. The pilot lights 21 and 22 illuminate when the respective timers 13 and 14 have timed out.

The pilot lights 21 and 22 will also illuminate if one of the normally open contacts of the switch associated with it shorts out. Thus, in the event of a failure of one of the timers, its pilot light would remain deenergized and would indicate the deactivated portion of the circuit. On the other hand, if one of the pilot lights is illuminated when it should not be illuminated, it would indicate that one of the normally open contacts associated with it has been frozen closed or shorted out. Thus, the pilot lights 21 and 22 provide visible indication of malfunction both of the timers 13 and 14 and the respective contacts 15, 16, 17 and 18.

While the safety alarm has been described and illustrated as an electrically operated device, all of the components could be equally as well actuated pneumatically or hydraulically. Pneumatic or hydraulic analogs of the electrical safety alarm illustrated in the drawings are contemplated as being within the scope of the claims.

The foregoing description is merely intended to illustrate and embodiment of the invention. The component parts have been shown and described. They each may have substitutes which may perform a substantially similar function; such substitutes may be known as proper substitutes for the said components and may have actually been known or invented before the present invention.

We claim:

1. A safety alarm for apparatus having selectable manual and automatic modes of operation comprising
  - a. at least one timing means operatively connected with means for energizing automatic mode of operation of apparatus,
  - b. manually operable means for energizing the timing means, the timing means timing out only if the said manually operable means are actuated uninterruptedly for a significant period of time,
  - c. the timing means converting the apparatus to automatic mode of operation only when all said timing means have timed out.
2. A safety alarm for apparatus having selectable manual and automatic modes of operation comprising
  - a. the structure in accordance with claim 1 and
  - b. alarm means operatively connected to both the timing means and means for energizing automatic mode of operation of the apparatus,
  - c. the alarm means being energized when the apparatus is programmed for automatic mode of operation and deenergized only when the timing means time out.
3. A safety alarm for apparatus having selectable manual and automatic modes of operation comprising
  - a. the structure in accordance with claim 1 in which
  - b. there are at least a pair of manually operable means spaced apart sufficiently that each said means must be actuated by a separate hand.
4. A safety alarm for apparatus having selectable manual and automatic modes of operation comprising
  - a. the structure in accordance with claim 1 in which

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- b. the timing means is an electrically actuated timer converted in series with the means for energizing automatic mode of operation.
- 5. A safety alarm for apparatus having selectable manual and automatic modes of operation comprising
  - a. the structure in accordance with claim 2 in which
  - b. the timing means is an electrically actuated timer connected in series with the means for energizing automatic mode of operation.
- 6. A safety alarm for apparatus having selectable manual and automatic modes of operation comprising
  - a. the structure in accordance with claim 1 in which
  - b. there are at least two timing means operatively connected with the means for energizing automatic mode of operation of the apparatus,
  - c. each of the timing means timing out only if the manually

- operable means are actuated uninterruptedly for a significant period of time,
- d. the timing means converting the apparatus to automatic mode of operation only when all said timing means have timed out.
- 7. A safety alarm for apparatus having selectable manual and automatic modes of operation comprising
  - a. the structure in accordance with claim 6 and
  - b. alarm means connected to both the timing means and the means for energizing automatic mode of operation of the apparatus
  - c. the alarm means being energized when the apparatus is programmed for automatic mode of operation and deenergized only when the timing means time out.

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