United States Patent [19]

Wheeler et al.

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[54] **TWO HAND OPERATED MACHINE CONTROL STATION USING CAPACITIVE PROXIMITY SWITCHES**

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[73] Assignee: **Square D Company,** Palatine, Ill.

[21] Appl. No.: **805,422**

[22] Filed: **Dec. 11, 1991**

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[52] U.S. Cl. 307/328; 361/179;
361/189; 340/573; 192/131 R; 192/129 A
[58] Field of Search 307/116–118,
307/308, 326, 328, 140, 141.4; 361/179–181,
189, 280; 200/600, 61.85; 340/551, 552, 561,
568, 573; 328/5, 7, 1; 192/129 R–132 R

[56] **References Cited**

U.S. PATENT DOCUMENTS

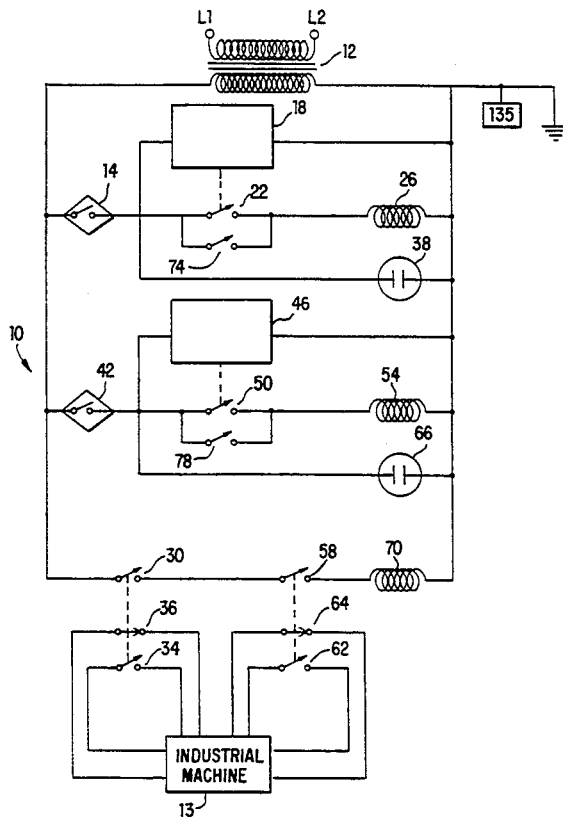|			
3,089,985	5/1963	Camfield et al.	361/189
3,560,800	2/1971	Weidenfeld	361/189
3,764,819	10/1973	Muller	307/116
3,895,269	7/1975	Geremia	361/189
4,031,408	6/1977	Holz	307/116
4,074,602	2/1978	Brower	361/189 X
4,412,268	10/1983	Dassow	361/181
4,767,940	8/1988	Tuttle	307/116
5,168,173	12/1992	Windsor	307/139
5,212,621	5/1993	Panter	361/181

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[57] **ABSTRACT**

A machine operator control station circuit which uses capacitive proximity switches to replicate the function of mechanical switches used in prior art control stations. A monitoring circuit for monitoring the "on" state of the capacitive proximity switches used in a two hand industrial machine control station is disclosed. The circuit also reduces the chance of unintended operation of the machine being controlled as a result of emitted or conducted radio frequency interference which might be detected by the capacitive proximity switches. An isolation transformer provides an isolated power supply for the monitoring circuit. The monitoring circuit includes a first capacitive proximity switch for detecting the presence of one of the machine operator's hands, and a second capacitive proximity switch for detecting the presence of the other of the machine operator's hands. Each proximity switch has a monitoring circuit for monitoring the length of time the proximity switch remains in the activated or "on" state. The monitoring circuits of the first and second proximity switches are connected together such that both switches must be activated within a set time window in order to activate the machine control circuit.

10 Claims, 6 Drawing Sheets

L1 L2

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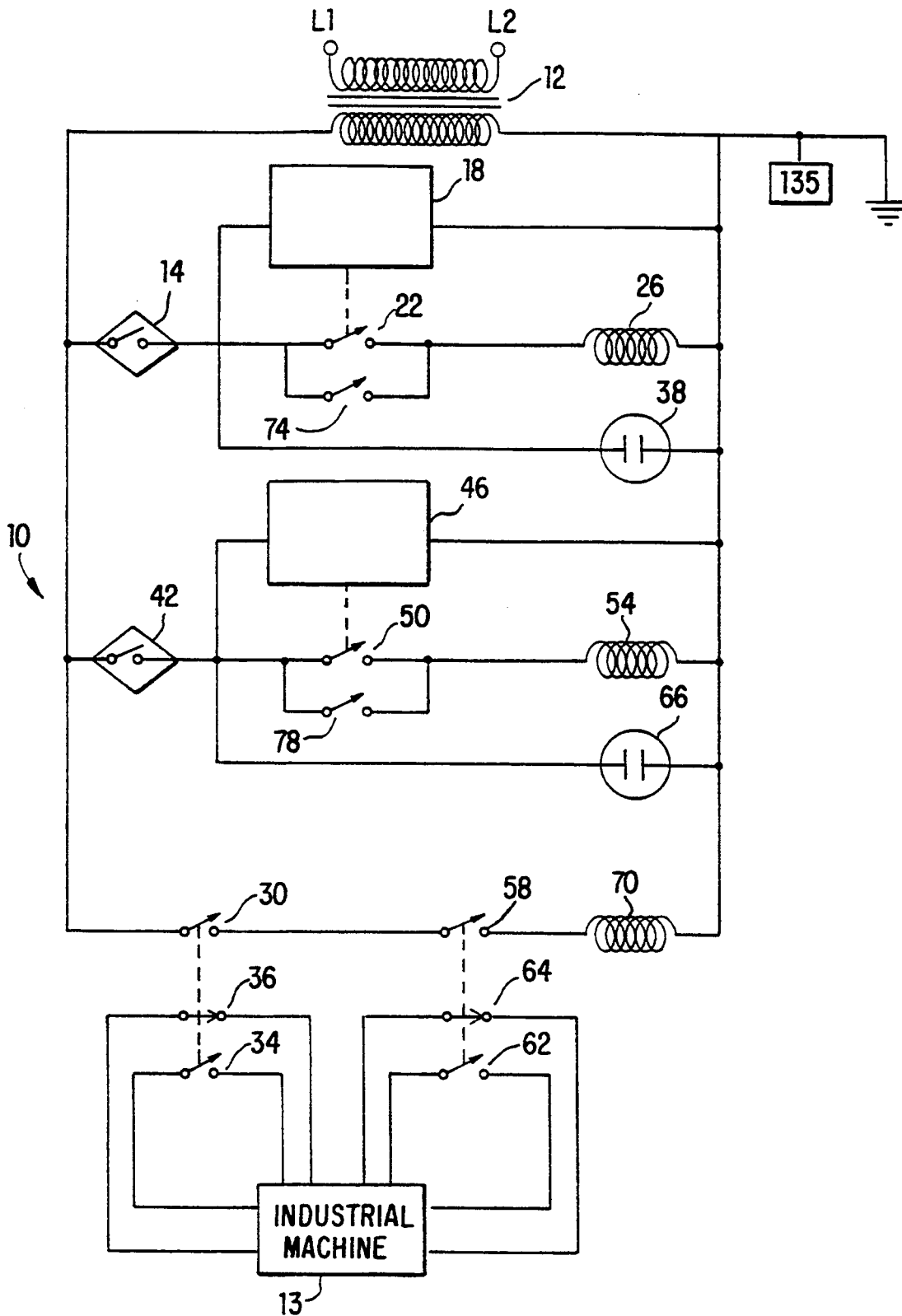
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INDUSTRIAL
MACHINE

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FIG. 1

FIG. 2

FIG. 3

FIG. 4

DOCKET ALARM
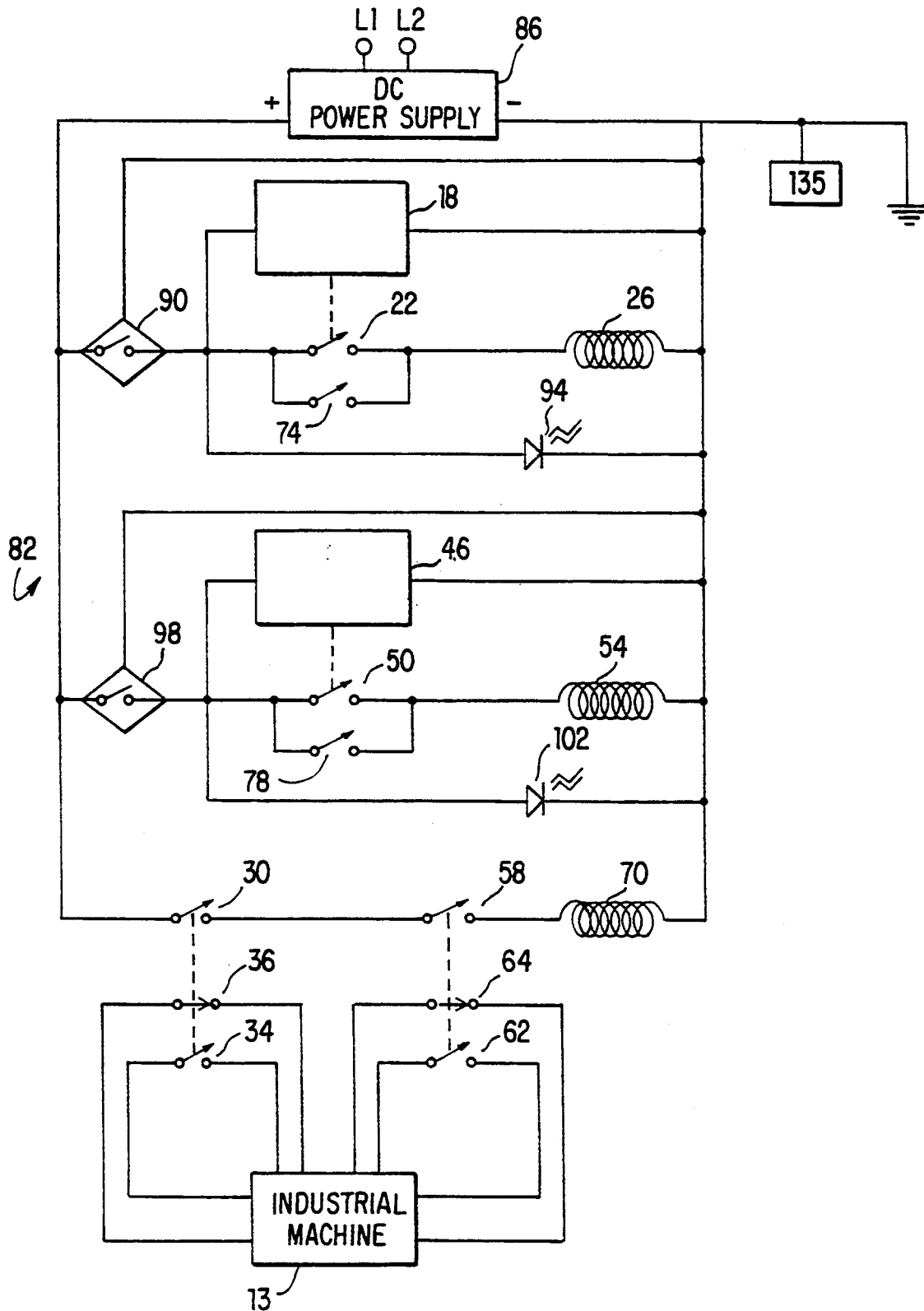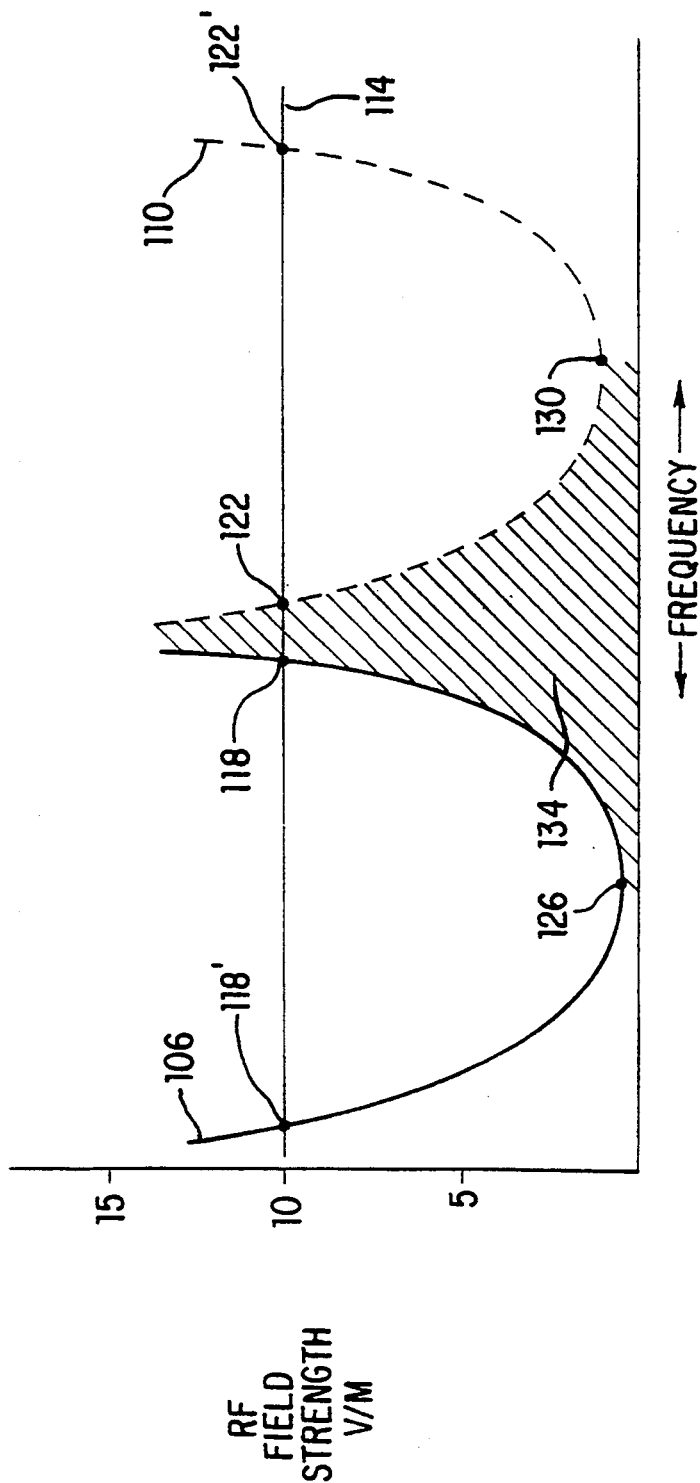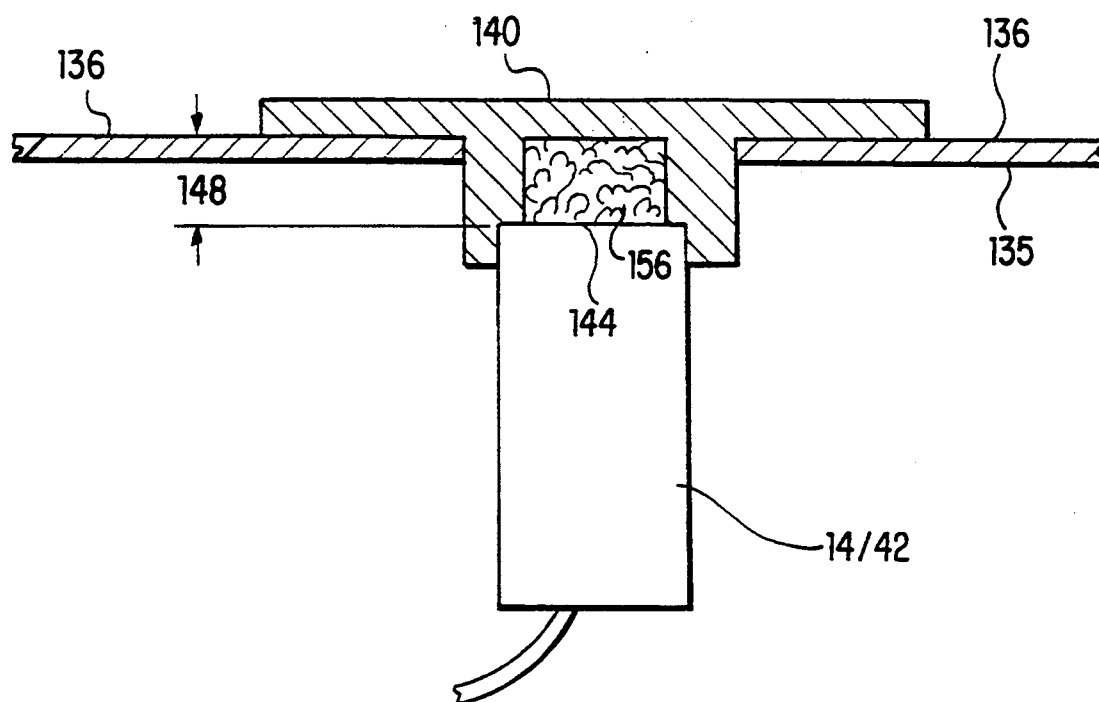
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