United States Patent [19]

Schricker et al.

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[54] **METHOD AND APPARATUS FOR INDICATING A FAULT CONDITION**

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[51] Int. Cl.6 .... **G08B 23/00**

[52] U.S. Cl. **364/551.01**; 340/679

[58] Field of Search 340/679, 680; 364/550, 551.01, 551.02

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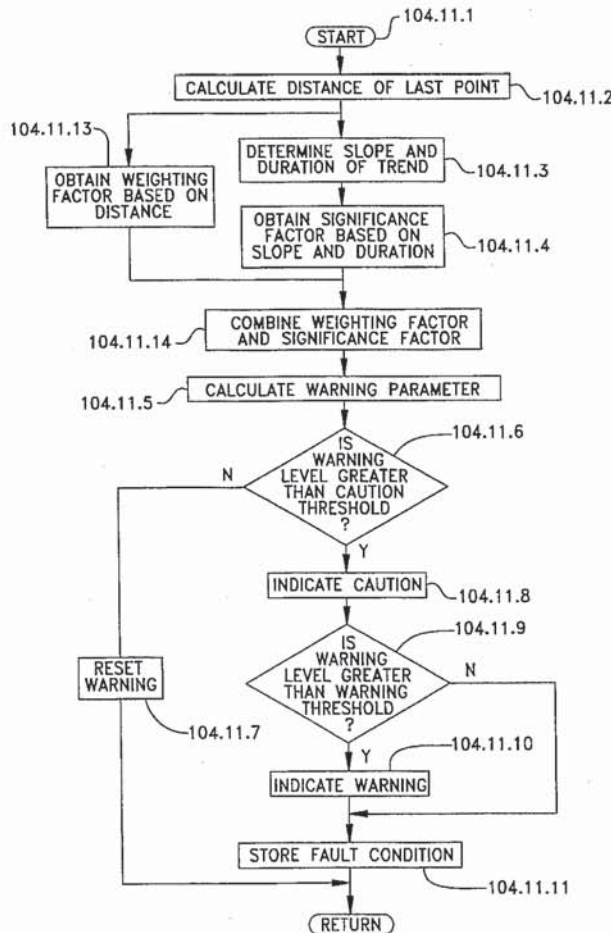
[57] **ABSTRACT**

An apparatus is provided for indicating a fault condition in a machine having a plurality of parameters each having levels being dependent upon machine performance. The apparatus includes a sensor adapted to produce an electrical signal in response to the level of one of the of parameters; and a processor for identifying a trend in the parameter level in response to the electrical signal, calculating the duration and slope of the trend; and determining whether a first warning threshold is exceeded in response to the duration and slope of the trend, the first warning threshold being a function of duration and slope.

16 Claims, 10 Drawing Sheets

Fig. 1

Fig. 2.

20

ELECTRONIC
MODULE

MEM

24

ATA DATALINK
PUSHBUTTON
+/– BATTERY, KEY SWITCH
RS485 (EXHAUST TEMP)
ADDITIONAL ANALOG #1
ADDITIONAL ANALOG #2
"   "   "
"   "   "
"   "   "
"   "   "
ADDITIONAL ANALOG #6

21

22

Fig_3_

210 — (START)

212 — IS ENGINE RUNNING ?   N

Y

214 — READ MACHINE PARAMETERS

216 — IS PARAMETER TO BE TRENDED ?

Y   N

ARE TREND DEPENDENCIES SATISFIED ? — 218

N   Y

STORE PARAMETER — 220

HAS TIME OR COUNTS BEEN REACHED ? — 222
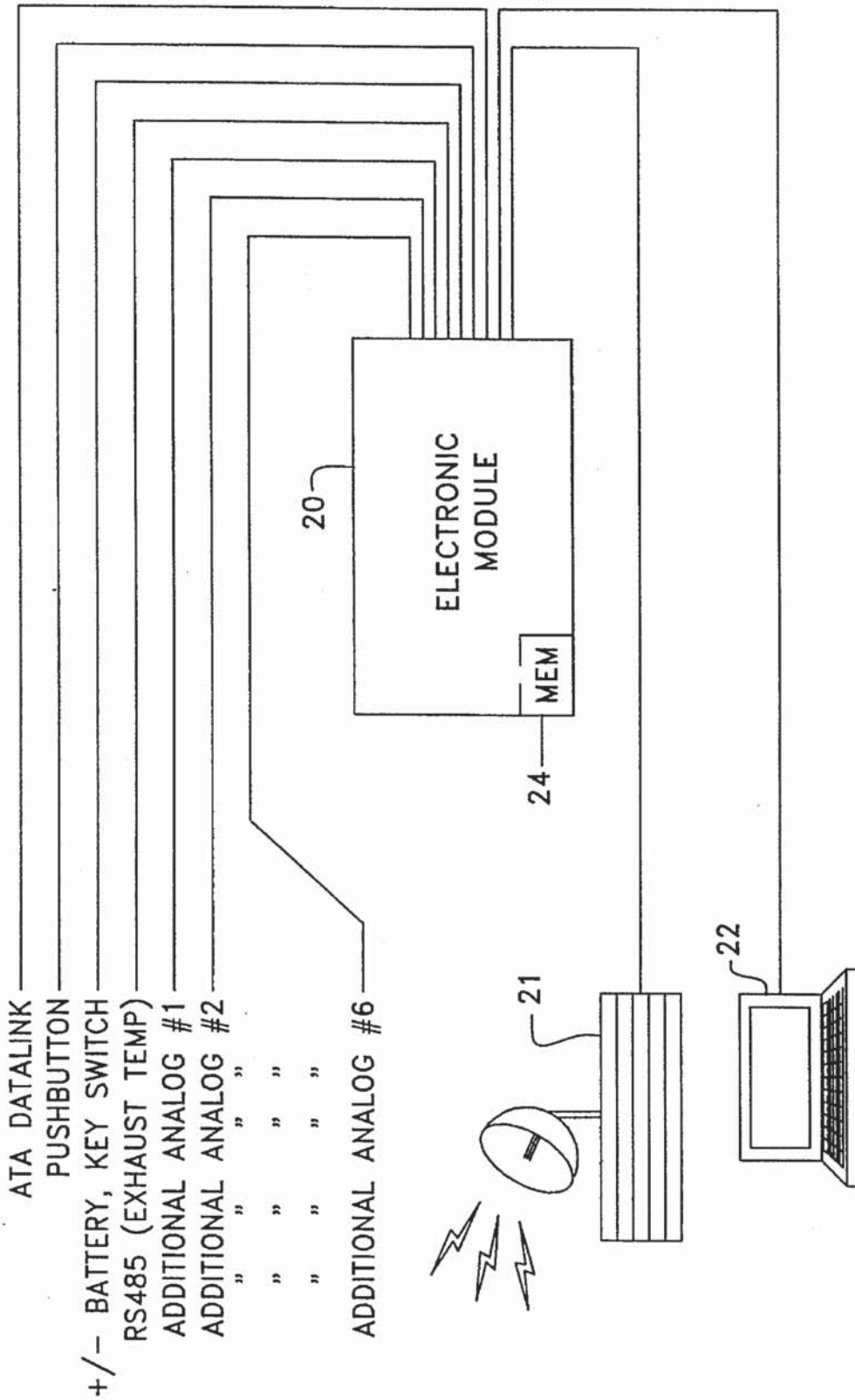
N   Y
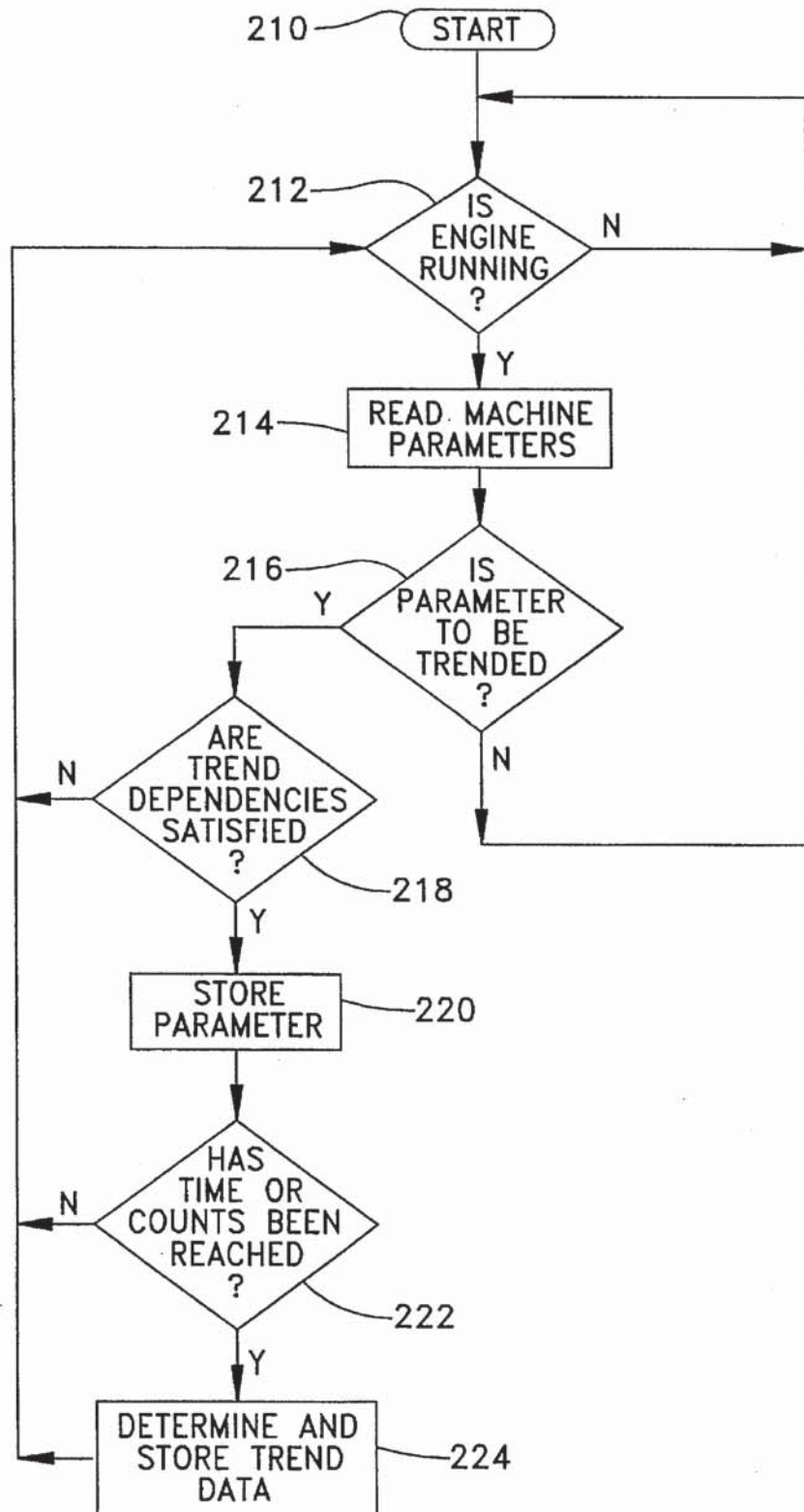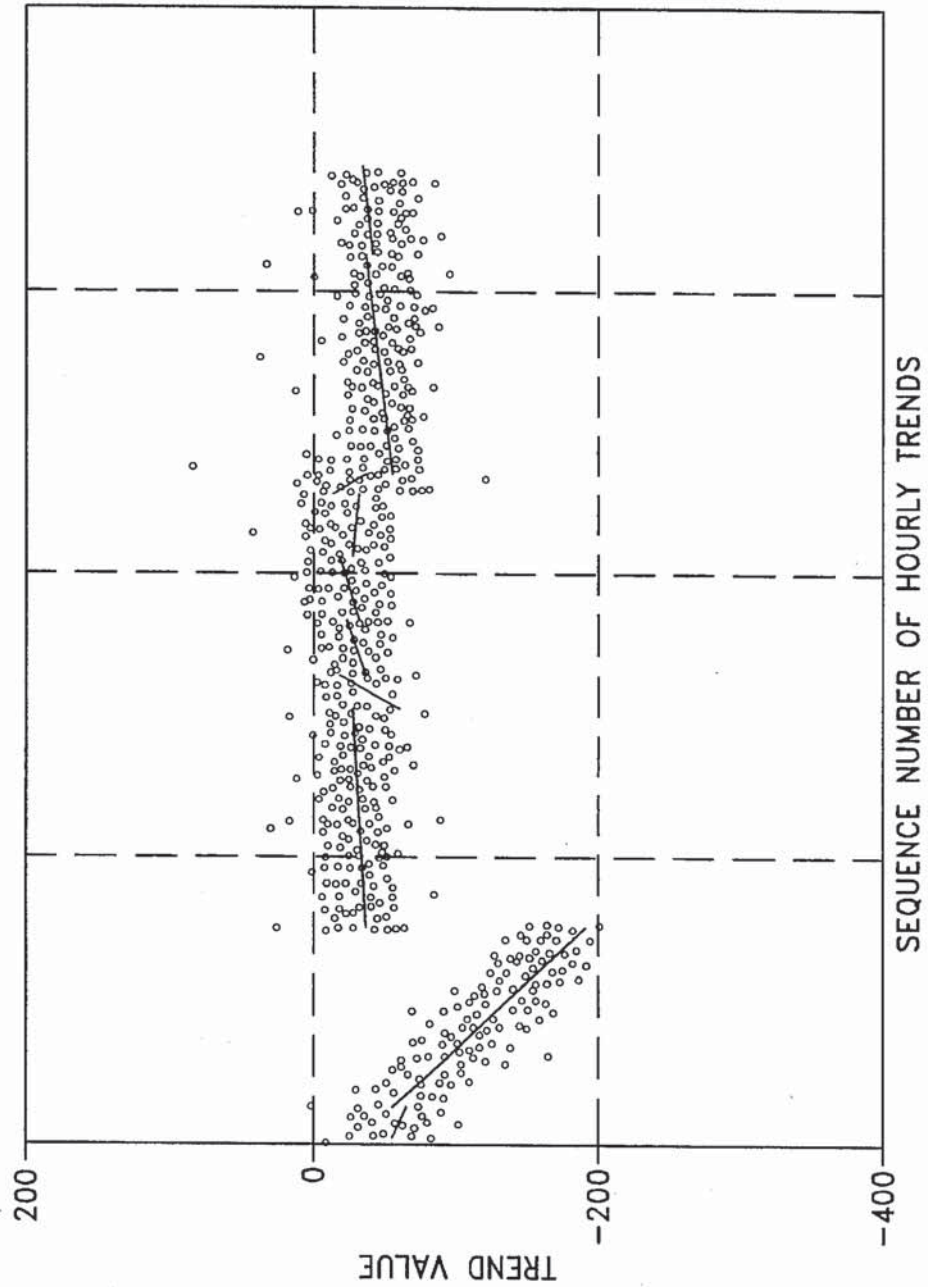
DETERMINE AND STORE TREND DATA — 224

Fig-4

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