A Novel Tank Level Controller

A 10-kilohm potentiometer is used here as the sensing element. A light rod, with a hollow ball at one end, is rigidly connected to spindle of the potentiometer. When water level changes, the potentiometer starts turning (see Fig. 1). The maximum rotation obtainable here is 90 degrees which is one third of the total possible rotation of a volume control. The control circuit is given in Fig. 2. The two transistors and resistors are connected to form a schmitt trigger multivibrator circuit whose transfer characteristics (V_{B1} vs V_{C2}) have two threshold voltage levels as shown in Fig. 3.

When input voltage V_{B1} exceeds 2.7 volts, transistor T1 goes into conduction, while T2 becomes non-conducting

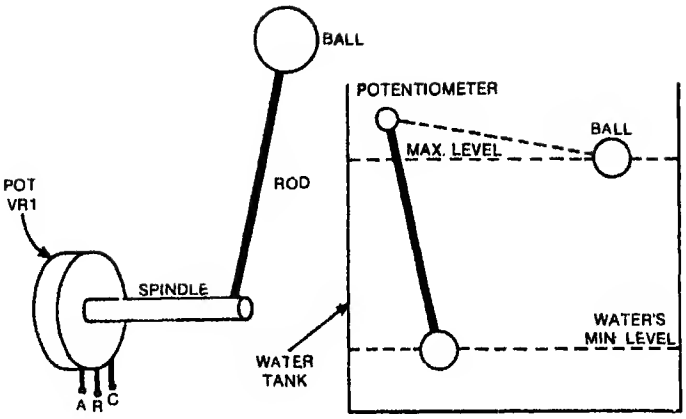

Fig. 1:

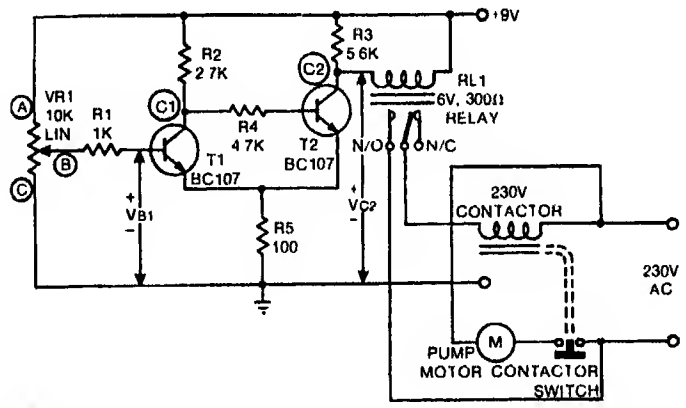

Fig. 2:

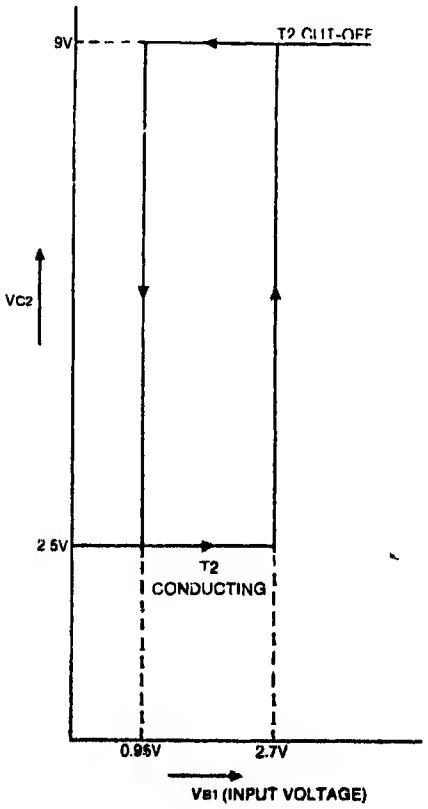

Fig. 3:

(cut-off) T2 remains in cut-off state until the input voltage becomes less than 0 97 volt When input voltage V_{BI} is less than 0.97 volt, T1 is cut-off and T2 goes into conduction, and the relay gets energised T2 remains in the conducting state, until V_{BI} exceeds 2 7 volts

The potentiometer is placed such that when the water level rises, V_{BI} also increases When the water level goes down to the minimum position or below, voltage V_{BI} goes below 0 97 volt and the relay gets energised As the contactor gets energised, the motor driving the pump is switched on This state continues until voltage V_{BI} increases to 2 7V (corresponding to maximum water level)

When the water level is above the maximum level (i e $V_{BI} > 2\ 7$ volts), relay is de-energised and hence the motor is switched off This state continues until the water level has dropped below the minimum level (i e $V_{BI} < 0\ 97$ volt)

The level (max level) can be raised by connecting additional resistors, (greater than 0 5k) between C2 and positive terminal of the battery And the minimum level can be adjusted by connecting resistors greater than 1k between C1 and positive terminal of the battery Rod length can be selected to suit the maximum and minimum levels required and the dimensions of the tank

The potentiometer is fixed such that in the minimum position it gives about 0 95 volt at the base of T1 Resistor R5 can be varied in value from 85 to 110 ohms for further adjustments

If the relay resistance is greater than 300 ohms, either the value of R5 can be increased or additional resistors can be connected in parallel with the relay