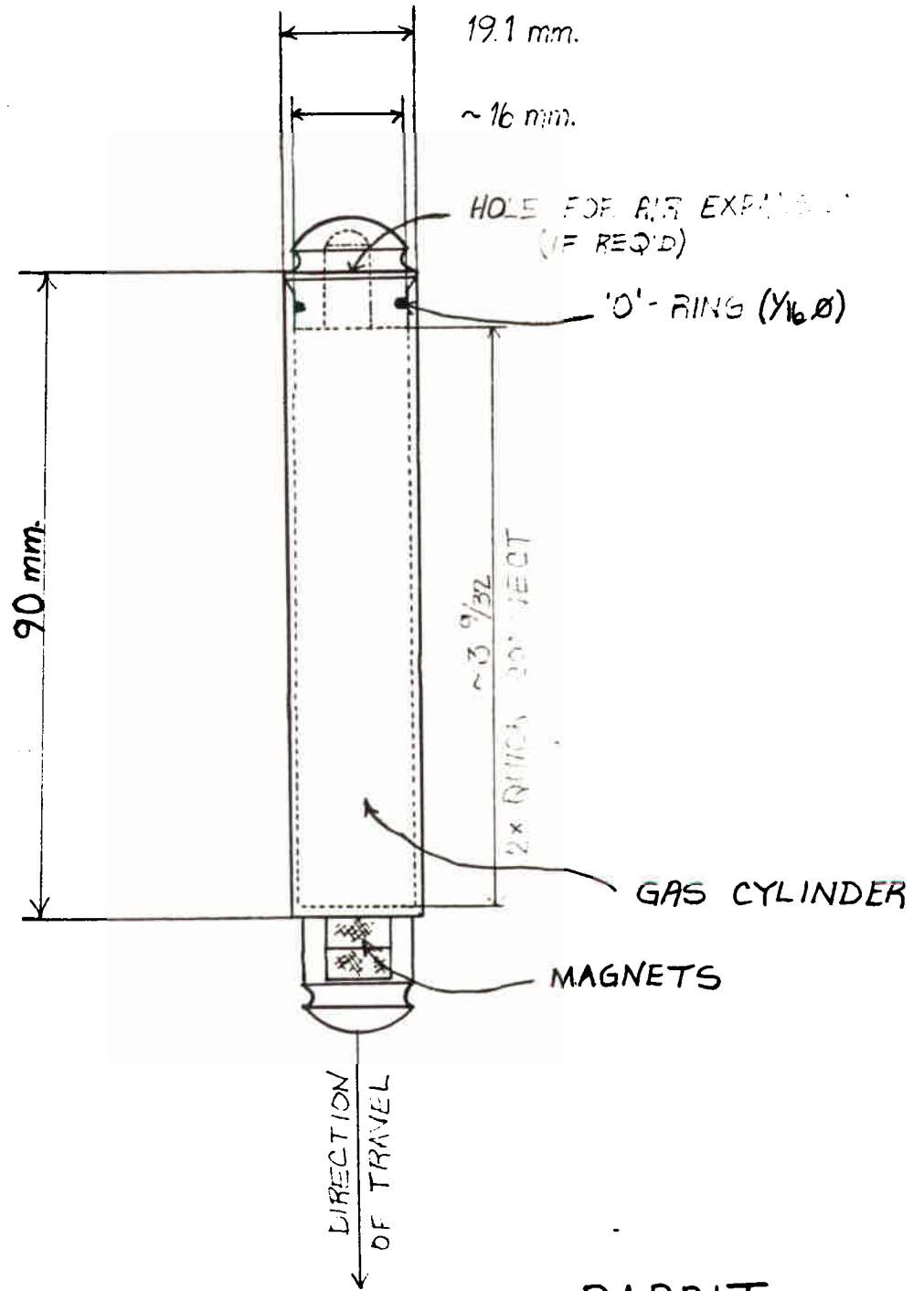
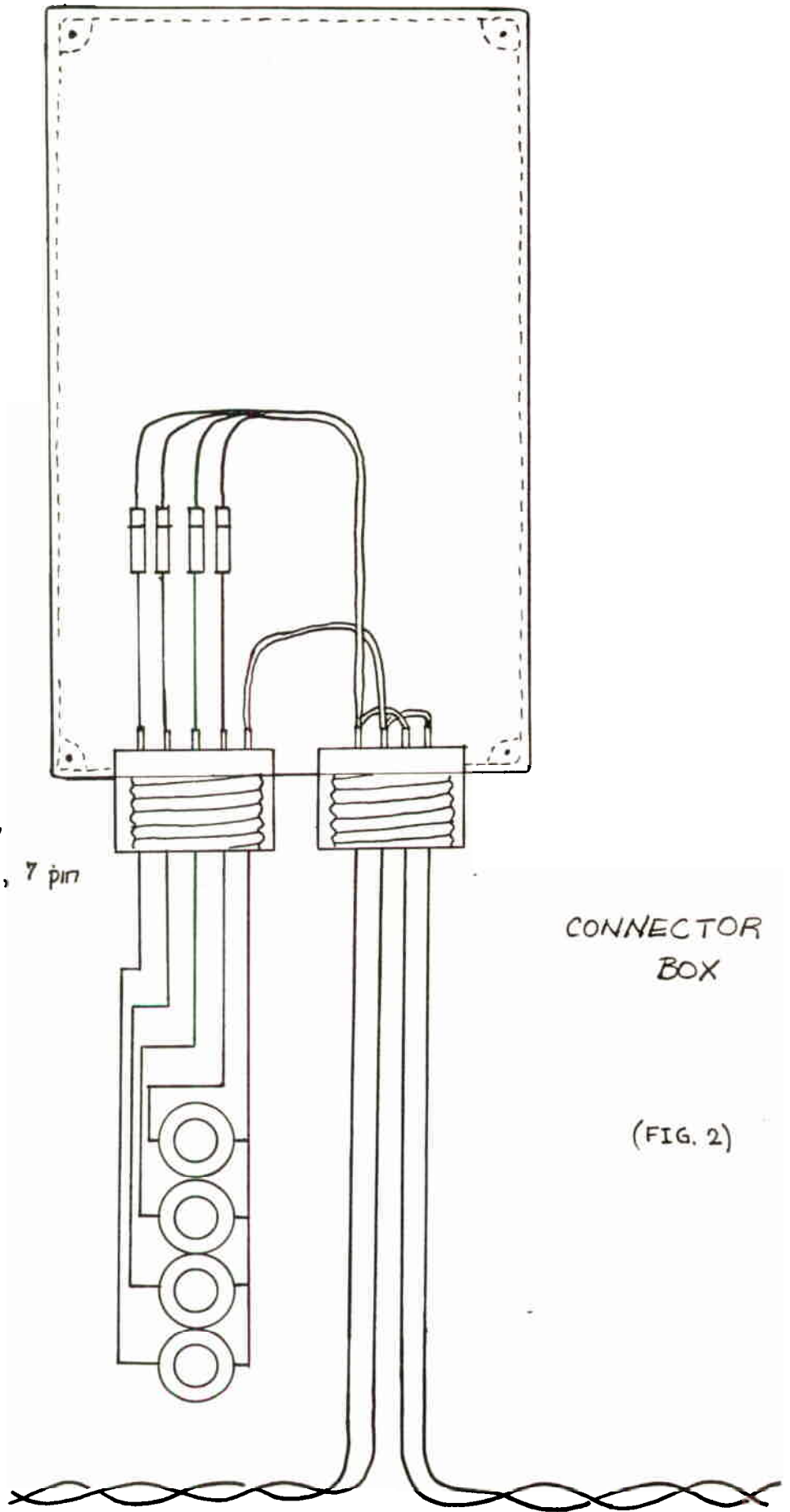


TRIUMF	4004 WESBROOK MALL, UBC CAMPUS, VANCOUVER, B.C. V6T 2A3		
DESIGN NOTE	NAME Z. Gelbart	DATE August 10, 1982	FILE NO. TRI-DN-82-15 PAGE 1 of 12
SUBJECT P.E.T. Rabbit Station Indicator System			
<p>This system was designed to indicate the passage of a capsule (rabbit) travelling through the TRIUMF/ACU rabbit tubes, using monitoring devices located at eleven stations along the line. The line contains two 1" diameter tubes and two 1.5" diameter tubes. The rabbits (Fig. 1), of corresponding sizes, are propelled by compressed air.</p> <p>Nine of the monitoring stations are located in manholes (see 'Manhole Details') while the other two are at the beginning and at the end of the line. At each station, around each of the four tubes there is a coaxial coil. (See Pick-Up Coil schematic). The coil consists of approximately 300 turns of 0.1 mm diameter magnet wire for the 1" tube and approximately 200 turns for the 1.5" tube. The coils are hooked up in parallel to the twisted pair through diodes. All the connections, and the diodes, are inside junction boxes mounted within the manhole. (See Fig. 2 and 3).</p> <p>The rabbit has two small ceramic magnets 1/2" diameter x 3/16", inserted in the front end. As the rabbit passes through the coil at each station, an electric pulse of approximately .4-2V and 10-80 usec. long is produced. (See Rabbit Speed expt.).</p> <p>Each coil is connected through a diode (IN914). The diode clips the negative half of the pulse and isolates each signal from the rest of the coils (see Fig. 4). The effect of the rabbit travelling through the line is that a series of eleven pulses, each corresponding to the rabbit's location, is transmitted through the line. Owing to the presence of only one twisted-pair running the length of the line, only one of the four tubes can be monitored at any one time.</p> <p>The series of pulses, and thus the location of the rabbit, are easily displayed (see Fig. 5). The pulse on the line is sensed by a comparator (U1, 3403). The comparator is adjusted to switch on an approximately &gt;.3V pulse. The comparator output triggers a one-shot (U2, 555) to give a pulse of approximately 0.5 second. This pulse can then be recorded on a chart recorder and is used as an input for a counter. As the rabbit passes each coil, a series of eleven LEDs will be lit, one by one, showing its travel. There are two display units (Fig. 6), one installed at the Acute Care Unit, UBC, and one at TRIUMF.</p> <p>The transport of a series of two pulses, from two coils approximately 1 m. apart, was successfully accomplished through 8000 feet of cable. The rabbit was travelling at approximately 30 m·s<sup>-1</sup> and a pulse of 2V and 1.5 msec length was detected at the end of the line.</p>			



RABBIT  
CAPSULE

(FIG. 1)

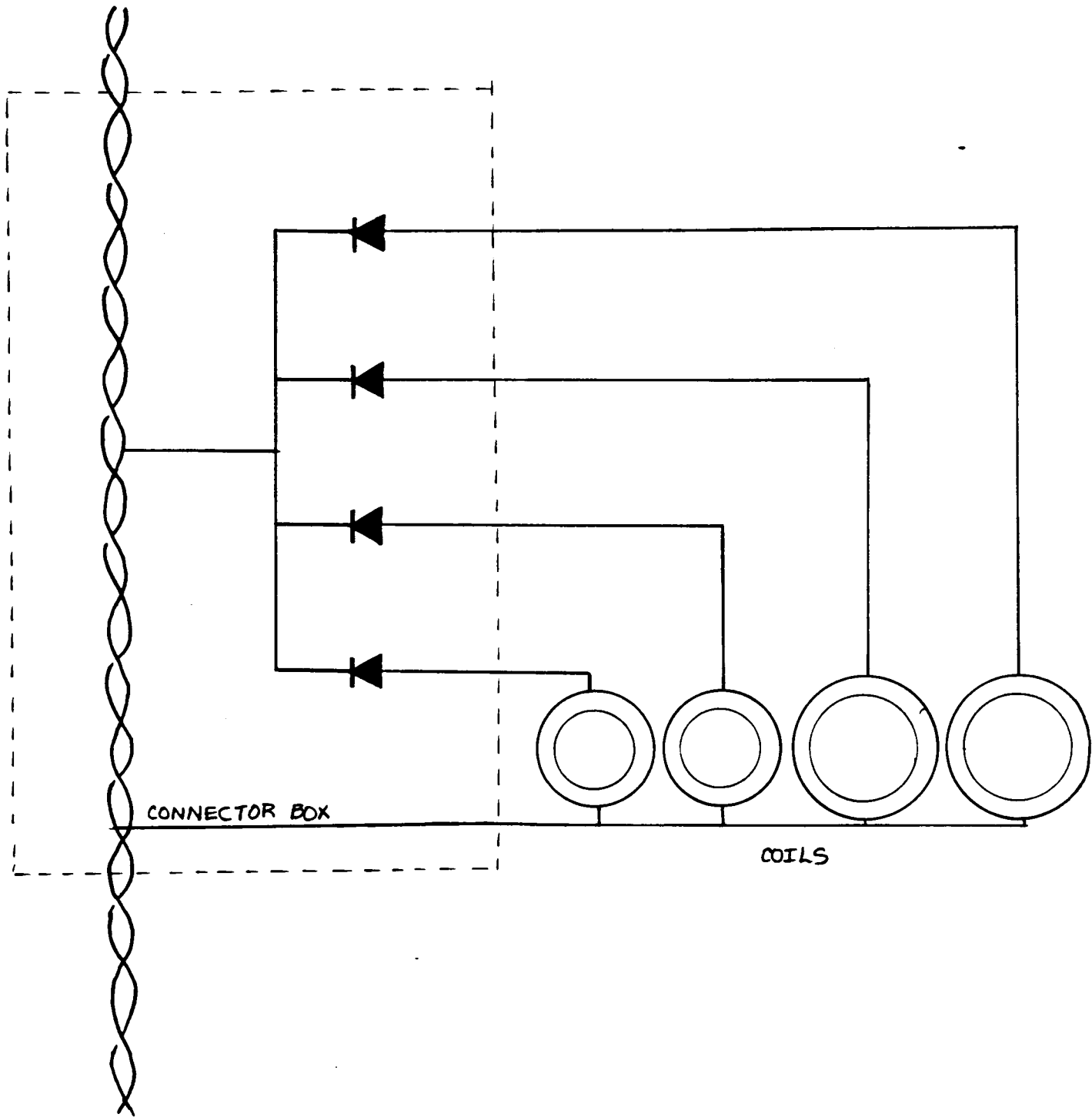


Connector - Aphenol  
series 44, 7 pin

CONNECTOR  
BOX

(FIG. 2)

# A MONITORING STATION



(FIG. 3)

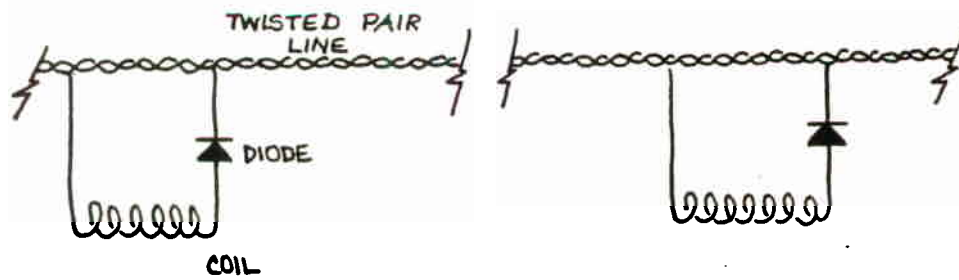
# RABBIT MONITORING



SELF-INDUCED  
PULSE GENERATED  
BY THE MAGNET.

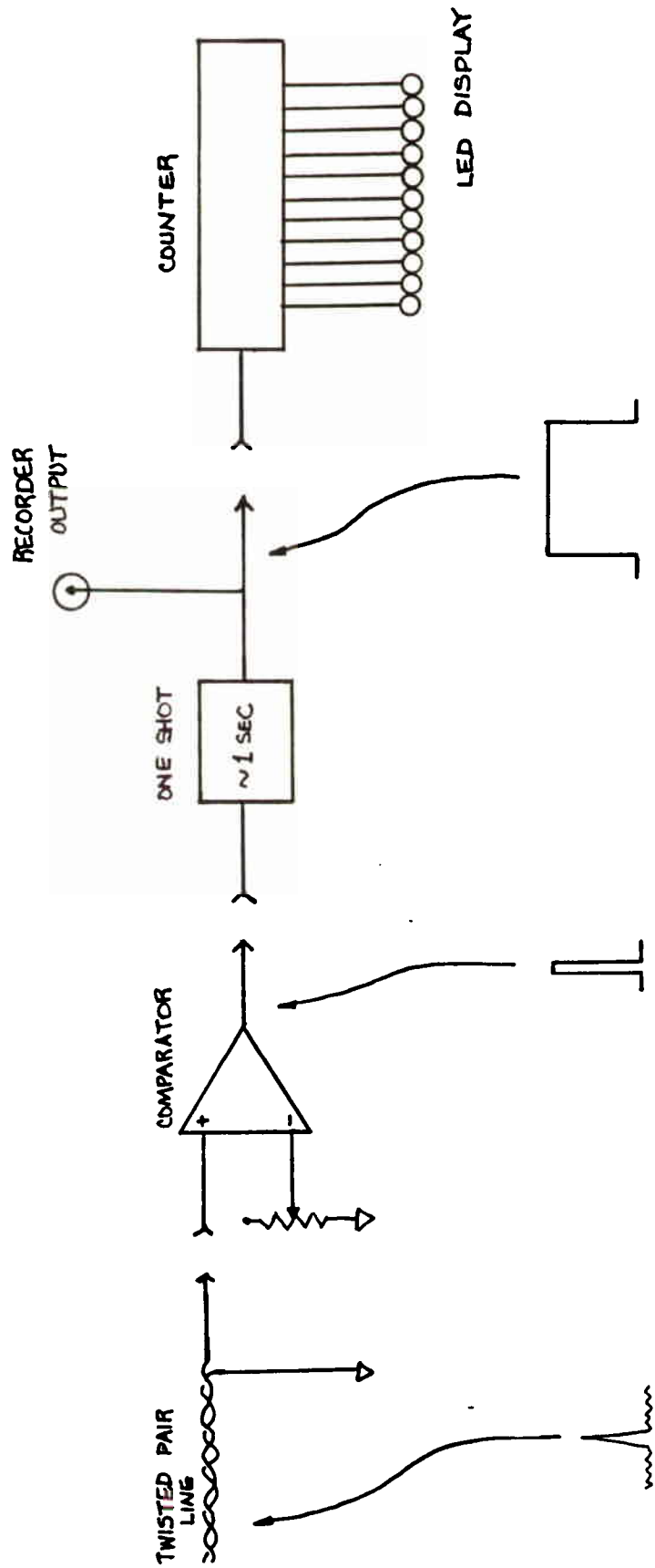


PULSE AFTER  
THE DIODE.



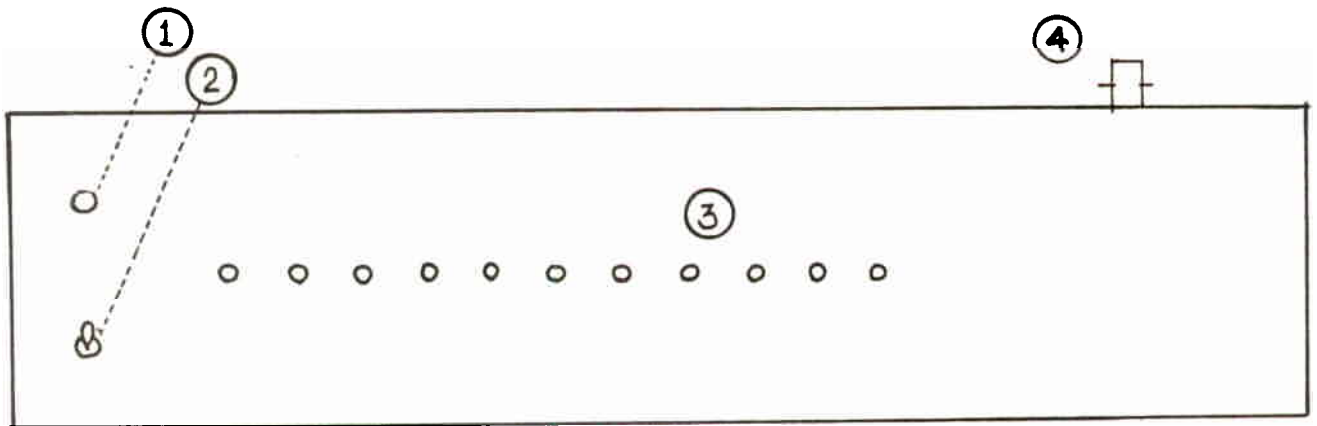
(FIG. 4)

# SYSTEM LAYOUT



(FIG. 5)

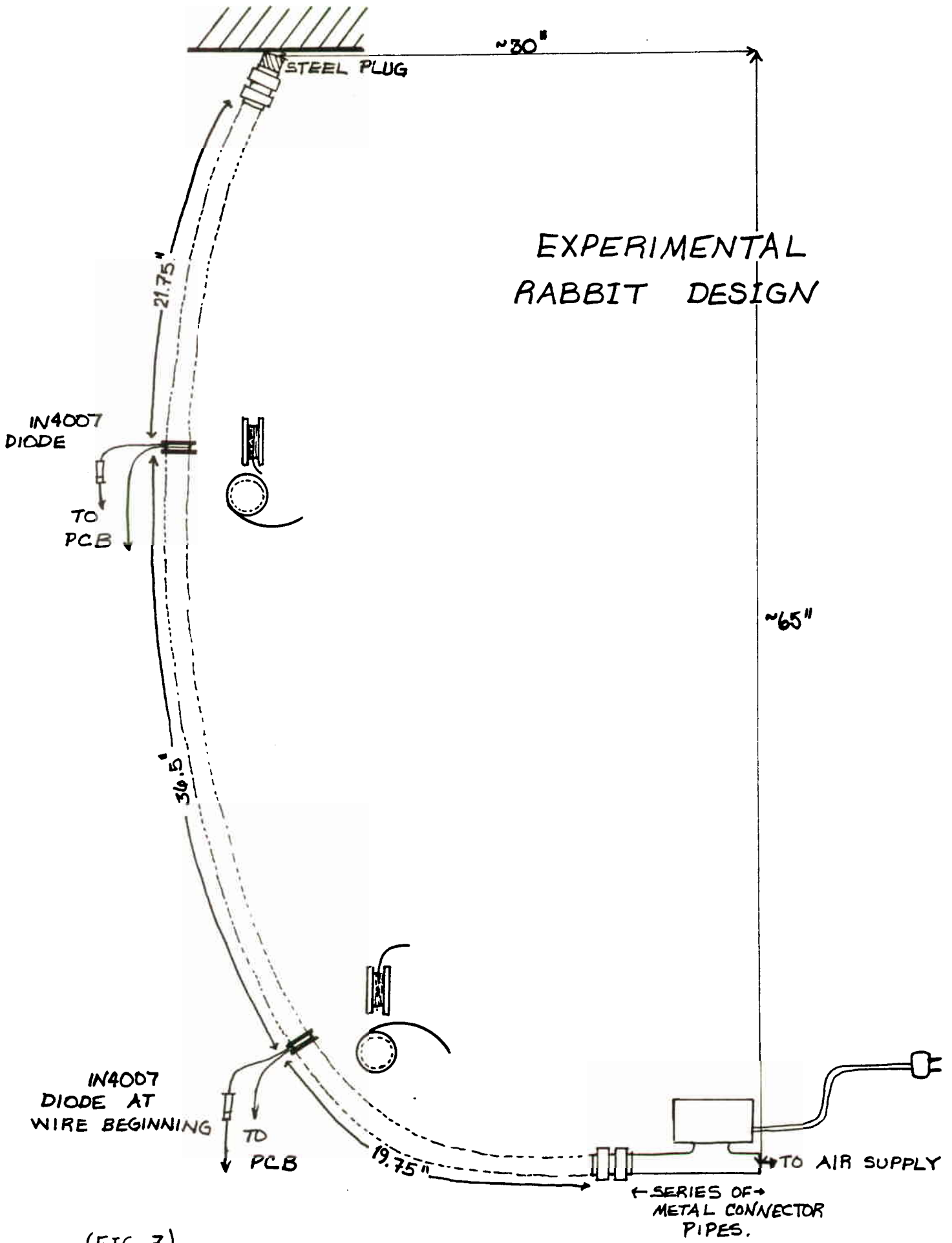
# INSTRUMENT DESCRIPTION



- ① ON LED
- ② SET-RESET SWITCH
- ③ 11 STATION INDICATOR LED'S
- ④ LINE CONNECTOR

(FIG. 6)

# EXPERIMENTAL RABBIT DESIGN



(FIG. 7)









