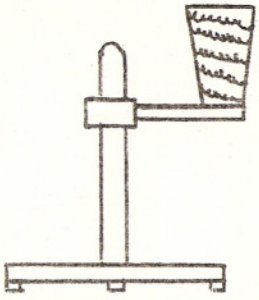
Absorbing Power

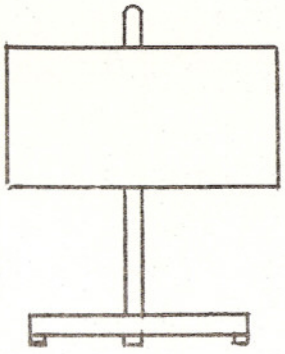
Blackened Versus Polished Surface

Two Disks
& Shield: H-2 S-2
Heater: H-1 S-1
All Else: E-6 S-3

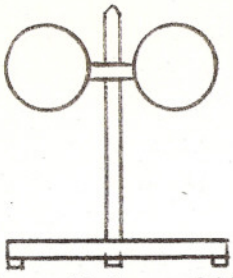
2A - 2E



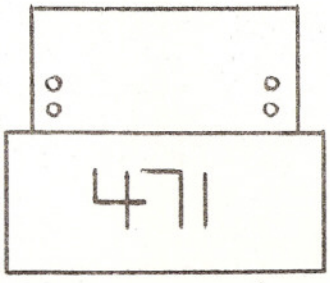
Radiant heater coil



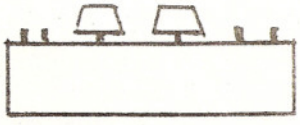
Shield



Two disks with thermocouple B



Digital voltmeter



DC amplifier

If you are not completely familiar with the operation of both the digital voltmeter and the DC amplifier, you should read the descriptions of demonstrations EC-4 and HA-1 before proceeding.

Use two thin, 3" disks mounted side by side, identical except that one has a blackened front surface and the other a polished front surface. One junction of a thermocouple is soldered to each metal disk. The test junction, indicated by red on the mounting, is on the blackened disk. The reference junction, indicated by black on the mounting, is on the polished disk.

Set the heater coil from 75 to 100 cm from the disks, set the shield in front of the disks, and then turn on the heater. Connect the thermocouple to the input of the amplifier, and the output of the amplifier to the digital voltmeter. Select an amplification factor of 100, and set both switches at the left of the amplifier in the up position. Turn on both the amplifier and the voltmeter, gradually move the range selector on the voltmeter to the 99.9-mv scale, and balance the amplifier rather accurately on this scale. Balancing the amplifier with the thermocouple connected to the input, rather than with the input shorted, compensates for any temperature difference that may exist between the two disks.

Remove the shield so that radiation falls equally upon the two disks. Note that the blackened disk becomes warmer than the polished disk. That it is actually the blackened disk that is the warmer can be checked, if desired, by placing a finger on the back of that disk at the position of the junction, thus heating it slightly, while the heater is either cold or shielded from the disks.