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# VACUUM CHAMBER RESISTOR-CAPACITOR NETWORKS

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## General

This Technical Note serves as a record for future reference, for AGS engineers and technicians. It includes brief notes and sketches of the assembly, location and mounting, of the RC networks located on the vacuum chambers and their flange clamps. Explanations of their functions are too lengthy for this Note and are not included.

## Introduction

Vacuum chambers are insulated from the main magnets and any other possible grounds. It is important that anyone working on systems connected to the chambers, such as cavities, pick-up electrodes, etc., or installing RC networks on these chambers, check for grounds. Grounding of vacuum chambers is unintentional and most can be avoided. Ohmmeter checks for grounds should be made at the completion of any chamber-related work.

## Upstream End of Vacuum Chamber

All vacuum chambers are insulated at their mounting brackets by special shoulder washers. Figure 1 shows an exploded view of the mounting hardware. It is important that the sequence of assembly shown in this figure be followed exactly, otherwise shorts will occur.

Figure 2 shows the upstream RC network. This network is assembled in the following way. First, two 10 watt, 100 ohm resistors are wired in parallel. Their leads are plated steel and must be cut as short as possible. Copper leads are added to each end. Attached to one lead is a non-insulated crimp-on lug with a clearance hole for a 3/8" screw. DO NOT cut this lug, or DO NOT use a spade lug. A small uninsulated spade lug (for a 6-32 screw) is crimped onto

the other end. Keep leads as short as possible. Finally, a series RC network will be placed across the two 100 ohm resistors. The resistor shall be 18 ohms, 1 watt, and the capacitor shall be 0.01 microfarad, 500 or 600 volts, disk ceramic or silver mica. The values of these resistors and capacitors SHALL NOT BE CHANGED. DO NOT substitute other values. Again, keep all leads short.

Downstream End of Vacuum Chamber

Figure 3 shows the downstream RC network. This network consists of only a 0.01 microfarad 500 or 600 volt silver mica or disk ceramic capacitor, and an 18 ohm, 1 watt resistor. The lug on one lead must be uninsulated, and with a clearance hole for a 3/8" screw. This lug SHALL NOT BE CUT, nor a spade lug. The other end shall have a specially made copper spade lug that fits under the outer insulated shoulder washer, and against the vacuum chamber bracket.

Flange Networks

All vacuum chamber flanges have two RC networks: one inside and one outside the ring circumference. At all pick-up electrode locations, the inside network is replaced by a shorting strap; however, the outside network must still be in place. Figure 4 shows the flange network and flange short. Figure 5 shows them installed.

Because of variations in vacuum chambers, variation in flange clamps, and the location of certain devices such as nu-quads, modifications must be made to the copper mounting strap and fingerstock ends. Some will require large hose clamps to hold them in place. Others will require special cutting and fitting at the time of mounting.

Some vacuum chambers have bellows on their downstream end, followed by a vacuum flange clamp. These bellows are shorted internally and do not require networks.

Many vacuum chamber clamps are supported by stands bolted to the magnet girder. These stands are insulated from the girder by shoulder washers and require two RC networks. Both networks are a 33 ohm, 1 watt resistor in series with a 0.01 microfarad 500-600 volt disk ceramic capacitor. They are mounted as shown in Figure 6.

Chamber Resistances

Many chambers will not measure 50 ohms to the main magnets. Shorts at the pick-up electrode flanges and internal resistances of the pick-up electrode assembly will cause lower readings. The following is a tabulation of resistances for a typical superperiod.

| Chamber Location | Resistance (Ohms) |
|---|---|
| 1 | 50 |
| 2 | 20 |
| 3 | 20 |
| 4 | 20 |
| 5 | 20 |
| 6 | 50 |
| 7 | 50 |
| 8 | 20 |
| 9 | 20 |
| 10 | 50 |
| 11 | 50 |
| 12 | 20 |
| 13 | 20 |
| 14 | 20 |
| 15 | 20 |
| 16 | 50 |
| 17 | 50 |
| 18 | 20 |
| 19 | 20 |
| 20 | 50 |

These resistance values are nominal and will vary as much as 5 or 10 percent because of their tolerances.

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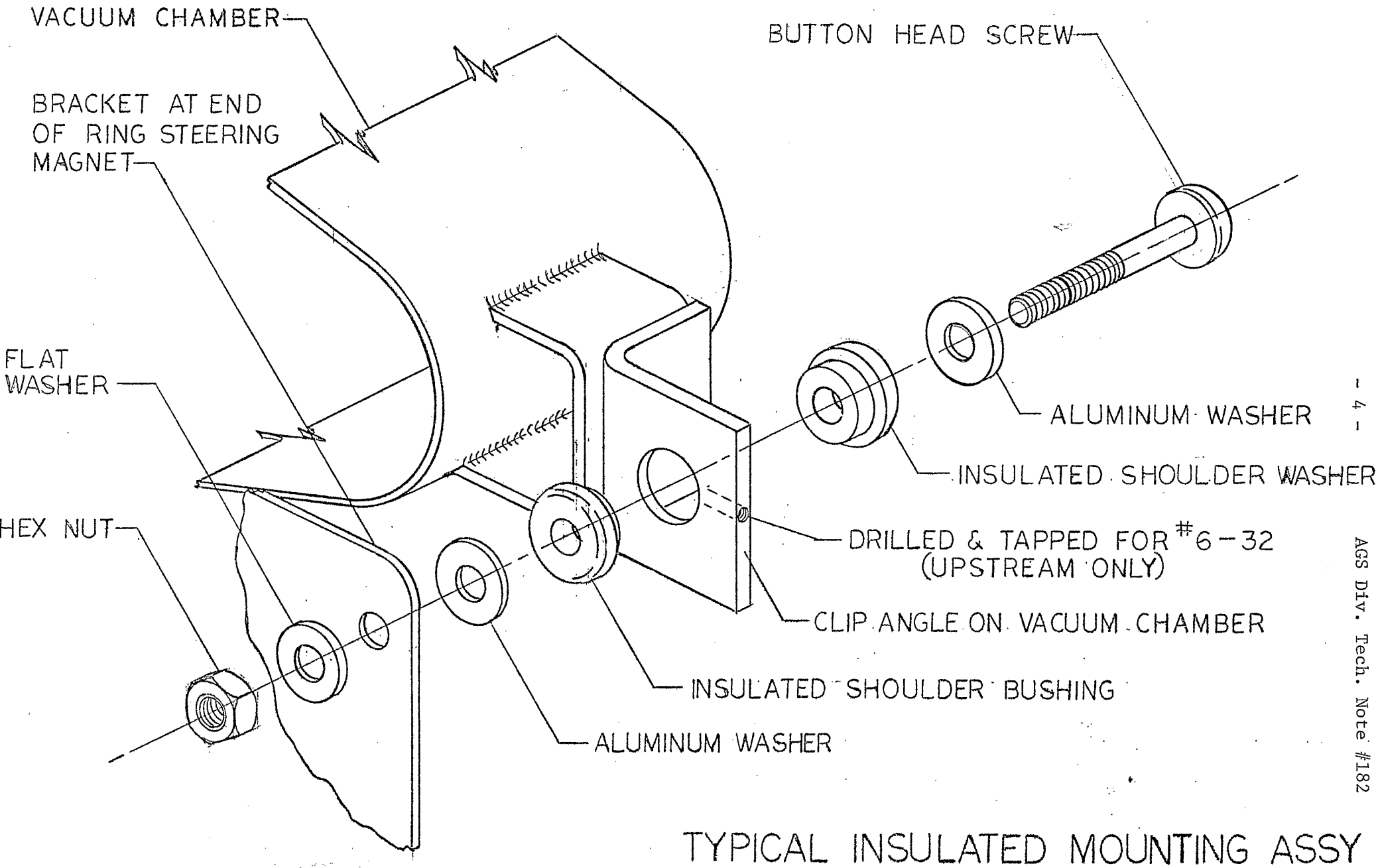



FIG. 1

# TYPICAL INSULATED MOUNTING ASSY FOR RING VACUUM CHAMBERS

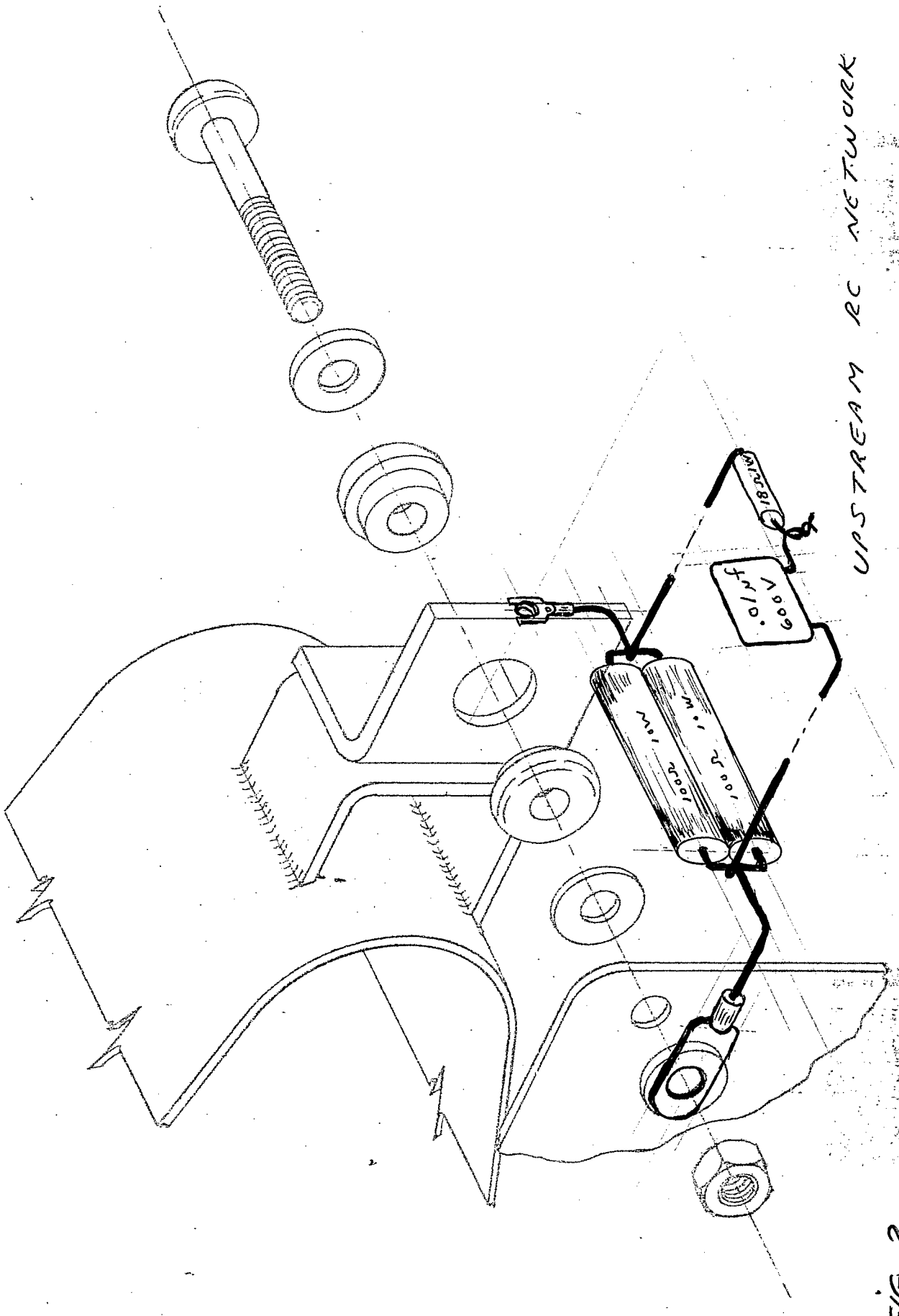
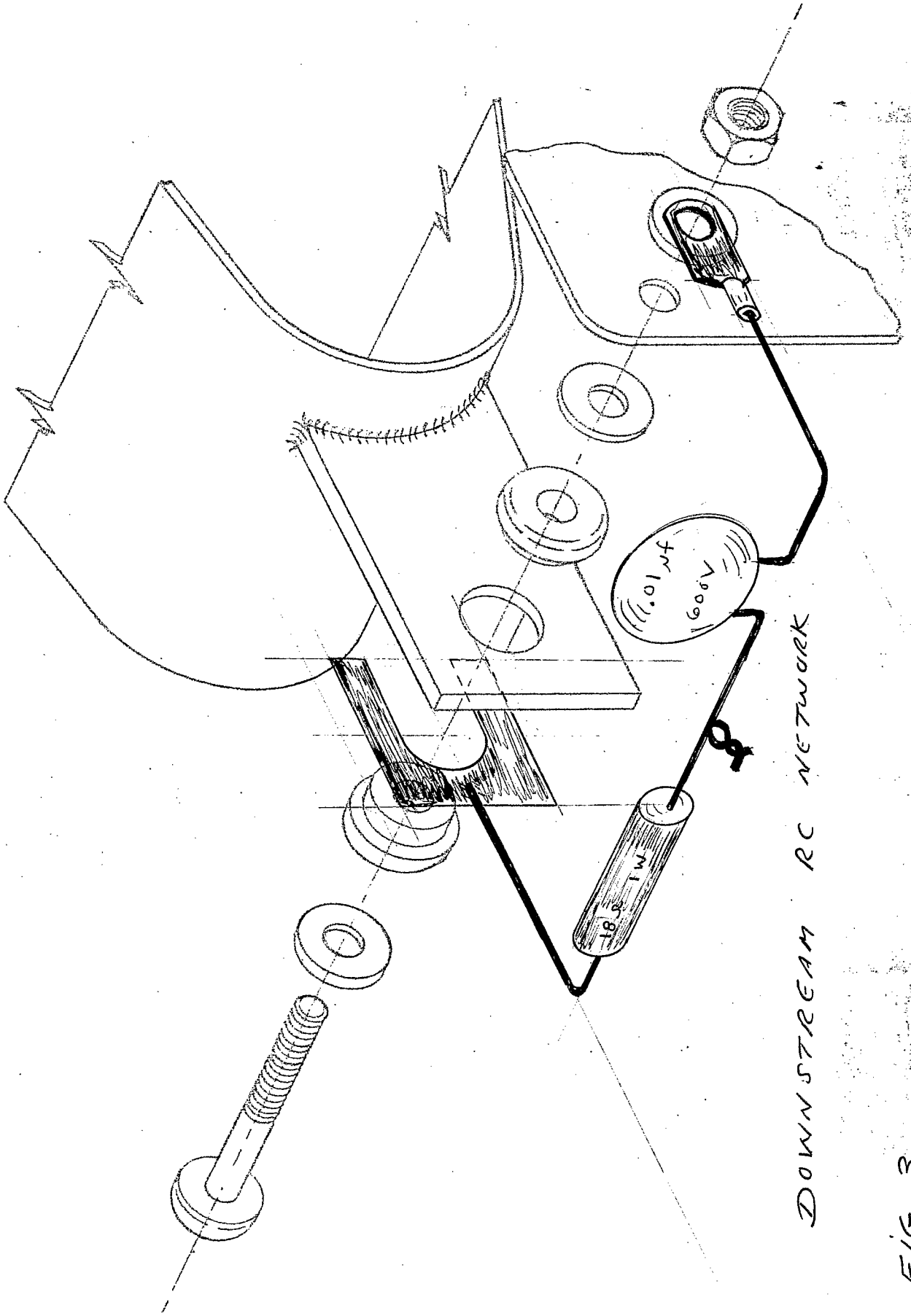



FIG. 2.




DOWNSTREAM RC NETWORK

FIG. 3.

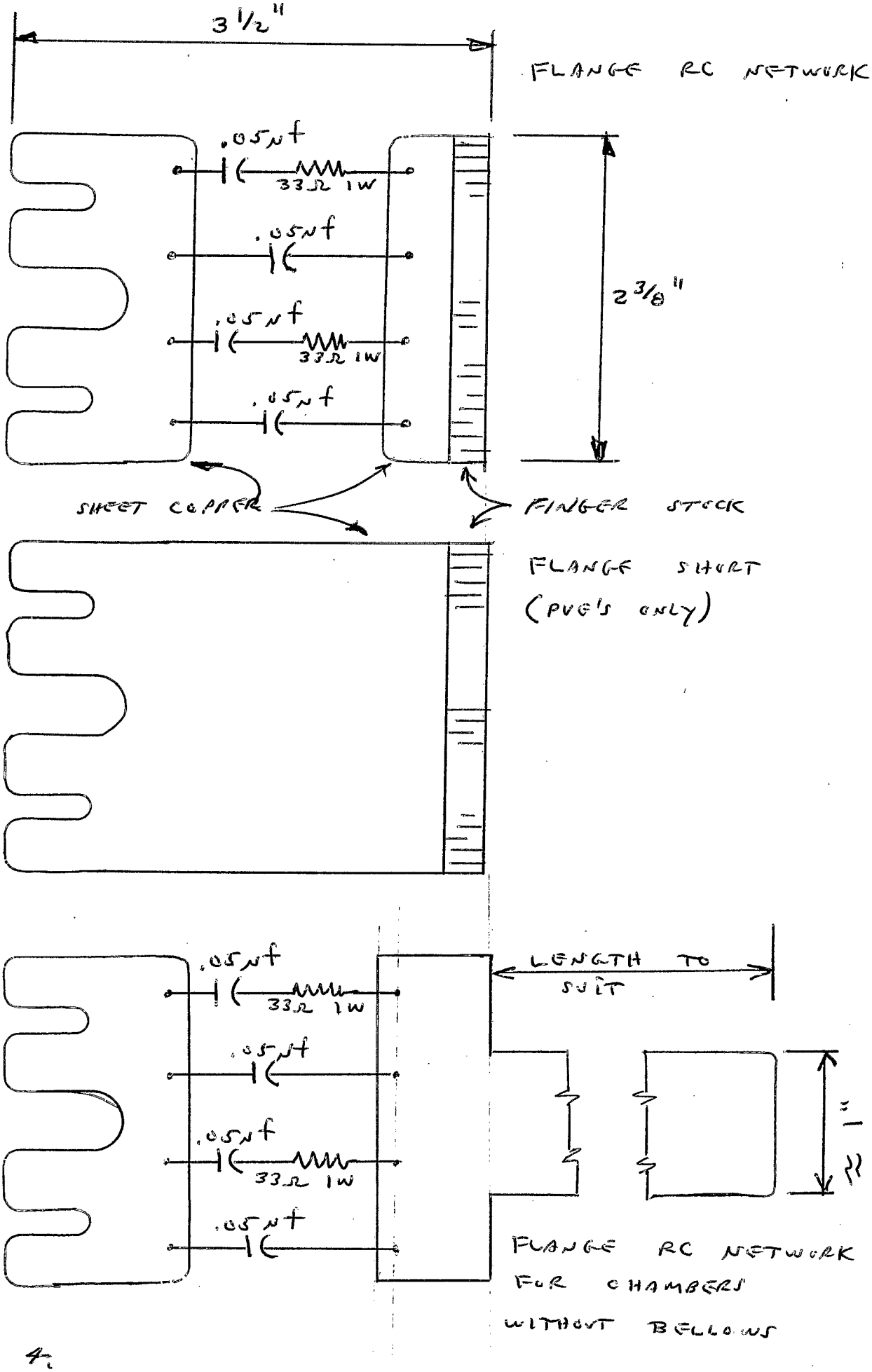
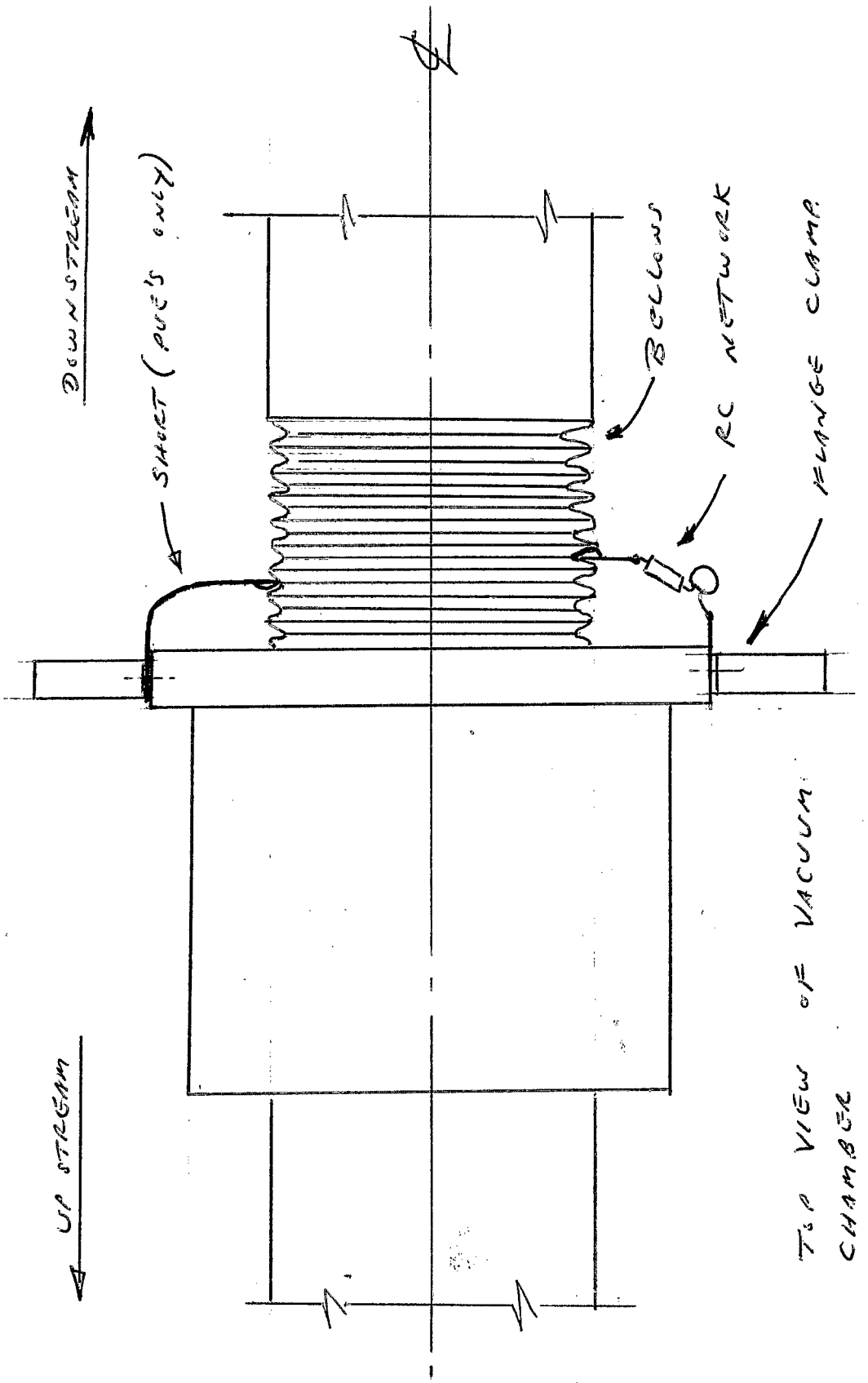
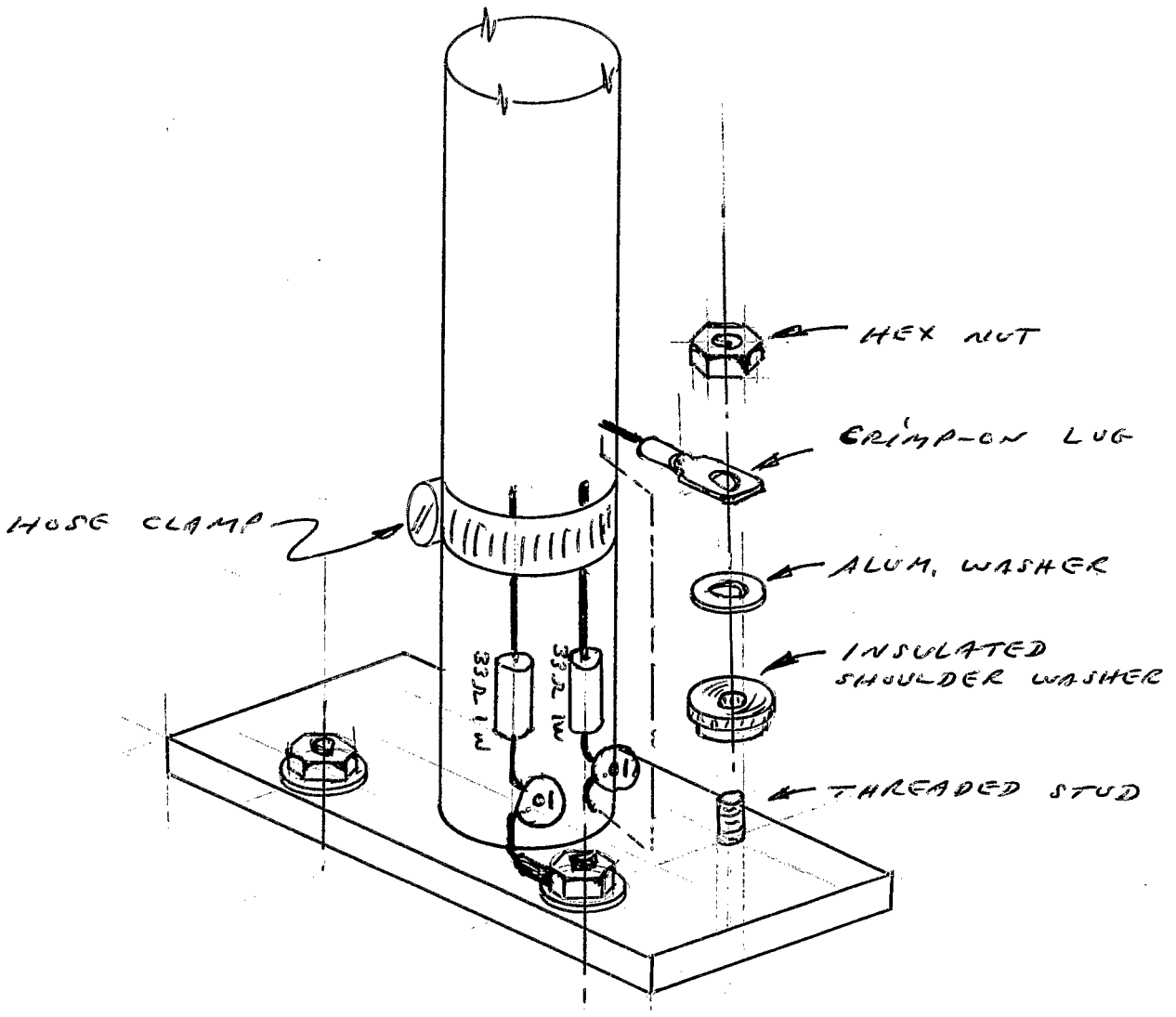

3 1/2"
FLANGE RC NETWORK
.05μf
33Ω 1W
.05μf
.05μf
33Ω 1W
.05μf
2 3/8"
SHEET COPPER
FINGER STOCK
FLANGE SHORT
(PVC'S ONLY)
.05μf
33Ω 1W
.05μf
.05μf
33Ω 1W
.05μf
LENGTH TO SUIT
FLANGE RC NETWORK
FOR CHAMBERS
WITHOUT BELLOWS

FIG 4




TOP VIEW OF VACUUM CHAMBER

FIG 5.




FLANGE CLAMP STAND RC NETWORKS

FIG 6