

CEGG

(CALTECH EXPERIMENTAL GRAVITATIONAL-PHYSICS GROUP)

PROGRESS REPORT

MAGNETIC LEVITATION AND COUPLED SUSPENSIONS

(HANFORD LSC MEETING)

MARCH 1998

{ RON DREVER
{ STEVE AUGST

+ STEVE VASS (PART-TIME)

3/14/98 R

LIGO-G980049-31-M

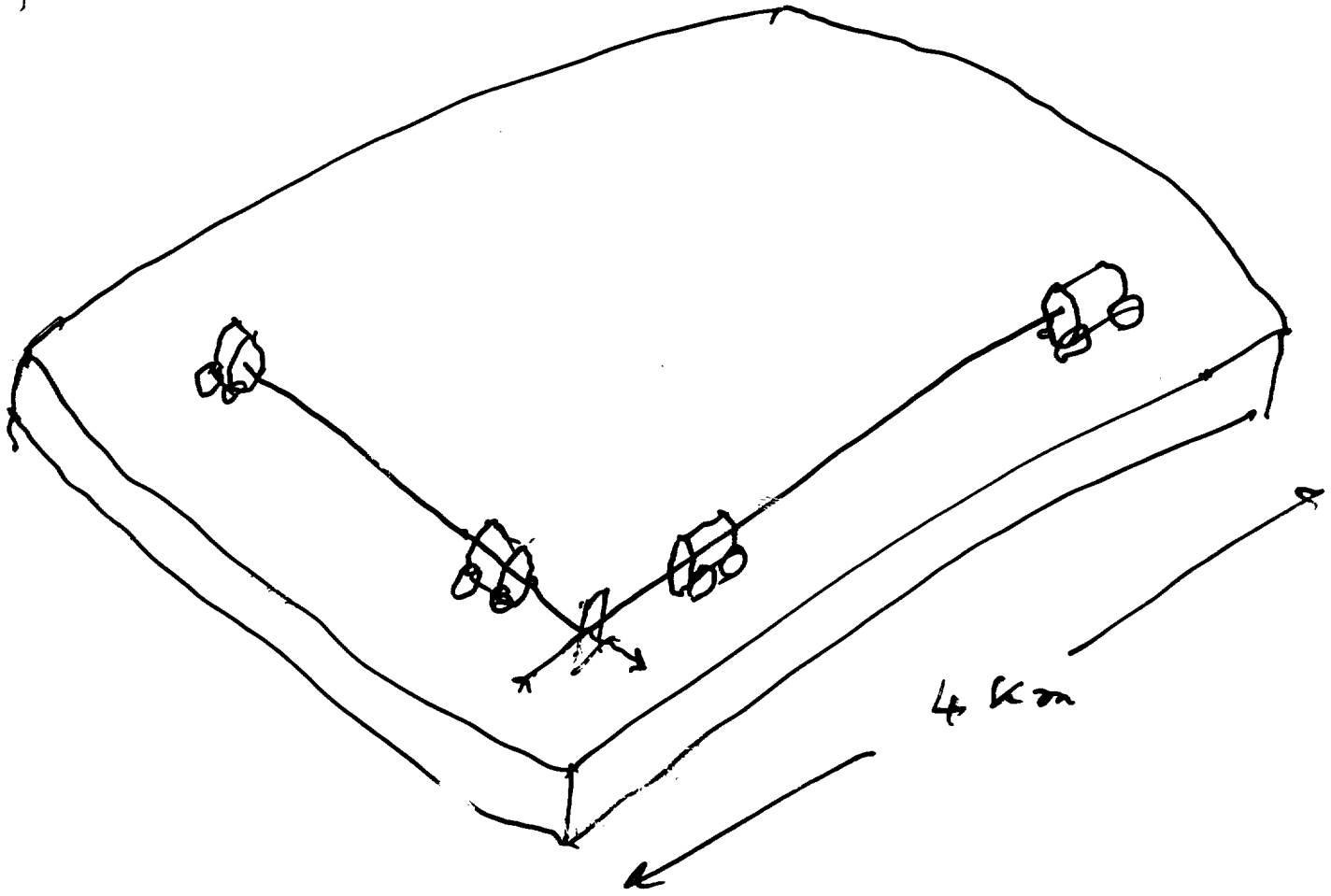
(HI)

LOW - FREQUENCY SUSPENSION

ONE WAY OF LOOKING AT IT -

TEST MASSES RUNNING ON FRICTIONLESS

TABLE, 4 Km SQUARE.



(TABLE HAS SAME CURVATURE AS EARTH)

(TABLE MATERIAL - INFINITELY RIGID

VELOCITY OF SOUND = VELOCITY OF LIGHT)

Magnetically Levitated Test Mass

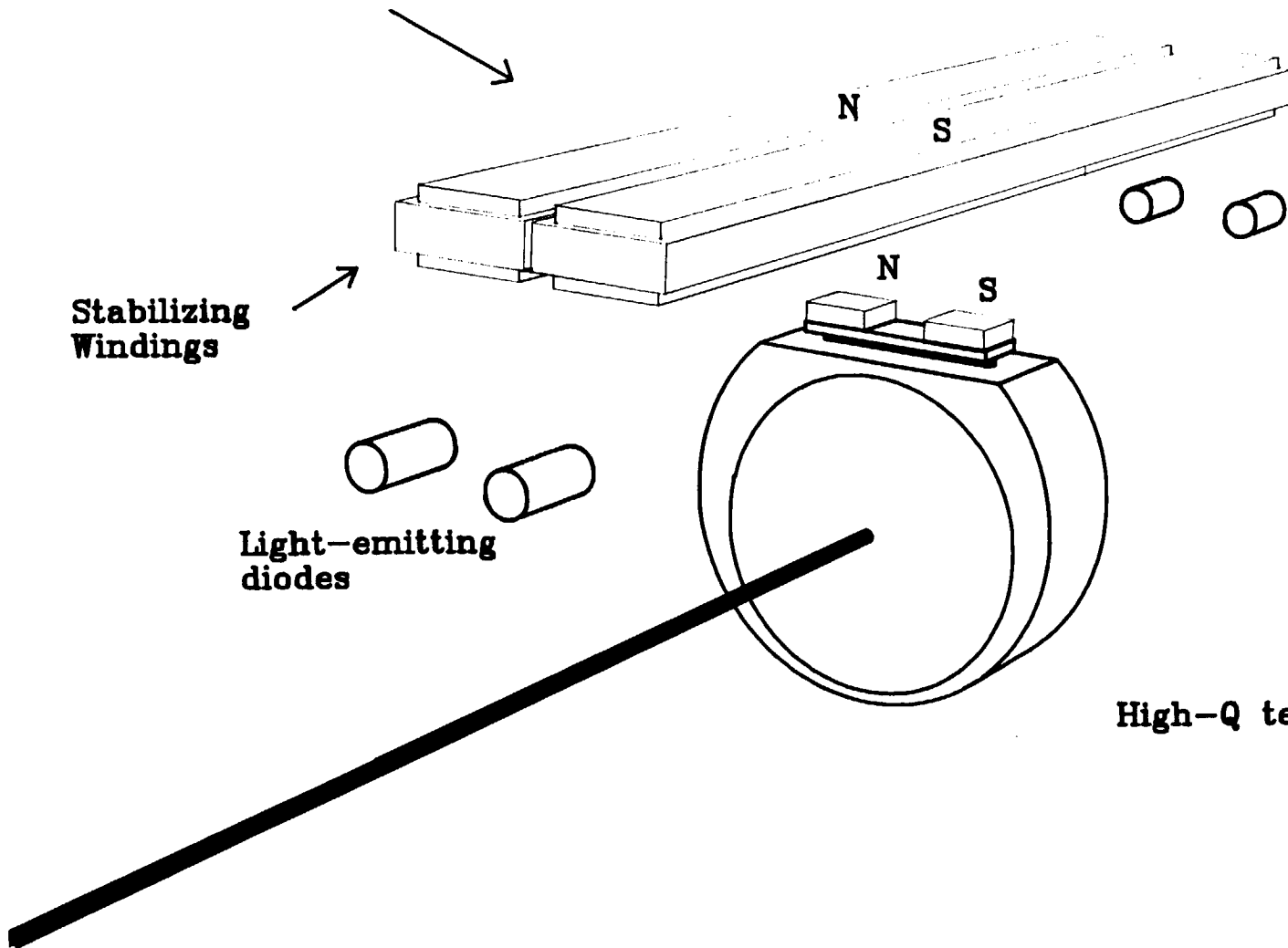
Permanent Magnets
for Lifting Field

Stabilizing
Windings

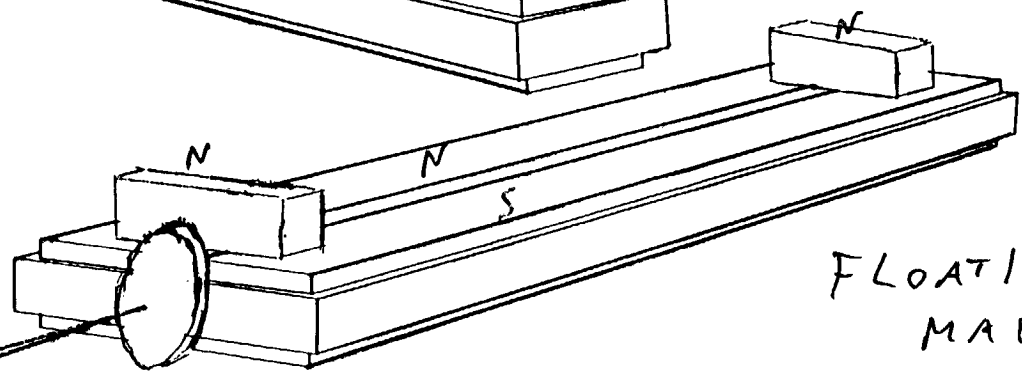
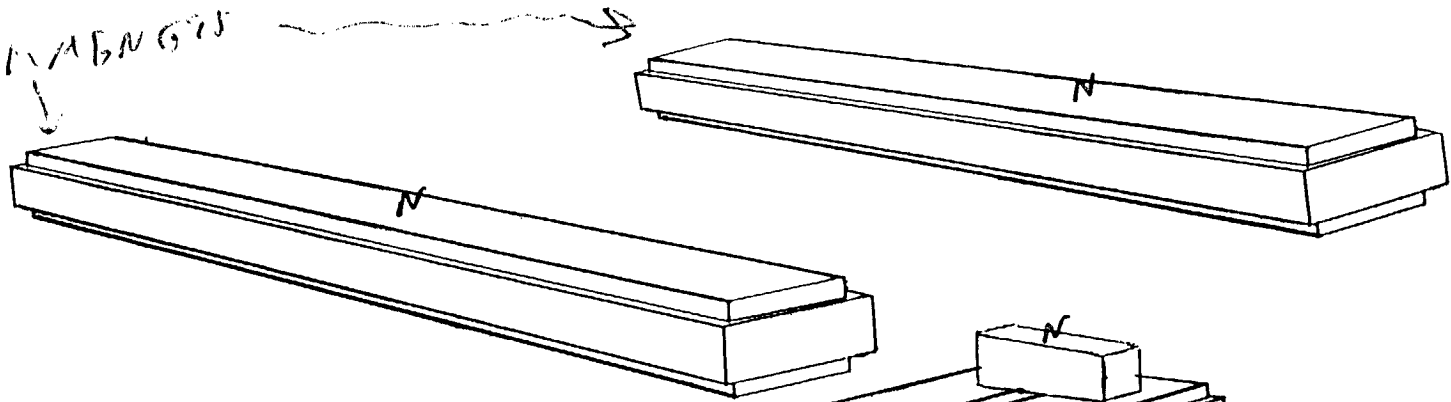
Light-emitting
diodes

Photodiodes for
height sensing

High-Q test mass

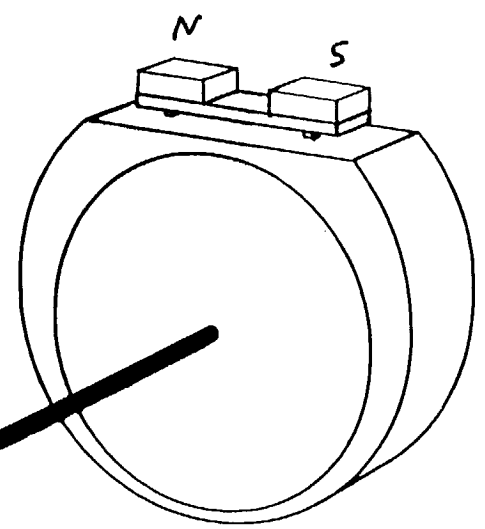


"FIXED" MAGNETS



FLOATING
MAGNET SYSTEM

TILT CONTROL
OVER 40 M.
(OPTICAL LEVER
OR INTERFEROMETER)

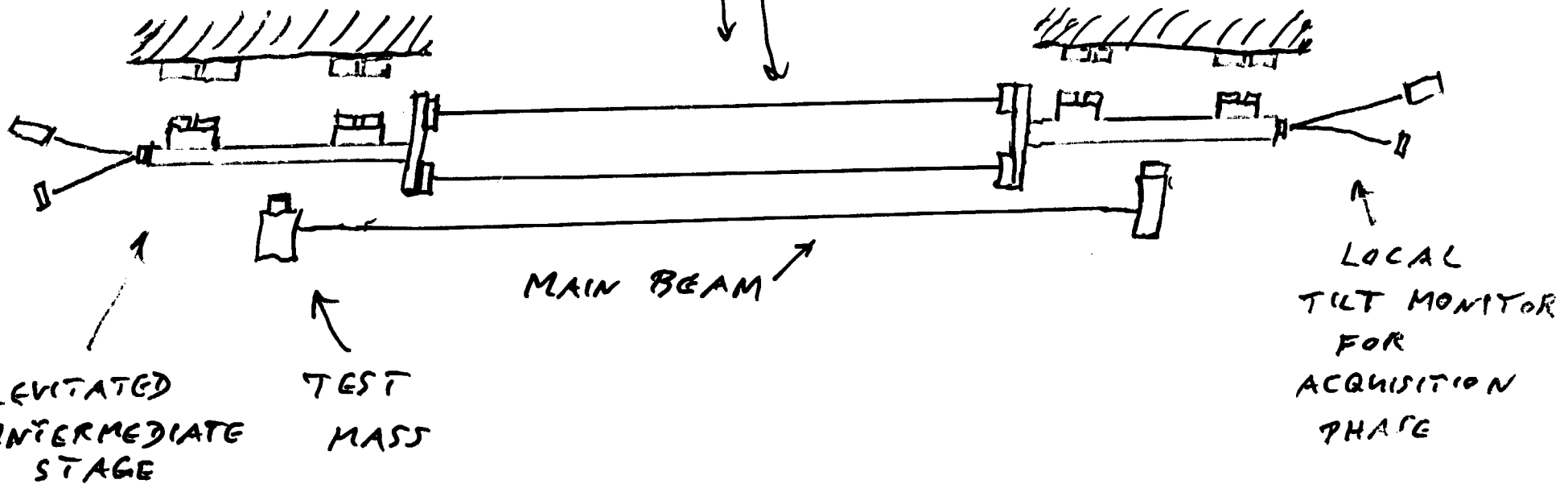


TEST MASS

FIRST TEST 2-STAGE SYSTEM - BOTH STAGES LEVITATED,

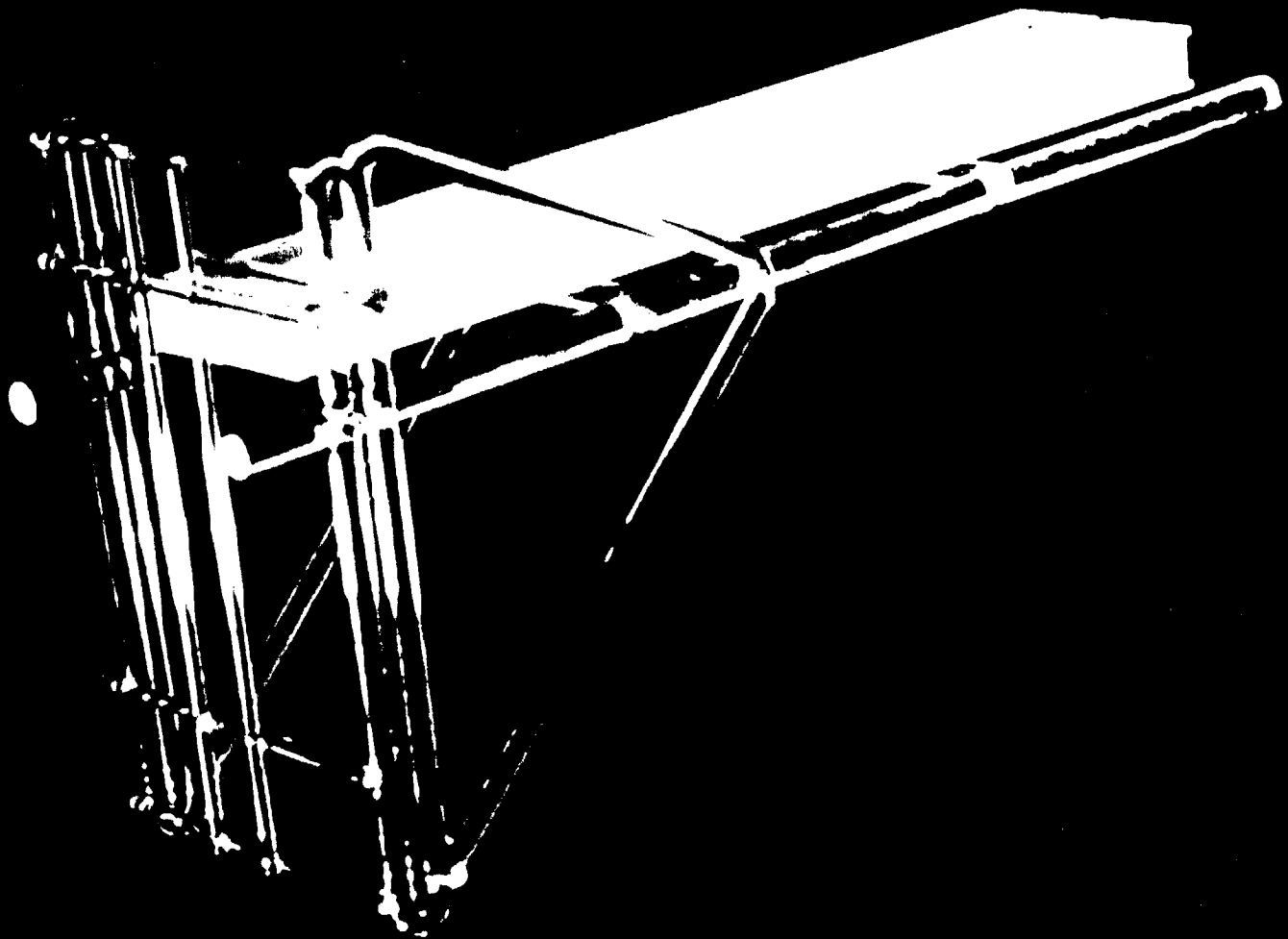


TILT + POSITION
BEAMS



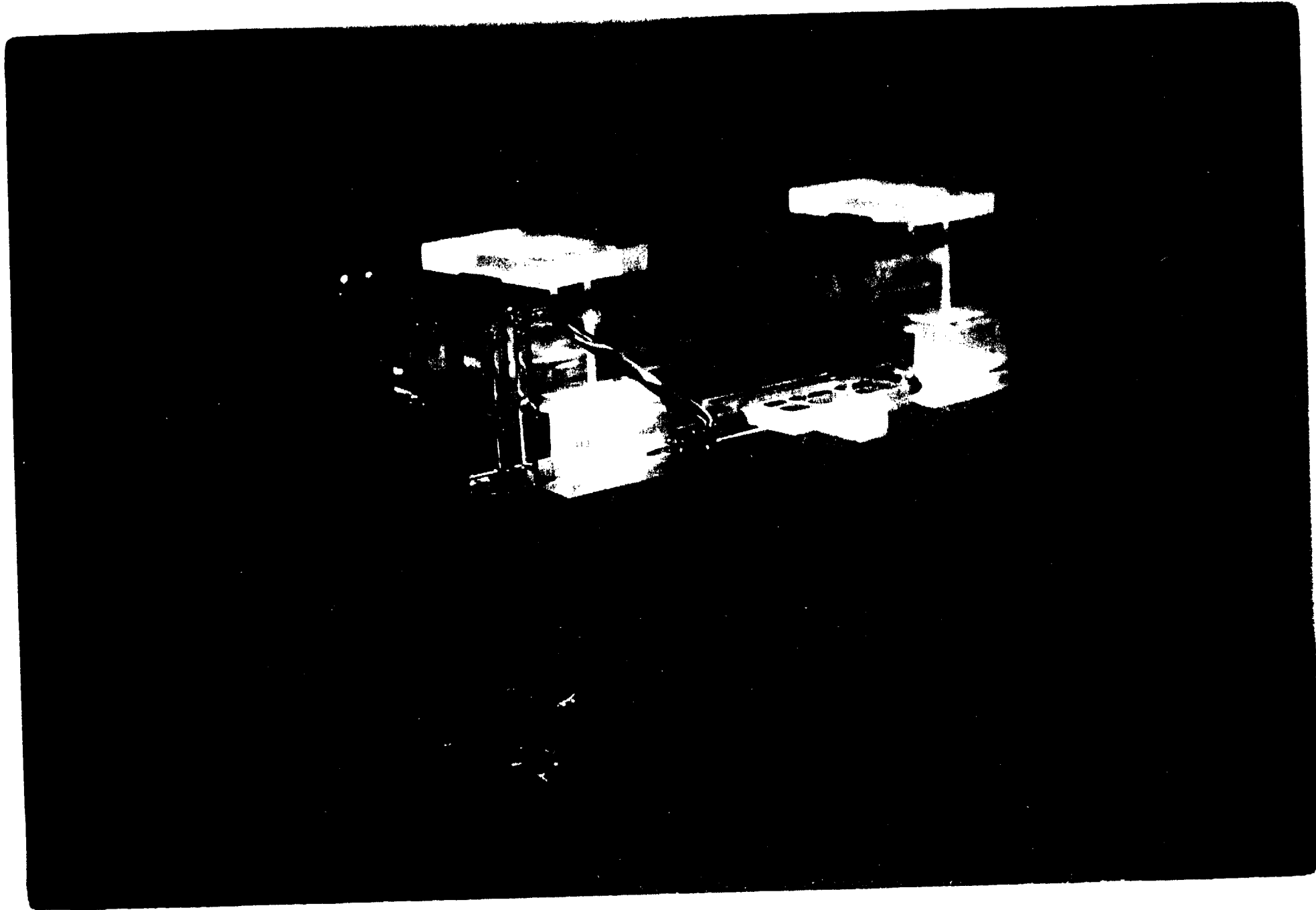
(2 TEST MASS SYSTEMS OF
THIS TYPE NEARLY READY NOW)

(SEE PHOTOS OF SECOND ONE
BEFORE INSTALLATION IN
VACUUM SYSTEM)

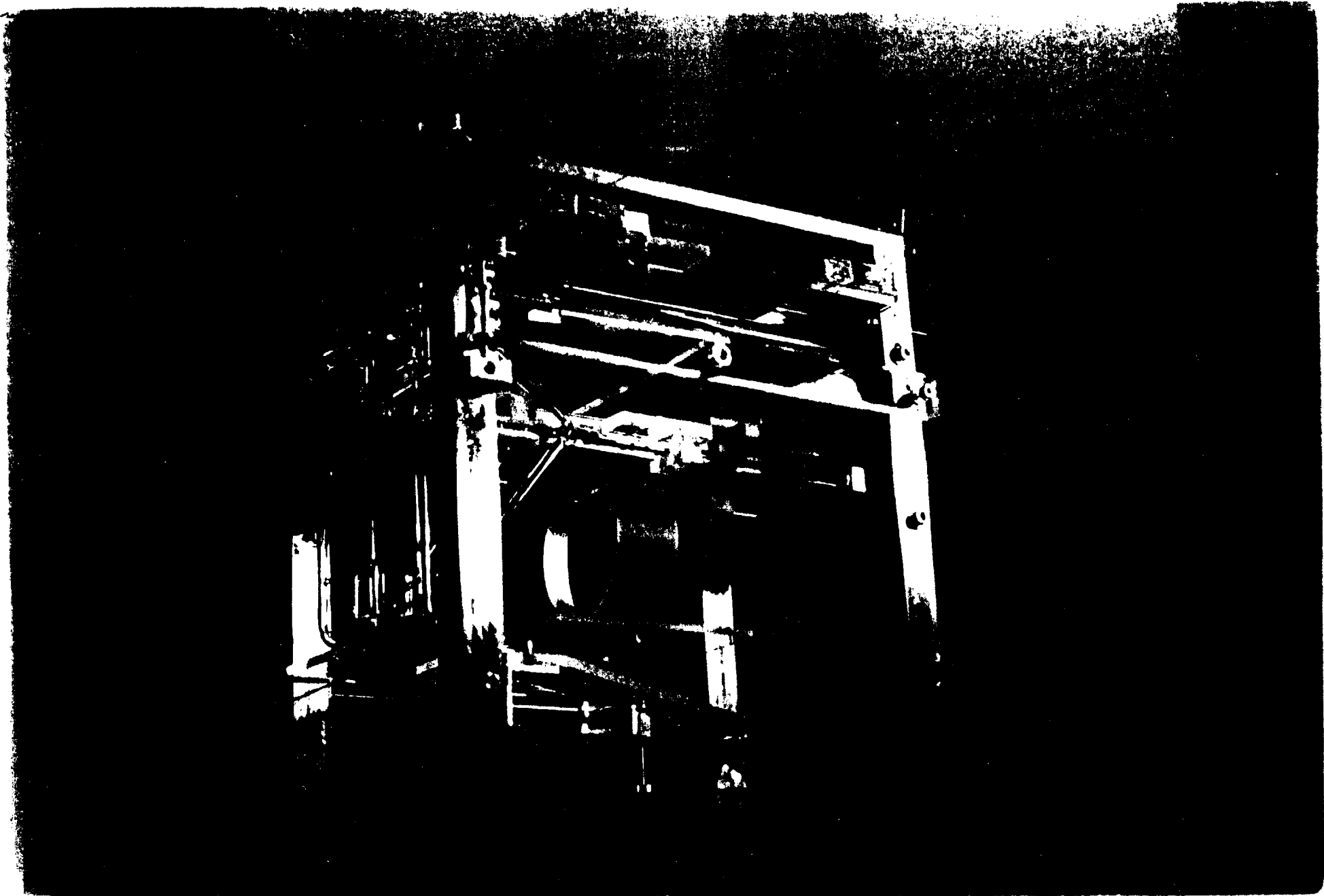


UPPER LEVITATED STAGE

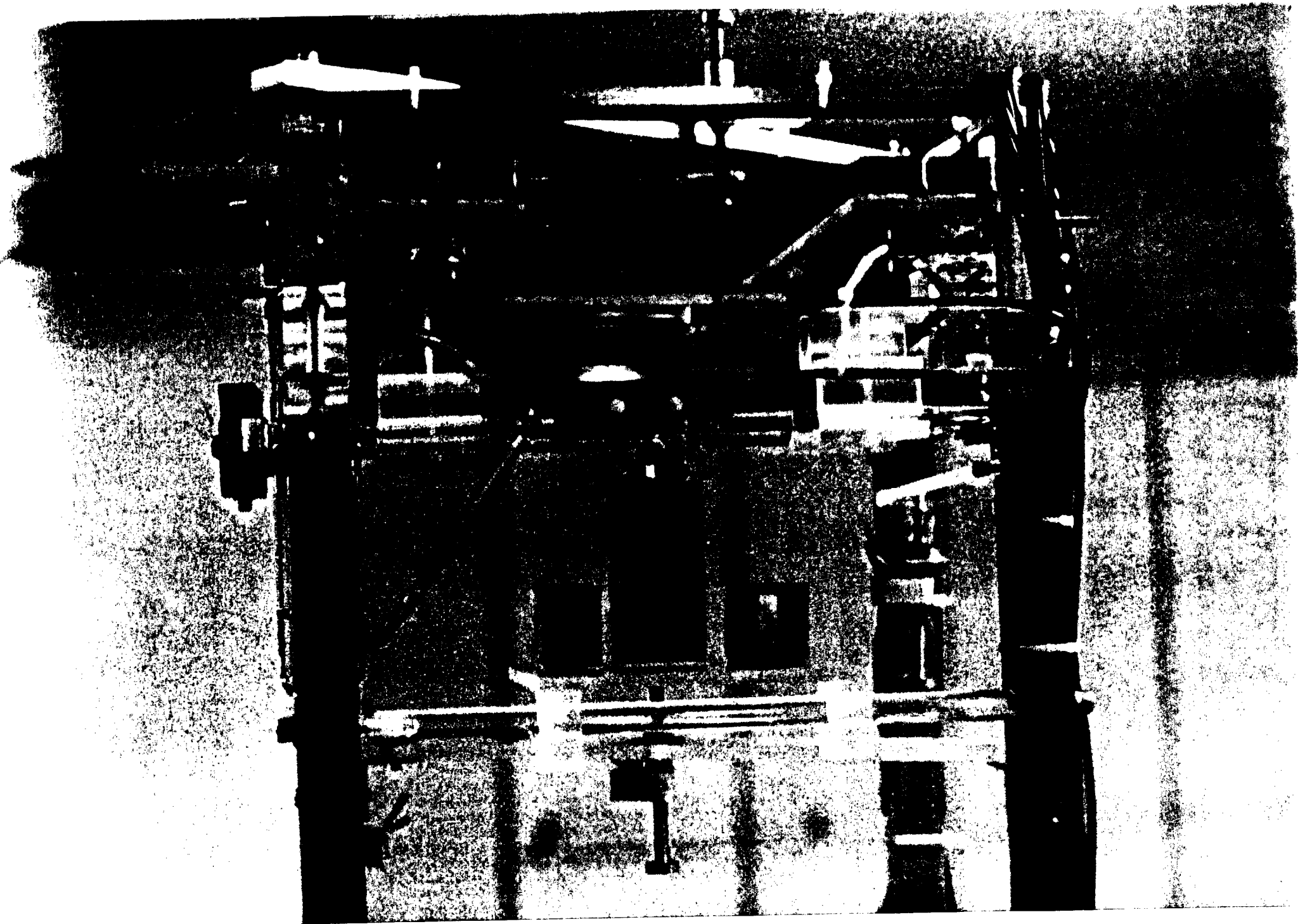
(No. 2.)



(H2)



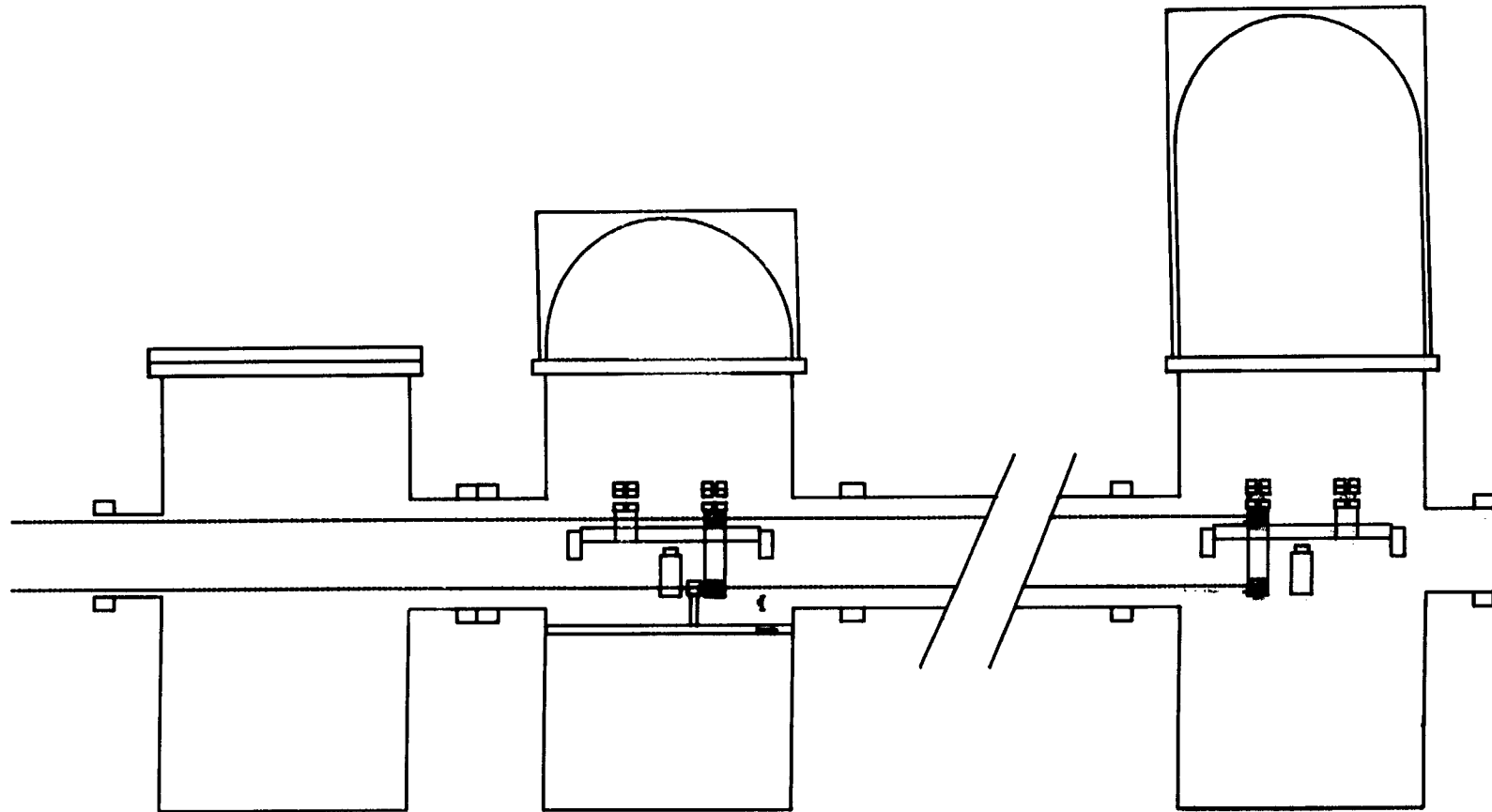
ASSEMBLY FOR TILT-COUPLED SYSTEM (NO. 2) (1)



(H10)

NORTH
TEST-MASS
CHAMBER

SOUTH
TEST-MASS
CHAMBER



← 40 m →

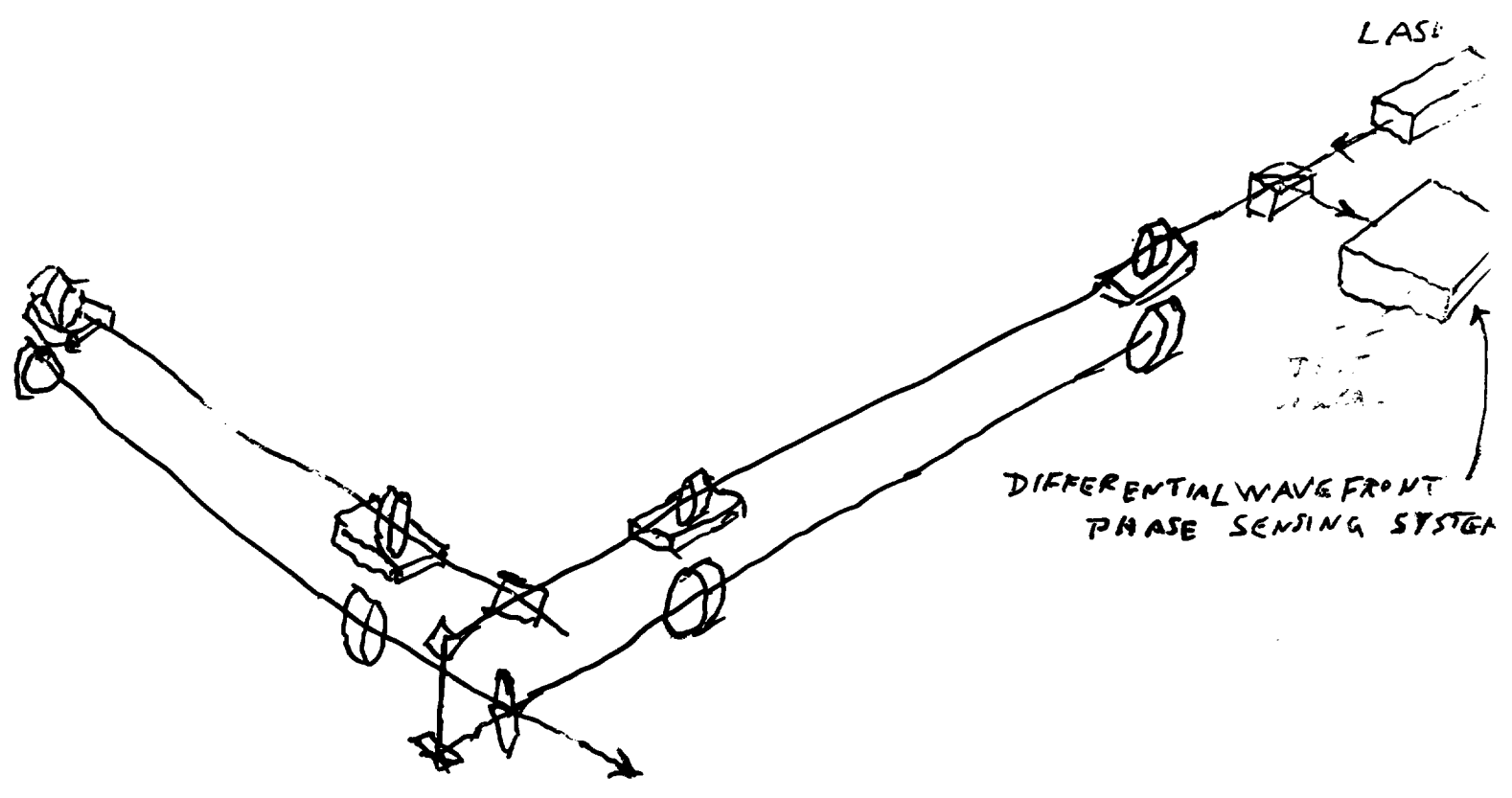
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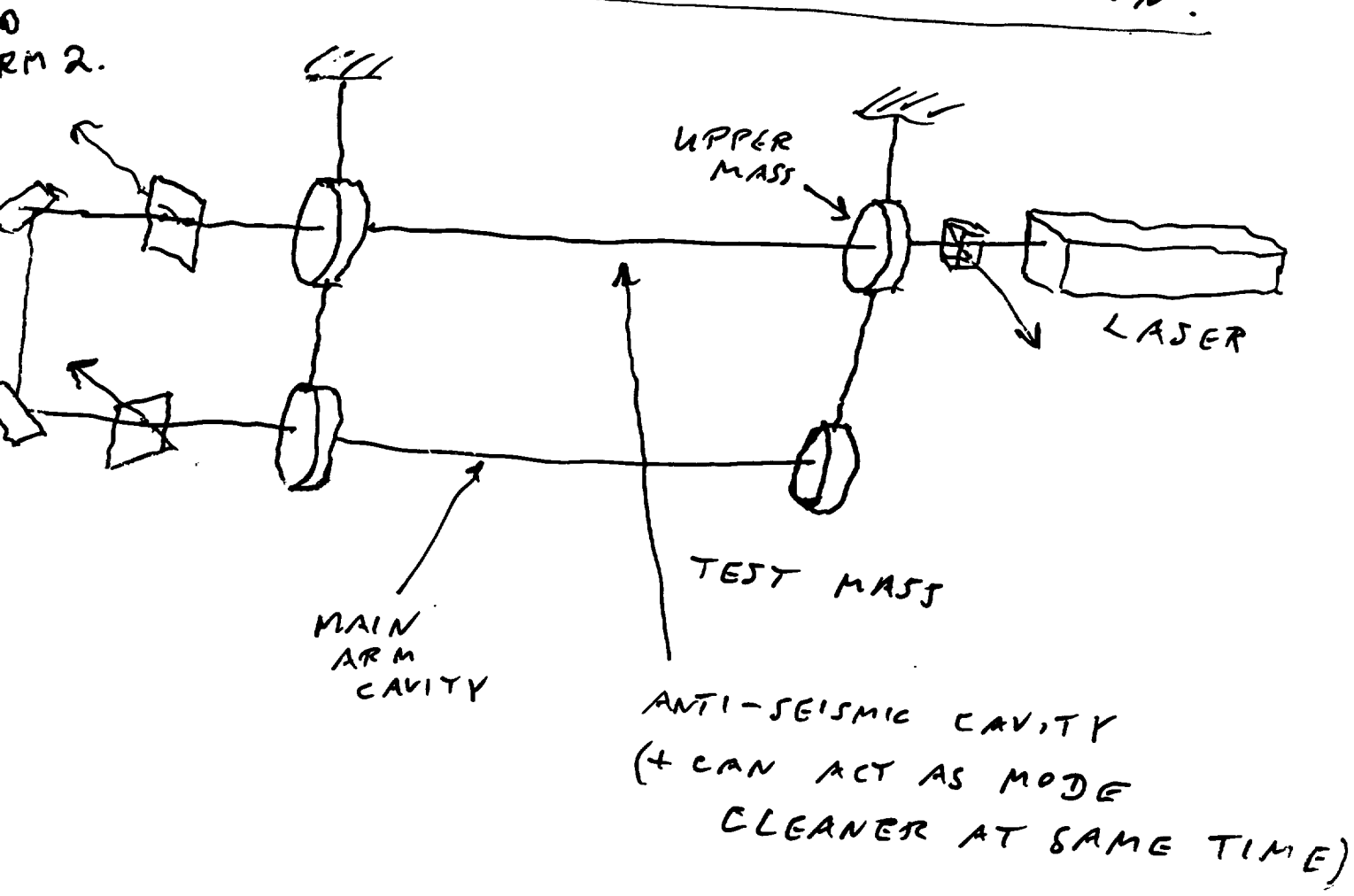
2 POSSIBILITIES FOR SIMPLIFYING SYSTEM.

- ① REPLACE 2 TILT INTERFEROMETER MONITORS BY 1 OPTICAL CAVITY WITH DIFFERENCE WAVEFRONT SENSING FOR TILT READOUT.
- ② USE THIS CAVITY AS SUSPENDED MODE-CLEAN, FOR THE MAIN INTERFEROMETER.



MECHANICAL LOW FREQUENCY
... FEASIBLE FOR SYSTEM

PROPOSED METHOD TO IMPROVE LOW FREQUENCY PERFORMANCE OF DOUBLE PENDULUM WITH WIRE OR FIBER SUSPENSION.



Note 1, Linda Turner, 04/21/98 09:30:44 AM
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