PLAINTIFF'S EXHIBIT WRG-415

April 2, 1963

Spray Applied Fireproofing
Ease of Damageability
Criteria & Test Program

Experience in San Francisco has indicated that some of the new fireproofing materials may easily be damaged during construction of a building or after when maintenance work is required adjacent to the fireproofed member. The materials in question are direct spray applied mixtures of asbestos, gypsum, perlite and vermiculite usually with a Portland cement binder. These new fireproofing materials have a considerable range of hardness and durability.

In 1961, because of considerable damage problems with one such material on actual construction job, the Board of Examiners of San Francisco, after extensive hearings, ruled that the particular material would no longer be permitted use in this City for primary member protection. The Board also indicated that this Bureau should review similar materials that had been approved for use in San Francisco to determine whether they too would be subject to easy damage.

Acting on this request by the Board, we have conducted investigations regarding the best means to evaluate the "ease of damageability". We found that there were no standard tests available for the materials in question. As a result, the Bureau of necessity has developed testing devices to provide the data needed in the evaluation of damageability.

Attached to this letter are the details of the test device and photographs of our device and the testing procedures to be followed. This is so that you may determine for yoursevles, if you so desire, the performance of your materials as well as to apprise you in advance, of our testing procedure and criteria of passage.

The attached photographs indicate the several components of our device. You will note that there are several items shown on the photographs but not indicated in the plans.

These items were early modifications of the device that were discarded and are not required to make the device perform. Similarly certain items are not fully detailed on the plans as they are in no way material to the performance of the test device and therefore can vary in design.

You are hereby requested to submit three (3) samples, each 12"x18" in size, of your fireproofing material that has been approved by the Bureau in the past. On the attached list are the various manufacturers involved and the products of each. You are advised to check this list to determine for which of your materials you must submit. The samples shall be one inch thick on 1/2 inch gypsum wallboard and shall be the density as the sample tested upon which the Bureau based its approval. In the event there were varying densities involved in the several approvals granted, you must submit three (3) samples of each density except where the variation between densities is 10% or less.

Failure to submit samples within forty-five (45) days from receipt of this letter will require that I automatically revoke the approvals previously granted for the materials involved.

The samples shall each bear a notarized statement as to the weight of the wallboard prior to application of the fireproofing; the mix used in making the fireproofing; the density of the mix at time of application (at nozzle); the weight of the entire sample, and the equilibrium dry density of the sample prior to delivery to this Bureau.

Two of the samples will be used in the tests and the third will act as a control and for use in the event something unforseen occurs to one of the samples. You will be responsible for assuring the delivery in good order, of your samples.

In the event you desire to modify your material to provide a less damageable surface, the following shall be the Bureau's concern with the samples and the acceptance thereof:

1. If the intent is to add a surface over the tested thickness of fireproofing for which the hourly rating was achieved, we will accept a small scale (1'x1½') pilot test made at Underwriters' Laboratories to indicate whether delamination of the materials occurs. The surface material shall not have flame spread characteristics exceeding 25.

2. If the intent is to incorporate the less damageable surface within the thickness of the approved hourly rating, we will require that a full scale fire test be performed as this would in effect be a new material with possibly different characteristics.

You are invited to witness the tests on your materials and if you or a representative desire to so witness the tests, please so advise me prior to our receiving the samples.

Upon completion of the test series on your samples, the approvals previously granted will either remain in effect or will be revoked. In the event an approval is revoked, the revocation would constitute a denial of approval which under Section 806.C of the San Francisco Building Code would enable you to appeal to the Board of Examiners.

Your cooperation in this test program will be appreciated.

If you have any questions with regard the test devices or the procedures please do not hesitate to contact me.

Very truly yours,

Robert C. Levy

Robert C. Levy, Superintendent
Bureau of Building Inspection

AG: jh
Enc.
cc: Board of Examiners

Mr. Jack Bono, Managing Engineer
Fire Protection Department
Underwriters' Laboratories, Inc.
207 E. Ohio Street
Chicago 11, Illinois

Mr. C. J. Koskinan
Underwriters' Laboratories, Inc.
1655 Scott Blvd.
Santa Clara, Calif.

Mr. T. H. Carter, Managing Dir.
International Conference of
Building Officials
50 South Los Robles
Pasadena, California

Mr. Herman Spaeth
Pacific Fire Rating Bureau
465 California Street
San Francisco, Calif.

Mr. R. Carlson
State Fire Marshal's Office
1025 P Street
Sacramento 14, Calif.

Mr. Walter Bruger
Dept. of Building & Safety
City Hall
Los Angeles, Calif.

Mr. R. Gewain
National Board of Fire
Underwriters
85 John Street
New York, N. Y.

E-5 Committee
American Society for
Testing Materials
c/o Irwin Benjamin
Granco Steel
6506 N. Broadway
St. Louis 15, Missouri

Mr. R. W. Bletzacher
Ohio State University
Engineering Experimental Sta.
Columbus, Ohio

Mr. Calvin H. Yuill
Southwest Research Institute
San Antonio, Texas

Prof. G. E. Troxell
University of California
Berkeley, Calif.

Mr. John Degenkolb
5940 Echo Street
Los Angeles 42, California

I. Abrasion Test

1. 12"x18", ½" wallboard; weight to be certified to by applicant.

2. Fireproofing 1" thick to test density of test submitted in original approval. If 2 or more different densities (varying by more than 10 percent) approved separate samples required. Mix and application shall be certified to by applicant.

3. Three samples to be furnished.

4. If open or coarse material submitted, voids in surface will be determined by sand displacement method* prior to testing. Average area 6"x3-1/8" will be used to determine average voids. Total volume 307 cubic centimeters.

   Condition of Passage: Maximum removal of material at end of 3 passes of test vehicle shall not exceed 20 cubic centimeters (16.5%) with a plus tolerance of 2 cubic centimeters. Removal to be measured by sand displacement method*. Removal will be measured for worst 6-inch length of 2 test cycles per sample. Two cycles will be made on each of 2 samples. Average of 2 worst runs will be value used for determination.

II. Impact Test

1. Same samples as for abrasion test shall be used.

2. Surface voids will not be measured due to small area involved.

3. Low point of impact rod to be set at ½" below surface of sample.

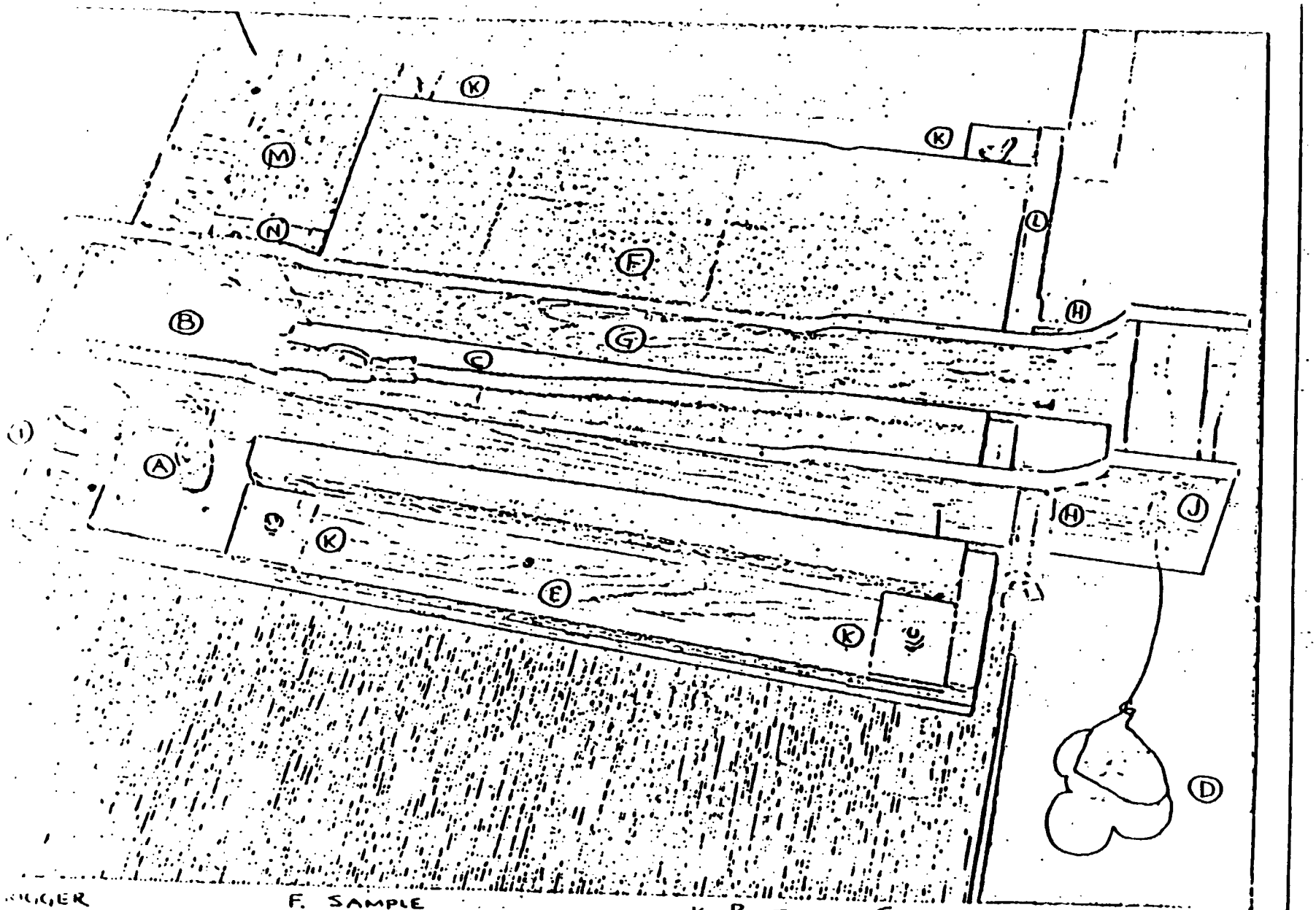
4. Test consists of three (3) impacts of test rod with resultant volume of displaced material measured. Material "heaved up" by impact will be removed to establish reference plane of original surface. Volume of impact to be determined by sand displacement method.

   Condition of passage: Amount of material removed after three (3) impacts shall not exceed 5.0 cubic centimeters with a plus tolerance of 1.0 cubic centimeters. Two (2) impact tests will be performed on each of two (2) of the samples. The maximum on each sample will be averaged and will be the value used

to determine passage or failure of test.

In the event the impact rod completely moves through the sample within the 3 test cycles, the material will automatically be considered to have failed the test.

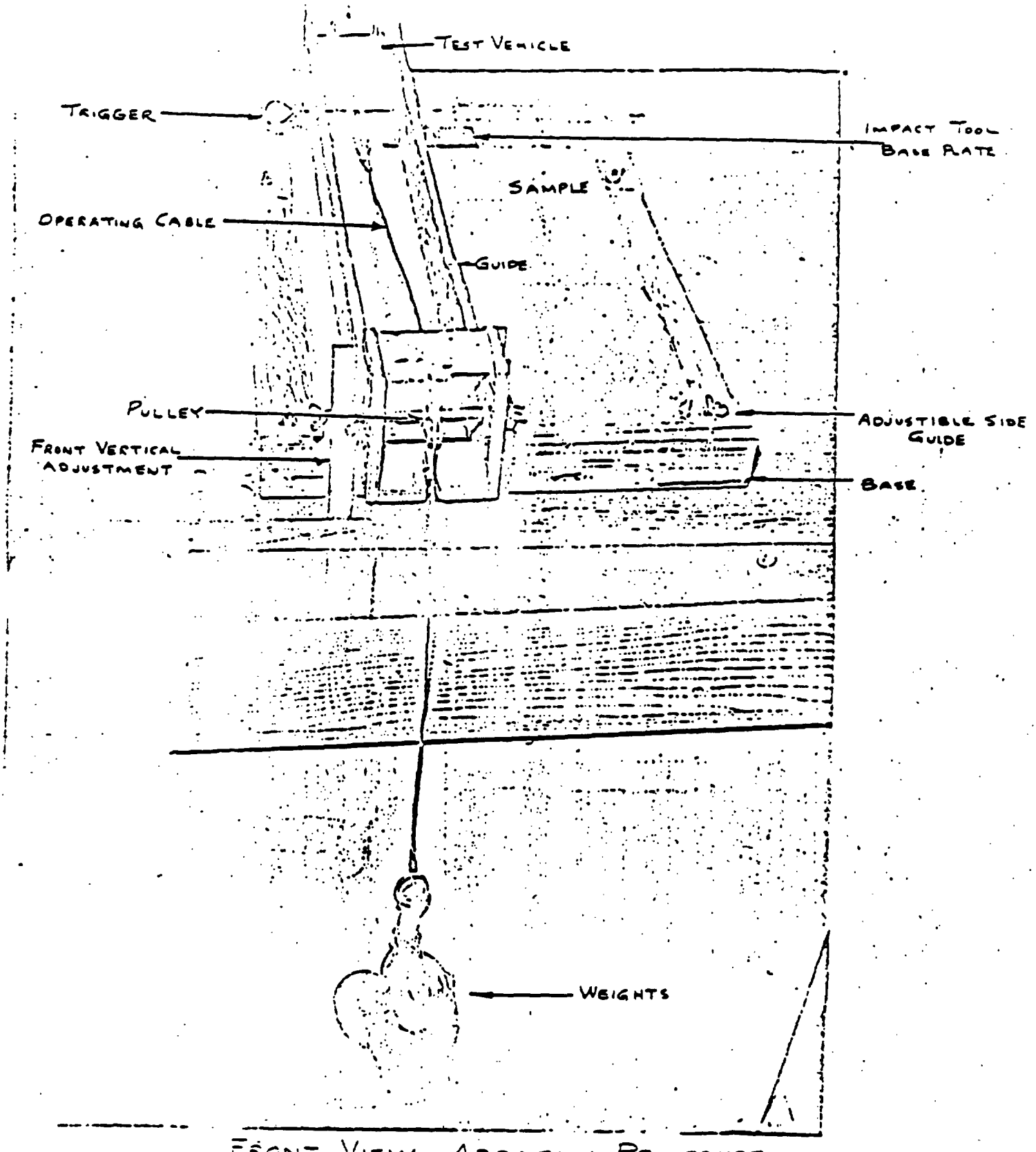
* Ottawa sand will be deposited to surface or depression to a level equal to original surface. Amount used will constitute volume.



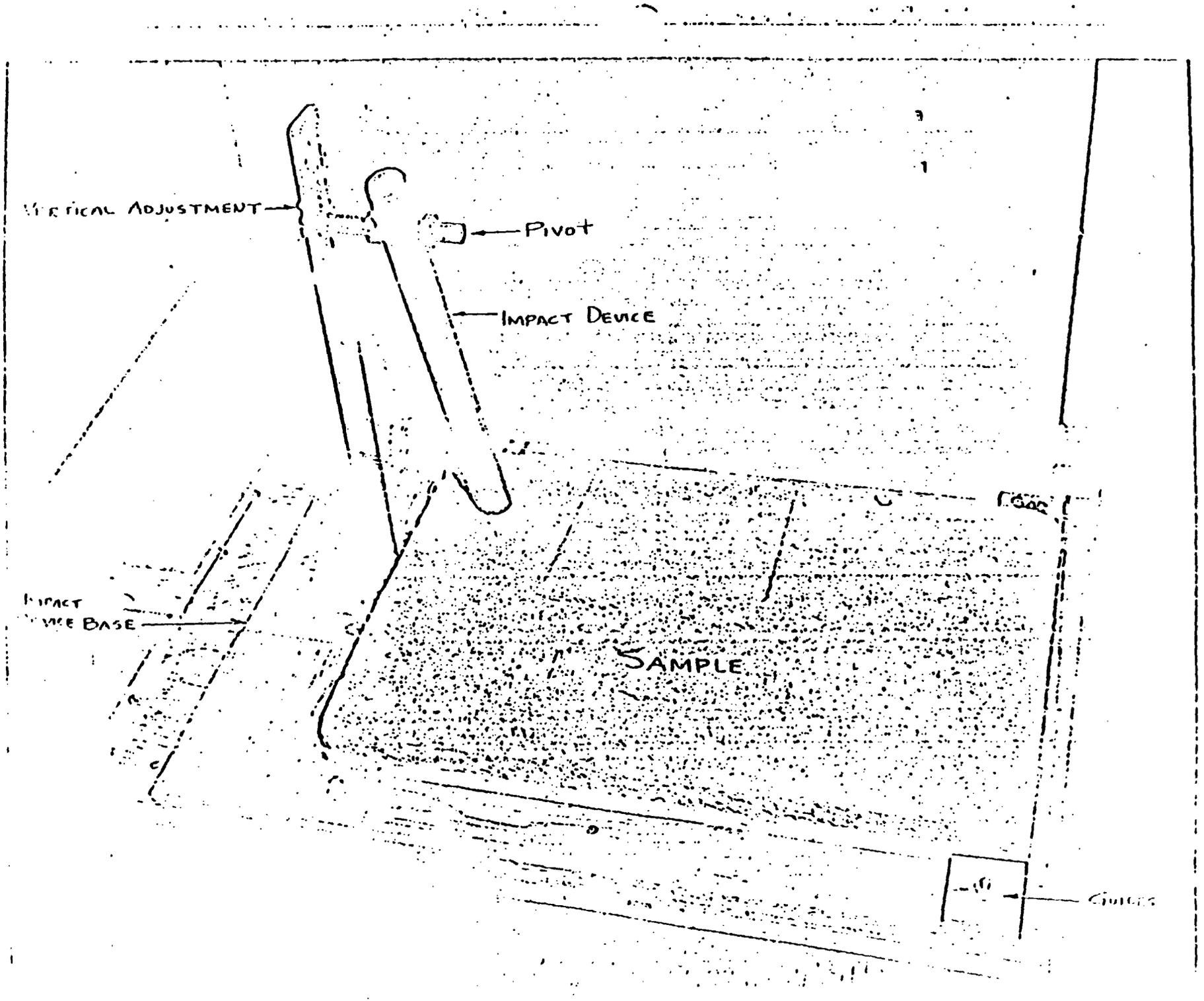
...GER
...R VEHICLE
...RATING CABLE
...IGHT

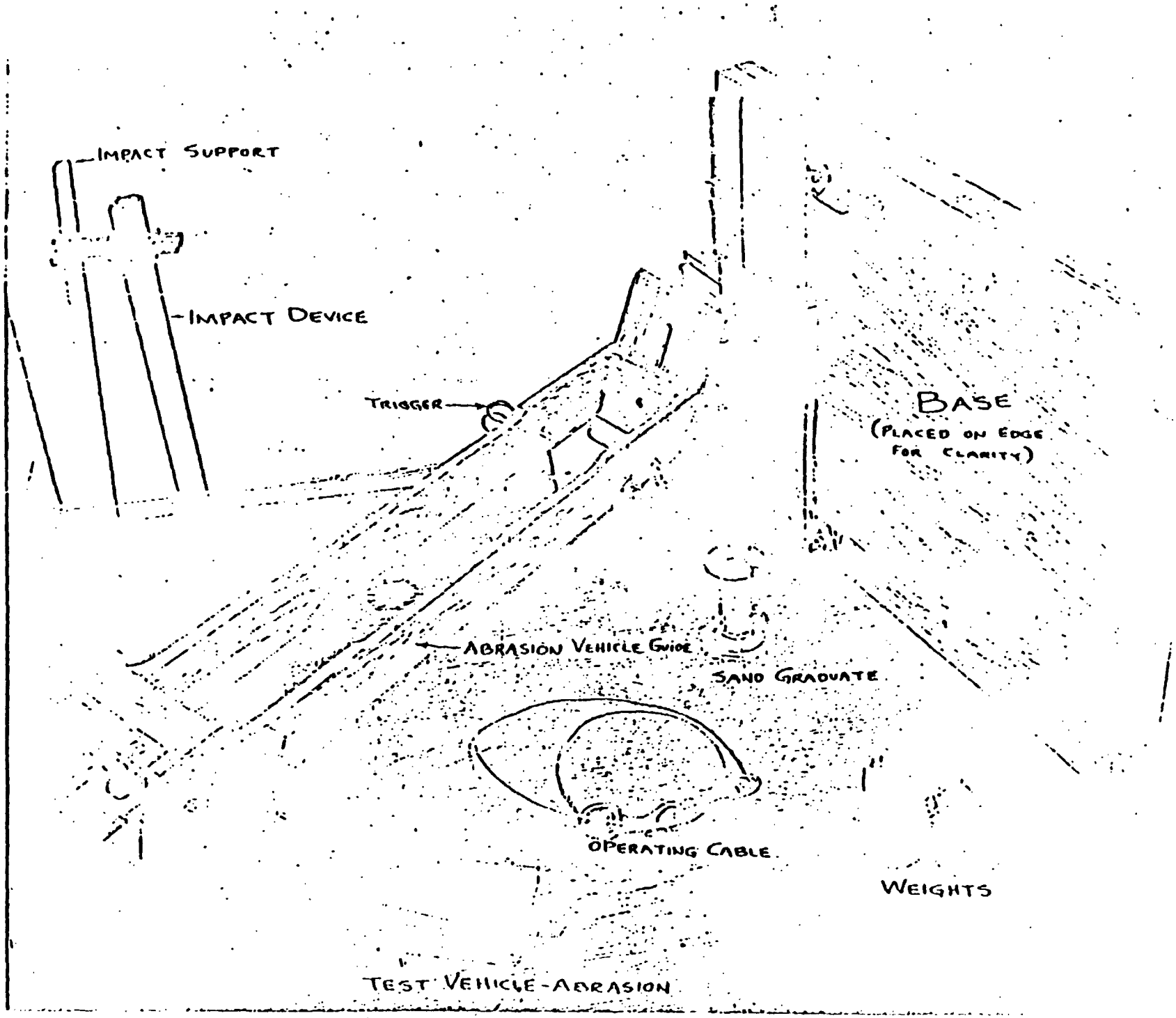
F. SAMPLE
G. GUIDES
H. VERTICAL ADJUSTMENT
I. POSITIONING ANCHOR
J. PULLEY HOUSING

K. POSITIONING GUIDE
L. FRONT SAMPLE STOP
M. REAR SAMPLE STOP
N. IMPACT TOOL BASE PLATE

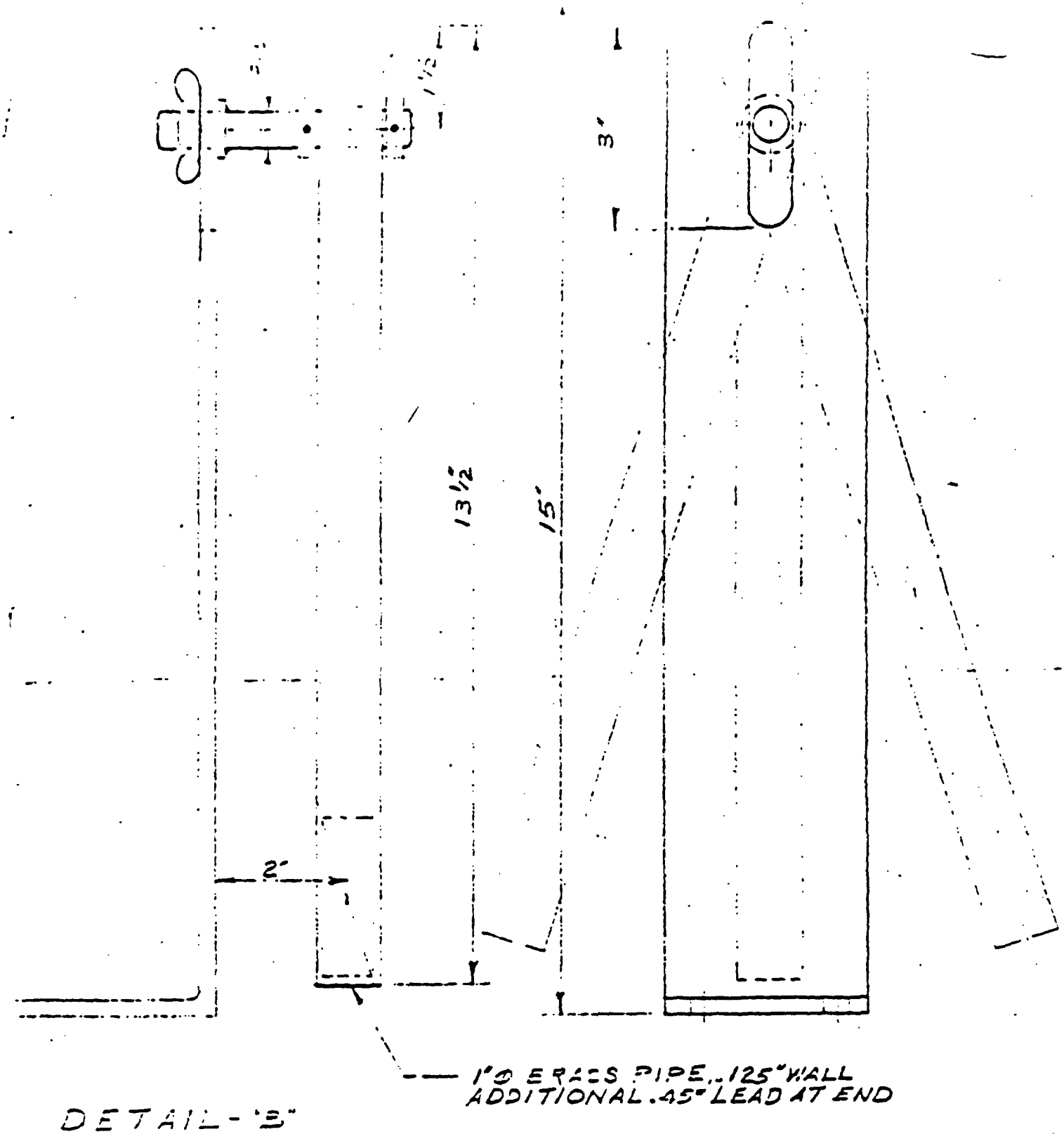


FRONT VIEW - ABRASION PROCEDURE


Pivot
Impact Device
Sample

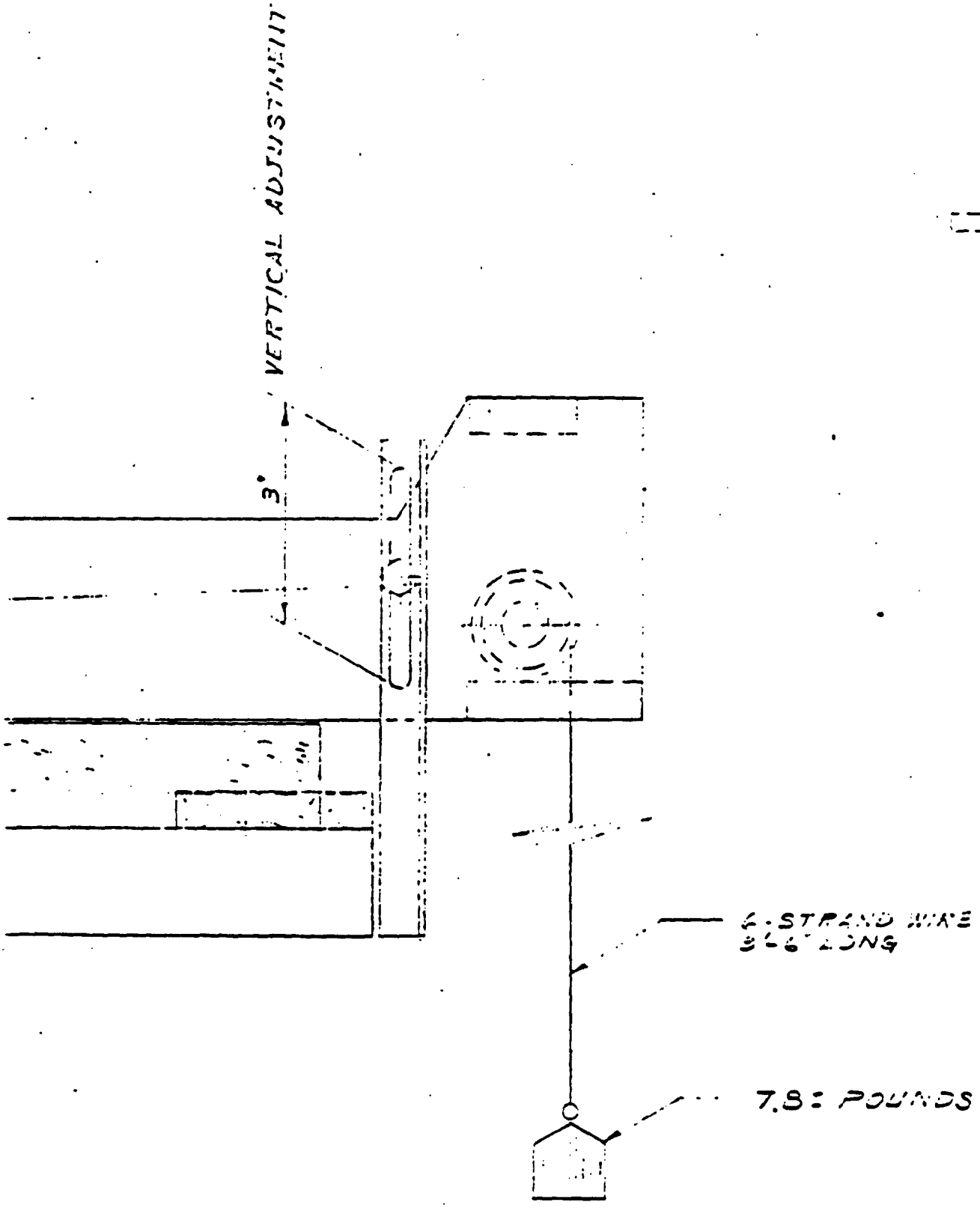


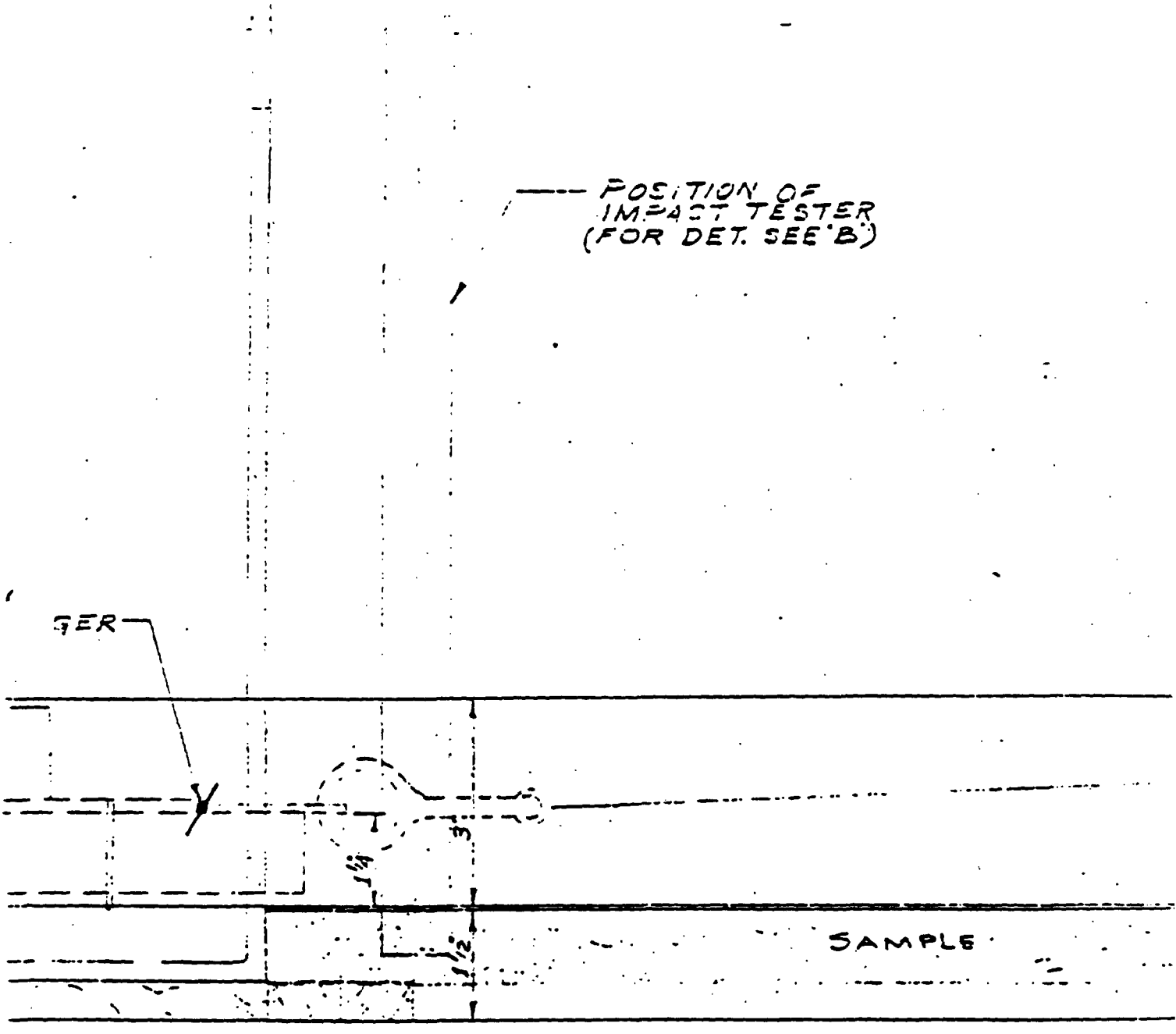
TEST VEHICLE-ABRASION



DETAIL - "B"

IMPACT TESTER


VERTICAL ADJUSTMENT
3'
6 STRAND WIRE
7.8 POUNDS



SIDE ELEVATION

1861

IMPACT PENETRATION TEST

MONOKOTE-5

FIRE RESISTIVE MATERIAL

Made for

ZONOLITE CONSTRUCTION PRODUCTS DIVISION

W. R. GRACE & COMPANY

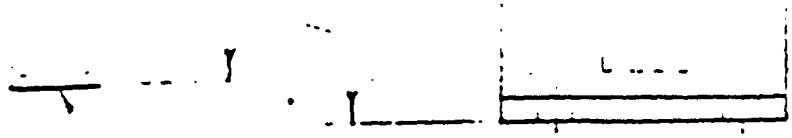
TRAVELERS REST, S. C.

Made by

FROEHLING & ROBERTSON, INC.

GREENVILLE, S. C.

QUARTERS: 3015 DUMBARTON ROAD • BOX 27524 • RICHMOND VA 23261 •
(804) 264-2701
ANCHES: ASHEVILLE NC • BALTIMORE MD • CHARLOTTE NC • CROZET VA •
FAYETTEVILLE NC • GREENVILLE SC • NORFOLK VA • RALEIGH NC • ROANOKE
VA • LYNCHBURG VA



1"Ø BRASS PIPE, .125" WALL
ADDITIONAL .45" LEAD AT END

TAIL - "B"

IMPACT TESTER

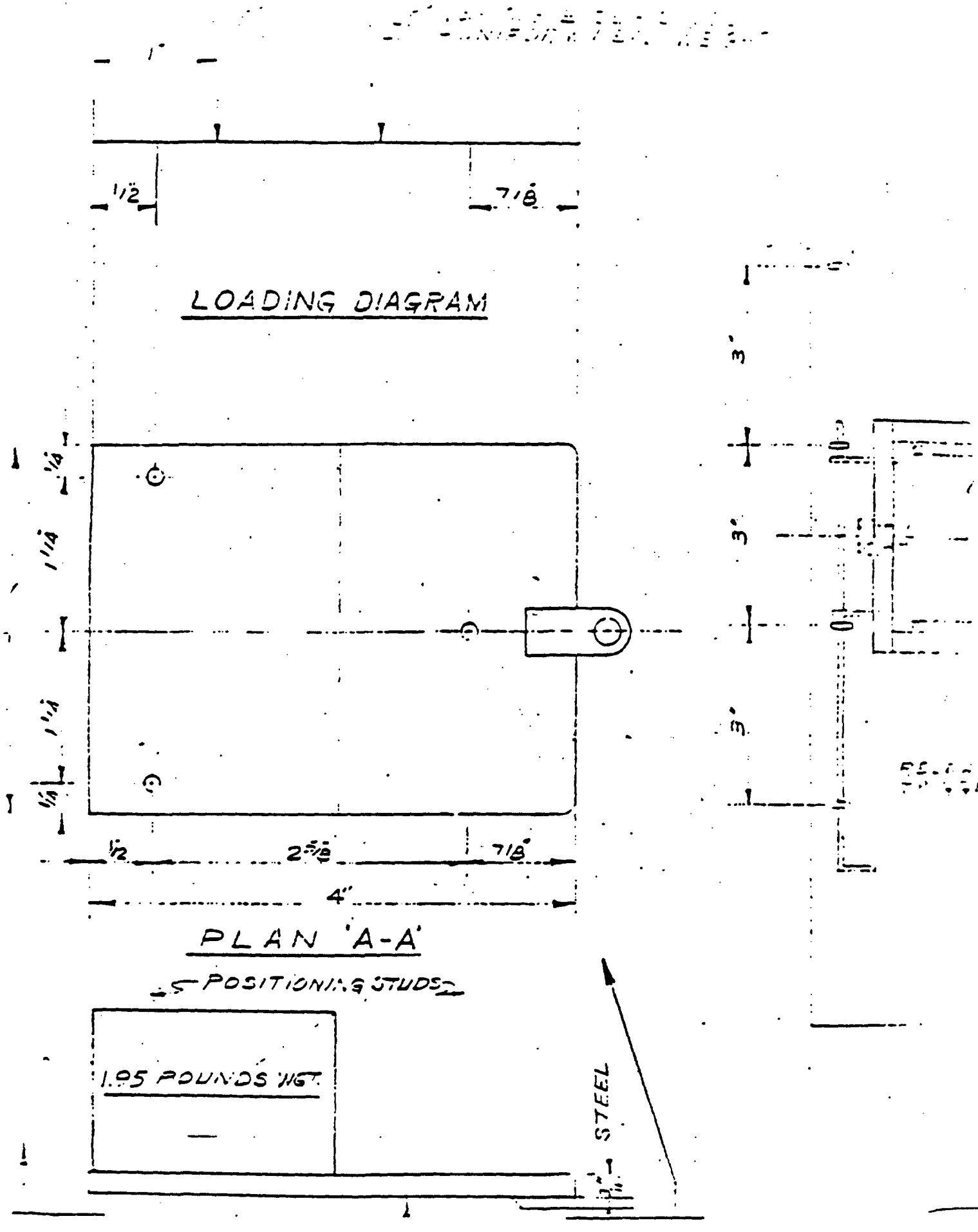
CITY AND COUNTY OF SAN FRANCISCO
DEPARTMENT OF PUBLIC WORKS
BUREAU OF BUILDING INSPECTION

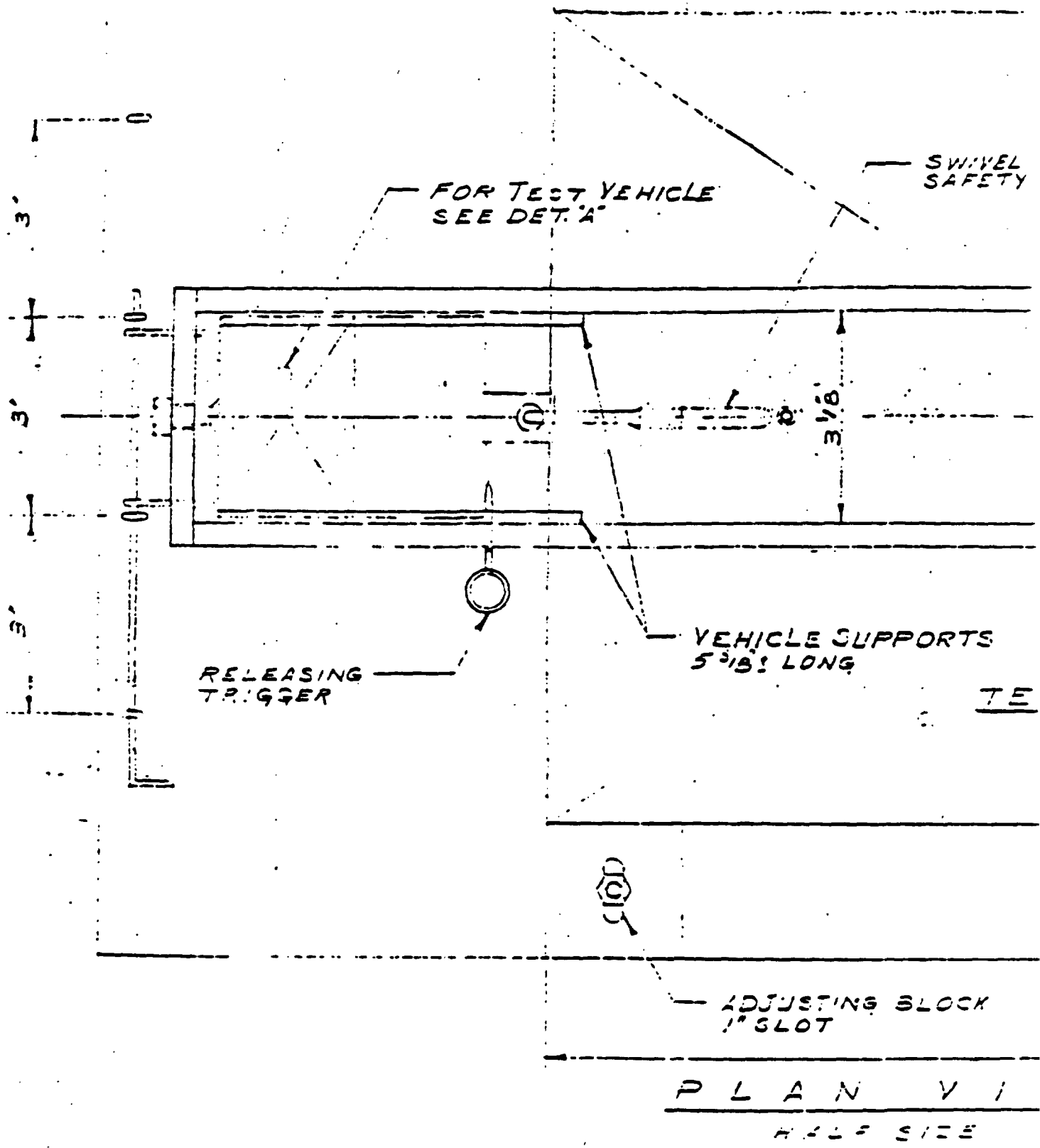
RELATIVE DAMAGEABILITY DEVICE

FOR FIREPROOFING MATERIALS

SAN FRANCISCO; CALIFORNIA

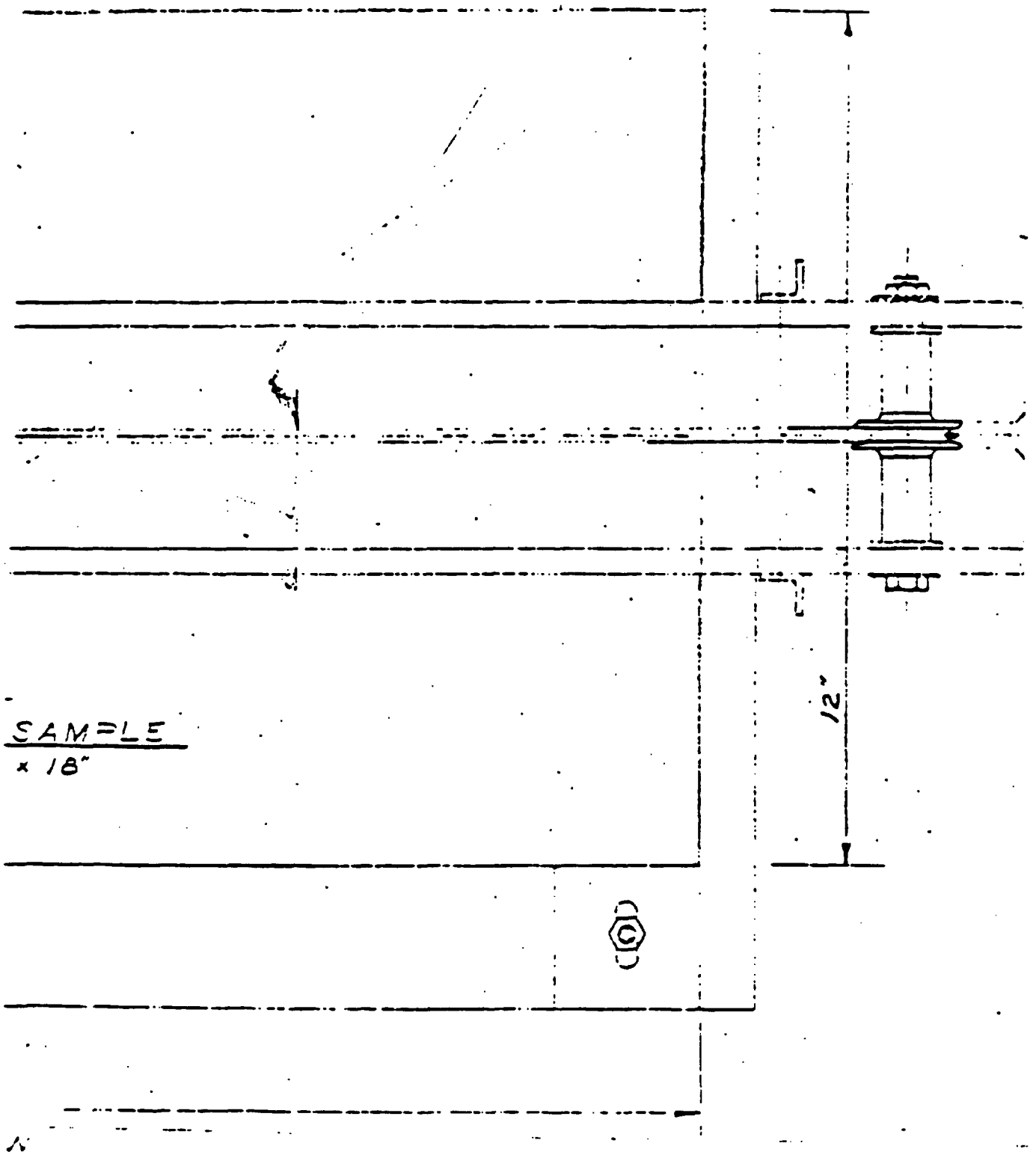
Robert C Levy	3-21-63	AS NOTED	1 OF 1
SUPERINTENDENT	DATE	SCALE	SHEET


1"
1/2
7/8
LOADING DIAGRAM
1/4
1 1/4
1 1/4
1/4
1/2
2 5/8
7/8
4"
PLAN 'A-A'
POSITIONING STUDS
1.95 POUNDS WGT.
STEEL
3'
3'
3'



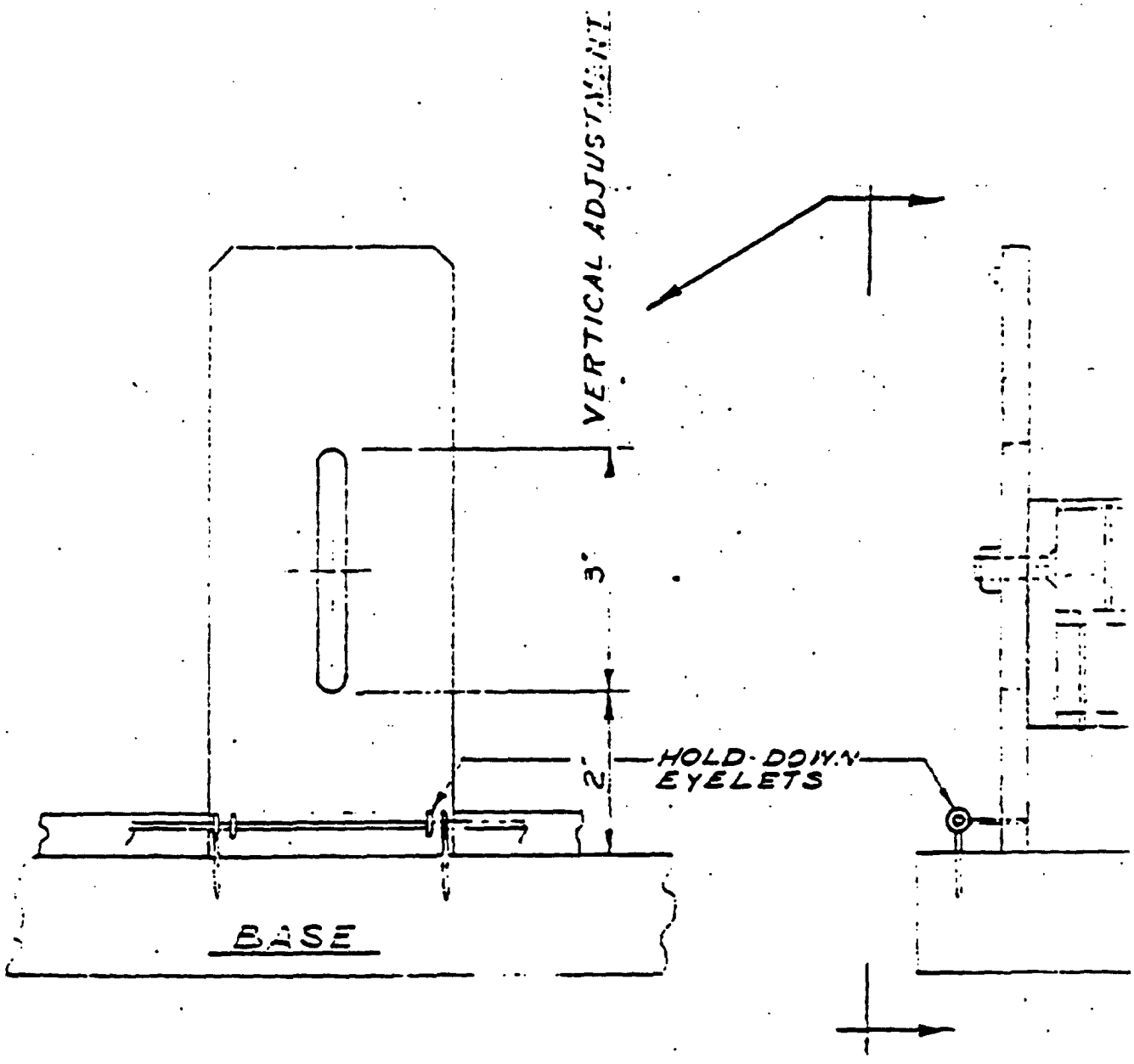
PLAN VI

HALF SIZE



SAMPLE
x 18"

DETAIL - "A"
(SIDE ELEVATION)



END VIEW