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TYPE PG-250 & PG-251

DRIVE-IN THEATRE
MOTION PICTURE SOUND EQUIPMENT

EXHIBITOR'S INSTALLATION INSTRUCTIONS

FIRST EDITION
FEBRUARY 1946

THEATRE EQUIPMENT DEPARTMENT

RADIO CORPORATION OF AMERICA
RCA VICTOR DIVISION **CAMDEN, N. J.**

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FOREWORD

(Exhibitor - Please read carefully for your protection)

This Instruction Book covers the procedure to be followed by the exhibitor in connection with the installation of the RCA PG-250, and PG-251 Drive-In Theatre motion picture sound systems.

All work to be done, and material required in connection with the installation of this equipment, is to be at the expense of the exhibitor. Much time and expense can be saved if the instructions contained in this book are studied carefully before any work is started on the installation. The exhibitor should communicate with the District Service Manager of the RCA Service Company, Inc., to obtain approval for any deviations from the instructions contained herein.

It is important that the exhibitor have completed all the work outlined herein prior to the arrival of the RCA Theatre Field Engineer so that he can spend his full allotted time inspecting the installation, and making final tests and adjustments.

All work performed by the electrical contractor must meet the National Board of Fire Underwriter's regulations on which these instructions are based. The work must meet, as well, all local regulations and ordinances pertaining to the installation of this equipment. The Radio Corporation of America and its subsidiaries assume no responsibility for any violations of the aforementioned regulations or ordinances.

Careful and complete execution of all work to be done before the arrival of the RCA Engineer, and close adherence to all local and national regulations, will result in an ideal installation at a minimum of time and expense.

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TYPE PG-250 AND PG-251
INSTALLATION INSTRUCTIONS

▲

EQUIPMENT

The complete RCA Drive-in theatre sound system is made up of many different assemblies which are known as Master Items. Each assembly has been assigned a special master item (MI) number. The individual assemblies are packed for shipment in wooden cases and paper-board cartons; the master item (MI) number of each assembly is marked plainly on the outside of its packing case for quick and easy identification. The contents of cases bearing identical "MI" numbers are similar in every respect and are interchangeable.

When the equipment is delivered at the theatre, the total number of cases and cartons received should conform with the total number shown on the shipping bill of lading. Any discrepancy should be indicated on the bill of lading, and a claim filed on the carrier immediately by the exhibitor. The equipment received should then be checked with the list shown on the packing slip which will be found in an envelope attached to one of the shipping containers. The RCA District Sales Office should be notified immediately of any discrepancies.

The equipment should be stored in a safe, dry place. The cases and cartons should be placed so that the "MI" number on each case can be observed easily for quick identification.

Only the master items listed below should be unpacked and installed before the arrival of the RCA Engineer. Caution should be used by those unpacking the equipment to prevent damage. This equipment is sensitive electrical apparatus, and even though it is of sturdy construction, it should be handled carefully, and not be left exposed to damage.

(1) Unpack and install the amplifier rack (MI-9211 or MI-9212)
(2) Unpack and install the exciter-lamp transformer (MI-9180)
(3) Unpack and install the volume control unit (MI-9726)
(4) Unpack and install the monitor loudspeaker (MI-9405C)
(5) Unpack and install in-car speakers and speaker junction boxes (MI-9433) or (MI-9433A, MI-9440 and MI-9441)

These items should be unpacked as closely as possible to the location where they are to be installed. The contents of each shipping container should be checked carefully with the factory packing slips, and inspection tags removed from each piece of equipment should be saved and given to the RCA Engineer upon his arrival.

The suggested locations for the installation of the above equipment are shown in Figure 1. In addition to the installation of the above equipment, the following electrical work should be completed.

(1) Complete all conduit and electrical wiring specified.
(2) "Ring out" and tag all conductors, and make connections to all units except the soundheads.
(3) Install and connect a loudspeaker distribution cabinet. This cabinet should be provided by the electrical contractor. (See "Wiring of Speakers" for details covering the construction of this cabinet.)
(4) Install and connect all underground wiring for in-car speakers.

The conduit layout, and details covering the electrical wiring are shown in Figures 1, 2, 7, 8, 9 and 10.

INSTALLATION MATERIAL

Some of the electrical material which the electrical contractor will be required to furnish is shown in the following tabulation. This list is approximate only, and should serve merely as a guide in determining the actual material needed.

The type and quantity of electrical fittings required for a particular installation can be determined easily by the electrical contractor after he has had a chance to study over these installation instructions, and when he knows the exact location of the equipment in the projection room.

TO BE FURNISHED BY THE ELECTRICAL CONTRACTOR

Item	Qty	Material
1	1	30 Ampere, double pole, single throw switch and pilot lamp; similar to a Trumbull No. 24211.
2	1	30 Ampere, double pole, single throw switch and pilot lamp; similar to a Trumbull No. 12221.
3	1	Steel cabinet type "A", 6" x 9" x 4" for mounting fuse cut-out.
4	1	G. E. 62587 two-wire, double branch fuse plug cut-out, or similar.
5	2	10 Ampere plug fuses (see Note C)
6	4	15 Ampere plug fuses (see Note C)
7		Miscellaneous 3-1/4" or 4" junction boxes and covers.
8		Conduit 10 foot lengths.
9		1/2", 3/4" and 1" Greenfield (flexible conduit).
10		Miscellaneous locknuts and bushings for conduit and Greenfield connectors.
11		Condulets (see Note B)
12		Single conductor, braided-rubber-covered wire #14. (See Note A)
13		Single conductor, braided-rubber-covered wire #12. (See Note A)

Item	Qty.	Material
14		Single conductor, braided-rubber-covered wire #10. (See Note A)
15		Flame-proof #14 wire for wiring to exciter lamp in soundhead (see Note A)
16		Flame-proof #10 wire for soundhead motor wiring (see Note A)
17	1	Steel box and cover, 8" x 8" or 10" x 10" for surplus MI-9778 cable.
18	1	Ramp distribution cabinet with double-pole, single-throw switches for speaker distribution.
19		In-car speaker standards. (Quantity depends on total number of speakers used.) See Figures 6, 8 and 9 for details.
20		Underground cable. The MI-32 special drive-in theatre underground cable is recommended. This may be obtained through the RCA Theatre Supply Dealer. See "Underground Cable Requirements".

NOTES:

A. *The number of lengths of conduit, or steel tubing with compression fittings, and the total amount of wire required, will depend on the size of the projection room and the theatre, and the location of the motion picture equipment. Before ordering any material, study carefully the drawings and sketches in this instruction book, and then determine just how much material will be required.*

B. *The number of condulets required will depend on the number of bends which are necessary to make the various conduit runs. The use of condulets is recommended; it is permissible to make bends in the conduit, however, provided that no more than four 90-degree bends are in a single run.*

C. *"Fusetron" fuses are recommended for protection of the soundhead drive motors. Four ampere "Fusetrons" should be used in the motor circuit if used in place of the standard fuses indicated in the drawings.*

INSTALLATION

In conjunction with the electrical contractor, check very carefully the installation diagrams in Figures 1 and 2, and plan the equipment locations best suited for the projection room.

The layout shown on the installation diagrams should be followed as closely as possible; however, deviation from this layout may be necessary due to variations in building construction and location. This is permissible provided the general plan is followed.

In those instances where a new motion picture equipment is to replace an equipment already existing, the exhibitor should have the existing conduit and wiring checked with the installation drawing, to determine how much of this conduit and wiring can be used, and to determine how much additional wiring is required.

In this connection we suggest the following items be checked carefully:

(1). Power supply wiring
(2) Conduit and wiring for projector drive motors
(3) Conduit and wiring between projector room and loudspeakers
(4) Conduit and wiring to monitor loudspeaker.

Do not wait for the RCA Theatre Field Engineer to arrive at the theatre. Notify the District Service Manager as soon as this preliminary work has been completed. The work which the exhibitor is called upon to do without supervision does not include the installation and wiring of the soundheads, and the placing of the tubes in the amplifiers and soundheads. This work will be done under the supervision of the RCA Theatre Field Engineer.

The major portion of the time allotted to the RCA Theatre Field Engineer for completion of the installation, should be available for the final testing, and adjustment of the sound equipment. A definite amount of time is allotted to the engineer for accomplishing this work. It is important, therefore, that all preliminary installation work be completed in accordance with the foregoing instructions, before the RCA Theatre Field Engineer arrives on the job.

MOUNTING EQUIPMENT IN PROJECTION ROOM

Since Drive-In Theatre projection room floors are usually below ground level, it is strongly recommended that all equipment normally mounted on the projection room floor be raised about six (6) inches on concrete bases. In this manner, the possibility of drainage water coming in contact with the apparatus is reduced.

Sound Main Feeders should be brought into the ramp distribution cabinet through conduit. The conduit should extend outside of building and possibly terminate in a water-tight junction box. Feeders should run continuously from the ramp to its respective switch in the distribution cabinet. Sound mains should not be laid closely to power feeders as this may induce hum.

Projector Base. If the negative projection angle (upward tilt) is greater than shown in the table (Figure 1) it may be necessary to compensate for the difference in angle by sloping the concrete base four or five degrees to the rear. Each degree increase in the height of angle will, of course, increase dimension "U" approximately 1 inch. All dimensions should be checked on the job.

Arc-Lamp Power Equipment may be either a motor-generator or rectifier. These should be mounted above the floor high enough to be free from possible contact with drainage water. The power room should be well ventilated so that the equipment does not over-heat.

Conduit and all wiring should be run along the walls or ceiling, above ground level.

WEIGHTS AND DIMENSIONS OF MAJOR EQUIPMENT

	Height	Width	Depth	Net Weight
MI-9211 Rack	64"	21-3/8"	16-1/4"	250 lbs.
MI-9212 Rack	64"	21-3/8"	16-1/4"	365 lbs.
MI-9726 Volume Control	10-1/4"	9-1/2"	6-1/4"	11 lbs.
MI-9180 Exciter Lamp Tr.	8"	6"	6"	11-1/4 lbs.
MI-9405B Monitor Speaker	12"	18-1/2"	7-1/2"	16 lbs.
BX-40 or 80 Projector	16-1/4"	12"	16-1/4"	110 lbs.
Brenkert Super High Intensity Lamp (Mod. A)	29-3/4"	22"	39-1/4"	185 lbs.
Projector Base BX-10	36"	20"	42"	406 lbs.
Projector Base BX-12	38"	19-1/2"	38-1/2"	300 lbs.
Projector Base BX-14	39-3/8"	19-3/4"	40"	300 lbs.
MI-9030-A Soundhead	8-1/2"	16"	28"	129 lbs.

WIRING OF SPEAKERS

An approved underground cable, such as the RCA MI-32 drive-in theatre underground cable, should be used between the projection room and the speakers. This cable should be buried a minimum of 12 inches below the surface to protect it against damage from maintenance tools. The RCA underground cable may be obtained through any of the RCA Theatre Equipment Supply Dealers.

All of the branch line feeders should be connected to the main feeders or trunk lines *above ground*. *No connections* should be made *underground*. Figure 7 covers methods of wiring the parking area. Figure 7-B is to be preferred.

It is recommended that the output leads from the power amplifier be connected through a D.P.S.T. switch in the Ramp Distribution Cabinet, located on the projection room wall.

If one main feeder is used for all the ramps, only one switch will be required.

If separate feeders are used for each ramp, these feeders should each have a D.P.S.T. switch in the distribution cabinet. A separate feeder for each ramp is the ideal method of wiring, as it allows the checking or replacing of speakers, standards or wiring on one ramp without affecting other ramps.

The **Ramp Distribution Cabinet** will in the case of a single main feeder, be one switch box and one D.P.S.T. switch. In the case of separate main feeders, the distribution cabinet may be single switch boxes and switches or one large box with switches, the number depending upon the number of main feeders or trunks used.

UNDERGROUND CABLE REQUIREMENTS

The following table is an *approximation* of underground cable requirements. Since no two layouts of Drive-In Theatres are exactly alike, it will be necessary for the contractor to determine the exact requirements for this theatre. The quantities given are based on speaker standards set eighteen feet apart and on ramps spaced 38 feet apart.

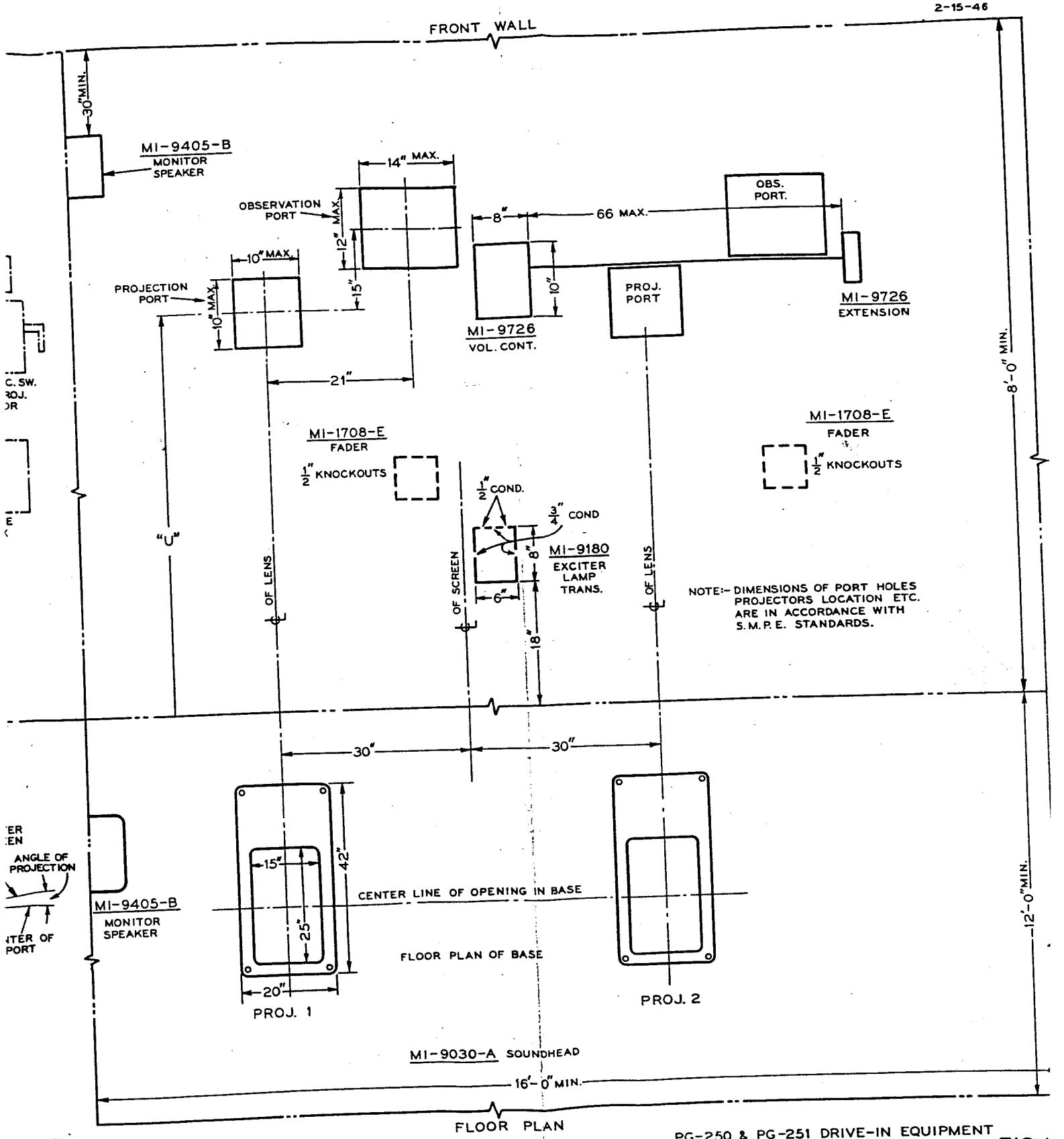
Column two (2) lists the estimated number of ramps that will be required to accommodate the quantity of automobiles enumerated in Column one (1).

Column three (3) lists the cable requirements in *feet*, for wiring to provide a separate feeder from the Ramp Distribution Cabinet in the projection room to each ramp. This method of distribution is recommended.

Column four (4) lists the cable requirements for a wiring plan that calls for wiring all the ramps in parallel with one feeder line from the projection room. Actually one feeder would be used for the ramps forward of the projection room, and another feeder for the ramps to the rear.

Other methods of running feeders from the projection room to the ramps are feasible. The cable requirements for these, if used, must be determined by the contractor.

(1)	(2)	(3)	(4)
		FEET OF CABLE REQUIRED	
NUMBER OF CARS	NUMBER OF RAMPS	INDIVIDUAL MAINS EACH RAMP	ONE MAIN FEEDING ALL RAMPS
200	5	4,000	3,500
300	7	5,500	5,000
400	9	7,500	6,500
450	9	8,000	7,500
500	10	9,000	8,500
550	10	10,000	9,500
600	11	11,000	10,000
650	11	12,000	11,000
700	12	13,000	12,000
750	12	14,000	12,000
800	13	15,000	13,000
850	13	15,500	14,500
900	13	16,500	15,000
950	14	17,500	16,000
1,000	15	19,000	17,000



PG-250 & PG-251 DRIVE-IN EQUIPMENT
2 PROJECTOR BOOTH LAYOUT FIG. 1

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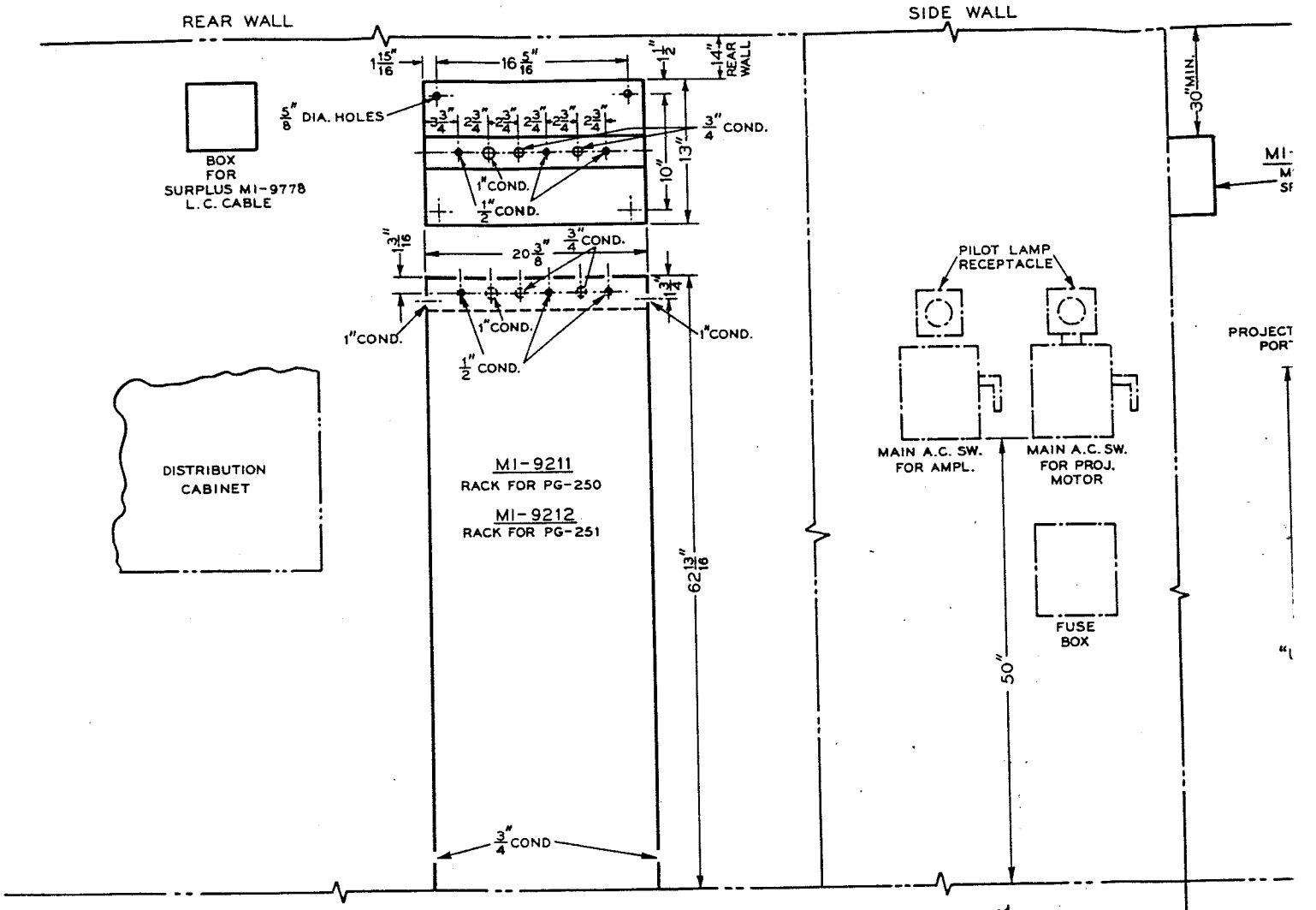
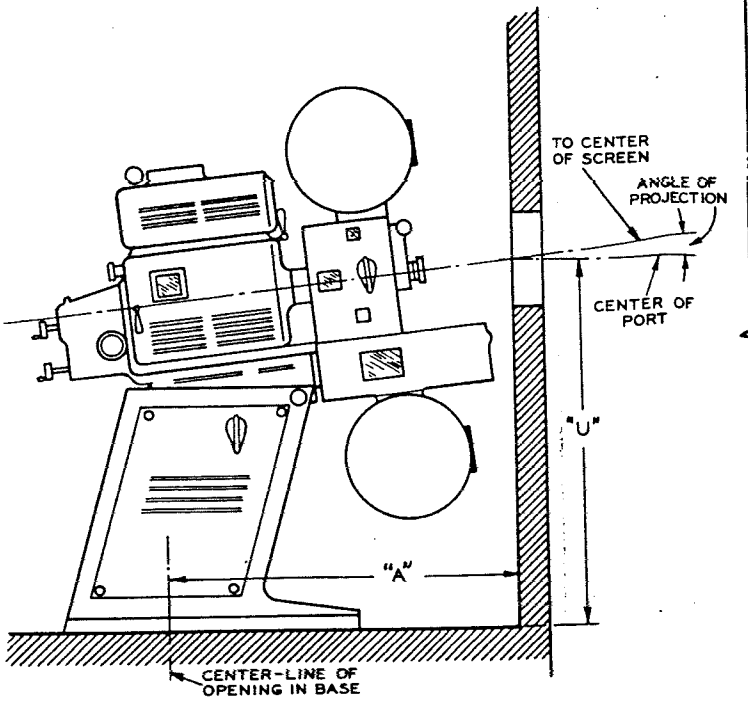


LOCATION OF PROJECTOR BASE AND PROJECTION PORT FOR BRENKERT BASES BX-8, 10A, 10B & 14		
ANGLE OF PROJECTION IN DEGREES	DIMENSION "U" INCHES	DIMENSION "A" INCHES
−10 (UP)	54	52
−8 "	52½	52
−6 "	51½	52
−4 "	50½	52
−2 "	49½	52
0 "	48	52
2(DOWN)	46½	52
4 "	45½	52
6 "	44½	52
8 "	43½	52
10 "	42	52
12 "	41	52
14 "	40	52
16 "	38½	53
18 "	37	53
20 "	36	54
22 "	34	55
24 "	32	56
26 "	30½	57
28 "	28½	58
30 "	26½	59



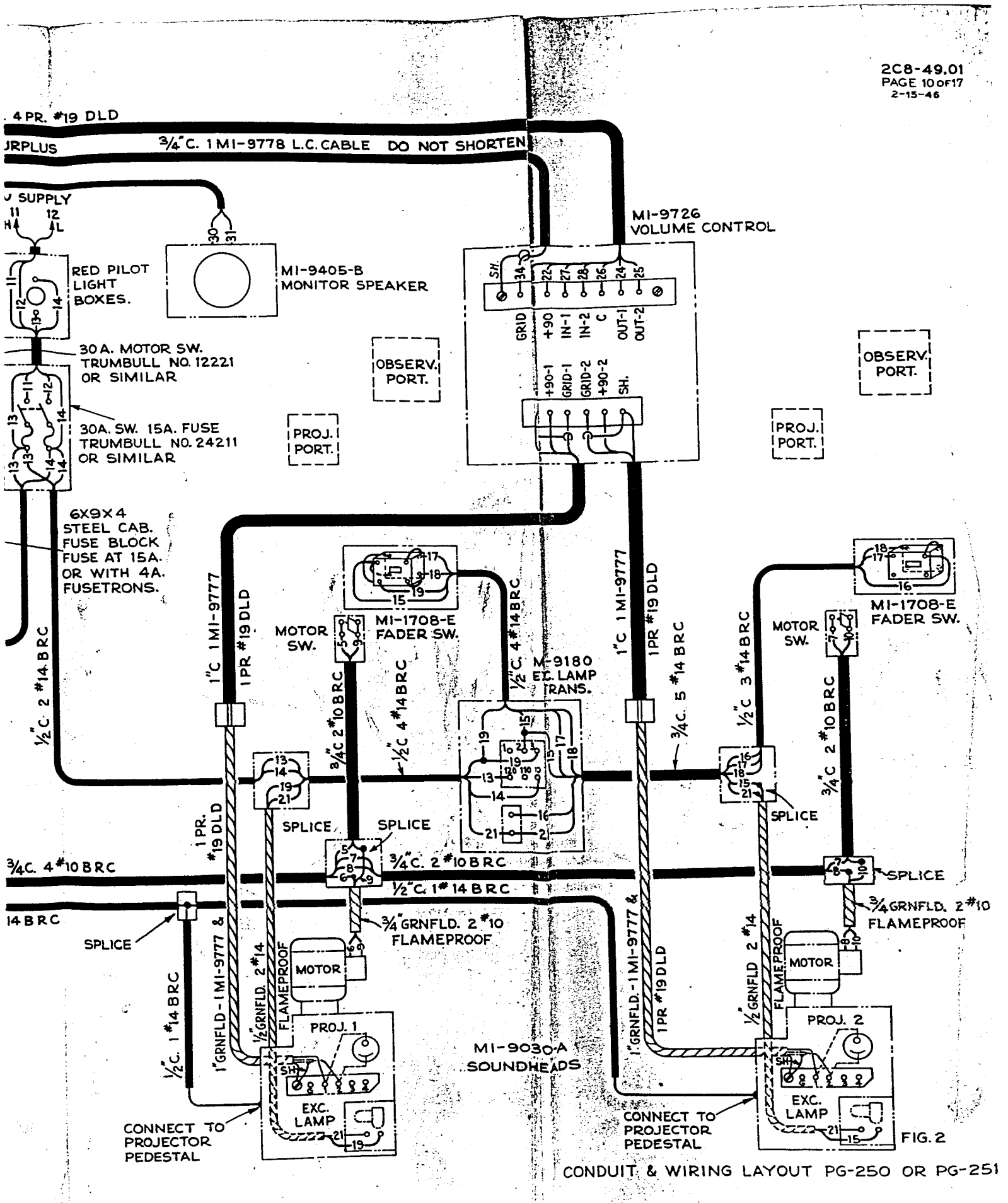
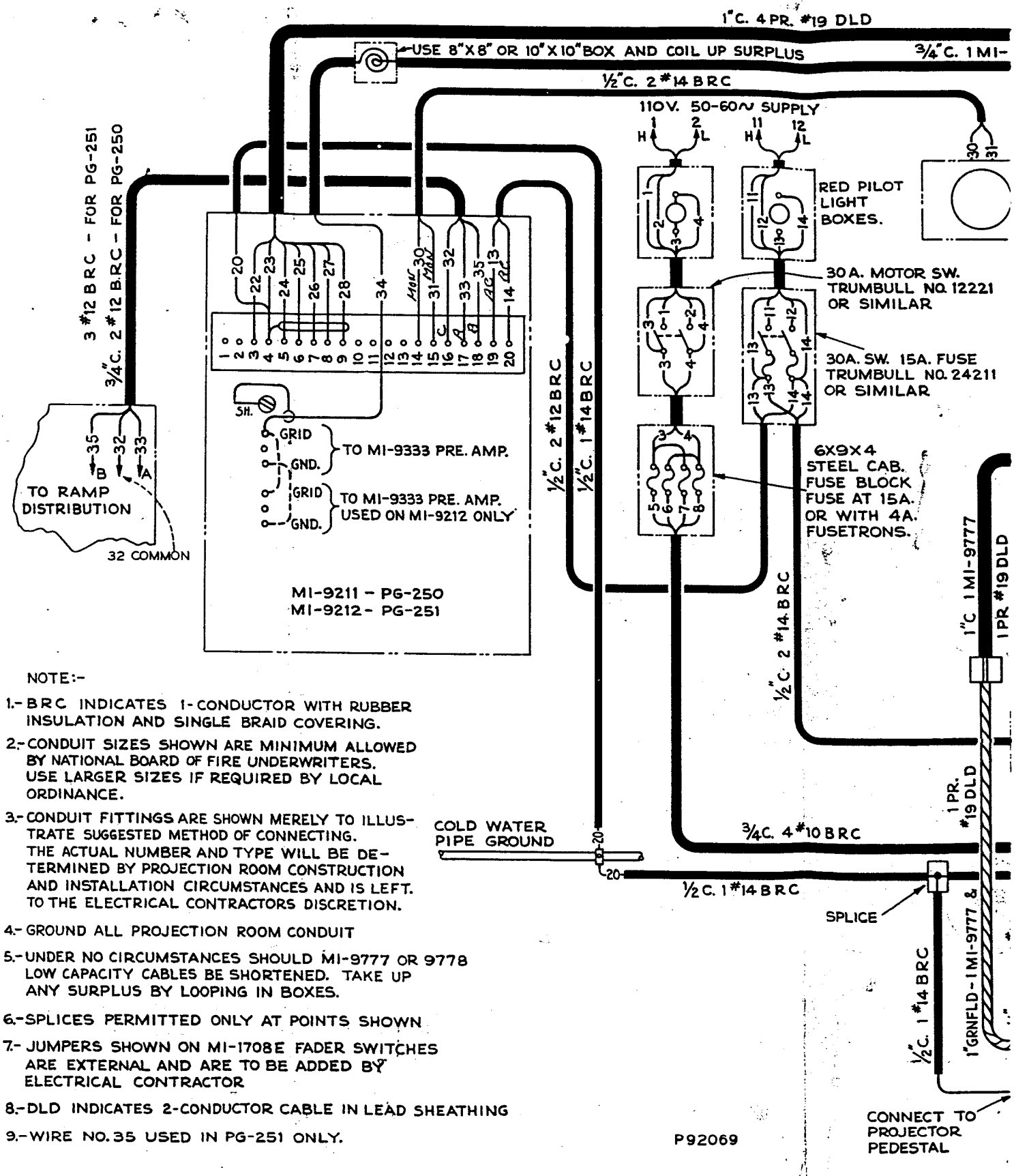


FIG. 2

CONDUIT & WIRING LAYOUT PG-250 OR PG-251



NOTE:-

1.- BRC INDICATES 1-CONDUCTOR WITH RUBBER INSULATION AND SINGLE BRAID COVERING.

2.- CONDUIT SIZES SHOWN ARE MINIMUM ALLOWED BY NATIONAL BOARD OF FIRE UNDERWRITERS. USE LARGER SIZES IF REQUIRED BY LOCAL ORDINANCE.

3.- CONDUIT FITTINGS ARE SHOWN MERELY TO ILLUSTRATE SUGGESTED METHOD OF CONNECTING. THE ACTUAL NUMBER AND TYPE WILL BE DETERMINED BY PROJECTION ROOM CONSTRUCTION AND INSTALLATION CIRCUMSTANCES AND IS LEFT TO THE ELECTRICAL CONTRACTORS DISCRETION.

4.- GROUND ALL PROJECTION ROOM CONDUIT

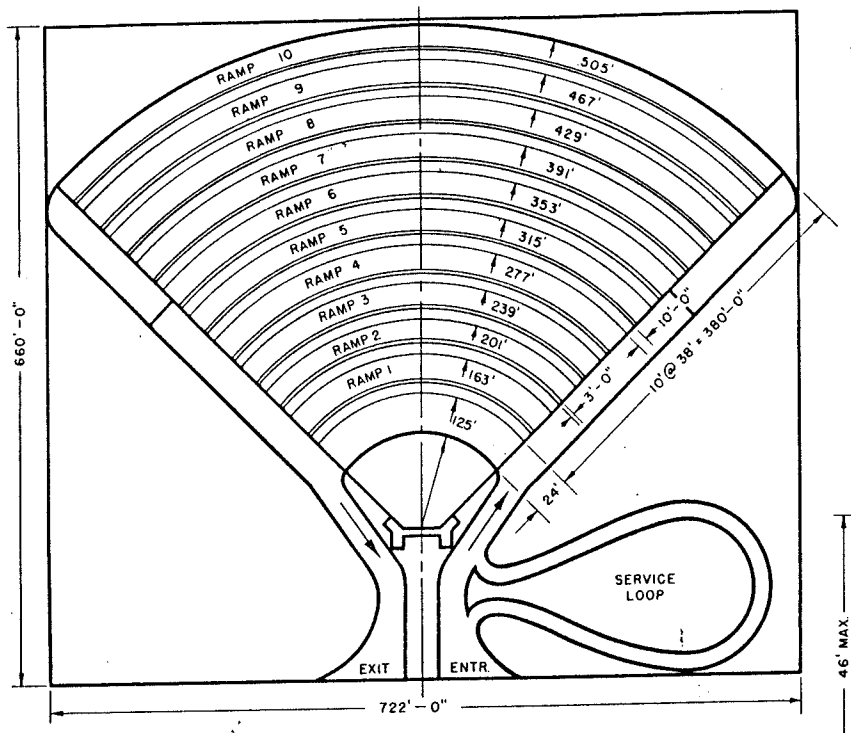
5.- UNDER NO CIRCUMSTANCES SHOULD MI-9777 OR 9778 LOW CAPACITY CABLES BE SHORTENED. TAKE UP ANY SURPLUS BY LOOPING IN BOXES.

6.- SPLICES PERMITTED ONLY AT POINTS SHOWN

7.- JUMPERS SHOWN ON MI-1708E FADER SWITCHES ARE EXTERNAL AND ARE TO BE ADDED BY ELECTRICAL CONTRACTOR

8.- DLD INDICATES 2-CONDUCTOR CABLE IN LEAD SHEATHING

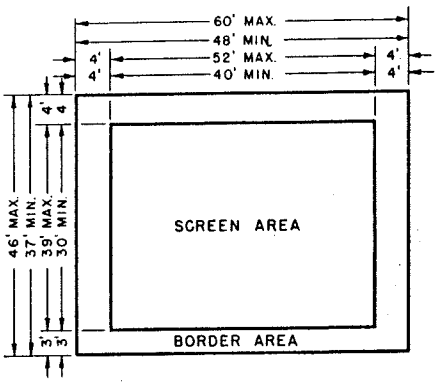
9.- WIRE NO. 35 USED IN PG-251 ONLY.



USE OF THE SERVICE LOOP DURING RUSH PERIODS WILL PREVENT CONGESTION AND PERMIT AN ORDERLY PROCESSION OF CARS PAST THE TICKET BOOTH

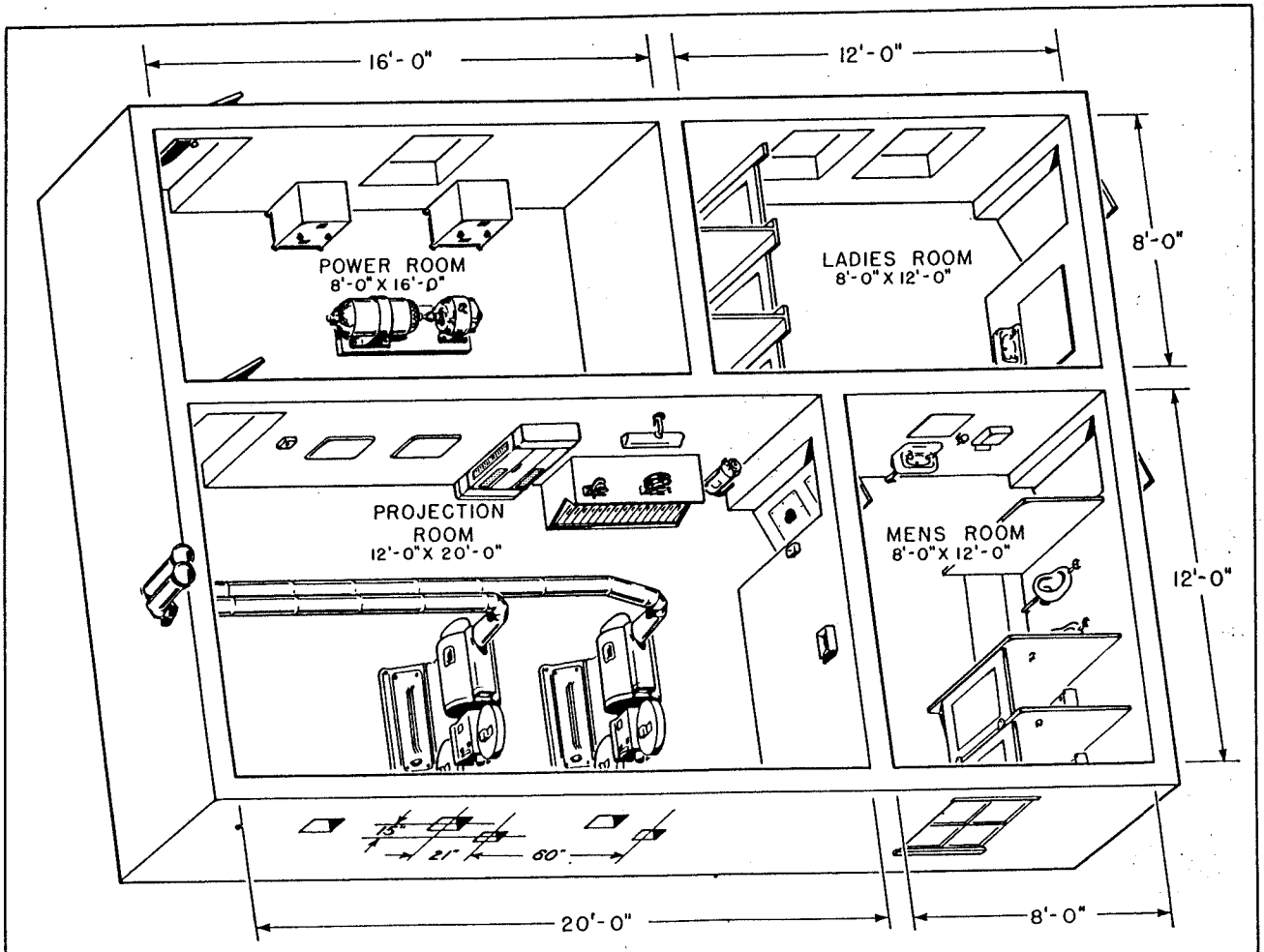
CAR CAPACITY	
RAMP NO.	RAMP CAPACITY
1	23
2	30
3	37
4	43
5	50
6	57
7	63
8	70
9	78
10	84
TOTAL	535

NOTE:—THE NATIONAL AVERAGE OF PERSONS PER CAR IS 2.25



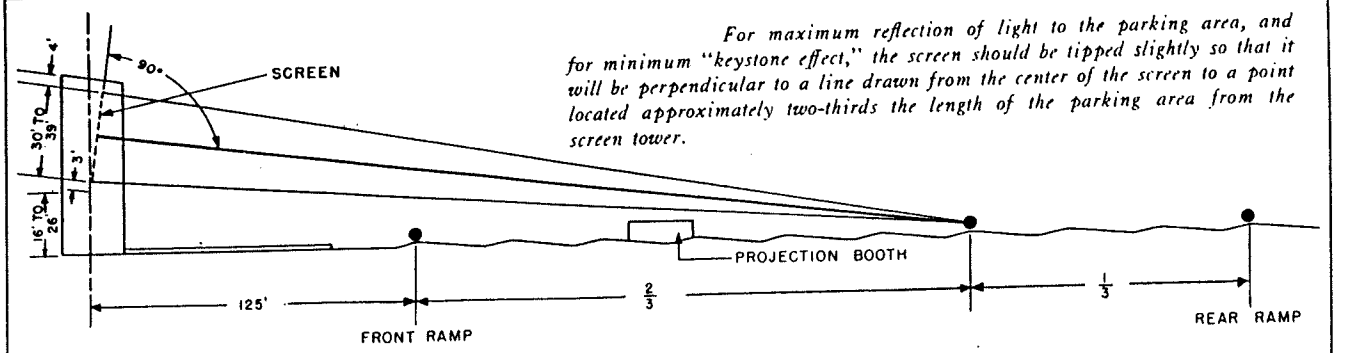
Plan View of a Modern Drive-In Theatre. (*Courtesy of Park-In Theatres, Inc., Camden, N. J. Owners of Patent #1,909,537.*)

FIG. 3



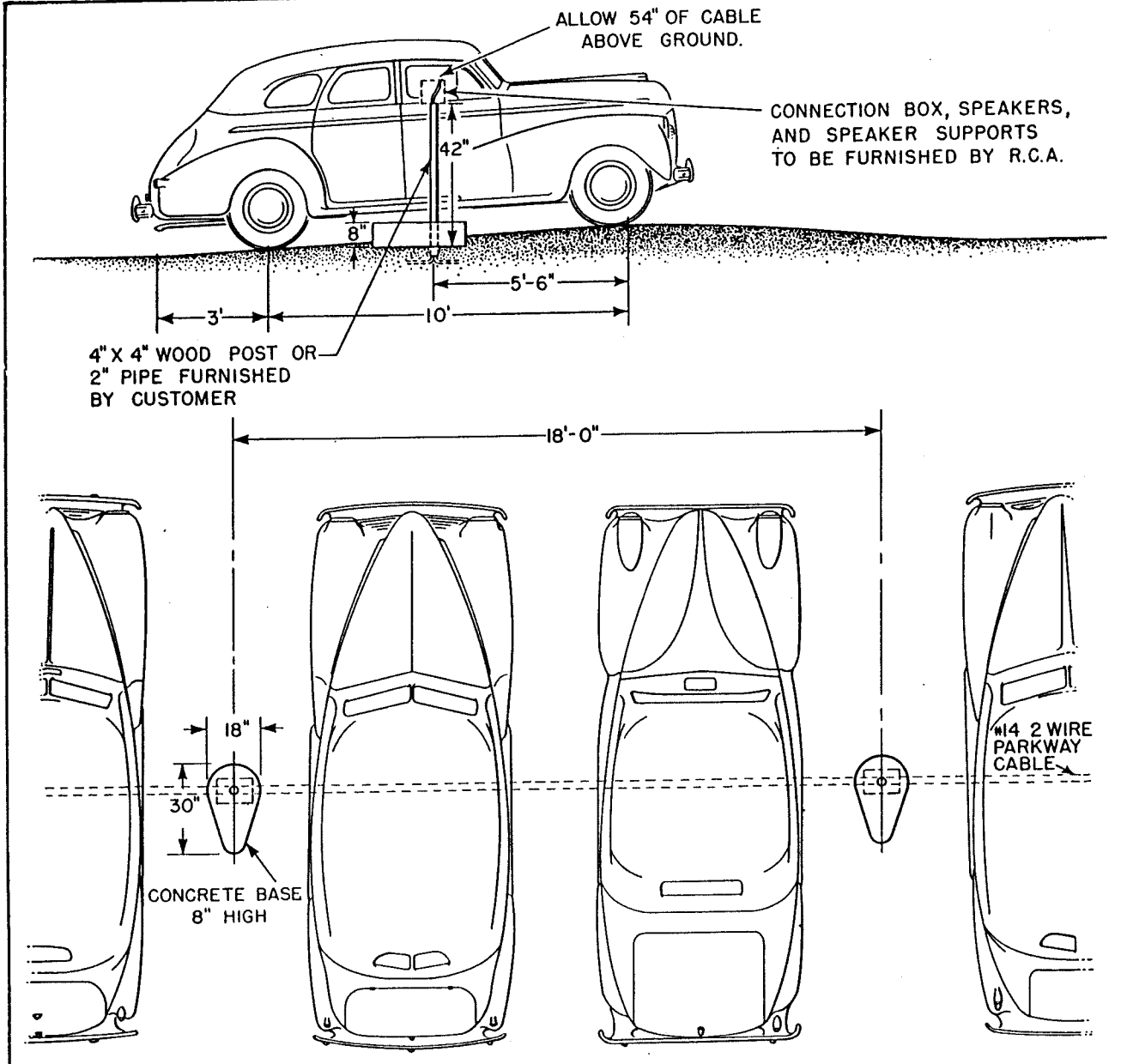
Layout of Projection Booth Building Showing Location of Projection Equipment.

FIG. 4

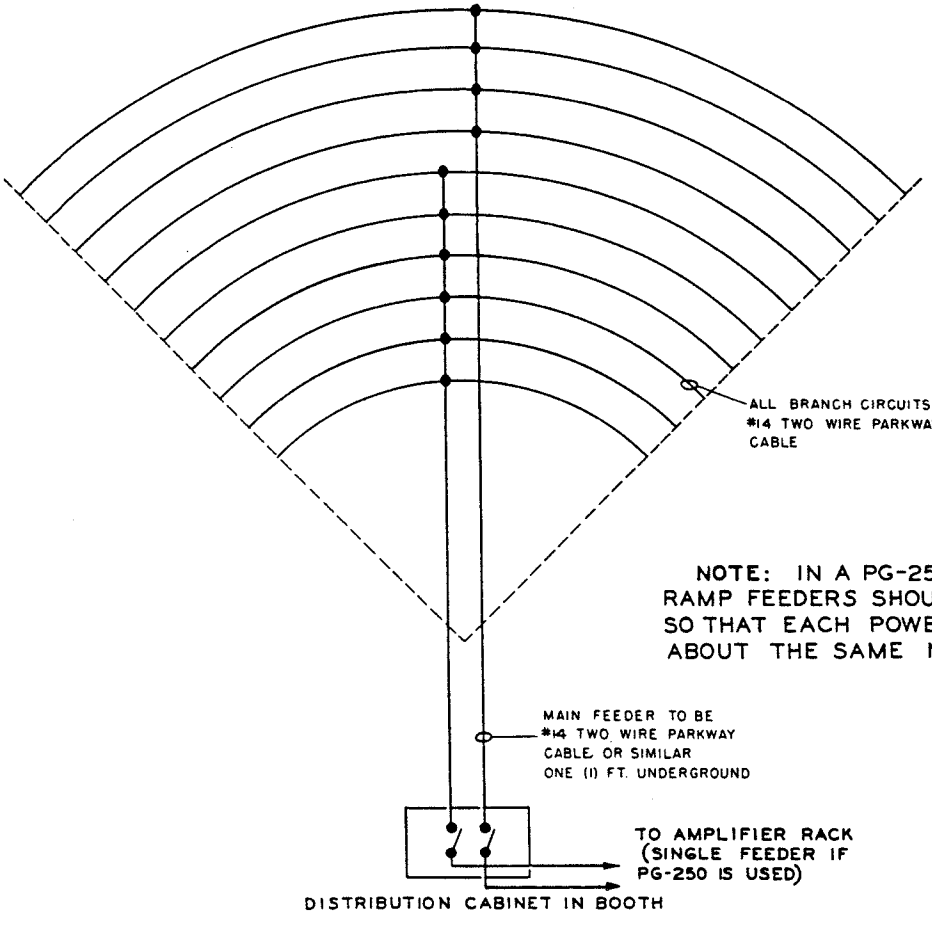


For maximum reflection of light to the parking area, and for minimum "keystone effect," the screen should be tipped slightly so that it will be perpendicular to a line drawn from the center of the screen to a point located approximately two-thirds the length of the parking area from the screen tower.

DRIVE-IN THEATRE SCREEN ARRANGEMENT FIG. 5



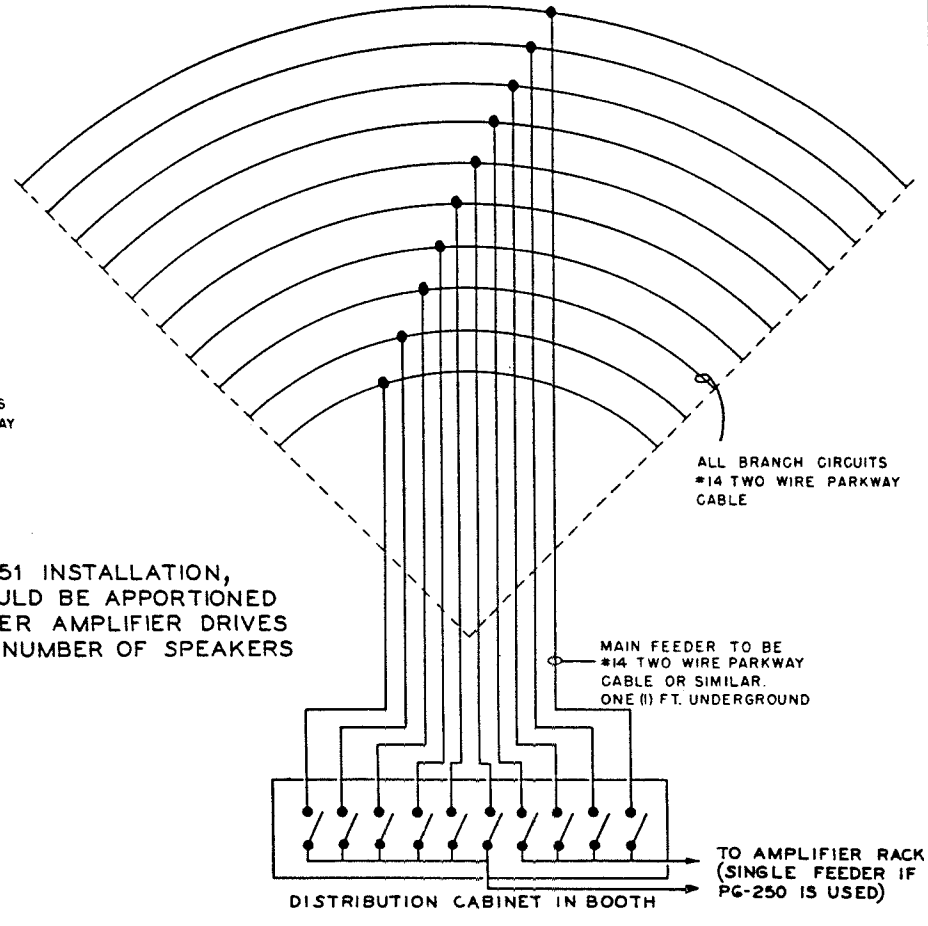
Location of Speaker Standards on Car Ramps.
(Ramp dimensions courtesy of Park-In Theatres, Inc., owners of Patent #1,909,537.) FIG. 6



SYSTEM SHOWING ENTIRE PARKING AREA
CONTROLLED BY TWO SWITCHES IN BOOTH

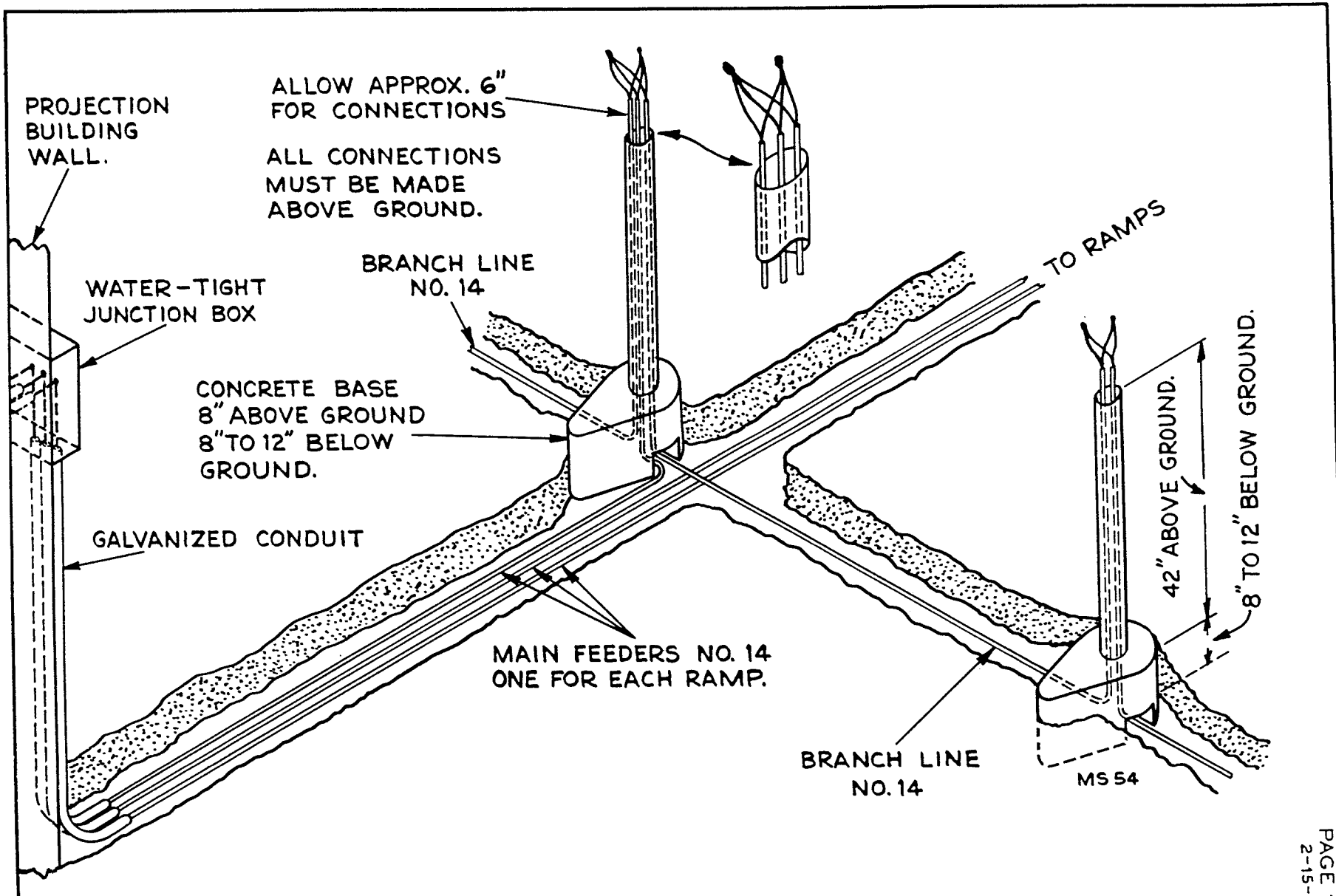
FIG. 7-A

NOTE: IN A PG-251 INSTALLATION, RAMP FEEDERS SHOULD BE APPORTIONED SO THAT EACH POWER AMPLIFIER DRIVES ABOUT THE SAME NUMBER OF SPEAKERS



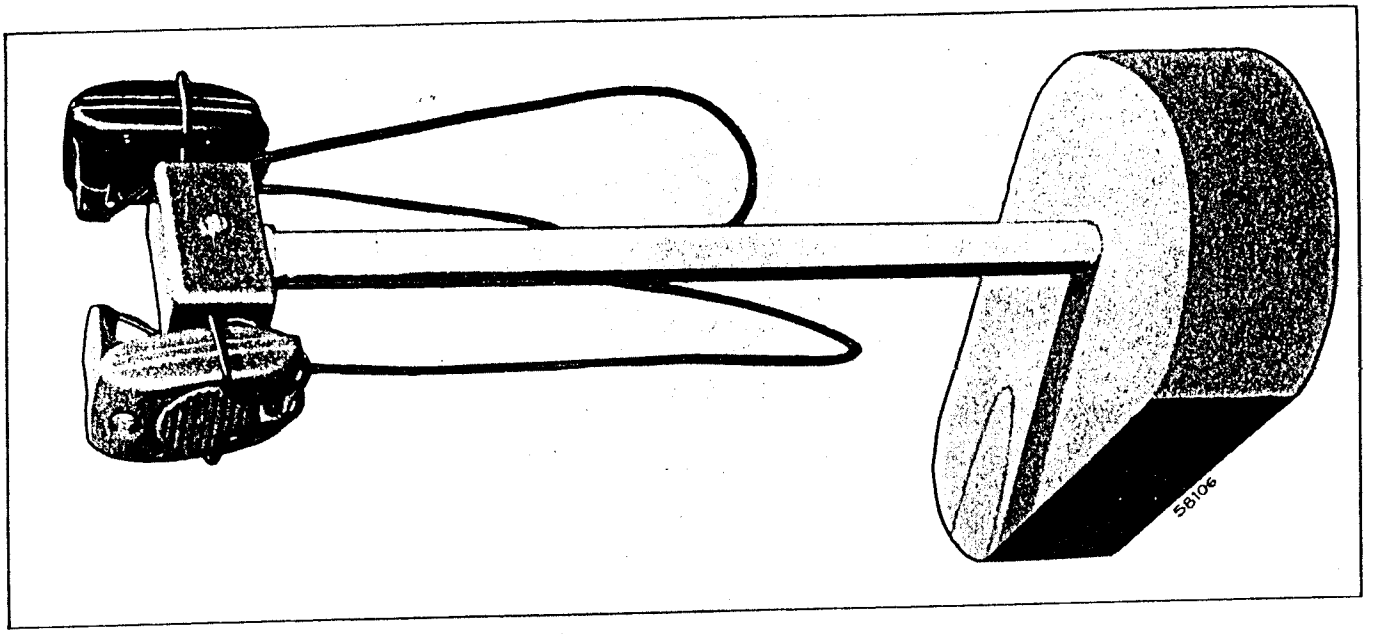
SYSTEM SHOWING EACH RAMP SEPARATELY
CONTROLLED BY SWITCHES IN BOOTH

FIG. 7-B



SUGGESTED METHOD OF WIRING SPEAKER STANDARDS ON CAR RAMPS

FIG. 8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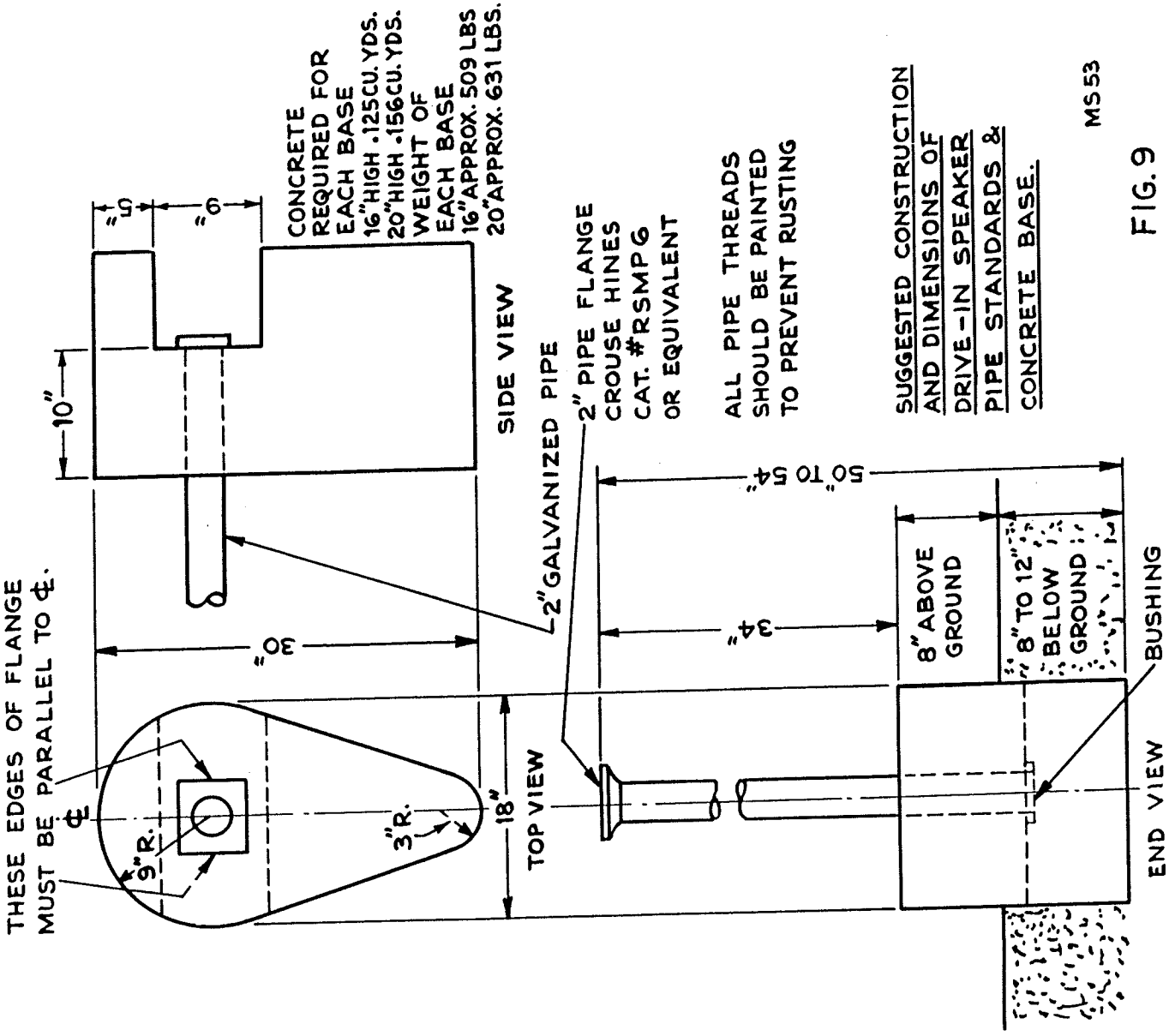
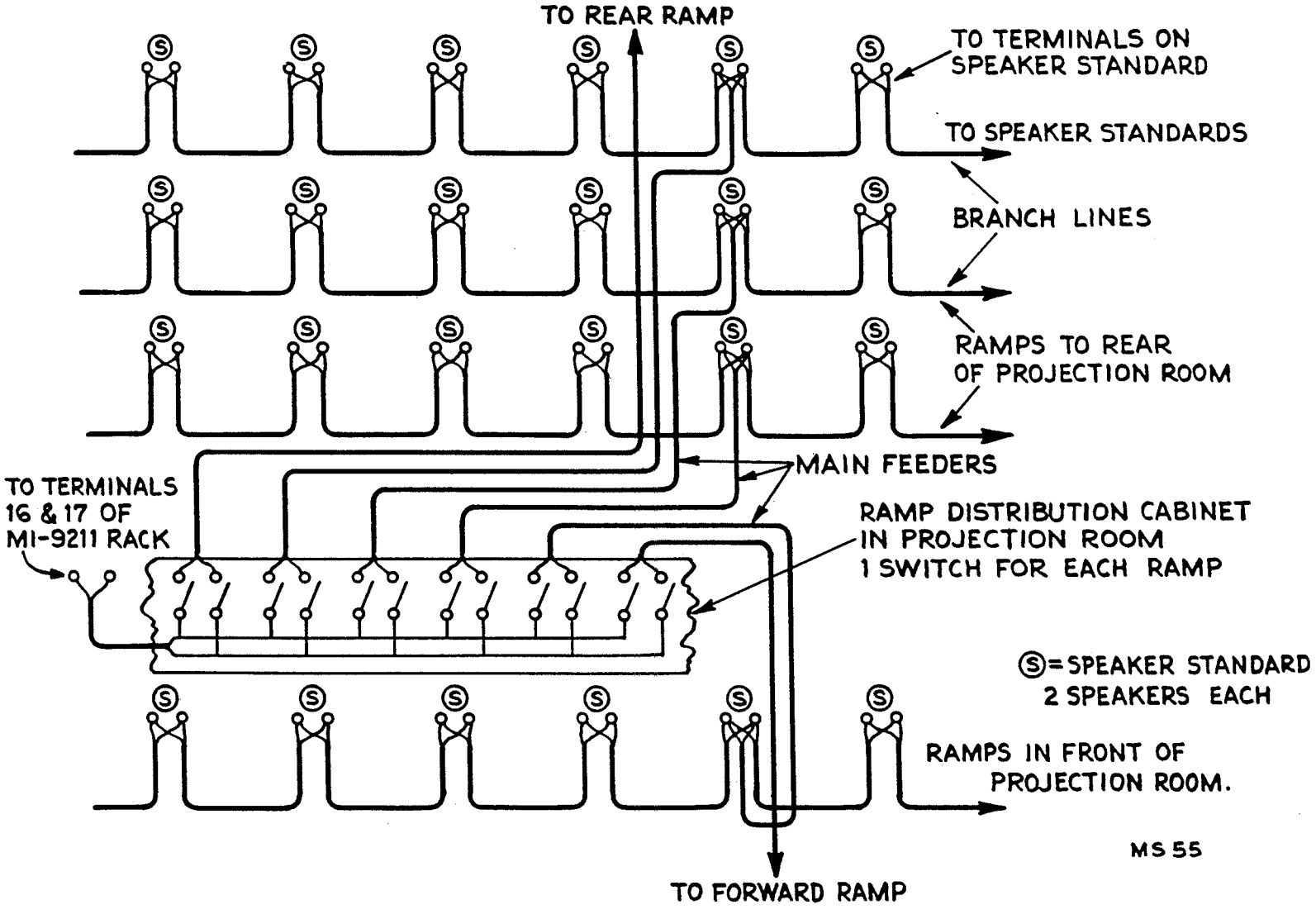

THESE EDGES OF FLANGE
MUST BE PARALLEL TO ℄.
℄
9"R.
3"R.
18"
TOP VIEW
30"
10"
5"
9"
SIDE VIEW
CONCRETE
REQUIRED FOR
EACH BASE
16"HIGH .125CU. YDS.
20"HIGH .156CU. YDS.
WEIGHT OF
EACH BASE
16"APPROX. 509 LBS
20"APPROX. 631 LBS.
2"GALVANIZED PIPE
2" PIPE FLANGE
CROUSE HINES
CAT. #RSMP6
OR EQUIVALENT
ALL PIPE THREADS
SHOULD BE PAINTED
TO PREVENT RUSTING
50" TO 54"
34"
8" ABOVE
GROUND
8" TO 12"
BELOW
GROUND
BUSHING
END VIEW
SUGGESTED CONSTRUCTION
AND DIMENSIONS OF
DRIVE-IN SPEAKER
PIPE STANDARDS &
CONCRETE BASE.
MS53

FIG. 9



DETAIL SHOWING METHOD OF CONNECTING CABLE TO RAMP SPEAKERS

PG-250-SEPARATE FEEDERS ARE SHOWN FOR EACH RAMP AND CONTROLED BY SWITCHES IN DIST. CABINET. IF ONE MAIN FEEDER IS USED, THIS FEEDER WILL CONTINUE TO EACH RAMP AND BE CONTROLED BY ONE SWITCH.

PG-251- IF PG-251 SYSTEM IS USED, HALF OF THE TOTAL SPEAKERS WILL BE CONNECTED TO THE NO. 1 AMPLIFIER OF THE MI-9212 RACK AND THE BALANCE TO THE NO. 2 AMPLIFIER. SEE FIG. 7.

FIG.10

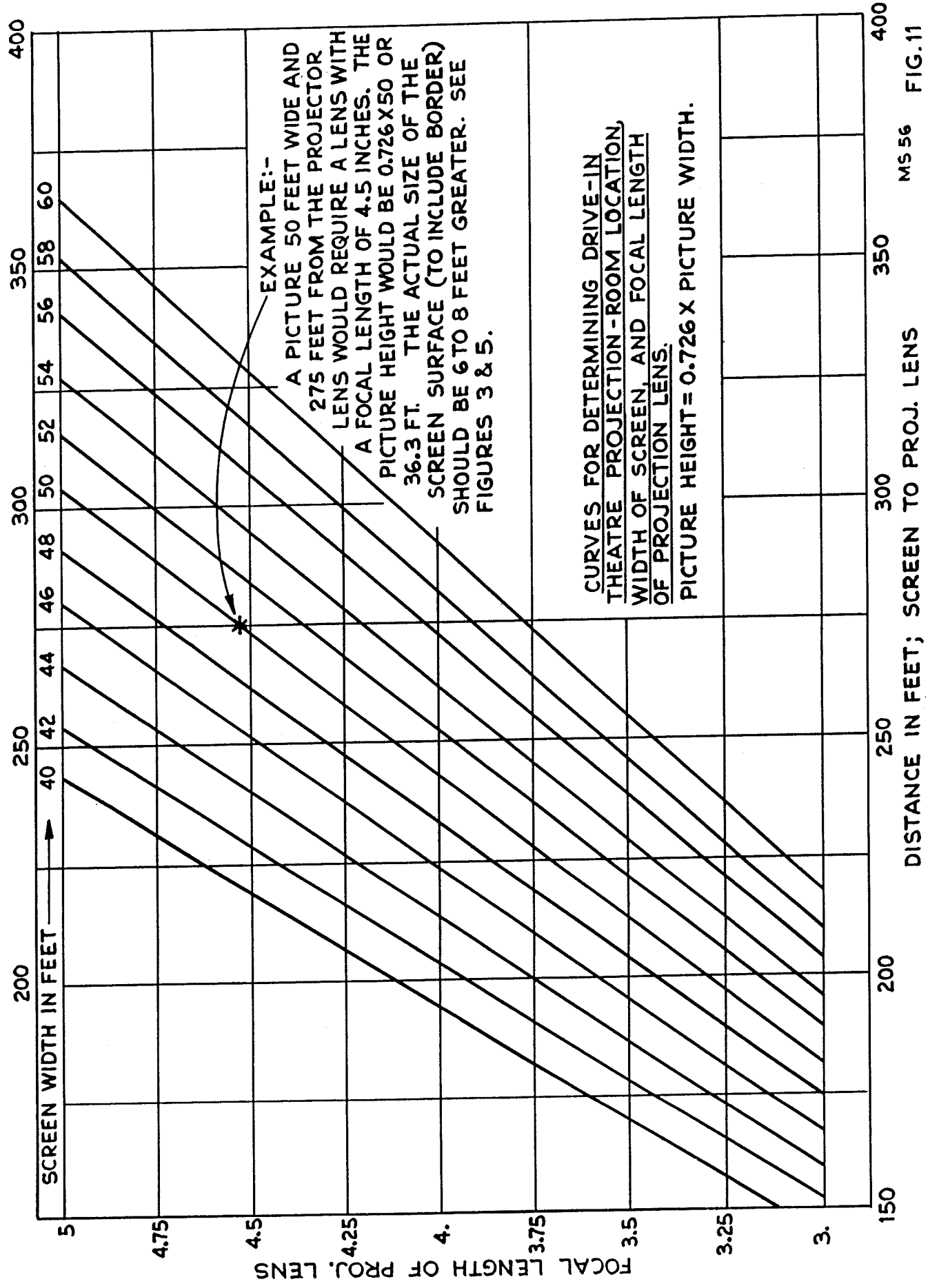

SCREEN WIDTH IN FEET
200
250
300
350
400
40
42
44
46
48
50
52
54
56
58
60
FOCAL LENGTH OF PROJ. LENS
5
4.75
4.5
4.25
4.
3.75
3.5
3.25
3.
150
200
250
300
350
400
DISTANCE IN FEET; SCREEN TO PROJ. LENS
EXAMPLE:-
A PICTURE 50 FEET WIDE AND 275 FEET FROM THE PROJECTOR LENS WOULD REQUIRE A LENS WITH A FOCAL LENGTH OF 4.5 INCHES. THE PICTURE HEIGHT WOULD BE 0.726 X 50 OR 36.3 FT. THE ACTUAL SIZE OF THE SCREEN SURFACE (TO INCLUDE BORDER) SHOULD BE 6 TO 8 FEET GREATER. SEE FIGURES 3 & 5.
CURVES FOR DETERMINING DRIVE-IN THEATRE PROJECTION-ROOM LOCATION, WIDTH OF SCREEN, AND FOCAL LENGTH OF PROJECTION LENS.
PICTURE HEIGHT = 0.726 X PICTURE WIDTH.
MS 56

FIG. 11