HANDBOOK OF

INSTALLATION, OPERATION

AND

MAINTENANCE INSTRUCTIONS

FOR
MODEL 1000
OR
MODEL 1003

THUNDERBOLT SIREN

8400 A177-01

C O N T E N T S

INTRODUCTION

This handbook contains instructions for the Installation, Operation, Service and Maintenance of the Model 1000 Thunderbolt Siren manufactured by Federal Sign and Signal Corporation, 13600 South Western Avenue, Blue Island, Illinois.

Description of Siren

The Model 1000 Thunderbolt Siren is a high intensity, directional, rotating beam type designed to give warning signals over a large area. It is extremely efficient and will operate from moderate sized power supplies. It produces a sound with substantially uniform output over a wide frequency range with a tone readily distinguished from other sounds such as vehicle sirens, horns and whistles. This device can be easily installed under a wide variety of mounting conditions.

Operation of Siren

Compressed air at low pressure and high volume is generated by a rotary positive displacement blower driven by an electric motor. The compressed air is delivered through a pipe to a high speed rotary valve or chopper which alternately opens and closes the throat of a large exponental horn. Air enters the horn in pulses which form sound waves of a frequency dependent upon the speed of the chopper. The horn is rotated about a vertical axis so that sound waves are emitted in all directions.

Description of Controls

When the control relay switch or manual code switch (See Page 24) is closed, the chopper motor control and the time delay relay are energized. The time delay relay closes the circuits to the blower and rotator motor controls. The motor controls in turn start their respective motors.

When the control relay switch or manual code switch is opened after some predetermined interval, the chopper motor control and the time delay relay are deenergized. The chopper motor is thus turned off. It begins to coast to a stop and the sound frequency falls lower and lower. When the time delay relay is deenergized, it does not immediately open the blower and rotator circuits. Consequently they will continue to run while the chopper is slowing down. The chopper cannot be restarted until the delay period is over. See "Adjustments" when a change in the delay period is desired.

The toggle switches permit individual operation of any of the three motors. The rotator switch has a center "off" position so that the sound may be beamed in any one direction. The "control" switch permits testing of the control circuits such as coding devices, phone lines, switches, etc., without sounding the siren.

The auto-transformer permits the top frequency of the siren to be varied by changing the voltage to the chopper motor. See "Adjustments". (See Page 27).

The Model #1003 Thunderbolt is an advanced model of the basic model #1000 Thunderbolt Siren. This handbook describes the installation, operation and maintenance of the basic Model #1000 Thunderbolt Siren with additional description detailing the function of the model #1003 Thunderbolt.

The Model #1003 is the same as the Model #1000, but has in addition tone modulator valves for control of the double tone chopper rotor in order to give 3 signals. The 3 signals are #1 "ALERT SIGNAL", a double tone sustained signal, #2 "AIR RAID ATTACK SIGNAL", a double tone undulating or up and down scale signal, #3 "FIRE" signal, a rapidly alternating sharp high and low note signal "FI RE" "FI RE".

On the "ALERT" and "ATTACK" signals the two tone modulator valves are left open. On the "FIRE" signal the tone modulator valves alternately open and close rapidly each of the two tone openings from the chopper stator into the siren horn. This gives a sharp high then low note signal as described above.

The basic #1000 Thunderbolt has a control panel which controls the sirens blower motor, rotator motor and chopper motor. The #1003 Thunderbolt also has in addition an auxiliary control panel which controls the tone modulator valves.

Specific reference pages for #1003 Thunderbolt are:

8400A177-03

SPECIFICATIONS

Weights:

Blower Assembly	850#
Rotator and Chopper Assembly	200#
Horn Assembly	100#
Total	1150#

Sizes:

Blower Assembly	24" high, 29"wide, 48"long
Rotator and Chopper Assembly	42" high, 14"wide, 22"long
Horn Assembly	28" x 28" x 53" long

Sound Output:

Intensity	126 db @ 100 feet
Frequency	128 Cycles/Sec. to 700 Cycles/Sec. (Maximum frequency may be varied to suit)

Electrical Power Requirements:

3 Phase	208-240 Volts 35 Amps running current
1 Phase	240 Volts 54 Amps running current

Blower:

Type	Rotary

Blower Motor:

Type	Semi-enclosed, ball bearing, induction

Chopper Motor:

Type	Ball bearing - series

Rotator Motor:

Type	Semi-enclosed, ball bearing, induction

Rotator Drive:

Type	Combination spur and worm gear reduction
Output Speed	Adjustable to 2, 4 or 8 R.P.M.

Horn:

Type	Exponential
Cut-off Frequency	128 Cycles/Sec.
Dispersal Angle	40^{o} x 40^{o} (Approx.)

Control Panel:

Size	8" Deep x 18" Wide x 24" High
Weight	75#
Enclosure	General purpose weatherproof

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MODEL 1003

#1003 THUNDERBOLT

TONE MODULATOR VALVES

SOLENOID OPERATED

2 AT 1.6 AMPS. EACH AT 240 V-60 CY. 1 PHASE

INSTALLATION

Location of Siren

A number of factors must be considered when the location of this unit is determined.

It will first be necessary to determine the effective range of the siren for the particular region in which it will be installed.

The desired signal level at the fringe of the area to be covered by the siren must be determined first. Signal levels of 70 db for residential area and 80 db for business area are considered adequate for the average city.

The next factor to be determined is the loss per distance doubled. Under ideal conditions where the terrain is flat and buildings are low, the loss will be about 8 db each time the distance is doubled. For instance, with a source strength of 126 db at 100 feet, the signal level will be 118 db at 200 feet, 110 db at 400 feet, 102db at 800 feet, etc. For average city conditions, this loss factor may be higher, 9 or 10 db per distance doubled and may be as high as 12 db for areas where high buildings predominate.

Page 14 is a graph which will provide an easy means of determining the siren range when the minimum signal level and the loss per distance doubled have been determined. Note the point at which the desired loss per distance doubled curve crosses the line extending to the right of the desired minimum signal level. Directly below this point on the bottom line will be found the effective range of the siren. For example, if the desired minimum signal level is 70 db and the type of terrain indicates a loss of 8 db per distance doubled, it will be found from the graph that the effective range will be about 2-1/2 miles. If the desired minimum signal level is 80 db and the terrain indicates a 10 db loss per distance doubled, it will be found that the graph indicates a range of about 1/2 mile.

After the approximate range of the siren has been determined, the general location of the unit may be determined by drawing a circle representing the effective range of the siren on a scaled map of the area to be covered by the siren.

Final selection of the site for the siren must also take into consideration the availability of suitable electrical power, ease of installation, height of surrounding buildings, hills or other obstructions. If uniform coverage in all directions is required, it will be necessary to locate the siren above surrounding obstructions, particularly those within a range of several hundred feet from the siren. It is extremely important that the horn be above all penthouses, parapet walls, exhaust blowers, etc. on the same roof as the siren if good coverage is to be obtained.

Mechanical Installation

Page 15 shows the siren installed in the normal manner, using the ten foot piece of pipe furnished with the unit. This will elevate the centerline of the horn about 14 feet above the mounting surface. If more elevation of the horn is required, a longer piece of 3" standard pipe can be used.

Page 16 shows an installation where the standpipe is longer than ten feet and guy wires or chains must be used to provide additional stability and strength.

Page 17 shows an installation where the unit is mounted against a wall or structure and the standpipe is supported by the wall or structure.

Page 18 shows a method of installation where the blower assembly is mounted within a building and the standpipe is put through the roof. IMPORTANT: When the blower is mounted inside a building with warm, moist air and the outside temperatures are below freezing, provisions must be made for the blower input to take-in outside air. If not; the warm, moist, inside air will cause condensation to form in the chopper and lock the rotor. A 2-1/2 to 3-inch reducing elbow should be connected to the top of the blower, after the screen and plug are removed. Use 3-inch dia. air intake pipe and fittings for the balance of the installation. The end of the 3-inch pipe outside the building should be directed downward, parallel to the wall of the building in which the blower is located (see page 18). It should be above the highest expected snow level. In addition, this end should be screened with 20GA. galvanized, steel hardware cloth with 1/4 x 1/4 mesh to keep birds from nesting in the pipe.

Page 19 shows an installation where the blower must be mounted a certain distance away from the standpipe.

Page 20 shows a method of mounting the Rotator and Chopper assembly on a structural frame when the connection between the Blower and the Rotator and Chopper unit is made by means of thinwall tubing or flexible hose instead of 3" standard pipe.

In all of the various mounting methods, the blower may be separated from the Rotator and Chopper by many feet. For example, a separation of one hundred feet will cause a loss in sound output of only one dB (Approx.).

Normal installations shown on Page 15 and Page 16 may be accomplished without the use of hoists or cranes in the following manner:

1. Uncrate the blower assembly, leaving the shipping crate base mounted to the blower base. This wooden shipping crate base will make an excellent permanent base for the blower.
2. Locate the blower assembly in its final position and secure to the mounting surface.
3. Screw 3" standard pipe included with siren into elbow. Use longer pieces of pipe if required to clear nearby obstacles.
4. Lay the Rotator and Chopper assembly on its side with the conduit fitting in the bottom of the rotator housing, located so that it will be in the position shown on Page 15 when erected. Fasten the mounting flange to the pipe flange using the four 5/8" bolts and the ring gasket which are included with the siren. See Page 21 and Page 22.
5. Raise Rotator and Chopper Unit and turn horn so that it extends downward. See Page 23.

A few men can then raise the unit to a vertical position similar to the manner in which a ladder or flagpole can be elevated. The pipe will hinge at the elbow connection. A pole or short ladder can be inserted under the horn bracket for added leverage and used to help push the unit into position. See Page 23. A rope may be attached to the top of the chopper and used to help pull the unit into position.

8. Lock pipe in position by means of U-Bolt. Use guy wires or chains to further support pipe if it extends more than 10 feet. See Page 16.
9. Unscrew the two bolts on the top of the blower housing and remove the blower housing. Take off the fastening which held the relief valve in place during shipment.

Electrical Installation #1000 Thunderbolt

The general layout of the electrical circuit is shown on Page 24. The wiring diagram of the control panel is shown on Page 25F.

1. Install 3/4" conduit between blower housing and rotator housing.

2. Mount control cabinet as near to siren as possible to shorten wires and conduit and reduce voltage drop. The control panel must be mounted against a vertical wall or surface since the motor controls will not operate properly in any other position.

3. Install 1" conduit between control cabinet and blower housing.

4. Run proper size wires from terminal blocks in bottom of control cabinet through pull box on blower base to blower motor and to rotator housing for connection to rotator and chopper motors. See Page 13 for proper wires needed for various distances between control cabinet and siren. See Page 27 for proper connections of chopper motor leads to control cabinet terminal block.

5. Provide and install a disconnect switch within sight of the control panel and connect with proper wires shown on Page 13.

6. Provide and install a remote relay or AR Timer coding device having a normally open, single pole switch and connect to the terminal strip marked "control" in the control cabinet. A manual code switch may also be installed. It should be noted that manual coding may also be achieved by operating the three toggle switches in the control cabinet.

This siren will work with a wide variety of code timings. For best results when a wailing signal is desired, the coding cycle should have a total time of approximately twelve seconds. The proportion of "on" and "off" time is not important since the "off" time of the siren is determined by the time delay relay in the control cabinet and not by the coding device. This "off" period has been adjusted at the factory for 8 seconds and when the siren is used with a total code cycle of 12 seconds will result in a siren "on" time of 4 seconds. This timing may be changed if desired. See "Adjustments".

OPERATION

After-Installation Inspection

After installing the siren and hooking up the electrical system, the following items should be checked before operation of the siren is attempted.

1. Check the oil level in the blower gear case as recommended in "Lubrication".

2. Turn the blower pulley by hand to see that the blower turns freely.

3. Open the rotator housing and install the oil breather plug if one is found wired and tagged to the oil filler plug.

4. Turn the gear reducer pulley and see that it turns freely.

5. Move all four toggle switches in the control cabinet to "Automatic" position and see that the control relay and manual code switches are open. Then close the disconnect switch, thus supplying power to the control cabinet.

6. Move the blower switch to the "Test" position and observe the blower drive shaft to see if it is turning in a counter-clockwise direction when viewed from the pulley end. Note arrow on blower pulley. If not, turn off the blower, open the disconnect switch and reverse two motor connections to obtain the proper direction of rotation. After checking for proper operation, stop the blower by moving the blower switch to the "Automatic" position.

7. Move the rotator switch to the "Test" position and see that the horn rotates. The direction of rotation does not matter. The horn may be stopped in any position by moving the rotator switch to the center "OFF" position.

8. Continue to rotate the horn, but be sure that the blower is not operating. Move the chopper switch to the "Test" position. When the chopper reaches top speed, after several seconds, move the chopper switch to the "Automatic" position and allow the chopper to coast to a stop. Very little sound volume will be generated during this test because the chopper receives no air from the blower. Repeat this operation several times and then move both the chopper and the rotator switches to the "Automatic" position.

9. Move the control switch to "Test" position. The circuits to the blower and rotator motor controls and to the chopper motor are now open. Only the chopper motor control and time delay relay will operate when a code signal is received at the control cabinet and consequently a silent test of the control circuits can be made. Check operation of the control circuits by noting the operation of the chopper motor control.

It should remain energized for about four seconds and be open for approximately eight seconds when operated by an AR Timer having a total cycle of twelve seconds as described in "Electrical Installation, Page #6". See "Adjustments" if a change in timing is desired. Move the control switch to "Automatic" position after checking control circuits.

10. With all four switches in the "Automatic" position, the siren is ready for final operation. It may be tested for full sound output by operating AR Timer or the manual code switch if one has been installed. It may also be tested by moving the blower and rotator switches to "Test" position and then operating the chopper up and down scale by means of the chopper test switch.

Adjustments

To Change Speed of Horn Rotation:

The rotating horn is driven through 3 - step cone pulleys. Speeds of approximately two, four or eight revolutions per minute are possible and can be adjusted by changing the V-belt to a different set of pulley grooves. Units are shipped arranged for a recomended 2 RPM speed.

To Change Maximum Frequency of Siren:

The chopper motor is a series type and its maximum speed can be controlled by varying the voltage to the motor. The control panel contains a tapped auto-transformer for this purpose and the speed of the chopper may be changed by moving one of the leads of the chopper motor to a different terminal. Terminal No. 1 gives the lowest top frequency and Terminal No. 7 gives the highest top frequency. See Page 27. After a change of the top frequency has been made, it may be necessary to change the time delay relay adjustment. If the frequency has been lowered, the delay period may be decreased while an increase in top frequency may require an increase in the delay period.

To Adjust Time Delay Relay:

The time delay relay has been adjusted at the factory to keep the blower and rotator running for eight seconds after the chopper has been shut off. This period may be changed by turning the dial on top of the relay. CAUTION: Do not adjust so that delay period is less than 5 seconds.

MAINTENANCE

To insure a high degree of reliability for any signal system, a definite program of inspection, lubrication, test, adjustment and repair must be planned and followed.

Periodic Inspection

The frequency of the following maintenance schedules may be varied to suit specific conditions such as extreme climates, frequent use, availability of maintenance personnel, etc.

Three-month Inspection:

1. Test blower alone by operating the blower switch.
2. Test rotator by operating the rotator switch.
3. While the horn rotates, but with the blower off, test the chopper by operating the chopper switch.
4. Make silent test of control circuits by moving control switch to "Test" position and then operating control circuits while observing chopper motor control for proper timing.
5. Return all four switches to "Automatic" position after test.

Six month Inspection:

In addition to the regular three-month checks, the following items should also be checked.

1. Remove blower relief valve, clean off machined surfaces and cover with a film of light oil.
2. Drain any moisture which may have collected in the elbow at the bottom of the standpipe by removing the plug at the bottom of the elbow. Replace drain plug.
3. Check the belt tension of the blower drive. Finger pressure should not depress belt more than approx. 1/2".
4. Check the belt tension of the rotator drive. Finger pressure should not depress belt more than approx. 1/2".
5. Check oil level of blower gear house.
6. Check oil level of rotator gear box.
7. Clean and relubricate rotator spur gear and pinion.
8. Lubricate chopper tube bearings by giving grease cups several turns.

Annually it is recommended that painted surfaces be examined for any necessary maintenance.

LUBRICATION

Blower:

The proper oil level in the blower gear house must be maintained at all times. Check the oil level in the gear house by removing the plug at the end of the blower. If no oil drips from the opening, add oil until it does. Do not over-lubricate as too much oil may cause hard starting and oil leakage. Use No. 10W30 SAE oil. Replace plug.

Bearings at the gear end are lubricated by splash from the gears, but the bearings at the drive end are packed with grease prior to shipment. Grease may be renewed by regreasing through grease fitting at bearing. The old grease will be forced out of the vents during greasing operation.

Blower Motor:

The bearings in this motor are prelubricated ball bearings and will not require lubrication during the life of the unit.

Rotator Gear Reducer:

The oil in the gear box must be maintained at the proper level. Check the level when the unit is not running. To check, remove the "Oil Level" plug and see if gear box is filled to this hole. If not, remove oil breather plug and add oil to bring level to proper point. Use No. 10W30 SAE oil.

Rotator Motor:

The bearings in this motor are prelubricated sealed ball bearings and will not require lubrication during the life of the unit.

Rotator Gear & Pinion:

These gears should be covered with a light film of grease to prevent oxidation. Ordinary cup grease will be suitable.

Chopper Tube Bearings:

These bearings are lubricated by means of two grease cups. One of these cups is located just below the chopper housing and the other is located on the rotator gear in the rotator housing. Cup grease will be suitable for these bearings, Texaco Unitemp or equal.

Chopper Motor:

The bearings in this motor are prelubricated sealed ball bearings and will not require lubrication during the life of the unit.

TROUBLE	PROBABLE CAUSE	REMEDY
Horn does not rotate Also see Horn Rotates Erratically	Switch in control cabinet on center "off" position	Put switch on automatic or manual position as desired
	Rotator motor control heater relay tripped	Reset control heater relays
	Open connection between Control Panel and motor	Check wiring for continuity
	Rotator motor defective	Check motor and repair or replace if found to be faulty
	Rotary motor control coil defective	Check coil and replace if found to be faulty
	Gear mechanism jammed	Turn pulleys by hand. Locate source of binding if pulleys turn hard.
Blower does not operate	Blower motor control heater relay tripped	Reset control heater relays
	Open connection between Control Panel and motor	Check wiring for continuity
	Blower motor defective	Check motor and repair or replace if defective
	Blower motor control coil defective	Check coil and replace if defective
	Blower jammed	Turn blower pulley by hand. Should turn easily. Look for cause of jamming if not free.
Blower motor is overloaded	Blower running in wrong direction	Change leads to motor if direction of rotation is wrong
	Voltage at siren is low	Provide shorter or larger wires to siren. Source of power may not be adequate.
	Relief valve may be stuck	Remove relief valve cover, clean with kerosene or light oil and replace.
	Intake port of blower is closed	Remove obstruction such as rags, paper, etc.
	Oil in blower gear house is too heavy for cold weather	Drain and refill with proper oil specified in these instructions
Chopper motor does not operate	Chopper motor control heater relay tripped	Reset control heater relay
	Open connection between control panel and motor	Check wiring for continuity

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TROUBLE	PROBABLE CAUSE	REMEDY
8400 A177-12	Chopper motor defective	Check motor and repair or replace if found defective
	Chopper rotor jammed	Check rotor for free rotation. Remove any foreign material causing jamming.
Chopper motor operates but blower and rotator do not start when remote relay is energized.	Time delay relay coil open	Check coil for continuity. Replace if defective.
	Circuit to time delay relay open	Check circuit for continuity
	Switches on time delay relay do not operate properly	Check switch for proper operations
	Circuit between time delay relay switch and motor controls open	Check circuits for continuity
Blower and rotator do not shut off after signal period is over or Blower and rotator shut off before chopper coasts to a stop	Time delay relay is not adjusted properly	See "Adjustments" Page 8
	Time delay relay defective	Check relay and repair or replace if found defective
Horn Rotates Erratically	Chopper Housing Bearing Binding	**Lubricate according to recommendations under "Lubrication"**
	Grease on Clutch Bands	**Remove bands and clean**
	Not enough clutch tension	**Tighten clutch band cross bolts.** Factory setting 40# pull at junction of horn &bra **CAUTION: DO NOT TIGHTEN TOO MUCH SO THAT STRONG GUSTS OF WIND WILL CAUSE DAMAGE TO DRIVE MECHANISM**

8400A177-13

TABLE 1

RECOMMENDED WIRE SIZES FOR CONNECTION OF THUNDERBOLT SIREN

208-240 Volts - 3 Phase

	Full Load Current	Distance in feet		
		100 or less	100 - 200	Over 200
Control Cabinet to blower motor	23 Amps	3 - #10's	3 - #8's	Calculate wire sizes on basis of not over 5% total line drop from power supply to siren for indicated full load current.
Control Cabinet to chopper motor	10 Amps	2 - #14's	2 - #12's	
Control Cabinet to rotator motor	2 Amp	2 - #14's	2 - #14's	
Power supply to Control Cabinet	35 Amps	3 - #6's	3 - #4's	
Control relay to Control Cabinet	180 Milliamps	2 - #14's	2 - #14's	

240 Volts - 1 Phase

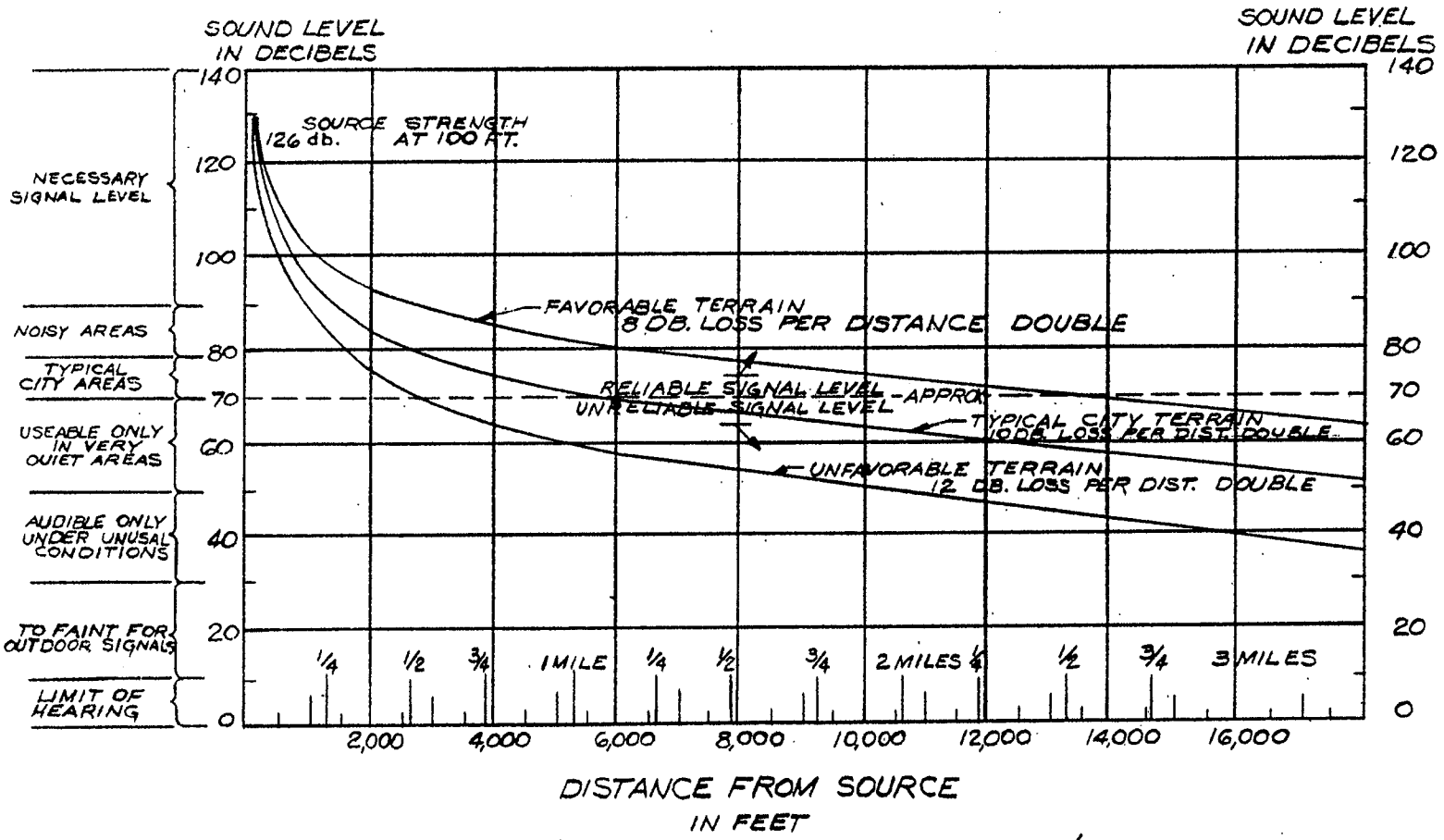
	Full Load Current	Distance in feet		
		100 or less	100 - 200	Over 200
Control Cabinet to blower motor	42 Amps	2 - #6's	2 - #4's	Calculate wire sizes on basis of not over 5% total line drop from power supply to siren for indicated full load current.
Control Cabinet to chopper motor	10 Amps	2 - #14's	2 - #12's	
Control Cabinet to rotator motor	2 Amps	2 - #14's	2 - #14's	
Power supply to Control Cabinet	54 Amps	2 - #4's	2 - #2's	
Control relay to Control Cabinet	180 Milliamps	2 - #14's	2 - #14's	

480 Volts - 3 Phase

	Full Load Current	Distance in feet		
		100 or less	100 - 200	Over 200
Control Cabinet to blower motor	12 Amps	3 - #10's	3 - #8's	Calculate wire sizes on basis of not over 5% total line drop from power supply to siren for indicated full load current.
Control Cabinet to chopper motor	10 Amps	2 - #14's	2 - #12's	
Control Cabinet to rotator motor	1 Amp	3 - #14's	3 - #14's	
Power supply to Control Cabinet	23 Amps	3 - #6's	3 - #4's	
Control relay to Control Cabinet	180 Milliamps	2 - #14's	2 - #14's	

AVERAGE SIGNAL LEVEL DISTRIBUTION FOR THUNDERBOLT SIREN

SOURCE STRENGTH 126 DB AT 100 FT.



(BASED ON DATA IN F.C.D.A. BULLETIN NO.46 & PUBLICATION TM 4-1)

FIGURE - 1

8400 A177-15

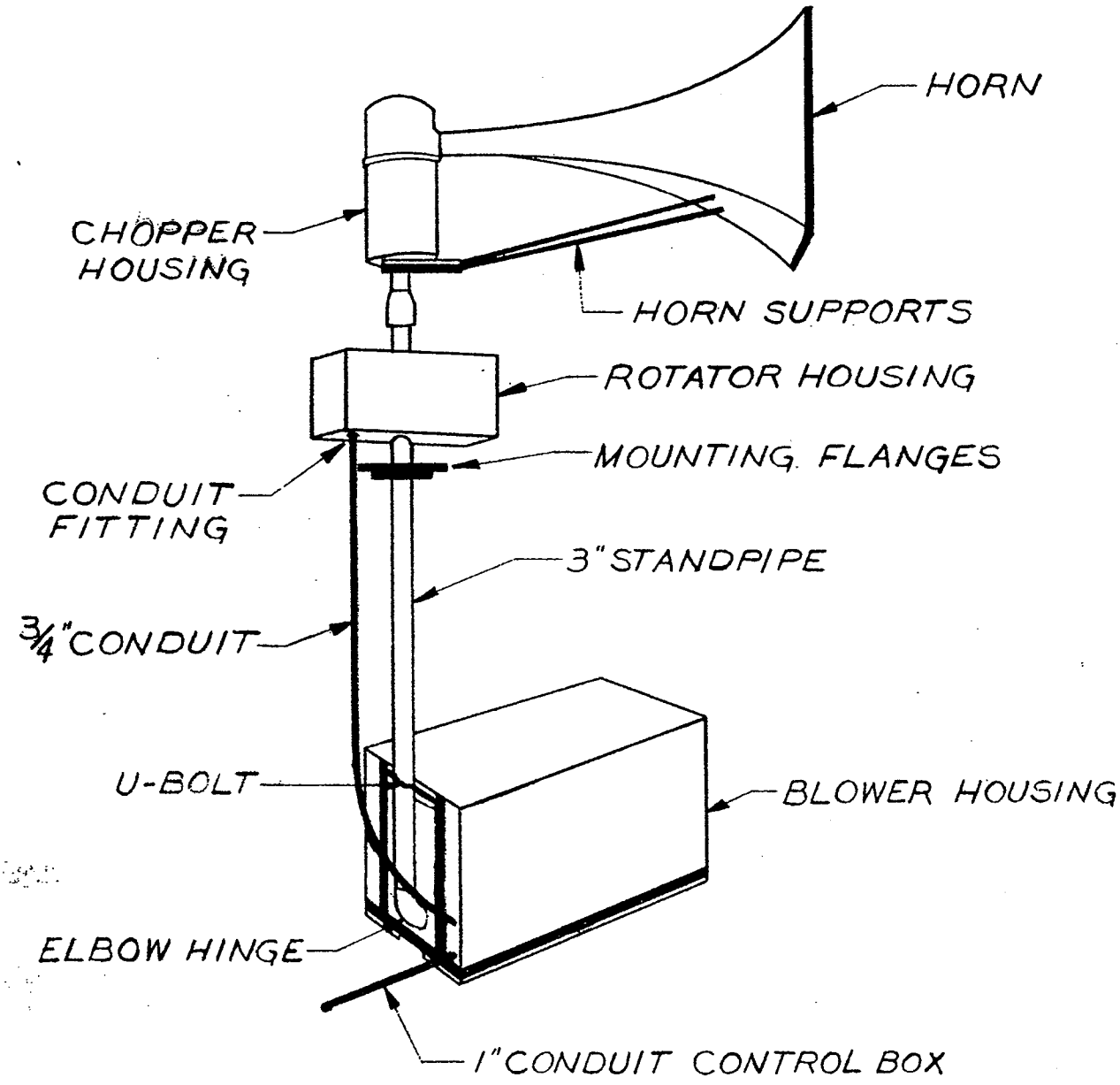


FIGURE - 2

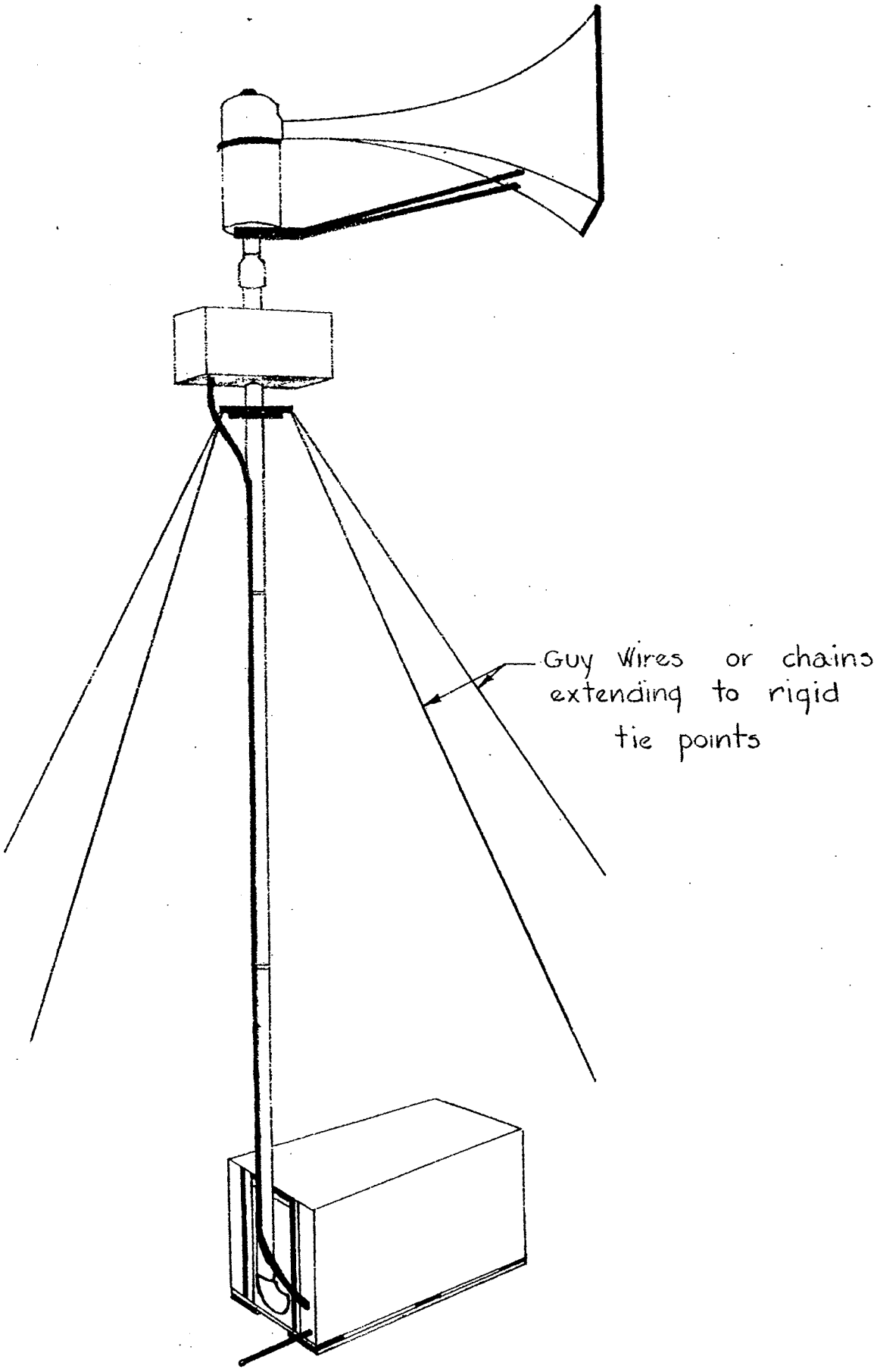


FIGURE - 3.

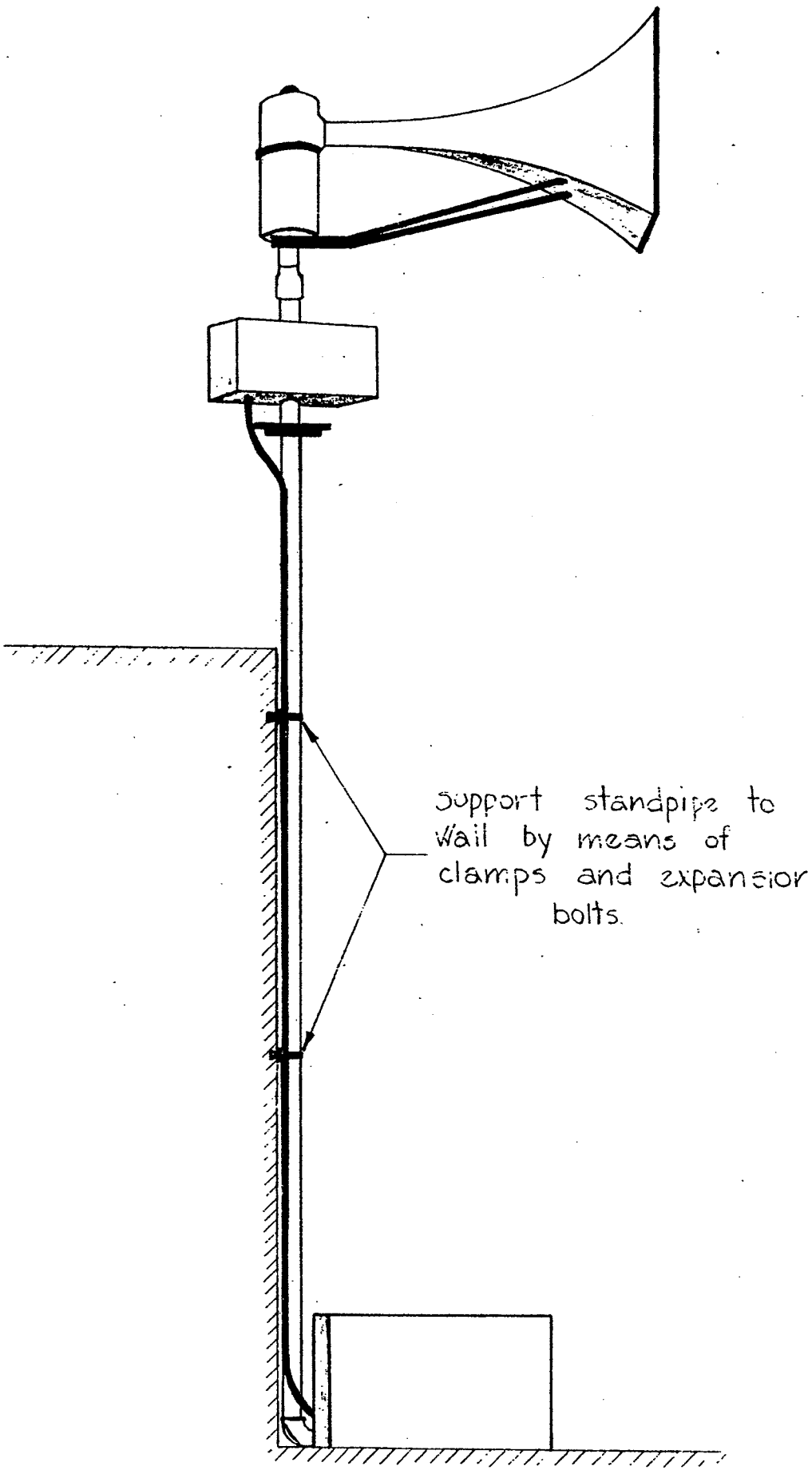

Support standpipe to wall by means of clamps and expansion bolts.

FIGURE- 4.

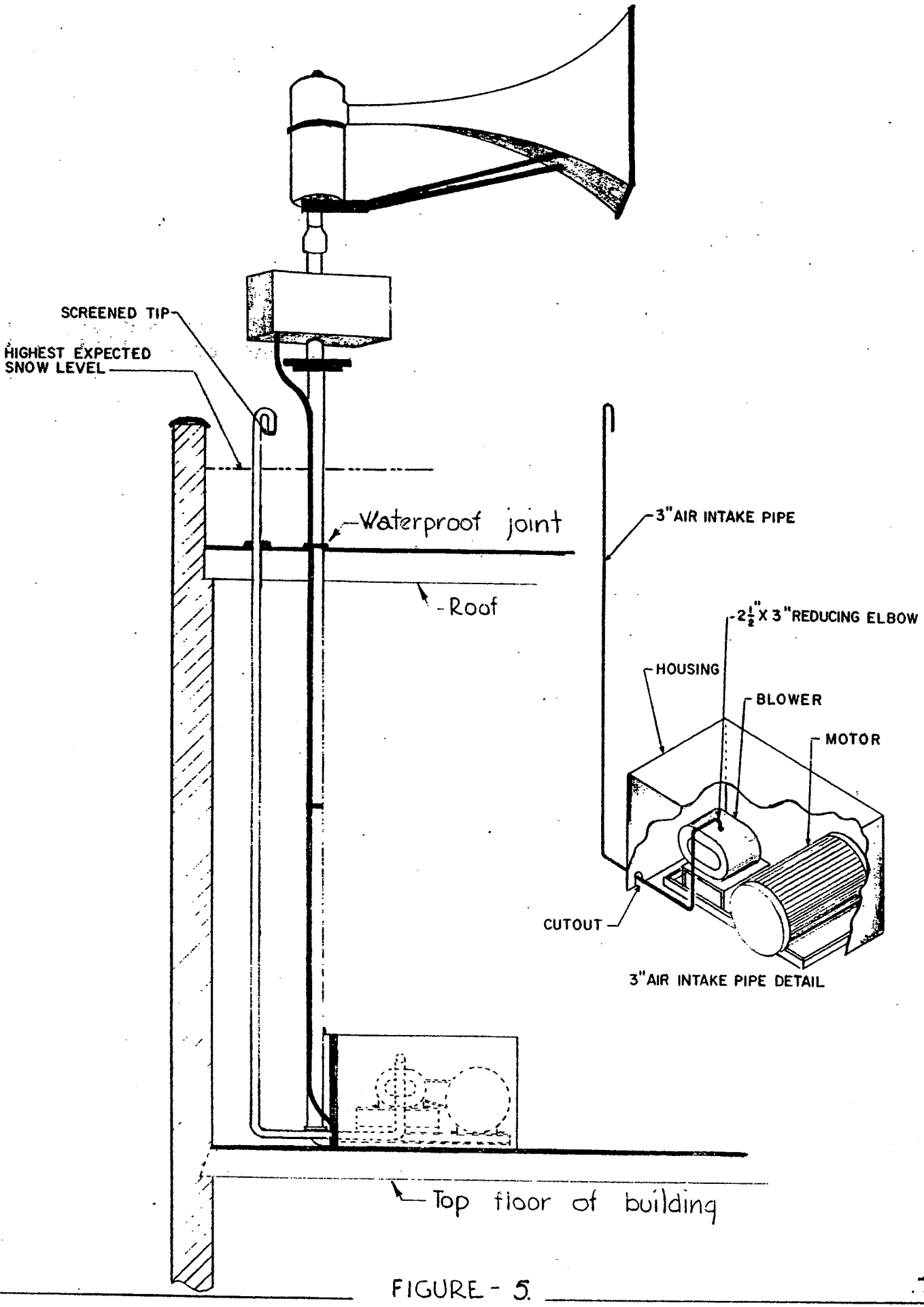

SCREENED TIP
HIGHEST EXPECTED SNOW LEVEL
Waterproof joint
Roof
3"AIR INTAKE PIPE
2½"X 3"REDUCING ELBOW
HOUSING
BLOWER
MOTOR
CUTOUT
3"AIR INTAKE PIPE DETAIL
Top floor of building

FIGURE - 5.

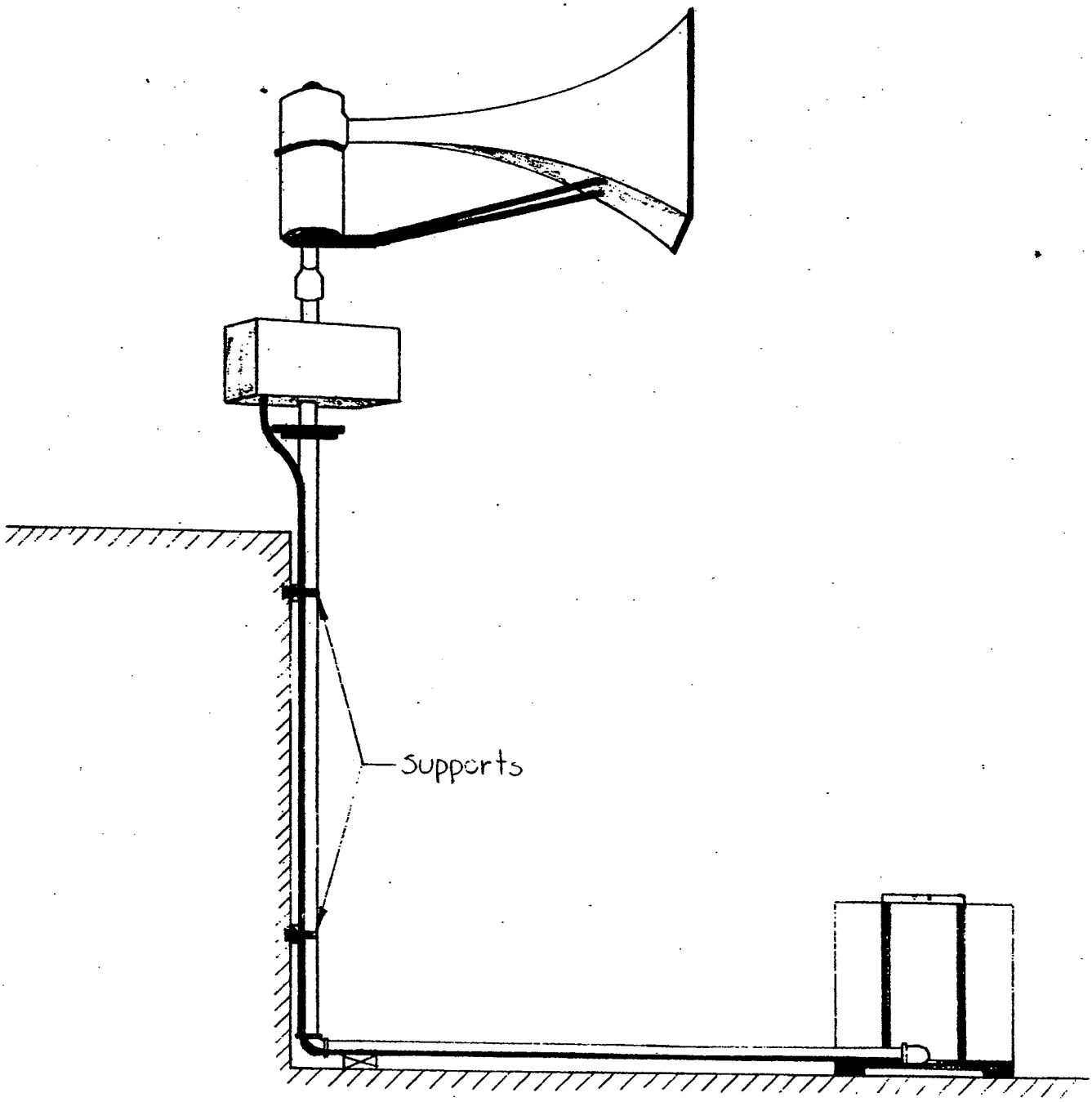


FIGURE - 6.

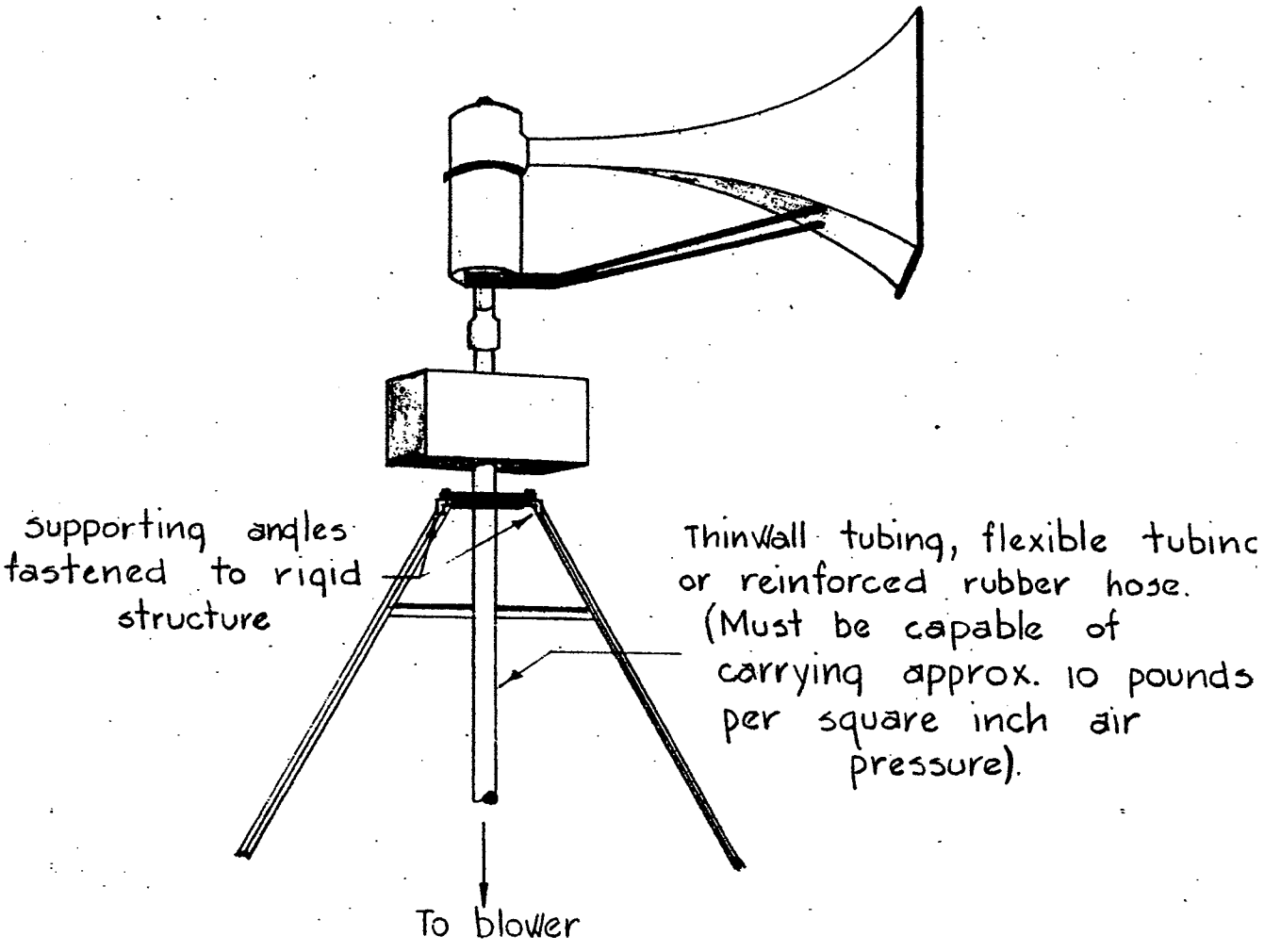

Supporting angles fastened to rigid structure
Thinwall tubing, flexible tubing or reinforced rubber hose. (Must be capable of carrying approx. 10 pounds per square inch air pressure).
To blower

FIGURE-7.

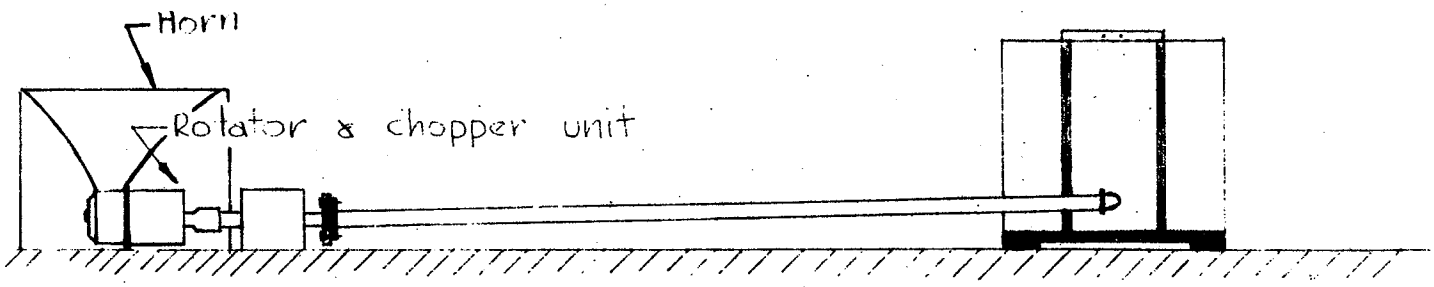


FIGURE - 8

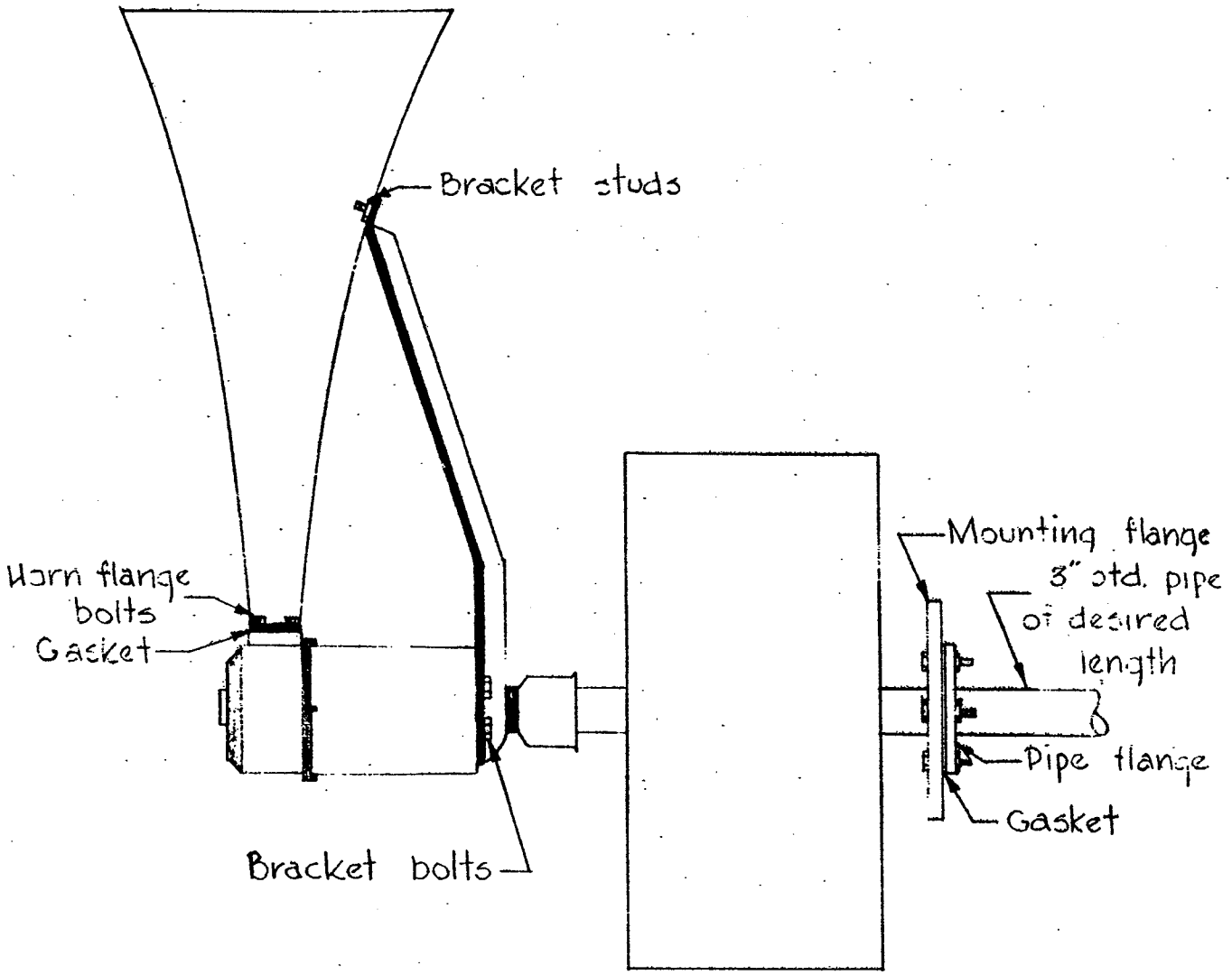

Bracket studs
Horn flange bolts
Gasket
Mounting flange
3" std. pipe of desired length
Pipe flange
Gasket
Bracket bolts

FIGURE- 9.

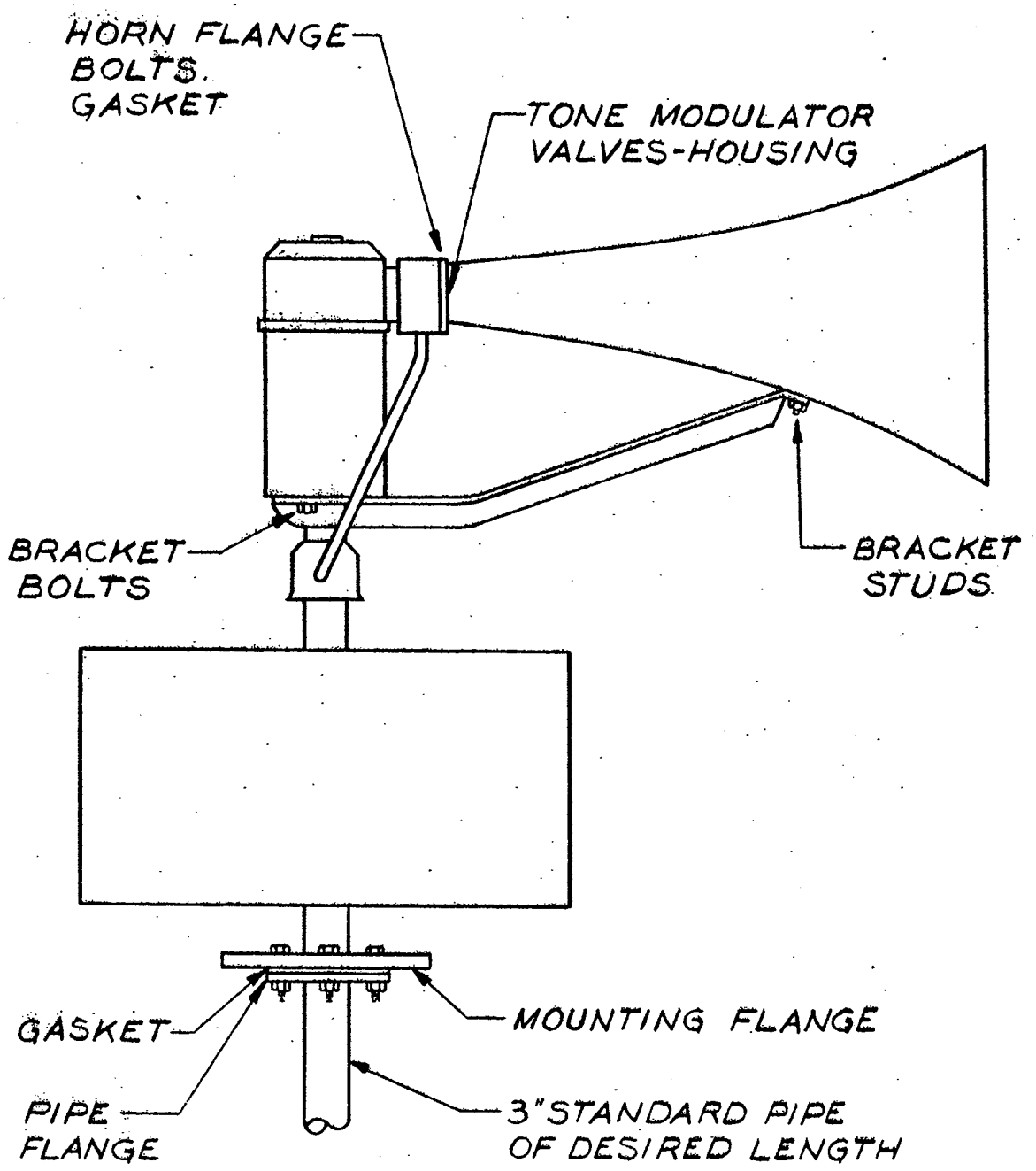


FIGURE - 9

MODEL 1003
THUNDERBOLT SIREN

8400-X177-23

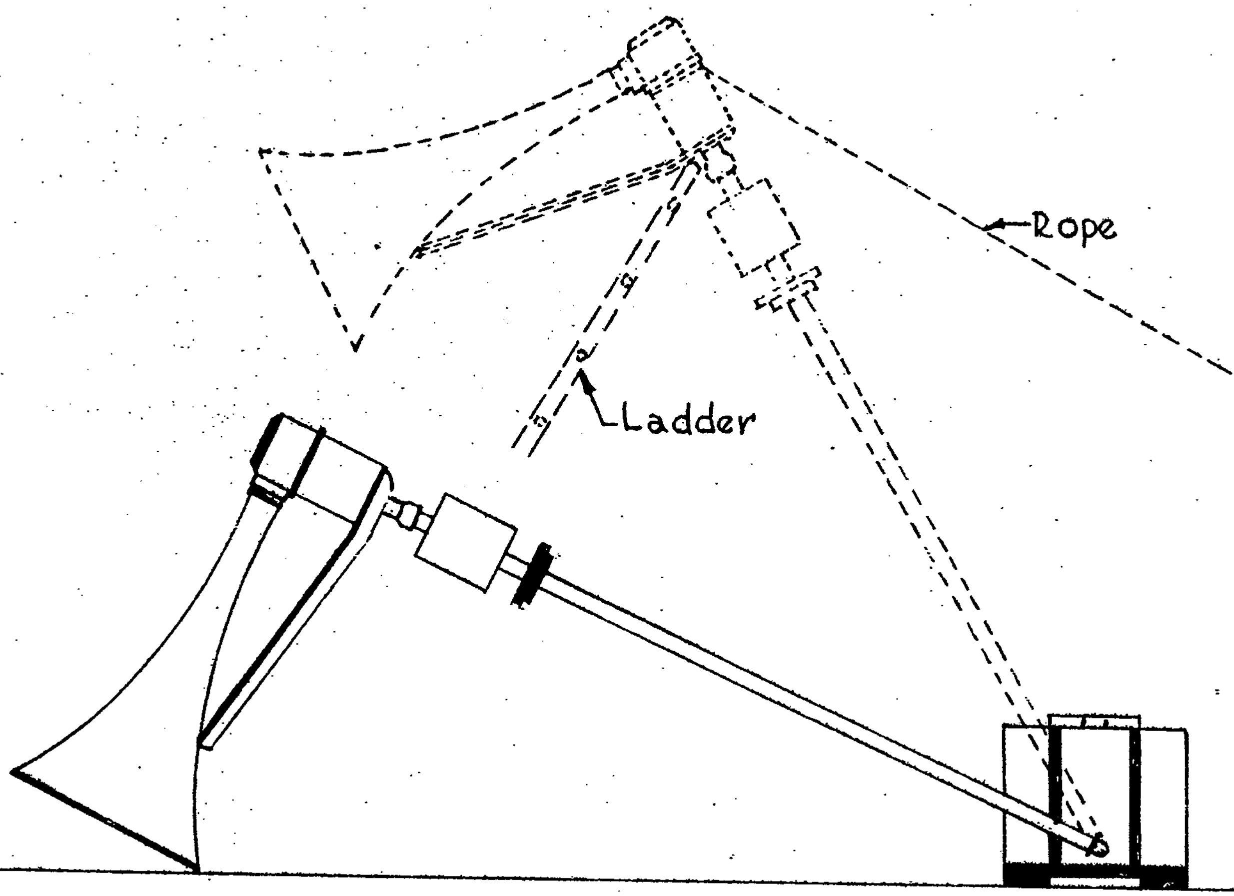
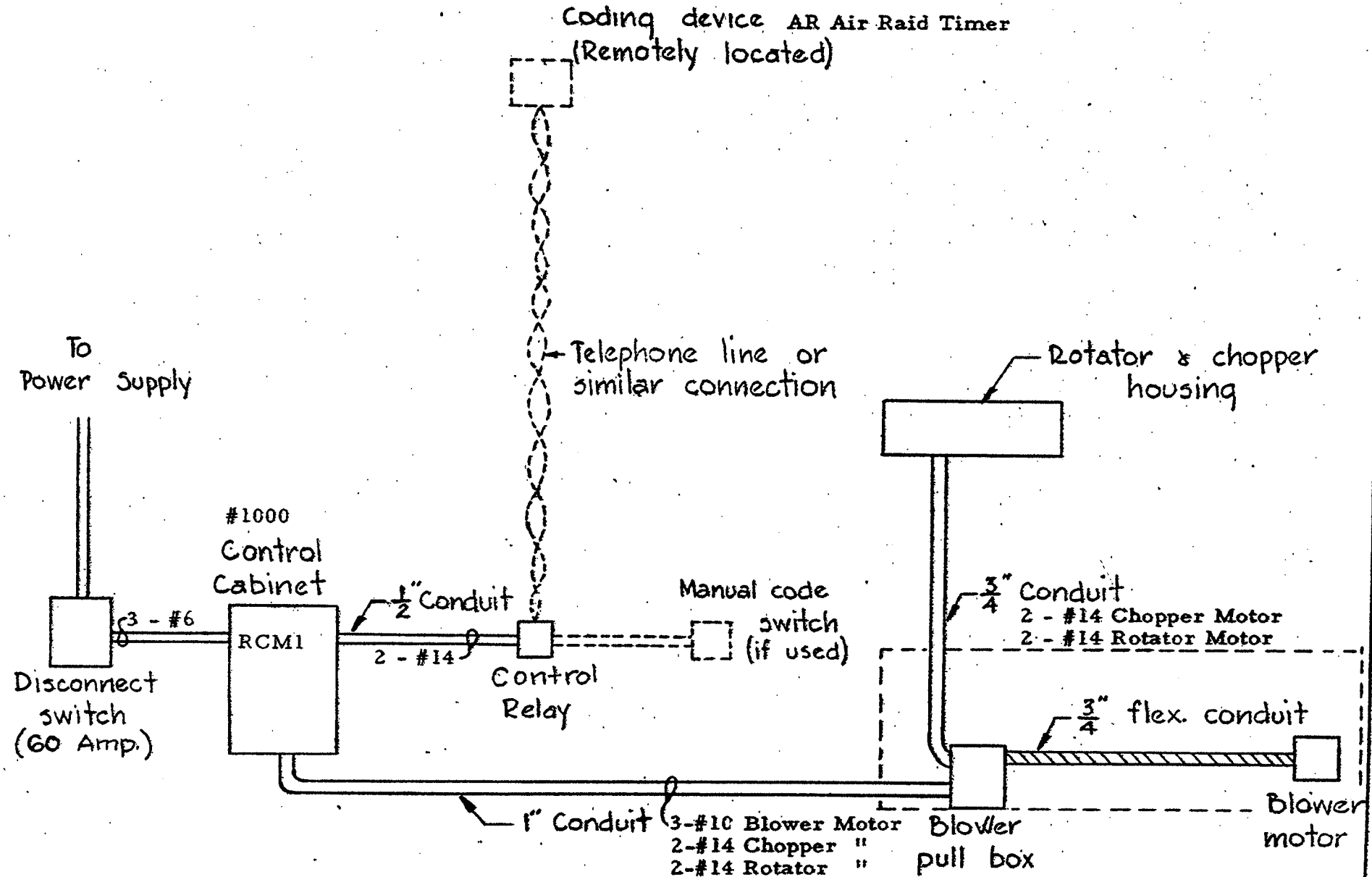


FIGURE - 10

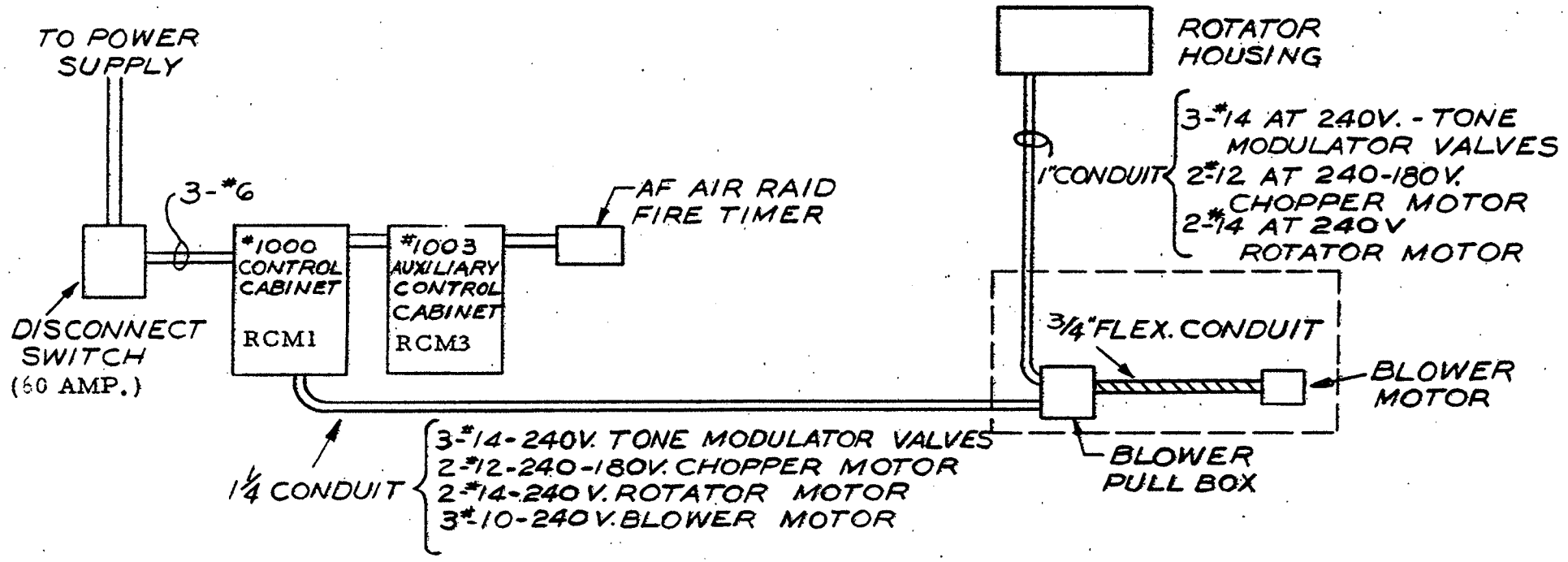
8100 A177-24



#1000 THUNDERBOLT - 240V. 3PH.

WIRING LAYOUT

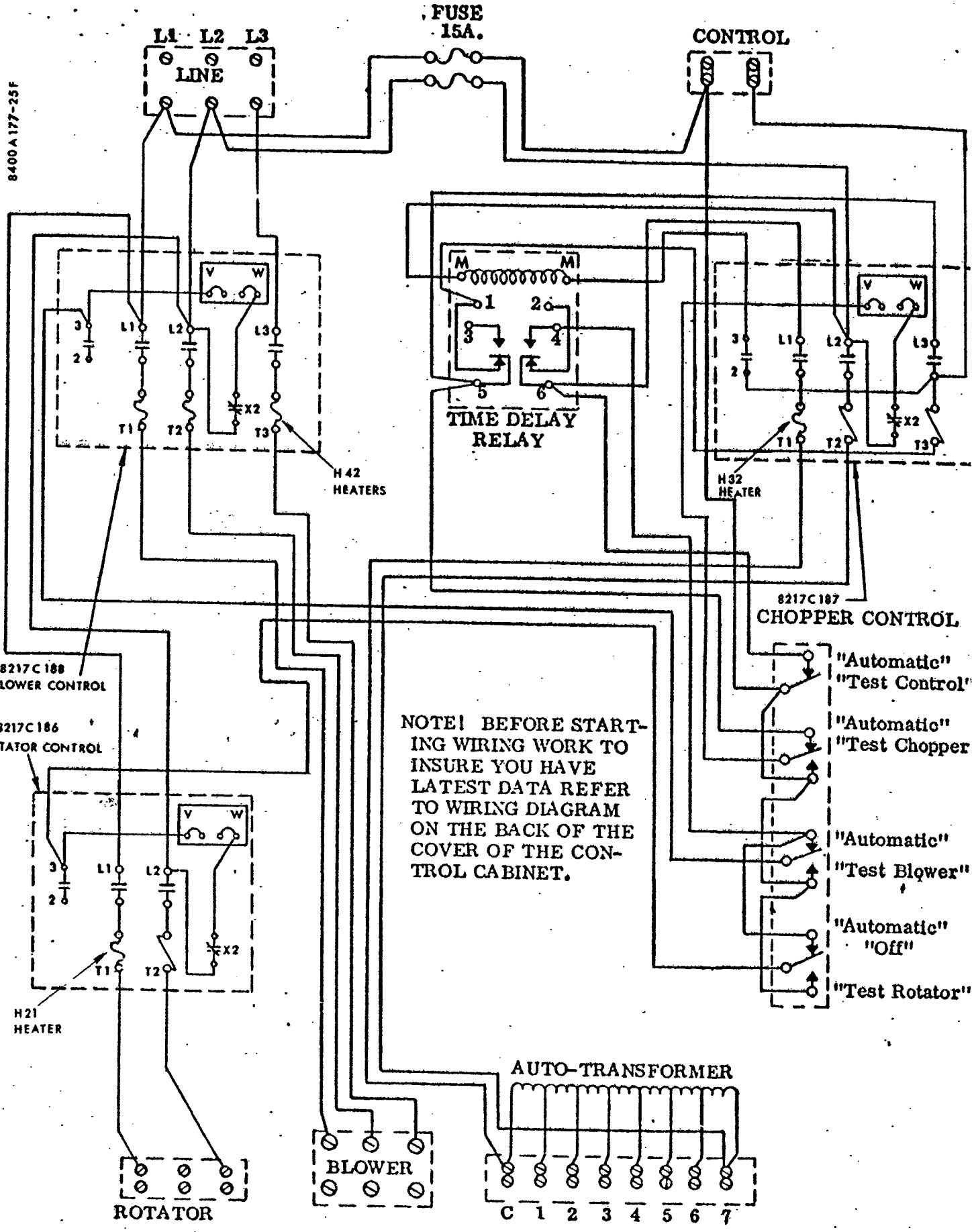
8400 K177-248



#1003 THUNDERBOLT - 240V. 3PH.

WIRING LAYOUT

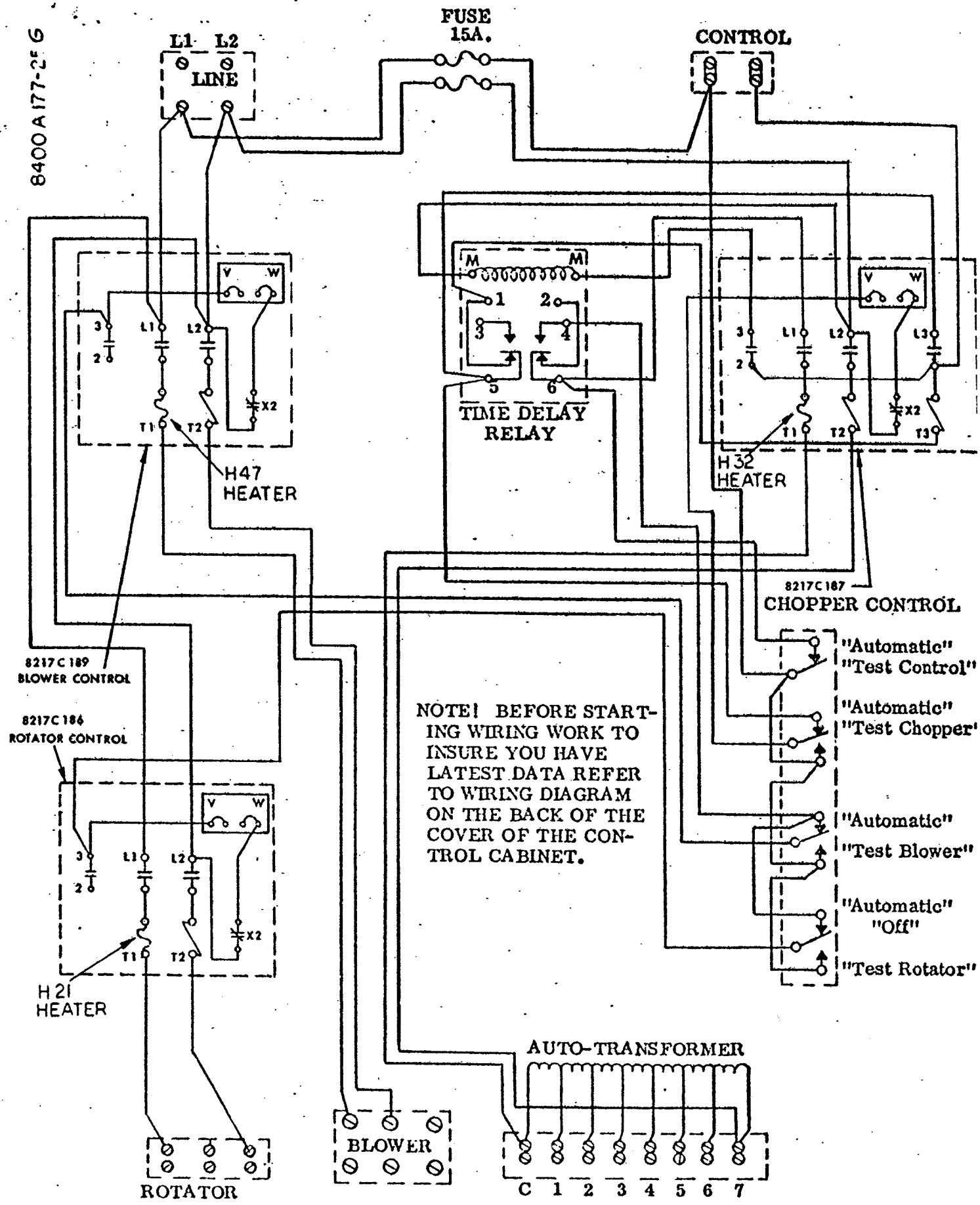
FIGURE 11A



MODEL # RCM1A* 240
CONTROL PANEL
WIRING DIAGRAM
SERIES A2

208-240 VOLT 3 PHASE

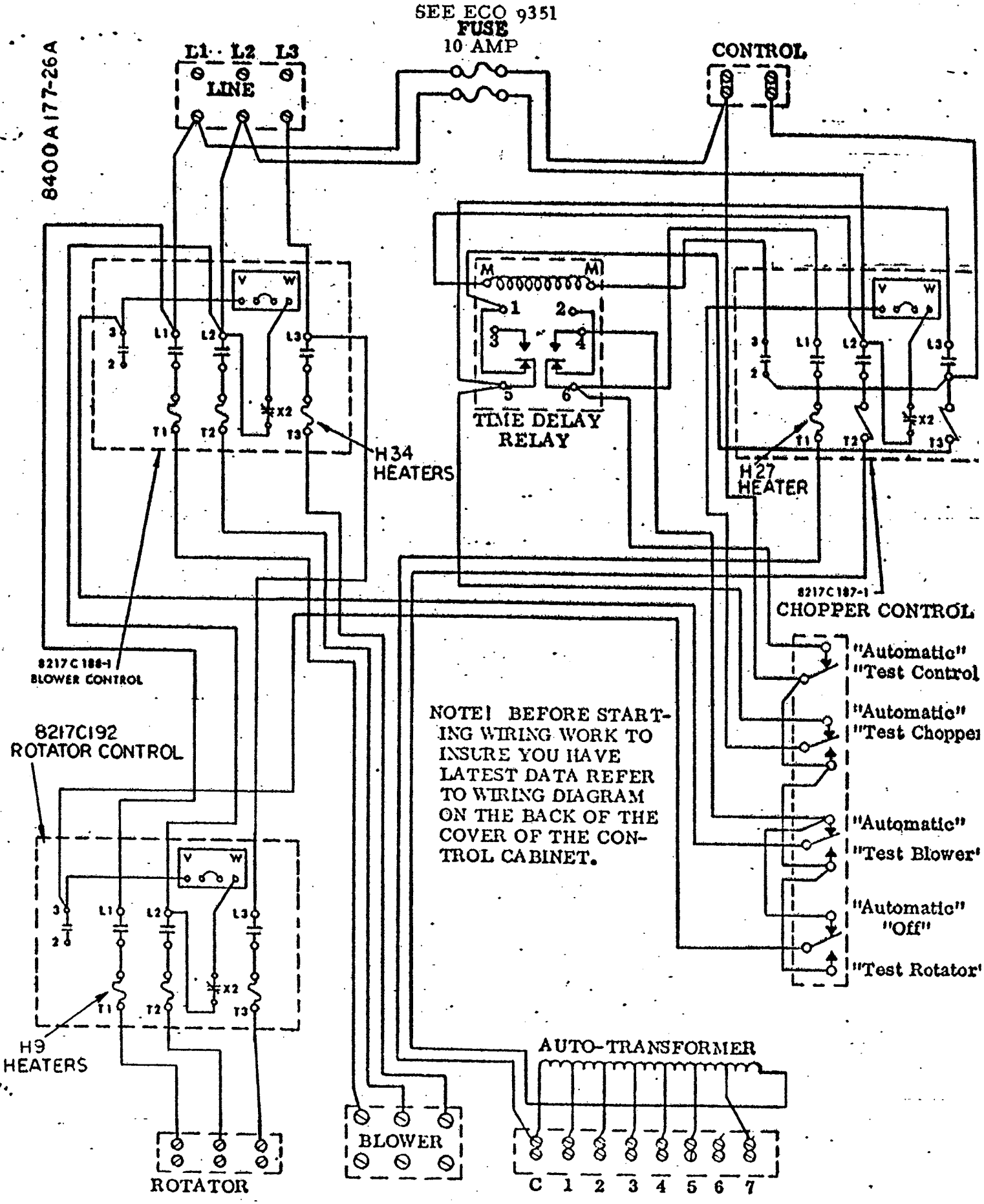
EFFECTIVE
OCT. 1973
25 F



MODEL # RCM1B* 240
CONTROL PANEL
WIRING DIAGRAM
SERIES A2

240 VOLT - 1 PHASE

EFFECTIVE
OCT 1973
25 G

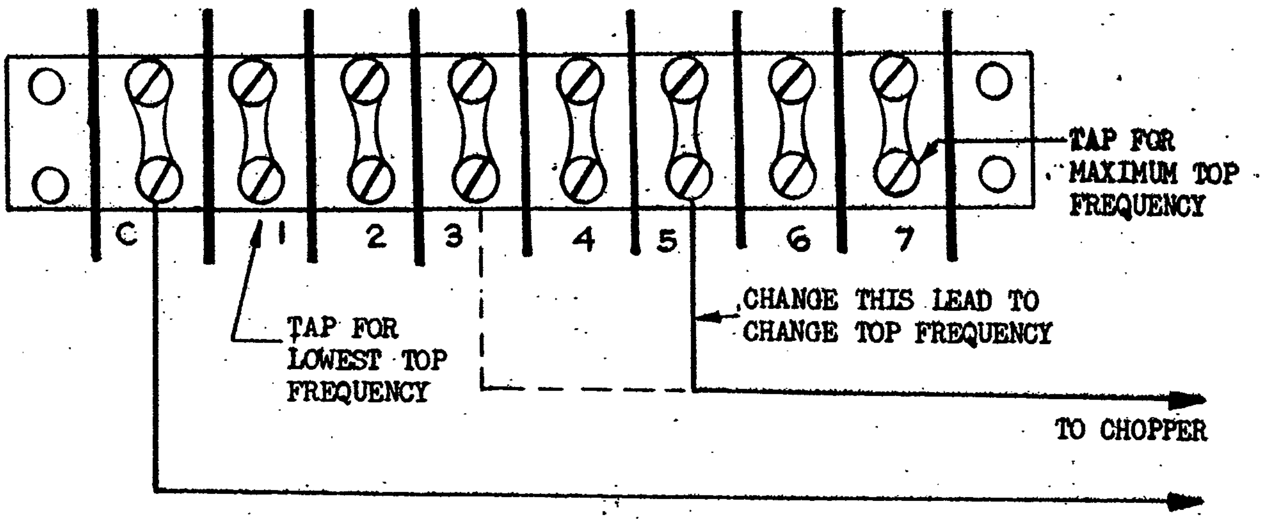


A1 ECO#9351
480 VOLT 3 PHASE

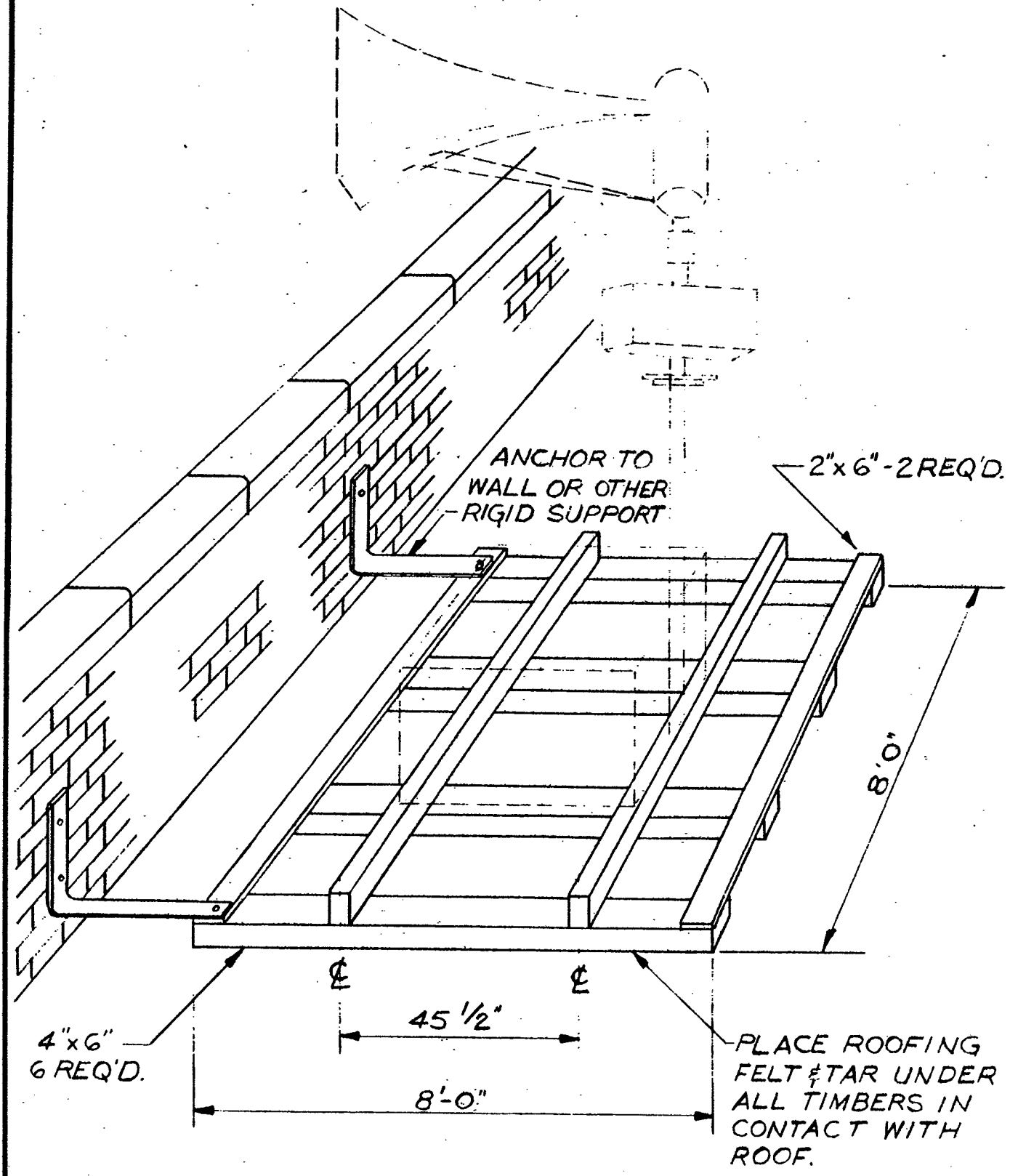
MODEL # RCM1A*480
CONTROL PANEL
WIRING DIAGRAM
SERIES A2

EFFECTIVE
FEB 1974
26A

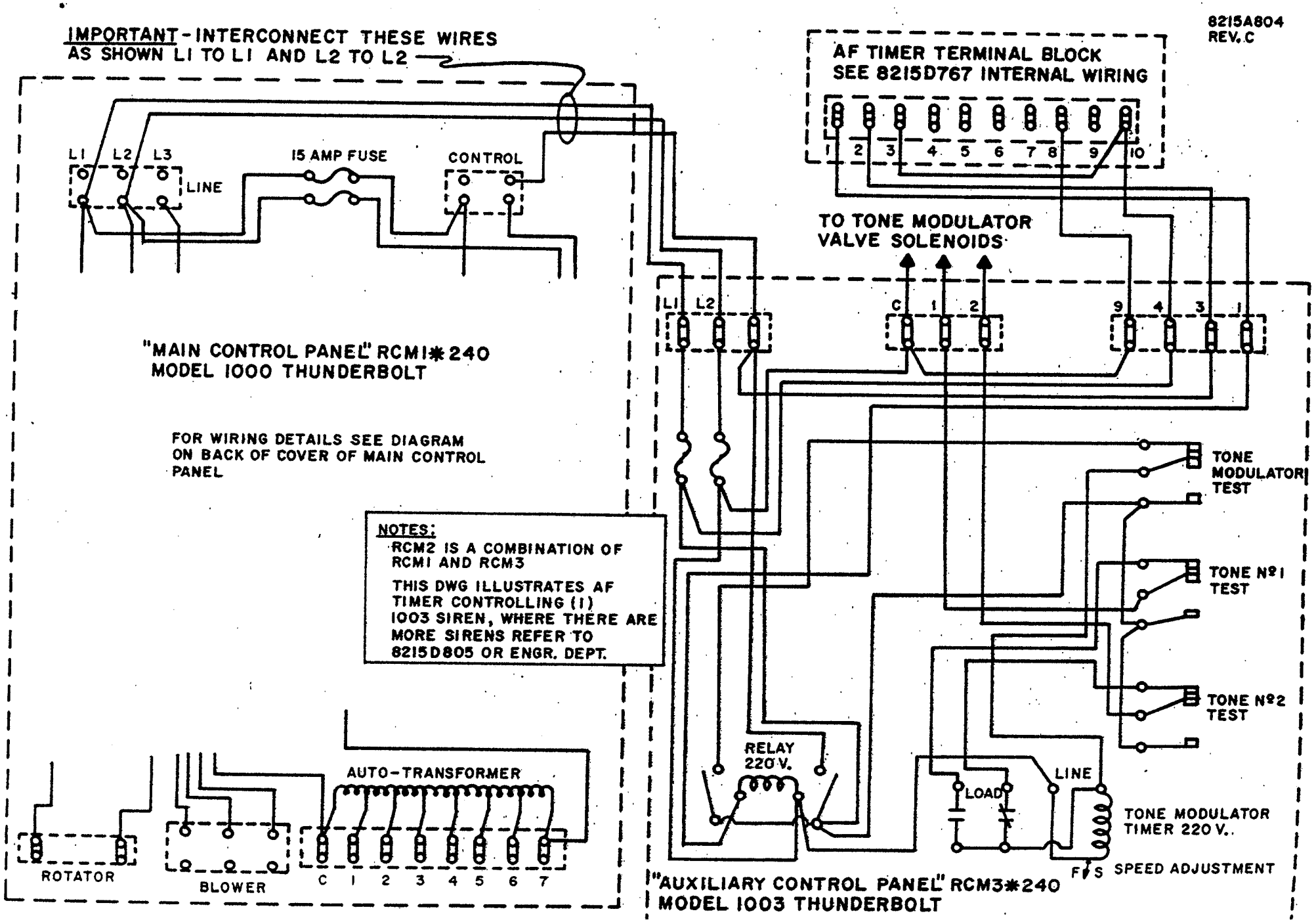
CONNECTION OF CHOPPER MOTOR LEADS



Connect one of the chopper motor leads to the terminal marked "C" in the control cabinet. Connect the other chopper motor lead to one of the terminals marked 1 to 7. It is suggested that terminal No. 5 be tried first. If any change in the top frequency of the siren is desired after testing it, move the motor lead wire on terminal No. 5 to a higher or lower numbered tap. See Page 8

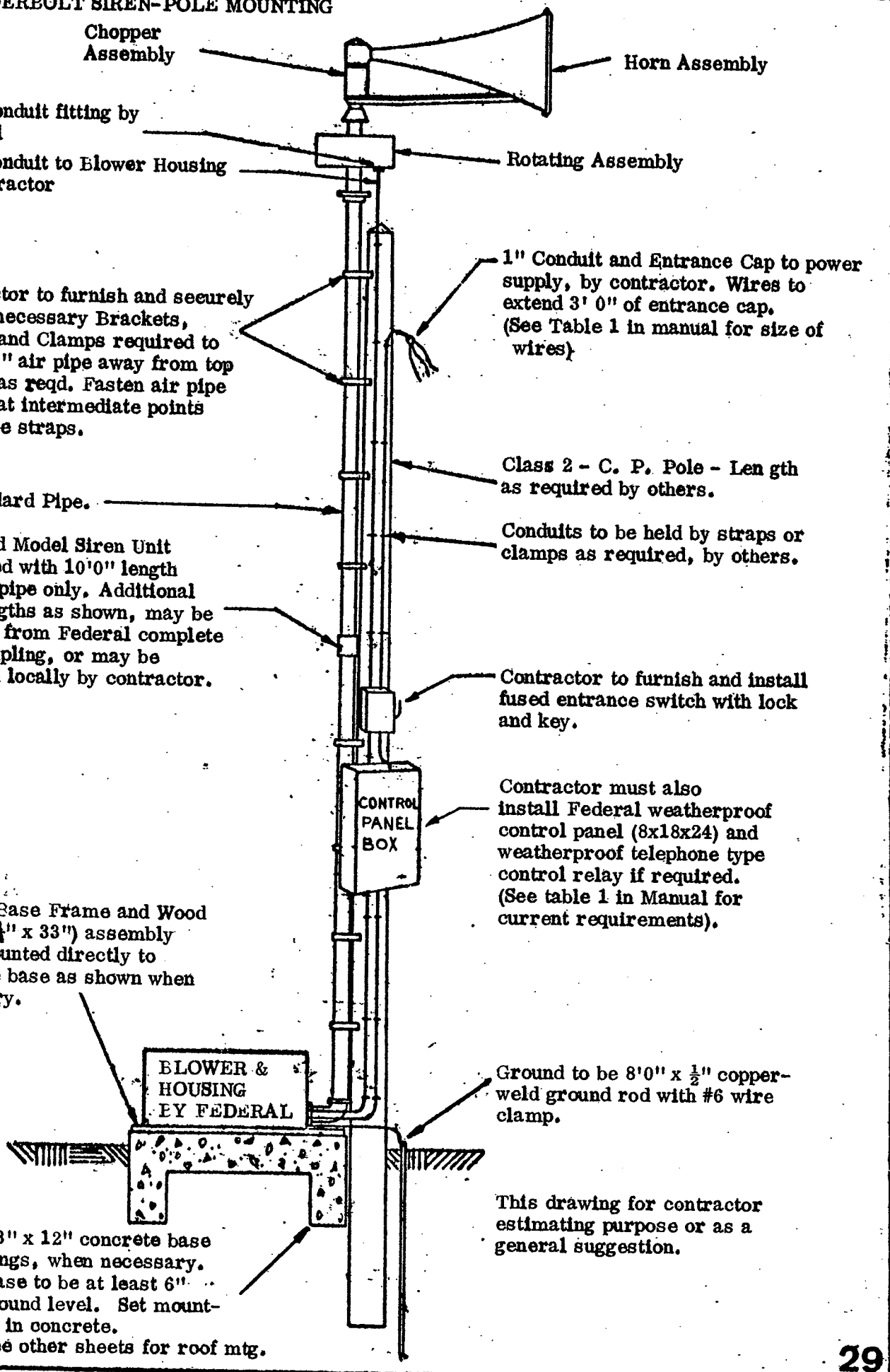


SUGGESTED ROOF MAT FOR WEIGHT DISTRIBUTION (APPROX. 18# PER SQ. FT.)


8215A804
REV. C
IMPORTANT - INTERCONNECT THESE WIRES
AS SHOWN L1 TO L1 AND L2 TO L2
AF TIMER TERMINAL BLOCK
SEE 8215D767 INTERNAL WIRING
1 2 3 4 5 6 7 8 9 10
L1 L2 L3
LINE
15 AMP FUSE
CONTROL
TO TONE MODULATOR
VALVE SOLENOIDS
L1 L2
C 1 2
9 4 3 1
"MAIN CONTROL PANEL" RCM1*240
MODEL 1000 THUNDERBOLT
FOR WIRING DETAILS SEE DIAGRAM
ON BACK OF COVER OF MAIN CONTROL
PANEL
NOTES:
RCM2 IS A COMBINATION OF
RCM1 AND RCM3
THIS DWG ILLUSTRATES AF
TIMER CONTROLLING (1)
1003 SIREN, WHERE THERE ARE
MORE SIRENS REFER TO
8215D805 OR ENGR. DEPT.
TONE
MODULATOR
TEST
TONE Nº1
TEST
TONE Nº2
TEST
RELAY
220 V.
AUTO-TRANSFORMER
LOAD
LINE
TONE MODULATOR
TIMER 220 V.
F/S SPEED ADJUSTMENT
ROTATOR
BLOWER
C 1 2 3 4 5 6 7
"AUXILIARY CONTROL PANEL" RCM3*240
MODEL 1003 THUNDERBOLT

THUNDERBOLT SIREN-POLE MOUNTING

8400A177-29



THUNDERBOLT CONTROL PANEL
TYPICAL WIRING

8400A177-30

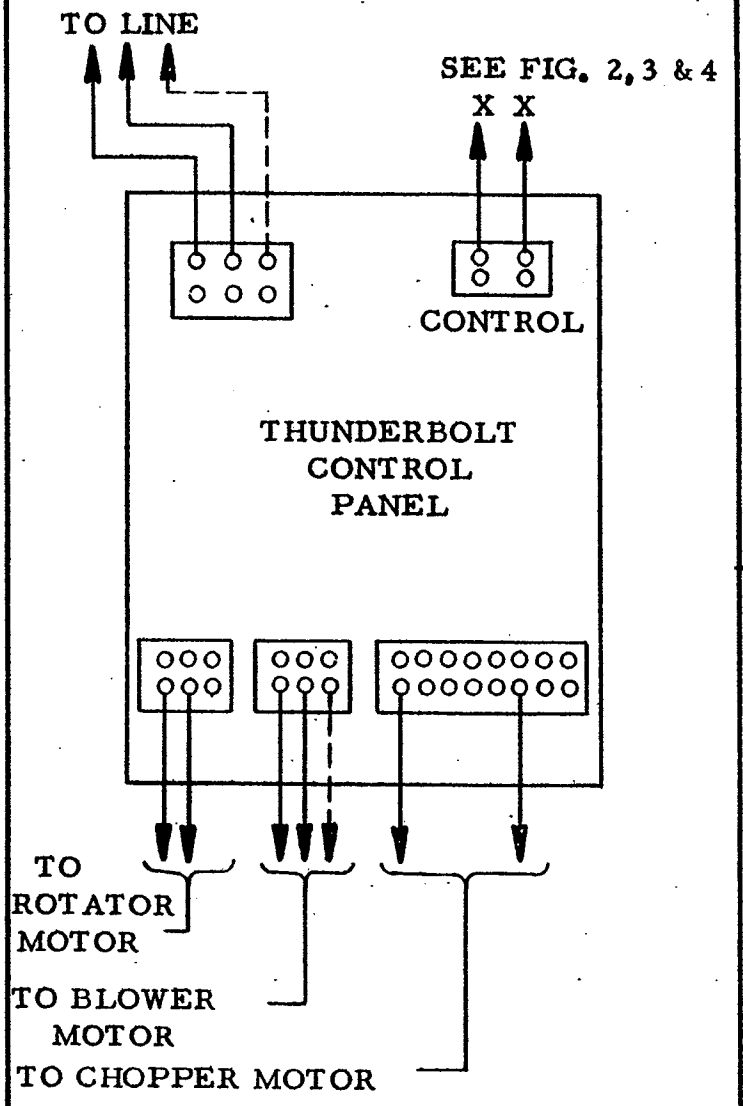
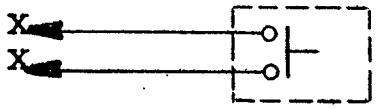
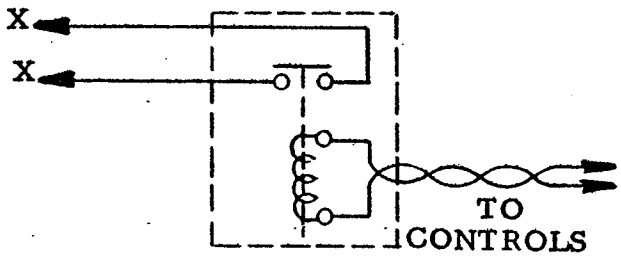


FIGURE 1



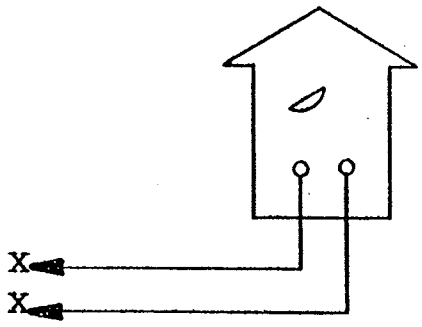
PUSHBUTTON SWITCH
CONNECTION

FIGURE 2



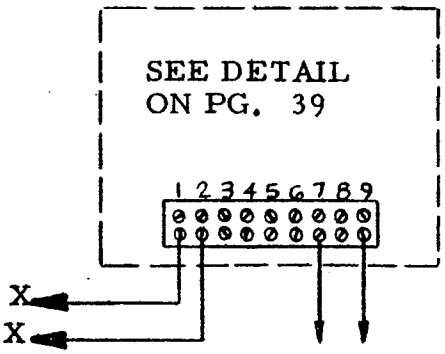
RELAY CONTROL

FIGURE 3



PULL LEVER BOX

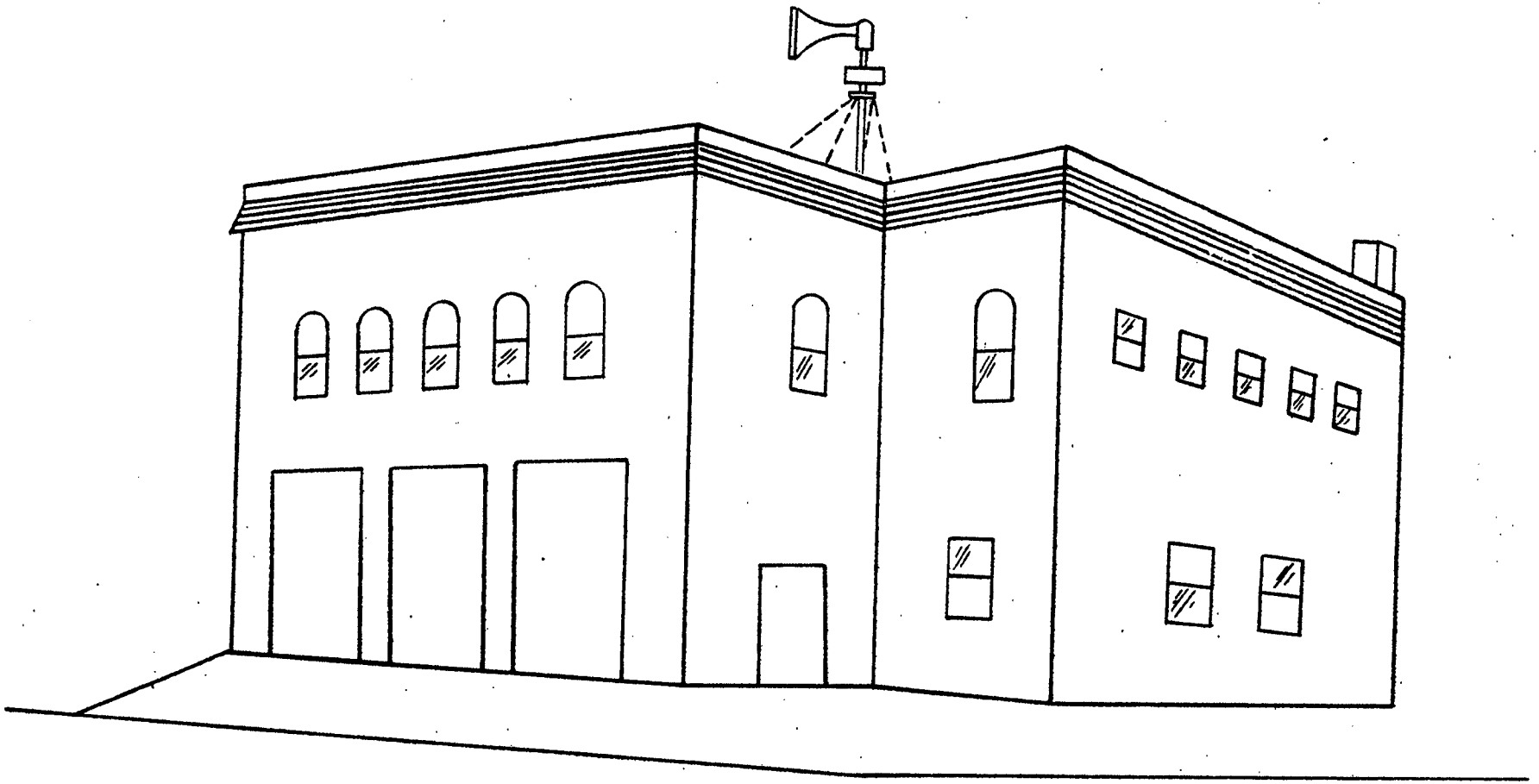
FIGURE 4



DIRECT CONNECTION TO
FEDERAL AIR RAID TIMER

FIGURE 5

IMPORTANT!
CONNECTIONS SHOWN BY DOTTED LINES FOR
3-PHASE OPERATION ONLY

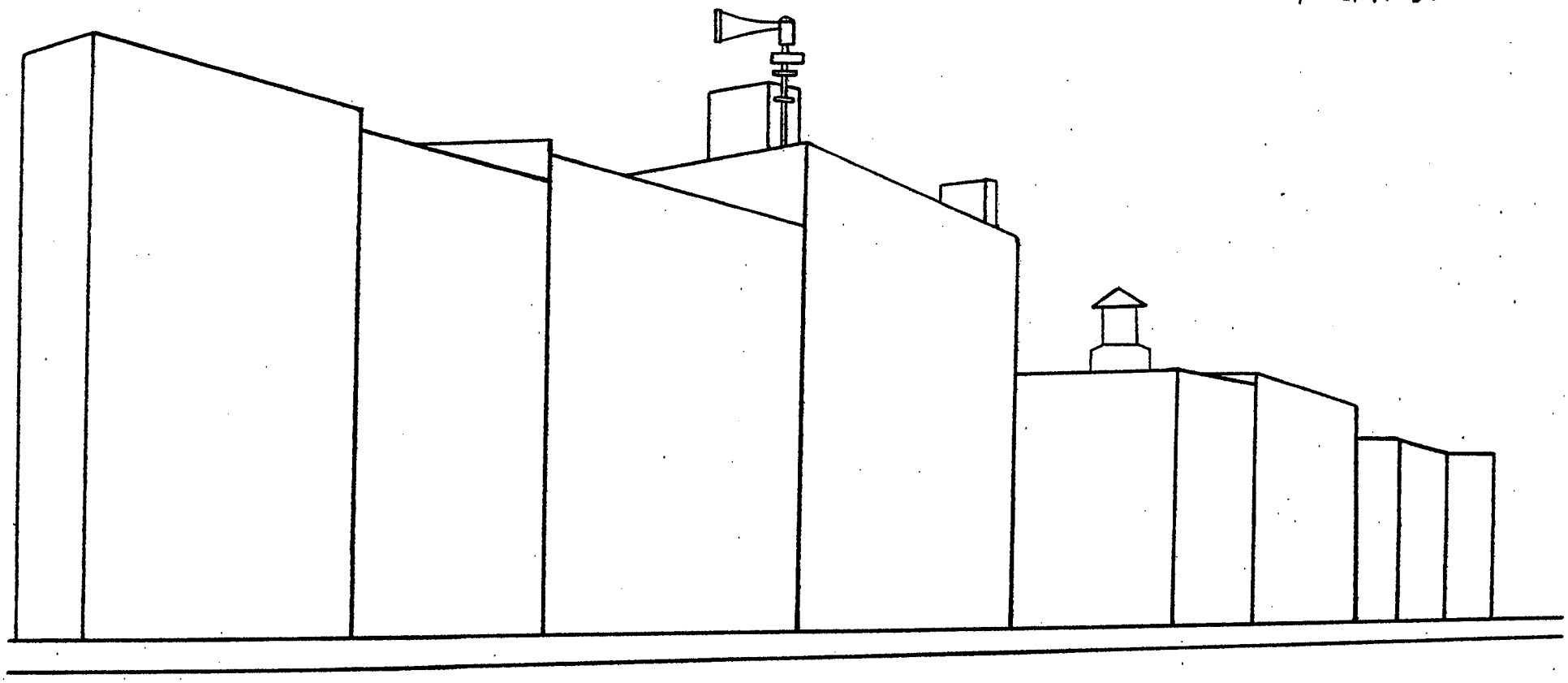


TYPICAL MOUNTING OF THUNDERBOLT AIR-RAID SIREN ON FLAT ROOF

Blower may be set directly on the roof, with stand-pipe sufficiently long to get the rotator, chopper and projector up high enough to clear all nearby obstacles.

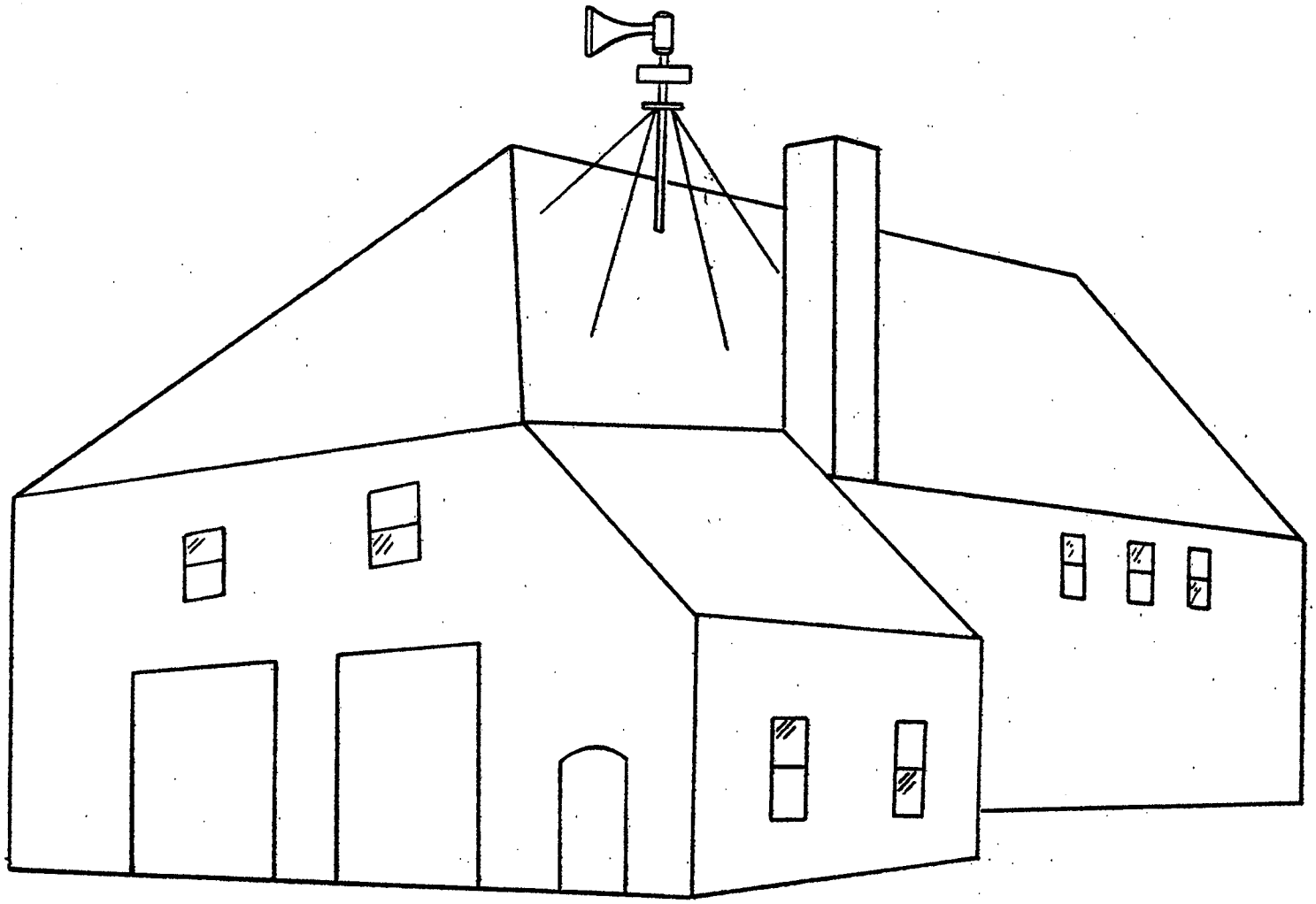
IMPORTANT: Centerline of projector must be as high as possible above the roof. A flat roof acts as a reflector if the siren is too low, which would be detrimental to proper sound distribution. Either keep the siren away from superstructures on the roof, such as chimneys or penthouses, or else make sure the projector is 5 feet or more above the top of such superstructures (the higher, the better). Use guy-wires to hold siren rigid.

8400 A177-32



TYPICAL MOUNTING OF THUNDERBOLT AIR-RAID SIREN IN AREA HAVING HIGH BUILDINGS

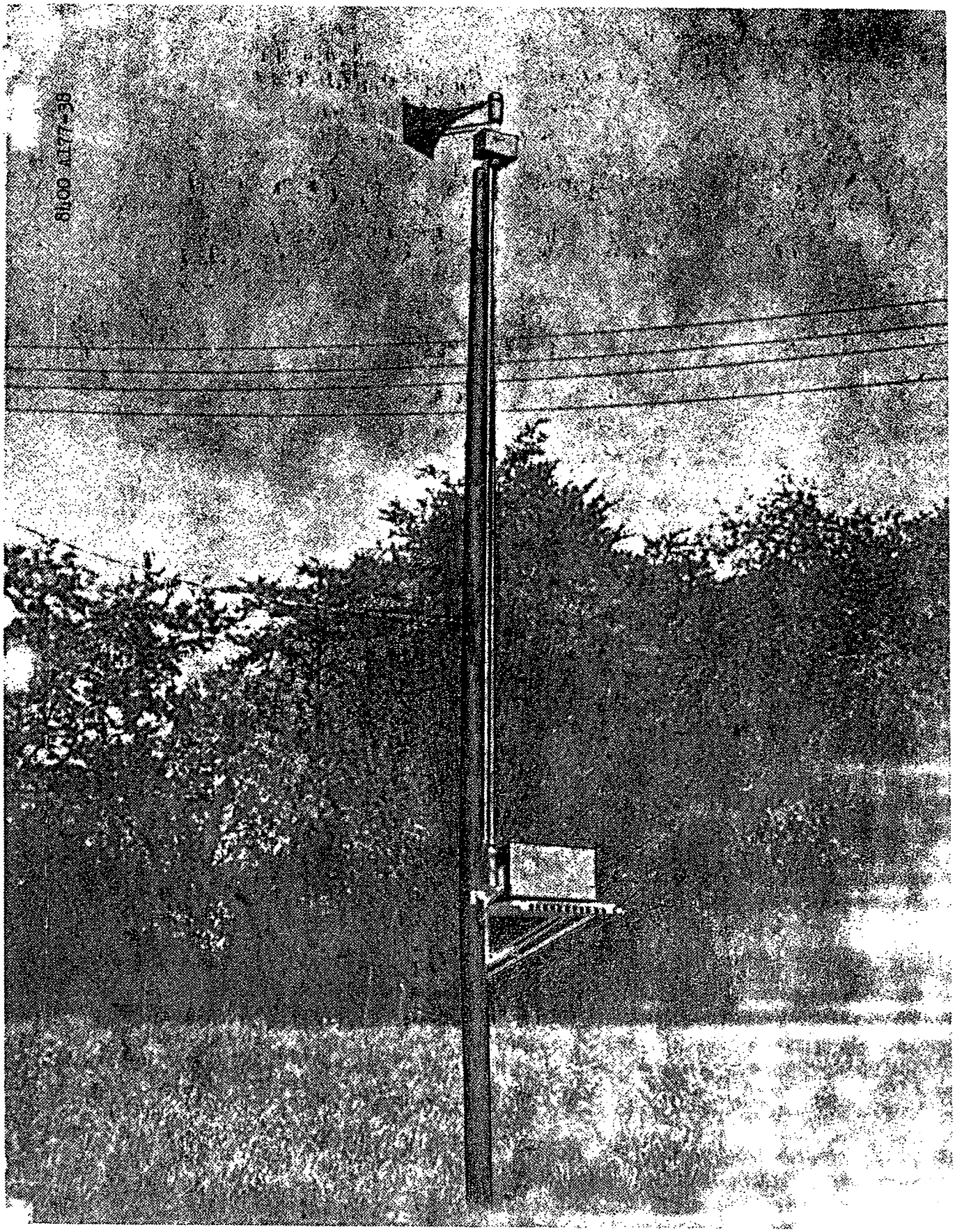
Select a building which is either the highest building in its vicinity, or else a building which has no higher building within 500 feet of it. Blower may be set directly on the roof, or on penthouse roof, with stand-pipe of sufficient length to clear all nearby obstacles. The stand-pipe may also be up along the side wall of penthouse, making certain that the projector is 5 feet or more above all obstructions (the higher, the better). Use guy-wires or clamps to hold siren rigid.

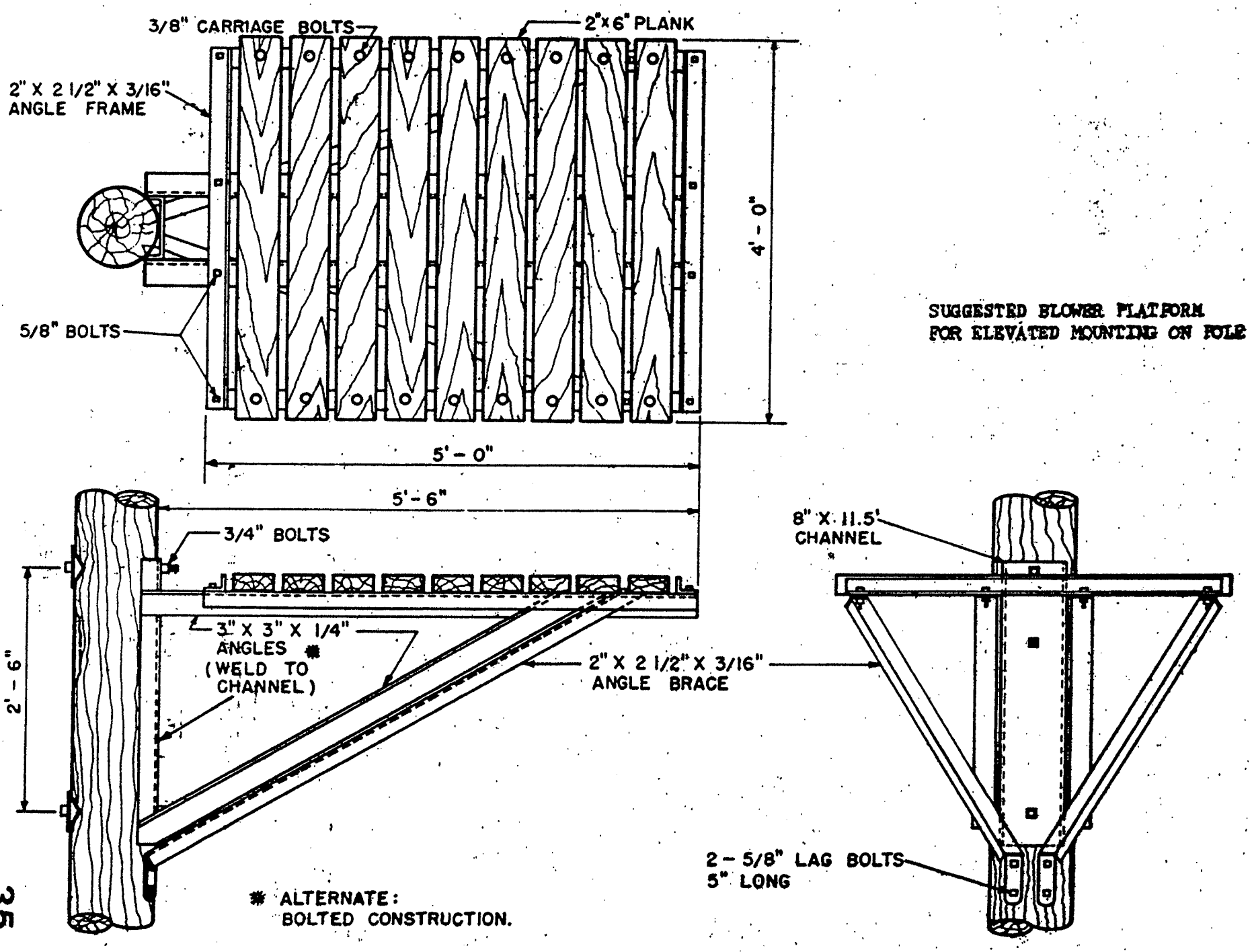


TYPICAL MOUNTING OF THUNDERBOLT AIR-RAID SIREN ON PITCHED OR SLOPED ROOF

Blower may be mounted on floor of attic, with stand-pipe through roof and the rotator, chopper and projector sufficiently high above roof, as illustrated. Or, a platform may be built on the roof, with entire unit including blower on the platform.

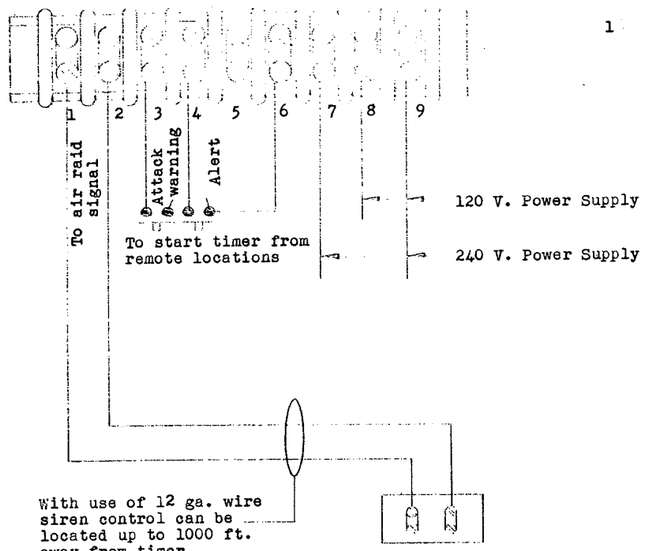
IMPORTANT: Centerline of projector must be high enough above peak of roof to allow sound to carry over and beyond adjacent buildings and any other obstructions (the higher, the better). Use guy-wires to hold siren rigid.


81:00 AL77-38



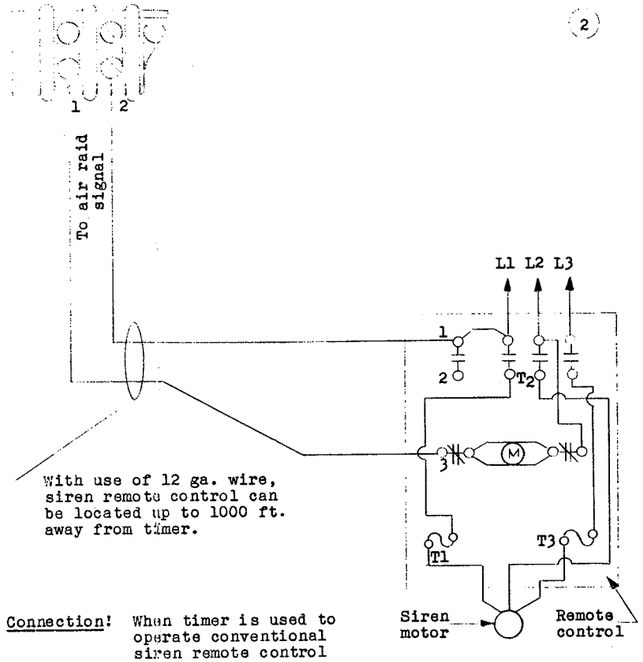
SUGGESTED BLOWER PLATFORM FOR ELEVATED MOUNTING ON POLE

(1)



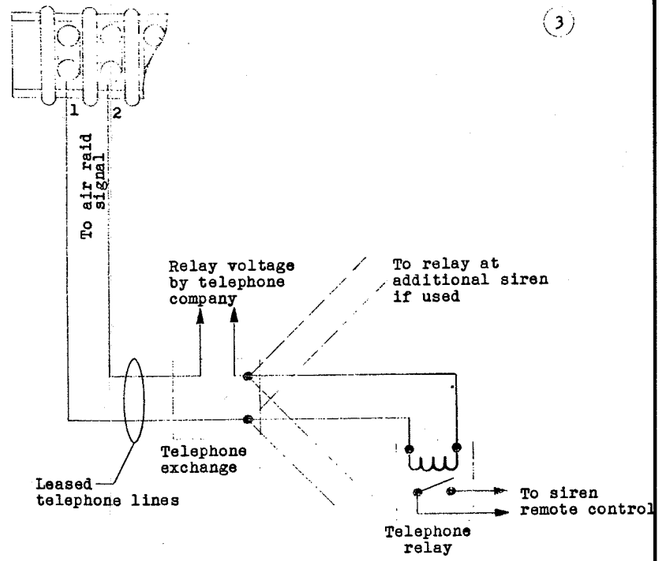
Connection: When used to operate Model #1000 Thunderbolt siren directly.

(2)



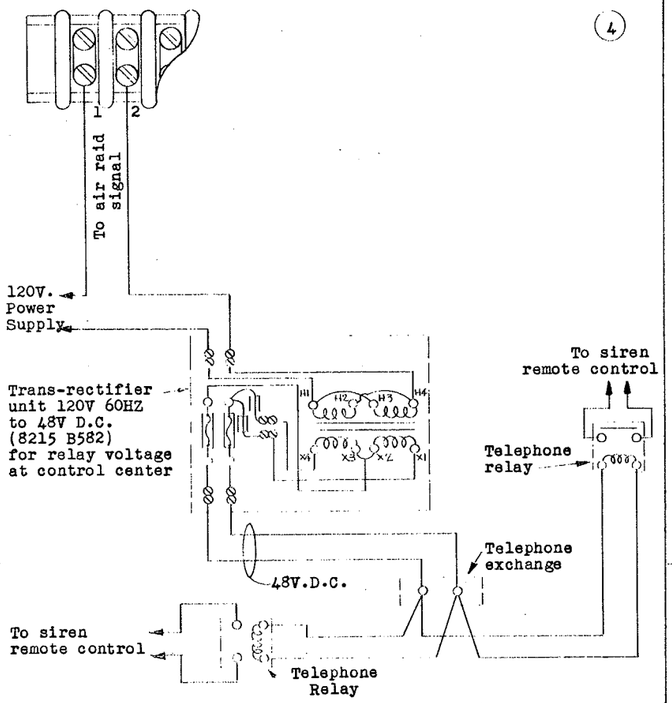
Connection: When timer is used to operate conventional siren remote control directly.

(3)



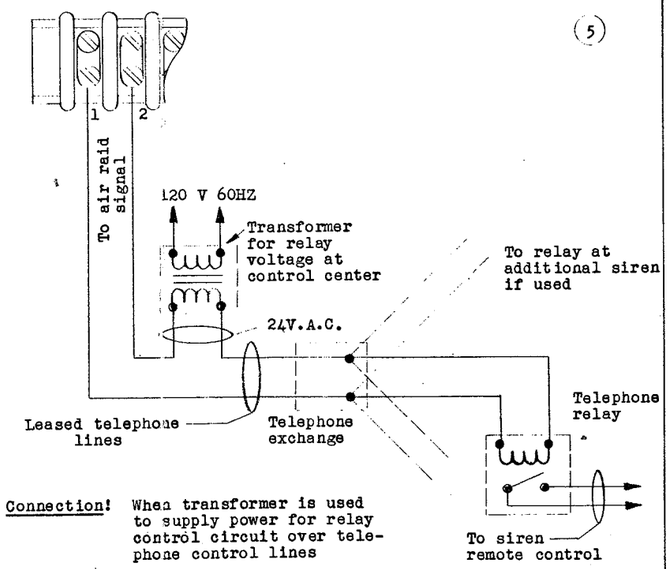
Connection: When used with relay control circuits, over telephone lines, for operation of siren from remote or distant point.

(4)



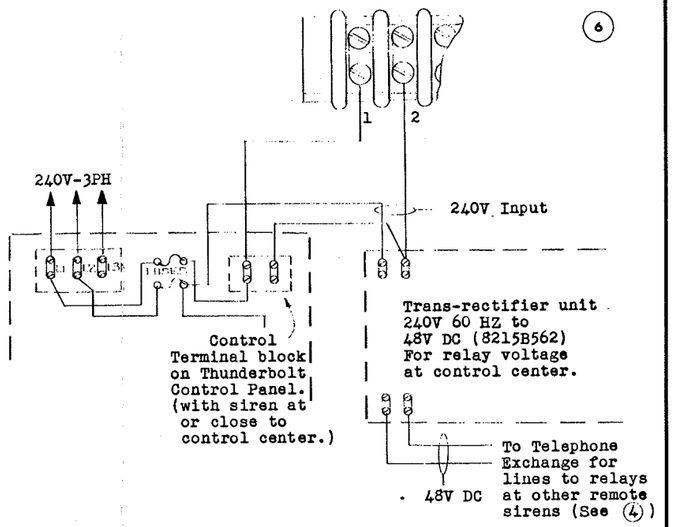
Connection: When rectifier unit is used to supply power for relay control circuit over telephone control lines.

(5)



Connection: When transformer is used to supply power for relay control circuit over telephone control lines

(6)



Connection when used to operate Model #1000 Thunderbolt siren directly and a rectifier unit to supply power for relay control circuits over telephone lines to relays at other remote sirens.

If the illustrations shown on this drawing do not cover the type system you wish to use, then write to our Engineering Dept. giving full details of the equipment you have or are purchasing and what you want it to do in your system. We will then provide information to you.

See Drawing 8215D768 for detail wiring and operating instructions for "AR" Air Raid Timer (1968 type) For model previous to 1968, see Drawing 8215C434.

LET	ECO	CHANGE	DATE	BY

FIRST USED ON

TOLERANCE UNLESS OTHERWISE SPECIFIED FRACTIONAL ± 1/64 DECIMAL ± .005

MATERIAL

FINISH

FEDERAL SIGN AND SIGNAL CORPORATION
136TH AND WESTERN AVENUE
BLUE ISLAND, ILLINOIS

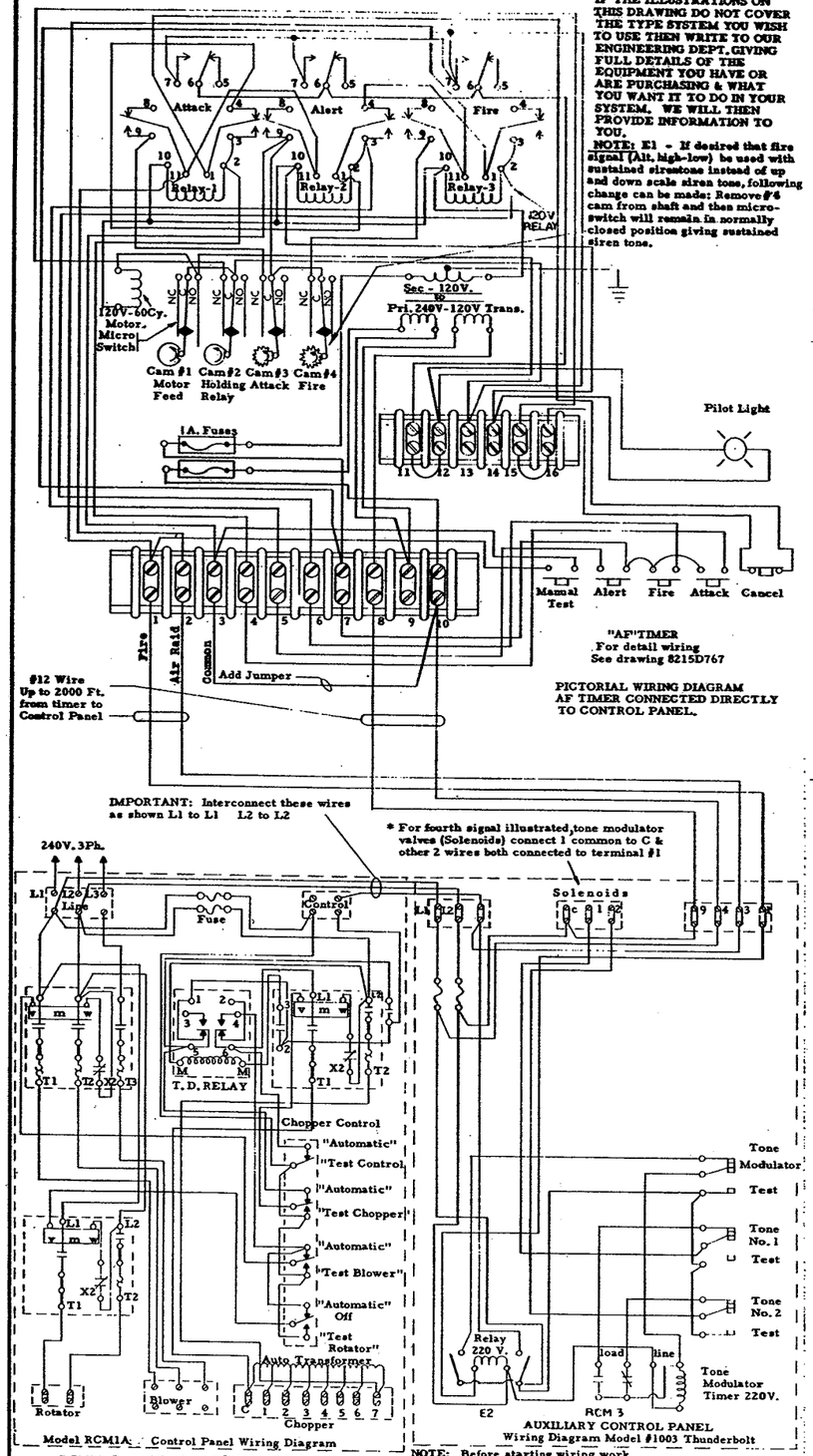
DRWN. BY RH DATE 11-19-68 | CHKD. BY FB DATE 11-20-68 | SCALE

NAME Typical hook-up of air raid timer operating siren control equipment

8215C819

NOTE:
IF THE ILLUSTRATIONS ON THIS DRAWING DO NOT COVER THE TYPE SYSTEM YOU WISH TO USE THEN WRITE TO OUR ENGINEERING DEPT. GIVING FULL DETAILS OF THE EQUIPMENT YOU HAVE OR ARE PURCHASING & WHAT YOU WANT IT TO DO IN YOUR SYSTEM. WE WILL THEN PROVIDE INFORMATION TO YOU.

NOTE: E1 - If desired that fire signal (Alt. high-low) be used with sustained sirenbone instead of up and down scale siren tone, following change can be made: Remove #4 cam from shaft and then micro-switch will remain in normally closed position giving sustained siren tone.

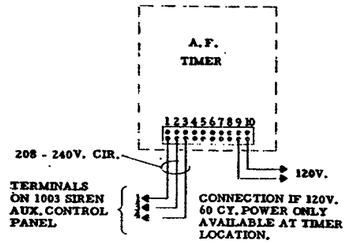


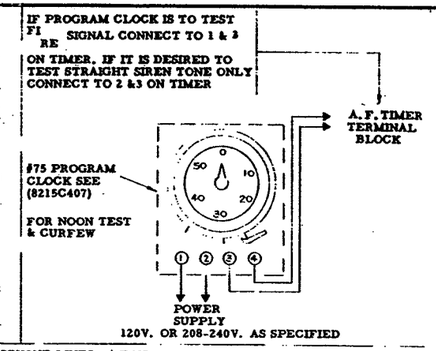
Model RCM1A Control Panel Wiring Diagram

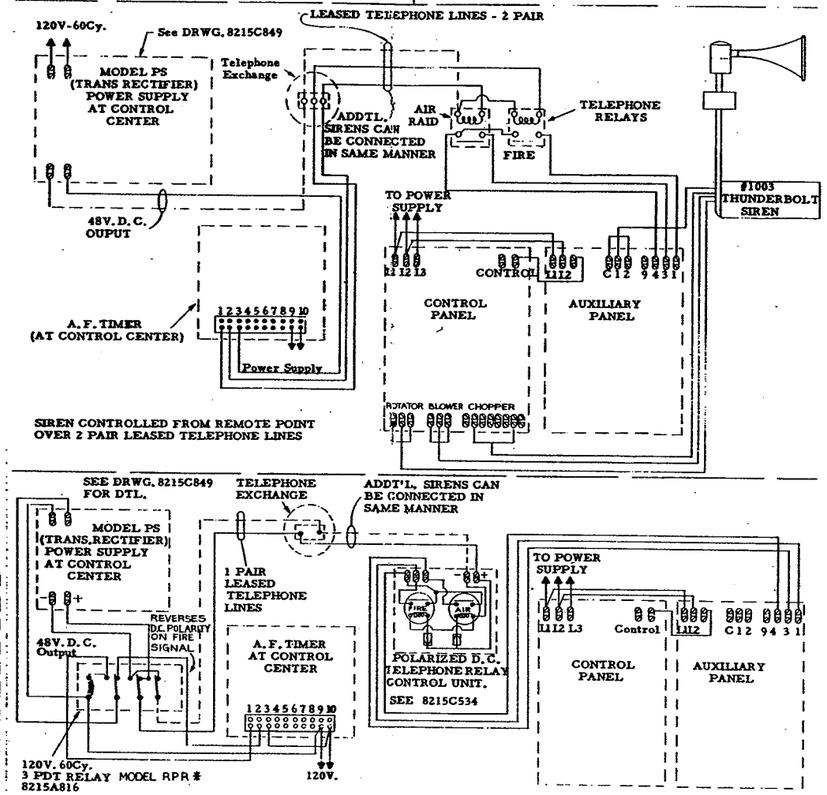
RCM2A Control for Model #1003 Siren 3 Ph. is made up of RCM1A Control & 8300A59 Control

NOTE: Before starting wiring work to insure you have latest data, refer to wiring diagram on the back of cover of the control cabinet.

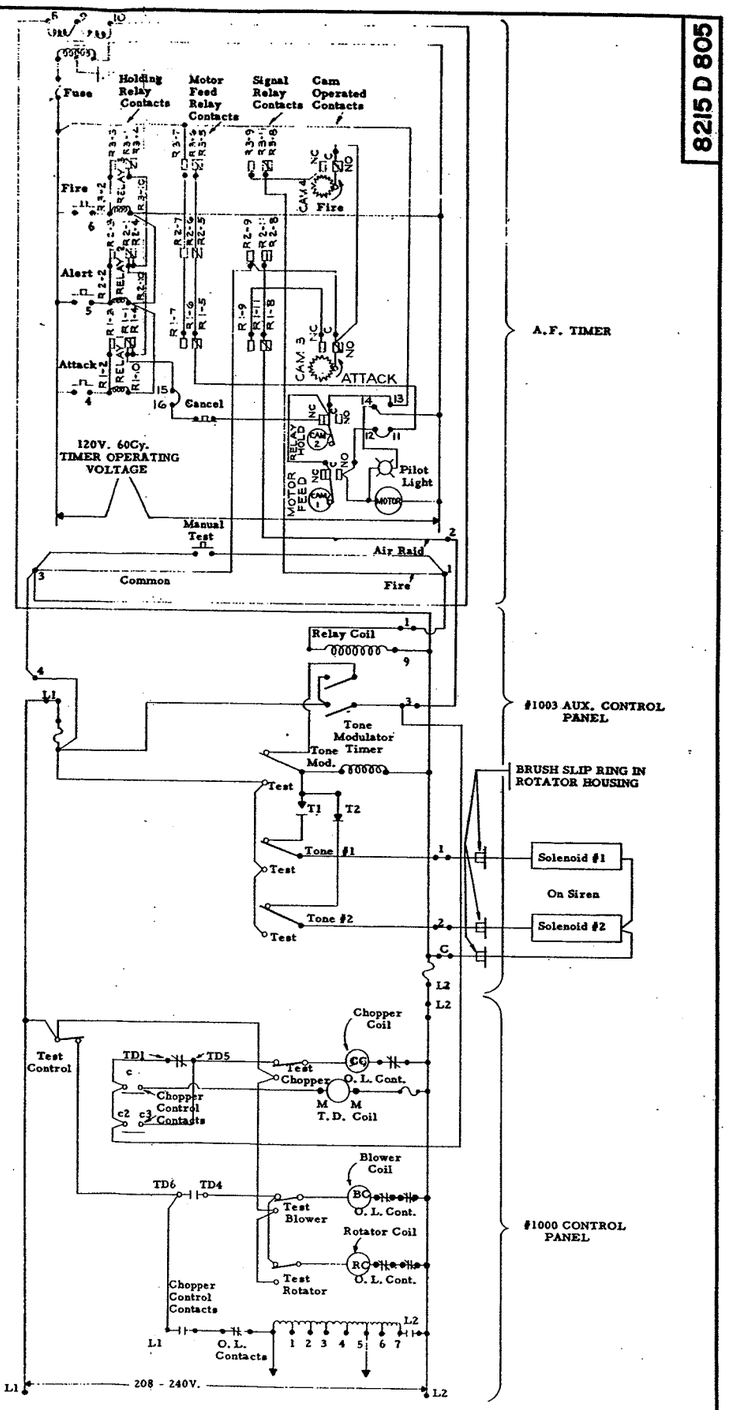
8215D805







GRAPHIC CHART OF SIGNALS



SCHEMATIC WIRING DIAGRAM AF TIMER CONNECT TO CONTROL PANEL

PRINT DISTRIBUTION CODE A 37

LTR	CHANGE	DATE	BY
E	ECH: JUMPER WIRE 220V. RELAY	6-17-75	BWH
E	SEE ECO # 8970	6-23-73	BWH
D	SEE ECO # ECC6	5-29-74	BWH
D	REDRAWN ECO # 7328	3-30-73	BWH

FIRST USED ON THREE PHASE

MATERIAL

TOLERANCE UNLESS SPECIFIED: FRACT. ± 1/64, DEC. ± .005

FINISH

DRWN. BY BWH DATE 3-30-73 CHKD. BY DATE SCALE

NAME #1003 THUNDERBOLT SIREN CONTROL PANEL & AF TIMER WIRING SYST.

FEDERAL SIGN AND SIGNAL CORPORATION
136TH AND WESTERN AVENUE
BLUE ISLAND, ILLINOIS

8215 D805

NOTE:
IF THE ILLUSTRATIONS ON THIS DRAWING DO NOT COVER THE TYPE SYSTEM YOU WISH TO USE THEN WRITE TO OUR ENGINEERING DEPT. GIVING FULL DETAILS OF THE EQUIPMENT YOU HAVE OR ARE PURCHASING & WHAT YOU WANT IT TO DO IN YOUR SYSTEM. WE WILL THEN PROVIDE INFORMATION TO YOU.

NOTE: E1 - If desired that fire signal (Alt. high-low) be used with sustained siren tone instead of up and down scale siren tone following change can be made: Remove #4 cam from shaft and then micro-switch will remain in normally closed position giving sustained siren tone.

Attack
Alert
Fire
Relay-1
Relay-2
Relay-3
120 V RELAY
120V-60Cy. Motor. Micro Switch
Sec - 120V.
Pri. 240V-120V Trans.
Cam #1 Motor Feed
Cam #2 Holding Relay
Cam #3 Attack
Cam #4 Fire
Pilot Light
1A. Fuses
Manual Test
Alert
Fire
Attack
Cancel
Fire
Air Raid
Common
Add Jumper
#12 Wire Up to 2000 Ft. from timer to Control Panel
"AF" TIMER
For detail wiring See drawing 8215D767
PICTORIAL WIRING DIAGRAM AF TIMER CONNECTED DIRECTLY TO CONTROL PANEL.
IMPORTANT: Interconnect these wires as shown L1 to L1 L2 to L2
* For fourth signal illustrated, tone modulator valves (Solenoids) connect 1 common to C & other 2 wires both connected to terminal #1
240V. 1Ph.
Fuse
Control
Solenoids
T.D. RELAY
Chopper Control
"Automatic"
"Test Control"
"Automatic"
"Test Chopper"
"Automatic"
"Test Blower"
"Automatic" Off
"Test Rotator"
Auto Transformer
Rotator
Blower
Chopper
Tone Modulator
Test
Tone No. 1
Test
Tone No. 2
Test
Relay 220 V.
load
line
Tone Modulator Timer 220V.
E2
RCM 2
AUXILIARY CONTROL PANEL
Wiring Diagram Model #1003 Thunderbolt
Model RCM1B Control Panel Wiring Diagram
RCM2B Control for Model #1003 Siren 1 Ph. is made up of RCM1B Control & 8300A59 Control
NOTE: Before starting wiring work to insure you have latest data, refer to wiring diagram on the back of cover of the control cabinet.
8215D 805-1

A.F. TIMER
208 - 240V. CIR.
TERMINALS ON 1003 SIREN AUX. CONTROL PANEL
120V.
CONNECTION IF 120V. 60 CY. POWER ONLY AVAILABLE AT TIMER LOCATION.

IF PROGRAM CLOCK IS TO TEST FI RE SIGNAL CONNECT TO 1 & 8
ON TIMER. IF IT IS DESIRED TO TEST STRAIGHT SIREN TONE ONLY CONNECT TO 2 &3 ON TIMER
#75 PROGRAM CLOCK SEE (8215C407)
FOR NOON TEST & CURFEW
A.F. TIMER TERMINAL BLOCK
POWER SUPPLY
120V. OR 208-240V. AS SPECIFIED

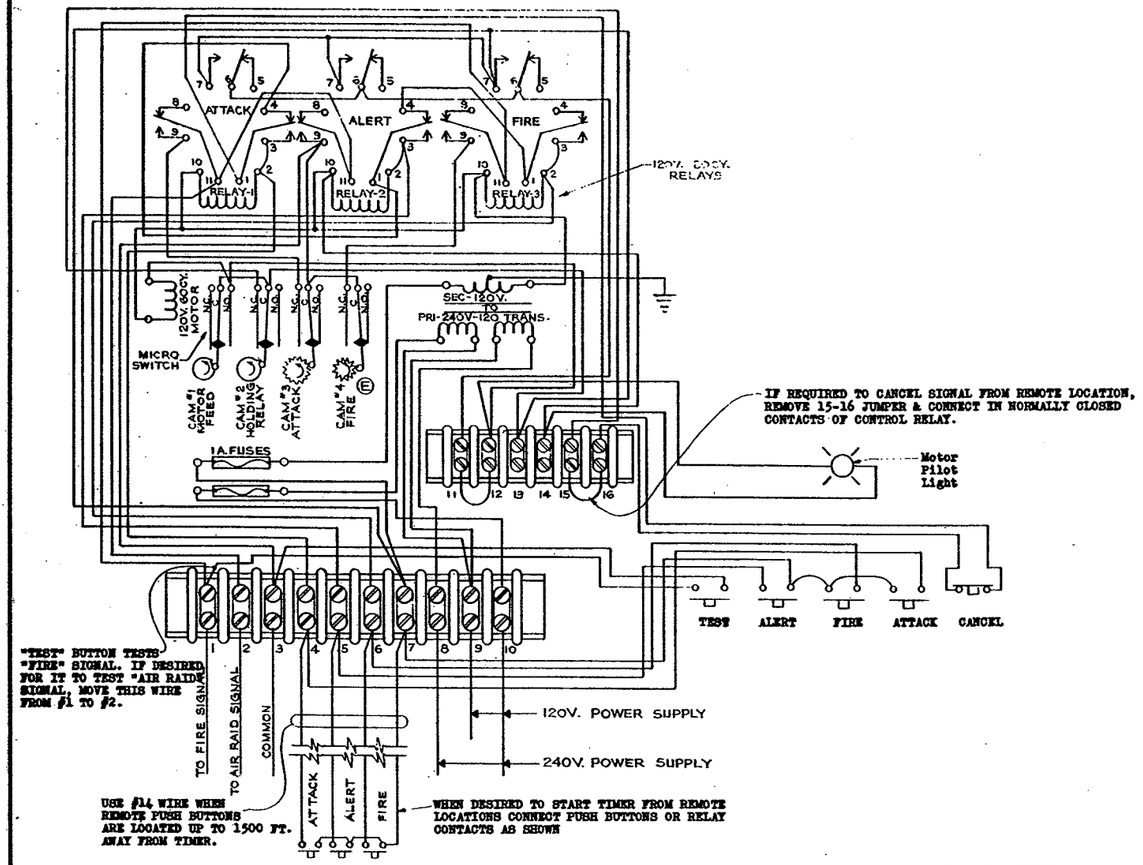
120V-60Cy.
See DRWG. 8215C849
MODEL PS (TRANS RECTIFIER) POWER SUPPLY AT CONTROL CENTER
48V. D.C. OUPUT
LEASED TELEPHONE LINES - 2 PAIR
Telephone Exchange
ADDT'L. SIRENS CAN BE CONNECTED IN SAME MANNER
AIR RAID
FIRE
TELEPHONE RELAYS
TO POWER SUPPLY
#1003 THUNDERBOLT SIREN
A.F. TIMER (AT CONTROL CENTER)
Power Supply
CONTROL PANEL
AUXILIARY PANEL
ROTATOR BLOWER CHOPPER
SIREN CONTROLLED FROM REMOTE POINT OVER 2 PAIR LEASED TELEPHONE LINES

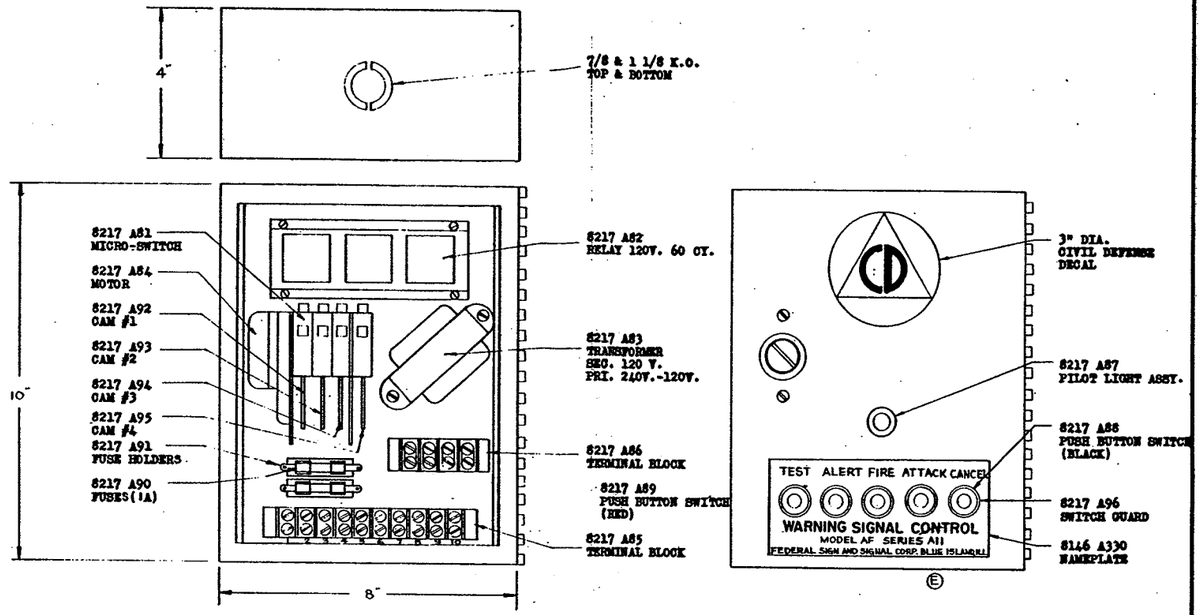
SEE DRWG. 8215C849 FOR DTL.
TELEPHONE EXCHANGE
ADDT'L. SIRENS CAN BE CONNECTED IN SAME MANNER
MODEL PS (TRANS. RECTIFIER) POWER SUPPLY AT CONTROL CENTER
48V. D.C. Output
REVERSES DC. POLARITY ON FIRE SIGNAL
1 PAIR LEASED TELEPHONE LINES
A.F. TIMER AT CONTROL CENTER
POLARIZED D.C. TELEPHONE RELAY CONTROL UNIT. SEE 8215C534
TO POWER SUPPLY
CONTROL PANEL
AUXILIARY PANEL
120V. 60Cy. 3 PDT RELAY MODEL RPR# 8215A816
120V.
SIREN CONTROLLED FROM REMOTE POINT OVER 1 PAIR LEASED TELEPHONE LINES
HIGH TONE = FUNDAMENTAL FREQUENCY OF 699 C.P.S.
LOW TONE. = FUNDAMENTAL FREQUENCY OF 575 C.P.S.

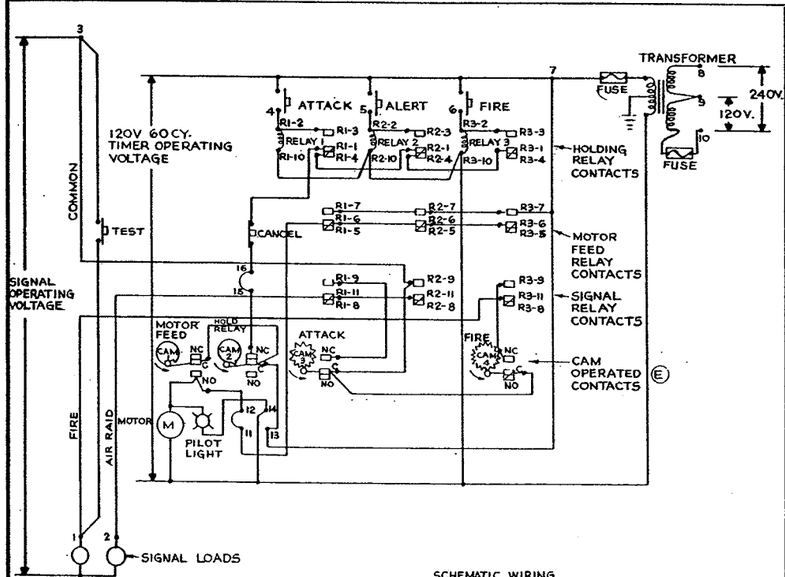
1st ALERT SIGNAL SUSTAINED DOUBLE TONE
2nd ATTACK SIGNAL UNDULATED DOUBLE TONE
3rd FIRE SIGNAL ALTERNATING HIGH-LOW UP SCALE, DOUBLE TONE DOWN SCALE
4th * FOURTH SIGNAL PULSED DOUBLE TONE UP SCALE, DOUBLE TONE DOWN SCALE
3 MIN.
SEE NOTE E1
* CAN BE AN ALTERNATE FIRE SIGNAL
GRAPHIC CHART OF SIGNALS

Fuse
Holding Relay Contacts
Motor Feed Relay Contacts
Signal Relay Contacts
Cam Operated Contacts
Fire
Alert
Attack
Cancel
CAM 4 Fire
CAM 3 ATTACK
120V. 60Cy. TIMER OPERATING VOLTAGE
Manual Test
Air Raid
Fire
Common
Pilot Light
MOTOR FEED CAM 1
RELAY HOLD CAM 2
A.F. TIMER
Relay Coil
Tone Modulator Tone Timer Mod.
Test
Tone #1
Tone #2
Solenoid #1
On Siren
Solenoid #2
#1003 AUX. CONTROL PANEL
BRUSH SLIP RING IN ROTATOR HOUSING
Test Control
Chopper Coil
Test Chopper
O. L. Cont.
T.D. Coil
Chopper Control Contacts
Blower Coil
Test Blower
Rotator Coil
Test Rotator
O.L. Contacts
208 - 240V.
#1000 CONTROL PANEL

SCHEMATIC WIRING DIAGRAM AF TIMER CONNECT TO CONTROL PANEL
PRINT DISTRIBUTION CODE A
37A
FEDERAL SIGN AND SIGNAL CORPORATION
136TH AND WESTERN AVENUE
BLUE ISLAND, ILLINOIS
NAME #1003 THUNDERBOLT SIREN
CONTROL PANEL & AF TIMER WIRING SYST.
DRWN. BY BWH
DATE 5-14-73
8215D805-1
8215 D805-1

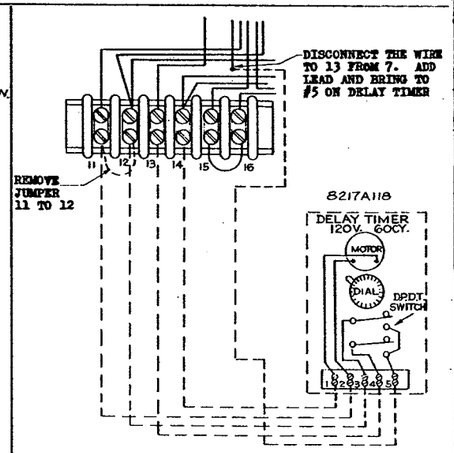






SCHEMATIC WIRING
AF TIMER

PICTORIAL WIRING
AF TIMER



TIME DELAY TIMER WIRING
(SEE EXPLANATION*)

FEDERAL WARNING SIGNAL CONTROL MODEL AF

(E) FEDERAL WARNING SIGNAL CONTROL MODEL "AF" SERIES A11 IS AN AUTOMATIC TIMER USED TO CONTROL SIGNALS ON LARGE FEDERAL #1003 & 3T22 SIRENS. IT PROVIDES FOR "ALERT" SIGNAL, A 3 MINUTE STEADY SIREN BLAST: "ATTACK SIGNAL," A 3 MINUTE UP & DOWN SCALE SIREN WAIL: "FIRE" SIGNAL, UP SCALE HIGH-LOW ALTERNATING SIGNAL FOLLOWED BY DOWN SCALE DOUBLE TONE, REPEATED IN 12 SECOND CYCLES FOR 3 MINUTE PERIOD.

THE TEST BUTTON GIVES A TEST OF THE "FIRE" SIGNAL ONLY AS LONG AS IT IS PRESSED, NO TIMER ACTION BEING ACTIVATED, AS BUTTON DIRECTLY CONTROLS SIREN REMOTE CONTROL.

IN CASE AN ERROR OCCURS IN SELECTION OR SENDING A SIGNAL IT IS POSSIBLE ON THIS TIMER TO "STOP" THE SIGNAL BY PRESSING "CANCEL" BUTTON. THE TIMER MOTOR WILL CONTINUE CYCLING UNTIL THE 3 MINUTE PERIOD HAS ELAPSED. IF ANOTHER SIGNAL IS IMMEDIATELY SELECTED IT WILL ONLY BE FOR THE REMAINDER OF THE 3 MINUTE CYCLE.

THIS TIMER'S MOTOR & RELAYS CAN BE OPERATED FROM EITHER A 240V. 60 CY. OR 120 V. 60 CY. POWER SUPPLY. THEY ARE 120 V. 60 CY. COMPONENTS OPERATED THROUGH A TRANSFORMER WHICH PROVIDES A SECONDARY VOLTAGE OF 120 V. WHEN THE PRIMARY VOLTAGE IS 240 V. OR 120 V BROUGHT TO THE PROPER TRANSFORMER TERMINALS DESIGNATED ON THE WIRING DIAGRAM. THE SIGNAL CIRCUITRY IS ELECTRICALLY INDEPENDENT OF THE OPERATING VOLTAGE & CAN BE 240 V. OR 120 V. OR LESS. THE MICRO SWITCH CAPACITY IS 15 AMP. WHEN CURRENT IS A.C. BUT IS ONLY 1/4 AMP. WHEN THE SIGNAL CURRENT IS D.C.

THE TIMER SIGNALS ARE INITIATED BY PRESSING THE DESIRED TIMER PUSH BUTTON FOR ABOUT 2 SECONDS. IT IS ALSO POSSIBLE TO START THE TIMER FROM REMOTE PUSH BUTTONS WIRED AS SHOWN WHICH CAN BE LOCATED AT DISTANCES UP TO 1500 FEET FROM THE TIMER. IF IT IS DESIRED TO CONTROL THE TIMER FROM GREATER DISTANCES THEN ANOTHER SET OF RELAYS SHOULD BE USED TO CLOSE THE PROPER CIRCUITS TO THE TIMER FOR THE DESIRED SIGNALS.

THE PILOT LIGHT ON FRONT OF TIMER SHOWS THAT TIMER MOTOR IS ON AND TIMER IS CYCLING.

THE TIMER OPERATES IN THE FOLLOWING MANNER: PRESSING A BUTTON SUCH AS "ALERT" OR "ATTACK" ENERGIZES ITS RESPECTIVE RELAY COIL & THE RELAY CONTACTS CLOSE & PROVIDE CURRENT TO THE TIMER MOTOR, MAKING THE TIMER CAMS ROTATE. THE RELAY IS HELD ENERGIZED BY CURRENT THROUGH ITS OWN CONTACTS & THE CAM OPERATED "HOLDING RELAY CONTACTS". AFTER THE CAMS HAVE ROTATED SLIGHTLY, THE CAM OPERATED "MOTOR CONTACTS" CLOSE & PROVIDE ANOTHER CIRCUIT TO THE OPERATING MOTOR. A FEW SECONDS BEFORE THE END OF THE TIMER CYCLE THE CAM OPERATED "HOLDING RELAY CONTACTS" OPEN MOMENTARILY RELEASING HOLDING RELAY CIRCUIT & THE RELAY COIL BECOMES DE-ENERGIZED. WHEN THE END OF THE TIMER CYCLE IS COMPLETED THE CAM OPERATED "MOTOR CONTACTS" OPEN & THE MOTOR STOPS. THE TIMER IS THEN READY FOR ANY FUTURE SIGNALS.

"ATTACK" SIGNAL WILL TAKE PRECEDENCE OVER OTHER SIGNALS. IF "ALERT" SIGNAL OR "FIRE" SIGNAL IS ON "ATTACK" SIGNAL BUTTON CAN BE PRESSED AND "ATTACK" SIGNAL WILL THEN TAKE OVER AND BE SOUNDED UNTIL THE END OF THE TIMER CYCLE OR UNTIL CANCEL BUTTON IS PRESSED. IN SAME MANNER "ALERT" SIGNAL TAKES PRECEDENCE OVER THE "FIRE" SIGNAL.

* WHEN THE TIMER IS STARTED REMOTELY BY PUSH BUTTONS OR RELAYS SOMETIMES THESE CONTROL LINES ARE AERIALLY EXPOSED AND WILL BE SUSCEPTIBLE TO LIGHTNING SURGES.

* AT TIMES THESE SURGES CAN INDUCE VOLTAGES IN THE CONTROL LINES SO THAT A TIMER RELAY WILL BE ACTIVATED AND TIMER WILL START GOING, GIVING A FALSE SIGNAL ON THE SIREN. IF THIS CONDITION OCCURS IT CAN BE ALLEVIATED BY WIRING AN AUXILIARY TIME DELAY TIMER INTO THE TIMER. THIS TIME DELAY WILL BE ARRANGED SO THAT MOMENTARY LIGHTNING INDUCED PULSES OF .05 SEC. CANNOT START THE AF TIMER OPERATING, BUT INTENDED SIGNAL PULSES OF 2 SECS. WILL ACTIVATE TIME DELAY TIMER SO THAT IT WILL START AF TIMER GOING. IF THIS TIME DELAY TIMER IS ADDED TO YOUR SYSTEM, PERSONNEL WHO TURN IN SIGNALS MUST BE ADVISED THAT THEY MUST PRESS BUTTON WHERE THEY INITIATE SIGNAL FOR AT LEAST 2 SECS. OR MORE.

THE TIMER CAN BE USED FOR PERIODIC TIME TESTS OF THE VARIOUS SIGNALS. FOR INSTANCE, A 1 MINUTE TEST OF "ALERT" SIGNAL CAN BE MADE BY PRESSING "ALERT" BUTTON AND THEN AFTER APPROXIMATELY 1 MINUTE THE CANCEL BUTTON CAN BE PRESSED TO STOP THE AUDIBLE SIREN SIGNAL. THE TIMER MOTOR WILL CONTINUE GOING TO COMPLETE ITS 3 MINUTE CYCLE. AFTER A SILENT PERIOD THE "ATTACK" SIGNAL BUTTON COULD BE PRESSED AND THEN ALSO COULD BE CANCELLED IF DESIRED.

SERVICE PROCEDURES

1. RELAYS ARE PLUG-IN TYPE AND ARE VERY EASILY REPLACED WHEN REQUIRED.
2. TO REPLACE A TRANSFORMER IT IS RECOMMENDED THAT WIRING PANEL BE REMOVED FROM CASE AFTER PROPERLY MARKING & REMOVING LEAD IN WIRES. THE LEADS FROM TRANSFORMER TO TERMINAL BLOCK CAN BE REMOVED BY RELEASING TERMINAL LUG SCREWS. LEADS FROM TRANSFORMER TO FUSE AND RELAY SECTION CAN BE CUT FOR SPLICING IN NEW TRANSFORMER LEADS. REPLACE WITH NEW TRANSFORMER.
3. IF MOTOR MICRO SWITCHES OR CAMS HAVE TO BE REPLACED, IT IS RECOMMENDED THAT WIRING PANEL BE REMOVED (AS ABOVE). THEN MAKE A MARK ON CAMS IN RELATION TO MICRO SWITCH ROLLERS TO INSURE CORRECT REPLACEMENT OF CAMS WHEN REASSEMBLING. TO REPLACE MOTOR, REMOVE SCREWS SECURING MOTOR, SWITCH & CAM ASSEMBLY TO WIRING PANEL. REMOVE RIGHT END CAM & LOOSEN SET SCREWS IN OTHER CAMS NOTING POSITION OF THE CAMS AND THEN REMOVE SCREWS SECURING MOTOR TO FRAME. PULL MOTOR & SHAFT OUT OF CAMS & REMOVE EXTENSION SHAFT. CUT MOTOR LEADS IN A MANNER SO THAT NEW MOTOR LEADS CAN BE SPLICED IN WITHOUT DIFFICULTY. INSTALL NEW MOTOR & REASSEMBLE PARTS.
4. TO REPLACE A CAM, REMOVE WIRING PANEL (AS ABOVE). RIGHT END CAM CAN BE REMOVED WITHOUT REMOVING MOTOR EXTENSION SHAFT BUT OTHER CAMS TO BE REMOVED REQUIRE THE WITHDRAWAL OF MOTOR SHAFT AS DESCRIBED ABOVE.
5. TO REPLACE A MICRO SWITCH REMOVE THROUGH BOLTS HOLDING SWITCHES TO FRAME. DISCONNECT WIRING TO DEFECTIVE SWITCH & REPLACE WITH NEW SWITCH.
6. TO REPLACE A PUSH BUTTON SWITCH, UNSCREW ALL PUSH BUTTON GUARDS SO SWITCH ASSEMBLY CAN BE REMOVED FROM CASE COVER. UNSCREW THE LOCKNUT ON DEFECTIVE SWITCH & REMOVE & THEN REPLACE WITH NEW SWITCH.
7. TO REPLACE A PILOT LIGHT ASSEMBLY ITS WIRES MUST BE DISCONNECTED AND THEN ASSEMBLY MUST BE PRESSED OUT FROM INSIDE OF FRONT COVER. REPLACE WITH NEW PILOT LIGHT ASSEMBLY.

REFER TO DRAWINGS 8215D805 AND 8215D796 FOR APPLICATION OF THIS TIMER WITH FEDERAL MODEL #1003 OR 3T22 SIRENS.

LET	ECO	CHANGE	DATE	BY	FIRST USED ON
E		SEE ECO # 7174 SEE ECO # 2733	3-30-73	WH	
D					
C		FINISHED PRIM. OF TRANS.	8-15-69	BG	
B		REDRAWN & REVISED	9-24-68	BG	

MATERIAL

TOLERANCE UNLESS SPECIFIED: FRACT. ± 1/64 DEC. ± .005

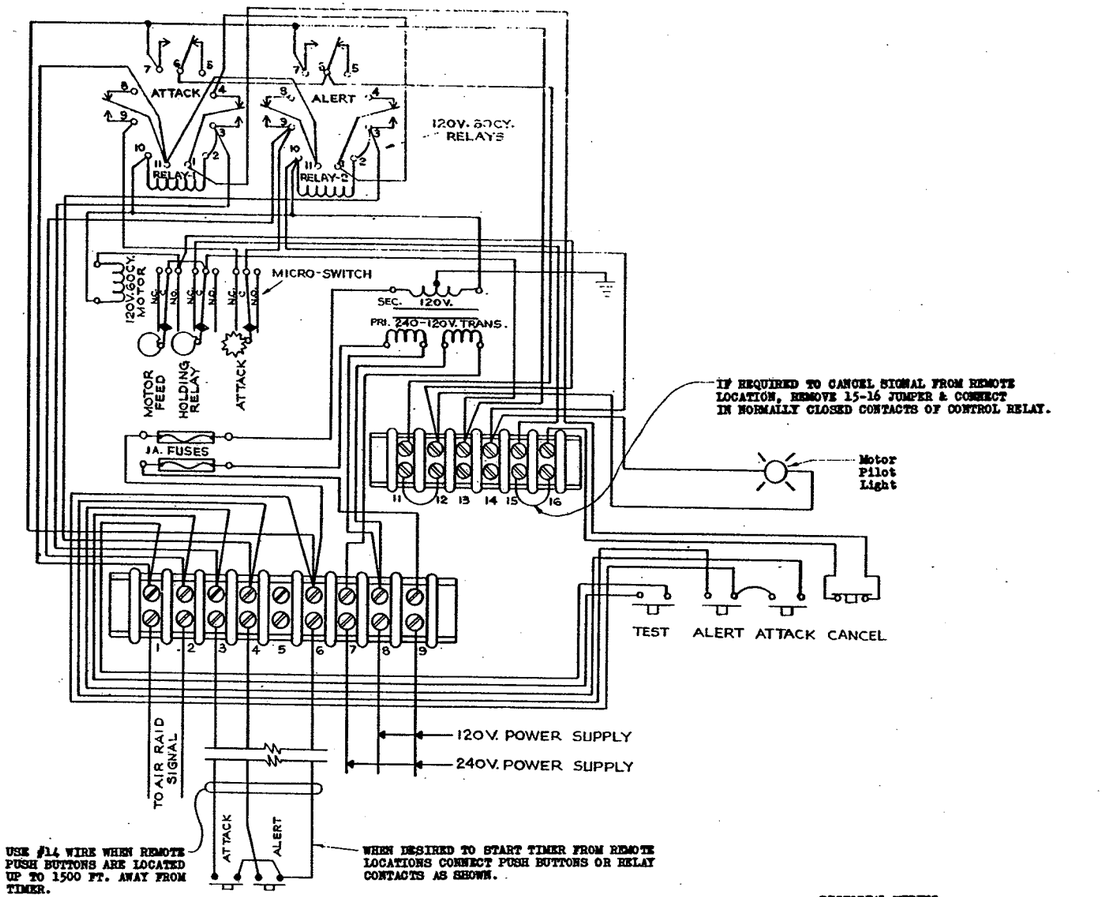
FINISH

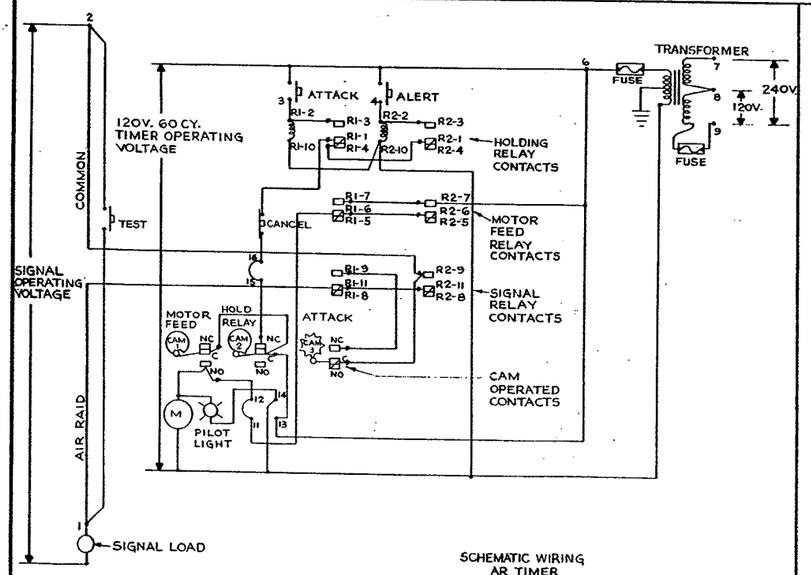
NAME MODEL AF- AIR RAID & FIRE WARNING SIGNAL CONTROL WIRING & OPERATING INSTRUCTIONS

FEDERAL SIGN AND SIGNAL CORPORATION
136TH AND WESTERN AVENUE
BLUE ISLAND, ILLINOIS

DRWN. BY B.G. DATE 9-24-68 | CHKD. BY DATE | SCALE

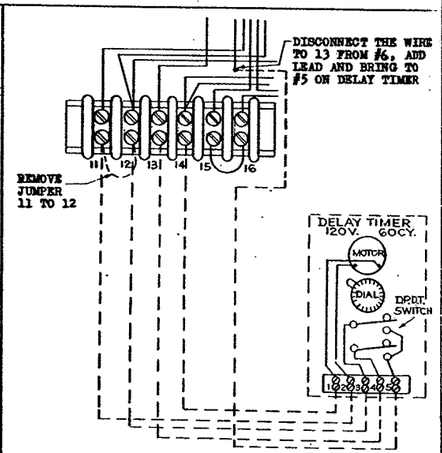
8215D767



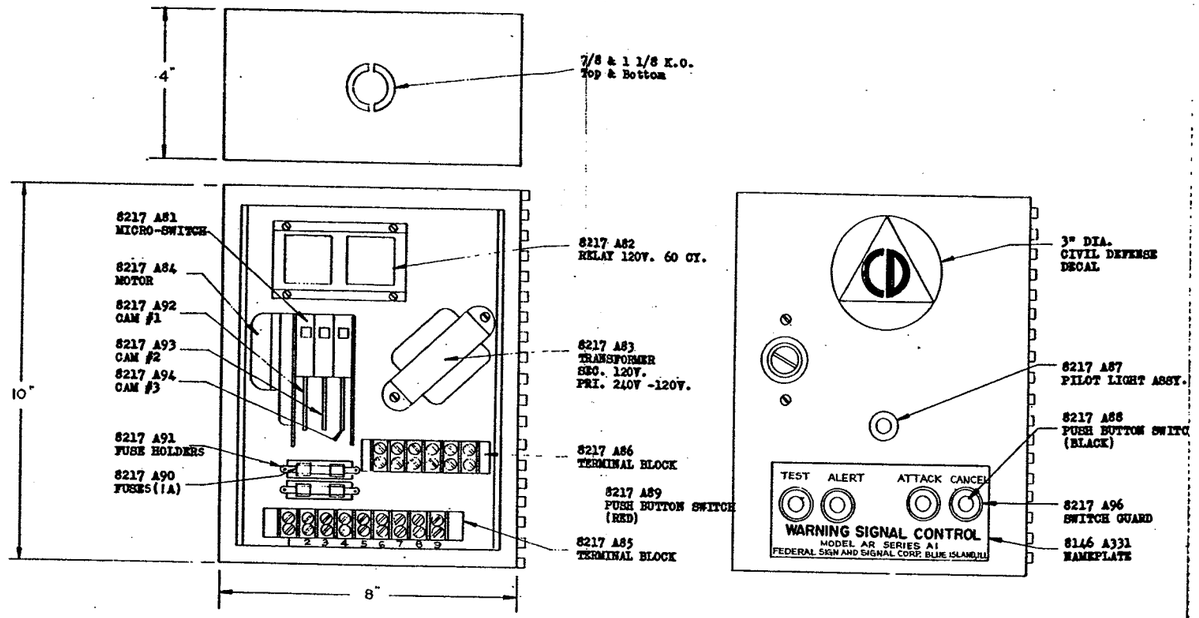


SCHEMATIC WIRING
AR TIMER

PICTORIAL WIRING
AR TIMER



TIME DELAY TIMER WIRING
(SEE EXPLANATION *)



FEDERAL WARNING SIGNAL CONTROL MODEL AR

FEDERAL WARNING SIGNAL CONTROL MODEL "AR" SERIES A1 IS AN AUTOMATIC TIMER USED TO CONTROL SIGNALS ON LARGE FEDERAL VERTICAL SIRENS. IT PROVIDES FOR "ALERT" SIGNAL, A 3 MINUTE STEADY SIREN BLAST: "ATTACK" SIGNAL, A 3 MINUTE UP AND DOWN SCALE SIREN WAIL. THE TEST BUTTON GIVES A TEST OF THE SIGNAL ONLY AS LONG AS IT IS PRESSED, NO TIMER ACTION BEING ACTIVATED, AS BUTTON DIRECTLY CONTROLS SIREN REMOTE CONTROL.

IN CASE AN ERROR OCCURS IN SELECTION OR SENDING A SIGNAL IT IS POSSIBLE ON THIS TIMER TO "STOP" THE SIGNAL BY PRESSING "CANCEL" BUTTON. THE TIMER MOTOR WILL CONTINUE CYCLING UNTIL THE 3 MINUTE PERIOD HAS ELAPSED. IF ANOTHER SIGNAL IS IMMEDIATELY SELECTED IT WILL ONLY BE FOR THE REMAINDER OF THE 3 MINUTE CYCLE.

THIS TIMER'S MOTOR & RELAYS CAN BE OPERATED FROM EITHER A 240 V. 60 CY. OR 120 V. 60 CY. POWER SUPPLY. THEY ARE 120 V. 60 CY. COMPONENTS OPERATED THROUGH A TRANSFORMER WHICH PROVIDES A SECONDARY VOLTAGE OF 120 V. WHEN THE PRIMARY VOLTAGE IS 240 V OR 120 V. BROUGHT TO THE PROPER TRANSFORMER TERMINALS DESIGNATED ON THE WIRING DIAGRAM. THE SIGNAL CIRCUITRY IS ELECTRICALLY INDEPENDENT OF THE OPERATING VOLTAGE AND CAN BE 240 V OR 120 V. OR LESS. THE MICRO SWITCH CAPACITY IS 15 AMP. WHEN CURRENT IS A.C. BUT IS ONLY 1/4 AMP. WHEN THE SIGNAL CURRENT IS DC.

THE TIMER SIGNALS ARE INITIATED BY PRESSING THE DESIRED TIMER PUSH BUTTON FOR ABOUT 2 SECONDS. IT IS ALSO POSSIBLE TO START THE TIMER FROM REMOTE PUSH BUTTONS WIRED AS SHOWN WHICH CAN BE LOCATED AT DISTANCES UP TO 1500 FEET FROM THE TIMER. IF IT IS DESIRED TO CONTROL THE TIMER FROM GREATER DISTANCES THEN ANOTHER SET OF RELAYS SHOULD BE USED TO CLOSE THE PROPER CIRCUITS TO THE TIMER FOR THE DESIRED SIGNALS.

THE PILOT LIGHT ON FRONT OF TIMER SHOWS THAT TIMER MOTOR IS ON AND TIMER IS CYCLING.

THE TIMER OPERATES IN THE FOLLOWING MANNER: PRESSING A BUTTON SUCH AS "ALERT" OR "ATTACK" ENERGIZES ITS RESPECTIVE RELAY COIL AND THE RELAY CONTACTS CLOSE AND PRIVIDE CURRENT TO THE TIMER MOTOR, MAKING THE TIMER CAMS ROTATE. THE RELAY IS HELD ENERGIZED BY CURRENT THROUGH ITS OWN CONTACTS AND THE CAM OPERATED "HOLDING RELAY CONTACTS". AFTER THE CAMS HAVE ROTATED SLIGHTLY, THE CAM OPERATED "MOTOR CONTACTS" CLOSE AND PROVIDE ANOTHER CIRCUIT TO THE OPERATING MOTOR. A FEW SECONDS BEFORE THE END OF THE TIMER CYCLE THE CAM OPERATED "HOLDING RELAY CONTACTS" OPEN MOMENTARILY RELEASING HOLDING RELAY CIRCUIT AND THE RELAY COIL BECOMES DE-ENERGIZED. WHEN THE END OF THE TIMER CYCLE IS COMPLETED THE CAM OPERATED "MOTOR CONTACTS" OPEN AND THE MOTOR STOPS. THE TIMER IS THEN READY FOR ANY FUTURE SIGNALS.

"ATTACK" SIGNAL WILL TAKE PRECEDENCE OVER OTHER SIGNALS. IF "ALERT" SIGNAL IS ON "ATTACK" SIGNAL BUTTON CAN BE PRESSED AND "ATTACK" SIGNAL WILL THEN TAKE OVER AND BE SOUNDED UNTIL THE END OF THE TIMER CYCLE OR UNTIL CANCEL BUTTON IS PRESSED.

* WHEN THE TIMER IS STARTED REMOTELY BY PUSH BUTTONS OR RELAYS SOMETIMES THESE CONTROL LINES ARE AERIALLY EXPOSED AND WILL BE SUSCEPTIBLE TO LIGHTNING SURGES.

* AT TIMES THESE SURGES CAN INDUCE VOLTAGES IN THE CONTROL LINES SO THAT A TIMER RELAY WILL BE ACTIVATED AND TIMER WILL START GOING, GIVING A FALSE SIGNAL ON THE SIREN. IF THIS CONDITION OCCURS IT CAN BE ALLEVIATED BY WIRING AN AUXILLIARY TIME DELAY TIMER INTO THE TIMER. THIS TIME DELAY WILL BE ARRANGED SO THAT MOMENTARY LIGHTNING INDUCED PULSES OF .05 SEC. CANNOT START THE AR TIMER OPERATING, BUT INTENDED SIGNAL PULSES OF 2 SECS. WILL ACTIVATE TIME DELAY TIMER SO THAT IT WILL START AR TIMER GOING. IF THIS TIME DELAY TIMER IS ADDED TO YOUR SYSTEM, PERSONNEL WHO TURN IN SIGNALS MUST BE ADVISED THAT THEY MUST PRESS BUTTON WHERE THEY INITIATE SIGNAL FOR AT LEAST 2 SECS. OR MORE.

THE TIMER CAN BE USED FOR PERIODIC TIME TESTS OF THE VARIOUS SIGNALS. FOR INSTANCE, A 1 MINUTE TEST OF "ALERT" SIGNAL CAN BE MADE BY PRESSING "ALERT" BUTTON AND THEN AFTER APPROXIMATELY 1 MINUTE THE CANCEL BUTTON CAN BE PRESSED TO STOP THE AUDIBLE SIREN SIGNAL. THE TIMER MOTOR WILL CONTINUE GOING TO COMPLETE ITS 3 MINUTE CYCLE. AFTER A SILENT PERIOD THE "ATTACK" SIGNAL BUTTON COULD BE PRESSED AND THEN ALSO COULD BE CANCELLED IF DESIRED.

SERVICE PROCEDURES

1. RELAYS ARE PLUG-IN TYPE AND ARE VERY EASILY REPLACED WHEN REQUIRED.
2. TO REPLACE A TRANSFORMER IT IS RECOMMENDED THAT WIRING PANEL BE REMOVED FROM CASE AFTER PROPERLY MARKING & REMOVING LEAD IN WIRES. THE LEADS FROM TRANSFORMER TO TERMINAL BLOCK CAN BE REMOVED BY RELEASING TERMINAL LUG SCREWS. LEADS FROM TRANSFORMER TO FUSE & RELAY SECTION CAN BE CUT FOR SPLICING IN NEW TRANSFORMER LEADS. REPLACE WITH NEW TRANSFORMER.
3. IF MOTOR, MICRO SWITCHES OR CAMS HAVE TO BE REPLACED IT IS RECOMMENDED THAT WIRING PANEL BE REMOVED (AS ABOVE). THEN MAKE A MARK ON CAMS IN RELATION TO MICRO SWITCH ROLLERS TO INSURE CORRECT REPLACEMENT OF CAMS WHEN REASSEMBLING. TO REPLACE MOTOR, REMOVE SCREW SECURING MOTOR, SWITCH & CAM ASSEMBLY TO WIRING PANEL. REMOVE SET SCREWS IN CAMS NOTING POSITION OF THE CAMS AND THEN REMOVE SCREWS SECURING MOTOR TO FRAME. PULL MOTOR & SHAFT OUT OF CAMS & REMOVE EXTENSION SHAFT. CUT MOTOR LEADS IN A MANNER SO THAT NEW MOTOR LEADS CAN BE SPLICED IN WITHOUT DIFFICULTY. INSTALL NEW MOTOR & REASSEMBLE PARTS.
4. TO REPLACE A CAM, REMOVE WIRING PANEL (AS ABOVE). CAMS TO BE REMOVED REQUIRE THE WITHDRAWAL OF MOTOR SHAFT AS DESCRIBED ABOVE.
5. TO REPLACE A MICRO SWITCH REMOVE THROUGH BOLTS HOLDING SWITCHES TO FRAME. DISCONNECT WIRING TO DEFECTIVE SWITCH & REPLACE WITH NEW SWITCH.
6. TO REPLACE A PUSH BUTTON SWITCH, UNSCREW ALL PUSH BUTTON GUARDS SO SWITCH ASSEMBLY CAN BE REMOVED FROM CASE COVER. UNSCREW THE LOCKNUT ON DEFECTIVE SWITCH & REMOVE & THEN REPLACE WITH NEW SWITCH.
7. TO REPLACE A PILOT LIGHT ASSEMBLY ITS WIRES MUST BE DISCONNECTED & THEN ASSEMBLY MUST BE PRESSED OUT FROM INSIDE OF FRONT COVER. REPLACE WITH NEW PILOT LIGHT ASSEMBLY.

SEE DRAWINGS 82150810 SHOWING USE OF THIS TIMER IN VARIOUS SIGNAL SYSTEMS.

LET	ECO	CHANGE	DATE	BY
C1		TO 13 FROM #6	6-17-68	BH
C		FUSED PRIM. OF TRANS.	5-15-68	BG
B		REDRAWN & REVISED	0-18-66	BG

FIRST USED ON

MATERIAL

FEDERAL SIGN AND SIGNAL CORPORATION
136TH AND WESTERN AVENUE
BLUE ISLAND, ILLINOIS

TOLERANCE UNLESS SPECIFIED
FRACT. ± 1/64
DEC. ± .005

FINISH

DRWN. BY B.G. DATE 9-16-66
CHKD. BY DATE
SCALE

NAME MODEL AR-AIR RAID WARNING SIGNAL CONTROL WIRING & OPERATING INSTRUCTIONS

8215D768