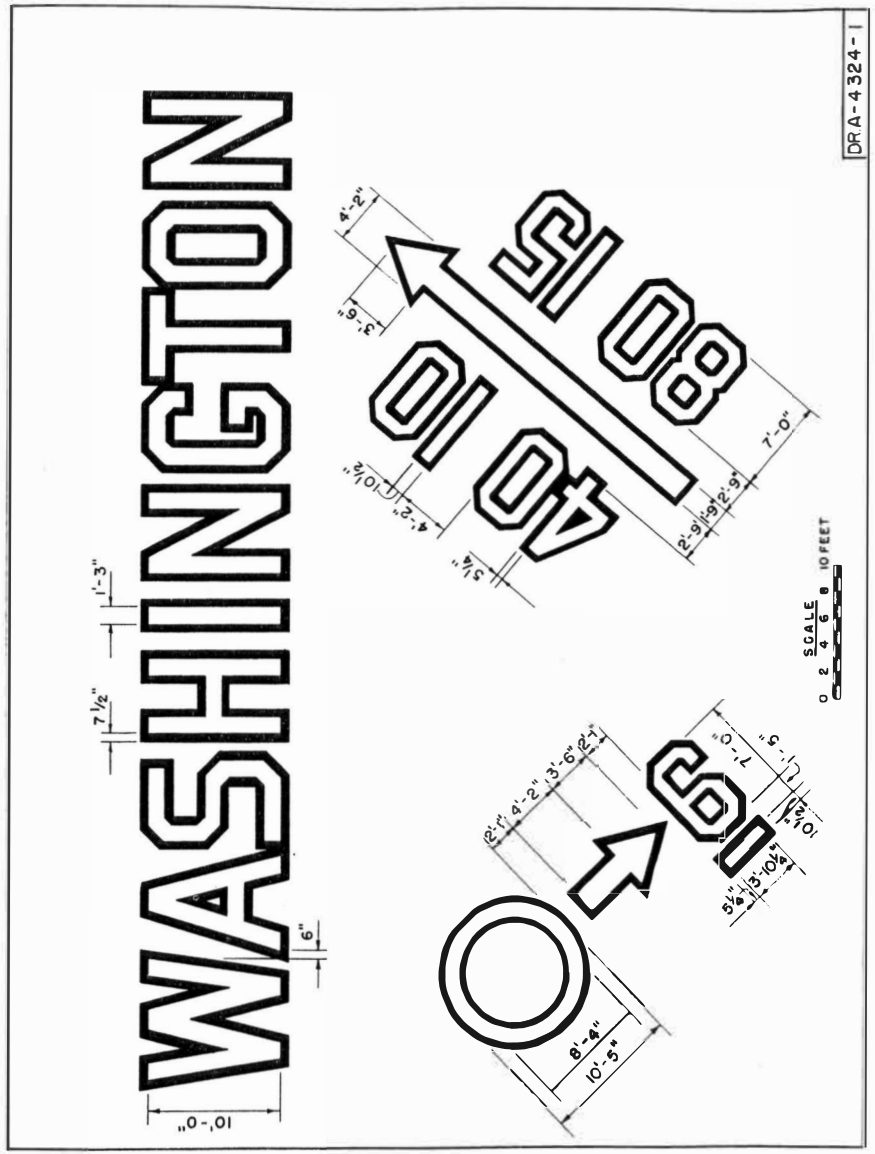
AIR MARKING

Revised August 1945

Civil Aeronautics Bulletin No. 12

For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C., Price 20 Cents

CONTENTS



Typical Air Marker

AIR MARKING

The air marker is one of the simplest and least expensive aids to air navigation, but it is at the same time one of the most effective and necessary, particularly for the private or nonscheduled flier. Perhaps the chief hazard concerned in "contact flying" is the danger of becoming lost. Obviously this hazard is lessened considerably, if not eliminated, when the flier can ascertain his exact whereabouts and orient himself merely by looking down and reading a sign as he passes over a town or city. This is the function of air markers.

To serve this purpose effectively, air markers should be as simple as possible, and should be of sufficient size to be legible under good visibility conditions from a height of at least 3,000 feet.

It also is apparent that this purpose cannot be achieved if there are only a few widely scattered air markers throughout the country. Fliers may become lost in any locality; therefore, it is desirable to have every city, town and village air marked. The Civil Aeronautics Administration will be pleased to assist regional, State, or local officials in planning air marking programs or individual markers.

In constructing air markers, if suitable area is not available to accommodate the complete names in letters of ample size, it is more desirable to use an abbreviation than to reduce the size of the lettering. No abbreviations should be used, however, that are likely to be misunderstood.

Information in this bulletin is based on a study and tests made over a period of years, with such modifications and additions as have been found necessary through the actual construction of thousands of air markers and their observation under varying weather and light conditions.

TYPES OF AIR MARKERS

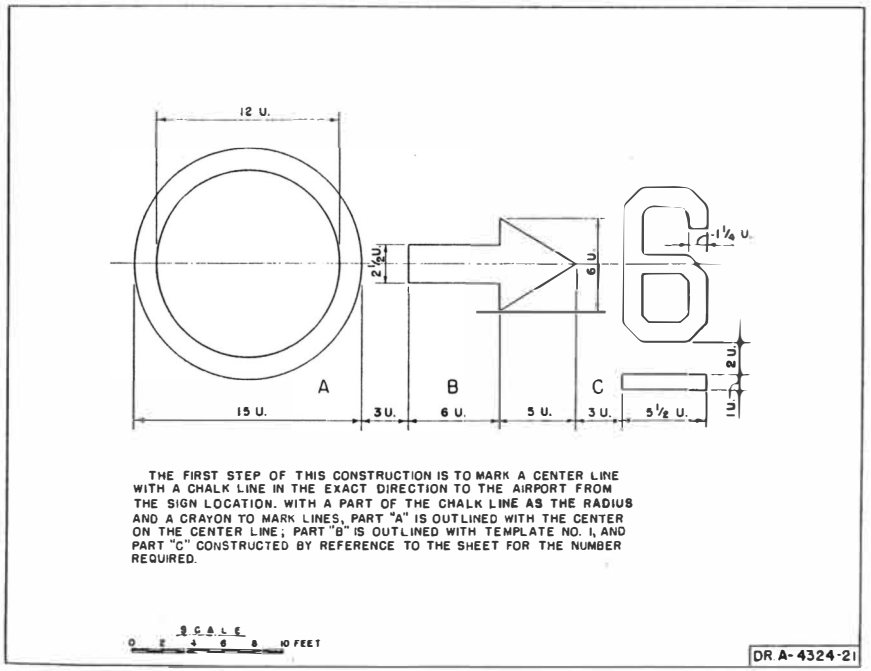
Nine general types of air markers are recommended for use as air navigation aids. They are:

1. The painted roof town marker.
2. Painted highway marker.
3. Illuminated day and night marker.
4. Baked-enamel or porcelain raised marker.
5. Raised metal marker.
6. Raised wood marker.
7. Crushed stone or concrete marker.

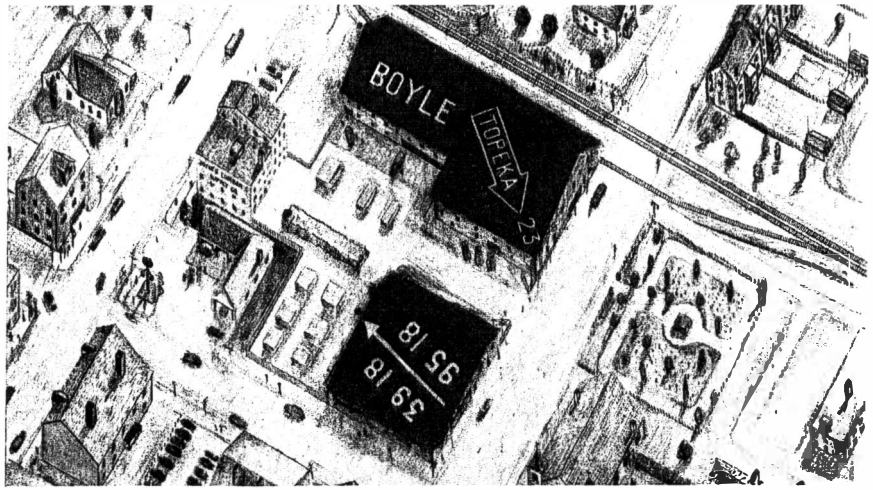
8. Painted marker for sides of buildings and water tanks.
9. Landscape marker for parks and along highways.

AIRPORT DIRECTION MARKER

Each marker should carry, as well as the name of the town, the latitude and longitude in degrees and minutes, and an airport direction marker indicating the nearest airport. The latitude and longitude are to be separated by the meridian or north marker, the latitude being placed to the west and the longitude to the east of the north marker. The symbol to be used to indicate the nearest usable airport is a circle with an arrow pointing to such airport, and the distance in miles at the head of the arrow. The symbol to be used to indicate the nearest airport having at least one hard-surfaced runway 3,000 feet in length is an arrow enclosing the name of and pointing to such airport, with the distance in miles at the head of the arrow. The name in the arrow should be placed so as to read from the tail to the head of the arrow. In the event the airport is above sea level the minimum length runway would be 3,000 feet plus 5 percent of 3,000 for each 1,000 feet above sea level. (See also Drawing A-4324-28.)



Airport Direction Marker



Standard Painted Roof Marker

Height of letters—10-foot minimum. Color—chrome yellow with black border or black background.

PAINTED ROOF TOWN MARKER

One of the most effective air markers is painted on roofs. Large flat (or nearly flat) roofs are conspicuous landmarks to fliers and are adapted naturally to air marking because they furnish an even background and the air marking is less likely to be obstructed by dirt, dust, and snow. Such markers, when properly painted, may remain clear and legible for 3 years or more.

ROOF SELECTION

1. The roof should be in a state of good repair.
2. As far as possible the roof should be a prominent one, located not far from the center of the community or near a main highway or railroad.
3. School houses lend themselves to air marking as they are usually large with flat roofs.
4. View of the roof should not be obstructed by overhanging trees or tall adjacent buildings.
5. The roof should not be located where it will be obstructed frequently by smoke from nearby stacks.

Where a single roof of sufficient size is not available, the marker may be painted on a group of roofs by placing on one of the group one complete unit of the marker. Clearly abbreviated names may be used.

TYPES OF ROOFS

Of the three general designs of roofs—flat, gable, and hip—flat roofs are preferred. Gable roofs can be used where the slope of the sides is not too great. The marker can be run over tops of

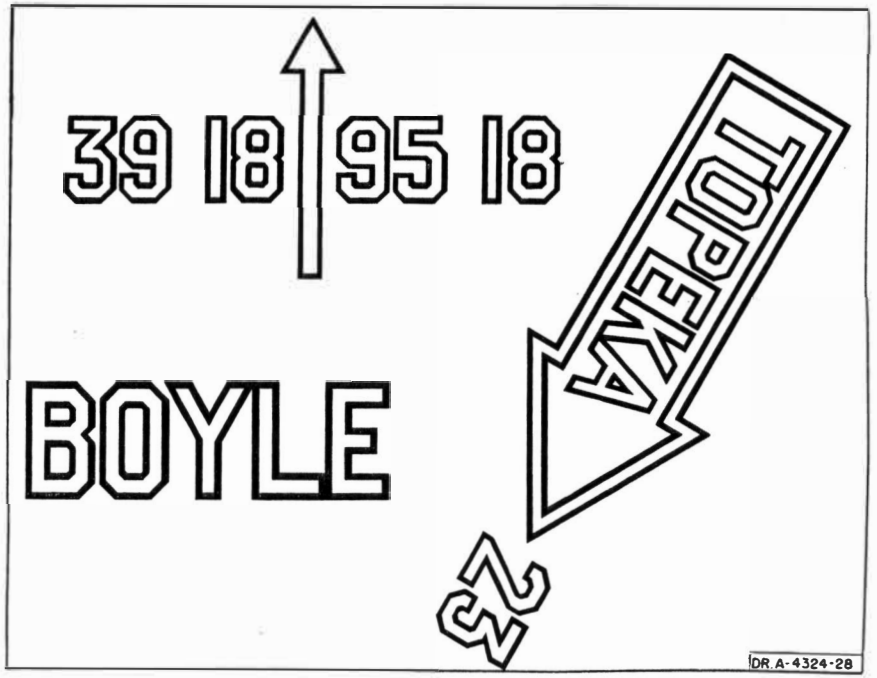
such roofs so that it will be visible from either side. Hip roofs should be avoided if they do not provide surfaces of satisfactory size and pitch.

ROOF SURFACES

Roof surfaces which may be painted without damage to the roof material include metal, concrete, tile, slate, wood shingle, and wood composition. Those which may be damaged when painted are bituminous composition and bituminous covered surfaces, with or without a gravel top.

Of the roof surfaces that may be safely painted, metal is perhaps the best because less paint is required and a longer life of the marker may be anticipated. Concrete, tile, and slate and wood composition surfaces may be satisfactorily painted at a low average cost. Wood shingle roofs are less desirable because they require more paint.

Bituminous composition or bituminous coated roofs should be in good repair and necessary precautions taken to prevent "bleeding through."



Suggested Roof Marker

COLOR COMBINATION

The distance at which air markers are legible depends largely upon the degree of contrast between the characters and the background. Best results are obtained by using a lighter color for characters and a darker color for the background or border. When a border is used it should be one-half the stroke or one-half the width of the letter. Chrome yellow—Specification No. TT–P–53– or any good grade of yellow highway paint may be used for the characters, with the border or background of dead black—Federal Specification TT–P–61.

LETTERS, NUMERALS, AND CHARACTERS

The legibility of air marking signs depends, in addition to the color combination used, on the size, shape, and spacing of letters, numerals, and characters. For markers constructed on roofs a letter size of 10 to 20 feet is recommended. The types of letters will be found in the back of the book.

A 20-foot marker will be 2 feet 6 inches wide and have a border of 1 foot 3 inches.
A 10-foot marker will be 1 foot 3 inches wide and have a border 7½ inches wide.
A 7-foot marker will be 10½ inches wide and have a border 5½ inches wide.
A 5-foot marker will be 7½ inches wide and have a border 3¾ inches wide.

CONSTRUCTION OF PAINTED ROOF MARKERS

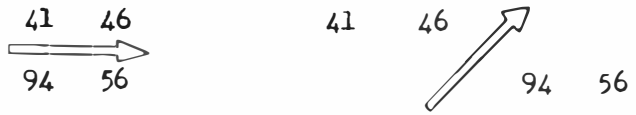
After selecting the roof on which to construct an air marker, the next problem is laying out the letters, numerals, and characters. In doing this it is of the utmost importance that the direction pointers, airport symbols and north arrows indicate exact direction and distances. Care should be taken that there is no departure from the standard marker as changing of design or color causes confusion in the mind of the lost pilot.

LATITUDE AND LONGITUDE

The latitude and longitude must be carefully determined from the latest edition of the U. S. Sectional Aeronautical Charts, scale 1:500,000. (In case of doubt as to the position of the town, inquiry should be made to the Director, U. S. Coast and Geodetic Survey, Washington, D. C.) These coordinates are to be indicated on the marker in degrees and minutes, the last two digits of each always being the minutes and are separated from the degrees by the standard spacing (as indicated in "Key for Determining Spacing of Numbers," Drawing A–4324–27) *plus 4 units.* The latitude and longitude will be separated by an arrow pointing true north—the latitude always being placed to the west and the longitude to the east of the arrow. There shall be 4 units between the last digit of the minutes of the latitude and the north arrow, and 4 units from the north arrow to the first digit of the degrees of

676049–46––2

longitude. For example, the town of Ross, latitude 41 degrees, 46 minutes, and longitude 94 degrees, 56 minutes should be indicated by 41 46 and 94 56, respectively.



MARKERS AT THE MERIDIAN OF GREENWICH

To avoid all confusion in the region of the meridian of Greenwich (the prime meridian) in the course of a long flight, the figures indicating the longitude of the first 5 degrees on either side of this meridian shall be preceded respectively by the letter "E" or "W". In the same way, in the region of the equator, the figures indicating the latitude of the first 2 degrees on either side of the equator shall be preceded by the letter "N" or "S".

NAME OF TOWN

The name of the town should be placed in minimum 10-foot letters. Where an airport arrow is used the letters enclosed in the arrow should be 7 feet in height. The number of miles at the head of the arrow should also be 7 feet in height, as well as the latitude and longitude. The name in the arrow should be placed so as to be read from the tail to the head of the arrow.

ACCURACY OF DIRECTIONS

A map of known accuracy and a good compass should be used, taking into consideration, in the use of the compass, the magnetic declination of the section of the country in which the marker is to be constructed. In using a magnetic compass care should be taken to correct for the magnetic effects of metal roofs, power lines, and other nearby metal objects.

PREPAINTING CARE

The surface on which the paint is to be applied should be thoroughly cleansed of any spots of grease or oil.

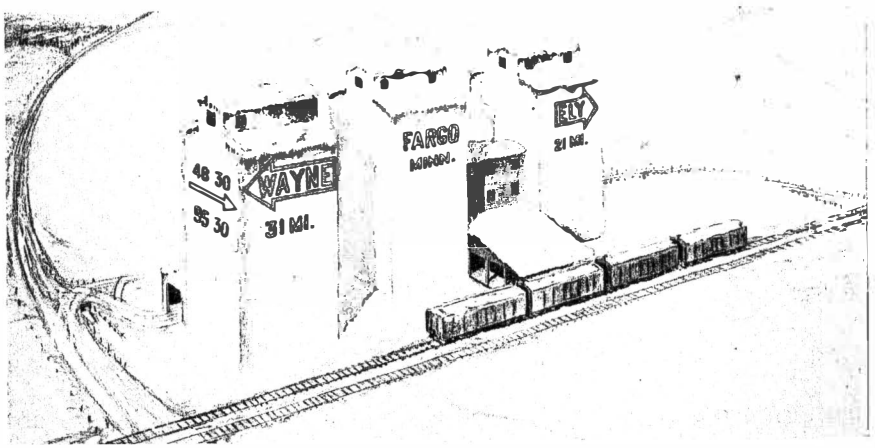
METAL ROOFS

The painting of new galvanized iron is uncertain in its results as to the adherence of the paint, but painting of galvanized metal which has been exposed to the weather for 6 months or more presents little or no difficulty in this respect.

TREATMENT OF GALVANIZED IRON SURFACES

When new galvanized surfaces are to be painted, a zinc dust-zinc oxide primer conforming to Federal Specification TT–P–641 should be used. A new red lead primer made specifically for galvanized surfaces is also being marketed.

Various "break-down" solutions for preparation of the galvanized surfaces are commercially available. The primers mentioned above are preferred to the break-down solutions, but of the latter, the following has been found to be the most satisfactory:



Air Marking for Sides of Buildings, Water Tanks, Standpipes

Height of letters—10-foot minimum. Smaller letters constitute a hazard rather than an aid. Color—chrome yellow with black border.

In 1 gallon of soft water dissolve 2 ounces each of copper chloride, copper nitrate, and sal ammoniac, then add 2 ounces of commercial muriatic acid. This should be done in earthen or glass vessel, never in a tin or other metal receptacle. Apply the solution with a wide flat brush to the area of the galvanized iron which is to be painted. It will assume a dark, almost black color, which on drying becomes a grayish film.

LAYING OUT THE MARKER

A step-by-step method of laying out the marker will be found in back of book.

PAINT APPLICATION

All painting should be done in a careful and workmanlike manner. Each coat of paint should be applied only when the temperature is above 40° F., and it should not be applied upon damp or frosty surfaces. In the western sections of the country consideration should be given to dust storms and an attempt should be made to paint the sign at such a time as will permit the paint to set before such a storm occurs.

In case the air marker is to be painted on a bituminous composition roof, a good grade of highway traffic paint should be used such as that of Federal Specification TT–P–115. The area covered by the sign should be thoroughly cleaned of foreign matter.

SEAL COAT

A seal or primer coat of aluminum paint on the roofing under the color coats will serve a two-fold purpose of reducing "bleeding through" and prevention of damage to the roof by solvents, if any, in the paint.

ALUMINUM PAINT

The aluminum paint may be prepared by mixing 2 pounds of aluminum powder or aluminum paste per gallon of good grade spar varnish.

GENERAL PAINT SPECIFICATIONS

1. *General.*—This specification covers the general requirements for yellow paint for use on steel, concrete, and wood surfaces, such as galvanized steel water towers, service sheds, tank houses, concrete directional arrows, galvanized iron roof surfaces, slate and tile roof surfaces, etc. The color shall be the same as yellow No. 4, supplement No. 3–1. United States Army Quartermaster Specifications. (Federal Specification TT–P–53.) The correct shade of yellow will match the yellow on the front cover of this book.

YELLOW PAINT

2. *Composition*

	Percent by weight Maximum	Minimum
Pigment	--	62
Liquid	38	--
Water	0.7	--
Coarse particles and "skins" (325 screen)	2	--

3. *Pigment*

Chemically pure medium chrome yellow	--	60
Lead-free zinc oxide	20	--
Extending pigments, Barytes, siliceous matter, or mixture thereof	20	--

4. *Liquid*

Raw linseed oil	--	80
Spar varnish—Fed. Spec. TT–V–121a	--	10
Drier and thinner	10	--

BLACK PAINT

5. *Weight per gallon*—not less than 15 pounds.

Black, ready-mixed paint for air markers.

1. *General*—This specification covers the general requirements for black paint for use on steel, concrete and wood surfaces, such as galvanized-steel towers, service sheds, tank houses, concrete directional arrows, galvanized iron roof surfaces, slate and tile roof surfaces, etc. (See Federal Specification TT–P–61.)

2. *Composition*

	Percent by weight Maximum	Minimum
Pigment	32	28
Liquid	72	68
Water	0.5	--
Coarse particles and "skins" (325 screen)	1.5	--

3. *Pigment*

Carbon	--	20
Lead Oxide	--	5
Carbon, lead oxide, insoluble mineral material, and loss on ignition	--	90

4. *Liquid*

Raw linseed oil	--	80
Thinner and drier mixture	20	--

5. *Weight per gallon*—not less than 9 pounds.

MAINTENANCE OF ROOF MARKERS

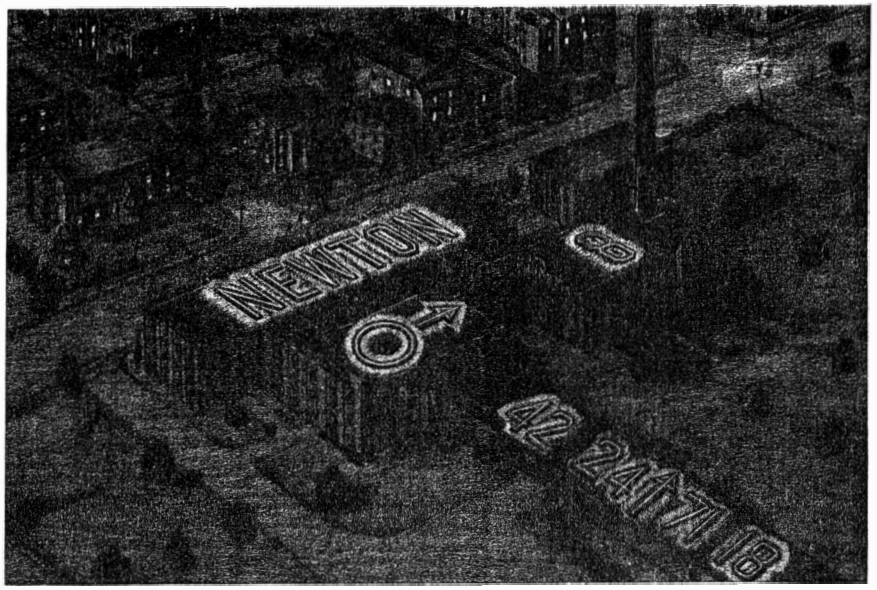
It is necessary that air markers be properly maintained if they are to fulfill their purpose of conveying information to air travelers. The marker should be swept or washed free from accumulations of soot or dirt from time to time in order to preserve the contrast between the markers and their background and thus insure maximum legibility. Arrangements should be made for such periodic repainting as local conditions may dictate; also for the proper maintenance of lighting equipment in case the markers are illuminated for night flying.

ILLUMINATED DAY AND NIGHT MARKERS

In order that air markers may serve their full purpose, it is desirable that they be illuminated at night. However, because of the high construction, operation and maintenance costs of illuminated signs, it may not be practicable to install them in many localities. The problems involved in illuminating markers are fundamentally the same as those encountered in illuminating large advertising signs except that air markers are horizontal instead of vertical. Two main methods of illumination are by direct and reflected lighting.

DIRECT LIGHTING

In direct lighting the markers are outlined by exposed incandescent lamps or gaseous-discharge tubes, preferably placed along the center



Illuminated Day and Night Marker

Gaseous discharge tubes, or incandescent lamps. Height of letters—10-foot minimum. Color—chrome yellow with black background.

line of the strokes of the letters and characters. (Markers may be made up of suitable colored reflecting surfaces giving good day visibility and illuminated for night operation by the exposed lamps, thus augmenting the effect of the lamps.)

For outlining small letters with incandescent lamps, 15-watt frosted sign lamps should be used, spaced 12 inches apart; for larger letters use 25-watt frosted sign lamps, spaced 18 inches apart.

REFLECTED LIGHTING

Reflected light is produced either by floodlight projectors with spread lenses (and when necessary, with suitable shields or visors to cut off stray upward light) or by industrial reflectors arranged to give a uniform distribution of light of proper intensity over the entire surface of the markers.

Illumination by direct light is more effective than floodlighting because of brilliance, and hence greater attracting power. Markers illuminated in this manner are effective at night even though the color of the characters is obscured by dirt or snow. The conduit and fittings for either exposed incandescent lamps or gaseous-discharge tubes may be fastened flat on the roof with metal conduit straps or strapped to light stringers superimposed on the markers. The conduit and fittings and the stringers when used should be painted the same color as the marker.

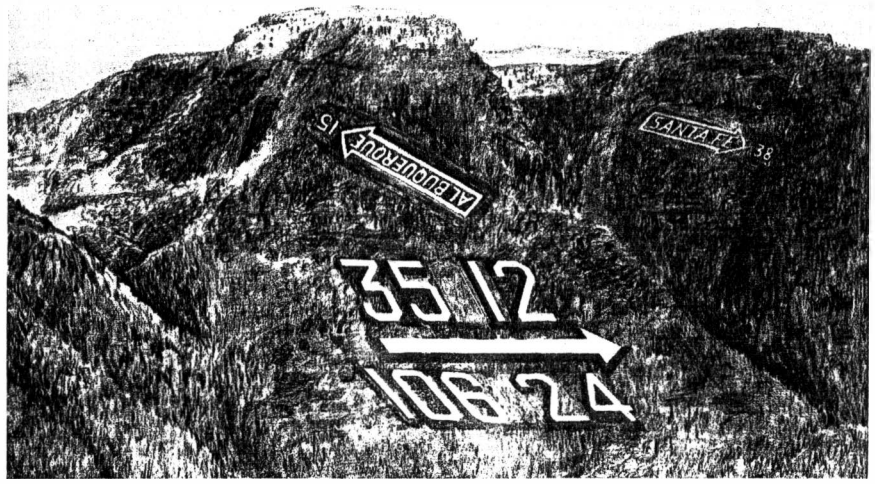
The reflected-light method of illumination is the simplest to install and gives good results if the markers are kept clear and free from snow, but it does not have the attracting power of the other systems. It is recommended that the average intensity of illumination of the surface of the markers for the reflected-light systems be not less than 10 foot-candles and preferably not less than 15 foot-candles. In general, as the amount of illumination in the vicinity of the air marker is increased, it may be necessary to increase the brilliance of the marker, to use color effect, or flash the marker lights (or all three), to give the necessary power of attraction.

CIRCUITS-VOLTAGE

In planning the illumination of markers, care should be taken to provide well-divided circuits with the least possible voltage drop, as a slight drop in voltage will materially reduce the output of the lamps. It is advisable to use wire of ample size to carry at least twice the proposed load, as it may later be found necessary to increase the wattage of the lamps. It is recommended that the entire electrical installation be made in accordance with the rules of the National Safety Code published by the National Bureau of Standards of the U. S. Department of Commerce.

AIR MARKERS CONSTRUCTED ON THE GROUND

Two commonly recommended methods of constructing air markers on the ground are: First, by construction with crushed stone or



Crushed Stone Air Marker

Height of letters—20-foot minimum (50 feet preferable). Color—white. Whitewash to be used.

gravel, bound with a cement and sand mixture or some other suitable binder; second, by construction with crushed stone, gravel, or other suitable aggregate without binder. The first method, though having a higher initial construction cost than the second, has very low maintenance cost and is permanent. The second method has a higher maintenance cost than the first, and the stone in the marker may be gradually displaced or scattered, thus eventually making the marker useless.

LOCATION OF GROUND MARKERS

Markers constructed on the ground should be placed in open spaces away from trees or other obstructions. Public parks or the grounds of public institutions are often suitable locations. Privately-owned property may be also used. Cleared hills or mountains make desirable locations for ground markers.

CHARACTERS OF GROUND MARKERS

These characters should be of the same proportions as those recommended under "Construction of Painted Roof Markers," with the exception that in the case of ground markers the minimum letter height should be 20 feet (50 feet is preferable).

GROUND MARKER COLOR COMBINATIONS

As stated before, in many cases the ground affords a poor background for air markers. In such cases the characters should be constructed on an artificial background of sod, cinders, or some

dark material which should extend at least one unit beyond the top, bottom, and both ends of the markers. The letters and characters should be white.

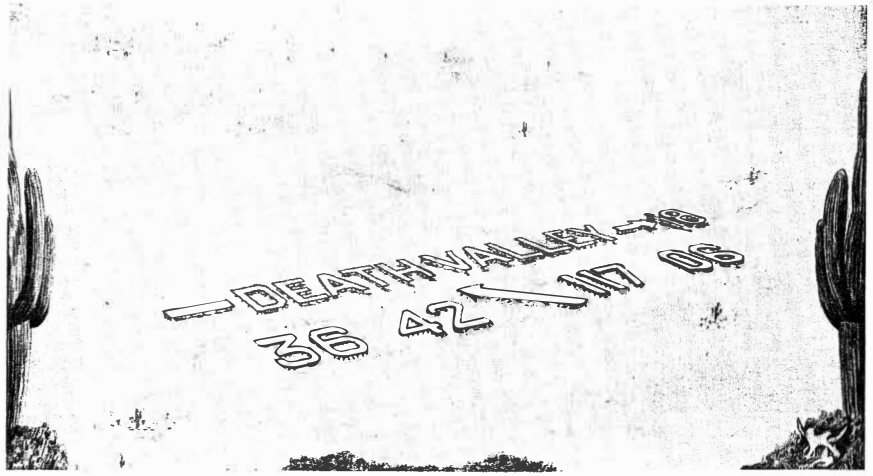
CONSTRUCTION OF GROUND MARKERS

In laying out markers to be constructed on the ground the same care should be exercised as is described under "Construction of Painted Roof Markers." Letters, numerals, and characters should be uniform and simple in their arrangement. The ground should first be cleared of all vegetation and then the characters outlined on the ground and excavated to the width and depth required by the method used.

DEPTH OF TRENCH AND VEGETATION-KILLING COMPOUND

To construct a marker of loose aggregate the characters should be excavated to a depth of from 5 to 9 inches and the entire area of the trench then treated with some vegetation-killing compound.

A mixture of crude oil and salt is nonpoisonous and will discourage the growth of vegetation for a short period of time. A more effective compound is a solution of sodium arsenite but since this material is poisonous it should not be used on playgrounds, or areas where animals graze. The trenched characters should then be filled and packed tightly with the aggregate and the face or top of the marker leveled by covering with fine aggregate and painted with the mixture of white Portland cement and water. Cinders, sod, or some other dark material suitable for the background should be placed around the characters.



Raised Air Marker

Enamel, metal, wood. Height of letters—20-foot minimum (50 feet preferable). Color—white with black border.

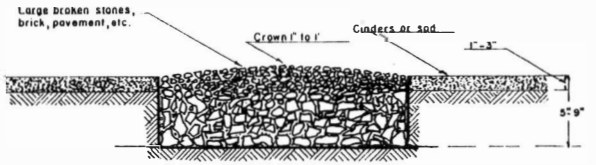
MIXTURE OF CEMENT

To construct a marker of stone bound with a mixture of cement and sand (mixture should be made by mixing 1 part of cement with 2 parts of sand, and enough water to form a dry mealy mortar), the characters should be excavated to a depth of 5 inches where a background of cinders or sod is to be used. (The edges of markers on airports should be beveled to prevent damage to airplane wheels.)

Broken stone, bricks, pavement, or aggregate native to the locality should be placed in the excavation and the cement mixtures poured over it and packed in. The top and sides should be shaped as illustrated.

Cross Section of Cement-Bound Stone Marker

When cinders are used as a background they should be thoroughly compacted. If desired, a binder of asphaltic oil may be applied.



Cross Section of Loose Stone Ground Marker

After excavating for the letters, the ground in and around the excavation should be treated with some vegetation-killing compound. Then the aggregate should be placed in the excavation and thoroughly compacted, the larger aggregate being at the bottom and the smaller at the top. Upon completion, the face of the letters should be painted with white Portland cement and water.

MIXTURE FOR PAINTING OF MARKERS

The top of the marker should then be painted with a mixture of white Portland cement and water. (Mixture made by mixing 5 pounds of white Portland cement with 1 gallon of water.)

ILLUMINATED GROUND MARKER

Air markers constructed on the ground can be illuminated by reflected light as described under "illumination of roof air markers."

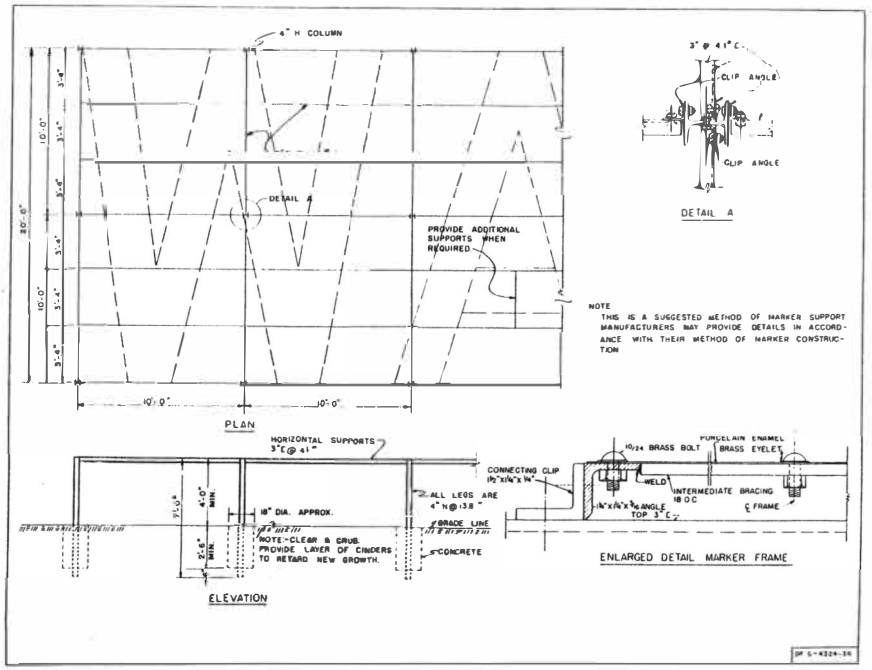
MAINTENANCE OF GROUND MARKERS

Ground markers constructed of crushed stone, bound together with a cement grout, require only an occasional repainting with white Portland cement and water mixture. Other ground markers constructed of loose aggregate should be repainted at least once a year with the white Portland cement and water mixture, at which time all aggregate which has been displaced should be restored.

RAISED ENAMEL MARKERS

Markers consisting of individual porcelain enameled letters are recommended for permanent installations where repainting would

676049—46——3



Steel Support for Raised Ground Marker

be inconvenient or difficult, as on roofs, alongside highways, or out-of-the-way locations. Porcelain enamel consists of high quality glass coating on metal, and has a high reflecting value which imparts to the letters a high visibility range. Porcelain enameled letters are raised from the background to convenient heights by means of rust-proofed metal supports. (See drawing C–4324–36.)

METAL OR WOOD MARKERS

Metal or wood markers may be constructed similarly to the raised enamel markers.

CONSTRUCTION OF MARKERS ON HIGHWAYS

In painting air markers on highways, care should be taken that the markers are located along open stretches of road away from overhanging trees, tall buildings, and other obstructions.

HEIGHT OF HIGHWAY MARKERS

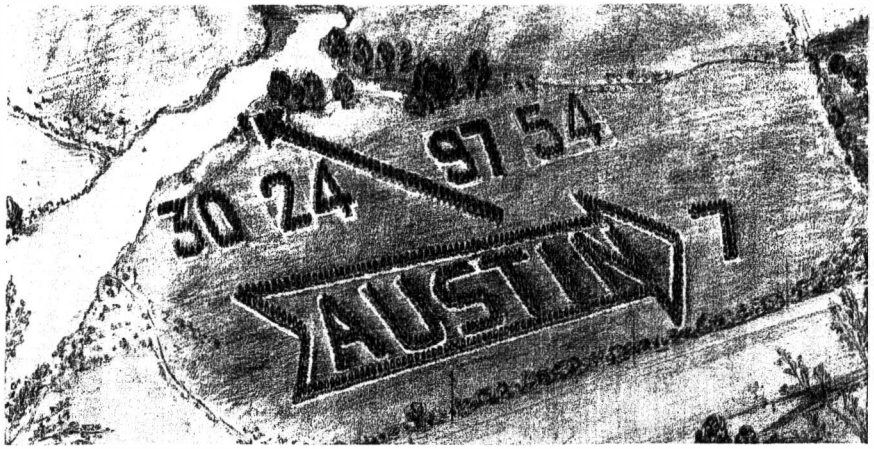
The letters and numerals of these markers should be at least 20 feet in height.

COLOR

Chrome yellow outlined with black.

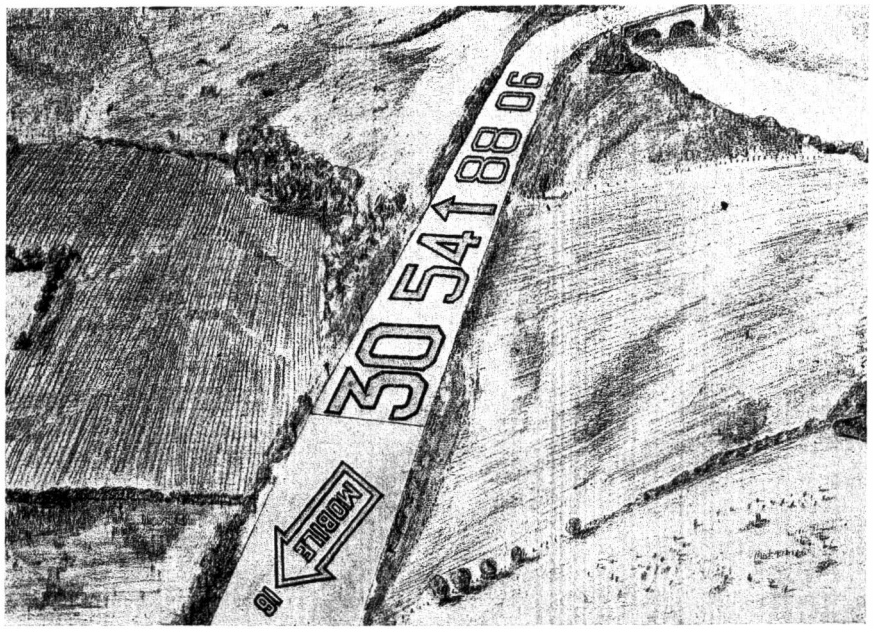
LAYING OUT OF MARKERS ON HIGHWAYS

Markers should be laid out on highways in a similar manner to the markers on roofs, and then painted with at least two coats of a good grade traffic paint, allowing each coat to dry thoroughly before the next coat is applied or before the highway is used.



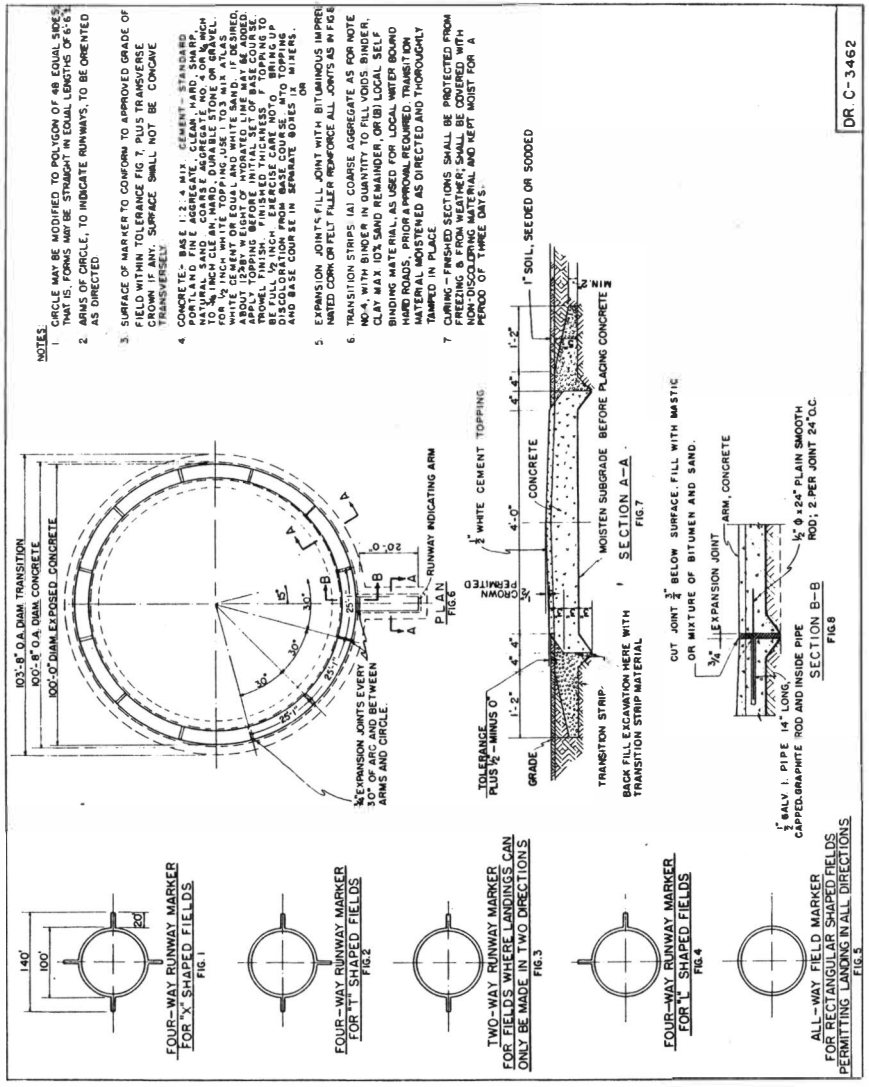
Landscape Air Marker

For parks, school yards, or along highways. Height of letters—20-foot minimum (50 feet preferable). Color—shrubs with contrasting color flower border.



Highway Air Marker

Height of letters—20-foot minimum. Color—chrome yellow with black border.



Concrete Ground Marker for Intermediate Landing Fields

MAINTENANCE

In order that highway markers be continuously effective they must be repainted whenever necessary. It is suggested that they be inspected at regular intervals, preferably at least twice a year, for signs of wear and other defects.

LANDSCAPE MARKERS

These markers should lend themselves nicely to school yards, airports, alongside highways, in traffic circles, etc. The marker should be at least 20 feet in height.

COLORS OF LANDSCAPE MARKER

The flowers and shrubbery should be as light in color as possible, and a border of crushed rock, whitewashed, at least 12 inches in width should outline the letters, numerals, and characters.

AIRPORT GROUND CIRCLE MARKERS

Airport ground markers can be made of either concrete or compacted crushed rock or shell. (See specifications.) Markers should be flush with the grade of the field, and periodic inspections should be made to detect dislocations or washes which might destroy the pattern of the marker. The marker should at all times be kept white, clean, and free from weeds. Markers should be in the center of sod field or at intersections of landing strips.

AIRPORT HANGAR MARKER

To indicate and specifically identify an airport, the hangar marker will be a circle of chrome yellow with a black border of one-half

Airport Hangar Marker

the stroke. Inside the circle will be shown the latitude and longitude (in degrees and minutes), separated by an arrow indicating true north. The circumference of the circle and the size of the numerals therein shall be governed by roof space. Underneath the circle the name of the airport will be painted in 10-foot letters.

FOREST LOOKOUT TOWERS

See scale drawing on page 20.

TEMPLATES

To expedite the laying-out of the marker and to insure accuracy in size and spacing, the following templates may be used. There are three templates to a set, and these three patterns will make each letter in the alphabet as well as the numerals. Templates can be made of metal, plywood, or wall board, with hinges in the center so that they can be folded and transported more easily from one location to another. The detailed method to be followed for each letter is shown on the following pages.

SIZE OF TEMPLATES

Templates can be made in three sizes to produce letters 5 feet, 7 feet or 10 feet high. One unit in this case equals 1 foot. It will be noted that the height is exactly eight times the width of the stroke (the stroke being the width of the letters or 1¼ units). Dimensions are given in units, thus the templates, as shown on the drawings, are 10 feet high and 1¼ feet wide. When making templates for air markers they should be 10 feet by 1 foot 3 inches, except that template No. 1 should be 11 units high to allow for laying out letters A, K, W, etc.

A 20-foot marker will have a stroke or width of 2 feet 6 inches.
A 10-foot marker will have a stroke or width of 1 foot 3 inches.
A 7-foot marker will have a stroke or width of 0 feet 10½ inches.
A 5-foot marker will have a stroke or width of 0 feet 7½ inches.

KEY FOR DETERMINING SPACING OF LETTERS AND NUMERALS

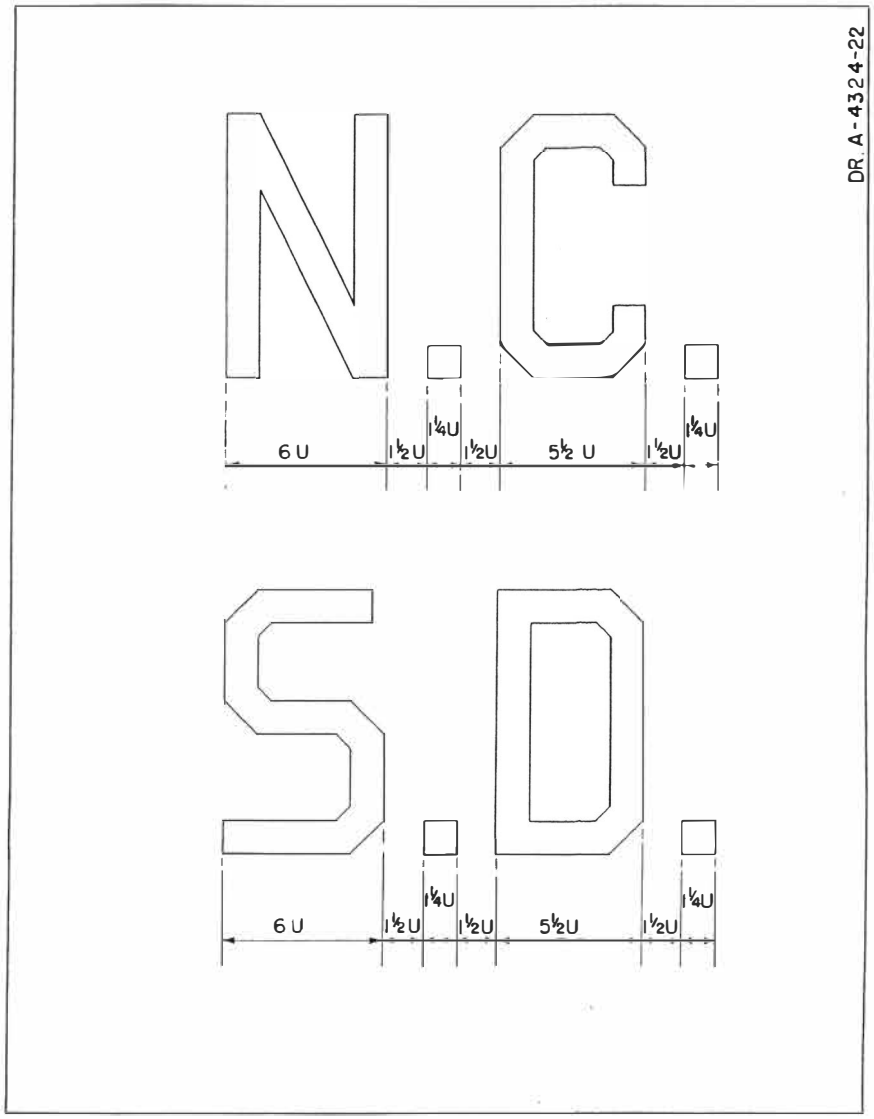
The purpose of the key for determining the spacing of letters is to simplify the lay-out of an air marker and to insure perfect spacing between both letters and numerals. For instance, to determine the number of units between A and N, find A on the left hand side of the page then follow that column to the right to the letter N; follow that column upward to the top of the page where the answer, 1½, is found. This means there shall be 1½ units between A and N. The same method is used in determining the spacing of numerals. In using this key, letters and numerals will be perfectly spaced and any chance of running letters together which might cause a blur from the air will be eliminated.

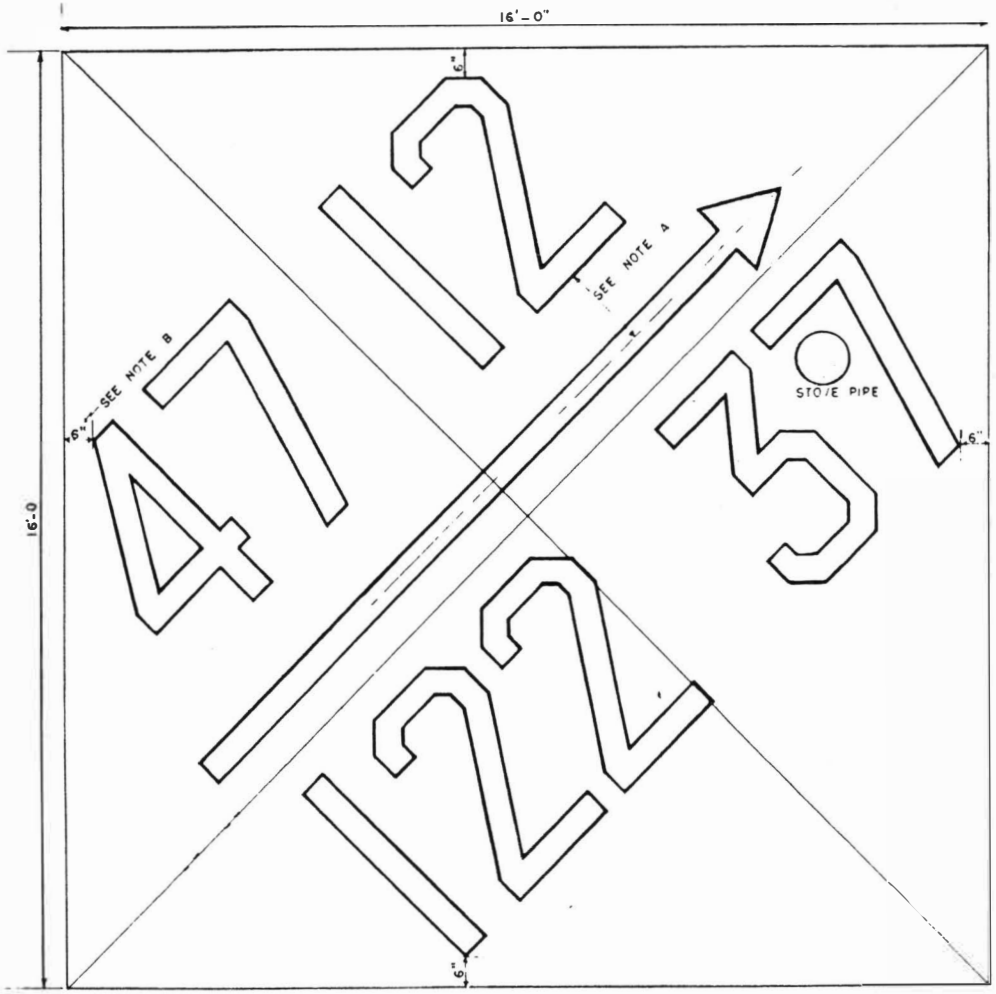
SPACING

Where the name of the town or city consists of two words as "Cedar Point" 5 units shall be left between the two words. In the abbreviation of the States as in N. C., there shall be 1½ units between N and the period; the period shall be 1¼ units in width, and the space between the period and the C shall be 1½ units.

SPACING (Continued)

There shall be 4 units between the last digit of the minutes of the latitude and the north arrow, and 4 units from the north arrow to the first digit of the degrees of longitude.





NOTE A

SPACE NORTH ARROW EVENLY BETWEEN NUMBER MASSES.

NOTE B

NUMBER MASS TO BE A MINIMUM OF 6" FROM ROOF EDGE.

NOTE C

APPEARANCE OF NUMBERS TO BE AS SHOWN IN PLAN THEREFORE SOME EXAGGERATION OF SHAPE MAY BE NECESSARY IN INDIVIDUAL NUMBERS TO RETAIN THIS APPEARANCE.

NOTE D

FOR DIMENSIONS AND LAYOUT OF NUMBERS SEE STANDARD "AIR MARKING" MANUAL PUBLISHED BY THE C A A

NOTE E

TOP NUMBER REPRESENTS LATITUDE, BOTTOM NUMBER REPRESENTS LONGITUDE OF STRUCTURE LOCATION TO CLOSEST MINUTE. THIS EXAMPLE IS, THEREFORE, 47° 12' LATITUDE, 122° 37' LONGITUDE

NOTE F

NORTH ARROW LENGTH TO BE 14'. NUMBERS TO BE PARALLEL TO ARROW AND TO READ IN DIRECTION ARROW POINTS. EXAMPLE SHOWN IS ONE CONDITION WHERE BUILDING IS ORIENTED 45° FROM CARDINAL POINTS. FOR OTHER CONDITIONS NUMBER MASSES AND ARROW ARE TO BE ROTATED TOGETHER SO THAT NUMBERS REMAIN PARALLEL TO ARROW.

DR B-4324-42

Typical Air Marking for Forest Lookout Tower

KEY FOR DETERMINING SPACING OF LETTERS

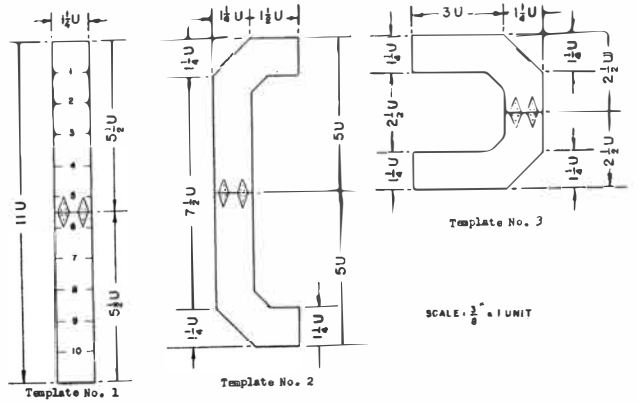
	2 1/2	2 1/4	2	1 3/4	1 1/2	1 1/4	1	3/4	1/2	0
A					BDEFHI KLMNPR	U	CGOQSZ	AX	JTW	VY
B			BDEFHI KLMNPR	CGOQSU	Z	X	AJTWY	V		
C			BDEFHI KLMNPR	CGOQSU	Z	X	AJTWY	V		
D			BDEFHI KLMNPR	CGOQSU	Z	X	AJTWY	V		
E				BDEFHI KLMNPR	CGOQSU	Z	X	AJTWY	V	
F						BDEFHI KLMNPR	U	CGOQST VWXYZ		AJ
G			BDEFHI KLMNPR	CGOQSU	Z	X	AJTWY	V		
H	BDEFHI KLMNPR	U	CGOQSZ	X	AJTWY	V				
I	BDEFHI KLMNPR	U	CGOQSZ	X	AJTWY	V				
J		BDEFHI KLMNPR	U	CGOQSZ	X	AJTWY	V			
K				BDEFHI KLMNPR	U	COGQSZ	X	AJTWY	V	
L						BDEFHI KLMNPR	U	ACGOQS XZ	J	TVWY
M	BDEFHI KLMNPR	U	CGOQSZ	X	AJTWY	V				
N	BDEFHI KLMNPR	U	CGOQSZ	X	AJTWY	V				
O			BDEFHI KLMNPR	CGOQSU	Z	X	AJTWY	V		
P					BOEFHI KLMNPR	U	CGOQSZ	TVWXY	AJ	
Q			BDEFHI KLMNPR	CGOQSU	Z	X	AJTWY	V		
R			BDEFHI KLMNPR	CGOQSU	Z	X	AJTWY	V		
S			BDEFHI KLMNPR	CGOQSU	Z	X	AJTWY	V		
T					BDEFHI KLMNPR	U	CGOQSZ	TVWXY	A	J
U		BDEFHI KLMNPR	U	CGOQSZ	X	AJTWY	V			
V						BDEFHI KLMNPR	U	CGOQST VWXYZ		AJ
W					BDEFHI KLMNPR	U	CGOQSZ	TVWXY	A	J
X				BDEFHI KLMNPR	U	CGOQSZ	X	AJTVW Y		
Y					BDEFHI KLMNPR	U	CGOQSZ	TVWXY		AJ
Z			BDEFHI KLMNPR	U	CGOQSZ	X	ATVWY	J		

DR.-A-4324-26

KEY FOR DETERMINING SPACING OF NUMBERS

	2 1/2	2	1 3/4	1 1/2	1	3/4				
1	1	2 3 4 5 6 8 9 0		7						
2		1	2 3 5 6 8 9 0	4	7					
3		1	2 3 5 6 8 9 0	4	7					
4		1		2 3 4 5 6 8 9 0	7					
5		1	2 3 5 6 8 9 0	4	7					
6		1	2 3 5 6 8 9 0	4	7					
7				1	2 3 4 5 6 8 9 0	7				
8		1	2 3 5 6 8 9 0	4	7					
9		1	2 3 5 6 8 9 0	4	7					
0		1	2 3 5 6 8 9 0	4	7					

DR A- 4324-27



NOTE: All measurements are in "units" (abbreviated "UN") representing any given unit of measurement. One and one-fourth units equal the width of a stroke. Thus, one unit can equal 1 inch or 1 foot. Use lumbermen's crayon to mark the outline of each step in the construction of letters and numerals with templates. The templates are identified by numbers 1, 2, and 3. Template No. 1 to be made 11 units long to allow for laying out of letters A, V, and W.

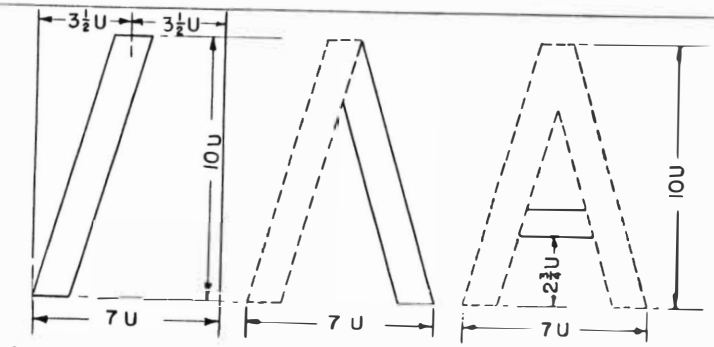
DEPARTMENT OF COMMERCE
CIVIL AERONAUTICS ADMINISTRATION
FEDERAL AIRWAYS SERVICE

TEMPLATES

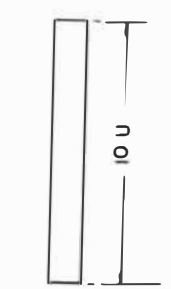
APPROVED CHIEF AIRWAYS ENGR.		SUBMITTED BLANCHE MOYES
DR BY: RSH	7-3-40	DR.A-4324-2

Templates

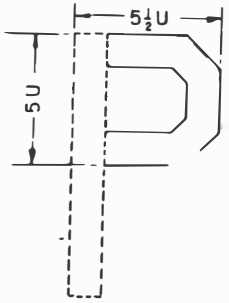
DR.A-4324-3



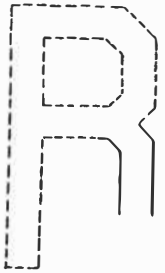
1st step - Template No. 1 2nd step - Template No. 1 3rd step - Template No. 1



1st step - Template No. 3

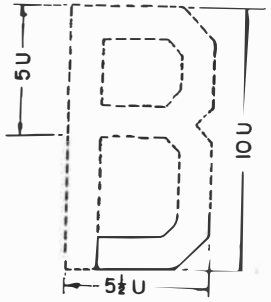


2nd step - Template No. 3



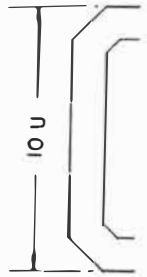
3rd step - Template No. 2

SCALE ¼" = 1 UNIT

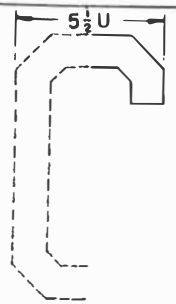


4th step - Template No. 2

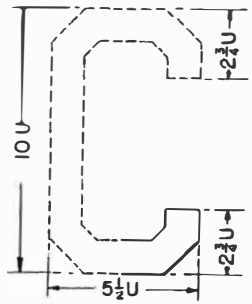
DR. A-4324-4



1st step - Template No. 2

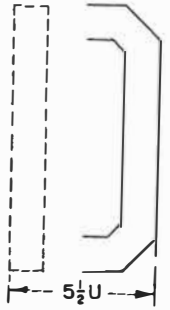


2nd step - Template No. 2

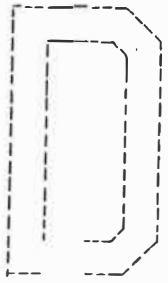


3rd step - Template No. 2

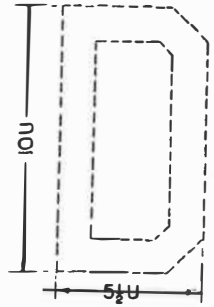
1st step - Template No. 1



2nd step - Template No. 2



3rd step - Template No. 1

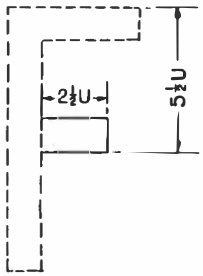


4th step - Template No. 1

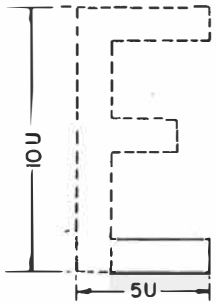
DR. A-4324-5

1st step - Template No. 1

2nd step - Template No. 1

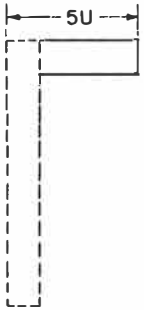


3rd step - Template No. 1

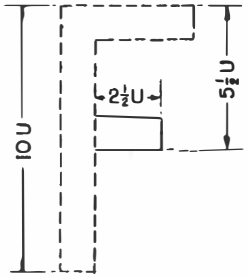


4th step - Template No. 1

1st step - Template No. 1

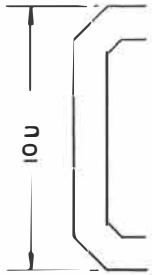


2nd step - Template No. 1

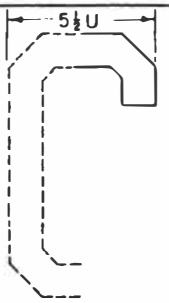


3rd step - Template No. 1

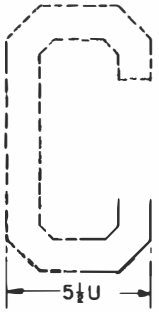
DR. A-4324-6



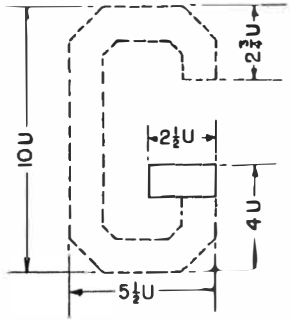
1st step - Template No. 2



2nd step - Template No. 2

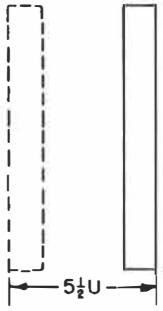


3rd step - Template No. 2

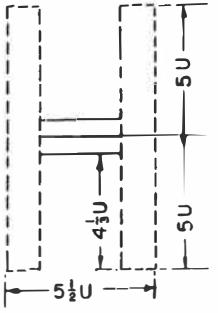


4th step - Template No. 1

1st step - Template No. 1

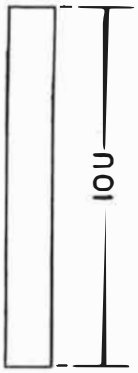


2nd step - Template No. 1

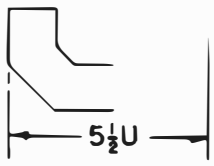


3rd step - Template No. 1

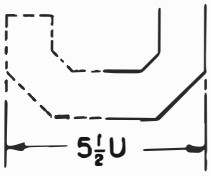
DR.A-4324-7



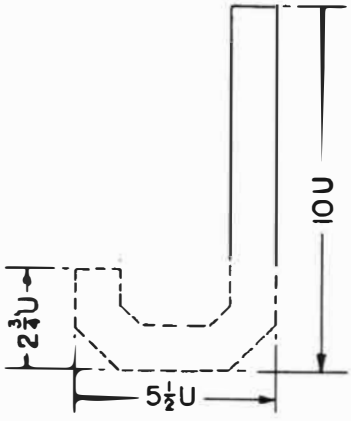
One step - Template No. 1



1st step - Template No. 2

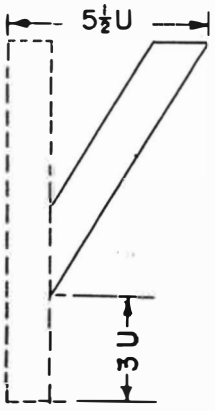


2nd step - Template No. 2

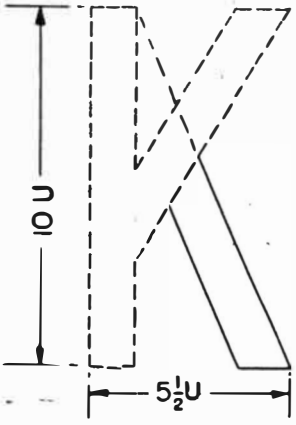


3rd step - Template No. 1

1st step - Template No. 1



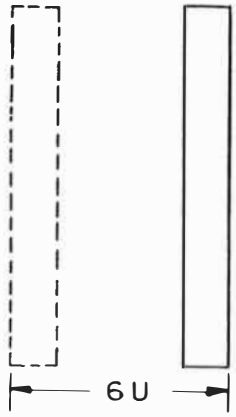
2nd step - Template No. 1



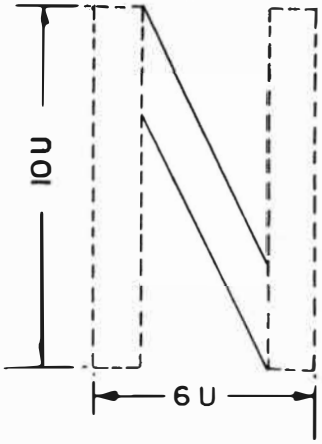
3rd step - Template No. 1

DR.A-4324-9

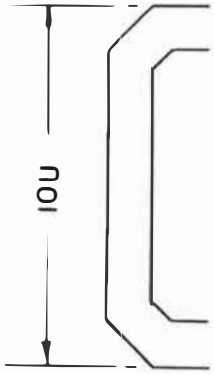
1st step - Template No. 1



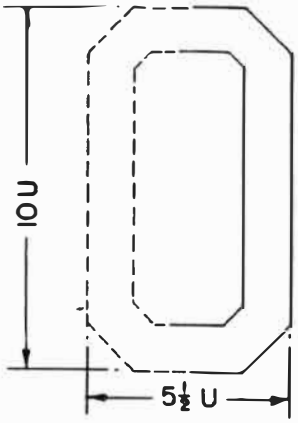
2nd step - Template No. 1



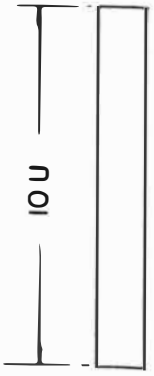
3rd step - Template No. 1



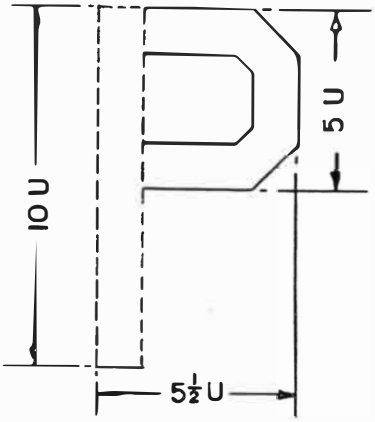
1st step - Template No. 2



2nd step - Template No. 2

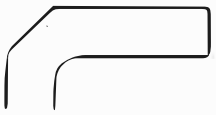


1st step - Template No. 1

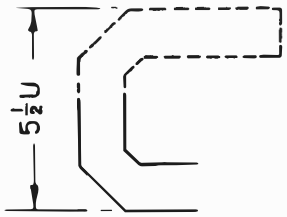


2nd step - Template No. 3

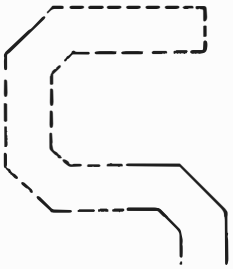
DR.A-4324-11



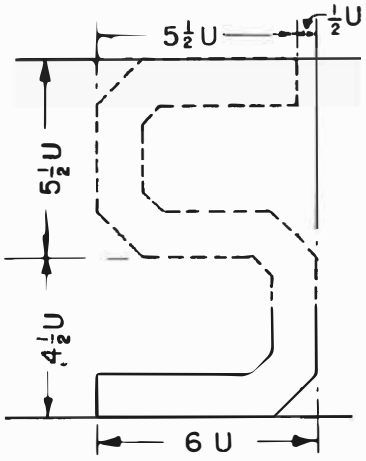
1st step - Template No. 2



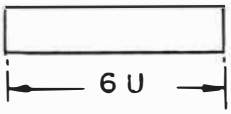
2nd step - Template No. 2



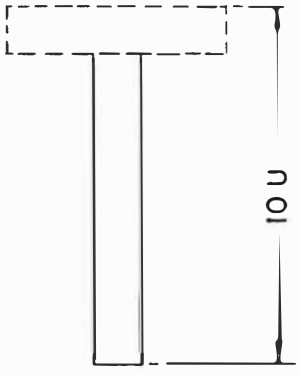
3rd step - Template No. 2



4th step - Template No. 2

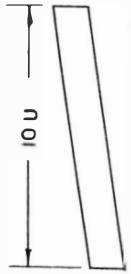


1st step - Template No. 1

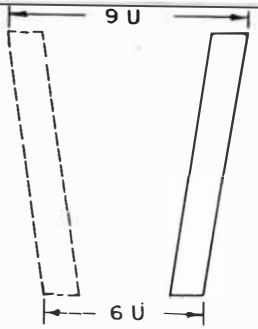


2nd step - Template No. 1

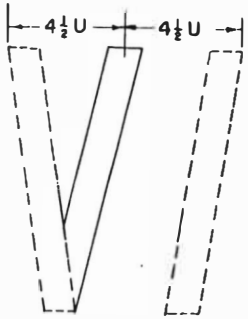
DR. A-4324-13



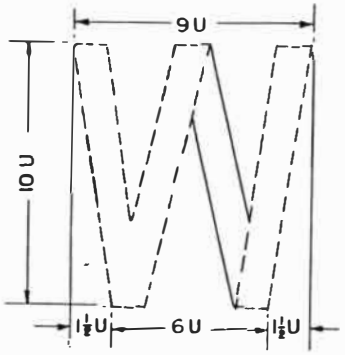
1st step - Template No. 1



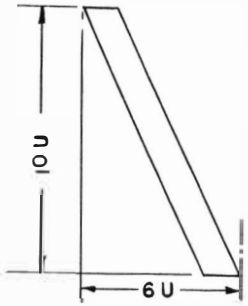
2nd step - Template No. 1



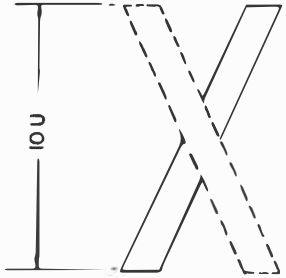
3rd step - Template No. 1



4th step - Template No. 1



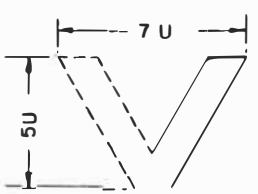
1st step - Template No. 1



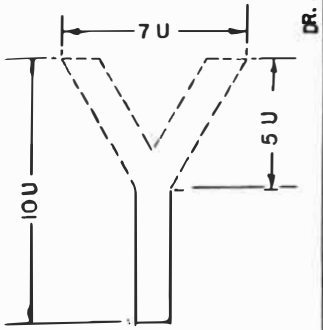
2nd step - Template No. 1

DR. A-4324-14

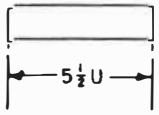
1st step - Template No. 1



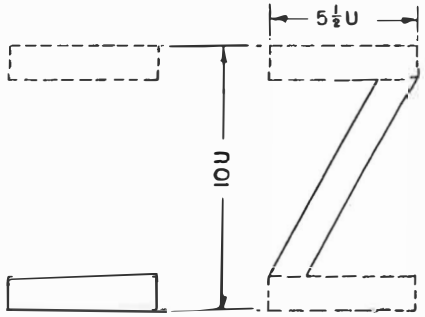
2nd step - Template No. 1



3rd step - Template No. 1



1st step - Template No. 1

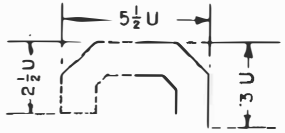


2nd step - Template No. 1 3rd step - Template No. 1

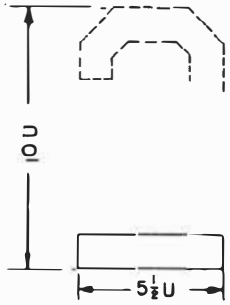
DR.A-4324-15

One step - Template No. 1

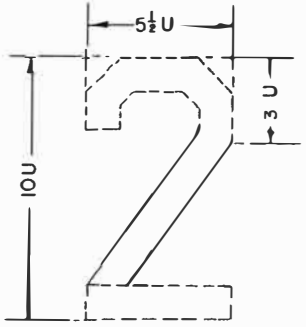
1st step - Template No. 2



2nd step - Template No. 2

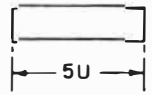


3rd step - Template No. 1

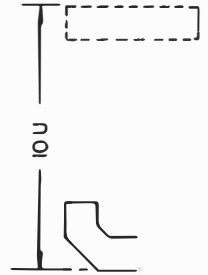


4th step - Template No. 1

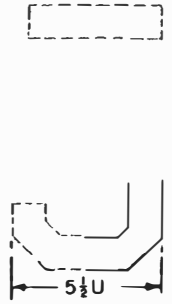
DR.A-4324-16



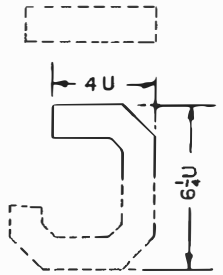
1st step - Template No. 1



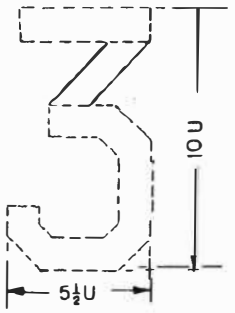
2nd step - Template No. 2



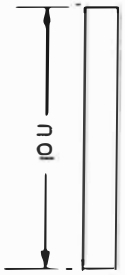
3rd step - Template No. 2



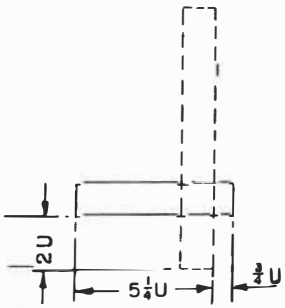
4th step - Template No. 2



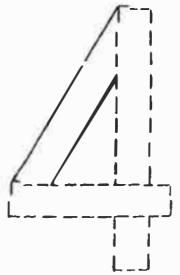
5th step - Template No. 1



1st step - Template No. 1

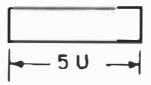


2nd step - Template No. 1

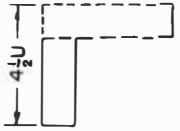


3rd step - Template No. 1

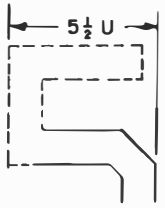
DR. A-4324-17



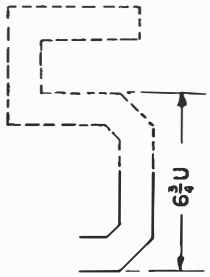
1st step - Template No. 1



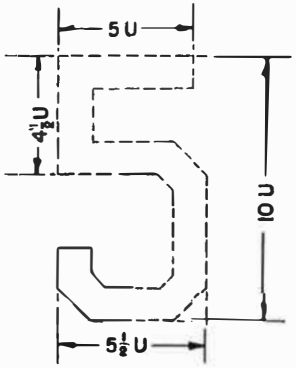
2nd step - Template No. 1



3rd step - Template No. 2

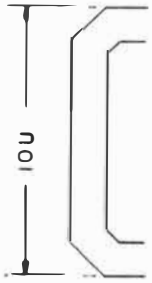


4th step - Template No. 2

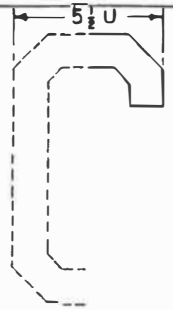


5th step - Template No. 2

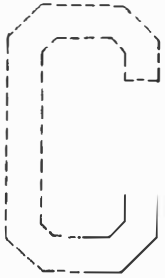
DR. A-4324-18



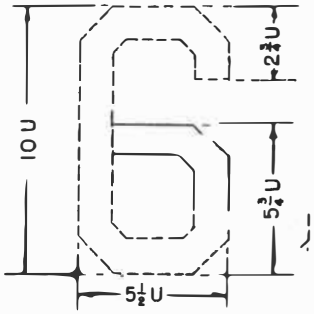
1st step - Template No. 2



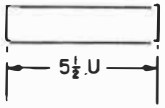
2nd step - Template No. 2



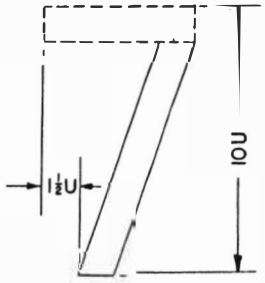
3rd step - Template No. 2



4th step - Template No. 2

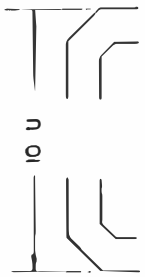


1st step - Template No. 1



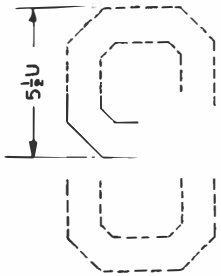
2nd step - Template No. 1

DR. A-4324-19

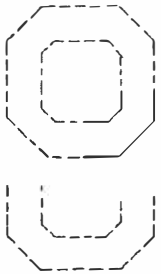


1st step - Template No. 2

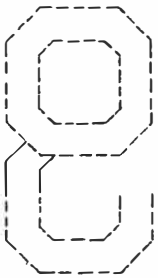
2nd step - Template No. 2



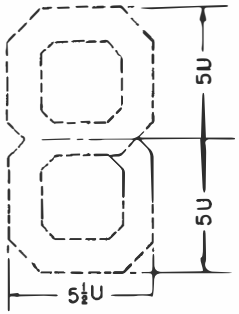
3rd step - Template No. 2



4th step - Template No. 2

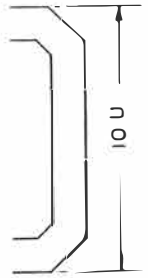


5th step - Template No. 2

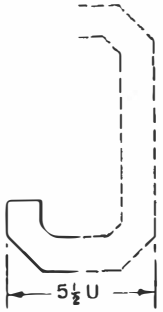


6th step - Template No. 2

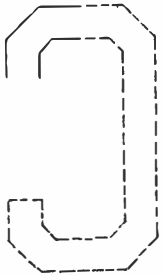
DR. A-4324-20



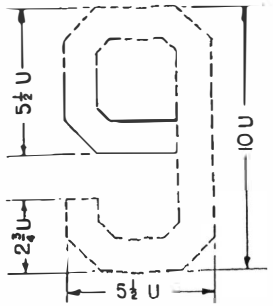
1st step - Template No. 2



2nd step - Template No. 2



3rd step - Template No. 2



4th step - Template No. 2

U. S. GOVERNMENT PRINTING OFFICE: 1946

PREPARED BY
AVIATION
INFORMATION