TECHNICAL MANUAL

TACTICAL MUNITIONS GENERAL INFORMATION

FOR

AIR LAUNCHED ROCKETS AND MISSILES

F42600-70-D-0912

EACH TRANSMITTAL OF THIS DOCUMENT OUTSIDE OF THE DEPARTMENT OF DEFENSE MUST HAVE APPROVAL OF THE TECHNICAL ORDER DISTRIBUTION CONTROL ACTIVITY. REFER TO TO 00-5-2.

PUBLISHED UNDER AUTHORITY OF THE SECRETARY OF THE AIR FORCE.

19 SEPTEMBER 1969

CHANGE 2 - 28 DECEMBER 1970

INTRODUCTION

This manual is intended for use by commanders and staff officers. Personnel requiring additional technical information will consult appropriate Air Force technical orders.

Suggested improvements to this manual shall be forwarded to OOAMA (MMST), Hill Air Force Base, Utah 84401, in accordance with TO 00-5-1.

SECTION I
GENERAL INFORMATION
AIR LAUNCHED ROCKETS AND MISSILES

1-1. GENERAL.

1-2. An air launched rocket normally consists of a rocket head (warhead) payload, a rocket motor and stabilizing fins. The motor is fired by an ignition system controlled by the aircraft. The warhead is detonated by one of several types of fuzes, depending on the mission. Rocket motors are normally filled with a solid propellant. Some air launched guided missiles are propelled by liquid fuel engines. A missile is a rocket equipped with a guidance system. Air launched rockets and missiles are carried by and fired from aircraft. Rockets and missiles are further classified according to their intended use. Service rockets have live motors and warheads and are used in tactical situations. Practice rockets have live motors and inert warheads and are used for pilot training. Drill or dummy rockets are inert and are used for training in rocket handling and loading.

1-3. A rocket motor is a cylindrical metal or filament tube (case) filled with propellant fuel. Gases generated by combustion of the fuel, escapes through the open end, propelling the rocket in the opposite direction. Nozzles reduce turbulence and increase thrust.

1-4. ROCKET CLASSIFICATION.

1-5. Air launched rockets are classified by size of motor and warhead, type of fin, and purpose. The purpose of the rocket is determined by the type of warhead and motor, combined to meet mission requirements. The most common air launched rockets are the 2.75-inch Folding Fin Aircraft Rocket (FFAR), the 5.0-inch FFAR (ZUNI), and the 5.0-inch High Velocity Aircraft Rocket (HVAR). The inch designation refers to the motor case diameter. The FFAR has folding fins to allow firing from launching tubes. The HVAR has fixed fins.

1-6. Rocket warheads are classified according to function. The most common warheads are the High Explosive (HE), the High Explosive Anti-Tank (HEAT), the Smoke or White Phosphorus (WP), the Flechette, and the Practice (PRAC). Thirty percent of the total weight of the HE warhead consists of high explosives. The HEAT warhead has a cone shaped explosive charge to increase penetration of armor. The WP warhead is filled with white phosphorus expelled by a booster charge. The Flechette warhead contains small projectiles for anti-personnel and anti-material use. PRAC warheads are plaster filled service heads or steel dummy.

1-7. PROPELLANT.

1-8. SOLID PROPELLANTS. Solid propellants are cast in long grain shapes to allow the escape of gases through the motor nozzle. The most common grain shapes are the cruciform, and cylinder with a longitudinal hole through the center. Inert plastic inhibitors are added to the propellant grains to control burning time and prevent excessive pressure build up which could burst the motor tube.

1-9. LIQUID PROPELLANTS. Prepackaged liquid propellant engines are used in some missiles such as the AGM-12/C Bullpup. Liquid engines are designated with an LR prefix followed by the model identification. The fuel consists of a mixture of amine unsymmetrical-dimethyhydrazine (UDMH) and hydrazine with other additives and is designated as MAF-1 fuel. The oxidizer is red fuming nitric acid (RFNA) and dissolved nitrogen dioxide (ND_2) gas. One-tenth of 1 percent hydrofluoric acid (H_2F_2) inhibits reaction and corrosion of the oxidizer tank. A solid propellant gas generator pressurizes separate fuel and oxidizer tanks. Fuel and oxidizer ignite upon contact by hypergolic action when introduced into the thrust chamber.

TABLE OF CONTENTS

SECTION II

DESCRIPTION OF AIR LAUNCHED ROCKETS AND LAUNCHERS

2-1. GENERAL.

2-2. This section covers two types of tactical air launched rockets. The 2.75-inch FFAR and 5.0-inch FFAR (ZUNI), and the 5.0-inch HVAR rockets consisting of various combinations of motors, warheads and fuzes provides a versatile arsenal of aircraft rockets capable of many mission requirements. The FFAR is fired from tubular launchers. The HVAR is fired from retractable launchers using suspension bands and lugs.

2-3. Air launched rockets are used for air-to-air, air-to-ground attack against aircraft, armored and fortified targets, personnel and material, target spotting and as missile targets.

2-4. 2.75-INCH FFAR.

2-5. The 2.75-inch FFAR (figure 2-1) consists of the following major components: a fuze, a warhead, and a rocket motor. Rockets are launched from various tube type launchers. Electrical contact to the rocket is provided through the detent and contact finger located in the launcher. Selective firing is provided by the launcher intervalometer and the aircraft armament selectors. Motors, warheads, fuzes and launchers are described in subsequent paragraphs. Leading characteristics and configurations are presented in table 2-1 and table 2-3.

2-6. MOTORS.

2-6A. The MK2, MK3, and MK4 Mod 7 motors consist of a aluminum alloy motor tube. The forward and aft ends of the tube are grooved internally to receive the lockwires that secure the head closure and nozzle fin assembly. The head closure has a thin metal disc that functions as a blowout diaphragm in case of inadvertent ignition of motor prior to warhead installation. The motor tube houses the MK125 igniter stablizing rod and a double base solid propellant grain. The nozzle fin assembly includes a fin retainer to hold the fins in a retracted position until rocket is launched. A contact button located on the fin retainer is connected to the integral igniter circuit. Furnished with the motor is a fin protector which also shorts the igniter circuit during shipping and storage.

2-6B. The MK4 Mod 8 and subsequent mods are basically the same as the above except the head closure is an integral part of motor tube and the blowout diaphragm has been eliminated. On some Mod 8 and subsequent mods, coined metal discs have replaced the cup type nozzle seals and the igniter lead has been rerouted through the cross-head instead of the nozzle seal. A shorting clip is provided with motor for shorting the igniter circuit.

2-6C. The MK40 motor is basically the same as the MK4 Mod 8 except the nozzles are scarfed (tapered) at a 24-degree angle to impart a low spin (LSFFAR) during launch, providing increased stability and accuracy of round.

2-7. WARHEADS.

2-8. The MK1 HE warhead is used for air-to-air and air-to-ground missions. It is filled with explosive compound HBX-1, a mixture of TNT, RDX, aluminum and a desensitizer. Warhead is normally shipped with fuze installed.

2-9. The MK5 HEAT warhead is similar in external configuration to the MK1 and contains composition B explosive in a shaped charge for armor penetration. Fuze is installed at time of warhead loading and will not be removed.

2-10. The M151 HE warhead has a pearlite malleable iron case filled with composition B4. The warhead has a graze sensitive fuze, with superquick action on function and anti-richochet capabilities. The M151 may be shipped with or without the fuze. The warhead is used for air-to-ground missions.

2-11. The M156 WP warhead is identical in external configuration to the M151 and is used for target spotting. The fuze is graze sensitive and has anti-richochet capabilities.

2-12. The WDU4A/A Flechette warhead is an anti-personnel and anti-material warhead consisting of three main parts: nose section, main body, and integral fuze section. The warhead weighs 9.2 pounds and has a base detonating fuze that functions at motor burnout due to deceleration. When the fuze functions the payload is expelled forward projecting the individual flechettes into a ballistic trajectory toward the target.

2-13. PRAC, HEAD 2.75-INCH MK1, MK5, MK61 and WTU-1/B. This item consists of two basic types: inert (plaster filled) service heads with inert fuzes, and dummy steel heads.

2-24. The LAU-59/A is a reusable launcher containing seven aluminum tubes for firing the 2.75-inch FFAR rockets. The rocket launcher has a selective single or ripple fire intervalometer, which is replaceable. The launcher has provisions for 14-inch and center lug suspension.

2-25. 5.0-INCH FFAR (ZUNI) MK40/M41.

2-26. The ZUNI rocket (figure 2-2) is a supersonic, unguided weapon propelled by the MK16 motor and equipped with various warheads and fuze combinations to provide a variety of configurations, capable of many mission requirements.

2-27. The ZUNI is carried in a four-tube launcher and can be fired single or ripple mode for air-to-ground use against light equipment, fortifications, personnel, shipping, tanks and gun emplacements. Characteristics and configuration are presented in tables 2-3 and 2-4.

2-28. MOTOR. The MK16 rocket motor consists of an aluminum alloy motor tube, and a nozzle (single) and fin assembly. Propellant is a double base MK40 low-flash internal burning, temperature sensitive grain. The integral MK130 igniter is a black powder and flaked magnesium filled cannister initiated by a squib. Motor gas pressure opens the fins to latch on ratchet pawls.

2-29. WARHEADS.

2-30. The MK24 HE warhead consists of a case, explosive filler, and a base fuze MK191. The warhead produces fragments and may be fuzed for contact, or delayed detonation. Delayed action is accomplished by the installation of a steel ogive nose plug in the nose fuze cavity, while contact detonation is accomplished by installing the MK188 or MK352 fuze (plus adapter) in the nose of the warhead.

2-31. The MK32 Anti-Tank/Armor Piercing (ATAP) warhead has a shaped charge action and is highly effective against heavily armored targets and bunkers. This warhead has no base fuze and uses either the MK188 or MK352 fuze (plus adapter).

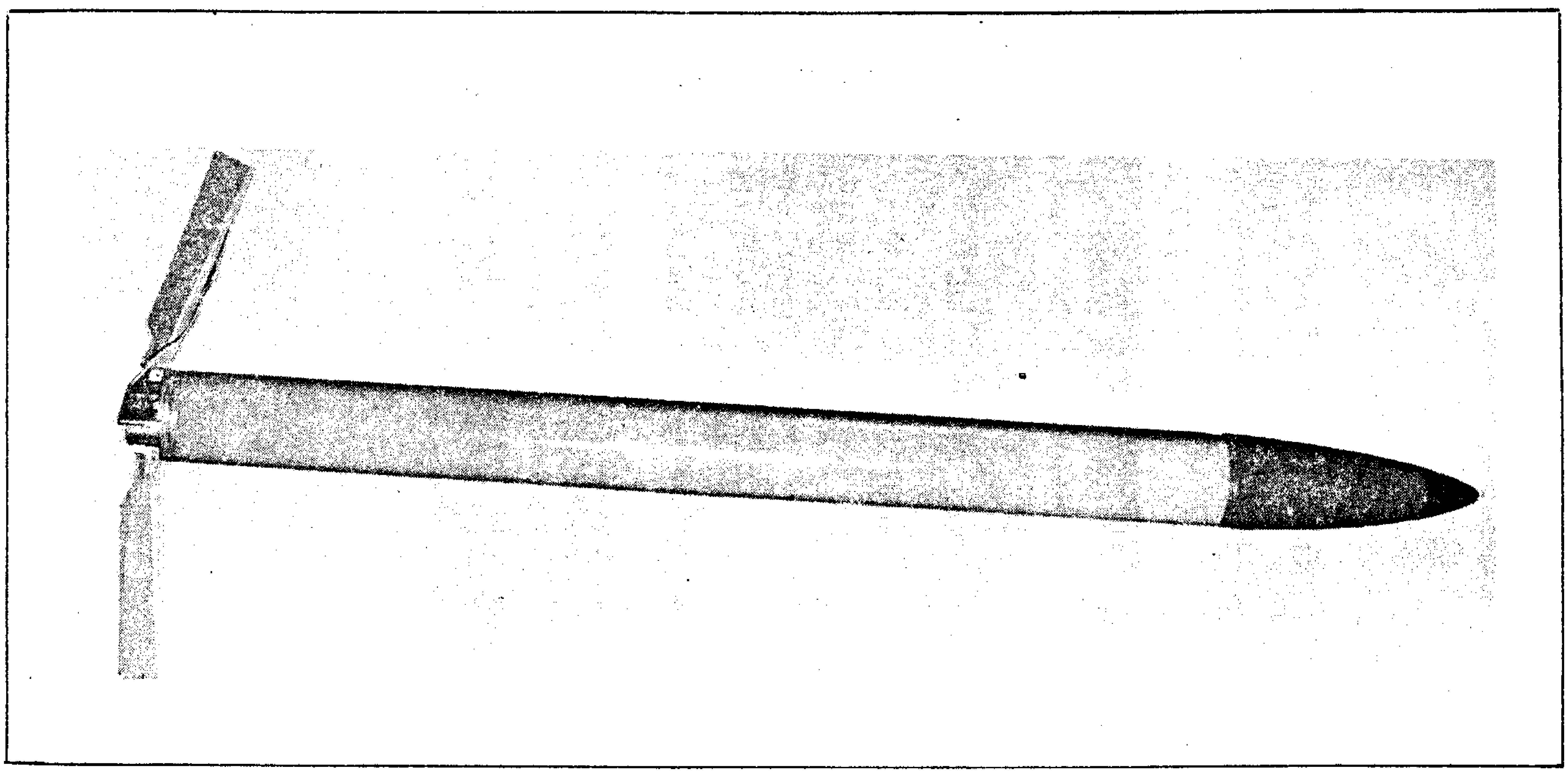


Figure 2-1. 2.75-Inch FFAR

2-32. FUZES.

2-33. The MK188 point detonating nose fuze is cone shaped with a cylindrical nose and is impact sensitive.

2-34. The MK191 base detonating fuze is installed in the warhead base at time of warhead loading and will not be removed.

2-35. The MK352 nose fuze is an improved fuze similar to the MK188. The fuze requires the use of an adapter booster in the nose cavity of warhead.

2-36. LAUNCHERS. The LAU-10/A and LAU-10A/A are four tube reusable launchers. This type has an intervalometer and selector switch for either single or ripple mode firing. The launcher has provisions for 14-inch, 30-inch or center lug suspension. Nose and aft fairings are used with launchers. Four MK16 motors can be shipped and stored in the launcher.

2-37. 5.0-INCH HVAR.

2-38. The HVAR (figure 2-3) is a high velocity fixed fin air launched rocket. The motor, warheads and fuzes can be assembled in various combinations to meet many mission requirements. Suspension bands on the motor are adjustable to fit various launchers. Leading characteristics and configuration are shown in tables 2-5 and 2-6.

2-39. MOTOR. The MK10 MOD 7 motor consists of a steel tube containing MK18 ballistic propellant grain and a MK114 integral igniter, and nozzles. The MK34 fin assembly is generally shipped separate from the motor.

2-40. WARHEADS.

2-41. The MK6 warhead is designed for use against armor and reinforced concrete. The principle difference between the MODS of the MK6 is the special cavity of the MOD 4 which is designed to receive a VT fuze. The VT fuze permits the head to be set for air bursts against personnel, light equipment and aircraft. With nose fuze inoperative, the head is detonated by the short delay base fuze. The warhead will penetrate 1-inch armor plate and explode with maximum effectiveness a few feet beyond the point of impact.

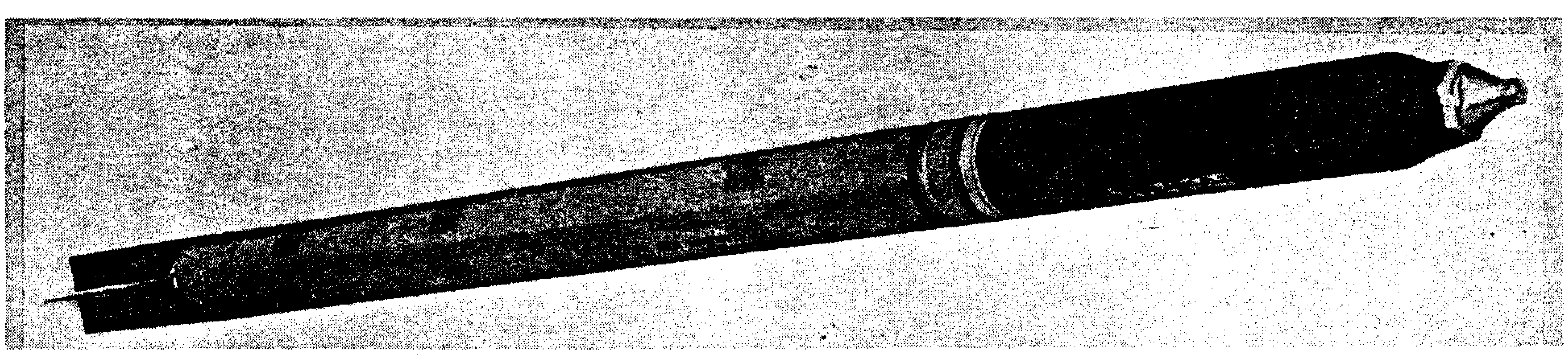


Figure 2-2. 5.0-Inch FFAR

Table 2-4. 5.0-Inch FFAR Configuration

MODEL	MOTOR	WARHEAD	FUZE	ADAPTER	TARGET	AIRCRAFT	LAUNCHER
MK40	MK16	MK24	MK188PD MK191BD MK352PD	BBU-15/B	Tanks, etc Personnel	F104G F105B, D, F F-5	LAU-10/A
MK41	MK16	MK32	MK188PD MK352PD	BBU-15/B	Tanks, etc	F104G F105B, D, F F-5	LAU-10/A

Table 2-5. 5.0-Inch HVAR Leading Characteristics

ITEM	LENGTH (IN)	DIAMETER (IN)	GROSS WEIGHT (LB)	EXPLOSIVE WEIGHT (LB)
Motor MK10	51.31	5.0	89.87	24.83
Warhead MK6	16.45	5.0	45.04	7.10
MK25	29.16	5.0	47.85	15.33
Fuze MK149	4.22	3.0	2.75	0.02
Kit TDU 14/B	N/A	N/A	140.0	N/A

Table 2-6. 5.0-Inch HVAR Configuration

MODEL	MOTOR	WARHEAD	FUZE	TARGET	AIRCRAFT	LAUNCHER
	MK10 MOD 7	MK6 MODS	MK149PD MK164BD	General Purpose		
	MK10 MOD 7	MK25 MOD 1	MK149PD	Tanks, etc		
TDU-11/B	MK10 MOD 7	Solid Machined Slug	None	Target for AIM-9B Sidewinder	F-4C F-5 F-86 F-100 F-104 F-105	Aero-3B Missile Adapter Wing-tip Launcher Aero-3B Missile Adapter Type IX Pylon Red Dog (Wing Tip) Launcher Aero-3B Missile Adapter

SECTION III

AIR LAUNCHED MISSILES

3-1. GENERAL.

3-2. Air launched guided missiles are similar to rockets except that they contain a guidance system and that the propulsive unit may be a solid motor, liquid motor or jet engine.

3-3. DESCRIPTION.

3-4. AIM-4A FALCON. The AIM-4A (figure 3-1) is an air-to-air radar guided light-weight self-propelled missile, capable of high and low altitudes. The missile is launched from retractable rails on an approximate collision course with the target, at a lead angle computed by the fire control system of the launch aircraft. It is propelled at supersonic speed until motor burnout, then glides while being guided to intercept target where warhead is detonated by the impact fuzing system. The missile body is magnesium alloy. Leading characteristics and configuration are presented in tables 3-1 and 3-2.

3-5. AIM-4C FALCON. The AIM-4C (figure 3-2) is an air-to-air passive, infrared seeking guided missile that is propelled at supersonic speeds until motor burn-out, then glides as an unpropelled projectile while being guided into aerial targets. It is launched from retractable rails on an approximate collision course with the target at a lead angle computed by the weapon control system of the launch aircraft. The seeker homes on infrared energy originating from the heated surfaces of airborne targets. The missile has a magnesium body and consists of the following components: guidance and control, warhead, fuze and motor. Leading characteristics and configuration are shown in tables 3-3 and 3-4.

3-6. AIM-4D FALCON. The AIM-4D (figure 3-3) is an air-to-air passive, infrared seeking guided missile that is propelled at supersonic speeds until motor burn-out, then glides as an unpropelled projectile while being guided into aerial targets. It is launched from retractable rails on an approximate collision course with

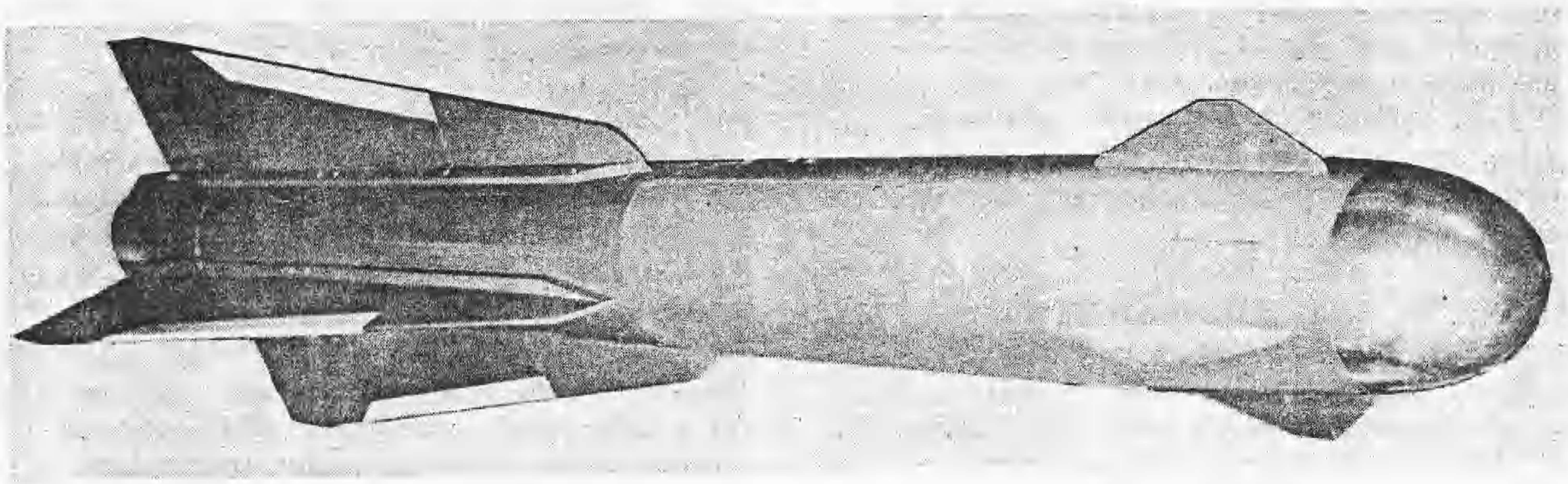


Figure 3-1. AIM-4A FALCON

Table 3-3. AIM-4C FALCON Leading Characteristics

DIMENSIONS		WEIGHTS	
Total Length	79.5 Inches	Total Weight	128.0 Lbs
Diameter	6.4 Inches	Explosive Weight Warhead	2.5 Lbs (HBX)
Length of Warhead	3.6 Inches	Explosive Weight Motor	31.2 Lbs
Diameter of Warhead	5.5 Inches		

Table 3-4. AIM-4C FALCON Configuration

MODEL	WARHEAD	FUZE	ADAPTER	TARGET	AIRCRAFT	LAUNCHER
AIM-4C	MK2 MOD 2	FMU-31/B		Fighter and Bomber	F-101	F-101 Rail on rotodoor.
					F-102	F-102 Retractable rail from center armament bay.

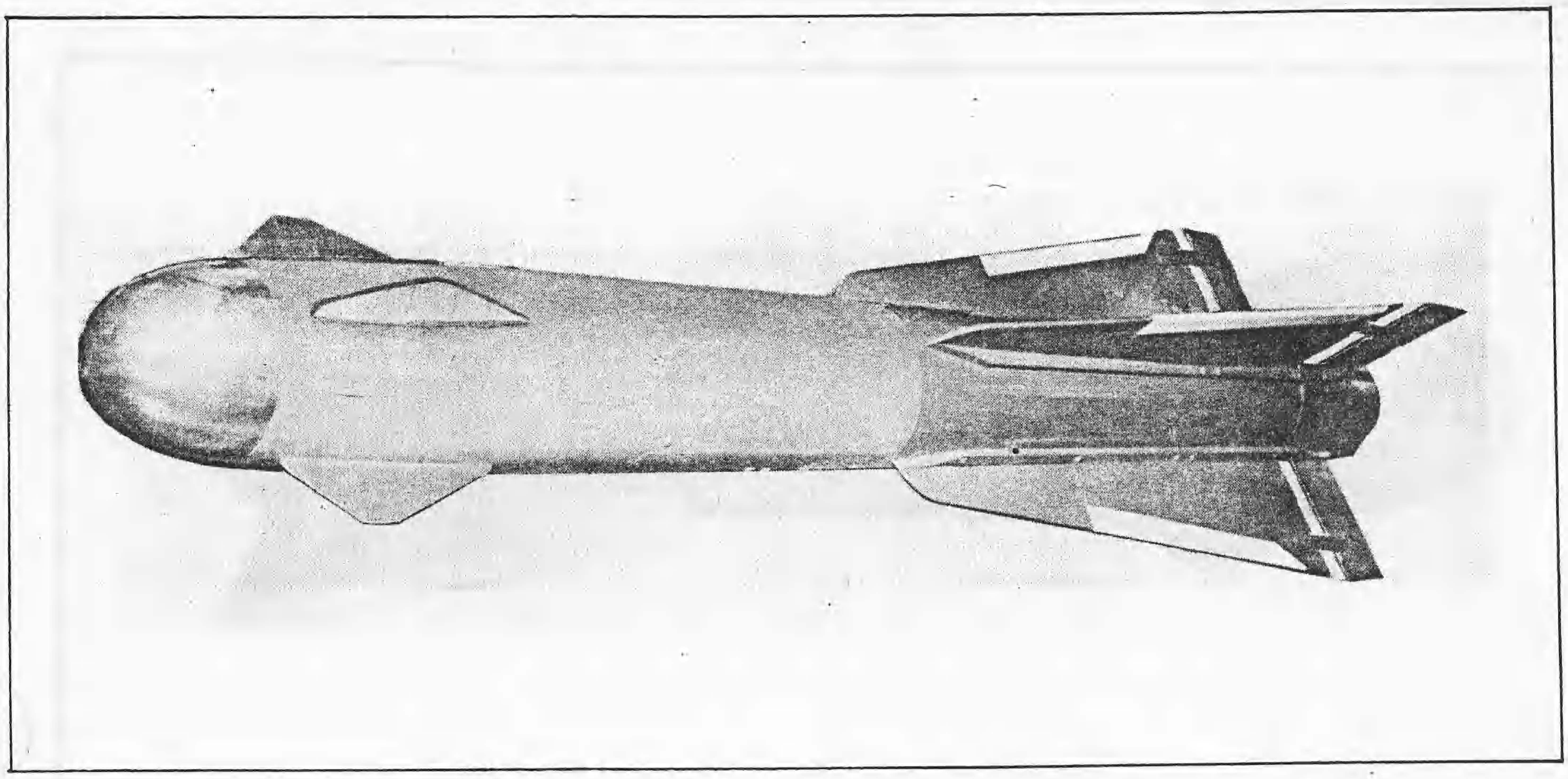


Figure 3-2. AIM-4C FALCON

Table 3-7. AIM-4F FALCON Leading Characteristics

DIMENSIONS		WEIGHTS	
Total Length	82.11 Inches	Total Weight	148.98 Lbs
Diameter	6.64 Inches	Explosive Weight Warhead	4.84 Lbs (HBX)
Length of Warhead	5.13 Inches	Explosive Weight Motor	26.5 Lbs
Diameter of Warhead	5.6 Inches		

Table 3-8. AIM-4F FALCON Configuration

MODEL	WARHEAD	FUZE	ADAPTER	TARGET	AIRCRAFT	LAUNCHER
AIM-4F	MK3	T1407		Aircraft	F-106	F-106 Retractable rail from center armament bay.

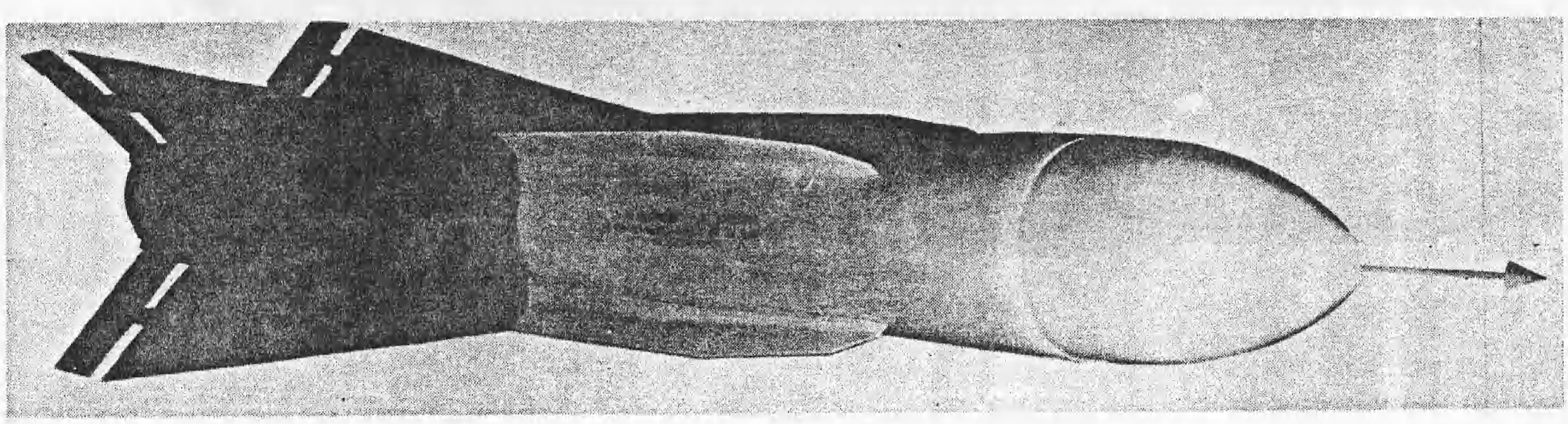


Figure 3-4. AIM-4F FALCON

3-9. AIM-7D/7E and 7E-2 SPARROW III. The AIM-7D/E/E-2 (figure 3-6) are supersonic, air-to-air, boost-glide missiles with the tactical mission of intercepting and destroying enemy aircraft and enemy missiles in all weather conditions. The missiles are designed to be rail or ejection launched from the aircraft. Semi-active CW homing radar and hydraulically operated control surfaces direct and stabilize the missiles on a proportional navigational course. Propulsion is produced by a short duration solid propellant rocket motor. Leading characteristics and configuration are shown in tables 3-11 and 3-12.

3-10. AIM-9B SIDEWINDER. The AIM-9B (figure 3-7) missile is a supersonic air-to-air homing weapon employing passive infrared target detection, proportional navigation guidance, and torque balance control. Propulsion is produced by a short duration solid propellant rocket motor. Leading characteristics and configuration are shown in tables 3-13 and 3-14.

3-11. AGM-12B BULLPUP. The AGM-12B (figure 3-8) is a short range air-to-surface missile powered by either a solid propellant motor or a single-stage, prepackaged liquid engine. It is used by attack aircraft to destroy surface targets whose size, importance, or tactical disposition require highly accurate delivery of a 250-pound bomb. A radio receiver located in the nose section interprets coded RF signals from the launch aircraft. Altitude and direction of the missile are controlled by four canard assemblies mounted on the forward body section. Four wing assemblies, attached to the aft body section, provide stability during flight. Two flares in the rear of the aft body section aid visual tracking of the missile by the pilot of the launch aircraft. The AGM-12B missile is also used for pilot proficiency training by substituting an inert warhead in place of the live HE warhead. Leading characteristics and configuration are shown in tables 3-15 and 3-16.

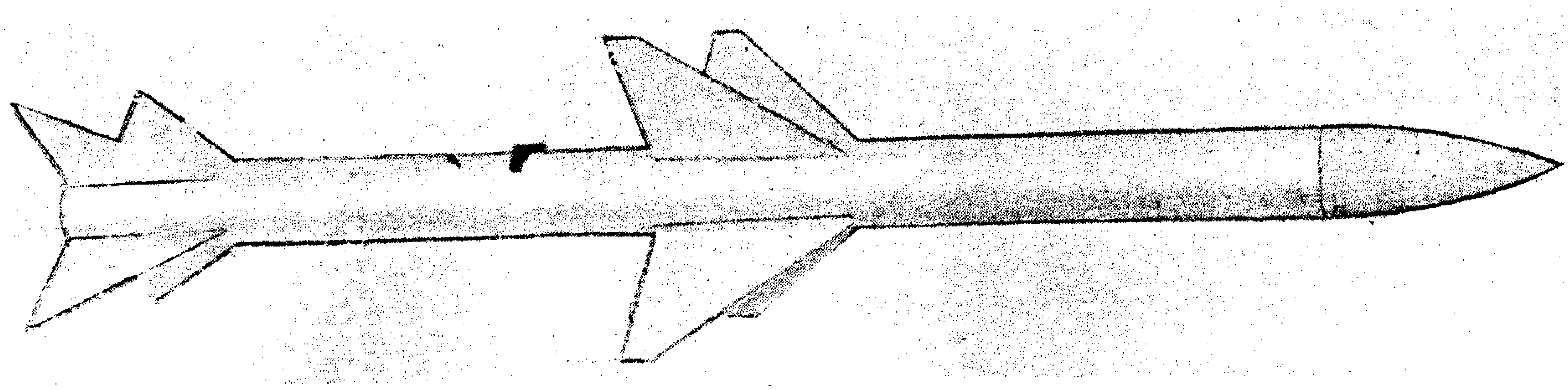


Figure 3-6. AIM-7D/7E/7E-2

Table 3-13. AIM-9B SIDEWINDER Leading Characteristics

DIMENSIONS		WEIGHTS	
Total Length	112 Inches	Total Weight	160.1 Lbs
Diameter	5 Inches	Explosive Weight Warhead	10.5 Lbs
Length of Warhead	13.5 Inches	Explosive Weight Motor	43.2 Lbs
Diameter of Warhead	5 Inches		

Table 3-14. AIM-9B SIDEWINDER Configuration

MODEL	WARHEAD	FUZE	ADAPTER	TARGET	AIRCRAFT	LAUNCHER
AIM-9B	MK8 MODS 0, 1, 2, 3	MK303, MOD 2 MK334 MODS 1 and 2	None	Enemy Aircraft	F-5	Wing Tip Launcher
					F-84	AERO-3B Missile Adapter
					F-86	AERO-3B Missile Adapter
					F-100	Type IX Pylon
					F-104	RED DOG Wing Tip Launcher
					F-105	AERO-3B Missile Adapter

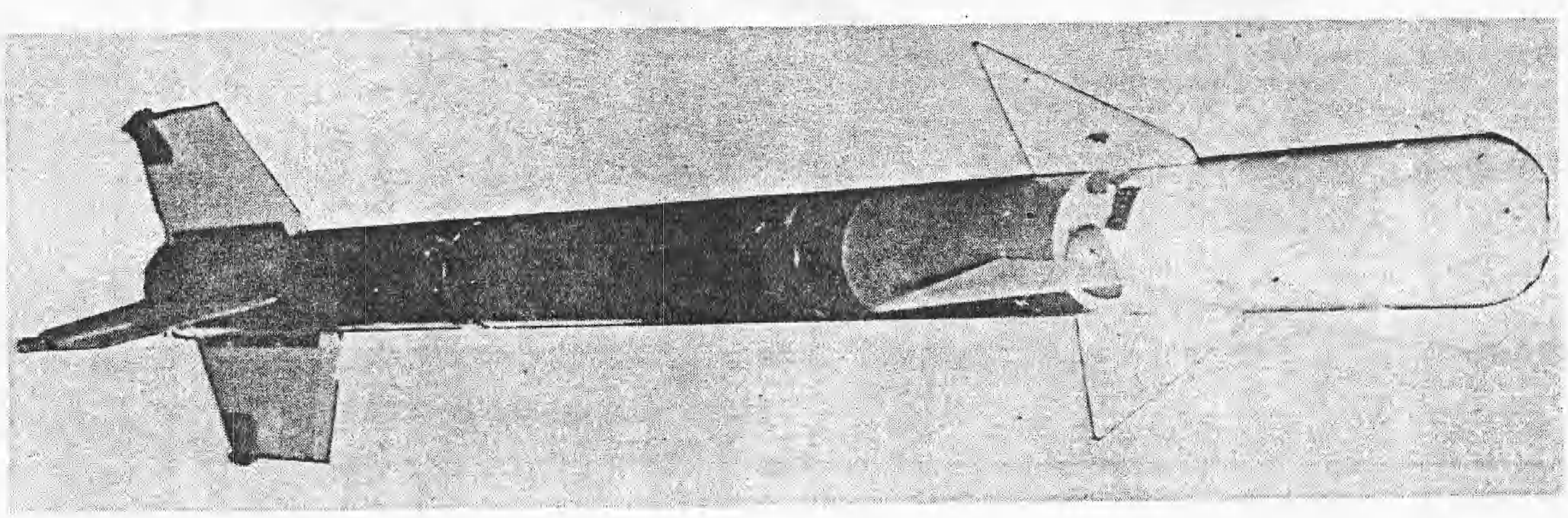


Figure 3-7. AIM-9B SIDEWINDER

Table 3-15. AGM-12B BULLPUP Leading Characteristics

DIMENSIONS		WEIGHTS	
Total Length	126 Inches	Total Weight	580.0 Lbs
Diameter	12 Inches	Explosive Weight Warhead	103.0 Lbs
Length of Warhead	44 Inches	Explosive Weight Motor	116.0 Lbs (Liquid)
Diameter of Warhead	12 Inches	Explosive Weight Motor	107.5 Lbs (Solid)

Table 3-16. AGM-12B BULLPUP Configuration

MODEL	WARHEAD	FUZE	ADAPTER	TARGET	AIRCRAFT	LAUNCHER
AGM-12B	MK19 MOD 0	MK312 MOD 0		Hard Targets	F-105 F-100 F-4C	Adapter Assembly Type X LAU-34/A
AGM-12B Trainer	Inert	None		Hard Targets	F-105 F-100 F-4C	Adapter Assembly Type X LAU-34/A

Table 3-17. AGM-12C BULLPUP Leading Characteristics

DIMENSIONS		WEIGHTS	
Total Length	160.87 Inches	Total Weight	1788.6 Lbs
Diameter	17.322 Inches	Explosive Weight Warhead	371.0 Lbs
Length of Warhead	59.52 Inches	Explosive Weight Motor	358.0 Lbs (Liquid)
Diameter of Warhead	17.312 Inches		

Table 3-18. AGM-12C BULLPUP Configuration

MODEL	WARHEAD	FUZE	ADAPTER	TARGET	AIRCRAFT	LAUNCHER
AGM-12C	MK40 MOD 0	MK312 MOD 0, 2		Hard Targets	F-4C F-5A/B F-105B F-105D/F F-111	Multi-Weapon Pylon

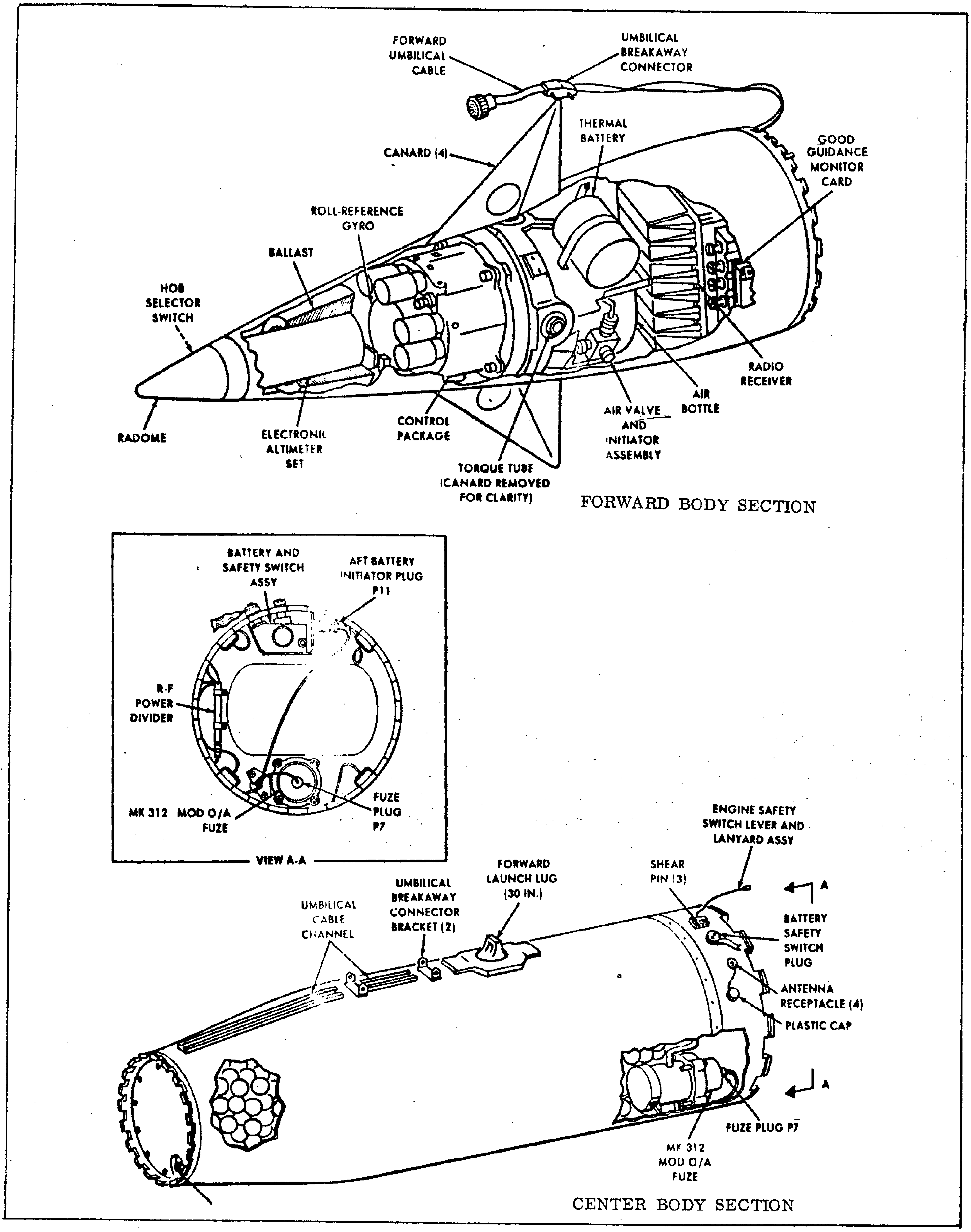


Figure 3-10. AGM-12E BULLPUP

Table 3-21. AIM-26B FALCON Leading Characteristics

DIMENSIONS		WEIGHTS	
Total Length	85.4 Inches	Total Weight	258.43 Lbs
Diameter	11.4 Inches	Explosive Weight Warhead	14.10 Lbs
Length of Warhead	14.8 Inches	Explosive Weight Motor	60.0 Lbs
Diameter of Warhead	10.442 Inches		

Table 3-22. AIM-26B FALCON Configuration

MODEL	WARHEAD	FUZE	ADAPTER	TARGET	AIRCRAFT	LAUNCHER
AIM-26B	HE (CR)	Safety, Arming & Firing Device		Aircraft	F-102	LD-3 (F-102A) from retractable rails in center armament bay.

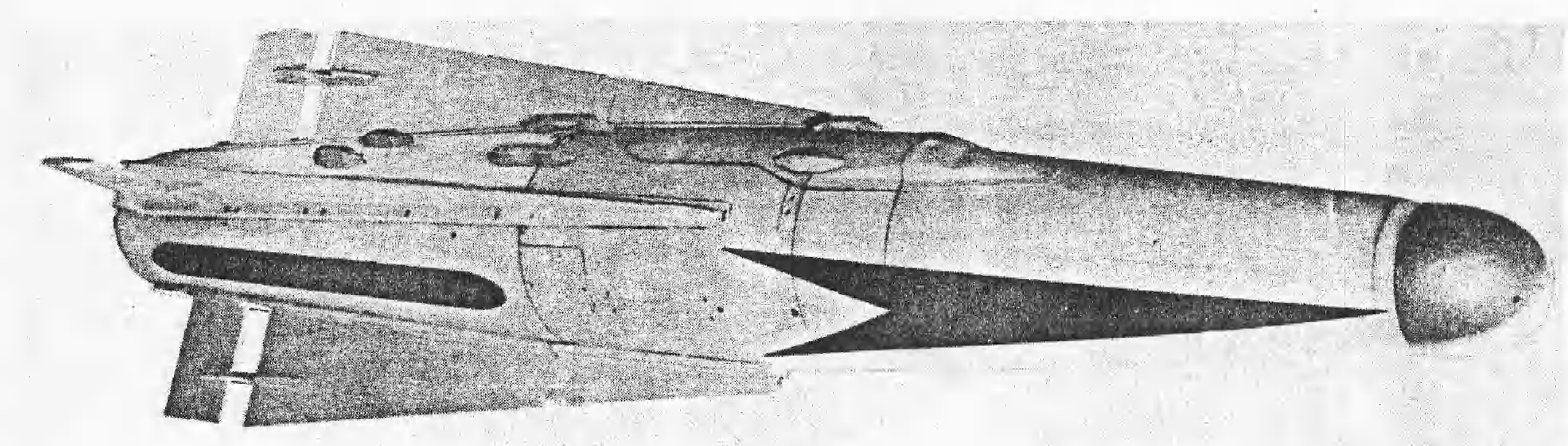


Figure 3-11. AIM-26B FALCON

RESTRICTED

AAF DISTRIBUTION CODES: 01.1, 01.7, 02.1, 02.2, 03., 08.1, 08.4, 10

AN 01-75FJ-3

STRUCTURAL REPAIR INSTRUCTIONS

FOR

AIRPLANE

ARMY MODEL

P-80A

Published under joint authority of the Commanding General, Army Air Forces, and the Chief of the Bureau of Aeronautics.

NOTICE: This document contains information affecting the national defense of the United States within the meaning of the Espionage Act, 50 U. S. C., 31 and 32, as amended. Its transmission or the revelation of its contents in any manner to an unauthorized person is prohibited by law.

RESTRICTED

WF-O-6 DEC 45 1,400

30 MARCH 1945

REVISED 20 SEPTEMBER 1945

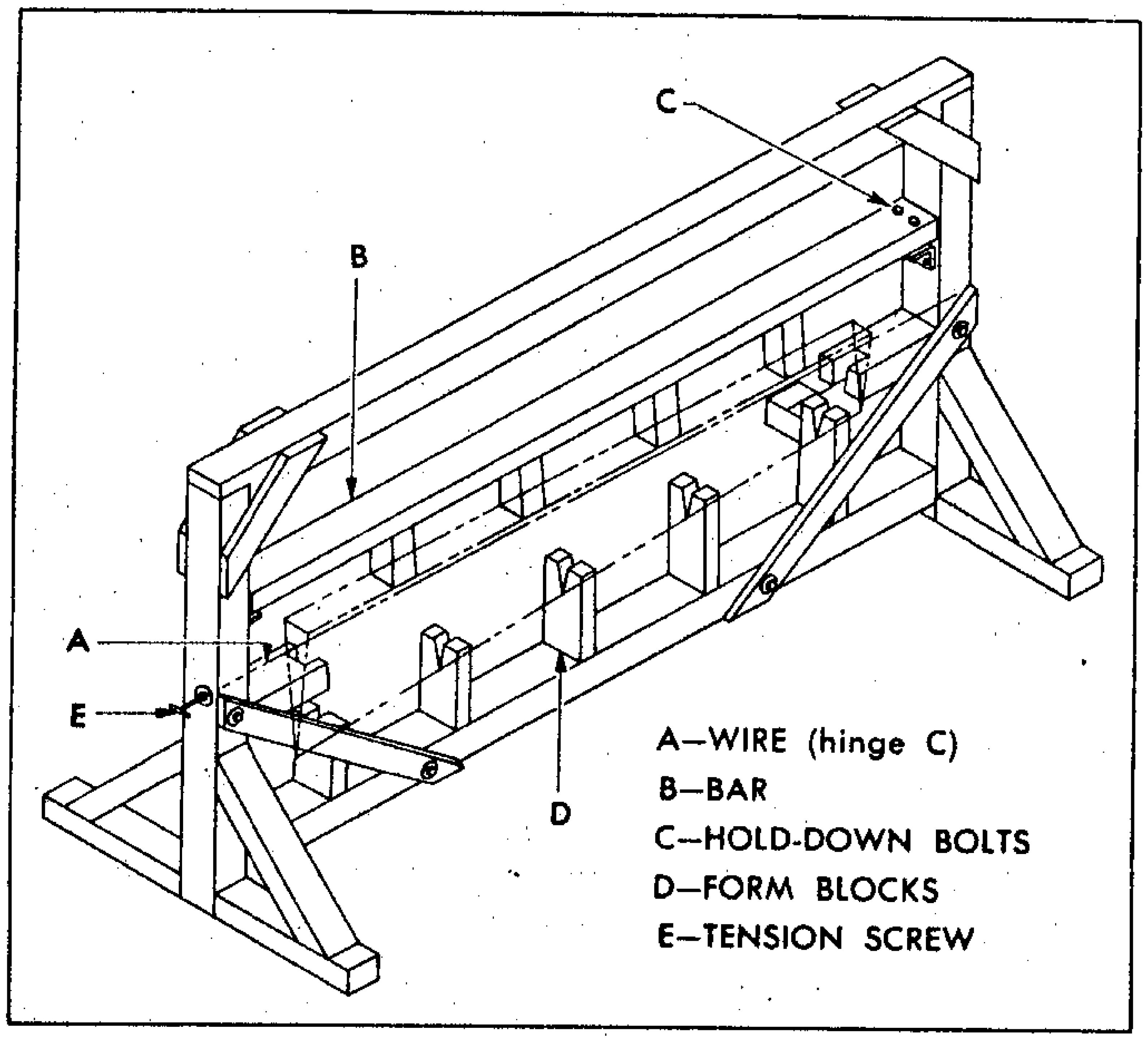


Figure 3 — Sample Jig

b. LAYOUT AND CONSTRUCTION OF TEMPLATES AND FORM BLOCKS.—Use the basic dimension diagrams to lay out templates. All basic dimensions are measured to the inside skin line with the exception of those for the fillets, which are measured to the outside skin line.

EXAMPLE

Assume that the stabilizer rib at station 43 must be replaced. The original shape of the rib must be duplicated in order that correct contour be maintained. Build the rib to an accurately constructed template as follows:

On a metal plate, scribe the rib contour from the dimensions given for station 43 on figure 63. Cut out the template as shown in figure 4. Construct a hardwood form block from the template. Round the corners to conform to the flange bend radius obtained from AN 01-1A-1, "General Manual for Structural Repair." Bend the rib on the form block and check the completed part against the template.

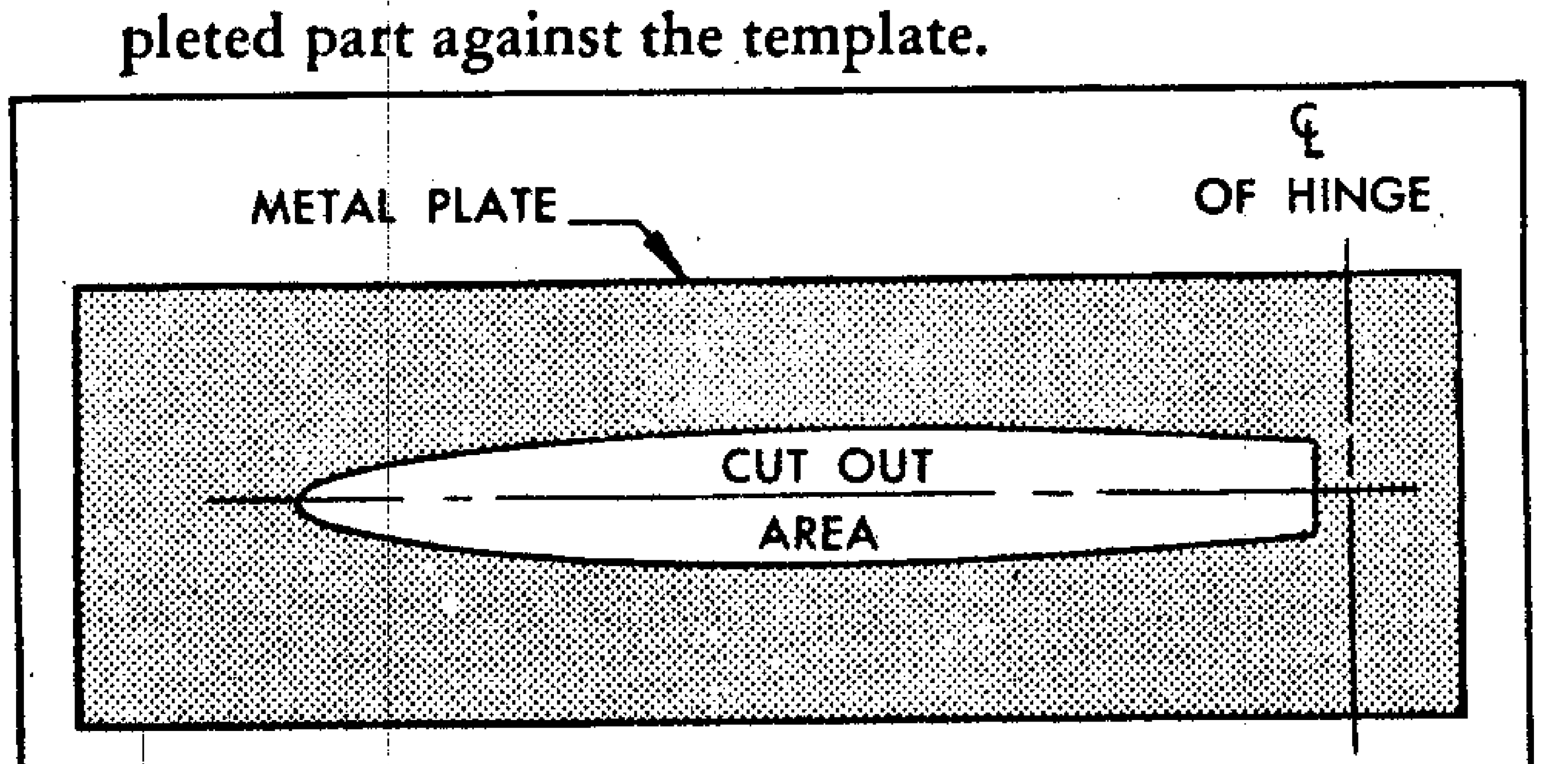


Figure 4 — Sample Template

c. CHECKING ALIGNMENT.—Before repairs are started, take measurements between reference points on adjacent parts unaffected by the damage. Compare these measurements with related points on the repaired member to determine whether distortion has occurred. Damage involving the major components, or large portions of the airplane, will require an alignment check of the airplane after repairs have been completed. See paragraph 10, this section, for instructions for checking alignment and symmetry.

6. LOCATION OF LEVELING POINTS.

The leveling pads are located on the lower fuselage longerons in the nose wheel well, as shown in figure 5. Level the airplane by jacking at the nose and wing jack points as shown in figure 18.

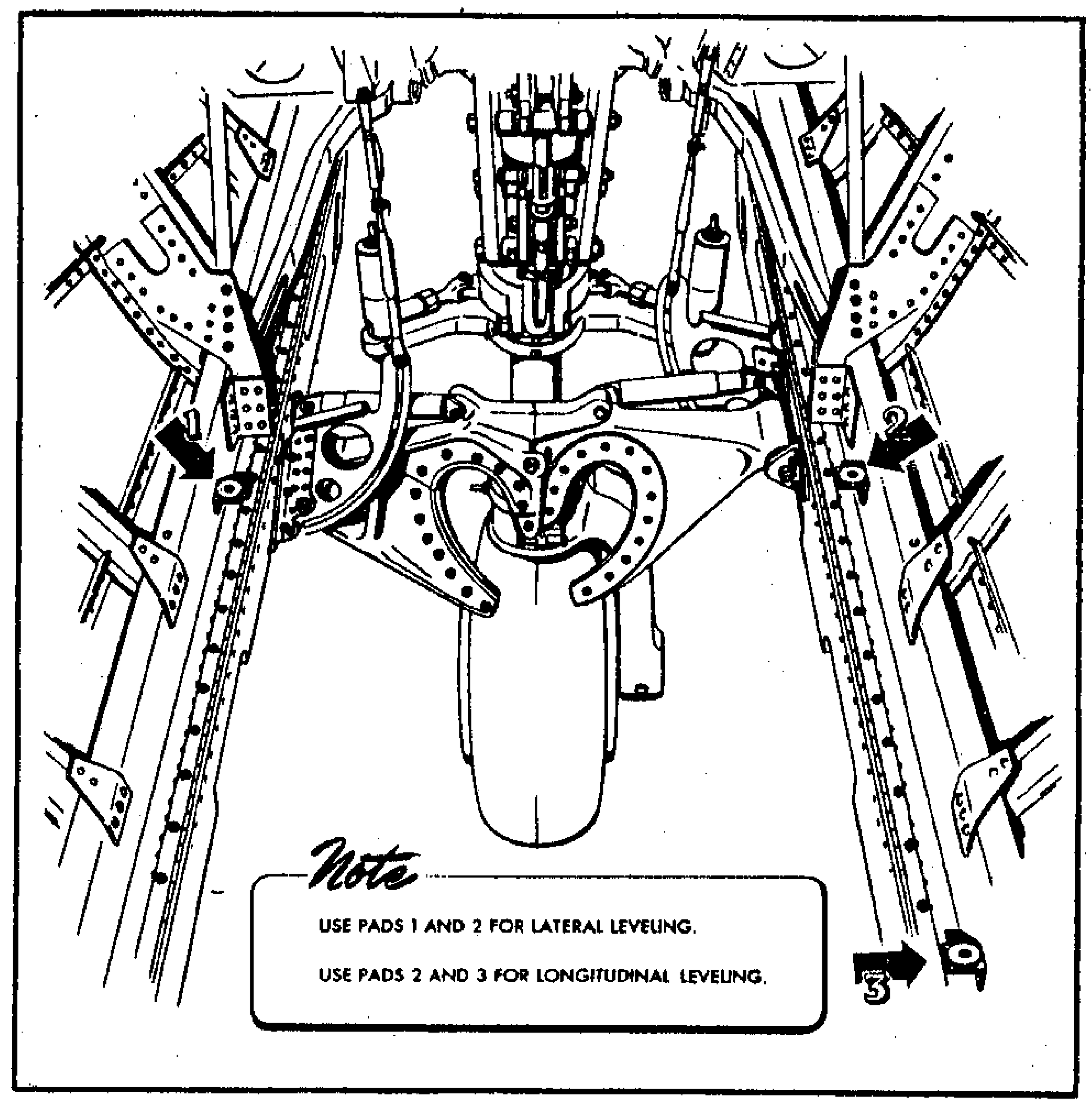


Figure 5 — Leveling Points

7. TYPES OF REPAIRS.

Most parts of the airplane may be repaired with patches and splices of aluminum Alclad sheet or NE8630 steel sheet (normalized). Rivets and bolts are the most common fasteners for attaching patches and splices. Do not use a blind fastener unless its use is specified by the applicable repair drawing.

a. MATERIAL FOR REPAIR AND REPLACEMENT.—Make replacement parts from material identical to that of the original part, as indicated on the keys to the reference diagrams included in this handbook. If identical materials are not available, the specification tables in section VI of AN 01-75FJ-2, "Handbook of Erection and Maintenance Instructions," will give a basis for the substitution of comparable materials.

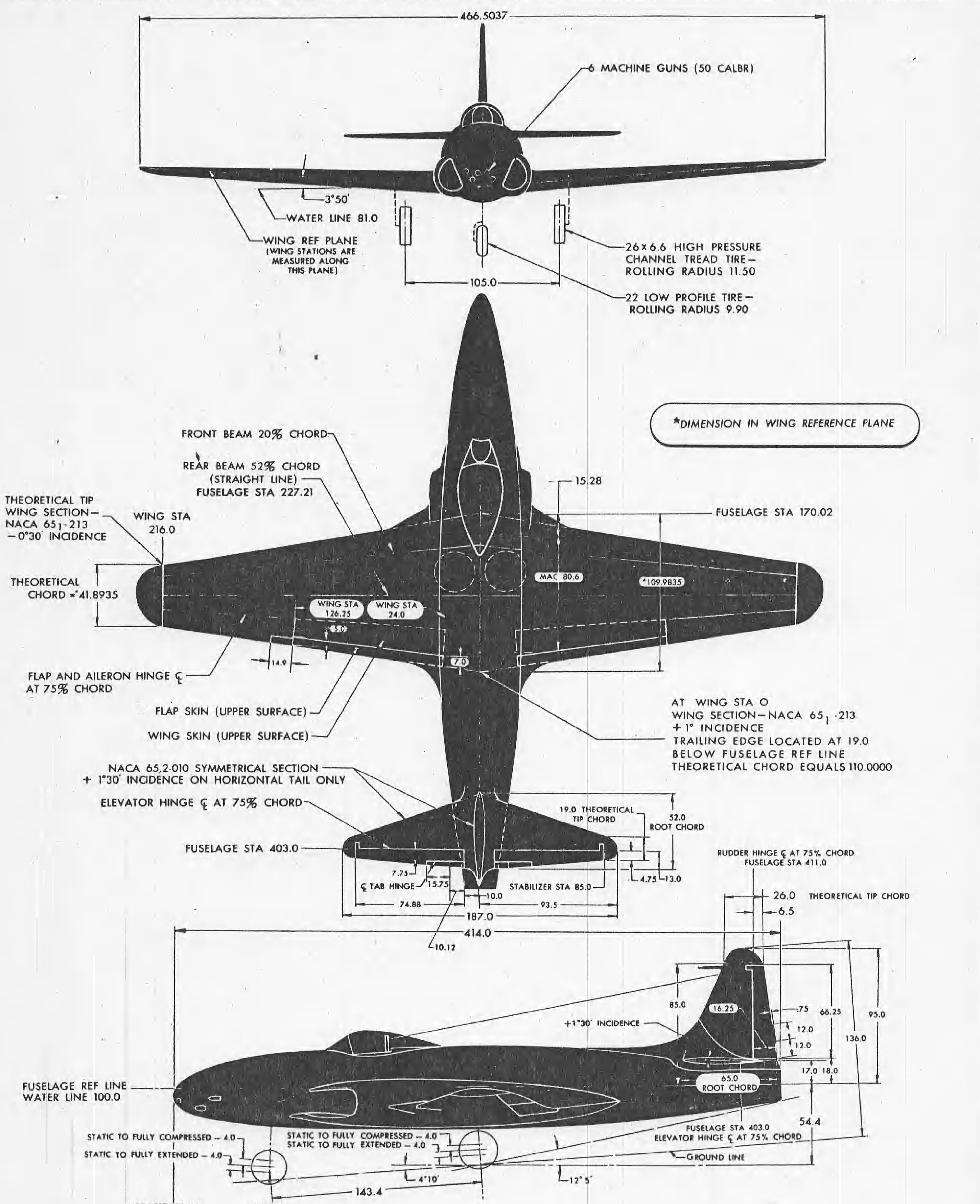


Figure 2 — Principal Dimensions

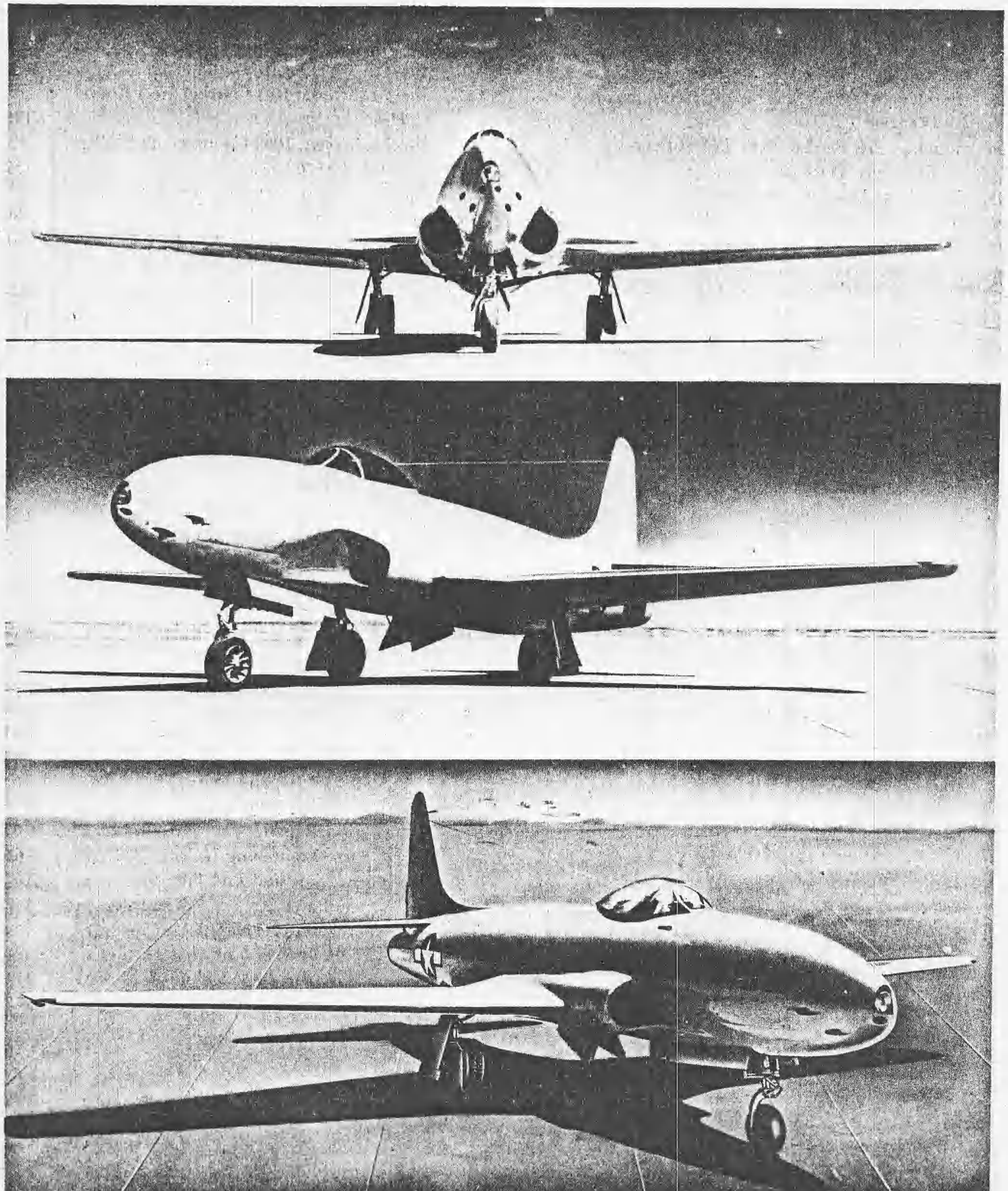


Figure 1 — P-80A Airplane

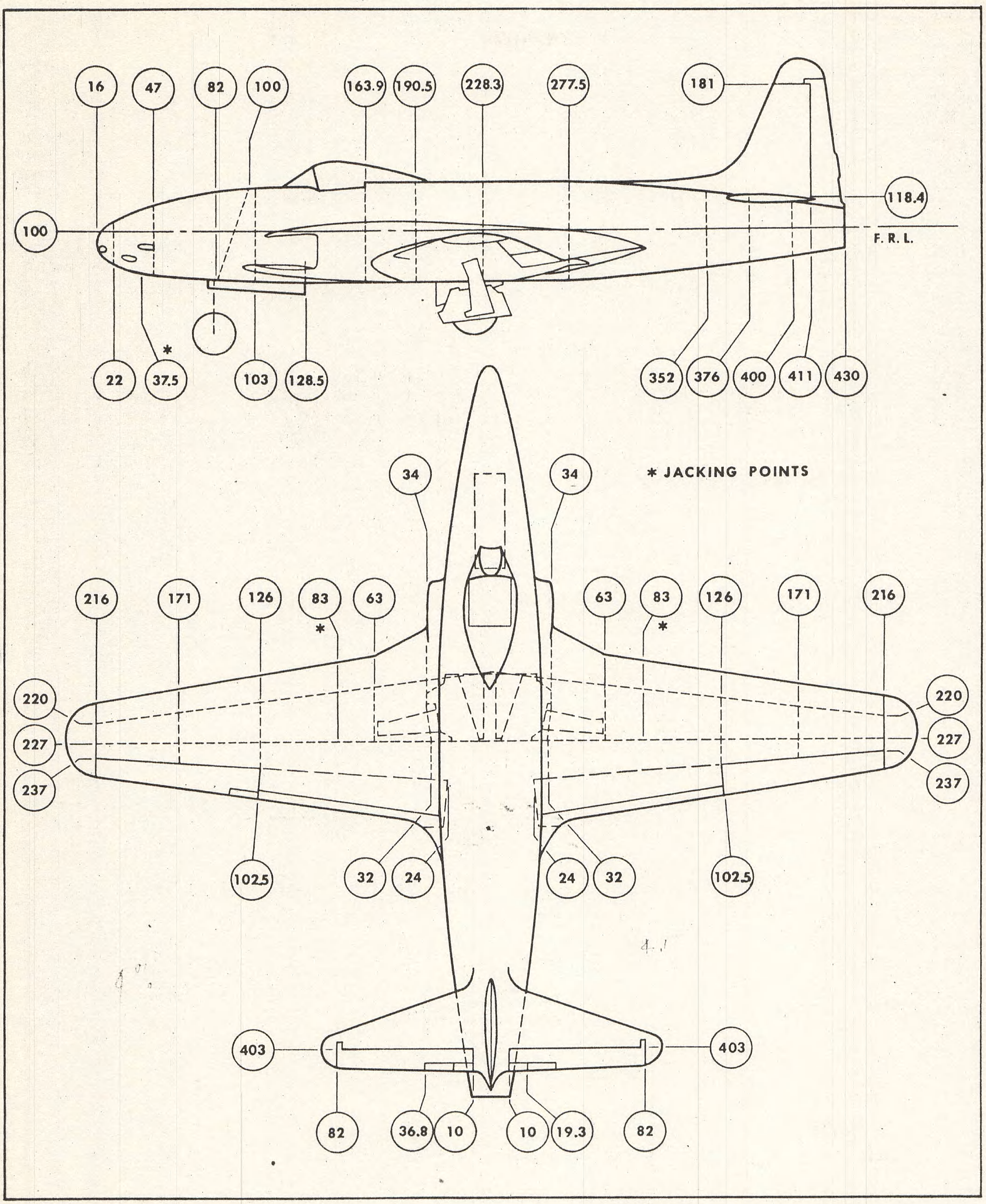
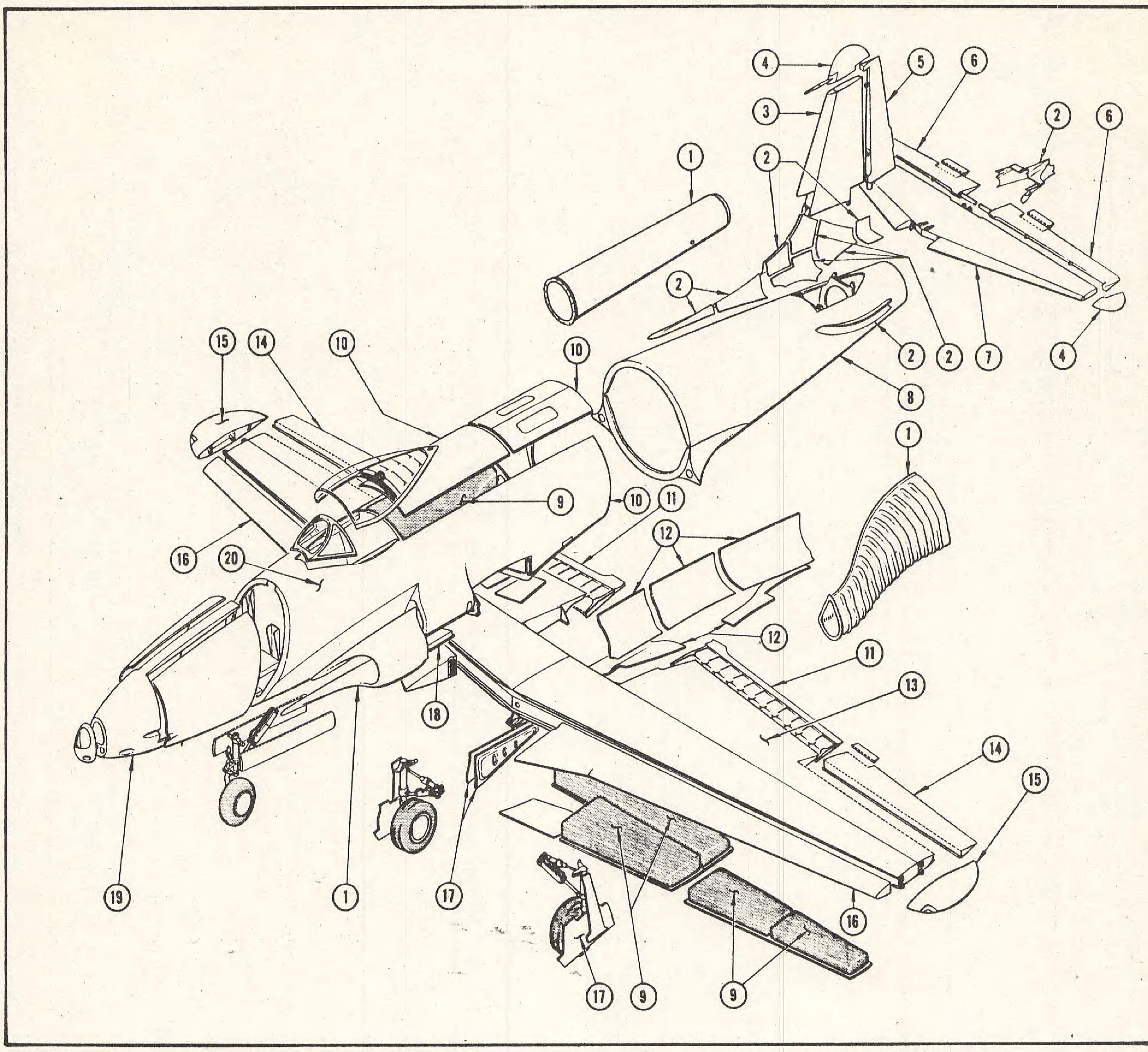
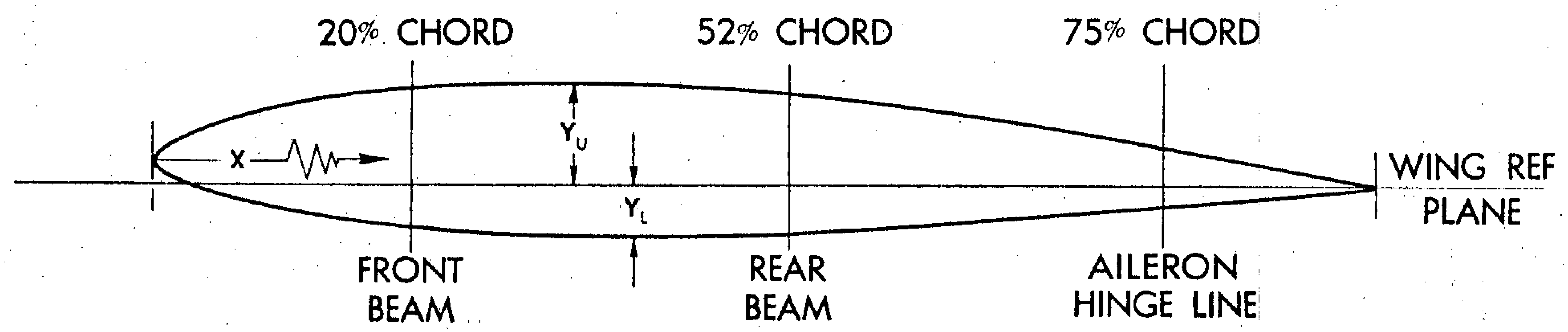


Figure 22 — Stations Diagram



No.	Item	Reference Diagrams Structure	Reference Diagrams Skin and Stiffeners	No.	Item	Reference Diagrams Structure	Reference Diagrams Skin and Stiffeners
1	Intake Ducts and Tail Pipe	123	123	11	Flaps	37	37
2	Tail Fillets	71	71	12	Wing Fillets	38	38
3	Fin	69	69	13	Wing	25, 25a, 26, 27, 28	29, 30
4	Fin and Stabilizer Tips	67	67	14	Aileron	35	35
5	Rudder	70	70	15	Wing Tip	33, 33a	33, 33a
6	Elevator	66	66	16	Wing Leading Edge	31, 32	31, 32
7	Stabilizer	64	65	17	Landing Gear Doors	121	121
8	Fuselage Aft Section	93	94	18	Dive Flaps	95	95
9	Self-sealing Tanks	See AN 01-1A-1		19	Fuselage Nose Station	87	88
10	Fuselage Mid Section (Sta 163-277)	91	92	20	Fuselage Mid Section (Sta 81-163)	89	90

Figure 23 — Exploded View and Index to Reference Diagrams



NOTE: X = DISTANCE AFT OF WING LEADING EDGE
MEASUREMENTS ARE TO INSIDE SKIN LINE

Sta		0			10			20			34	
% Chord	Y_U	Y_L	X	Y_U	Y_L	X	Y_U	Y_L	X	Y_U	Y_L	X
0	2.220	+1.912	0							1.832	+1.553	0
1.25	3.778	+ .462	1.374							3.239	+ .247	1.240
2.50	4.438	− .038	2.749							3.838	− .201	2.481
5.00	5.457	− .760	5.499							4.763	− .849	4.963
7.50	6.241	−1.323	8.248							5.475	−1.351	7.444
10	6.900	−1.792	10.998							6.074	−1.772	9.926
20	8.706	−3.138	21.996	8.416	−3.088	21.366	8.126	−3.039	20.735	7.720	−2.970	19.853
30	9.666	−3.960	32.995	9.353	−3.881	32.049	9.040	−3.803	31.103	8.602	−3.694	29.779
40	9.932	−4.217	38.494	9.616	−4.263	42.732	9.301	−4.169	41.741	8.860	−4.036	39.706
50	9.458	−4.270	54.991	9.037	−4.173	53.415	8.746	−4.076	51.839	8.339	−3.940	49.632
60	8.116	−3.690	65.990	7.862	−3.604	64.098	7.608	−3.519	62.207	7.253	−3.400	59.559
70	6.173	−2.770	76.988	5.980	−2.706	74.781	5.787	−2.642	72.575	5.517	−2.552	69.485
80	3.938	−1.679	87.986	3.814	−1.641	85.464	3.690	−1.603	82.943	3.517	−1.550	79.412
90	1.675	− .596	98.985	1.621	− .584	96.148	1.567	− .572	93.310	1.493	− .555	89.339
100	.032	.032	109.983	.032	.032	106.831	.032	.032	103.678	.032	.032	99.265

Sta		41			48			55.5			63	
% Chord	Y_U	Y_L	X	Y_U	Y_L	X	Y_U	Y_L	X	Y_U	Y_L	X
0							1.587	+1.326	0	1.501	+1.247	0
1.25							2.899	+ .112	1.156	2.781	+ .064	1.126
2.50							3.547	− .304	2.312	3.327	− .340	2.253
5.00					− .886	4.742	4.325	− .905	4.624	4.172	− .925	4.506
7.50					−1.363	7.113	4.990	−1.370	6.936	4.821	−1.376	6.759
10					−1.763	9.485	5.551	−1.759	9.248	5.369	−1.754	9.013
20	7.518	−2.936	19.411	7.315	−2.901	18.970	7.098	−2.864	18.497	6.880	−2.827	18.028
30	8.383	−3.640	29.117	8.165	−3.585	28.455	7.430	−3.527	27.746	7.696	−3.468	27.039
40							8.182	−3.833	36.995	7.945	−3.763	36.053
50							7.713	−3.731	46.244	7.495	−3.658	45.066
60							6.708	−3.216	55.492	6.518	−3.152	54.079
70							5.102	−2.415	64.741	4.958	−2.367	63.093
80							3.251	−1.469	73.990	3.159	−1.440	72.106
90							1.377	− .529	83.239	1.377	− .520	81.119
100	.032	.032	97.059	.032	.032	94.323	.032	.032	92.488	.032	.032	90.123

Sta		71.2			80.4			89.6			98.8	
% Chord	Y_U	Y_L	X	Y_U	Y_L	X	Y_U	Y_L	X	Y_U	Y_L	X
0	1.408	+1.160	0	1.303	+1.063	0	1.198	+ .966	0	1.093	+ .869	0
1.25	2.651	+ .013	1.094	2.505	− .044	1.057	2.360	− .102	1.021	2.214	− .160	.985
2.50	3.182	− .379	2.188	3.020	− .423	2.115	2.858	− .468	2.043	2.696	− .512	1.970
5.00	4.004	− .946	4.376	3.817	− .971	4.231	3.629	− .995	4.086	3.442	−1.019	3.941
7.50	4.637	−1.383	6.565	4.429	−1.391	6.347	4.222	−1.399	6.130	4.015	−1.407	5.912
10	5.170	−1.750	8.753	4.946	−1.744	8.463	4.723	−1.739	8.173	4.499	−1.733	7.883
20	6.643	−2.787	17.507	6.376	−2.742	16.927	6.110	−2.697	16.347	5.843	−2.651	15.767
30	7.439	−3.404	26.261	7.152	−3.332	25.391	6.864	−3.261	24.521	6.376	−3.189	23.651
40	7.687	−3.685	35.015	7.397	−3.598	33.855	7.107	−3.511	32.695	6.817	−3.424	31.535
50	7.256	−3.579	43.769	6.988	−3.490	42.319	6.721	−3.400	40.869	6.453	−3.311	39.419
60	6.310	−3.082	52.523	6.077	−3.004	50.783	5.844	−2.925	49.043	5.610	−2.847	47.303
70												
80												
90												
100	.032	.032	87.539	.032	.032	84.638	.032	.032	81.238	.032	.032	78.838

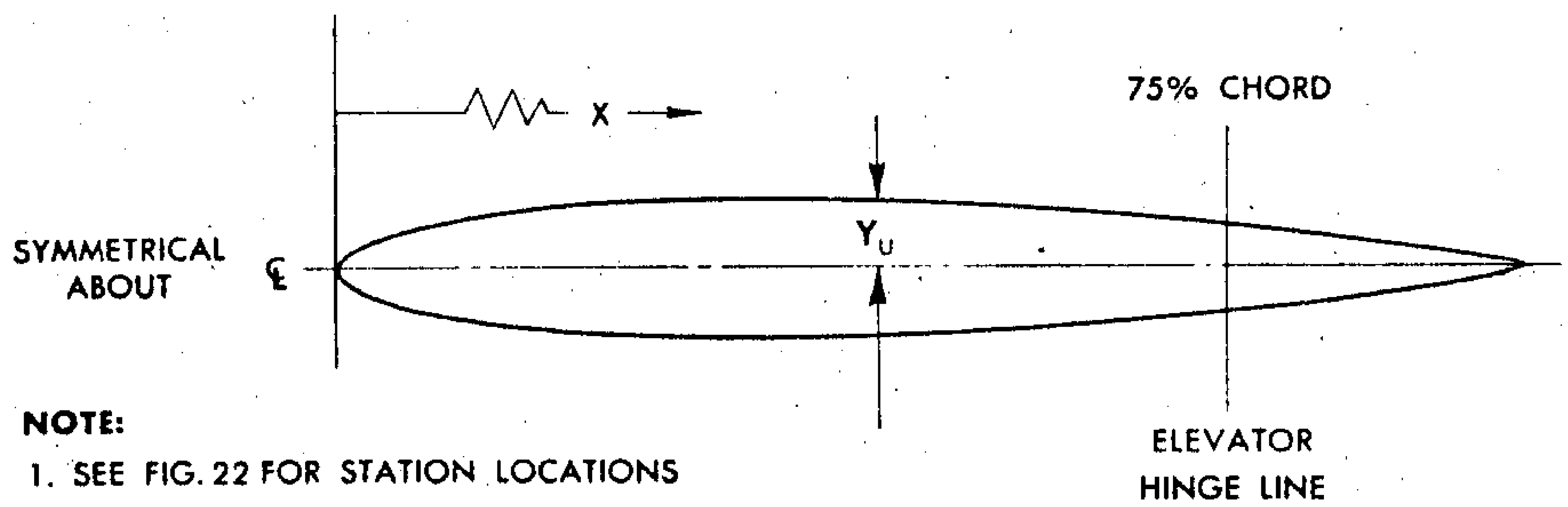
Figure 24 (Sheet 1 of 2 Sheets) — Wing Basic Dimensions

Sta	108			117.2			126.25			137.45		
% Chord	Y_U	Y_L	X	Y_U	Y_L	X	Y_U	Y_L	X	Y_U	Y_L	X
0	.988	+ .772	0	.883	+ .674	0	.780	+ .579	0	.652	+ .461	0
1.25	2.069	− .219	.949	1.923	− .277	.912	1.780	− .334	.877	1.602	− .404	.833
2.50	2.534	− .556	1.898	2.371	− .600	1.825	2.212	− .644	1.754	2.014	− .697	1.666
5.00	3.254	−1.043	3.796	3.066	−1.067	3.651	2.882	−1.091	3.509	2.653	−1.120	3.332
7.50	3.808	−1.415	5.695	3.600	−1.422	5.477	3.396	−1.430	5.263	3.149	−1.440	4.999
10	4.276	−1.728	7.593	4.053	−1.723	7.303	3.833	−1.717	7.018	3.561	−1.711	6.665
20	5.577	−2.606	15.187	5.310	−2.561	14.607	5.048	−2.516	14.037	4.729	−2.461	13.330
30	6.289	−3.117	22.781	6.001	−3.045	21.911	5.718	−2.975	21.055	5.368	−2.887	19.996
40	6.527	−3.338	30.375	6.236	−3.251	29.215	5.951	−3.165	28.074	5.598	−3.059	26.661
50	6.185	−3.222	37.969	5.917	−3.133	36.519	5.654	−3.045	35.092	5.328	−2.936	33.327
60	5.377	−2.769	45.563	5.144	−2.690	43.823	4.914	−2.613	42.111	4.630	−2.517	39.992
70							3.738	−1.963	49.129	3.522	−1.891	46.658
80							2.377	−1.201	56.148	2.238	−1.159	53.323
90							.999	− .444	63.166			
100	.032	.032	75.938		.032	73.038	.032	.032	70.185	.032	.032	66.654

Sta	148.65			159.85			171			182.25		
% Chord	Y_U	Y_L	X	Y_U	Y_L	X	Y_U	Y_L	X	Y_U	Y_L	X
0	.524	+ .342	0	.397	+ .224	0	.270	+ .106	0	.141	− .011	0
1.25	1.455	− .475	.789	1.248	− .545	.744	1.072	− .616	.670	.894	− .687	.656
2.50	1.817	− .751	1.578	1.619	− .805	1.489	1.423	− .858	1.296	1.225	− .912	1.313
5.00	2.425	−1.150	3.156	2.197	−1.179	2.979	1.969	−1.208	2.548	1.740	−1.238	2.626
7.50	2.892	−1.499	4.734	2.639	−1.459	4.469	2.388	−1.468	3.800	2.135	−1.478	3.939
10	3.289	−1.704	6.312	3.016	−1.698	5.959	2.746	−1.691	5.052	2.472	−1.684	5.253
20	4.399	−2.406	12.624	4.074	−2.351	11.918	3.751	−2.296	10.060	3.425	−2.241	10.506
30	5.017	−2.800	18.937	4.667	−2.713	17.878	4.319	−2.626	15.068	3.967	−2.538	15.759
40	5.245	−2.954	25.249	4.892	−2.848	23.837	4.540	−2.743	20.076	4.186	−2.636	21.013
50	5.002	−2.828	31.562	4.676	−2.719	29.796	4.352	−2.611	25.084	4.025	−2.502	26.266
60	4.346	−2.422	37.874	4.064	−2.326	35.756	3.780	−2.231	30.092	3.494	−2.135	31.519
70	3.306	−1.820	44.187	3.090	−1.748	41.715	2.875	−1.677	35.100	2.658	−1.605	36.772
80	2.100	−1.116	50.499	1.962	−1.074	47.674	1.824	−1.032	40.108	1.685	− .979	42.046
90							.759	− .390	45.116	.699	− .377	47.279
100	.032	.032	63.124	.032	.032	59.593	.032	.032	56.078	.032	.032	52.532

Sta	193.5			204.75			216		
% Chord	Y_U	Y_L	X	Y_U	Y_L	X	Y_U	Y_L	X
0	.013	− .130	0	− .114	− .249	0	− .243	− .368	0
1.25	.716	− .758	.612	.538	− .829	.568	.360	− .900	.523
2.50	1.026	− .966	1.224	.828	−1.020	1.136	.630	−1.075	1.047
5.00	1.510	−1.267	2.449	1.281	−1.297	2.272	1.052	−1.327	2.094
7.50	1.881	−1.487	3.673	1.628	−1.497	3.408	1.375	−1.507	3.142
10	2.199	−1.678	4.898	1.926	−1.671	4.544	1.652	−1.665	4.189
20	3.099	−2.185	9.797	2.773	−2.130	9.087	2.448	−2.075	8.378
30	3.615	−2.450	14.695	3.263	−2.362	13.631	2.912	−2.275	12.568
40	3.831	−2.530	19.594	3.476	−2.424	18.175	3.122	−2.318	16.757
50	3.697	−2.393	24.493	3.370	−2.284	22.719	3.042	−2.175	20.946
60	3.209	−2.039	29.391	2.924	−1.943	27.263	2.639	−1.848	25.136
70	2.441	−1.533	34.290	2.224	−1.461	31.807	2.008	−1.390	29.325
80	1.546	− .947	39.188	1.407	− .904	36.351	1.268	− .862	33.514
90	.639	− .363	44.087	.579	− .350	40.895	.519	− .337	37.704
100	.032	.032	48.986	.032	.032	45.439	.032	.032	41.893

Figure 24 (Sheet 2 of 2 Sheets) — Wing Basic Dimensions



NOTE:
1. SEE FIG. 22 FOR STATION LOCATIONS
2. USE THESE BASIC DIMENSIONS IN THE MANUFACTURE OF JIGS AND TEMPLATES AS DESCRIBED IN SECTION I PARAGRAPH 5

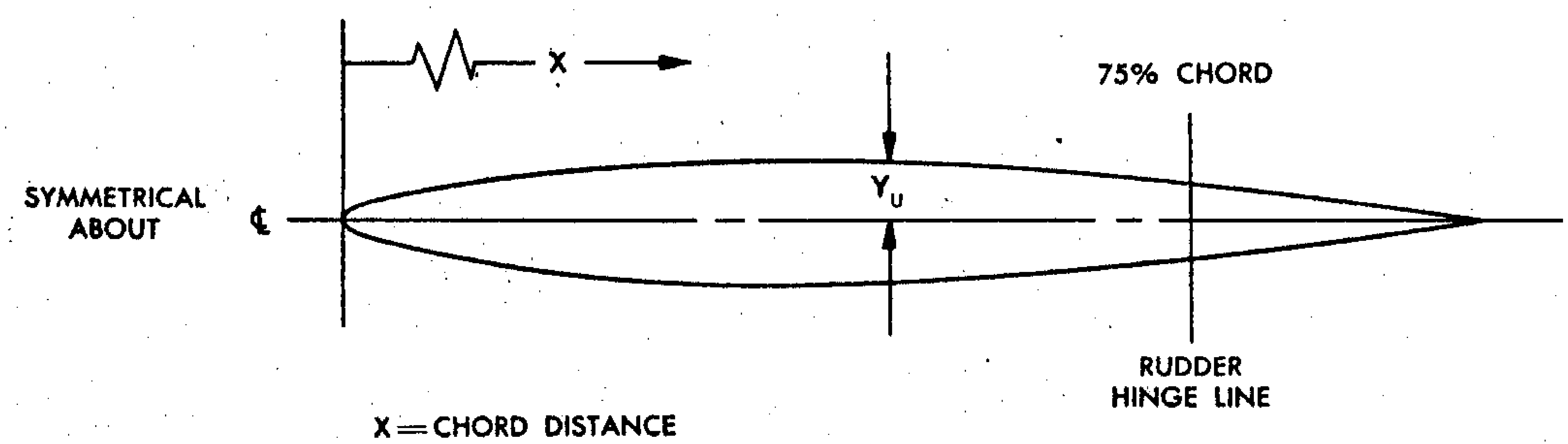
X = CHORD DISTANCE

Sta	0	
% Chord	Y_U	X
1.25	.600	.650
2.50	.810	1.300
5.00	1.130	2.600
7.50	1.375	3.900
10.00	1.580	5.200
20.00	2.155	10.400
30.00	2.475	15.600
40.00	2.60	20.800
50.00	2.495	26.000
60.00	2.140	31.200
70.00	1.620	36.400
80.00		41.600
90.00		46.800
100.00		52.000

Sta	10		15		20		30		40	
% Chord	Y_U	X	Y_U	X	Y_U	X	Y_U	X	Y_U	X
1.25	.555	.601	.532	.577	.510	.522	.465	.504	.421	.455
2.50	.749	1.202	.719	1.154	.688	1.105	.628	1.008	.567	.911
5.00	1.045	2.405	1.002	2.308	.960	2.211	.875	2.017	.791	1.823
7.50	1.272	3.608	1.220	3.463	1.169	3.317	1.066	3.026	.963	2.735
10.00	1.461	4.811	1.402	4.617	1.343	4.423	1.225	4.035	1.107	3.647
20.00	1.994	9.623	1.914	9.235	1.833	8.847	1.673	8.070	1.512	7.294
30.00	2.290	14.435	2.197	13.852	2.105	13.270	1.920	12.105	1.736	10.941
40.00	2.405	19.247	2.308	18.470	2.211	17.694	2.017	16.141	1.823	14.588
50.00	2.308	24.058	2.215	23.088	2.122	22.117	1.935	20.176	1.749	18.235
60.00	1.980	28.870	1.900	27.705	1.820	26.541	1.660	24.211	1.500	21.882
70.00	1.498	33.682	1.438	32.323	1.377	30.964	1.256	28.247	1.135	25.529
80.00										
90.00										
100.00	.025	48.117	.025	46.176	.025	44.235	.025	40.352	.025	36.470

Sta	50		60		70		80		85 — Tip	
% Chord	Y_U	X	Y_U	X	Y_U	X	Y_U	X	Y_U	X
1.25	.376	.407	.331	.358	.287	.310	.242	.261	.220	.237
2.50	.507	.814	.446	.717	.385	.620	.325	.523	.295	.475
5.00	.706	1.629	.621	1.435	.537	1.241	.452	1.047	.410	.950
7.50	.860	2.444	.757	2.152	.654	1.861	.551	1.570	.500	1.425
10.00	.988	3.258	.870	2.870	.752	2.482	.634	2.094	.575	1.900
20.00	1.352	6.517	1.191	5.741	1.030	4.964	.870	4.188	.790	3.800
30.00	1.551	9.776	1.366	8.611	1.182	7.447	.997	6.282	.905	5.700
40.00	1.629	13.035	1.435	11.482	1.241	9.929	1.047	8.376	.950	7.600
50.00	1.562	16.294	1.376	14.352	1.189	12.411	1.003	10.470	.910	9.500
60.00	1.340	19.552	1.180	17.223	1.020	14.894	.860	12.564	.780	11.400
70.00	1.014	22.811	.892	20.094	.771	17.376	.650	14.658	.590	13.300
80.00										15.200
90.00										17.100
100.00	.025	32.588	.025	28.705	.025	24.823	.025	20.941	.025	19.000

Figure 63 — Stabilizer and Elevator Basic Dimensions



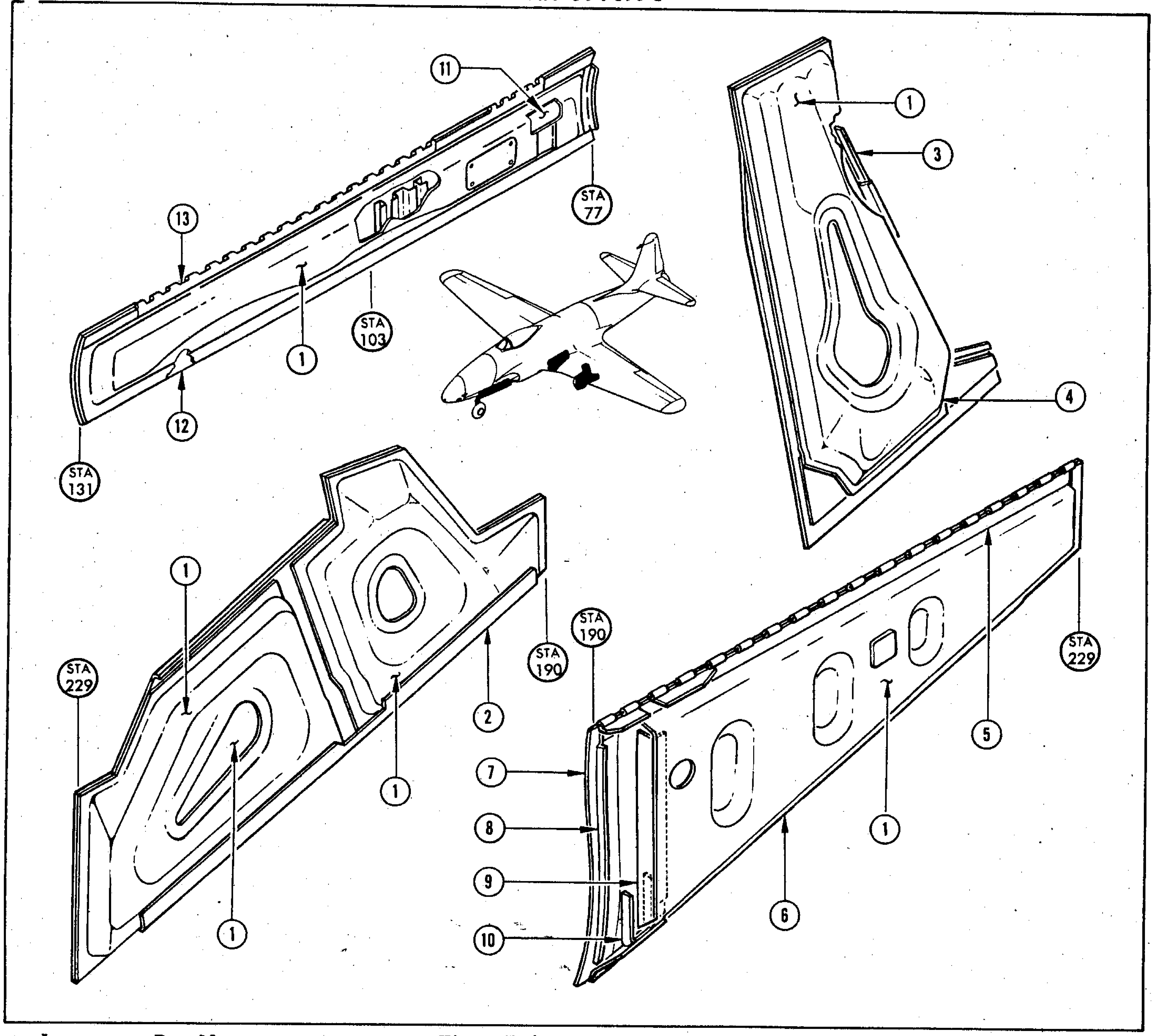
NOTE: SEE FIG. 22 FOR STATION LOCATIONS

Sta.	118		124		128		135		143	
% Chord	Y_U	X	Y_U	X	Y_U	X	Y_U	X	Y_U	X
1.25	.75	.810		.768	.682	.739	.635	.688	.582	.630
2.50	1.015	1.625		1.537	.923	1.479	.860	1.377	.787	1.261
5	1.410	3.250		3.075	1.283	2.958	1.195	2.755	1.094	2.522
7.50	1.720	4.875		4.613	1.565	4.438	1.457	4.132	1.333	3.783
10	1.975	6.500		6.150	1.798	5.917	1.674	5.510	1.532	5.044
20	2.695	13.00		12.301	2.453	11.835	2.285	11.020	2.092	10.089
30	3.095	19.5		18.452	2.818	17.753	2.624	16.531	2.402	15.134
40	3.25	26.0		24.602	2.958	23.671	2.755	22.041	2.522	20.179
50	3.12	32.5		30.753	2.840	29.589	2.644	27.552	2.420	25.223
60	2.675	39.0		36.904	2.435	35.507	2.267	33.062	2.076	30.268
70	2.025	45.5		43.055	1.843	41.425	1.716	38.573	1.571	35.313
80										
90										
100	.025	65.00	.025	61.507	.025	59.179	.025	55.104	.025	50.447

Sta.	151		160		170		181		185-Tip	
% Chord	Y_U	X	Y_U	X	Y_U	X	Y_U	X	Y_U	X
1.25	.528	.572	.467	.506	.400	.434			.3	.325
2.50	.714	1.144	.632	1.013	.541	.868			.405	.650
5	.993	2.289	.880	2.027	.754	1.736			.565	1.300
7.50	1.210	3.434	1.071	3.041	.916	2.604			.685	1.950
10	1.391	4.579	1.232	4.055	1.055	3.473			.79	2.6
20	1.899	9.158	1.682	8.110	1.441	6.946			1.080	5.2
30	2.181	13.737	1.932	12.165	1.655	10.419			1.24	7.8
40	2.289	18.316	2.027	16.220	1.736	13.892			1.3	10.4
50	2.196	22.895	1.944	20.276	1.664	17.365	1.356	14.164	1.245	13.00
60	1.884	27.474	1.668	24.331	1.429	20.838	1.165	16.997	1.070	15.6
70	1.426	32.053	1.263	28.386	1.082	24.311	.882	19.829	.810	18.2
80										
90										
100	.025	45.791	.025	40.552	.025	34.731	.025	28.328	.025	26.00

NOTE: USE THESE BASIC DIMENSIONS IN THE MANUFACTURE OF JIGS AND TEMPLATES AS DESCRIBED IN SECTION I PARAGRAPH 5

Figure 68 — Fin and Rudder Basic Dimensions



Item	Part Name	Figure Reference Neg. Damage	Figure Reference Repair	Remarks
1	Inner Skin	130	122	24S-T80 — .051
2	"Z"	131	148	24S-T80 — .051
3	Channel	131	143	24S-T80 — .064
4	Outer Skin	130	122	24S-T80 — .040
5	Hinge			53S-T Extr., LS348
6	"Z"	131	148	24S-T80 — .072
7	Outer Skin	130	122	24S-T81 — .051
8	Doubler			24S-T80 — .040
9	Angle	132	139	LS3228
10	Support			24S-T80 — .125
11	Outer Skin	130	122	24S-T81
12	Strip			LS2227
13	Hinge			LS3560

NOTE: Items not indicated are not repairable.

Figure 121 — Landing Gear Doors Reference Diagram

SECTION VI

ENGINE SECTION

1. GENERAL.

The intake ducts and engine tail pipe are the only repairable portions of the engine section discussed in this handbook. The intake duct leading edges are constructed of 3S aluminum; the remainder is 24S-T material. The engine tail pipe consists of an inner skin of 347-1A corrosion-resistant steel, and an outer skin of light gage 24S-T Alclad. The two skins are separated by hat-section rings. See figure 123 for details of construction.

2. NEGLIGIBLE DAMAGE.

Refer to the negligible damage drawings indexed on the key to the reference diagram, figure 103, for permissible negligible damage to ducts and tail pipe. Negligible damage not indexed on this key is restricted to dents and nicks, which after being cleaned up to a regular shape, do not exceed 1/16 inch in depth and do not occur closer than 3/8 inch from a rivet or attaching hole. All holes in the skins must be repaired to prevent air leakage.

3. DAMAGE REPAIRABLE BY PATCHING.

The applicable repairs to intake ducts and tail pipe are indexed on the key to reference diagram, figure 123. Parts not indexed are not repairable. These are items which are either too highly loaded, too inaccessible, or too small to be repaired economically. Be sure that repairs to the inside skins do not permit leakage of air. The portion of the intake ducts constructed of 3S aluminum, and that portion of the tail pipe constructed of 347-1A steel may be repaired by welded patches. The tail pipe track and fittings are not repairable.

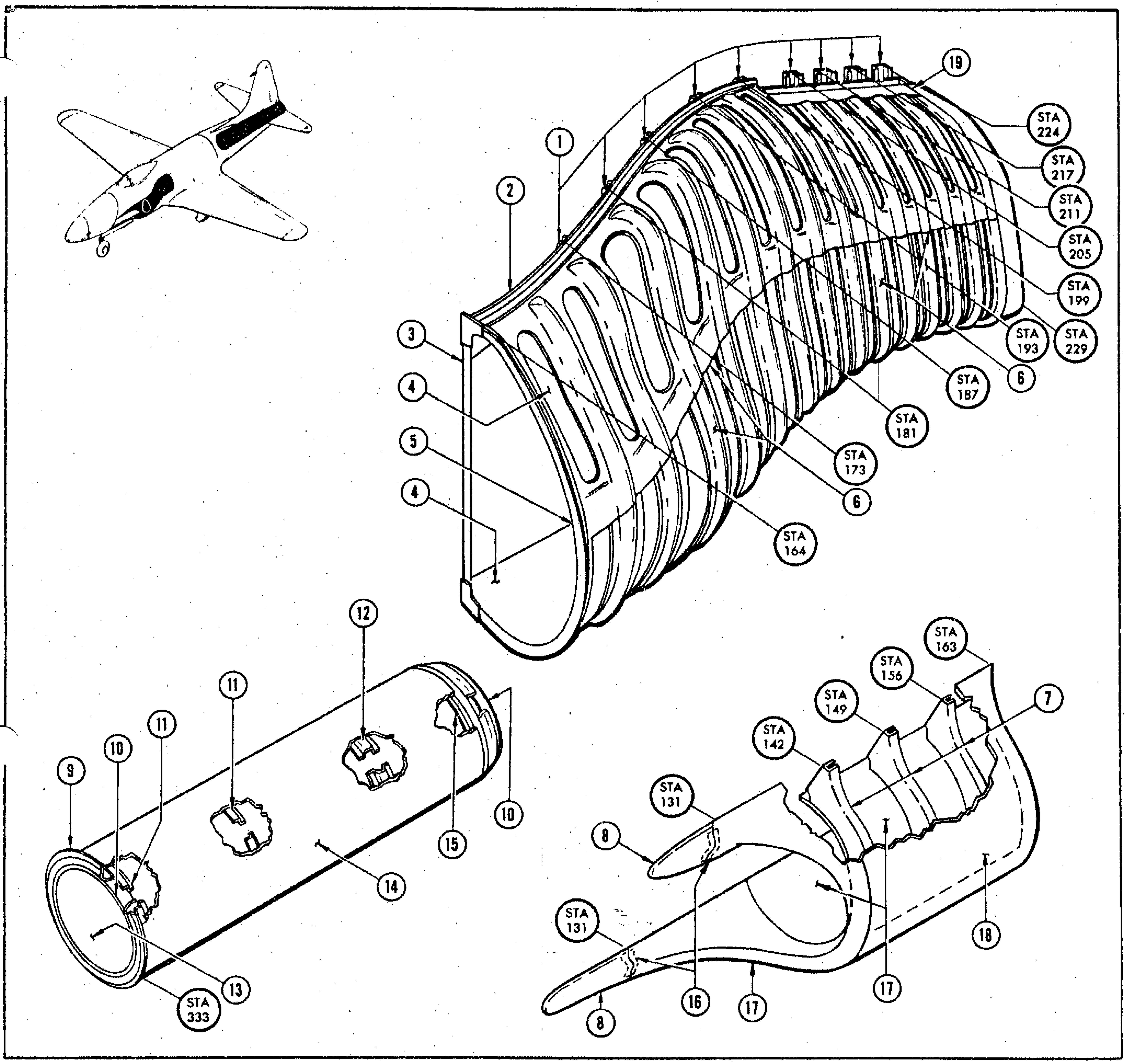
4. DAMAGE NECESSITATING REPLACEMENT.

Damage in excess of that described as negligible for items not indicated on the key to figure 123 requires replacement of the item involved. Skins and doublers originally constructed of aged material (24S-T81) must be replaced with identical material. The gage of the replacement part must be the same as the original skin or doubler. Interior structure originally constructed of aged 24S-T may be replaced with parts constructed of 24S-T unaged material if no interferences are encountered.

Part No.	*Material*			*Remarks*
	Spec. No.	*Title*	*Size or Gage*	
24S-T	AN-A-13	Sheet, Aluminum Alclad	.032	For repair of duct skins.
24S-T	AN-A-13	Sheet, Aluminum Alclad	.040	For repair of skins.
24S-T	AN-A-13	Sheet, Aluminum Alclad	.051	For repair of lips.
24S-T	AN-A-13	Sheet, Aluminum Alclad	.064	For repair of hat and ring stiffeners.
24S-T	AN-A-13	Sheet, Aluminum Alclad	.072	For repair of stiffeners.
24S-T	AN-A-13	Sheet, Aluminum Alclad	.102	For angle repair.
24S-T	AN-A-13	Sheet, Aluminum Alclad	.020	For repair of tail pipe outer skin.
*24S-T	AN-A-13	Sheet, Aluminum Alclad	.032	For replacement of skin.
*24S-T	AN-A-13	Sheet, Aluminum Alclad	.040	For replacement of skin.
*24S-T	AN-A-13	Sheet, Aluminum Alclad	.064	For replacement of hat stiffeners and angles.
*24S-T	AN-A-13	Sheet, Aluminum Alclad	.081	For replacement of angles and doublers.
*24S-T	AN-A-13	Sheet, Aluminum Alclad	.091	For replacement of angles.
347-1A	AN-QQ-S-757	Corr. & Heat Res. Steel	.030	For replacement of rings, skins, and doublers.
347-1A	AN-QQ-S-757	Corr. & Heat Res. Steel	.037	For repair of rings, skin, and doublers.
3SO	QQ-A-359	Aluminum Alloy	.051	For repair of leading edge skin.
	AN426AD4	Rivets—100° Countersunk	1/8	For skin repairs.
	AN426AD5	Rivets—100° Countersunk	5/32	For skin repairs.
	AN430AD4	Rivets—Roundhead	1/8	For angle repairs.
	AN430AD5	Rivets—Roundhead	5/32	For angle and stiffener repairs.
	AN430AD6	Rivets—Roundhead	3/16	For stiffener repairs.
	QQ-R-571	Welding Rod, Type D		For welding leading edge skins.
	AC11313	Flux		For QQ-R-571 welding rod.

*Aged materials. Age 10 hours at 375°F.

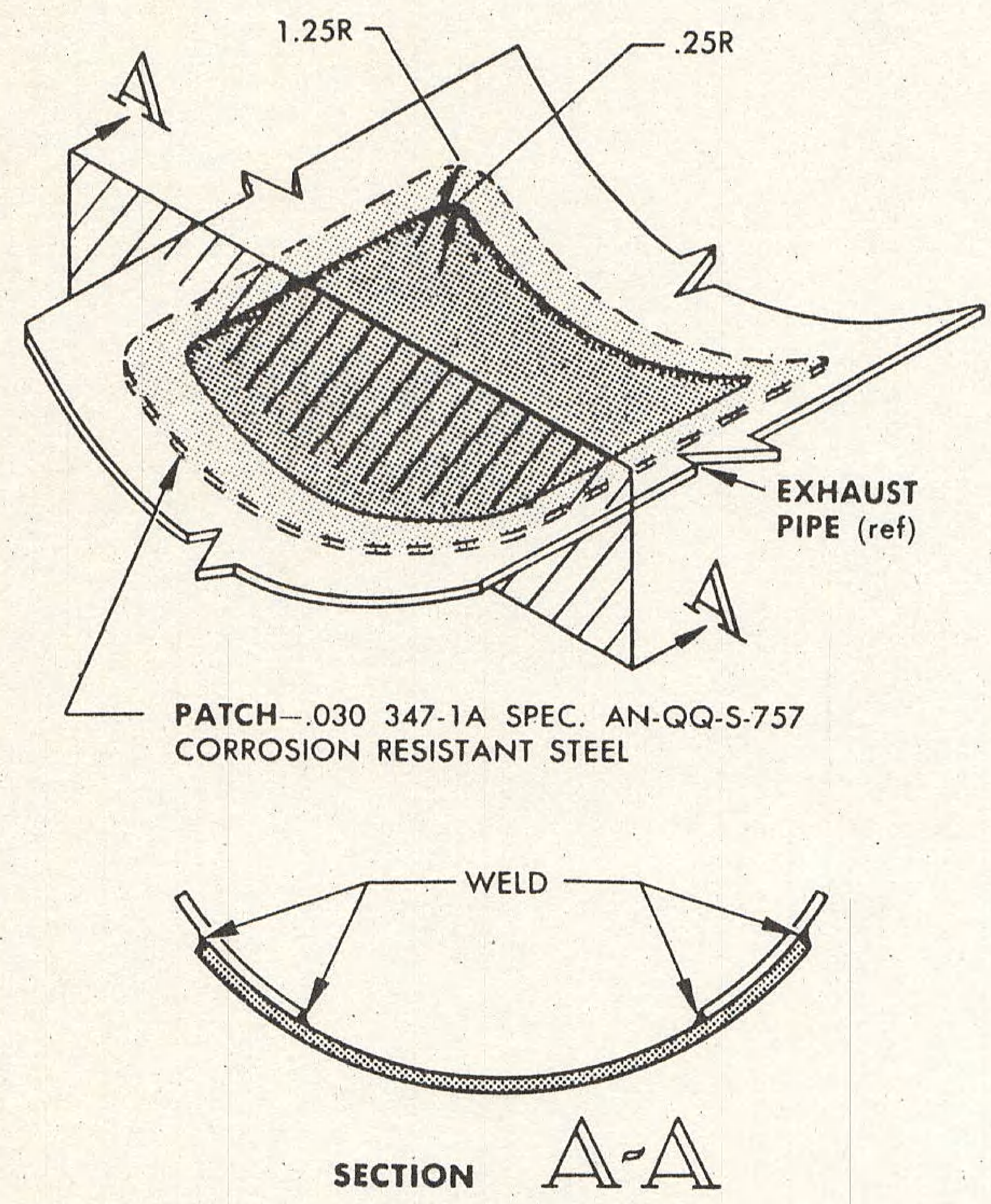
Table 7 — Material for Repair of the Engine Section



Item	Part Name	Figure Reference Neg. Damage	Repair	Remarks
1	Hat Stiffeners	131	145	24S-T80 — .064
2	Angle	131	139	24S-T80 — .081
3	Angle	131	139	24S-T80 — .064
4	Skin	130	135, 137	24S-T81 — .032
5	Angle	131	139	24S-T80 — .091
6	Reinforcement	131	145	24S-T80 — .040
7	Rings	131	118	.064
8	Lips		135, 136, 137	.051
9	Ring	131	145	347-1A .030 Corr-res. St. Sht.
10	Doubler			347-1A .030 Corr-res. St. Sht.
11	Ring	131		347-1A .030 Corr-res. St. Sht.
12	Ring	131		347-1A .030 Corr-res. St. Sht.
13	Skin	130	124	347-1A .030 Corr-res. St. Sht.
14	Skin	130		.012
15	Ring	130	135, 137	347-1A .030 Corr-res. St. Sht.
16	Doubler			Corr-res. St. Sht.
17	Skin	130	*	.040
18	Skin		135, 136, 137	3S-O — .051
19	Doubler			24S-T81 — .040 24S-T81 — .081

NOTES: All material 24S-T unless otherwise noted.
Items not indicated are not repairable.
*See text, section VI, paragraph 3.

Figure 123 — Air Ducts and Tail Pipe Reference Diagram



NOTES:

1. PATCH MAY BE EITHER TORCH OR ARC WELDED.
2. PUDDLE WELD PATCH TO EXTERIOR OF PIPE. USE PUDDLES 1 INCH LONG SPACED 1 INCH APART FOR PATCHES 6 INCHES OR GREATER ON 1 SIDE; FOR PATCHES LESS THAN 6 INCHES USE PUDDLE 1/2 INCH LONG SPACED 1/2 INCH APART.
3. ATTACH INSIDE OF PATCH TO PIPE WITH CONTINUOUS WELD. GRIND OR FILE THIS WELD SMOOTH.
4. INSPECT PATCH AFTER EACH FLIGHT.
5. REPLACE PATCHED EXHAUST PIPE WITH A NEW ONE AS SOON AS POSSIBLE.

Figure 124 — Tail Pipe Repair

SECTION VII

FABRIC REPAIRS AND ATTACHMENT

Does not apply to this airplane.