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T. O. NO. 01-70AB-2

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SERVICE INSTRUCTIONS
FOR
ARMY MODELS
PT-13B, -17 and -18

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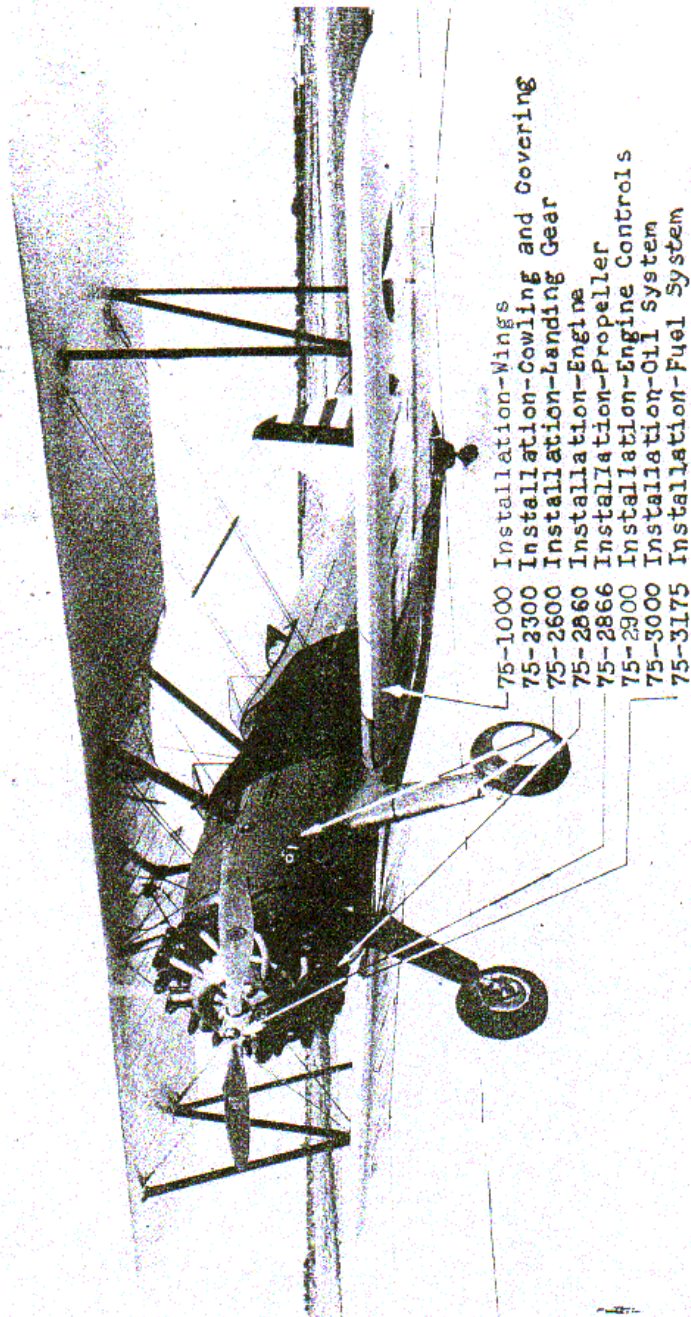


FIG. 1 - MDL PT-13B AIRPLANE - 3/4 LEFT FRONT VIEW

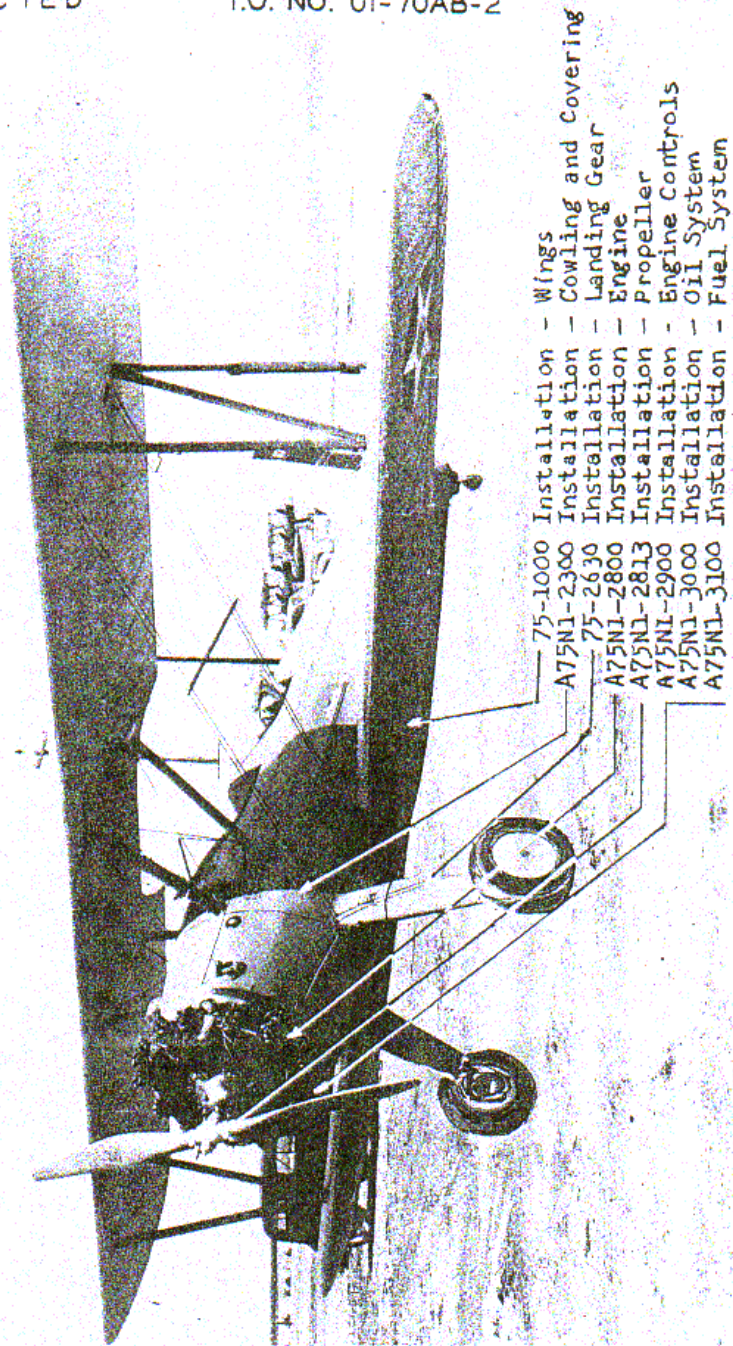


FIG. 2

3/4 LEFT FRONT VIEW - MODEL PT-17

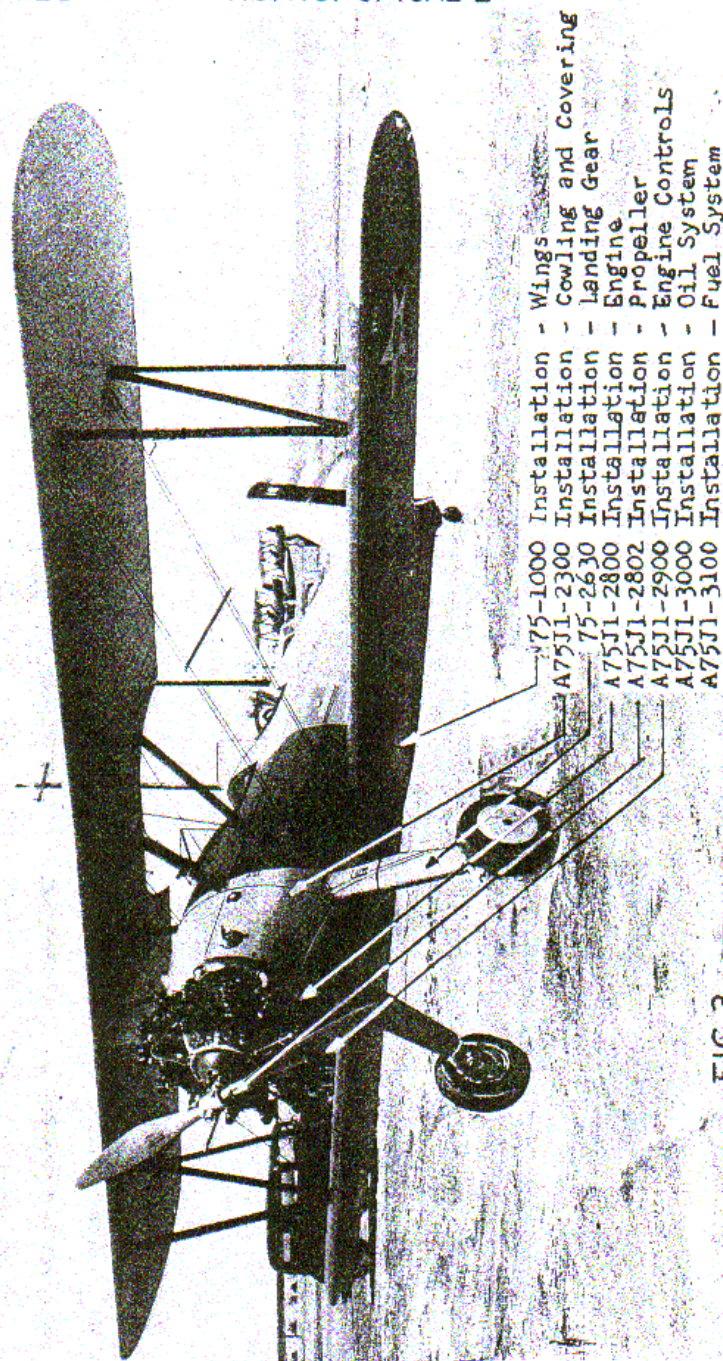


FIG. 3

3/4 LEFT FRONT VIEW - MODEL PT-18

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SECTION I

INTRODUCTION AND REFERENCES

1. This Technical Order is the Service Instructions for the Models PT-13B, PT-17 and PT-18 Training Airplanes. Personnel who are required to service and maintain this equipment will read and be familiar with the information contained in T. O. No. 01-70AB-1 which forms a part of the complete service instructions.

2. Reference has been made in this Handbook to the following Technical Orders which contain applicable data and instructions:

T. O. No.	00-20A	The Visual Inspection System for Airplanes
ø	00-25-3	Distribution of Air Corps Maintenance Publications ø
	01-1-1	Cleaning of Aeronautical Equipment
	01-1-3	Airplane Finishes
	01-1-5	Installation of Static Ground
	01-1-7	Long-Time Storage of Airplanes
	01-1-12	Inspection of Airfoils
	01-1-26	Replacement of Frayed Control Cables
	01-1-50	Towing, Mooring & Handling Airplanes
	01-1-58	Tightening of Radial Engine Mount Bolts & Replacement of Rubber Vibration Absorbers
	01-1E-26	Repair & Cleaning of Fuel & Oil Tanks
	01-1E-31	Annealing of Fuel, Oil & Water Lines
	01-70AB-1	Operation & Flight Instructions PT-13B
	01-70AB-2	Service Instructions PT-13B
	01-70AB-3	Overhaul Instructions PT-13B
	01-70AB-4	Parts Catalog PT-13B
	02-1-5	Operation of Carburetor Heaters
	02-1-29	Ground Operation Instructions for Aircraft Engines
	02-1-33	Stamping of Overhauls & Flying Time - Engines & Superchargers
	02-15AA-1	Operation & Flight Instructions, R-680-3, -5, -7 & -11 Engines (PT-13B)
	02-15AA-2	Service Instructions, R-680-3, -5, -7, & -11 Engines (PT-13B)
	02-15AA-3	Overhaul Instructions, R-680-3, -5, -7 & -11 Engines (PT-13B)
	02-15AA-4	Parts Catalog, R-680-3, -5, -7, & -11 Engines (PT-13B)
	02-30AA-1	Operation & Flight Instructions - R-755-3, -5, & -7 Engines (PT-18)
	02-30AA-2	Service Instructions - R-755-3, -5, & -7 Engines (PT-18)
	02-30AA-3	Overhaul Instructions - R-755-3, -5, & -7, Engines (PT-18)
	02-30AA-4	Parts Catalog, R-755-3, -5, & -7 Engines (PT-18)

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T. O. No.	02-40AA-1	Preliminary Operation Instructions - R-670-3, & -5 Engines (PT-17)
	02-40AA-2	Service Instructions - R-670-3, & -5 Engines (PT-17)
	02-40AA-3	Overhaul Instructions - R-670-3, & -5 Engines (Pt-17)
	02-40AA-4	Parts Catalog, R-670-3, & -5 Engines (PT-17)
	03-1-2	Safety Belts
∅	03-10-9	Replacement of Gasket, Fuel Line Strainer Cover - C2A ∅
	03-10-13	Operation & Inspection of Fuel Cock Controls
∅	03-10-16	Replacement of Gasket - Tank Filler Cap & Adapter Assembly ∅
	03-20-1	List of Propellers for Service Airplanes
	03-5CA-1	Starters & Starter Motors (Eclipse)
	03-5D-5	Magnetos - Scintilla - Types SC & DF
	03-5D-6	Booster Magneto - Scintilla - Type DS
	03-5E-1	Spark Plugs - Use & Reconditioning
	03-25A-1	Inspection & Lubrication of Anti-Friction Bearings
	03-25C-2	Streamline Wheel & Brake Assemblies (Bendix)
	03-25E-1	Air-Oil Shock Absorber Struts
	03-45-1	Fire Extinguishers - Installation & Inspection - One Qt. Pump Type
	03-45B-1	Fire Extinguishers Type A-2
	04-5-1	Issue & Inspection - Shock Absorber Cord
	04-10-1	Aircraft Tire Pressures
	04-10-2	Inspection of Aircraft Tires
	05-1-1	Repair, Storage & Reinspection of Instruments
	05-1-9	Aircraft Clocks, Types A-6, A-7, A-8 & A-9
	05-1-16	Identification of Aircraft Thermometers
	05-1-17	Marking of Aircraft Instruments
∅	05-5C-1	Tachometers, Chronometric, Types C-2 & C-7 ∅
	05-10-2	Service & Overhaul Instructions - Airspeed Indicators
	05-15-2	Service & Overhaul Instructions - Magnetic Compasses
	05-20-2	Bank & Turn Indicators (Pioneer)
	05-20-10	Altimeters, Types C-6, C-7, C-8, C-10 & C-11
	05-20-26	Rate-of-Climb Indicators, Type A-6 (Kollsman)
	05-40-10	Cold Weather Operation of Oil Pressure Gages

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T. O. No.	05-40-10	Cold Weather Operation of Oil Pressure Gages
	05-50-1	Airspeed Tubes - Pitot Static & Power Venturi Tubes
	05-75-1	Engine Gage Units, Types B-1, B-2 & B-7
	06-1-2	Fluids for Hydraulic Equipment
	06-5-1	Use & Disposition - Fuels
	06-10-1	Aircraft Engine Lubricating Oil, Grades & Use
	06-10-3	Prevention of Thread Seizures
	06-10-4	General Aircraft Use
	07-1-1	Aircraft Markings & Insignia
	17-1-2	Pressure Type Portable Cleaner
	17-1-3	Operation & Maintenance Instructions - High Pressure Hand Pump (Bendix)
	19-1-18	Hydraulic Airplane Jacks - Airplane Hoisting Precautions
	23-5-2	Welding of Steel Tubular Structures
	23-5-3	Welding, Machining, & Forming Corrosion Resistant Steels & Inconel
	23-15-1	Repair & Manufacturing Practices, Aluminum Alloys
ø	29-1-3	Cleaning, Inspection & Lubrication of Anti-Friction Bearings

3. The following Technical Orders, appearing in the preceding paragraph and throughout the text of this handbook, have been replaced by the Technical Order indicated. The replacing numbers will be inserted throughout the text in the next complete reissue of this handbook.

<u>OLD NO.</u>	<u>NEW NO.</u>	<u>TITLE</u>
	00-20A-2	Airplane Maintenance Instruction Forms
03-25E-1	03-25E	Shock Struts
05-20-10	05-30-1	Operation & Service Instructions - Altimeter Assemblies - (Kollsman)
05-20-10	05-30-3	Altimeter Assembly - (Kollsman)

SECTION II
GENERAL INSTRUCTIONS

1. Description and Dimensions.

a. <u>Airplane General:</u>	<u>PT-13B</u>	<u>PT-17</u>	<u>PT-18</u>
Overall Span	32' 2"	32' 2"	32' 2"
Overall Length . . .	24' 11-1/2"	25' 0"	25' 1-3/4"
Overall Height, Thrust Line Level.	9' 8-1/2"	9' 8-1/2"	9' 8-1/2"
Overall Height, At Rest	9' 4-1/2"	9' 4-1/2"	9' 4-1/2"
Height, Propeller Hub, Thrust Line Level	67"	67"	67"
Height, Propeller Hub, At Rest . . .	79"	79"	79"
Clearance, Propeller Tip, Thrust Line Level (L.G. and Tires Flat) . . .	12-1/2"	12-1/2"	12-1/2"

b. Wings:

Airfoil Section	NACA (Modified)
Stagger	27" at Root 26-13/16" at Strut
Gap (Mean)	60.09"
Total Area Including Fuselage and Ailerons	297.6 Sq.Ft.

(1) Upper Wing:

Span	32' 2"
Chord	60"
Dihedral	1/2°
Incidence	4°
Area	147.4 Sq.Ft.

(2) Lower Wing:

Span	31' 2"
Chord	60"
Dihedral	1-1/2°
Incidence	3°
Area (Including Ailerons) . .	150.2 Sq.Ft.

c. Ailerons:

Area to Hinge Centerline -
 Each Aileron 11.89 Sq.Ft.
 Area of Balance - Each Aileron 2.925 Sq.Ft.
 Total Area - Both Ailerons 29.63 Sq.Ft.

d. Empennage:(1) Horizontal Stabilizer:

Overall Span 12' 6"
 Setting Range (ground only) 1-3/4° to 3-3/4°
 Area (less fuselage) 21.16 Sq.Ft.

(2) Elevator:

Area (including tabs) 14.14 Sq.Ft.
 Area of both Tabs 1.46 Sq.Ft.
 Total Horizontal Surface Area 35.3 Sq.Ft.

(3) Vertical Stabilizer:

Area 3.14 Sq.Ft.
 Setting None

(4) Rudder:

Area (including tab without
 balance) 10.45 Sq.Ft.
 Area - Tab (ground
 adjustable)06 Sq.Ft.
 Area - Balance 1.32 Sq.Ft.
 Total Vertical Surface Area 14.97 Sq.Ft.

e. Landing Gear:

Tread 77-9/16" Normal

2. Handling.

Provision is made for jacking at the tail of the fuselage near the forward bottom edge of the tail wheel fairing. Provision is made for jacking the front end of the airplane for servicing or inspecting the landing gear where a hoist is not available. This provision consists of pads under the lower wing at the front spar root. The front of the airplane may also be raised by placing the jacks under the lower axle knuckles. For instructions covering the use of airplane jack assemblies, see Technical Order No. 19-1-18

CAUTION: Do not jack at the wing pads unless at least 200 lbs. is attached at the lift handles or unless the tail is securely tied down. These points are located back of the weight empty center of gravity. The rear of the fuselage may be supported on trestles at the lifting handles but particular care should be taken that the tail is not dropped on the supports but lowered easily.

2. Hoisting.

a. Provision is made for hoisting the front of the airplane (while leaving the tail on the ground) by means of fittings located at the ends of the center section at the front spar. To use these fittings for hoisting they should be provided with 3/8 shackles and clevis pins. The hoisting provision is designed primarily for use in raising the airplane to check oleo struts and to remove piston tubes for packing replacement or to change landing gear assemblies. As alternate means of accomplishing these aims, see paragraph 2 above, under "Handling".

b. Provision is made for lifting the tail of the airplane by means of the lift handles projecting through the cover at the lower longeron of the fuselage near the stabilizer leading edge. For precaution when lifting tail section, see T. O. No. 01-1-50.

4. Towing.

Towing eyes are provided on the front of the lower axle knuckle at the center of the axle. See T. O. No. 01-1-50.

5. Leveling.

Leveling pads are provided in the fuselage front cockpit. The lateral leveling pads are on the lower longerons near the firewall and the longitudinal pads are on the cross tube near the front stick and on the firewall across tube near the center. The fuselage may be jacked up for leveling at wing roots and tail, taking care to weight lift handles as outlined in Paragraph 2 above.

6. Filling Fuel and Oil Tanks.

a. Fuel: The fuel tank may be filled at the filler neck located in the upper surface of the center section. No reserve of fuel is provided for in the tank. See Paragraph 7 below and T. O. No. 06-5-1 for further information for servicing personnel.

b. Oil: The oil tank is located on the engine mount just forward of the firewall. The filler neck is accessible through an opening in the left engine side cowling. For servicing with oil see T. O. No. 06-10-1.

7. Steps and Walkways.

Walkways are provided at the lower wing roots for use of the crew and ground personnel entering or leaving the airplane. No other portion of the fabric covered surfaces is reinforced or intended to handle such loads. Steps are provided at the top of the oleo struts and at the centerline of the engine immediately behind the cylinders for use of ground personnel in servicing the fuel tank. The top center portion of the engine cowling is reinforced and covered with non-skid material to use as a place to stand while refueling. The center section leading edge and the fuel tank are sufficiently strong to withstand the load of seated personnel but the tank and center section should not be walked on unless some means is provided to spread the load over an area of several square feet. Steps are provided at both sides of the airplane.

8. Mooring.

a. When the airplane is moored outside of the hangar, the instructions in T. O. No. 01-1-50 and the following will be complied with:

b. A combination stick and rudder parking lock is provided which locks these controls from levers, located one in each cockpit ahead and below the trim tab control. These levers are painted red for easy identification and when locked, the words "Controls Locked" are visible on the handles. To operate the lock from either cockpit, the handle should be grasped firmly, moved slightly down to disengage the locking pin, then forward, down and slightly to the rear. This operation releases a safety locking pin, moves a "Y" shaped fork down over the elevator control tube at the bottom of the front stick and places a lever with a spring-loaded pin into position to engage with a slotted fitting attached to the interconnecting tube between the front and rear left rudder pedals. By moving the rudder pedals slightly near the neutral position, the rudder lock will then automatically engage. To release the lock from either cockpit, the red lever may be pushed, either by hand or with the foot, down, forward and released. A spring then returns the system to the unlocked position and latches it in place. The arrangement of this control lock may be found on Figure 50.

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T. O. No. 01-70AB-2

c. The airplane will be staked down in accordance with T. O. No. 01-1-50 mooring lines being fastened through the loops projecting through the lower surface of the lower wings at the interplane strut point and through each of the fuselage lift handles located just ahead of the stabilizer leading edge.

9. Starting of Engines.

See T. O. No. 01-70AB-1

10. Stopping of Engines.

See T. O. No. 02-1-29

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SECTION III

SERVICE, INSPECTION AND MAINTENANCE

(Inspection, Cleaning, Servicing,
Lubricating and Adjusting)

1. General.

a. The work outlined in this Section is a normal function of the Operating Organizations at Air Corps Stations. It consists of the periodic inspection, cleaning, servicing, lubricating, adjusting and such maintenance work as the organization facilities will permit. These instructions will be used in lieu of inspections specified in T. O. No. 00-20A.

b. The lubrication requirements are noted on Figure 4. See T. O. No. 06-10-4.

2. Inspection and Maintenance.

a. Column 16 - Pre-Flight Inspection:

Daily.

Before Starting engine:

As prescribed in T. O. No. 00-20A and the following:
Engine and Electrical Instruments - T. O. No. 05-1-17.
Pitot Static Tube - T. O. No. 05-50-1.
Altimeter - T. O. No. 05-20-10.
Bank & Turn Indicator - T. O. No. 05-20-2.
Rate of Climb Indicator - T. O. No. 05-20-26.
Clock - T. O. No. 05-1-9.
Aircraft Data Case - T. O. No. 00-25-3.

See that all inspection doors and covers are properly fastened.

See that pins holding crash pads in place are properly installed.

If flown solo, see that the belt in the unoccupied seat is fastened up by the clips provided, or is closed across the seat.

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While warming up the engine:

As prescribed in T. O. No. 00-20A and the following:

Carburetor Air Heater - T. O. No. 02-1-5.

Engine Gage Unit - The required oil pressure and oil temperature are given in the following T. O. Nos.:

PT-13B Airplane - T. O. No. 02-15AA-1

PT-17 Airplane - T. O. No. 02-40AA-1

PT-18 Airplane - T. O. No. 02-30AA-1

Tachometer - In case of malfunction see T. O. No. 05-

Before Take-Off: See that brake parking valves are completely released by applying considerable pressure to both brake pedals without touching the parking valve control handle.

See that red flight control parking lock handle is in the up position and latch pin engaged.

b. Column 25 - Engine Controls.

(1) Inspection: As prescribed in T. O. No. 00-20A.

(2) Lubrication: Lubricate in accordance with Figure 4.

c. Column 26 - Engine Instruments.

(1) Inspection: As prescribed in T. O. Nos. 00-20A, 05-1-1 and 05-1-17.

d. Column 27 - Ignition and Electrical.

(1) Inspection:

(a) Daily: No routine daily inspection specified - See T. O. No. 00-20A.

(b) 20-Hour: Magneto - T. O. No.'s 02-15AA-2, 02-40AA-2 and 02-30AA-2.

(c) 40-Hour: Starter - T. O. No. 03-5CA-1.

Magnetos - T. O. Nos. 02-15AA-2, 02-40AA-2, 02-30AA-2, 03-5D-5 and 03-5D-6.

Spark Plugs - T. O. No. 03-5E-1.

Switches - T. O. No. 00-20A.

Wiring - T. O. No. 00-20A.

Inspect magneto switch controls for proper functioning.

Inspect booster magneto control shock absorber cord per T. O. No. 04-5-1.

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T.O. NO. 01-70AB-2

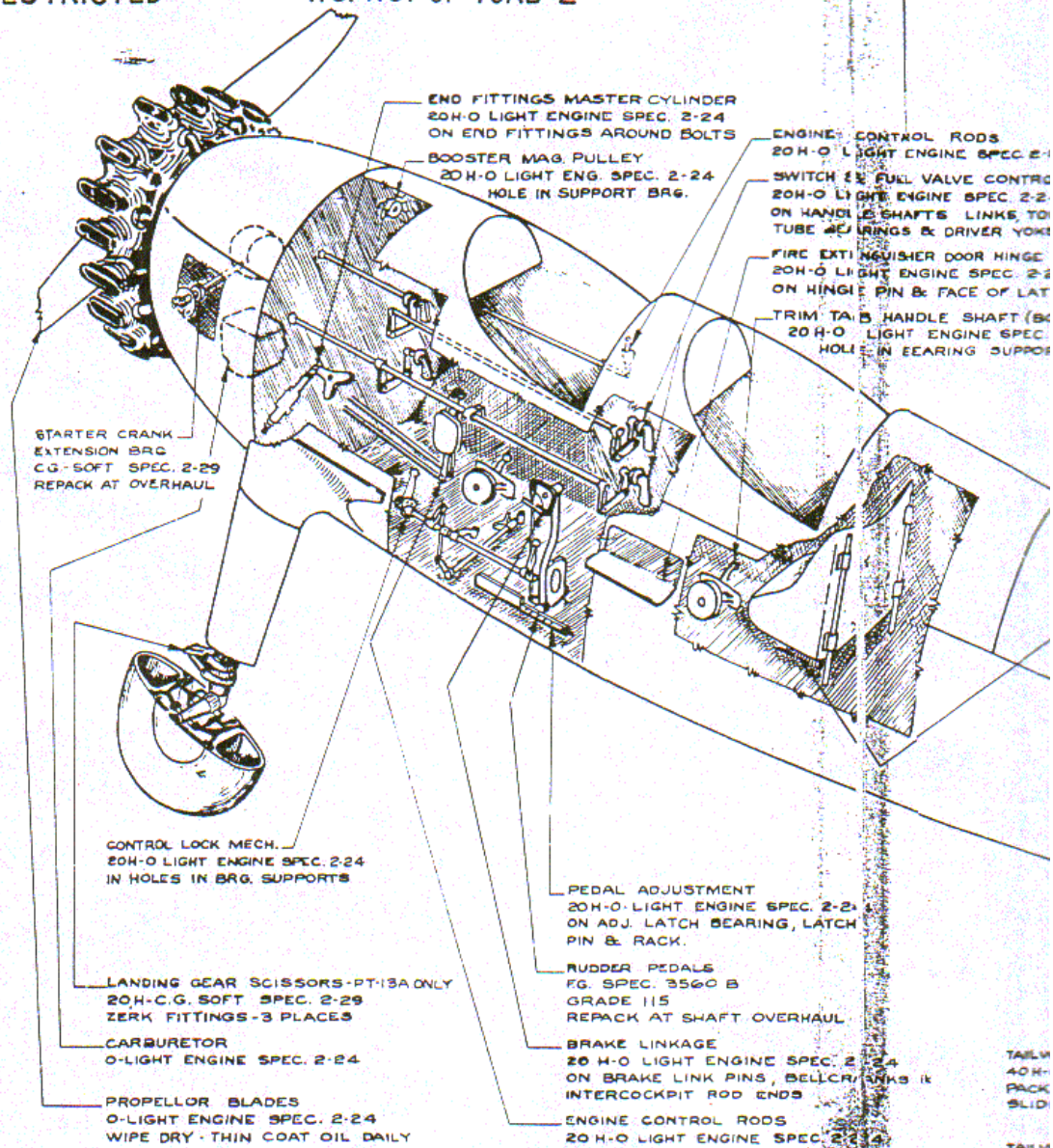


FIG. 4-LUBRICATION CHART

LEGEND

LUBRICANTS

O : OIL
 GG : GRAPHITE GREASE
 FG : FIBRE GREASE
 CG : CUP GREASE
 RG : ROCKER ARM GREASE

PERIOD OF TIME
 20 H : 20 HOURS
 40 H : 40 HOURS

C : 2-24

NTROLS

2-24

5 TORQUE

YOKE

NGE & LATCH

2-24

LATCH

F (BOTH COCKPITS)

PEC : 2-24

PORTS

TAILWHEEL BEARINGS
 40 H : RG : SPEC Y-3558-A
 ON BEARINGS ONLY

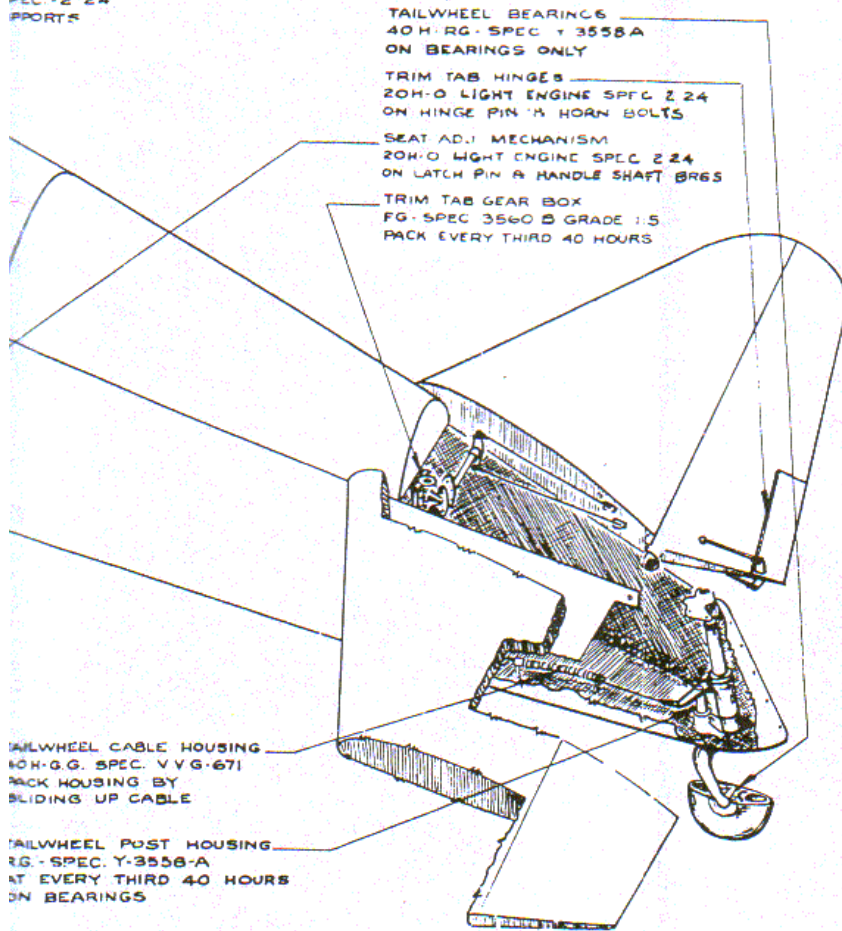
TRIM TAB HINGES
 20H-O LIGHT ENGINE SPEC 2-24
 ON HINGE PIN & HORN BOLTS

SEAT ADJ. MECHANISM
 20H-O LIGHT ENGINE SPEC 2-24
 ON LATCH PIN & HANDLE SHAFT BRGS

TRIM TAB GEAR BOX
 FG : SPEC 3560 D GRADE 1:5
 PACK EVERY THIRD 40 HOURS

TAILWHEEL CABLE HOUSING
 10H-G.G. SPEC. VVG-671
 PACK HOUSING BY
 SLIDING UP CABLE

TAILWHEEL POST HOUSING
 RG : SPEC Y-3558-A
 AT EVERY THIRD 40 HOURS
 ON BEARINGS



(2) Lubrication.

(a) 20-Hour: Lubricate magneto drive drum (pulley) in accordance with Figure 4.

(b) 40-Hour: Lubricate switch controls in accordance with Figure 4.

e. Column 28 - Fuel System.

(1) Inspection: As prescribed in T.O. No. 00-20A.

(2) Lubrication:

(a) 20-Hour: Lubricate fuel valve control linkage in accordance with Figure 4.

f. Column 29 - Oil System.

(1) Daily:

As prescribed in T.O. No. 00-20A.

(2) 20-Hour:

As prescribed in T.O. No. 00-20A.

(3) 40-Hour:

As prescribed in T.O. 00-20A.
Periodic Oil Changes - T.O. No. 06-10-1.

(4) Special:

Cold weather operation of oil pressure gage -
T.O. No. 05-40-10.

g. Column 30 - Cooling System.

As prescribed in T.O. No. 00-20A for air-cooled engines.

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h. Column 31 - Valves, Manifolds and Supercharger.

(1) Automatic valve gear lubrication is provided in the engines installed in these airplanes. For complete inspection, maintenance and lubrication instructions see the following T. O. Nos.: 02-15AA-2, 02-40AA-2 and 02-30AA-2.

(2) Whenever push rods are removed - See T. O. No. 00-20A.

i. Column 32 - Propellers and Accessories.

(1) Daily:

As prescribed in T. O. No. 00-20A.

(2) 20-Hour:

As prescribed in T. O. No. 00-20A.

j. Column 33 - Power Plant General. As prescribed in T. O. No. 00-20A. For complete inspection and maintenance instructions see the following T. O. Nos.: 02-15AA-2, 02-40AA-2 and 02-30AA-2.

k. Column 34 - Cockpits and Cabins.

(1) Inspection.

(a) Daily:

As prescribed in T. O. No. 00-20A.

(b) 20-Hour:

As prescribed in T. O. No. 00-20A.

(c) 40-Hour:

Inspect seat shock absorber cord per T. O.

No. 04-5-1.

Replace speaking tube rubber hose when cracked or split.

(2) Lubrication.

(a) 20-Hour:

Lubricate seat adjustment mechanism in accordance with Figure 4.

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T. O. No. 01-70AB-2

1. Column 35 - Navigation Instruments. - Inspect as prescribed in T. O.'s 00-20A, 05-1-1, 05-10-2, 05-50-1, 05-20-2, 05-20-10 and 05-20-26.

40-Hour:

Drain airspeed lines.

Inspect instrument board Lord type shock absorber units for deterioration.

II. Column 36 - Flight Control Mechanism.

(1) Daily:

As prescribed in T. O. No.'s 00-20A and 01-1-26.

Inspect flight control lock mechanism for proper operation.

(2) 20-Hour:

(a) Inspection:

As prescribed in T. O. No.'s 00-20A and 01-1-26.

(b) Adjustment:

(1) Rigging Tensions: The rigging tensions of control cables in this airplane are given on Figure 46.

(2) Elevator Trim Tab Cables: Trim tab cables will never be allowed to become loose. The rear trim tab cables will always be so adjusted that with the horn on the trim tab worm gear box in neutral, both tabs will line up with the elevator trailing edge. With the tabs in this position, both control handles in the cockpit should be straight up or at 0°.

(c) Lubrication: Lubricate trim tab control handle shaft and rudder pedal adjustment in accordance with Figure 4.

Lubricate flight control lock mechanism in accordance with Figure 4.

(3) 40-Hour:

(a) Inspection: Inspect elevator trim tab gear box and if backlash or looseness exists, adjust top and bottom eccentric bearings to reduce play. This box is shown on Figure 47

Disconnect tail wheel cables at idlers under baggage compartment and pull cables out of housing to the rear, far enough to inspect portion normally covered by housing in accordance with T. O. No. 01-1-26.

(b) Lubrication: All cables, except cable which drives elevator trim tab mechanism, will be cleaned where they pass over pulleys, or through fairleads, and covered with compound, heavy rust preventive, Specification 2-82.

Lubricate tail wheel cable housing, and trim tab worm gear box in accordance with Figure 4.

Lubricate rudder pedals, at shaft overhaul, in accordance with Figure 4.

n. Column 37 - Flight Control Surfaces.

(1) Inspection:

As prescribed in T. O. No. 00-20A.

(2) Adjustment (Ground Adjustable Trim Tabs):

The airplane is rigged symmetrically at the factory and the aileron and rudder trim tabs bent at the correct angle to give the proper trim at normal operating speed. When the airplane no longer trims properly and the rigging has been checked in accordance with chart in front cockpit (see Figure 10 of this Handbook), the tabs will be removed, bent to such angles as will result in proper trim, and replaced.

(3) Lubrication:

Lubricate elevator trim tab hinges in accordance with Figure 4.

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T. O. No. 01-70AB-2

o. Column 38 - Wings. - As prescribed in the Airplane Maintenance Instructions forms compiled in accordance with the provisions of T. O. No. 00-20A-2; also as prescribed in accordance with the provisions of T. O. No. 01-1-12. At any sign of wearing through or tearing, the walkways will be replaced with rubberized canvas, Specification 6-42, thoroughly cemented down with rubber cement, Specification 20-29.

p. Column 39 - Wing Struts and Bracing. - As prescribed in the Airplane Maintenance Instructions forms compiled in accordance with the provisions of T. O. No. 00-20A-2. For rigging and tensions, see Figure 10.

q. Column 40 - Fuel Tanks. - As prescribed in the Airplane Maintenance Instructions forms compiled in accordance with provisions of T. O. No. 00-20A-2.

r. Column 41 - Empennage. - As prescribed in the Airplane Maintenance Instructions forms compiled in accordance with the provisions of T. O. No. 00-20A-2. For rigging and tensions, see Figure 10.

s. Column 42 - Tail Gear. - (1) Daily: As prescribed in the Airplane Maintenance Instructions forms compiled in accordance with the provisions of T. O. No. 00-20A-2; also as prescribed in accordance with the provisions of T. O. Nos. 04-10-2 and 03-25E. The pressure in the tail wheel tire will be maintained in accordance with T. O. No. 04-10-1. Proper inflation of the air-oil strut is indicated by the red line which should be approximately 2-1/2 inches from the strut end, with airplane loaded to normal gross weight less crew. This dimension may vary, without bad operation, as much as one-half inch.

(2) 25-Hour: (a) Inspection: As prescribed in the Airplane Maintenance Instructions forms compiled in accordance with the provisions of T. O. No. 00-20A-2. For instructions covering operation and maintenance of Bendix High Pressure Hand Pump, see T. O. No. 17-1-3. When checking fluid level, the following procedure will be observed:

1. Remove hex cap.
2. Depress valve stem until strut is deflated.
3. Remove filler plug and obtain new copper gasket. Discard old gasket.

4. Refer to Technical Order 06-1-2 and Air Corps Dwg. #41-J-985, Hydraulic Fluid Selection Chart as authority for use of hydraulic fluids for all aircraft hydraulic equipment.

Revised 3-5-42

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T. O. No. 01-70AB-2

NOTE: 1. Fluid used in these struts has been changed from Spec. 3586 fluid to Spec. 3580 fluid. Filling instruction plates (see Note No. 3 below) must be changed accordingly, and struts must be thoroughly flushed to remove all traces of Spec. 3586 fluid before new fluid is used.

NOTE: 2. All airplane shock absorber struts shall carry a fluid designation tag, constructed and attached in accordance with dwg. No. 41B986-1 for Spec. 3580 fluid or 41B986-2 for Spec. 3586 fluid, except as noted (See Note 3).

NOTE: 3. Any unit containing fluid filling instructions clearly defining the use of 3580 or 3586 fluid, need not carry tags as specified in note 2 above.

5. Re-inflate strut to dimension noted under daily inspection above, after installing plug with new copper gasket.

6. Test air valve for leakage and replace cap. Check splines for wear and galling per Figure 21, also clearance should be approximately .005 inch.

(b. Tail Wheel Post Adjustment: End clearance may be adjusted by means of nut on top of tail post. This clearance should be approximately .005 inch.

(3) 50-Hour: (a) Inspection: As prescribed in the Airplane Maintenance Instructions forms compiled in accordance with the provisions of T. O. No. 00-20A-2. Inspect tail wheel assembly attachment bearings for slack and wear.

(b) Lubrication: Lubricate tail wheel bearings and tail wheel post housing in accordance with Figure 4.

t. Column 43 - Landing Gear. - (1) Daily: As prescribed in the Airplane Maintenance Instructions forms compiled in accordance with the provisions of T. O. No. 00-20A-2; also as prescribed in accordance with the provisions of T. O. No. 03-25E.

(2) 25 Hour: (a) Inspection: As prescribed in the Airplane Maintenance Instructions forms compiled in accordance with the provisions of T. O. No. 00-20A-2. For instructions covering operation and maintenance of Bendix High Pressure Hand Pump, see T. O. No. 17-1-3. Inflate air-oil struts, part No. 75-2615, until red line on piston tube is one inch maximum with light load, or one-half inch with full load from end of packing gland nut. If there is an indication of fluid leakage at packing gland nut, release air pressure until strut is fully compressed, tighten packing gland nut, remove filler plug, fill in accordance with Technical Order 06-1-2 and Air Corps Dwg. #41-J-985, Hydraulic Fluid Selection Chart as authority for use of hydraulic fluids for all aircraft hydraulic equipment.

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T. O. No. 01-70AB-2

NOTE: 1. Fluid used in these struts has been changed from Spec. 3586 fluid to Spec. 3580 fluid. Filling instruction plates (see note No. 3 below) must be changed accordingly, and struts must be thoroughly flushed to remove all traces of Spec. 3586 fluid before new fluid is used.

NOTE: 2. All airplane shock absorber struts shall carry a fluid designation tag, constructed and attached in accordance with dwg. No. 41B986-1 for Spec. 3580 fluid or 41B986-2 for Spec. 3586 fluid, except as noted (see note 3).

NOTE: 3. Any unit containing fluid filling instructions clearly defining the use of 3580 or 3586 fluid, need not carry tags as specified in note 2 above.

(b) Lubrication: Lubricate landing gear in accordance with Figure 4.

(3) 50-Hour: As prescribed in the Airplane Maintenance Instructions forms compiled in accordance with the provisions of T. O. No. 00-20A-2.

(4) General Maintenance and Inspection of Air-Oil Struts:

CAUTION: The PT-13B, PT-17, and PT-18 airplanes, being equipped with torque knee type oleos, require little if any maintenance. The maintenance of oleos consists of servicing common to all air-oil struts. All bushings in the knees are hard chromium plated and are lubricated through standard pressure fittings. All nuts and bolts in the torque knees should be taken up tight and kept tight.

a. Column 44 - Wheels and Brakes.(1) Daily:

As prescribed in T. O. 00-20A, 04-10-2 & 03-25C-2.

Air pressure in landing gear tires will be maintained in accordance with T. O. No. 04-10-1.

(2) 20-Hour:(a) Inspection:

As prescribed in T. O. No. 00-20A.

Fluid reservoir in master cylinder unit will be filled with Specification 3586 fluid per T. O. No. 06-1-2. This is accomplished by removing the reservoir cap at the top, or left hand end, of reservoir. It will be noted that this cap has a metal gage attached to it, which gage registers the fluid height in the reservoir. Within the cap is a gravity operated ball check to prevent leakage of the fluid through the vent hole during inverted flight. See that the ball is free and that the vent is not clogged.

(b) Adjustment:

1. Brake Shoes: Remove weight of airplane from landing gear. With wheel clear of ground, proceed as instructed in T. O. No. 03-25C-2.

2. Brake Parking Valve Cable: The master cylinder brake parking valve cable passes over a system of pulleys located near the top longeron forward of the front cockpit and accessible through the hinged fuselage side cowling doors. It is important that both parking valves operate simultaneously. When both valves do not operate together the relative lengths of cable may be changed by sliding the pulley brackets back or forward on the longerons as shown on Figure 5.

3. Master Cylinder Unit: No adjustments are required for the life of this unit, however, in event of master cylinder unit replacement, as a whole, the extended length of the unit should be so adjusted that 1/16 clearance is obtained between the actuating bellcrank and the stop located on the fuselage truss. This will insure that the port connecting the pressure producing chamber to the reservoir is always uncovered when the brakes are in the "Off" position, thus allowing them to fully release and preventing "pumping up" of the system.

(c) Servicing Master Cylinder Unit for Brake and Parking Valve Troubles -(See Figure 25): If it is difficult to build up pressure on applying the brakes and no leaks are found in the brake lines or brake cylinders, examine the inside of boot (16) to see if it contains fluid. If so, it is because fluid leaked past cup (4). Remove fitting (23) to see if there is fluid in cylinder (10). If there is, it is probably there because piston cup (11) leaks. If no fluid can be found here, it is possible valve (3) leaks, thus allowing fluid to pass back into the reservoir from the pressure chamber while the brakes are being applied. In this case plug (18) should be removed and valve disassembled and the ball and seat thoroughly cleaned and examined carefully. A light tap on the ball might help to reseal it on the seat.

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HEADQUARTERS, ARMY AIR FORCES
WASHINGTON 25, D. C.

TECHNICAL ORDER
NO. 01-70A-36

AIRCRAFT AND MAINTENANCE PARTS

8 January 1945

BOEING (WICHITA) - WING INSPECTION - PT-13 SERIES,
PT-17 SERIES, AND PT-27

This Technical Order replaces T. O. No. 01-70A-36, dated 21 December 1944, revised to clarify status of aircraft.

NOTE The publication of this Technical Order has been expedited as the instructions contained herein are of vital importance and should be disseminated to all affected personnel without delay. As prescribed in T. O. No. 00-20A, appropriate reference to this Technical Order will be entered on AAF Forms 60-A for the aircraft affected. The inspection directed herein, if not previously performed, will be accomplished immediately by service activities with the aid of base maintenance facilities, if necessary. Wing assemblies in stock having the following part numbers will be inspected and reworked, if necessary, in accordance with T. O. No. 01-70A-37 prior to issue.

75-1100	D75N1-1100	E75N1-1100
75-1100-1	D75N1-1100-1	E75N1-1100-1
75-1200	D75N1-1200	E75N1-1200
75-1200-1	D75N1-1200-1	E75N1-1200-1

1. To reduce the possibility of failure of wing rib stitching and subsequent failure of wing ribs during flight, inspection will be made to determine the size of cord used in rib stitching of wings, upper and lower, left and right, on all PT-13 series, PT-17 series, and PT-27 airplanes. In the event the cord size does not conform to Specification Nos. 6-27 (20/3/3/3 - waxed), 6-203 (16 ends - 3 ply - waxed), AN-C-122 (15 ends - single ply - waxed) or as specified in paragraph 2. on any wing, the subject airplanes will be restricted from all acrobatics and to 140 mph indicated air speed until the wings are restitched in accordance with T. O. No. 01-70A-37, with the exception of PT-27 airplanes which will not have wings reworked if cord is found defective but, if flown, will comply with restrictions set out herein.

NOTE Until such time as wings are restitched, a placard stating restrictions set out herein will be installed on the instrument panels on all restricted aircraft.

2. Wing assembly ribs stitched with natural finish (unwaxed cord) in accordance with Boeing Aircraft drawings (numbers listed in NOTE preceding paragraph 1.) will not be restricted in accordance with paragraph 1. unless cord wear and fraying at junction of fabric and rib are evident.

By Command of General ARNOLD:

Prepared by
Aircraft Section,
Maintenance Div.,
Hq. ATSC.

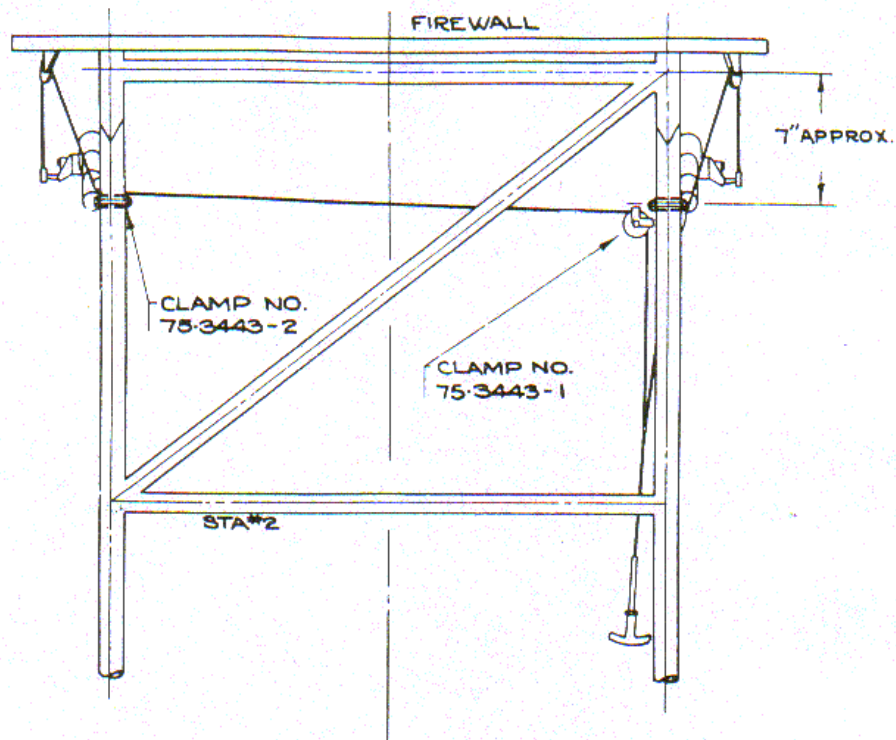
B. E. MEYERS
Major General, U.S.A.
Deputy Director
Air Technical Service Command

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Compliance with these instructions is MANDATORY within the continental United States. Within theaters of operation, compliance will be at the discretion of Task Force Commanders concerned.



METHOD OF ADJUSTING CABLES

- A-TO ADJUST BOTH CABLES EQUALLY — MOVE CLAMP NO. 75-3443-1 FORWARD (OR AFT) AS REQUIRED TO ARRIVE AT DESIRED ADJUSTMENT.
- B-TO ADJUST LEFT HAND BRAKE CABLE — MOVE CLAMP NO. 75-3443-2 FORWARD (OR AFT) AS REQUIRED TO ARRIVE AT DESIRED ADJUSTMENT
- C-TO TIGHTEN RIGHT HAND BRAKE CABLE — (1) LOOSEN LEFT CABLE BY MOVING CLAMP NO. 75-3443-2 FWD. (2) MOVE CLAMP NO. 75-3443-1 FORWARD UNTIL PROPER ADJUSTMENT IS ATTAINED. (3) MOVE 75-3443-2 AFT UNTIL LEFT CABLE IS ADJUSTED PROPERLY.
- D-TO LOOSEN RIGHT HAND BRAKE CABLE — (1) MOVE CLAMP NO. 75-3443-1 AFT UNTIL PROPER ADJUSTMENT IS ATTAINED (2) MOVE CLAMP NO. 75-3443-2 AFT UNTIL LEFT CABLE IS ADJUSTED PROPERLY.

FIG.5-BRAKE PARKING VALVE CABLE ADJUSTMENT

If parking pressure cannot be held and the aforementioned leaks are not visible, it will be necessary to disassemble parking valve (8) and reseal it by means of lapping it into place with the finest lapping compound which is available.

Port (5) is a very small hole, therefore, remove the screw (27) and clean out the port. Also remove screw (28) and clean the channel (6). Cleanliness cannot be too strongly stressed because a small amount of dirt can seriously interfere with satisfactory operation of cups and valves.

When re-assembling do not use any copper sealing washers over again. New washers should be employed. On this assembly, copper washers are used to seal the following joints: Plugs (22), (30) and (18), and Screws (27) and (28).

If it is found that the brakes will not un-park by depressing the brake pedal, it is probably because the valve operating plunger (14) sticks, or because there is sufficient friction in the parking control mechanism attached to lever (13) to prevent the operating plunger (14) from being forced out by the fluid pressure. If this is the case it will be necessary to free up the parking mechanism.

(d) Lubrication: Lubricate brake controls, and end fittings of master cylinder units, in accordance with Figure 4.

(3) 40-Hour:

As prescribed in T. O. No. 00-20A.

v. Column 45 - Fuselage, Hull and Floats.

As prescribed in T. O. 00-20A (Including frame, fairing, covering and cowling.)

w. Column 47 - Airplane - General.

(1) Inspection: As prescribed in T. O. No. 00-20A.

(2) Lubrication: Lubricate fire extinguisher door hinge and latch in accordance with Figure 4.

x. Column 49 - Engine Change:

As prescribed in T. O. No. 00-20A, 01-1-58, 03-5CA-1, 05-1-16 and 05-15-2.

RESTRICTED

T. O. No. 01-70AB-2

3. Additional Inspection and Maintenance Instructions Issued by the Air Corps.

a. Installation of Static Ground Chain:

T. O. No. 01-1-5

b. Replacement of Gasket, Fuel Line Strainer Cover - C2A

T. O. 03-10-9

c. Replacement of Gasket - Tank Filler Cap and Adapter Assembly.

T. O. 03-10-16

SECTION IVINSTALLATION, MAINTENANCE, REPAIR & REPLACEMENT AND MINOR REPAIR1. General Data.

The work outlined in this section can be performed with the facilities usually available at Air Corps Stations, but is not normally a function of the operating organization.

2. Wings.

a. General: The wings and center section are constructed of solid or laminated spruce spars of rectangular cross section, built-up truss ribs of square spruce sections assembled by glued and nailed plywood gussets, and drawn section aluminum alloy compression struts, assembled by riveting. Single bracing of AN standard Type I (cadmium plated steel) square section rod is used. All strut attachment fittings and the four (4) aileron hinge brackets are aluminum alloy forgings and all other fittings are aluminum alloy plate except the chrome molybdenum lugs to which the interplane wires are attached. The wings and ailerons are fabric covered. All wing attachment fittings are pin joints using standard one-half ($\frac{1}{2}$ ") AN bolts. Leading edge covers and trailing edges are of aluminum alloy. Ailerons are located on the lower wings only. The hinges are provided with standard AN-200 bearings. A small trim tab of the ground adjustable type is bolted to the trailing edge of the left aileron. Interplane struts are constructed of drawn streamline aluminum alloy tubing and aluminum alloy reinforcement plates assembled by riveting. The outer struts are in "N" form. The center section strut system consists of front and rear struts braced by AN standard streamline wires. All interplane wires are AN standard streamline Type II stainless steel.

b. Inspection Doors and Cover Plates: Are placed at intervals throughout the wing sections for inspection and maintenance.

c. Replacement of Fibre Insert Self-Locking Nut Plates in Wood Members: At points in the center section and outer wings, fibre insert nut plates are installed for the attachment of fuel tank gap covers and inspection doors. Should one of these nuts be damaged or a machine screw break off in it, the portion of the nut carrying the nut and extending approximately one inch each side, should be sawed out and a new section (made locally) installed by gluing and nailing. These nut strips consist of $\frac{3}{8}$ plywood strips with the nuts imbedded in them at regular intervals. A $\frac{1}{16}$ plywood strip is then glued and nailed over the nuts and is drilled on correct centers to permit passage of the machine screws. This method permits of a much more reliable attachment of the nut plates than the use of wood screws.

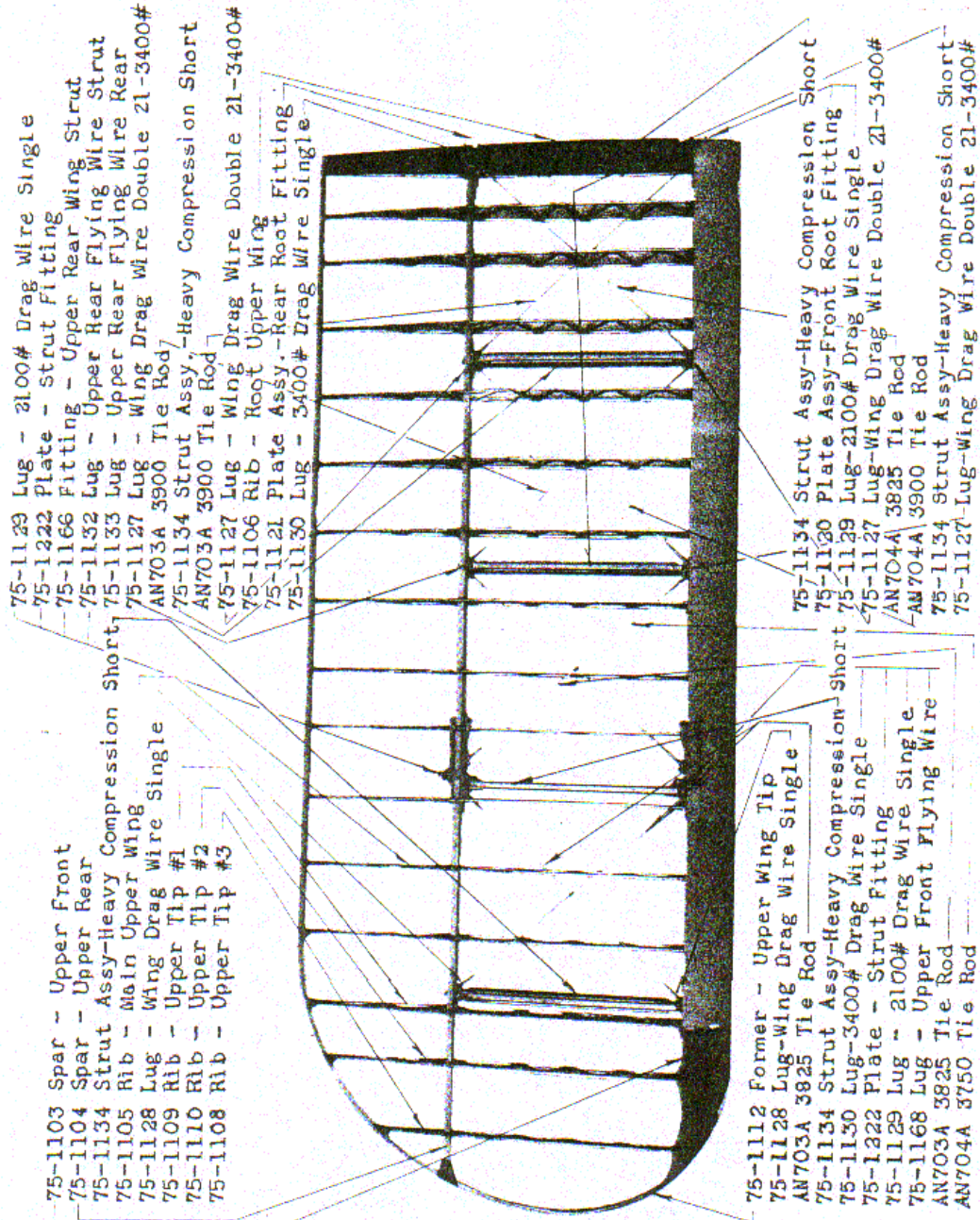


FIG. 6 - UPPER WING FRAME ASSEMBLY

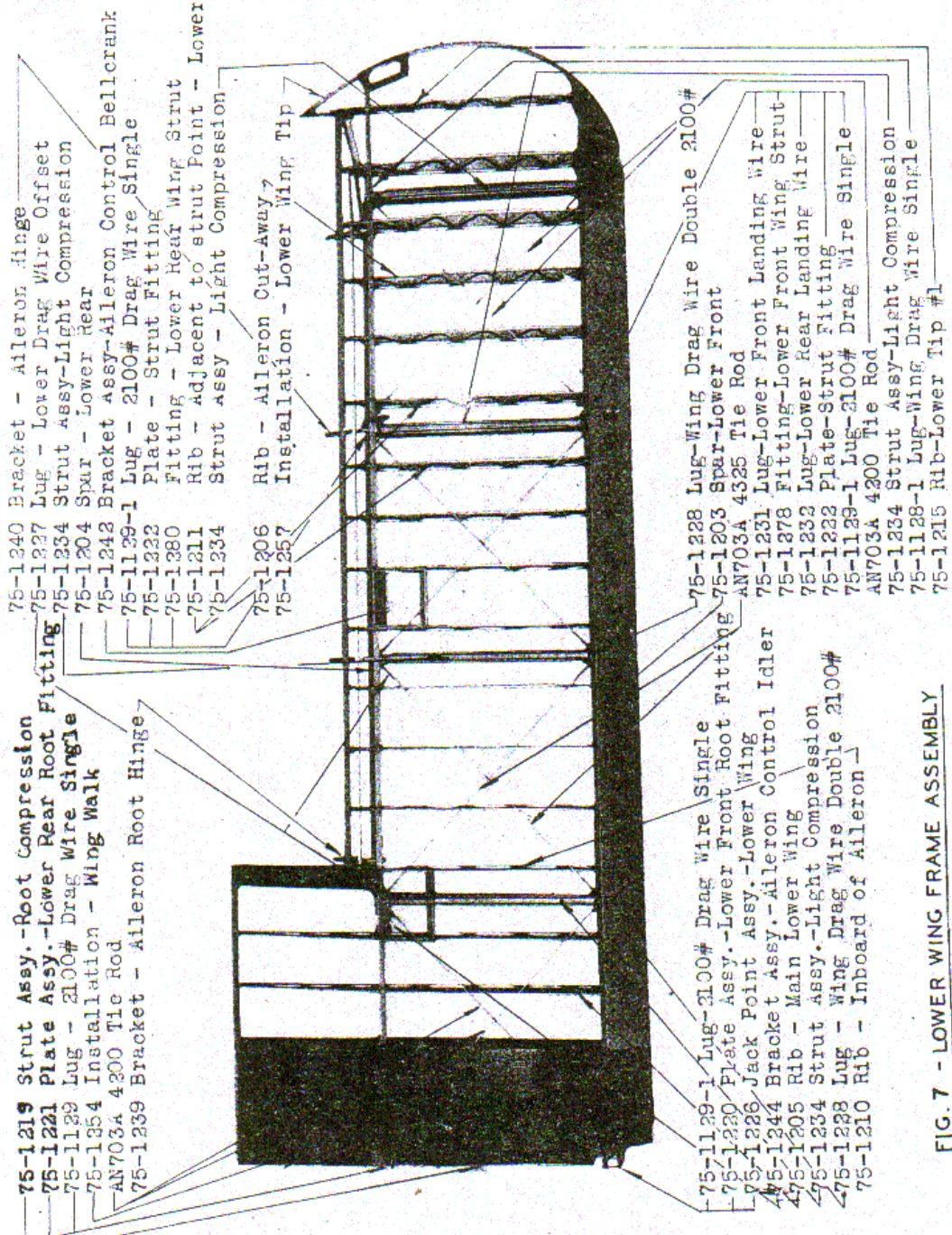


FIG. 7 - LOWER WING FRAME ASSEMBLY

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T.O. NO. 01-70AB-2

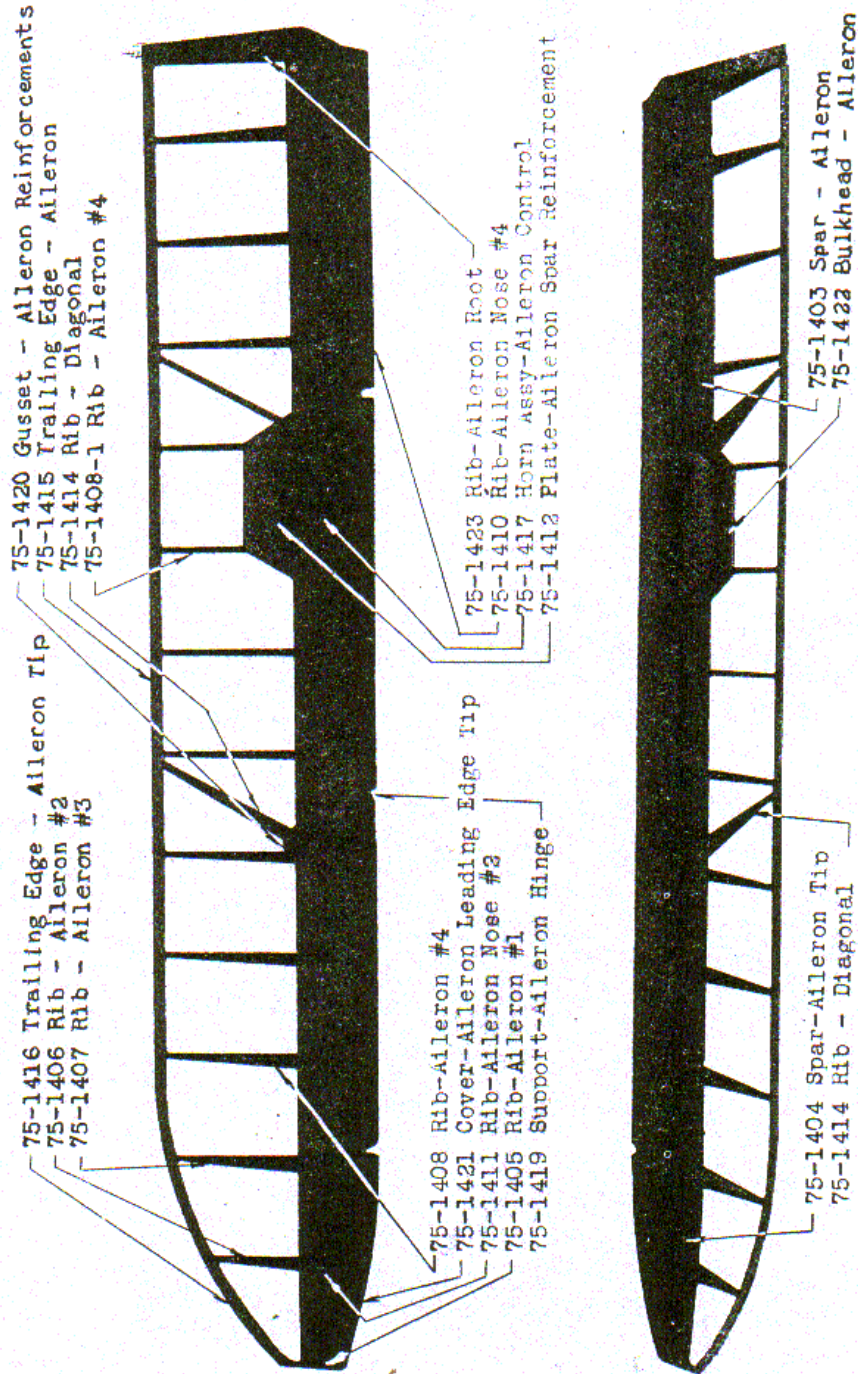


FIG. 8 - AILERON FRAME ASSEMBLY

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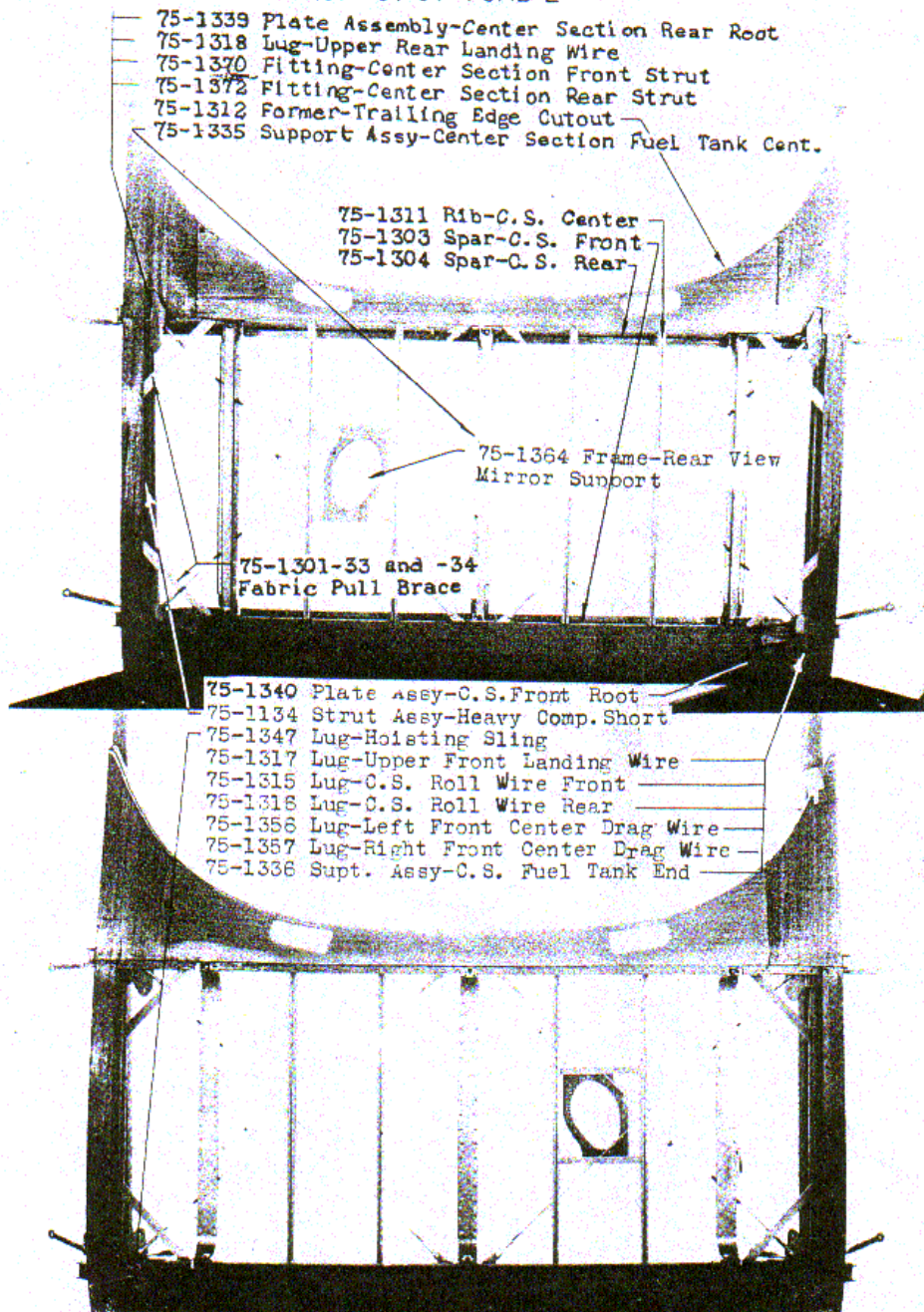


FIG. 9 - CENTER SECTION FRAME ASSEMBLY

d. Installation - To Install Complete Wing Group:

CAUTION: The inner aileron push-pull tube should be installed in the lower wing panel before assembly to the fuselage and slipped through the opening in the fuselage fabric as the wing is brought into position. The interplane strut bolts pass through struts and wing fittings parallel to the spars, therefore, it is important that the wings be supported close to their normal position until all landing wires have been installed, and partially rigged, in order to relieve the fittings of unnecessary strain due to misalignment. In checking rigging tensions the loads given on Figure 10 are the limiting values.

Two methods of wing installation are possible, depending on the equipment available:

(1) When cradle hoists are available for support of the entire upper wing and center section group, the following procedure should be followed:

(a) Place upper outer panels and center section in line on the cradle hoist and install hinge bolts.

(b) Hoist complete upper wing group assembly and bolt all interplane struts and attach wires.

(c) Lower assembly over complete fuselage until center section strut bolts at fuselage can be inserted. Attach all center section wires and rig loosely.

(d) Install lower wings, connect hinge bolts and wires.

(e) Rig all wires loosely and remove hoist.

(f) Rig per Figure 10. Connect all fuel lines.

(g) Connect airspeed lines at the root of lower left wing panel.

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T. O. No. 01-70AB-2

(2) When cradle hoist is not available, proceed as follows:

(a) Install center section, struts and wires, and partially rig wires.

(b) Install lower wings and landing wires. Partially rig wires.

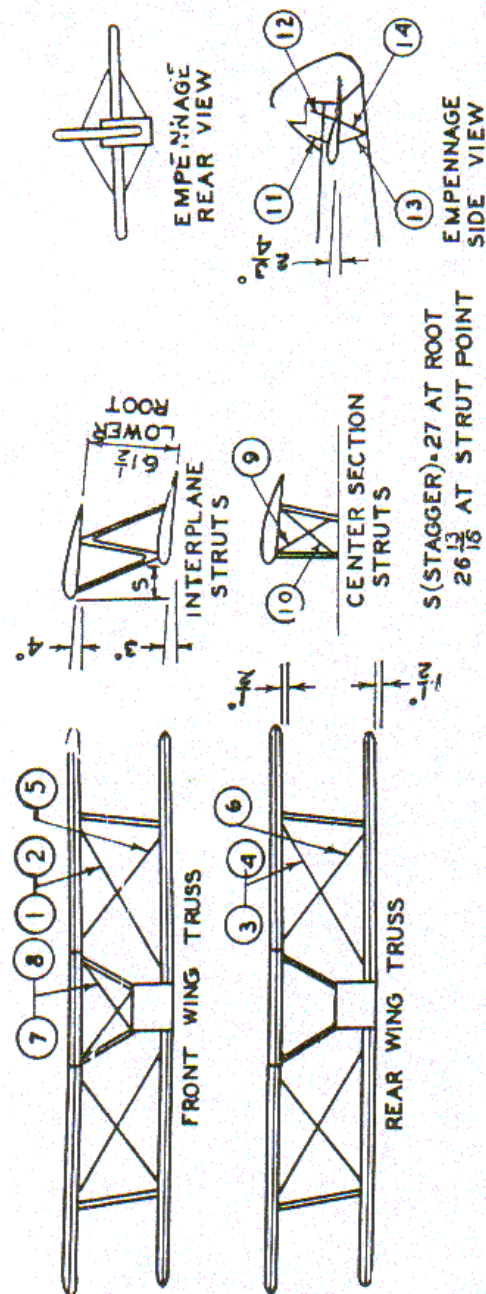
(c) Install outer bay struts.

(d) Install upper wing and flying wires.

(e) Rig per Figure 10. Connect all fuel lines.

(f) Connect airspeed lines at the root of the lower left wing panel.

NOTE: Should it be necessary to transfer ailerons from one airplane to another, care should be taken to note whether or not the aileron hinge bracket forgings are properly lined up. If lower surfaces of brackets are not in line, washer shims may be used between the eye-bolt fittings and the aileron spar to allow the aileron to move freely. This applies only, however, to airplanes which have been in service for long periods of time.



NO	SIZE	TENSIO METER READING		
		MINIMUM	NOMINAL	MAXIMUM
① ②	5 1/2 - 24 - 6100	750	850	950
③ ④	5 1/2 - 24 - 8000	1000	1200	1400
⑤	5 1/2 - 24 - 6100	1000	1300	1600
⑥	5 1/2 - 24 - 6100	1500	1800	2100
⑦ ⑧	5 1/2 - 24 - 6100	1100	1250	1400
⑨	5 1/2 - 24 - 8000	NO REQ. LOAD	NO REQ. LOAD	NO REQ. LOAD
⑩	5 1/2 - 24 - 6100	1200	1550	1900
⑪	10 - 32 - 2100	200	300	400
⑫	10 - 32 - 2100	200	300	400
⑬	1 1/4 - 28 - 3400	215	315	415
⑭	1 1/4 - 28 - 3400	235	335	435

FIG. 10- WING AND EMPENNAGE RIGGING DIAGRAM

3. Empennage.a. General:

(1) Horizontal Stabilizer: This surface is made in one piece and secured to the fuselage by means of four (4) 3/8-inch AN bolts passing through chrome molybdenum steel forgings welded to the spars. It is adjustable on the ground for a limited range. This adjustment is obtained through use of spacer washers under the mounting fittings.

(2) Elevators: The left and right hand elevators are joined at the centerline by machined steel fittings supporting between them the single forged aluminum alloy elevator mast. Five (5) hinges with standard AN-200 bearings are provided. Trim tabs, operable in flight from both cockpits, are located in both elevators.

(3) Vertical Stabilizer: This surface is attached to the fuselage by suitable end fittings at front and rear spars and the entire empennage assembly is braced by two (2) separate systems of Type II stainless steel streamlined wires in the plane of front and rear spars. A sheet metal fairing, which is attached by means of standard Air Corps cowling fasteners, is furnished to close the gap between the vertical and horizontal stabilizers. It is not adjustable.

(4) Rudder: A trim tab of the ground adjustable type is fitted into the trailing edge of the rudder. It is held in place by No. 10 machine screws. Three (3) rudder hinges with standard AN-200 bearings are provided.

b. Installation - To Install Empennage Assembly:

(1) Install elevator trim tabs on elevator tab spars by use of AN-502-10-6 cap screws, lock-wiring the heads together, and install tab cables.

(2) Assemble elevators to horizontal stabilizer, taking particular care to see that the female parts of the hinges do not rub on the sides of the bearing support hinge. Shims should be used if these parts rub. At the time of assembly the tab cables should be passed through the pulley support and pulleys installed in both elevators and stabilizer.

(3) Assemble rudder to vertical stabilizer using same care in regard to hinges as mentioned in (2) preceding.

(4) Bolt horizontal stabilizer-elevator assembly to fuselage inserting two AN-960-6 washers between stabilizer and fuselage at each fitting.

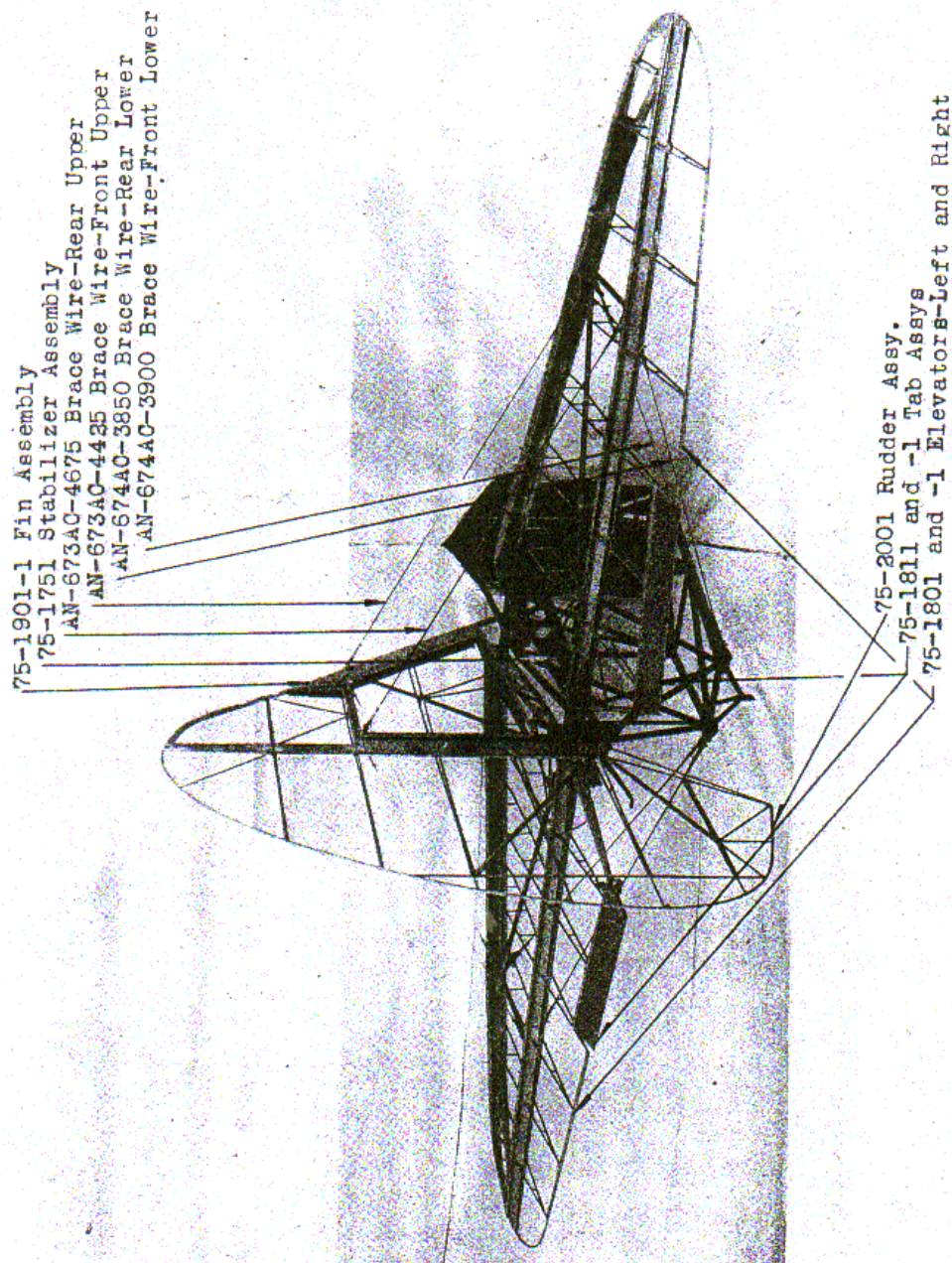
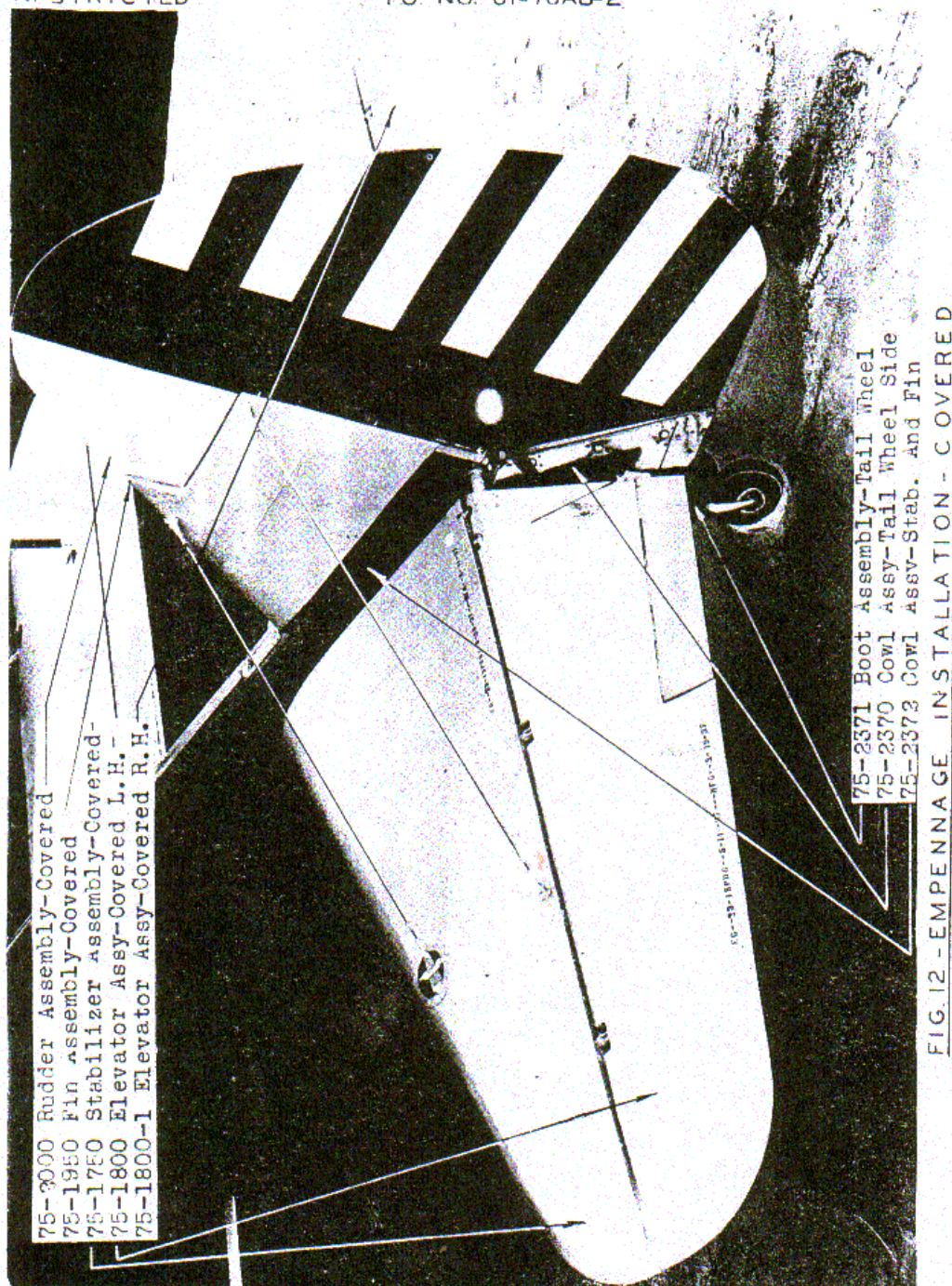


FIG. II - EMPENNAGE INSTALLATION - UNCOVERED

RESTRICTED

T.O. NO. 01-70AB-2



NOTE: The airplanes have been checked for horizontal trim, full load, at operating speed. Under these conditions the trim tab is in neutral with two washers under the stabilizer fittings. After service overhaul or at any time when the airplanes are found to trim improperly, the stabilizer may be reset by the addition or removal of washers. The permissible number of washers under fittings at front or rear spar is eight. Removal of one pair of washers at either spar results in a change of $1/8^\circ$ in the stabilizer incidence. The total variation is from plus $1-1/4^\circ$ to plus $3-3/4^\circ$.

(5) Install vertical stabilizer and drill through stabilizer rear spar and fuselage fitting with an "F" drill.

(6) Install wires and rig with airplane leveled.

(7) All controls should be attached and rigged in accordance with Figure 46.

4. Fuselage and Engine Mount.

a. General:

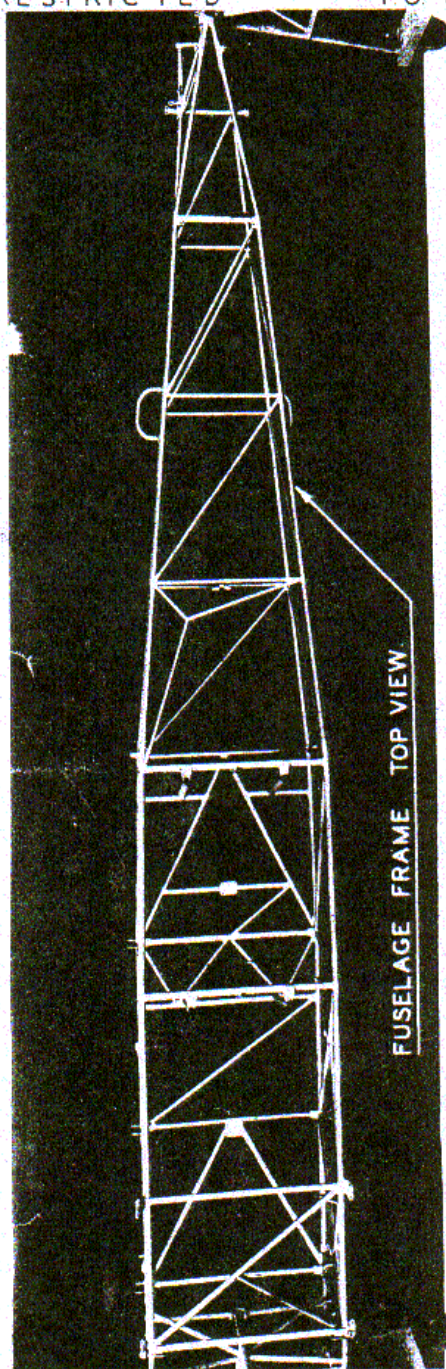
(1) Fuselage: The fuselage structure is of chrome molybdenum steel tubing assembled by flame welding. All fittings for the attachment of landing gear, wings, center section struts, rudder pedal hangers, and flying wires, are chrome molybdenum forgings, or machined from chrome molybdenum bar stock.

(2) Engine Mount: The engine mount is similar in construction to the fuselage and is attached thereto by means of four (4) 7/16-inch nickel steel replaceable studs. The mount is provided with rubber insulated engine mounting lugs.

b. Repairs:

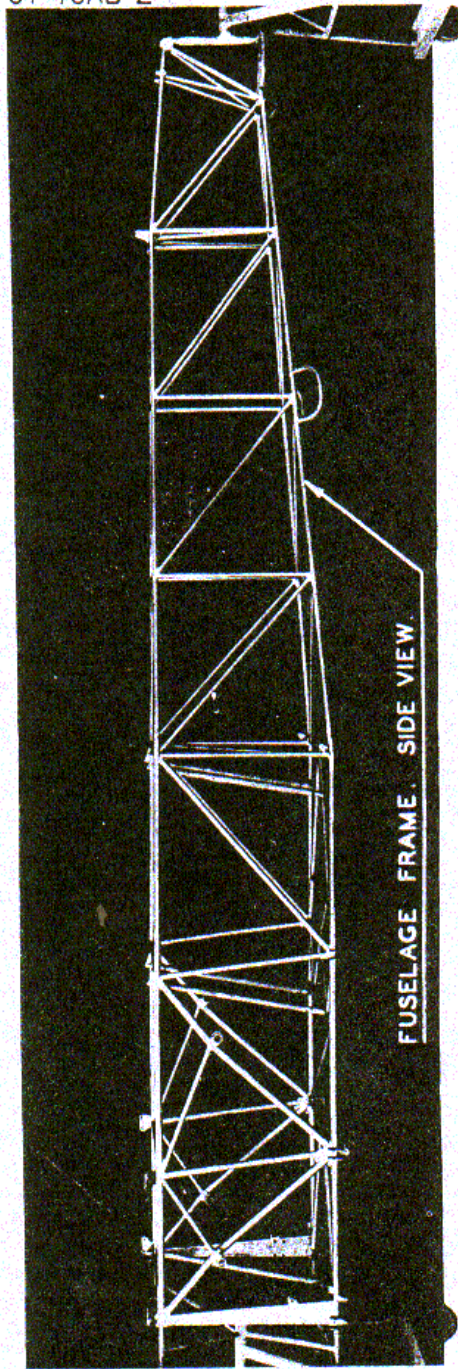
(1) Fuselage: Repairs to the fuselage tubular structure may be made by welding in accordance with T. O. 23-5-2 but particular care should be given to assemblies shown on Figure 14. The fuselage cross tube assemblies, part Nos. 75-2142-1 and 75-2142-2, are heat treated and should be replaced as units rather than attempting to effect repairs on the parts themselves. All important fittings on the fuselage frame through which bolts pass may be drilled out 1/8-inch larger diameter and a 1/16-inch wall chrome molybdenum bushing pressed in. Wire pull fittings correspond to standard lug dimensions and should not be drilled oversize.

(2) Engine Mount: The information in the preceding paragraph applies to the engine mount except that there are no heat-treated members, therefore, welded repairs may be made as required, in accordance with T. O. 23-5-2.



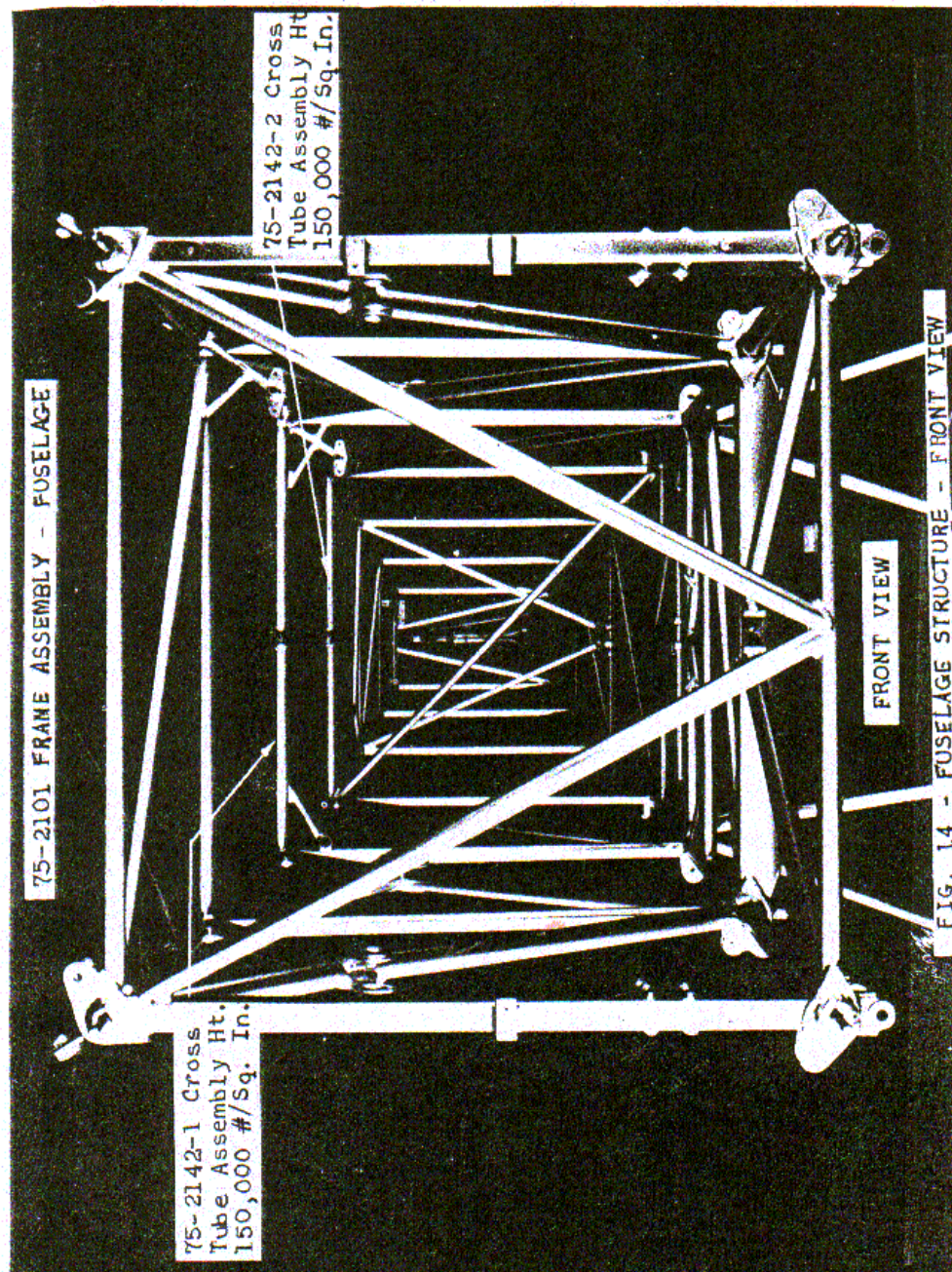
FUSELAGE FRAME TOP VIEW

75-2101 Frame Assembly - Fuselage



FUSELAGE FRAME SIDE VIEW

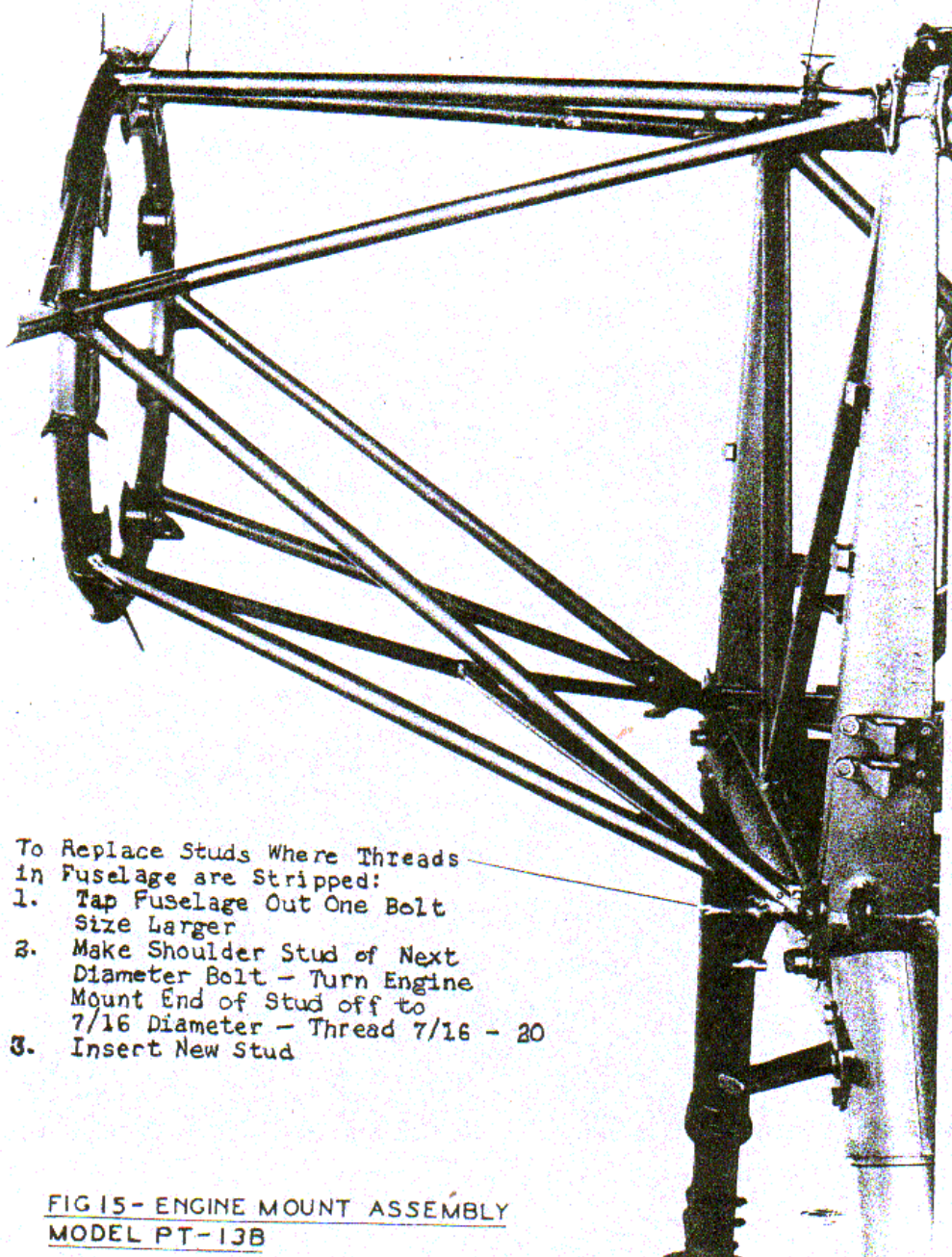
FIG.13-FUSELAGE STRUCTURE-TOP&SIDE VIEWS



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T.O. NO. 01-70AB-2

75-2500 Mount Assembly - Engine
75-2131 Stud - Engine Mount Attachment



- To Replace Studs Where Threads
in Fuselage are Stripped:
1. Tap Fuselage Out One Bolt
Size Larger
 2. Make Shoulder Stud of Next
Diameter Bolt - Turn Engine
Mount End of Stud off to
7/16 Diameter - Thread 7/16 - 20
 3. Insert New Stud

FIG 15- ENGINE MOUNT ASSEMBLY
MODEL PT-13B

RESTRICTED

T.O. NO. 01-70AB-2

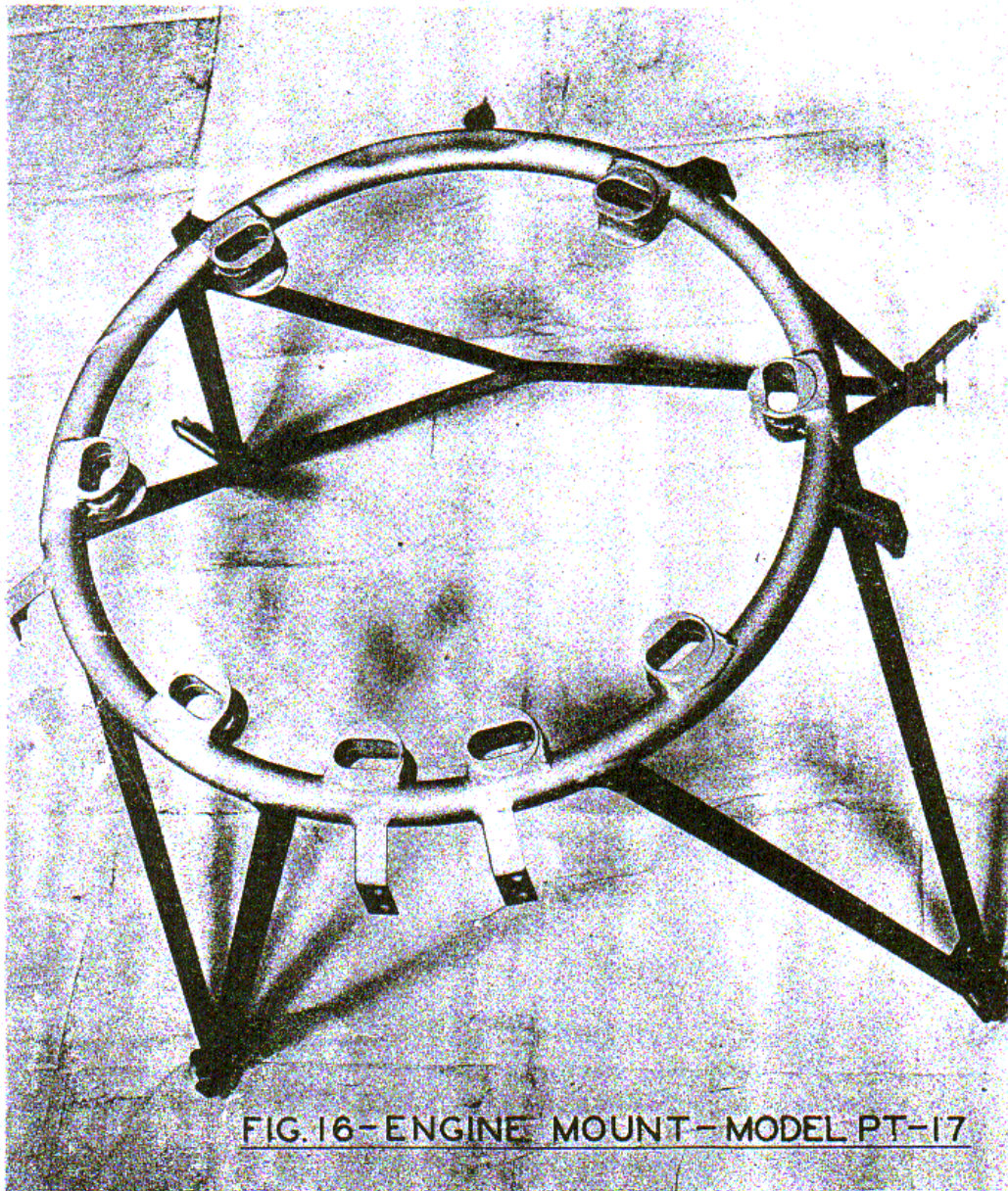


FIG. 16-ENGINE MOUNT-MODEL PT-17

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T.O. NO. 01-70AB-2

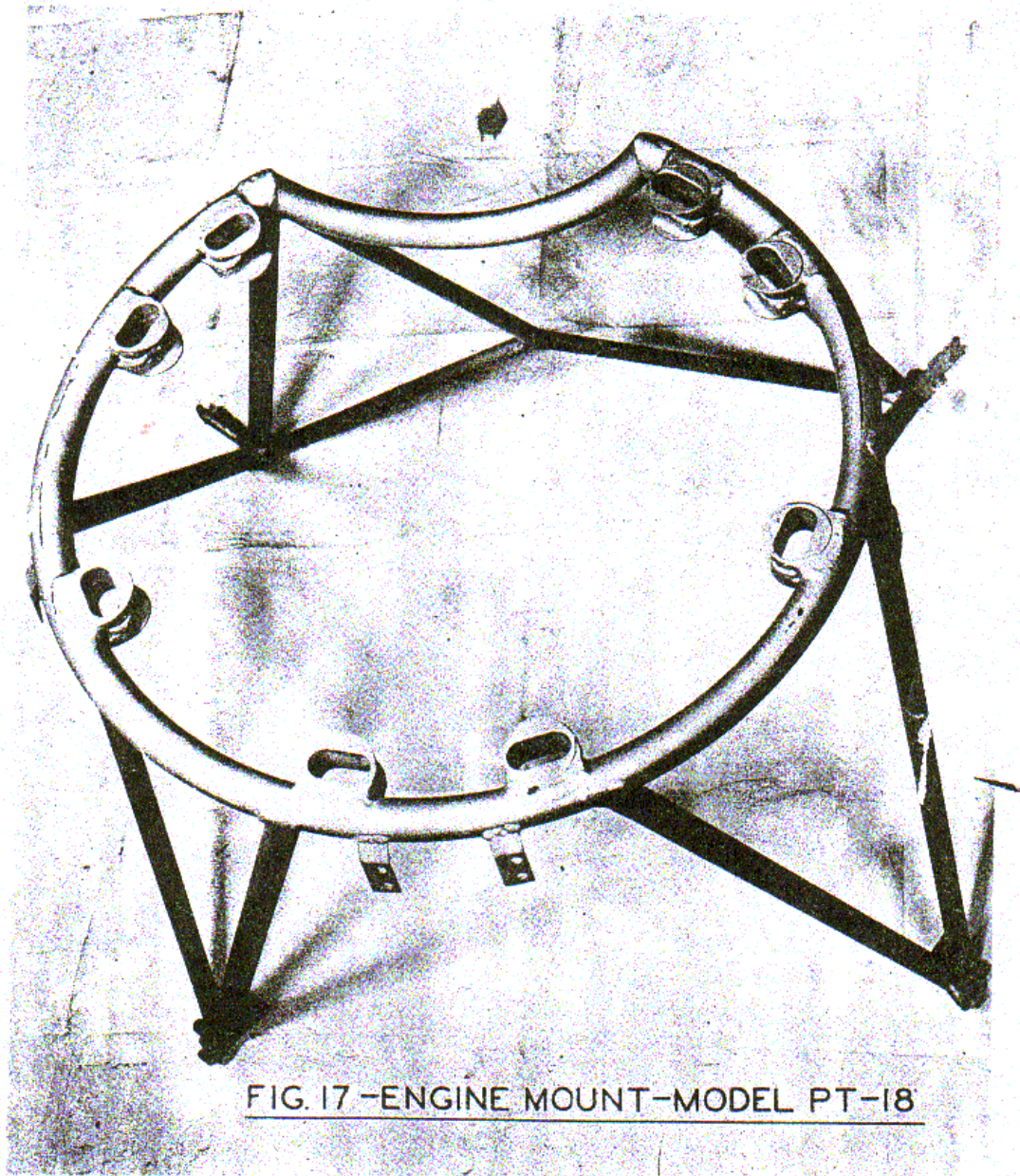


FIG. 17 -ENGINE MOUNT-MODEL PT-18

CAUTION: After welding, the engine mount should be placed ring down on a surface plate and means taken to insure that no mounting lug is more than .015 inches from the surface of the plate. This will prevent undue strain on engine mounting bosses.

c. Replacement of Engine Mount Attaching Studs: The method of attachment of engine mount by studs has been used in these airplanes to reduce, as far as possible, any eccentricity between the fuselage and the mount. In order to reduce the possibility of damaging threads in the fuselage, the studs should not be removed when disassembling the engine mount from the fuselage, except for replacement or inspection. Should the threads on the outer end of the studs become damaged and their replacement is necessary, care must be exercised in their removal and replacement in order to prevent damage to the threads in the fuselage. Should such damage occur, the strength of fuselage fittings and engine mount bolt tubes is sufficient to permit of two oversize stud replacements. These studs are made from 7/16 AN bolts and may be replaced by 1/2-inch and/or 9/16-inch studs with ends turned to 7/16 diameter and threaded 7/16-20. When replacement is made, lubricate in accordance with T. O. No. 06-10-3. See Figures 15, 16 and 17.

5. Cowling and Fairing.

a. General: The engine section cowling, fuselage cowling, and firewall are constructed of aluminum alloy sheet. The engine side cowling, and the fuselage side cowling immediately to the rear of the firewall, are hinged. The cowling section in front of the engine mounting ring is supported by a former ring attached to the engine mount. The fuselage fairing is constructed of aluminum alloy strips and aluminum alloy bulkheads, assembled by riveting. The different fairing units are attached to the fuselage frame by clamps.

b. Repairs: Cowling and fairing are totally non-structural. All main cowling sheets are 17S aluminum alloy. Repairs to small cracks or checks may be effected by drilling a stop hole at the end of the crack and riveting on a patch if necessary.

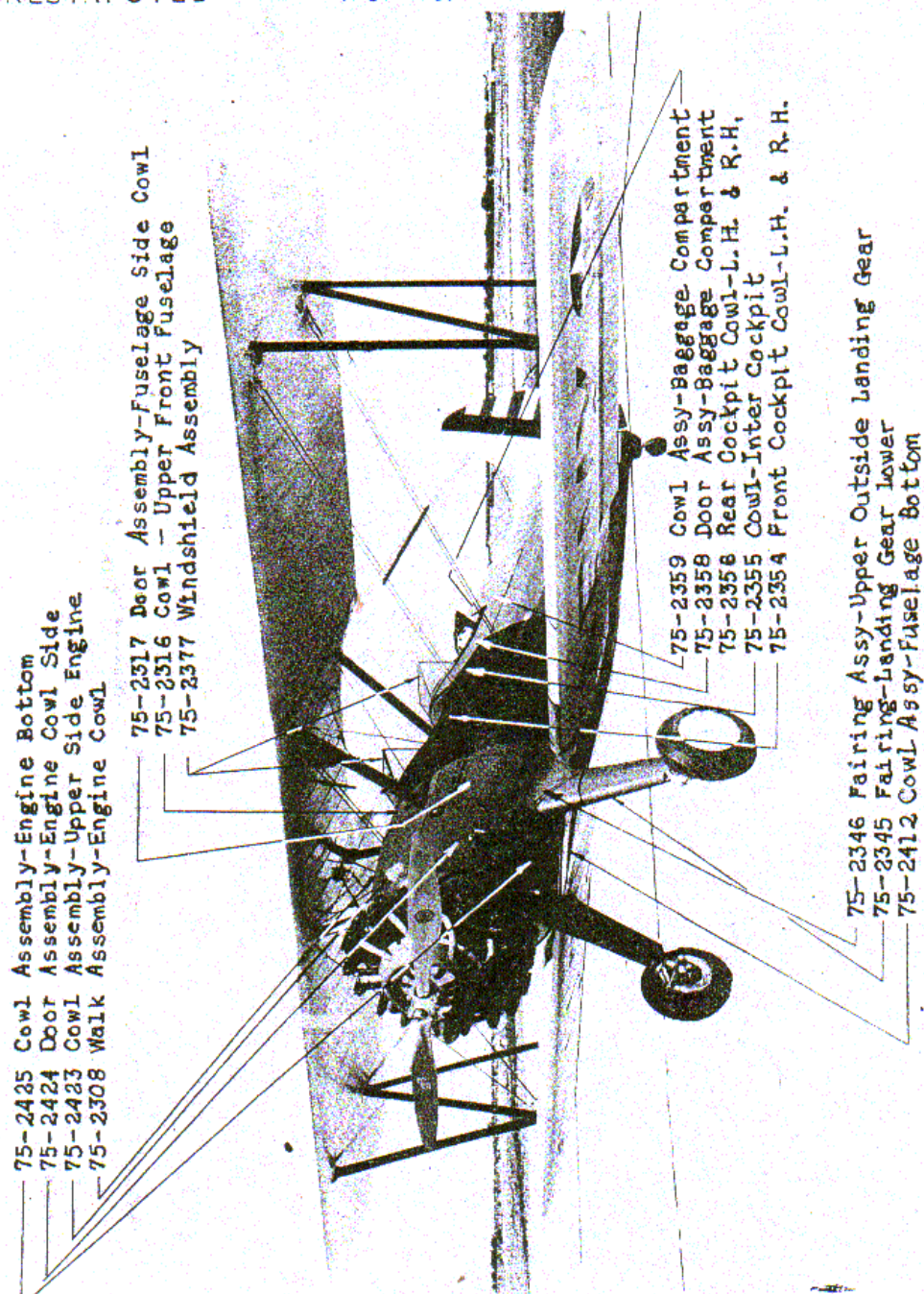


FIG.18 - MODEL PT-13B AIRPLANE - COWLING & COVERING

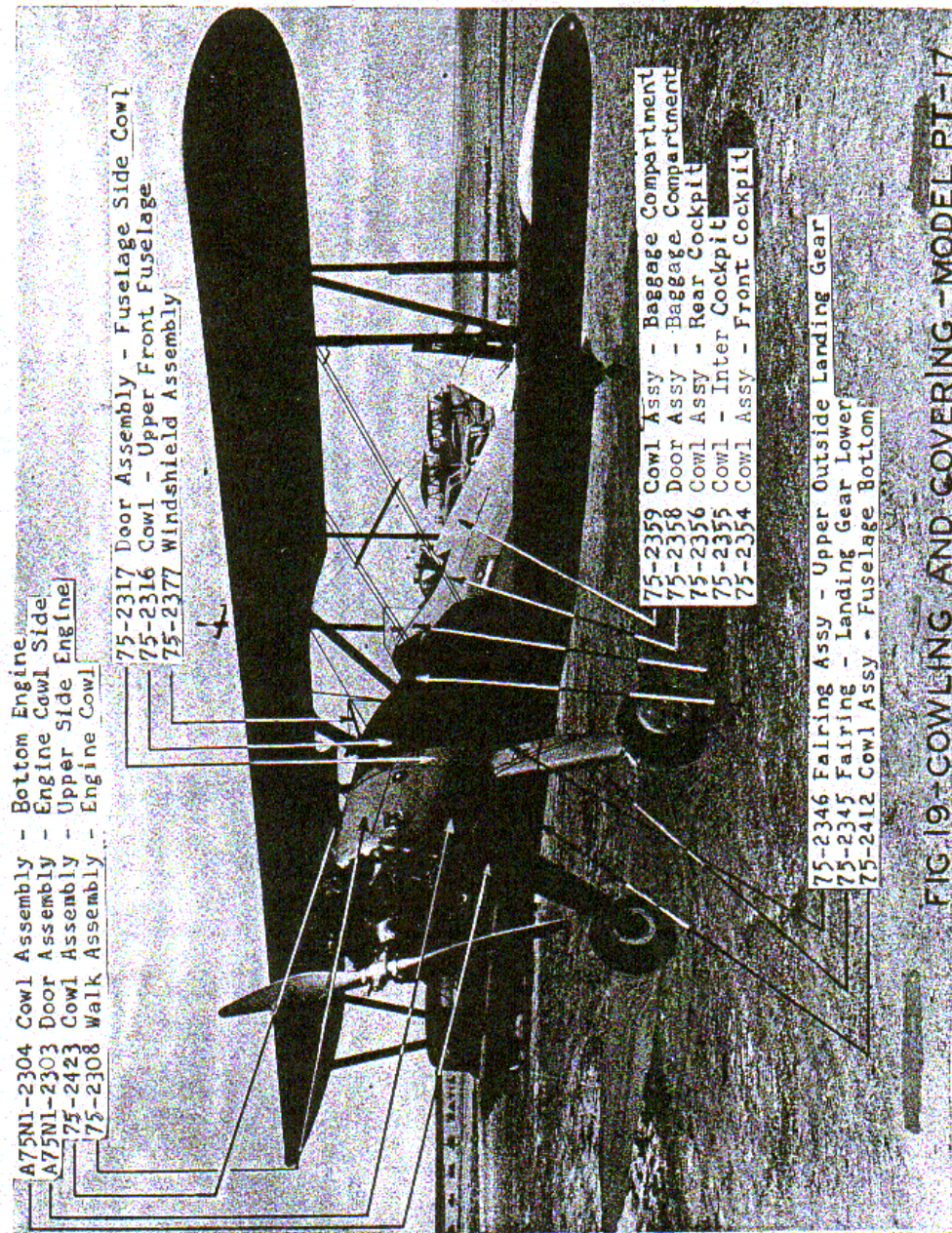


FIG 19-COWLING AND COVERING - MODEL PT-17

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T.O. NO. 01-70AB-2

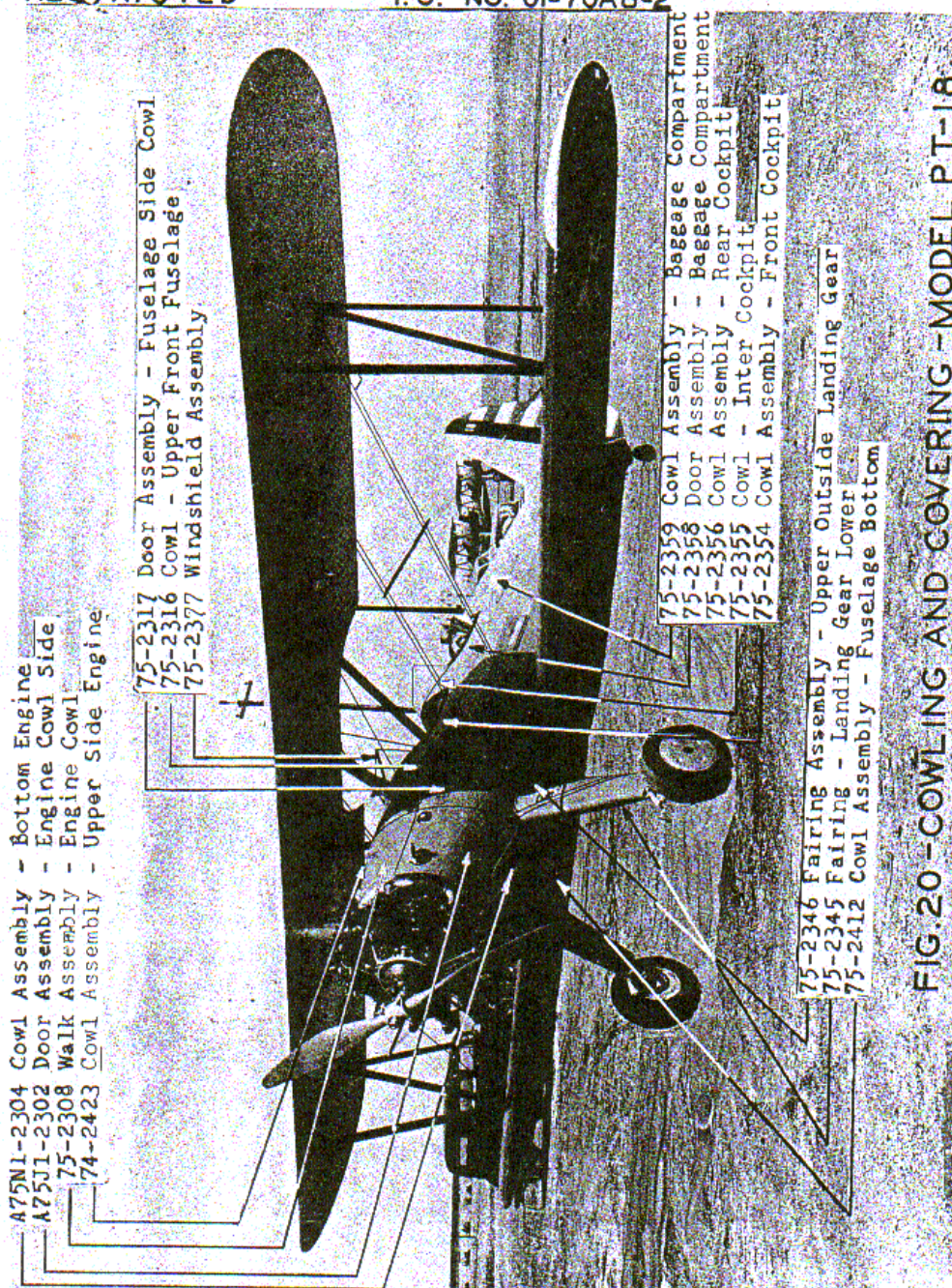


FIG. 20 - COWLING AND COVERING - MODEL PT-18

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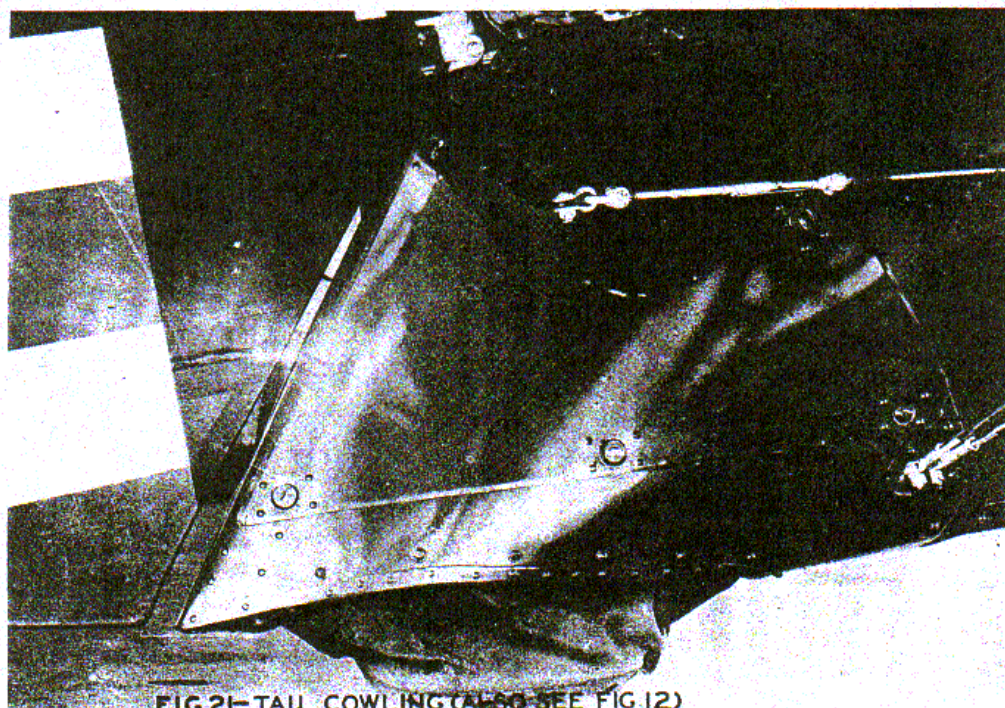
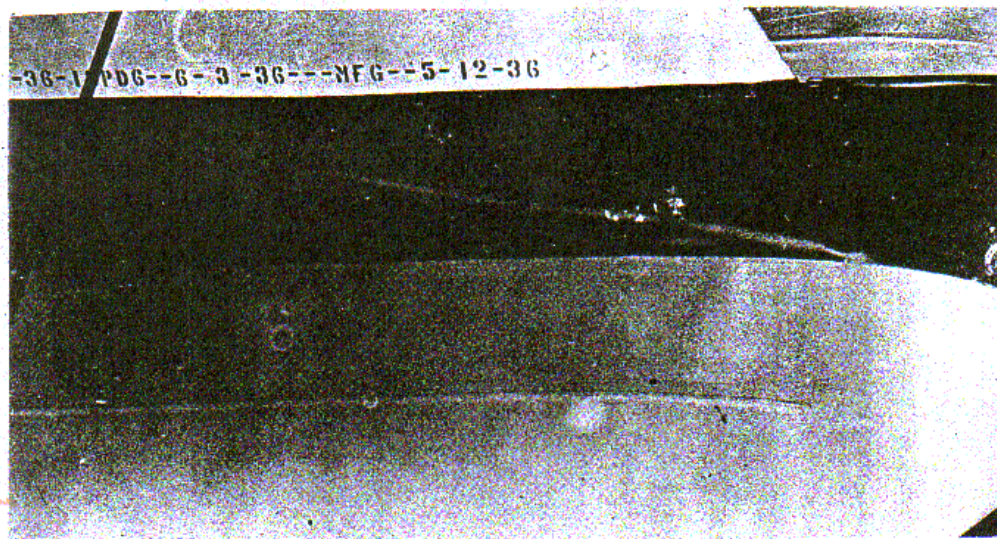
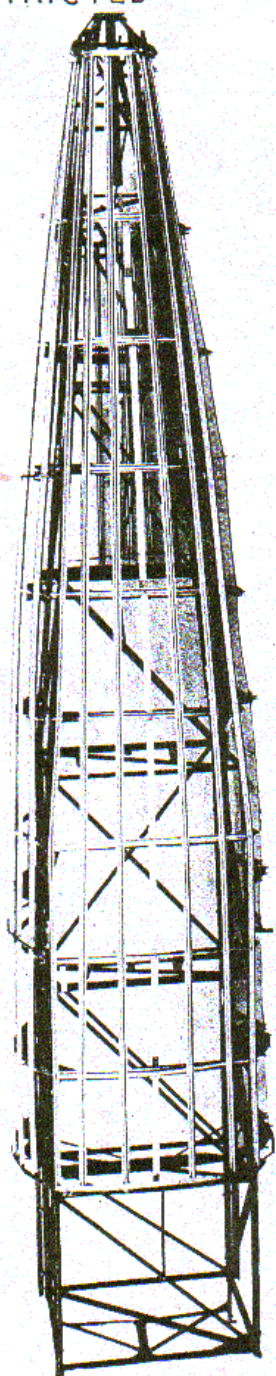


FIG 21-TAIL COWLING (ALSO SEE FIG 12)

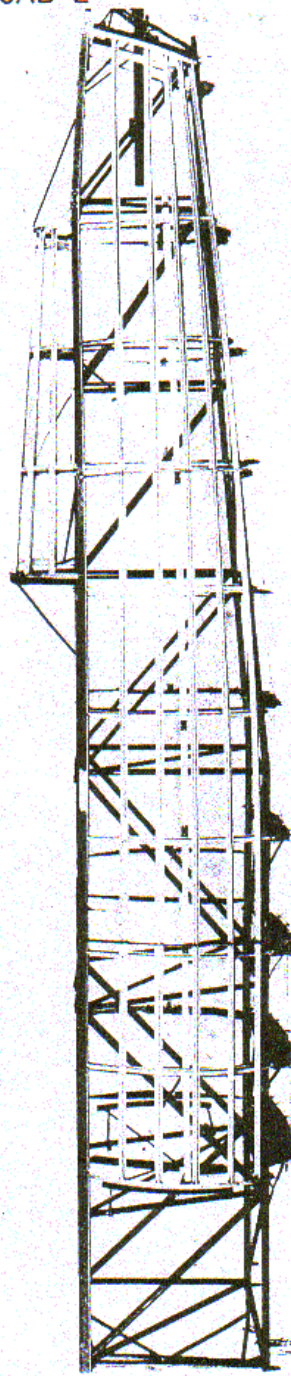
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T.O. NO. 01-70AB-2



Fuselage Fairing (Bottom View)



Fuselage Fairing (Side View)

FIG. 22-FUSELAGE FAIRING ASSEMBLY

6. Landing Gear.

a. General: The landing gear is a full cantilever bolted structure attached to the fuselage by four (4) bolts. The sponson assembly (landing gear proper) consists of a large diameter round seamless chrome molybdenum steel tube to each end of which is bolted a forged chrome molybdenum socket to receive the air-oil shock absorber strut. Bolted to this assembly and projecting backward from each socket are forged chrome molybdenum torque arms of "I" beam shape and tapered in depth from front to rear. The entire assembly is heat-treated.

(1) Axles: The axle knuckle is made from a chrome molybdenum steel forging, heat-treated and machined to accommodate the standard axle and brake assembly. It is pressed into the lower end of the air-oil shock absorber strut and held in place by two 3/8-inch diameter AN steel bolts. The axle is also pressed into the axle knuckle and held in place by one 3/8-inch diameter AN steel bolt and an eye bolt which serves as the second bolt and towing eye.

(2) Wheels and Brakes.

(a) General: General data covering the standard Air Corps 24-inch streamline wheels and 10-inch brakes on PT-13B, PT-17, and PT-18 airplanes are contained in T. O. No. 03-25C-2.

(b) Master Cylinder Unit:

1. General: A master cylinder unit (Bendix Compensating Type Master Cylinder) is used in the hydraulic brake control system. A cross sectional view of the cylinder is shown in Figure 25. It is a combination master cylinder, pressure compensator and reservoir, one of which is provided for each brake. Hydraulic pressure is produced by forcing the piston (1) into its cylinder. The fluid thus put under pressure is led to the operating cylinder in the brake from the opening (7). The unit, as a whole, incorporates the following:

- a. Pressure producing piston and cylinder (1).
- b. Fluid Reservoir (2).
- c. Parking valve (8) with mechanism to operate parking valve.
- d. Pressure compensating device consisting of a cylinder (9) piston (10) and spring (11) to compensate for expansion and contraction of fluid, with temperature changes, while the brakes are applied for parking.

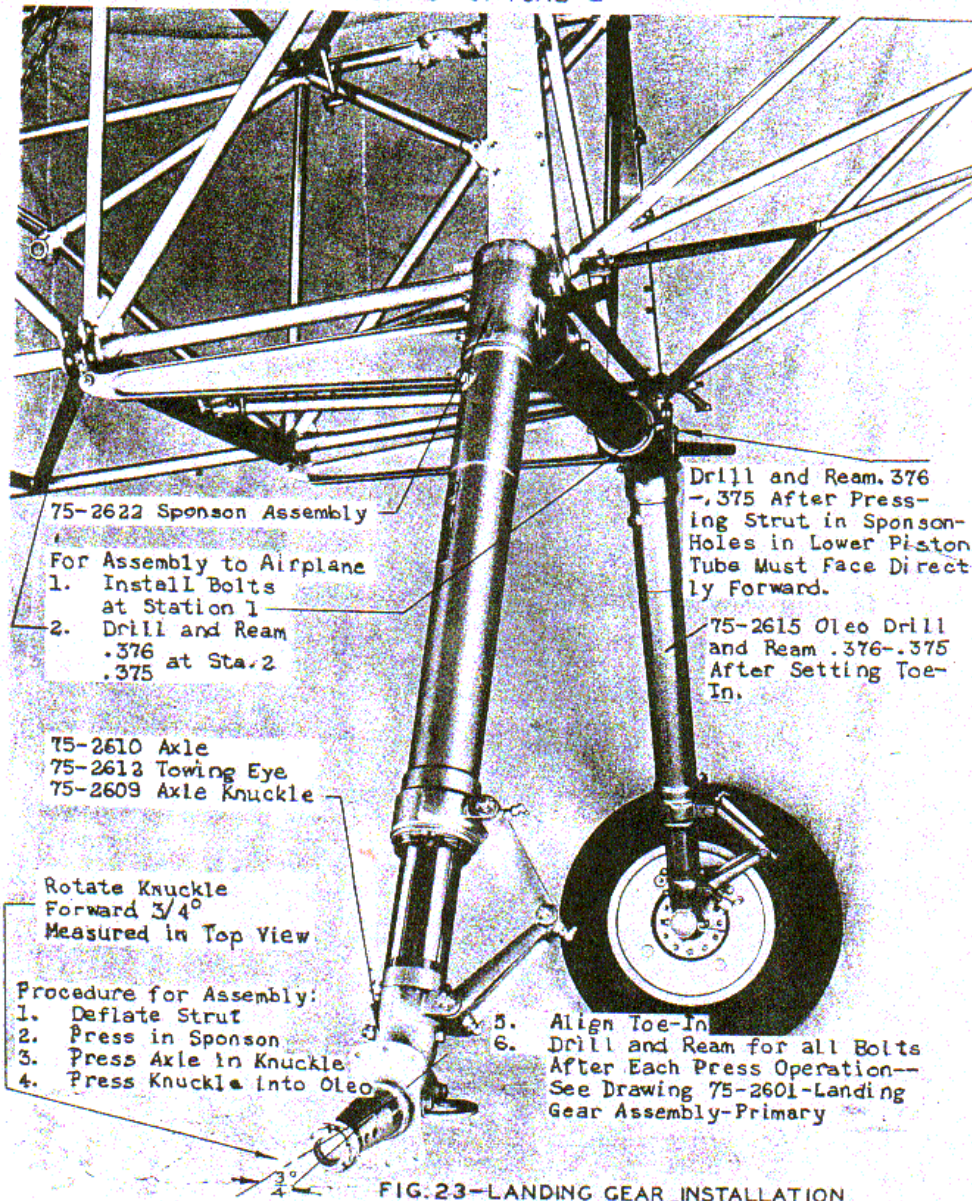


FIG. 23-LANDING GEAR INSTALLATION

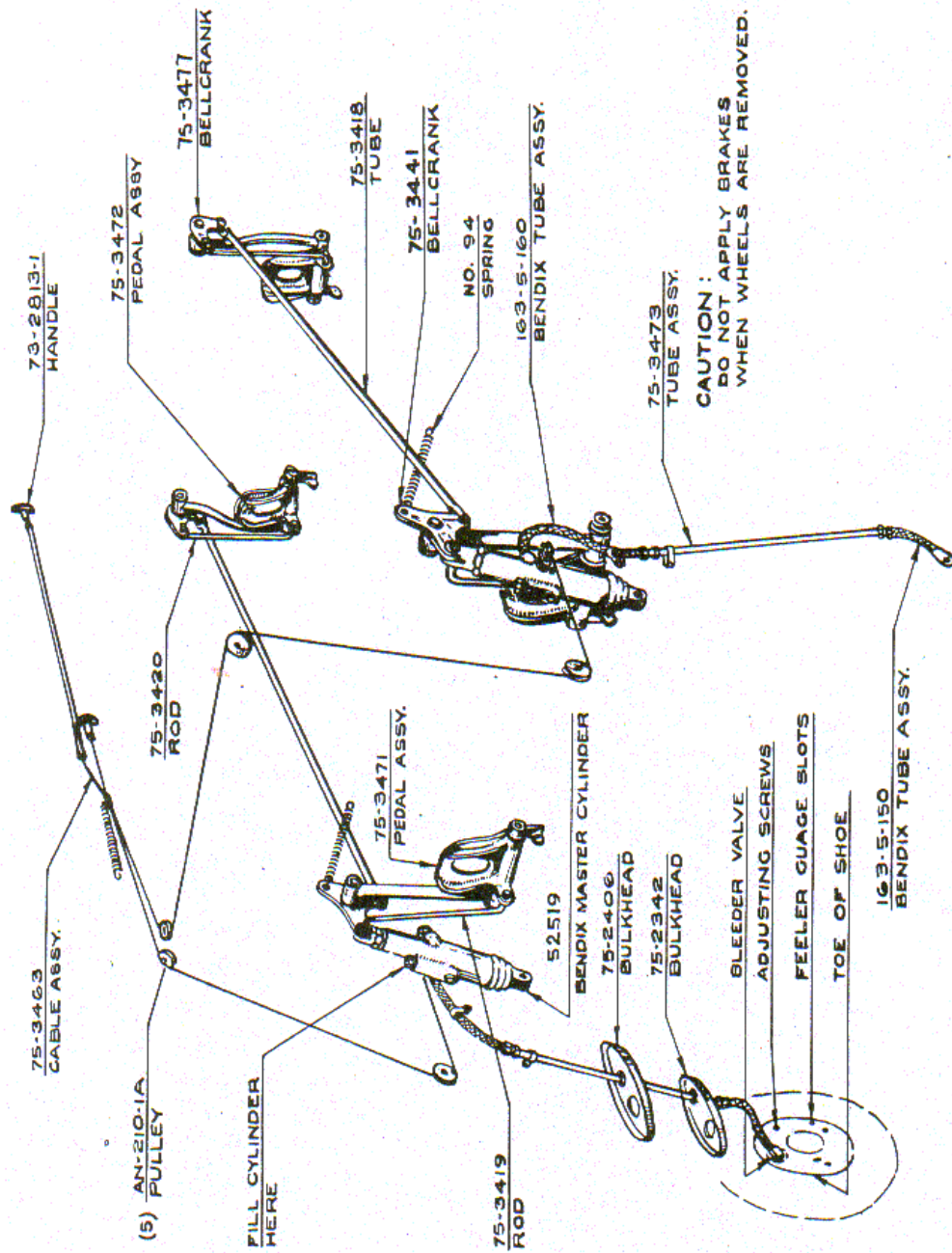


FIG. 24 - BRAKE CONTROLS INSTALLATION

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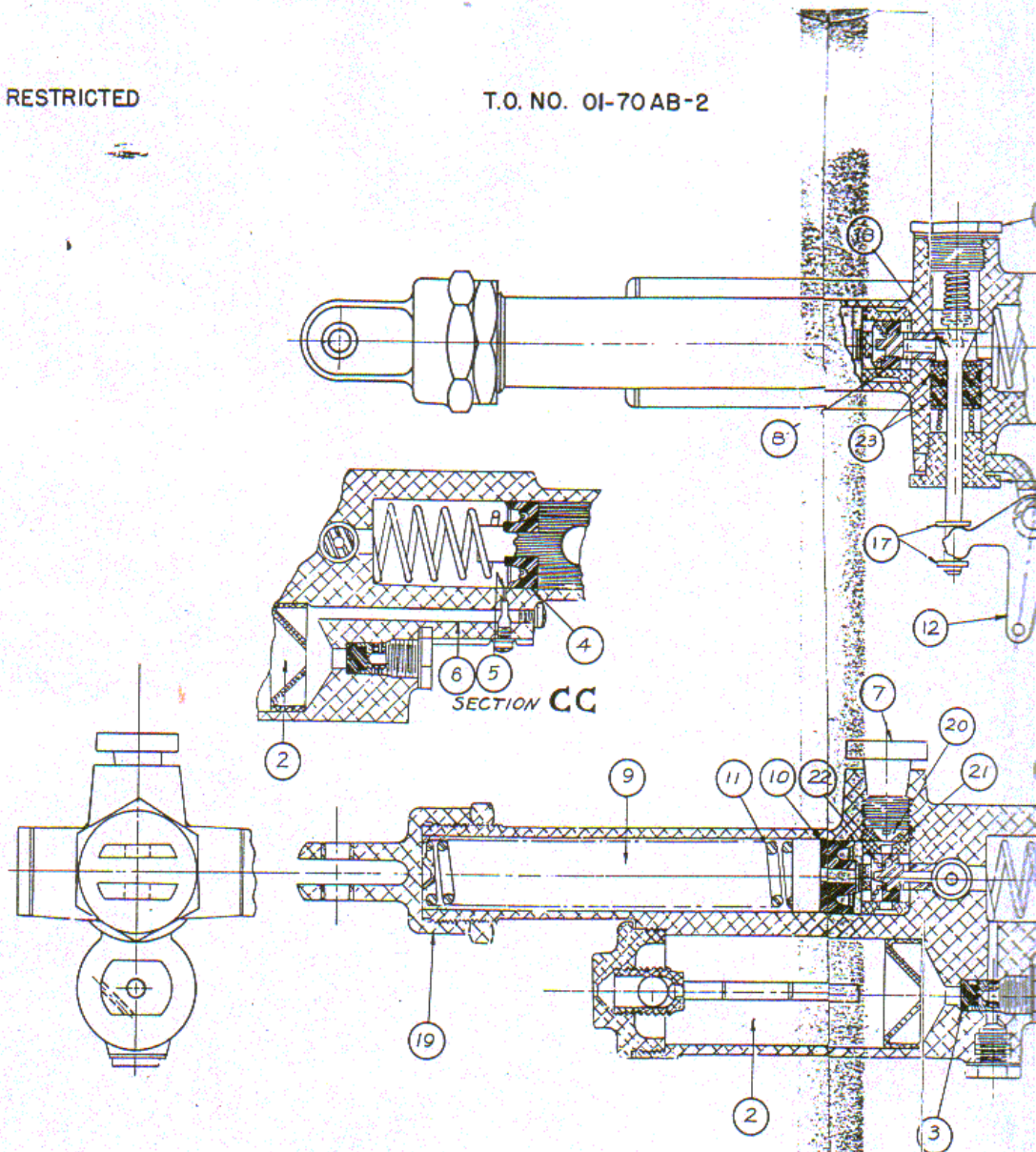
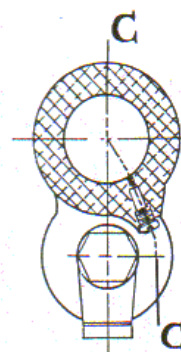
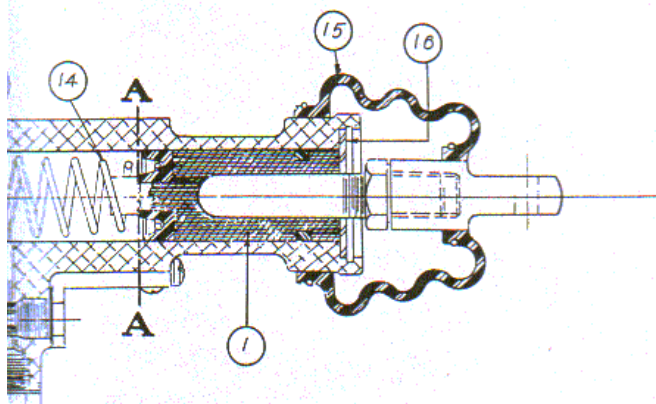
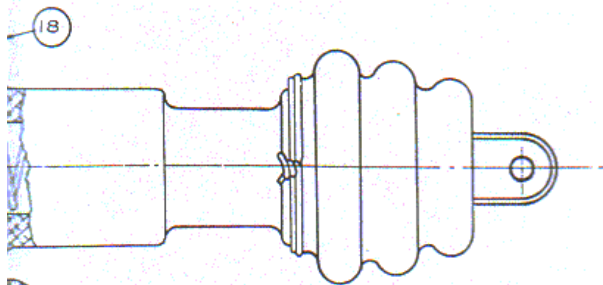


FIG.25 MASTER CYLINDER UNIT

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SECTION-AA

2. Detailed Operation of Unit (See Fig. 25):

a. The reservoir (2) is for the purpose of storing excess fluid. A check valve (3) is provided to permit the fluid to flow from reservoir (2) into the pressure chamber but not from the pressure chamber back into the reservoir. When the piston (1) is in its extended position, the rubber cup (4) uncovers a port (5) which connects through the channel (6) directly to the reservoir, allowing any excess fluid in the braking system to flow back into the reservoir. Immediately upon applying the brakes the cup(4) seals the port (5).

b. In the position shown the check valve (8) is held open by its tapered operating plunger (13) thus the fluid is free to flow back and forth through the valve (8) so the brakes at all times are connected to the pressure producing chamber. As pressure is built up some of the fluid will flow out of connection (7) to the brakes and some of it will flow into the compensating chamber ahead of the compensating piston cup (10). The pressure of this fluid will compress the spring (11) moving the compensating piston to the left, thus providing a reserve of fluid in the compensating cylinder.

c. In locking the brakes for the purpose of parking, the parking valve operating lever (12) is pulled to the left, thus forcing inward the tapered valve operating plunger (13), allowing the valve (8) to rest upon its seat. The valve (8) now acts as a check valve allowing fluid to flow into the brake but preventing it from flowing back to the pressure producing chamber. If the brakes are now applied the pressure created in the pressure producing chamber will lift the valve (8) off its seat and fluid will flow into the brakes and into the compensating chamber. When sufficient pressure has been produced to lock the brakes for parking, the pressure on the foot pedal is released and the spring (14) pushes the pressure producing piston outward to its extended position. The fluid under pressure in the brakes cannot escape because it is sealed by valve (8). The compensating piston and spring have been displaced as previously outlined to accommodate a reserve of fluid to take care of expansion or contraction of fluid. Fluid to fill the pressure producing chamber as the piston returns is supplied from reservoir (2) through check valve (3).

d. When the brakes are released from parking position, the displacement of the foot pedal produces a pressure in the pressure chamber equal to that in the brake line. When the pressure has been built up to this point it will lift the check valve (8). This pressure acting on the valve operating plunger (13) forces the plunger outward, thus holding the valve (8) off its seat.

e. Pressure in the pressure chamber always tends to force the valve operating plunger (13) outward into the position which holds the valve (8) open, thus the brakes cannot be accidentally locked as they can only be locked by a force sufficient to move lever (12) to the left.

(3) Air-Oil and Spring Oil Shock Absorber Struts: For general instructions covering air-oil and spring oil shock absorber struts and booster (high pressure) air pump used to build up pressure in the struts, see T. O. 03-25E and T. O. 17-1-3. The struts incorporate the use of forged "scissors" bolted to the piston tube and above the packing gland on the cylinder, and "C" shaped flexible edge ring packing which depends on pressure to maintain a good air seal. No boots are provided or required.

b. Bleeding Hydraulic Brake System (See Figure 25):

(1) General: After a hydraulic brake system has been disconnected and reconnected, air is present in the system. This air must be eliminated because its presence in the line will result in increased pedal travel due to the compression of the air. The compression chamber and operating piston (1) can be used as a pump providing the parking handle is held in the parking position allowing the valve (8) to rest on its seat. This pump action is possible because valve (3) acts as an intake valve between the pump and the fluid reservoir (2) and valve (8) acts as an exhaust valve. Therefore, by pumping the brake pedal slowly fluid can be passed from the reservoir through the braking line and exhausted from the bleeder fitting at the brake.

(2) Procedure:

(a) Open the bleeder fitting in the brake. This fitting is next to the hydraulic line which connects to the brake. In opening this fitting it is necessary to remove the small screw in the end of the bleeder fitting, then open the bleeder fitting valve about one-half turn with a small wrench. Put a piece of hose over the bleeder fitting valve and lead it out into a receptacle to receive the fluid which is to be pumped out.

(b) Fill the reservoir (2) on the master cylinder unit by removing the cap at the top of the reservoir and gaging the height of the fluid by the fluid gage attached to the cap.

(c) Pull on the parking mechanism and pump the brake pedal back and forth slowly. This, as previously explained, will pump fluid from the reservoir (2) through the brake line and out of the bleeder fitting at the brake. This operation should be continued until the fluid coming out of the bleeder is entirely free of air bubbles and then should be continued further until about one-half pint of fluid, free of air bubbles, has come through.

(d) Close bleeder fitting valve tightly and replace the small screw in the end of the valve.

(e) As the reservoir (2) is of small capacity, it will be necessary to keep it full at all times while bleeding the line, because if the reservoir becomes empty, air will be introduced in the line and bleeding will have to be started over again. Probably not more than three strokes of the brake pedal will be required to completely empty the reservoir.

(f) It is suggested in this connection that while bleeding the line an auxiliary can of brake fluid be used to replenish the reservoir (2). This may be accomplished quite easily by using a quart container with a fitting soldered into the bottom and a short length of hose connected to this fitting so the hose can be introduced into the reservoir (2).

c. Installation and Disassembly.

(1) General: Assembly of the complete landing gear is covered by Figure 23.

(2) Master Cylinder Unit (See Figure 25):

(a) Disassembly: The disassembly of this unit is as follows:

1. To remove the pressure producing piston (1), remove the rubber boot (15) and compress the snap spring (16) sufficiently to release it from its groove. It is now possible to remove the piston (1) with its rubber cup (4) and spring (14).

2. To remove the check valve, unscrew the plug (18).

3. To disassemble the valve operating mechanism, remove lever (12) and remove the two split washers (17) from the valve operating plunger (13) by prying them open. Remove plug (18) and push the valve operating plunger (13) out through the hole left open by removal of plug (18). In order to remove the two rubber cups (23) which seal the valve operating plunger shaft, unscrew the plug (24) which permits the removal of the two cups (23) and their retaining parts.

4. To remove parking valve (8), remove the end fitting (19) which permits the removal of compensating spring (11). Disconnect the line to the brake from the opening (7). With a screwdriver unscrew the valve cage locking plug (20) by inserting the screwdriver in the outlet hole (7). This plug locks the valve cage (21) in position. Insert a long bar about 3/16" in diameter into the operating cylinder, which accommodates piston (1) so that it presses on the lower end of valve (8). Pushing on this rod will push valve (8) with its spring (22) valve cage (21) compensating piston and cup (10) out through the end from which fitting (19) was removed.

(b) Reassembly: The order of reassembly is exactly the reverse. When inserting the valve operating plunger (13) the best procedure is to insert the plunger (13) first and then insert the cups (23) and their retainer parts, by pushing them over the small end of the plunger. In this way, danger of damaging the lips of the cups (23) is minimized. In reassembling the unit, all internal parts should be lubricated with pure castor oil before assembly. When inserting the pistons, it is necessary to insert them very carefully so the piston cups (4) and (10) are not damaged. The feather edges of these piston cups act as seals to prevent leakage and if damaged or turned over, the unit is sure to leak. This also applies to cups (23).

(3) To Replace Shock Absorber Strut Packing: When the air-oil shock absorber struts are manufactured, the ring packings are installed as complete circular units. Because of the lower knuckle, however, the packing must be replaced with diagonally cut packing. Care should be taken to insure that the cuts are staggered so as to prevent a clear leakage path from opening. The old packing may be removed by cutting each ring.

7. Tail Wheel.

a. General: See T. O. No. 01-70AB-1 The Cleveland Pneumatic Tool Company Type B125-ST13 Strut, Manufacturer's No. A-5643, is used as the shock absorbing medium in the tail wheel installation. For general instructions covering the maintenance, use, and inspection of this strut, see T. O. No. 03-25E-1. The complete assembly, including the trunnion frame assembly, is attached to the fuselage by three (3) AN-5 bolts. The tail wheel is steerable throughout the range of rudder travel and becomes free swiveling for the remainder of the 360° rotation.

b. Tail Wheel Post Assembly: As the result of shimmy tests on standard Air Corps tail wheel post assembly, this assembly has been revised to replace the lower tapered roller bearing with a bronze thrust collar. A flanged steel sleeve is pressed on the post at the position normally occupied by the tapered roller cone. A normal end clearance of the post in the post housing of from .002 to .005 is provided so that the friction loads will be relieved in the air. The standard Air Corps assembly, Drawing No. 35D428, is interchangeable and may be substituted for the revised unit in an emergency; the loads on the rudder pedals, however, will be considered excessive for maneuvers in the air. The tail wheel post assembly has been further revised to decrease the throwout cam angle.

c. Replacement of Tail Wheel Post Lower Bearing: When the radial clearance between the bronze thrust collar, Part No. 73-2711, and the steel bushing, Part No. 73-2711-1, has increased to exceed .010 inch, these parts will be replaced. Replacement instructions are given on Figure 27.

RESTRICTED

T.O. NO. 01-70AB-2

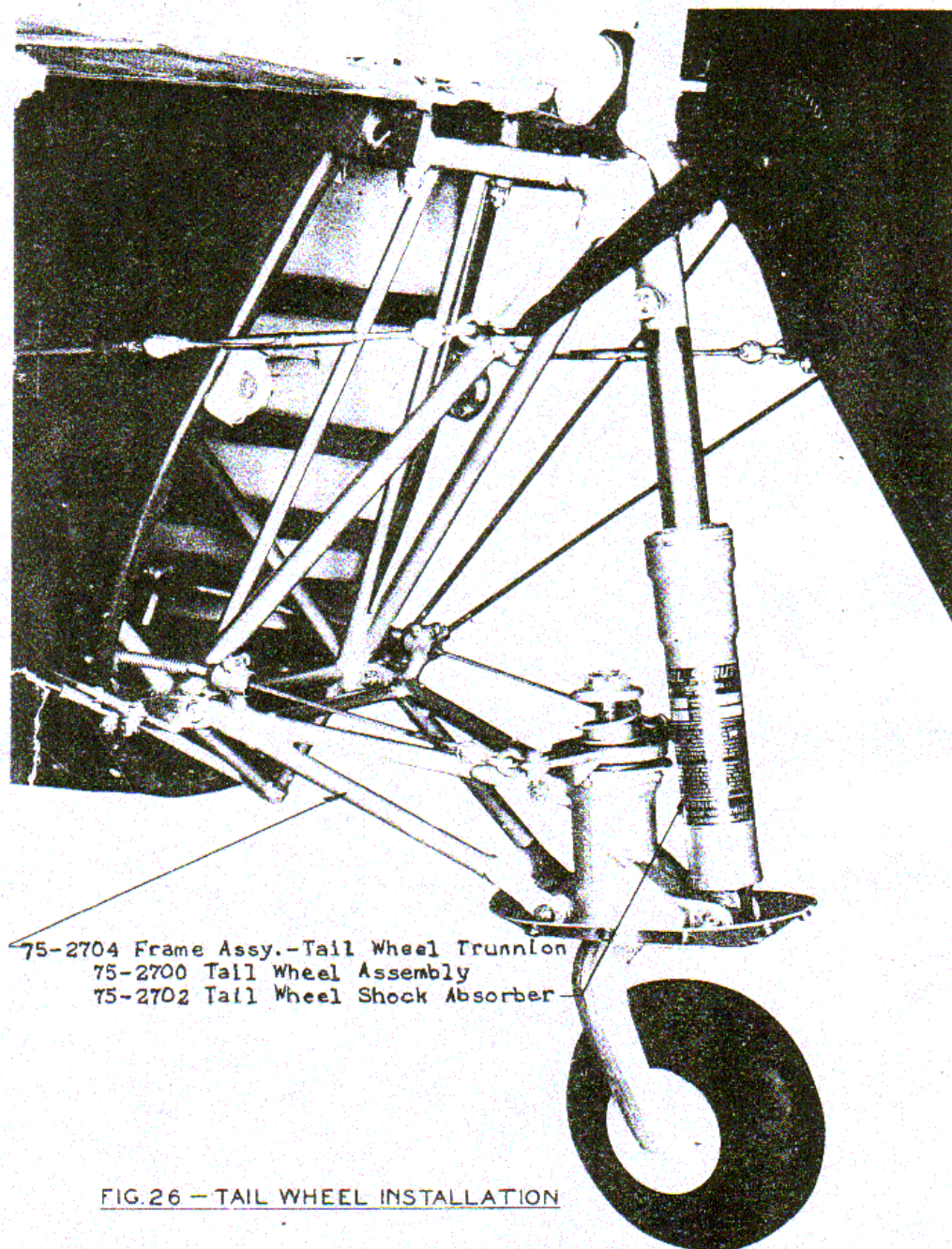


FIG.26 - TAIL WHEEL INSTALLATION

RESTRICTED

T.O. NO. 01-70AB-2

WHEN THE CLEARANCE (A) BETWEEN THRUST PLATE 73-2711-1 AND BEARING 73-2711 EXCEEDS .010 THESE PARTS MUST BE REPLACED.

TO REPLACE, REMOVE SPRING RETAINER NUT AND KNUCKLE RETAINER NUT. REMOVE SNAP RING AND FELT WASHER. REMOVE KNUCKLE ASSEMBLY FROM HOUSING ASSEMBLY. REMOVE THRUST PLATE FROM SHAFT AND PRESS ON REPLACEMENT PART. REMOVE BEARING AND INSTALL REPLACEMENT.

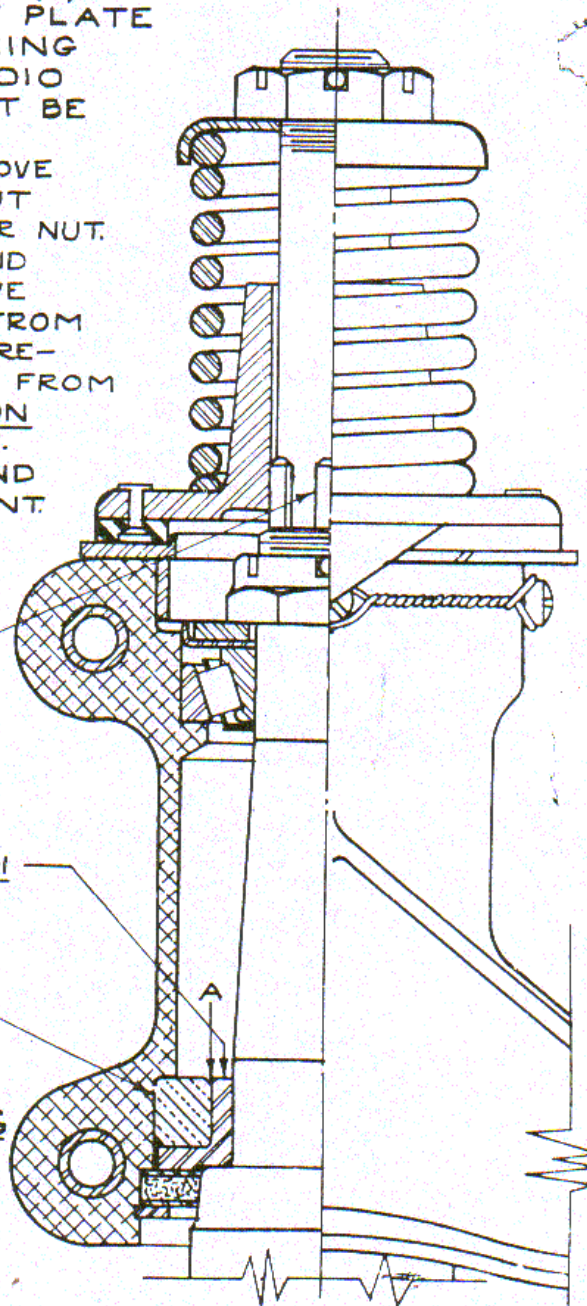
CHECK SPLINES FOR WEAR OR GALLING.

THRUST PLATE 73-2711-1

BEARING 73-2711

FIG. 27- TAIL WHEEL POST LOWER BEARING REPLACEMENT.

REF. DWG. 75-2711



8. Engines and Accessories.a. Engine:

(1) Installation: The R-680-11 (Lycoming), R-670-5 (Continental), and R-755-7 (Jacobs) engines for the Models PT-13B, PT-17, and PT-18, respectively, are attached to the engine mount by eight (8) AN-6 bolts, passing through rubber cushion bushings conforming to Air Corps standards. In addition, two (2) 1/4-inch thick rubber washers are placed between the retainer washers and mounts. These rubber washers and bushings are of approximately 75 Shore durometer hardness and reduce transmission of vibration from the engine to the mount. See Figure 34.

(2) Exhaust System: (a) The exhaust system of the R-680-11 engine consists of welded nose collectors and bayonet type tail pipe extensions of .041 stainless steel, all supported from the engine. The air intake system consists of an aluminum alloy nose deflector cowl incorporating an air heater located behind the exhaust collector, a hot air duct leading back to the carburetor, a cold air duct leading down through the engine section, and a cast magnesium carburetor air box bolted to the bottom of the carburetor. Two butterfly valves operating together and controlled from the cockpit provide hot or cold air to the carburetor as required.

(b) The exhaust system of the R-670-5 and R-755-7 engines consists of a welded collector ring having six sleeve jointed sections fabricated from corrosion resistant tubing. They are mounted at the rear of the engines and supported direct from the cylinders. The R-670-5 engine exhaust outlet pipe projects 5/8" into cylinder port and is connected to the cylinder by a two-bolt flange, welded to the exhaust outlet pipe. The use of a gasket is not required. The R-755-7 engine exhaust outlet pipe is connected to the cylinder with a four-bolt type flange. A gasket is used between the flange and exhaust port.

The R-670-5 and R-755-7 Air Intake systems consist of a top air intake duct extending through the cowl to the air mixing box at the carburetor. The hot air induction system consists of a duct from the collector weld to the air mixing box. A balanced valve in the air mixing box operated from the cockpit provides hot or cold air to the carburetor as required.

b. Accessories: The accessories mounted on the engines of the PT-13B, PT-17 and PT-18 airplanes are as follows: See T. O. No. 's: 02-15AA-2. 02-40AA-2 and 02-30AA-2.

(1) Starters:

- (a) R-680-11 (Lycoming) - Eclipse Type B-11
Hand Inertia.
- (b) R-670-5 (Continental) - Eclipse Type B-11
Hand Inertia.
- (c) R-755-7 (Jacobs) - Eclipse Type B-9
Hand Inertia.

(2) Magnetos:

- (a) R-680-11 (Lycoming) - One Scintilla Magneto -
Type D-4.
- (b) R-670-5 (Continental) - Two Scintilla
Magnetos - Type MN7-DF.
- (c) R-755-7 (Jacobs) - Two Scintilla Magnetos -
Type VMN7-DF.

c. Engine Change:

(1) The R-680-11 (Lycoming), R-670-5 (Continental), and R-755-7 (Jacobs) engines may be removed from the mount in the normal manner in about four (4) man hours.

(2) When rapid engine changes are desired and a complete spare engine section is available, the entire engine section may be removed at the firewall by breaking all necessary connections at that joint and an entire new section substituted including cowlings. This type of engine change requires about two (2) man hours and is recommended in case of an emergency. Further details of this change are shown on Figure 35.

RESTRICTED

T.O. NO. 01-70AB-2

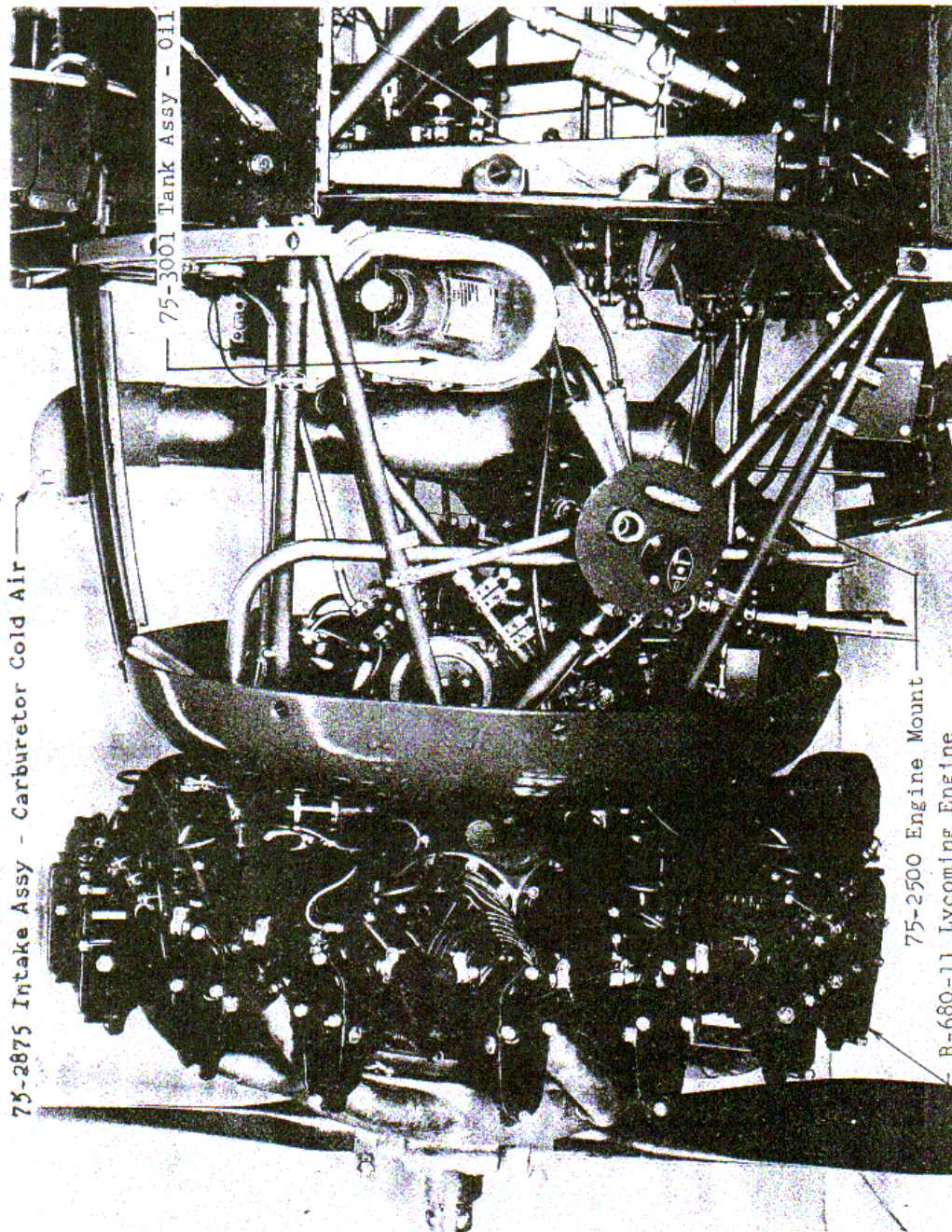


FIG. 28- MODEL PT-13B AIRPLANE-POWER PLANT-LEFT SIDE

RESTRICTED

T.O. NO. 01-70AB-2

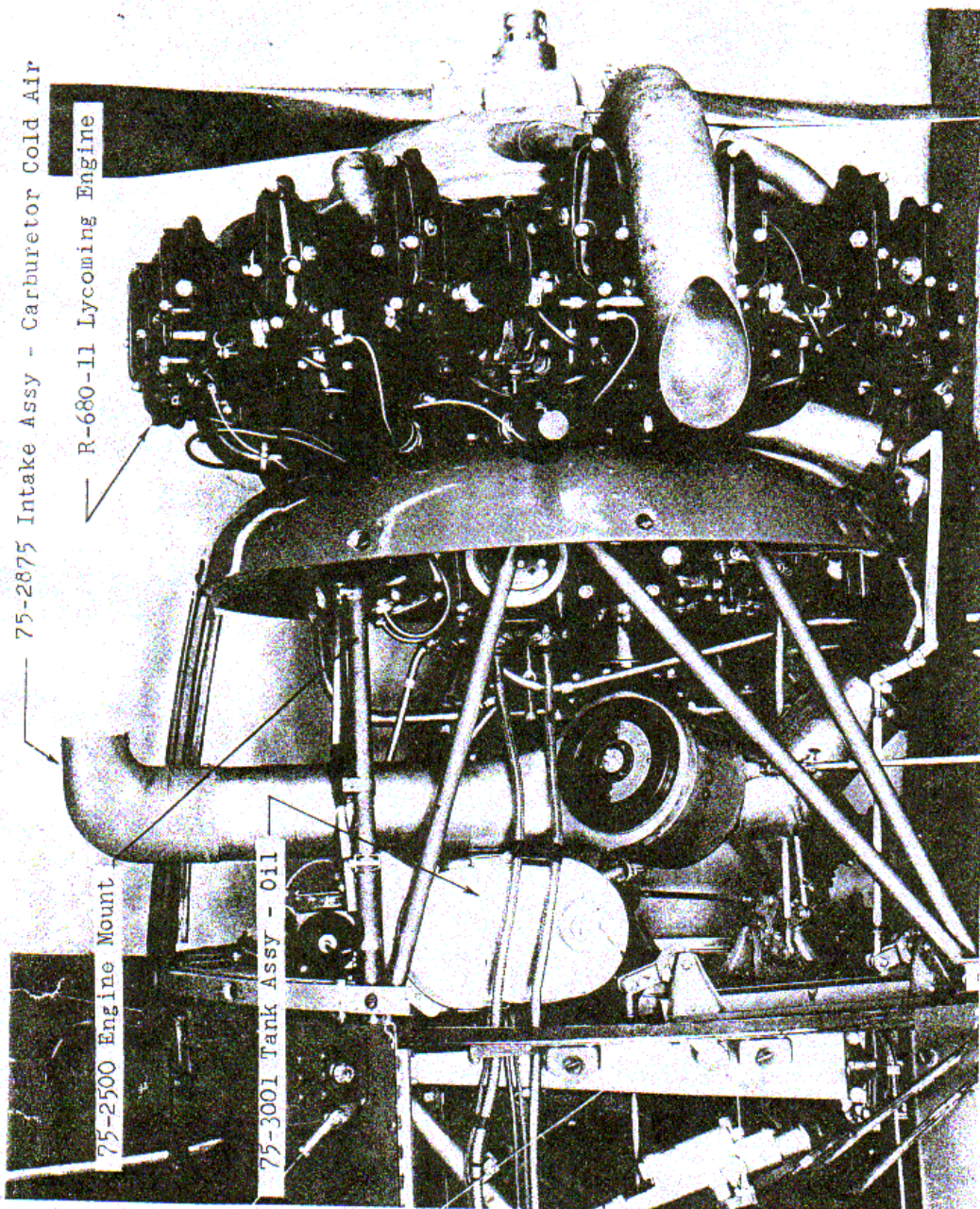


FIG.29-MODEL PT-13B AIRPLANE-POWER PLANT-RIGHT SIDE

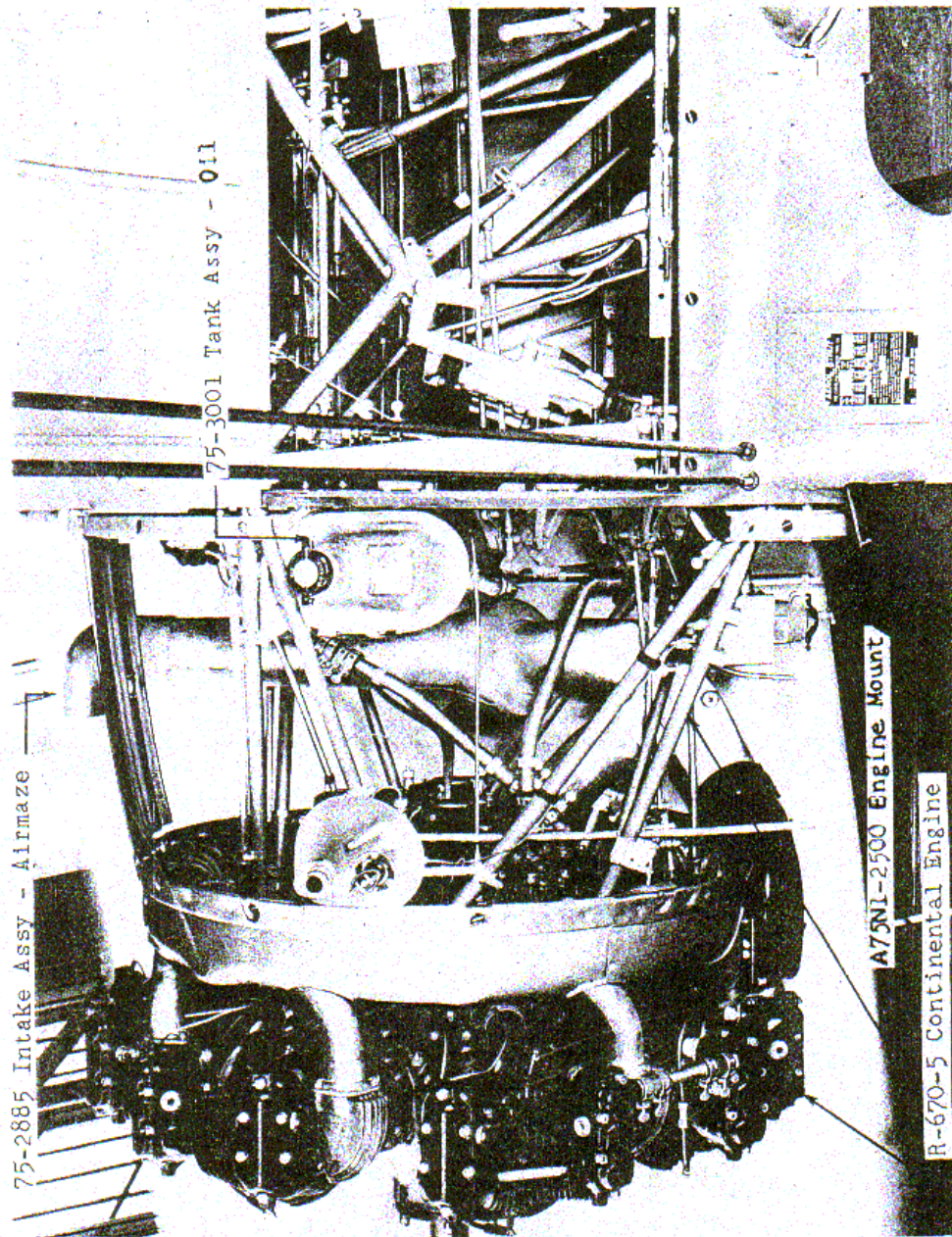
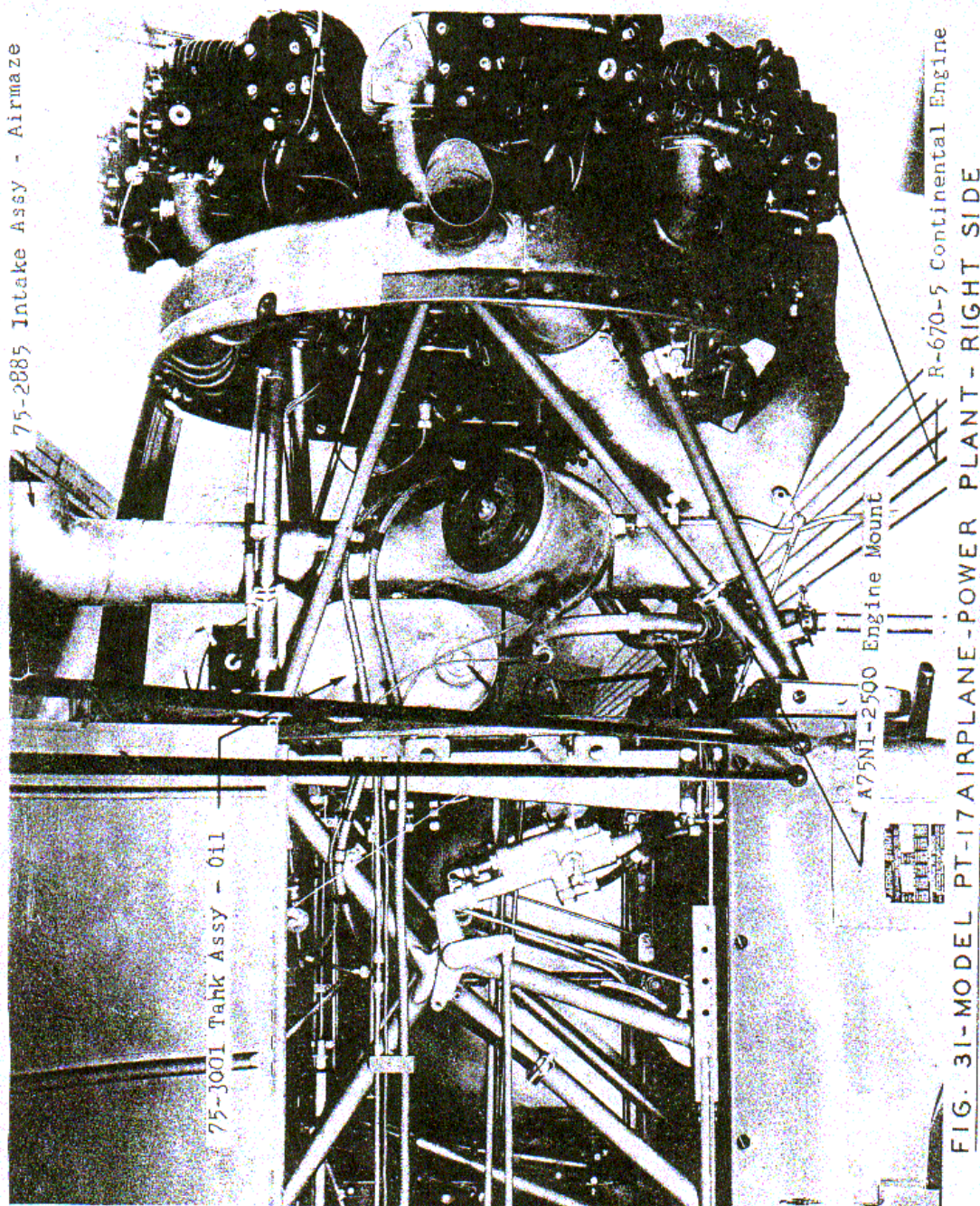
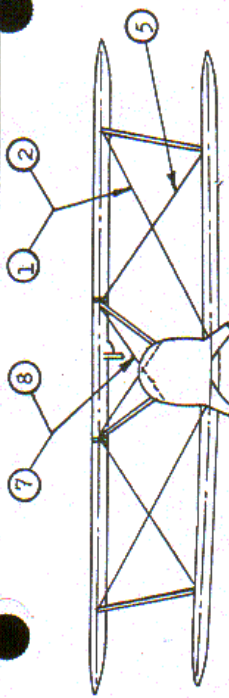


FIG. 30- MODEL PT-17 AIRPLANE - POWER PLANT - LEFT SIDE

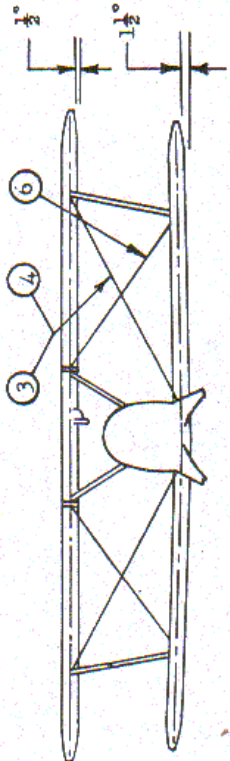
RESTRICTED

T.O. NO. 01-70AB-2

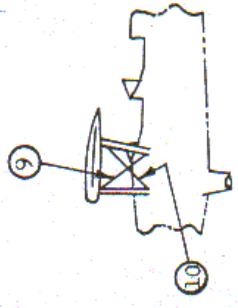




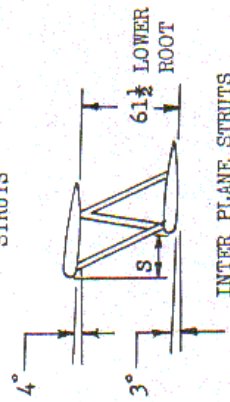
FRONT WING TRUSS



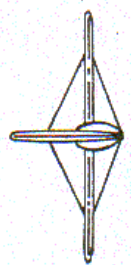
REAR WING TRUSS



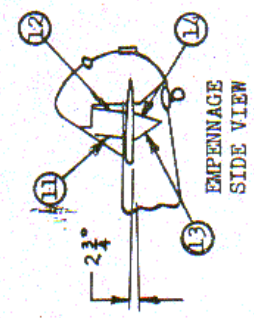
CENTER SECTION STRUTS



INTER PLANE STRUTS
S (STAGGER) = 27 AT ROOT
S (STAGGER) = 26 1/4 AT STRUT POINT



EMPENNAGE
REAR VIEW



EMPENNAGE
SIDE VIEW

TIE ROD NO.	INDEX NO.	SIZE	MINIMUM	TENSIOMETER READING	MAXIMUM
AN675AC-12025	1 & 2	5/16-24-6100	750	NO REQD LOAD	950
AN676AC-11925	3 & 4	3/8 -24-8000	1000	NO REQD LOAD	1400
AN675AC-9300	5	5/16-24-6100	1500	NO REQD LOAD	2000
AN675AC-8900	6	5/16-24-6100	1500	NO REQD LOAD	2200
75-1001-1	7 & 8	5/16-24-6100	1100	NO REQD LOAD	1400
AN676AC-3575	9	3/8 -24-8000	1200	NO REQD LOAD	2100
AN675AC-3925	10	5/16-24-6100	200	NO REQD LOAD	400
AN673A -4425	11	10 -32-2100	200	NO REQD LOAD	400
AN673A -4675	12	10 -32-2100	215	NO REQD LOAD	415
AN674A -3900	13	1/4 -28-3400	235	NO REQD LOAD	435
AN674A -3850	14	1/4 -28-3400	235	NO REQD LOAD	435

RIGGING DIAGRAM - WING AND EMPENNAGE

RESTRICTED

T.O. NO. 01-70AB-2

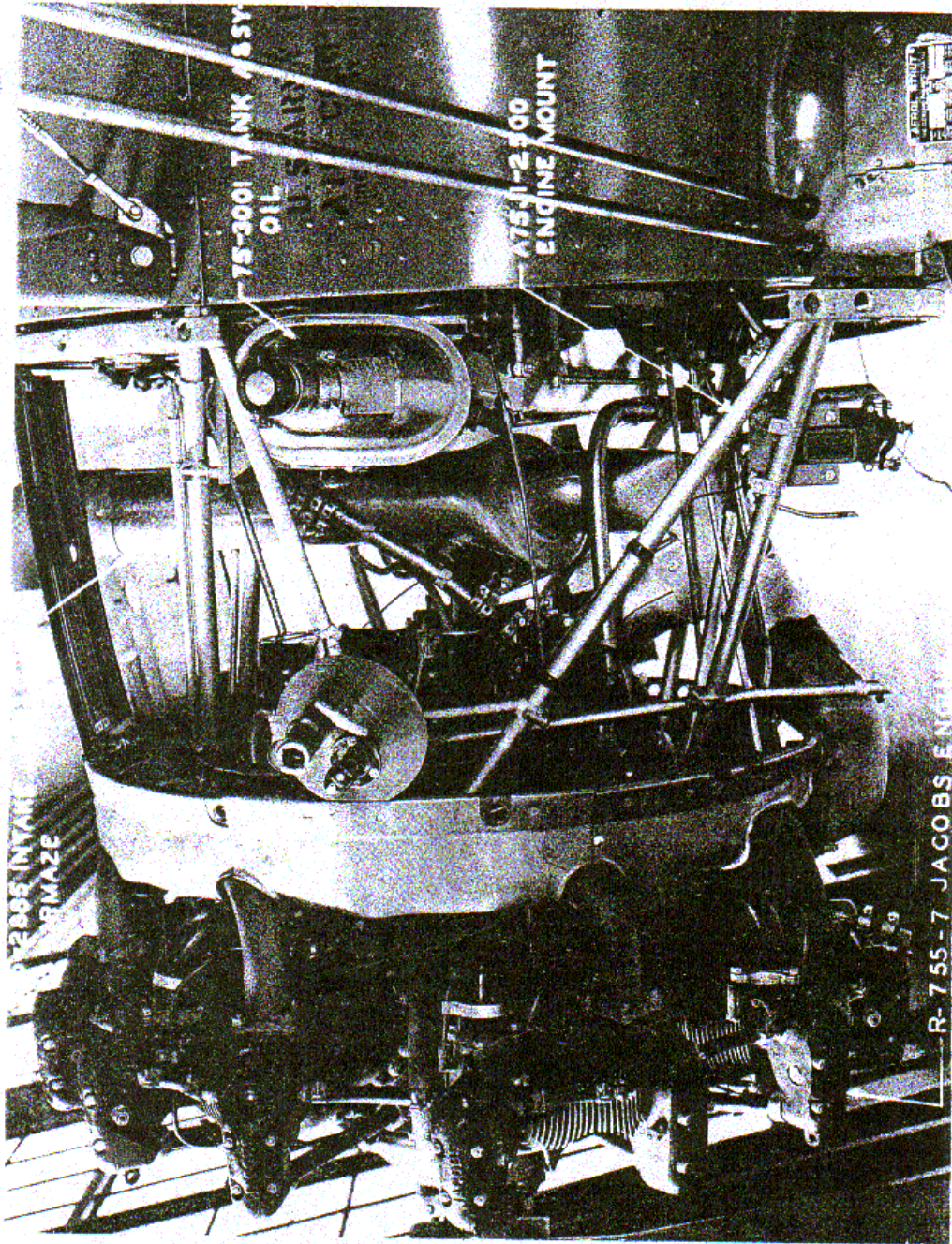


FIG. 32-MODEL PT-18 AIRPLANE-POWER PLANT-LEFT SIDE

RESTRICTED

T.O. NO. 01-70AB-2

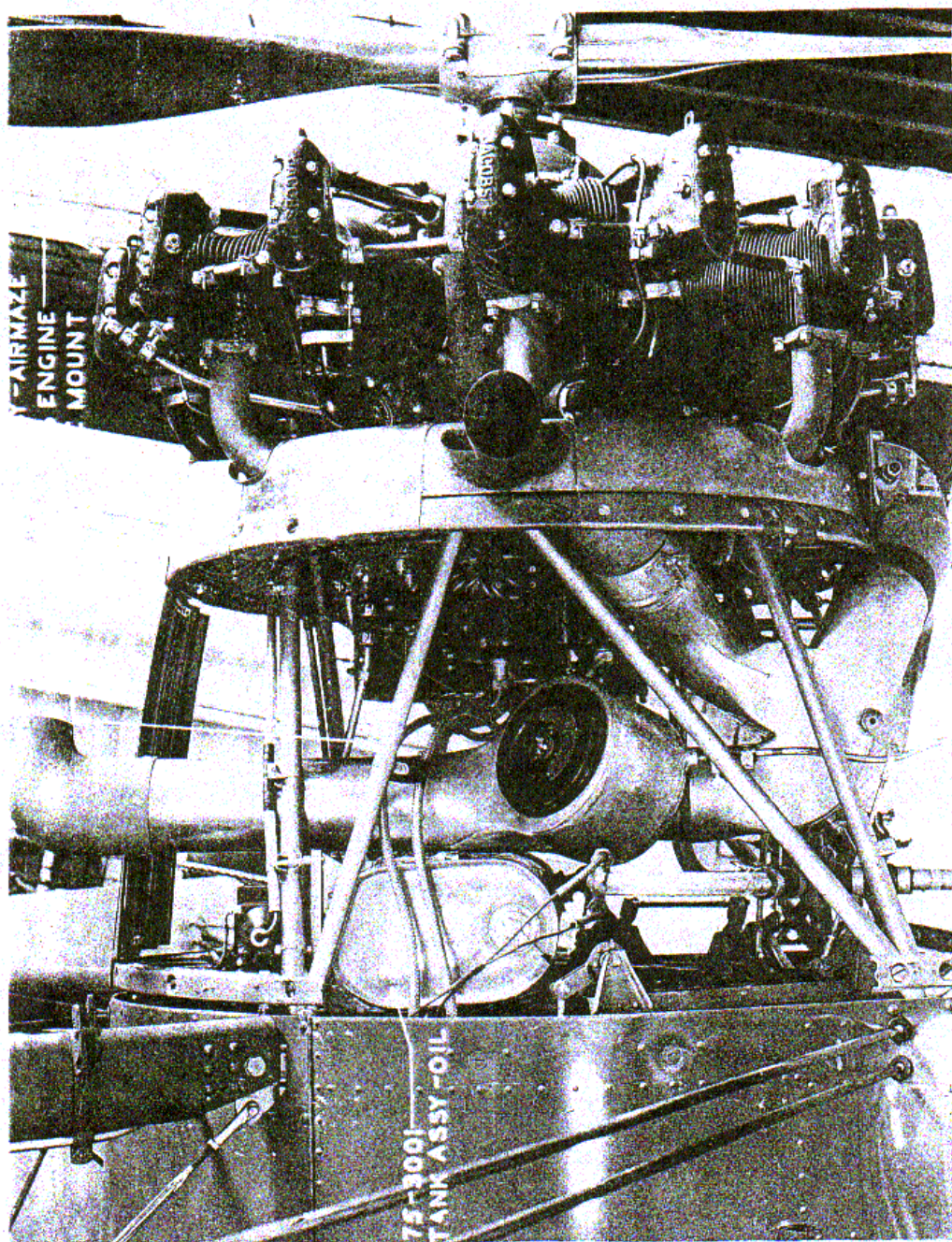
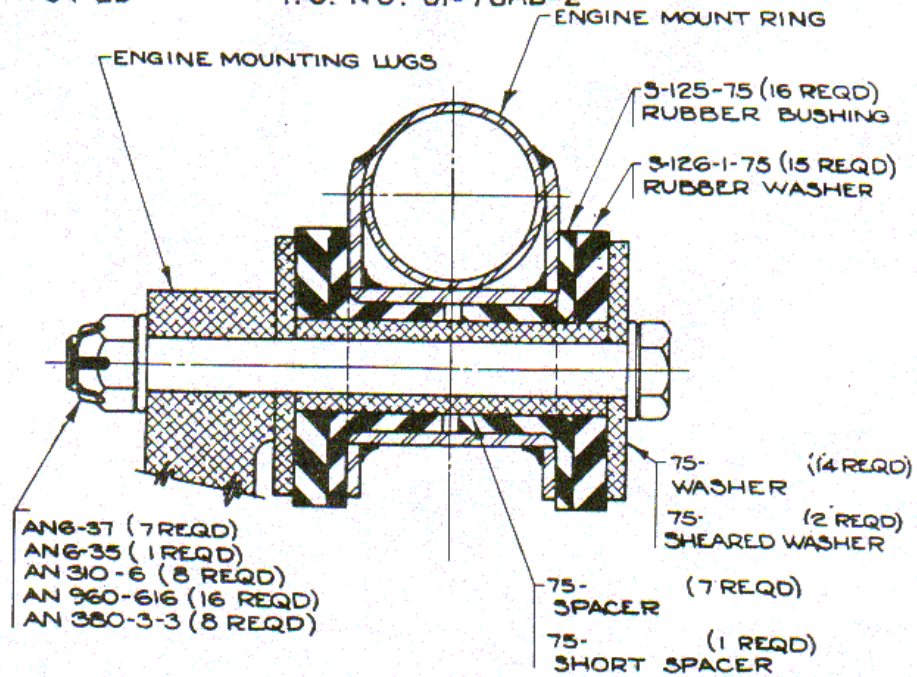


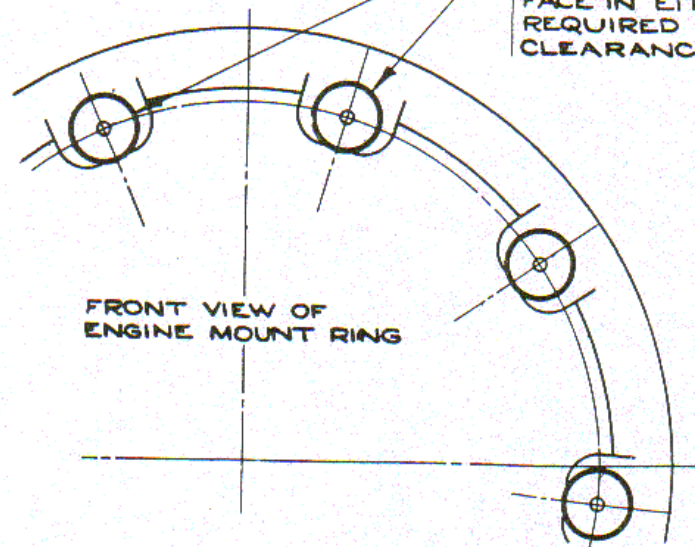
FIG. 33 - MODEL PT-18 AIRPLANE-POWER PLANT - RIGHT SIDE

RESTRICTED

T.O. NO. 01-70AB-2



INSTALL 75- SPACER WITH SHORT BOLT AND NO RUBBER WASHER ON REAR FACE IN EITHER LUG AS REQUIRED FOR MAGNETO CLEARANCE

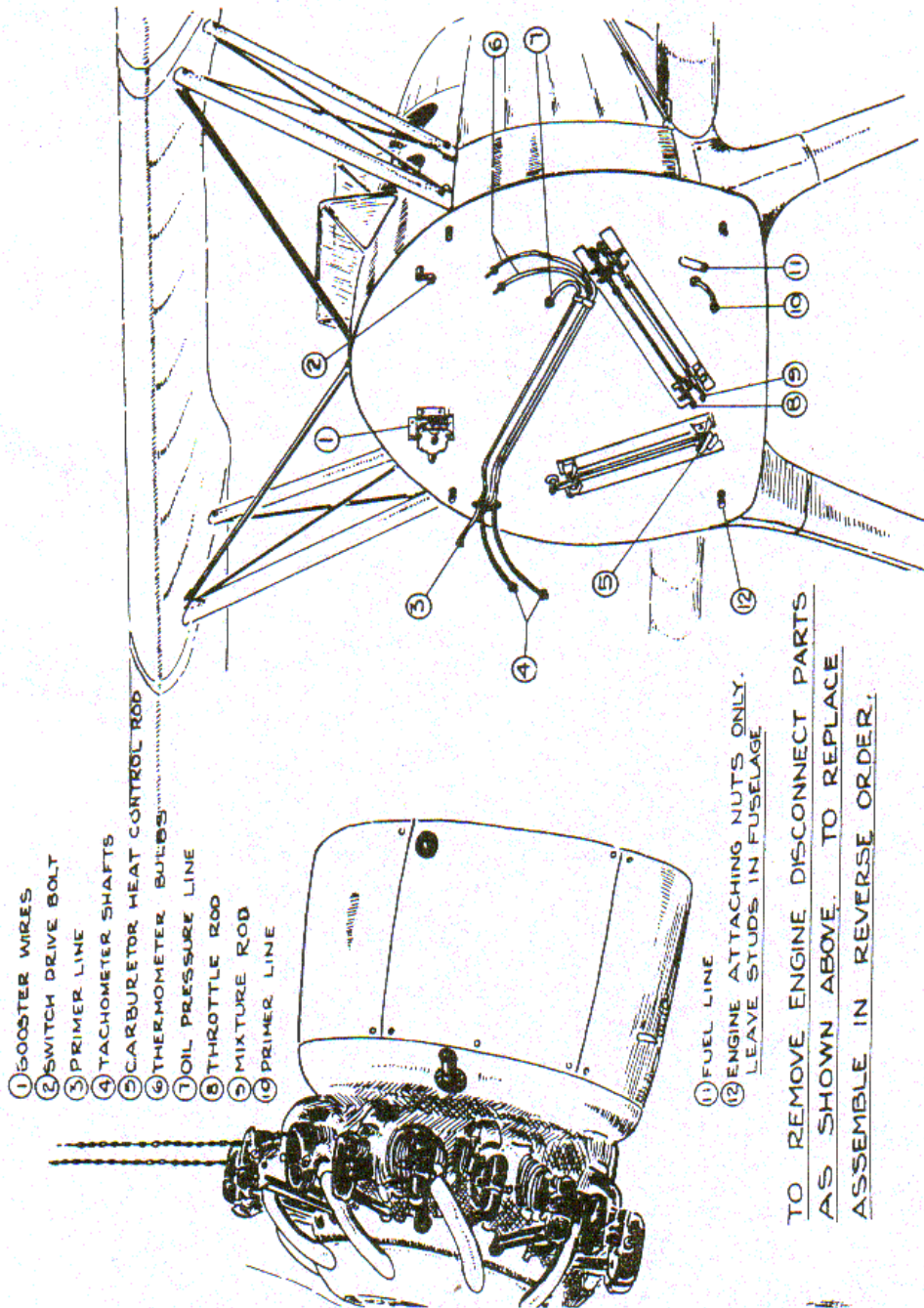


FRONT VIEW OF ENGINE MOUNT RING

FIG.34-ENGINE MOUNT SHOCK ABSORBER INSTALLATION

RESTRICTED

T.O. NO. 01-70AB-2



- 74 -

RESTRICTED

FIG.35-ENGINE SECTION CHANGE METHOD

9. Engine Controls (See Figures 36, 37, and 38).

All engine control rod ends are ball bearing Fafnir No. REB3N with the exception of the rod ends at the B-13 engine control units in each cockpit. All bellcranks are mounted on ball bearing assemblies, Fafnir No. BCU4. The B-13 units operate both throttle and mixture controls from either cockpit. The spark control on the magneto is wired in the advance position. The carburetor air heater valve is operated by a linkage similar to throttle controls from an AN-4010 shutter control unit located between the cockpits and accessible to both pilots. The direction of operation is forward for "Open Throttle", "Rich Mixture", and "Cold Carburetor Air".

10. Propeller and Hub.a. General:

(1) PT-13E (R-680-11) Lycoming or McCauley ground adjustable pitch propeller. Lycoming hollow steel blades, part No. FO-200806, and McCauley solid steel blades, part No. SS-135-6, are suitable for installation in Standard Air Corps hub, part No. 39D3592.

(2) PT-17 (R-680-5) McCauley or Lycoming ground adjustable pitch propeller. Lycoming hollow steel blades, part No. FO-200806, and McCauley solid steel blades, part No. SS-135-6, are suitable for installation in Standard hub, part No. 39D3592.

(3) PT-18 (R-755-7) McCauley ground adjustable pitch propeller. Two solid steel blades, part No. SS-135-6, installed in Standard Air Corps hub, part No. 39D3592.

b. Engine Roughness or Vibration: Should engine roughness or vibration develop after some time in service, which is traceable to ragged or uneven power impulses, the following procedure is recommended:

(1) Remove propeller and carefully check for balance, track, and blade angle.

(2) Remove locating screw on the engine crankshaft.

(3) Replace propeller at a position 180° from the original. This should either result in improved operation or slightly worse vibration.

(4) Should this trial be unsuccessful, the next step consists in rotating the propeller on the shaft 90° more or a total of 270°.

(5) The last trial should consist of turning 180° from (4) above.

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T.O. NO. 01-70AB-2

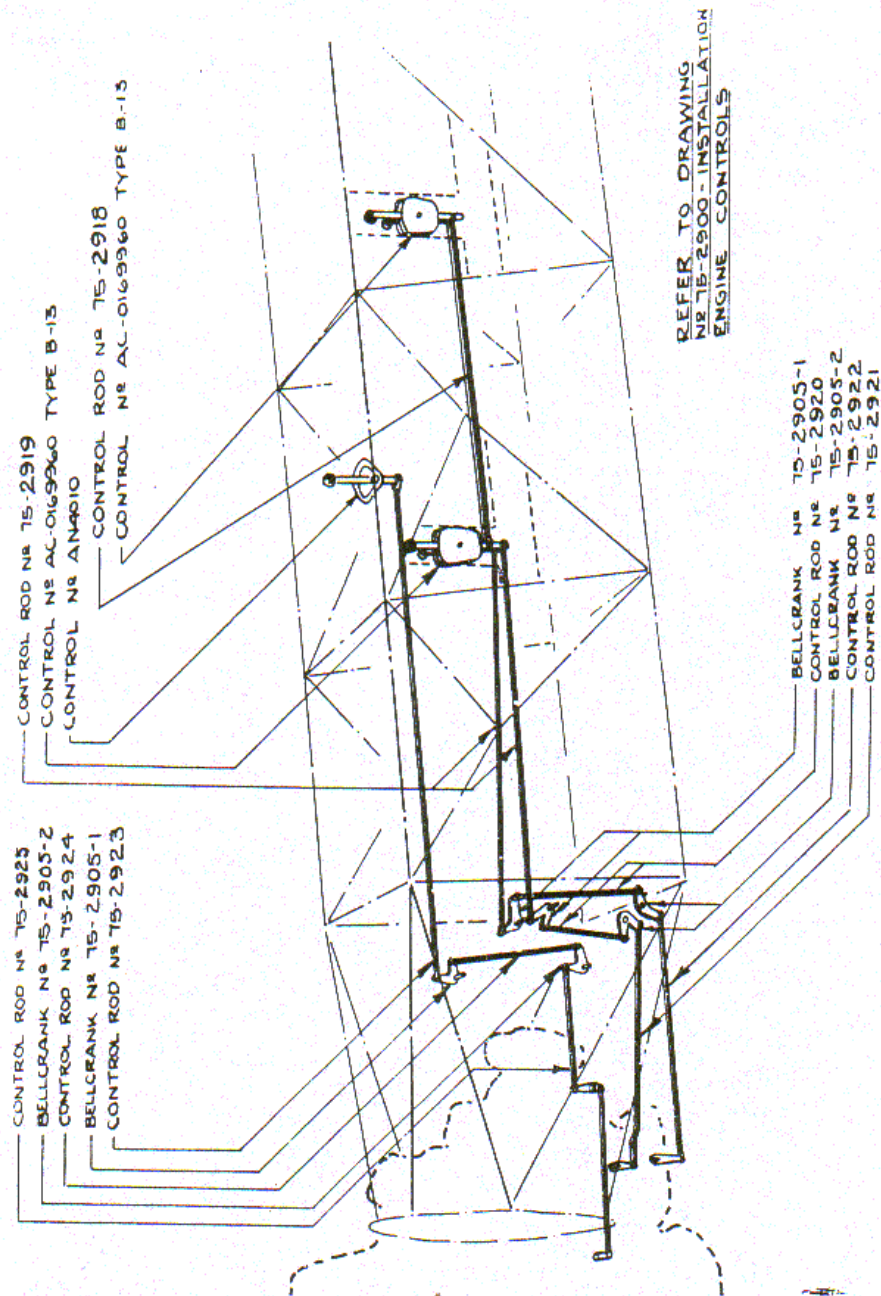


FIG.36-ENGINE CONTROLS INSTALLATION-MODEL PT-13B

RESTRICTED

T.O. NO. 01-70-AB-2

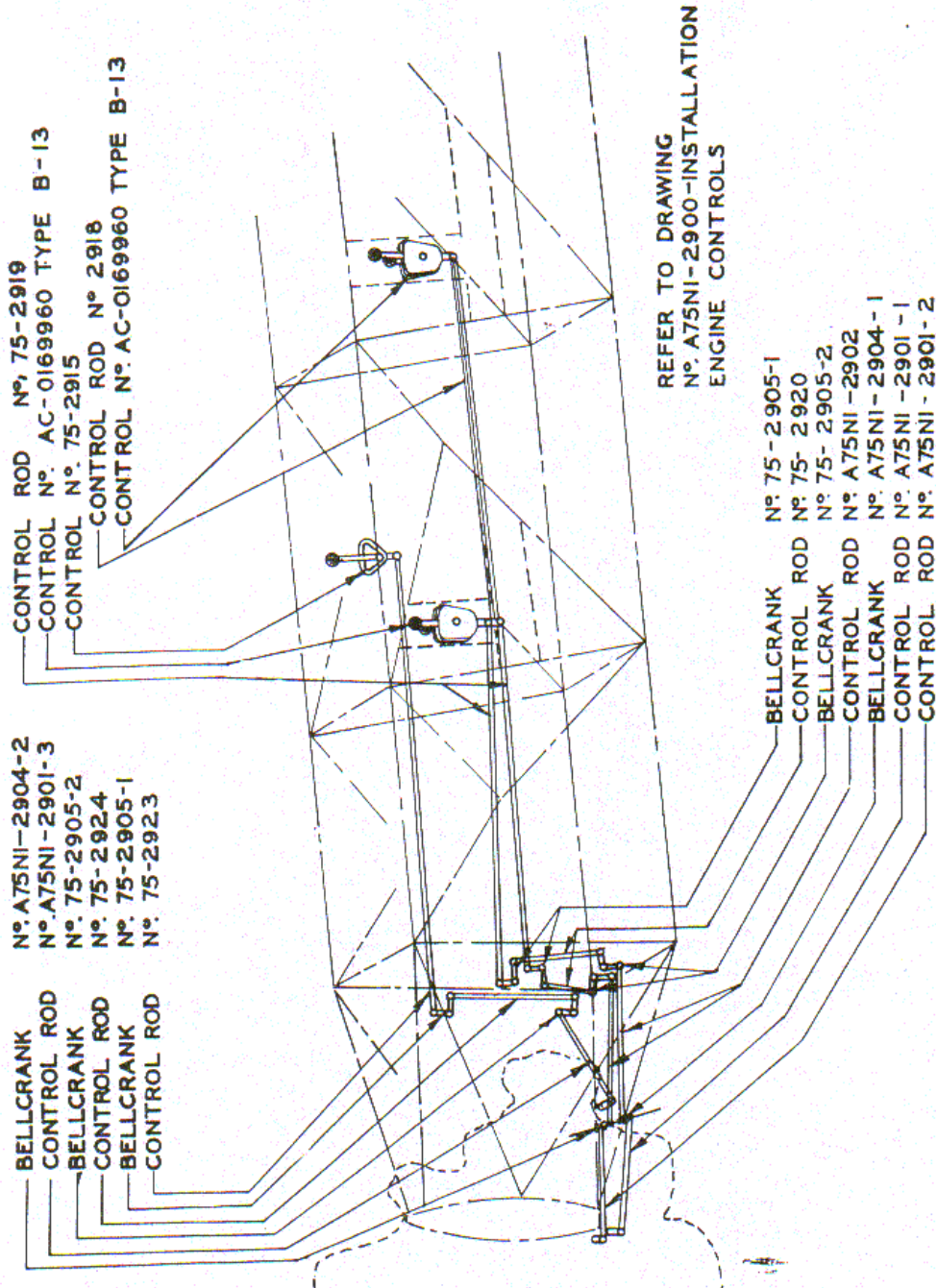


FIG.37- ENGINE CONTROLS INSTALLATION-MODEL PT-17

RESTRICTED

T.O. NO. 01-70AB-2

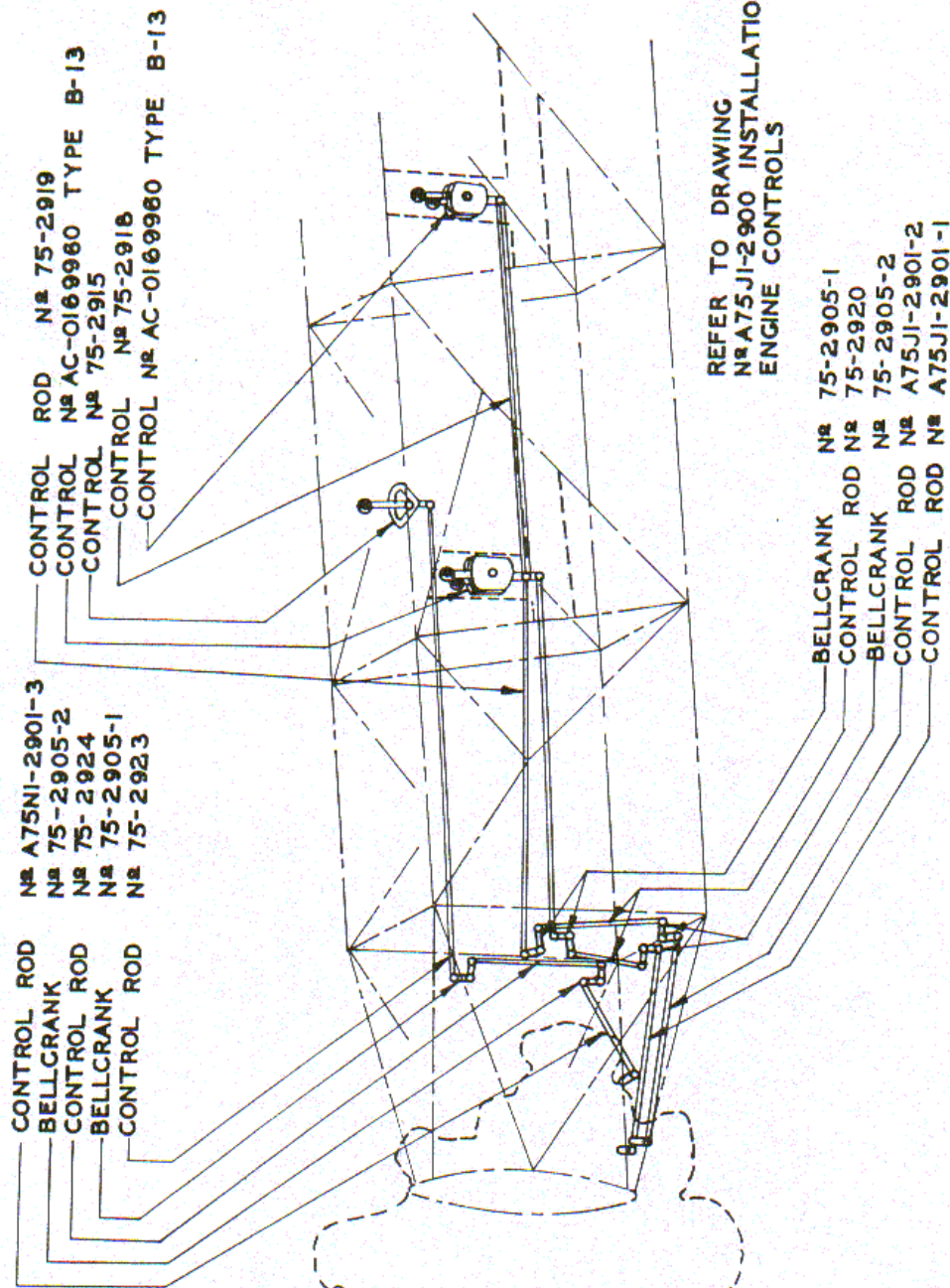


FIG.38 - ENGINE CONTROLS INSTALLATION-MODEL PT-18

11. Starting System.

(Installation, maintenance and repair instructions for starters are contained in T. O. No. 03-5CA-1.

a. The starting system for the PT-13B and PT-17 consists of a Type B-11 hand inertia starter. The PT-18 starting system consists of a Type B-9 hand inertia starter. All three models have an extension shaft protruding through a small panel in the left side engine cowling. The starter clutch, terminating in a pull handle is located on this panel convenient to ground personnel.

12. Oil System:

(See Figures 39, 40, 41 and T. O. No. 01-70AB-1)

The oil tank is constructed of 3S aluminum alloy sheet assembled by welding. A flange is provided for a Type C-2 electric oil heater. The filler neck, with cap and adapter assembly, Air Corps Drawing 0153682, is located on the left side and is accessible from the outside. The remainder of the system consists of one-inch O.D. aluminum alloy oil-in, oil-out and drain lines; drain "Y" No. 32B527, with drain line leading clear of cowling; thermometer wells in the oil-in line; and two aluminum alloy vent lines. One vent line runs from the engine to the top of the tank, - the second, from the engine down and out through the cowling. The oil pressure gage line is one-quarter inch O.D. copper tubing. (For cold weather operation of oil pressure gage, see T. O. No. 05-40-10.

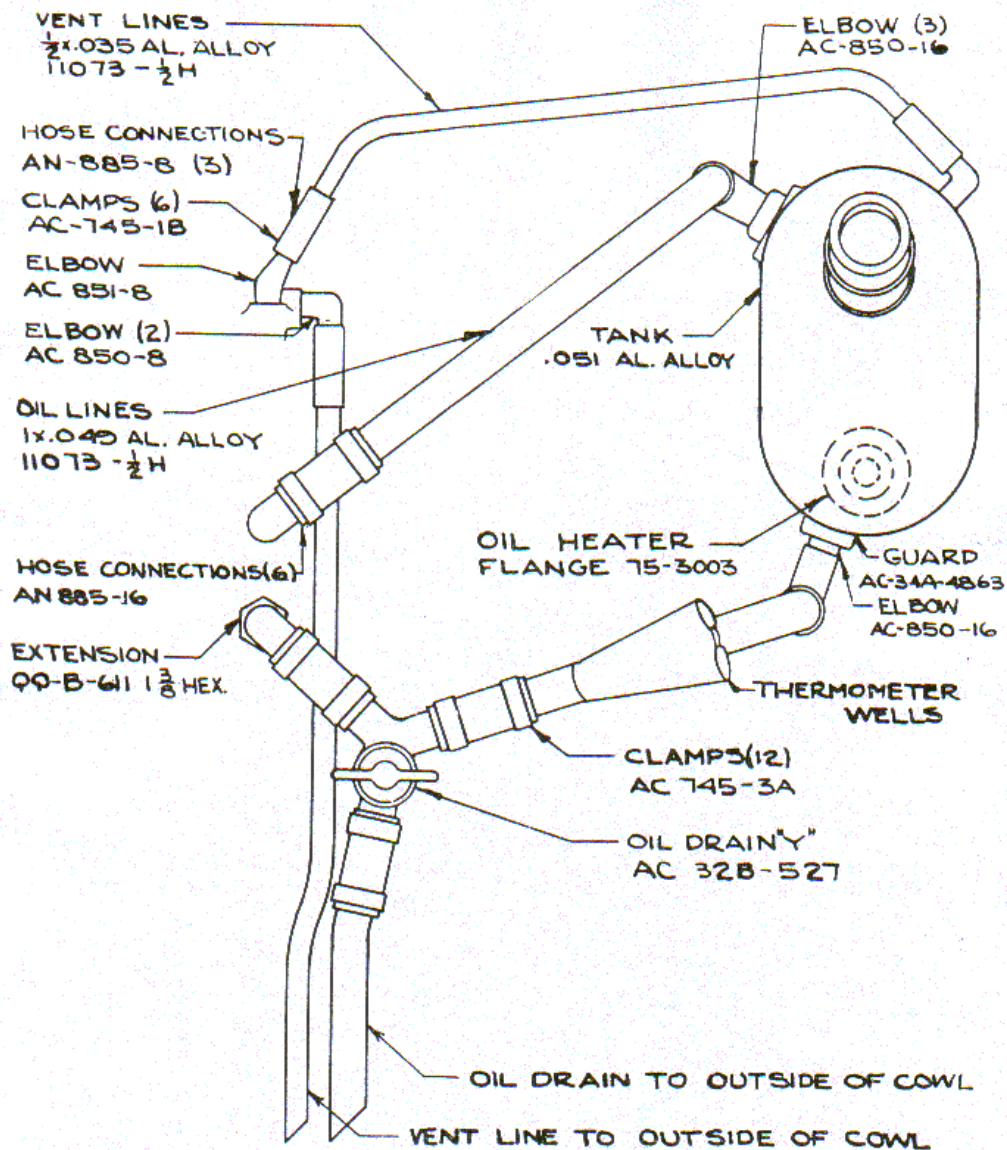
13. Fuel System: (See T. O. No. 01-70AB-1)

a. General: The fuel system consists of a single gravity tank containing the entire fuel supply, sight type fuel gage, fuel valve, fuel strainer, primer, and lines and fittings. No reserve supply of fuel is provided. The main units comprise the following:

(1) Tank: The fuel tank is constructed of 3S aluminum alloy sheet, assembled by riveting and welding. All surfaces of the tank are beaded and the baffle rivets are sealed against leakage by welding. All seams are torch welded. Removable sumps are provided at the rear on each side of the tank. To prevent uncovering the fuel tank outlets in a dive, auxiliary lines have been connected to fittings in the front end of the tank, ahead of the sumps. Coarse mesh finger strainers are silver soldered to the outlet fittings at all four connections. The screens in the sumps in the tank are separate from and may be removed for cleaning, etc., without disturbing the fuel lines. The filler neck is equipped with cap and adapter assembly, Air Corps Drawing 0153682.

RESTRICTED

T.O. NO. 01-70AB-2



REFER TO DRAWING № 75-3000
OIL SYSTEM INSTALLATION

FIG.39 OIL SYSTEM DIAGRAM-MODEL PT-13B

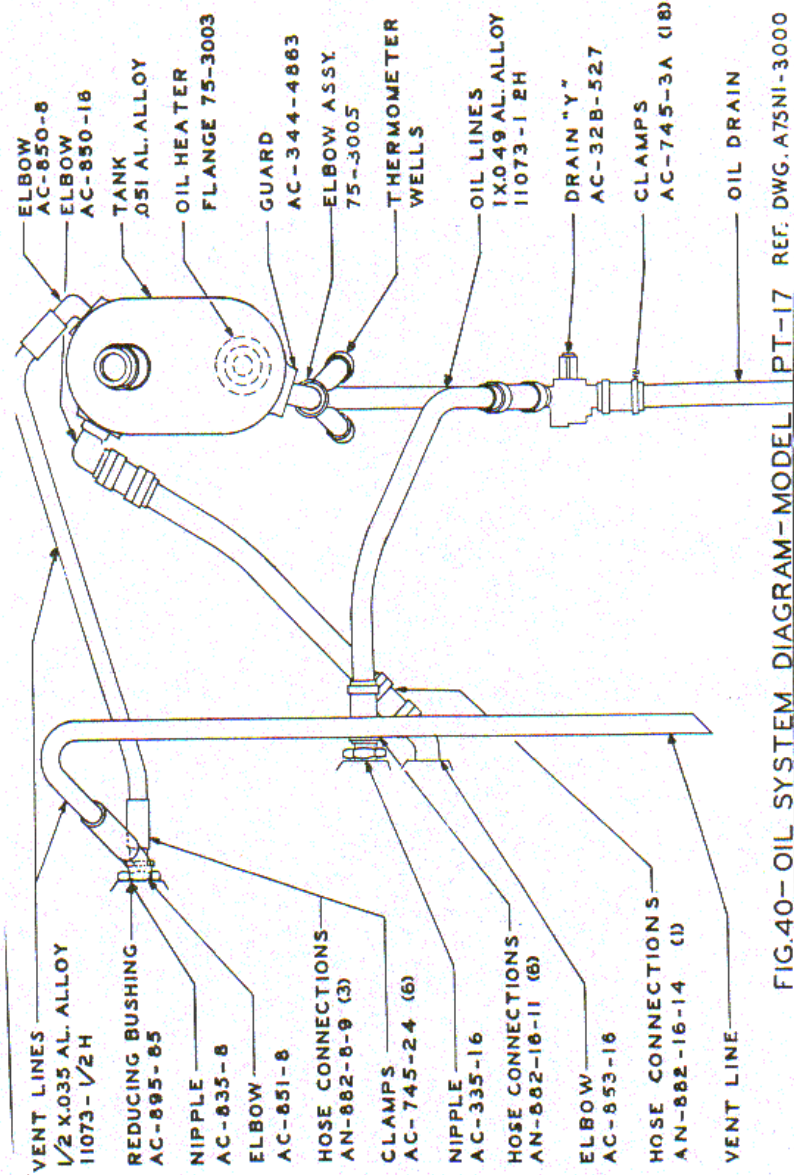


FIG.40-OIL SYSTEM DIAGRAM-MODEL PT-17 REF. DWG. A75NI-3000

T.O. NO. 01-70AB-2

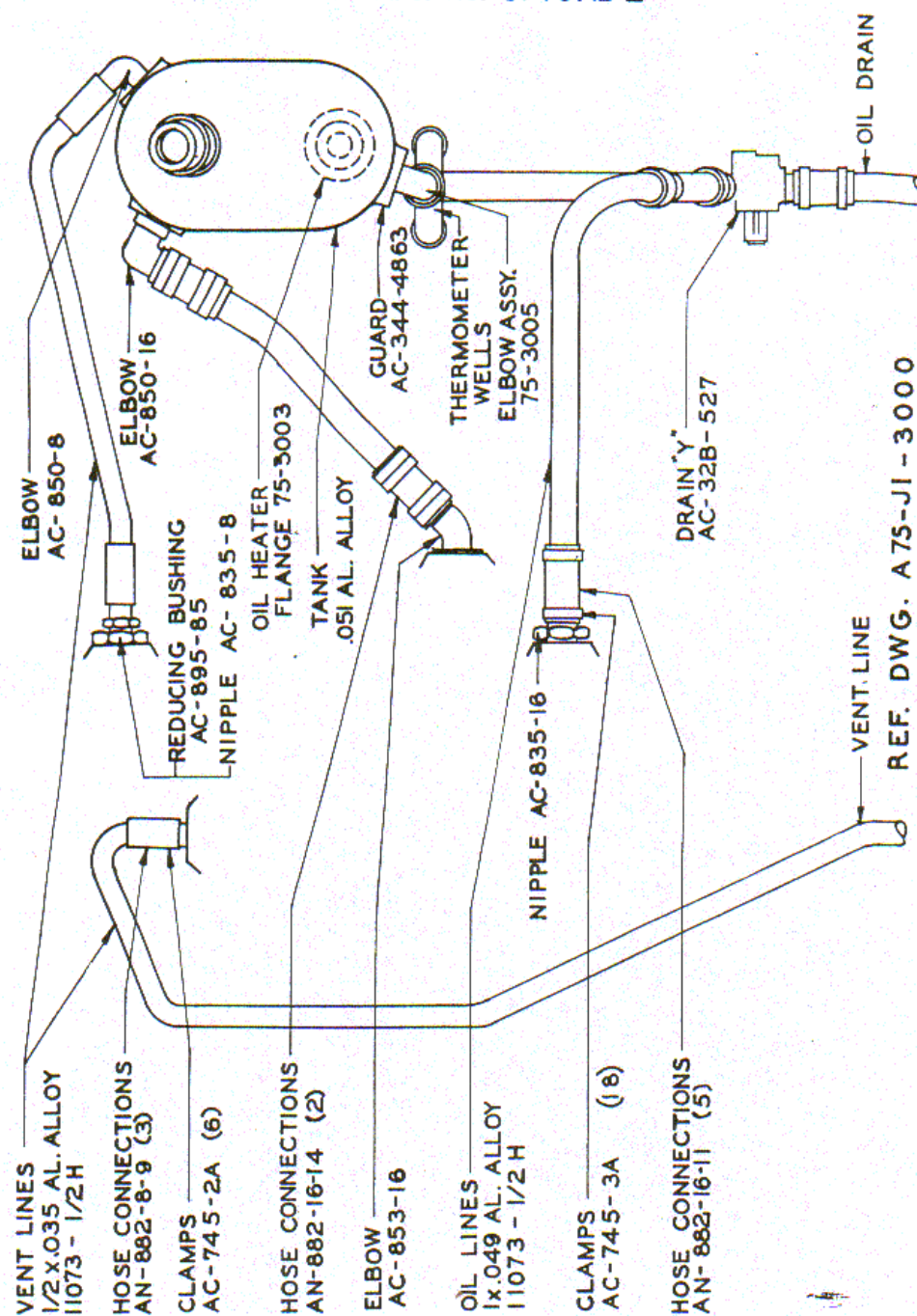


FIG. 41 - OIL SYSTEM DIAGRAM - MODEL PT-18

RESTRICTED

(2) Fuel Gage: A sight type fuel gage is provided in the bottom of the tank which is visible to both members of the crew. It is calibrated in fourths of capacity for level flight only.

(3) Fuel Valve: See T. O. No. 01-70AB-1.

(4) Fuel Strainer: The fuel strainer is located in the lowest point of the fuel valve to carburetor line and is accessible through a hole in the bottom cowling.

(5) Primer: The primer is located on the starter panel in the left side engine cowling for use from the ground. The primer suction line is connected to the fuel strainer.

(6) Fittings: All fuel line fittings are Air Corps AC-811 type except fittings having male pipe threads. Fittings with male pipe threads are made of brass. All sleeves are made of copper-silicon alloy.

(7) Vent Line: The vent is drained through an auxiliary line for overflow. It runs from the vent connection at the left front of the tank to the right side of the center section and thence to the trailing edge.

(8) Lines: Fuel lines are one-half inch aluminum alloy tubing; primer lines are one-eighth inch copper tubing; and vent lines are one-quarter inch aluminum alloy tubing.

b. To Replace Fuel Tank:

(1) Disconnect all fuel lines.

(2) Remove screws holding down the gap covers.

(3) Remove the auxiliary compression strut tube at the centerline of the tank and back off strap turnbuckles to separate them.

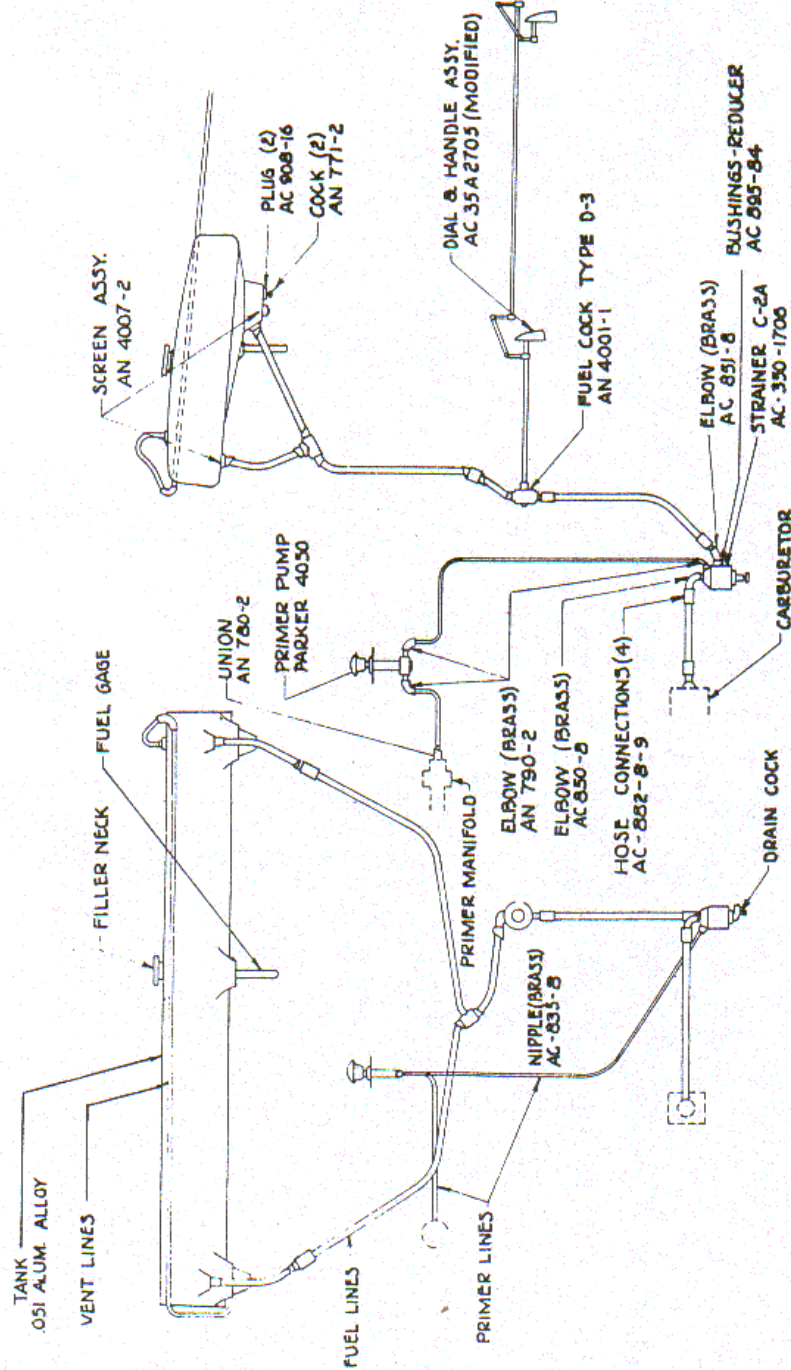
(4) Re-installation is the reverse of the above process.

(5) The felt pads should be inspected for wear and replaced if necessary.

(6) In tightening the tank straps they should be pulled up sufficiently snug to steady the tank but not enough to noticeably deform the spars.

RESTRICTED

T.O. NO. 01-70AB-2



ALL FITTINGS ARE AC-811
EXCEPT AS NOTED

FIG. 42 - FUEL SYSTEM DIAGRAM

RESTRICTED

T.O. NO. 01-70AB-2

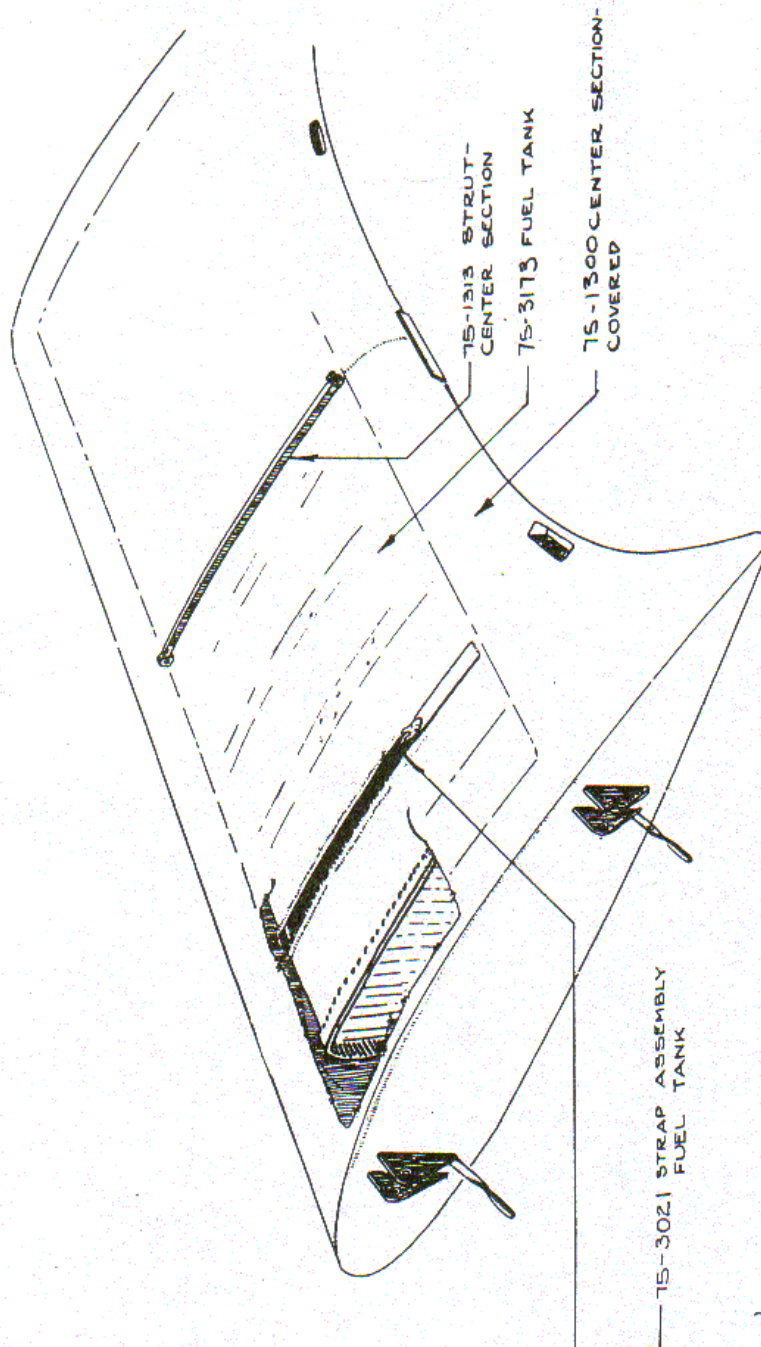


FIG. 43-FUEL TANK INSTALLATION

RESTRICTED

T. O. No. 01-70AB-2

(7) Care should be exercised in replacement of the gap covers so as not to damage slots or threads of the machine screws.

(8) This installation is shown on Figure 43.

14. Engine and Aeronautical Instruments (See Figure 44.)

a. General:

(1) Instrument Boards: Instrument boards are mounted on Lord shock absorber units, four to each board. In both front and rear installations, a fixed base forms the frame which supports the board. The board consists of two parts: A panel to which the instruments are attached, and a light aluminum alloy shield to which is cemented a sponge rubber crash pad of approximately 1-1/2 inches in thickness. The shield is hinged to the panel and secured in place by standard AN-415 lock pins. These pins are locked in place by the use of a standard .040 copper safety wire. See Figure 45.

(2) Instruments: The front and rear panels in PT-13B, PT-17 and PT-18 airplanes are identical. A bank and turn indicator and a rate of climb indicator are mounted on the rear panel only; plates are provided to cover the openings for these instruments in the front panel. The tachometer is mounted on the fixed base to the right of the instrument board. Following is a list of the instruments installed:

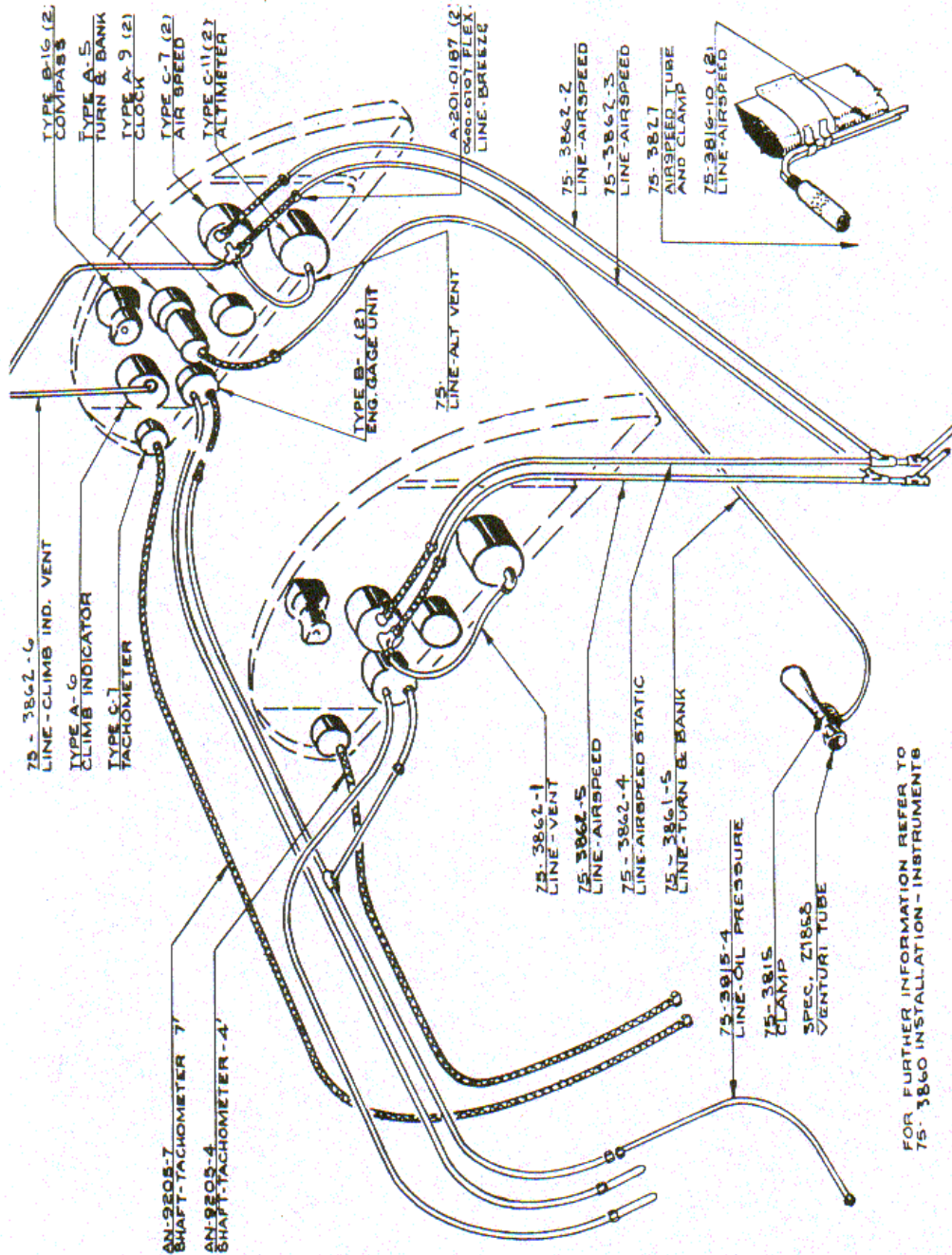
2 ea - Compass, Type B-16 - T. O. No. 05-15-2.
2 " - Airspeed Indicator, Type C-7 - T. O. No. 05-10-2.
1 " - Bank & Turn Indicator, Type A-5 - T. O. No. 05-20-2.
1 " - Rate of Climb Indicator, Type A-6 - T. O. No. 05-20-26.
2 " - Engine Gage Unit, Type B-2 - T. O. 05-75-1. ϕ
Note: Fuel Pressure dial is painted over
2 " - Clock, Type A-9 - T. O. No. 05-1-9.
2 " - Tachometer, Type C-7 - T. O. No. 05-50-1. ϕ
2 " - Altimeters, Type C-11 - T. O. No. 05-20-10. ϕ

(3) Instrument Marking: (a) The instruments in the front and rear cockpits of the Model PT-13B airplane are marked as follows:

Tachometer	Red Line	2100
	Green Arc	1700 - 1840
Engine Gage Unit	"Oil in Temp."	
Oil Temperature	Green Arc	50 - 70
Oil Pressure	Red Line	80
	Red Line	50
	Green Arc	60 - 80
Airspeed	Red Line	(186 M.P.H.)

RESTRICTED

T.O. NO. 01-70AB-2



FOR FURTHER INFORMATION REFER TO
75-3860 INSTALLATION - INSTRUMENTS

FIG. 44 - INSTRUMENT INSTALLATION

RESTRICTED

T. O. NO. 01-70AB-2

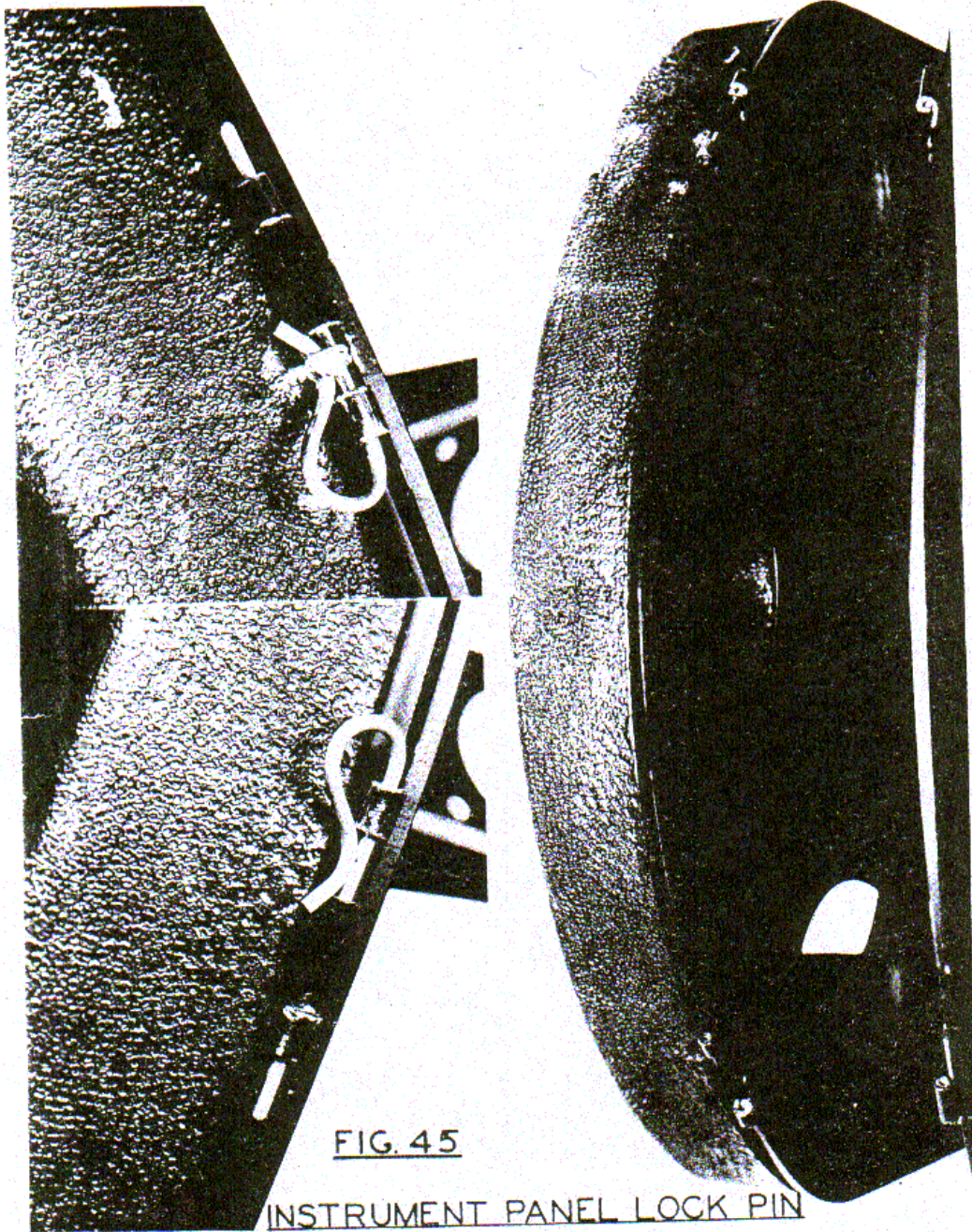


FIG. 45

INSTRUMENT PANEL LOCK PIN

RESTRICTED

RESTRICTED

T. O. No. 01-70AB-2

(b) The instruments in the front and rear cockpits of the Model PT-17 airplane are marked as follows:

Tachometer	Red Line	2075
	Green Arc	1680 - 1815
Engine Gage Unit	"Oil in Temp."	
Oil Temperature	Green Arc	50 - 70
Oil Pressure	Red Line	90
	Red Line	60
	Green Arc	70 - 90
Airspeed	Red Line	(186 M.P.H.)

(c) The instruments in the front and rear cockpits of the Model PT-18 airplane are marked as follows:

Tachometer	Red Line	2000
	Green Arc	1650 - 1750
Engine Gage Unit	"Oil in temp."	
Oil Temperature	Green Arc	50 - 70
Oil Pressure	Red Line	60
	Red Line	90
	Green Arc	65 - 85
Airspeed	Red Line	(186 M.P.H.)

(4) Pitot Static Tube: A Type B-5 pitot static tube is located on the left front interplane strut of the PT-13B, PT-17 and PT-18 airplanes about thirty-six inches (36") above the lower wing.

(5) Airspeed Drain Tees: Drain tees are provided for the airspeed lines located at the root of the lower front wing spar and accessible from the inspection door at the leading edge.

b. Installation and Disassembly: To replace or service instruments, remove lock pins and hinge crash pads down. To remove instrument boards, take out screws holding shock absorber units together and disconnect necessary lines. When assembling crash pad caution must be taken to install lock pins and to lock pins in place with standard .040 copper safety wire. See Figure 45.

15. Surface Controls.

a. Elevator and Aileron Controls: This control unit consists of two sticks supported on a large diameter aileron torque tube. The elevator control is by push-pull tube, in three sections, from the front stick to the elevator horn. The aileron control is by three push-pull tubes, the first from the aileron control horn at the central control to an idler located in the wing opposite the inner end of the aileron, the second from the idler to a bellcrank located approximately in a line with the center of the aileron spar, and the third is a short link projecting through the rear wing spar to the aileron horn.

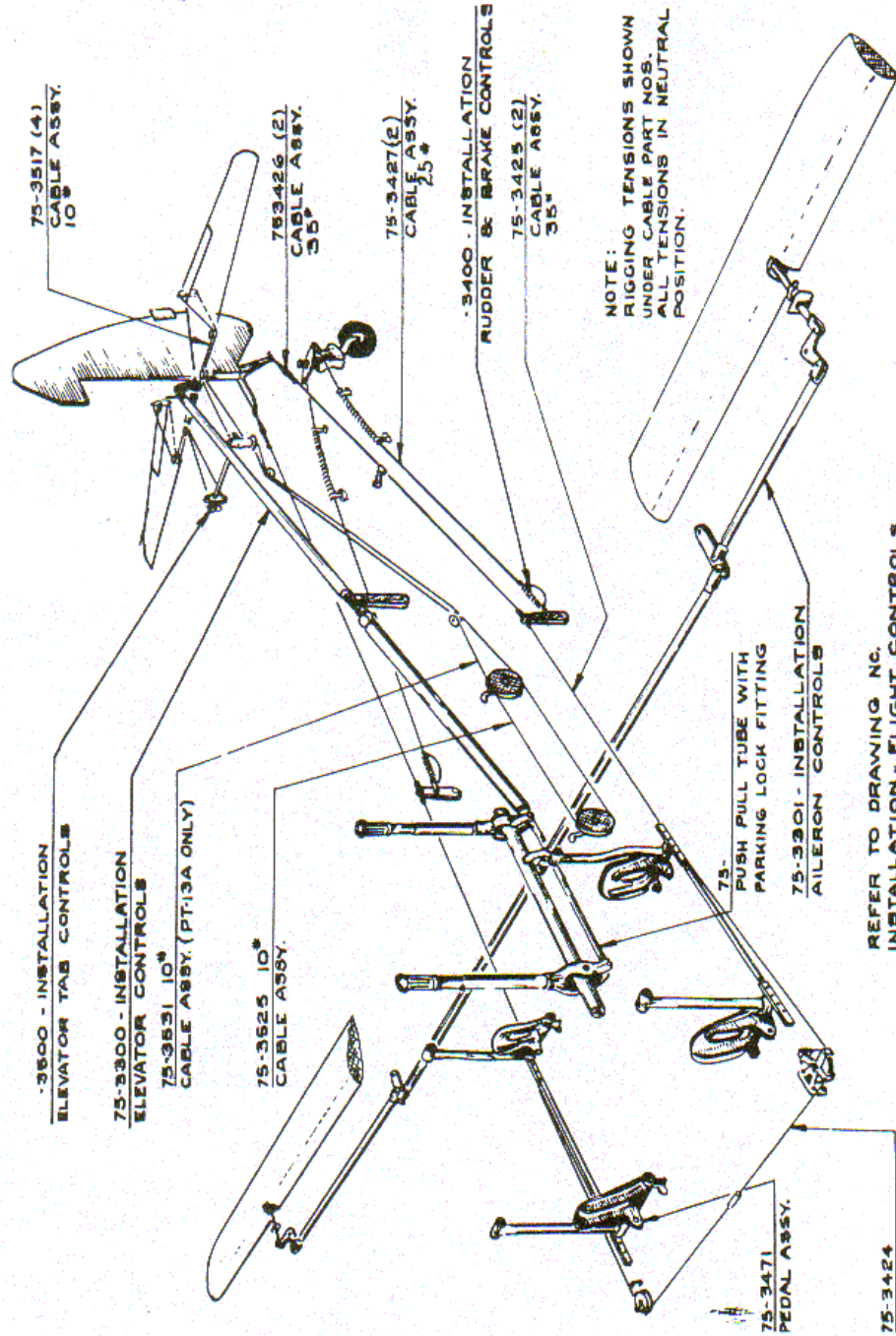
b. Rudder and Tail Wheel Controls: The rudder pedals are supported on cantilever hangers, interconnected by push-pull tubes forming part of a continuous cable and pulley system. The tail wheel control cables are attached to the rudder cable idler mast at the rear of the rear cockpit and run direct to the tail wheel post mast, passing through flexible housing at the point where the tail wheel assembly is attached to the fuselage. These flexible housings are of a coiled flat wire spring type enclosed by a flexible metal tube packed with graphite grease.

c. Elevator Tab Controls: These controls consist of two separate systems of cables from the tab masts to a torque shaft located at the horizontal stabilizer front spar. This torque shaft is driven by a non-reversing worm gear box. See Figure 47. The gear box is driven by a continuous cable and pulley system from the rear trim tab control lever in the rear cockpit. The levers in the front and rear cockpits are interconnected by a continuous cable, operating over drums to which the cable is anchored. Indicators calibrated to read in degrees of tab angle up and down, from neutral, are provided in both cockpits.

d. Bearings: All bearings in the elevator and aileron system are sealed ball bearings, and all bearings in the rudder control system proper are likewise ball bearing with the exception of the brake pedals.

RESTRICTED

T.O. NO. 01-70AB-2



REFER TO DRAWING NO.
75-3301-1
INSTALLATION - FLIGHT CONTROLS

FIG. 46 - SURFACE CONTROLS DIAGRAM

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RESTRICTED

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T.O. NO. 01-70AB-2

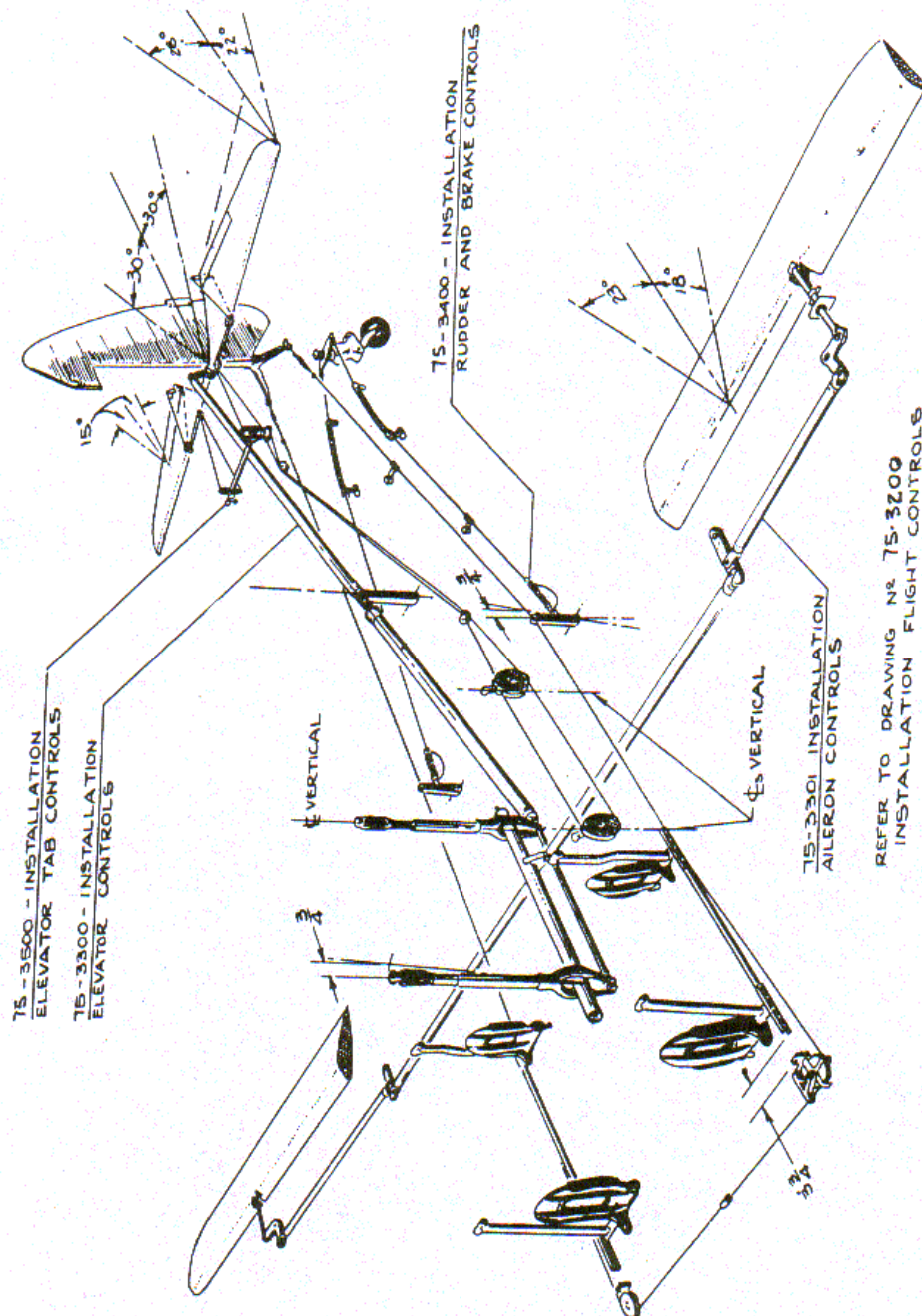


FIG. 47 - CONTROL CABLE RIGGING TENSIONS

RESTRICTED

T.O. NO. 01-70AB-2

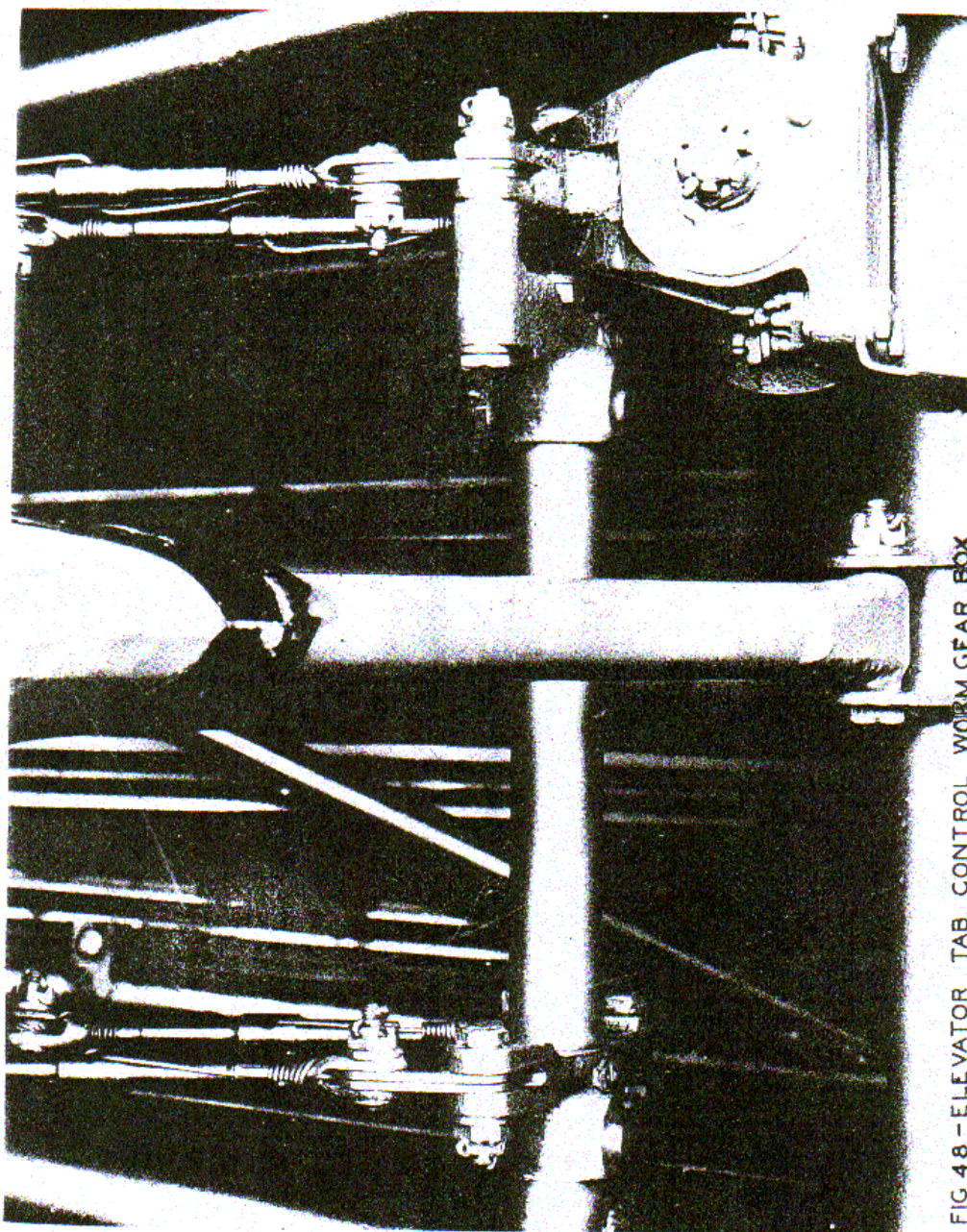


FIG 48 -ELEVATOR TAB CONTROL WORM GEAR BOX

RESTRICTED

T. O. No. 01-70AB-2

16. Fire Extinguishers - General.

For information and instruction applicable to the Type A-2 hand fire extinguisher in this airplane, see T. O. Nos. 03-45B-1, 03-45-1 and 01-70AB-1.

17. Fuselage Equipment.

a. General:

(1) Seats and Safety Belts:

See T. O. No. 01-70AB-1.

(2) Baggage Compartment: A baggage compartment made of 9-oz. duck is provided at the rear of the rear cockpit. This compartment is accessible through a hinged door locked by keyless combination lock and secured by wing-head cowlings fasteners. The capacity of this compartment is approximately thirteen (13) cubic feet and sixty (60) pounds. For information covering baggage compartment lock, see T. O. No. 01-70AB-1 and Figure 50, this Handbook.

b. Miscellaneous Equipment: For information applicable to life preserver cushions, surface control locks (parking locks), flight report holder, speaking tube, and rear view mirror, see T. O. No. 01-70AB-1 and Figure 51, this Handbook.

c. Furnishings:

(1) Windshield: Both front and rear windshields are of the flat three-panel type with 3/16 Type I laminated scatterproof glass, mounted with insulating tape in aluminum alloy frames. The windshields are attached to the cowlings with machine screws.

(2) Blind Flying Hood: See T. O. No. 01-70AB-1 and Figure 52, this Handbook.

RESTRICTED

T.O. NO. 01-70AB-2

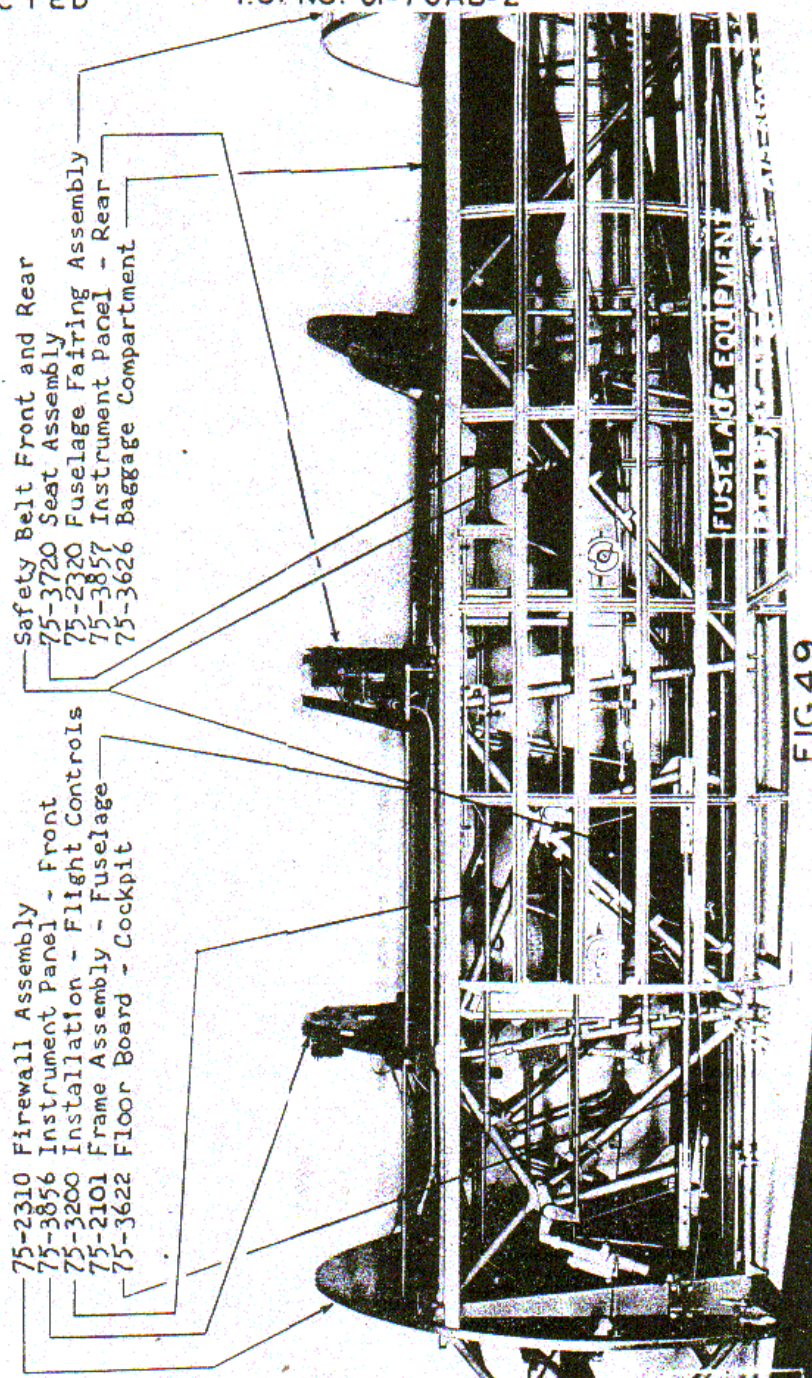
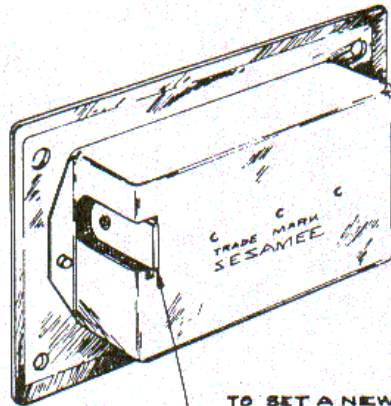


FIG. 49

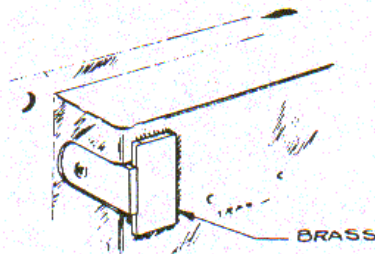
FIG. 49 - FUSELAGE EQUIPMENT INSTALLATION

RESTRICTED

T.O. NO.-01-70AB-2



TO SET A NEW COMBINATION ON LOCK -
PRESS THIS LATCH IN AND TURN DIALS
ON FACE TO DESIRED COMBINATION
NUMBER, THEN RELEASE LATCH. THE
LOCK MUST BE UNLOCKED BEFORE THE
LATCH WILL GO IN.

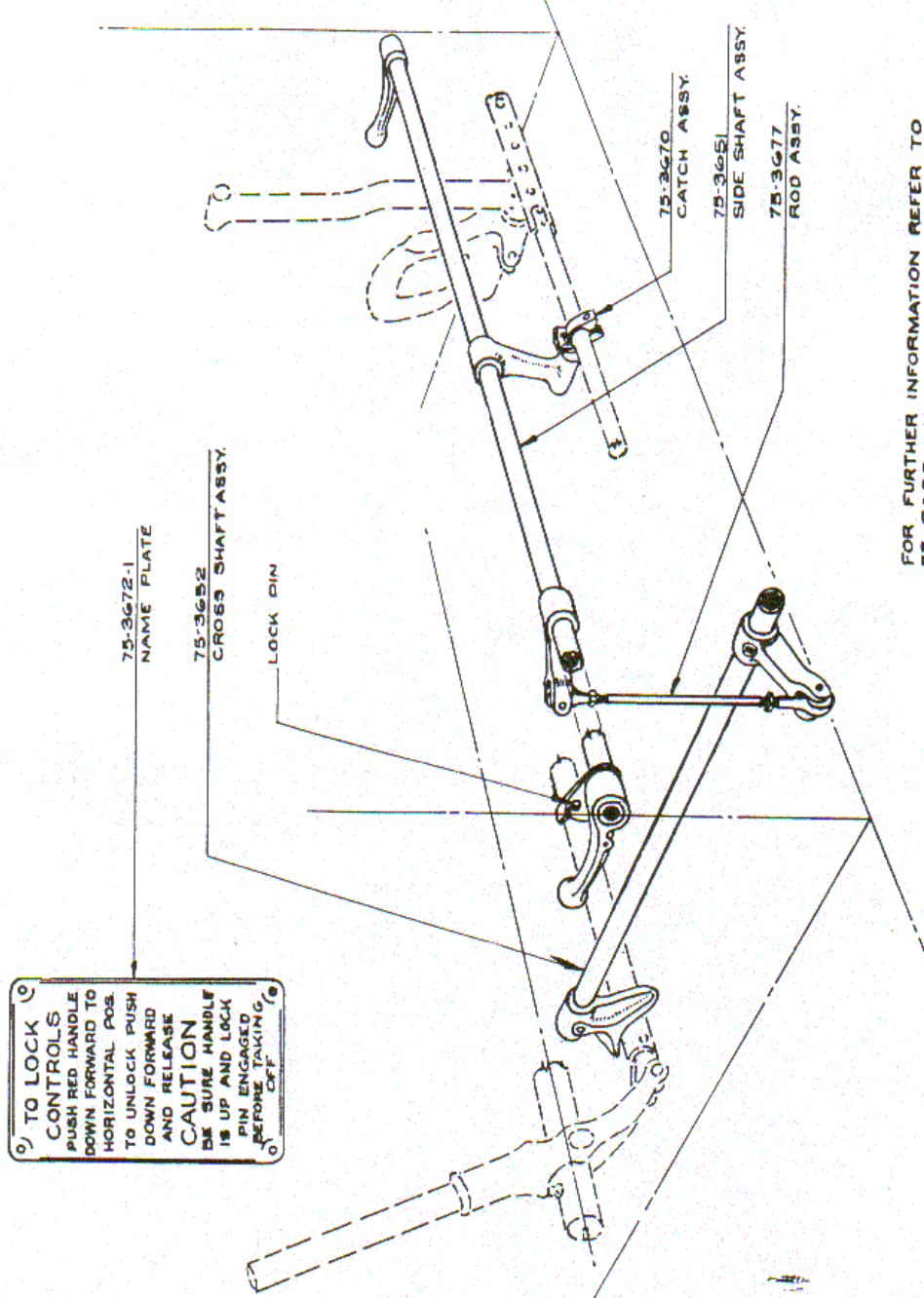


SINCE ANY NEW COMBINATION CAN EASILY
BE GIVEN TO THIS LOCK AS DESCRIBED
ABOVE - A SMALL PIECE OF BRASS
SHOULD BE SOLDERED AS SHOWN
THIS WILL ELIMINATE THE POSSIBILITY
OF ACCIDENTALLY CHANGING THE
COMBINATION.

FIG.50-BAGGAGE COMPARTMENT COMBINATION LOCK

RESTRICTED

T.O. NO. 01-70AB-2



FOR FURTHER INFORMATION REFER TO
75-3650 INSTALLATION-FLT. CONTROL PARK. LOCK

FIG. 51- PARKING LOCK-FLIGHT CONTROLS

RESTRICTED

T.O. NO. 01-70AB-2

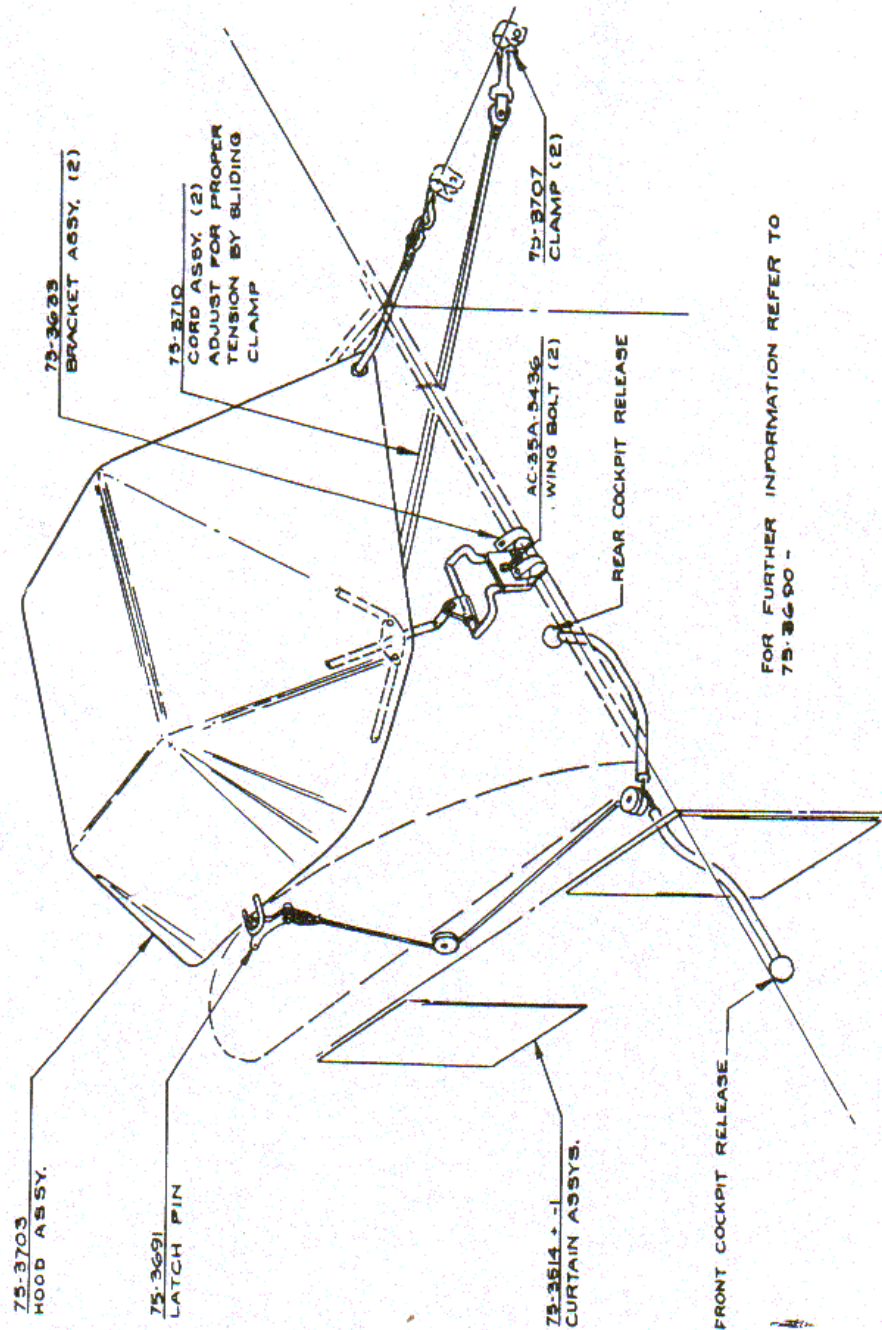


FIG. 52 - BLIND FLYING HOOD

18. Ignition System.

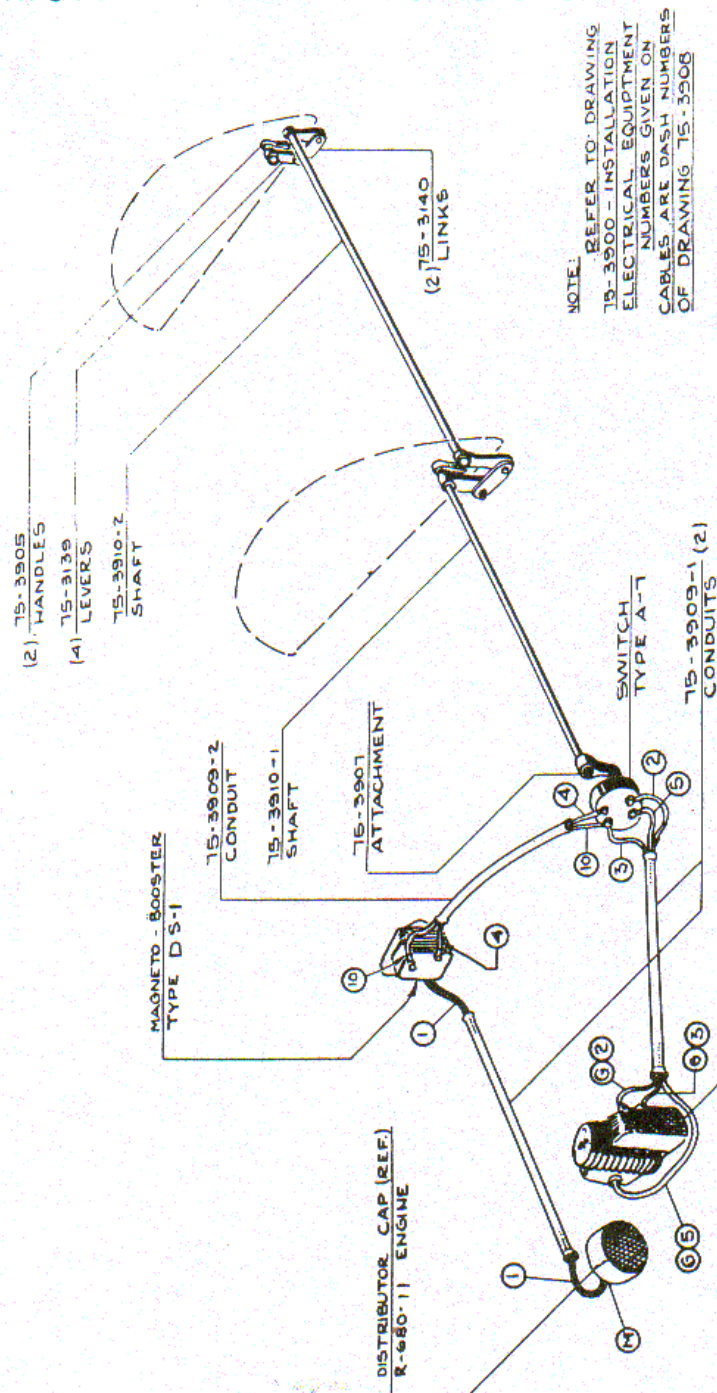
The ignition system consists of an A-7 ignition switch and a Type DS-1 booster magneto located ahead of the firewall. All wiring within the engine section is protected by aluminum alloy conduit without end fittings. The switch and booster magneto controls are located as follows:

a. Ignition Switch Control: On the left side of the instrument boards in both cockpits. These controls are mechanically interconnected by levers and shafts to the Type A-7 ignition switch in the engine section.

b. Booster Magneto Control: The magneto is operated by knobs attached to a push-pull tube running through both cockpits at the right side and connecting to a cable and shock absorber cord assembly. The cable operates a drum on the magneto drive shaft through a system of pulleys. The shock absorber cord, to which the end of the cable is anchored, returns the controls to their original position after the pull. See Figure 56, this Handbook.

RESTRICTED

T.O. NO. 01-70AB-2



NOTE: REFER TO DRAWING 15-3900 - INSTALLATION ELECTRICAL EQUIPMENT NUMBERS GIVEN ON CABLES ARE DASH NUMBERS OF DRAWING 15-3908

FIG. 53 - IGNITION SYSTEM DIAGRAM - MODEL PT-13B

RESTRICTED

T.O. NO. 01-70AB-2

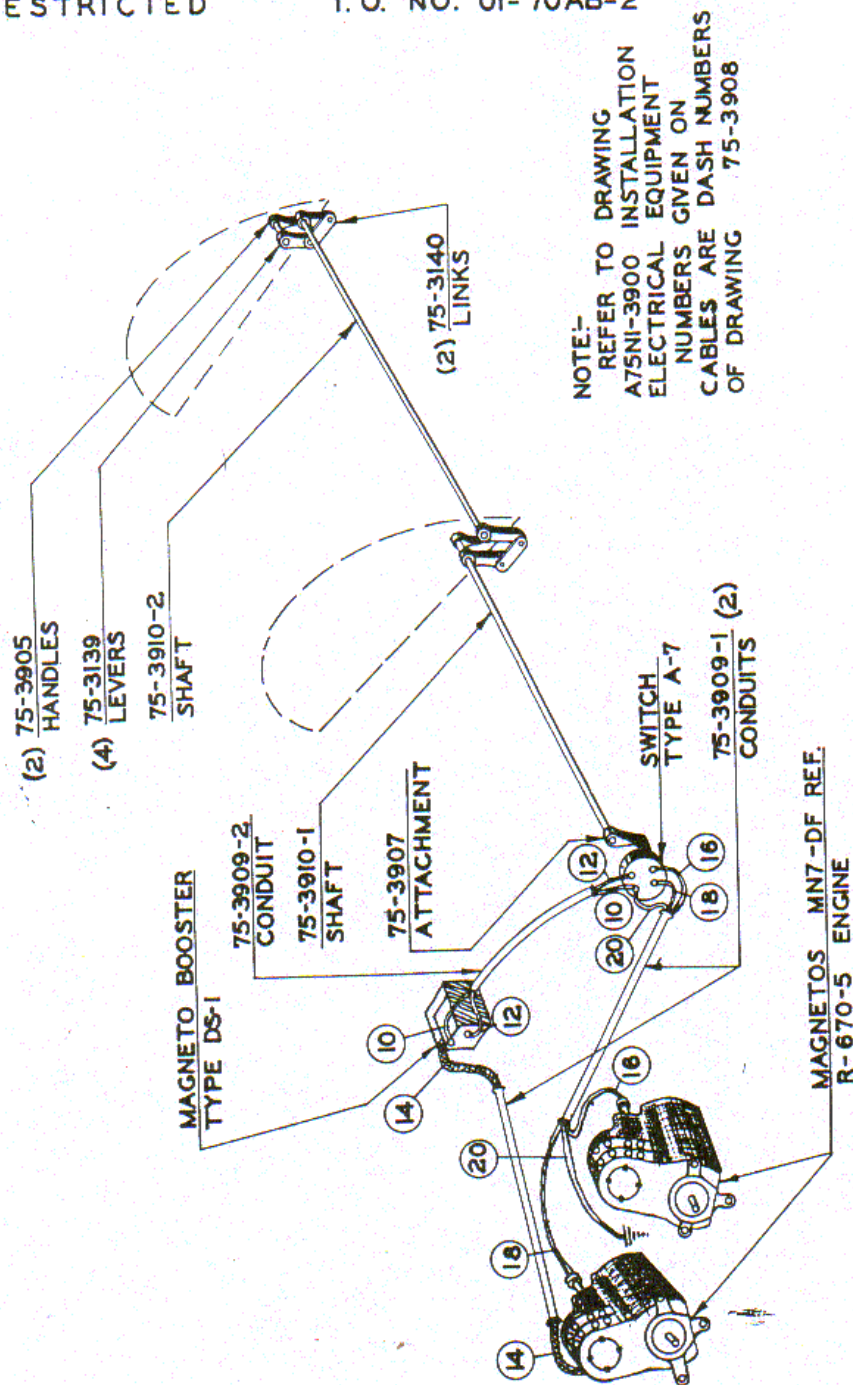


FIG. 54 IGNITION SYSTEM DIAGRAM-MODEL PT-17

T.O. NO. 01-70AB-2

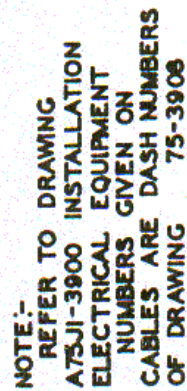
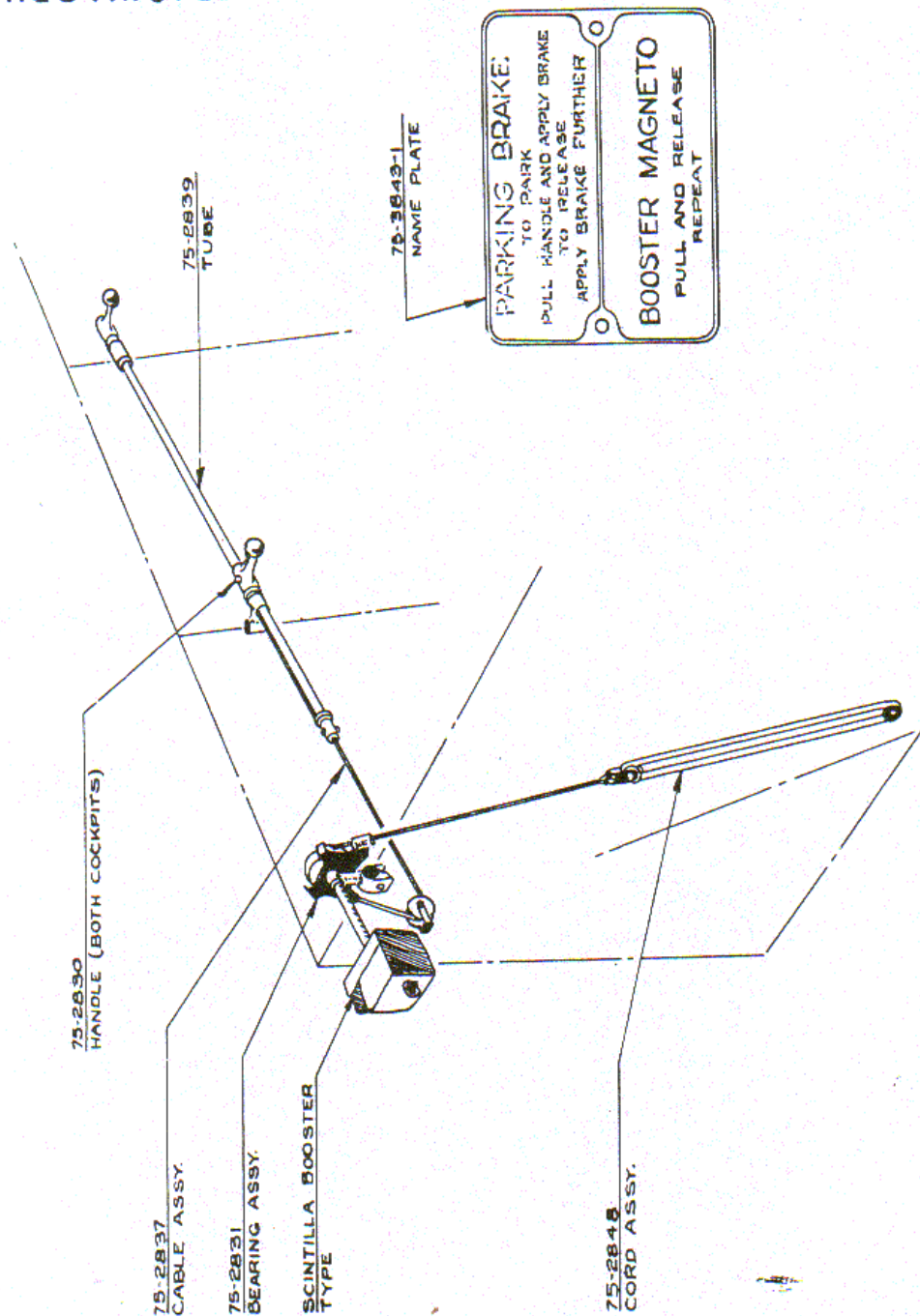


FIG. 5.55 IGNITION SYSTEM DIAGRAM - MODEL PT-18

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T.O. NO. 01-70AB-2



IG.56 - BOOSTER MAGNETO CONTROL

RESTRICTED

T. O. No. 01-70AB-2

19. List of Anti-Friction Bearings - PT-13B.

NOTE: For cleaning, inspection and lubrication of anti-friction bearings, see T. O. No. 29-1-3.

<u>Drwg. No.</u>	<u>Part Name</u>	<u>No. Req'd</u>	<u>Bearing</u>	<u>How Installed</u>
75-1233	Clevis-Aileron Hinge	8	AN-200K3L	Staked
75-1750	Stabilizer Assy-Covered	4	AN-200K3L	Staked
75-1950	Fin Assembly-Covered	3	AN-200K3L	Staked
75-2131	Tube Assy-Fuse. Sta. 1 & 2	4	AN-200K8A	Staked
75-2132	Tube Assy-Fuse. Sta. 2 & 3	4	AN-200K8A	Staked
75-2711	Post Assy-Tail Wheel	1	07100 & 07196 (Timken)	Push Fit
75-2821	Extension Assy-Starter Crank	1	**205-S	Pressed
75-2905	Bellcrank Assy-Eng. Control	6	30-1135	Riveted
75-2907	Rod Assembly-Eng. Controls	15	33A6241	Tapped
73-3302	Socket-Stick	4	AN-200K4	Pressed
75-3313	Bellcrank Assy-Aileron Cont.	4	AN-200K4	Pressed
75-3313	Bellcrank Assy-Aileron Cont.	4	AN-200KS4	Staked
75-3346	Idler Assy-Aileron Control	4	AN-200K4	Pressed
75-3346	Idler Assy-Aileron Control	4	AN-200KS4	Staked
75-3349	Link Assy-Aileron Control	2	KSF-4	
75-3355	Eye Assy-Ail. Push-Pull Adj.	2	(Norma Hoffman) AN-200KS4	Staked
75-3325	Tube Assy-Ail. Push-Pull Adj.	2	AN-200KS4	Staked
75-3331	Idler Assembly-Elevator	2	AN-200K4	Pressed
75-3332	Tube Assy-Elevator Front	1	AN-200KS4	Staked
75-3332	Tube Assy-Elevator Front	2	AN-200K5	Clamped
75-3333	Tube Assy-Elevator Rear	1	AN-200KS4	Staked
75-3333	Tube Assy-Elevator Rear	1	AN-200K4	Staked
73-3301	Bearing Housing-Rear	1	**201-S	Pressed
73-3310	Bearing Housing-Front	1	**201-S	Clamped
75-3342	Tube Assy-Inter-Stick	2	AN-200K4	Staked
75-3480	Install.-Rudder Control	2	AN-210-4A	Pulleys
75-3480	Install.-Rudder Control	5	AN-210-1A	Pulleys
75-3417	Idler Assy-Rudder Cable	4	AN-200K4	Pressed
75-3500	Install.-Elevator Tab	12	AN-210-1A	Pulleys
75-3500	Install.-Elevator Tab	1	AN-200KS4	Push Fit
75-3510	Drive Assy-Tab Control	2	AN-200K8A	Pressed

Standard Parts

List of Anti-Friction Bearings - PT-17.

NOTE: For cleaning, inspection and lubrication of anti-friction bearings, see T. O. No. 29-1-3.

<u>Drwg. No.</u>	<u>Part Name</u>	<u>No. Req'd</u>	<u>Bearing</u>	<u>How Installed</u>
75-1239	Bracket-Aileron Root Hinge	2	AN-200K3L	Staked
75-1240	Bracket-Aileron Hinge	6	AN-200K3L	Staked
75-1750	Stabilizer Assy-Covered	4	AN-200K3L	Staked
75-1825	Horn Assy-Elevator Control	2	AN-200K4	Staked
75-1950	Fin Assembly-Covered	3	AN-200K3L	Staked
75-2131	Tube Assy-Fuse. Sta. 1 & 2	4	AN-201K8A	Staked
75-2132	Tube Assy-Fuse. Sta. 1 & 2	4	AN-201K8A	Staked
75-2711	Post Assy-Tail Wheel	1	07100 (Timken)	Push Fit
75-2711	Post Assy-Tail Wheel	1	07196 (Timken)	Push Fit
A75N1-2809	Extension Assy-Starter Crank	1	**205-S	Clamped
A75N1-2901	Rod Assy-Eng. Cont. to Eng.	6	REB3N	Staked
A75N1-2902	Rod Assy-Eng. Cont. Long	4	REB3N	Staked
A75N1-2904	Idler Assy-Engine Control	2	BCU4	Pressed
75-2905	Bellcrank Assy-Engine Cont.	6	BCU4	Pressed
75-2919	Rod Assy-Eng. Cont. Cockpit to Firewall	2	REB3N	Staked
75-2920	Rod Assy-Eng. Cont. on Fr'wl	4	REB3N	Staked
75-2923	Rod Assy-Air Cont. Cockpit to Firewall	1	REB3N	Staked
75-2924	Rod Assy-Air Cont. on Fr'wl	2	REB3N	Staked
75-3300	Install.-Elevator Control	2	**201-S	Clamped
73-3302	Socket-Stick Front	4	AN-200K4	Pressed
75-3313	Bellcrank Assy-Ail. Control	4	AN-200K4	Pressed
75-3313	Bellcrank Assy-Ail. Control	4	AN-200KS4	Staked
75-3331	Idler Assy-Elev. P-P. Tube	2	AN-200K4	Pressed
75-3332	Tube Assy-Elevator Front	1	AN-200KS4	Staked
75-3333	Tube Assy-Elevator Rear	1	AN-200KS4	Staked
75-3333	Tube Assy-Elevator Rear	1	AN-200K4	Staked
75-3334	Fit'g-Fr. Elev. P-P Tube	2	AN-200K5	Pressed
75-3342	Tube Assy-Interstick P-P	2	AN-200K4	Staked
75-3346	Idler Assy-Ail. Control	4	AN-200K4	Pressed
75-3346	Idler Assy-Ail. Control	4	AN-200KS4	Staked
75-3349	Link Assy-Ail. Control	2	KSF-4 (Norma Hoffman)	Staked
75-3355	Eye Assy-Ail. Adj. P-P Tube	2	AN-200KS4	Staked
75-3417	Idler Assy-Rudder Cable	4	AN-200K4	Pressed
75-3480	Install.-Rudder Control	2	AN210-4A	Pulleys
75-3480	Install.-Rudder Control	5	AN210-1A	Pulleys
75-3500	Install.-Elevator Tab	12	AN210-1A	Pulleys
75-3500	Install.-Elevator Tab	1	AN200KS4	Push Fit
73-3519	Housing-Flap Cont. Worm B'rg	2	AN201K8A	Pressed
75-3540	Sector-Tab Control Worm Gear	2	AN201K4A	Staked

**Non-Standard Parts

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T. O. No. 01-70AB-2

List of Anti-Friction Bearings - PT-18

NOTE: For cleaning, inspection and lubrication of anti-friction bearings, see T. O. No. 29-1-3.

<u>Drwg. No.</u>	<u>Part Name</u>	<u>No. Req'd</u>	<u>Bearing</u>	<u>How Installed</u>
75-1239	Bracket-Ail. Root Hinge	2	AN-200K3L	Staked
75-1240	Bracket-Aileron Hinge	6	AN-200K3L	Staked
75-1750	Stabilizer Assy-Covered	4	AN-200K3L	Staked
75-1825	Horn Assy-Elevator Control	2	AN-200K4	Staked
75-1950	Fin Assembly-Covered	3	AN-200K3L	Staked
75-2131	Tube Assy-Fuse. Sta. 1 & 2	4	AN-201K8A	Staked
75-2132	Tube Assy-Fuse. Sta. 1 & 2	4	AN-201K8A	Staked
75-2711	Post Assembly-Tail Wheel	1	07100 (Timken)	Push Fit
75-2711	Post Assembly-Tail Wheel	1	07196 (Timken)	Push Fit
A75J1-2809	Extension Assy-Starter Crank	1	**205-S	Clamped
A75J1-2901	Rod Assy-Engine Control	6	REB3N	Staked
75-2905	Bellcrank Assy-Eng. Control	6	BCU4	Pressed
75-2919	Rod Assy-Eng. Cont.-Cockpit to Firewall	2	REB3N	Staked
75-2920	Rod Assy-Eng. Cont. on Fir'wl	4	REB3N	Staked
75-2923	Rod Assy-Air Cont.-Cockpit to Firewall	1	REB3N	Staked
75-2924	Rod Assy-Air Cont. on Fir'wl	2	REB3N	Staked
75-3300	Install.-Elevator Control	2	**201-S	Clamped
73-3302	Socket-Stick Front	4	AN-200K4	Pressed
75-3313	Bellcrank Assy-Ail. Cont.	4	AN-200K4	Pressed
75-3313	Bellcrank Assy-Ail. Cont.	4	AN-200KS4	Staked
75-3331	Idler Assy-Push-Pull Tube	2	AN-200K4	Pressed
75-3332	Tube Assy-Elevator Front	1	AN-200KS4	Staked
75-3333	Tube Assy-Elevator Rear	1	AN-200KS4	Staked
75-3334	Fit'g-Fr. Elev. P-P Tube	2	AN-200K5	Pressed
75-3342	Tube Assy-Interstick P-P	2	AN-200K4	Staked
75-3346	Idler Assy-Ail. Control	4	AN-200K4	Pressed
75-3349	Link Assy-Ail. Control	2	KSF (Norma Hoffman)	Staked
75-3355	Eye Assy-Ail. Adj. P-P Tube	2	AN-200KS4	Staked
75-3417	Idler Assy-Rudder Cable	4	AN-200K4	Pressed
75-3480	Install.-Rudder Control	2	AN-210-4A	Pulleys
75-3480	Install.-Rudder Control	5	AN-210-1A	Pulleys
75-3500	Install.-Elevator Tab	12	AN-210-1A	Pulleys
75-3500	Install.-Elevator Tab	1	AN-200KS4	Push Fit
73-3519	Housing-Flap Cont. Worm B'rg	2	AN-201K8A	Pressed
75-3540	Sector-Tab Cont. Worm Gear	2	AN-201K4A	Staked.

**Non-Standard Parts

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HEADQUARTERS, ARMY AIR FORCES
WASHINGTON 25, D. C.TECHNICAL ORDER
NO. 01-70A-32

AIRCRAFT AND MAINTENANCE PARTS

12 September 1944
DPBOEING (WICHITA)—REINFORCEMENT OF RUDDER HORN—PT-13,
PT-13A, PT-13B, PT-17, AND PT-27

This Technical Order replaces T. O. No. 01-70A-32, dated 29 February 1944.

NOTE As prescribed in T. O. No. 00-20A, appropriate reference to this Technical Order will be entered on AAF Forms 60-A for the aircraft affected. The work directed herein will be accomplished as soon as practicable by service activities with the aid of base maintenance facilities, if necessary. All spare rudders in stock for the affected airplanes will be reworked prior to issue.

1. To prevent failure of the rudder control horn, and resultant loss of rudder control in flight, the following listed aircraft will be modified, if not already accomplished, in accordance with the instructions contained in paragraph 2.

MODEL	AF SERIAL NOS.
PT-13	36-2 to 36-27 inclusive
PT-13A	37-71 to 37-114 inclusive 37-232 to 37-259 inclusive 38-451 to 38-470 inclusive
PT-13B	40-1562 to 40-1741 inclusive

MODEL	AF SERIAL NOS.
PT-13B	41-787 to 41-861 inclusive
PT-17	40-1742 to 40-1891 inclusive 40-1892 to 40-2041 inclusive 41-862 to 41-1086 inclusive 41-7867 to 41-9010 inclusive 41-25202 to 41-25726 inclusive 41-25742
PT-27	41-25760 to 41-25801 inclusive 41-16046 to 42-16845 inclusive All series

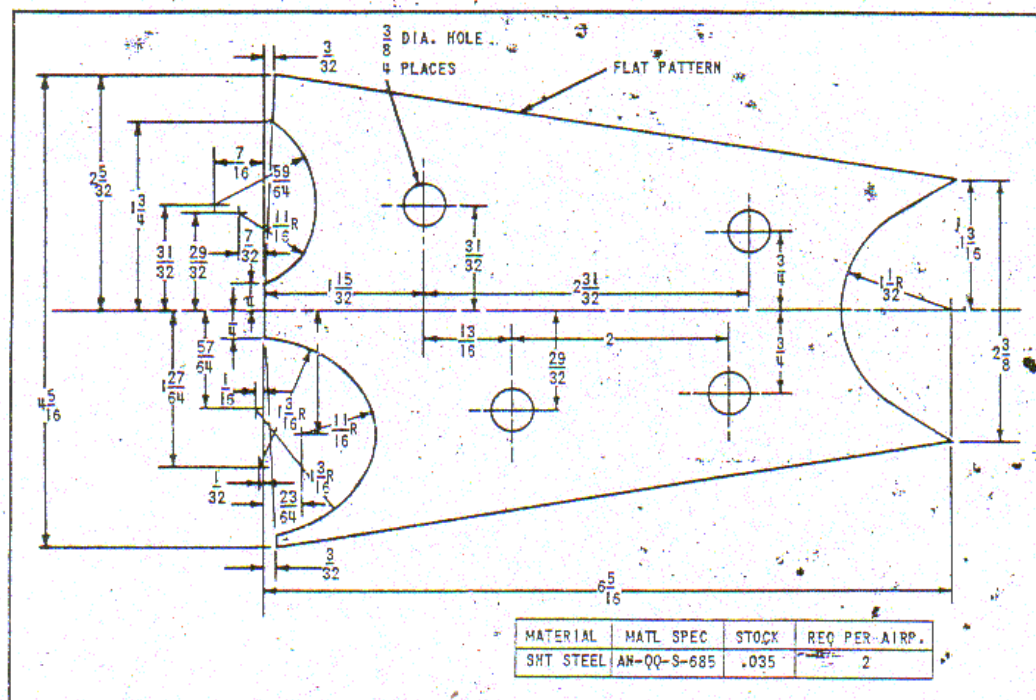


Figure 1 - Sleeve - Rudder Horn Reinforcement, Part No. 0170A32-1

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RESTRICTED
T. O. No. 01-70A-32

2. The instructions for accomplishing this work as contained in Boeing (Wichita) Service Bulletins PT-13-16, PT-13A-15, PT-13B-20, and PT-17-32, dated 26 July 1943, are as follows:

a. Remove rudder, part No. 75-2000, from airplane.

b. Remove identification plate, Boeing part No. S-102, from rudder horn, part No. 75-2006.

c. Open rudder cover as follows:

(1) Lay back reinforcing tape to expose stitches.

(2) Cut stitches approximately 8 inches above the aft of the rudder horn, exercising care to see that fabric is not cut in the procedure.

(3) Lay back fabric from leading edge of the rudder.

d. Remove finish from the rudder horn, part No. 75-2006.

e. Remove oilhole screws from lower leading edge of rudder horn, part No. 75-2006.

f. Previous to welding operation, cover the exposed surfaces of the rudder frame and adjacent portions of the fabric with wet asbestos, making certain that there is no unprotected surface within 8 inches of the torch flame.

g. Examine the trailing edge of the rudder horn to

determine if it is fusion welded. If so, it will be necessary to reweld this seam, using No. 2 welding rod. If this seam has been previously torch welded (not simply fused together), do not reweld. The holes left in the rudder horn by the removal of the identification plate, Boeing part No. S-102, are to be welded closed.

h. Line drill one No. 35 (.110-inch) diameter hole through both sides of the rudder horn approximately 1 inch from the intersection of the horn tube and the rudder socket.

i. Use wire brush or similar tool to remove scale from the rudder horn.

j. Form sleeve, part No. 0170A32-1, around rudder horn with edges meeting at the trailing edge. Adjust sleeve so that it fits snugly against the lower end of the rudder spar. (See figure 1.)

k. Renew asbestos protection previously applied, and weld sleeve to the rudder horn and spar along all edges as shown in figure 2. Rosette weld reinforcement sleeve to rudder horn in four places as indicated by the 3/8-inch diameter holes in the sleeve.

l. Lubricate rudder horn internally with corrosion-preventive compound, Specification No. AN-C-52, type 1, drain thoroughly and seal oilholes in lower ends of rudder horn with two self-tapping screws, part No. AN530-6-4.

m. Remove accumulated scale by wire brush or similar tool and wash surface with lacquer thinner.

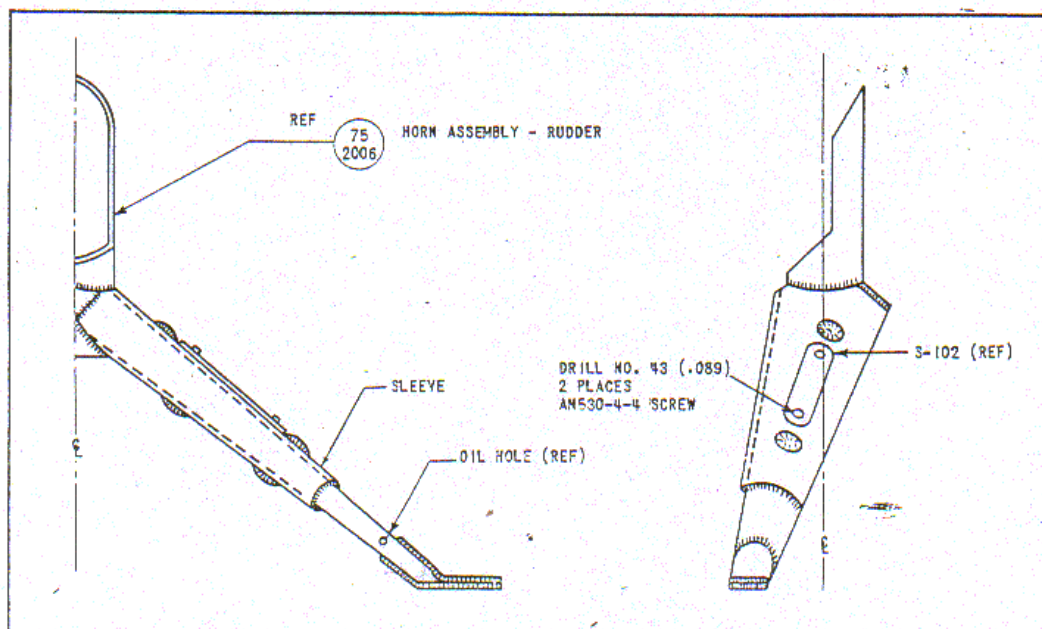


Figure 2 - Installation - Rudder Horn Reinforcement Sleeves

RESTRICTED
T. O. No. 01-70A-32

n. Finish the reinforced rudder horn assembly with two coats of zinc chromate primer, Specification No. AN-TT-P-656.

o. Reinstall identification plate, Boeing part No. S-102, in accordance with figure 2.

p. Reinstall that portion of the cover which was laid back, by the following method:

(1) Soften fabric by soaking with one coat of clear cellulose nitrate dope, Specification No. AN-TT-D-514.

(2) While fabric is still soft, resew to original position with sewing thread, Specification No. V-T-291, type B.

(3) Reapply tape to leading edge of rudder both above and aft of the rudder horn to replace that which was removed in paragraph 2.c.(1).

q. Finish repaired portion of the rudder with one coat of clear cellulose nitrate dope, Specification No. AN-TT-D-514, one spray coat of aluminum pigmented cellulose nitrate dope, Specification No. AN-TT-D-551, and one spray coat of cellulose nitrate dope, Specification No. AN-TT-D-551, with color to match the existing color of the rudder.

r. Reinstall the rudder, part No. 75-2000.

3. a. The following parts are required per airplane to accomplish this change.

QTY	STOCK NO.	PART NO.	NOMENCLATURE	CLASS	SOURCE
2		0170A32-1	Reinforcement Sleeve - Rudder horn Mfr. from: (See figure 1.)	01-P	Local Mfr.
			Steel - Chrome molyb condition A X4130 sheet .0375 in., Specification No. AN-QQ-S-685, stock No. 6800-450900	23-A	AF Stock
2	6700-747850	AN530-4-4	Screw - Sheet metal roundhead No. 4 x 1/4 in.	29	AF Stock
2	6700-747900	AN530-6-4	Screw - Sheet metal roundhead No. 4 x 3/8 in.	29	AF Stock
As req			Zinc Chromate Primer - Specification No. AN-TT-P-656	07	AF Stock
As req			Cellulose Nitrate Dope - Specification No. AN-TT-D-514	07	AF Stock
As req			Sewing Thread - Specification No. V-T-291, type B	21	AF Stock
As req			Cellulose Nitrate Dope - Specification No. AN-TT-D-551	07	AF Stock
As req			Compound - Corrosion-preventive Specification No. AN-C-52 type 1	07	AF Stock

b. The effect on weight and balance resulting from this change is negligible.

By Command of General ARNOLD:

Prepared by Aircraft Section,
Maintenance Div, Hq, ASC.

CLEMENTS McMULLEN,
Major General, U.S.A.,
Commanding General, Air Service Command.

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HEADQUARTERS, ARMY AIR FORCES
WASHINGTON 25, D. C.TECHNICAL ORDER
NO. 01-70A-34

AIRCRAFT AND MAINTENANCE PARTS

L.A. FILES
ENGINEERING

16 May 1945

BOEING (WICHITA)—REPLACEMENT OF SAFETY BELT GUIDE—PT-17,
PT-13D, PT-13D/N2S-5, N2S-4, AND N2S-5

This Technical Order replaces T. O. No. 01-70A-34, dated 5 September 1944.

NOTE As prescribed in T. O. No. 00-20A, appropriate reference to this Technical Order will be entered on AAF Forms 60-A for the aircraft affected. The work directed herein will be accomplished as soon as possible and not later than the next 100-hour (second 50-hour) inspection period, by service activities with the aid of base maintenance facilities, if necessary.

1. To reduce the possibility of broken safety belt guides lodging in the tab control cables, the wooden safety belt guides will be replaced by aluminum safety belt guides in accordance with the instructions in paragraph 2., on the following airplanes:

MODEL

PT-17

PT-13D

PT-13D/N2S-5

AF SERIAL NOS.

42-16251 to 42-16273 inclusive
42-16277 to 42-16723 inclusive
42-16846 to 42-16995 inclusive
42-16996 to 42-17374 inclusive

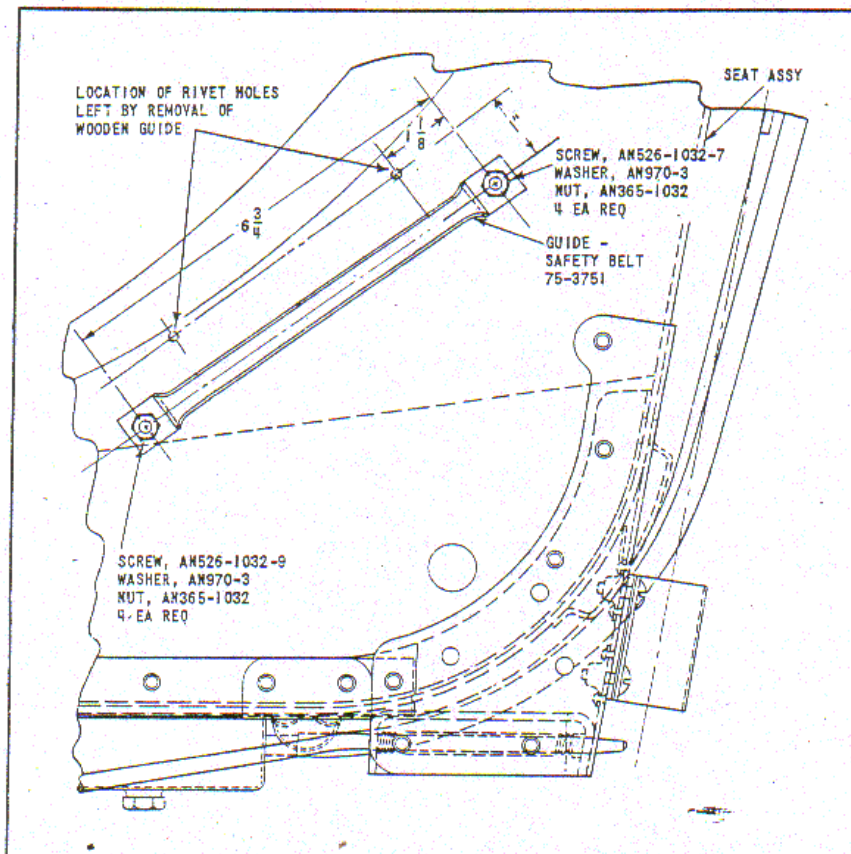


Figure 1
Aluminum
Safety
Belt Guide
Installation

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RESTRICTED
T. O. No. 01-70A-34

MODEL	NAVY SERIAL NOS.
N2S-3	07410 to 08004 inclusive
	37988 to 38437 inclusive
N2S-4	55650 to 55771 inclusive
N2S-5	38438 to 38610 inclusive
	43138 to 43637 inclusive
	52550 to 52626 inclusive

This modification will be accomplished on PT-13D/N2S-5 airplanes, AF No. 42-17375 and subsequent, prior to delivery by the contractor.

2. The instructions for accomplishing this replacement, as contained in Boeing (Wichita) Service Bulletin PT17-35 and N2S3-27, are as follows:

- a. Drill out the guide retaining rivets.
 - b. Mark on the inside of the seat, the common center line of the rivet holes.
 - c. Locate the new holes and install guide as shown in Figure 1.
3. a. The following parts are required per airplane to accomplish this change. These parts, except as indicated, are furnished as complete kits for initial installation and will be requisitioned in accordance with T. O. No. 00-35A-15. Parts required for maintenance after the initial installation will be requisitioned from the property classes as indicated:

QTY	STOCK NO.	PART NO.	NOMENCLATURE	CLASS	SOURCE
8	6500-980400	AN970-3	Washer - Flat (for wood)	04-A	AF Stock
4	6700-617850	AN526-1032-9	Screw - Buttonhead 10-32 x 9/16 inch	29	AF Stock
1	1300TO-01-70A34		KIT, "Replacement of Safety Belt Guide - PT-17, PT-13D, PT-13D/N2S-5, N2S-3, N2S-4, and N2S-5," consisting of the following parts:	15	AF Stock
4		75-3751	Guide - Safety belt	01-P	
8	6700-617750	AN526-1032-7	Screw - Buttonhead 10-32 x 7/16 inch	29	
8	6500-514000	AN365-1032	Nut - Self-locking steel 10-32	04-A	

b. Guides, part No. 0-3731-43-A, removed are obsolete and will be condemned at once and so tagged for disposition as condemned property.

c. Four screws, part No. AN526-1032-7, assembled in kits are no longer necessary for installation, will be returned to stock if serviceable.

4. Weight and balance change is negligible.

5. Approximately 4 man-hours are required to accomplish this change.

BY COMMAND OF GENERAL ARNOLD:

Prepared by Aircraft Section,
Maintenance Div, Hq, ATSC.

B. E. MEYERS
Major General, U.S.A.
Acting Director
Air Technical Service Command

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HEADQUARTERS, ARMY AIR FORCES
WASHINGTON 25, D. C.

TECHNICAL ORDER
NO. 01-70A-33

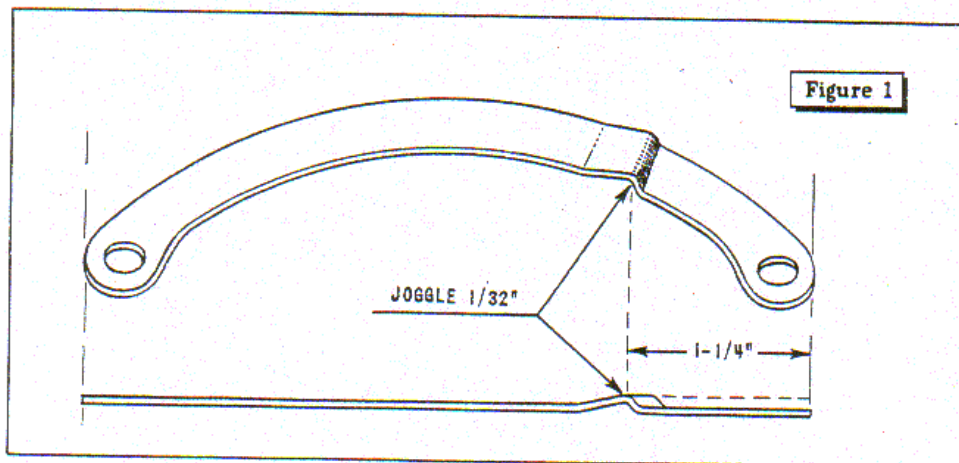
AIRPLANES AND MAINTENANCE PARTS

April 20, 1944

STEARMAN—MODIFICATION OF MIXTURE CONTROL, PT-13 SERIES,
PT-17 SERIES, PT-18 SERIES, AND PT-27 AIRPLANES

NOTE The provisions of T. O. No. 00-20A will be complied with in this case, these instructions being entered on AAF Forms 60-A for the airplanes affected. The work directed herein will be accomplished as soon as possible and not later than the next 100-hour inspection period, by service activities with the aid of sub-depots, if necessary.

1. To provide a means for avoiding accidental retard of the mixture control, with consequent engine stopping through functioning of the idle cut-off, the engine control assembly will be reworked in accordance with instructions contained in paragraph 2.
2. a. Disassemble type B-13 engine control assembly, part No. AC-0169960, to remove brass guide, part No. 0150798, on inboard side of the mixture control lever, part No. 0169962.
b. Offset guide, part No. 0150798, approximately $1/32$ inch as shown in figure 1.
c. Replace guide, part No. 0150798, with offset at the "RICH" position.
d. Reassemble type B-13 engine control assembly, part No. AC-0169960.



By Command of General ARNOLD:

Prepared by Aircraft Section,
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WALTER H. FRANK,
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Commanding General, Air Service Command.

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HEADQUARTERS, ARMY AIR FORCES

WASHINGTON 25, D. C.

TECHNICAL ORDER

NO. 01-70A-35

REFER TO T.O. 01-70A-35A

AIRCRAFT AND MAINTENANCE PARTS

10 November 1944

BOEING (WICHITA)—REINFORCEMENT OF PILOT'S WOODEN SEAT— PT-17, PT-13D, PT-13D/N2S-5, N2S-3, N2S-4, AND N2S-5

NOTE As prescribed in T. O. No. 00-20A, appropriate reference to this Technical Order will be entered on AAF Forms 60-A for the aircraft affected. The work directed herein will be accomplished as soon as practicable by service activities with the aid of base maintenance facilities, if necessary, and by manufacturing, modification, or overhaul establishments when directed by the Procurement Division, ATSC, in accordance with F. O. Memo 150-4. Spare wooden seat assemblies, part No. B75N1-3610, in stock, will be reworked prior to issue.

1. To reduce the possibility of injury to pilot personnel during a crashlanding, wooden pilot seats, part No. B75N1-3610, installed in PT-17, PT-13D, PT-13D/N2S-5, N2S-3, N2S-4, and N2S-5 will be reinforced in accordance with the instructions contained in paragraph 2.

NOTE This modification will not be made on all PT-13D and PT-17 airplanes declared or in process of being declared as excess to requirements per AAF Regulations 65-86 and 65-87.

2. The instructions for accomplishing this change as recommended in Engineering Division, ATSC, Memorandum Report No. U-TSELA-2B-7040, dated 30 September 1944, and as shown on AF Drawing 45K294 are as follows:

NOTE ~~Wooden seat assemblies of Fritz Ziebarth manufacture, which were procured for T. O. No. 01-70A-7, will not require reinforcement as these seats are of a different design.~~ Deleted See 01-70A-35A

- a. Remove wooden seat assemblies, part No. B75N1-3610, from the airplane.

NOTE Inasmuch as both seats are reinforced in an identical manner, instructions will be given for one seat only.

- b. Manufacture two straps, part No. 45K294-1, two plates, part No. 45K294-2, and four washers, part No.

45K294-3, in accordance with figure 1 (reference drawing No. 45K294-2), and paint with zinc chrome primer, Specification No. AN-TT-P-656.

- c. Drill the top four No. 18 (.169-inch) holes through seat from straps, part No. 45K294-1, and install the straps and plates, part No. 45K294-2, with four screws, part No. AN507-836-24, four nuts, part No. AN365-836, and four washers, part No. AN960-8, as shown on figure 2 (reference drawing No. 45K294-2).

- d. Stretch the straps as tightly as possible and drill the lower two No. 18 (.169-inch) holes through the seat from the straps, and secure the straps and two washers, part No. 45K294-3, with two screws, part No. AN507-836-12, two nuts, part No. AN365-836, and two washers, part No. AN960-8, as shown in figure 2.

- e. Drill two No. 18 (.169-inch) holes through seat from straps and install the remaining two washers with two screws, part No. AN507-836-16, two nuts, part No. AN365-836, and two washers, part No. AN960-8, as shown in figure 2.

- f. Drill eight No. 38 (.101-inch) holes to depth of 5/8 inch and two No. 38 (.101-inch) holes to a depth of 3/8 inch in the seat from the straps and install eight wood screws, part No. AN550-6-6, and two wood screws, part No. AN550-6-4, as shown in figure 2.

- g. Reinstall the seat.

3. a. The following parts are required per airplane to accomplish this change.

QTY	STOCK NO.	PART NO.	NOMENCLATURE	CLASS	SOURCE
4		45K294-1	Strap	01-P	Local Mfr
			Mfr from:		(See figure 1.)
			Alum.-alloy Sheef, Condition T.	23-A	AF Stock
			.081 inch Specification No.		
			QQ-A-355, Stock No. 6800-144900		

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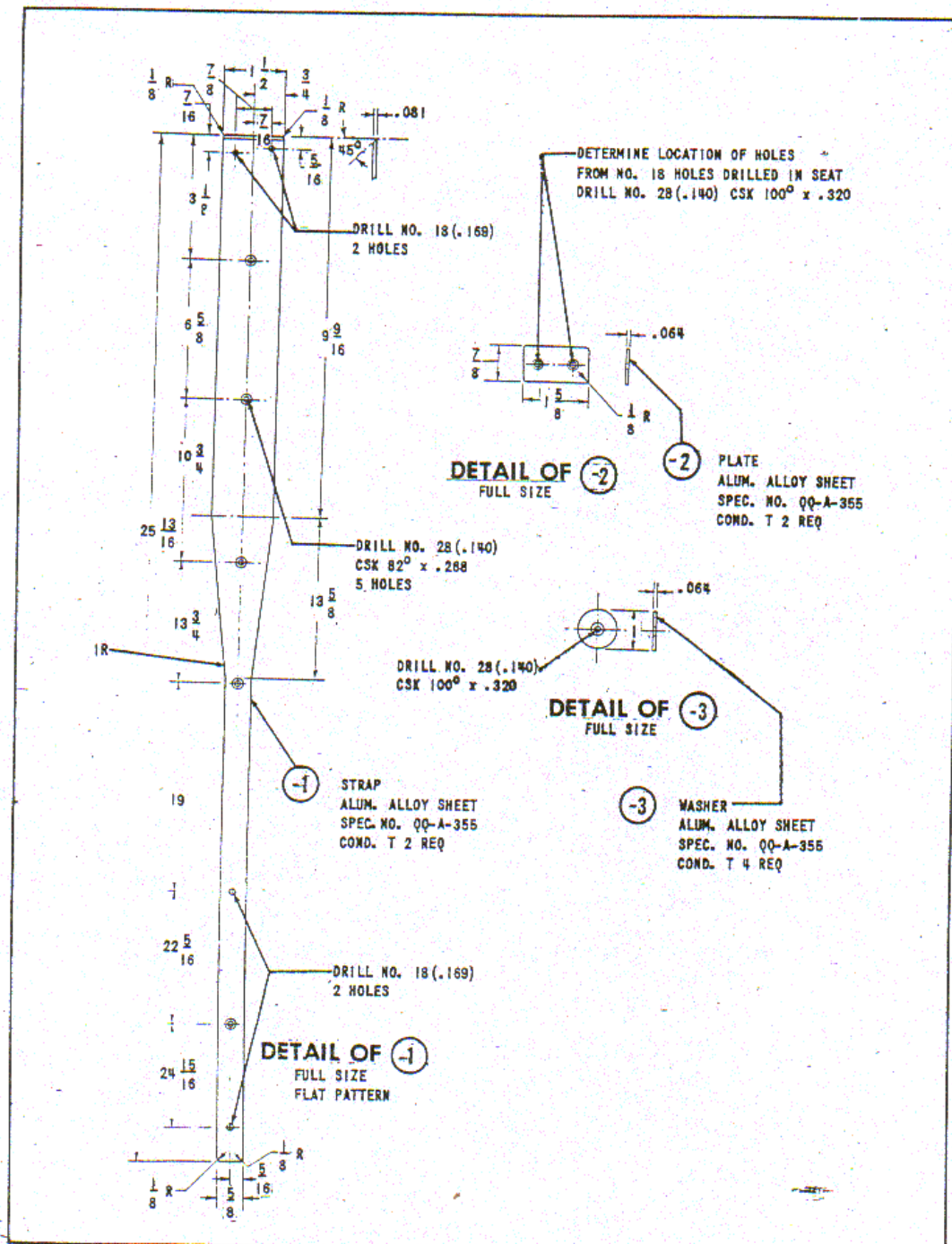


Figure 1

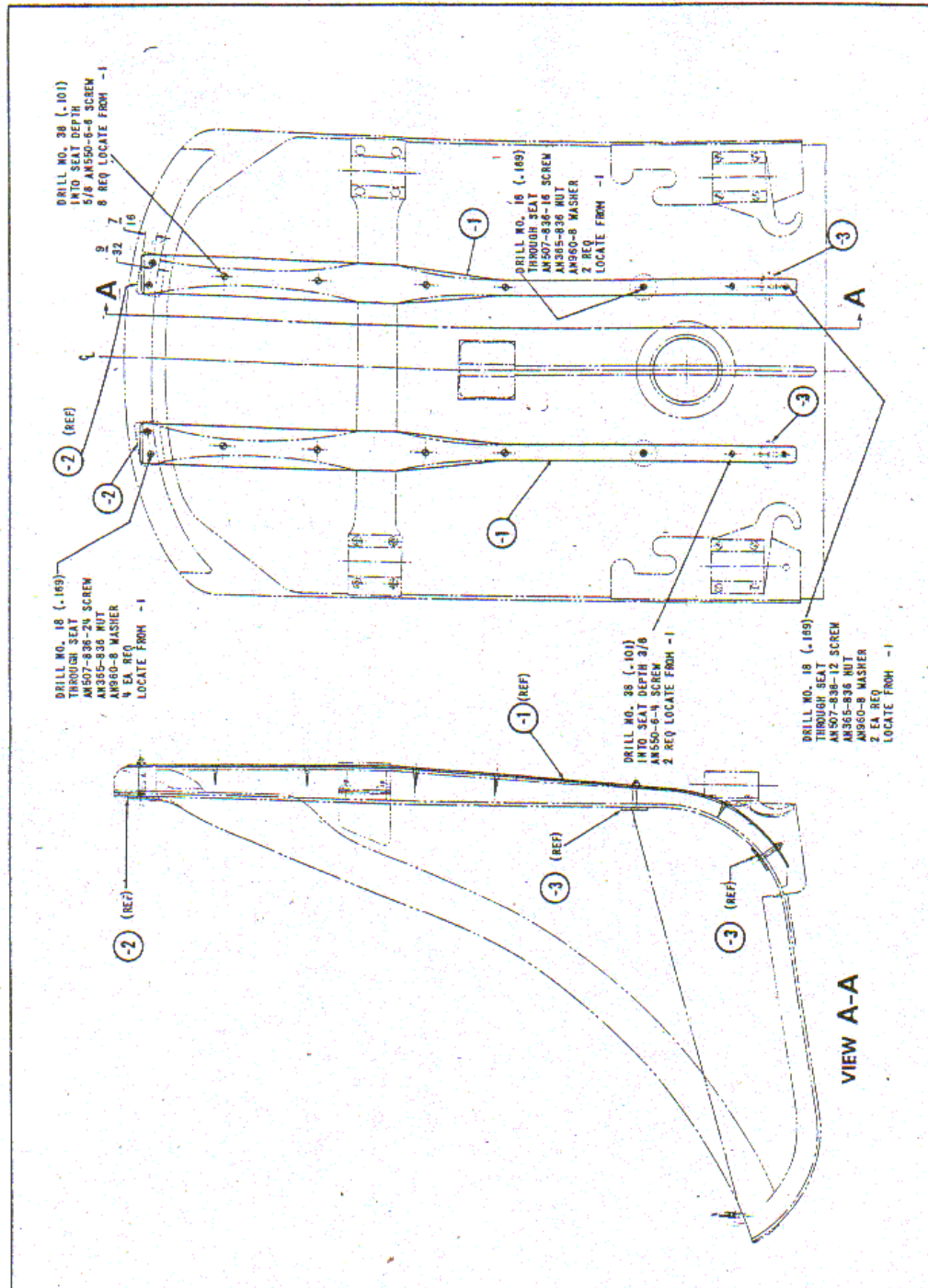


Figure 2

RESTRICTED
T. O. No. 01-70A-35

QTY	STOCK NO.	PART NO.	NOMENCLATURE	CLASS	SOURCE
4		45K294-2	Plate Mfr from: Alum.-alloy Sheet, Condition T, .064 inch Specification No. QQ-A-355, Stock No. 6800-144800	01-P 23-A	Local Mfr (See figure 1.) AF Stock
8		45K294-3	Washer Mfr from: Alum.-alloy Sheet, Condition T, .064 inch Specification No. QQ-A-355, Stock No. 6800-144800	01-P 23-A	Local Mfr (See figure 1.) AF Stock
8		AN507-836-24	Screw - 100-degree flathead machine	29	AF Stock
4		AN507-836-12	Screw - 100-degree flathead machine	29	AF Stock
4		AN507-836-16	Screw - 100-degree flathead machine	29	AF Stock
16		AN550-6-6	Screw - 82-degree flathead (wood) No. 6 x 3/4 inch	29	AF Stock
4		AN550-6-4	Screw - 82-degree flathead (wood) No. 6 x 1/2 inch	29	AF Stock
16		AN365-836	Nut - Self-locking	04-A	AF Stock
16		AN960-8	Washer - Plain steel	04-A	AF Stock
As req	7300-788000		Primer - Zinc chromate, Specification No. AN-TT-P-656	07	AF Stock

4. Approximately 8 man-hours are required to accomplish this modification.

5. The weight change effected by this modification is negligible.

By Command of General ARNOLD:

Prepared by Aircraft Section,
Maintenance Div, Hq, ATSC.

BENNETT E. MEYERS
Major General, U.S.A.
Deputy Director
Air Technical Service Command

RESTRICTED

HEADQUARTERS, ARMY AIR FORCES
WASHINGTON 25, D. C.

TECHNICAL ORDER
NO. 01-70A-37

8 January 1945

AIRCRAFT AND MAINTENANCE PARTS

BOEING (WICHITA) - WING REWORK - PT-13 PT-17 SERIES

NOTE As prescribed in T. O. No. 00-20A, appropriate reference to this Technical Order will be entered on AAF Forms 60-A for the aircraft affected. The work directed herein will be accomplished as soon as possible and not later than the next 200-hour (second 100-hour) inspection period by service activities with the aid of base maintenance facilities, if necessary. In accordance with T. O. No. 00-20A-2, a reference to the periodic inspection prescribed in paragraph 2. will be entered in the applicable Aircraft Inspection and Maintenance Guide. Wing assemblies in stock having the following part numbers will be inspected in accordance with T. O. No. 01-70A-36 and reworked, if necessary, prior to issue:

75-1100	D75N1-1100	E75N1-1100
75-1100-1	D75N1-1100-1	E75N1-1100-1
75-1200	D75N1-1200	E75N1-1200
75-1200-1	D75N1-1200-1	E75N1-1200-1

1. To cancel restrictions set out in T. O. No. 01-70A-36, wings found to have defective rib stitching, except as specified in paragraph 2., will be restitched (if condition of fabric warrants restitching) or re-covered in accordance with procedure specified on Boeing drawings using lacing cord conforming to Specification 6-27, 6-203 or AN-C-122. All unwaxed cord will be lightly waxed with beeswax before use. Following rework of wings, flight restrictions imposed and placard installed in accordance with T. O. No. 01-70A-36 will be removed.

2. Wing assembly rib stitched with natural finish (unwaxed) cord in accordance with Boeing aircraft drawings which did not show signs of cord wear and fraying at initial inspection will be carefully inspected at each succeeding 500-hour inspection for evidence of cord wear and fraying at junction of fabric and rib. At first evidence of cord wear, the airplane will be restricted in accordance with T. O. No. 01-70A-36 pending restitching specified in paragraph 1.

By Command of General ARNOLD:

Prepared by
Aircraft Section,
Maintenance Div.,
Hq, ATSC.

B. E. MEYERS
Major General, U. S. A.
Deputy Director
Air Technical Service Command

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HEADQUARTERS, ARMY AIR FORCES
WASHINGTON 25, D. C.

Lt. CHARLES
S. DEPT
ENGINEERING

TECHNICAL ORDER
NO. 01-70A-35A

★ SUPPLEMENT TO BASIC TECHNICAL ORDER ★

AIRCRAFT AND MAINTENANCE PARTS

PM 1:37 12 February 1945

BOEING (WICHITA)—REINFORCEMENT OF PILOT'S WOODEN SEAT—
PT-17, PT-13D, PT-13D/N2S-5, N2S-3, N2S-4, AND N2S-5

NOTE This Technical Order supplements T.O. No. 01-70A-35, dated 10 November 1944, to make corrections as indicated herein. A SUITABLE REFERENCE TO THIS SUPPLEMENT WILL BE MADE ON PAGE 1 OF THE BASIC TECHNICAL ORDER AND THE AFFECTED NOTE DELETED ACCORDINGLY.

1. The ~~NOTE~~ immediately following paragraph 2., which reads as follows, will be deleted.

2. * * * * *

"NOTE Wooden seat assemblies of Fritz Ziebarth manufacture, which were procured for T. O. No. 01-70A-7, will not require reinforcement as these seats are of a different design."

* * * * *

IMPORTANT Make this correction on all file copies.

By Command of General ARNOLD:

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Aircraft Section,
Maintenance Div,
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