



*PILOT'S FLIGHT OPERATING  
INSTRUCTIONS*

*FOR*

**ARMY MODEL  
PT-13B PT-17 PT-18  
AIRPLANE**

This publication contains specific instructions for pilots and should be available for Transition Flying Training as contemplated in AAF Reg. 50-16.

This publication shall not be carried in aircraft on combat missions or when there is a reasonable chance of its falling into the hands of the enemy.

Published by authority of the Commanding General, Army Air forces,  
and accepted by the Air Council of the United Kingdom,

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*15 July 1940*

*Revised 10 February 1945*

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**LIST OF REVISED PAGES ISSUED**

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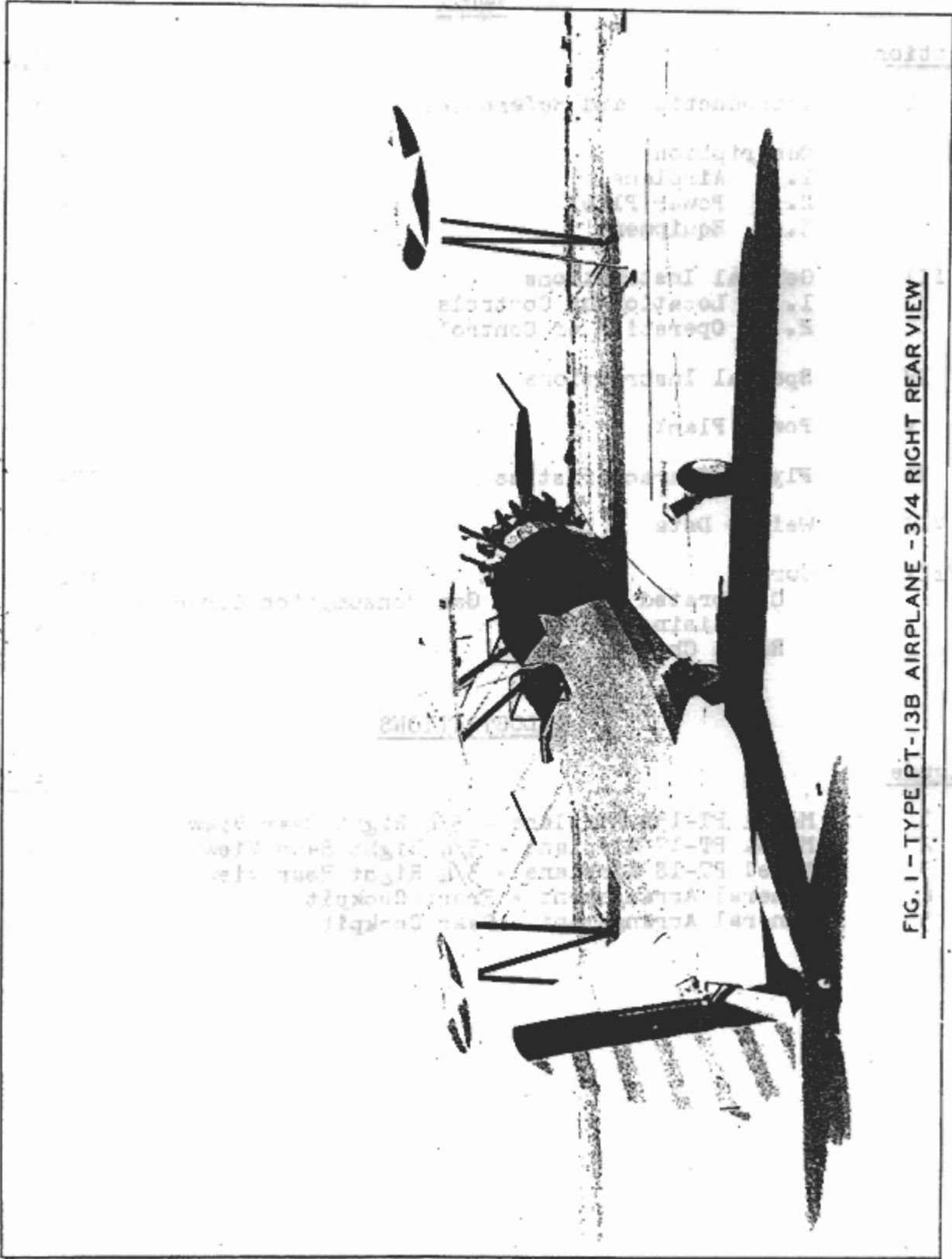


FIG. 1 - TYPE PT-13B AIRPLANE - 3/4 RIGHT REAR VIEW

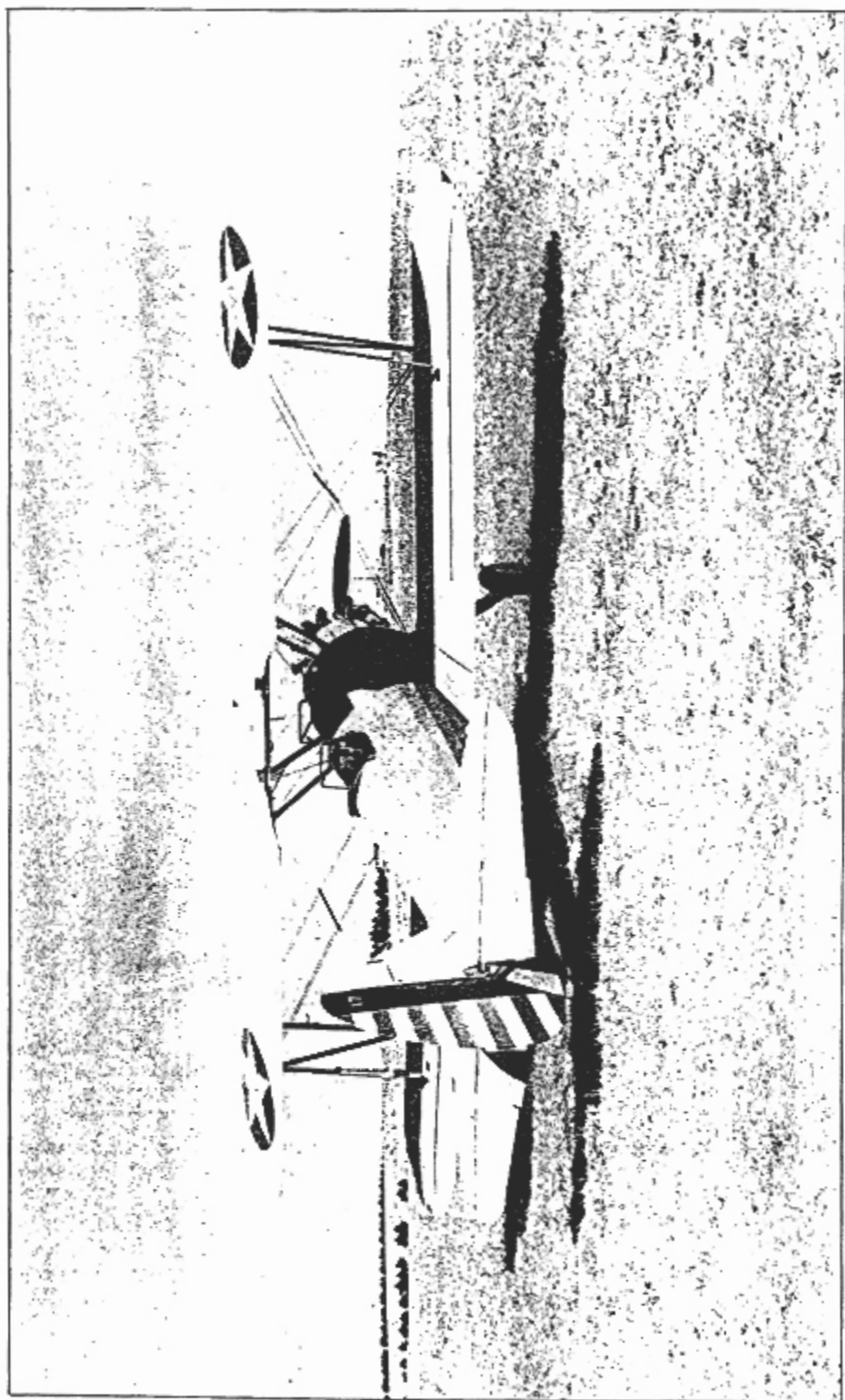


FIG. 2 - MODEL PT-17 AIRPLANE - 3/4 RIGHT REAR VIEW

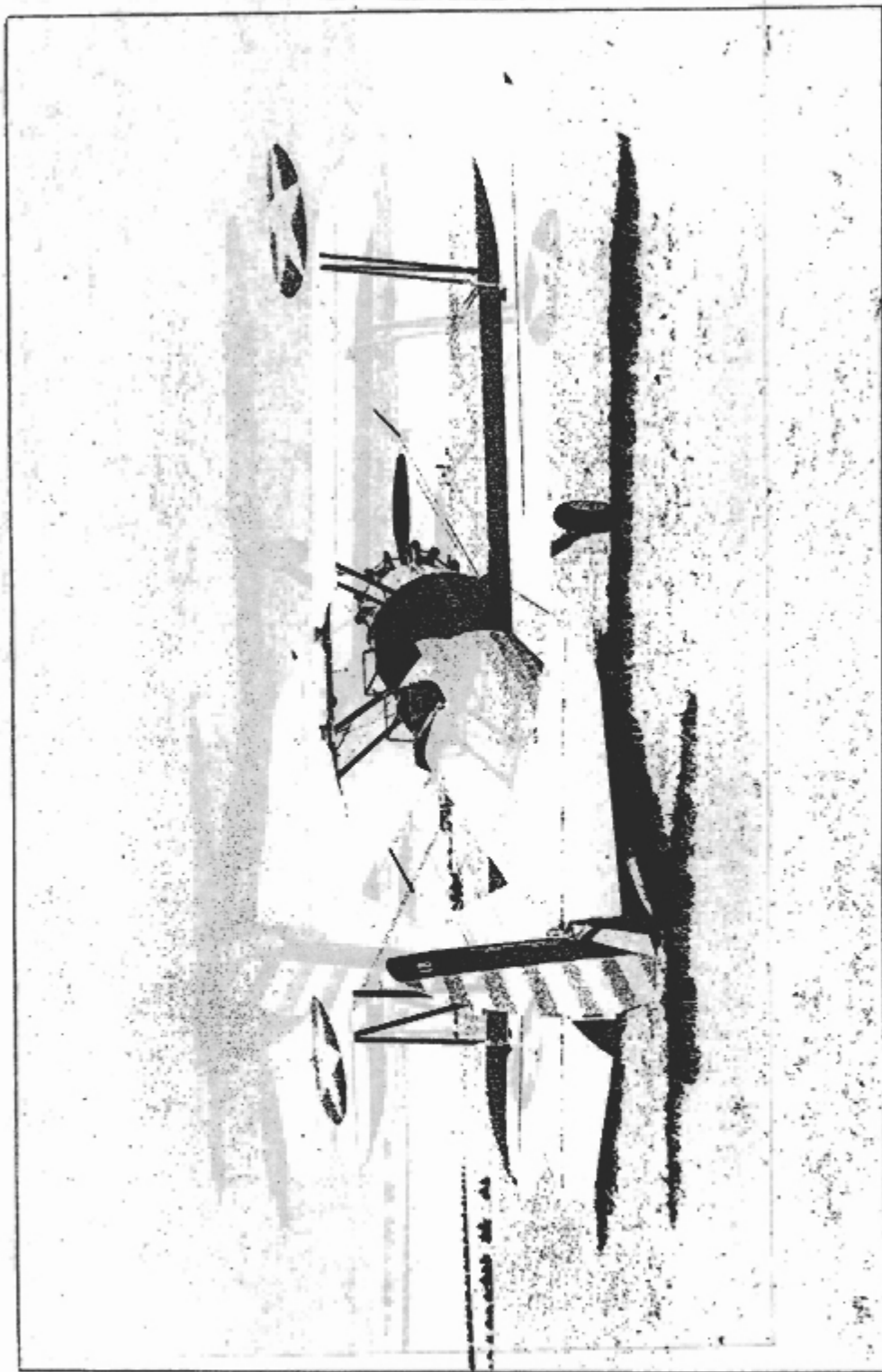


FIG. 3 - MODEL PT-18 AIRPLANE - 3/4 RIGHT REAR VIEW

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SECTION IINTRODUCTION AND REFERENCES

1. This Publication has been revised to apply to Model PT-13B airplanes only. Refer to T. O. No. 01-70A-1 for operating instructions for Model PT-17 airplanes.
2. Information in this Publication regarding Models PT-17 and PT-18 airplanes will be disregarded.



SECTION IIDESCRIPTION1. Airplane.

a. General. - The PT-13B, PT-17 and PT-18 airplanes are two place biplanes incorporating fabric covered steel tube fuselage, fixed type landing gear, and hydraulic brakes. The overall length is 24' 9-1/2", span 32' 2" and height 9' 8-1/2".

b. Wings. - The upper wing consists of two outer panels and a center section. A rear view mirror for the use of the instructor is faired into the lower side of the center section. The lower wing consists of two outer panels with ailerons in the trailing edge. All wings are of wood and fabric construction.

c. Empennage. - The empennage surfaces are of welded steel tube fabric covered construction with aluminum alloy leading edge. Aluminum alloy trim tabs are incorporated in the trailing edge of each elevator.

d. Fuselage. - The fuselage is of welded steel tube construction with fairing of drawn aluminum alloy sections supporting the fabric and aluminum alloy sheet cowling.

e. Landing Gear. - (1) General: The landing gear is a full cantilever bolted structure of the oleo pneumatic type.

(2) Wheels and Brakes: The wheels are standard 24" streamline incorporating hydraulically actuated brakes. A combination master cylinder, pressure compensator, and reservoir is installed for each wheel. Compensator springs are built into the master units to prevent variation in temperature from affecting the pressure in the braking shoes. A brake parking valve operable from both cockpits is provided.

(3) Tail Wheel: The tail wheel is the full swiveling throw-out latch type mounting a standard 8" streamline tire. An air-oil shock strut is provided.

2. Power Plant.

a. Engines. - See Section V for description.

b. Propeller. - When these airplanes are equipped with ground adjustable pitch propellers, having standard Air Corps hubs; the models PT-13B and PT-17 may be equipped with McCauley solid steel blades or Lycoming hollow steel blades. The model PT-18 airplanes, however, use only McCauley solid steel blades.

c. Oil System. - A 4.4 gallon oil supply tank with an expansion space of 1.4 gallons is provided. The filler neck is located so that the expansion space can not be filled.

d. Fuel System. - A fuel system diagram is under the cowling in the pilot's cockpit. The fuel system consists essentially of a 46 gallon center section tank, a gravity feed line, D-3 Fuel cock operable in either cockpit, and a C-2A strainer.

### 3. Equipment.

a. Flight Controls. - The dual flight controls are of the stick and rudder pedal type. The rudder pedals also serve to actuate the brakes. Levers in both cockpits control the elevator trim tabs.

b. Fuselage Equipment. - (1) Seats: The seats are standard and interchangeable. A Type A-3 life preserver cushion and a Type B-11 safety belt are provided with both seats.

(2) Flight Report Holder: Type A-2 Flight Report Holder is provided in the front cockpit.

(3) Fire Extinguisher: A Type A-2 hand fire extinguisher is located in a door in the fuselage fairing at the left side of the rear cockpit. The fire extinguisher is accessible from the rear cockpit by a quick acting latch or from outside the airplane. For procedure to be followed in case of fire during flight refer to T. O. No. 00-25-5.

(4) Speaking Tube: A non-electric speaking tube is provided for instruction of the student. Mouth piece and earphone tubes are held in clips at the left side of the cockpits.

(5) Blind Flying Hood: The rear cockpit is equipped with an easily removable blind flying hood.

(6) Baggage Compartment Lock: Keyless combination locks are provided for the baggage compartment door. The lock combination may be set by pressing the button at the rear of the lock and then setting the three dials to the combination desired.

(7) Surface Control Locks: Locks are provided which positively lock the rudder and ailerons in neutral and the elevators in the down position. A positive latch pin safeties the lock mechanism in both the locked and unlocked positions.

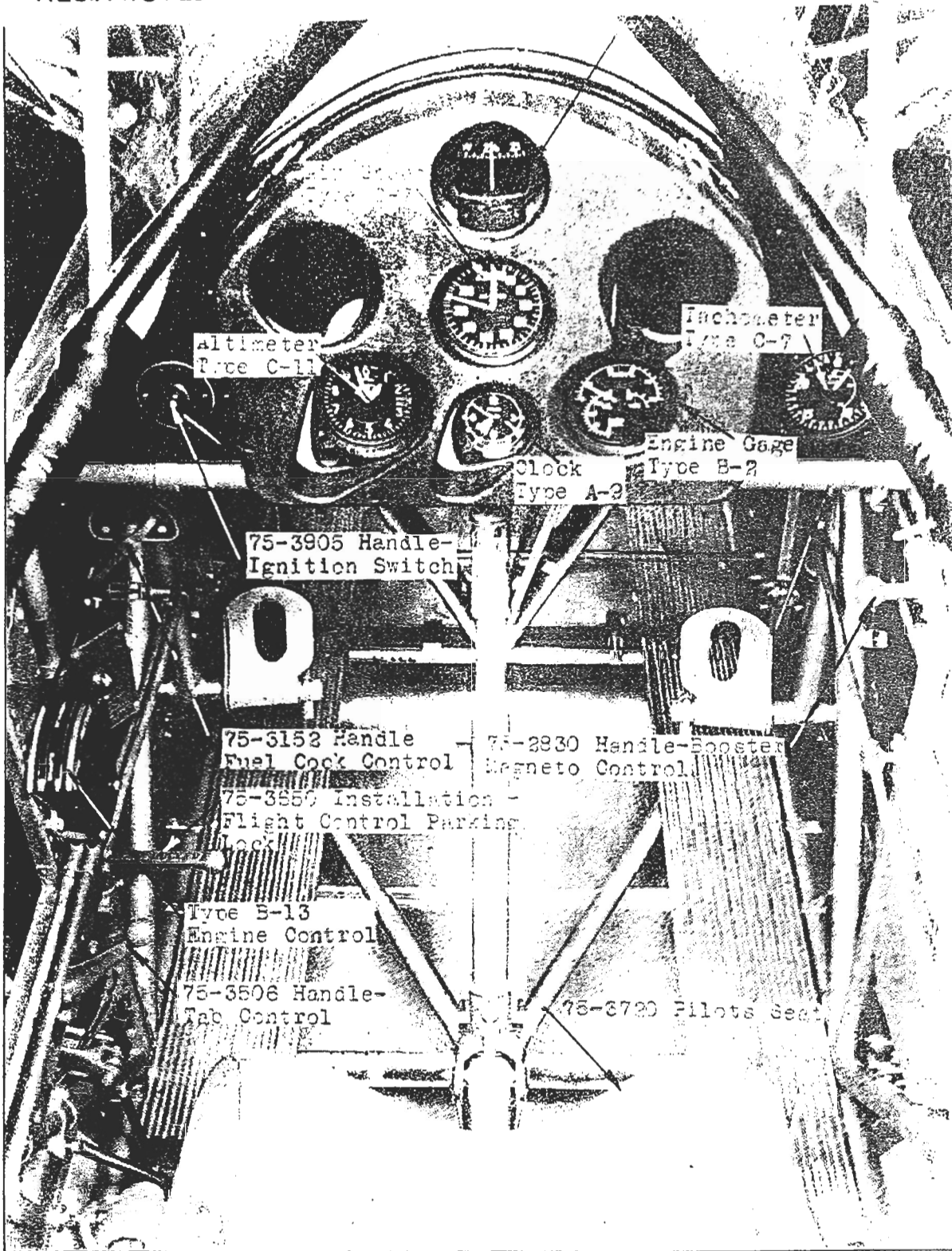


FIG. 4 - GENERAL ARRANGEMENT - FRONT COCKPIT

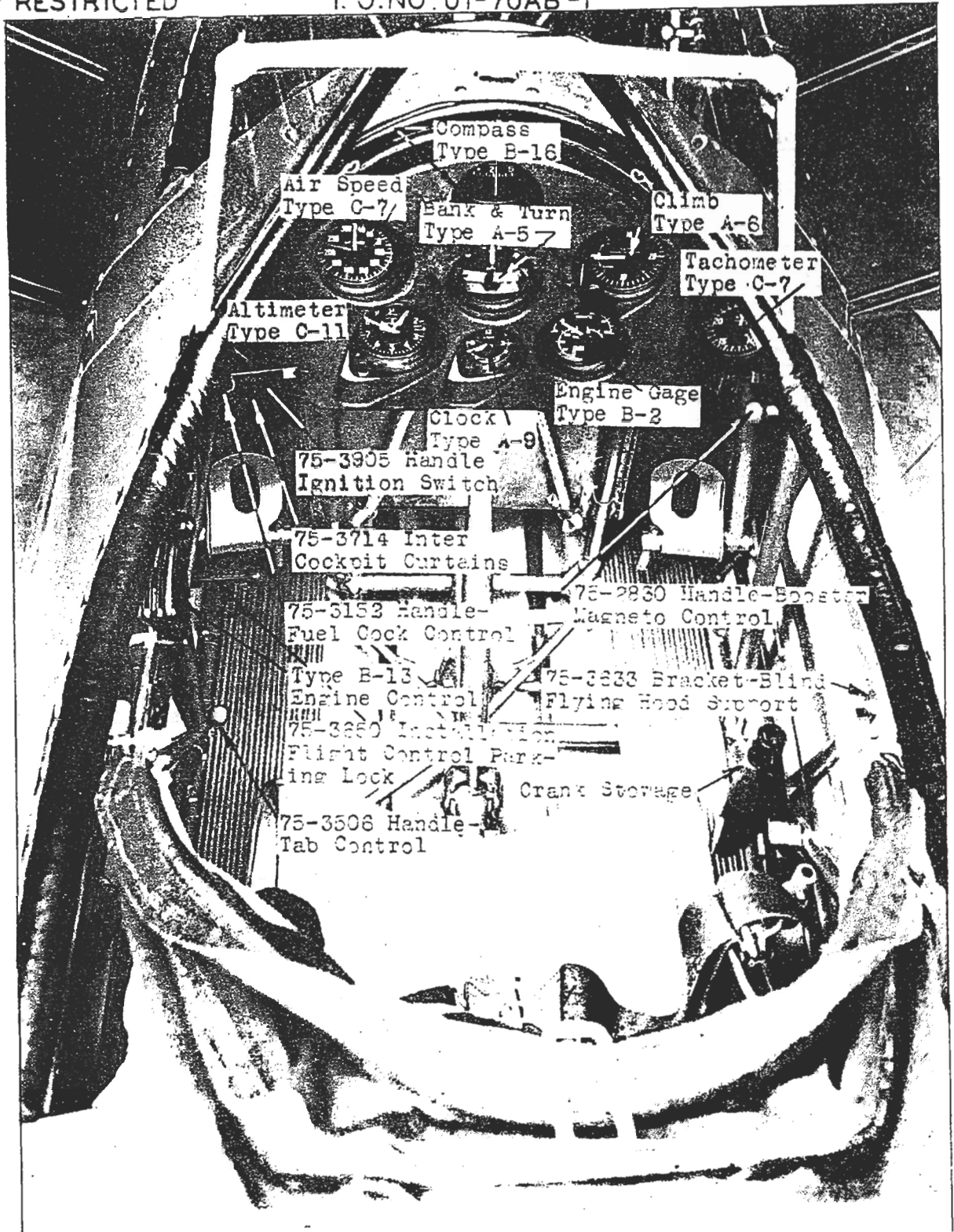


FIG. 5 -GENERAL ARRANGEMENT-REAR COCKPIT

SECTION IIIGENERAL INSTRUCTIONS1. Location of Controls.

See Section II and Figures 4 and 5 for location of controls.

2. Operation of Controls.

a. Flight Controls. - The aileron, elevator and rudder controls are conventional as described in Section II.

b. Power Plant Controls.

(1) General. - Essential instructions on the ground operation of aircraft engines are contained in T. O. No. 02-1-29.

(2) Engine Operating Instructions.(a) Procedure Preliminary To Starting.

1. If the engine has been idle for over 30 minutes, turn engine slowly by hand 4 or 5 revolutions in direction of rotation. If excessive priming has been used in previous starting attempts, make sure ignition is "OFF" and turn engine over by hand 4 or 5 revolutions with throttle wide open. If an obstruction to rotation is noted, remove front spark plugs and drain out excess oil and fuel. Dry spark plugs thoroughly before reinstallation.

CAUTION: Starting the engine with excessive oil or fuel in the cylinders may result in bent or broken rods.

2. In extremely cold weather, the oil should be drained and preheated unless the airplane is equipped with an oil dilution system. If very low oil temperatures are encountered during sustained flight, use the next lighter grade oil.

3. Turn fuel supply "ON."

4. Set mixture control in full "RICH" position.

5. Set the throttle approximately one-tenth open.

(b) Starting.

1. Prime - Normally two strokes in fairly warm weather and four strokes in cold weather.

CAUTION: Avoid excessive priming as it has a tendency to wash the oil off the cylinder walls causing scoring of the barrels or seizing of the pistons.

2. Energize starter.
3. Engage engine starter clutch.
4. Turn ignition switch "ON" after one turn of propeller.
5. Set throttle to attain an indicated engine speed of from 700 to 800 rpm for warm-up.
6. If engine does not start on the first attempt, another attempt should be made without additional priming.
7. After the engine starts, it is important to keep it running to prevent repeating the priming operation. To accomplish this, close the throttle abruptly as the prime begins to burn out, and reopen to about one-tenth of the quadrant. Repeated priming produces condensation in the cylinders and may cause "icing" of the spark plugs.

(c) Warm-Up and Ground Test.

1. As soon as the engine is running, the oil gage should be watched for pressure indication. If pressure is not indicated within 1/2 minute, the engine should be shut down immediately and an investigation made.
2. Increase engine speed during warm-up period gradually from 600 to 1000 rpm.
3. A warm-up period totaling 5 minutes is usually enough. The mixture control will remain in full "RICH" position. Avoid prolonged ground operation.
4. The engine is warm enough to fly at an oil temperature of 10°C (50°F) if the oil-pressure gage maintains a steady reading of at least 50 pounds per square inch for a period of 5 minutes and the engine can be accelerated rapidly without skipping or backfiring.
5. When the engine is warm and functioning properly, increase the speed to 1500 to 1700 rpm and quickly check the magnetos by switching them off separately. It is important to switch back to "BOTH" and leave the switch in that position until the engine has picked up, the loss in rpm before testing for loss of rpm on the other magneto. Testing of each magneto should be completed in approximately 5 seconds and the normal loss should not exceed 100 rpm. At no time will the mixture control be leaned out to clear spark plugs.
6. The "OFF" position of the ignition switch will be checked to assure proper connection of the ground wires. The check should be made at the end of the warm-up period with the engine running at 1000 rpm. The switch should be turned to the "OFF" position momentarily to note whether or not the engine stops firing, and immediately returned to the "BOTH ON" position.

(d) Take-Off.

1. Mixture control must remain in full "RICH" position.

2. Carburetor heat control will be in the "COLD" position during take-off except under extreme icing conditions when heat may be applied immediately prior to take-off and applied again when power is reduced after take-off.

3. For take-off, the throttle should be wide open and the rpm should not exceed 2100.

(e) Flight. - Mixture control will be maintained in full "RICH" up to 5000 feet.

(f) Landing. - Care will be exercised to prevent overcooling of the engine during long glides.

(g) Stopping.

1. To stop the engine, move throttle to "IDLE" position and then move the mixture control to the "IDLE CUT-OFF" position. Since the carburetor is not drained, the mixture control lever will be left in the "IDLE CUT-OFF" position as a precaution against accidental starting. The engine may continue to run on a lean mixture with the mixture control in "IDLE CUT-OFF" position, due to fuel fed from the economizer jet, if the throttle is more than one-third open.

2. The ignition switch will be turned to the "OFF" position after the engine ceases firing.

SECTION IVSPECIAL INSTRUCTIONS1. Flying Limitations.a. Maneuvers Prohibited. -

Inverted Flight

Inverted Spin

Outside Loop

Snap roll at more than 106 m.p.h. indicated.

Slow roll at more than 124 m.p.h. indicated.

Air speed in excess of 186 m.p.h. indicated.

2. Brake Parking Valve Control Handle.

Do not operate brake parking valve control handle during flight.

3. Crash Pad Shields.

Ascertain that crash pad shields are properly installed and secure in both cockpits before flight.

φ 4. Baggage Compartment.

Under no circumstances will the weight of contents of the baggage compartment exceed 60 lbs. as specified in paragraph 17 a (2) Sect. IV, T. O. No. 01-70AB-2, nor will containers, tools or other objects be carried that have sharp edges or corners that may pierce the fabric compartment unless they are safely and securely wrapped and tied down. The "G" value of such load components are materially increased during certain maneuvers and may result in failure of the baggage compartment and consequent jamming of surface controls. In general, the baggage compartment in these airplanes should carry only such equipment as cushions, mooring equipment, engine covers, etc., necessary when the airplanes are to be stored in the open.



AIRPLANE MODELS		SPECIFIC ENGINE				ENGINE MODELS					
PT-13B		R-680-11									
FORM ASC512A		PT-13B				R-680-11					
CONDITION	FUEL PRESSURE (LB./SQ. IN.)	OIL PRESSURE (LB./SQ. IN.)	OIL TEMP.		COOLANT TEMP.		MAX. PERMISSIBLE DIVING RPM. . . . . 2520	ALLOWABLE OIL CONSUMPTION			
			°C	°F	°C	°F		NORMAL RATED (MAX. CONT.)	U.S. QT./HR.	IMP. PT./HR.	
DESIRED		70	60	140				3.1	5.2		
MAXIMUM		80	85	185				1.7	2.8		
MINIMUM	GRAY T FUEL FEED	50	10	50	COOLED			1.7	2.8		
IDLING		15						1120	1100		
OIL GRADE: (S) . . . . . 1120 . . . . . (W) . . . . . 1100 . . . . .											
SUPERCHARGER TYPE: None											
FUEL GRADE: 73											
OPERATING CONDITION	RPM	MANIFOLD PRESSURE (BOGGS)	HORSE-POWER	CRITICAL ALTITUDE		USE LOW BLOWER BELOW:	MIXTURE CONTROL POSITION	FUEL FLOW (GAL./HR./ENG.)		MAXIMUM CYL. TEMP.	MAXIMUM DURATION (MINUTES)
				WITH RAM	NO RAM			U.S.	IMP.		
TAKE-OFF	2100	Full Throttle	---	---	Sea Level	---		22.0	18.3	---	---
WAR EMERGENCY	---	---	---	---	---	---		---	---	---	---
MILITARY	---	---	---	---	---	---		---	---	---	---
NORMAL RATED (MAX. CONT.)	2100	Full Throttle	220	---	Sea Level	---		22.0	18.3	---	---
MAXIMUM CRUISE	1850	Part Throttle	147	---	Sea Level	---	5000 feet. (See Remarks)	13.0	10.8	---	---
MINIMUM SPECIFIC CONSUMPTION	1840	Part Throttle	147	---	Sea Level	---	Full Rich (See Remarks)	13.0	10.8	---	---

REMARKS: Above 5,000 feet, lean out to best power.

RESTRICTED

T. O. No. 01-70AB-1  
SECTION VIFLYING CHARACTERISTICS  
PT-13B Airplane

1. Level Flight Speeds at Design Altitude of S.L. ft. with Design Gross Weight of 2678 lb.
- |                 |              |             |             |               |            |                               |
|-----------------|--------------|-------------|-------------|---------------|------------|-------------------------------|
| Maximum Speed   | <u>125.2</u> | m. p. h. at | <u>2100</u> | r. p. m. with | <u>222</u> | b. hp. ( <u>103</u> % rated)  |
| High Speed      | <u>124</u>   | m. p. h. at |             | r. p. m. with | <u>215</u> | b. hp. ( <u>100</u> % rated)  |
| Operating Speed | <u>103.1</u> | m. p. h. at | <u>1785</u> | r. p. m. with | <u>149</u> | b. hp. ( <u>69.5</u> % rated) |
| Cruising Speed  |              | m. p. h. at |             | r. p. m. with |            | b. hp. (..... % rated)        |
2. Optimum Range and Endurance with 46.0 gal fuel and.....lb. bombs.
- |                    |            |          |       |             |             |         |              |                                 |
|--------------------|------------|----------|-------|-------------|-------------|---------|--------------|---------------------------------|
| At High Speed      | <u>284</u> | miles at | ..... | mi./gal. or | <u>2.27</u> | hrs. at | <u>20.3</u>  | gal./hr. (s. f. c.....)         |
| At Operating Speed | <u>410</u> | miles at | ..... | mi./gal. or | <u>3.98</u> | hrs. at | <u>11.57</u> | gal./hr. (s. f. c. <u>467</u> ) |
| At Cruising Speed  |            | miles at | ..... | mi./gal. or |             | hrs. at |              | gal./hr. (s. f. c.....)         |
3. Practical Range and Endurance with 46.0 gal fuel and.....lb. bombs.
- |                    |            |          |       |             |             |         |              |                                 |
|--------------------|------------|----------|-------|-------------|-------------|---------|--------------|---------------------------------|
| At Operating Speed | <u>347</u> | miles at | ..... | mi./gal. or | <u>3.36</u> | hrs. at | <u>13.68</u> | gal./hr. (s. f. c. <u>.55</u> ) |
| At Cruising Speed  |            | miles at | ..... | mi./gal. or |             | hrs. at |              | gal./hr. (s. f. c.....)         |
4. Climb Data with Gross Weight of 2678 lb.
- |                   |          |             |             |               |               |               |       |       |
|-------------------|----------|-------------|-------------|---------------|---------------|---------------|-------|-------|
| Standard Altitude | ft.      | <u>0</u>    | <u>5000</u> | <u>10,000</u> | <u>13,500</u> | <u>15,350</u> | ..... | ..... |
| Climbing Speed    | m. p. h. | <u>78.5</u> | <u>79</u>   | <u>81</u>     | <u>82</u>     | <u>82</u>     | ..... | ..... |
| Engine Speed      | r. p. m. | <u>1835</u> | <u>1800</u> | <u>1765</u>   | <u>1730</u>   | <u>1705</u>   | ..... | ..... |
| Total Power       | b. hp.   |             |             |               |               |               | ..... | ..... |
| Maximum Rate      | f. p. m. | <u>825</u>  | <u>555</u>  | <u>285</u>    | <u>100</u>    |               | ..... | ..... |
| Minimum Time      | min.     | <u>0</u>    | <u>7.3</u>  | <u>19.6</u>   | <u>39.3</u>   |               | ..... | ..... |
5. Ceiling: Normal Engine Operation: Service Ceiling 13,500 ft. Absolute Ceiling 15,350 ft.
6. Take-off and Landing Distances—To Clear 50 ft. Obstacle at Sea Level (no wind).
- |          |            |        |           |          |       |            |                         |            |            |     |
|----------|------------|--------|-----------|----------|-------|------------|-------------------------|------------|------------|-----|
| Take-off | <u>935</u> | ft. at | <u>55</u> | m. p. h. | ..... | deg. flap. | Gr. Wt. <u>2678</u> lb. | Ground run | <u>535</u> | ft. |
| Land     | <u>725</u> | ft. at | <u>53</u> | m. p. h. | ..... | deg. flap. | Gr. Wt. <u>2678</u> lb. | Ground run | <u>410</u> | ft. |
7. References and Remarks: This airplane may be expected to give approximately the above performance with given load under standard atmospheric conditions. Figures given may vary slightly from figures listed elsewhere in this Technical Order and other technical publications for this model of airplane.

SECTION VI  
FLYING CHARACTERISTICS  
PT-17 Airplane

1. Level Flight Speeds at Design Altitude of S.L. ft. with Design Gross Weight of 2635 lb.  
 Maximum Speed..... m. p. h. at..... r. p. m. with..... b. hp. (.....% rated)  
 High Speed 123.5 m. p. h. at 2085 r. p. m. with 220 b. hp. (100 % rated)  
 Operating Speed 96 m. p. h. at 1700 r. p. m. with 120 b. hp. (54.5 % rated)  
 Cruising Speed..... m. p. h. at..... r. p. m. with..... b. hp. (.....% rated)

2. Optimum Range and Endurance with 46 gal fuel and.....lb. bombs.  
 At High Speed..... miles at..... mi./gal. or..... hrs. at..... gal./hr. (s. f. c.....)  
 At Operating Speed 410 miles at 8.9 mi./gal. or 4.28 hrs. at 10.75 gal./hr. (s. f. c. 538)  
 At Cruising Speed..... miles at..... mi./gal. or..... hrs. at..... gal./hr. (s. f. c.....)

3. Practical Range and Endurance with 46 gal. fuel and.....lb. bombs.  
 At Operating Speed 380 miles at 8.3 mi./gal. or 4.0 hrs. at 11.5 gal./hr. (s. f. c. 60)  
 At Cruising Speed..... miles at..... mi./gal. or..... hrs. at..... gal./hr. (s. f. c.....)

4. Climb Data with Gross Weight of 2635 lb.

			S.C.	A.C.	
Standard Altitude	ft. <u>0</u>	<u>5000</u>	<u>10,000</u>	<u>13,200</u>	<u>14,700</u>
Climbing Speed	m. p. h. <u>83</u>	<u>80.3</u>	<u>76.2</u>	<u>73.5</u>	<u>72.2</u>
Engine Speed	r. p. m. <u>1870</u>	<u>1830</u>	<u>1760</u>	<u>1685</u>	
Total Power	b. hp. <u>195</u>	<u>170</u>	<u>145</u>	<u>99</u>	
Maximum Rate	f. p. m. <u>960</u>	<u>635</u>	<u>310</u>	<u>100</u>	<u>0</u>
Minimum Time	min. <u>0</u>	<u>6.3</u>	<u>17.3</u>	<u>34.1</u>	

5. Ceiling: Normal Engine Operation: Service Ceiling 13,200 ft. Absolute Ceiling 14,700 ft.

6. Take-off and Landing Distances—To Clear 50 ft. Obstacle at Sea Level (no wind).  
 Take-off 915 ft. at 54.7 m. p. h. deg. flap. Gr. Wt. 2635 lb. Ground run 453 ft.  
 Land 845 ft. at 54.7 m. p. h. deg. flap. Gr. Wt. 2635 lb. Ground run 340 ft.

7. References and Remarks: This airplane may be expected to give approximately the above performance with given load under standard atmospheric conditions. Figures given may vary slightly from figures listed elsewhere in this Technical Order and other technical publications for this model of airplane.

RESTRICTED

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

## SECTION VI

## FLYING CHARACTERISTICS

## PT-18 Airplane

1. Level Flight Speeds at Design Altitude of Sea Level, with Design Gross Weight of 2729 lb.

Maximum Speed	- - -	m. p. h. at	- - -	r. p. m. with	- - -	b. hp. (	- - -	% rated)
High Speed	125	m. p. h. at	2025	r. p. m. with	225	b. hp. (	100	% rated)
Operating Speed	105	m. p. h. at	1750	r. p. m. with	145	b. hp. (	64.5	% rated)
Cruising Speed	-	m. p. h. at	-	r. p. m. with	-	b. hp. (	-	% rated)

2. Optimum Range and Endurance with 46 gal fuel and - lb. bombs.

At High Speed	269	miles at	5.84	mi./gal. or	2.15	hrs. at	21.4	gal./hr. (s. f. c. 57)
At Operating Speed	430	miles at	9.34	mi./gal. or	4.10	hrs. at	11.2	gal./hr. (s. f. c. 465)
At Cruising Speed	-	miles at	-	mi./gal. or	-	hrs. at	-	gal./hr. (s. f. c. -)

3. Practical Range and Endurance with 46.0 gal. fuel and - lb. bombs.

At Operating Speed	334	miles at	7.25	mi./gal. or	3.18	hrs. at	14.5	gal./hr. (s. f. c. 60)
At Cruising Speed	-	miles at	-	mi./gal. or	-	hrs. at	-	gal./hr. (s. f. c. -)

4. Climb Data with Gross Weight of 2729 lb.

				S.C.	A.C.		
Standard Altitude	ft.	0	5,000	10,000	14,200	16,000	
Climbing Speed	m. p. h.	79.2	79.3	79.5	79.7	79.8	
Engine Speed	r. p. m.	1815	1800	1770	1735	1715	
Total Power	b. hp.	210	185	156	-	-	
Maximum Rate	f. p. m.	870	600	327	100	0	
Minimum Time	min.	0	6.9	17.9	39.6	-	

5. Ceiling: Normal Engine Operation: Service Ceiling 14,200 ft. Absolute Ceiling 16,000 ft.

6. Take-off and Landing Distances—To Clear 50 ft. Obstacle at Sea Level (no wind).

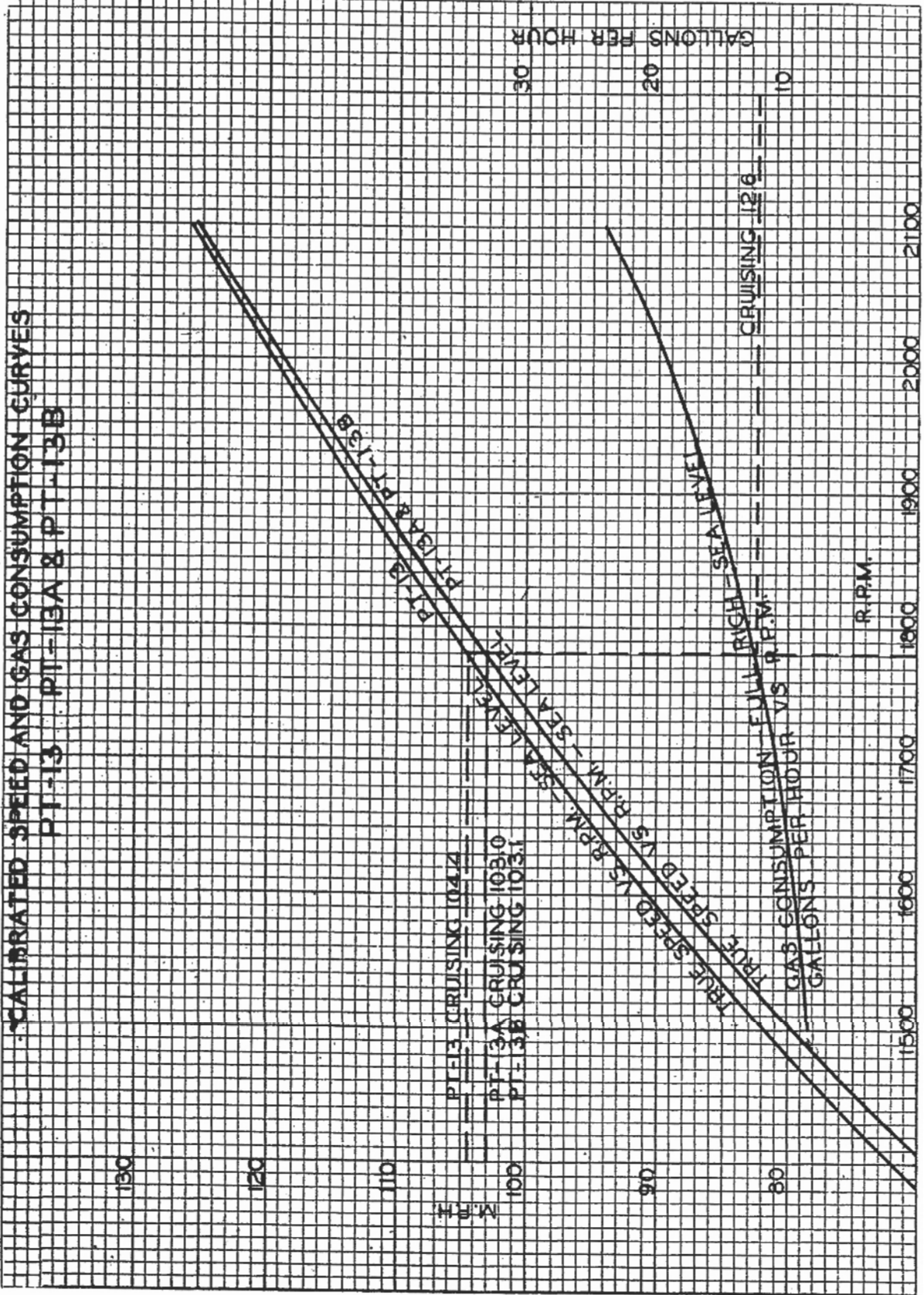
Take-off	900	ft. at	55	m. p. h.	-	deg. flap.	Gr. Wt.	2729	lb.	Ground run	480	ft.
Land	880	ft. at	60	m. p. h.	-	deg. flap.	Gr. Wt.	2729	lb.	Ground run	522	ft.

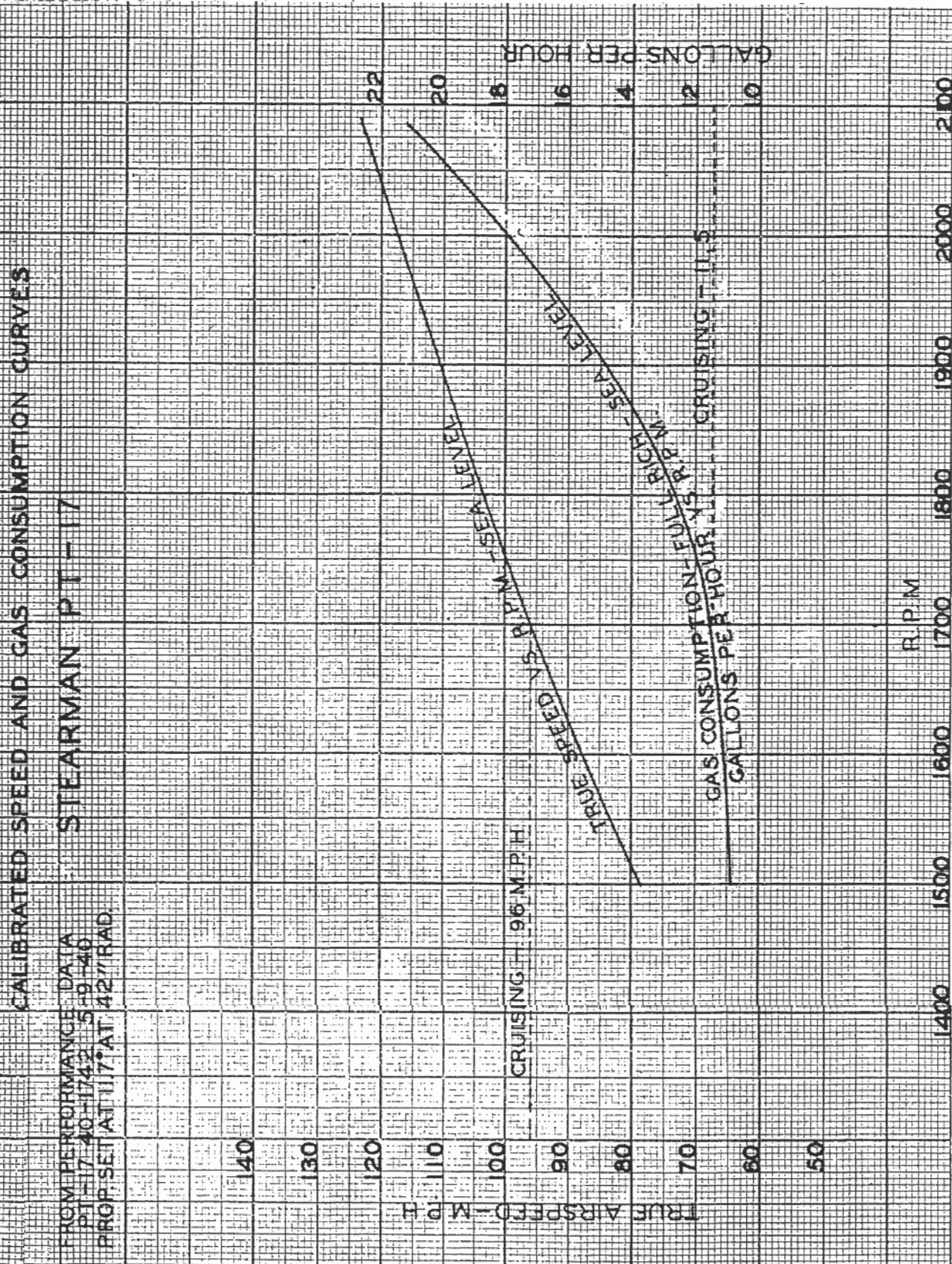
7. References and Remarks: This airplane may be expected to give approximately the above performance with given load under standard atmospheric conditions. Figures given may vary slightly from figures listed elsewhere in this Technical Order and other technical publications for this model of airplane.

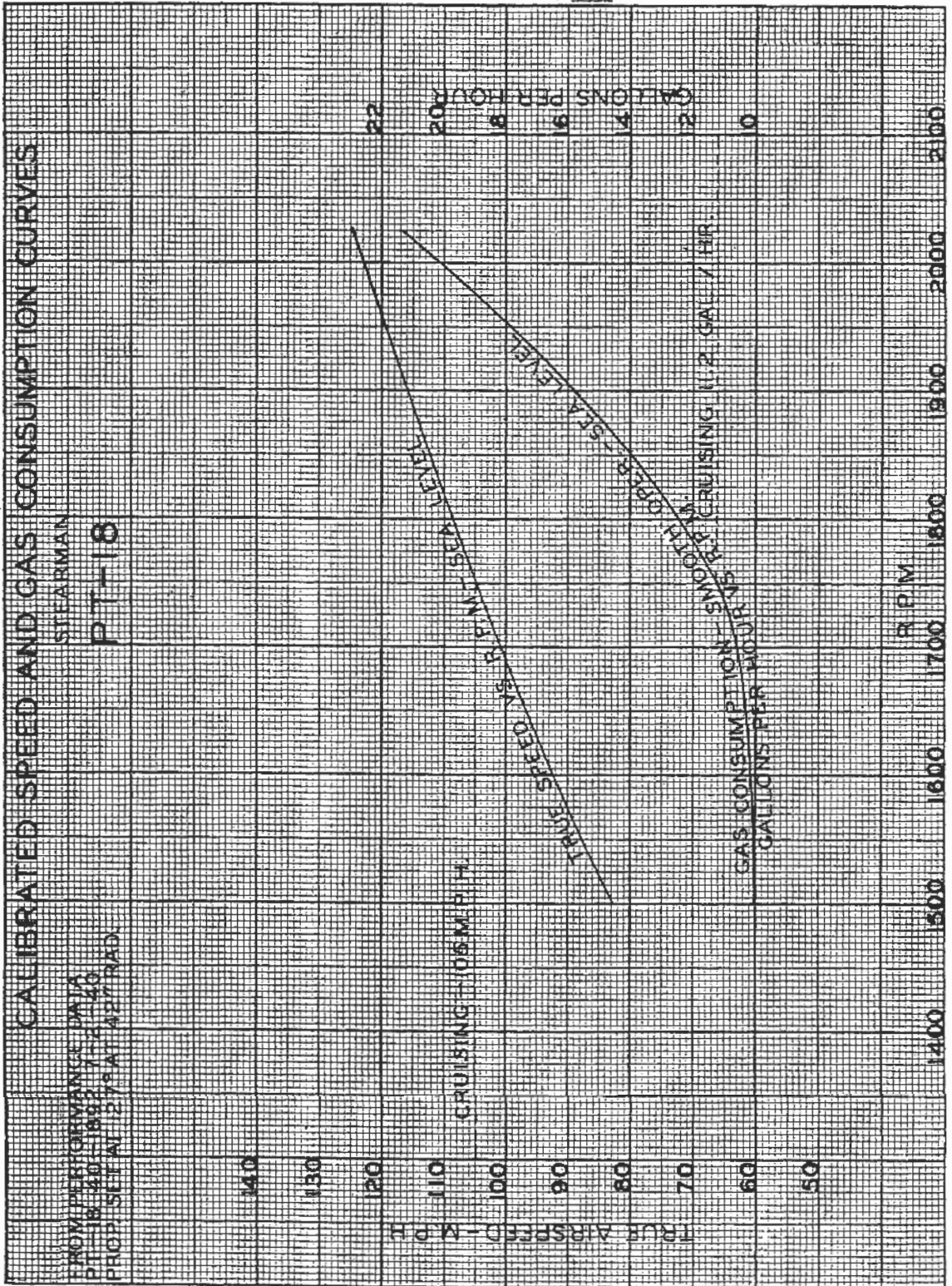
SECTION VIIWEIGHT DATA

1. Weight (In Pounds)	<u>PT-13B</u>	<u>PT-17</u>	<u>PT-18</u>
Weight Empty	1948	1927	1971
Useful Load	709	709	709
Crew - 2 at 200 Lbs.	400		
Fuel - One Tank (46 Gal.)	276		
Oil - (4.4 Gal.)	33		
Gross Weight	2657	2636.0	2680.0
Wing Loading (Lbs./Sq.Ft.)	9.05	8.9	9.02
Power Loading (Lbs./H.P.)	12.05	11.96	11.9

SECTION VIII









RANGE CHART

(Range Charts will not be issued for the PT-13B, PT-17 and PT-18  
Airplanes.)