Cessna

Cessna 170

P-125 GRIT—1000—2/5/59

CESSNA AIRCRAFT COMPANY

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OPERATION MANUAL
CESSNA 170 SERIES

PREFACE

This book has been prepared for you as an owner and operator of a Cessna 170A airplane. It was written specifically for you — to help you get the best out of your airplane — for the longest period of time.

Your Cessna is a product of the best in aircraft engineering and production skill. The maintenance of the quality that is built into it will be assured by simple but necessary upkeep on your part. The purpose of this book is to acquaint you with the things you should know — both in operation and care of the airplane.

The book is divided into four basic sections. The first concern of the owner of any product is the operation of his equipment. The first section, therefore, sets forth in Pilot's Check List form the basic data that have been developed as the best operational methods for flying your Cessna. It is not a check list in its true form as it is considerably longer, but it does cover briefly all of the points that you would want to or should know concerning the operation of your airplane.

Section two of the book sets forth the operation limitations and performance data and should be of useful interest to those desiring the most in performance from their airplane.

In the third section are set forth details and explanations that are necessary to avoid complicating the check list to the point where it loses its purpose.

The fourth section is devoted to care of the airplane itself and covers your responsibilities to help it perform faithfully and economically the many hours of fine flying that are built into it. A list of Cessna distributors, who can provide you with service wherever you may be, together with a list of approved Cessna accessories has been included in this section for your convenience.

WARRANTY

The Cessna Aircraft Company warrants each new airplane manufactured to be free from defects in material and workmanship under normal use and service, provided, however, that this warranty is limited to making good at the Cessna Aircraft Company's factory any part or parts thereof which shall, within ninety (90) days after delivery of such airplane to the purchaser, be returned to the Company with transportation charges prepaid, and which upon Company examination shall disclose to the Company satisfaction to have been thus defective; this warranty being expressly in lieu of all other warranties expressed or implied and all other obligations or liabilities on the part of the Company, and the Company neither assumes nor authorizes any other person to assume for it any other liability in connection with the sale of its airplanes.

This warranty shall not apply to any airplane which shall have been repaired or altered outside the Company's factory in any way so as, in its judgment, to affect its stability or reliability, nor which has been subject to misuse, negligence or accident.

SECTION I — OPERATING CHECK LIST

The flight and operational characteristics of the Model 170A Cessna are normal in all respects. There are no "unconventional" characteristics or operations that need to be mastered. All controls respond in the normal way within the entire range of operation of the airplane.

A. BEFORE ENTERING THE AIRPLANE

(1) Check oil level. Do not operate on less than four quarts. Fill for extended flights. For seaplane note Operating Details.
(2) On first flight of the day, drain a small (one-ounce) quantity of fuel from fuel strainer drain to insure that no free water is in the fuel line.
(3) Check quantity of fuel (two gauges).
(4) Make a visual check of the airplane.
(5) Remove control locks, if installed.

B. BEFORE STARTING THE ENGINE

(1) Operate controls and make a rapid visual check for proper operation.
(2) Make sure windshield is clean for maximum visibility.
(3) Adjust seat for comfort and distance to rudder pedals.
(4) Check brakes and set parking brake.
(5) Fasten and check safety belt.

C. STARTING THE ENGINE

(1) Set carburetor heat to "cold."
(2) Set mixture control to "full rich."
(3) Set fuel tank selector to "both tanks." (Take-off on less than 1/4 tank is not recommended.)
(4) If engine is cold (50°F or below), prime the engine as follows:
Turn master switch "on."
Clear propeller.
Make certain magneto switch is "off" and throttle "closed" then give engine three or four strokes with the primer as

the engine is turned over. (Ordinarily not required except at winter temperatures.)

(5) Turn magneto switches "on."

(6) Open throttle 1/8 (to idle position) and start engine by pulling starter control. Note: In extremely cold weather a few strokes of the primer as the engine fires will enable the engine to keep running. (Avoid over-priming.) After priming push primer all the way in and turn to locked position to avoid possibility of engine drawing fuel through the primer. *Do not pull out on starter* for a second starting attempt until engine has come to a complete stop from the first attempt. Failure to do this may result in damage to the starting gear.

D. WARM-UP AND GROUND TEST

(1) Do not allow engine to operate at more than 800 r.p.m. for first 60 seconds after starting. (Especially important in cold weather as lubricating oil will be slow in circulating.) After starting if oil gage does not *begin* to show pressure within 30 seconds in the summertime and about twice that long in very cold weather, stop engine and investigate. Lack of oil pressure may cause serious engine damage.

(2) Apply full carburetor heat except under dusty air conditions.

(3) After two to three minutes running at 800 r.p.m., open the throttle gradually to 1000 r.p.m. and allow to run for three to five minutes or until engine is sufficiently warm for take-off. Warm-up may be accomplished during taxiing. Do not overheat the engine by running engine at high speed while on the ground. It is not necessary to run the engine until oil is "hot"; if engine runs properly at full throttle and oil pressure is normal, you are ready for take-off.

E. BEFORE TAKE-OFF

(1) Apply toe brakes.

(2) Set altimeter.

(3) Set trim tab to "take-off" position.

(4) Check oil pressure – should show 30 to 40 lbs. sq. in. (Minimum idling oil pressure – 5 lbs. sq. in.)

IV. Empennage and Surfaces.

1. Check both stabilizer, and vertical fin, for possible damage.
2. Check attaching bolts on both fin and stabilizer for security.
3. Check rudder and elevator attaching bolts for security and surfaces for freedom of movement.
4. Check elevator and rudder hinge connections for cracks.
5. Check surface travels to plus or minus 1°. Elevator 28° up and 17° down, Elevator tab 10° up and 27° down, Rudder travel 16° right 16° left, Aileron 20° up 14° down, and Flaps 50° down.
6. Check elevator bellcrank and rudder bellcrank.
7. Clean tail wheel assembly. Check for security, freedom of operation. Grease lube fittings. Pack wheel at 500 hours. Check rubber mounting of springs for wear.

V. Cabin Section.

1. Clean cabin section, vacuum it if possible.
2. Inspect rudder bar and brake assembly and the control tee for the security of mounting. Inspect cable connection points. Check pulley installations.
3. Suspend landing gear wheels from floor and remove outer wheel fairings. Shake landing gear and wheels for any sign of looseness and visually inspect fuselage attachment. If necessary tighten landing gear bolts and wedges. With airplane in 3-point position on the floor visually inspect landing gear spring leaf underside for cracks. (Remove landing gear wheels and pack with grease every 500 hours unless otherwise designated by owner.)

VI. Electrical System.

1. Check electrical system by operating the lights, starter, and all accessories which are incorporated in the electrical system.

VII. Recowl the engine. Replace all inspection plates and fairings.

VIII. Run engine.

1. Check magnetos for drop.
2. Check generator for proper charge.

11. Remove rear center tunnel covers between the front seats.
12. Open curtains at the aft end of the baggage compartment for access to the cables, bellcranks and pulleys. It is necessary to crawl back into the fuselage for proper inspection.
13. Open landing gear fairing.

II. Engine Check.

1. Remove heater muffs. Inspect mufflers and exhaust stacks for possible cracks.
2. Drain oil and clean oil strainer located on rear side of accessory case and replace oil.
3. Check magneto, touching up points if necessary, and check timing. Right Magneto 26° B.T.C., Left Magneto 28° B.T.C.
4. Check cylinder base nuts for tightness.
5. Check for oil leaks.
6. Remove spark plugs, clean if necessary, check gap spacing and replace.
7. Wash down engine.
8. Check engine mount bolts for security.
9. Check all wires forward of the firewall.
10. Check all engine controls for travel and free movement.
11. Remove and clean gasculator bowl and screen.
12. Check propeller track and inspect for bad nicks or cracks.
13. Check starter travel.
14. Clean carburetor air screen, re-oil and reinstall.
15. Check battery water level.
16. Replace engine cowling.

III. Wing Inspection.

1. Check front and rear wing bolts attaching wing to fuselage (both wings).
2. Check out strut bolts for security (both wings).
3. Check all wing control surfaces for freedom of movement and bolts for security.
4. Check aileron bellcranks (both sides).
5. Check flap latch and flap pulleys.
6. Drain wing fuel tank sumps.

(5) Check engine magnetos at 1600 r.p.m. by opening the throttle and switching off separately each magneto momentarily. Drop of r.p.m. from 1600 r.p.m. should not exceed 50 r.p.m. on the right magneto or 75 r.p.m. on the left magneto. Switch to both magnetos before continuing.

(6) Check carburetor heat and leave on full heat until take-off.

(7) Full throttle r.p.m. check is optional but not recommended. The engine should run smoothly and turn, with carburetor heat off, 2230 to 2330 r.p.m. The engine should idle between 300 and 400 r.p.m. Except for short check do not idle below 600 r.p.m.

F. TAKE-OFF

(1) Release brakes.

(2) Turn carburetor heat "off."

(3) For take-off use full throttle, or power required.

(4) Heels on the floor.

(5) Climb at full throttle, or power required for safety. Best rate of climb airspeed 89 m.p.h. indicated, at sea level.

G. CRUISING

(1) Recommended maximum cruising r.p.m. 2450.

(2) Trim airplane by adjusting elevator tab.

(3) Oil pressure – 30-40 lbs. sq. in.

(4) Oil temperature – maximum 225°F.

(5) Above 5000 ft. lean mixture to 10 or 25 r.p.m. richer than maximum r.p.m.

H. BEFORE LANDING

(1) Set fuel valve to both tanks.

(2) Set mixture control full rich.

(3) Apply full carburetor heat before closing throttle. If a long letdown is available, avoid "chopping" the throttle.

(4) Suggested glide speed 70-75 m.p.h.

(5) Use tab to relieve elevator control wheel pressure when establishing glide.

(6) Lower flaps as desired (do not lower flaps when indicated airspeed is above 100 m.p.h.)

I. AFTER LANDING

(1) Raise flaps.

(2) Normal glide and taxiing should cool engine sufficiently; however, if excessive amount of taxiing is necessary, allow engine to cool before cutting ignition by allowing to idle at 800 r.p.m. two to three minutes.

(3) Turn magneto switches "off." (Open throttle to avoid pre-ignition when hot.) Alternate method – Full lean with partially open throttle before turning switches off.

(4) Turn radio switch "off."

(5) Turn master switch "off." Be sure – otherwise your battery may run down overnight.

(6) Set parking brake, if required.

Distributors carry a full complement of genuine Cessna service parts, complete repair and service facilities, including such specialized jigs and tooling as may be necessary. Cessna dealers maintain stocks of genuine Cessna parts and Service facilities consistent with the demand.

An illustrated Parts Catalog for the Model 170 Cessna airplane is available through distributors and dealers at a nominal charge. The catalog lists optional equipment as well as all standard parts. Your Cessna distributor or dealer will be glad to give you current price quotations on all parts that you might need and will be glad to advise you on the practicability of parts replacement versus repairs that might from time to time be necessary.

100 HOUR INSPECTION:

Before beginning the inspection, shop foreman or mechanic runs the engine to check for magneto drop, generator charge and general smoothness of operation of the engine and records these facts as an aid to the mechanic. The inspection consists basically of the following procedure:

I. Remove all inspection plates and necessary fairing consisting of the following:
   1. Remove front strut inspection plates (both sides).
   2. Remove lower half of wing root fairing (both sides).
   3. Remove two round inspection plates at aileron bellcrank.
   4. Remove two flap pulley inspection covers on top of the wing-root-to-cabin-junction-section forward of the flap.
   5. Remove tail group fairing and round plate on left side under the fin.
   6. Remove round plate on underneath right side of the stabilizer.
   7. Remove lower half of engine cowl. Upper cowl may be clamped together and left on airplane.
   8. Remove the two round inspection plates on the under side of the cabin section outside skins.
   9. Open the upholstery zipper above the rear seat.
   10. Remove the two round plates on the top side of the landing gear bulkhead.

INSPECTION SERVICE AND INSPECTION PERIODS:

Plan to take your Cessna 170A back to your dealer or distributor after you have flown it for 30 days or about 25 hours, whichever comes first. This will permit him to check it over, to tighten rocker-box covers, the exhaust manifold installation, and to make any other minor adjustments that might appear necessary. Also, plan a 100-hour inspection by your dealer or distributor at 100 hours or 90 days – whichever comes first. These first two inspection services are performed by your dealer or distributor for you at "No Charge."

The Civil Air Regulations require all airplanes to have an "annual inspection" as prescribed by the administrator, by a person designated by the administrator, and in addition, 100 hour periodic inspections made by an "appropriately rated mechanic" if the airplane is flown for hire. The Cessna Aircraft Company recommends the 100 hour periodic inspection for the Model 170A airplanes. The procedure for this 100 hour inspection has been carefully worked out by the factory and is followed by the Cessna dealer and distributor organization. The complete familiarity of the Cessna distributor and dealer organization with Cessna equipment and with Cessna procedures provides the highest type of service possible at lower cost.

Time studies of the 100 hour inspection at the factory and in the field have developed a standard flat rate charge for this inspection at any Cessna Dealer or Distributor. Points which the inspection reveals require modification or repairs will be brought to the owner's attention by the dealer or distributor and quotations or charges will be made accordingly. The inspection charge does not include the oil required for the oil change.

Every effort is made to attract the best mechanics in each community to Cessna service facilities. Many distributors' and dealers' mechanics have attended Cessna Aircraft Company schools and have received specialized instruction in maintenance and care of Cessna airplanes. Cessna service instruction activity in the form of service bulletins and letters is constantly being carried on so that your enjoyment and safety in your Cessna will be complete and up-to-date when you have your inspection and service work performed by Cessna distributors' and dealers' mechanics.

SECTION II — OPERATION LIMITATIONS† AND PERFORMANCE DATA

OPERATIONS AUTHORIZED:

Your Cessna 170A with standard equipment as certificated under CAA Type Certificate No. 799, is approved for day and night operation under VFR.

Additional optional equipment is available to increase its utility and to make it authorized for use under IFR day and night. When operated for hire at night, certificated flares are required. An owner of a properly equipped 170A is eligible to obtain approval for its operation on single engine scheduled airline service on VFR.

MANEUVERS — NORMAL CATEGORY

The Model 170A exceeds the requirements of the Civil Air Regulations, Part 3, set forth by the United States Government for airworthiness. Spins and aerobatic maneuvers are not permitted in normal category airplanes, in compliance with these regulations. In connection with the foregoing, the following gross weights and flight load factors apply:

	LANDPLANE AND SKIPLANE		SEAPLANE	
Gross Weight	2200 lbs.		2106 lbs.	
Flight Load Factor*				
Flaps Up	+3.8	−1.52	+3.8	−1.52
Flight Load Factor*				
Flaps Down	+3.5		+3.5	

MANEUVERS — UTILITY CATEGORY

This airplane is not designed for purely aerobatic flight. However, in the acquisition of various certificates such as commercial pilot, instrument pilot and flight instructor, certain maneuvers are required by the CAA. All of these maneuvers are permitted in the Cessna 170A when operated in the utility category.

† Your airplane must be operated in accordance with the CAA approved Airplane Flight Manual. If there is any information in this section which contradicts the CAA approved manual, it is to be disregarded.

In connection with the Utility category, the following gross weights and flight load factors apply, with recommended entry speeds for maneuvers as shown.

	LANDPLANE AND SKIPLANE	SEAPLANE
Gross Weight	1900 lbs.	1975 lbs.
Flight Load Factor*		
Flaps Up	+4.4 −1.76	+4.4 −1.76
Flight Load Factor*		
Flaps Down	+3.5	+3.5
Steep Turns	115 m.p.h.	100 m.p.h.
Spins	Slow Deceleration	Slow Deceleration
Stalls (Except Whip Stalls)	Slow Deceleration	Slow Deceleration
Lazy Eights	115 m.p.h.	110 m.p.h.
Chandelles	115 m.p.h.	110 m.p.h.

Aerobatics that may impose high inverted loads should not be attempted. The important thing to bear in mind in flight maneuvers is that the Cessna 170A is clean in aerodynamic design and will build up speed quickly with the nose down. Proper speed control is an essential requirement for execution of any maneuver and care should always be exercised to avoid excessive speed which in turn can impose excessive loads. In the execution of all maneuvers avoid abrupt use of controls.

AIRSPEED LIMITATIONS:

The following are the certificated true indicated airspeed limits:

	LANDPLANE AND SKIPLANE	SEAPLANE
Glide or Dive (smooth air) (*red line*)	160 m.p.h.	140 m.p.h.
Level Flight or Climb (normal range marked with green arc; caution range marked with yellow arc, 140 to 160 m.p.h., seaplane 110 to 140 m.p.h.)	140 m.p.h.	110 m.p.h.
Flap Extension and Operation (flap operating range marked by white arc)	100 m.p.h.	100 m.p.h.

* The design load factors are 150% of the above and in all cases the structure meets or exceeds design loads.

LUBRICATION:

Figure 19 outlines the lubrication requirements for the Cessna Model 170A.

LIFTING AND JACKING:

The airplane may be lifted by an appropriate sling at the engine mount fuselage attachment fitting or by lifting lugs on the engine and a sling around the aft section of the fuselage. The cowl upper halves need not be removed as they can be opened upward for application of the sling at the engine mount fuselage attachment fitting. Jacking point brackets and hoisting rings are available as optional equipment and insure easy, safe handling of the airplane. A block of hardwood sawed at an angle to fit between the fuselage and the landing gear spring may be used as a jacking point to hold the airplane when working on a wheel or tire. Do not use the brake casting as a jacking point.

AIRPLANE FILE:

There are miscellaneous data, information and licenses that are a part of the airplane file. The following is a check list for that file:

A. To be carried in the airplane at all times:
   (1) Aircraft Registration Certificate (Form ACA 500A)
   (2) Aircraft Airworthiness Certificate (CAA Form ACA 1362)
   (3) CAA approved flight manual
   (4) Airplane Radio Station License (if transmitter installed)
   (5) Airplane Log Book
   (6) Engine Log Book

B. To be maintained but not necessarily carried in the airplane at all times:
   (1) Weight and Balance report or latest copy of the Repair and Alteration Form 337
   (2) Equipment List
   (3) A form containing the following information: Model, NC Number, Factory Serial Number, Date of Manufacture, Engine Number and Key Numbers (duplicate keys are available through your Cessna dealer or distributor).

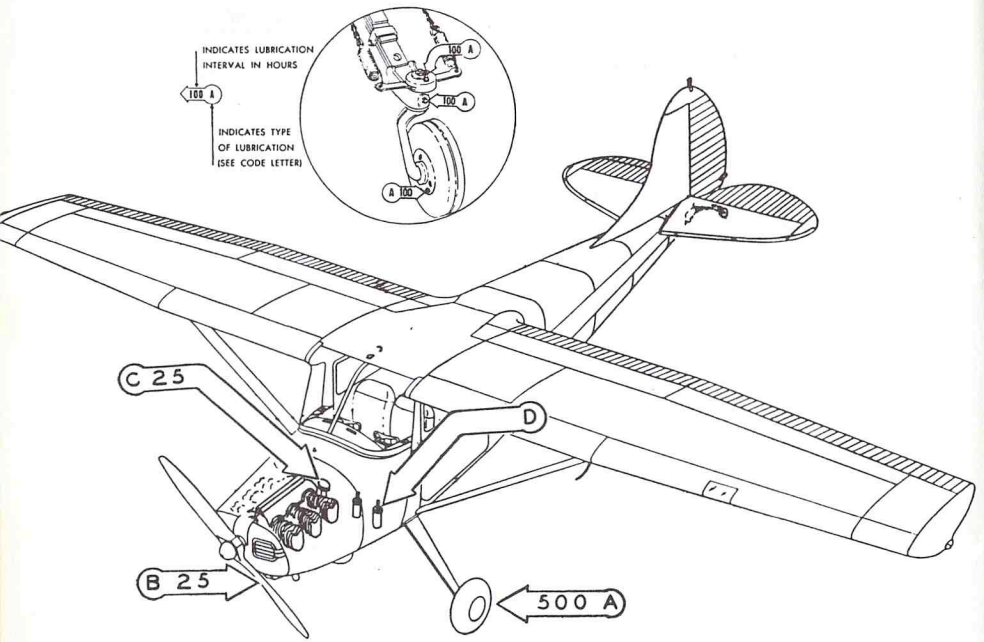


Figure 19 — Lubrication Diagram

Code Letter LUBRICATION CODE

A — AN-G-15 — Grease

B — Carburetor Air Filter — Wash in gasoline, coat both sides with (SAE 10) motor oil and allow to drain before re-installing. Service every 25 hours or oftener when operating in dusty conditions.

C — Engine Oil Tank — Check dip-stick before each flight. Drain and refill every 25 hours.

D — Brake master cylinders — should be checked and refilled periodically with AN-VV-O-366 (3580-D) Oil-Hydraulic (Petroleum base).

NOTE 1. All pulleys, trim tab actuator rod, control surface hinge bearings, bellcrank clevis bolts, flap actuating handle, brake pedal pivots, rudder pedal crossbars, door hinge and mechanism, Bowden controls, throttle, control rod universal (if unsealed) and control column ball, should be lubricated with AN-O-6a General Purpose light machine oil as required or every 1,000 hours.

NOTE 2. In general, roller chain (Aileron, Tab wheel, tab actuator) and control cable tend to collect dust, sand, and grit when greased or oiled. More satisfactory operation except under seacoast conditions results when the chains are wiped clean occasionally with a clean dry cloth.

FLAP SETTINGS:

For normal take-off ..... Up — 0°
For shortest take-off ..... Second Notch
For landing ..... Full down — 50°

ENGINE OPERATING LIMITATIONS:

Power and Speed ..... 145 b.h.p. at 2700 r.p.m.

Instrument Markings:

Oil Temperature Maximum ..... 225°F. (Red Arc)

Oil Pressure:
Minimum Idling ..... 5 p.s.i.
Normal Operating ..... 30 to 40 p.s.i.

Tachometer:
Normal Operation ..... 2200-2450 (green arc)
Cautionary Range 2450-2700
Maximum Allowable ..... 2700 (red line)

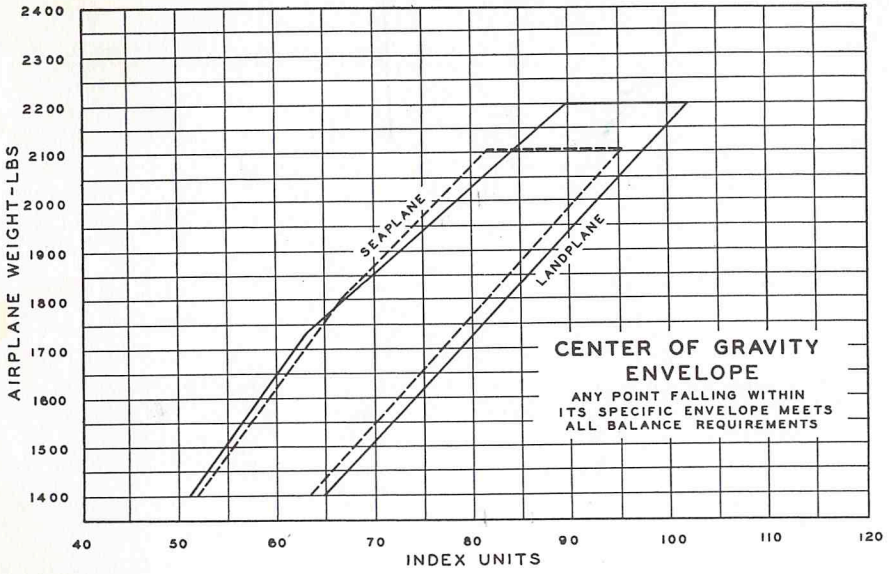
WEIGHT AND BALANCE:

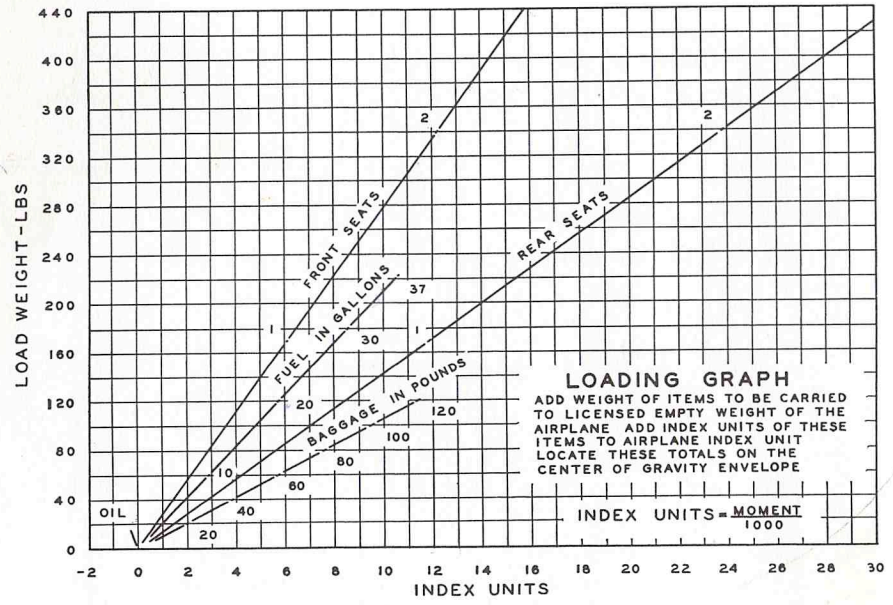
All aircraft are designed for certain limit loads and balance conditions.

These specifications for your 170A are charted on page 10.

A weight and balance report and equipment list is furnished with each airplane. All the information on empty weight c.g. and allowable limits for your particular airplane as equipped when it left the factory is shown. Changes in the original equipment affecting weight empty c.g. are required by the C.A.A. to be recorded in the repair and alteration form 337.

Using the weight empty, c.g. location and moment from the weight and balance report and following the example on Page 10, the exact moment may be readily calculated which when plotted on the upper chart will quickly show whether or not the c.g. is within limits.





EXAMPLE: Empty weight of 1220 lb. moment of 47,900 in. lb. or index of 47.9.

	WT.	INDEX
EMPTY WEIGHT (LICENSED)	1220	+47.9
OIL	15	−0.3
PILOT & PASSENGER (1)	340	+12.2
PASSENGERS (2)	340	+23.8
FUEL (MAXIMUM) 37 GAL.	222	+10.7
BAGGAGE (TO MAKE GR. WT.)	63	+6.0
Total	2200	100.3

Locate this point (2200-100.3) on the center of gravity envelope graph, and, since the point falls within the envelope, the above loading meets all balance requirements.

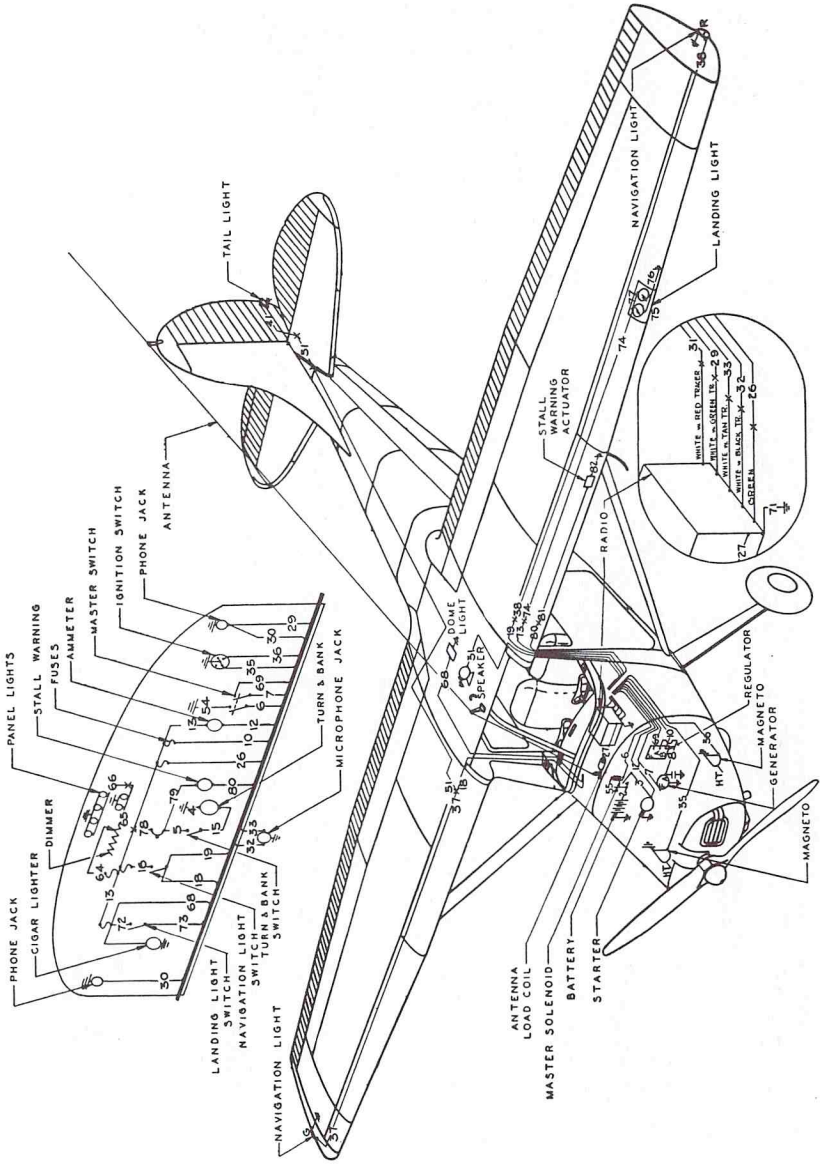


Figure 18 — Electrical Wiring Diagram

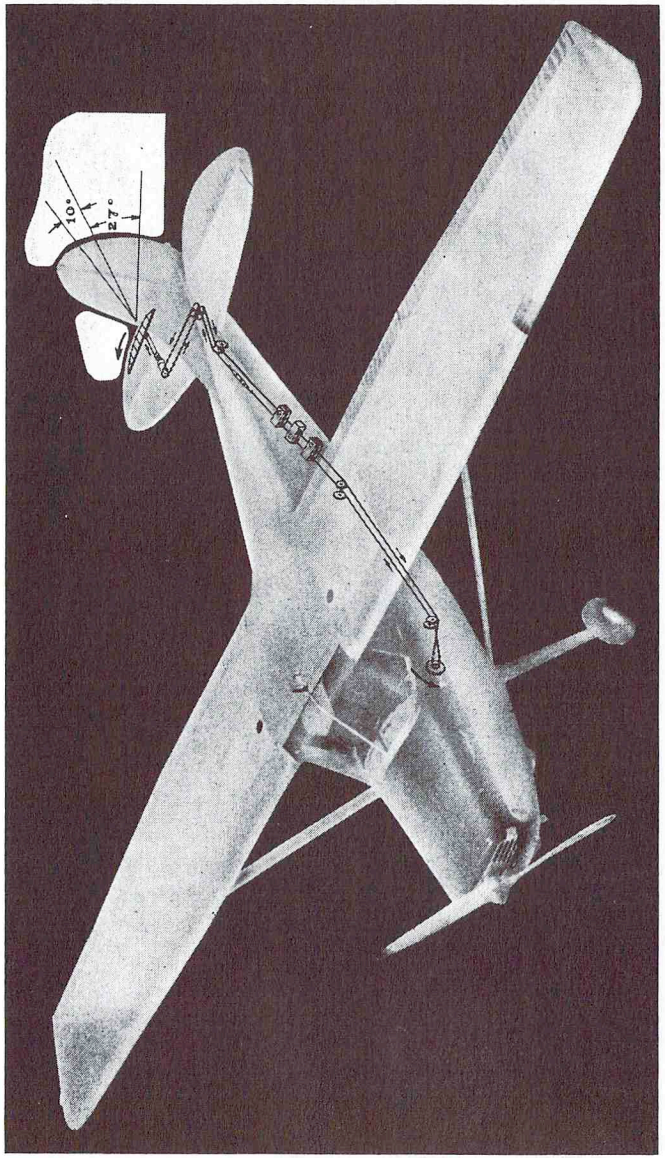


Figure 17 — Elevator Tab Control System

The utility category is solely for the purpose of instructing and training in certain flight maneuvers. The weight and balance considerations limit the airplane to a pilot with or without co-pilot, full gas, no baggage and no rear seat baggage *or passenger.* The utility category has not been included in the weight and balance charts.

OPERATIONAL DATA:

PERFORMANCE INFORMATION — LANDPLANE

The following operational data are compiled from actual tests with airplane and engine in good condition and using average piloting technique. Data are based upon a gross weight of 2200 lbs. with McCauley propeller installed, and full throttle for take-off and climb. Performance figures are for zero wind velocity and hard surface level runway. Speeds are true indicated airspeeds.

	Item			Altitude	Outside Air Temperature					
					0°F	20°F	40°F	60°F	80°F	100°F
Flaps Down	*Landing Distance* (Ft.)* To land over 50 ft. obstacle at 71 MPH TIAS approach (Roll 45% distance shown)			Sea Level	1580	1640	1700	1755	1810	1860
				2000 Ft.	1685	1745	1805	1860	1915	1965
				4000 Ft.	1790	1850	1910	1970	2020	2075
				6000 Ft.	1900	1955	2020	2075	2130	2180
				7000 Ft.	1950	2010	2070	2130	2185	2235
Flaps Up	*Take-off Distance* (Ft.)* To clear 50 ft. obstacle at 76 MPH TIAS (ground run approx. 40% distance shown)			Sea Level	1460	1580	1700	1820	1930	2050
				2000 Ft.	1780	1910	2050	2190	2340	2500
				4000 Ft.	2140	2290	2450	2610	2790	3000
				6000 Ft.	2550	2740	2930	3140	3360	3620
				7000 Ft.	2820	3040	3260	3500	3750	4040
	Normal Rate of Climb Feet per min.	Best Climb Speed TIAS	89	Sea Level	760	740	715	690	670	645
			86	2000 Ft.	670	645	625	600	580	555
			84	4000 Ft.	580	555	535	510	485	465
			81	6000 Ft.	490	465	440	420	395	370
			79	7000 Ft.	445	420	395	370	345	325

PERFORMANCE INFORMATION — SKIPLANE

Data are based upon a gross weight of 2200 lbs. and full throttle for take-off and climb. Performance figures are for zero wind velocity and one inch of snow on grass. Speeds are true indicated airspeeds.

Both take-off and landing distances are based on a coefficient of friction of .08 which is representative of dry snow at 10°F. At temperatures lower than 10°F. the take-off distances listed below will be increased. At higher temperatures up to 32°F., the landing distances will be increased.

SKI PLANE (Continued)

	Item			Altitude	Outside Air Temperature					
					–40°F	–20°F	0°F	20°F	40°F	60°F
Flaps Down	*Landing Distance* (Ft.)* To land over 50 ft. obstacle at 71 MPH TIAS approach (Roll 45% distance shown)			Sea Level	1650	1720	1790	1855	1925	1995
				2000 Ft.	1765	1835	1905	1975	2045	2110
				4000 Ft.	1885	1955	2030	2095	2165	2235
				6000 Ft.	2000	2075	2145	2215	2290	2360
				7000 Ft.	2065	2135	2210	2280	2350	2420
Flaps Up	*Take-off Distance* (Ft.)* To clear 50 ft. obstacle at 76 MPH TIAS (ground run approx. 55% distance shown)			Sea Level	1380	1505	1615	1770	1910	2055
				2000 Ft.	1680	1715	1980	2140	2320	2500
				4000 Ft.	2070	2250	2440	2640	2850	3080
				6000 Ft.	2550	2780	3020	3280	3560	3870
				7000 Ft.	2840	3100	3380	3680	4000	4360
	Normal Rate of Climb Feet per min.	Best Climb Speed TIAS	89	Sea Level	795	775	755	735	710	690
			86	2000 Ft.	705	685	665	645	625	600
			84	4000 Ft.	615	595	575	555	535	510
			81	6000 Ft.	525	505	485	465	440	420
			79	7000 Ft.	485	460	440	420	395	375

PERFORMANCE INFORMATION — SEAPLANE

All performance is given for 2106 pounds gross weight and with zero wind velocity and zero current. Take-off and climb performance figures given below were obtained using a propeller with a static r.p.m. of 2350. Performance will be improved using a propeller with a higher static r.p.m.

	Item			Altitude	Outside Air Temperature — °F				
					20°F	40°F	60°F	80°F	100°F
Flaps Down	*Landing Distance* (Ft.)* To land over 50 ft. obstacle at 69 MPH TIAS approach. (Water run approx. 35% distance shown)			Sea Level	1440	1480	1525	1570	1610
				2000 Ft.	1520	1570	1610	1655	1700
				4000 Ft.	1605	1650	1700	1745	1790
				6000 Ft.	1695	1740	1785	1830	1875
				7000 Ft.	1735	1780	1830	1875	1920
Flaps Up	*Take-off Distance* (Ft.)* To clear 50 ft. obstacle at 75 MPH TIAS (Water run approx. 60% distance shown)			Sea Level	2620	2830	3020	3220	3420
				2000 Ft.	3240	3500	3750	4000	4270
				4000 Ft.	3980	4320	4650	4980	5300
				6000 Ft.	4930	5360	5780	6200	6620
				7000 Ft.	5620	6100	6610	7140	7670
	Normal Rate of Climb Feet per min.	Best Climb Speed TIAS	73	Sea Level	610	595	585	570	555
			72	2000 Ft.	535	520	510	495	480
			72	4000 Ft.	450	440	425	410	400
			71	6000 Ft.	375	360	345	330	315
			70	7000 Ft.	335	320	305	290	275

* Both take-off and landing distances are reduced approximately 10% for each 6 m.p.h. wind velocity.

ELEVATORS:

Elevator travel is 28° up and 17° down with a tolerance of plus or minus 1°. This travel is controlled by two stops located in the rear of the fuselage.

1. Set stops (eccentric blocks) so elevator has correct travel when in contact with them.
2. With elevator in full down position, the measurement from firewall to the edge of the chain sprocket hub should be ½".
3. Tighten cables to approximately 30 lbs.

ELEVATOR TAB:

The elevator tab is actuated by a cable which has a chain incorporated in each end. The chain in front is actuated by the fingertip tab control, and the one at the rear operates a screwjack, which is mounted in the right half of the stabilizer. The travel is 10° up and 27° down, plus or minus 1°.

1. Install cables. Turn tab control wheel to full-forward position, and screwjack to full up position. Then turn screwjack back ½ turn. Set the chain on sprockets at each end, allowing ½" to 1" overlap in direction of travel. Tighten cable tension to approximately 30 lbs.
2. To set tab travel, elevator MUST BE in neutral position.
3. Turn tab control to full-forward position, disconnect push-pull tube from tab and adjust it to hold the tab approximately 11°. (This can be done by screwing it in or out, whichever the case may be.) Connect the push-pull tube to the tab and turn the tab control to the full rearward position. The tab should be approximately 28°.
4. Set stops between first and second bulkheads rear of the baggage compartment on the cables for correct travel, which is 10° up and 27° down.

ELECTRICAL SYSTEM:

Figure 18 outlines the 12-volt electrical system including electrical accessories. The numbers indicate wire numbers which can be found on each wire in the actual airplane.

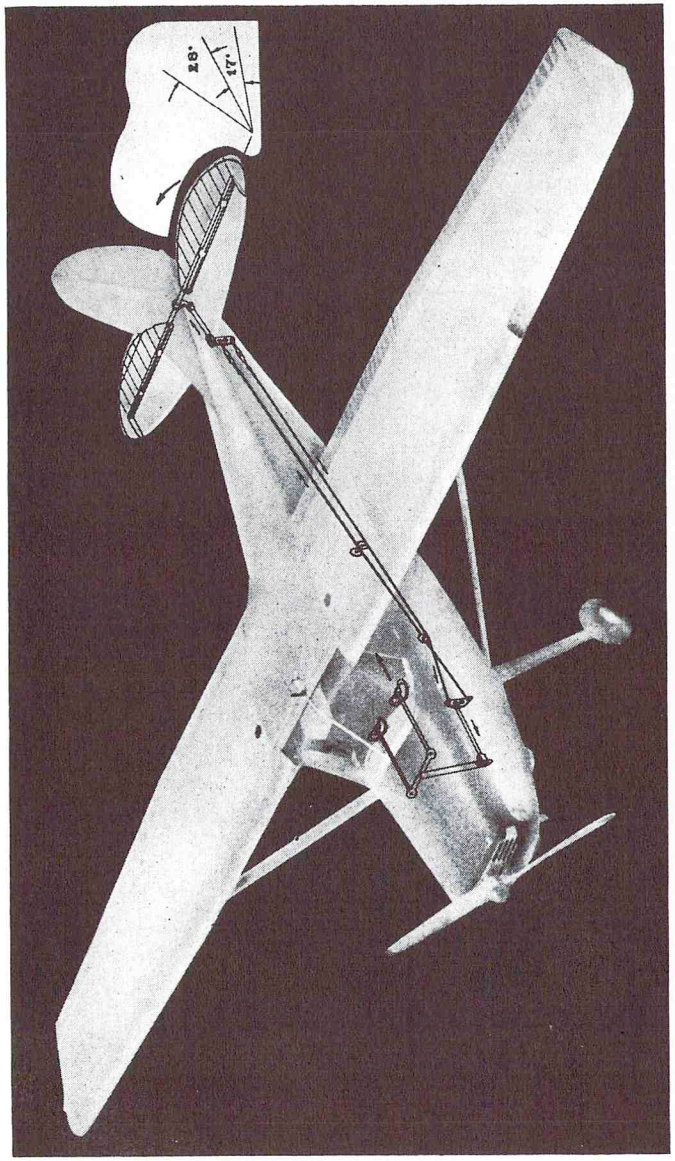


Figure 16 — Elevator Control System

STALLING SPEED:

Stalling Speed	Condition	Angle of Bank Degrees			
		0°	20°	40°	60°
MPH TIAS	Power Off; Flaps Up	58	60	66	82
Stall Warning	Power Off; Flaps Down	53	55	61	75
Indicator Signal	Power On; Flaps Up	52	54	59	73
Is Evident	Power On; Flaps Down	49	51	56	69

The stalling speeds are for forward c.g., normal category, full gross weight conditions. Other loadings result in slower stalling speeds. The horn and light stall warning indicator produces a steady signal 5 to 10 m.p.h. before the actual stall is reached and remains on until the airplane flight attitude is changed. Fast landings will not produce a signal.

CLIMB:

The rate of climb and speed for best climb at various altitudes for gross weight of 2200 lbs. and equipped with metal McCauley propeller is given in the table below:

Density Attitude (Ft.)	Sea Level	2500′	5000′	7500′	10,000′	12,500′	15,000′
Best Climb Speed (TIAS)	89	86	82	79	75	72	68
Rate of Climb (ft./min.) Standard Conditions	690	590	485	380	277	173	68

FLIGHT PROCEDURE:

Flight and operational characteristics while already defined as normal, are at an optimum under certain fairly simple techniques. It may be noted for example that perfectly controlled approaches and take-offs may be made at slower speeds than those for average technique tabulated on Pages 11 and 12. The stall-warning indicator proves a useful tool when maximum take-off and landing performance is necessary.

Landplane and Skiplane Take-off: Set flaps in second notch before take-off, maintain approximately three-point attitude and "fly-off." Slowly raise flaps after climb-out is established.

Landplane and Skiplane Cruise: The following table is for full gross weight and standard conditions. Fuel consumption (gallons

per hour) will decrease as flight altitude is increased when maintaining a constant r.p.m. Ranges and duration are computed for zero wind and total usable fuel (37 gal.).

Pressure Altitude 6000 Ft.				Full Rich				Lean			
RPM	BHP	% BHP	TAS MPH	Gal./ Hour	End Hours	Mi./ Gal.	Range Miles	Gal./ Hour	End Hours	Mi./ Gal.	Range Miles
2500	90	62	122	9.3	4.0	13.1	485	7.9	4.7	15.5	571
2400	80	55	115	8.4	4.4	13.7	506	7.2	5.2	16.0	592
2300	71	49	108	7.7	4.8	14.0	518	6.5	5.7	16.6	624
2200	64	44	101	7.2	5.2	14.0	518	5.9	6.3	17.1	633
2100	58	40	94	6.7	5.5	14.0	518	5.2	7.1	18.0	666
2000	54	37	88	6.4	5.8	13.7	506	4.5	8.2	19.6	725

Landplane and Skiplane Landing: Full flap – 3-point attitude, Landplane may use heavy braking.

Seaplane Take-off: The following techniques were developed during flight tests and are recommended for comfortable safe operation.

1. With usual seaplane technique, the seaplane will "fly-off" the water, flaps up. "Horsing the seaplane off" or breaking one float is unnecessary.

2. For shorter take-offs, set the flaps in the second notch before start of take-off and "fly-off" as with flaps up. Use of this method is particularly desirable in rough water conditions to keep the tail surfaces higher over the float wash and to aid in getting on the step.

3. For extreme overload conditions, breaking one float or lowering flaps as required when maximum step speed has been reached will generally break the seaplane clear of the water.

4. Under certain loading conditions, porpoising may be encountered while on the step during the take-off-run. This is caused by the seaplane being in an excessively nose-low attitude. The porpoising is very readily stopped by increasing the back pressure on the wheel and allowing the seaplane to accelerate to take-off speed.

4. Adjust ailerons to neutral position, by reference to the wing tips. This adjustment is made by disconnecting the aileron push-pull tube from the bellcrank, and making adjustment on the rod end at the aileron.
5. Check travel which should be 20° up and 14° down, with a tolerance of plus or minus 1°.
6. Any correction necessary on the travel can be made by tightening the direct cable and loosening the carry-through cable, or vice versa, whichever the case may be. Note: After corrections have been made, check aileron in neutral position and make adjustment per instructions in 4.

RUDDER:

Rudder travel is 16° from centerline of the airplane, with a tolerance of plus or minus 1°. Travel is controlled by stops located on the extreme rear bulkhead. Adjustment is made by increasing or decreasing washer thickness under the head of the bolts which serve as stops.

1. Rig stops to allow correct travel of rudder.
2. Install cables, and with the rudder in neutral position, tighten turnbuckles until rudder pedals are neutral, 6″ aft of the firewall, measuring to the hingeline of the brake pedal.
3. Check to make sure cables do not rub side holes in bulkheads.

RUDDER TAB:

The rudder tab is a fixed tab located on the trailing edge of the rudder and can be set by bending in either direction, the amount desired.

WING ADJUSTMENT:

Initial rigging is accomplished by setting the two eccentric bushings on each rear spar attachment at neutral position. If flight test shows excessive wing heaviness, re-rig by rotating the proper bushings, which will increase or decrease the angle of attack of the wing.

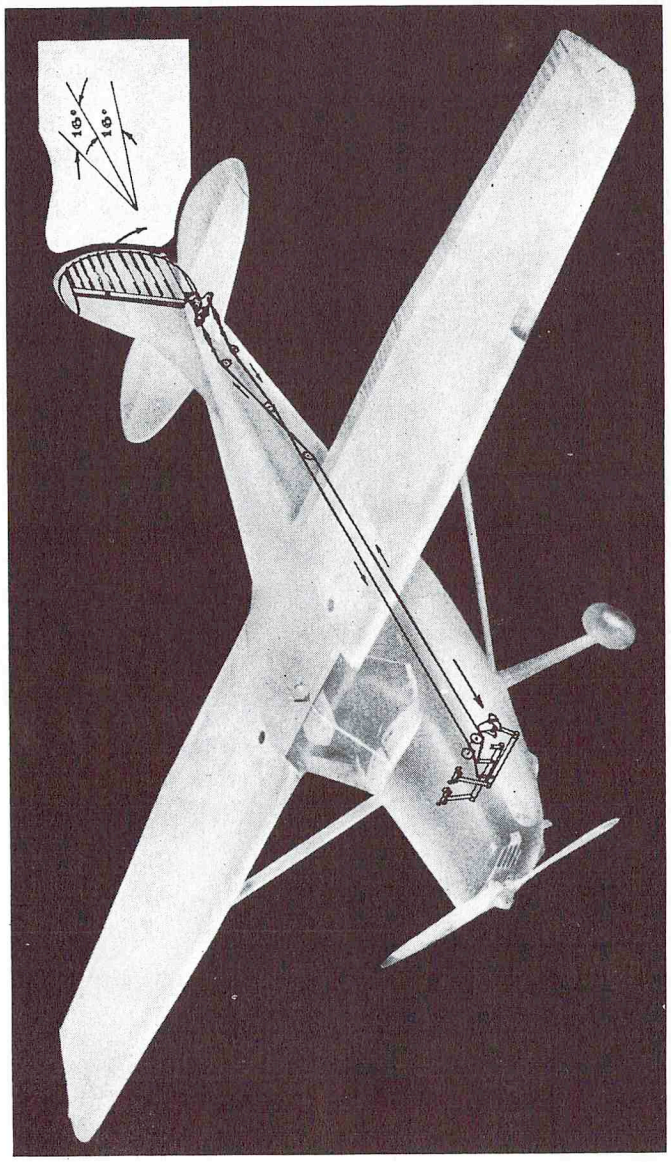


Figure 15 — Rudder Control System

Seaplane Cruise: Cruising performance and fuel consumption obtained by flight tests are presented in the following table for a gross weight of 2106 pounds. These data were obtained when the sea level temperature was 90° F. and standard temperature lapse rate prevailed. Range is computed for zero wind and total usable fuel (37 gallons).

Pressure Altitude 6000 Ft.				Full Rich				Lean			
RPM	BHP	% BHP	TAS MPH	Gal./ Hour	End Hours	Mi./ Gal.	Range Miles	Gal./ Hour	End Hours	Mi./ Gal.	Range Miles
2700	106	73	108	11.3	3.3	9.6	354	8.9	4.2	12.1	448
2600	95	66	104	9.8	3.8	10.5	390	7.9	4.7	13.1	485
2500	85	59	99	8.8	4.2	11.3	416	7.1	5.2	14.0	516
2400	76	53	93	8.0	4.6	11.6	429	6.5	5.7	14.3	529
2300	68	47	85	7.4	5.0	11.5	425	5.9	6.3	14.4	533
2200	61	42	73	6.9	5.4	10.6	392	5.4	6.9	13.5	500

Pressure Altitude 3000 Ft.				Full Rich				Lean			
RPM	BHP	% BHP	TAS MPH	Gal./ Hour	End Hours	Mi./ Gal.	Range Miles	Gal./ Hour	End Hours	Mi./ Gal.	Range Miles
2700	125	86	114	13.3	2.8	8.6	317	10.5	3.5	10.9	402
2600	108	75	110	11.1	3.3	9.9	366	9.0	4.1	12.2	448
2500	96	66	105	9.9	3.7	10.6	392	8.0	4.6	13.1	485
2400	85	59	99	8.9	4.2	11.1	411	7.3	5.1	13.6	501
2300	77	53	94	8.4	4.4	11.2	415	6.7	5.5	14.0	518
2200	68	47	88	7.7	4.8	11.4	421	6.0	6.2	14.7	543
2100	61	42	82	7.3	5.1	11.2	415	5.5	6.7	14.9	551
2000	54	37	74	6.9	5.4	10.7	396	5.1	7.3	14.5	536

Seaplane Landing: Full flap.

Seaplane Taxiing and Engine Operation: In hot weather operation, when extensive water taxiing is involved and/or numerous take-offs are made, it is recommended that a maximum of six (6) quarts of oil be in the engine.

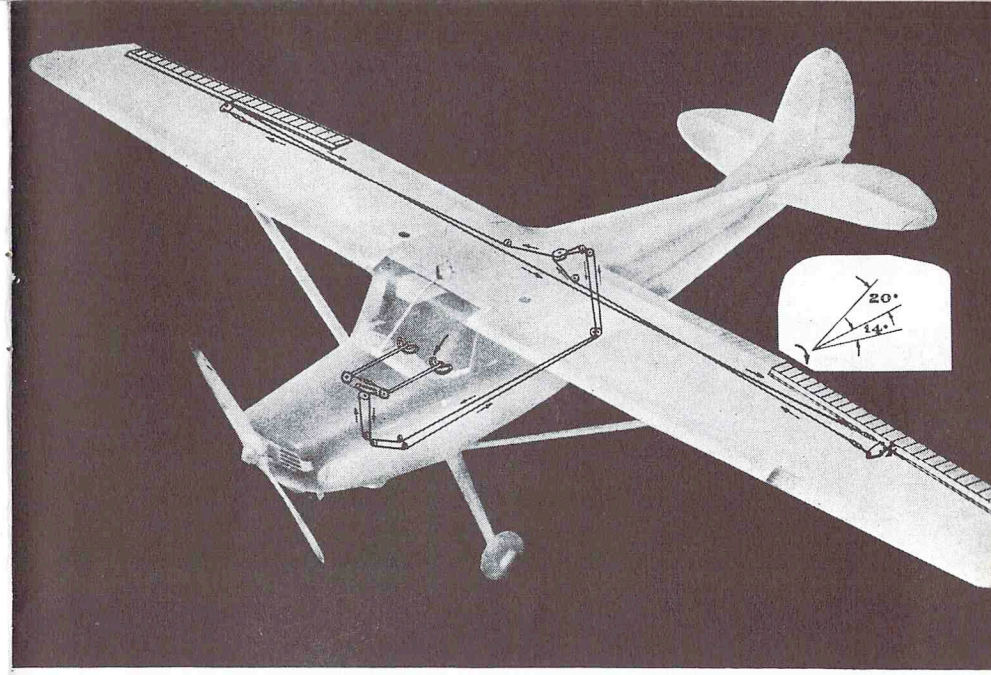


Figure 14 — Aileron Control System

AILERONS:

1. Place control wheels in neutral position and place a neutral bar across the top of both wheels, using tape or a clamp to secure them. Install chain over sprockets, leaving approximately nine links inboard of the chain guard on each side of the turnbuckle.
2. String cables back through system.
3. The ailerons on the Model 170A are restricted in travel by a feature built into the bellcranks. Stops in the bellcrank allow a total travel of 34°. In rigging the ailerons, it is important that the bellcranks are neutralized. Connect the cables and adjust bellcrank to a position in which the three bolts are equidistant to the adjacent rib. The measurement is 2 9/16 from the center of the push-pull tube bolt to the rib. Cable tension should be approximately 30 lbs., with the control wheels in full-forward position. This position should also be maintained in checking the travel.

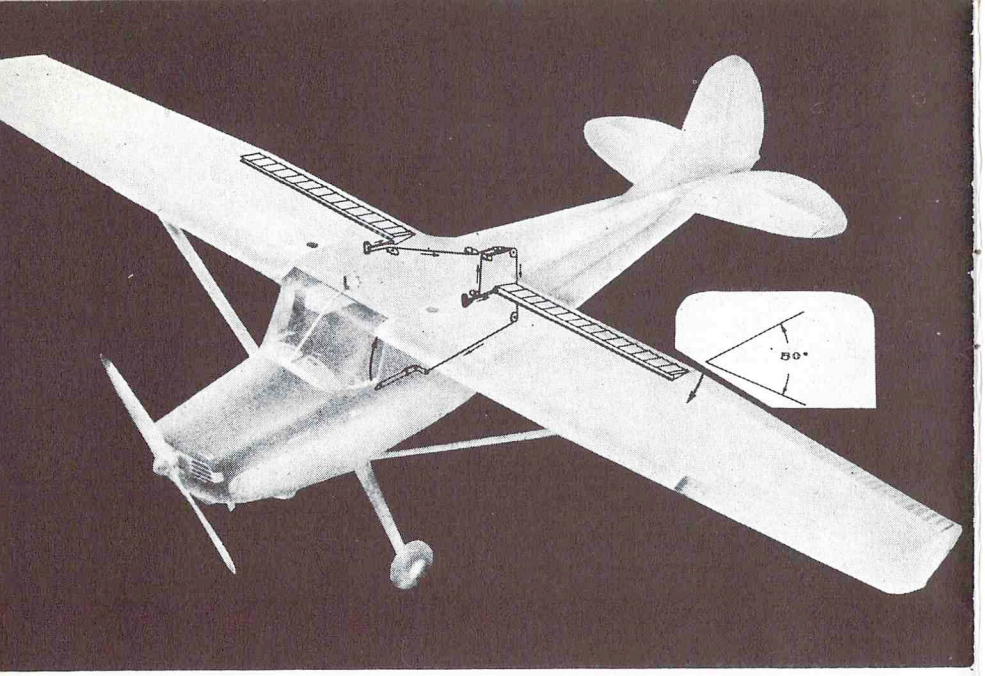


Figure 13 — Flap Control System

CONTROL SYSTEM:

Figures 13 to 17 incl. outline the control system including control travel limits, location of control stops, and the location of turnbuckles. The use of the single .040 brass wire for safetying of turnbuckles is satisfactory and CAA approved. Rigging method for the various systems is outlined below:

FLAPS:

1. The flaps are set in neutral position by two adjustable stops which are located in the trailing edge of the auxiliary spar ahead of the flaps. Set flaps to the contour of the wing.
2. Flap down travel is 50°. Adjustment is accomplished by changing turnbuckle in the cable system, located rear of baggage compartment.
3. Check flap lock latch for engagement and release. Adjust if necessary with screws and slotted holes provided in the lock.

SECTION III — OPERATING DETAILS

The following paragraphs cover in somewhat greater detail the items entered as a Check List in Section I. Every item in the list is not included.

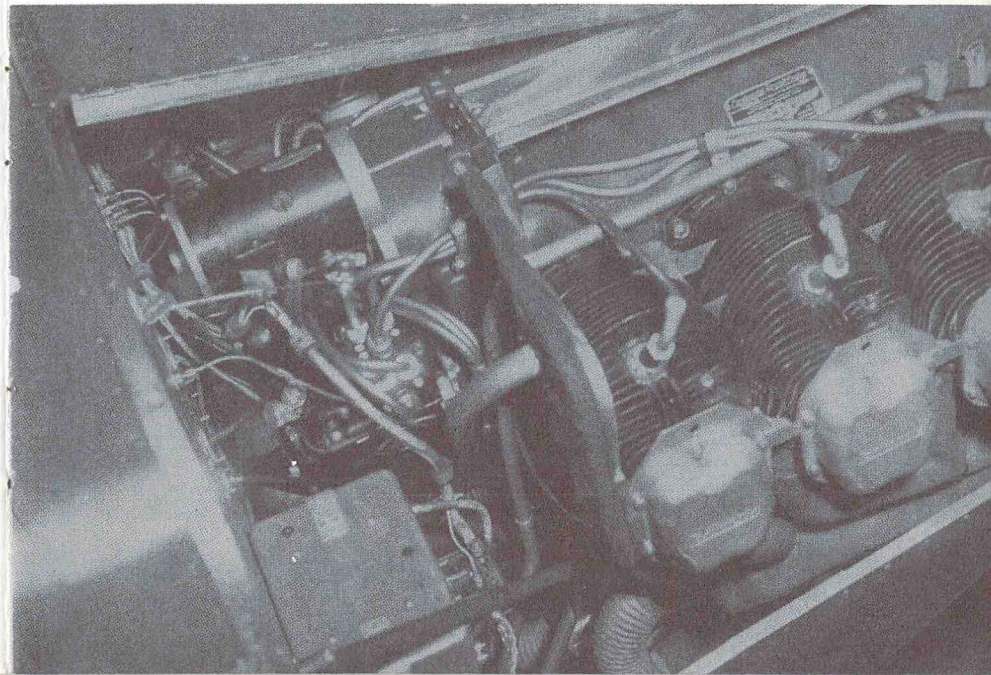
CLEARING THE PROPELLER:

"Clearing" the propeller should become a habit with every pilot. Making sure no one is near the propeller before the engine is started should be a positive action. Yelling "clear" in loud tones is best. An answering "clear" from ground crew personnel is the response that is required.

ENGINE

Oil Level: The oil capacity on the Continental C-145 is eight quarts. The quantity can be checked easily by raising the hood on the left side and reading the quantity in the sump directly on the

Figure 1 — Continental C-145 Engine Inst.



stick adjacent to the oil tank cap. In replacing the stick, make sure that it is firmly back in place. In replacing the oil filler cap, make sure that it is on firmly and turned all the way to the stop at the right to prevent loss of oil through the filler neck. While the minimum oil supply is four quarts, oil should be added if below six quarts and should be full if an extended flight is planned.

Seaplanes should never show over seven quarts since the dip stick reads one quart short as calibrated for a landplane.

Fuel Strainer Drain: The fuel strainer drain provides a quick simple method of draining any water that might have collected in the fuel line. The valve on the strainer located just ahead of the firewall is easily accessible by reaching in the bottom rear opening of the cowl. Make sure that the valve is closed before leaving it. The fuel tank sump drain plugs are located on the underneath side of the wing in line with the rear edge of the door and out from the fuselage a few inches, one on each side.

FUEL SYSTEM:

The quantity of fuel should be checked before each flight. There are 20-gallon tanks in each wing with direct reading gas gauges in the cabin at the wing root. One filler neck is provided in each wing panel. The fuel system is shown diagrammatically in Figure 2. The fuel is brought to the engine by gravity flow through aluminum alloy tubing which runs rearward to and down the cabin door rear post and across to the center of the ship where the two lines connect to the tank selector valve. A single fuel line runs forward from the selector valve to the fuel strainer on the firewall. Fuel may be drained at the fuel strainer, at the tank drain plugs, or a belly fuel line drain plug just forward of the fuel tank selector valve. The fuel tank selector valve provides fuel flow from either the right tank or the left tank, a shut-off for both tanks, and can be set to provide fuel flow from both tanks simultaneously to provide maximum safety. *Important* – The fuel valve *handle* indicates the setting of the valve by its position above the valve dial.

(5) Moisten another piece of clean cloth with cleaner and allow to evaporate until barely damp. Now rub the spot lightly, working from the outside in toward the center. (This, as you probably know, keeps the spot from spreading and is less likely to leave a ring.) If necessary, repeat several times.

(6) Brush again, to remove any further particles which may have become loosened.

PROPELLER:

The life and satisfactory operation of the wood propeller is a function of how well the finish is kept intact. The maintenance of a good wax finish in addition to the finish already on the propeller is a good first step. Bruises, dents and breaks in the finish should be immediately repaired with shellac, varnish or other water repellent sealer. No break in the finish should be allowed to remain. This prevents moisture from entering or leaving the wood. The metal tips may, in time, crack through. This is normal and unless there is actual metal missing, the rivets are loose, or the tip has moved or slipped, the propeller may be continued in normal use.

The occasional wiping of the metal propeller with an oily cloth will result in cleaning off grass and bug stains and will assist materially in corrosion proofing in salt water areas.

appearance of the metal. Use only waxes and polishes containing no harsh abrasives or grit and only those which are neutral in reaction. Dulled aluminum surfaces may be cleaned effectively with Bon Ami. A cleaning solution consisting of about two quarts of alcohol, two quarts of water and a package of powdered Bon Ami will be found to be particularly effective, followed by waxing to retain the bright appearance.

ENGINE COMPARTMENT:

The engine section should be kept free of an accumulation of oil, grease and dirt to prevent a fire hazard. The bulkhead between the cabin and the engine section is aluminized iron and may be cleaned with recommended solvent cleaners for grease and oil.

UPHOLSTERY:

Keeping the inside of your airplane clean is no more difficult than taking care of the rugs and furniture in your home. It is a good idea to occasionally take the dust out of the upholstery with a whisk broom and a vacuum cleaner.

If spots or stains get on the upholstery they should be removed as soon as convenient before they have a chance to soak and dry. Cleaning fluids having a carbon tetrachloride or a naphtha base are recommended. Soap or detergents and water are not recommended for use on the seats since this will remove some of the fire retardant with which the seats have been treated. When using recommended cleaners, the following method is suggested:

(1) Carefully brush off and vacuum all loose particles of dirt.

(2) Don't use too much fluid. The seat cushions are padded with "foam rubber," and since volatile cleaners attack rubber, these paddings may be destroyed if the material gets soaked with the cleaner.

(3) Wet a small, clean cloth with the cleaning solution, wring out thoroughly. Then open cloth and allow the fluid to evaporate a trifle.

(4) Tap the spot lightly with the cloth, but don't rub it. This will pick up particles which are too embedded to be removed by brushing. Repeat several times, using a clean part of the cloth each time.

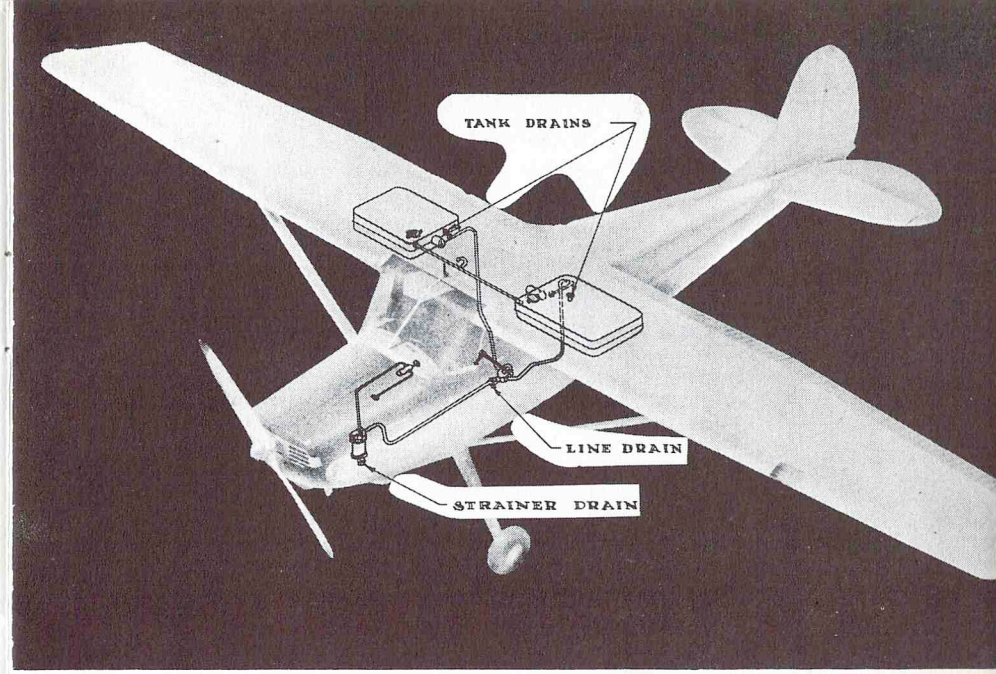
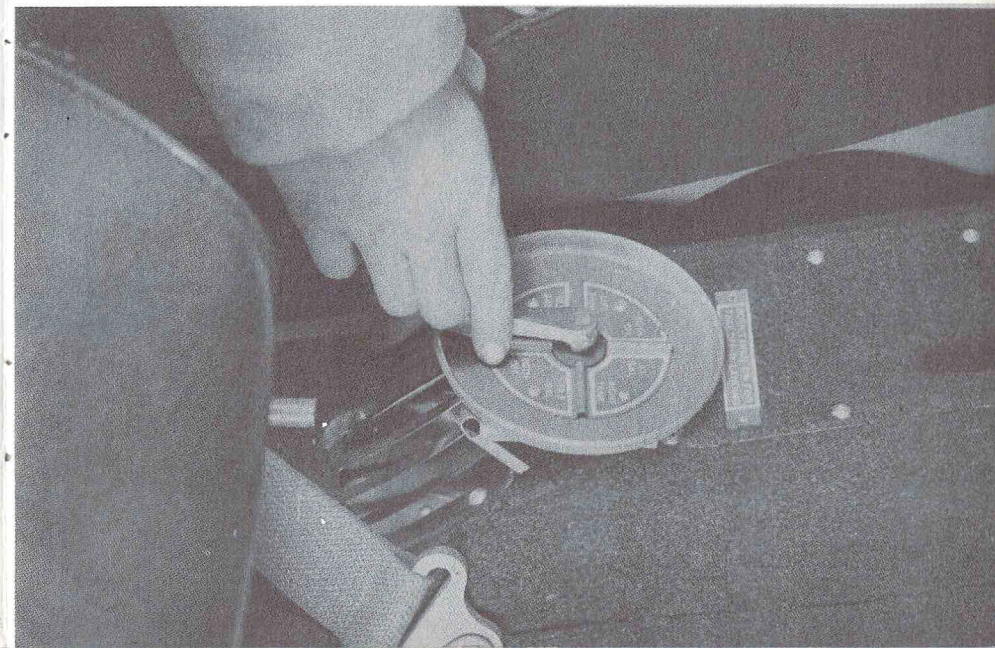


Figure 2 — Fuel System

Figure 3 — Fuel Tank Selector Valve



ENGINE OPERATING PROCEDURE:

Engine Operation: You have a new Continental engine made to the highest standards available. Continental's accumulated years of experience in the manufacture of light aircraft engines assures you of a precision made, skillfully engineered product. The built-in Red Seal quality, which is now yours, is your guarantee of maximum safety, trouble-free operation and low maintenance cost.

This engine has been carefully operated in its run-in and flight tests, so that the engine as you receive it is in the best possible condition. We earnestly request that you operate your engine accordingly for at least the first 50 hours and for its total life where possible. The following points are mentioned so that you may receive the maximum of trouble-free operation and low maintenance cost.

1. *Starting:* Ordinarily the engine starts best and smoothly with proper priming and the throttle opened 1/8 inch. Check the oil pressure as soon as engine is running.

2. *Warm Up:* The engine should be warmed up for approximately 3 minutes at 800 to 1000 r.p.m., headed into the wind where possible and the rest of the warm up during the taxi, which should not exceed 1600 r.p.m.

3. *Take-Off:* Most engine harm results from improper operation before it is properly warmed and temperatures stabilized. For this reason on your initial take-off use maximum power only when and as necessary for safe operation of the airplane and reduce power as quickly as possible.

4. *Cruising:* The maximum cruising r.p.m. for the C-145 engine is 2450 r.p.m., other cruising speeds may be selected from the flight procedure section. The mixture control installed in your airplane is not primarily for reducing fuel consumption but rather to maintain smooth engine operation at the higher altitudes – above 5,000 feet. On the Model 170A lean the mixture (by pulling the mixture control knob out from the panel) until a loss of r.p.m. is noted and then push in the control until maximum r.p.m. is reached; then richen further until 10 to 25 r.p.m. below maximum r.p.m is obtained.

The master switch on the instrument panel operates a solenoid located at the battery. Occasionally when the battery is allowed to get sufficiently low, it will not have enough energy to actuate the solenoid when the master switch is turned on resulting in the generator being unable to charge the battery. In this case, the battery should be removed and recharged.

THE PLEXIGLAS WINDSHIELD AND WINDOWS:

The windshield is a single piece full floating molded unit of lifetime plastic. To clean plexiglas, wash with plenty of soap and water using the palm of the hand to feel and dislodge any caked dirt or mud. A soft cloth, sponge, or chamois may be used, but only as a means of carrying water to the plastic. Dry with a clean, damp chamois. Rubbing with a dry cloth builds up an electrostatic charge on the glass so that it attracts dust particles from the air. Wiping with a damp chamois will remove this charge as well as the dust and is therefore recommended. Remove oil and grease by rubbing lightly with a cloth wet with kerosene. Do not use gasoline, alcohol, benzene, acetone, carbon tetrachloride, fire extinguisher, or de-icing fluid, lacquer thinner or glass window cleaning spray as they will soften the plastic and will cause crazing.

If after removing dirt and grease no great amount of scratching is visible, the plexiglas should be waxed with a good grade of commercial wax. These waxes will fill in minor scratches and help prevent further scratching. The wax should be applied in a thin even coat and brought to a high polish by rubbing lightly with a clean, dry, soft flannel cloth.

ALUMINUM SURFACES:

The Alclad 24ST used in the construction of Cessna airplanes requires a minimum in care to keep the surface bright and polished, neat and trim looking. The airplane may be washed with clear water to remove dirt and with gasoline, carbon tetrachloride or other non-alkaline grease solvents to remove oil, grease, and paint. Household type detergent soap powders are effective cleaners, but should be used cautiously since some of them are strongly alkaline.

Due to the fact that aluminum will not corrode without the presence of moisture, it is recommended that the surfaces be kept waxed to exclude all moisture and thus retain the bright

BATTERY:

The battery is located under the cowling on the right side and is reached by raising the right cowl hood.

Maintain the level of the battery electrolyte at the level of the horizontal baffle plate (the plate with the holes in it) which is approximately two inches below the filler plug by adding distilled water as required. Obtain the water level but do not fill above the plate mentioned above. This water level should be maintained when the battery is in the level position and, therefore, approximately the forward one-quarter of the plate should not be covered when the battery is in the airplane with the airplane in three point position on the ground. The space above the horizontal plate is a fluid reservoir when the battery is tipped to the side or inverted. See Figure 12. When the electrolyte level is too high, spillage of fluid will result when acrobatic maneuvers are performed and as a result, the proper concentration of acid will be destroyed. Sponge off any spilled acid and corrosion products with soda water solution to neutralize acid, then rinse with clear water. Do not use excessive amounts of soda water.

Keep battery connections tight and clean, otherwise excessive voltage may be generated and damage other electrical equipment. Control of the charging current and voltage is accomplished by the generator regulator mounted on the firewall. Only those persons familiar with the operation, adjustment, and repair of the control should be permitted to remove the cover of the device.

The ammeter indicates the generator charging rate which will normally be in the neighborhood of 4 amps. Discharge generally indicates electrical energy drain in excess of generator output — resulting from:

(1) Use of a large number of electrical units.
(2) Malfunctioning generator.
(3) A short in the electrical system.

(2) and (3) require corrective measures. Failure of the ammeter to indicate will generally be a wiring problem or a malfunctioning indicator.

The airplane should not normally be operated with the master switch in the "off" position nor should it be operated without a battery or with battery disconnected. Damage to the generator and the voltage regulator may be the result.

5. *Let-Down:* The cruising glide should begin far enough away from destination so that a gradual descent can be made with power on, with mixture full rich. On approaching the landing field the engine should be throttled down gradually and the glide with closed throttle should not be longer than necessary.

6. *Idling Engine:* Your engine is set to idle well below 600 r.p.m. but at engine speeds below 600 r.p.m. satisfactory piston lubrication cannot be maintained, therefore, it is recommended that the engine not be allowed to operate below 600 r.p.m. for prolonged intervals.

7. *Stopping Engine:* The engine should always be allowed to idle (800 to 1000 r.p.m.) for at least two minutes before stopping. This not only permits the temperature of the various engine parts to equalize, but works oil up around the pistons and rings, thus leaving the engine in good condition for the next start. It is recommended that the engine be stopped by using the mixture control providing the engine has been idled two minutes. The procedure should be to place the mixture control in full lean position (pull control out as far as possible), partially open the throttle with the ignition switch still on. After the engine stops turn the ignition switch to the "off" position.

CABIN

Seat Adjustment: The rear seat back hinges at the bottom to provide easy access to the baggage compartment. The rear seat back also offers four fore and aft adjustments at the top. This adjustment is accomplished in the slotted recesses using the same handle that is used to open the seat back for access to the baggage compartment. The front seats are adjustable in a fore and aft direction. The seat adjusting lever is located on the left front side of each seat just under the edge of the seat – see Figure 5.

PARKING BRAKE:

The parking brake control is operated in conjunction with the toe brake and is a part of the master brake cylinders. In setting the parking brake, *first* press the toe brakes to the desired brake pressure *then* pull the control on the panel out to engage locking lever and release the toe brake pressure. To release the brake press parking brake control in, apply pressure to the brake pedals and then release them.

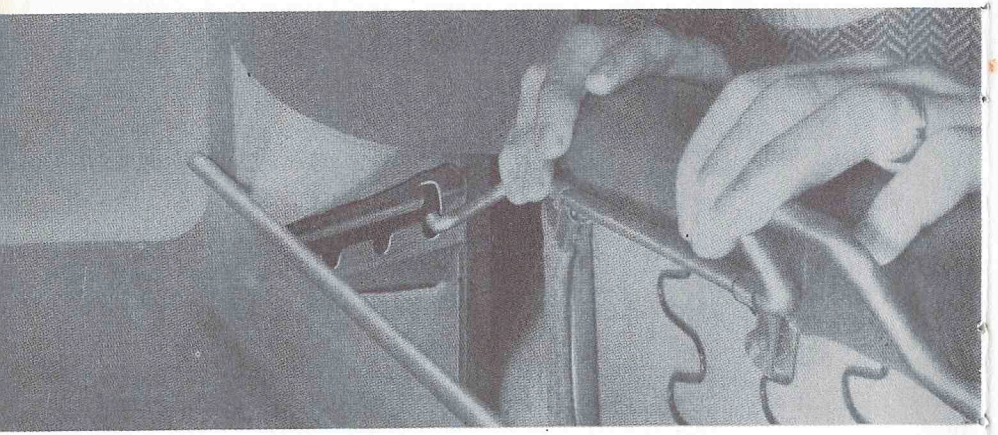


Figure 4 — Rear Seat Back Adjustment

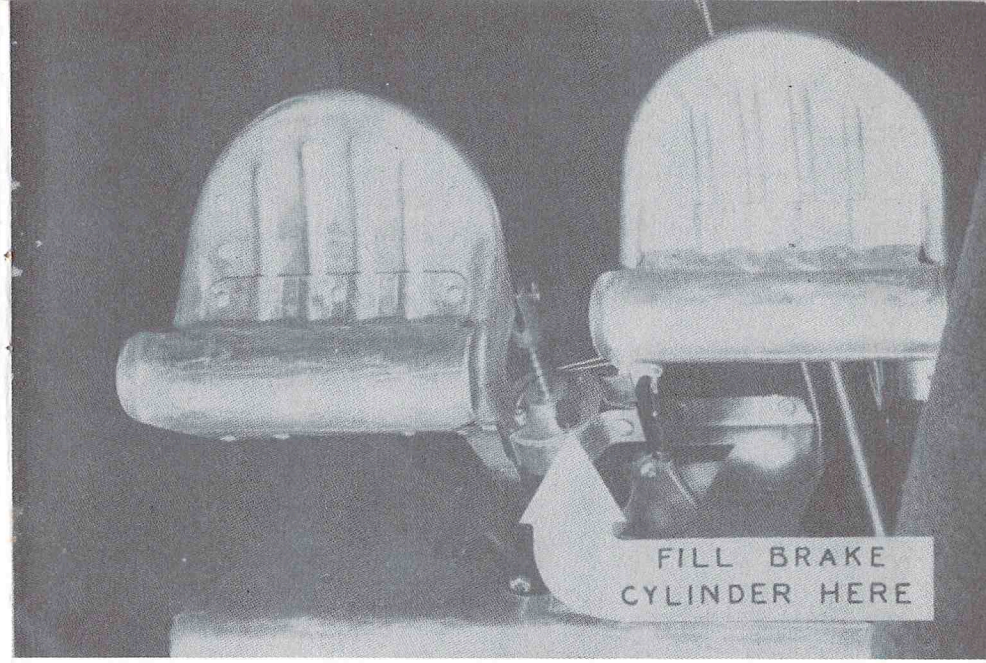
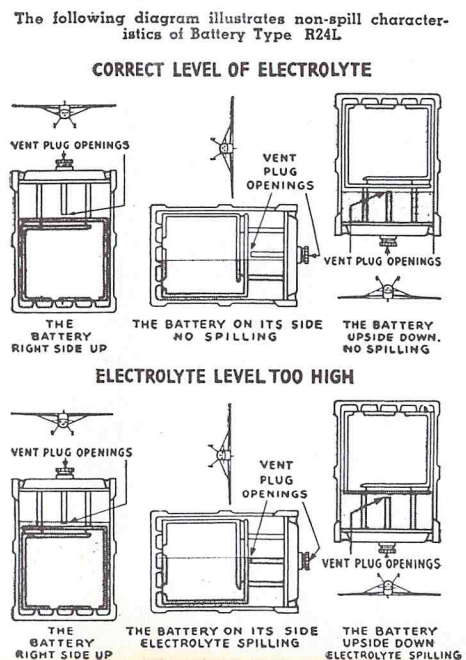
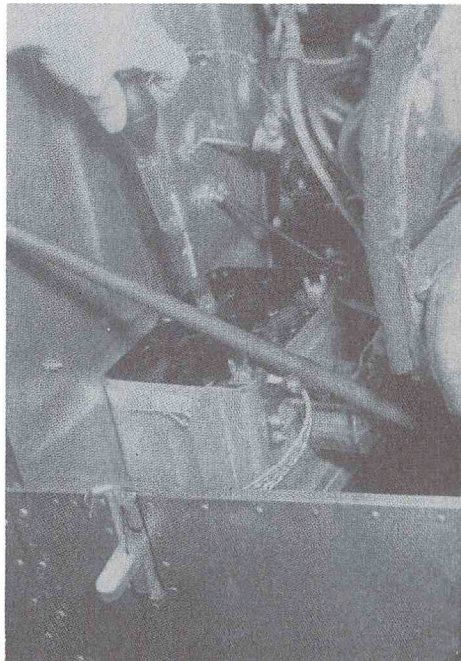


Figure 11 — Rudder Pedals and Brake Cylinder

Figure 12 — Battery, Maintenance of Correct Electrolyte Level





bearings, and plungers, used in conventional shock strut types. This spring is made from the highest quality chrome vanadium steel, heat treated and shot peened for added fatigue resistance. No maintenance of this spring is necessary other than paint to prevent rusting. Operation of the gear actually makes ground handling, taxiing, and landing easier.

Correct tire pressure is essential to realize the full benefit of the spring landing gear properties and obtain maximum tire wear. Correct tire pressure is 24 lbs./sq. inch gauge pressure. An accumulation of oil and grease on tires will have an adverse effect on tire life and should be removed with soap and water. The 6:00 x 6 wheel is a two piece type, cast of magnesium alloy and equipped with a single disc type brake. Tires are easily removed by jacking up the airplane, removing the wheel and disassembling the two piece wheel. Be sure that all of the air is out of the tire and tube before taking the wheel apart. The tire is reinstalled by reversing the procedure. In removing the wheel, it is necessary to remove the brake disc anti-rattle clips before the wheel can be taken off the axle. The wheel axle nut should be tightened finger tight plus one-half turn.

The wheel alignment has been properly set at the factory. Wheels should have zero toe in and zero camber at approximately 2000 lbs. weight in the three point taxi attitude. Excessive tire wear indicates an improper wheel setting for the "on the ground" weight at which you are operating. See your dealer or distributor for re-alignment.

The brake master cylinders located in the cabin at the rudder and brake pedals incorporate a reserve reservoir for brake fluid to replace leakage losses. The reservoir should be kept full and this should be checked periodically. Brake fluid should be Univis No. 34 or equivalent (specification 3580 or AN-VV-O-366) petroleum base hydraulic fluid. (Do not use castor oil base hydraulic fluid.) Adjustment of the brake is not necessary. Whenever the brakes feel spongy, bleed out the entrapped air from the top of the actuating cylinder at the brake and refill the hydraulic reservoir at the pedal.

The tailwheel mounting a solid rubber tire is the full swiveling steerable type mounted on leaf springs. The tailwheel tire is removed and replaced by taking the tailwheel apart the same as the main wheel.

Figure 5 — Front Seat Adjustment

THE PRIMER:

The primer ordinarily is not required except at winter temperatures. It is used to supply an initial charge of raw fuel to the cylinders to aid in starting the engine. To operate, first unlock the plunger by pressing in and at the same time turning the knob to the left, then slowly pull the plunger all the way out and then push the plunger all the way in. This action is termed "one stroke of the primer." Make sure that the magneto switch is "off" and throttle "closed," then give the engine three or four strokes with the primer as the engine is turned over by hand or by engaging the starter. Very cold (−20°F.) weather may require ten strokes.

MIXTURE CONTROL:

The mixture control is to be always set at "full rich" for starting and take-off purposes. Pulling out on the control leans the fuel mixture. *The mixture control is not a device for cutting down fuel consumption* but rather a device for obtaining better engine operation and performance at altitudes above 5000 feet, whether in level flight or take-off from a high altitude field. The mixture control should be used cautiously to lean mixtures to give maxi-

mum engine r.p.m. when flying above 5000 feet pressure altitude. Changes in throttle setting or altitude require changes in mixture control setting. Too lean a mixture will cause excessive engine heating and result in damage. It is recommended that the mixture be leaned out 10 to 25 r.p.m. richer than maximum r.p.m.

To avoid possible inadvertent use of the mixture control, a lock is provided. With a little practice one hand can be used to operate by pressing the lock spring plate with the right thumb while operating the knob with the index and middle finger of the same hand. The lock operates only when the mixture is leaned out, the mixture control may be returned to full rich by pushing on the knob only.

CARBURETOR AIR HEAT:

The carburetor air heat control is located on the instrument panel. The push-pull control operates the butterfly valve in the carburetor air intake which proportions the hot and cold air entering the carburetor. To provide heated air for the carburetor, pull out the control; to provide only cold air for the carburetor, push the control in all the way.

Air pulled into the muff heaters and subsequently into the engine does not pass through the air filter. For this reason when taxiing on dirty, dusty, and sandy fields, carburetor heat should not be used until the engine is cleared prior to take-off. After full stop landing under these conditions, carburetor heat should be returned to full cold in order that the air filter becomes fully effective again.

Carburetor ice can form on the ground with the engine idling, therefore, just before take-off when you run the engine and test the magnetos be sure to have the carburetor heat in the "on" position after mag check. Leave it in that position until just before you open the throttle for the take-off run. Then move carburetor heat to the cold air position. This gives maximum power for the take-off. Then watch engine for any indications of ice (roughness or loss of r.p.m.) during climb and apply full carburetor heat if engine begins to ice. The correct way to use carburetor heat is to first use full heat to remove any ice that is forming. By trial and error determine the minimum amount of heat required to prevent ice forming, each time removing any ice that is formed by apply-

SECTION IV — CARE OF THE AIRPLANE — OWNER'S RESPONSIBILITIES

In order that the airplane may give the performance, stamina and dependability built into it, certain requirements in its care, inspection and maintenance must be followed. These requirements will assure the owner of satisfactory service and in the long run pay for the effort many times over.

FUEL AND OIL REQUIREMENTS:

The airplane should be serviced with only the best lubricants and fuels. Aviation grade fuel should be used except under emergency conditions. The recommended fuel is 80 octane rating minimum with a lead content of not more than ½cc per gallon. Highly leaded fuels are not recommended. Filling the fuel tanks immediately after flight will reduce the air space and minimize the condensation of atmospheric moisture.

Aviation grade oil is recommended; change the oil each 25 hours of operation. When adding or changing oil, use the grades in the following table:

Average Outside Temperature	*Recommended Oil Grade*
Below 50°F.	SAE 20
Above 50°F.	SAE 40

POWER PLANT:

The power plant used in the Cessna 170A is a 145 horsepower Continental Model C-145-2 Engine. It is bolted to the engine mount through rubber bushings providing complete separation of the engine and air frame. An air filter is incorporated as a part of the air intake system.

LANDING GEAR, WHEELS, AND TIRES:

The landing gear consists of a single tapered spring leaf for each leg which replaces the shock strut, torque arms, coil springs,

COLD WEATHER OPERATION:

Prior to starting on cold mornings, it is advisable to pull the propeller through several times by hand to "break loose" or "limber" the oil, thus conserving battery energy. The oil temperature indicator registers a minimum of 100°F. During cold weather operations no indication, therefore, will be apparent on the gauge prior to take-off if outside air temperatures are very cold. After a suitable warm-up period (5 minutes at 1000 r.p.m.) with the oil pressure indicator in the operating range, it will not be necessary to wait for the oil temperature gauge to indicate 100°F.

Where the oil pressure gauge is extremely slow in indicating pressure in cold weather it may be advisable to fill the pressure line to the gauge with kerosene.

For operation at temperatures consistently below freezing, a winterization kit consisting of plates for closing cowl openings is available at your distributor or dealer for a nominal charge.

The airplane is eligible for use with skis. Your distributor or dealer will be glad to give you details on their installation on your airplane.

STORAGE:

The all-metal construction in your Cessna makes outside storage of it practical. Inside storage of the plane will increase its life just as inside storage does for your car. If an airplane must remain inactive for a time, cleanliness is probably the most important consideration – whether your airplane is inside or outside. A small investment in cleanliness will repay you many times in not only keeping your airplane *looking* like new but in *keeping* it new. A later section in this book covers the subject in great detail. Dirt and mud have the same effect as salt, only to a lesser degree. And do not neglect the engine when storing the airplane. Turn it over by hand or have it turned over every few days to keep the bearings, cylinder walls, and internal parts lubricated. Airplanes are built to be used and regular use tends to keep them in good condition. An airplane left standing idle for any great length of time is likely to deteriorate more rapidly than if it is flown regularly and should be carefully checked over before being put back into service.

ing full heat. On each subsequent trial, increase the amount of heat applied until no ice forms. On approach glide just before reducing power apply full carburetor heat and leave in full hot air position.

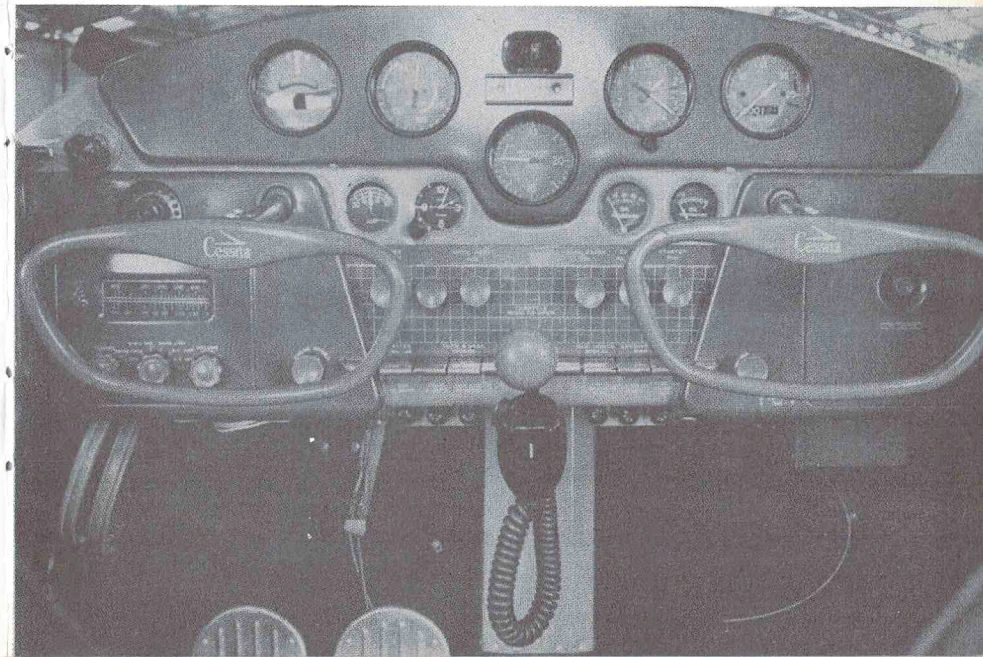
MASTER SWITCH:

The master switch operates the solenoid switch located at the battery turning on all electrical power at the battery. In the event of a short or a malfunctioning of the airplane electrical system, the master switch may be turned off and the engine will continue to run on the magneto ignition system. The radio switch should be turned off when starting the engine.

MAGNETO SWITCH:

The two magnetos are turned on and off through one switch operated with a key. The panel placard indicates the right and left magnetos. The switches operate to ground out the indicated magneto when the switch is turned off.

Figure 6 — Instrument Panel



ELEVATOR TRIM TAB:

The elevator trim tab is an auxiliary movable control surface located on the trailing edge of the elevator. It is used to relieve control wheel pressures during flight. The tab is controlled by rotating the tab control wheel located just ahead of the front edge and between the two front seats. The tab indicator adjacent to the wheel shows the relative position of the tab. Forward movement of the wheel trims nose down and vice versa. This allows the airplane to be trimmed to fly level for a wide selection of load and speed conditions. Take-off is made with the tab set in "take-off" position.

FLAPS:

Flaps installed on the 170A are raised or lowered with the flap handle located between the two front seats. Flaps may be lowered or raised during normal flying whenever the airspeed is less than 100 m.p.h. The flaps supply some added lift and considerable drag; the resulting action steepens the glide of the airplane enabling the pilot to bring the airplane in over an obstruction and land shorter than could be done without flaps.

For unusually short field take-offs the application of full flaps will be of assistance, applied just before the airplane is ready to leave the ground. An alternate procedure of setting the flaps in the second notch, prior to take-off may be used. The flaps should not be released until an altitude of at least 100 feet above the highest obstacle has been obtained.

STALL WARNING INDICATOR:

Your Safe Flight Stall Warning Indicator gives your 170A full and complete protection from inadvertent stalls. It gives warning whenever a stall is approached regardless of speed, attitude, altitude, acceleration or other factors which change the stalling speed. A warning margin of 5 m.p.h. above normal straight ahead stalling speed has been determined as best. Other attitudes and speeds provide a wider margin.

TAKE-OFF

The shortest take-off run can be obtained by keeping the tail low during the whole procedure. The tab can be set to assist in this. With the tail just a little off the ground the wings begin to provide lift quickly. The airplane "breaks ground" at approximately 50 m.p.h. and accelerates rapidly with complete control. From this point the best rate of climb can be easily established. For a long climb 85 to 95 m.p.h. is recommended. Avoid long full throttle climbs.

GROUND HANDLING:

Proper tie down and ground handling (for instance, pushing and pulling the airplane around on the ground) are necessary if the airplane is to remain always airworthy.

Sufficiently strong (700 lbs. tensile strength) ropes fastened to suitably set tie down rings in the ground are required as shown in Figure 11 to properly fasten the airplane and prevent strong gusty winds from damaging the airplane. Also as mentioned in the fore part of the book, adequate measures must be taken to insure that the flaps, ailerons and empennage will not be damaged in a high wind. Install the control lock.

Flaps are held in the up or "closed" position by automatic spring latches. To prevent damage to surfaces, a surface control lock should be installed between the flap and the aileron on both right and left wing panels when the airplane is tied out in strong, gusty winds.

When moving the airplane about push at the root front edge of the stabilizer at the fuselage, the root of the dorsal fin and at the landing gear or the strut root fitting. Do not lift the empennage by the tip of the stabilizer; likewise, do not shove sidewise on the upper portion of the fin.

There is an insert type handhold along the top edge of the cowl inside of the cabin. This handhold is to be used as an assist handle for adjusting the front seats.

The suggested way of "loading up" the 170A is to load your baggage first behind the rear seat back. Next load the right front seat and the pilot's seat and finally the rear seat.

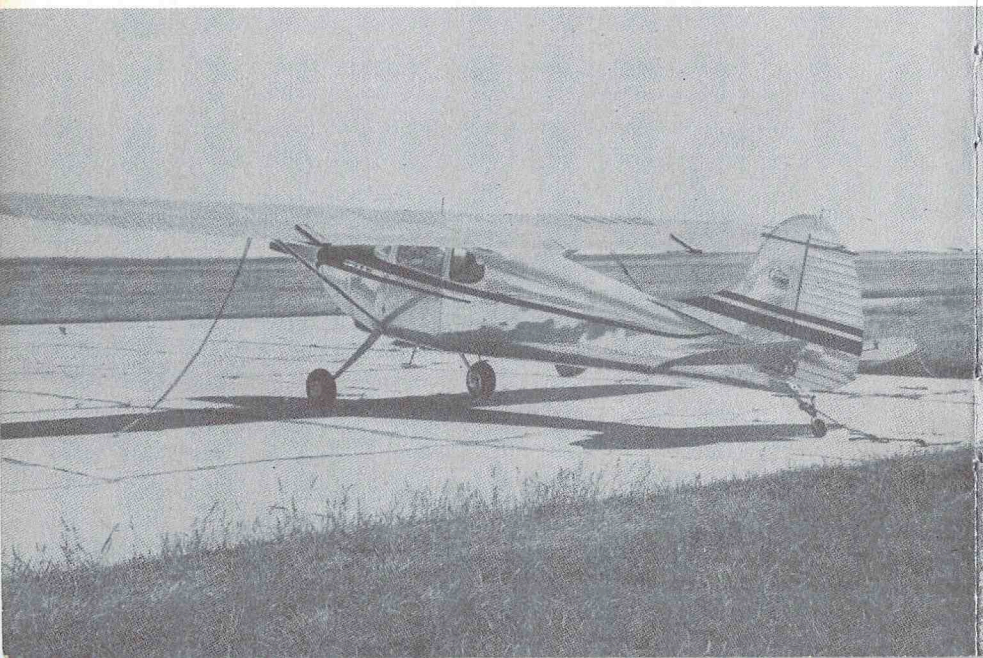
BRAKES:

The hydraulic brakes are individually operated. The rudder pedals are pivoted so that braking action is applied by pressure with the toe on the rudder pedal to either or both wheels.

TAXIING:

Taxiing is facilitated by the use of a steerable tailwheel which operates with the rudder. The tailwheel is steerable through approximately 66° to either side of the straight rearward trailing position and automatically becomes full swiveling when turned to a greater angle. The airplane may thus be turned about in its own length, if desired, yet is fully steerable while taxiing. By using the steerable tailwheel and by keeping the heels on the floor, excessive heat and unnecessary wear on the brakes can be avoided. The heels on the floor precaution applies also to take-off and landing procedure.

Figure 10 — Tie Down Procedure



The only time you may hear the Indicator under safe flight condition will be merely a short beep as you land. Usually no warning will be evident on a properly executed landing because the Indicator takes the ground effect into consideration. (If the airplane is leveled off high, however, the Indicator will signal.) The Indicator automatically cuts out on the ground, although high surface winds may give signals when taxiing. It therefore requires no silencing switch which might be inadvertently left off.

A manual is provided in the airplane kit which describes in detail the many useful purposes of this instrument.

Figure 7 — Cabin Interior

CABIN AIR HEAT:

The cabin air heater is installed as optional equipment. The push-pull control operates to open the heater valve allowing fresh warm air to enter the cabin when the control is pulled out. Intermediate positions of the control may be used as desired. A Stewart-Warner gasoline heater is also available as optional equipment.

TURN AND BANK:

The turn and bank indicator, if installed as optional equipment, is an electrically operated unit which operates when its switch on the instrument panel is placed in the "on" position.

NAVIGATION LIGHTS:

The navigation light switch is located on the instrument panel and controls the wing lights and rudder light. The Model 170A has an independent rheostat switch for the panel lights located on the bottom edge of the instrument panel just right of center. A word of caution is worthwhile here. The bulbs used with the rheostat are G. E. No. 1826 having a .12 ampere rating. Do not use higher ampere capacity bulbs as they allow the rheostat to get too hot with possible burning out of the unit. Make sure when replacing instrument panel bulbs that the correct bulb is used. The model number of the bulb is marked on the base.

LANDING LIGHTS:

The landing light switch is located on the instrument panel, if a landing light is installed as optional equipment. The landing light switch controls the turning off and on of the light.

FUSES:

Fuses for the various electrical devices are located beneath the electrical switches under the edge of the instrument panel. The fuse circuit and fuse capacity are indicated above the respective fuse retainers. Fuses may be removed by unscrewing the fuse retainers and lifting out the fuse. Spare fuses are located in a clip on the inside of the glove compartment door. The turn and bank indicator and stall warning indicator are protected with an automatically resetting circuit breaker which provides intermittent emergency operation of these devices in case of a faulty circuit.

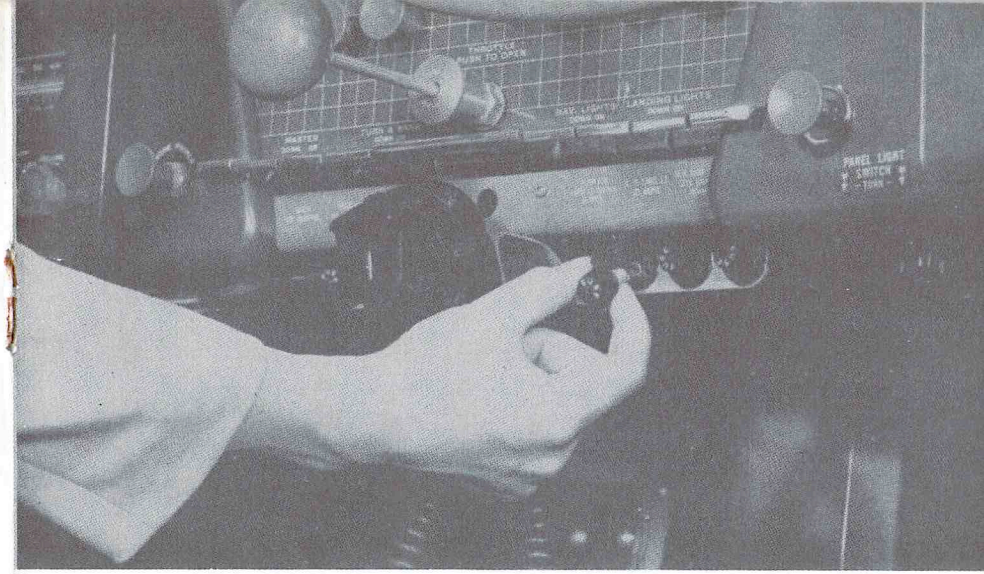


Figure 8 — Fuse Holder

CIGARETTE LIGHTER:

The cigarette lighter is located on the instrument panel. Push the lighter all the way in to heat the element, and release. The lighter will pop part way out when sufficiently heated. When replacing lighter in holder press only part way in.

Figure 9 — Cabin Heater Inlet