

Service Manual

7A *AERONCA*
Champion

AERONCA AIRCRAFT CORPORATION
MIDDLETOWN, OHIO



FLYING BOOKS, Publishers & Wholesalers

3850 Coronation Road, Eagan, Minnesota 55122

FOREWARD

This manual has been prepared to aid owners, operators and repairmen in protecting and maintaining The First in Quality, Construction and Performance of all Aeronca Aircraft.

All Engineering and Service data pertinent to the Aeronca Champion, Model 7A has been summarized in this manual. There are also complete service drawings for positive identification of all parts by part number.

Aeronca Dealers and Distributors are prepared to furnish "top flight" service. Use your Champion Service Manual. It has been published to aid you in receiving the utmost pleasure and trouble-free operation from your Aeronca Champion.

AERONCA AIRCRAFT CORPORATION
SERVICE AND PARTS DEPARTMENT
MIDDLETOWN, OHIO, U.S.A.

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TABLE OF CONTENTS

	Page
General Description	1-2
Specification and Performance Data	3
Rigging Instructions	4
Center of Gravity Data	5
Wing Frame Information	6-7
Wing Frame Drawing	8
Fuselage Frame Information	9
Fuselage Frame Drawing	10-12
Fairing Installation Information	13
Fairing Installation Drawing	14
Control System Information	15
Control System Drawing	16-18
Installation Hand Brake Drawing.	17
Fixed Equipment Information.	20-21
Fixed Equipment Drawing.	22
Landing Gear Group Information	23-24-25
Brake and Wheel Drawing.	26
Landing Gear and Tailwheel Drawings.	28
Tail Surfaces Information.	30-31
Tail Surfaces Drawings	32
Fuel System Information.	33
Fuel System Drawing.	34
Engine Installation Information.	35-36-37
Engine Installation Drawing.	38-40
Safetying Information.	39
Cowl and Covering Information.	41
General Explosion Drawing.	42
Do's and Don'ts.	43
Lubrication Chart.	44



GENERAL DESCRIPTION:

The Aeronca Champion is a two place, tandem, high wing monoplane. Basic construction consists of welded tube, fabric covered fuselage. Wings are fabric covered, wood spar with hydro-formed aluminum alloy ribs.

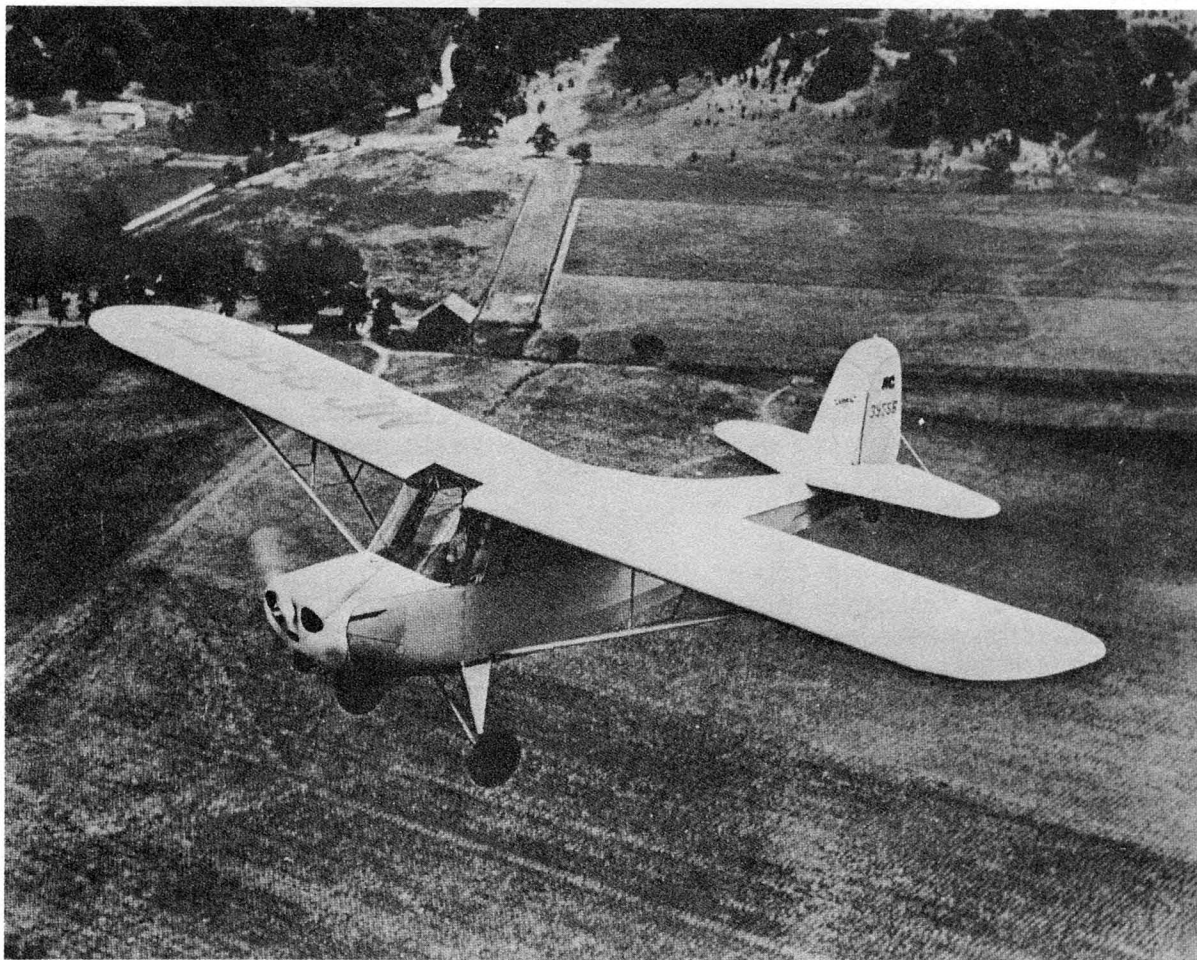
Power is supplied by a 65 horse-power engine turning a fixed pitch wood propeller. The engine is insulated against excessive vibration with rubber bushings, at the motor mount attachment points, resulting in smooth, noise-free operation.

Unrestricted vision is attained through the use of a one-piece moulded windshield, large door windows and rear side windows.

Cabin control cables are concealed adding to the comfort of the spacious cabin. Engine controls are readily accessible from the front and rear seats. A spacious baggage compartment is located aft of the rear seat to accommodate luggage, guns, fishing equipment, and many other items.

Basically, the Aeronca Champion is a conventional three control aircraft. The newly designed control system provides smooth non-fatiguing, positive control action. Brake pedals are provided for both front and rear occupants. A trim tab on the left elevator compensates for load differences and provides hands-off flight. Positive trim tab control is conveniently located above and between each occupant.

The famous Aeronca oleo landing gear is again incorporated in the new Champion. This time-tested method of landing gear construction insures sturdy yet smooth handling on rough fields. Much of the shock is absorbed in the oleo thereby lessening fatigue on the rest of the airframe and wing structure. Ease in ground handling is assured with steerable leaf spring tail wheel and positive acting mechanical brakes. Tie down rings are incorporated at the strut wing point attachment for security in the event storage space is not available.



SPECIFICATIONS AND PERFORMANCE DATA

A.T.C. NO. 759

MAJOR AIRPLANE DIMENSIONS:

Length, overall, (level)	21' 5 13/16"
Height, overall, (three point)	7'
Height, (level position)	8' 7 5/8"
Wing Span	35' 1 3/4"
Wing Chord	60"
Stabilizer Span	10' 2 1/4"
Wheel tread (static)	70"
Wheel base (static, level)	16' 3/16"
Wing Area (including fuselage)	170.22 sq. feet
Aileron Area	16.54 sq. feet
Stabilizer Area	14.08 sq. feet
Elevator Area	11.92 sq. feet
Fin Area (not including fuselage)	5.17 sq. feet
Rudder Area	6.80 sq. feet
Elevator Trim Tab Area	.83 sq. feet
Wing dihedral	plus 2°
Wing incidence	plus 1°
Stabilizer incidence (approx.)	minus 5°
Fin offset	3/8" left

WEIGHTS:

Empty weight	Seaplane 810 lbs., landplane 710 lbs.
Gross weight	Seaplane 1320 lbs., landplane 1220 lbs.
Useful load	Seaplane 510 lbs., landplane 510 lbs.
Wing Loading	Seaplane 7.7 lbs., landplane 7.2 lbs. per sq. ft.
Power Loading	Seaplane 20.3 lbs., landplane 18.8 lbs. per h.p.

BAGGAGE:

20 lbs. when flying solo rear
 40 lbs. when flying solo front

Top Speed	100 M.P.H.
Cruising Speed	90 M.P.H.
Landing Speed	35 M.P.H.
Rate of Climb	500 ft. per minute
Fuel Capacity	13 gallons
Cruising Range	260 miles

RIGGING INSTRUCTIONS

LEVELING:

Level in fore and aft direction by supporting tail on stand and placing bubble level on front window sill or any portion of cabin floor. When bubble is centered in level, the aircraft is longitudinally level.

WING RIGGING:DIHEDRAL:

The plus 2° angle of dihedral is fixed by the length of the front strut.

ANGLE OF INCIDENCE:

The angle of incidence, which is plus 1° at the leading edge over the trailing edge through the five foot chord of the wing, is fixed in the manufacture of the airplane at the wing root fittings on the fuselage.

The angle of incidence at the rib nearest the strut point attachment fitting of the wing may be corrected to the corresponding angle of incidence at the root, by adjusting the screw adjustment at the lower end of the rear strut where it attaches to the front strut.

RIGGING:

For rigging purposes a bubble level should be laid along the bottom of the butt rib between the spars. The level may be shimmed with a small block on the leading edge end of the level until bubble is centered. Tape the shim in place and move level to the rib adjacent to the strut attaching points, parallel with the rib and between the spars. This will offer a reference means of alignment. By adjusting rear strut lower end fitting until bubble is centered in level, the proper angle of incidence along entire wing will be accomplished.

ADJUSTMENT:

If after flight test the airplane has a tendency toward wing heaviness, the necessary wash in or wash out may be secured by adjusting the rear strut at its lower attachment point.

CAUTION: Only a C.A.A. licensed aircraft mechanic should attempt the assembly and rigging of wings and struts.

CENTER OF GRAVITY LIMITATIONS:

Datum line wing leading edge
M.A.C. 58.84 inches
Leading Edge M.A.C. plus .28 inches
Center of gravity range plus 10.9, (18.0% M.A.C.) most
forward, plus 21.5 (36.0% M.A.C.) most rearward.

AIRSPPEED LIMITATIONS:

Do not exceed 129 M.P.H. true indicated airspeed at any time. This figure is derived from stress analysis and flight testing at the factory and has been established with a reasonable margin of safety.

PROPELLER LIMITS:

Static R.P.M. at full throttle setting not more than 2200 R.P.M.,
not less than 2010 R.P.M.

DIAMETER:

Not more than 72 inches.
Not less than 70 inches.

EXPORT OR FOREIGN:

C.A.A. has approved left windows as emergency exit. Defined in C.A.R. 04.462 for export particularly Canada. Tests have been run and it has been found that by pushing from the inside, either one or both of the windows may be removed in an emergency and only a nominal amount of pressure is required.

WING FRAME

The wing frame consists of laminated spruce spars reinforced at the butt and strut attachments with three ply spruce pads. All ribs are one piece hydro-formed aluminum reinforced at the spar openings bottom, with spot welded aluminum gussets. The butt and inner aileron bay ribs are .040 - 52 S 1/2 H. aluminum alloy, and the main, tip and aileron bay ribs are .020 - 52 1/2 H. aluminum alloy.

Spar butt attachment and strut attachment fitting holes are reinforced with micarta bushings pressed and glued into the spar blank. Kem wood primer is applied to the spar as a protective coating, and should be reapplied to any exposed wood after splicing or repairs. Methods of splicing and repair are covered in Civil Aeronautics Manual 18.

Spar butt fittings are X4130 steel, clevis type. Damaged or worn spar butt fittings should never be welded or bushed but should be replaced complete and may be ordered by giving the number shown on the accompanying drawing.

The wings are attached to the fuselage with AN6-24 bolt, AN310-6 nut, rear spar, and AN5-14 bolt, AN310-5 nut, front spar.

These bolts pass through the spar butt clevis type fittings and fuselage spar attachment fittings. The spar butt attachment fittings are designed to fit snugly to the fuselage fittings and should not be bushed or shimmed. The front spar strut attachment fittings include tie down rings as an integral part of the fittings. The rear strut is attached with a bolt through the spar and the strut upper end fitting.

Bellcrank and bracket assembly is cast aluminum. The counter-balanced bellcrank and ball bearings provide ease of aileron control and is another new feature incorporated in the control system to insure smooth positive control action.

Two .125 - 24 St Alclad Aluminum brackets bolted to the rear spar support the aileron in conjunction with the aileron bellcrank assembly, which incorporates an aileron bearing support on the bellcrank bracket. Ball bearings are also used in the aileron bracket supports.

Position light wiring is provided in each wing and is attached to the drag wire intersections running from the fuselage to the wing tip front.

Rigidity between front and rear spars is accomplished by the use of eight drag wires and four compression struts. The drag wires are heat treated steel, 125,000 P.S.I. Rockwell test, and IN NO INSTANCE SHOULD THEY BE REPLACED WITH SOFT WIRE. Care should be used when rebuilding or repairing the wing to avoid the use of tools such as pliers which might scratch or crack these wires. A small scratch in this material may develop into a crack and structural failure.

The compression struts are X4130 round steel tubing, not heat treated, to which brackets are welded on each end. These compression assemblies are bolted to the rear and front spars.

Wing leading edges are reinforced with .016 - 24 ST 52 S 1/2 H. aluminum. Replacement of these parts should be ordered by numbers shown on the drawing. Specify left or right when ordering any leading edge section.

Wing tip bows are located at the outer wing tip as formers. The bow is made up of 1/2" .035 - 1025 steel tubing and fastened to the tip rib, front and rear spars with clips as shown on the wing drawing.

COVERING:

A new and simplified method of attaching fabric to the wing ribs has been used on the Aeronca Champion. 3/4" pinked tape is laid over the fabric and rib and fastened into place with aluminum washers, Number 1-2331, and Number 4 x 1/4 stove head PK screws over which is laid 2" pinked tape doped to the fabric or fabric attachment wire is placed over 3/4" pinked tape doped in place. The tape and wire are covered with 2" pinked tape doped to fabric. These simplified methods of attaching fabric save many tedious hours of rib stitching formerly required when recovering wings.

Caution: Wire attachment may not be used for partial rib repair. It is advisable in this instance to drill new holes between the wire attachment holes and attach fabric with 4 x 1/4 stove P.K. screws as mentioned in first instance. When replacing whole ribs with wire "stitching" the ends should be cut and tucked in as shown on wing drawing.

AILERONS:

Aileron frames are all metal, single spar, fabric covered, attached to the supporting brackets with clevis type fittings. The leading edge of the aileron is designed to provide additional ease of control movement. Fabric is attached to the aileron by the same method used on the wing.

Aileron travel limitations are: 28.5° plus 0° minus 2° up - 18° plus 0° minus 2° down.

NOTICE: FLEXIBILITY OF AILERON HINGE BRACKETS

Aileron floating action is perfectly normal and allowances have been incorporated in the design of the wing to compensate for it. Due to the length of the hinge bracket and the narrow base attachment on the spar, it is possible to move the hinge point up or down and the movement is absorbed in the rear spar itself. A flexible action is desirable at this point to lessen stress. The brackets are bolted and safetied to the spar and inspected. Unless there is a decided looseness in the movement of the bracket, there is no cause to open the wing for further inspection.

NOTICE:

Spars built at the factory may be solid or spliced and may be laminated vertically or horizontally or both. They may be of spruce or fir. Spars are manufactured in accordance with drawings approved by the C.A.A. and may or may not conform to Manual 18 repair requirements. However this does not waive compliance with Civil Aeronautics Manual #18 when making spar repairs.

FUSELAGE FRAME

Basically, the fuselage frame consists of 1025 and X4130 tubing acetylene welded to form the body structure of the fuselage.

Tubing members are shown in the small circles on the accompanying drawing in order that they may be identified in the event repairs are necessary in the field.

Fairing clips, landing gear fittings, gussets, and brackets are welded to the fuselage frame. These parts are shown on the fuselage drawing and identified by number only.

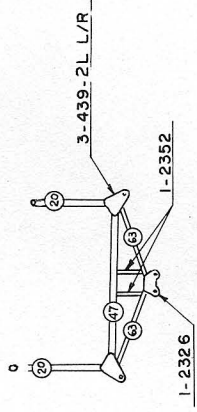
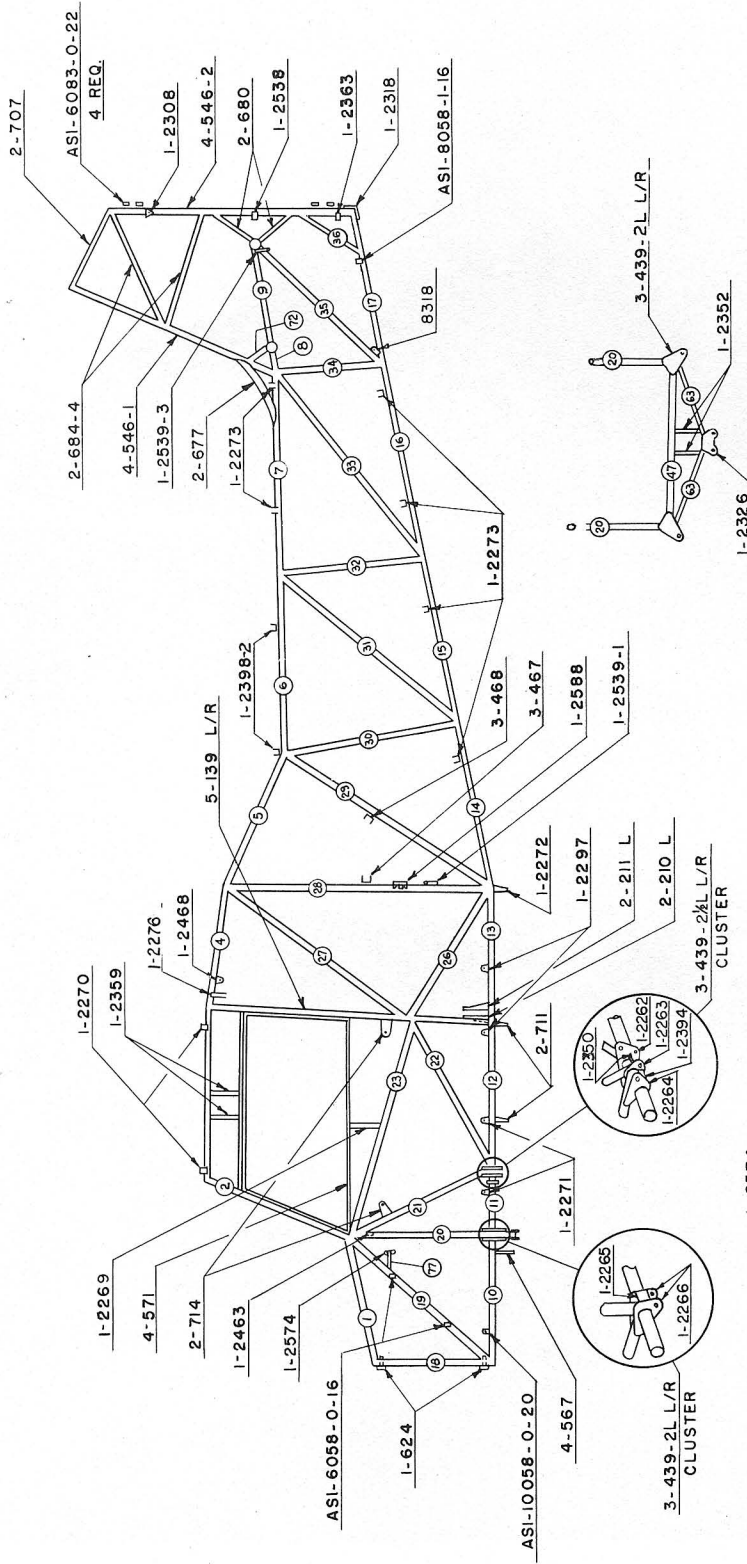
In the event of serious damage to the landing gear yoke section, a complete assembly may be ordered for replacement. The replacement assembly will be furnished as shown on the drawing.

Should the front or rear landing gear attachment cluster be damaged beyond repair, it is possible to obtain this complete cluster. The front component, (3-439-2L-L/R) or rear component, (3-439-2 1/2L-L/R), may be obtained separately or a complete assembly including front and rear clusters may be obtained by ordering Part Number 3-439, left or right.

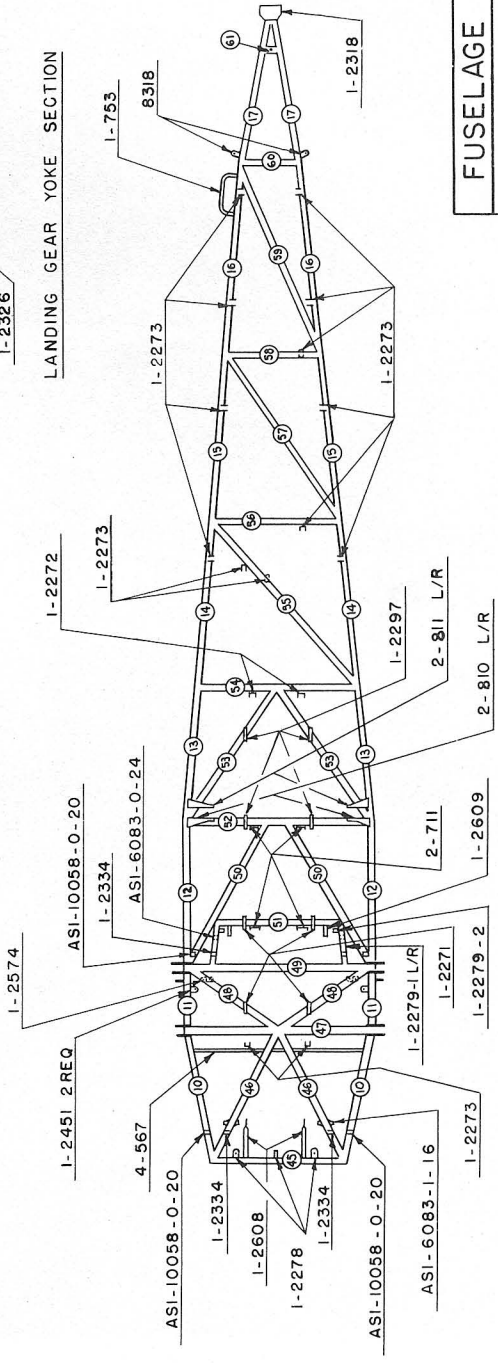
The entire fuselage frame structure is coated with zinc chromate primer at the factory. Upon making any repairs in the field, care should be taken to thoroughly clean the repaired areas and recoat with zinc chromate primer. Zinc chromate has been found to be an excellent corrosion proofing and adds materially to the life of the structure.

Navigation light wiring which is attached along the upper fuselage longeron is installed at the factory as standard equipment. Wiring extends from rear of rear seat to fuselage vertical fin.

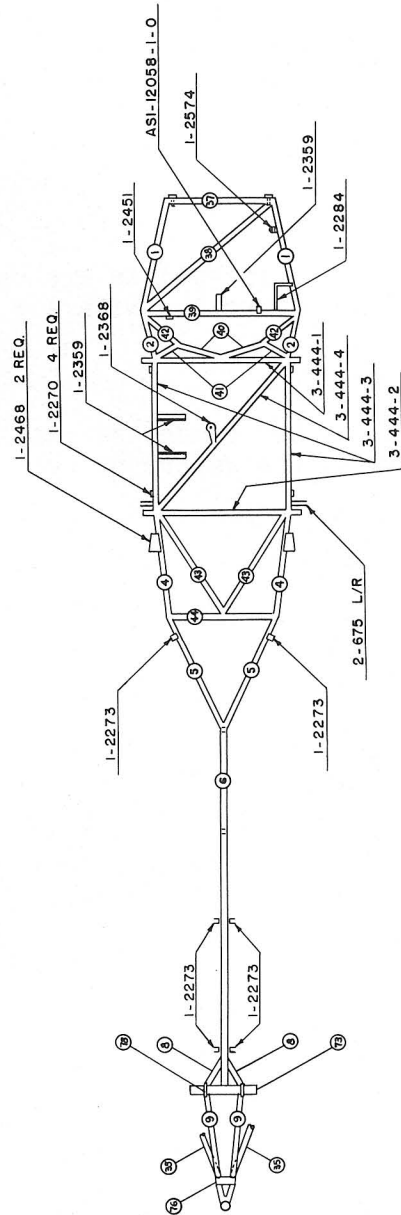
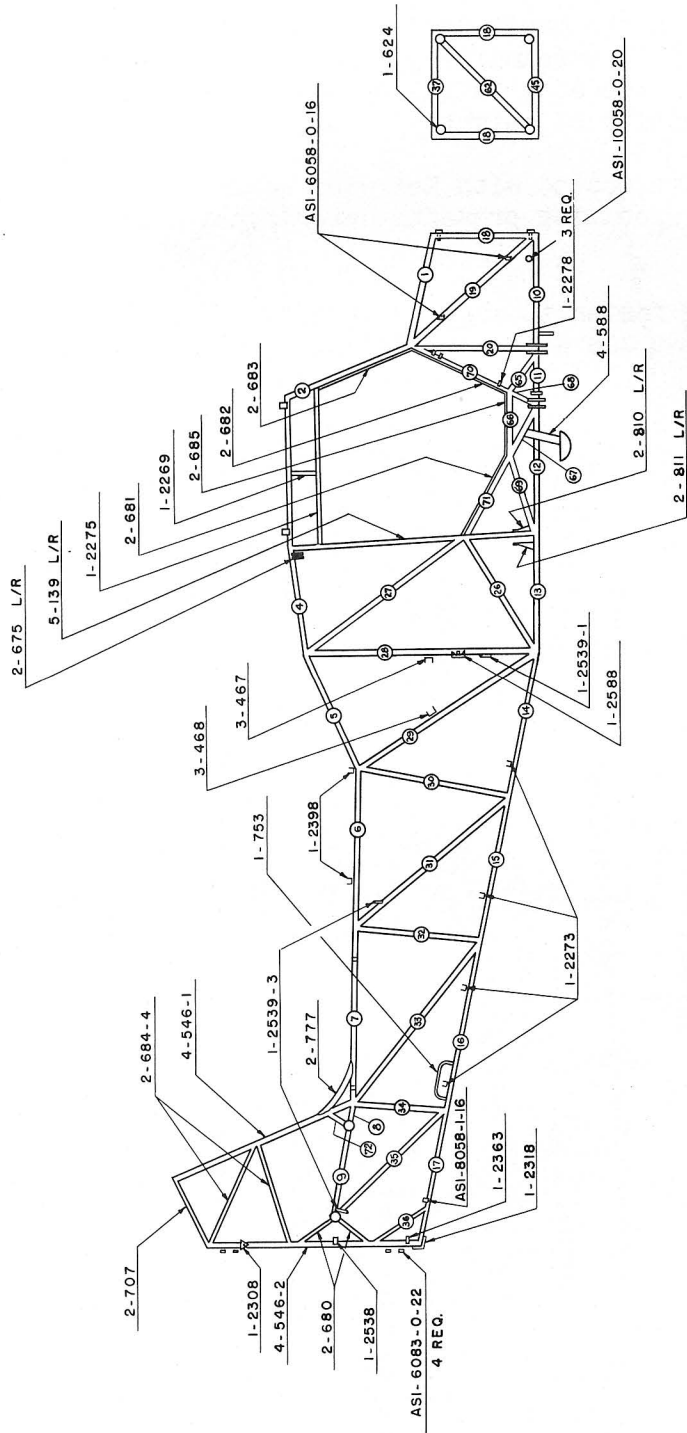
All repairs should be made in accordance with Civil Aeronautics Manual 18.



LANDING GEAR YOKE SECTION







FUSELAGE FRAME
 RIGHT AND TOP VIEWS
 7-450

FAIRING INSTALLATION

GENERAL:

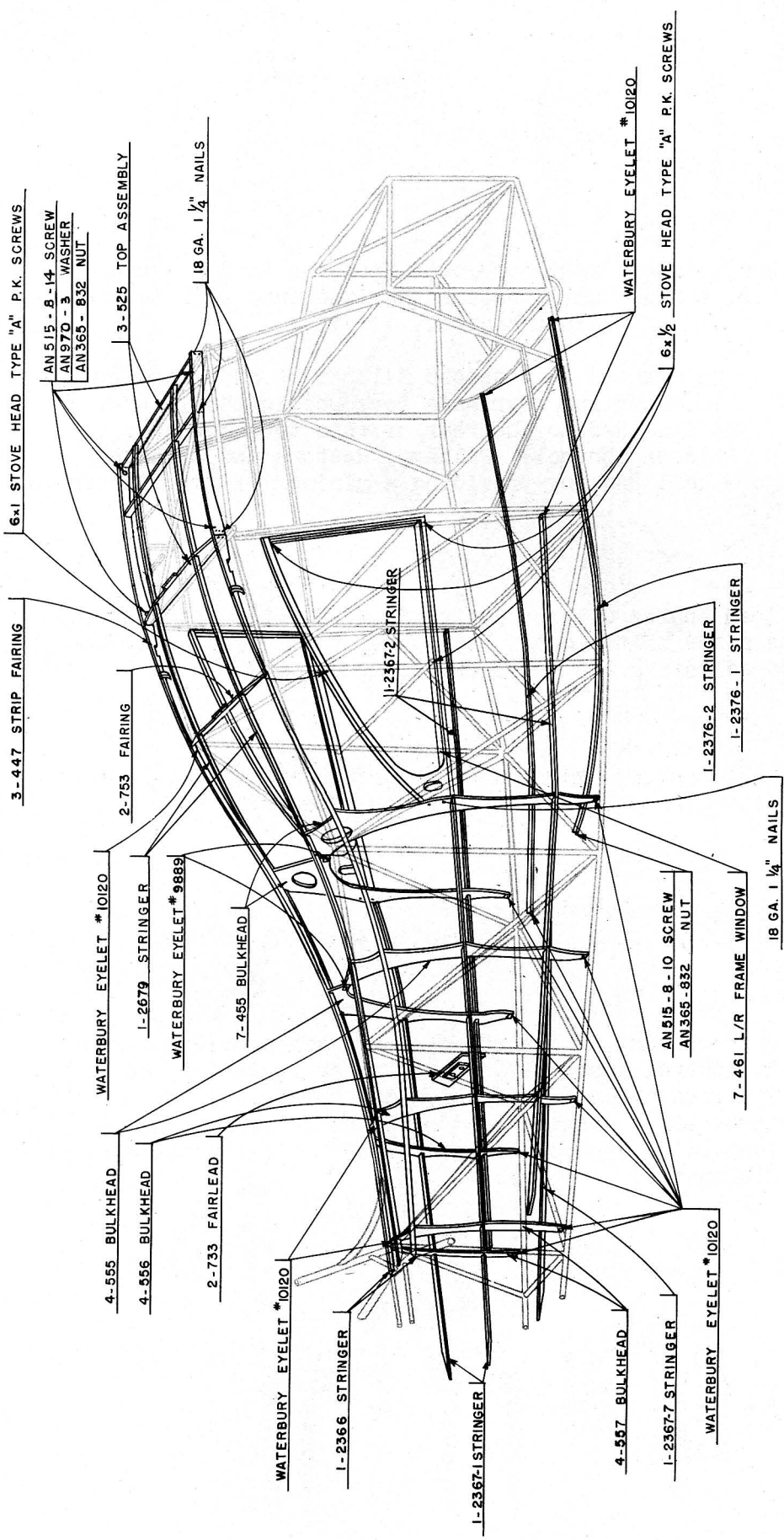
Wood fairing is incorporated in the basic design of the fuselage structure to provide the best possible streamlining, thereby lessening wind resistance. This fairing also adds to the beauty of the contour and contributes to the elimination of weight.

All wood fairing components are coated with Kem wood sealer before installation. This protective coating prevents deterioration from heat and moisture.

Waterbury eyelets are used to fasten fairing to fuselage structure in conjunction with A.N. screws and self-locking nuts.

SERVICE:

A center punch and small bucking bar or hammer may be used in replacing the Waterbury eyelets.



FUSELAGE FAIRING

CONTROL SYSTEM

GENERAL:

All control surfaces are cable operated from the front or rear seat. An X4130 steel torque tube connects the front and rear control sticks for coordinated longitudinal control.

The two sticks are mounted on a second X4130 tube supported by fibre bearing blocks on front and rear ends for coordinated lateral control. A bell crank attached to the rear of this tube actuates the mechanism producing aileron control. Pulleys, sectors and aileron hinge attachments are ball bearing providing a minimum of friction in the system.

AILERON:

The rigging load on the aileron system is 45 to 55 pounds and can be adjusted at the sides of the cabin enclosure or top by opening the slide fastener and adjusting the turnbuckles.

RUDDER:

Rudder tension is springloaded through springs attached to the rudder pedal and floor frame. No adjustment is necessary.

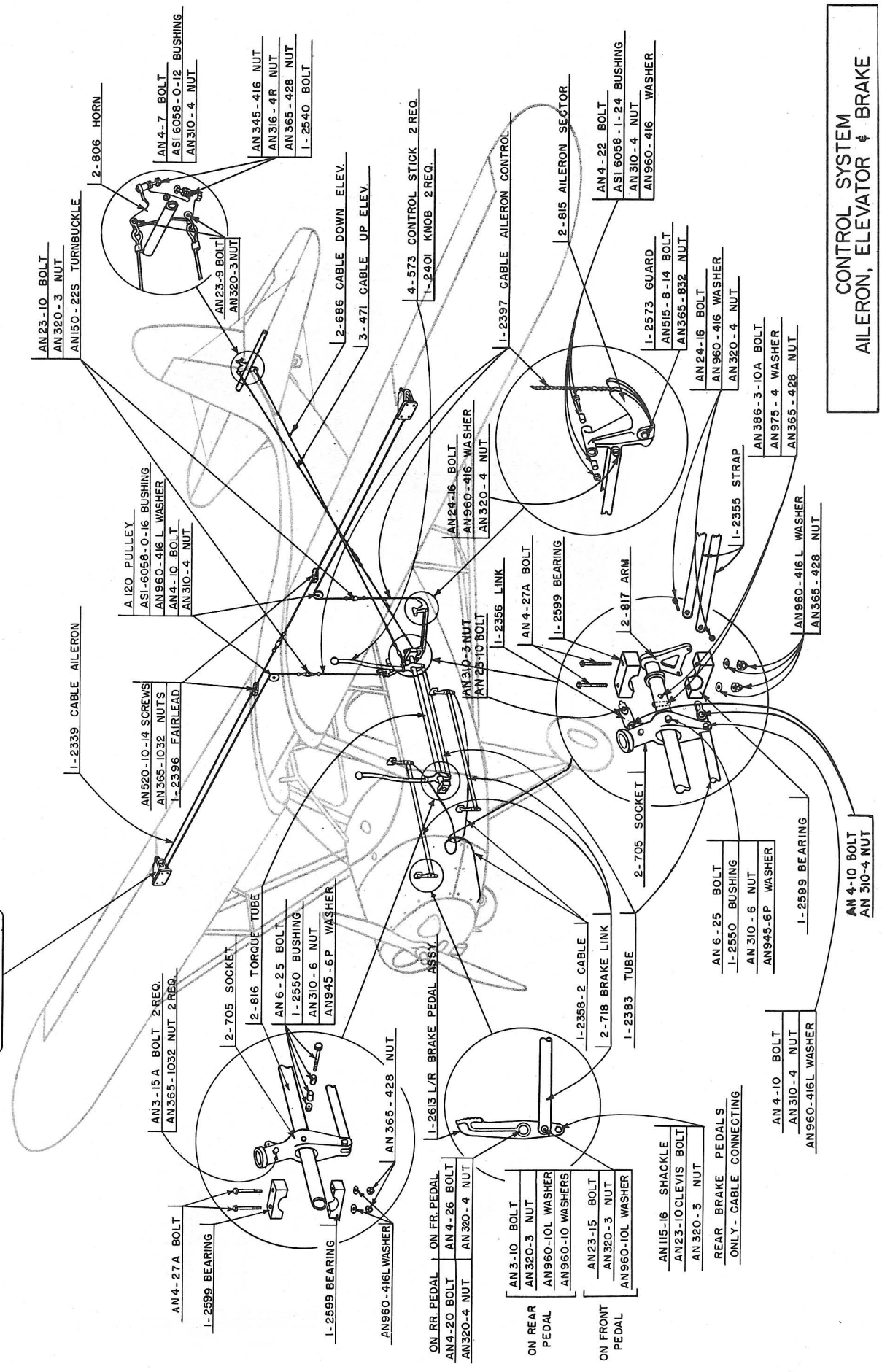
ELEVATOR:

Adjustment may be accomplished at the turnbuckles located just aft of the rear stick. Rigging load should be 45 to 55 pounds.

ELEVATOR TAB:

A slide fastener opening in the top of the cabin provides access to the tab friction control knob. By tightening or loosening the knurled knob, the desired amount of friction may be applied to the tab control adjustment arm. Rigging load of 15 to 20 pounds may be adjusted at the turnbuckles located immediately fore of the tab assembly on the left elevator.

DETAILS SHOWN ON
WING DRAWING



- AN 23-10 BOLT
- AN 320-3 NUT
- AN 150-225 TURNBUCKLE

- A 120 PULLEY
- ASI-6058-0-16 BUSHING
- AN 960-416 L WASHER
- AN 4-10 BOLT
- AN 310-4 NUT

- AN 520-10-14 SCREWS
- AN 365-1032 NUTS
- I-2396 FAIRLEAD

- AN 3-15 A BOLT 2-REQ.
- AN 365-1032 NUT 2-REQ.

- 2-705 SOCKET
- 2-816 TORQUE TUBE
- AN 6-25 BOLT
- I-2550 BUSHING
- AN 310-6 NUT
- AN 945-6P WASHER

- AN 4-27A BEARING
- AN 4-27A BOLT

- I-2599 BEARING
- AN 960-416L WASHER
- AN 365-428 NUT

- 2-586 CABLE DOWN ELEV.
- 3-471 CABLE UP ELEV.

- ON RR. PEDAL
- AN 4-20 BOLT
- AN 320-4 NUT
- ON FR. PEDAL
- AN 3-10 BOLT
- AN 320-3 NUT
- AN 960-10L WASHER
- AN 960-10 WASHERS

- ON REAR PEDAL
- AN 23-15 BOLT
- AN 320-3 NUT
- AN 960-10L WASHER
- ON FRONT PEDAL
- AN 115-16 SHACKLE
- AN 23-10CLEVIS BOLT
- AN 320-3 NUT
- REAR BRAKE PEDALS ONLY- CABLE CONNECTING

- AN 6-25 BOLT
- I-2550 BUSHING
- AN 310-6 NUT
- AN 945-6P WASHER
- I-2599 BEARING

- AN 4-10 BOLT
- AN 310-4 NUT
- AN 960-416L WASHER

- I-2613 L/R BRAKE PEDAL ARSY

- AN 310-5 NUT
- AN 25-10 BOLT
- I-2556 LINK

- AN 4-27A BOLT
- I-2599 BEARING
- 2-817 ARM
- 2-705 SOCKET
- 2-716 BRAKE LINK
- I-2358-2 CABLE
- I-2393 TUBE

- AN 24-16 BOLT
- AN 960-416 WASHER
- AN 320-4 NUT

- 4-573 CONTROL STICK 2 REQ.
- 1-2401 KNOB 2 REQ.

- I-2397 CABLE AILERON CONTROL
- 2-815 AILERON SECTOR

- AN 4-22 BOLT
- ASI 6058-1-24 BUSHING
- AN 310-4 NUT
- AN 960-416 WASHER

- I-2573 GUARD
- AN 515-B-14 BOLT
- AN 365-832 NUT

- AN 24-16 BOLT
- AN 960-416 WASHER
- AN 320-4 NUT

- AN 386-3-10A BOLT
- AN 975-4 WASHER
- AN 365-428 NUT

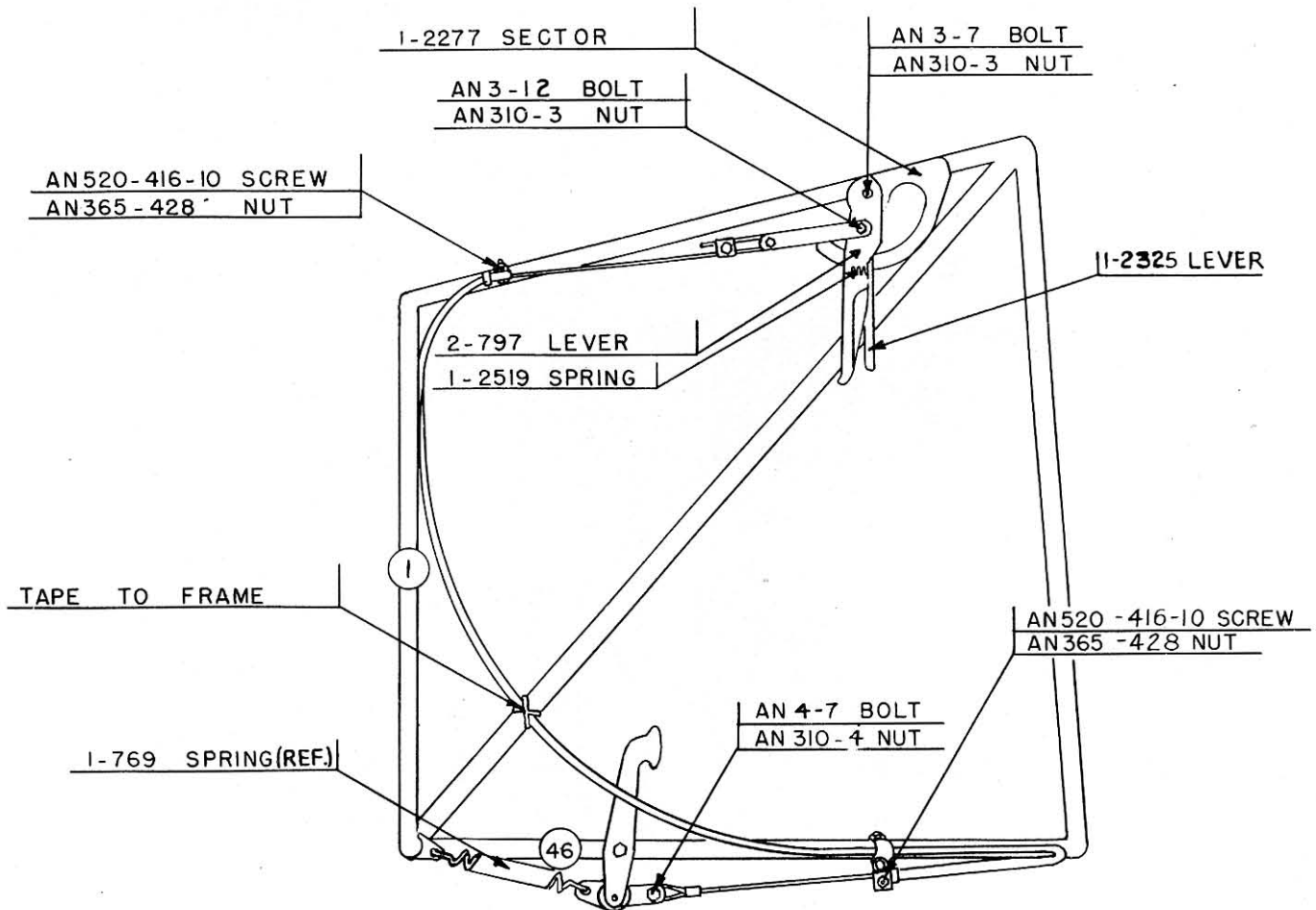
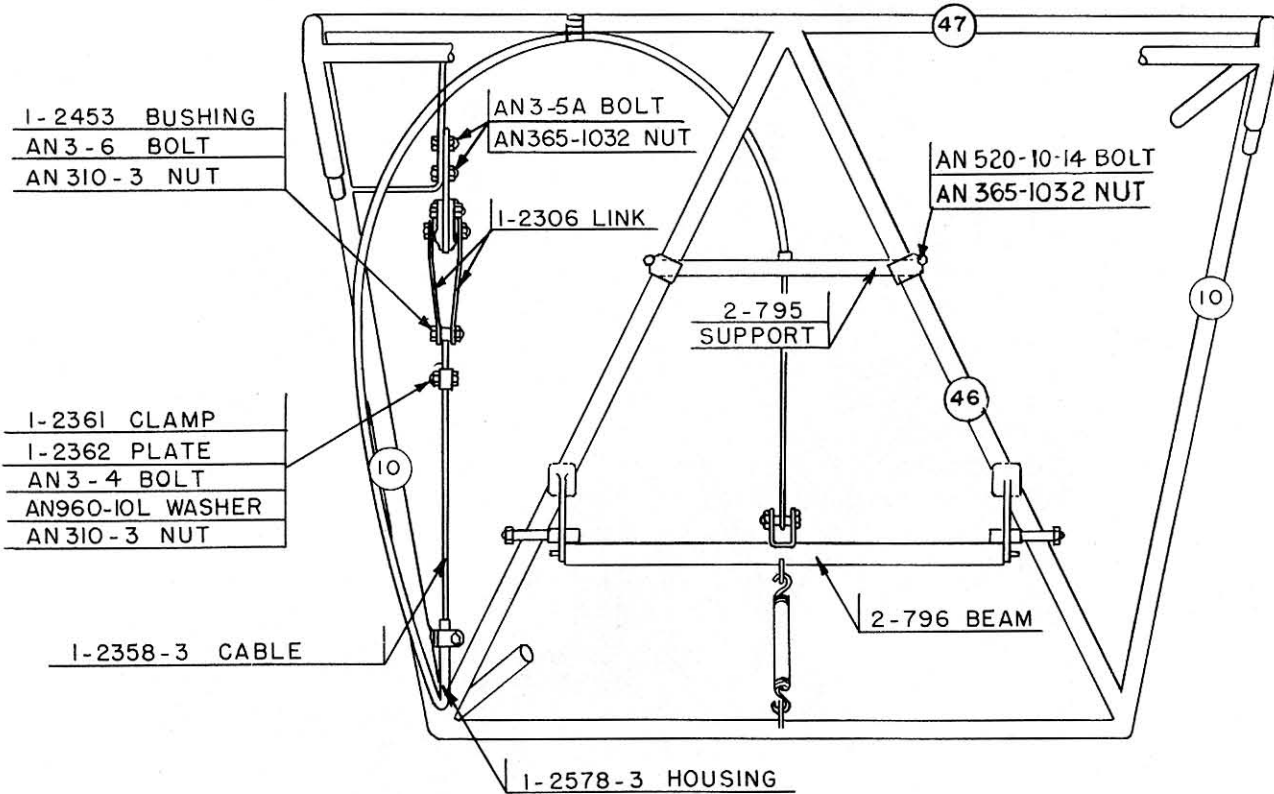
- I-2355 STRAP

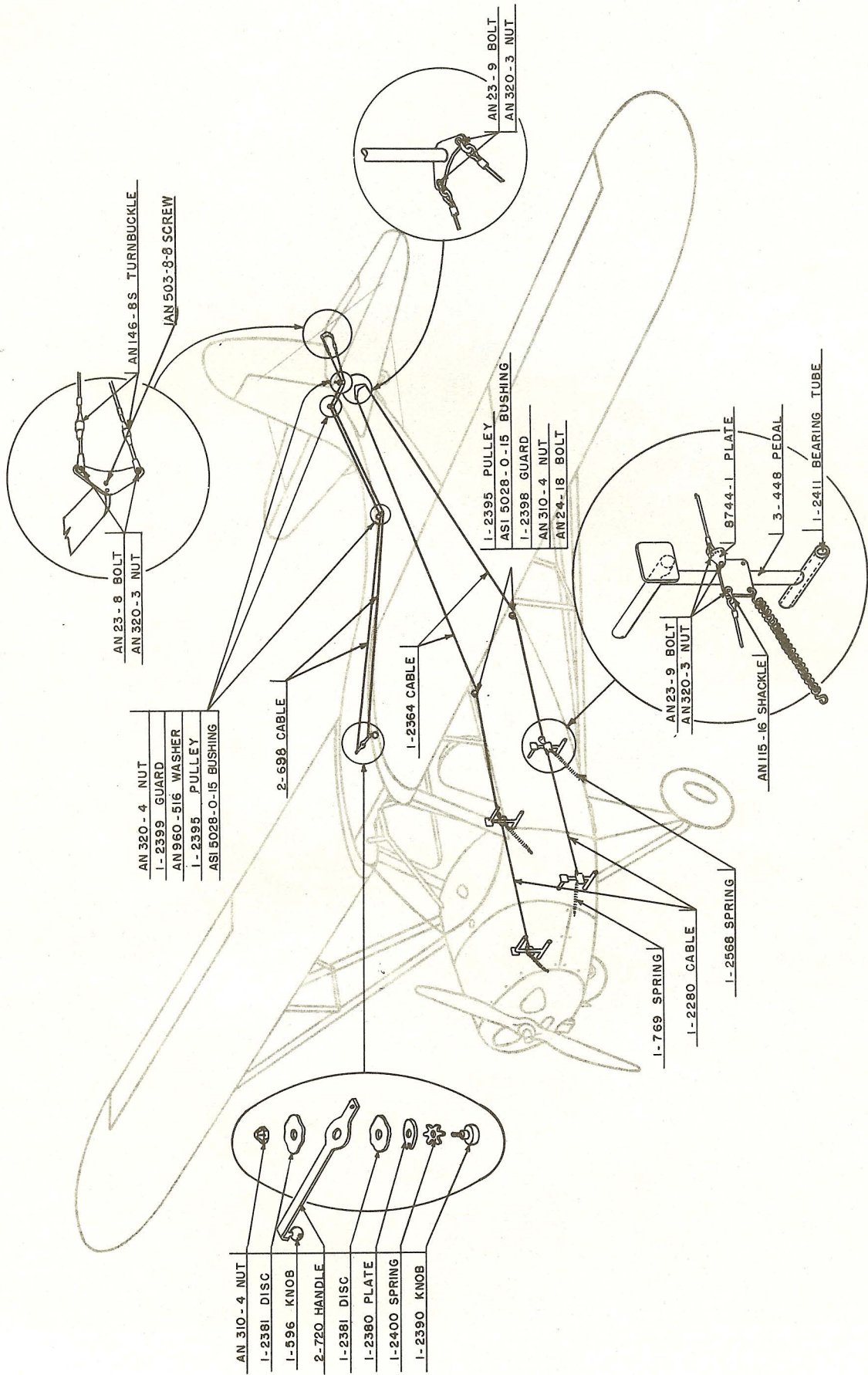
- AN 960-416 L WASHER
- AN 365-428 NUT

- AN 4-10 BOLT
- AN 310-4 NUT

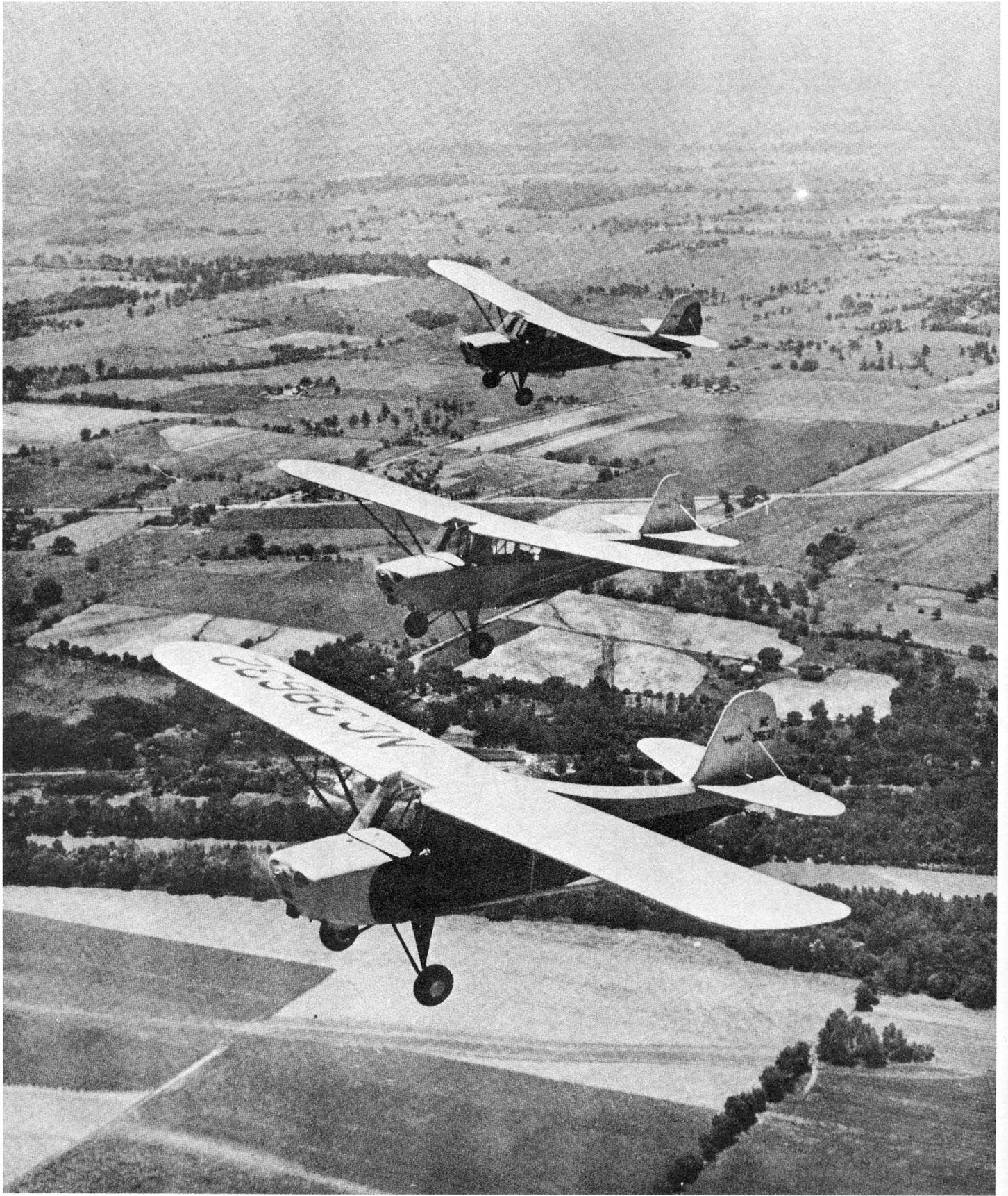
CONTROL SYSTEM
AILERON, ELEVATOR & BRAKE

7-443 INSTALLATION HAND BRAKE - TOP & SIDE VIEWS





CONTROL SYSTEM
 RUDDER & TRIM TAB



FIXED EQUIPMENT

GENERAL:

All components of the cabin enclosure are shown on the fixed equipment drawing except brake pedals, rudder pedals or any part of the control system. These parts are included in the control system drawings.

Rayon flock is used on the panel surfaces. Head lining, flock and flock sealer are shown in the Champion Parts Price List and may be ordered from your dealer or distributor. High grade Paratex (soft type) covered with either imitation leather or Bedford cord is used in the construction of the seat bottoms and backs.

Fibreglass insulation at the firewall eliminates engine noise and insulates against heat radiated from the engine.

Cabin heat is controlled from the instrument panel, the heated air entering at the valve opening in the lower left corner of the firewall.

One piece moulded metal instrument panel accommodates the flight instruments. Grouping of instruments is arranged to permit full visibility from both seats. Note: S.W. shaft may be used with Waltham Tachometer & Waltham shaft may be used with Stewart-Warner Tachometer.

WINDOWS AND WINDSHIELD:

Plexiglass is used throughout assuring a minimum of discoloration due to exposure. Front left side windows are aluminum reinforced, sliding in felt insulated channel, which is an integral part of the window frame assembly.

The one piece moulded windshield provides unobstructed visibility never before offered in the light plane field.

CARE OF PLEXIGLASS:

When cleaning plexiglass, all grit and foreign particles should be flushed off with clear water. Final cleaning should be done with a soft cloth and any recommended type of plexiglass cleaner. NEVER USE DIRTY, OILY RAGS TO CLEAN PLEXIGLASS.

CAUTION:

Rapid changes in temperature should be avoided (i. e., moving from warm hangar to extreme cold) which will cause rapid contraction and breakage. Allow fifteen minutes after plexiglass has cooled before starting engine. Vibration increases the possibility of breakage during cooling.

DOOR:

One piece hydro-formed, spot-welded aluminum alloy is the construction of the large car type door. Incorporated in this design is a large compartment located just under the door window to accommodate maps, log books and personal effects.

CAUTION:

This map compartment should not be used when pulling the door closed.

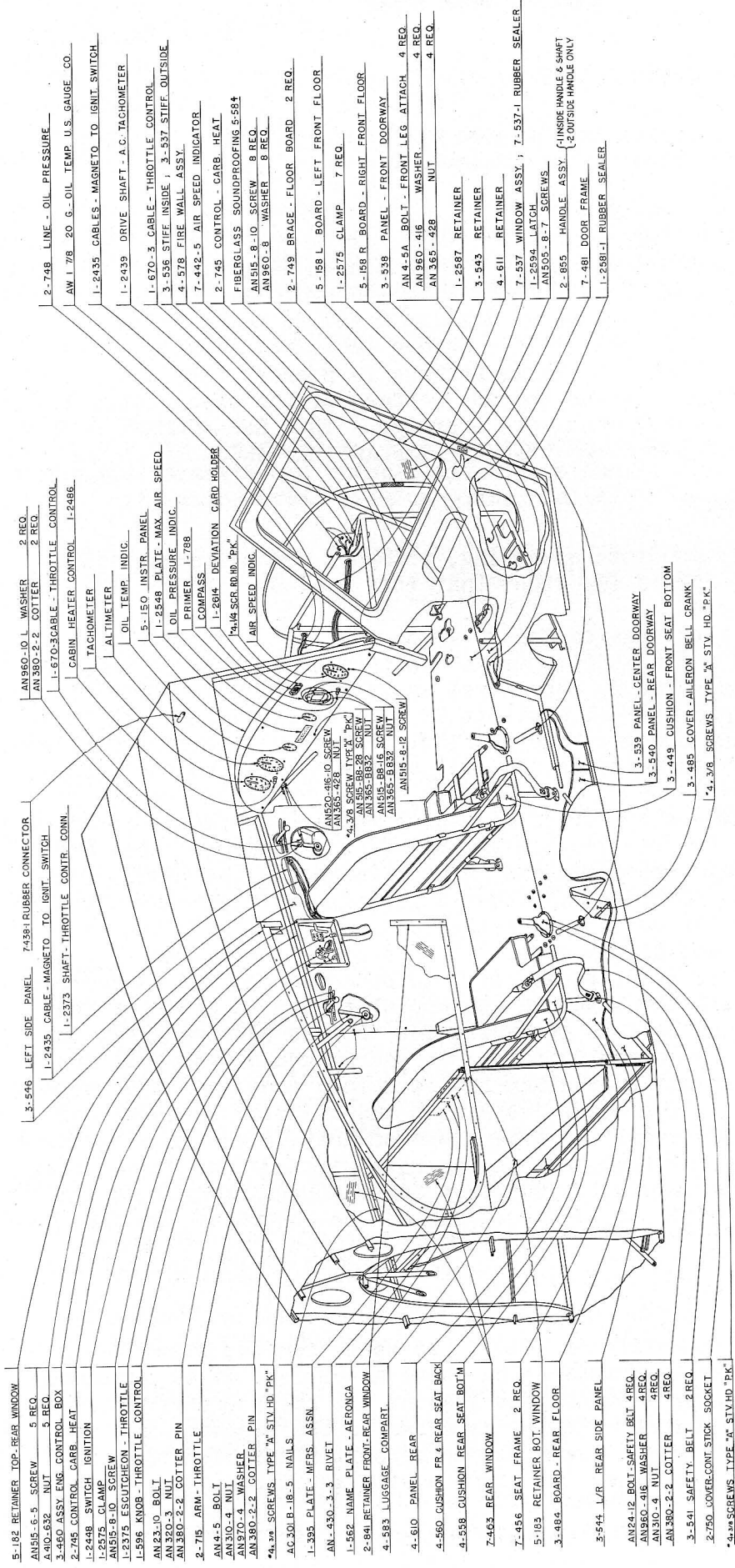
Plexiglass is secured in the door and rear windows with Alumilastic compound and reinforced with aluminum alloy channel. This method of installation insures a watertight seal. When installing new door window, center the plexiglass in the frame to allow for expansion front and rear. The plexiglass should not touch the frame at either the front or rear.

ENGINE CONTROL:

A recessed panel located between front and rear seats left side of cabin houses ignition switch, carburetor heater control and fuel shut-off valve. Safety-recessing these controls, eliminates hazard of catching clothing on them during flight.

FLOORBOARD SURFACES:

Consist of three ply laminated fir, designed in three sections. Sections are finished with black DuLuxe enamel and bolted to the fuselage floor frame.



- 5-102 RETAINER TOP-REAR WINDOW
- AN515-6-5 SCREW 5 REQ.
- A10-532 NUT 5 REQ.
- 3-460 ASSY. ENG. CONTROL BDX
- 2-745 CONTROL CARB. HEAT
- 1-2448 SWITCH IGNITION
- 1-2575 CLAMP
- AN515-8-10 SCREW
- 1-2375 ESCUTCHEON - THROTTLE
- 1-596 KNOB - THROTTLE CONTROL
- AN23-10 BOLT
- AN320-3 NUT
- AN380-2-2 COTTER PIN
- 2-715 ARM - THROTTLE
- AN4-5 BOLT
- A10-4 NUT
- AN370-4 WASHER
- AN380-2-2 COTTER PIN
- *4.00 SCREWS TYPE "A" STV.HD "PK"
- AC301 B-1B-5 NAILS
- 1-395 PLATE - MFRS. ASSN.
- AN-430-3-3 RIVET
- 1-562 NAME PLATE - AERONCA
- 2-841 RETAINER FRONT-REAR WINDOW
- 4-583 LUGGAGE COMPART.
- 4-610 PANEL REAR
- 4-560 CUSHION FR. & REAR SEAT BACK
- 4-558 CUSHION REAR SEAT BOT'M
- 7-463 REAR WINDOW
- 7-456 SEAT FRAME 2 REQ.
- 5-103 RETAINER BOT. WINDOW
- 3-484 BOARD - REAR FLOOR
- 3-544 L/R REAR SIDE PANEL
- AN24-12 BOLT SAFETY BELT 4 REQ.
- AN300-3-16 WASHER 4 REQ.
- AN300-2-2 NUT 4 REQ.
- AN300-2-2 COTTER 4 REQ.
- 3-541 SAFETY BELT 2 REQ.
- 2-790 COVER CONT. STICK SOCKET
- *4.00 SCREWS TYPE "A" STV.HD "PK"
- 3-546 LEFT SIDE PANEL 7-438-1 RUBBER CONNECTOR
- 1-2435 CABLE - MAGNETO TO IGNIT. SWITCH
- 1-2373 SHAFT - THROTTLE CONTR. CONN.
- TACHOMETER
- CABIN HEATER CONTROL 1-2486
- AN960-10 L. WASHER 2 REQ.
- AN380-2-2 COTTER 2 REQ.
- 1-670-3 CABLE - THROTTLE CONTROL
- 1-2435 CABLES - MAGNETO TO IGNIT. SWITCH
- 1-2439 DRIVE SHAFT - A. C. TACHOMETER
- 1-670-3 CABLE - THROTTLE CONTROL
- 3-536 STIFF INSIDE ; 3-537 STIFF OUTSIDE
- 4-578 FIRE WALL ASSY.
- 7-442-5 AIR SPEED INDICATOR
- 2-745 CONTROL CARB. HEAT
- FIBERGLASS SOUNDPROOFING 5-584
- AN515-8-10 SCREW 8 REQ.
- AN960-8 WASHER 8 REQ.
- 2-749 BRACE - FLOOR BOARD 2 REQ.
- 5-108 L BOARD - LEFT FRONT FLOOR
- 1-2575 CLAMP 7 REQ.
- 5-108 R BOARD - RIGHT FRONT FLOOR
- 3-538 PANEL - FRONT DOORWAY
- AN4-5A BOLT - FRONT LEG ATTACH 4 REQ.
- AN960-416 WASHER 4 REQ.
- AN365-428 NUT 4 REQ.
- 1-2587 RETAINER
- 3-543 RETAINER
- 4-611 RETAINER
- 7-537 WINDOW ASSY. ; 7-537-1 RUBBER SEALER
- 1-2594 LATCH
- AN505-8-7 SCREWS
- 2-655 HANDLE ASSY. (INSIDE HANDLE & SHAFT ; 2 OUTSIDE HANDLE ONLY)
- 7-481 DOOR FRAME
- 1-2581-1 RUBBER SEALER
- 3-539 PANEL - CENTER DOORWAY
- 3-540 PANEL - REAR DOORWAY
- 3-449 CUSHION - FRONT SEAT BOTTOM
- 3-485 COVER - ALLERON BELL CRANK
- *4.00 SCREWS TYPE "A" STV.HD "PK"
- 2-748 LINE - OIL PRESSURE
- AW 1 78 20 G. OIL TEMP. U.S. GAUGE CO.
- 1-2435 CABLES - MAGNETO TO IGNIT. SWITCH
- 1-2439 DRIVE SHAFT - A. C. TACHOMETER
- 1-670-3 CABLE - THROTTLE CONTROL
- 3-536 STIFF INSIDE ; 3-537 STIFF OUTSIDE
- 4-578 FIRE WALL ASSY.
- 7-442-5 AIR SPEED INDICATOR
- 2-745 CONTROL CARB. HEAT
- FIBERGLASS SOUNDPROOFING 5-584
- AN515-8-10 SCREW 8 REQ.
- AN960-8 WASHER 8 REQ.
- 2-749 BRACE - FLOOR BOARD 2 REQ.
- 5-108 L BOARD - LEFT FRONT FLOOR
- 1-2575 CLAMP 7 REQ.
- 5-108 R BOARD - RIGHT FRONT FLOOR
- 3-538 PANEL - FRONT DOORWAY
- AN4-5A BOLT - FRONT LEG ATTACH 4 REQ.
- AN960-416 WASHER 4 REQ.
- AN365-428 NUT 4 REQ.
- 1-2587 RETAINER
- 3-543 RETAINER
- 4-611 RETAINER
- 7-537 WINDOW ASSY. ; 7-537-1 RUBBER SEALER
- 1-2594 LATCH
- AN505-8-7 SCREWS
- 2-655 HANDLE ASSY. (INSIDE HANDLE & SHAFT ; 2 OUTSIDE HANDLE ONLY)
- 7-481 DOOR FRAME
- 1-2581-1 RUBBER SEALER
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- 3-540 PANEL - REAR DOORWAY
- 3-449 CUSHION - FRONT SEAT BOTTOM
- 3-485 COVER - ALLERON BELL CRANK
- *4.00 SCREWS TYPE "A" STV.HD "PK"

FIXED EQUIP'T & DOOR
INSTALLATION

GENERAL:

The Aeronca Champion is equipped with the now famous Aeronca hydraulic-spring type landing gear assembly.

CASE FRAME:

The oleo case frame assembly, Part Number 4-540, incorporates the frame or cylinder which houses the spring and hydraulic unit. This frame attaches to the fuselage at Station 2 and 2½ using bolts AN6-15 front and AN6-27 rear. This welded tube structure is X4130 steel, not heat treated. A bronze bushing is pressed into the lower end of the case frame for the bearing surface of the oleo piston action and can be replaced when worn oversize. THIS REPLACEMENT SHOULD NOT BE ATTEMPTED BY ANY OTHER THAN AN AIRPLANE MECHANIC.

OLEO PISTON ASSEMBLY:

This assembly consists of spring, plunger, and hydraulic oil retaining cylinder. It is important that this cylinder be full of oil.

To fill the oleo, (using Teleo oil or any good hydraulic oil), prop up the front of the ship, remove the connecting bolt at the axle strut and raise the oleo up to a level where you can remove the brass screw plug; then pour in oil until it is completely filled. If it is necessary to change the graphite packing, release oleo unit from the oleo case assembly by removing the bolt at the top of the oleo case.

Drive bushing out of spring retaining washer and remove retainer and oleo spring. Pry the plug at the top of the cylinder loose and remove old packing. Press the new into place around the piston rod and replace parts. Extreme care should be taken in replacing the oleo in the oleo case. Be certain that the bolt passes through the retainer at the top end of the oleo. If this is not done, the oleo will fall out when the aircraft takes off. This can be checked as follows: Lower one wing until the wheel on the opposite side is clear of the ground. This should be done by having one or more persons grasp the wing struts at their attaching points to the wing and then pull down. One other person should then stand on the raised wheel and test with his full weight. If the wheel drops down and the oleo pulls out of the case assembly, the bolt holding the oleo unit in the case has not passed through the provided hole in the retainer. On the front lower end of the oleo case assembly, there is an alemite fitting. Apply grease with a gun until it is forced out of the bottom of the oleo case assembly.

AXLE STRUT:

This assembly consists of X4130, not heat treated, steel tubing, welded and formed to accommodate the wheel assembly. It is attached to the fuselage center landing gear yoke at the upper end and to the oleo assembly at the lower fitting as shown on the landing gear assembly drawing. It is not advisable to attempt straightening this axle if it is bent more than 1/8" from a straight line.

All landing gear parts are interchangeable, left and right.

WHEEL AND BRAKE ASSEMBLY:

VAN SICKLE - C7000 BRAKE, C38500 WHEEL. INTERNAL EXPANDER, SHOE TYPE BRAKE UNIT.

BRAKE UNIT:

Hardened steel cams are used for operating and expanding the shoes against the brake drums. Adjustment may be accomplished on the linkage provided at the cam control lever without disturbing the original cable setting. All steel parts are cadmium plated.

All assemblies are interchangeable, left and right.

WHEELS:

Wheels are die castings of high strength aluminum alloy designed for maximum strength and durability. These wheels come in halves clamped together with alloy steel cadmium plated bolts.

Flanges are knurled to secure firm grip on the tire casings. The brake drum is heavy gauge pressed steel with an approximate total braking area of 25.5 square inches per wheel.

GOODYEAR SINGLE DISC TYPE MECHANICAL BRAKES, ASSEMBLY #95-2213, WHEEL #95-2311.

PRINCIPLES OF OPERATION:

Friction is applied to the chromium plated steel brake disc by flat segments of molded brake lining secured in the inner and outer aluminum cast housings. The outer housing incorporates a lever and pin arrangement, spring loaded, which when actuated by pressure on the brake pedal presses the lining discs against the floating rotating wheel disc.

ADJUSTMENT:

1. Back off adjusting screw lock nut.
2. Turn adjusting screw until snug and perceptible drag is noted when wheel is turned by hand.
3. Back off adjusting screw one quarter turn.
4. Hold adjusting screw with screwdriver and tighten lock nut.

SERVICE, INSPECTION, MAINTENANCE AND LUBRICATION:

Working parts of the brake must be kept free of dirt and foreign matter, and be able to work freely.

Replacement of linings should be made if they are worn to less than 0.160 of an inch thickness.

To disassemble braking mechanism, it is necessary to remove wheel from axle and remove bolts from the disc retainer housings. All assemblies are interchangeable left and right.

Tension in return action is provided by the spring attached to the lever and axle flange.

WHEELS:

Sandcast magnesium split type held together with steel bolts.

Hardened steel drive keys accommodate slots in the rotating brake disc.

All wheels are equipped with tapered roller bearings which are seated in hardened steel bearing cups inboard and outboard of the wheel. Bearings must be washed and repacked every one hundred hours.

Proper balance is assured by matching the balance marks "B" stamped on the two bolt bosses which must be placed together.

TAIL WHEEL:

SCOTT MODEL 3000-A1, steerable tail wheel assembly attached to leaf spring assembly and rudder arms.

WHEEL - cast in two sections, locked together with three bolts and elastic stop nuts. Ball bearings facilitate easy rolling.

FORK - Manganese Silicon steel high strength weight ratio, attached and bushed with bronze one piece bushings at the bracket. Bracket and axle are equipped with Zerk fittings for lubrication.

RUDDER ATTACHMENT SPRINGS:

Provided to lessen strain on assembly in turning, absorbing shock from rudder arm to tailwheel fork.

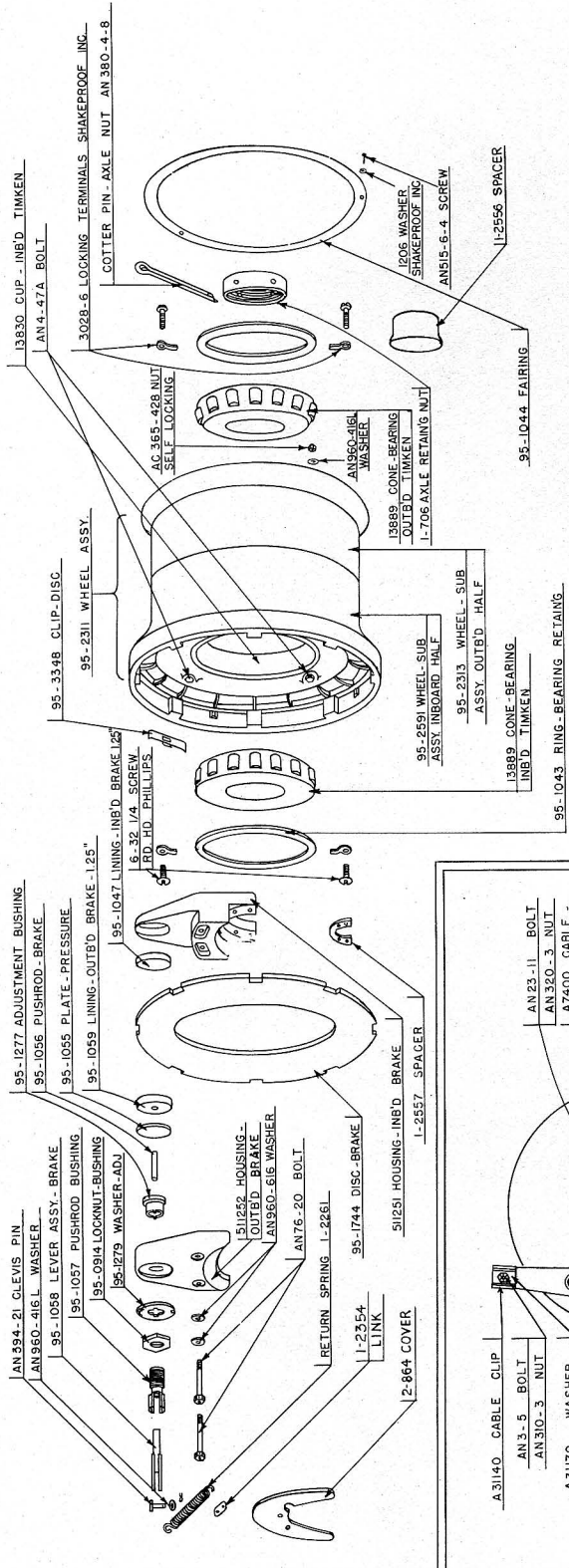
RUDDER ARM attaches to the rudder post by means of two AN bolts and elastic stop nuts through the arm and post.

TAIL WHEEL LEAF SPRINGS are attached to the tail post bottom lug with two AN bolts and shimmed with leather pads. The front of the leaf spring assembly attaches to the first cross member tube forward of the tail post with one AN bolt.

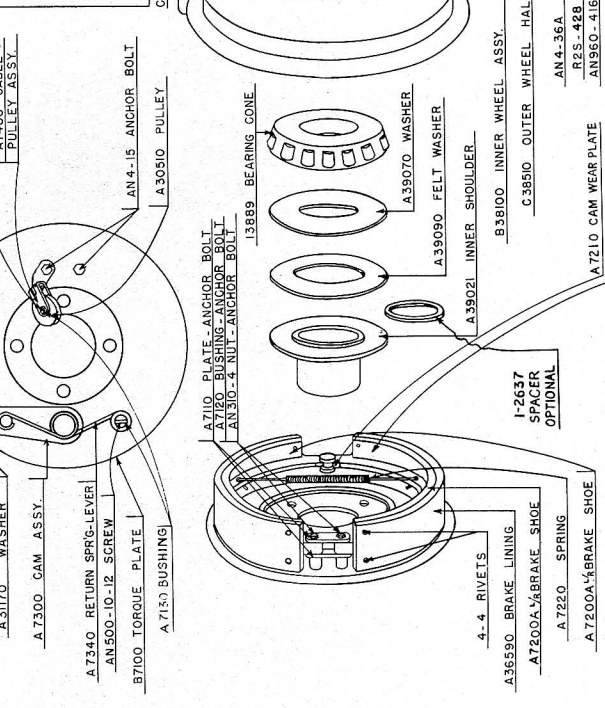
TIRE TAIL WHEEL: General solid rubber 6 x 2 steel wire reinforced to eliminate rolling off during rough usage.

TIRES - MAIN GEAR:

600 x 6, 2 ply, low pressure tire inflated to 13- 15 pounds per square inch pressure depending on load in airplane. Note: Goodyear inner tubes may not be used on Van Sickle installation.

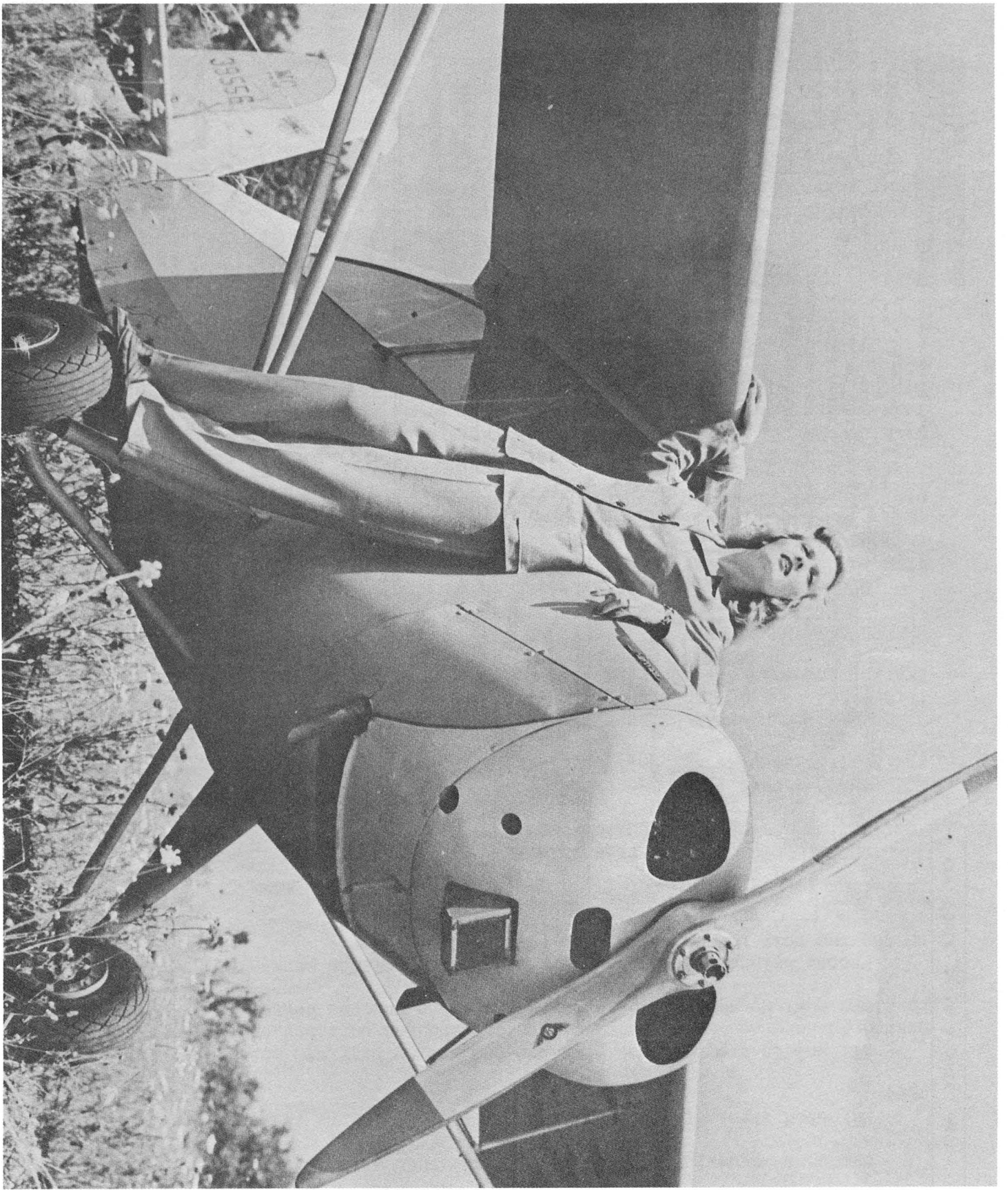


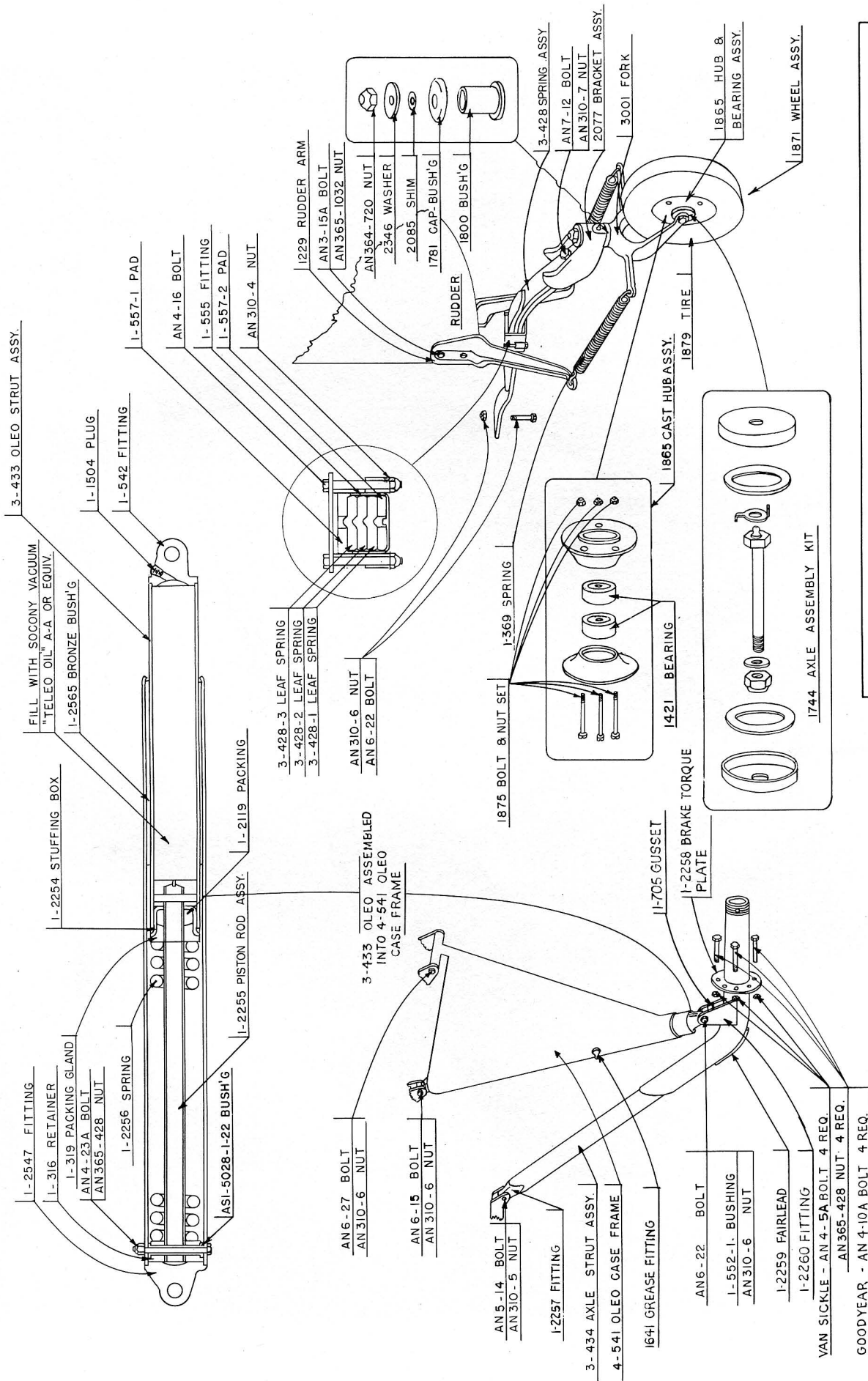
GOOD YEAR BRAKE & WHEEL ASSY.
 95-2213 BRAKE 600-6
 95-2311 WHEEL
 BRAKE SIZE 8-1.25-1.125 SINGLE DISC MECH.
 2.45



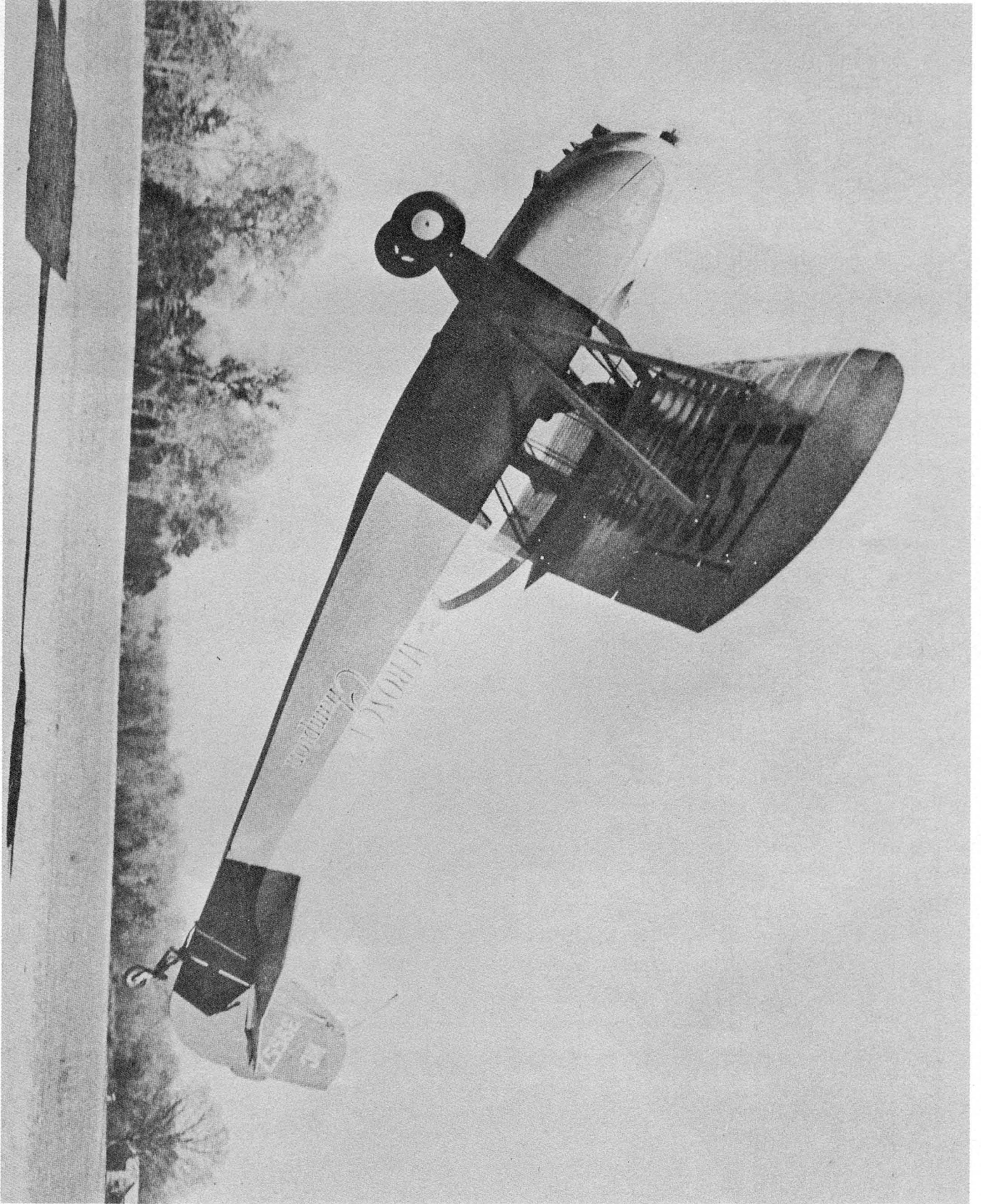
A7200A 1/2 IS AN ASSEMBLY CONSISTING OF BRAKE SHOE, LINING, RIVETS, CAM WEAR PLATE, AND ANCHOR BOLT BUSHING. VAN SICKLE CO RECOMMENDS REPLACING THIS COMPLETE ASSEMBLY RATHER THAN SEPARATELY.

VAN SICKLE BRAKE & WHEEL ASSY.
 C 70000





MAIN LANDING GEAR & TAIL WHEEL ASSEMBLIES



TAIL SURFACES

Newly designed metal ribs, diagonally assembled for additional strength, are incorporated in all of the tail surfaces. The fabric is attached to the surfaces by means of PK screws, washers and pinked tape.

RUDDER:

The rudder design with the top leading edge protruding over the vertical fin provides a counterbalance action in the rudder control movements.

The rudder is attached to the vertical stabilizer at two points by the use of bushings welded to the rudder frame and stabilizer and held in place with flat head clevis pins. A horn welded to the rudder and to which the rudder cables are attached regulates rudder travel by touching adjustable rudder stops welded to the lower part of the tail post.

Rudder travel can be adjusted at the rudder stops. Travel limitations are 25° plus 0° minus 2° left, 25° plus 0° minus 2° right.

ELEVATORS:

The elevators are attached to the horizontal stabilizers by the same means as described for the rudder. Elevator travel limitations are 25° plus 0° minus 2° up, 15.5° plus 2° minus 2° down.

Incorporated in the left elevator is the all metal trim tab assembly, attached with a continuous type hinge bolted to the elevator. The trim tab is operated from the cabin.

Trim tab travel limitations are 20° plus 2° minus 0° up and 34.5° plus 2° minus 0° down.

Compensation for weight variations in loading may be quickly and easily accomplished by the use of the newly designed tab control adjustment in the cabin above the pilot.

HORIZONTAL STABILIZER:

The horizontal stabilizer is designed in two interchangeable sections. Rigidity is accomplished by the use of 2330 steel rod heat treated to an ultimate tensile strength of 95,000 P.S.I. These "wires" are cadmium plated and care should be observed to preserve this protective finish.

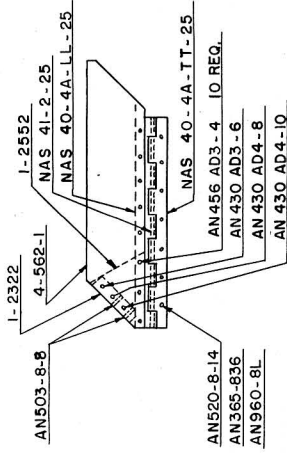
Both upper and lower tail wires are attached to fittings on the stabilizer, fuselage and vertical fin by means of clevis bolts and

can be adjusted by turning the wire on the flat space provided for this purpose. A smooth jaw wrench should be used, adjusted to fit the wire correctly in order to avoid damage of finish. The clevis fittings are threaded left and right hand to facilitate adjustment without removing the wires or fittings. Rigging load is 350 to 450 pounds.

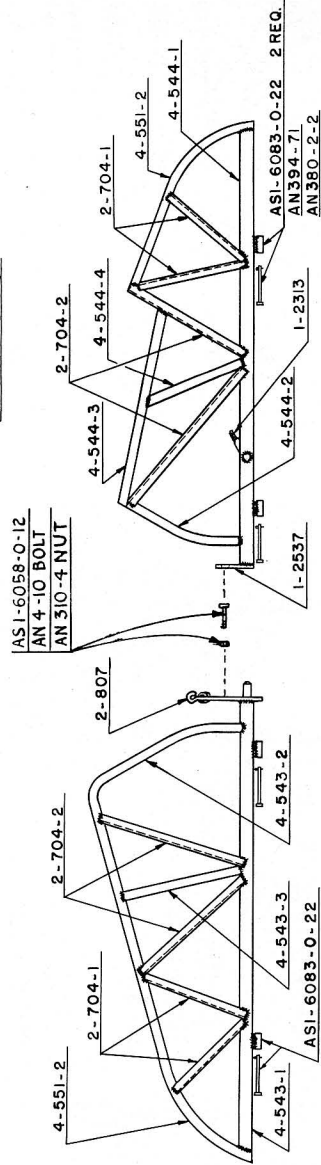
VERTICAL STABILIZER:

The vertical stabilizer or fin is an integral part of the fuselage and is shown on the fuselage drawing together with all fittings. This fin is offset $3/8$ " to the left to compensate for torque and virtually eliminates the necessity of a rudder trim tab. NOTE: If at cruising R.P.M., a yawing tendency is noted, it is permissible to install a permanent trim tab on the trailing edge of the rudder, Part Number 1-2190. This tab must be attached to the same side as the direction of the yaw.

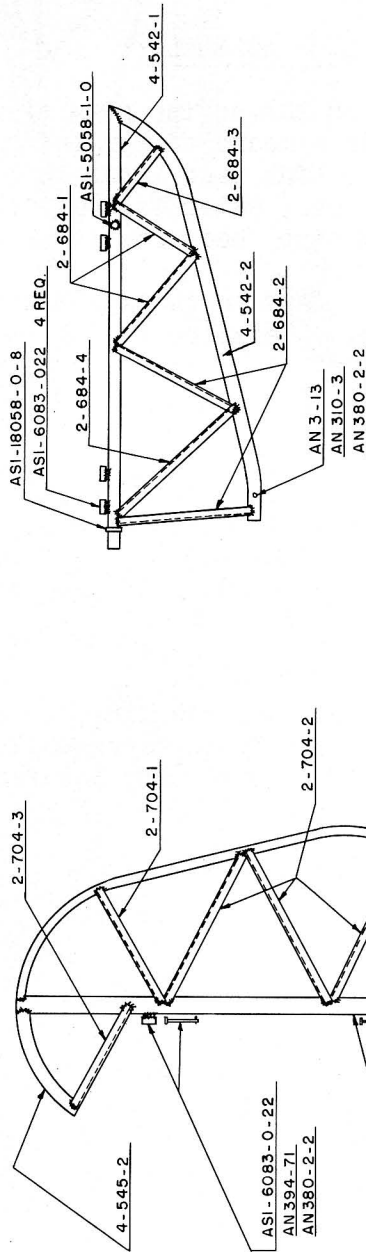
4-562 ELEV TAB



4-543 RIGHT ELEV.



4-544 LEFT ELEV.



4-542 STABILIZER

5-545 RUDDER

TAIL SURFACE FRAME ASSEMBLIES

FUEL SYSTEM

GENERAL:

The welded aluminum tank is located directly behind the firewall (capacity 13 gallons.) Fuel is gravity fed from tank to gascolator filter assembly and from gascolator to carburetor. A positive and accurate method for checking fuel supply is provided with a float type fuel gauge located directly on top of the fuel tank deck. The fuel shutoff valve is readily accessible from front or rear seat, being located on the engine control panel. A primer is furnished to aid in cold weather starting.

GASCOLATOR FILTER ASSEMBLY:

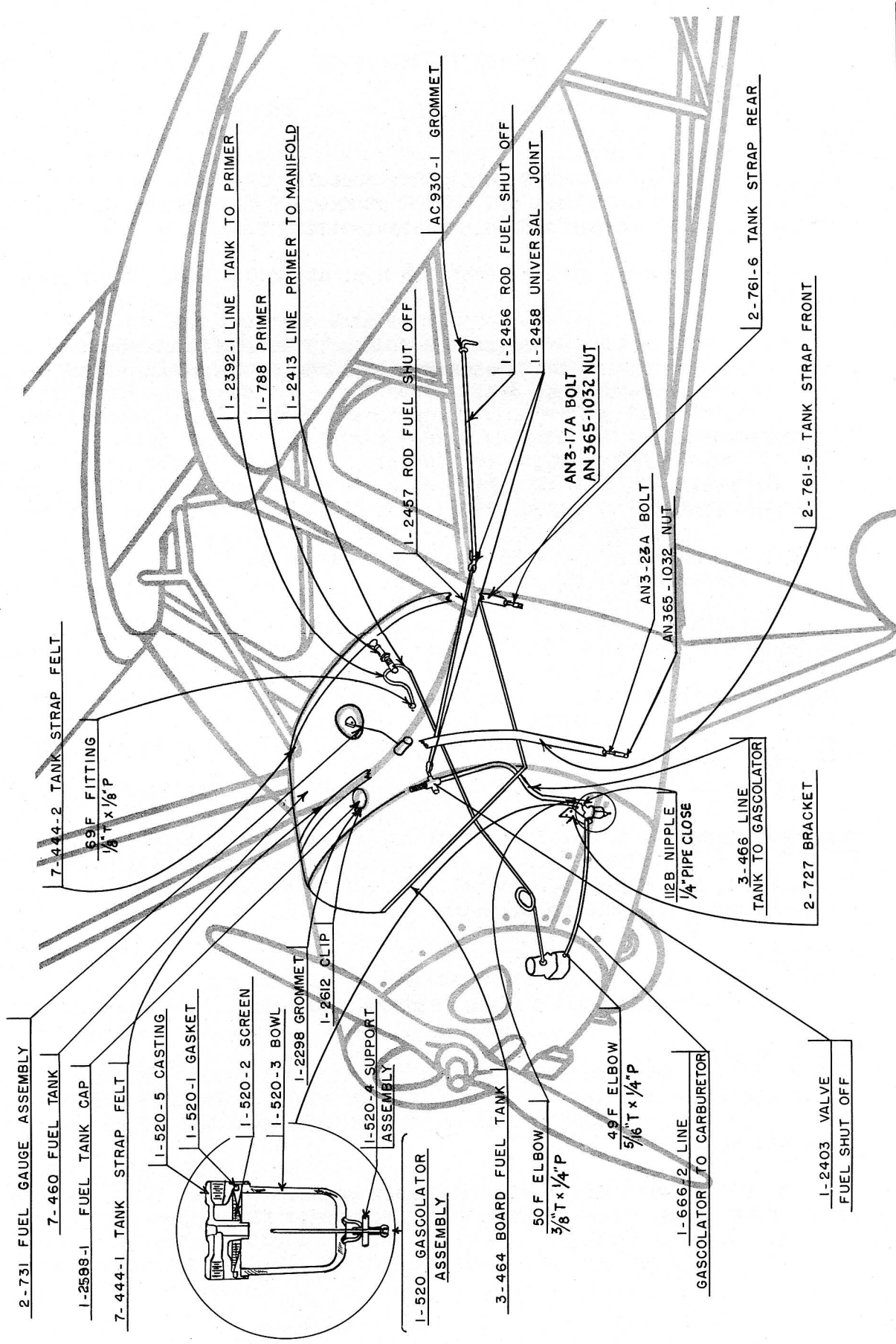
Located on the engine side of the firewall, the gascolator assembly affords a means of straining sediment and foreign matter from the fuel flow. The gascolator is located at the lowest point in the system, therefore, water is collected in the sediment bulb and care should be taken to check for its presence.

CAUTION: This check can be accomplished visually and should be a daily check. Operating in cold weather and storing in warm hanger with an unfilled tank, also operating in a climate where high humidity ratio is prevalent, are most probable causes for condensation and the presence of water in the fuel system.

Care should be taken to replace the bowl securely and re-safety. Gascolator gasket should not be used more than once before being replaced. When draining gascolator bowl, filter screen should be cleaned and checked for enlarged mesh or damage.

PRIMER:

For cold weather starting, three slow movements of the primer pump as the propellor is being pulled through, will force fuel directly into the induction system assuring quick, positive starting.



FUEL SYSTEM

ENGINE INSTALLATION

GENERAL:

Continental A65-8 A.T.C. 205. Horizontally opposed, four cylinder, air cooled with 3 7/8" bore and 3 5/8" stroke. Total piston displacement is 171 cubic inches and compression ratio 6.3 to 1.

Rated horsepower at sea level, 65 h.p. at 2300 R.P.M. Recommended cruising 2150 R.P.M.

NOTE: Recommended cruising R.P.M. should be static or the maximum R.P.M. shown on the tachometer when the engine is run up prior to flight with carburetor heat off.

OIL REQUIRED:

Warm weather	S.A.E. #40
Cold weather	S.A.E. #30
Oil pressure	10 - 35 pounds per sq. inch
Oil temperature	Minimum - 120° F.
	Maximum - 220° F.

CARBURETOR:

Stromberg N.A.-S3A1

FUEL REQUIRED:

73 octane.

FUEL CONSUMPTION:

4.25 U. S. gallons per hour
3.52 Imperial gallons per hour

IGNITION:

Bendix, Scintilla or Eiseman magnetos. Champion C-26 spark plugs.

FIRING ORDER:

1 - 3 - 2 - 4.

SPARK ADVANCE:

30° B.T.C. with both magnetos. Left magneto (Number 1 mag.) fires lower spark plugs, right magneto (Number 2 mag.) fires upper plugs.

MOUNT:

Attachment of engine to fuselage is provided by the engine mount assembly, fabricated of 1010, 1025 and X4130 steel tubing engineered to lessen vibration transmission to the fuselage. Four A.N. bolts attach the mount to the fuselage and four A.N. bolts attach the engine to the mount. Rubber bushings are provided by the engine manufacturer to insulate further against vibration at the engine mount attachments.

BAFFLES:

Two side and two rear baffles make up the basic cylinder barrel and cylinder head pressure cooling system. Aluminum alloy sheet is used in the fabrication of these parts. Air, upon entering the upper front of the nose cowling, is forced around the cylinder fins of the engine assembly. Air from the upper cowling and baffle chamber is passed through flexible aluminum tubing to mufflers at the junction of the exhaust stack "Y" on each side of the engine. The air is heated upon contact with the exhaust stacks, the left muffler and stack assembly providing heated air for cabin heater, the right muffler and stack assembly providing heated air for the carburetor heater assembly.

INTER-CYLINDER BAFFLES:

Two baffles are incorporated below and between the cylinder heads and barrels on each side of the engine. Supported with a spring and rod assembly these units complete the baffle system for the engine cylinders. It is very important that these inter-cylinder baffles are in place at all times to prevent leakage of pressure in the upper baffle system resulting in improper cooling.

CRANKCASE BAFFLES:

These baffles are provided to force cool air around the crankcase of the engine. Outside air enters through the lower front nose cowling building up pressure at the front of the crankcase.

HEAT CONTROL:

Flow of the heated air to the carburetor heater and cabin heater is controlled from the engine control panel and instrument panel respectively.

CAUTION: Leather binding around the upper cylinder baffles must always extend inward. This insures a snug cowling and baffle fit when air pressure is exerted against the leather binding in flight.

CARBURETOR HEATER:

This assembly controls the flow of heated air from the baffle system to the carburetor venturi. A butterfly valve connected to the carburetor heater control cable directs the airflow to the carburetor, when heat

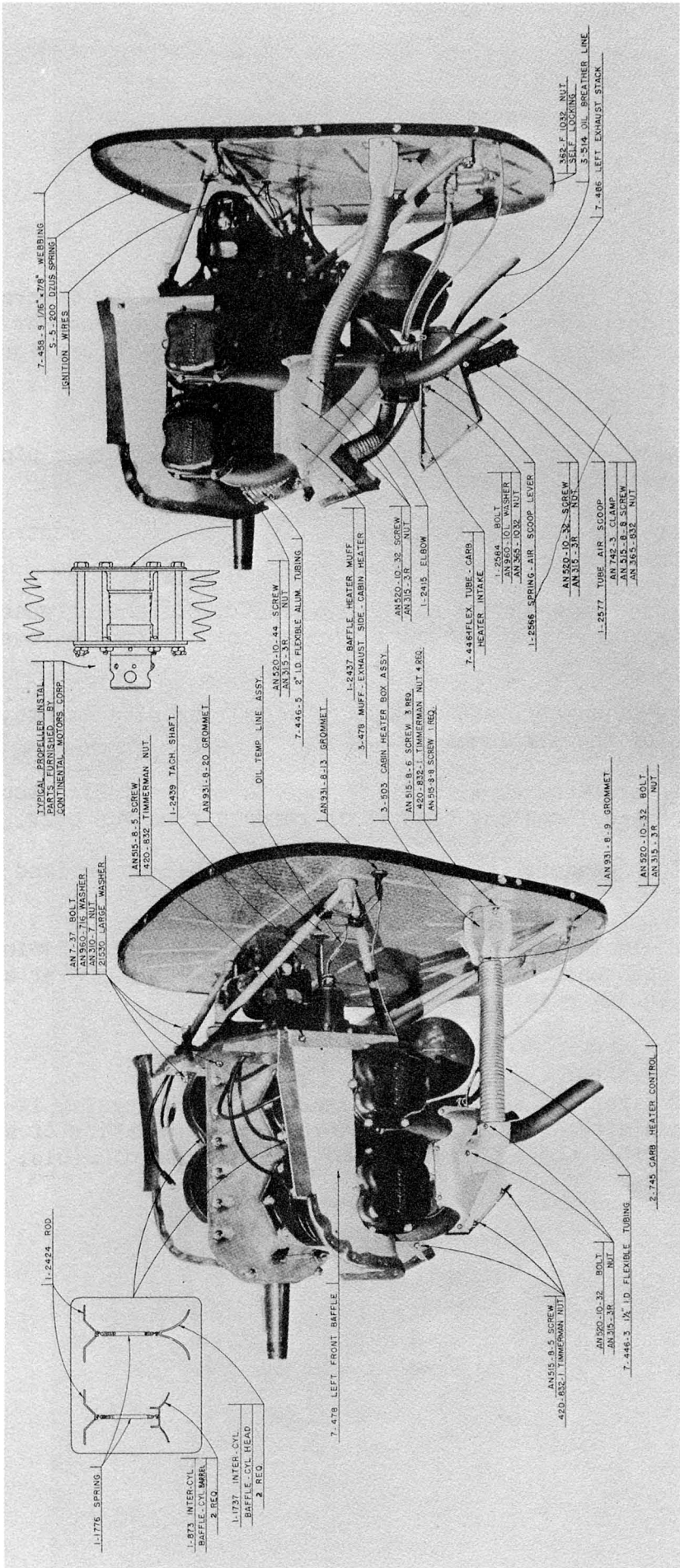
is desired, or through the outlet at the bottom of the air scoop assembly when not in use.

CAUTION: Proper functioning of the heater butterfly valve may be determined as follows:

Set throttle at cruising R.P.M. (2150 to 2200 R.P.M.) Pull heater control on, R.P.M.'s should drop not less than 75 R.P.M. not more than 200 R.P.M.

If no change is noted check butterfly valve for proper seating.

Engine overhaul procedure, specifications and instructions are contained in the Continental Instruction Manual.



ENGINE & BAFFLE INSTALLATION
LEFT SIDE

7-458-9 1/16" x 7/8" WEBBING
5-5 ROD-DZUS SPRING
IGNITION WIRES

TYPICAL PROPELLER INSTALLATION
ANTICLOCKWISE TO ROTATE PROPELLER
CLOCKWISE TO ROTATE PROPELLER
1-2439 TACH. SHAFT
AN 931-8-30 GROMMET
OIL TEMP. LINE ASSY.
AN 550-10-44 SCREW
AN 315-31 NUT
7-446-5 2" I.D. FLEXIBLE ALUM. TUBING

AN 7-37 BOLT
AN 360-716 WASHER
AN 310-7 NUT
Z090 LARGE WASHER
AN 515-8-5 SCREW
420-B32 TIMMERMAN NUT

1-2577 TUBE AIR SCOOP
AN 742-3 CLAMP
AN 515-8-8 SCREW
AN 365-632 NUT
1-2586 SPRING-AIR SCOOP LEVER
AN 550-10-32 SCREW
AN 315-31 NUT
AN 931-10-1 WASHER
AN 365-1032 NUT
1-2584 BOLT
7-446 FLEX. TUBE-CARB. HEATER INTAKE
3-503 CABIN HEATER BOX ASSY.
AN 515-8-6 SCREW 3 REQ
420-B32 TIMMERMAN NUT 4 REQ
AN 315-8 SCREW 1 REQ
1-2437 BAFFLE HEATER MUFF
3-478 MUFF-EXHAUST SIDE-CABIN HEATER
AN 550-10-35 SCREW
AN 315-31 NUT
1-2415 ELBOW

AN 931-8-9 GROMMET
AN 550-10-32 BOLT
AN 315-31 NUT
2-745 CARB. HEATER CONTROL
AN 515-8-5 SCREW
AN 315-31 NUT
7-446-3 1/2" I.D. FLEXIBLE TUBING

AN 515-8-5 SCREW
420-B32 TIMMERMAN NUT
AN 220-10-32 BOLT
AN 315-31 NUT
7-446-3 1/2" I.D. FLEXIBLE TUBING

AN 515-8-5 SCREW
420-B32 TIMMERMAN NUT
AN 220-10-32 BOLT
AN 315-31 NUT
7-446-3 1/2" I.D. FLEXIBLE TUBING

AN 515-8-5 SCREW
420-B32 TIMMERMAN NUT
AN 220-10-32 BOLT
AN 315-31 NUT
7-446-3 1/2" I.D. FLEXIBLE TUBING

AN 515-8-5 SCREW
420-B32 TIMMERMAN NUT
AN 220-10-32 BOLT
AN 315-31 NUT
7-446-3 1/2" I.D. FLEXIBLE TUBING

SAFETYING

GENERAL:

The word "safetying" is a shop term universally used in the aircraft industry. Briefly, safetying is defined as "Securing by various means any nut or bolt on the aircraft so that vibration will not cause it to loosen during operation."

METHODS:

Three basic methods are used in safetying, safety wire, cotter pins, and self-locking nuts or retainer washers and pal nuts.

Wire, either soft brass or steel is used on cylinder studs, control cable turnbuckles and engine accessory attaching bolts.

Cotter pins are used on airplane and engine controls, landing gear and tail-wheel assemblies or any other point where a turning or actuating movement takes place.

Self locking nuts or washers are used only on fairing attachments, or other non-moving components of the airplane.

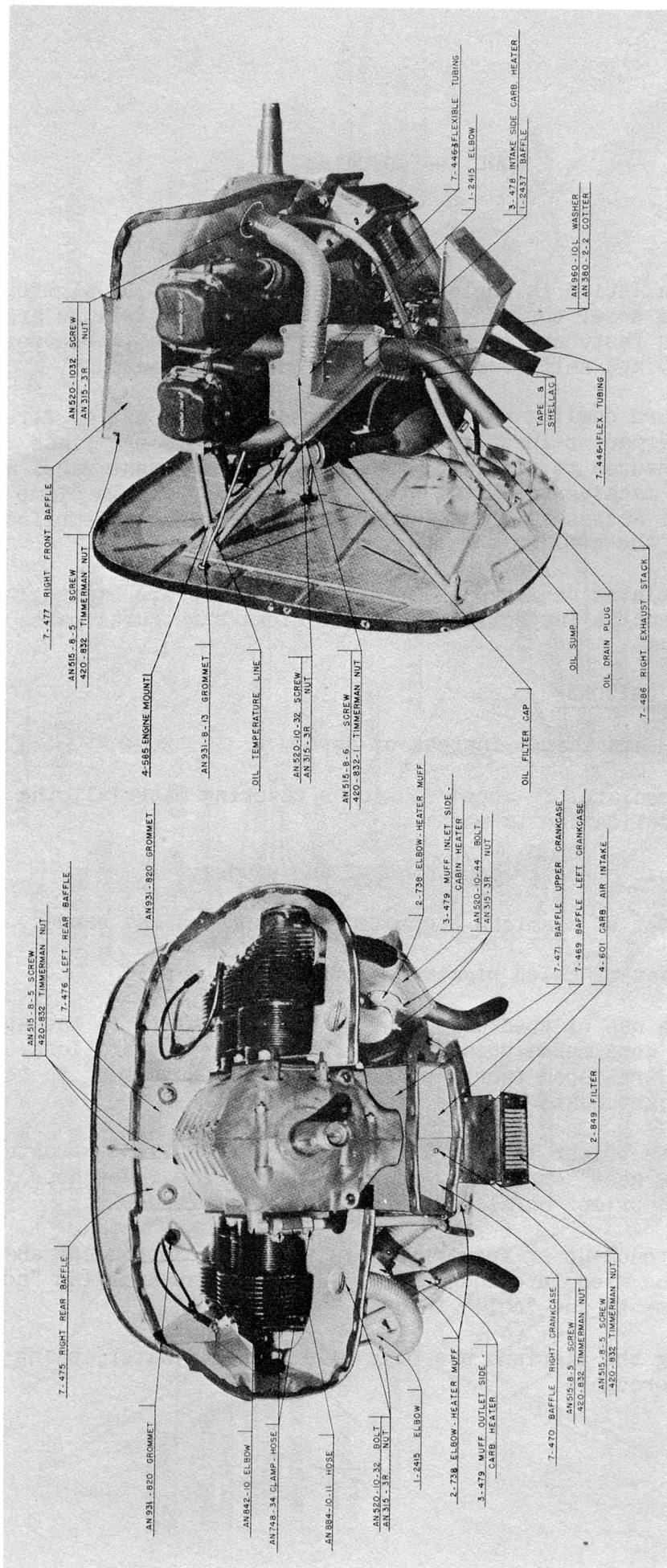
Self locking nuts are secured with fibre inserts at the inside top of the nut. This lock nut should be replaced any time it is removed from the bolt.

Three types of lock washers, external spider, internal spider and split types are used at points on non-moving parts.

Pal or speed nuts include designs which force the nut thread against the bolt or screw thread when tightened. These nuts should never be used over again and should be replaced with new when removed.

CAUTION:

In the event any safetying should be replaced on the aircraft, it should be inspected by a licensed aircraft or engine mechanic. Substitution of any one of the three methods described above, one for another is not permissible.



ENGINE 8 BAFFLE INSTALLATION
FRONT & RIGHT SIDES

COWL AND COVERING

COWLING:

Engine installation is enclosed with three sections of aluminum alloy, namely the nose, top and lower cowlings. These cowlings are secured with Dzus fasteners (incorporated at the most desirable points of accessibility) and self-locking nuts and machine screws.

The wraparound cowling which encloses the fuselage aft of firewall is a semi-permanent installation. This cowling is one piece of aluminum alloy secured to firewall, fuselage and instrument panel with P.K. screws and machine bolts and stop nuts. An adjustable clamp assembly provides access to front rudder and brake pedal assemblies, besides securing the cowling together at the bottom.

Inspection plates on wings and fuselage covering are strategically placed to enable inspection of all critical structural parts and control cables.

FINISHING SPECIFICATIONS:

N.C. numbers are enamel instead of dope.

Using intermediate pre-doped fabric as covering material, the following dope application is made:

One cross coat of clear dope brushed and sanded.

One cross coat of aluminum pigmented dope sprayed and sanded.

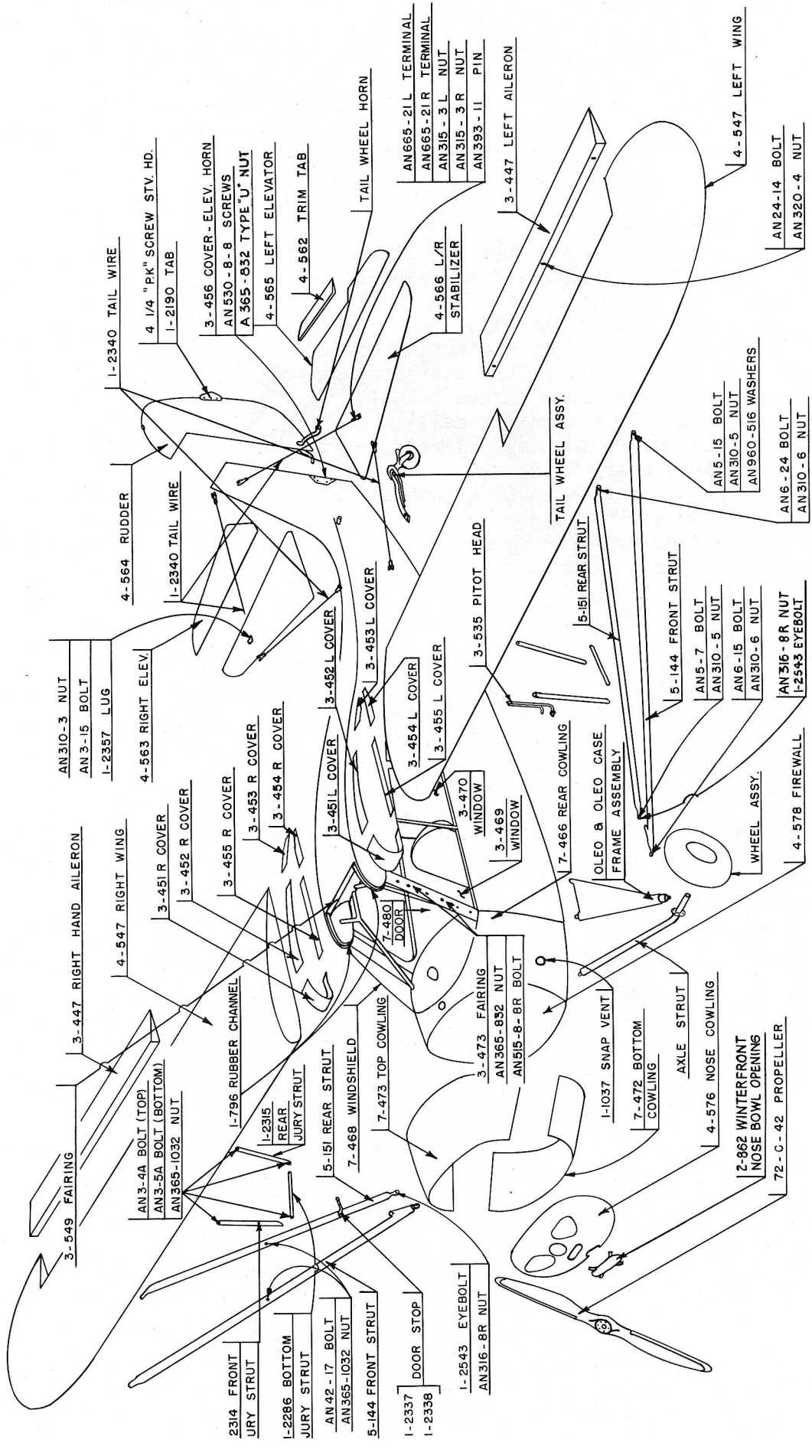
One cross coat of color pigmented hot dope, sprayed.

NOTICE: The use of special equipment at the factory in the application of hot dope makes possible fewer application operations. Aeronca's use of pre-doped fabric plus hot dope is equivalent to regular fabric and eight coats of dope applied cold.

Zinc chromate primer is used on all metal parts of the structure including landing gear components, cowling and fairing. Hot dope is applied over this primer on all of these exposed surfaces.

When doing touch-up or repair work in the field "hot" dope and "cold" dope may be used interchangeably. However when applying "hot" dope cold, be sure to use "cold" thinner.

When washing the airplane use only mild soap and water, being sure to rinse thoroughly.

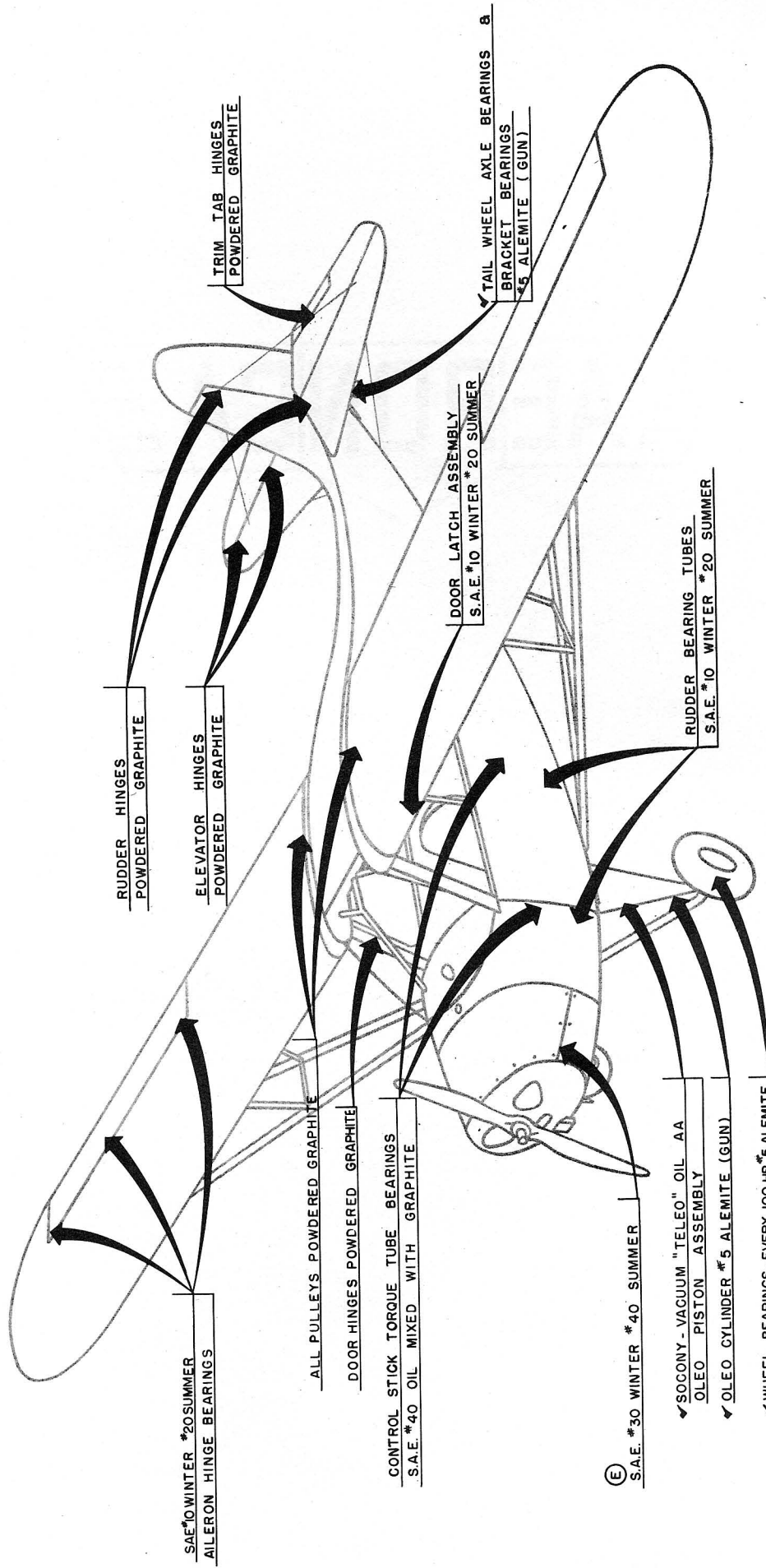


GENERAL EXPLOSION VIEW

DO'S AND DON'TS

- DO - tie your ship down.
- DO - cover the pitot tube head when not in use.
- DO - check fuel and oil supply before takeoff.
- DO - keep your ship clean.
- DO - check your mags before takeoff.
- DO - check your oil pressure when starting engine.
- DO - fasten your safety belt before starting engine.
- DO - check freedom of controls before takeoff.
- DO - check sediment bulb for water, daily.
- DO - check traffic before turning, climbing or gliding.
- DO - lubricate oleos every 25 hours.
- DO - check engine and engine mount attachment bolts, every 20 hours for security and tightness.
- DO - face wind during engine warm up.
- DO - tail airplane into wind when parking if possible.

- DON'T - take off until oil temperature reads at least 90° F.
- DON'T - use the rudder trailing edge to push the airplane.
- DON'T - use strong soap on the aircraft finish.
- DON'T - leave your plane untied.
- DON'T - hangar your plane without filling the fuel tank.
- DON'T - neglect those 20 and 100 hour checks.
- DON'T - try to imitate the stunt pilots.
- DON'T - neglect checking tire pressures (13 to 15 pounds).
- DON'T - force upper cowling above horizontal when checking oil.
- DON'T - use waste fabric to clean your windows and windshield.
- DON'T - "jazz" your throttle.



SAE #10 WINTER #20 SUMMER
AILERON HINGE BEARINGS

RUDDER HINGES
POWDERED GRAPHITE

ELEVATOR HINGES
POWDERED GRAPHITE

TRIM TAB HINGES
POWDERED GRAPHITE

ALL PULLEYS POWDERED GRAPHITE

DOOR HINGES POWDERED GRAPHITE

CONTROL STICK TORQUE TUBE BEARINGS
S.A.E. #40 OIL MIXED WITH GRAPHITE

DOOR LATCH ASSEMBLY
S.A.E. #10 WINTER #20 SUMMER

(E) SAE #30 WINTER #40 SUMMER

SOCONY - VACUUM "TELEO" OIL AA
OLEO PISTON ASSEMBLY

OLEO CYLINDER #5 ALEMITE (GUN)

WHEEL BEARINGS - EVERY 100 HR. #5 ALEMITE

RUDDER BEARING TUBES
S.A.E. #10 WINTER #20 SUMMER

TAIL WHEEL AXLE BEARINGS
BRACKET BEARINGS
#5 ALEMITE (GUN)

OR EQUIVALENT

(E) CONSULT YOUR ENGINE MANUAL FOR
LUBRICATION AND CHANGING OF OIL OF THE
ENGINE AND FOLLOW THOSE INSTRUCTIONS

LUBRICATION CHART

