SERVICE MANUAL

COVERING

CARE AND OPERATION

OF

PIPER CUB TRAINER

J3

ISSUED BY THE

PIPER AIRCRAFT CORPORATION

LOCK HAVEN, PENNSYLVANIA, U. S. A.

FOREWORD

This manual has been prepared for owners, operators, servicemen, and users of the Cub Trainer, one of the finest light airplanes in the world. It is with pleasure that the Piper Aircraft Corporation presents this manual in the hope that suggestions and instructions contained therein may prove helpful in keeping this airplane in first-class operating condition at all times. The co-operation of all who are concerned with the operation and maintenance of Cub airplanes is solicited so that the slogan "The Cub Is Safe" may be quoted without fear of contradiction.

This manual offers a description of the various constructional details with reference to proper servicing.

Your dealer and distributor are anxious to serve you and will gladly furnish advice as to proper servicing methods. You may also address requests for information on any items not covered in this manual to the Service Department of the Piper Aircraft Corporation. In correspondence, please be certain to give complete information on model Cub, serial number, engine make and model, etc.

In conclusion, we wish to request all connected with the operation of this airplane to comply with the Civil Air Regulations as these regulations are primarily concerned with safeguarding your interests.

PIPER AIRCRAFT CORPORATION,
LOCK HAVEN, PENNSYLVANIA, U. S. A.

January, 1941

TABLE OF CONTENTS

Warranty for "PIPER" Airplanes

The Piper Aircraft Corporation warrants each new Airplane or part to be free from defects in material and workmanship when used under normal conditions, for ninety days or in no case to exceed fifty hours flying time, after delivery of plane from factory. This warranty is limited to replacing or repairing at its factory any part or parts which have been returned to the Piper Aircraft Corporation with transportation charges prepaid and which, in its opinion, are defective. This warranty is expressly in lieu of all other warranties and representations, expressed or implied, and all other obligations or liabilities on the part of the Piper Aircraft Corporation.

This warranty does not cover any labor charges for replacement of parts, adjustments, repairs, or any other work done by the Piper Aircraft Corporation or other parties.

This warranty shall not apply to any aircraft or part which shall have been repaired or altered outside of our factory in any way, so as in our judgment to affect its operation, or which has been subject to misuse, negligence, or accident.

The Piper Aircraft Corporation makes no warranty, with respect to motor, instruments, propellers, tires, wheels, or other trades accessories, inasmuch as they are usually warranted especially by their respective manufacturers.

The Piper Aircraft Corporation reserves the right to change the aircraft or parts, specifications, or prices without incurring any responsibility with regard to aircraft or parts previously or subsequently sold or replaced.

The Piper Aircraft Corporation is not responsible to any purchaser of its goods for any undertaking, representation, or warranty made by dealers selling its products, beyond those herein expressed.

PIPER AIRCRAFT CORPORATION.

GENERAL DESCRIPTION

TYPE: 2 Place Closed Land or Sea Monoplane.

ENGINE INSTALLATION: Single engine in nose of fuselage.

WING: Strut braced, two spar, cloth covered, USA 35-B Airfoil.

FUSELAGE: Welded steel tubing cloth covered. Door on right side of cockpit.

CHASSIS: Main gear split axle type, rubber cord shock absorber. Low pressure tires, hydraulic brakes available. Tail skid. Steerable tail wheel available, solid tire.

CONTROL SYSTEMS: Dual control sticks and dual rudder pedals. Cable attachments between control surfaces and cockpit. Dashboard control for cabin heater and lights. Throttle, fuel shut-off, and stabilizer control on left side of cockpit. Ignition switch on left side of ceiling. Carburetor heater control on right side of cockpit.

DIMENSIONS

Wing Span—35′ 2½″
Wing Chord—5′ 3″

Wing Area, including Ailerons—178.5 Sq. Ft.

Aspect Ratio—6.96

Overall Length—22′ 2¾″ with Engine

Cockpit Height—46″

Front Seat—
- Width—13½″
- Height above floor—7¾″
- Height of back—19″

Rear Seat—
- Width—19½″
- Height above floor—8⅛″
- Height of back—18½″

Seat Back to Control Stick—
- Front—16½″
- Rear—15″

Control Stick Grip Above Floor—
- Front—19½″
- Rear—21½″

Seat Back to Rudder Pedals—
- Front—38″
- Rear—39″

Width of Luggage Compartment—25″
Breadth of Luggage Compartment—11″

Depth of Luggage Compartment—10″
Width of Firewall—21⅞″

Depth of Firewall—28⅞″
Width of Instrument Panel—27½″

Fuselage Frontal Area—9.9 Sq. Ft.
Stabilizer Area (Two Sides)—14.65 Sq. Ft.

Elevator Area (Two Sides)—10.64 Sq. Ft.
Stabilizer Span (Overall)—9′ 6″

Horizontal Tail Aspect Ratio—3.57

Fin Area—4.02 Sq. Ft.

Rudder Area—6.55 Sq. Ft.

Rudder Height—4′ 5″

Aileron Chord—13½″

Aileron Span—8′ 6⅛″

Aileron Area (Each)—9.6 Sq. Ft.

Wheel Tread—71″ (Static)

Tire Size—8.00 x 4

Wing Leading Edge to Axle Centerline—2½″

Axle Centerline to Tail Post—15′ 7½″

Tail Wheel Size—6 x 2.00

Height of Upper Surface of Wing Above Ground—6′ 8″ level, 6′ 5½″ 3-Point

SECTION I

WING

WING: The wing on the Piper Cub Trainer embodies the general type of construction used in earlier model Cubs with several noteworthy revisions. The wing spars are solid Sitka Spruce, rectangular in cross section with plywood plates glued to the faces of the spars at the wing strut fittings. Very little maintenance is required on the spars other than an occasional inspection of the spars at the fittings to ascertain that no looseness exists in the fitting attachments.

DRAG BRACING: The drag bracing consists of tubular drag or compression struts bolted at the ends to the spars. At major overhauls of the wing panel, these compression struts should be inspected for corrosion or bowed condition.

The drag wires are No. 6-40 tie rods with right hand thread at each end. These tie rods are made of high strength steel and should not be replaced with soft steel wire. It is recommended that a regular inspection of the drag wire installation be conducted to insure proper rigging and to see that the end connections are in good condition and free from corrosion. In rigging the tie rods, care should be taken in adjusting the tension to avoid marring the rod with plier or wrench marks as any scratches may induce a fatigue failure. The locknut at the end of the adjusting nipple should not be drawn up too tightly as a high stress may result. This comment also applies to rigging the tie rods. You will note that pyralin grommets have been installed on the under surface of the wing to facilitate inspection of the drag bracing.

WING RIBS: The wing ribs, 12 of which are used in each panel, are constructed of aluminum alloy drawn sections riveted together with "Thompson" type rivets. The ribs are attached to the spars by means of wire brads. Past experience over a period of years indicates that the material used in the ribs is highly corrosion resistant; however, an occasional examination of the ribs to check for loose rivets or corrosion (particularly when the airplane is used in a salt air atmosphere) is advisable. If any evidence of corrosion is noted, the advance of this may be forestalled by cleaning the surface and coating with Lionoil or any good grade of spar varnish.

LEADING EDGE: The wing leading edge is covered with light gauge aluminum alloy sheet which extends back from the leading edge on upper and lower surfaces approximately halfway to the front spar. Aluminum alloy channels between the sheet metal cover and the ribs add stiffness to the surface. About the only maintenance necessary on the leading edge is an occasional examination for corrosion or looseness. Care should be taken in handling the leading edge to prevent denting the aluminum cover sheets.

WING TIP BOW: The wing tip bow is a formed ash strip attached to the front and rear wing spars by steel fittings. This member is also secured to the aluminum leading edge and to the trailing edge of the wing rib nearest the tip. Rough handling of the airplane on the ground may damage the tip bow, so care should be taken when handling by means of the wing tips to apply force only at the juncture of the spars with the wing tip bow.

AILERON FALSE SPAR: The aileron false spar is a formed aluminum alloy channel attached to the wing ribs by means of self-tapping sheet metal screws. Inspect the false spar to check for looseness of the attaching screws or corrosion. Be sure that all drain grommets in the wing trailing edge are kept open so that accumulations of moisture will drain out of the wing.

AILERON HINGE BRACKETS: The aileron hinge brackets are made of tubing with sheet metal fittings for attachment to the wing spar and to the aileron false spar. These brackets must be kept securely attached to the wing structure and should be inspected occasionally for corrosion or looseness.

SPAR FITTINGS: The spar butt fittings and strut fittings are made of carbon steel plates and are bolted to the spars with AN standard steel bolts. An occasional inspection to see that all nuts are drawn snug should be made. At this inspection period the bolts attaching the wings to the fuselage should be examined to see that they do not have excessive play and that all nuts are cottered.

LIFT STRUTS: The lift struts are streamlined tubes attached to the wing and fuselage by means of AN standard steel bolts. In inspecting the struts, check for nicks or dents and see that the jury strut attaching clamps are in place. It is only necessary to draw jury strut clamp bolts snug, as excessive tightening may break the bolt or crush the wing strut.

In handling the airplane on the ground care should be taken to prevent damage of the lift struts by pushing or lifting in the middle of the strut. Frequent inspections for corrosion of the struts should be made and if any corroded spots are found, these should be sanded down to the bare metal with fine sandpaper and metal primer should be applied. After the primer has dried, a finish coat of the desired color may be added.

SECTION II

RIGGING PROCEDURE

RIGGING PROCEDURE: Raise the forward part of the airplane so that the wheels are just clear of the ground and support it by props under the front landing gear fittings. Raise the tail to approximate level flight position and support it there.

LEVELING: Level the airplane as follows:

Laterally: Using a level 30 inches long, place it across the center of the rear seat with the ends resting on the longerons. Due to the right upper longeron being 1/8 inch lower than the left, a 1/8 inch block is used under the right end of the level. Adjust the blocks under the landing gear fittings to bring the bubble to the center.

Longitudinally: Place the 30-inch level along the upper left longeron in the cockpit. Raise or lower the tail to bring the bubble to the center.

DIHEDRAL ANGLE: To check the dihedral angle at the front spar proceed as follows:

Stretch a string along the top of the wings above the front spar, from wing tip to wing tip, and draw it tight.

Check the dimension vertically from the front edge of the center section to the string. For correct dihedral this dimension should be 2 3/8 inches. On earlier models the dihedral dimension should be checked from the fuselage front spar fitting and the correct dimension should be 4 1/4 inches. Obtain this dimension by adjusting the front struts in or out.

To check for equal dihedral in each wing proceed as follows:

Using the 30-inch level (without any spacer blocks) hold it spanwise against the bottom of the wing under the front spar in the space between the jury struts and lift strut attachments. Note the position of the bubble and do the same on the other wing. Re-adjust the front struts until both wings show the same amount off-level, being careful with each adjustment to set the left strut out the same number of turns as the right one is set in, and vice versa.

WASH OUT: To adjust the wash out in the wings (dihedral of the rear spar) proceed as follows:

Set a 3/8 inch spacer block on top of the 30-inch level at one end.

Working on the rib adjacent to the outer end of the aileron, hold the level fore and aft along the bottom of the rib with the spacer block at the rear and the front end of the location of the front spar. The correct wash out will exist when the bubble is centered. Adjust the rear struts in or out to obtain this condition.

TAIL ASSEMBLY: With the airplane in level position the stabilizers should be leveled at their rear spars. The hinge line should be straight from tip to tip.

Plumb the fin at the rudder hinges.

SECTION III

CHASSIS

CHASSIS: The main gear on the Cub Trainer consists of individually sprung wheels on which are mounted low pressure tires.

TIRES: 8.00 x 4. It is important that the tires be kept fully inflated to 12 lbs. per square inch pressure at all times, as operation of the hydraulic brakes when the tires are soft may cause the tires to creep with consequent damage to the valve stem.

It is advisable when installing a tire on a wheel to check to make certain that the beads on the tire are seated on the wheel rim. The tire should then be inflated to about 35 pounds pressure to force the tire beads out onto the taper of the rim. Air should then be let out until the correct pressure of 12 pounds per square inch is reached. This will assist materially in preventing tire "creep."

At the first sign of wear on the tire, reversing the tire on each wheel will equalize wear and give longer tire life.

WHEELS: Cast aluminum wheels with Timken tapered roller bearings are lubricated at the factory and should not require additional lubrication for several hundred hours. When removing wheels, dust and dirt should be kept out of the bearings. When reinstalling wheels or to remove end play in wheel on axle, do not tighten axle nut enough to cause binding of the roller bearings as this will result in excessive wear. The proper procedure in adjusting the axle nut is to tighten nut while rotating wheel until a slight drag is felt, then back nut off one castellation and cotter.

WHEEL BRAKES: (OPTIONAL) A full hydraulic system of individual wheel braking is used. Heel type brake pedals are mounted one on each side. The rear seat installation is standard, front seat installation, optional. The pedals are mounted on a bearing shaft which is located under the floor and pressure on the pedal is transmitted through a push rod to a master cylinder. Each pedal is thus connected to a master cylinder for individual control of the wheels for ground maneuvering.

In early airplanes of this model, the reservoir for the storage of brake fluid is located on the floor under the front seat, while later airplanes have this reservoir mounted on the engine side of the firewall. It is important that this reservoir be kept filled with genuine Lockheed Fluid as any air bubbles introduced into the line due to a low fluid supply will cause a loss of brake effectiveness. This fact should be kept in mind when any work is done on the brake system. An indication of air in the brake lines is found in a "fading pedal," that is, pressure applied to the pedal will cause the pedal to travel to its limit without the usual solid feeling. To remove the air or to "bleed" the system, follow this procedure:

1. Airplane on level ground with tail down.
2. Fill reservoir with brake fluid and keep filled with Lockheed Fluid during "bleeding" operations.
3. Place clean vessel under the bleeder valve located at connection of brake line with wheel.
4. Press brake pedal down slowly while another person opens bleeder valve. Close bleeder valve before end of pedal travel is reached.
5. Allow brake pedal to return to "Off" position with the bleeder valve closed.
6. Try pedal for solid feeling and braking action. It may be necessary to repeat the above operations, No. 4 and No. 5, several times. The fluid drained from the bleeder valve may be used again if no foreign matter such as dust or dirt is present.

It may be well to remember that air may be introduced into the lines if any fitting is disconnected. Care should be taken to prevent brake fluid from getting on brake linings during bleeding operations. Under no conditions should brake pedals be operated when wheels are removed as the brake linings may be sprung out of their housings causing damage to the linings or springs. The operating principle of these brakes depends upon the expansion of a rubber bag under the segments of brake lining. Lubricating oil will damage the system and for this reason only genuine Lockheed No. 21 Brake Fluid should be used. **As this fluid will damage doped or lacquered surfaces, care should be taken to prevent spilling the liquid.**

A routine inspection of the brake system for leakage is advisable.

LANDING GEAR FITTINGS: All hinge fittings should be lubricated regularly with engine oil and a check for wear or looseness should be made. As the hinge fittings are bushed with steel inserts, these may be replaced to remove play. Bolts should also be inspected for wear and replacement should take place at the first signs of wear. End play should be removed by the insertion of washers of correct thickness.

TAIL WHEEL: (OPTIONAL) Tire size is 6 x 2.00, solid rubber. Lubricate all bearings frequently.

SECTION IV

FUSELAGE

FUSELAGE FRAME: The fuselage frame is constructed of seamless steel tubing welded at the joints to form a rigid structure. A number of highly stressed members are of chrome-molybdenum steel; all other members are of 1025 steel.

If it becomes necessary to replace any fuselage members, sleeve type splices should be made in accordance with practices outlined in Chapter CAAM 18 of the Civil Aeronautics Manual. Use only aircraft grade of tubing confirming to AN specifications and if the original material specifications are not known, consult the Service Department of the Piper Aircraft Corporation or use chrome-molybdenum tubing.

After replacing members, clean scale from the welded joints and apply an effective protective coating, such as zinc chromate primer, to prevent corrosion.

If the fuselage has been "Metallized" for corrosion proofing, remove all of the "Metallized" coating from the area which is to be welded. This is necessary as a satisfactory weld cannot be made over a surface which is covered by the "Metallizing." This cleaning is best accomplished by painting a strong solution of sodium hydroxide (caustic soda) over the area to be welded. This caustic soda is obtainable from drugstores. Apply sufficient of this solution to clean off all traces of the aluminum "Metallizing" and then rinse thoroughly with water.

Accumulations of dirt in the cockpit and in the crevices between the fuselage tubes and the cloth covering should be removed occasionally as moisture will be absorbed by the dirt with the possibility of corrosion or fabric rot. A regular inspection of the lower longerons near the tailpost should be made to guard against corrosion.

ENGINE MOUNT: The engine mount is similar to the fuselage in construction. An occasional check of the bolts attaching the mount to the fuselage should be made to see that these bolts and also the engine attaching bolts are snug. Do not draw these bolts too tight as a failure in one of the bolts may result. It should be remembered that terrific loads can be put on a bolt by overtightening.

In handling the plane on the ground, care should be taken to prevent the application of loads at points other than fuselage clusters as bowed or kinked members may result. Wood fairing strips are used to give the fuselage its form and these may be damaged by rough handling.

SECTION V

CONTROL SURFACES

AILERON: The aileron structure is of aluminum alloy with fabric covering. A channel runs the length of the aileron and serves as a main spar to which is attached the nose former ribs, nose cover sheet, trailing edge, ribs, hinges, and horn fittings. Soft aluminum rivets are used to attach the component parts to the spar. When it becomes necessary to recover the aileron, it is advisable to check all riveted joints for looseness. The security of the hinges and control attachment should be determined. Lubricate hinges occasionally with light engine oil and check for cotter pins in hinges.

VERTICAL FIN: The vertical fin has a steel tube leading edge and rear post. The ribs are of low carbon steel channel. A short stub of steel tube is welded to the lower end of the leading edge spar and fits into a tubular socket in the fuselage. An AN bolt fastens these parts together. During periodic inspections these bolts should be checked for tightness and cotter pins.

RUDDER: The rudder has a steel tube leading edge and trailing edge and channel steel ribs. No maintenance other than an inspection for corrosion during overhaul is necessary. Drain grommets in the rudder cover should be kept open. The hinges attaching the rudder to the tailpost and fin rear spar should be lubricated with light engine oil. Accumulations of dust and dirt on hinges should be removed.

STABILIZERS: The stabilizers have a steel frame consisting of tubular leading and trailing edges and channel steel ribs. The leading edge has a tubular steel liner inside the front spar joining the two sides of the stabilizer. A stabilizer yoke is attached thereto through which an adjusting screw passes. A pulley on the lower end of the screw is turned by means of an endless cable from a crank on the left side of the cockpit. By means of this mechanism the incidence of the stabilizer may be adjusted over a range of several degrees.

A tubular steel liner joins the two sides of the stabilizer at the trailing edge and this liner passes through a short tube installed in the fuselage. An occasional check should be made to see that the bolts attaching the leading and trailing edges to the liners are drawn snug and that cotter pins are in place.

Steel tie rods brace the stabilizers to the fin and fuselage. These tie rods should not be rigged tighter than necessary as high loads may be imposed on other parts of the tail surfaces or fuselage. It should be remembered that even with the tie rods rigged "flabby," they will be tensed by a very slight deflection of the surfaces and thus will do their work as well as if they were rigged very tightly. In adjusting the tension of the tie rods, care should be taken so that marring of the rods will not result. Friction tape should be wrapped around the rods near the threads. Pliers may then be used to grip the wires but be certain to grip on the tape. The nipple may then be turned with a wrench after the lock nuts have been loosened. The threads at each end of the rod must be visible through the end of the nipple. A line inspection of the tie rod end fittings should be made to check cotter pins and lock nuts.

ELEVATORS: The elevator structure is very similar to the rudder. No maintenance other than inspection for corrosion is needed. The hinges attaching the elevators to the stabilizer should be cleaned and lubricated with light engine oil at frequent intervals.

A final word of caution in regard to proper care of the tail surface bracing. Do not use the tail tie rods for purposes of lifting or handling the airplane. See that this rule is adhered to strictly.

SECTION VI

CONTROL SYSTEM

ELEVATORS: The fore and aft motion of the control sticks is transmitted back through the fuselage by means of the following linkage. The sticks are mounted on a torque tube which passes beneath the front seat above the floor board. The lower ends of the sticks are connected to a push-pull tube which passes through the torque tube and imparts action to a bellcrank located behind the rear seat. Two ⅛ inch 7 x 19 cables are attached to this bellcrank and are connected at the rear to the elevator horns by means of turnbuckles.

The principal control system parts and brake master cylinders which are located below the floor are readily serviced and inspected by removing the inspection plates on the belly of the ship.

An occasional lubrication of the elevator bellcrank located behind the rear seat will reduce control system friction and prolong bearing life.

AILERONS: The lateral motion of the control stick rotates the torque tube, to the rear end of which is attached an aileron control arm. Control cables are attached to this control arm and pass through composition fairleads at the edge of the floor, up the rear edge of the front lift strut to the wings. Where the cables enter the wings, as well as at turns within the wings, they pass over composition pulleys. Passing through the wing to the rear they are connected to the upper aileron horns. A balance cable connecting the lower aileron horn in each wing passes along the rear of the front spar. Lubricate all moving parts in the aileron system regularly with light engine oil to reduce friction. Inspect all cabes for wear at pulleys and fairleads.

If it becomes necessary to rig the ailerons, the following method should be employed:

1. Locate control sticks at midpoint of lateral travel.
2. Line up trailing edge of aileron with the inboard wing trailing edge.
3. If the aileron is too high, open the turnbuckle on the cable attached to the upper aileron horn and then draw up turnbuckle on cable attached to lower aileron horn the same amount. If the aileron is too low, the above turnbuckle adjustments are in reverse.
4. Check to see that there is no play or looseness in the action of the ailerons when the control stick is moved.
5. Safety all turnbuckles and nuts. It may be necessary to check through the rigging several times in order to get the proper positioning of all parts.

RUDDER: The rudder control system is fairly simple and very little maintenance is necessary. Inspect control cables at the fairleads under the seat, and those just ahead of the point near the tail where the cables pass through the fuselage cover. See that rudder pedal return springs are operating to hold the pedals forward.

STABILIERS: The stabilizer is operated by a crank located on the left side of the cockpit. An endless, stranded cable passes around a V groove pulley attached to the crank, then back through the fuselage to another V groove pulley on the lower end of the stabilizer adjusting screw. Turning the crank forward or backward rotates the screw which in turn raises or lowers a stabilizer yoke attached to the front of the stabilizer. This alters the angle of incidence which compensates for "nose heaviness" or "nose lightness."

Under no circumstances should the stranded cable from the cockpit to the rear of the fuselage be lubricated as this may cause slippage. If it becomes necessary to increase the tension in this cable, an idler pulley adjusting nut is located at the tail near the front of the stabilizer and is accessible by removal of the inspection plate on the left side of the fuselage. Do not tighten this nut excessively as binding of the driving mechanism may result.

The stabilizer indicator consists of a fine wire passing back from the control crank in the cockpit, over a composition pulley in the tail of the fuselage, to the stabilizer yoke. If any adjustments are made to the stabilizer indicator system, check to assure correct functioning of the stabilizer.

A return spring on the stabilizer indicator mechanism is located above the stabilizer operating crank and is accessible by removal of the indicator face plate.

SECTION VII

FUEL SYSTEM

FUEL TANK: The fuel tank is located in the fuselage just behind the firewall, and has a capacity of twelve gallons (U. S.). This fuel tank is supported by flat steel straps lined with felt to prevent chafing. If it becomes necessary to remove the fuel tank, drain fuel, disconnect fuel line and shutoff valve control shaft. Remove filler cap and all lines and controls which run under the tank to the instrument panel. Then remove the diagonal fuselage tube running from the upper right longeron to the center of the fuselage cross tube at the floor behind the firewall. This is easily done by removing the bolt in each end of the tube, sliding the tube upward until it clears the lower fitting, and then sliding it downward outside the lower fitting. The tank may then be removed from the cockpit without removing the cowling.

PRIMER: A primer to assist in starting the engine is mounted on the instrument panel. A fuel line runs from a gascolator up to the primer pump and a return line runs back to the engine. Always see that the primer plunger seats firmly as irregular operation of the engine may result from a leaking needle valve in the primer pump.

CARBURETOR HEATER: A carburetor heater is installed on the engine and is controlled by a push-pull control on the left side of the cockpit by means of which the pilot can regulate the temperature of the air entering the carburetor. For most economical and efficient operation, set the heat control to provide just enough heat to result in smooth operation of the engine. Excess heat merely reduces power. It is always advisable to set heat control to "Full On" position during long glides such as an approach for a landing as this will tend to keep the engine warm and reduce the possibility of the engine failing to accelerate when the throttle is opened suddenly.

Extreme care should be taken in hot weather to see that no carburetor heat is used otherwise overheating of the engine may result.

The points of the fuel system which require regular servicing are:

1. Gascolator or fuel strainer.
2. Drain in fuel tank.
3. Strainer in fuel tank.

FUEL STRAINER: The gascolator is located in the engine compartment and should be inspected daily for accumulations of water or sediment. It is a good habit to remove bowl and screen from the fuel strainer at least every ten hours and clean both and flush the lines by allowing fuel to flow through with bowl removed.

Always safety nut under bowl after servicing.

TANK DRAIN: A drain is located at the rear of the gasoline tank and is accessible from the cockpit. Remove the drain plug at frequent intervals to allow water and sediment to drain from the tank.

TANK STRAINER: A finger strainer is located in the fuel tank outlet fitting to which the fuel line attaches. This finger strainer is intended to prevent large particles of foreign matter entering the fuel lines. The finger strainer should be removed and cleaned every 100 hours by removing the fuel line and all fittings from the bottom of the tank.

SECTION VIII

ELECTRICAL SYSTEM

ELECTRICAL SYSTEM: (OPTIONAL) A six volt lighting system is installed as optional equipment in the Cub Trainer. Equipment includes a spill-proof type battery and navigation or position lights—one at each wing tip and one on top of the rudder.

BATTERY: The battery is located in a metal case just back of the firewall and should be kept fully charged at all times as there is some danger of freezing of the electrolyte or liquid in cold weather if the battery is discharged. Distilled water should be added to the battery only before recharging and the quantity added should be just sufficient to cover the plates to a depth of ¼ inch. Charging rate of 1 ampere.

The battery is not grounded to the fuselage or any part of the structure and a complete two wire system is used throughout. If any electrical equipment is added, care should be taken in the installation to prevent any part of the structure acting as a conductor.

LIGHT SWITCH AND FUSE: The light switch is located on the instrument panel and a 10 ampere fuse is located behind the instrument panel on the left side. A spare fuse is mounted adjacent to the active fuse.

The wing light wires run along the top of the front spar in each wing. The rudder light wires run back through the fuselage, up through the leading edge of the fin and under the top rib of the fin, finally passing up through this rib just ahead of the rudder post.

An occasional inspection of the electrical wiring for worn or cracked insulation is recommended.

IGNITION SYSTEM: The ignition system for the engine is composed of either one or two magnetos which are connected to the switch on the left side of the ceiling. Two wires run from this switch to the magneto. The connections of these wires should be kept tight at all times.

On earlier models of the Trainer, the ignition switch or switches are located on the left side of the cockpit and the ground connection is attached to the fuel tank support strap bolt on the left side of the fuselage.

SECTION IX

LINE INSPECTION

1. Engine mount and attachment.
2. Manifolds securely attached.
3. Gas strainer (flush).
4. Propeller.
5. Cockpit controls operate freely and move surfaces without excessive play.
6. All bolts, nuts, and cotters in lift struts and jury struts.
7. Hinge pins in ailerons and bolts safetied in aileron hinges.
8. Hinge pins in tail surfaces and brace wires and fittings in good order.
9. Main landing gear bolts safetied.
10. Tires properly inflated.
11. All covering in good condition.

20 HOUR INSPECTION

1. All items under "Line Inspection."
2. Remove drain plug in bottom of gas tank with tail on ground to drain off water.
3. Inspect elevator controls, rudder controls and structure adjacent to battery for corrosion.
4. Lubricate all moving parts of control system and landing gear. (Do not oil or grease stabilizer drive cable from cockpit to tail).
5. Check brake fluid level in reservoir.
6. Remove exhaust stack shrouds and inspect pipes for excessive scaling or cracks.
7. Check all engine controls and piping.
8. Clean oil and dirt from engine compartment.
9. Check tail wheel fittings for excessive play or damage. Lubricate spindle. Check end play in spindle shaft.
10. Remove inspection cover at tailpost and inspect elevator cable terminals at horn and stabilizer screw mechanism.

100 HOUR PERIODIC INSPECTION

1. All items listed under "20 Hour Inspection."
2. Inspect all control cables where they pass through fairleads or over pulleys.
3. Remove inspection plates on belly cowling and inspect all control system parts and brake mechanism. Lubricate all control parts.
4. Remove wing root fairings and inspect wing hinge bolts and spar fittings.
5. Inspect wing drag bracing.
6. Inspect aileron cables in wing and lift strut fittings.
7. Inspect seat structures and baggage compartment.
8. Inspect gas tank mounting and remove gas outlet fittings to clean finger strainer in bottom of tank.
9. Remove wheels and inspect wheel bearings and brakes.
10. Inspect landing gear bushings for wear.

DISTRIBUTOR LIST

Mr. Harvey N. Martin
Aircraft Associates, Inc.
Municipal Airport
Long Beach, California

Mr. W. H. Marden
Airways, Inc.
Waterville Municipal Airport
Waterville, Maine.

Atlantic Aviation Service
P. O. Box 1952
Wilmington, Delaware

Mr. Glenn Barr
Barr Aviation Corporation
Detroit City Airport
Detroit, Michigan

Mr. Alfred B. Bennett
Bennett Air Service
Central Jersey Airport
Box 247
Hightstown, N. J.

Mr. John F. Byrd
Blevins Aircraft Corporation
Candler Field
Hapeville, Ga.

Mr. Edwin S. Braden
Braden's Flying Service
Easton Airport
Easton, Pa.

Mr. E. H. Brockenbrough
Carolina Aircraft Sales
Municipal Airport
Charlotte, N. C.

Messrs. A. R. Burnham, L. D. Miller
Burnham-Miller Flying Service
Municipal Airport
Omaha, Nebr.

Mr. Herbert Elliott
Clayton Aircraft Sales
Clinton County Airport
De Witt, Iowa

Mr. Angelo De Ponti
De Ponti Aviation Co., Inc.
Minneapolis Municipal Airport
Wold Chamberlain Field
Minneapolis, Minn.

Mr. R. Davis
Des Moines Flying Service, Inc.
Muncipal Airport
Des Moines, Iowa

Mr. R. E. Fly
Berry Field
Nashville, Tennessee

Mr. Lou Foote
Lou Foote Flying Service
Box 386
Grand Prairie, Texas

Mr. Clinton J. Thompson
Hangar Six, Inc.
Stinson Field
San Antonio, Texas

Mr. George L. Harte
Harte Flying Service, Inc.
116 Administration Building
Municipal Airport
Wichita, Kansas

Mr. Beverly Howard
Hawthorne Flying Service
Municipal Airport
Charleston, S. C.

Mr. B. F. Himes
Hobbs Me-Tex Airport
Hobbs, New Mexico

Mr. John K. Hinson
Rutherford Field
Windsor Mill Road
Baltimore, Md.

Mr. S. T. Randall
The Hudson Valley Aircraft Co., Inc.
68 Dolson Ave.
Middletown, N. Y.

Mr. R. P. Hylan
Hylan Flying Service, Inc.
Rochester Municipal Airport
Rochester, N. Y.

Mr. R. N. Jonas
Frank Sheridan Jonas
277 Broadway
New York, N. Y.

Mr. Robert Tyce
K-T Flying Service
John Rodgers Airport
Honolulu, T. H.

Mrs. Ruth K. Larson
Larson Alaskan Distributing Co.
Anchorage, Alaska

Mr. John C. Bennett, Jr.
Louisville Flying Service, Inc.
Bowman Field
Louisville, Kentucky

Mr. William McBoyle
McBoyle Cub Sales
Riverside Airport
Spring Green, Wisconsin

Mr. Neil R. McCray
Municipal Airport
Jamestown, N. Y.

Mr. Philip A. Meinke
Box 327
Willoughby, Ohio

Messrs. C. Shockley, L. Eikenberry
Muncie Aviation Corporation
Muncie Airport
Muncie, Indiana

Mr. L. L. Rupert
Muskogee Air Service
Municipal Airport
Muskogee, Oklahoma

Mr. William A. Ong
Ong Aircraft Corporation
P. O. Box 214
Kansas City, Missouri

Mr. Thomas Davis
Piedmont Aviation, Inc.
P. O. Box 1941
Winston-Salem, N. C.

Mr. O. P. Hebert
Safair, Inc.
Hangar "B," Roosevelt Field
Mineola, L. I., N. Y.

Mr. Jack Wood
St. Louis Flying Service, Inc.
Lambert Field
St. Louis, Mo.

Mr. J. L. Schroeder
J. L. Schroeder, Inc.
Houston Main Street Airport
Houston, Texas

Mr. J. F. Lanier
Southern Air Services, Inc.
Municipal Airport
Memphis, Tenn.

Mr. Frank Hulse
Southern Airways Sales Co., Inc.
Municipal Airport
Birmingham, Alabama

Mr. Ben Stanislaw
Stanislaw's, Inc.
West Bend Municipal Airport
West Bend, Wisconsin

Mr. T. C. Henry
Susquehanna Air Service
1229 Park Avenue
Williamsport, Pennsylvania

Mr. Harold D. Swank
Scranton Airport
Clarks Summit
Scranton, Penna.

Messrs. A. C. Tufts, G. Edgcumbe
Tufts-Edgcumbe, Inc.
Ravenswood Airport
Des Plaines, Illinois

Mr. A. R. Mortensen
Utah Pacific Airways, Inc.
P. O. Box 1187
Ogden, Utah

Mr. W. R. Franke
Virginia Cub Distributors, Inc.
Box 211
Farmville, Va.

Mr. D. H. Wallace
Wallace Aircraft Company
Clarcona, Florida

Mr. M. R. Bingman
West Virginia Air Service, Inc.
P. O. Box 401
Clarksburg, W. Va.

Mr. A. W. Whitaker
Hangar No. 4
Swan Island Airport
Portland, Oregon

E. W. Wiggins Airways, Inc.
Metropolitan Airport
Norwood, Mass.

Mr. W. O. Wight
Box 487
Biloxi, Mississippi

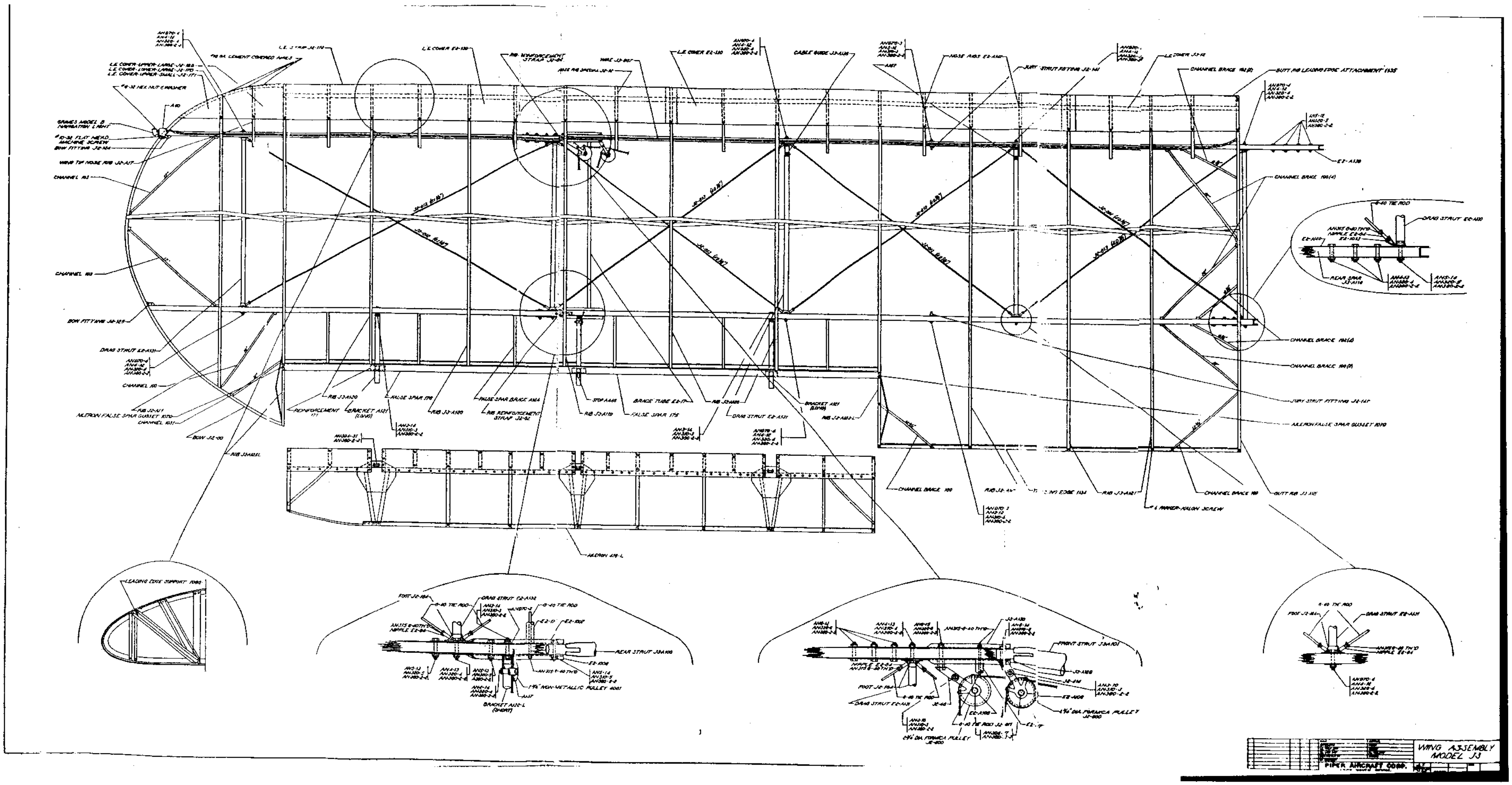
Mr. Ray Wilson
Ray Wilson, Inc.
Park Hill Airport
4700 Dahlia Street
Denver, Colorado

ASSEMBLY DRAWINGS

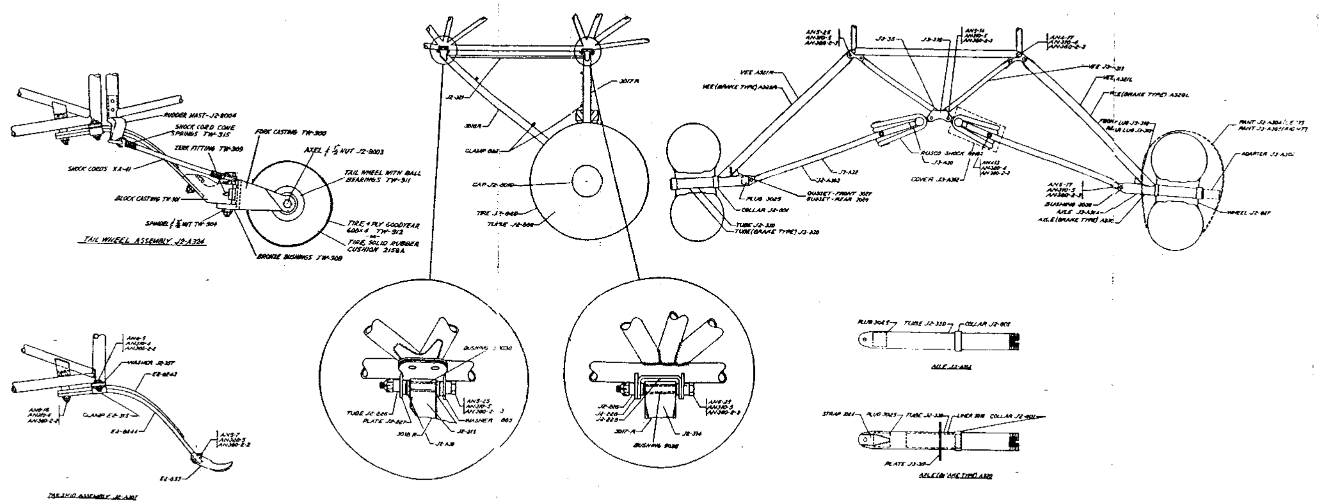
ISSUED BY THE

PIPER AIRCRAFT CORPORATION

LOCK HAVEN PENNSYLVANIA, U. S. A.

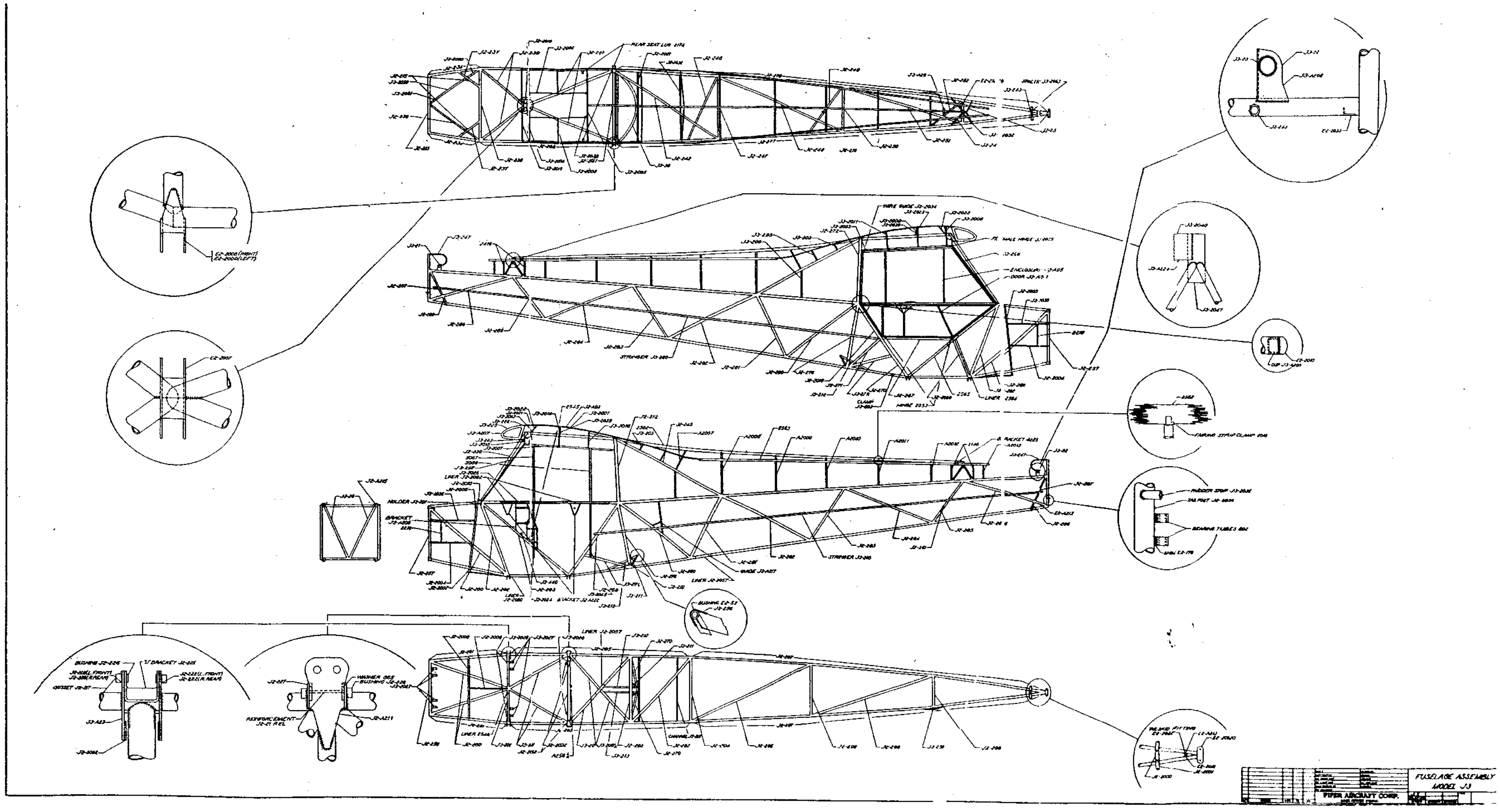


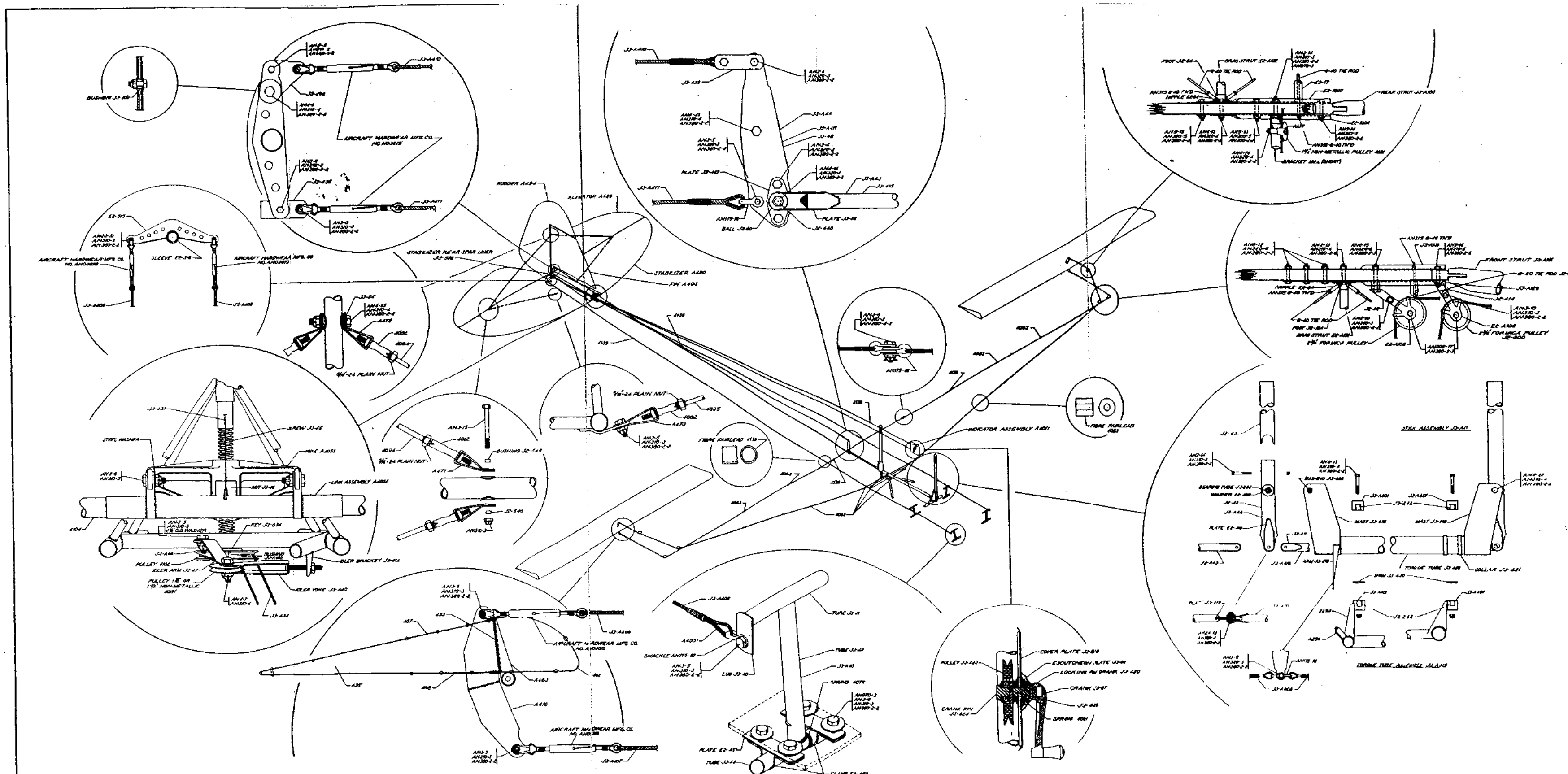
WING ASSEMBLY MODEL J3
PIPER AIRCRAFT CORP.
L.E. COVER E2-130
CABLE GUIDE J3-A138
JURY STRUT FITTING J2-141
CHANNEL BRACE 1162
DRAG STRUT E2-A131
FALSE SPAR 175
BRACE TUBE E2-171
AILERON FALSE SPAR GUSSET 1010
AILERON A76-L
LEADING EDGE SUPPORT 1085
REAR STRUT J3A105
FRONT STRUT J3A101
1 3/4" NON-METALLIC PULLEY 4061
BRACKET A112-L (SHORT)



PIPER AIRCRAFT CORP.

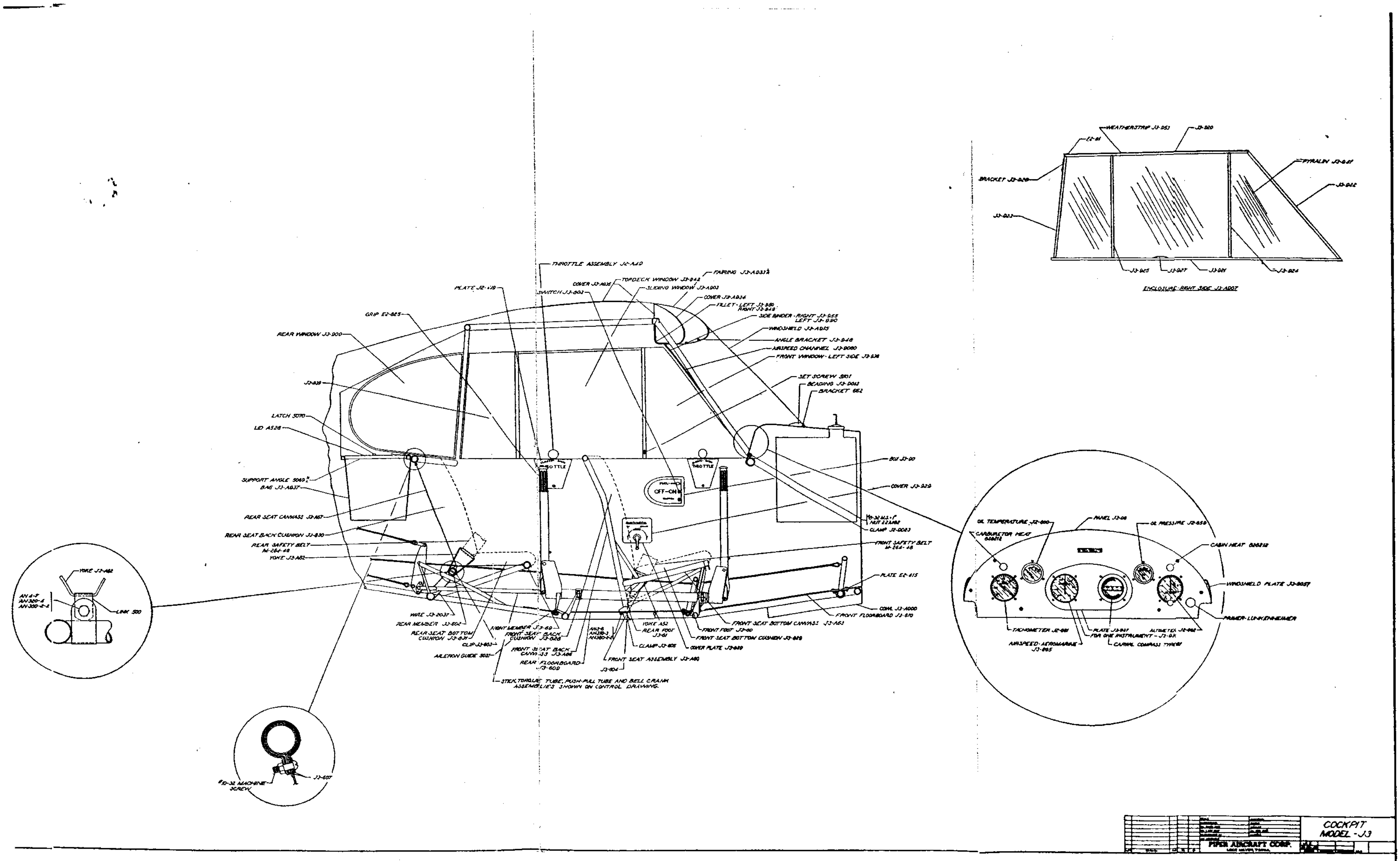
CHASSIS MODEL-J3

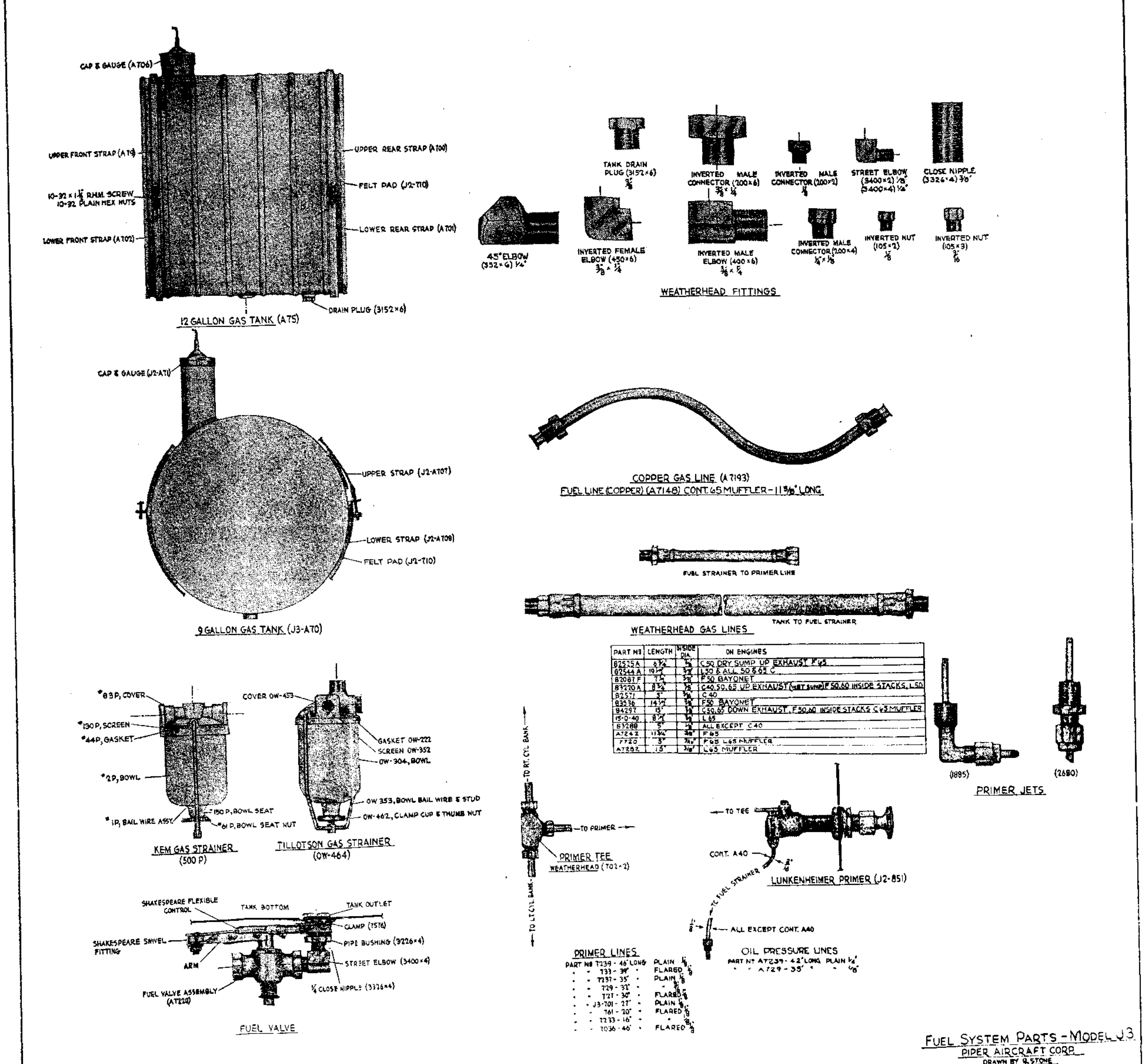

FUSELAGE ASSEMBLY
MODEL J3
PIPER AIRCRAFT CORP.



CONTROL SYSTEM

PIPER AIRCRAFT CORP.


THROTTLE ASSEMBLY J2-A10
PLATE J2-419
SWITCH J3-802
COVER J3-A636
TOPDECK WINDOW J3-942
SLIDING WINDOW J3-A903
FAIRING J3-A033
COVER J3-A934
FILLET - LEFT J3-930
RIGHT J3-948
SIDE BINDER - RIGHT J3-955
LEFT J3-990
WINDSHIELD J3-A915
ANGLE BRACKET J3-946
AIRSPEED CHANNEL J3-9060
FRONT WINDOW - LEFT SIDE J3-936
SET SCREW 3101
BEADING J3-9043
BRACKET 662
GRIP E2-825
REAR WINDOW J3-900
LATCH 3070
LID A526
SUPPORT ANGLE 5060
BAG J3-A937
REAR SEAT CANVASS J3-817
REAR SEAT BACK CUSHION J3-830
REAR SAFETY BELT
YOKE J3-A62
BOX J3-20
COVER J3-929
CLAMP J2-8083
FRONT SAFETY BELT
PLATE E2-415
COWL J3-A000
FRONT FLOORBOARD J3-870
FRONT SEAT BOTTOM CANVASS J3-A63
FRONT FOOT J3-40
FRONT SEAT BOTTOM CUSHION J3-828
COVER PLATE J3-889
FRONT SEAT ASSEMBLY J3-A80
YOKE A52
REAR FOOT
CLAMP J3-805
WIRE J3-2037
REAR MEMBER J3-802
REAR SEAT BOTTOM CUSHION
AILERON GUIDE 5021
FRONT SEAT BACK CUSHION
REAR FLOORBOARD J3-609
STICK, TORQUE TUBE, PUSH-PULL TUBE AND BELL CRANK ASSEMBLIES SHOWN ON CONTROL DRAWING.
YOKE J3-A62
LINK 500
#10-32 MACHINE SCREW
J3-607
WEATHERSTRIP J3-953
J3-920
PYRALIN J3-927
BRACKET J3-928
J3-922
J3-924
ENCLOSURE-RIGHT SIDE J3-A907
OIL TEMPERATURE J2-880
CARBURETOR HEAT
PANEL J3-08
OIL PRESSURE J2-858
CABIN HEAT
WINDSHIELD PLATE J3-9057
PRIMER-LUNKENHEIMER
TACHOMETER J2-881
AIRSPEED-AEROMARINE J3-865
PLATE
FOR ONE INSTRUMENT
ALTIMETER
CARNAL COMPASS
COCKPIT
MODEL -J3
PIPER AIRCRAFT CORP.



WEATHERHEAD GAS LINES

PART Nº	LENGTH	INSIDE DIA.	ON ENGINES
82525A	6¾"	⅜"	C50 DRY SUMP UP EXHAUST F65
82544A	19½"	⅜"	L50 & ALL 50 & 65 C
82087F	7½"	⅜"	F50 BAYONET
83220A	8¾"	⅜"	C40,50,65 UP EXHAUST (WET SUMP) F50,60 INSIDE STACKS, L50
82571	5"	5/16"	C40
83536	14½"	⅜"	F50 BAYONET
84297	15"	⅜"	C50,65 DOWN EXHAUST, F50,60 INSIDE STACKS C65 MUFFLER
15-0-40	8½"	⅜"	L65
63288	5"	¼"	ALL EXCEPT C40
A7242	11¾"	⅜"	F65
7720	5"	5/16"	F65 L65 MUFFLER
A7282	15"	⅜"	L65 MUFFLER

PRIMER LINES

PART Nº T239 - 46" LONG PLAIN ⅛"
" " T33 - 39" " FLARED ⅛"
" " T237 - 35" " PLAIN ⅛"
" " 729 - 32" " " ⅛"
" " T27 - 30" " FLARED ⅛"
" " J3-701 - 27" " PLAIN ⅛"
" " T61 - 20" " FLARED ⅛"
" " T233 - 16" " " ⅛"
" " T036 - 46" " FLARED ⅛"

OIL PRESSURE LINES

PART Nº AT239 - 42" LONG PLAIN ¼"
" " A729 - 35" " " ⅛"

FUEL SYSTEM PARTS - MODEL J3
PIPER AIRCRAFT CORP.
DRAWN BY G. STONE

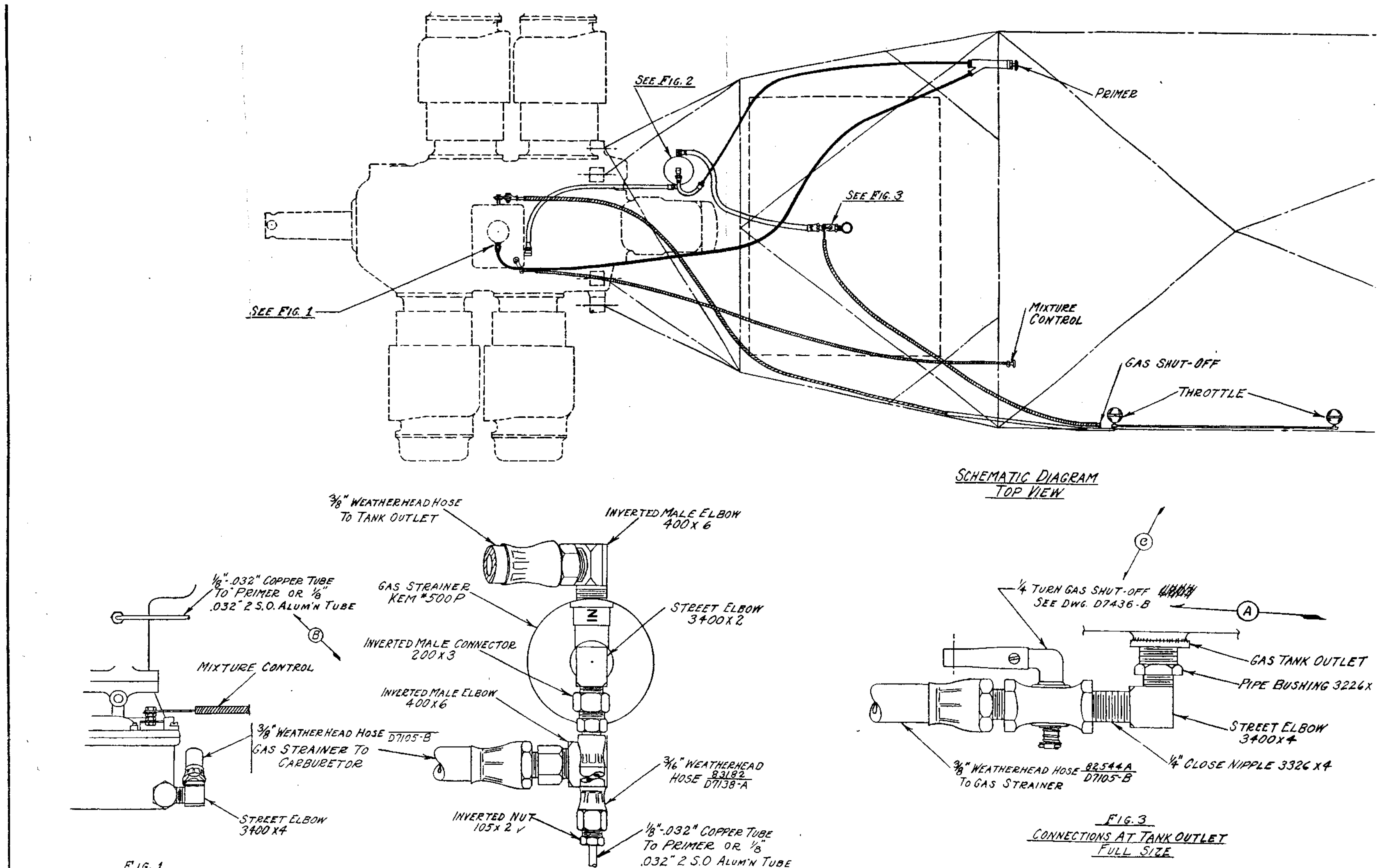


FIG. 1
CONNECTIONS AT CARBURETOR
HALF SIZE

FIG. 2
CONNECTIONS AT GAS STRAINER
FULL SIZE

FIG. 3
CONNECTIONS AT TANK OUTLET
FULL SIZE

LET	REVISION	DATE	SR.	BY
C	D7436-B WAS D7255-B	9-3-40		M.H.
B	ALT MAT'L ADDED	4-25-40		M.H.
A	FUEL SHUT-OFF REVISED	1-30-40		

TOLERANCE — SCALE: NOTED — SUPERSEDES — SR. FIRST SHIP — SR. LAST SHIP — SUPERSEDED BY — ON ASSEMBLY

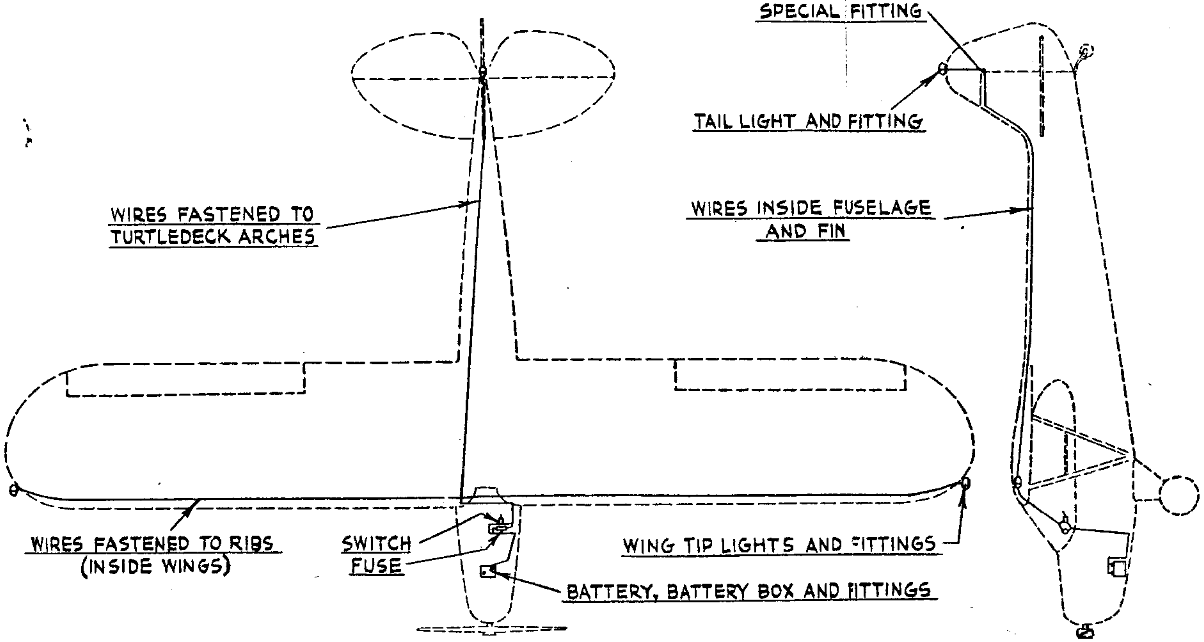
DO NOT SCALE — MATERIAL: NOTED — FINISH — WEIGHT — No. PER SHIP: 1 — MODELS: J3C-65

DATE OF PRINT

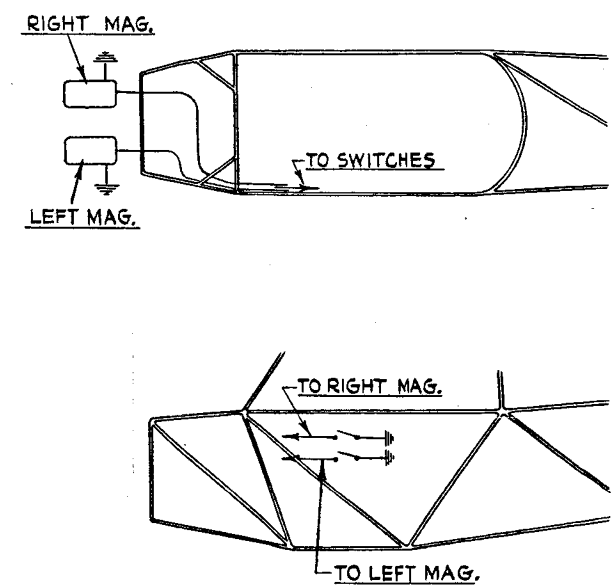
FUEL SYSTEM

PIPER AIRCRAFT CORP.
LOCK HAVEN, PENNA.

DRAWN	CHECKED	APPROVED	FILE
7-13-39	8-3-39		D715



NAVIGATION LIGHTS



IGNITION

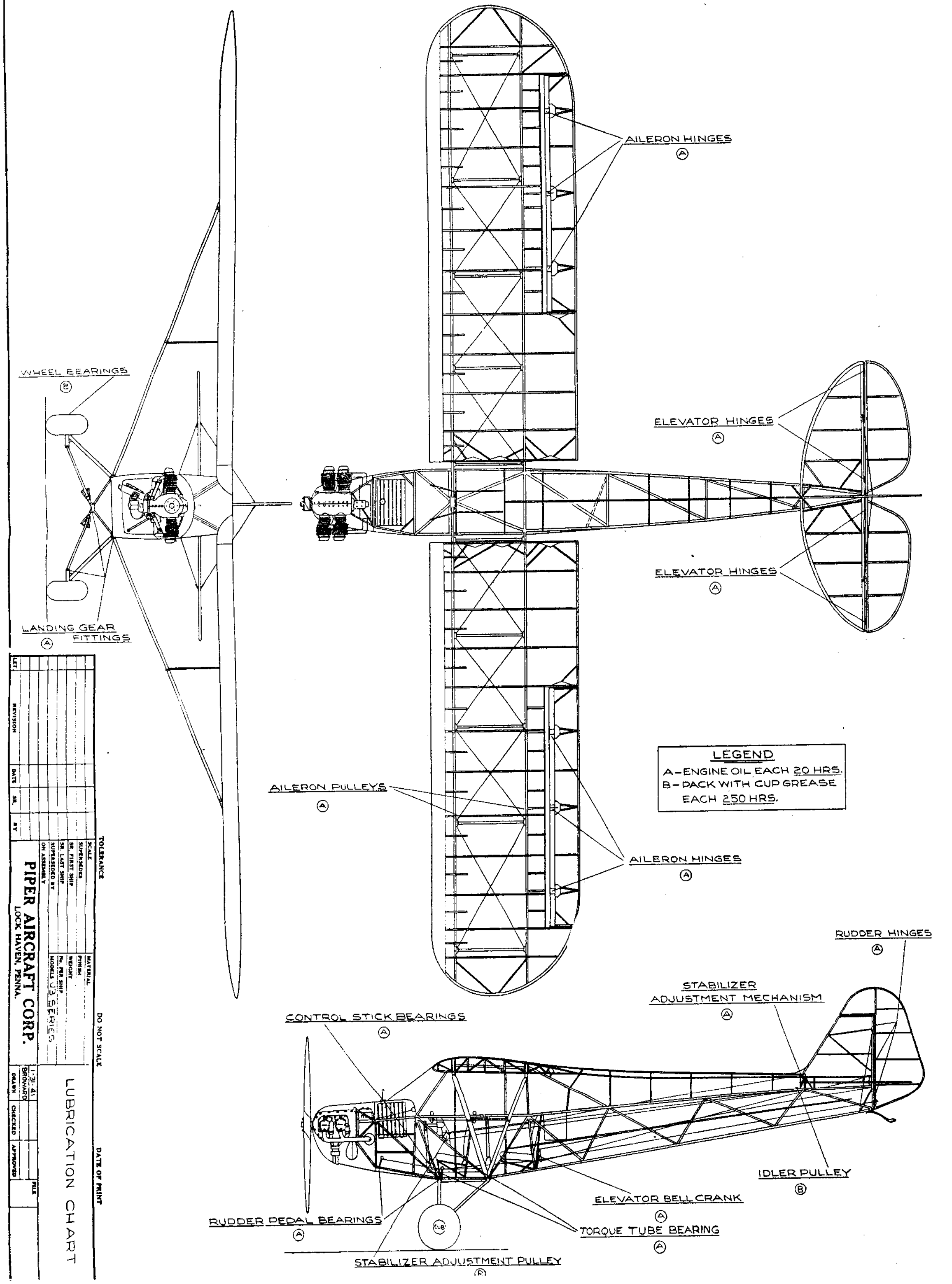
TOLERANCE DO NOT SCALE DATE OF PRINT

SCALE		MATERIAL		WIRING DIAGRAM
SUPERSEDES		FINISH		
SR. FIRST SHIP		WEIGHT		
SR. LAST SHIP		No. PER SHIP		
SUPERSEDED BY		MODELS J3		
ON ASSEMBLY				

LET.	REVISION	DATE	SR.	BY

PIPER AIRCRAFT CORP.
LOCK HAVEN, PENNA.

DRAWN	CHECKED	APPROVED	FILE
B. STONE			



LUBRICATION CHART

PIPER AIRCRAFT CORP.
LOCK HAVEN, PENNA.

TOLERANCE

DO NOT SCALE

DATE OF PRINT

SCALE	
SUPERSEDES	
SR. FIRST SHIP	
SR. LAST SHIP	
SUPERSEDED BY	
ON ASSEMBLY	
MATERIAL	
FINISH	
WEIGHT	
No. PER SHIP	
MODELS	J3 SERIES

1-31-41			
BROWARD			
DRAWN	CHECKED	APPROVED	FILE

LET.	REVISION	DATE	SR.	BY