

THE WACO MODEL "F"

Powered with the 110 h. p.
Warner "Scarab" Motor



THE WACO RNF

Beauty :: *Performance* :: *Economy*



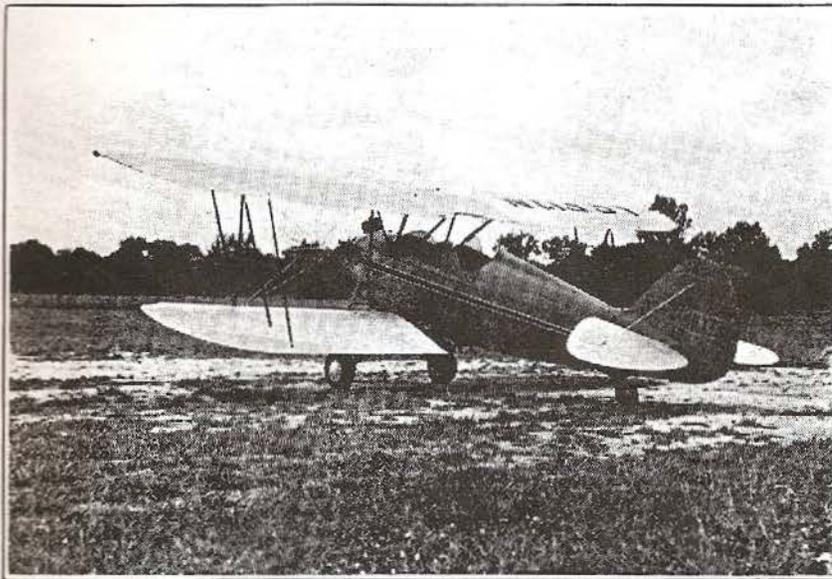
"Ask Any Pilot"

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THE WACO MODEL "F"

Powered with the New 125
h. p. Kinner Motor



THE WACO INF

Outstanding Performance ∴ *Outstanding Economy*

Easy To Fly



"Ask Any Pilot"

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THE WACO AIRCRAFT COMPANY
TROY, OHIO, U. S. A.

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GENERAL INFORMATION

WACO airplanes are usually sold for flyaway at our field in Troy, Ohio. The airplanes prepared for flyaway delivery are completed, carefully inspected, test flown, reinspected and held in our hangar until customer arrives for delivery. Please note that it is a policy of our company not to build a surplus of airplanes for warehouse storage. Your WACO airplane will be strictly new when delivered to you.

Domestic shipment of airplanes is made by carload lots, there being no extra charge for loading your airplane in a carload, if instructions are given to this effect when order is placed. In this case follow the assembly and rigging instructions. You will find WACOS easy to assemble.

WACOS for export shipment are set up, inspected, test flown, dismantled and carefully packed. The Model "F" is crated complete in a single crate for export shipment; the crate measuring 706 cubic ft. The net weight of the shipment being 1210 lbs., the gross weight 2873 lbs. and at 40 cubic ft. per measurement ton it figures 17.65 measurement tons.

Transportation Liabilities

The WACO Aircraft Company does not hold itself liable for damage to airplanes or parts in transit from the factory. If a shipment is received in a damaged condition, have the delivery man or transportation company make a notation of the damage and file your claim with the carrier. In case of concealed damage, do not attempt to remove from shipping container or endeavor to repair, but call carrier and have claim agent inspect the damage before filing your claim with the carrier.

Uncrating Export Box

The box should be placed at some point where a hoist will be available for lifting one end of the airplane.

First remove the top of the box; then remove one side. Use care in doing this as there are fragile parts just inside the box which will be easily damaged if struck with tools while uncrating. Remove all the airplane parts from the open side of the box with the exception of the fuselage itself. Then from one end at a time remove all airplane parts down to the fuselage itself. Remove the ends of the box of course to do this. This will permit the removal of the remaining side and the remaining material.

Further assembly will be done as described under the assembly of airplanes shipped in carload lots, as is the domestic practice.

Instructions for Unloading Carload of Airplanes

Inspect the car carefully to make sure door seals are intact and that the ends of the car are in good condition. Report any damage found to carrier at once. (See page 5.)

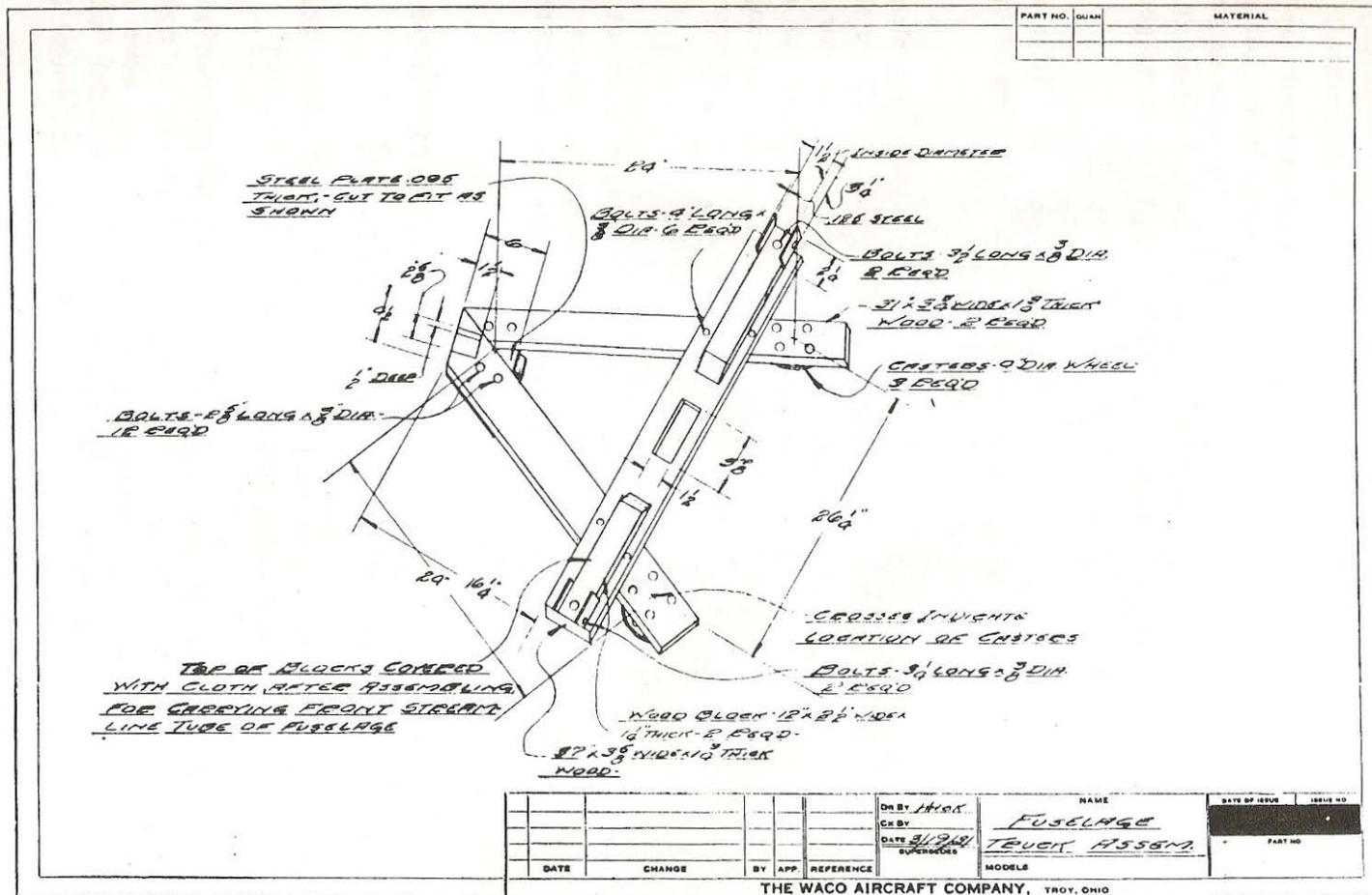
All cars containing WACO airplanes are carefully marked "Unload from this side" on the correct side and "unload from the other side" on the wrong side. Care should be taken when cars are spotted to a platform to be sure the right side of the car is next to the platform.

Open the double door as wide as possible. CAUTION: In unloading the carload it is very important that all bracings, bulkheads and dunnage are removed from the car as soon as it is loosened up. Most damage to airplane parts is done by snagging them on some of this loose material when it is not immediately removed from the car.

A packing slip for the carload and any special instructions will be attached to the door post and it is important that you check the items against our packing slip as the car is unloaded. We will not be responsible for any shortage claims made later than three days after the arrival of the car. In case you do not find all of the small parts be sure to look in the baggage compartment and cockpit of the airplane as numerous small parts, are packed in these locations.

Remove the fuselage immediately in front of the door and to the left as you look into the car. This fuselage will come out tail first. First remove the 2" x 4" frame bound around the tail post of the first airplane to come out, also the strap over and around the wheel and fork. Then remove all straps around front landing gear fittings at the front of the airplane. At this point it is very desirable to have a dolly to place under the airplane to facilitate handling when the landing gear is off. (Note Sketch of the type dolly we recommend.) These dollies will be furnished by us at the nominal charge of \$7.50 each, or from this sketch one can readily be made for handling airplanes without landing gear.

If the dolly is available, four men can lift the front end of the fuselage, one man on either side can get hold of the bottom of the outrigger struts for lift and two men at the front can lift at the crankshaft. This can probably be done easiest by the use of a 2 x 4 about 3 ft. long, with one man on either end of the 2 x 4. With the airplane lifted and moved back slightly, it will set on this dolly and can be easily handled.



Dolly for Handling Fuselage Without Landing Gear.

In case you do not have a dolly available, the airplane can be carried out by four or five men placed as previously described. It is very important that when it is set down the weight is carried on the landing gear outrigger fittings, making sure the bottom part of the fuselage does not carry any weight.

Continue in the same manner to remove the fuselages on your left, looking into the car.

The fourth fuselage to be removed should be the one on your right closest to the door. This should be backed into the opposite corner and brought out nose first. On some cars where the inside dimensions are a little smaller than standard it is necessary to raise the tail of the airplane as high as 5 ft. to get sufficient clearance to get it out the door.

Remove the fifth airplane tail first. It is always advisable to get all fuselages out of the car before beginning to work above them as a precaution to avoid damage.

Now be sure the car floor is clean, all blocks and dunnage removed so that the wing parts can be laid on the floor if necessary while unpacking the remainder of the car. You will have no difficulty in unloading the remainder of the car, but extreme care should be taken in getting the first two wings out to be sure they are not snagged as there is very little clearance allowed for slipping them out.

It is suggested that the V shaped block at the trailing edge of each wing be removed before attempting to slip the wing out. This will give additional clearance and be another precaution to avoid damage.

Assembly Instructions

General

Rights and lefts are determined while standing at the tail and looking toward the nose of the airplane.

Bolts and clevis pins should be installed with heads up, forward or outboard. Make it a practice to tighten the nut and insert the cotter key on each bolt as used, never leaving any finishing process to be done at a later date. This will avoid the possibility of leaving out the very important cotter keys.

Center Section

First, prepare the center section for installation by attaching the center section strut to the center section before installing it

Center Section (Cont'd)

on the fuselage. The right hand strut can be distinguished as it has clips on both front and rear members for holding the gasoline lines, while the left hand strut has clips on the rear member only. The bolts, $\frac{1}{4}$ " x $1\frac{1}{4}$ ", should be inserted with the nuts toward the center of the airplane and locked with cotter keys. (See Illustration No. 1.)

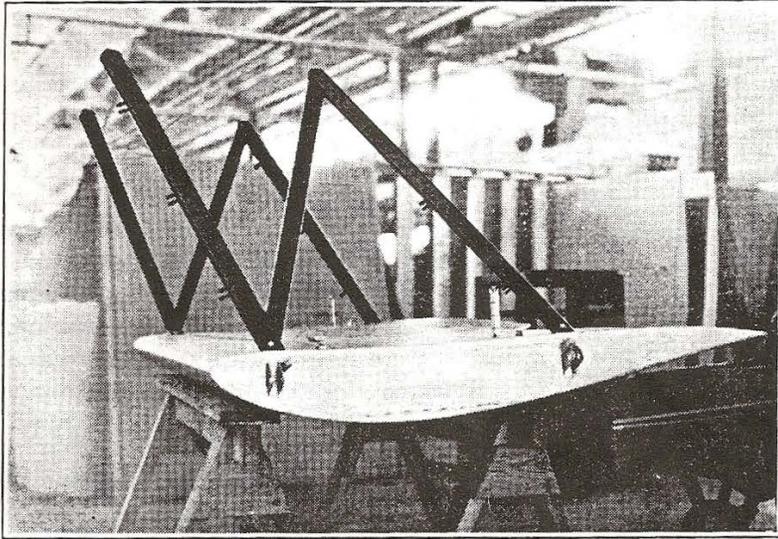


ILLUSTRATION No. 1

Now with one man on either side of the center section, place this on the fuselage and attach the struts at the rear fitting on the fuselage first. After the rear fitting bolts are in place, the strut can be attached to the front fuselage fitting. The bolts which secure the center section strut to the fuselage are size $\frac{5}{16}$ " x $\frac{7}{8}$ ". The center section cross wires are $\frac{5}{16}$ " streamline with one end left round for about half its length. Insert the round end of the wire down through the rubber grommet in the top of the cowl. Start the other end of the wire in the fitting, projecting from the under side of the center section. When threads are just started put the terminal on the lower end of the wire and give it the same number of turns that the upper end had in the center section, about two or three are sufficient. While holding the terminal at the lower end from turning, with a screw driver tighten the wire until the terminal can be slipped over its fitting inside the cowl and secured with a $\frac{3}{8}$ " clevis pin. The head of this pin should be toward the front.

Center Section---(Cont'd)

Draw these wires up quite snugly, being careful that they are exactly the same length. They can be measured by inserting a steel tape through the rubber grommet beside the wire or by the use of a trammel. The gasoline lines can now be fastened to the struts by the above mentioned clips and attached to the tanks by the fittings provided there.

It is important that the tubing be held firmly well up in the fitting while the fitting nut is tightened.

Landing Gear

The oleo shock strut should first be filled by removing the plug at the top, pouring in one pint of Gargoyle Teleo Oil AA, a sufficient quantity of which is shipped with each oleo strut. After the strut has been filled with oil see that it is kept right side up until installed on the airplane.

This is a transformer oil and can be secured either from your WACO dealer or from your local power company.

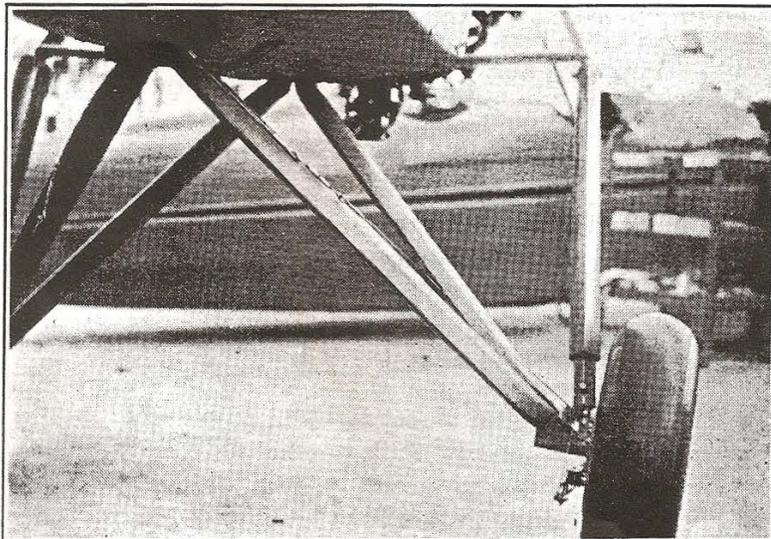


ILLUSTRATION No. 2

Landing Gear (Cont'd)

Now raise the motor end of the fuselage by attaching a hoist to the motor mount members as near as possible to the firewall. A rope or chain of generous length with suitable padding should be used to prevent denting the tubes.

The landing gear V's with wheel assembled should now be attached to the fuselage, inserting tubular bushings in the upper end of landing gear V. Attach first the upper rear member of the V, then the upper front, using bolts $\frac{3}{8}$ " x $2\frac{1}{8}$ ".

The brake control wire passes through a pulley shackle which is fastened to the rear end of the bolt holding the rear landing gear strut in place. See that this shackle is properly attached before tightening these bolts.

The landing gear V attachment bolts should be kept tight at all times. The bushings inserted are not designed to turn, but are a surface to be held stationary by the tight bolt and the landing gear V allowed to hinge on this bushing to prevent any elongation of the holes on the fuselage fitting.

Next attach the oleo shock strut, attaching the upper end of the shock strut to the universal, which is bolted on the outrigger of the fuselage. Then secure the lower end of the oleo shock strut. Note that the brake wire and pulley shackle should be fastened to the rear of the lower bolt with the pulley tab vertical above the bolt.

Brake

Connect brake control cable. See Illustration No. 3 for method of attaching brake cable to brake lever.

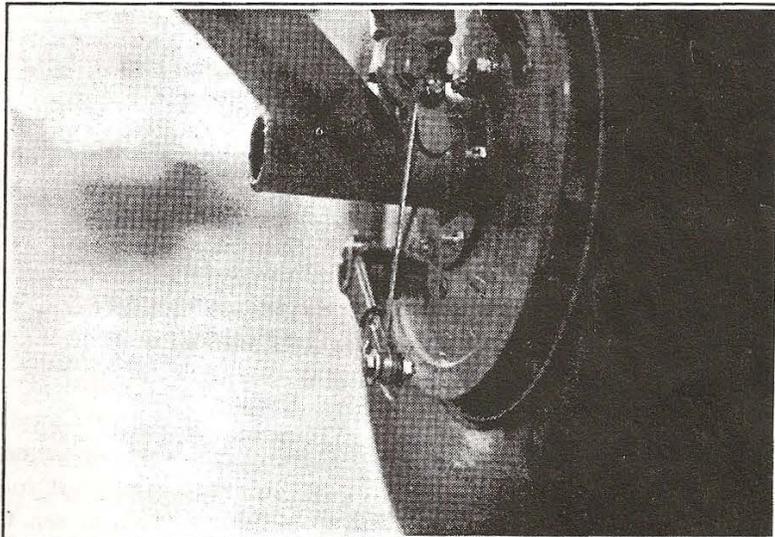


ILLUSTRATION No. 3

All Model "F" WACOS are equipped with brakes and are operated by a combination throttle and brake lever. The fore and aft movement of this lever gives the customary airplane throttle action. The movement of the lever at a right angle to this or pulled outward toward the pilot operates the brakes. This lever puts equal tension on both brakes, but for maneuvering the system is so arranged that the rudder pedals automatically release one brake and tighten the other when using the rudder as is normally done in taxiing.

The dual controls include the same brake arrangement in front and rear cockpit. At the front of this lever there is provided a slotted fitting operating on a bolt with thumb screw. This can be used to lock the brakes for use as an emergency brake in holding the airplane on an incline or while the motor is being reved up. To use this lock pull the desired amount of tension on the brake lever with the left hand and with the right hand tighten the thumb screw against the slotted fitting. This will maintain tension in the brake system.

Likewise, if you wish to make the brake lever inoperative in either cockpit, tighten securely this thumb screw on the lever. This enables the instructor to have brakes in the front cockpit while his student does not have brakes, which is of considerable advantage to instructors. Either throttle or brake can be readily disconnected by opening the zipper and disconnecting the throttle rod or brake cables, although we suggest that the brakes be locked as above rather than disconnected and only the throttle be disconnected to be made inoperative.

Brake Adjustment

(Note) Export ships have been flown and had their brakes properly adjusted at the factory. They should, therefore, need little, if any, change when assembled.

With wheels clear of ground with jacks or hoist, have one man get in the cockpit of the airplane to work the brakes and another man at the wheels.

First, be sure wheels turn free when brakes are not used. Then have the man in the cockpit put moderate pressure on the brake system. With rudder neutral see that brake wheels have about equal drag on each side. Then with pressure on the brake lever (throttle) press fully the right rudder pedal. This should

Brake Adjustment (Cont'd)

enable you to lock the right brake leaving the left one without a great deal of drag, and vice versa. If necessary, change brake adjustment sufficiently to get this action. See Illustration No. 4.

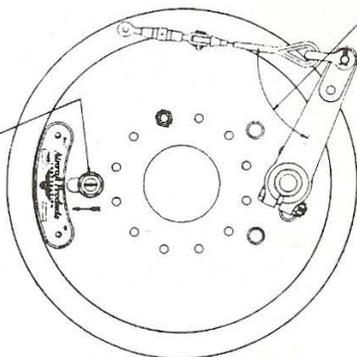
AIRCRAFT PRODUCTS AIRPLANE BRAKE

METHOD OF ADJUSTMENT

Jack Up Axle to Free Wheel

Installation of brake to airplane-tighten brake support bolts with wheel on axle and brake locked to center brakes in brake drum.

Operation - 1 to take up brake, loosen nut and move in direction indicated until brake shoes contact with drum. Release slightly until wheel spins freely. Tighten nut by holding screw driver in slot to prevent stud from turning.



It is important that the angle between cable and lever be maintained at approximately 80° when brake is applied.

Operation - 2 reset lever on serrated shaft allowing $\frac{1}{2}$ to $\frac{3}{4}$ inch travel to lock brake.

Operation - 3 Adjust turnbuckle provided between brake pedal and lever for proper pedal travel, and to eliminate slack in cable.

ILLUSTRATION No. 4

It will also be noted that when brakes are properly adjusted without using the brake lever (throttle) some braking effect will be exerted on the wheels when the rudder is in extreme position. This is a decided advantage when correcting any tendency toward ground looping. Brakes should not be tight enough to allow wheels to lock without use of brake lever (throttle).

Tail Assembly

Before shipment the empennage is fitted on each airplane and is left as near assembled as is practical in shipment. You will, therefore, experience no difficulty in the reassembly.

Stabilizer and elevators will be shipped assembled and the first operation is to get the stabilizer right side up, which will place the ball nut on top. First, screw this ball nut on the threaded bolt which will be done by having one man in the cockpit work the stabilizer cord which will turn this bolt and let another man hold the stabilizer properly aligned so the threads will start. When the nut has been screwed down to a neutral position, replace the square guide sleeve on the upper end of the stabilizer adjuster screw and lock in place with a washer and cotter key. Attach the rear of the stabilizer to the fuselage with a $\frac{1}{4}$ x $1\frac{1}{8}$ " bolt.

The elevator control wires pass through pulleys just ahead of the stabilizer. The wire on the upper pulley should be attached to the upper end of the elevator horn. Adjust the elevator cables and the position of the elevators by means of turnbuckles just aft of the pilot's seat which may be reached through zippers in the bottom of the fuselage, being careful that not over two threads show from either end of the turnbuckle barrel after adjusting. When properly adjusted the leading edge of the elevator at the extreme point of the balance should have a down travel below the stabilizer when in full down position of approximately $10\frac{1}{4}$ ". (Note Illustration No. 5 for this measurement.)

Hold fin approximately in position and attach navigation light wires taping them to one side so they will not conflict with any moving parts.

Install the fin by inserting the fin into the tail post bolting it in place with a bolt just above the lower rudder hinge. The bolt is size $\frac{1}{4}$ " x $\frac{1}{2}$ ". Fasten the front of the fin to the bracket which supports the stabilizer adjuster screw with a bolt $\frac{1}{4}$ " x $\frac{5}{8}$ ".

Inspect carefully all nuts and cotter keys and then install tail cowl. First, screw front section of tail cowl in place, then hold the two sides which go at the rear of the tail cowl in place and hook the spring at the center. This will hold the two sides roughly in position while the wood screws are inserted along the bottom, one small machine screw inserted at each side in front fastening the upper part of the side cowl to the front cowl and $\frac{1}{4}$ " x $1\frac{5}{8}$ " bolt inserted to hold the two sides together at the rear.

Tail Assembly (Cont'd)

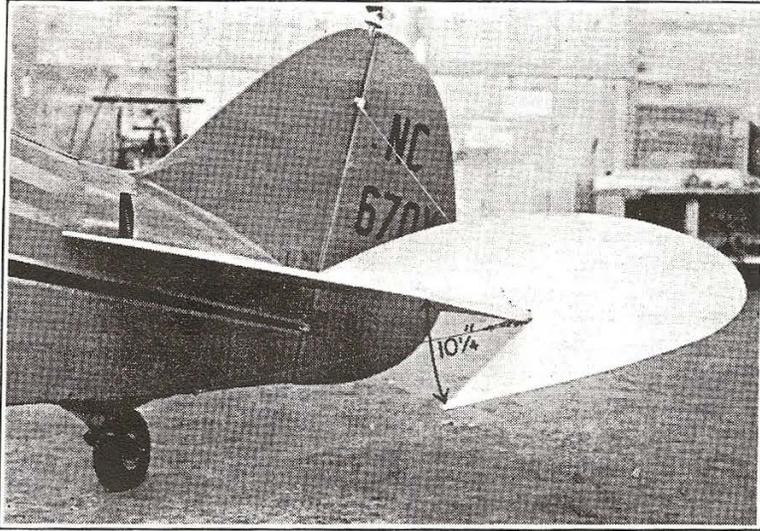
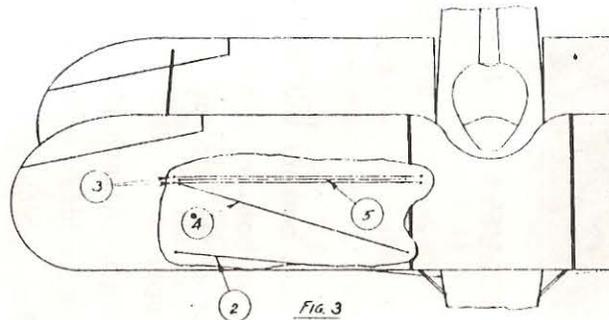
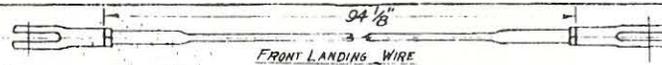


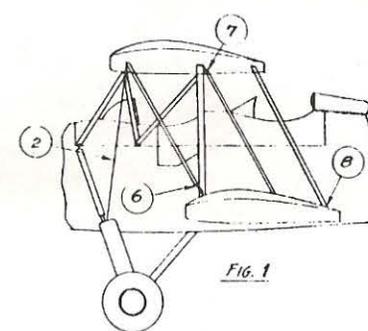
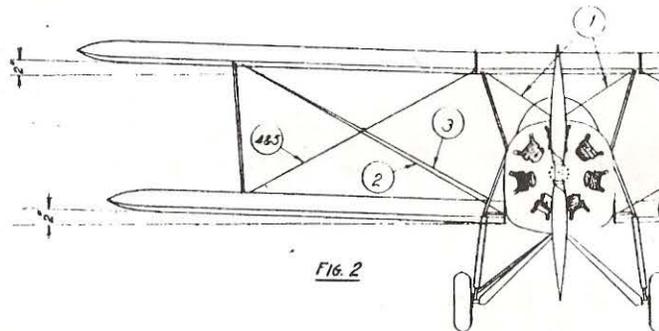
ILLUSTRATION No. 5

Attach the top and bottom tail wires to the stabilizer using $\frac{1}{4}$ " x $1\frac{3}{4}$ " bolts. The bottom wire is the shorter one. The clip on the stabilizer end of the top tail wire is more nearly straight than that on the upper end. This top tail wire bolt also holds the upper rudder hinge. Attach the rudder being sure to fasten the tail wires and rudder hinge with this bolt. Then attach lower rudder hinge with bolt which is $1\frac{1}{4}$ " x $\frac{3}{4}$ ". The upper rudder hinge bolt is $1\frac{1}{4}$ " x $1\frac{7}{8}$ ". Tighten the tail wires being careful that stabilizer is kept straight. When properly adjusted both bottom wires will be the same length and both top wires the same length. Check by eye to see that the fin post is perpendicular to the center section and the stabilizer is parallel to the center section.

Bolt the rudder wires to the rudder horn and adjust turn-buckles until rudder action from stop to stop gives comfortable pedal action.



- 1-CENTER SECTION WIRES
- 2-FRONT FLYING WIRES - 3/16" X 13 3/4" ACTUAL WIRE LENGTH
- 3-REAR FLYING WIRES - 3/16" X 10 3/4" ACTUAL WIRE LENGTH
- 4-FRONT LANDING WIRES - 1/4" X 96" ACTUAL WIRE LENGTH
- 5-REAR LANDING WIRES - 1/4" X 91 1/2" ACTUAL WIRE LENGTH
- 6-ADJUSTMENT FOR SHORT STRUT
- 7-ADJUSTMENT FOR LONG STRUT
- 8-ADJUSTMENT FOR AILERON STRUT



Wing Rigging

Thread the navigation light wires from the upper wings down through the diagonal (center) interplane struts and bolt the struts to rear fitting on upper wing using $\frac{1}{4}$ " x $1\frac{1}{2}$ " bolts. Also attach the front interplane struts to the front fittings on the upper wings. The lower ends of the front struts have adjustment screws. Bolt these lower ends to the diagonal struts using $\frac{1}{4}$ " x $\frac{3}{4}$ " bolts.

The wing wires consist of four $\frac{1}{4}$ " streamline and six $\frac{5}{16}$ " streamline wires. The $\frac{1}{4}$ " wires are the landing wires, the longer pair of these being the front landing wires. The longest pair of $\frac{5}{16}$ " wires are the front flying wires. The other four $\frac{5}{16}$ " wires constituting double rear flying wire are of equal length.

With one man in the rear cockpit and at least two men handling the lower wing, attach each lower wing to the fuselage using $\frac{3}{8}$ " x $2\frac{1}{8}$ " bolts. Bolt the front spar fitting to the fuselage fitting placing this bolt with head to the rear; then using a $\frac{3}{8}$ " x $1\frac{1}{2}$ " bolt secure the rear spar fitting to the fuselage placing this bolt head front.

Attach the rear landing wire to support the wings temporarily until ready to attach the upper wings. Note all streamline wires have the right hand thread at the bottom. It will be necessary to disconnect this landing wire while putting the upper wing in position.

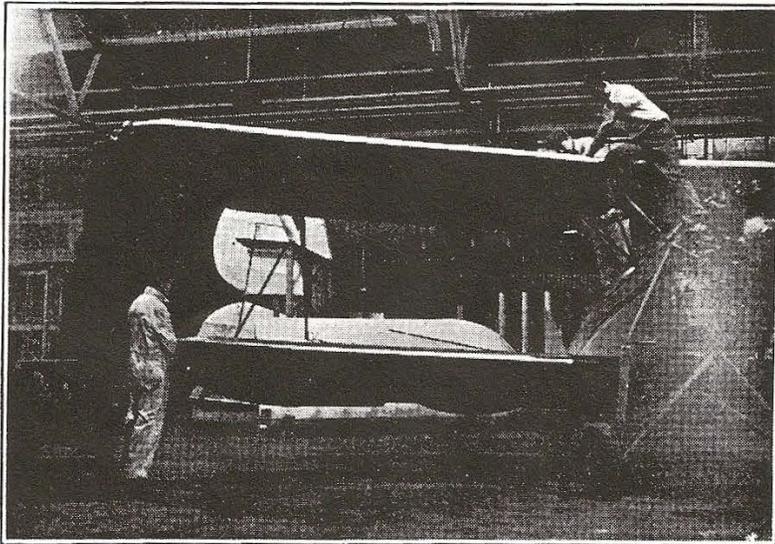


ILLUSTRATION No. 6

Wing Rigging (Cont'd)

After both lower wings are in place, the upper wings should be installed in the following manner:

(Note Illustration No. 6) After protecting the rear cockpit cowl have a man stand on this cowl and guide the upper wing into position. This man should have four $5/16''$ x $1\frac{3}{4}''$ bolts threaded for $\frac{3}{4}''$ together with four pair of taper bushings, one pair to go on each bolt. At least two men will be required to place this upper wing in position and a fourth man will be required to support the lower wing while the upper is being secured.

Loosen the landing wire supporting the lower wing temporarily and place the upper wing in position, being careful to see that landing wire terminals from the center section go down through the patches provided in the upper wing for these terminals. The man on the center section will then bolt the upper wing securely to the center section using bolts and bushings above described. The diagonal wing strut can then be attached to the lower wing and the rear landing wire again screwed in place. The wings on this side will now be self-supporting and the upper wing can be placed on the other side in the same manner.

The front landing wires should be tightened until they measure $94\frac{1}{8}''$ between the exposed ends of the terminals. Adjust the rear landing wires and variable front wing struts until the wings are rigged flat. In other words so that the lower surface of the wings appears entirely flat, not warped up or down viewed from wing ends. This can best be observed on the lower wings by standing ahead of the wings in a position where you can sight the lower surface of the wings, on the upper wings by standing behind the wings and sighting the lower surface. In other words the airplane is rigged flat; it is not necessary to make any allowance for propeller torque.

Attach and tighten flying wires to hold wings in this position and then attach rear wing struts properly adjusted to maintain this position. If the rear landing and flying wires touch each other, they should be padded to prevent wear. Tighten all wires to a fair tension, making sure they are left in a streamline position and attach wing pencils with friction tape.

With the control stick in neutral position adjust aileron control rods so that ailerons will be flush with the lower wings and connect these control rods to the aileron control horn, using $\frac{1}{4}''$ x $1''$ bolt. Attach the aileron struts with the adjustment end down using $\frac{1}{4}''$ x $\frac{7}{8}''$ bolts and adjusting them so that the trailing edge of the upper aileron will be parallel to the trailing edge of the upper wing.

Wing Rigging (Cont'd)

Lubricate the various working parts of the control system. Use Engine Oil. Mobiloil Aero "H" summer and Mobiloil Aero "W" winter. Controls will naturally be rather stiff on a brand new airplane until they have been worked in somewhat.

Screw on the inspection plates furnished for the various inspection openings in the wings. Then close zippers in the fuselage cover which have been opened during assembly.

Propeller

Make sure both propeller hub and propeller shaft are perfectly clean. Cover the propeller shaft with Mobiloil Aero "H". Force the propeller on the shaft tight using the small nut which screws on the end of the shaft. Screw the lock nut on the propeller and lock it with the wire provided. (See page 24 for further propeller instructions.)

Final Check

Check all bolts, clevis pins and turnbuckles to see that they are properly locked with safety wire or cotter pins. See that lock nuts on all streamline wires are tight.

Fill the oil tank with an oil of the body and character of Mobiloil Aero "H" for use during the warm months of the year and an oil of the body and character of Mobiloil Aero "W" at atmospheric temperatures below 32 degrees F.

Grease rocker arm shafts with grease gun filled with Mobilgrease, or a lubricant of similar character.

After filling oil and gas tanks, check all lines for leaks. See motor instruction book for full particulars concerning motor operations.

The airplane is now ready for test flight after the brakes have been tested in taxiing. Taxi the airplane out and try first right brake and then left brake, taxiing enough to make sure the brakes are in correct adjustment and will operate either together or separately as applied.

If properly rigged, the airplane should fly in a normal course with "hands off" for an indefinite period in smooth air. However, if it should prove to be a little right wing heavy for instance, this can be corrected by lengthening slightly the right rear interplane strut, or if left wing heavy, the left rear strut.

If any trouble should be experienced in setting up a new airplane, get in touch immediately with the nearest WACO dealer or the factory giving full details and the Serial Number of your airplane.

Stabilizer Control

Model "F" stabilizer is controlled by a screw operated by a knotted cord which extends from the front of the stabilizer up the right side to the front of the airplane, thus giving stabilizer control in both front and rear cockpits.

In front the stabilizer cord passes over a pulley just behind the firewall at the extreme right. The pulley fitting has been threaded for a distance of approximately 4". Play can be taken out of the stabilizer cord by tightening this pulley fitting using nut and lock nut provided for this purpose located just ahead of the firewall, and easily reached with right side motor cowl removed.

If the cord stretches so much that all the play cannot be eliminated by this adjustment, remove the tail cowl at either side of the fin and work the stabilizer cord until spliced section is at hand. Back off on the adjustment nut at the front as far as possible, then cut a piece out of the cord and splice again at the rear which will give you complete range for adjustment again in front.

Bear in mind that the stabilizer will remain stationary in its setting at any time should the cord come off or break.

If you wish to replace the stabilizer cord at any time, tie one end of the new cord to one end of the old cord and pull it in place in this manner, making the splice at the rear while the tail cowl is removed.

If play is noticed at the leading edge of the stabilizer, this can be eliminated by removing part of the shims from the ball socket connection of the stabilizer to the adjusting screw. This as indicated on the maintenance diagram.

Oleo Shock Strut

These shock struts are so constructed that initial landing shock is absorbed by the oleo action before the piston reaches the shock spring at the bottom of the strut. Taxi shocks are absorbed by this coil spring in combination with the normal oleo action of the strut.

You will note there is practically no rebound after the initial impact with the ground in a landing, as this initial impact is taken entirely by the oleo action of the strut.

Oleo Shock Strut (Cont'd)

Very little maintenance is required. It only being necessary to check the oil level occasionally, every 100 hours if the ship is in regular service, or if it has been allowed to stand for a considerable period, or has been flown inverted quite a bit, it may be necessary to check this before the expiration of the 100 hours.

We suggest at the end of each 200 hours you dismantle this strut completely, cleaning each part with gasoline, inspecting and refilling with new oil.

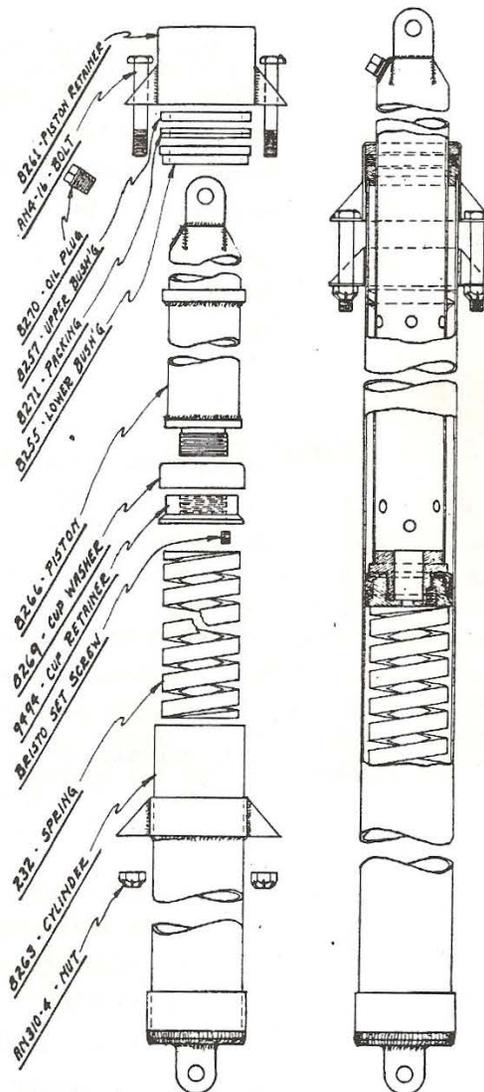
Instructions

To prepare shock strut for use:

1. Remove oil plug.
2. Pour one pint of G. E. Transformer Oil No. 6 into strut.
3. Replace oil plug.

To assemble a completely disassembled Shock Strut.

1. Assemble cup washer and cup washer retainer to piston. Drill and tap for $3/16'' \times 1/4''$ Bristo Set Screw so that it will lock the retainer to the piston.
2. Smooth top half of piston with emery cloth.
3. Assemble lower bushing, packing leather, upper bushing and piston retainer on piston.
4. Place spring in cylinder, insert piston and bolt piston retainer to cylinder.
5. Pour one pint of G. E. Transformer Oil No. 6 into strut.
6. Screw in oil plug.



Model "F" Oleo Strut

Gasoline System

The WACO Model "F" carries its gasoline in two tanks in the center section. It is important that vent lines protruding from top of these tanks be kept open at all times. It is also important that gas tank caps fit snugly and do not leak. Occasionally the steel clip fittings which hold these tank caps in place will get pulled out of shape and not have the correct tension. This can be quickly remedied by putting them back in shape with a pair of pliers and if this fails to stop the leak, one or two new cork gaskets should be used on the caps which will stop the leak.

You need not become alarmed if, after filling the tanks completely, one tank appears to drain faster than the other. This is normal and there is no set rule as to which tank will drain the fastest under certain conditions. On some airplanes one tank will one day and the other the next. However, as soon as one tank really gets low, the other one will automatically come in as both tanks are connected at all times, being joined together above the shut-off valve.

You will note the right tank has been provided with two outlet lines, one at the front and one at the rear. This is to take care of all conditions and make sure the carburetor gets gas both during a steep climb and a steep descent.

Note that the gasoline gauges owing to their position are not accurate on the ground because with the tail down, as on the ground, all the gasoline runs to the rear of the tank and the gauge may indicate full on the ground when there is less than a quarter of a tank. The gauges, however, are accurate during level flight in the air.

If the tank appears to leak, first make sure that all fittings are tight before going to the trouble of removing the tank. Leaks are usually found to be around the gasoline gauges or one of the fittings and are easily repaired by tightening, or, if necessary, removing and adding filler, such as clear dope or white lead to the threads and replacing. (See maintenance diagram for method of overcoming gasoline gauge leaks.)

FIRE EXTINGUISHERS

Care of Pyrene Extinguisher

Be sure that the extinguisher is kept full of Pyrene liquid (up to the level of the filler plug hole) and once every thirty days the extinguisher should be removed from the bracket, the handle unlocked and given a couple of pumps, after which the handle should be properly locked. Then with a downward movement (as used in making the ink in a fountain pen flow) clean the fluid out of the discharge nozzle.

By following these suggestions and the information printed on the label on the extinguisher, you will have an extinguisher that will function properly at the time you need it, and further prolong the life of the extinguisher.

Refill the extinguisher with *genuine Pyrene liquid* only. Pint refills \$1.80.

Care of Flash Fire Extinguisher

Inspect every 90 days to make sure there is sufficient liquid in the fire extinguisher. The most convenient method is to weigh the extinguisher. The pint size when properly filled weighs three pounds and the quart size five pounds and ten ounces. If scales are not handy, unscrew the cap at the top of the extinguisher and the liquid should stand approximately at the bottom of the cartridge when filled to the correct level. If necessary, refill with *genuine Flash liquid* and replace the cartridge, making sure it is screwed tightly in place.

If the fire extinguisher has been used, it is necessary that you refill with liquid and also put in a new cartridge. Pint refill for Flash is \$1.00 and a new cartridge 30¢. It is important that the extinguisher is refilled immediately after use to prevent injuries to the parts.

*Both The Above Extinguishers Are Made For Use On
Electric Fires*

Propellers

The efficiency and performance of an airplane is vitally affected by the propeller used.

Metal Propellers

A metal propeller for the Warner or Kinner B-5, 125 horsepower motor in order to give satisfactory performance up to standard, should be of 8 ft. diameter and so adjusted that the motor will turn between 1660 and 1700 at full throttle on the ground. To improve specific performance it may be desirable to change this adjustment slightly. An increase in the ground r.p.m. will give you better take-off and a decrease will give you more economical cruising. The above setting however is what we recommend.

Wood Propellers

A wood propeller for either the Warner or Kinner B-5, 125 horsepower motor should be 93 in. in diameter and should turn 1700 r.p.m. on the ground at full throttle.

Care of the Airplane

Your WACO airplane is a piece of fine machinery and is deserving of care and attention. When not in use it should be stored in a hangar as near dustproof and fireproof as is available. The finish of an airplane deteriorates much faster when left out in the weather than when properly sheltered.

It is desirable to keep the airplane clean both inside and outside at all times.

With this in mind we advise the use of a cockpit cover at all times when the airplane is not in use. Even in a hangar it is desirable to use a cockpit cover as it lends so much additional protection.

Cleaning the Airplane

We advise the use of gasoline for cleaning the airplane finish only when it is absolutely necessary to remove grease spots.

The best method of cleaning the airplane is to use warm water and a flake soap, like Lux, washing a spot of say three square feet at a time and rinsing immediately afterward. Begin at the upper surface of one of the top wings and wash that wing, both upper and lower surface, working in from the top and across to the other side. Then wash fuselage, tail surfaces and lower wings and last landing gear.

After completely washing and rinsing one surface, say one complete wing, if a chamois is available, go over the surface with the chamois which will add to the smoothness and luster of the finish.

While washing the airplane, one has a good opportunity to inspect the vent patches along the lower side of the trailing edge of wings, center section, ailerons and tail surfaces. These patches should be kept open at all times and it is well to make sure these are open by sticking a small instrument, say a match stub or something of that nature, through the holes as you come to them while washing. Care should be taken to keep water off the motor and also out of the cockpit.

See diagram for full instructions on inspection, lubrication and maintenance.

General Procedure for Starting the Motor

1. Check gasoline supply.
2. Check oil supply. Note the neck of the oil tank on your Model F WACO extends well down into the tank proper. This is done to insure sufficient expansion space in the oil tank at all times. In filling the tank the oil level should be brought to the bottom of the tank neck.
3. Be sure that gasoline shut-off valve at the right side of pilot's cockpit is turned on.
4. See detailed instructions for each motor as listed below:

Heywood Starter

When a Heywood starter is used, please note that the airplane has been provided with a Lunkenheimer priming pump on the instrument board. When it is cold or after the airplane has been standing for a while and you wish to start, first pump several shots with the primer.

Note on the left side at the outrigger strut there is a small overflow tube and this primer should be pumped until gasoline drops from this tube. This will indicate that the priming chamber is full. Then see that all is clear and turn on your switch with throttle closed, mixture controls full rich and use the Heywood starter.

If the motor does not start, in the first two or three seconds of starter use, stop and allow it to stand about one minute and try the starter again without using the primer.

If the motor fails to start, make another attempt using the starter and at the same time pumping the throttle (open and close) while the starter is turning. If this fails, it is possible the motor has been loaded and the next trial should be made with the throttle held about half open. If this is unsuccessful, the motor can be backed up as below described to unload it. See Motor Instruction Manual.

Please note in attempting to start the motor without the starter, the primer is of no value because the primer does not go direct to the motor, but rather goes to the starter. Therefore, it should be disregarded in attempting to start the motor without the starter and cranking instructions followed as given below.

Warner Motor

1. Carburetor control at the right side of your instrument board is a mixture control and not a primer. Be sure that this control is pushed all the way in, in the full rich position.

2. Pump throttle (open and close) about eight strokes so that gasoline flows from the carburetor. Then close throttle completely.

3. With switch off, spin the motor fast about four turns, the throttle still tightly closed. This gets a charge of gas into the cylinders.

4. With throttle still closed, turn the switch on and crank the motor briskly. In cranking the motor the prop should be allowed to stop at a neutral position between compression strokes or should be backed up slightly from this position so that when the motor is cranked the propeller will be turning quite rapidly as it passes the firing point. This will insure a spark from the magnetos and the inertia will carry the propeller through the right direction rather than allowing it to kick back. The spark should be fully advanced before cranking unless the motor shows a definite tendency to kick back, in which case the spark should be retarded slightly.

If the motor does not start after a reasonable amount of cranking as above described, repeat the procedure. If the motor still does not start and it appears to be loaded, with switch off and throttle full open, spin the motor backwards about eight revolutions turning it fast. Then with switch on and throttle closed, crank motor again.

When the motor is being started by the use of an electric starter use the same procedure as above described, except that the motor will be turned over by the starter instead of by manual cranking.

See page 25 for instructions on starting with Heywood starter.

See Motor Instruction Manual for further details.

Kinner Motor

See general procedure for starting the motor. Page 25.

1. Carburetor control at the right side of your instrument board is a mixture control and not a primer. Be sure that this control is pushed all the way in, in full rich position.

2. Pump throttle (open and close) about eight strokes so that the gasoline flows from the carburetor. Then close throttle completely.

3. With switch on and throttle closed, crank the motor. Please note that all Kinner B-5 motors (125 h.p.) and most of the Kinner K-5 (90 h.p.) motors have an impulse coupling on one of the magnetos. The presence of an impulse coupling which is working can be readily detected by a sharp click. This will be heard each time the motor is turned over. Therefore, when a Kinner motor with an impulse coupling is being cranked, it is not advisable to crank it in the regular manner, but rather stand well clear of the propeller and with the finger tips of one hand, pull the propeller slowly past the point where the magneto impulse coupling clicks. The motor will start quicker being pulled past the point slowly than if you attempt to crank it in the regular manner.

When a motor is equipped with an impulse coupling and the coupling is not working correctly, it can be readily detected by noticing whether the sharp clicking occurs or not. The cause of trouble will probably be found in the oil getting gummy or heavy in the impulse coupling, and can be quickly remedied by washing out this impulse coupling with a little gasoline and again lubricating with very light oil. This should be done promptly for otherwise the impulse coupling is apt to work part of the time only and it is dangerous to crank the motor with an impulse coupling in this condition.

If the motor does not start after a reasonable amount of cranking, as above described, repeat the procedure. If the motor still does not start and it appears to be loaded, with switch off and throttle full open, spin the motor backwards about right revolutions turning it fast. Then with switch on and throttle closed, crank the motor again.

When the motor is being started by the use of an electric starter use the same procedure as above described, except that the motor will be turned over by the starter instead of by manual cranking.

See page 25 for instructions on starting with Heywood starter.

See Motor Instruction Manual for further details.

Menasco Motor

See general procedure for starting motor. Page 25.

1. Carburetor control at the right of your instrument board is a mixture control and not a primer. Be sure that this control is pushed all the way in, in full rich position.

2. Pump throttle (open and close) about eight strokes so that the gasoline flows from the carburetor or manifold. Then close throttle completely.

Menasco Motor (Cont'd)

3. With switch on and throttle closed, crank the motor. Please note this motor has an impulse coupling on one of the magnetos. The presence of an impulse coupling which is working can be readily detected by a sharp click which will be heard each time the motor is turned over. Therefore, when a Menasco motor with an impulse coupling is being cranked, it is not advisable to crank it in the regular manner, but rather stand well clear of the propeller and with the finger tips of one hand, pull the propeller slowly past the point where the magneto impulse coupling clicks. The motor will start quicker being pulled past the point slowly than if you attempt to crank it in the regular manner.

When a motor is equipped with an impulse coupling and the coupling is not working correctly, it can be readily detected by noticing whether the sharp clicking occurs or not. The cause of trouble will probably be found in the oil getting gummy or heavy in the impulse coupling, and can be quickly remedied by washing out this impulse coupling with a little gasoline and again lubricating with very light oil. This should be done promptly for otherwise the impulse coupling is apt to work part of the time only and it is dangerous to crank the motor with an impulse coupling in this condition.

If the motor does not start after a reasonable amount of cranking as above described, repeat the procedure. If the motor still does not start and it appears to be loaded, with switch off and throttle full open, spin the motor backwards about eight revolutions turning it fast. Then with switch on and throttle closed, crank the motor again.

Please note there is a small hole at the lowest point at the rear of the manifold. As this is a down draft carburetor, this hole is drilled to prevent raw gasoline accumulating in the manifold, so you may have no fear of this trouble. If the motor gets loaded, it can be unloaded by turning it backward with switch off and throttle open rapidly about eight times the same as you would unload any other motor.

When the motor is being started by the use of an electric starter use the same procedure as above described, except that the motor will be turned over by the starter instead of by manual cranking.

See page 25 for instructions on starting with Heywood starter.

See Motor Instruction Manual for further details.

Flight Training in Model "F" WACO

The Model "F" WACO has been especially designed for both training and private owner sport use. You will observe that the front cockpit cowl has been made much lower than usual to give an instructor good visibility. You will also observe that the pilot in the rear seat sits up higher than the people in the front cockpit so that he can see over their heads readily which is particularly desirable while landing.

All Model "F" WACOS are supplied with an instruction cushion for use in the front cockpit while training in the airplane. This cushion raises the instructor approximately four inches and allows him to look over the moulded pyralin windshield.

We also supply a small instruction windshield, about the size and shape of the visor of a cap which slips on the center of the moulded windshield and forms a vertical screen immediately ahead of the instructor. This will give the instructor protection and allow him excellent visibility.

Please also note that tightening the thumb screw on the brake lever in the rear cockpit renders the student's brakes inoperative while the instructor sits in front with both brake and stabilizer controls in addition to other flight controls. This makes the ideal arrangement for instruction.

Racing

1. You can increase the top speed of the Model F WACO about four miles an hour by using a metal propeller in place of the standard wood propeller.

2. A further increase of two miles per hour in the top speed of the airplane can be gained by closing the front cockpit. You will find listed in the price list under Accessories two types of cockpit covers, one which fits over the front windshield and is held in place by lace wires and another type which is a little more efficient used when the front windshield is removed. This second covering is hammered along the leading edge and gives a smoother flow of air. It is also secured by lace wires and fits on after standard windshield has been removed.

3. Further increase of from two to three miles per hour can be secured by fairing the lower wing at the point of attachment to the fuselage. This fairing is of cloth over a built up fillet and the installation requires skilled workmanship. We therefore suggest that it be installed only at the factory by our experienced men. However, we are contemplating building a hammered metal part for this use and if this is available at some future date it will be easy to install on the field.

Racing (Cont'd)

4. Wheel pants give a very small addition to the top speed and will be supplied on request. However, they are a considerable nuisance for normal operation and are sold largely on account of improved appearance.

5. The greatest gain in speed can be obtained by a speed ring cowl. A single camber speed ring cowl on the Warner motor gives a minimum increase in top speed of five miles an hour, and on some combinations this increase has actually been as high as seven miles per hour. The speed ring cowl is also valuable in increasing the speed when a Kinner motor is used, but as the Kinner motor has fewer cylinders the gain in top speed with this motor will be about three and one half miles per hour. We will be glad to give further information on any of the above accessories on request.

The best speed with a standard 8 ft. metal propeller will be obtained with a setting which will allow either Kinner B-5 or Warner 7 cylinder motors to turn 1700 at full throttle on the ground.

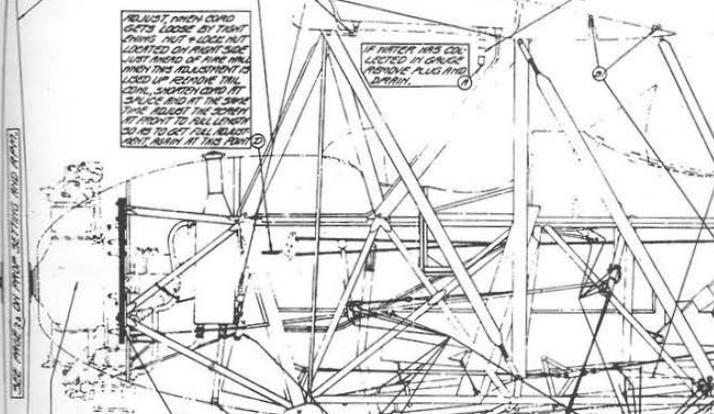
1. CHECK GAUGE, BY HAND, SETTING AND RANGE.

2. INSPECT FITTINGS AND TIGHTEN IF NECESSARY. INSPECT LINES TO SEE FOR CHANGES OR REPAIRS.

3. MAKE SURE CAP FITS SNUGLY, REPLACING COVER GASKET WHEN NECESSARY.

4. SEE THAT GAUGE IS TIGHT. IF GAUGE COVERS LEAKS, WHEN FULL LEVEL IS LOW, PRIZE THE TAIL HIGH ENOUGH SO GAUGE CAN BE AIR-MAINED WITHOUT GAS LEAKING OUT. CLEAN THERMOS CAREFULLY AND APPLY CLEAN DOPES.

5. ALLOW THIS TO SET AND PURCHASE AND APPLY SECOND COAT. SCRAM GAUGE IN AND TIGHTEN, USING PLUGS OR SMALL STAPLER WITHIN COVERSING GAUGE AT BOTTOM WHERE IT WILL NOT COLLAPSE.



6. BELLOWS WHEN LOOSE GETS LOOSE BY TIGHT TURNS. PUT A LOCK NUT LOCATED ON RIGHT SIDE JUST AHEAD OF PIPE AND WHEN THIS ADJUSTMENT IS LOOSE UP, SCREW THE COIL, SCREW COIL AT SLICE AND AT THE SAME TIME, SCREW THE SCREW AT FRONT TO FULL LENGTH SO AS TO GET FULL BEARING, BUT NOT TOO TIGHT.

7. IF WATER HAS COLLECTED IN GAUGE REMOVE PLUG AND DRAIN.

8. INSPECT AIR LINE EXTENS WIDENED AND REFILL IF NECESSARY. LIQUID LIQUIDATE SLOWLY, EVEN WHEN HOT IN USE.

9. INSPECT MOTOR MOUNT BOLTS AND TIGHTEN IF LOOSE. TIGHTEN CARE NOT TO TIGHTEN SO MUCH THAT BOLT HEADS WILL BE PULLED INTO MOTOR MOUNT.

10. SEE MOTOR INSTRUCTIONS ON TREATMENT OF OIL IN COLD WEATHER. CHANGE OIL APPROXIMATELY EVERY THIRTY HOURS.

11. INSPECT AND CHECK OIL LEVEL. SEE PAGE 11 FOR FULL INSTRUCTIONS.

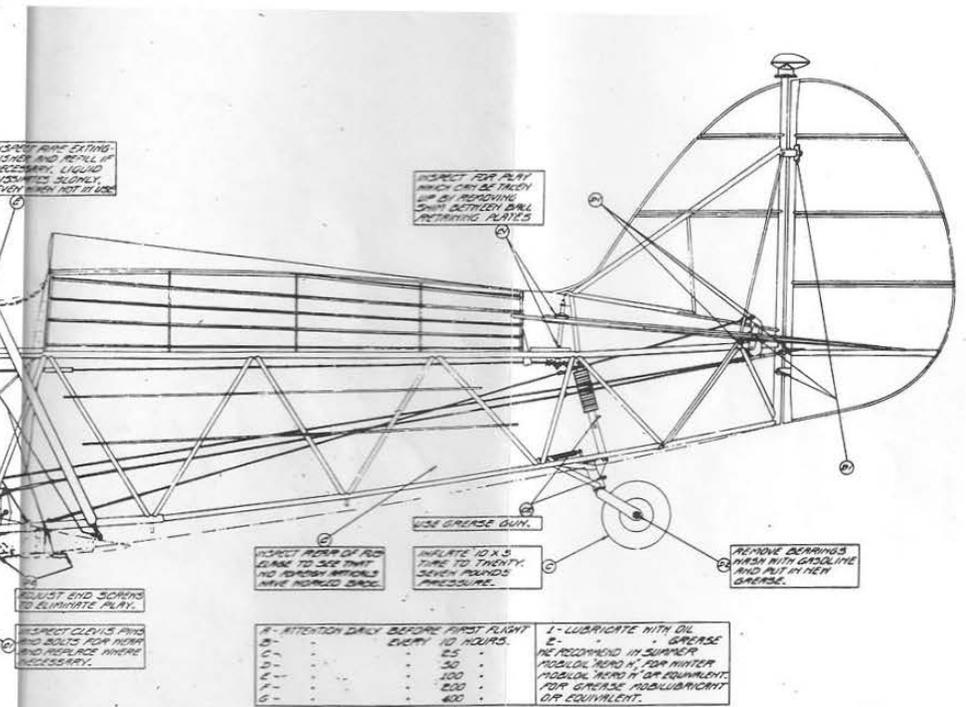
12. SEE MOTOR INSTRUCTIONS FOR MOTOR MAINTENANCE.

13. DRAIN SEDIMENT BUBB.

14. WASHING GOVT TO FUSE. CAP BOLTS SHOULD BE KEPT TIGHT AT ALL TIMES.

15. REMOVE BEARINGS, WASH WITH GASOLINE AND REPLACE WITH NEW BEARING. CLEAN UP ANY GUM PLAY WHICH MAY OCCUR BY ADDING MORE WASHING LIQUID. RESTRING COLLAR. SEE PAGE 12 FOR SLACK ADJUSTMENT.

16. INFLATE TO 30 X 30 POUNDS TO SEVEN POUNDS PRESSURE.



17. INSPECT FOR PLAY WHICH CAN BE TAKEN UP BY ADJUSTING UP OR DOWN WITH SETTING BALL RETRACING PLATES.

18. USE GREASE GUN.

19. INSPECT AREA OF ROD LEASE TO SEE THAT NO BUSHING ARTICLES HAVE MOVED BACK.

20. INFLATE TO 30 X 30 POUNDS TO THIRTY SEVEN POUNDS PRESSURE.

21. REMOVE BEARINGS WASH WITH GASOLINE AND PUT IN NEW GREASE.

22. INSPECT END SCREWS TO ELIMINATE PLAY.

23. INSPECT CLEVIS PINS AND BOLTS FOR NUTS AND REPLACE WHERE NECESSARY.

A -	ATTENTION DAILY BEFORE FIRST FLIGHT
B -	EVERY 10 HOURS.
C -	25
D -	30
E -	100
F -	200
G -	400

1 - LUBRICATE WITH OIL
2 - GREASE
AS RECOMMEND IN SUMMER
3 - OIL FOR WINTER
4 - EQUIVALENT
5 - EQUIVALENT
6 - EQUIVALENT

Instructions for Ordering

PRICES: The prices shown in this book are our best list prices. They are based on manufacturing costs and are kept as low as possible so as to encourage replacement of all new parts that are needed. As costs vary from time to time all prices shown are subject to change without notice. However supplement sheets will be sent you as soon as possible advising of any changes.

TERMS: All prices are F.O.B. Troy, Ohio, and parts shipments (except fuselages) will be sent **Express C.O.D.** unless otherwise specified. Parts shipped from Distributors stock will usually have small handling charges added to take care of transportation.

SERVICE: We endeavor to ship all parts orders the same day they are received. A separate stock room is provided and only service orders are filled from that stock. We carry a complete supply of all Model "F" parts ready for immediate shipment.

ORDERING: If the following instructions are followed orders can be filled with precision and errors brought to a minimum:

1. Drawings are provided showing the major and most used parts of the Model "F". Note the lines indicating the parts you need and the reference symbols which apply. Reference symbols are BB, BC, etc.
2. Immediately following the drawing showing the parts you need is an alphabetical list of part names for that particular assembly. Also the reference symbols are shown in alphabetical arrangement. Simply locate the symbol guide and under its heading you will find the part number, quantity used and the price each.
3. If you cannot locate the part you want on the drawing refer to the alphabetical list of parts and look under the common name. That is, "Interplane Strut" would be found under "Strut, Interplane".
4. Always specify the factory serial number of your airplane when ordering. This is important as the design of parts changes from time to time and the later type may not fit your ship.

DAMAGED SHIPMENTS: We will not be responsible for loss or damage sustained in shipments. However we will gladly assist you to secure an adjustment from the carrier. Our material is always packed in the best of containers and the transportation Company assumes responsibility for damage incurred in transit.

SHORTAGES: All shipments are checked and rechecked before leaving our stock room to prevent error and shortages. A packing slip is enclosed with each shipment and claims for shortage must be made within 3 days after receipt of order.

RETURNED GOODS: No material should be returned to us without first securing our written permission. Material sent in without notice will be held at the owners risk for 30 days and will then be disposed of as we see fit. A returned goods notice must be filled out for all returned material. Transportation charges must be prepaid on returned goods or the shipment will be refused.

FACTORY HOURS: Our factory is open from 8:00 A.M. to 5:00 P.M. each week day until Saturday. On Saturday we close at 12:00 noon and remain closed all day Sunday. Wire orders should be sent as early in the day as possible to aid us in making immediate shipment.

REF. PART	NO.	QTY.	MODEL	DESCRIPTION	PRICE EACH
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FUSELAGE, BARE

AA	9400	1	INF	Fuselage, bare	\$375.00
AA	8000	1	KNF-RNF	Fuselage, bare	375.00
AA	9840	1	INF	Fuselage, front half with motor mount	250.00
AA	9774	1	KNF-RNF	Fuselage, front half with motor mount	250.00
AA	9775	1		Fuselage, rear half	125.00
AB	9589	1		Fuselage Strut Assy., left outrigger (ready to weld on)	24.00
AB	9590	1		Fuselage Strut Assy., right outrigger (ready to weld on)	24.00
AC	9394	1	INF	Mount, Motor (metal parts complete)	36.00
AC	8232	1	KNF-RNF	Mount, motor (metal parts complete)	36.00
AC	9591	1	KNF-RNF	Mount Motor, top V Assy.	12.00
AC	9592	1	KNF-RNF	Mount Motor, left side V Assy.	12.00
AC	9593	1	KNF-RNF	Mount Motor, right side V Assy.	12.00
AC	9965	1	INF	Mount Motor, top V Assy.	12.00
AC	9966	1	INF	Mount Motor, left side V Assy.	12.00
AC	9967	1	INF	Mount Motor, right side V Assy.	12.00
AD	8091	1	INF-KNF	Mount Motor, plywood ring	9.00
AD	8096	1	RNF	Mount Motor, plywood ring	8.20

Note: A charge of \$10.00 will be made for splicing customer's front or rear half fuselage to a new half. This in addition to the charge for new half ordered.

Bare fuselages and front halves are shipped without Serial Number. In making repairs be sure to stamp the original Serial Number of your airplane on the fuselage.

FUSELAGE ASSEMBLY PARTS

AE	8969	1		Arm, Altitude Adjusting (Adaptor for carburetor)	.70
AF	8281	1		Bearing, Stabilizer Adjusting Universal	.60
AF	8386	1		Bearing, Stabilizer Adjusting Universal (ball Threaded)	1.80
AF	9159	1		Bearing, Stabilizer Adjusting Universal Threaded (ball)	2.00
AF	9258	4		Bearing Shims (Stabilizer Adjusting Universal)	.05
AG	8713	1	INF-KNF	Bellcrank Assy., Throttle (at cowl support ring)	1.10
AG	9127	1	RNF	Bellcrank Assy., Throttle (at cowl support ring)	1.15
AH	9396	1		Belt, Front Safety	4.40
AH	9397	1		Belt, Rear Safety	4.10
---	9387	2		Block, Filler (control stick)	.30
---	8176	8		Block, Large Stringer Shim	.05
---	9314	1	RNF	Board, Oil Tank	.30
AI	8644	2		Brake Equalizer Arm	.60
---	9164	1		Brake Equalizer Assy., Left	2.10
---	9165	1		Brake Equalizer Assy., Right	2.10
---	9035	2		Brake Wire Assembly	9.75
---	8399	4		Pulley, Dural, 1½" x ⅜"	.40
---	8366	3		Pulley, Dural, 1¾" x ½"	.40
---	8360	4		Pulley, Dural, 1½" x ¼"	.40

Always specify factory Serial Number of your airplane when ordering

REF. PART NO.	NO.	QTY.	MODEL	DESCRIPTION	PRICE EACH
FUSELAGE ASSEMBLY PARTS (cont'd)					
BRAKE CONTROL SYSTEM (cont'd)					
---	8392	2	-----	Brake Pulley Shackle, Double	.75
---	8435	2	-----	Brake Pulley Shackle, Single at lever	.75
---	9310	2	-----	Brake Equalizer Arm Stop Brace	1.00
---	8069	2	-----	Brake Equalizer Tube	.50
---	8668	2	-----	Brake Pulley Shackle (lower brake V)	1.00
---	8638	2	-----	Brake Pulley Shackle (Upper brake V)	1.15
AJ	8135	1	-----	Bulkhead, Left Side Fairing (wood)	.45
AJ	8136	1	-----	Bulkhead, Right Side Fairing (wood)	.45
AK	9447	1	-----	Bulkhead, No. 1, Left Bottom Fairing (wood)	.30
AK	9448	1	-----	Bulkhead, No. 1, Right Bottom Fairing (wood)	.30
AL	9209	1	-----	Bulkhead, No. 1, Front Floor (wood)	.15
AM	9449	1	-----	Bulkhead, No. 2, Bottom Fairing (wood)	.35
AN	9453	1	-----	Bulkhead, No. 2, Front Floor (wood)	.80
AO	8160	1	-----	Bulkhead, No. 3, Bottom Fairing "	.60
AP	9450	1	-----	Bulkhead, No. 4, Bottom Fairing "	.40
AQ	9451	1	-----	Bulkhead, No. 5, Bottom Fairing "	.30
AR	9452	1	-----	Bulkhead, No. 6, Bottom Fairing "	.25
---	9259	2	-----	Bushing, Long Front Pedal	.25
---	9359	2	-----	Bushing, Short Front Pedal	.15
---	9260	4	-----	Bushing, Rear Pedal	.15
---	9365	3	-----	Bushing, Pulley	.10
AS	8923	2	-----	Cable Assy., Long Rudder	3.40
AS	9223	2	-----	Cable Assy., Short Rudder	4.00
---	1716	-	-----	Clip, Engine Control	.05
---	8276	-	-----	Clip, Throttle Control Lock	.20
---	9373	3	-----	Clip, Auxiliary Windshield (top)	.10
---	9374	1	-----	Clip, Auxiliary Windshield (bottom)	.10
---	1293	4	-----	Clip, Large Rear Windshield	.15
---	2002	1	-----	Clip, Small Rear Windshield	.10
AT	764	4	-----	Clip, Safety Belt Wire	.15
---	9109	1	-----	Clip, Stabilizer Rope Guide	.25
AU	9574	1	-----	Control Assy., Engine (Boden controls to carburetor)	9.50
AU	2869	1	-----	Control Bracket, Right Hand Engine	.75
AU	9582	1	INF	Control Bracket Assy., Mixture	5.20
AU	9583	1	INF	Control Bracket Assy., Spark	5.00
---	9206	1	-----	Cord, Stabilizer Control	2.50
---	9173	1	-----	Coupling, Gas Shut-off	.50
---	9329	1	-----	Cover, Front Cockpit Control	2.00
---	9637	1	INF	Draglink Assy., Magneto	1.30
AV	9122	1	RNF-KNF	Draglink, Throttle	.40
AV	9636	1	INF	Extension Throttle (Long Throttle Rod)	.45
---	9150	6	RNF	Exhaust Stack (Short for cylinder)	1.80
---	9151	1	RNF	Exhaust Stack (Special for Carburetor heater)	1.80
---	11035	1	RNF	Exhaust Stack (Special when carburetor heater is removed)	1.80
---	8968	1	RNF	Extension, Magneto Arm	.20
AW	8718	1	-----	Extension, Long Throttle Rod	.50
---	8151	1	-----	Fairing, Bay No. 1, Left Bottom Longeron	.55
---	8152	1	-----	Fairing, Bay No. 1, Right Bottom Longeron	.55
---	8144	1	-----	Fairing, Bay No. 1, Left Top Longeron	.30
---	8145	1	-----	Fairing, Bay No. 1, Right Top Longeron	.30

REF. PART NO.	PART NO.	QTY.	MODEL	DESCRIPTION	PRICE EACH
FUSELAGE ASSEMBLY PARTS (cont'd)					
---	8140	1	-----	Fairing, Bay No. 1, Left Diagonal Strut.....	.30
---	8141	1	-----	Fairing, Bay No. 1, Right Diagonal Strut.....	.30
---	8143	1	-----	Fairing, Bay No. 2, Left Top Longeron	.15
---	8142	1	-----	Fairing, Bay No. 2, Right Top Longeron.....	.30
---	8155	2	-----	Fairing, Bay No. 2, Long Bottom Longeron.....	.30
---	8154	2	-----	Fairing, Bay No. 2, Short Bottom Longeron.....	.10
---	8147	1	-----	Fairing, Bay No. 3, Left Top Longeron	.55
---	8146	1	-----	Fairing, Bay No. 3, Right Top Longeron.....	.55
---	8156	2	-----	Fairing, Bay No. 3, Bottom Longeron	.30
---	8149	2	-----	Fairing, Bay No. 6, Top Longeron	.10
---	8157	2	-----	Fairing, Bay No. 7, Side Strut	.30
---	8150	2	-----	Fairing, Bay No. 7, Top Longeron	.30
---	8795	1	-----	Fairing, Long Door	.50
---	8796	1	-----	Fairing, Short Door	.25
---	9681	1	-----	Felt, Oil Tank	.15
AX	8980	1	RNF-KNF	Firewall, Top	10.25
AX	8977	1	RNF-KNF	Firewall, Bottom	3.50
AX	9498	1	INF	Firewall, Top	10.25
AX	9500	1	INF	Firewall, Bottom	3.50
AY	9472	1	-----	Floor, Front Cockpit	4.30
AZ	8197	1	-----	Floor, Rear Cockpit	6.00
BB	8632	2	-----	Gauge Assy., Gas Assembly complete	1.30
---	9252	-	-----	Gauge, Gas, Tubes only	1.00
---	9226	2	-----	Guide, Short Rudder Cable	1.35
BC	8975	3	-----	Guide, Stabilizer Rope	.25
BD	8244	1	-----	Headrest, Pilots (complete)	7.50
BD	8246	1	-----	Headrest, Pilot (bulkhead, upholstered)	1.20
BD	8248	1	-----	Headrest, Pilot (cowhide for up- holstering).....	.50
BE	9634	1	-----	Horn, Front Elevator	1.30
BF	8178	1	-----	Horn, Rear Elevator	1.30
---	3559	5	RNF-6 INF	Hose, Oil— $\frac{1}{2}$ " x 3"	.15
---	2599	3	-----	Hose, Gas— $\frac{3}{8}$ " x 3"	.10
---	515	5	RNF-2 INF	Hose, Oil— $\frac{3}{4}$ " x 3"	.25
---	8389	1	-----	Jamb, Door	.40
BG	9032	1	RNF-KNF	Line, Oil Drain	1.50
BG	9834	1	INF	Line, Oil Drain	2.40
BH	9625	1	INF	Line, Oil Feed	.95
BH	9036	1	KNF	Line, Oil Feed	.45
BH	9204	1	RNF	Line, Oil Feed	.45
---	9023	1	INF	Line, Oil Pressure (gauge)	1.80
BI	9626	1	INF	Line, Oil Return	1.00
BI	9037	1	KNF	Line, Oil Return	.55
BI	9202	1	RNF	Line, Oil Return	.85
BJ	9627	1	INF	Line, Oil Tank Breather	1.00
BJ	----	1	RNF	Line, Oil Tank Breather ($\frac{3}{8}$ " x 30" copper tubing, without fittings).....	.35
---	9628	1	INF	Line, Oil Tank By-Pass	.85
---	8194	1	-----	Off-set, Left Rear Cockpit Flooring (aluminum strip).....	2.40
---	8195	1	-----	Off-set, Right Rear Cockpit Flooring (aluminum strip).....	2.40

Always specify factory Serial Number of your airplane when ordering

REF. PART NO.	PART NO.	QTY.	MODEL	DESCRIPTION	PRICE EACH
FUSELAGE ASSEMBLY PARTS (cont'd)					
BK	8736	2		Pedal Assy., Left Rudder	4.40
BK	8737	2		Pedal Assy., Right Rudder	4.40
BL	8284	1		Pulley Assy., Stabilizer Adjustment Universal (includes screw on stabilizer)	2.75
BM	8290	1		Rod Assy., Gas Shut-off	2.75
---	8387	1		Screw, Stabilizer Adjusting	3.15
---	8187	1		Seat, Rear (without support tube)	17.00
BN	8633	1		Shackle Assy., Stabilizer Rope Pulley	3.70
---	8990	1		Shield, Left Fuselage Side (aluminum)	3.60
---	8991	1		Shield, Right Fuselage Side (aluminum)	3.60
---	8176	8		Shims, Large Fairing Stringer	.05
---	2285	16		Shims, Stringer	.05
---	8960	1		Sill, Door	.20
BO	9189	1		Spring, Magneto Advance	.10
---	9120	1		Spring, Left Rudder Pedal	.15
---	9121	1		Spring, Right Rudder Pedal	.15
---	9193	1		Spring, Tail Cowl	.20
---	9151	1	RNF	Stack, Long Exhaust (special when heat is off)	1.80
---	9150	6	RNF	Stack, Short Exhaust (on Warner Cylinder)	1.80
---	9151	1	RNF	Stack Exhaust (Special for Carbu- retor heater)	1.80
---	11035	1	RNF	Stack, Exhaust (Special when carbu- retor heater is removed)	1.80
BP	8236	1		Stick, Front Control (without socket)	5.70
BQ	8233	1		Stick, Rear Control (with socket)	6.15
---	9385	1		Stick Socket, Front Control	3.70
---	8241	1		Stick Socket, Rear Control	2.70
BR	8361	1		Stirrup, Stabilizer Cord Guide	1.20
---	8138	2		Stringer, Front (bottom)	.25
---	9446	2		Stringer, Center Bottom	.55
---	8974	2		Stringer, Side Bottom	.55
---	8133	2		Stringer, Side (top)	1.00
---	8137	2		Stringer, Side (bottom)	1.00
---	760	-		Strip, Fairing— $\frac{3}{4}$ " x $\frac{7}{8}$ "	.10
---	759	-		Strip, Fairing— $\frac{3}{4}$ " x $1\frac{1}{4}$ "	.10
---	9467	1		Support, Front Seat (metal) Dural	1.80
---	9055	1		Support, Gas Shut-off Cock	.40
BS	9716	1	KNF	Tank, Oil	20.50
BS	8641	1	RNF	Tank, Oil	20.50
BS	9411	1	INF	Tank, Oil	19.00
BT	8293	2		Throttle Arm Assy., Inside	1.95
BT	8297	2		Throttle Arm Assy., Outside	.80
---	8774	1		Throttle Friction Block (pair)	.30
---	8279	2		Throttle Lever Knob	.20
---	8272	2		Throttle Lever Assembly	2.35
---	8221	1		Throttle Lever Connection Link, long	.30
---	9056	1		Tie, Bottom Short Stringer	.15
---	3407	2		Transfer, Waco	.15
BU	8751	1		Tube Assy., Front Elevator Control	5.60
BV	8099	1		Tube Assy., Rear Elevator Control	4.40
BW	8186	1		Tube, Rear Seat Support (Dural tube)	3.90
BX	9353	1		Tube, Step	.85
BY	9423	1		Tube, Torque	9.00
BZ	8313	1		Turtle Deck Assembly	16.25
CC	3582	2		Vents, Gas Tank Air	.45
---	9190	1	RNF-KNF	Washer, Magneto Spring Lock	.10

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REF. PART NO.	NO.	QTY.	MODEL	DESCRIPTION	PRICE EACH
FUSELAGE ASSEMBLY PARTS (cont'd)					
---	9358	1	-----	Washer, Step Tube Leather20
---	9245	1	-----	Weatherstrip, Front Windshield.....	.40
---	9246	1	-----	Weatherstrip, Rear Windshield.....	.30
CD	9366	1	-----	Windshield, Auxiliary.....	1.00
CE	8992	1	-----	Windshield, Front.....	20.00
CF	9567	1	-----	Windshield, Rear.....	8.50
---	9035	1	-----	Wire Assy., Brake.....	10.40
CG	8924	2	-----	Wire, Elevator.....	3.20
---	9205	1	-----	Wire, Navigation Light (complete set)	1.15
---	9643	1	INF	Wire Assy., Oil Tank.....	2.20
---	8923	2	-----	Wire, Long Rudder.....	3.40
---	9223	2	-----	Wire, Short Rudder.....	4.00
---	8394	2	-----	Wire Assy., Front Safety Belt.....	1.40
---	8395	2	-----	Wire Assy., Rear Safety Belt.....	1.40
---	9215	1	-----	Wire, Double Switch (ignition).....	1.00
---	9219	1	-----	Wire, Single Switch (ignition).....	.65

COWLING

---	8289	1	-----	Blank, Instrument Bulkhead (For Consolidated panel).....	5.00
---	8200	1	-----	Blank, Instrument Bulkhead (For Pioneer panel).....	5.00
---	9161	2	-----	Clip, Luggage Door Catch.....	.05
---	9287	1	-----	Cover, Cockpit Door Inside (metal)..	.85
---	9286	1	-----	Cover, Cockpit Door Outside.....	1.85
---	8903	1	-----	Cowl Assy., Front Cockpit.....	28.00
---	8981	1	-----	Cowl Assy., Rear Cockpit.....	17.00
---	9031	1	-----	Cowl, Front Tail.....	2.50
---	9029	1	-----	Cowl, Left Side Tail.....	2.70
---	9030	1	-----	Cowl, Right Side Tail.....	2.75
---	9243	1	KNF	Cowl, Nose.....	40.00
---	9248	1	KNF	Cowl, Left Side.....	20.00
---	9249	1	KNF	Cowl, Right Side.....	20.00
---	9247	1	KNF	Cowl, Top.....	15.00
---	9250	1	RNF	Cowl, Nose.....	23.00
---	9256	1	RNF	Cowl, Left Side.....	20.00
---	9257	1	RNF	Cowl, Right Side.....	20.00
---	9255	1	RNF	Cowl, Top.....	15.00
---	9645	1	INF	Cowl, Left Side (with exhaust ring)..	20.00
---	9647	1	INF	Cowl, Right Side (with exhaust ring)	20.00
---	9651	1	INF	Cowl, Bottom (with exhaust ring)....	12.85
---	9649	1	INF	Cowl, Top (with exhaust ring).....	15.00
---	9641	1	INF	Cowl, Nose (without exhaust ring)...	40.00
---	9662	1	INF	Cowl, Left side (without exhaust ring)	20.00
---	9663	1	INF	Cowl, Right Side (without exhaust ring)	20.00
---	9666	1	INF	Cowl, Top (without exhaust ring)....	15.00
---	9028	1	-----	Door Assy., Cockpit.....	14.00
---	9288	1	-----	Lining, Cockpit Door (Fabricoid)....	.60
---	8988	1	-----	Moulding, Cockpit Door.....	.35
---	9563	1	-----	Moulding, Set of Cockpit.....	4.15
---	9222	1	-----	Pan, Oil.....	2.35
---	9389	3	-----	Pin, Large Cowling.....	.10
---	9390	7	-----	Pin, Small Cowling.....	.10
---	9301	1	-----	Plate, Bottom Skuff (door sill).....	.35
---	9300	1	-----	Plate, Front Skuff (door sill).....	1.05

Always specify factory Serial Number of your airplane when ordering

REF. PART NO.	NO.	QTY.	MODEL	DESCRIPTION	PRICE EACH
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COWLING (cont'd)

---	9302	1	-----	Plate, Rear Skuff (door sill).....	1.15
---	8746	1	KNF	Ring, Left Cowling Support.....	5.00
---	8747	1	KNF	Ring, Right Cowling Support.....	6.00
---	8754	1	RNF	Ring, Left Cowling Support.....	5.00
---	8755	1	RNF	Ring, Right Cowling Support.....	5.70
---	9654	1	INF	Ring, Left Cowling Support.....	5.00
---	9655	1	INF	Ring, Right Cowling Support.....	6.00
CH	8990	1	-----	Shield, Left Fuselage (aluminum)....	3.60
CH	8991	1	-----	Shield, Right Fuselage (aluminum)...	3.60
---	9214	1	-----	Shield, Instrument Board (rear of front cockpit).....	4.00
---	9303	4	-----	Spacer, Cowling (rear of motor cowl) .	.55
---	8244	1	-----	Streamline, Headrest.....	7.50
---	835	10	RNF-KNF	Stud, Cowling.....	.05
---	9479	10	INF	Stud, Cowling.....	.30
---	9366	1	-----	Windshield, Auxiliary.....	1.00
---	8992	1	-----	Windshield, Front.....	20.00
---	9567	1	-----	Windshield, Rear.....	8.50
---	9253	2	-----	Wires, Side Cowl Lace.....	.40

UPHOLSTER PARTS

---	8246	1	-----	Bulkhead Assy., Headrest (pilot)....	1.20
---	9199	1	-----	Cushion, Front Seat Back.....	9.85
---	9462	1	-----	Cushion Assy., Front Seat Bottom (single type only available).....	14.40
---	9194	1	-----	Cushion, Rear Seat Back.....	9.00
---	3624	1	-----	Cushion, Rear Seat Bottom.....	9.65
---	9564	8 ft.	-----	Felt, Cockpit Roll (padding) per ft. .	.20
---	---	-	-----	Lace, Shoe.....	.10
---	9562	1	-----	Roll, Set Cockpit (front and rear) (leather).....	2.25
---	9437	1	-----	Roll, Front Cockpit (leather only)...	1.75
---	9438	1	-----	Roll, Rear Cockpit (leather only)....	.75
---	9207	1	-----	Upholstering, Left Side Fabricoid....	13.00
---	9208	1	-----	Upholstering, Right Side Fabricoid...	10.00

TAIL SURFACES

---	8508	1	-----	Elevator, Left, Covered.....	28.60
---	8509	1	-----	Elevator, Right, Covered.....	28.60
---	8510	1	-----	Elevator, Left, Uncovered.....	18.35
---	8511	1	-----	Elevator, Right, Uncovered.....	18.35
---	8480	1	-----	Fin, Covered.....	25.00
---	8481	1	-----	Fin, Uncovered.....	17.50
---	8496	1	-----	Rudder, Covered.....	31.00
---	8497	1	-----	Rudder, Uncovered.....	18.50
---	8512	1	-----	Stabilizer, Covered.....	59.00
---	8513	1	-----	Stabilizer, Uncovered.....	42.50

For miscellaneous small parts used on the tail see Page 40, parts used in rigging.

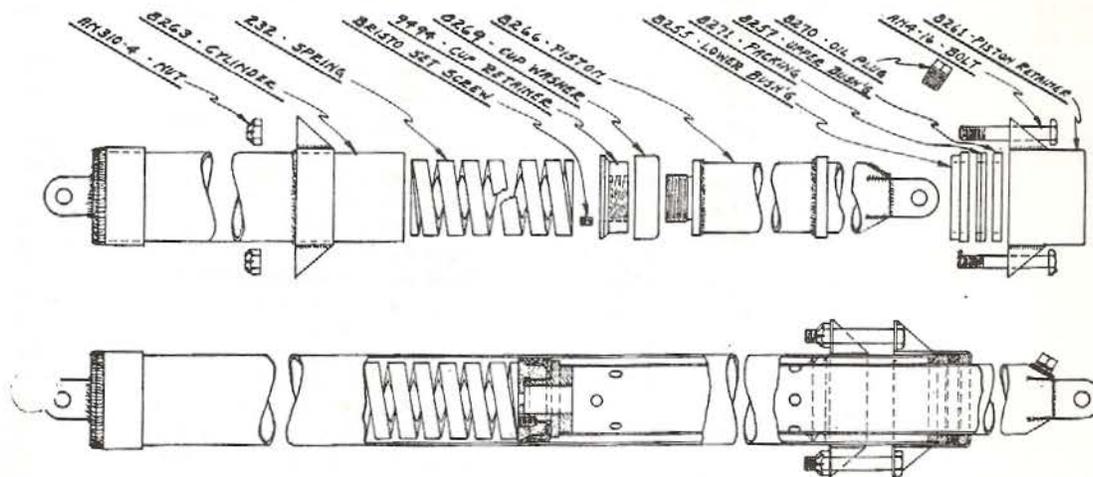
LANDING GEAR PARTS

---	---	-	-----	Brake Mechanism Assy., Left—less wheel (Aircraft Products 6.50 x 10) .	20.00
---	---	-	-----	Brake Mechanism Assy., Right—less wheel (Aircraft Products 6.50 x 10) .	20.00

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REF. PART NO.	NO.	QTY.	MODEL	DESCRIPTION	PRICE EACH
LANDING GEAR PARTS (cont'd)					
---	265	4	-----	Bushing, Landing Gear (top of V struts)	.20
CI	263	2	-----	Cap, Hub	.90
---	9313	-	-----	Clip, Brake Wire Guide	.10
CJ	---	2	-----	Discs, Brake Wheel (6.50 x 10 ACP)	.80
---	---	-	-----	Oil, Landing Gear, Transformer No. 6, per gal.	1.40
---	9961	-	-----	Oleo, Cylinder Assy. (with retainer collar and bolts)	7.00
---	8269	-	-----	Oleo, Leather cup washer	.75
---	9960	-	-----	Oleo, Piston Assembly complete	12.00
---	8639	4	-----	Shackle, Brake Equalizer pulley	.35
CK	232	2	-----	Spring, Landing Gear Shock, large	1.25
CK	233	2	-----	Spring, Landing Gear Shock, small	1.00
CK	9038	2	-----	Streamline, Landing Gear Shock Strut	7.25
CK	8250	2	-----	Strut Assy., Landing Gear Shock, bare	20.00
---	---	-	-----	Tire, 6.50 x 10	22.00
---	---	-	-----	Tube, 6.50 x 10	7.10
CL	9481	1	-----	Vee, Left Landing Gear, less streamline	30.00
CL	9482	1	-----	Vee, Right Landing Gear, less streamline	30.00
CL	9487	1	-----	Vee Assy., Left Landing Gear, streamlined	38.00
CL	9488	1	-----	Vee Assy., Right Landing Gear, streamlined	38.00
---	9495	2	-----	Vee Streamline Fairing, Front Landing Gear (Balsa Wood)	1.25
---	9496	2	-----	Vee Streamline Fairing, Rear Landing Gear (Balsa Wood)	1.25
---	8353	4	-----	Universal, Shock Strut	.50
---	264	8	-----	Washer, Wheel	.05
---	8360	4	-----	Wheels, Pulley (1 1/2 x 1/4") Dural	.35
---	---	-	-----	Wheel only, Brake (6.50 x 10 ACP)	40.00

Note—Unless otherwise specified streamlined landing gear V's will be shipped.



MODEL "F" OLEO STRUT

Always specify factory Serial Number of your airplane when ordering

REF. PART NO.	NO.	QTY.	MODEL	DESCRIPTION	PRICE EACH
TAIL WHEEL ASSEMBLY					
CM	9565	1		Tail Wheel only complete with tire and tube. Size 10 x 3	23.00
CM		1		Axle	2.50
CM		1		Bearing	2.00
CM	8101	2		Bushing, Support Assy. Bronze	.80
CM		1		Casting (Wheel)	11.50
CN	8166	14		Discs, Shock Strut tail wheel rubber	.10
CN				Fitting, Zerk Grease	.20
CN	9722	1		Fork	8.85
CN	8164	1		Shock Strut Assy., complete	8.35
CN	8167	1		Shock Strut Bottom Tube Assembly	2.10
CN	8171	1		Shock Strut Top Tube Assembly	2.65
	8642	1		Spring	.15
	8112	1		Spring Retainer	1.30
CO	8102	1		Support Assembly	13.00
				Tire	9.40
				Tube	2.75
	8165	6		Washers, Shock Strut Spacer (metal)	.10

STRUTS, WIRES & OTHER PARTS USED IN RIGGING

CP	8283	1		Bearing, Stabilizer Adjustment Guide	.20
	8414	8		Bushing, Wing Attachment Taper	.15
	3097	2		Clip, Fin Wire	.15
	3096	4		Clip, Stabilizer Wire	.15
	2997	4		Cover, Aileron Slot	1.00
	9275	1		Cover, Left Aileron Bellcrank	1.00
	9276	1		Cover, Right Aileron Bellcrank	1.00
	194	4		Hinge, Elevator	.25
	9126	2		Hinge, Rudder	.25
	9634	1		Horn, Front Elevator	1.30
	8178	1		Horn, Rear Elevator	1.30
	2127	1		Lights, Set Navigation	15.00
	9381	2		Plug, Rudder Stop	.20
CR	9306	2		Link, Aileron Drag	8.50
	9329	1		Plate, Front Cockpit Control Cover	2.00
	9221	4		Plate, Top Wing Inspection	.35
	8425	2		Rod Assy., Aileron Push tube	12.00
	3481	1		Rope, Set of Tie Down	1.25
	8470	4		Screw, Interplane Strut Adjustment	.30
	9043	2		Stick, Interplane Wire	2.00
CS	8428	1		Strut Assy., Left Aileron	5.00
CS	8429	1		Strut Assy., Right Aileron	5.00
CT	8514	1		Strut Assy., Left Center Section	19.00
CT	8515	1		Strut Assy., Right Center Section	19.00
CU	8476	2		Strut Assy., Diagonal Interplane	9.75
CV	8474	2		Strut Assy., Front Interplane	8.25
CW	8475	2		Strut Assy., Rear Interplane	8.25
	5-465	2		Wire, Center Section, 5/16-24 x 48 1/2"	5.00
	5-113	2		Wire, Front Flying, 5/16-24 x 115"	6.00
	5-109	4		Wire, Rear Flying, 5/16-24 x 111"	6.00
	4-96	2		Wire, Front Landing, 1/4-28 x 97 3/4"	4.50
	4-9125	2		Wire, Rear Landing, 1/4-28 x 93"	4.50
	4-40	2		Wire, Bottom Tail, 1/4-28 x 41 1/2"	4.50
	4-455	2		Wire, Top Tail, 1/4-28 x 47"	4.50

Always specify factory Serial Number of your airplane when ordering

REF. PART NO.	NO.	QTY.	MODEL	DESCRIPTION	PRICE EACH
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COVERS & PATCHES

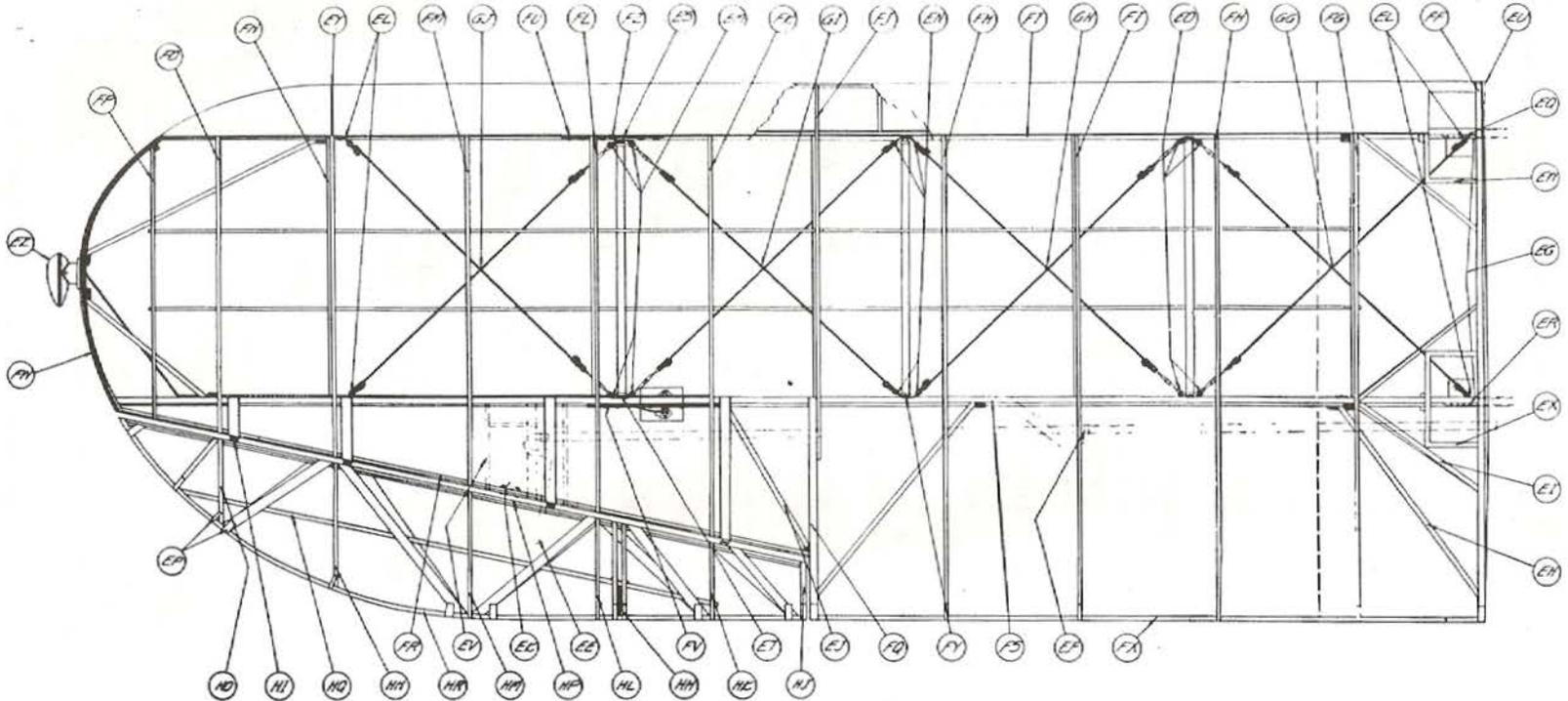
---	9242	4	-----	Aileron Cover.....	3.00
---	9241	1	-----	Center Section Cover.....	7.65
---	9315	1	-----	Cockpit Cover.....	7.00
---	9238	2	-----	Elevator Cover.....	4.25
---	9235	1	-----	Fin Cover.....	2.75
---	9239	1	-----	Fuselage Cover.....	25.00
---	3440	2	-----	Landing Gear Fairing Cover, for 1 V.....	.60
---	9328	1	-----	Motor Cover.....	7.20
---	9333	2	-----	Pulley Covers (bottom fuselage) metal.....	.70
---	9236	1	-----	Rudder Cover.....	4.50
---	9237	2	-----	Stabilizer Cover (one side).....	3.25
---	9220	1	-----	Tail Wheel Cover.....	2.00
---	9240	4	-----	Wing Cover.....	17.00
---	9265	2	-----	Aileron Push Rod Patch Assy. (bottom fuselage).....	.30
---	3444	2	-----	Center Section Gas Tank Cap Patch.....	.10
---	3450	4	-----	Center Section Patch (strut).....	.15
---	3453	2	-----	Center Section Patch (two holes for wire terminals).....	.15
---	9445	1	-----	Fin Inspection Patch.....	.15
---	9024	1	-----	Gas Shut-off Patch (cockpit lining)....	.30
---	9455	4	-----	Landing Gear Shock Strut Stream- line Rawhide Patch.....	.10
---	1989	2	-----	Rudder Wire Patch.....	.10
---	1147	2	-----	Rudder Wire Rawhide Patch (fusel- age frame).....	.10
---	9444	2	-----	Safety Belt Wire Patch, Rear.....	.15
---	9213	1	-----	Stabilizer Rope Fabricoid Patch (cockpit lining).....	.10
---	9263	1	-----	Tail Wheel Fabricoid Patch Assy. (with eyelets) (sewed to fuselage cover)	.95
---	9268	2	-----	Wing Fitting Patch, large (bottom fuselage).....	.15
---	9271	2	-----	Wing Fitting Patch, small (bottom fuselage).....	.15
---	1995	4	-----	Wire Fitting Patch.....	.10
---	370	44	-----	Vent Patch.....	.03

Note: All covers are sewed and ready to slip on over the part to be covered.
We use only Grade A Wing Cloth of the best quality.

COVERING CHARGES

Aileron.....	\$ 6.00
Center Section.....	20.00
Elevator.....	6.00
Fin.....	6.00
Fuselage.....	45.00
Rudder.....	8.00
Stabilizer.....	10.00
Wing.....	35.00

Always specify factory Serial Number of your airplane when ordering



*PARTS ON LOWER WINGS NOT USED ON UPPER WINGS.
ARE SHOWN IN DOT AND DASH LINES.*

WING PARTS DIAGRAM

REF. PART NO.	QTY.	MODEL	DESCRIPTION	PRICE EACH
WINGS				
---	8423	1	Wing, Left Lower, Covered.....	225.00
---	8424	1	Wing, Right Lower, Covered.....	225.00
---	8421	1	Wing, Left Upper, Covered.....	195.00
---	8422	1	Wing, Right Upper, Covered.....	195.00
---	8402	1	Wing, Left Lower, Uncovered.....	175.00
---	8403	1	Wing, Right Lower, Uncovered.....	175.00
---	8400	1	Wing, Left Upper, Uncovered.....	150.00
---	8401	1	Wing, Right Upper, Uncovered.....	150.00
WING PARTS				
---	8425	-	Aileron Push Rod (Long).....	12.00
EE	8811	1	Bellcrank, Left Aileron.....	2.15
EE	8812	1	Bellcrank, Right Aileron.....	2.15
EF	8961	1	Block Assy., Left Aileron Rod Guide..	1.00
EF	8962	1	Block Assy., Right Aileron Rod Guide	1.00
---	9067	2	Block, Footwalk Center Attachment..	.05
---	9062	4	Block, Front Footwalk Attachment....	.10
---	9063	2	Block, Rear Footwalk Attachment....	.15
---	8838	6	Block, Solid End Rib Nose.....	.02
---	2357	72	Block, Plywood Utility (large).....	.02
---	1357	112	Block, Plywood Utility (medium)....	.02
---	9066	4	Braces, Footwalk Center.....	.10
---	9065	4	Braces, Footwalk Side.....	.05
---	9163	4	Braces, Plywood.....	.10
EG	8839	2	Braces, Solid End Rib Compression..	.20
EH	8685	8	Braces, Long Solid End Rib.....	.10
EI	8686	16	Braces, Short Solid End Rib.....	.05
EJ	8687	4	Braces, A No. 2, Solid Tail Rib.....	.05
EK	3650	1	Bracket, Left Aileron Bellcrank.....	1.85
EK	3651	1	Bracket, Right Aileron Bellcrank.....	1.85
---	9112	2	Capstrip, Main Front Spar Rein- forcement.....	.05
---	9114	2	Capstrip, Rear Spar Reinforcement Top.....	.05
EL	9718	16	Clip, Internal Brace Wire.....	.20
EM	8462	16	Clip, Internal Brace Wire.....	.20
EN	8468	16	Clip, Internal Brace Wire.....	.20
EO	8466	16	Clip, Internal Brace Wire.....	.20
EP	1067	24	Coppers, Narrow Trailing Edge.....	.02
EP	1066	12	Coppers, Wide Trailing Edge.....	.02
---	9064	18	Cross Pieces, Footwalk.....	.10
---	9334	2	Cross Pieces, Footwalk.....	.10
---	2085	-	Fairing, 1/4" Round.....	.02
---	9103	1	Fairing, Left Lower Terminal.....	.40
---	9104	1	Fairing, Right Lower Terminal.....	.40
---	9116	2	Fairing, Upper Front Flying Wire Terminal.....	.15
---	9185	2	Fairing, Upper Rear Flying Wire Terminal.....	.40
---	9117	2	Fairing, Left & Right Upper Front Landing Wire Terminal.....	.15
---	9118	2	Fairing, Upper Rear Landing Wire Terminal.....	.15
EQ	8623	4	Fitting, Front Lower Root Plate.....	.45
---	8627	4	Fitting, Rear Lower Root Plate.....	.45
EQ	8441	4	Fitting, Left Upper Wing Root Plate..	.70
EQ	8442	4	Fitting, Right Upper Wing Root Plate	.70

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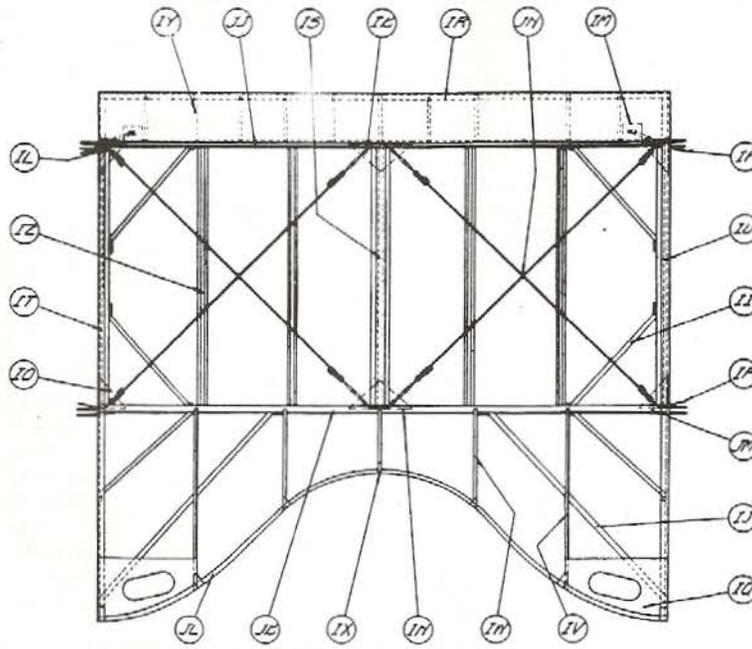
REF. PART NO.	NO.	QTY.	MODEL	DESCRIPTION	PRICE EACH
WING PARTS (cont'd)					
ES	8771	2	-----	Fitting, Left Upper Wing Front Strut Plate.....	.35
ES	8772	2	-----	Fitting, Right Upper Wing Front Strut Plate.....	.35
ES	8606	2	-----	Fitting, Upper Front Flying Wire Pull	.25
ES	8383	2	-----	Fitting, Lower Front Landing Wire Pull.....	.25
ET	8419	4	-----	Fitting, Upper Wing Rear Strut Plate	.35
ET	8420	4	-----	Fitting, Lower Wing Rear Strut Plate	.35
ET	8446	4	-----	Fitting, Upper Rear Flying Wire Pull	.25
ET	8413	2	-----	Fitting, Lower Rear Landing Wire Pull	.25
EU	9060	2	-----	Former, Lower Solid End Rib Nose (Balsa).....	.15
EV	9227	1	-----	Frame, Left Aileron Bellcrank (lower)	.50
EV	9228	1	-----	Frame, Right Aileron Bellcrank (lower)	.50
EW	9176	1	-----	Frame, Left Front Inspection (upper)	.75
EW	9177	1	-----	Frame, Right Front Inspection (upper)	.75
EX	9178	1	-----	Frame, Left Rear Inspection (upper)	.75
EX	9179	1	-----	Frame, Right Rear Inspection (upper)	.75
---	8607	4	-----	Front, Upper Strut Plate Reinforce- ment (plywood).....	.30
---	8594	28	-----	Gusset, Rectangular (rib).....	.02
---	10240	752	-----	Gusset, Rectangular (rib).....	.02
---	9098	8	-----	Gusset, Large False Rib.....	.10
---	2371	56	-----	Gusset, Tail (rib).....	.02
EY	8677	4	-----	Leading Edge, Wing (wood).....	1.00
EY	8702	4	-----	Leading Edge, Dural (top camber) including tips.....	6.00
EY	8703	4	-----	Leading Edge, Dural (Bottom Camber) including tips.....	5.00
EY	8704	4	-----	Leading Edge, Dural (top camber) tip only.....	1.00
EY	8706	4	-----	Leading Edge, Dural (Bottom camber) tip only.....	1.00
EZ	2123	2	-----	Navigation Light Base.....	1.25
EZ	----	2	-----	Navigation Light Bulb.....	.75
EZ	----	2	-----	Navigation Light Shell.....	2.25
EZ	----	2	-----	Navigation Light Bracket.....	.75
EZ	2093	2	-----	Moulding, Wing Walk.....	.15
---	8625	4	-----	Reinforcement, Lower Wing Root Fitting (plywood).....	.15
---	9113	2	-----	Reinforcement, Additional Front Spar	.10
---	9110	4	-----	Reinforcement, Main Front Spar.....	.25
---	9111	4	-----	Reinforcement, Rear Spar.....	.15
FF	8823	1	-----	Rib, Left Lower Solid End.....	3.50
FF	8824	1	-----	Rib, Right Lower Solid End.....	3.50
FF	8661	1	-----	Rib, Left Upper Solid End.....	3.50
FF	8662	1	-----	Rib, Right Upper Solid End.....	3.50
FG	8663	2	-----	Rib, A No. 1, Left Upper Light Compression.....	2.50
FG	8664	2	-----	Rib, A No. 1, Right Upper Light Compression.....	2.50
FG	8879	2	-----	Rib, Solid Nose (wing walk).....	.15
FG	8825	2	-----	Rib, Solid Center (wing walk).....	1.00
FG	8829	2	-----	Rib, Lower Solid Tail (wing walk)....	.75
FH	8517	8	-----	Rib, A No. 1, Light.....	2.25
FI	8933	1	-----	Rib, A No. 1, Left Lower Light Compression.....	3.80

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REF. PART NO.	PART NO.	QTY.	MODEL	DESCRIPTION	PRICE EACH
WING PARTS (cont'd)					
FI	8934	1		Rib, A No. 1, Right Lower Light Compression	3.80
FJ	8665	2		Rib, A No. 2, Left Light Compression	2.00
FJ	8666	2		Rib, A No. 2, Right Light Compression	2.00
FK	8523	4		Rib, No. 3, Light	2.00
FL	8867	1		Rib, A No. 4, Left Lower Light Compression	2.00
FL	8868	1		Rib, A No. 4, Right Lower Light Compression	2.00
FL	8865	1		Rib, A No. 4, Left Upper Light Compression	2.00
FL	8866	1		Rib, A No. 4, Right Upper Light Compression	2.00
FM	8527	4		Rib, A No. 5, Light	2.00
FN	8669	1		Rib, "B", Left Upper Light Com- pression	2.00
FN	8670	1		Rib, "B", Right Upper Light Com- pression	2.00
FN	8529	2		Rib, "B", Light (lower)	2.00
FO	8531	2		Rib, "C", Light (upper)	1.00
FO	8833	1		Rib, "C", Left Lower Light Com- pression	1.00
FO	8834	1		Rib, "C", Right Lower Light Com- pression	1.00
FP	8671	2		Rib, Left False	.70
FP	8672	2		Rib, Right False	.70
FQ	8926	1		Rib, A No. 2, Left Lower Solid Tail	1.00
FQ	8927	1		Rib, A No. 2, Right Lower Solid Tail	1.00
FQ	8519	1		Rib, A No. 2, Left Upper Solid Tail	1.00
FQ	8520	1		Rib, A No. 2, Right Upper Solid Tail	1.00
---	8593	70		Rib, Nose Gusset "A" Light	.10
---	9162	4		Saddle, A No. 2, Solid Tail Rib Brace	.05
FR	9148	1		Spar, Left Lower False (with hinges)	5.00
FR	9149	1		Spar, Right Lower False (with hinges)	5.00
FR	9183	1		Spar, Left Upper False (with hinges)	5.00
FR	9184	1		Spar, Right Upper False (with hinges)	5.00
FS	8451	1		Spar, Left Upper Front	9.00
FS	8452	1		Spar, Right Upper Front	9.00
FS	8455	1		Spar, Left Lower Front	9.00
FS	8456	1		Spar, Right Lower Front	9.00
FT	8449	1		Spar, Left Upper Rear	9.00
FT	8450	1		Spar, Right Upper Rear	9.00
FT	8453	1		Spar, Left Lower Rear	9.00
FT	8454	1		Spar, Right Lower Rear	9.00
FU	8607	4		Strap, Upper Front Wing Reinforce- ment (metal)	.30
FV	8407	4		Strap, Upper Rear Wing Reinforce- ment (metal)	.30
FW	8678	4		Strip, Inner Wing Bow End	.30
FW	8679	4		Strip, Middle Wing Bow End	.30
FW	8680	4		Strip, Outer Wing Bow End	.30
FX	8564	1		Trailing Edge, Wing (lower)	.80
FX	8563	1		Trailing Edge, Wing (upper)	.80
FY	8471	8		Tube, Long Wing Compression (dural)	1.75
FY	8472	4		Tube, Short Wing Compression (dural) (at strut fitting)	1.75
FZ	8443	12		Universal, Interplane Strut	.90
---	8681	4		Wedge, False Wing Spar	.05

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REF. PART NO.	NO.	QTY.	MODEL	DESCRIPTION	PRICE EACH
WING PARTS (cont'd)					
---	9058	1	-----	Wing Walk (Plywood)-----	6.25
GG	9719	8	-----	Wire, Wing Internal Brace, 1st bay, upper-----	2.00
GG	9717	8	-----	Wire, Wing Internal Brace, 1st bay, lower-----	2.00
GH	9074	12	-----	Wire, Wing Internal Brace, 2nd bay, upper-----	2.00
GH	9072	4	-----	Wire, Wing Internal Brace, 2nd bay, lower-----	2.00
GI	9074	12	-----	Wire, Wing Internal Brace, 3rd bay, upper and lower-----	.85
GJ	9719	8	-----	Wire, Wing Internal Brace, 4th bay, upper-----	2.00
GJ	9717	8	-----	Wire, Wing Internal Brace, 4th bay, lower-----	2.00
AILERONS					
---	8494	1	-----	Aileron, Left Lower, Covered-----	30.00
---	8495	1	-----	Aileron, Right Lower, Covered-----	30.00
---	8492	1	-----	Aileron, Left Upper, Covered-----	30.00
---	8493	1	-----	Aileron, Right Upper, Covered-----	30.00
---	8431	1	-----	Aileron, Left Lower, Uncovered-----	22.00
---	8432	1	-----	Aileron, Right Lower, Uncovered-----	22.00
---	8433	1	-----	Aileron, Left Upper, Uncovered-----	22.00
---	8434	1	-----	Aileron, Right Upper, Uncovered-----	22.00
AILERON PARTS					
HH	8898	1	-----	Fitting, Left Lower Aileron Strut Attachment-----	.25
HH	8899	1	-----	Fitting, Right Lower Aileron Strut Attachment-----	.25
HH	8759	1	-----	Fitting, Left Upper Aileron Strut Attachment-----	.65
HH	8760	1	-----	Fitting, Right Upper Aileron Strut Attachment-----	.65
HH	8437	1	-----	Fitting, Left Lower Aileron Horn-----	2.60



CENTER SECTION PARTS DIAGRAM

REF. PART NO.	NO.	QTY.	MODEL	DESCRIPTION	PRICE EACH
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AILERON PARTS (cont'd)

HH	8438	1	-----	Fitting, Right Lower Aileron Horn	2.60
HI	2825	-	-----	Hinge, Left and Right Aileron (Interchangeable)	.30
IJ	8521	2	-----	Rib, Left Aileron Solid End (No. 1)	.30
HJ	8522	2	-----	Rib, Right Aileron Solid End (No. 1)	.30
HK	8524	4	-----	Rib No. 2, Aileron Light	.65
HL	8526	4	-----	Rib No. 3, Aileron Light	.65
HM	8528	4	-----	Rib No. 4, Aileron Light	.65
HN	8530	4	-----	Rib No. 5, Aileron Light	.65
HO	8532	4	-----	Rib No. 6, Aileron Light	.65
HP	8999	1	-----	Spar, Left Lower Aileron Front (with hinges)	4.50
HP	9000	1	-----	Spar, Right Lower Aileron Front (with hinges)	4.50
HP	8997	1	-----	Spar, Left Upper Aileron Front (with hinges)	4.50
HP	8998	1	-----	Spar, Right Upper Aileron Front (with hinges)	4.50
HQ	9377	1	-----	Spar, Left Lower Aileron Rear	1.00
HQ	9378	1	-----	Spar, Right Lower Aileron Rear	1.00
HQ	9375	1	-----	Spar, Left Upper Aileron Rear	1.00
HQ	9376	1	-----	Spar, Right Upper Aileron Rear	1.00
HR	8565	4	-----	Trailing Edge, Aileron	.90

Note—It is important in ordering ailerons and aileron parts that you specify upper or lower and right or left.

CENTER SECTION

---	9749	1	-----	Center Section, Covered, with tanks	200.00
---	9825	1	-----	Center Section, Covered, without tanks	100.00
---	9750	1	-----	Center Section, Uncovered, without tanks	75.00

CENTER SECTION PARTS

II	8818	6	-----	Brace, Short Solid End Rib	.05
IJ	8685	6	-----	Brace, Long Solid End Rib	.10
IK	8461	2	-----	Clip, Internal Brace Wire (double)	.25
IL	8464	4	-----	Clip, Internal Brace Wire	.25
IM	8935	2	-----	Fairing, Brace Wire Terminal	.15
IN	8919	2	-----	Fitting, Gas Tank Retainer (metal triangle)	.35
IO	8920	4	-----	Fitting, Gas Tank Retainer (metal triangle)	.25
IP	8415	4	-----	Fitting, Left Root (front or rear)	.45
IP	8416	4	-----	Fitting, Right Root (front or rear)	.45
IP	8409	2	-----	Fitting, Center Section Brace Wire (Pull)	.25
IP	8385	2	-----	Fitting, Front Landing Wire (Pull)	.25
IP	8411	2	-----	Fitting, Rear Landing Wire (Pull)	.25
---	9695	5	-----	Flange, Pipe 1/4" (aluminum) (welds to tank)	.60
---	9696	2	-----	Flange, Pipe 1/2" (aluminum) (welds to tank)	.60
---	8632	2	-----	Gauge Assy., Gas	1.30

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REF. PART NO.	PART NO.	QTY.	MODEL	DESCRIPTION	PRICE EACH
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CENTER SECTION PARTS (cont'd)

IQ	8791	2	-----	Hand Grip.....	.60
IQ	8790	4	-----	Hand Grip Plywood Reinforcement..	.50
IR	8931	1	-----	Leading Edge, Bottom Dural.....	1.50
IR	8930	1	-----	Leading Edge, Top Dural.....	2.00
IR	8781	1	-----	Leading Edge (spruce).....	.30
IS	9761	1	-----	Rib, Center (compression).....	2.50
IT	9752	1	-----	Rib, Left Solid End.....	3.50
IU	9753	1	-----	Rib, Right Solid End.....	3.50
IV	8787	2	-----	Rib, Long Tail.....	.85
IW	8788	2	-----	Rib, Intermediate Tail.....	.50
IX	8789	1	-----	Rib, Short Tail.....	.60
IY	8780	5	-----	Rib, Nosc, open.....	.50
IZ	8786	4	-----	Bottom Cap Strip.....	.10
IZ	9201	4	-----	Bottom Cap Strip Reinforcement....	.15
JJ	8405	1	-----	Spar, Front.....	3.00
JK	8406	1	-----	Spar, Rear.....	3.00
---	9759	4	-----	Supports, Solid Rib Gas Tank.....	.15
---	---	1	-----	Tank, Left Gas (old type Aircraft Products).....	50.00
---	---	1	-----	Tank, Right Gas (old type Aircraft Products).....	50.00
---	9687	1	-----	Tank, Left Gas (aluminum).....	50.00
---	9688	1	-----	Tank, Right Gas (aluminum).....	50.00
---	8595	1	-----	Tank, Left Gas (Terneplate).....	45.00
---	8596	1	-----	Tank, Right Gas (Terneplate).....	45.00
---	---	-	-----	Tank Caps, Gas.....	1.25
---	---	-	-----	Tank Cap Gasket (cork).....	.05
JL	8566	1	-----	Trailing Edge.....	.90
JM	8443	4	-----	Universal, Interplane Strut.....	.90
JN	8819	4	-----	Wire Assy., Internal Brace.....	2.00

Note: On Model "F" WACOS up to Serial No. 3389 the gasoline tanks were self-supporting from a flange formed on their top. In that case certain parts are different as listed in the following:

---	8778	1	-----	Rib, Left Solid End.....	5.75
---	8779	1	-----	Rib, Right Solid End.....	5.75
---	8783	1	-----	Rib, Center (compression).....	5.00
---	8782	-	-----	Strip, Solid End Rib Top Cap.....	.20
---	8875	-	-----	Strip, Solid End Rib Bottom Cap....	.30
---	8784	-	-----	Strip, Center Compression Rib Top Cap.....	.10
---	8786	-	-----	Strip, Center Compression Rib Bottom Cap.....	.20
---	9765	-	-----	Strip, Spar Top Cap.....	.10
---	9765	-	-----	Strip, Spar Bottom Cap.....	.10

ACCESSORIES

Speed Ring Cowl for Warner Motor.....	\$ 38.00
Metal front cockpit cover (Used over regular windshield).....	8.25
Metal front cockpit cover (with detachable windshield).....	25.00
Combination exhaust speed ring cowl for Warner Motor.....	Price on request
Fire Extinguisher (Pyrene—Pint size).....	10.00
Fire Extinguisher (Flash—Pint size).....	7.50
Gas Strainers for RNF, KNF and INF.....	3.50

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Raw Materials

Cable, Hard $\frac{1}{8}$ "	\$.06 ft.
Cloth, Wing (Grade A)	.75 yd.
Cord, Linen—for hand sewing	3.50 lb.
Cord, Linen—for rib sewing	3.50 lb.
Cord, Shock $\frac{5}{8}$ "	.30 ft.
Cork	.30 lb.
Dope, Aluminum	2.75 gal.
Dope, Clear (5 gal. lot—\$2.35 per gal.)	2.50 gal.
Dope, Pigmented	5.00 gal.
Dope, Red Brown TiTwo	3.20 gal.
Duck, Waterproof	.90 yd.
Fabricoid (specify color)	2.50 yd.
Funnel, large—with neck	5.00 ea.
Funnel, large	3.00 ea.
Funnel, small	1.50 ea.
Gimp	.10 yd.
Glue	.50 lb.
Lacquer (for cowling)	5.00 gal.
Nails (cover tacks)	.30 lb.
Paint, Exhaust	1.80 qt.
Plywood, Mahogany $\frac{1}{16}$ "	.50 sq. ft.
Plywood, Mahogany $\frac{3}{16}$ "	.55 sq. ft.
Plywood, Mahogany $\frac{1}{4}$ "	.70 sq. ft.
Plywood, Mahogany $\frac{3}{8}$ "	.70 sq. ft.
Plywood, Mahogany $\frac{1}{2}$ "	.80 sq. ft.
Powder, Aluminum	1.00 lb.
Retarder, Dope	3.00 gal.
Tape, Friction	.50 lb.
Tape, Pinked (2" 100 yds. per roll)	.05 yd.
Thinner, Dope	3.50 gal.
Thinner, Lacquer	3.50 gal.
Tubing, Copper $\frac{1}{8}$ "	.07 ft.
Tubing, Copper $\frac{3}{16}$ "	.07 ft.
Tubing, Copper $\frac{1}{4}$ "	.10 ft.
Tubing, Copper $\frac{5}{16}$ "	.12 ft.
Tubing, Copper $\frac{3}{8}$ "	.15 ft.
Tubing, Copper $\frac{1}{2}$ "	.20 ft.
Varnish	2.25 gal.
Wire, Safety	.65 lb.

Paint Cans

5 gallon can	.65
1 gallon can	.35
$\frac{1}{2}$ gallon can	.30
1 quart can	.25
1 pint can	.20

Bolt List for Model "F" Waco

All bolts are of Army and Navy Standard made from 2330 Nickel Steel heat treated to an ultimate tensile strength of 125,000 lbs. per square inch, and are cadmium plated. To measure the length of a bolt, measure from the under side of the bolt head to the upper side of the cotter key hole. This gives the useful length.

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Bolt List (Cont'd)

In bolt sizes, the first number is the diameter; the next number of S.A.E. threads to the inch; the third number is the useful length, measured as per the above.

1/4"—28 x 1/2"	bolt and nut Used on	Fin to fuselage.....	\$.10
1/4"—28 x 5/8"	bolt and nut Used on	Elevators to rear elevator horn Front and rear safety belt wires Front wing strut to diagonal strut Magneto Arm extension Short rudder wire to front pedals Stabilizer adjustment to fuselage Stern post to fin	.10
1/4"—28 x 3/4"	bolt and nut Used on	Brake pulleys to top of landing gear V Long rudder wire to rudder pedals Rudder cables to rudder horn Stabilizer hinge Wing struts (top rear and bottom front)	.10
1/4"—28 x 7/8"	bolt and nut Used on	Aileron strut to lower aileron Brake pulleys to fuselage at shock strut For dual brake wires Front pedal to fuselage Elevator wire pulleys	.10
1/4"—28 x 1"	bolt and nut Used on	Aileron strut fitting to aileron spars (upper and lower wings) Aileron strut to upper aileron Rear of center section strut to fuselage	.10
1/4"—28 x 1 1/8"	bolt and nut Used on	Aileron control rod to aileron horn Internal drag wires to front and rear spars (center section) Root fittings to center section spars Root fittings to front and rear spars (upper wings)	.10
1/4"—28 x 1 1/4"	bolt and nut Used on	Compression tubes to spars (upper and lower wings) Internal drag wires to front and rear spars (upper wings)	.10
1/4"—28 x 1 3/8"	bolt and nut Used on	Bottom rear wing struts to wing Rear wing strut to top of diagonal strut Throttle bellcrank	.10
1/4"—28 x 1 1/2"	bolt and nut Used on	Diagonal wing struts (top and bottom) Front and rear center section strut to center section Throttle lever	.10

Bolt List (Cont'd)

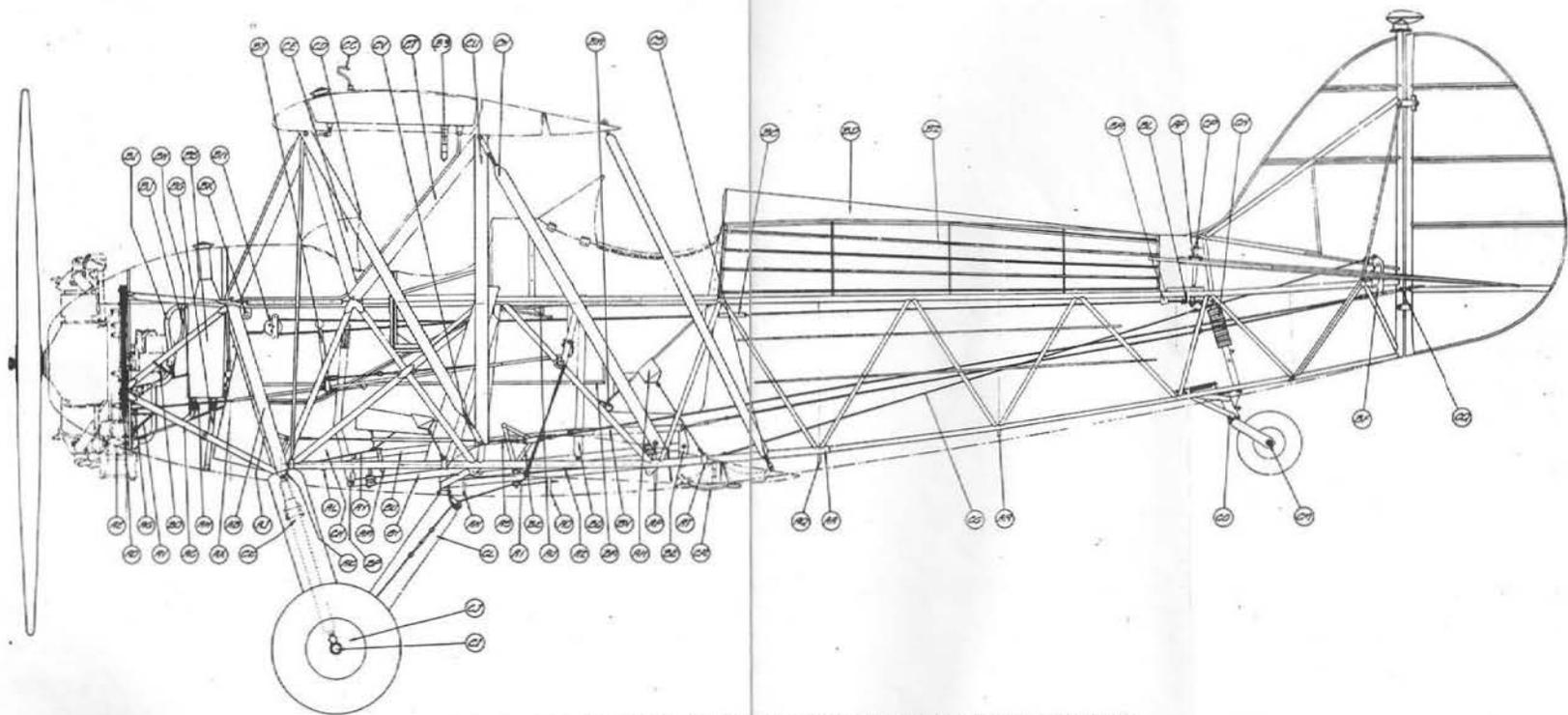
$\frac{1}{4}$ "—28 x $1\frac{5}{8}$ "	bolt and nut Used on	----- Front wing struts to upper wings Stern post to fin	.10
$\frac{1}{4}$ "—28 x $1\frac{3}{4}$ "	bolt and nut Used on	----- Stabilizer wires to stabilizer Wing root fittings to front and rear spars (lower wing)	.10
$\frac{1}{4}$ "—28 x $1\frac{7}{8}$ "	bolt and nut Used on	----- Internal drag wires to front and rear spars (lower wings)	.10
$\frac{1}{4}$ "—28 x 2"	bolt and nut Used on	----- Front elevator tube to rear stick socket Hub cap to axle Top and bottom rudder hinges	.10
$\frac{1}{4}$ "—28 x $2\frac{1}{8}$ "	bolt and nut Used on	----- Tail wheel fork to support	.10
$\frac{1}{4}$ "—28 x 3"	bolt and nut Used on	----- Front stick socket to torque tube Rear stick socket to torque tube	.15
$\frac{1}{4}$ "—28 x $3\frac{1}{2}$ "	bolt and nut Used on	----- Torque tube bearing cap to fuselage	.15
$\frac{5}{16}$ "—24 x $\frac{3}{4}$ "	bolt and nut Used on	----- Elevator control wire to rear elevator horn Elevator to elevator horn	.10
$\frac{5}{16}$ "—24 x 1"	bolt and nut Used on	----- Front of center section strut to fuselage	.10
$\frac{5}{16}$ "—24 x $1\frac{1}{8}$ "	bolt and nut Used on	----- Aileron bellcrank bracket to false spar (lower wing) Aileron control rod to aileron bellcrank (lower wing) Center section strut universal to rear spar (center section) Spar bracket fittings to front and rear spars (lower wing)	.10
$\frac{5}{16}$ "—24 x $1\frac{1}{2}$ "	bolt and nut Used on	----- Bottom oleo universal to strut Tail wheel spring to fuselage Universal strut fittings to front and rear spars (upper and lower wings)	.10
$\frac{5}{16}$ "—24 x $1\frac{5}{8}$ "	bolt and nut Used on	----- Bottom oleo universal to landing gear V Tail wheel shock strut to fuselage Tail wheel shock strut to piston Assy.	.10
$\frac{5}{16}$ "—24 x $1\frac{3}{4}$ "	bolt and nut Used on	----- Front elevator tube to front stick socket Tail wheel support assembly to fuselage Upper wing fittings to center section fitting (4 special)	.10

Bolt List (Cont'd)

5/16"—24 x 2"	bolt and nut Used on	----- Torque tube to front elevator horn	.10
5/16"—24 x 2 3/8"	bolt and nut Used on (8)	----- Warner motor to plywood mounting board	.10
5/16"—24 x 2 1/2"	bolt and nut Used on (2)	----- Warner motor to plywood mounting ring (holds cowl ring)	.10
5/16"—24 x 2 5/8"	bolt and nut Used on	----- Oleo strut to outrigger	.10
3/8"—24 x 1 1/4"	bolt and nut Used on	----- Strut plate reinforcement strap to rear spar (upper wing) Lower rear wing root fittings to fuselage (2)	.15
3/8"—24 x 1 3/8"	bolt and nut Used on	----- Warner plywood board to fuselage (6) Spar bracket fitting to rear spar (upper wing)	.15
3/8"—24 x 1 1/2"	bolt and nut Used on	----- Warner Plywood board to fuselage (hold cowl ring at top and right side) (2)	.15
3/8"—24 x 1 5/8"	bolt and nut Used on	----- Front and rear landing wire pulls to spars (lower wing) Kinner plywood board to fuselage (6) Landing wire pull to rear spar (center section) Strut plate reinforcement strap to front spar (upper wings) Warner plywood board to fuselage (1) (holds cowl ring at left side)	.15
3/8"—24 x 1 3/4"	bolt and nut Used on	----- Kinner plywood board to fuselage (2) (holds cowl ring at top and left side) Landing wire pull to front spar (center section)	.15
3/8"—24 x 1 7/8"	bolt and nut Used on	----- Flying wire pull to rear spar (upper wing) Kinner Plywood board to fuselage (1) (holds cowl ring at left side) Spar bracket fitting to front spar (upper wing)	.15
3/8"—24 x 2 1/8"	bolt and nut Used on	----- Flying wire pull to front spar (upper wing) Landing gear V to fuselage Lower front wing root fittings to fuselage (2)	.15

MODEL DESIGNATION		ENGINE	HORSEPOWER AND R.P.M.	LENGTH OVERALL	HEIGHT	SPAN	GAS CAPACITY GALLONS		GROSS WEIGHT LBS.	EMPTY WEIGHT LBS.	USEFUL LOAD LBS.	WING LOADING LBS./SQ. FT.	TOP SPEED M.P.H.	CRUISING SPEED M.P.H. AT SPECIFIED R.P.M.	LANDING SPEED M.P.H.	CLIMB 1ST MIN. FT.	GAS CONSUMPTION GALS. AT CRUISING SPEED	FLYAWAY - TROY, OHIO PRICE WITH STANDARD EQUIPMENT
MODEL A	KBA	KINNER	100 at 1900	21'11"	8'8"	29'6"	32	3	1985	1259	726	8.21	101	86 at 1750	40	425	6.0	3585.00
	IBA	KINNER	125 at 1900	21'11"	8'8"	29'6"	32	3	1985	1264	721	8.21	114	98 at 1750	40	875	7.5	4095.00
	RBA	WARNER	110 at 1850	21'6-1/2"	8'8"	29'6"	32	3	1985	1250	735	8.21	105	91 at 1710	40	500	7.0	4195.00
	PBA	JACCOBS	170 at 2150	21'0-1/2"	8'8-5/8"	29'6"	40	4	2250	1369	881	9.32	119	101 at 2000	42	850	10.0	4285.00
	TBA	KINNER	160 at 1975	21'11"	8'8-5/8"	29'6"	40	4	2200	1305	895	9.11	119	101 at 1850	41	900	9.5	4435.00
	UBA	CONT.	210 at 2000	21'0-1/4"	8'8-5/8"	29'6"	40	4	2250	1409	841	9.32	132	116 at 1850	42	1500	13.0	4895.00
	BBA	WRIGHT	165 at 2000	21'2-3/4"	8'8-5/8"	29'6"	40	4	2250	1409	841	9.32	122	107 at 1850	42	950	10.0	6065.00
MODEL F	KNF	KINNER	100 at 1900	21'4"	8'9"	29'7-1/4"	32	3	1938	1162	776	8.01	100	85 at 1750	40	425	6.0	3630.00
	INF	KINNER	125 at 1900	20'9-1/2"	8'9"	29'7-1/4"	32	3	1938	1198	740	8.01	112	96 at 1750	40	875	7.5	4110.00
	RNF	WARNER	110 at 1850	21'0"	8'9"	29'7-1/4"	32	3	1938	1181	757	8.01	103	90 at 1710	40	500	7.0	4210.00
MODEL F2	PEF	JACCOBS	170 at 2150	20'10"	8'9"	29'7"	40	4	2300	1344	956	9.52	119	101 at 2000	42	850	10.0	4415.00
	TBF	KINNER	160 at 1975	21'8-1/2"	8'9"	29'7"	40	4	2200	1272	928	9.11	119	101 at 1850	41	900	9.5	4560.00
	UBF	CONT.	210 at 2000	20'6"	8'9"	29'7"	40	4	2300	1376	924	9.52	132	116 at 1850	42	1500	13.0	6025.00
MODEL C	OEC	KINNER	210 at 1900	24'8-5/8"	8'6"	33'0"	40	4	2700	1667	1033	11.25	133	117 at 1750	49	1000	13.0	5865.00
	UEC	CONT.	210 at 2000	24'10"	8'6"	33'0"	40	4	2700	1662	1038	11.25	130	116 at 1850	49	1000	13.0	5985.00
	BEC	WRIGHT	165 at 2000	25'0-7/16"	8'6"	33'0"	40	4	2700	1662	1038	11.25	121	106 at 1850	49	700	10.0	6170.00

The figures shown are based on standard equipment with full load, wood propeller, and at Troy, Ohio, U.S.A. 875 feet above sea level and are guaranteed correct within 3%.



FUSELAGE ASSEMBLY SHOWING PARTS AND REFERENCE SYMBOLS