PART 1

Plans for the Pietenpol SKY SCOUT

Since plans for the Pietenpol Air Camper were published just a year ago, several hundred sets of blueprints have been purchased, and those who followed the plans closely were, without exception, successful in building a safe and economical airplane. Owing to the insistent demand of lightplane fans for a similar ship powered with a Model T motor, the originator of the Air Camper has designed the Pietenpol Sky Scout especially for readers of the 1933 Flying Manual.

By B. H. Pietenpol
Designer of the Pietenpol Air Camper

No sooner had my article on building the Air Camper appeared in *Modern Mechanix and Inventions* than the readers began flooding both myself and Andy with queries as to whether the ship could be powered with a Model T motor.

Unfortunately I had to tell the fans that the Model T was hardly powerful enough for a two-place job. And then the fun began! Letters started pouring in, asking for plans for a one-place job that could use the main-spring of an old Henry. Well, here we are!

But, before going into the actual construction of the Sky Scout I wish to say a few things about the ship, how it happened to be, what it will do, and what not to expect of it.

Back to the Model T

I have been experimenting and building lightplanes since 1920 and my first ship was a biplane powered with a Model T Ford motor. The ship was very light, but not very strong, compared with the Sky Scout. However, I did with that first plane what a lot of you who build *your* first ship will try to do. I mean teach yourself to fly.

The plane was fully able to fly as I had it in the air about 20 times, but as I didn't know how to land, I busted something every time I had it up.

The last time I tried it in a 25-mile wind and there was not enough left of the crate to fix it up after that.

Learn to Fly First

So my first bit of advice is, by all means learn to fly before you try to take your own ship into the air. While I started flying with not over four hours and twelve landings, and soloed and test-flew a ship at the same time, I surely advise you against that method. But where could you find a school in 1920?

I then went in for higher powered jobs, but always believed that the Model T motor could be made to fly successfully.

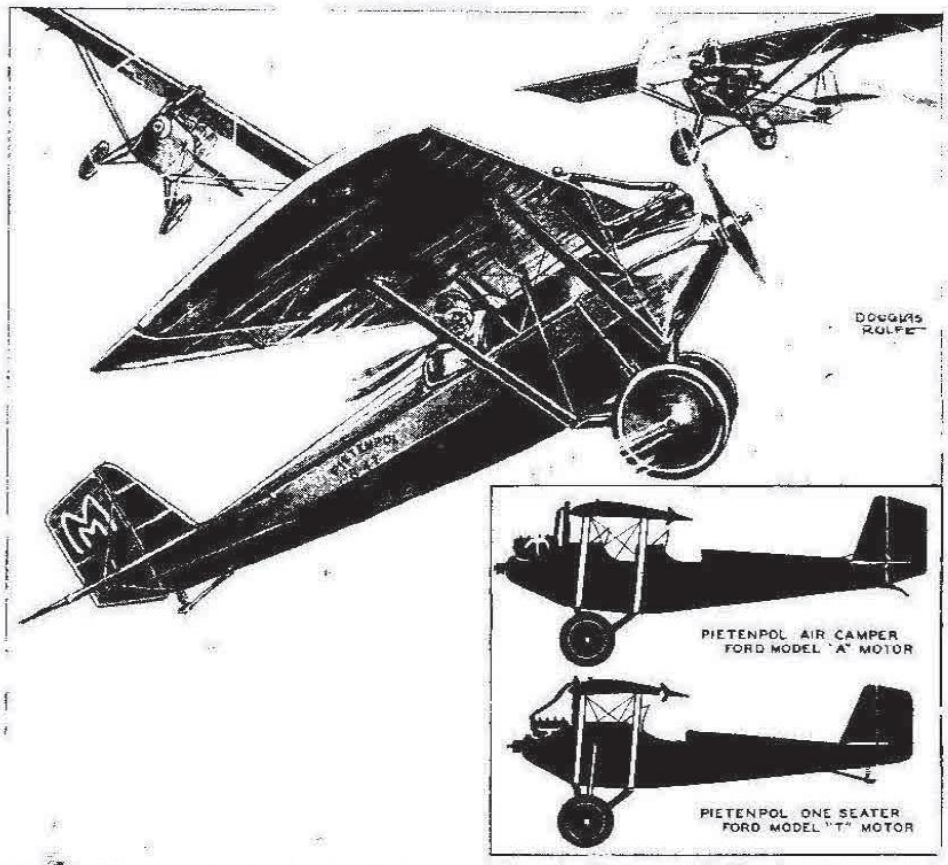
About in 1928 when the new Ford came out I decided that the Model A was the engine I wanted, so I bought all the sample parts from the Ford dealer and assembled a motor, although I had not seen the inside of the new Ford. The ship flew and was a success from the start.

Model A Gets All Credit

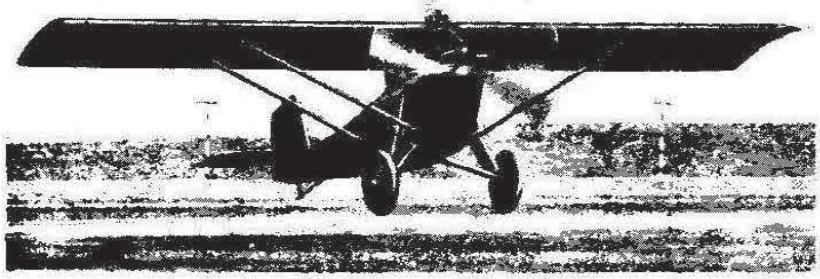
There was only one thing I did not like about this — the motor got all the credit, and the ship got none. So when the editors of M. M. told me that they could use a similar ship that would fly good on a Model T motor, I built the Sky Scout to prove to myself that I could build a ship powered with that motor which would be practical, and also to prove that the Model A engine was not the only automobile motor that would fly successfully.

The Model A is a wonderful motor for the small plane, and may be used in this ship, and advise its use if you have not a Model T all rebuilt for aircraft use. There must be hundreds of them built up.

The only change needed if the Model A motor is used is to move the wing about one inch ahead and put on a little larger radiator, as the ship is



The Air Camper and Sky Scout compared. The same sturdy construction is evident in every line of the Scout as was found in its bigger and higher-powered brother.



The Pietenpol Sky Scout taking off from the Wold-Chamberlain airport at Minneapolis, Minn., for a cross-country hop.

plenty strong for this engine, and cowling and all will fit.

Now a few words on what the Sky Scout is:

First, the ship was designed to be as easy to fly as it is possible to make it. I have never flown a plane that handled better. It is also almost impossible to hurt it landing.

I have watched two fellows make their first solo on this ship, and if ever a plane had a reason to crack up, it did when it landed about 20 ft. up and pancaked down.

I have watched students fly into the ground with the tail skid two feet in the air, and have also watched the tail skid strike the ground when the wheels were two feet in the air on a stall landing.

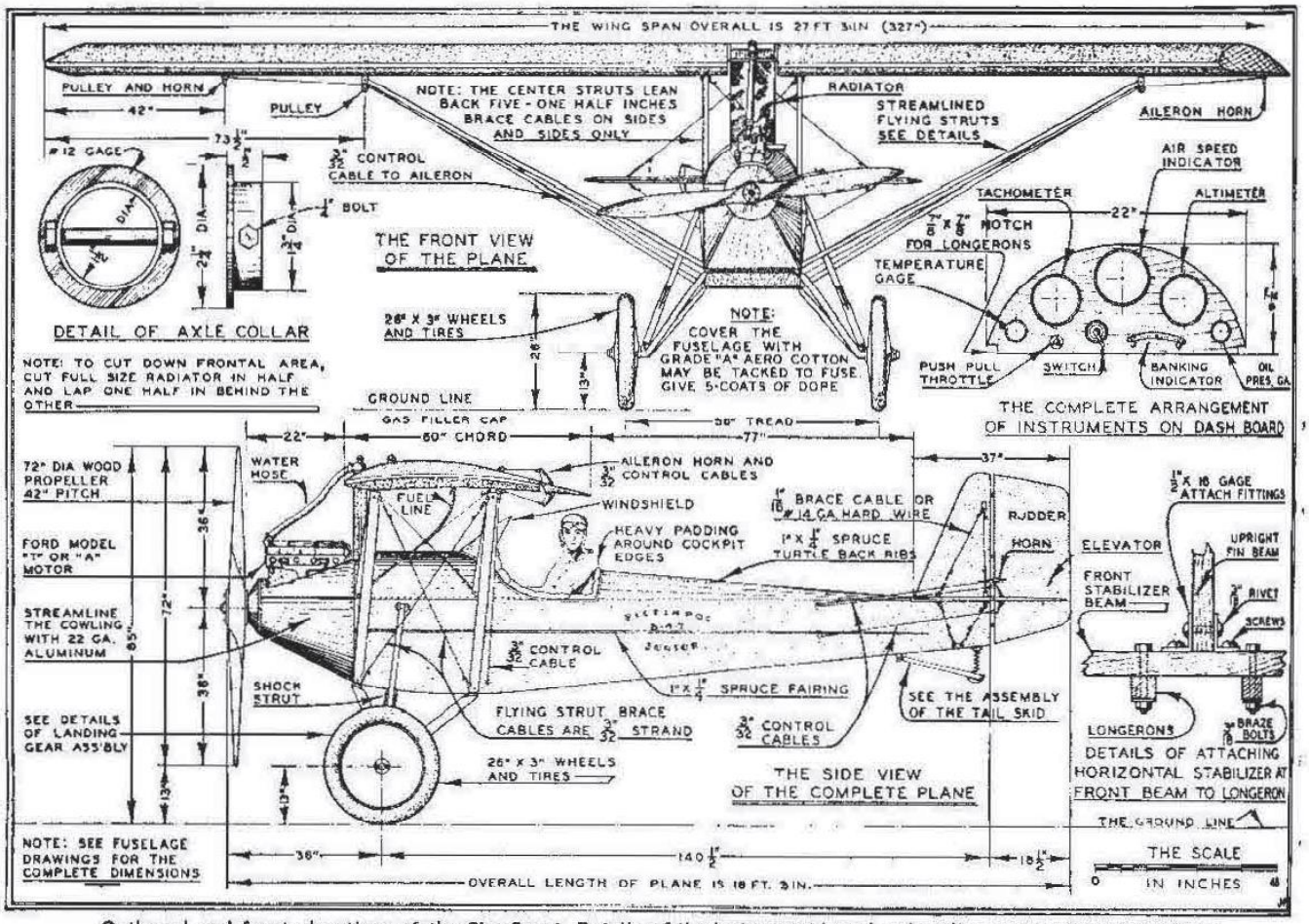
The ship now has about 100 hours of this sort of time. The only thing that has been hurt is one vee on the landing gear that was bent a little on a forced landing made down wind when one wheel went into a sharp ditch (it did not nose over).

I also saw this ship land on a plowed field O.K., although it was necessary to pull it on to a solid field to take off as it could not move an inch on its own power — the field was too soft.

Now do not think I advise you to do these things, as I certainly do not. But it's comforting to know that your plane can stand this kind of abuse without cracking up.

The Sky Scout has a climb of at least 200 fpm, although it has been climbed at around 500 several times. It has a top speed of about 62 mph, a landing speed of under 35 mph, a take-off run of 150 ft. on a good field, and about 250 ft. landing run.

We let the motor turn a 6 ft. propeller with a 42 in. pitch, 1740 maximum revolutions per minute on the ground, and cruise the motor at between 1500 and 1600 in the air. The throttle is about one-third open at cruising speed so you see you have



Outboard and front elevations of the Sky Scout. Details of the instrument board, axle collar, and horizontal stabilizer

some reserve power. The motor will turn as high as 1800 in the air.

Blueprints Correct

The editors showed me a set of blueprints that they made from the shop drawings that I used in building the ship, and let me say for the plans that they are exactly like this plane is built, and the most beautifully drawn up and easy to understand that I have ever seen.

There are a lot of improvements in these prints that will also be a great help to you if you are building the Air Camper.

Again I wish to say that these plans are exactly as the ship was built, and if we build any more of this model, they will be exactly like this one, as after flying the whole season of 1931 we have not found one improvement we would wish to make, and the plane is far better than we dared hope for.

So please do not write to have the design changed, as I advise that the ship be built as it is.

There are so much of the instructions printed right on the plans that it does not seem necessary to write a treatise on how to build it, but I will try to give a few pointers that will be of help to you.

Designed for Easy Building

The Sky Scout was designed to be as easy as possible to build; but unless you know you are capable of building a plane, or have someone to help you that is capable, please do not try to build any airplane.

I believe this is the easiest ship to build there is. However, I wish to have only safely built and good flying planes in the air, and if I knew that any unsafe ships were built from these plans I would prefer that you had never seen them.

I believe that this is the safest plane for the beginner that has ever been built. It is for the fellow who is going to build his own ship that these plans were made. All of us who are interested in aviation have to make a start some time and I think that building your own lightplane is the best way to get started.

The Fuselage

We will now take up the construction of the fuselage. This is very plainly drawn up and I do not think you will have any trouble with it. It is made from 7/8 in. by 7/8 in. spruce, for longerons and struts, while the sides and front are covered with

3/32 in. mahogany plywood. The floor is made of ¼ in. 5-ply haskelite. All gusset plates of ⅛ in. material. Remember, all plywood must be regular aircraft grade and waterproof.

Use a good glue. We use Rodgers semi-waterproof and give it two good coats of varnish. You may use regular casein glue, but be sure you know how to handle it. It won't keep long (12 hours).

Make Jig for Fuselage

You will need a large bench on which to draw out and build your jig. We use the same jig for both sides.

Each strut is held in place by blocks which are left nailed down until both sides are finished. Also leave the longerons a little long, and wrap some wire from the top to bottom longerons, twisting it tight with a nail until you have the plywood nailed and glued on each side. When the glue is dry you may saw off the longerons in front.

First lay out one side in the jig, putting in all struts and braces. When you make one strut, make another just like it to be used on the other side so the two will be exactly alike. Be sure to use a miter box for this work.

Next glue and nail on all the ⅛ in. gusset plates, wire the front longerons together so they will not spring apart and break the gusset plates.

Now remove the side from jig, put the longerons, struts and braces for the other side into the jig, and put the gusset plates, starting from tail and working up to where the 3/32 in. sides start.

Now take the side you have just finished from jig, lay it in on a piece of 3/32 in. plywood, and mark out all longerons, struts, and braces by running a pencil around them, then cut the plywood the size of fuselage. Make two of these — one for the right and one for the left side.

The side of the plywood bearing the pencil marks goes on the outside, and gives you good marks to keep your nails between.

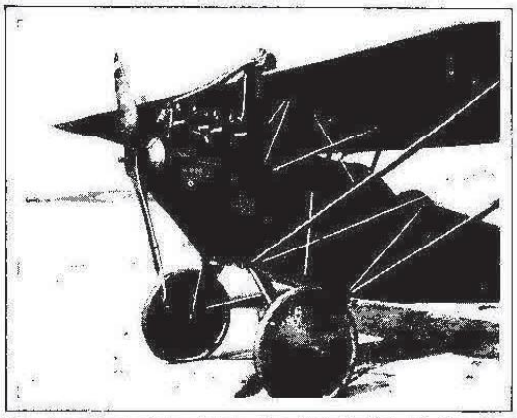
Glue and Nail Gusset Plates

Now put a good layer of glue on longerons, struts, and braces as far back as the plywood goes; lay on your plywood and get busy nailing it down with ¾ in. by 18 gauge cement coated nails. All other gusset plates are also put on with this size nail.

When you have this done, wire front of longerons together and remove from jig. Now remove all blocks from the bench so that it is smooth. Turn the side of the fuselage over and put gusset on that side; then do the same with first side you started.

Now take the two sides and clamp them together. Saw off ends of the longerons exactly the same length. Take a tri-square and mark off all strut stations, the place for the instrument boards, and a few extra marks that will come in handy to measure from.

Now make the seat back and the front bulkhead. (These must be perfect, as the whole job depends on them) and nail and glue them in place. You may now put in the ¼" by 5-plywood floor, nailing it in with 1 in. 17 gauge nails. Next comes the top of the fuselage.



This excellent view shows the installation of the Ford Model T engine in the Sky Scout. Note location of the radiator and individual exhaust stacks.

Now pull the tail end of longerons together, make this joint fit good, glue and nail it good, and put in all the rest of the struts and braces, using the center line method to get it straight. That is, make a line in the center of each strut and make a tight string or wire pass over this line when drawn from center of front to center of tail post.

The struts are next set on the gusset plates of the sides. Then put on turtle back, instrument board, cowling, and support and the woodwork is finished except for seat, which you should have no trouble with.

I can get the fuselage built up for you if this sounds like too much work, and then you will have a perfect job around which to build the rest of the ship.

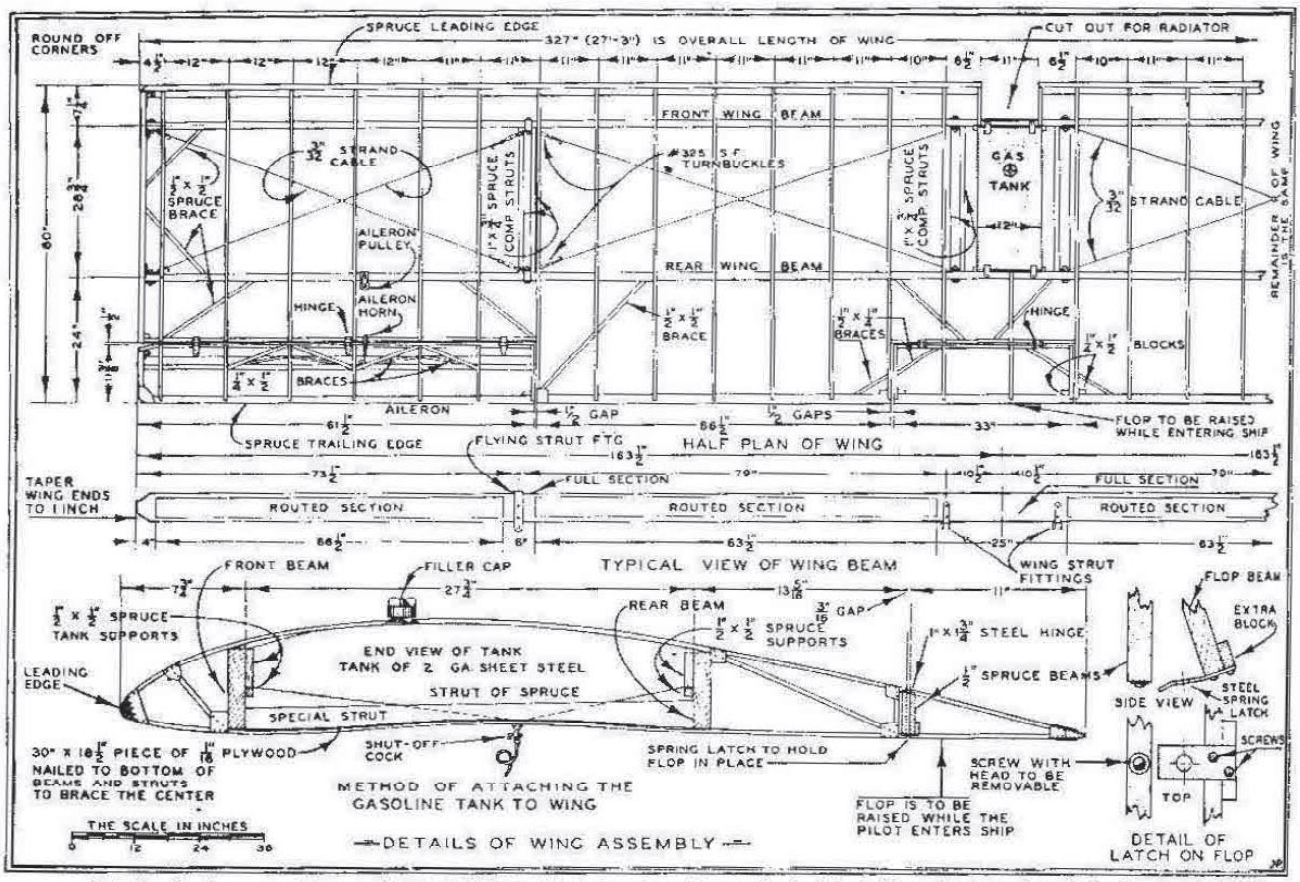
The Wing

The fittings are so clear on the plans that it would be a waste of time to say anything about them. They are all made of regular 1025 aircraft steel and are more than strong enough.

The wing on the Sky Scout is much too strong and could be lightened a little. It weighs about 90

SPECIFICATIONS OF THE PIETENPOL SKY SCOUT

High Speed	62 mph
Cruising Speed	55 mph
Landing Speed	35 mph
Take-off Run	150 ft.
Landing Run	250 ft.
Initial Climb	Minimum, 200 fpm
Span	27 ft. 3 in.
Chord	5 ft.
Length	16 ft. 3 in.



Details of wing assembly are given on this working drawing. The method of installing sheet steel tank in the center section of wing is clearly shown here. Another interesting innovation is the flap at the trailing edge of the center section.

lbs. complete. It was only built this heavy because all the regular parts to build the Air Camper wing were used.

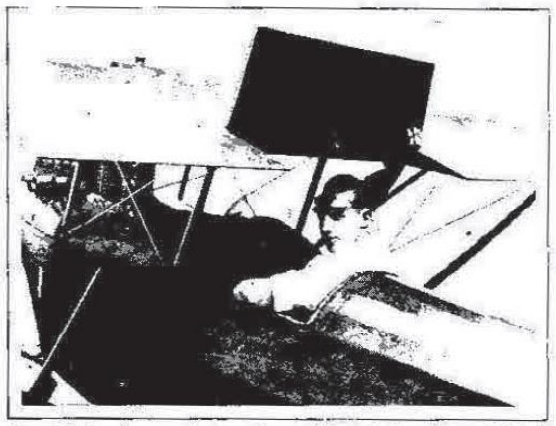
I wish to call your attention to the brace right back of the rear beam. This was changed from the plans of the Air Camper, and I advise all of you who have not built up your wing ribs to build them this way.

After your ribs are finished, make your beams (if you have trouble doing this, we will be able to make them for you) and splice them in the center. Now mark off all places where the ribs will come, having the two beams clamped together.

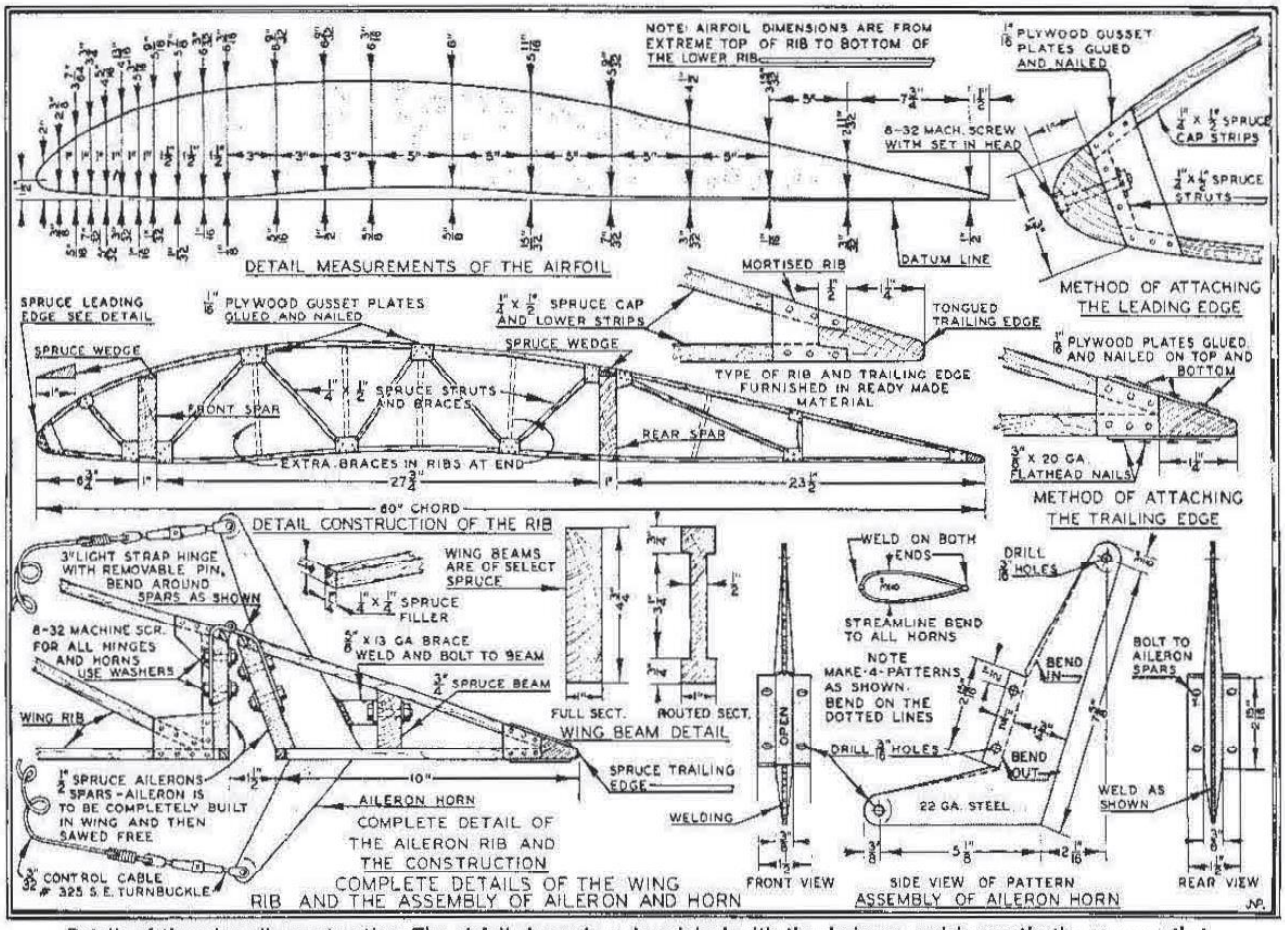
A good way to do this is to mark off the places on half of the spars, then reverse one beam and mark the other half from the first marks. You will then know that it is right.

Next glue in the piece of 3/32 in. or 1/8 in. plywood that is set beneath the gas tank, and be sure you have this in the center and perfectly square, as the whole wing is lined from this center. Now put on all the ribs and glue and nail them with two 1 in. by 17 gauge nails at each joint. On the top it will be found necessary to put in small spruce blocks to fill up the gap. These must be glued on both sides.

Next put on all wing fittings and brace wires (we use 3/32 in. cable as it is easier to handle, although No. 12 hard wire is O.K.), and line the wing up with the wires. Do not make them too



Don Finke demonstrates the utility of the flap, which is necessary for easy entrance and egress. Photo also gives you an idea of the plane's visibility.



Details of the wing rib construction. The airfoil shown here is original with the designer, and is exactly the same as that of the Model A Air Camper. Construction is a trifle heavy, but the ship has been designed for safety rather than speed.

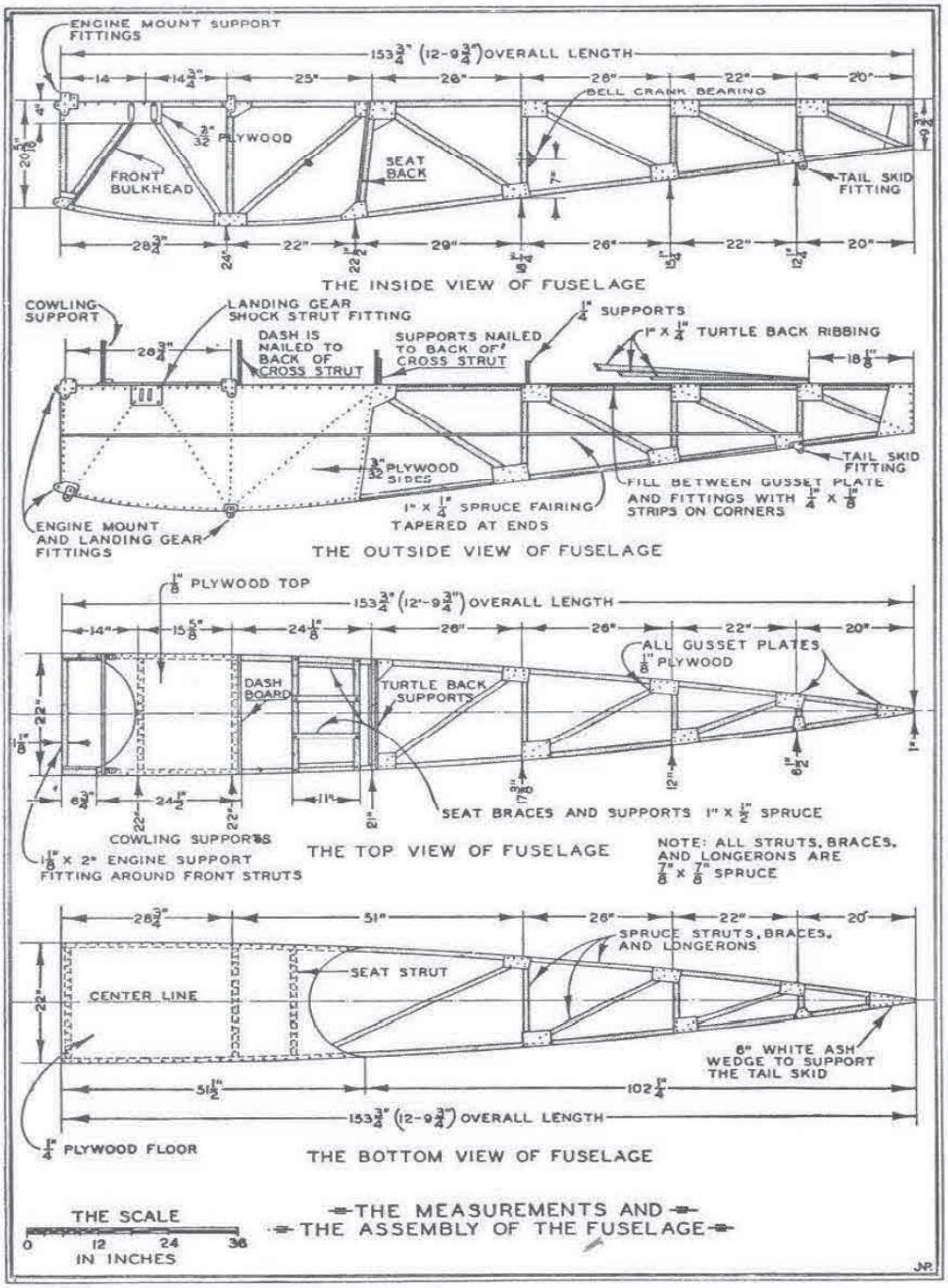
tight until you get in your compression struts and wing tips.

Now put on leading edge, trailing edge, aileron beams, flop beams, and wing tips in order named. Line the wing up so that it is perfectly straight and put in all braces in wing (wood) and also put the 1/2 in. by 1/4 in. braces on the ailerons and put all filler strips on the aileron hinges (which are only small strap hinges with a new pin put in which has a cotter pin hole in its end).

Now place the control horns, and you are ready to cut the ailerons and center flop from the wing. By leaving all the ribs full length and cutting the ailerons and flop free when finished you are sure to get a better and straighter wing. After you have all the parts finished and sanded you may give the whole thing a coat of varnish.

This wing is as strong as I know how to make a wing without having a lot of needless weight. We experimented a lot with wings on the good old Air Camper, which still is the best ship today for the model A Ford motor. We looked at planes with a lot more load per running foot of spar length and a lot more load per square foot of wing, and made our spars and ribs to conform. We found only one flaw in years of flying the A jobs and that was the trailing edge of the wing was a little weak for stunting. Don came sailing into the field with his job one day in a steep side slip — so steep I thought he'd hook a wing and flip over. Boy, he was going, and he yanked her out to see what would happen. Due to the fact that the little cross members in the trailing edge were in the wrong direction, a portion of the trailing edge folded up, but it didn't seem to hurt things any, and he flew the rest of the day before we started to fix it. That shows the extreme confidence we have in the ruggedness of our ships and I hope my telling this will convince you of our candor in perfecting the little things. We went through our analysis again, and found it would make the rear edge of the rib a little stronger to run the piece the other direction, taking the load in compression instead of in tension, and we have done so in this Sky Scout design. I'm still sticking to our home brew wing section and I will until I can find something that will work better — so far I haven't found it.

For the benefit of those of you who have not read of how we constructed the Ford A job (which article appeared in the last issue of the FLYING

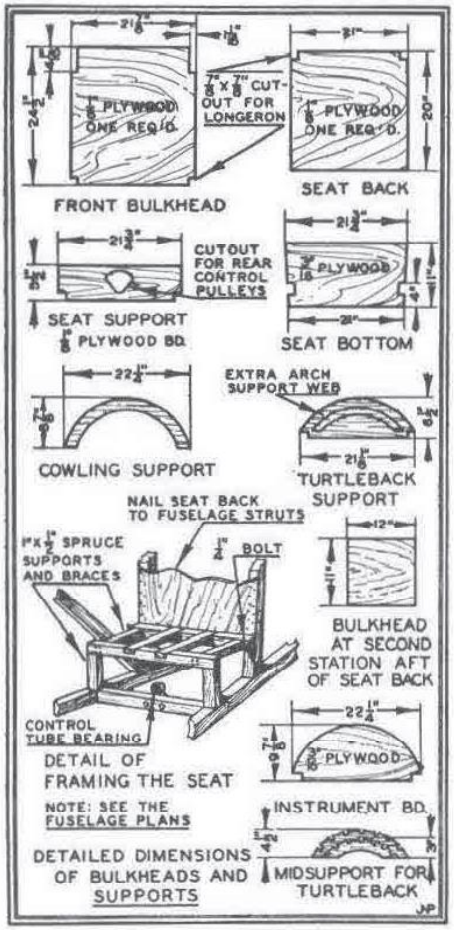


Dimensioned drawings of the Sky Scout wooden fuselage. It has been the experience of the designer that de Havilland type of wood construction is simpler to build and will stand up under the hardest usage. This job is a marvel of strength.

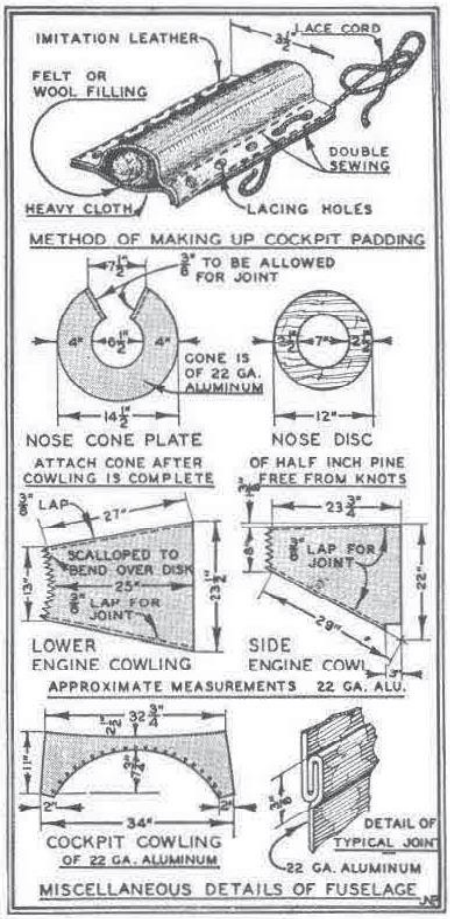
MANUAL) I'll retell the history of this wing curve of ours.

I've been building airplanes for the last 12 year, you see, and the first one I started was a biplane which was powered with a Ford T. She flew nicely, but in those days we hadn't heard of modern high-lift wing sections, and the underside of everything flying was as curved as a shoe horn, and not a lot more efficient, either. I think the wing curve I used on that first ship was a U.S.A. No. 4, which was supposed to be the hot-test pepper out at the time. Then I used other wing sections on other ships, and found out a lot of rule of thumb things about them which any ham mechanic knows.

That is, that within limitations the center of pressure of almost all wings varies from about a third of the chord from the leading edge to about 40 percent at the very high angles of incidence. I know there are wing sections with negative angles of incidence, but they are mostly freaks — I am talking about normal wings. The center of pressure



Right– Dimensioned drawings for miscellaneous fuselage fittings.

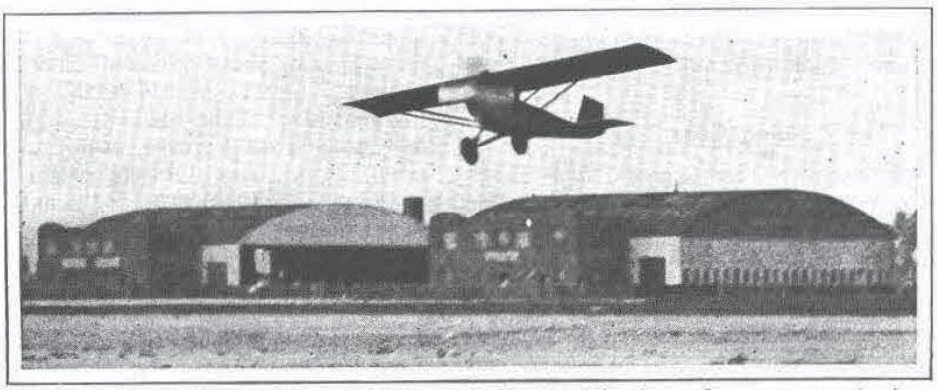


Left — Detailed drawings of the seat and bulkhead construction.

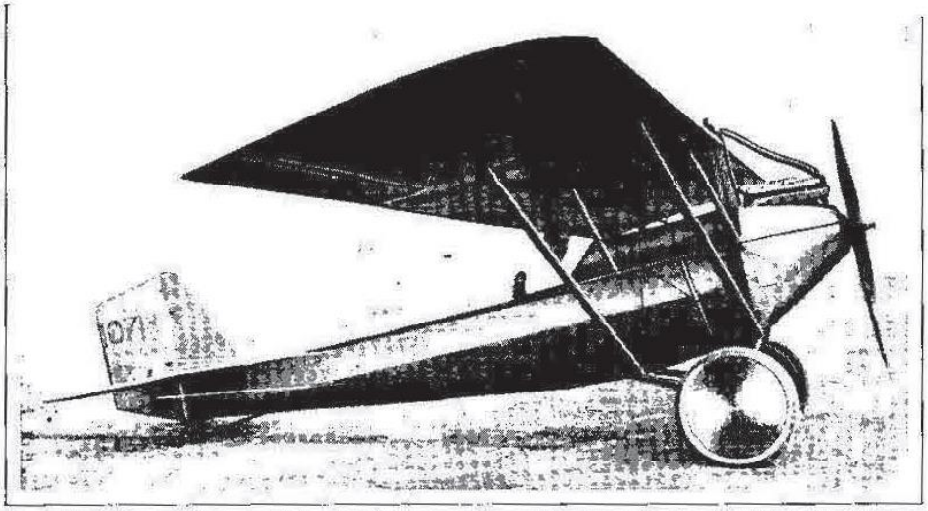
was about the same with all wings, and traveled back about the same amount for increased angles of incidence.

But while all the graphs of wing curves which I secured from the N.A.C.A. at Washington looked about alike, and had about the same characteristics on paper, there was a lot of difference in the way they handled. Slight differences in lift and drag characteristics on these graphs, which wouldn't seem to mean a thing, would mean a whole lot when put onto a ship.

You know monoplanes of the high-wing type are the strongest and safest from the aerodynamical point of view. Yet they handle differently than any type of airplane like a biplane. There is a sort of pendulum effect that makes it rock back and forth, and a wing section that doesn't have a minimum travel of the center of pressure will be bucky on the controls. That is all taken out of the Sky Scout through the use of our wing, but I often wondered why nobody had taken a crack at the subject. I know the M-6 wing section has no travel pressure, but it isn't so hot in the air alongside our section. And so that is that. • • •



Up she goes! Don Finke taking off at the Wold-Chamberlain airport for a cross country hop.



A real airplane, m'lads, and it gets its power from the innards of a Model T Ford. This ship is just as sturdy as it looks, is easy to build, and can take off and land at a field which would stump an OX-5 or like-powered job.

PART 2

TAIL GROUP AND FUSELAGE FITTINGS PLANS FOR THE "SKY SCOUT"

Continued in this chapter you will find Author Pietenpol's description of how to build the tail group, control fittings, and this unique tail skid.

You fellows who have been demanding a real airplane powered by a Model T Ford engine have no doubt digested the previous installment, in which we discussed what could be expected of the ship, and in which you were given part of the plans and instructions for building.

In the first installment, you will remember, we took up the building of the fuselage and wings. Now we will go on from there. The present installment will include the tail assembly, landing gear, and controls.

The Landing Gear

We will first take up the landing gear. This has proven to be a very strong outfit which will stand plenty of abuse. While it would be difficult to explain how this is built, the plans are very clear and you should have no trouble.

You will have to use a turning lathe and be a good welder to make the gear shown here. You may also build the type of landing gear that is used on the Air Camper. You will find that this is much easier to make and is quite strong enough.

While we are on the subject of this gear we had better put on some safety device to keep the ship from dropping to the ground if the shock cord breaks, since it seems that everybody has trouble wrapping shock cord.

Here is the method we use: First cut a piece of leather to fit around the bottom of the landing gear vee, and lace it on with lace leather. Now take 6 ft. of ½ in. shock cord and have someone hold it about half way up on the outside of the front landing gear strut. Take the other end and pass it under the landing gear vee, over the axle, under the landing gear, over the axle, under the vee on the inside of the first wrap, over the axle on the outside of the first wrap and under the vee on the inside of the last wrap until you have three wraps pulled quite tight.

The cord should be just long enough to make a good square knot and to permit taping of the ends. This method makes each wrap about the same length and you will not have any trouble with your

shock cord cutting. The landing gear should give not over one inch with a full load in the ship, but neither should it be any tighter.

The Tail Skid

The tail skid comes next. This is of extremely simple construction, but it has proved so efficient that we are now using it on all of the planes we build. Be sure to put a small keel on the shoe or you will find your ship hard to steer on a windy day. This keel will also help to prevent the beginner from ground looping.

The Empennage

And now for the empennage. If you saw the plans of the Air Camper you will see at a glance that the tail surfaces of the Sky Scout follow the same general lines as those of its big sister. I have, however, cut down the weight a little at this point and I also believe I have given the Scout a bit the best of it on the lines.

But outside of a bit of cleaning up I have seen no reason for changing this part of the ship, as the assembly on both jobs has given quick and sensitive control of the ship at all times. And another thing which is even more important — if you follow these plans you need have no fear of any structural weakness in this most vital part of the ship.

The Motor Mount

In the motor mount you will notice that there is a drop of about one inch on the front of the motor mounting. I have had a lot of so-called experts tell me that this should not be. However, I reason that the motor should pull in the direction of travel and not the way the ship points.

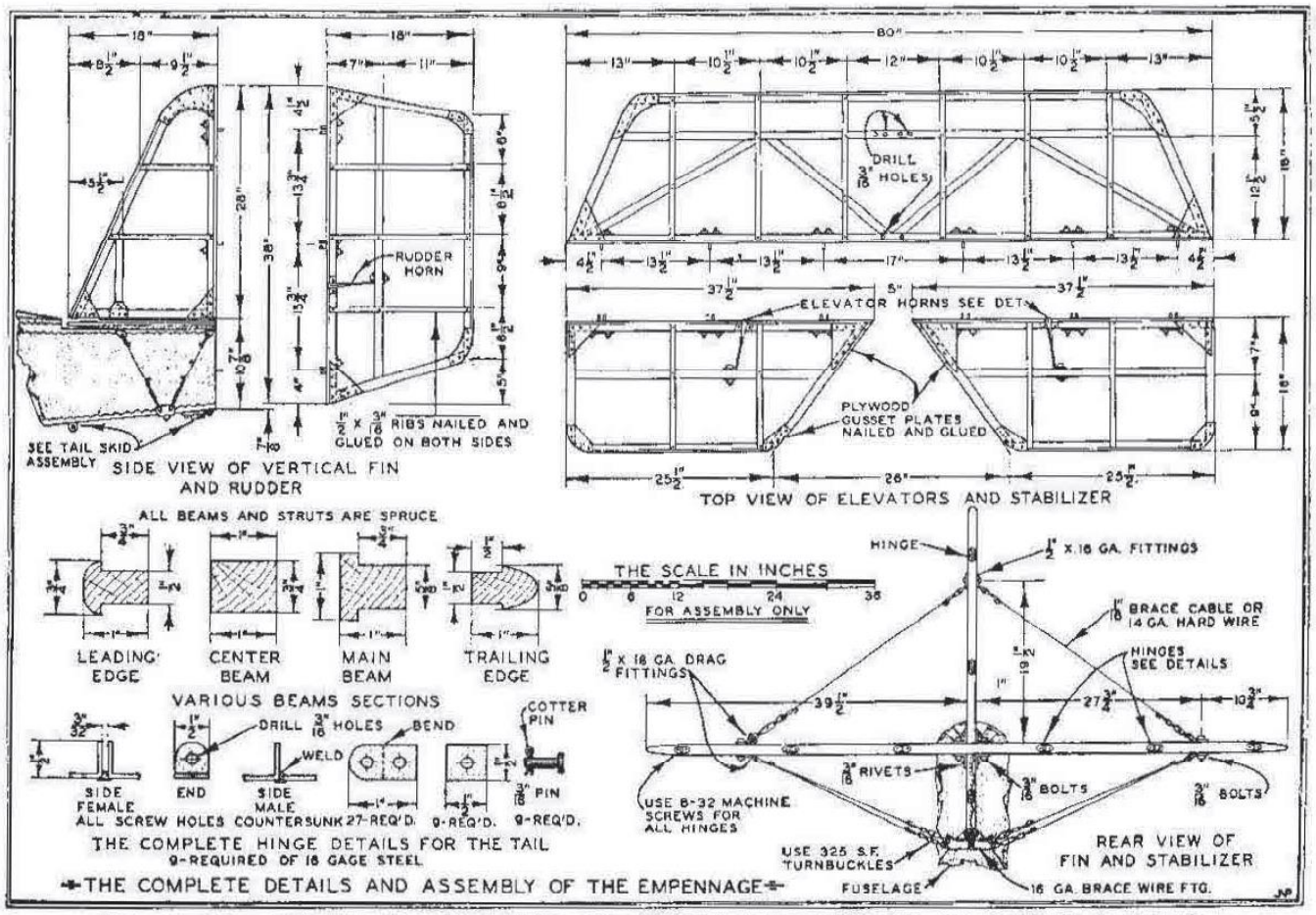
We built one ship using a straight motor bed and the climb was not so good, while it was almost impossible to fly it hands off, except at one speed and throttle setting; so my advice is to be sure and give this drop on the front of the motor.

The motor mounting itself is well shown on the drawings and I wish to say it is all built right on the fuselage.

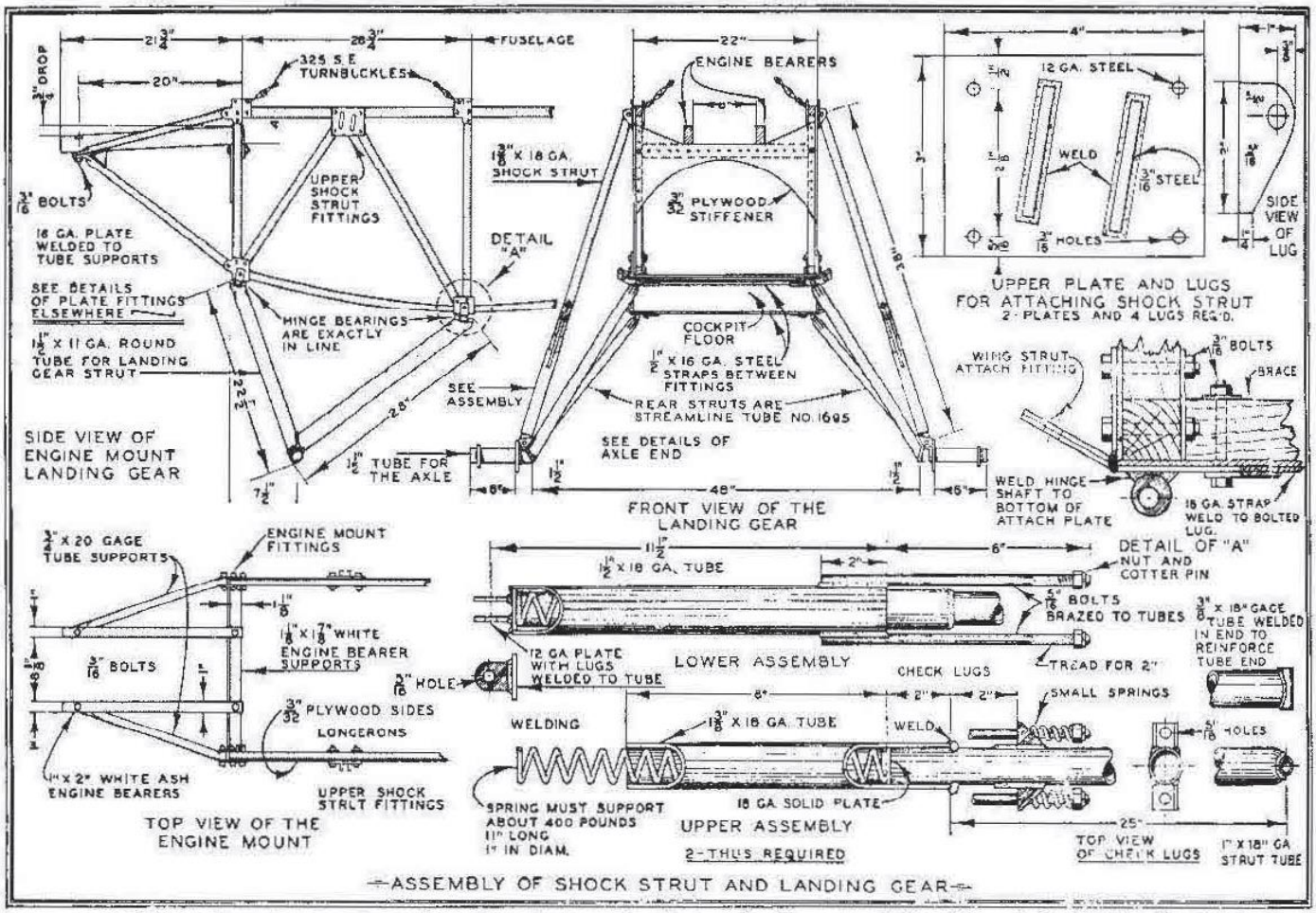
The motor bed pieces are bolted on and temporarily braced and then the motor support tubes are fitted to the fittings and bearers.

The Covering

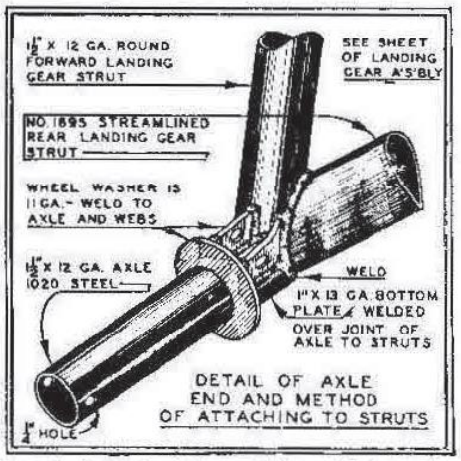
Now put in the gas tank (5½ gal.) and the wing is ready to cover. You may use any light grade of aircraft cloth for this or you may use sheeting.



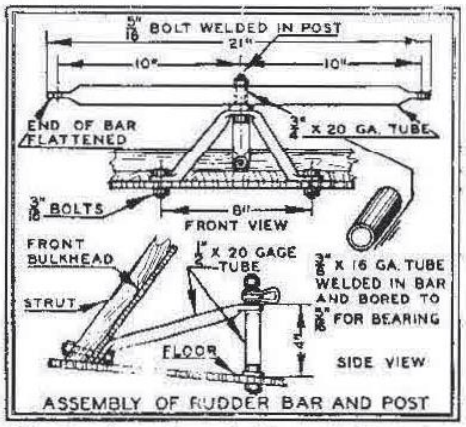
Here are the working drawings for building and rigging the tail assembly of the Sky Scout. This is of simple wood construction, and no plans have been drawn for a steel tube job. The scale applies only to the assembly drawing.



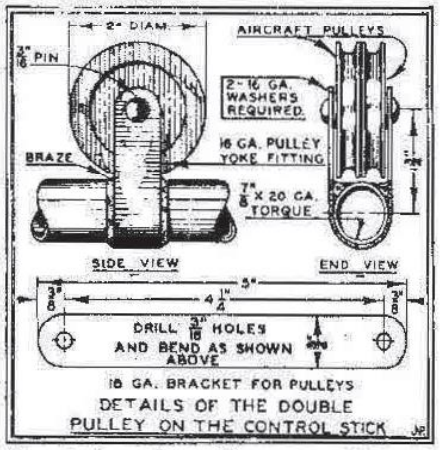
This working drawing shows the extremely rugged split-type landing gear designed especially for the Sky Scout. At the left will be found the dimensions for the bolted steel and ash motor mount. Further details found elsewhere.



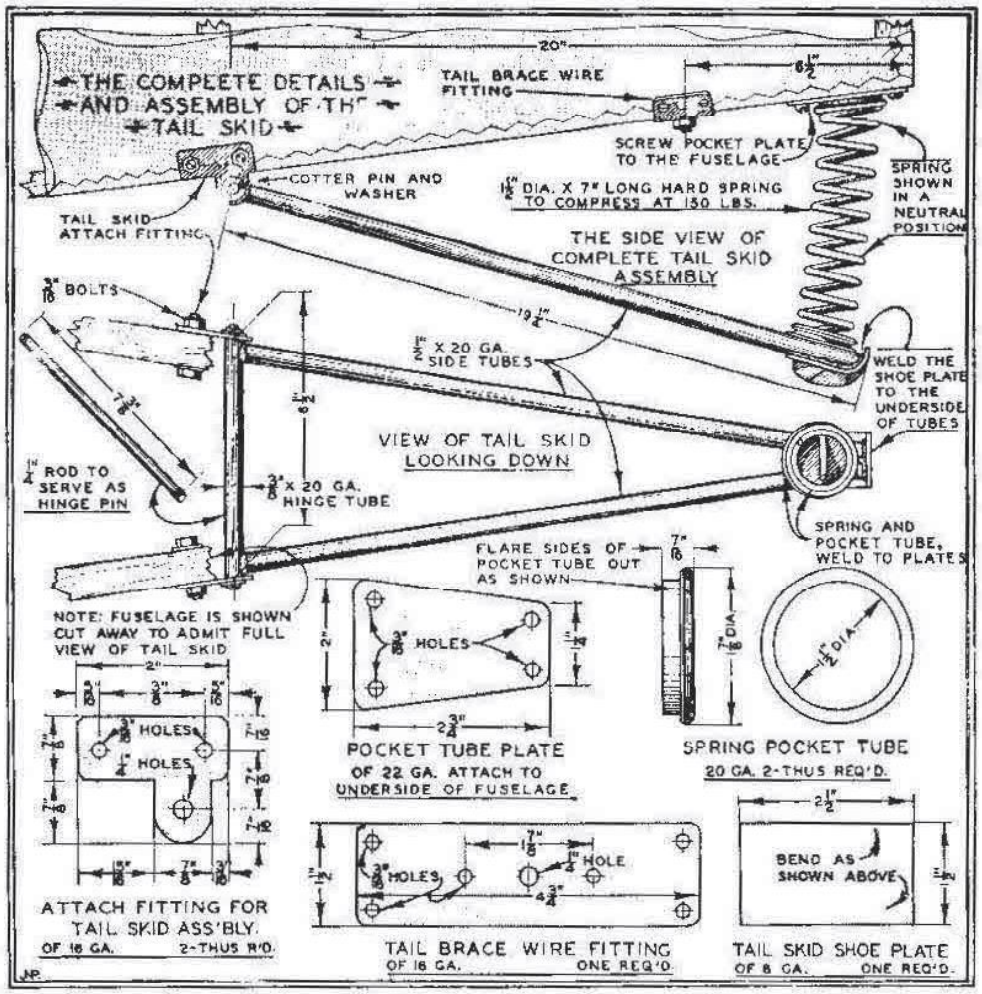
Here is how the axle end is welded to the landing gear struts. A workmanlike job of welding is vital at this point.



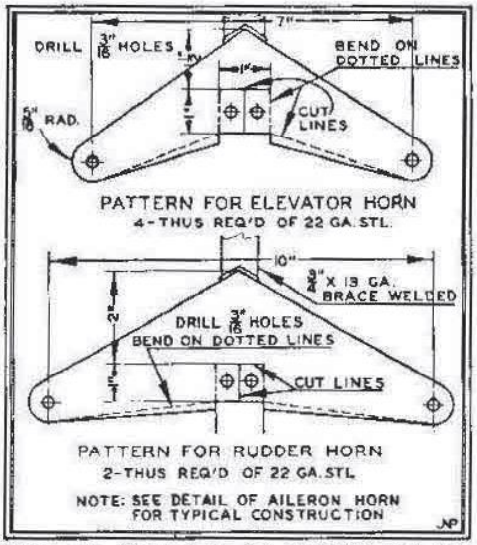
This drawing gives details and dimensions for building and assembling the rudder bar and post. The ends of the rudder bar are flattened and a hole drilled for the cable.



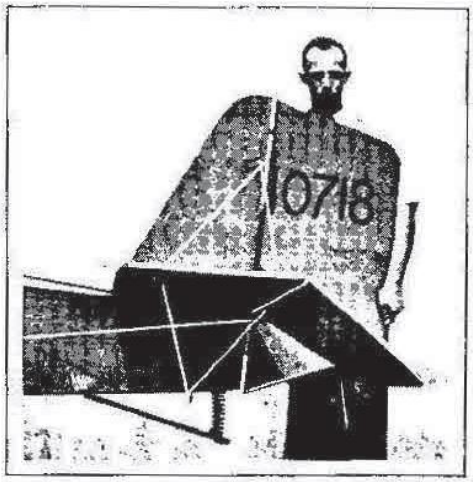
Here is how the pulleys are welded to the control stick torque tube. One pulley is used in front and two at the rear.



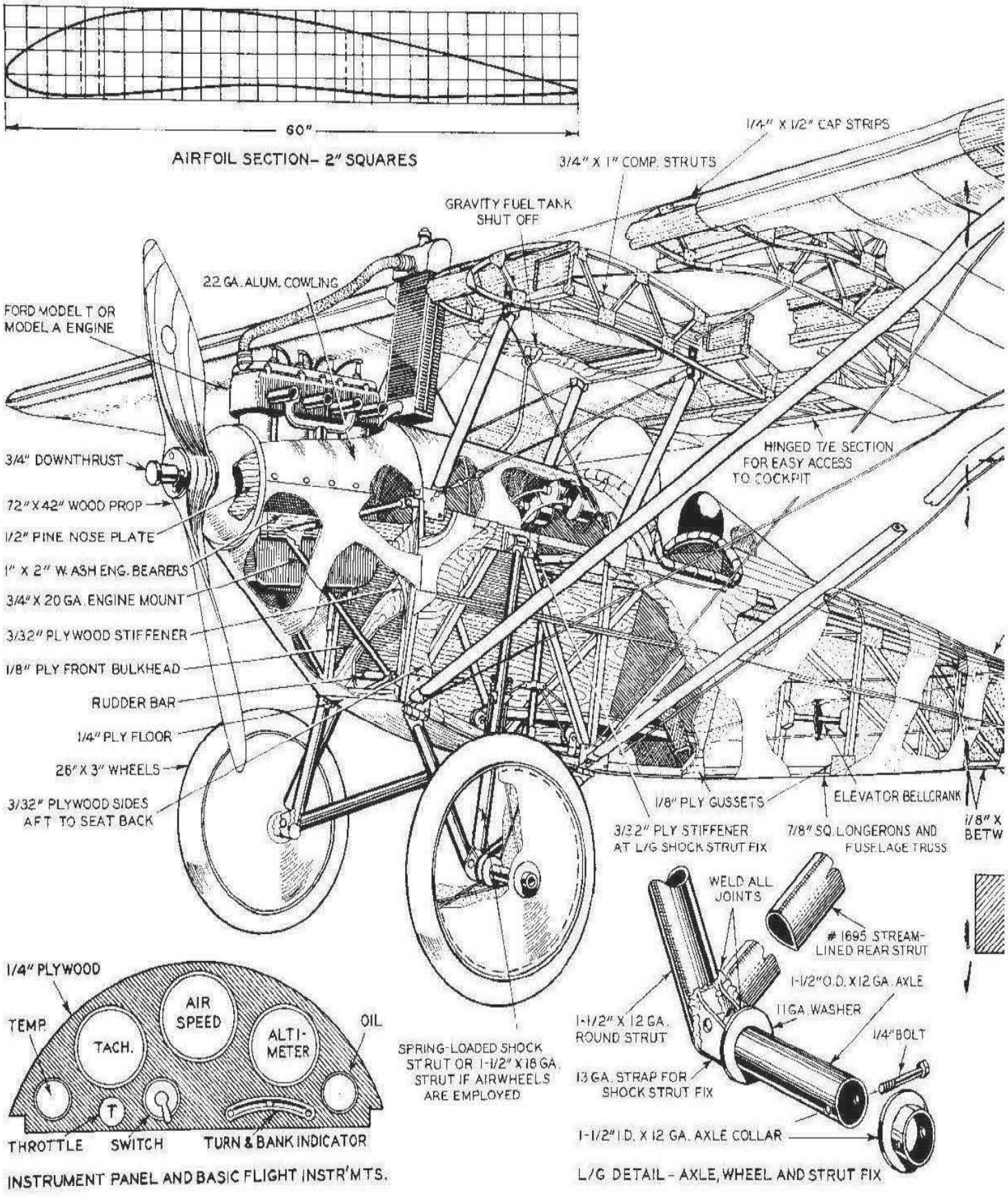
Complete details for the tail skid are given here. Be sure to weld the keel onto the underside of the skid-shoe.

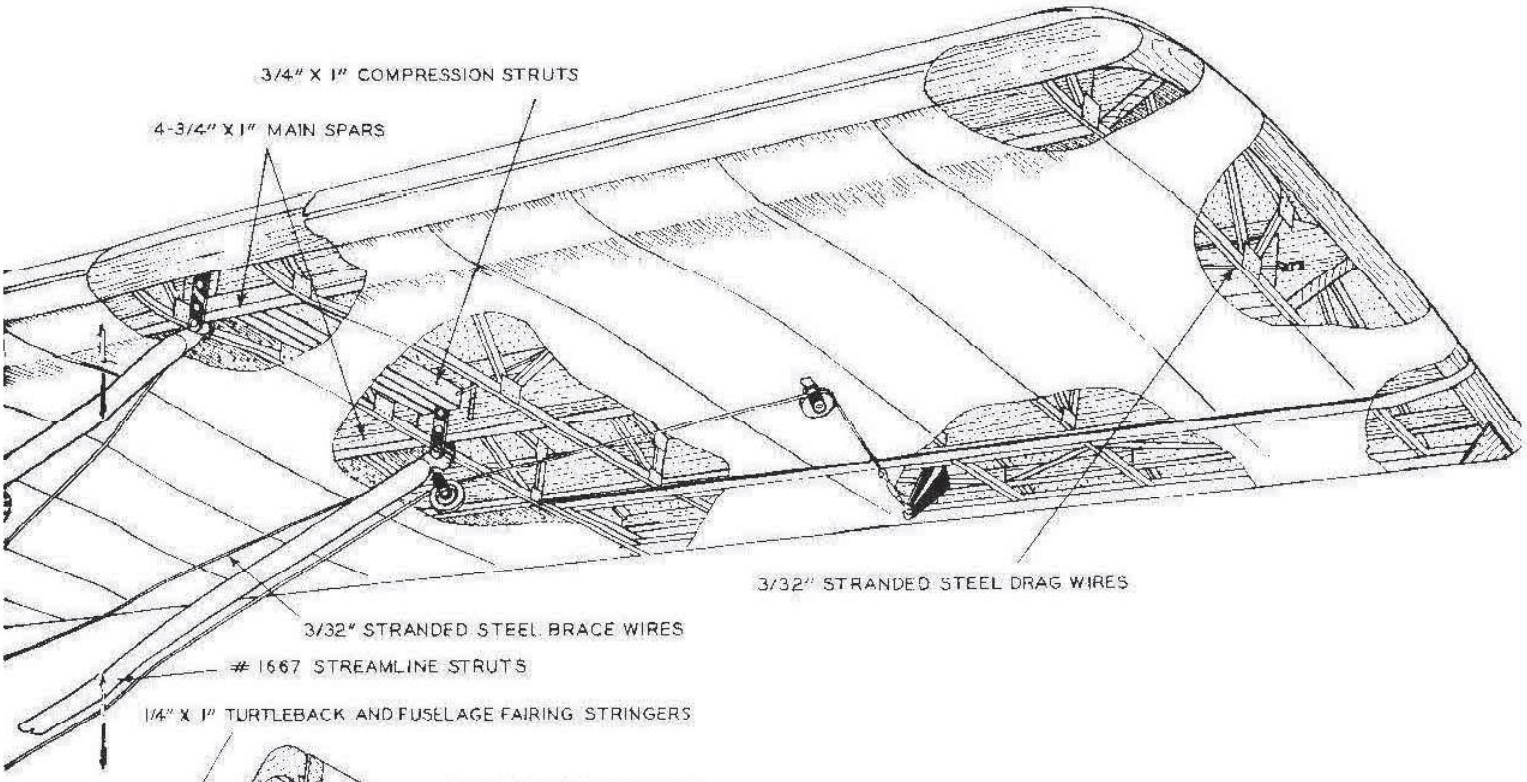


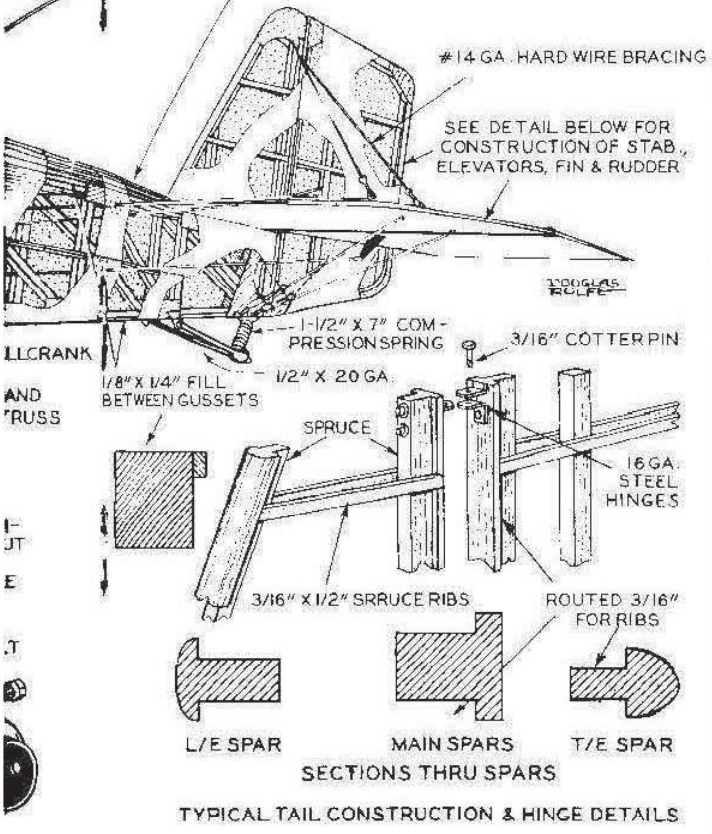
Above are dimensions for elevator and rudder horns. For typical construction see aileron horns in first installment.



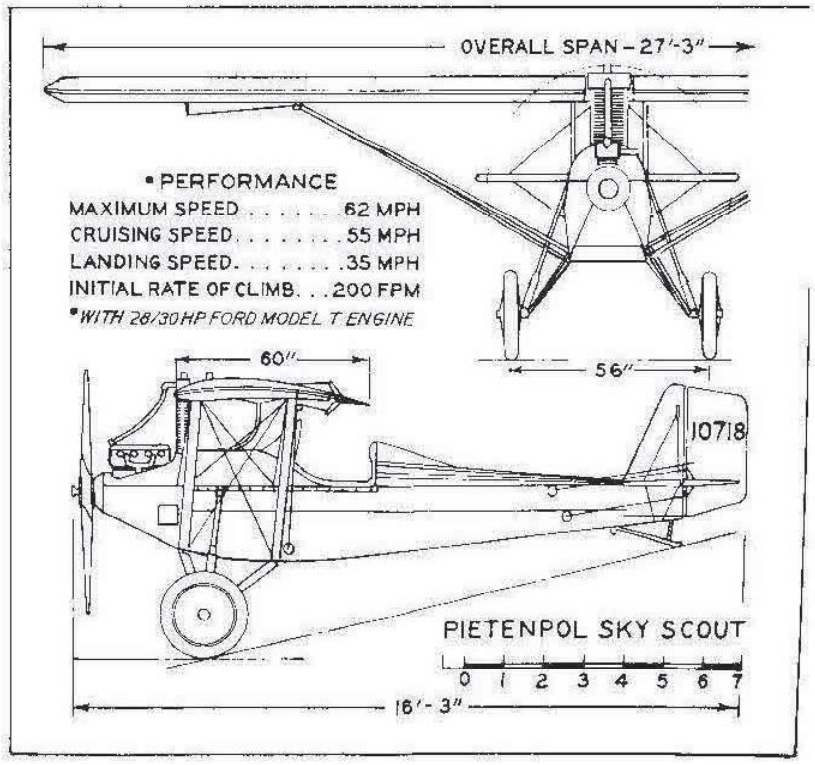
Rear Admiral Don Finke shows the tail skid and rear assembly. This plane is light enough for the average man to wheel in and out of the hangar without assistance.

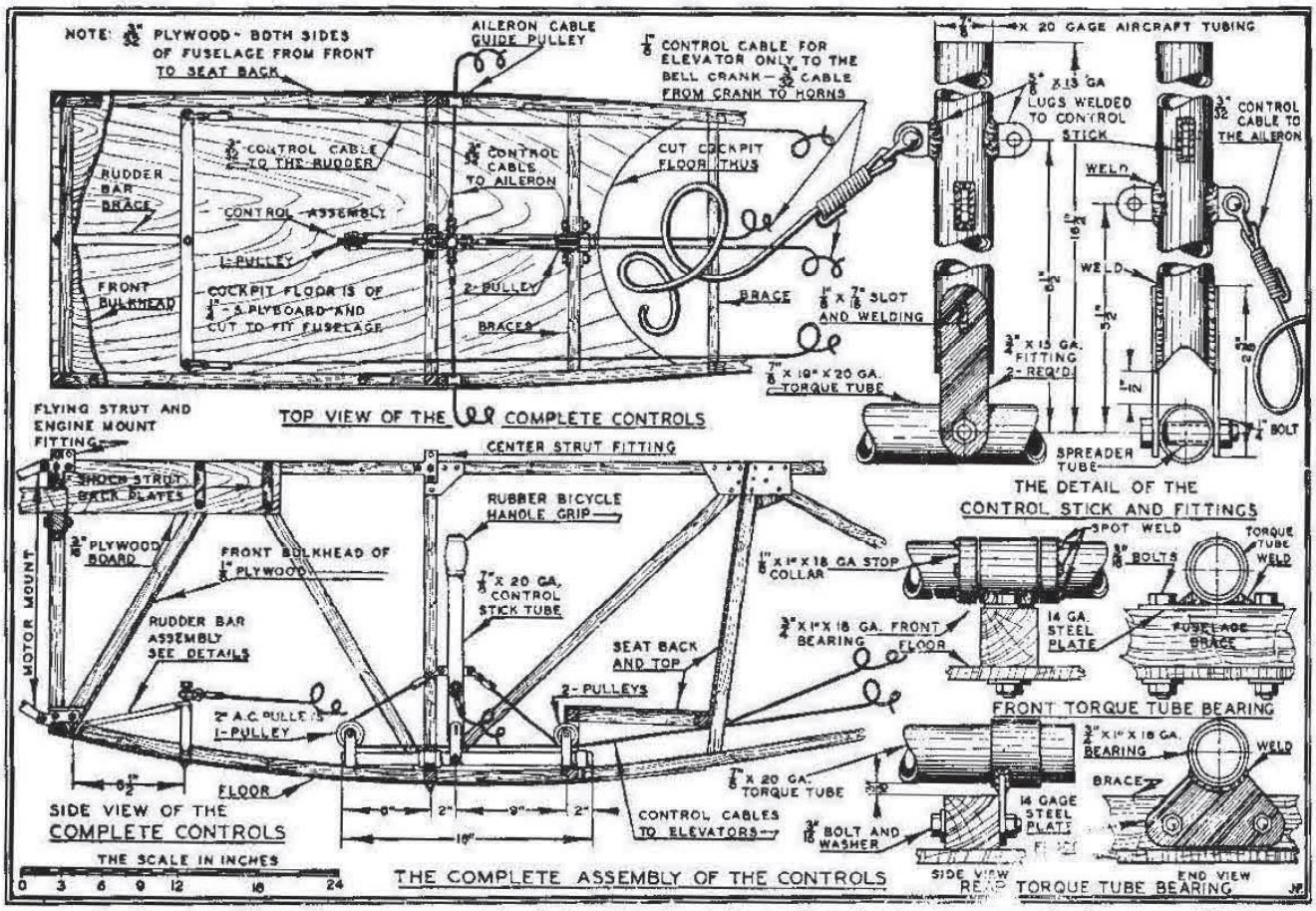

60"
AIRFOIL SECTION– 2" SQUARES
1/4" X 1/2" CAP STRIPS
3/4" X 1" COMP. STRUTS
GRAVITY FUEL TANK SHUT OFF
22 GA. ALUM. COWLING
FORD MODEL T OR MODEL A ENGINE
3/4" DOWNTHRUST
72" X 42" WOOD PROP
1/2" PINE NOSE PLATE
1" X 2" W. ASH ENG. BEARERS
3/4" X 20 GA. ENGINE MOUNT
3/32" PLYWOOD STIFFENER
1/8" PLY FRONT BULKHEAD
RUDDER BAR
1/4" PLY FLOOR
26" X 3" WHEELS
3/32" PLYWOOD SIDES AFT TO SEAT BACK
HINGED T/E SECTION FOR EASY ACCESS TO COCKPIT
1/8" PLY GUSSETS
ELEVATOR BELLCRANK
3/32" PLY STIFFENER AT L/G SHOCK STRUT FIX
7/8" SQ. LONGERONS AND FUSELAGE TRUSS
1/8" X BETW
1/4" PLYWOOD
AIR SPEED
TEMP.
TACH.
ALTI-METER
OIL
THROTTLE
SWITCH
TURN & BANK INDICATOR
INSTRUMENT PANEL AND BASIC FLIGHT INSTR'MTS.
SPRING-LOADED SHOCK STRUT OR 1-1/2" X 18 GA. STRUT IF AIRWHEELS ARE EMPLOYED
WELD ALL JOINTS
1695 STREAM-LINED REAR STRUT
1-1/2" O.D. X 12 GA. AXLE
11 GA. WASHER
1/4" BOLT
1-1/2" X 12 GA. ROUND STRUT
13 GA. STRAP FOR SHOCK STRUT FIX
1-1/2" I.D. X 12 GA. AXLE COLLAR
L/G DETAIL – AXLE, WHEEL AND STRUT FIX





TYPICAL TAIL CONSTRUCTION & HINGE DETAILS





This drawing shows the complete assembly of the controls, which are installed in the conventional manner. Aileron, elevator, and rudder horns and other details will be found on the smaller working drawings. If you are not an expert at welding, this work should be sent out, as failure of the controls has an annoying inclination to become embarrassing.

Tack a piece 60 in. wide the full length of the wing all around the edge, bottom side first. Give the edge a coat of dope, turn the wing over and do the same on top.

Now sew the cloth to the ribs in the regular manner, put on a coat of dope, then all the tape and patches around fittings and give the wing four extra coats of dope (five in all).

The last two coats may be colored. I advise a light coat of paint on the wing if you wish the cloth to last a long time, although this makes the ship harder to patch.

Just a little warning, be sure and put the flap in the center. A lot of those building the Air Camper did not do this but put a large opening instead and spoiled the climb of the ship. Remember that you cannot have all the features of a high powered plane in a small Ford powered ship and expect it to fly well. And the flap is one of the things that makes these ships a success.

The first thing to remember in building a low powered ship is to keep the weight down and to keep the efficiency up.

After you have your ship complete, that is, the motor in, tail group on, all controls in, and are ready for the wing, make up your center struts like drawings (see next installment), all brace wires made, get about four extra helpers, put the wing on the center struts and line up.

Next have someone hold up the ends of the wing so that it will have a little dihedral, and measure the length of the front flying struts. These should both be exactly the same length. When these are in place, do the same with the rear flying struts. Now make the flying or brace wires. Hook up the ailerons, safety all turnbuckles and your ship should be ready to go.

I will likely get a lot of letters saying that I did not cover the whole ship, but if I were to do this it would take more space than this whole magazine.

I personally think that if you cannot build a ship from the plans alone, that all the instructions it would be possible to write would not do you much good.

But as I said before, if you know your stuff,

you may be able to make improvements in this ship and I would like to hear from those doing it, as it is one of my greatest desires to see the lightplane developed into one of the safest and best sports there is.

I believe this to be the safest lightplane there is, and if this design is a start in that direction it has all been well worth the time we have put into it. But those of you who wish only to build so that they will have something to fly had better build it exactly as the plans, and you will be sure of having a ship that is very easy to handle. It is cheap to run and will land and take off at a field where the average OX5 job, or similar powered ship, would be completely out of luck.

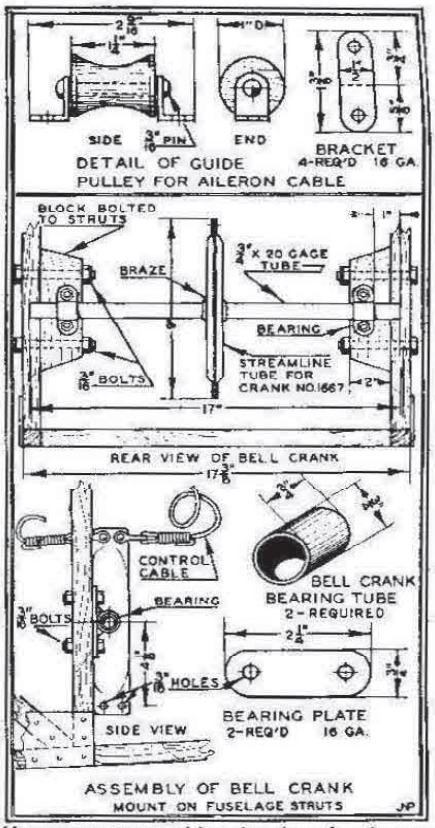
I am sure if you ever come to our field and see these ships fly you will agree that these planes will do all we claim they will — and then some.

If you fellows are going to build this ship for the Model T motor, well and good, but if it goes for the Packmag Twin, then here's a word or two on that motor and what it will do to your ship.

It was originally designed by Earl D. Hilburn for use with all of the type of ships which can be flown with around 30-40 hp. She was built at the MECHANICAL PACKAGE MAGAZINE'S Experiment Station, and, after considerable machining, took final form and was tested in a ship like the Air Camper.

This motor sells in the rough casting form for $75.00, and in the finished machined form for $261.00. It will make this plane have pursuit ship performance and it will be able to carry considerable pay load, although the fuselage is not stressed for two-place work. I imagine a top speed of 95 miles and an even lower landing speed due to lower weight would give this ship some real soup.

It is not necessary to have very elaborate machine shop equipment to build the engine. If you have a small lathe, the cylinders can be bought machined, and then the crankcase and the shaft and all can be bought as is necessary.



Here are more working drawings for the control fittings. Dimensions for the construction of the bell crank and guide pulleys for the aileron cables are shown above.

A longer mount will have to be put on the ship and it should extend 13 in. farther out than the Ford T due to its lower weight of 120 lbs.

The Cross Country can be cowled in to make the ship have Army type looks and this is always something to be desired — a classy ship.

I don't know about the proposition of floats with a Model T. I do know you can't use them as the motor won't have enough soup. The usual procedure for any land plane which performs well as a land plane is to add 50 percent more power when used as a sea plane.

This is because of the increased resistance of the floats, which have their highest resistance just before they begin to plane. After that they become less and less drag until they take off and the ship's highest speed is reached, which of course means that the drag has reached the highest proportions possible with that power.

Next chapter we will take up the engine details and the method of mounting the good old Model T, which, after all, is the ideal for this ship as she was designed. •••

Engine Details of the "Sky Scout"

Here we round the pylon on the home stretch in one of the most popular how-to-build stories we have ever published. This series on building the Sky Scout, slightly smaller sister to the Model A powered Air Camper, is second only in popularity to the series run on the building of that famous ship. Here are finishing details of motor conversion, operation, ship finishing and flying hints. Bank her over and rip in!

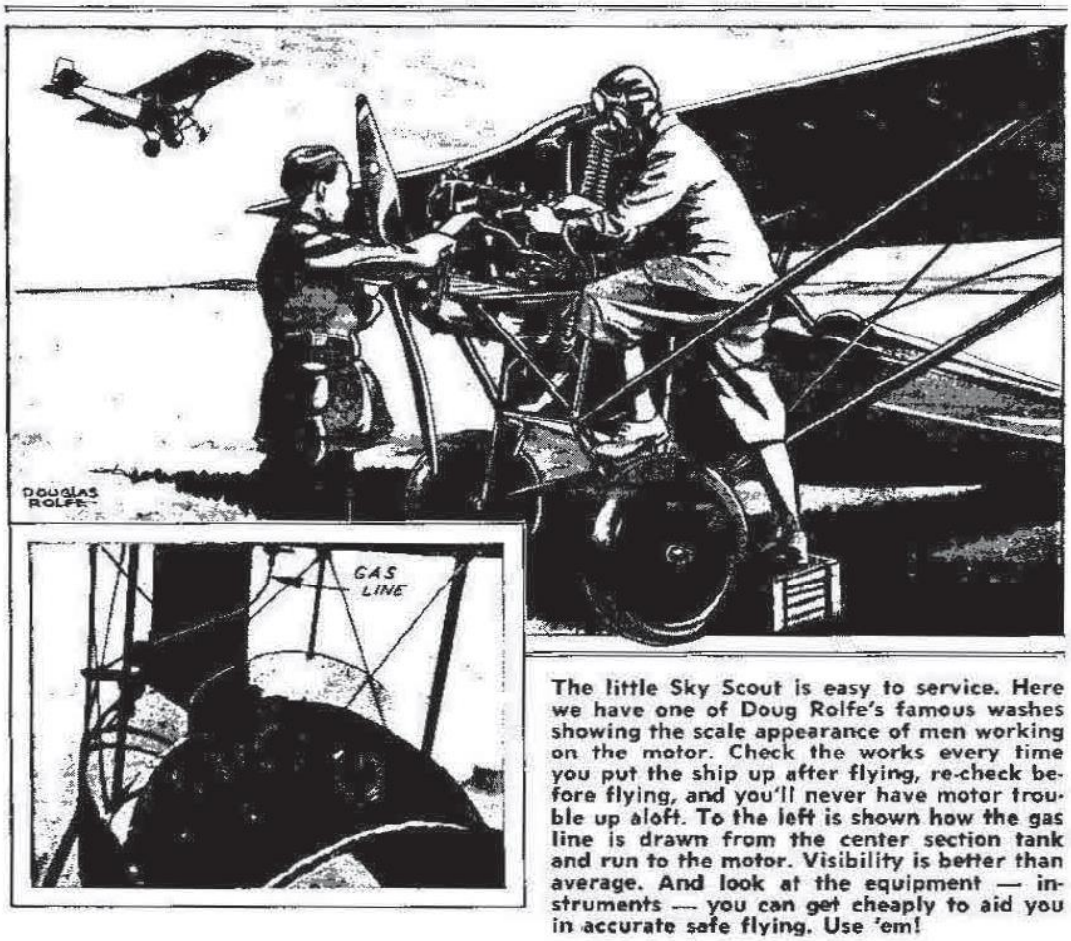
For the benefit of those readers who may have skipped over the first two chapters of this article in their eagerness to get to the engine conversion plans presented herewith, let me summarize what we have gone over.

As you know if you read these first two parts, the Sky Scout is a slightly smaller version of the famous model "A" powered Air Camper which was published in this magazine about a year ago, and which is now obtainable in the FLYING and GLIDER MANUAL.

Model T Ford Motor Used

The Sky Scout, however, instead of being a two-seater, and using the 38-40 hp model A conversion, makes use of the cheaply obtainable model T motor, and is a one-seater in which a student can pile up hours at low expense.

It is a ship for which an identification num-



The little Sky Scout is easy to service. Here we have one of Doug Rolfe's famous washes showing the scale appearance of men working on the motor. Check the works every time you put the ship up after flying, re-check before flying, and you'll never have motor trouble up aloft. To the left is shown how the gas line is drawn from the center section tank and run to the motor. Visibility is better than average. And look at the equipment — instruments — you can get cheaply to aid you in accurate safe flying. Use 'em!

ber can be had from the Department of Commerce, and while I have heard that a few over-zealous inspectors will ground a ship if it doesn't have a "C" of some kind, you will find that all state legislation hinges upon the Federal air laws, and that anyone can fly for himself on an unlicensed field in an unlicensed ship if he wishes. All that the states ask is that the Federal laws be observed and that unlicensed ships not be flown from licensed airports.

So much for our introduction.

Part one took up the building of the fuselage and the wings.

Part two explained the landing gear, tail surfaces, and control system.

Now, in part three, we will have a little word to say about the minor fittings, the finishing of the ship, and the method of fixing up what little conversion work there is to making the Model T a good airplane engine.

We will take the power plant first, as the whole ship is of course built for the motor it will be using.

This ship was built for the model T of course, but may I say that the cowling is big enough for the model A. There is not much difference in the sizes of these two motors, but you will need a new engine bearer if you use an A, and also put the wing about an inch ahead.

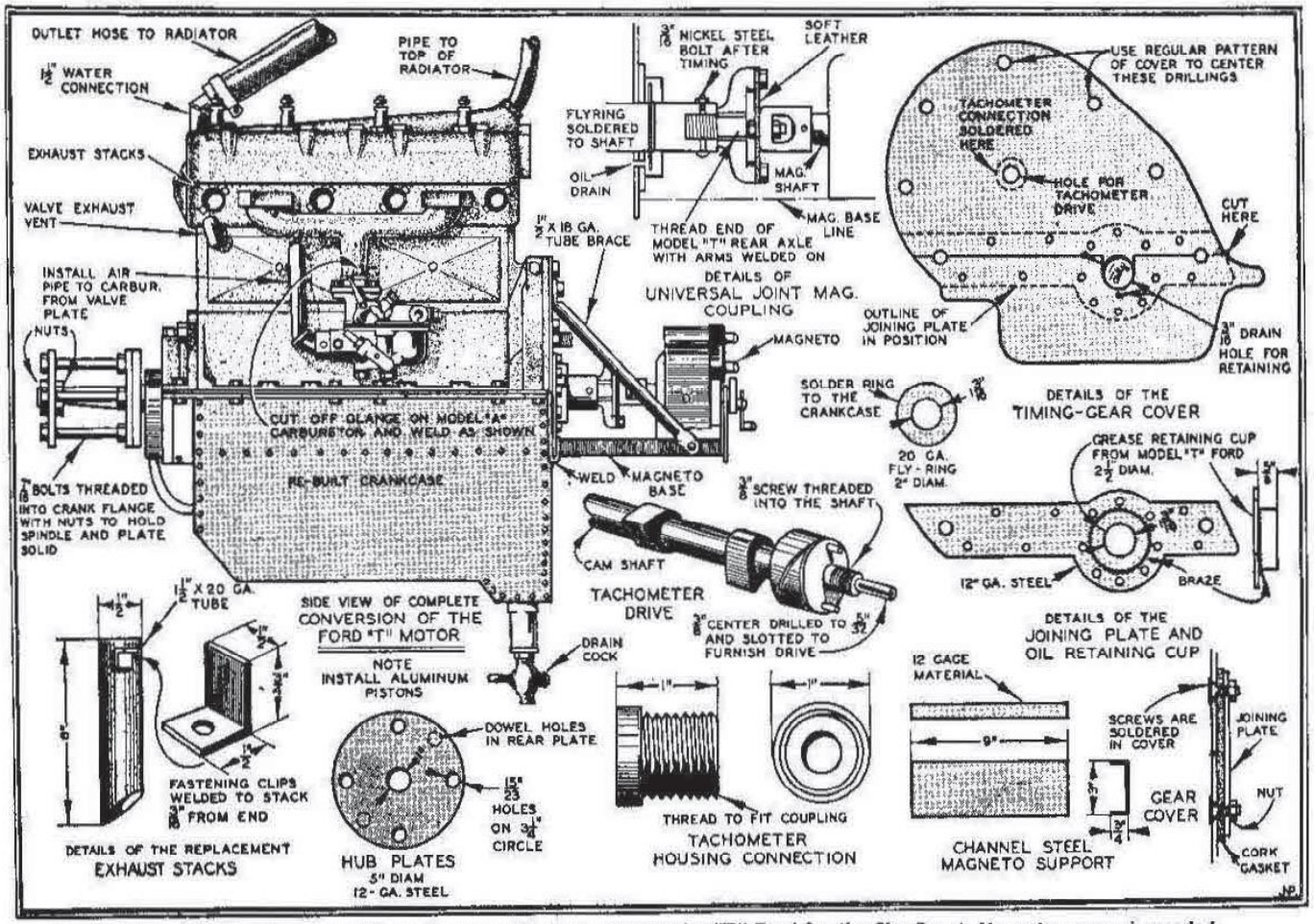
Model A Carburetor Favored

We did not make plans for the motor as everyone has his own ideas on the subject.

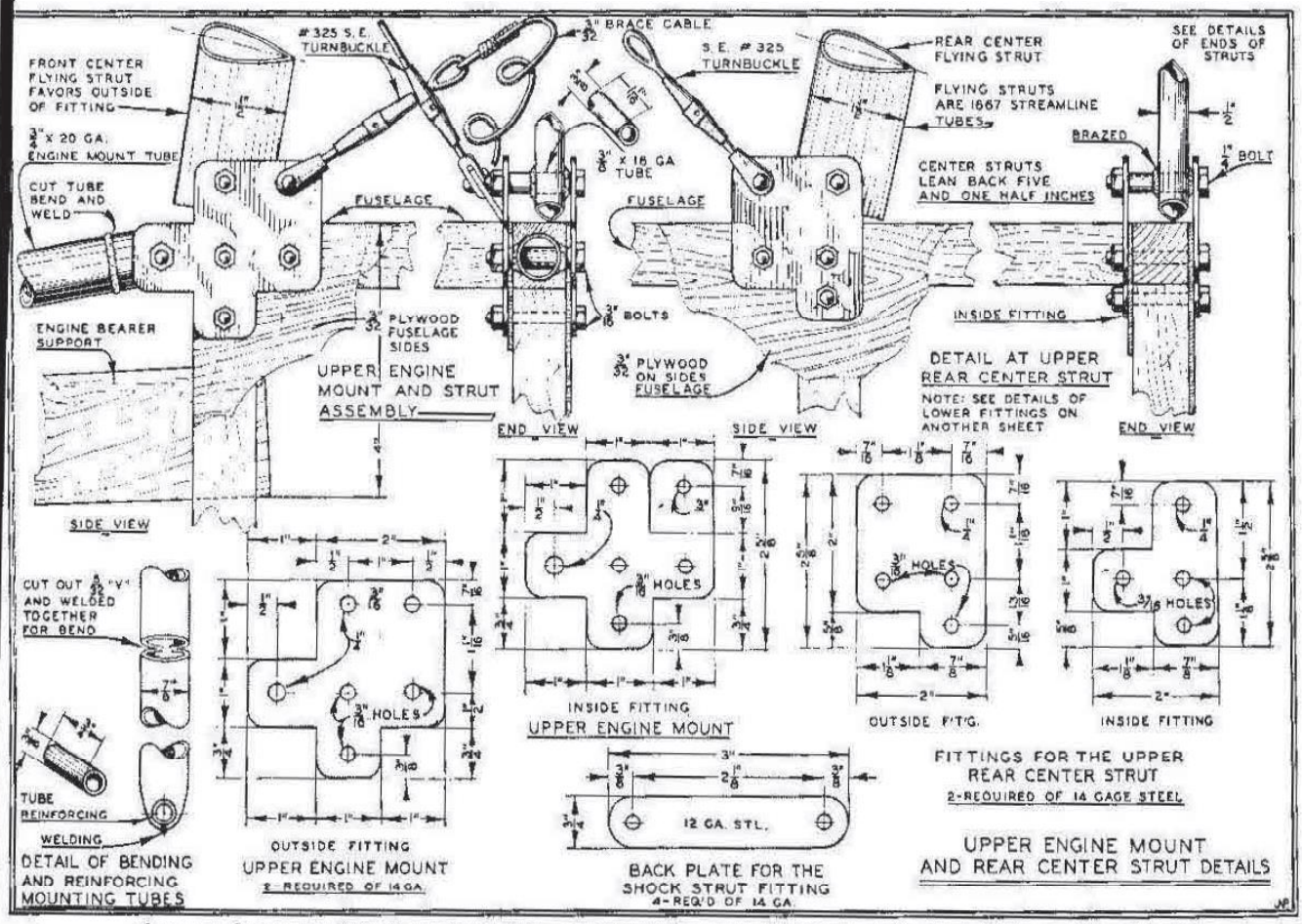
As long as they cool well and oil well they all work about the same in an airplane as in a car. The following changes were made. A model A carburetor was used. Cut off the intake flange where the carburetor was fastened and weld it back on so that a model A carburetor will fit. See drawing.

Exhaust stacks are put on. Aluminum pistons were installed. The regular head and valves were used (putting in larger valves won't help — the passages aren't big enough to let the gas flow any faster). The end of the camshaft was fixed for a tachometer drive as was shown on the drawings in the Manual and prints for the A conversion. Be sure and put in a tachometer. They are very necessary and don't cost much.

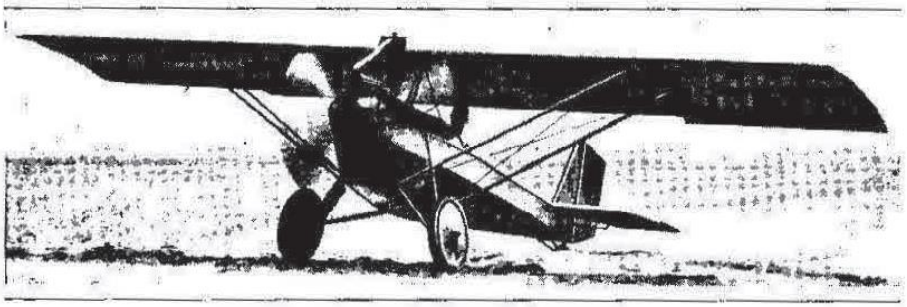
A fellow had an Air Camper here this summer without any instruments in it. I flew it but surely did not like it that way. I say, the more instruments the better. We use a complete set on all



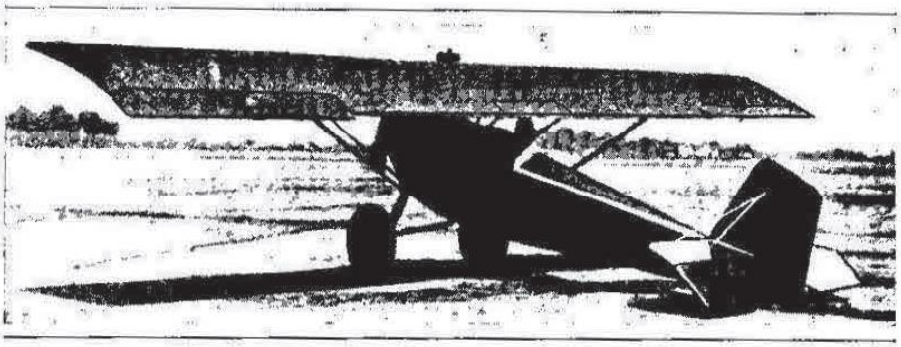
By studying this drawing you will see how easy it is to convert the "T" Ford for the Sky Scout. No water pump is needed.



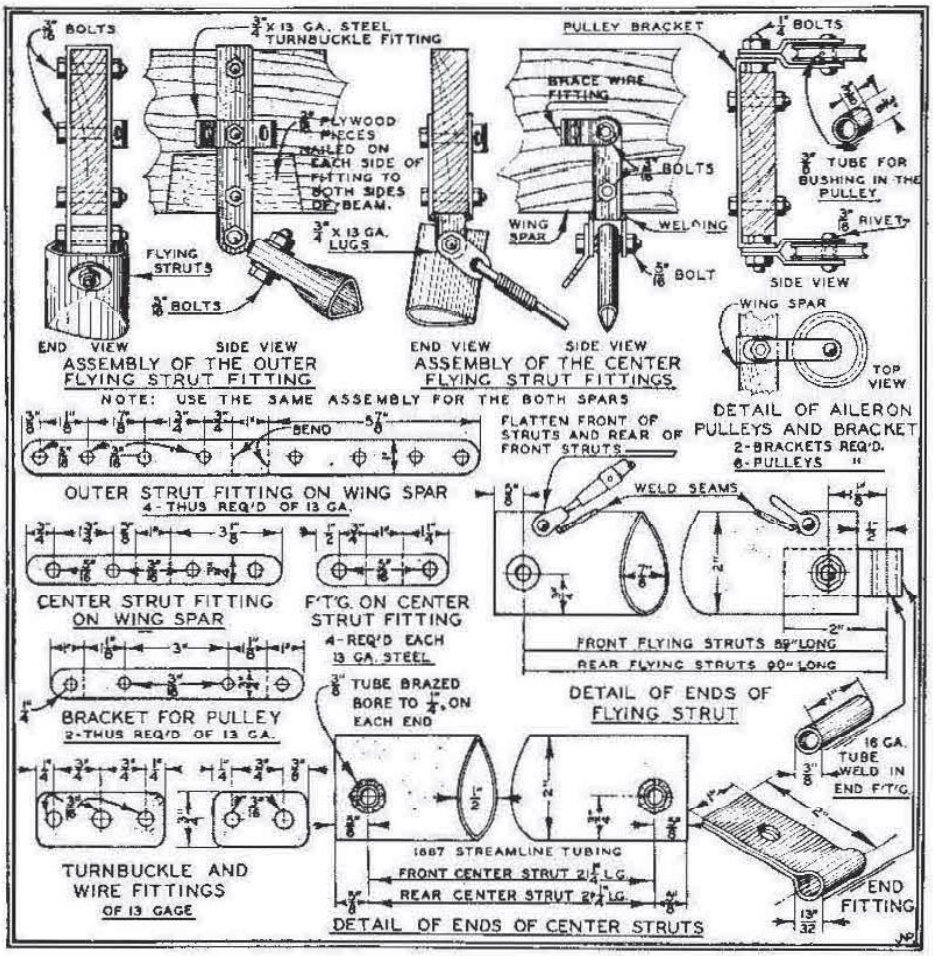
Here are shown complete dimensions of the upper engine mount plates and of the strut fittings and turnbuckles.



Always warm the ship up a little before taking off. See that the oil is warmed all through, and that the water and valves have warmed up. Some peelots have felt they were driving a car with these motors. Be sensible!—it pays to take pains!



The Sky Scout is but a few inches larger than a Heath, but a few inches smaller than an Air Camper. It will fly nicely on the Model T Ford engine and is very rugged. The ship will also make a very high speed "hot" ship with a Pack Mag "Cross Country Twin" 40 hp twin opposed motor. Note flap in rear of wing to admit pilot to cockpit.



Here are the details of the center section struts and the aileron pulley fittings. These drawings need no explanations.

our ships.

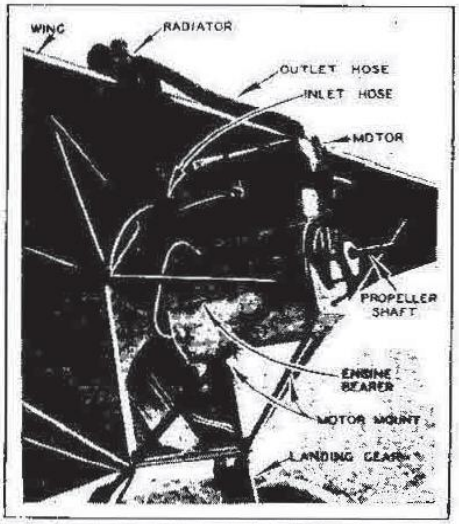
The magneto is driven in a left hand direction, direct from the crankshaft.

Better use a good mag, as I have seen a lot of the old D U 4s go bad when they are flown in hot weather. Also, a new mag weighs about 7½ lbs. where the old ones weighed about 14 lbs. Although we have one of the old mags on a ship at present, and it seems to work fine. The propeller hub is made as on the model A, except that it is necessary to use a nut on the engine side as the flange is not threaded.

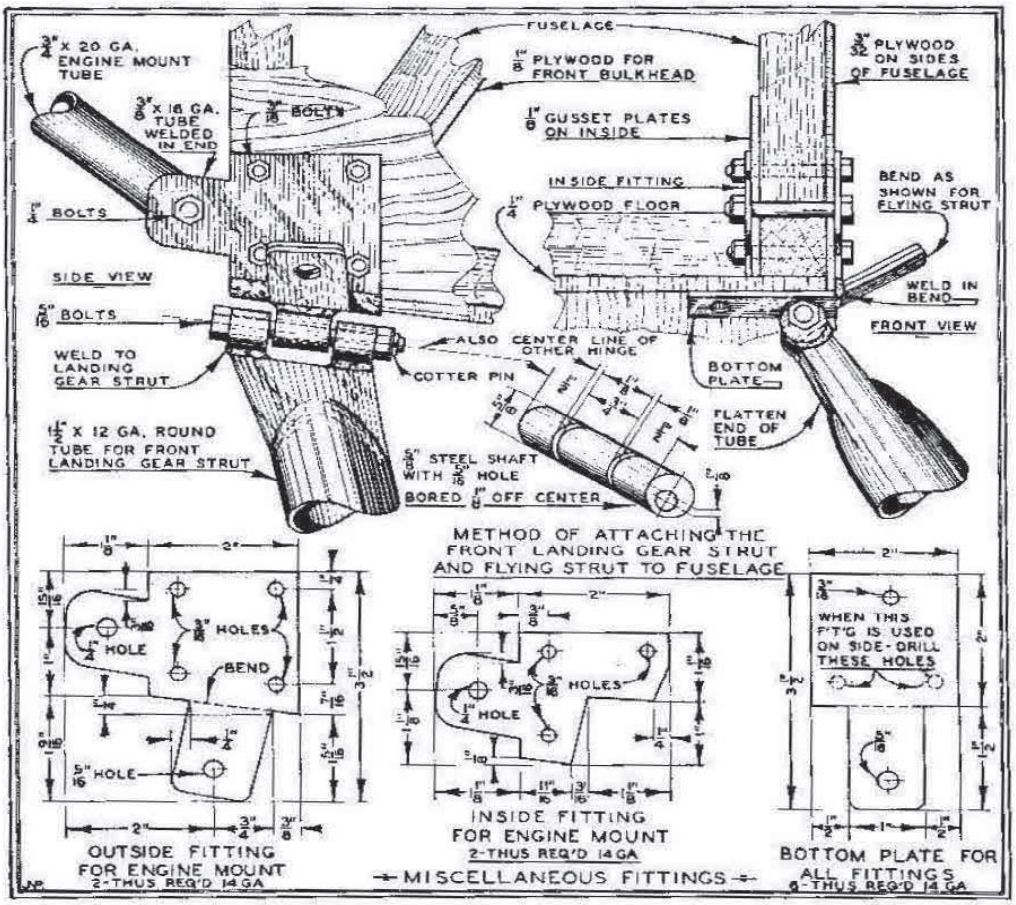
We use a gear driven oil pump from an old Ace motor, built by Horace Kean in New York about 1919. We have a hollow drilled shaft and carry three quarts of oil, although any good oil system will work. Don't favor splash so much for model Ts as they have bent hair pins for crankshafts and the bearings are small, although the shafts are built of the best stuff money can buy for crankshafts.

Thermo-Syphon Cooling

The thermo-syphon system is used. The block is fitted with a 1½ in. outlet near the top front of the motor (see drawing) opposite the place where it was on the motor, and this runs to the radiator top. A circulating pump could be used in warm



This will give you an intimate glimpse at the salient points of the T conversion as used in the Sky Scout. The McCord radiator, bearing lubricator and other parts are shown as per drawings elsewhere in this series.



The same sturdy, ample fittings of simple design are used on the Sky Scout as were used on the Air Camper, with only minor changes. All bends must be made slowly, and done cold. It's important that all welding be well done.

weather, and would be better, but we have had no trouble as on one instance Don Finke flew a ship from Spring Valley, Minn., where we have our shops, up to Minneapolis, a distance of 150 some odd bee line miles, and he ran into some hot, dry weather, then a thunder and rain storm. The motor never coughed, but kept slamming along.

The radiator was made from a 1926 Macord Ford radiator cut in two and one half put in back of the other. This makes a better looking job. Better have a tinsmith do this job well for you. In regard to the radiator, lots of those building the Air Camper asked why I did not put the radiator below the fuselage. We have tried this on two ships and in both cases the climb of the ship was poor, the top speed five miles less. The motor overheated, and the draft and lack of supporting wind stream made the ship very tail heavy. Carried a passenger with difficulty and weighed more, and the same would hold true on the Sky Scout here.

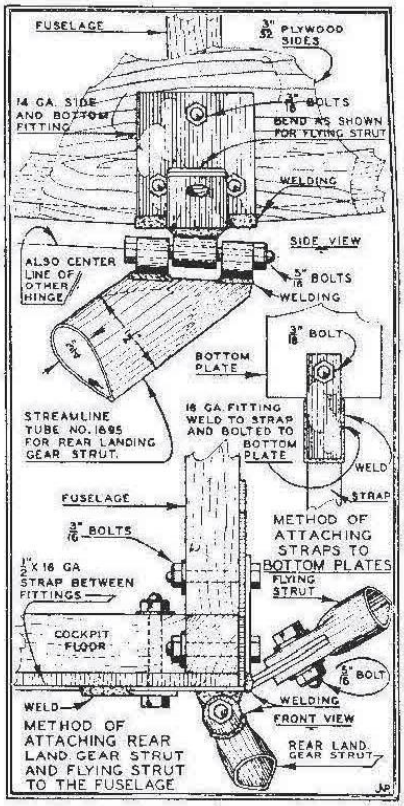
The vision on these ships is good and the radiator does not bother. In fact, the vision is better than one of the Air Campers using a Velie motor.

It will not be necessary to use a new Ford T block for the ship. We can arrange a regrind job at a dollar an inch of bore on any old block, so that the new aluminum Ritefit pistons, which must be used anyway, can be cut to fit the new job just as well as an old one. Old T blocks used with the cast iron pistons very soon run out of round, and are hogs on oil as most of you know. With aluminum pistons cut with .007 in. skirt clearance and .025 in. head and ring gland clearance, the oil pumping and the blow-by compression losses are cut way down. The pistons are sold in the rough and are fitted for any prescribed diameter at the time of selling.

Here are some of the salient figures that readers will be wanting in connection with the motor and the business end of the ship. The weight of the prop is about 12 lbs. The weight of the motor dry is about 185 lbs. The weight of the radiator is 15 lbs. The job holds 4 qts. of oil which weigh 7 lbs., and the cooling system holds 3 gals., or about 20 lbs.

I would say that this four is about 32 hp. It turns a Lawrence prop 1500 rpm and the government figures show that this prop requires 28 hp at 1400 revs.The model A will not turn this prop over 50 turns faster.

The propeller is 6 ft. diam. by 42 in. pitch and turns anti-clockwise. This is a Flottorp prop. It will turn from 1650 to 1740 on the ground, depend-



Here are the details for the fittings used on the fuselage end of the new V-type Pietenpol landing gear. All bolt holes must be snug fits.

ing on the day. It cruises at 1600 to 1650 in the air and will turn 1850 in the air wide open.

The weight of the fuselage less cloth and metal fittings is 43 lbs. with turtleback and instrument board. The weight of the tail unit less cloth and horns is 9¾ lbs. Each landing gear V weighs 5 lbs. Shock struts weigh 3½ lbs. each. Weights of other components have been given in other installments.

• • •