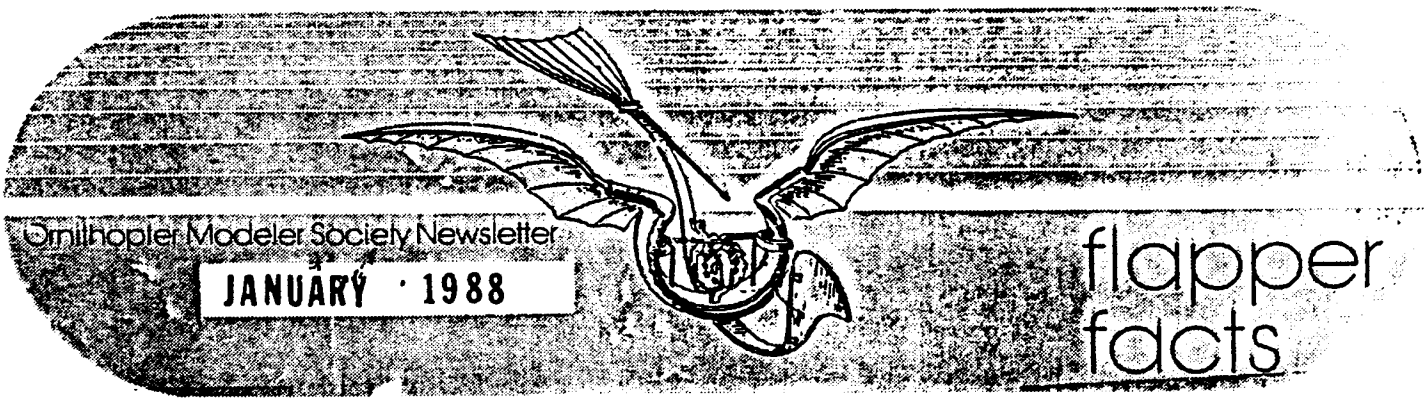


Well, 1987 proved to be a great year for Ornithoptic flying, with three new records set! Ray Harlan holds Cat I, with 5:25, set in September, 1986. Frank Kieser now holds Cat II, with 10:00, set in July, 1987, and Cat III, with 11:32, set in August, 1987. I now hold Cat IV, with 12:20, set in July, 1987. I also hold all three outdoor records.

I built a Canard this summer for outdoor flying at the Lawrenceville, Indiana contest. The model weighs about 14 grams. In dead air, it flew 55 seconds. It was far too windy to do any flying on the day of the contest. Oh, I tried - only to break the flapping wing spar! Better luck this year, Tiger!

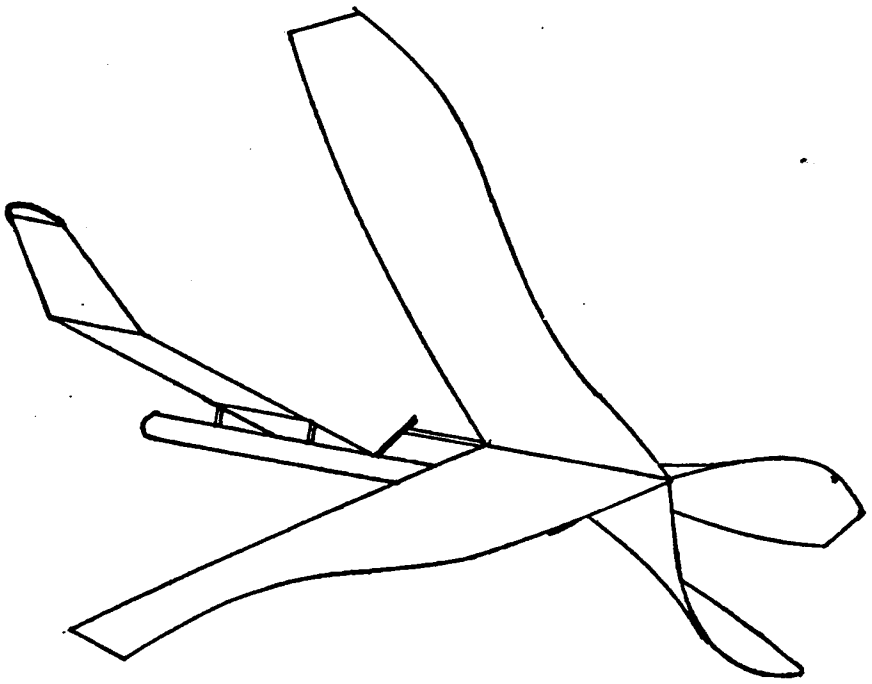
Frank Kieser and I flew in the Delta hangar in Tampa Bay, Florida on January 3 & 4, 1988. The Delta Hangar is big, with the circling bottom of steel about 66 feet. The weather was grand and so was the flying! My best flight was 8:00 and Frank's best flight was 10:13! Frank did have his problems flying, though - he hung up three models! However, all were retrieved with no damage. Old Tarzan here, rescued one for him, and I was busy climbing the walls for two or three others. You all know that I enjoy doing that!

Picture my trip south to 72 degree weather in Florida for two beautiful flying days. Then, on to Kissimee for a great visit to Epcot Center and some rollerskate dancing. Next day, a beautiful drive in the sunshine to Jacksonville Beach and a visit with Frank Kieser and his lovely wife, Betty. I walked in the surf of the Atlantic Ocean! Then, on to Columbia, South Carolina to visit my daughter. Now, picture my drive northward, through a blizzard! When I could no longer see, I stopped in Greenville, walking through 14 inches of snow to the restaurant. Well, let it snow, I built a Delta Dart! Next day, the snow hadn't been touched on parking lots or highways. It seems they don't know how to handle snow - I mean - it never happens in South Carolina, where they drive like South Carolidiots in the snow! With all highways closed, I headed south to Atlanta and made my way back to St. Louis. High flyers don't let anything get them down!

Frank and I are already planning the next trip (hopefully, in March or April) to fly Cat IV at Tustin in California. We can hardly wait!

I will end this report with a positive note - no dues for 1988! Have a great time building, and I'm looking forward to the next time we all fly together!

Roy White



This is a line drawing of Frank Kieser's Fancy Girl III in flight. It was made from a picture in Nov. '87 Model Aviation that was taken by Larry Kruze at the 1987 Nats at Lincoln Neb. It appears to have been taken shortly after launch when the model was climbing under high torque. It is interesting in that it clearly shows the membrane shape. In this design, the left and right wings are out of phase by 90 degrees. The left hand pair are very near full up and down stroke where the rotational velocity is zero. The membranes are slack as indicated by the wavey trailing edge. The right hand pair are at mid stroke and rotating toward each other at near maximum rotational velocity. The membranes are highly loaded as indicated by the bowed trailing edges and the tips are rotated about the leading edge spar in the direction of the loading, all of which tend to set the membranes at the optimum angle of attack for maximum propulsive efficiency.

CANARD ORNITHOPTER CONSTRUCTION by FRANK KIESER - 9/15/87

The canard biplane ornithopter has proven to be the best competitive configuration holding three of the four categories of AMA records. Many have asked about construction details of the wing and linkage for this type of model. Presented here are details of Fancy Girl III which features a wing, linkage and crank in a single assembly, demountable from the motor tube. This design is particularly attractive since it reduces considerably the box size, provides adjustment of the flapper incidence and gives interchangability of parts with practically no weight penalty. Wood sizes shown are for the competitive model weighing 1.2 grams. For those building this type model for the first time, sizes may be increased. However, too much weight in the wing assembly will have an adverse affect on the center of gravity. Details of parts not shown are conventional indoor model construction to suit the builder. For instance, my model uses an unbraced mylar covered stabilizer while Roy White uses a braced microfilm covered stabilizer.

FIG. 1 - UPPR & LWR WING SPAR ASS'Y (4)

All wood parts are .045 square 5 lb. balsa. Boron is used top and bottom for the inboard 9 inches and the front inboard 4 inches. The hinge pins are .006 mw glued to the inboard side of the inboard rib. Be sure to leave extra length on the tips for glueing temporary T.E. strips in fig. 3. Lower spar diagonal member must be sufficiently inboard to clear upper wing linkage support.

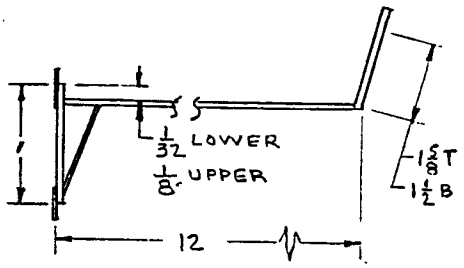


FIG. 2 - HINGE PLATE ASS'Y

The hinge plates are .025 balsa .12 wide x .19 high. The faces are coated with glue to incease the bearing strength for the hinge pins. Tack glue the 4 spar assemblies to the .020 thick temporary plate between the upper and lower hinge ribs. Be sure the spars are in their exact relative positions. With the upper spars on a smoothe surface, push the hinge plates over hinge pins.

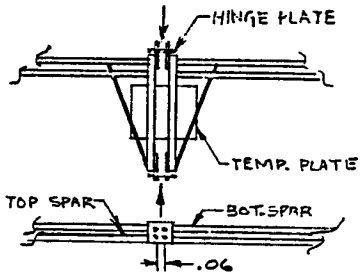


FIG. 3 - WING COVERING

Preparetory to covering, the center rib is made from .025 sheet balsa leaving extra length. It is cemented to the aft hinge plate. The temporary trailing edge strip is made from .05x3/8 balsa and cemented so that the trailing edge of the wing is 1/8 forward of the forward edge of the strip. The tips are bowed back 1/2 inch from the straight position. Care must be taken to keep the upper spar a uniform 3/32 ahead of the lower spar. The covering is 1.7 mylar. The covering is stretched and cemented to a frame, the lower structure surfaces, except for the inner 1 1/2 inches of the spar where the conrod hinge support will be glued, are coated with contact cement, including the temporary T.E. strip and then placed on the mylar. The mylar is cut with a hot wire. The upper surface is covered in like manner. After both surfaces are covered, the T.E. of the mylar is cut with a hot wire using the temporary strip as a guide. After all 4 T.E. cuts are made, the excess center rib and tips are cut away taking with it the temporary T.E. strip.

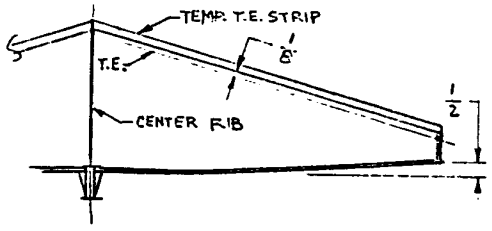


FIG. 4 - LINKAGE DIMENSIONS

The linkage dimensions for this design are shown for reference. Points A and B are the upper conrod hinge points and are fixed to the upper and lower wing spars respectively (see figs. 9 & 10)

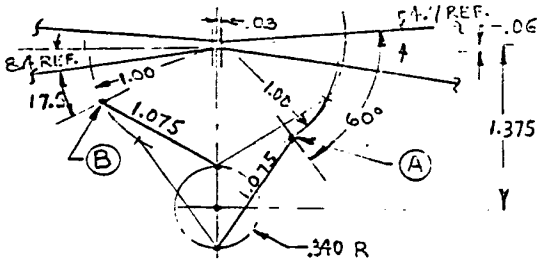


FIG. 5 - FLAPPER SUPPORT ASS'Y

The vertical and horizontal members are .050 square 7 lb. balsa. Boron is glued to the sides of these members. The diagonal is .045 square 5 lb. balsa. The paper tube is .05 I.D. Jap tissue. The crank bearing is a piece of hypo needle tubing with a tab bent up from the forward end. Dim. A is sized to suit the linkage dimensions (see figs. 4&7). Dim. B is sized to suit the motor clearance. Dim. C must match the hole spacing in fig. 6.

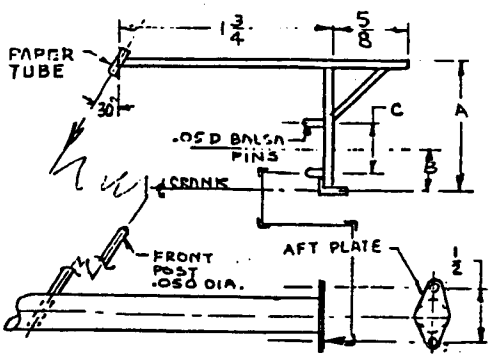


FIG. 6 - MOTOR TUBE ASS'Y

Only the aft end of the motor tube is shown. The rest is conventional indoor construction. The tube is .012 dia. x 9/32 I.D.. Three boron stiffeners, one each at 5, 7 & 12 o'clock are used. The aft plate is .025 thick. It is coated with glue around the two holes. The front post is stiffened with boron on both sides. The post must be sized and located so that it slides tightly in the paper tube.

FIG. 7 - WING & SUPPORT ASS'Y

First make the crankshaft from .015 mw. Insert in the bearing with a short length of hypo needle to act as a washer and then bend the hook. The covered wing is now assembled to the flapper support by glueing the hinge plates to the support. the location must be such that the wing spars are aligned with the crankshaft. Also check that the height of the upper hinge pin above the crank is correct. When wing assembly is firmly attached to the support, remove the temporary plate between the upper and lower hinge ribs by disolving the tack glue spots (see fig. 2). Check wings for freedom of rotation.

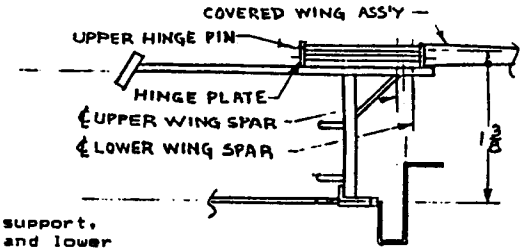


FIG. 8 - CONNECTING RODS

The linkage is designed such that all four conrods are the same length. They are made of .025x.040 balsa with the ends wrapped with 3 layers of jap tissue. The crank end is pierced with a .015 wire and the wing end .006. I use a simple jig so that all hole spacings are accurate and identical.

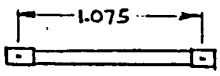


FIG. 9 - CONROD HINGE SUPPORTS

The struts for the conrod hinge supports are made of .025x.035 balsa. The hinge pin is bent from .006 mw and glued to the struts. The hinge support for the upper wing is glued to the spar with the pin at the correct radius (1.00) from the wing hinge. A diagonal brace is run from the lower end of the support to the forward end of the hinge rib to steady the conrod hinge pin. The conrods are slipped on the crank and then on the wing. With the crank in the bottom center position, both upper wings should be 5 degrees above horizontal. A small balsa washer is glued on the hinge pin to retain the rod.

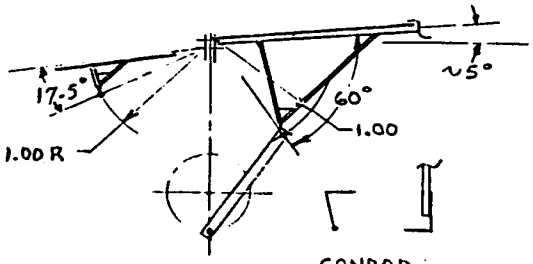
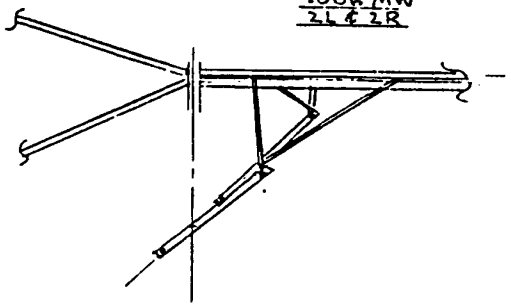


FIG. 10 - LOWER WING HINGE SUPPORT

The final step is to attach the lower wing conrod and hinge support. Each wing is done separately. Slip one conrod on the crank and the hinge support on the conrod. Rotate the crank so that the upper wing is in the full down position and slide the hinge support along the lower wing spar until the upper and lower wing just come together. Glue the hinge support in this position. Repeat for the other wing. This method assures that the upper and lower wings will come together even though there are small errors in the linkage.



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June 12, 1987

Roy White
Ornithopter Model Society Newsletter
Route 1, Box 241
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Dear Roy:

Charlie Sotich was good enough to send me a copy of the article "Cutting Boron" by Frank Kieser, which I believe originally appeared in your newsletter. We found it quite interesting because our readers are getting more and more involved in making small kites using boron. You will see why from pages 12-14 in the sample issue of Kite Lines which I'm enclosing.

We would like to know if we can reprint "Cutting Boron" in Kite Lines. Incidentally, although we put out a handsome rag (if I do say so), we're still pretty small and only recently squeaked past the 10,000 circulation point after publishing for over 10 years. I mention these things as a preamble to requesting that we be charged no fee in connection with this permission. We would, of course, be happy to give a complete credit line to the Ornithopter Model Society Newsletter, using any wording you specify.

Speaking of OMSN, we would greatly appreciate receiving a sample copy. We will want to subscribe for sure, unless you'd rather exchange subscriptions with us, which would also be fine with us.

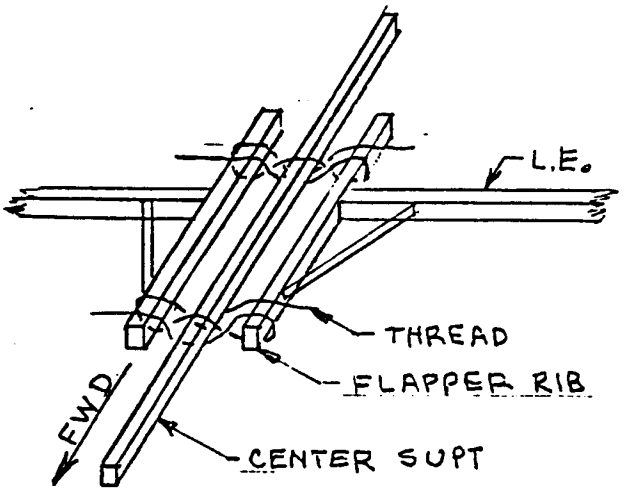
We look forward to your reply.

Sincerely,

Valerie Govig

Valerie Govig
Publisher-Editor

CC: Frank Kieser
2219 Gordon Avenue
Jacksonville Beach, FL 32250
(per Sotich reference)



THREAD HINGE FOR CANARD ORNITHOPTER
Frank Kieser - 9/1/87

1. Clamp or temporary glue flapper ribs to center support in between hinges. NOTE - Parts are shown separated on sketch for clarity. Use balsa for ribs and supports that is hard enough to resist cutting by threads (about 6#).
2. Run one continuous thread at front and one at back as shown pulling tight but not enough to cut balsa. Glue threads to ribs and center support being careful not to glue pieces together.
3. Unglue temporary glue joint. Hinges should now be operable.
4. Make one top wing assembly and one bottom and cover each. Join center supports with thin balsa spacer between them and top and bottom wings in correct relative position. NOTE - Top covering is on top, bottom on bottom.