# THE HANGAR PILOT

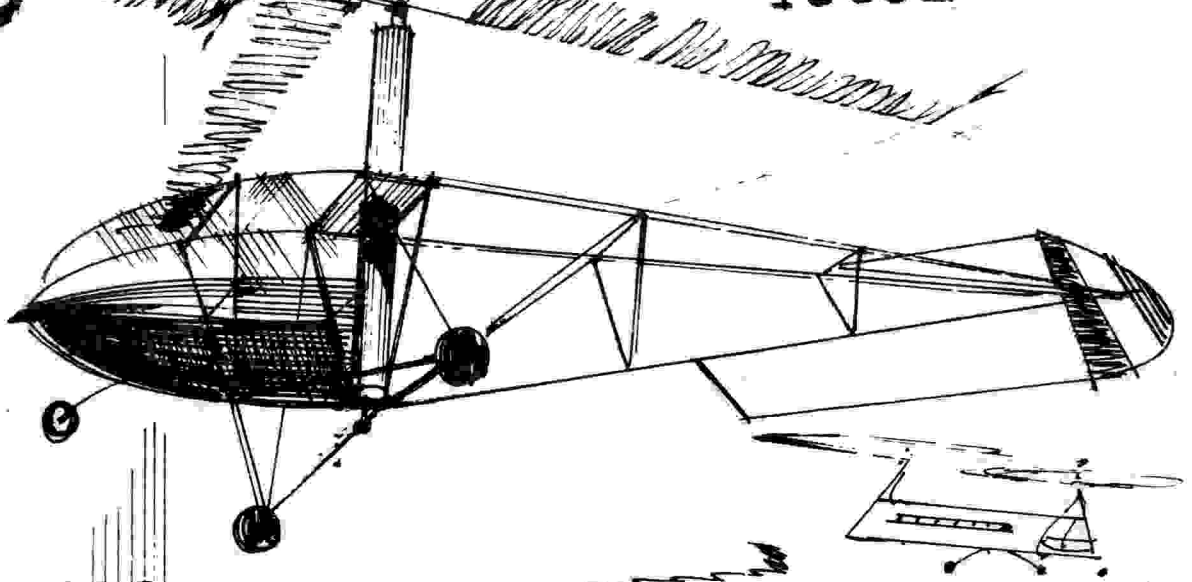
ISSUE 87

THE MIAMI INDOOR AIRCRAFT MODEL MAKERS

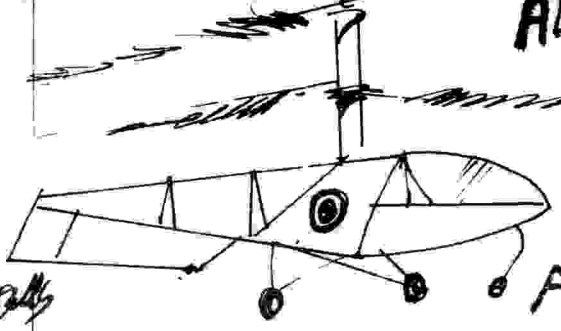
MIAMI

MAY 83

HELICOPTER ISSUE



ALSO: ELLIPTIC 30 GLIDER



FEATURING:
A JUNIOR GLIDER
ARTICLE by DON BAL

(1) THE HANGAR PILOT



Is published 8 (Or 9) times a season by Miami Indoor Aircraft Model Association (MIAMA) AMA Club 986, the only active all indoor club publication in the AMA. For $10.00 a year you receive all 8 additions, and for an additional $10.00 you are a member of this famous, far out, club. (Indoor isn't for everyone.!) We solicit your contributions, plans, comments, contributions, funds, 3-views, articles, gripes. We particularly want to hear from those who have not seen their particular interest in print..... Fly powered mike jobs, paper gliders, etc. LET'S HEAR FROM YOU!!!! Dr. John Martin 2180 Tigertail Ave, Coconut Grove Florida, USA 305-858-6363 AMA CD 712

NOTE NEW ADDRESS FOR HANGAR PILOT!

# National AMA Records

## AS OF MARCH 31, 1983

### INDOOR AMA CEILING CATEGORY I

| Category | Age | Min/Sec | Held By | Date Set |
|---|---|---|---|---|
| ROG Stick | Jr. | 3:54.0 | Robert Skrjanc | 1-9-83 |
| " | Sr. | No record established | | |
| " | Op. | 7:10.0 | Gerald Skrjanc | 1-9-83 |
| Paper | Jr. | 7:41.6 | Jon Smothers | 11-13-82 |
| Stick | Sr. | No record established | | |
| " | Op. | 15:21.0 | Stan Chilton | 1-21-83 |
| HL Stick | Jr. | 9:35.0 | Paul Loucka | 1-9-83 |
| " | Sr. | No record established | | |
| " | Op. | 23:24.0 | Thomas Vallee | 9-12-82 |
| ROG | Jr. | 0:28.2 | Melanie Anderson | 3-13-83 |
| Cabin | Sr. | No record established | | |
| " | Op. | No record established | | |
| Autogiro | Jr. | No record established | | |
| " | Sr. | No record established | | |
| " | Op. | 2:32.0 | Jean Andrews | 6-10-82 |
| Helicopter | Jr. | 1:38.0 | John Godel | 6-10-82 |
| " | Sr. | 2:00.0 | Frank Godel | 6-10-82 |
| " | Op. | 3:15.0 | Douglas Barber | 6-18-82 |
| Orni- | Jr. | 1:29.0 | Jolyn Andrews | 6-10-82 |
| thopter | Sr. | No record established | | |
| " | Op. | 2:04.0 | Kenneth Johnson | 6-10-82 |
| HL Glider | Jr. | 3:24.0 | Melanie Anderson | 3-13-83 |
| " | Sr. | 1:00.0 | Mike Clem | 3-27-82 |
| " | Op. | 1:18.8 | Mark Drela | 7-3-82 |
| FAI Stick | Jr. | 9:35.0 | Paul Loucka | 1-9-83 |
| " | Sr | No record established | | |
| " | Op. | 13:27.0 | Larry Loucka | 1-9-83 |
| Penny- | Jr. | 6:05.0 | Jon Harlan | 7-3-82 |
| plane | Sr. | 6:45.8 | Mike Clem | 5-13-82 |
| " | Op. | 8:36 | Walter Van Gorder | 2-20-83 |
| Novice | Jr. | 8:06.0 | Jonathan Harlan | 5-16-82 |
| Penny- | Sr. | 6:51.0 | Mike Clem | 2-28-81 |
| plane | Op | 7:53 | Douglas Barker | 2-13-83 |
| Easy B | Jr. | 7:41.6 | Jon Smothers | 11-13-82 |
| " | Sr. | 6:32.8 | Mike Clem | 5-13-82 |
| " | Op | 15:21.0 | Stan Chilton | 1-21-83 |

### INDOOR AMA CEILING CATEGORY II

| Category | Age | Min/Sec | Held By | Date Set |
|---|---|---|---|---|
| ROG Stick | Jr. | 8:09.0 | Mike Clem | 12-14-80 |
| " | Sr | 12:14.4 | Mark Drela | 6-12-77 |
| " | Op | 17:42.4 | James Richmond | 6-24-81 |
| Paper | Jr. | 8:55.0 | Dave Lindley | 3-30-80 |
| Stick | Sr | 14:37.6 | Mark Drela | 6-12-77 |
| " | Op. | 16:04.0 | Thomas Vallee | 8-2-81 |
| HL Stick | Jr. | 9:28.8 | Mike Clem | 11-2-80 |
| " | Sr | 22:56.0 | Richard Whitten | 6-6-76 |
| " | Op. | 26:03.5 | Dan Domina | 5-16-82 |
| ROG | Jr. | 8:26.0 | Paul S. Loucka | 4-5-81 |
| Cabin | Sr. | 7:10.0 | Robert Dunham II | 6-18-72 |
| " | Op | 17:49.4 | Robert Randolph | 9-16-69 |
| Autogiro | Jr. | 1:06.2 | Dave Lindley | 6-23-78 |
| " | Sr. | 2:17.4 | Charles K. Martin | 12-29-75 |
| " | Op | 5:15.0 | Jean Andrews | 2-27-83 |
| Helicopter | Jr | 2:22.6 | Dan Aggers | 3-24-72 |
| " | Sr | 4:32.0 | Ronnie Stransky | 3-31-73 |
| " | Op. | 10:36.0 | W.H. Phillips | 12-28-69 |
| Orni- | Jr | 0:31.4 | Dean Bayer | 4-9-81 |
| thopter | Sr | 0:24.0 | Bill Melo | 4-9-81 |
| " | Op | 2:22.0 | Robert B. Meuser | 4-27-80 |
| HL Glider | Jr. | 1:02.4 | B. Scott Wisniewski | 4-9-72 |
| " | Sr. | 1:17.0 | Tom Croft | 1-20-80 |
| " | Op | 1:39.8 | Dan Domina | 6-13-82 |
| FAI Stick | Jr | 9:28.8 | Mike Clem | 11-2-80 |
| " | Sr | 22:56.0 | Richard Whitten | 6-6-76 |
| " | Op | 26:03.4 | Dan Domina | 5-16-82 |
| Penny- | Jr | 8:06.0 | Jonathan Harlan | 5-16-82 |
| plane | Sr. | 9:14.0 | Mark Trubowitsch | 8-5-79 |
| " | Op | 10:57.0 | Gordon Wisniewski | 3-20-83 |
| Novice | Jr | 8:06.0 | Jonathan Harlan | 5-16-82 |
| Penny- | Sr | 6:51.0 | Mike Clem | 2-28-81 |
| plane | Op | 8:41.4 | Thomas Koprive | 9-18-82 |
| Easy B | Jr | 9:04 | Robert Skrjanc | 3-20-83 |
| " | Sr | 8:50.0 | Tom Croft | 1-20-80 |
| " | Op | 15:22.0 | Richard Hardcastle | 4-4-82 |

### INDOOR AMA CEILING CATEGORY III

| Category | Age | Min/Sec | Held By | Date Set |
|---|---|---|---|---|
| ROG Stick | Jr. | 12:47.0 | Robert Skrjanc | 5-16-82 |
| " | Sr. | No record established | | |
| " | Op. | 22:54.0 | Richard Doig | 6-15-82 |
| Paper | Jr | 17:57.0 | Robert Skrjanc | 6-18-82 |
| Stick | Sr. | 15:15.0 | David Lindley | 6-13-82 |
| " | Op. | 26:34.0 | Stan Chilton | 6-18-82 |
| HL Stick | Jr. | 20:52.0 | Paul Loucka | 6-18-82 |
| " | Sr. | 20:30.0 | David Lindley | 6-15-82 |
| " | Op. | No record established | | |
| ROG | Jr. | No record established | | |
| Cabin | Sr. | No record established | | |
| " | Op. | 24:16.0 | Larry Loucka | 6-19-82 |
| Autogiro | Jr. | No record established | | |
| " | Sr. | No record established | | |
| " | Op. | 3:30.0 | Walter Erbach | 8-1-82 |
| Heli- | Jr | No record established | | |
| copter | Sr. | No record established | | |
| " | Op. | 4:46.0 | Douglas Barber | 6-19-82 |
| Orni- | Jr. | No record established | | |
| thopter | Sr. | No record established | | |
| " | Op. | 3:37.0 | Al Rohrbaugh | 5-16-82 |
| HL Glider | Jr. | No record established | | |
| " | Sr. | 1:51.6 | Bryan Fulmer | 2-27-83 |
| " | Op. | 2:14.0 | Bernard Boehm | 6-16-82 |
| FAI Stick | Jr. | 20:52 | Paul Loucka | 6-18-82 |
| " | Sr. | 20:30 | David Lindley | 6-15-82 |
| " | Op. | 39:27 | Cezar Banks | 6-18-82 |
| Penny- | Jr. | 11:05 | Paul Loucka | 6-15-82 |
| plane | Sr. | 14:36.2 | David Lindley | 6-17-82 |
| " | Op. | 14:15 | Ed Whitten | 1-24-82 |
| Novice | Jr. | 11:12 | Paul Loucka | 6-15-82 |
| Penny- | Sr. | 9:28 | Mike Clem | 6-15-82 |
| plane | Op. | 11:43 | Cezar Banks | 6-15-82 |
| Easy B | Jr. | 17:57 | Robert Skrjanc | 6-18-82 |
| " | Sr. | 10:26 | Mike Clem | 8-2-82 |
| " | Op. | 20:43 | Gerald Skrjanc | 6-14-82 |

THESE RECORDS WILL BE USED FOR INDEX OF "PERFORMANCE" AT THE ENART.

VIII

HELI-CONCUSSION

Although this model is a lot of extra work it is a real eye opener at any meet and a lot of fun to fly. Mine makes a realistic whirring sound from the rotors. I've had some outdoor flights of over 75' and 1 minute duration. It has no counterrotation ability, butthe model usually comes down under power. With careful wood selection the model can weigh about 7 grams. Mine is old and dirty and weighs 8 grams. The ultimate would be this platform with a scale body such as a Hughes 300 or similar. Good luck with your HELE-FLEX.

# MEET 7 APRIL 24 MIAMI DADE SOUTH (2)

This month's visiting ambassador was DON LINDLEY of Naperville,Ill who brought with him the latest FUN event of the Chicago area..... INDOOR PAYLOAD. The rules are very simple: 12" span, 12" overall length, and must carry a regulation ping pong ball. We understand these weigh 1.2 grams. No sanding the ball. Now that we've severed athletic relations with red China there ought to be a lot of surpluss ping pong balls. Don says times are over 4 minutes! (Must have 2 wheels and ROG) Don's flew great.

With only one meet remaining, many events are still in doubt. Martin and Kiefer are tied in AMA Scale. In old timer ROG Mike Arak has a 3 point lead, and this is the safest margin! In Easy B Kiefer leads Hedly by 1, and in Penny Plane Everson leads Shaw by 1. See you May 22.

Peanut Plane Event:

| | | | | |
|---|---|---|---|---|
| 1.Millard Wells | 5Pts. | (Curtiss Tripe 32.5) | 1 Stat., 4 Fly (30.0) | (28.0) |
| 2.John Martin | 9Pts. | (Nakajima 90 28.0) | 2 Stat, 7 Fly (22.2) | (24.0) |
| 3.Walt Everson | 9Pts. | (Found 19.5) | 8 Stat.,1 Fly (53.4) | (46.2) |
| X Wells | 9Pts. | (Kawasaki hipe 23.5) | 5 Stat.,4 Fly (30.0) | (28.0) |
| 4.Dave Kiefer | 11Pts. | (Ganagobie 23.5) | 5 Stat., 6 Fly (27.7) | (27.2) |
| X.John Martin | 11Pts. | (Stratoplane 25.0Pistach) | 3 Stat.3Fly (20.1) | (22.0) |
| X.Wells | 7 Pts. | (Vagabond 24.3) | 4 Stat.,3 Fly (44.1) | (44.5) |
| X.Wells | 8 Pts. | (S:E:-5 23.3) | 6 Stat.,2 Fly (50.5) | (48.6) |

AMA Scale:

| | | | | |
|---|---|---|---|---|
| 1.Dave Kiefer | Lacey M-10 | 82.2 Stat., | 40.8 Fly | 123.0 |
| 2. John Martin | Martin MO-1 | 69.2 Stat., | 51.8 Fly | 121.0 |
| 3. Millard Wells | S.E.-5 | 71.5 Stat., | 49.3 Fly | 120.8 |

GLIDER: 1. Don Bal (32.0)(32.3)

Junior: 1.David Bal (30.7)(25.6)
2.Steven Bal(15.8)(17.8)

Easy B: Walt Everson 6:09
2.Dave Kiefer 4:22
3.M. Wells 3:36

Old Time ROG:
1.M. Wells 3:16
2.Dave Kiefer 2:29.3
3.W. Everson 1:35
4 John Martin 1:18

JUNIOR RUBBER:1. Sue Arak 54.4
ENDURANCE.. 2.Heather Arak 21.8
JUNIOR ROG: 1.Sue Arak 48.7

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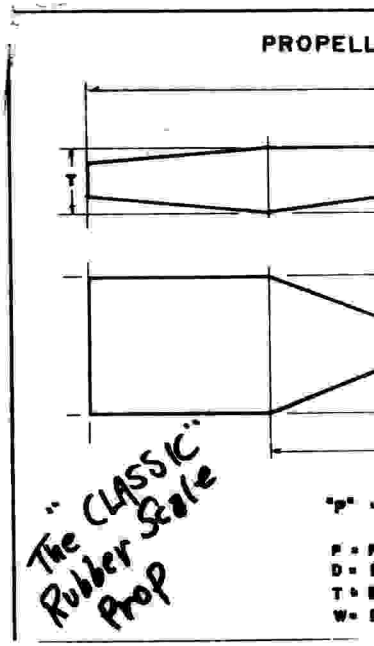
# LAST MEET THIS SUN. MAY 22 MIAMI DADE SOUTH 9→5

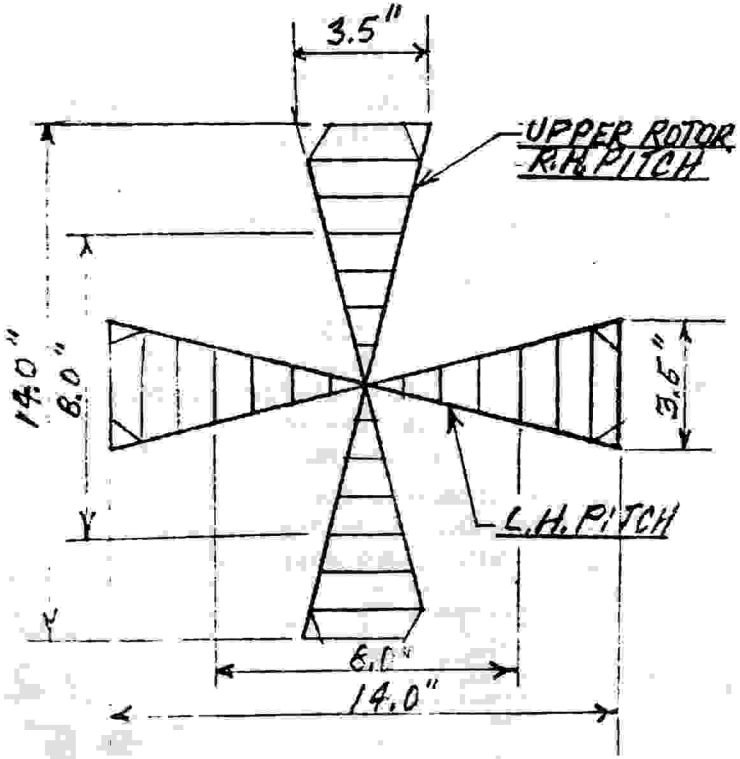
VERY GOOD CHANCE WE CAN USE OPA LOCKA BLIMP HANGAR → SEE P. 14!

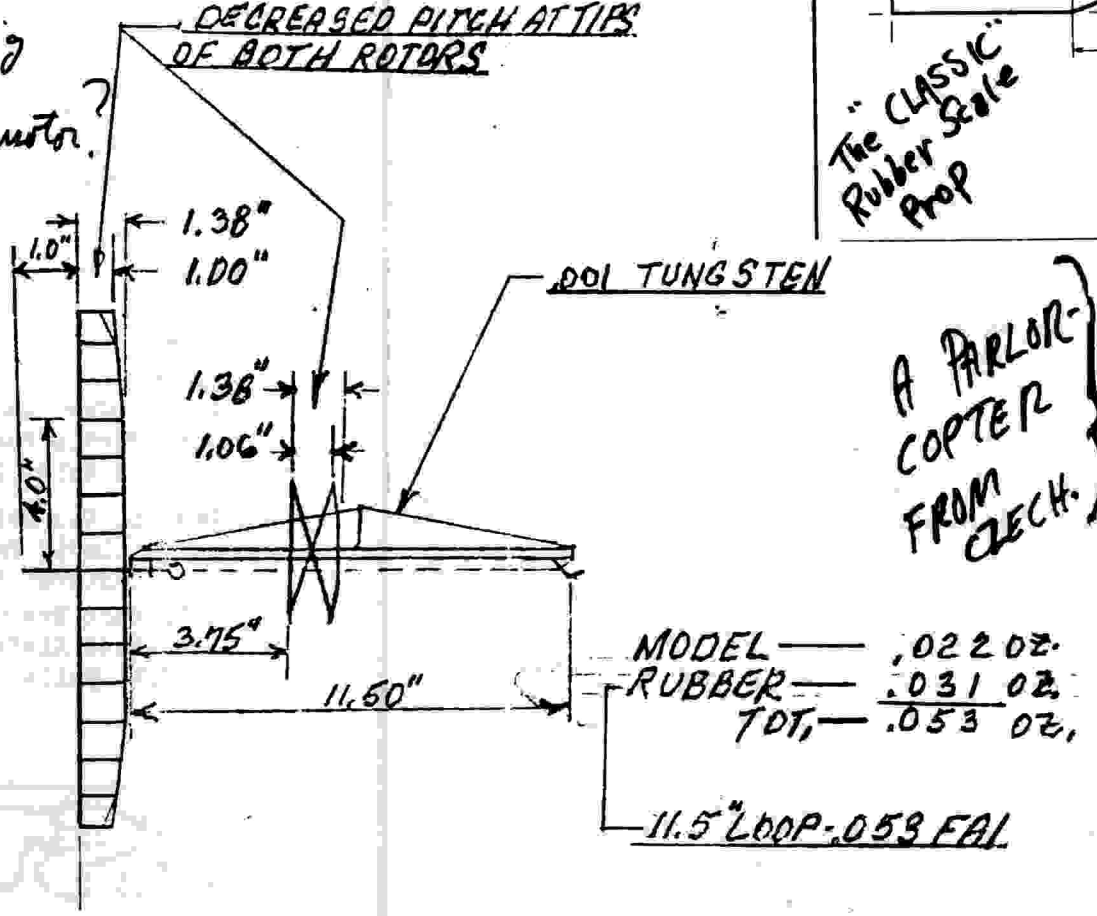
(3) Our Helicopter Issue: We would have liked to present more material, but you guys didn't send it in.

Bill Hannan had a helicopter in the first world pennit ground prix, without a tail rotor, that flew very well even though the fuselage rotated almost as fast as the rotor. We may present plans for it someday. Notice how you have to pull your issue of Hangar Pilot apart in order to read it.

Now, how about you guys sending in some material on ultra-light, R.O.W., Canard, flying wing + multi-motor?




A PARLOR-COPTER FROM CZECH.

MODEL —— .022 oz.
RUBBER —— .031 oz.
TOT, —— .053 oz.

11.5" Loop-.053 FAI

RECORD HELICOPTER
by MIAMA'S DICK OBARSKI
FT MYERS, FLA.

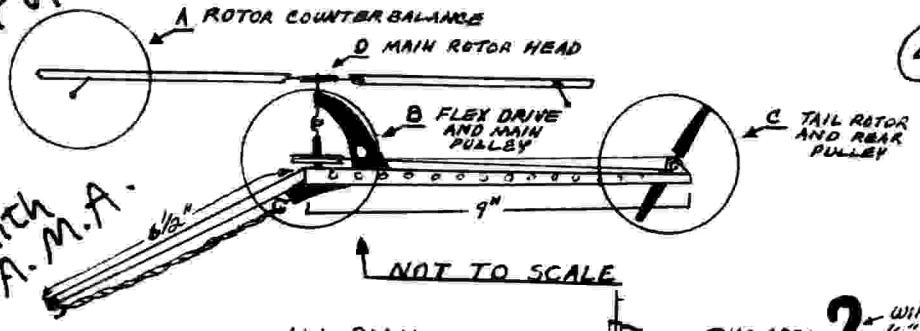
# HELICOPTER

by DICK OBARSKI

OPEN CAT. II RECORD - BM-4765 - 6/23/78

# SCALE HELI-SET UP

by Charles Slater + Kevin Smith M.I.A. M.A.




NOT TO SCALE

ALL PIANO WIRE .032

## A.

90° BEND AT END OF COUNTER-BALANCE

MAKE 2 THIS SIZE

BALL OF SOLDER APROX. 1/8" DIAM.

LEADING EDGE (MAKE TWO)

BLADE ACTUAL SIZE 1/2" C" GRAIN W/MICAFOIL

## B.

ACTUAL SIZE

PULLEY OF 4-6 16. 'C' GRAIN 1/8" 1 5/16 DIAM. W/ LIGHTINING HOLES

THIS AREA ALL SOLDERED TOGETHER

BEARING SURFACES

WIRE HOOK, 1/16" O.D. BRASS JOINER, 1/16" I.D. BRASS, .018-.020 STRANDED STEEL 'U' CONTROL CABLE

REGULAR SEWING THREAD IS BEST

BALSA GUSSET GROVED ON BACK SIDE SO ALUM FLEX DRIVE TUBE SLIPS THROUGH

1/16 O.D. ALUM

1/16 O.D. BRASS W/ FLEX CABLE SOLDERED INSIDE

BLOCK IN END OF TAIL BOOM FOR STIFFNESS

HELE-FLEX

DESIGNED BY CHARLES SLATER

FLEX DRIVE BY KEVIN SMITH

VI BIS

AXIS OF ROTOR HEAD WIRE PARALLEL W/LEADING EDGE

## C.

TAIL BOOM IS BOX 4-6 16. 1/32 SHEET

THIS SIDE CONSTANT WIDTH 5/16"

LE MAKE TWO 4-6 16. 1/32

1/4"

1/16 OD ALUM BEARINGS

## D.

1/16 OD ALUM. SPACERS

1/16 O.D. BRASS SOLDERED TO DRIVE SHAFT AND ROTOR HEAD (EXACT 90°)

1/16 O.D. ALUM ROTOR BEARING

ROTOR BLADE STOP MADE OF 1/4" x 1/8", x.020 BRASS SHIM STOCK, SOLDER TO END OF HEAD ASSEMBLY

ROTOR SUPPORT OF 1/8 6-8 16 'C" GRAIN

ROTOR BLADE BEARING 1/16 OD ALUM IMBEDDED IN BLADE END STIFINER

THIS SET-UP IS IDEAL FOR REALISTIC PEANUT SCALE HELOS. DON'T EXPECT 1 MIN.

# HELE-FLEX by Charles Slater NOT FOR THE TYRO!

(5)

After one month of experimenting with rubber powered helicopters, (Tail rotor type), the 6th model flew off the board. *

Special credit must be given to Kevin Smithfor helping design the flexible drive shaft system which operates very smoothly. This flex drive kills a lot of birds at once. First it puts the rubber weight out in front to help balance the tail boom. Then it enables a light scale body with a decent length motor stick, to be added. Actually it shows that indoor builders are the most ingenious in the modelling community for even fooling around with this sort of thing. Indoor is NOT for everyone.

CONSTRUCTION: From front to rear: The front rubber hook is 1/16" O.D. alum. tube. This stuff is really great because it's light and much easier on rubber motors than music wire. The motor stick should be of light 'AB' grain and strong, because it takes a hefty amount of power.

I must stress that it is VERY important that everything be at the correct angle called for because precision is the criterion for a good flying helicopter.

The flex drive should be built next. Be sure the pulley end of the drive housing (1/16 OD Alum.Tube) be straight so that the brass outer tube that the pulley is glued to rotates freely. Make a small hook of .032" piano wire approx. 3/8" from end to end and solder about1/8" of the end into a 1/4" piece of brass tube-1/16 OD. Into the remaining 1/8" of the tube solder a 4" length of .018-.020 stranded steel U-Control cable. When doing this fray the end of the cable so it will be firmly imbedded in the solder, otherwise rubber tension will break the joint. Also make sure the twist of the cable is in the direction of the torque. Next slide a piece of 1/16 OD brass tube (9/16")over the hook cable assembly, and solder in place. Do this with care so that other pieces don't come unsoldered.

Next make the front pulley from 4-6 lb. "C" grain wood making sure the hole is centered. Run some Hot Stuff along the edge of the wheel to make the wood very hard, but add little weight. Take a flat jewlers file 1/16" on edge, and file the groove in the wheel. Slide the finished pulley onto the outer brass tube, and glue in place with Hot Stuff. Be sure the pulley spins true. Slide this unit onto the end of (slightly oiled) a length of 1/16,OD alum.tube. Bend the tube as shown on the plan. Slide a 1/2" piece of 1/16 OD brass over the extruding cable and solder...leaving about 1/32" play in the drive unit.

The rotor head assembly is very simple and should be exactly true (90 degrees) to the drive shaft. Make the whole thing first. Don't forget to slide a 5/16 piece of alum. tube on the drive shaft before bending the bottom hook...i.e.main rotor bearing. Draw an alignment diagram and lay the head assembly down onto the rotor blades. Put a drop of Hot Stuff on the blade bearings..careful not to freeze the bearing with the H:S:...and the blade end stiffner.

* YES, CHARLES BUILT 6 MODELS IN ONE MONTH! (CONT. ON P. 10 )



Don Bal & sons David & Steven
Shown with their Elliptic '90',
'50' & '30' gliders

## Young Hand-Launch Glider Builders

By: Don Bal

Teaching young boys the art of building and flying hand-launch gliders requires a lot of patience and understanding ( I discovered my deficiencies in both areas while teaching my sons David ( 9yrs.) and Steven ( 8 yrs.) about glider building).

One of the first things I realized is the youngsters had to be supervised continuously during their glider construction; if not, they could sand a hole right in the middle of their wing. I positioned their work table next to mine such that I could monitor their work progress while I did some glider work. I remind them to stop periodically and examine their sanding progress by looking at the wing's shadow contour produced by a light shining over the wing. The wing's shadow contour can be seen by holding the wing level at about arms length towards a bright light. When the wing is rotated towards or away from the observer, the valleys in the wing surface will appear darker than the higher areas. This technique can be used to determine where the high point occurs and the contour of the undercambered section of the wing. I also check the boys progress and show them what to look for and indicate any areas they should do more sanding on. Their gliders' parts are occasionally checked for thickness with a dial micrometer ( I use a Starrett with a $2\frac{1}{2}$" throat, 0-1" range, .001 graduation) and weighed with a gram scale. The number of measurements of the boys gliders is not as extensive as what I would perform to make a complet construction history of the glider.

The second problem I was confronted with is the young glider builder can not sit down in one spot and sand a wing very long. If you can get them to work

CONT. ON P. 9

GLIDER WEIGHT 3 GM., AS CONSTRUCTED BELOW
MAX. LAUNCH HEIGHT OF 3 GM. GLIDER 30'-35'
3 GM. GLIDER GETS 34+ SEC. FLIGHTS (27' CEILING)
LAUNCH-RIGHT
TURN-RIGHT

## WING

13 x 3 4.5-5LB. 'A' GRAIN
THICK. MAX. BEFORE UNDERCAMBER .125 AT H. P.
THICK. MAX. AFTER UNDERCAMBER .050 AT H. P.
PROJECTED AREA 30 SQ. IN.

## STABILIZER

3 3/8 x 1 3/16 4.5-5LB. 'A' GRAIN
THICK. MAX. .025
AREA 10.5% OF WING AREA

## RUDDER

1 x 3/4 4.5-5LB. 'A' GRAIN
THICK. MAX. .025
AREA 3.9 % OF WING AREA

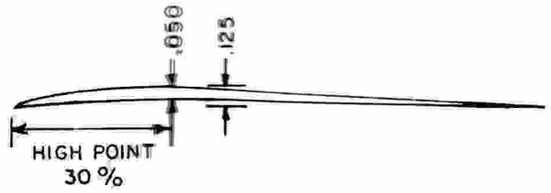
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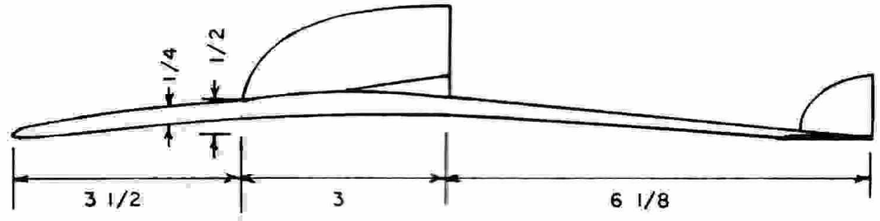
12 5/8 x 1/2 8.5-9LB. 'A' GRAIN
THICK. MAX. .080

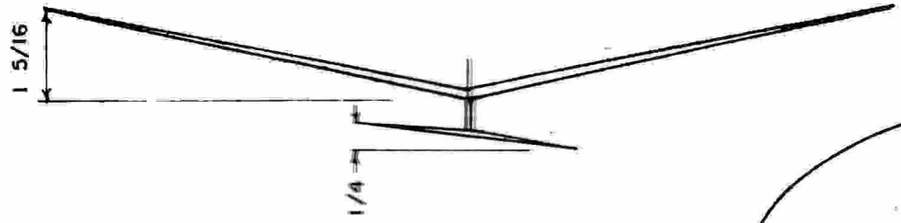
## FINGER REST

1 1/2 x 3/4 6LB. 'A' GRAIN
THICK. MAX. .062

ALL MEASUREMENTS IN INCHES



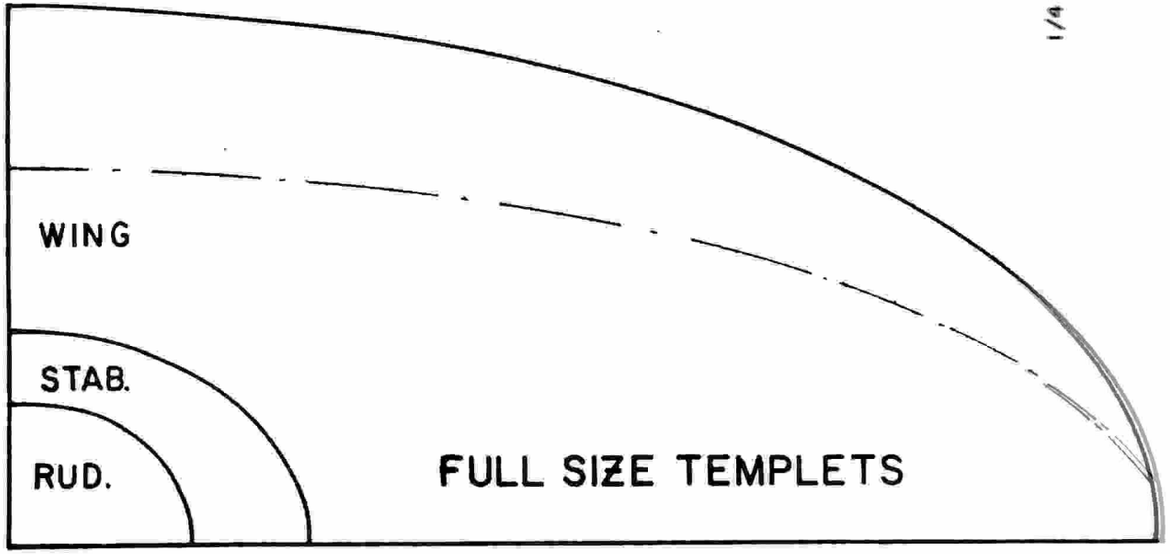



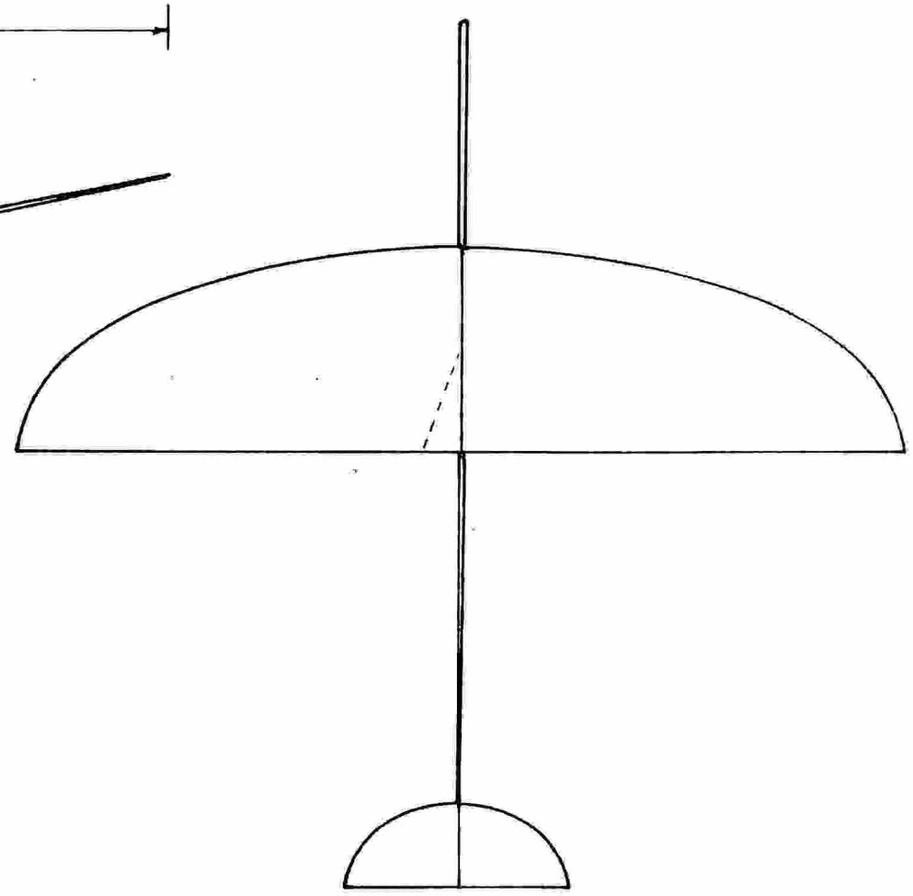




# ELLIPTIC '30' LC

DESIGNED & DRAWN BY
DON BAL

LOW CEILING
INDOOR HAND-LAUNCHED GLIDER



for an hour, consider yourself lucky. Sanding glider wings is time consuming work. A glider wing is a form of wood sculpture having a pre-defined shape which the modelers try to duplicate by planing and sanding. To break up the monotony of sanding for hours, I have the boys sand only the top airfoil of a wing in one day (or morning) and the undercamber another day (or afternoon). This break allows the boys to puruse their other interests (running, climbing, bike riding, fighting, etc.), recharging their sanding arms in the process. A slight conflict exists with this segmented construction approach. I would rather they would continue working, so I could get on to other projects. Also, I have trouble getting started working with the boys again, usually because I am involved in something else. This out of phase timing causes the construction of the boy's model projects to be extended over a long period of time.

Actually flying the gliders is probably the most frustrating, disappointing, and rewarding experience for the youngsters. Frustrating, when they can't seem to launch their glider without it going straight up and straight down, bouncing on its nose (we reinforce the nose with carbon fiber to increase its life). Disappointing, when they break the wing after a wild throw. Rewarding, when they get it all together and achieve high times.

You will notice, by looking at the photo, that the gliders are sized according to the size of the flyer. The Elliptic '30' was specifically designed with my eight year old son in mind. The glider had to be a size he could throw to a decent altitude, so he could get a sense of accomplishment. Steven has done quite well with his 3 gram glider. He achieved 23 sec. flights with about an 18' launch. David, on the other hand, is a little larger than Steven; therefore, I designed a little larger glider for him. The Elliptic '50' is matched very closely to David's arm strength in Cat. I flying. This glider size will be good for him for another year or two. He is anxious to build the new Elliptic '60' I have designed. This glider will have similar wing aspect ratio to my Elliptic '90'. David recently broke the Florida junior glider record with times of 29.9, 27.2 sec. Last meet he passed the 30 sec. mark. (It won't be long when his good day times will surpass my off day times.)

The occasions when the boys do well are very rewarding for the boys and myself. I get a proud feeling when I see them make an outstanding launch that has perfect transition into a slow glide--it makes all the time I spent with them very meaningful.

HELI-FLEX. (CONT.)



Rotor blades should be light "AC" grain wood and fairly stiff. Counter weights should be made as shown on plan. A 90 degree bend should be put on each end..and a little one inside the solder ball and one on the blade side so the weight won't turn. On the bottom of the blades, where the blade stop touches, coat the wood with a couple of drops of Hot Stuff to prevent the stop from digging into the wood.

Make the tail boom of very light "C" grain with the exception of the top side. Make this a little stiffer up where the rotor support is glued on. Lighting holes lessen the tail weight and look great, but aren't necessary. Push a solid block of light balsa into the front end of the boom and groove the whole thing 1/16" to accept the alum. flex.

Make the tail rotor assembly with pulley Hot Stuffed to the rotor wire. This wire spins very freely in two very small pieces of 1/16 OD alum. tube. These are Hot Stuffed into two triangle shaped supportts which are ,in turn, glued to the top of the tail boom. The small pulley should be made with the same method as the front pulley.

Now slide the drive assemblyonto the front end of the boomand get the plane of the front pulley parallel with the top surface of the tail boom. At the same time the vertical axis of the front pulley must be at right angles to the horizontal axis of the rear pulley. Tack in place with a drop of Hot Stuff. Tack the motor stick onto the front of the boom so it is parallel with the end of the drive unit. Slide the grooved balsa gusset from between and underneath the motor stick and the drive housing, and tack. Now check over everything to assure proper alignment and glue, usingHot Stuff and balsa dust filler. Now glue the rotor head support bearing onto the end of the support piece. Make sure the drive wire is right angles to the bottom edge of the support (where thw support is glued to the tail boom). Hook the hooks up and tack the support to the boom(both shAFTS SHOULD BE ALIGNED) and check everything once again. When satisfied be liberal with the Hot Stuff and filler.

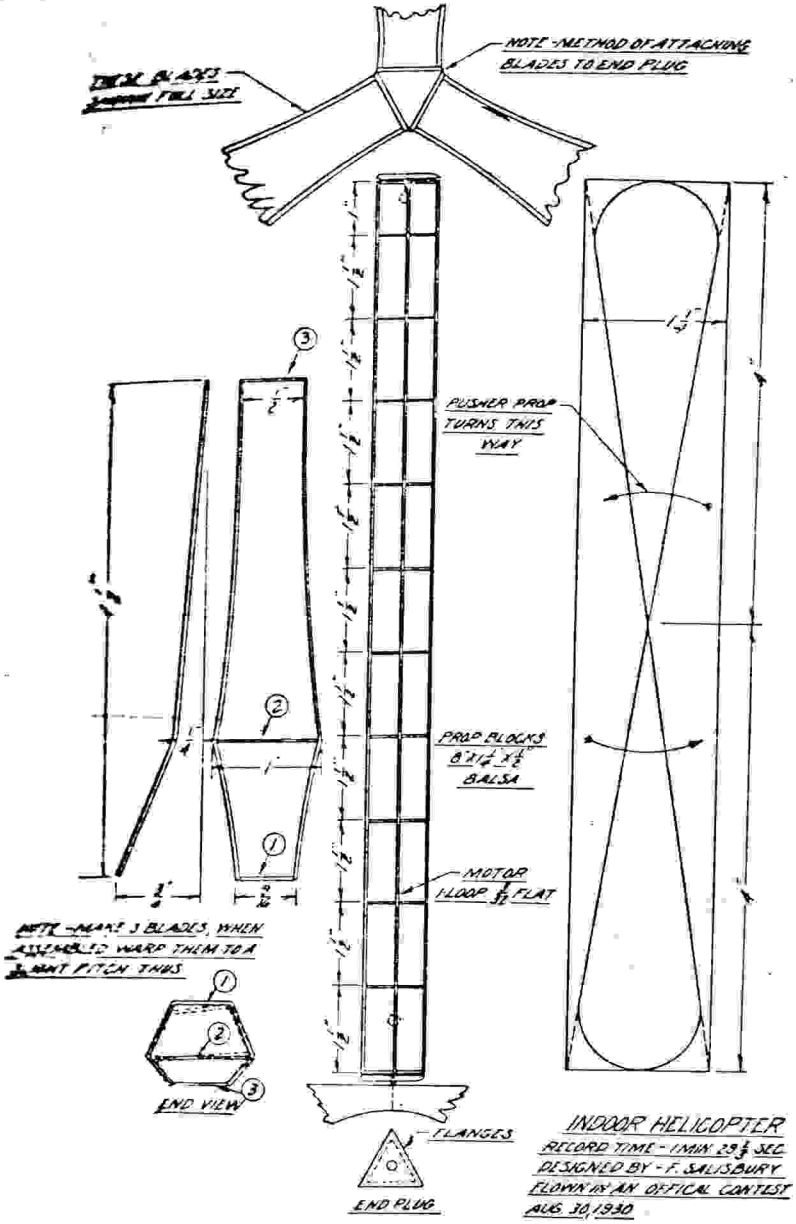
Now take a length of thread and wrap around pulleys so that both blades turn counterclockwise (looking down from above). Have someone hold the thread tight while you Hot Stuff the loop.

After everything is oiled up, and the top rotors balance up, make a motor of 1/4" Pirelli about 71/2" long and hook it up. When winding NEVER turn the rotor blades with your finger backwards..It breaks! Have your assistant pinch the flex drive hook and rubber while you stretch and wind . The pitch in the rotor blades is self adjusting but both blades must have the same angle (No more than 5, nor less than2 degrees). IF THE BLADE HAS TOO MUCH PITCH,BEND THE COUNTERWEIGHT UP SLIGHTLY until the pitch of both blades are equal.

FLYING: Put a few winds in and release. Watch and see if the model needs more or less tail rotor pitch and adjust blades. If the flight is erratic check the main rotor blades for pitch equality. Also check the balance point..should be within 1/2" of the main rotor shaft.

CONT. INSIDE COVER

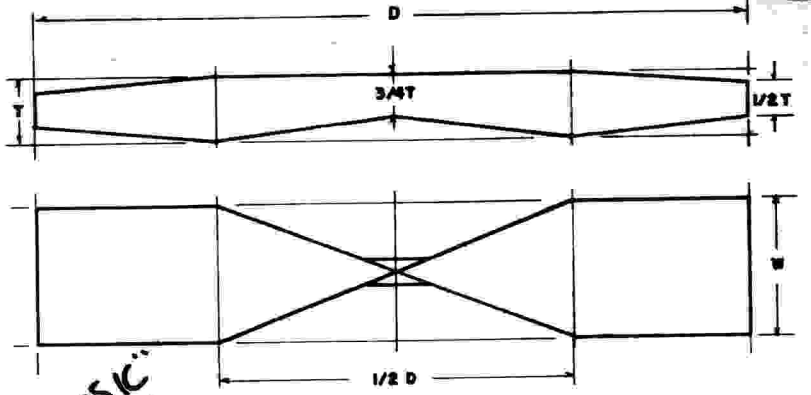
(11) ARTICLE ON P. 13




PLAN 3

## PROPELLER BLOCK LAYOUT

(12)




"The CLASSIC" Rubber Scale Prop

$$"P" = \frac{3.14 \times "D" \times "T"}{"W"}$$

P = PITCH
D = DIAMETER
T = BLOCK THICKNESS
W = BLOCK WIDTH

You can use this layout and formula to carve a high-quality Rubber prop.

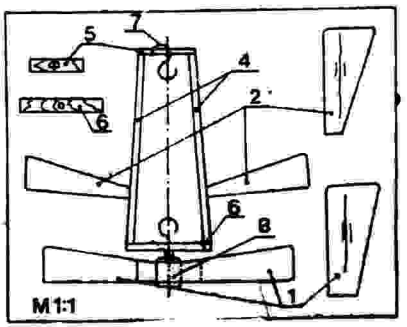
## NA VEČER

vymyslel Ľubomír MITÁŠ z Buchlovic.

K STAVBĚ: Listy rotorů 1 a 2 z balsy tl. 1 mm jsou obroušeny do profilu. Střední část 3 spodního rotoru z balsy o rozměrech 3 × 3 × 9 mm je ve střední části zpevněna z obou stran tenkým celuloidem. Konce dílu jsou seříznuty tak, aby listy rotoru měly po přilepení náběh asi 30 až 40°.

Trup je slepen z lišt 4 o průřezu 1 × 1 mm z tvrdé balsy a z čel 5 a 6 z překližky tl. 0,8 mm, v nichž jsou vyvrtány otvory pro háček a hřídel rotoru z kytarové struny o průměru 0,3 mm. Listy 2 se přilepí k trupu tak, aby měly opačné nastavení než listy rotoru. Zbývá jen zavěsit svazek z jedné smyčky gumy o průměru 0,75 mm (z páskové gumy do prádla) a po natočení 50 až 80 otáček model vypustit (volný rotor je dole). Model vylétne do výšky 2 až 3 metry a volným pádem přistane zpět – díky malé hmotnosti se mu nic nestane.

Příjemnou zábavu!




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(13)

From "Prize Winners Book of Model Aviation" Carl Cloudy - 1930

# WORLD-RECORD HELICOPTER

Designed and Described by Frank Salisbury, Jr.,
Washington, D. C.

THIS model (Plan 3) is very different from those model builders are accustomed to; however it is very easy to build and is a beautiful flying model. Its best official time 1:29⅗ (indoors) was made in an auditorium with only a fifty-foot ceiling. I am confident it would have flown at least two and a half minutes had it had twenty-five feet more of ceiling.

The fuselage requires four strips of balsa, $\frac{3}{32}$ inch by $\frac{3}{32}$ by 36 or 40. As you will note in the drawings, the fuselage is a triangle such as has been used in commercial models for some time. When your frame has been assembled select a good piece of balsa and cut both end plugs the same. One is fitted with a washer for the propeller bearing and the other with a hook (rear). When the fuselage is thoroughly dry cover it with a very thin high-grade model tissue.

The three blades for this model are very simple to make inasmuch as $\frac{1}{32}$ inch square is used throughout. Measure off six spars the correct length and three of each kind of rib. To make the operation easier draw the blade full size on paper. Make one blade at a time taking care to make all alike; when nearly dry put the necessary one-half-inch dihedral in them. When absolutely dry they are ready to be covered in the same manner as the fuselage.

The propeller for this model is carved in the same manner as that of the Curtiss "Robin" (Pocket Sheet 3), with the exception that while the prop itself turns the same way as the Robin it pushes instead of pulls.

The size of the block for this propeller is 1¼ inches by ⅝ by 8. Remember this is a pusher propeller.

To assemble, glue one blade on each side of the plug with the end hook on it, taking care that there is one-fourth-inch dihedral in the blades making a total of three-fourths of an inch on each of the tips. Now bend a shaft from Number 9 wire and insert it through the other plug and then through the prop. Now warp a slight pitch in each blade making it like a tractor prop. A very light model flies on one loop of $\frac{3}{32}$ inch and one heavier will require a loop of one-eighth-inch flat rubber.

Assemble the model and give it about one hundred turns flying it with the wood prop on the bottom, pushing. If the plane twirls fast but doesn't climb, give the blades on top more pitch, but if it twirls slowly and doesn't climb, take some pitch out. Be sure all three blades have the same pitch.

P.S. DOC DID 1:31 IN THE 23' BOXING GYM WITH THIS.

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