THE HANGAR PILOT

ONE AND ONLY!

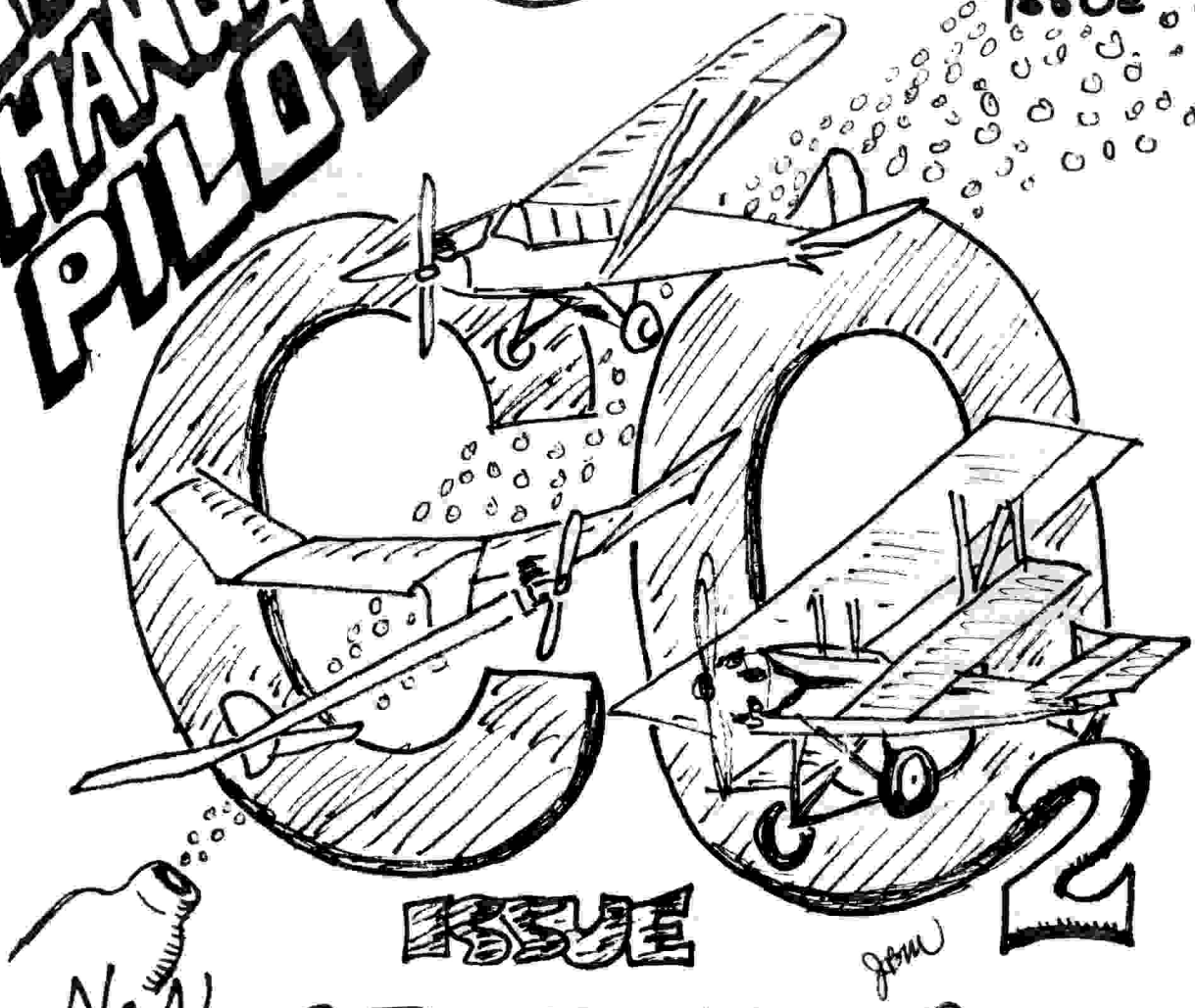
THE MINNI INDOOR AIRCRAFT MODEL MAG

MINAM

ISSUE 02

FEB/MARCH 1984

ANOTHER COLLECTORS ISSUE



ISSUE 2

John

NO NEWS - THIS ISSUE OF: P-NUT G.P

+ NINART - "WE'RE WORKING ON IT."

BLIMP HANGAR - " " " "

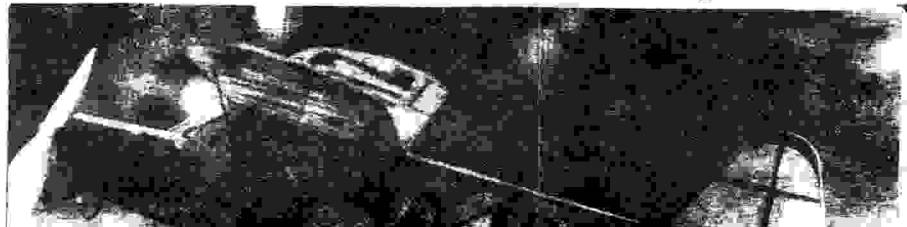
NEW CENTER STATE SITES - WERE WORKING ETC"



THE HANGAR PILOT

Is published 8 (or 9) times a season for a bunch of middle aged guys who refuse to grow up. MIAMA (Miami Indoor Aircraft Model Association,) AMA Club 986, is the only active all indoor free flight club in AMA. Our Mottos: "It must be fun.", and "Indoor isn't for everyone." For $10.00 a year you will receive all copies. We solicit your contributions since we are always running out of material. Letters, plans, 3-views, articles, gripes, and Money to: Dr. John Martin Pres./Editor. 2180 Tigertail Ave. Miami, Fla. 33133 USA Phone: 305-858-6363 We want to hear from you!!! Send material!!!

"Small Deeds Done are better than great deeds planned" (Build a Pistachio)
Justice Peter Marshall

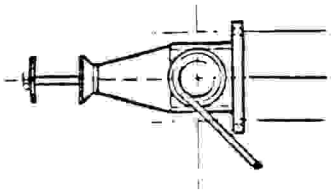


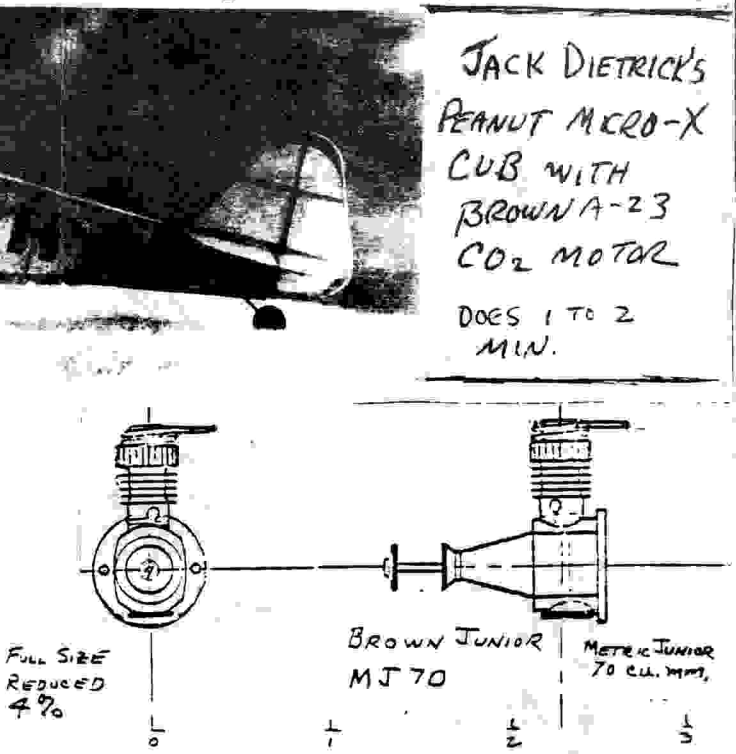
JACK DIETRICK'S PEANUT MICRO-X CUB WITH BROWN A-23 CO_2 MOTOR

DOES 1 TO 2 MIN.

LARRY KRUSE (CONT.)

CO_2 cartridge, and speed adjustment wrench. Replacement cartridges are priced at $2.85 for a box of ten which should provide between 50 and 70 separate charges. I'm so impressed with the increased performance of the unit that I've begun designing my '84 Nats scale entry around it.





RESULTS, MEET 4 FGO 26 M/P SOUTH MARTIN, CA COLLEGE (2)

Peanut Scale event: (Using new AMA 'Jim Miller' rules)

				TOTAL:	
1. Walt Everson (Found 70.4 Static)	6	Av. of two best flights: 70.2	1	140.6	7
2. Millard Wells (SE-5 70.1 Static)	7	Av. of 2 best flights: 65.0	2	135.1	9
3. John Martin (Ansaldo 90.0 Static)	2	: 44.9	4	134.9	6
4. Dave Kiefer (Waco E 90.0 Static)	2	: 35.0	6	125.0	8
5. Carl Hedley (CNA-PM-1 77.6 Stat.)	4	: 40.7	5	118.3	9
6. Mike Arak (Bleriot 4 94.6 Stat.)	1	:18.0	8	112.6	9
X Walt Everson (Waco E 57.0 Stat.)	8	: 53.7	3	110.7	11
7. Dick Kelso (Waco E 71.7 Stat.)	5	:24.1	7	103.8	12
X Dick Kelso (Curtiss Hawk 79.7 Stat.)	3	:15.5	9	95.2	12

KIT/PLAN EVENT:

1. John Martin Curtiss Robin 68 Stat. plus	61.7,	& 62.0.....	191.7	
3. Walt Everson Found 80 Stat. Plus	34.0,	& 48.0.....	162.0	
4. Mike Arak Curtiss Robin 94 Stat. +	31.0	& 30.0.....	155.0	
2. Millard Wells Alco Sport 86 Stat. +	50.0	& 50.3.....	186.3	WELLS IS 2ND
5. Dave Kiefer Waco E 85 Stat. +	28.7	& 25.2.....	138.9	
X Millard Wells Stinson Reliant 75 Stat. +	28.0	& 37.0.....	140.0	
6. Dick Kelso Waco E 70 Stat.	-	-	70.0	

Easy B:

1.	Roman Szymula	7:36.4
2.	Mike Arak	5:37.5
3.	Dave Kiefer	4:04
4.	Walt Everson	3:45

GLIDER :

1. Don Bal (32.9)(33.0)
1 (Junior) Steven Bal (20.9)(21.4)

[redacted] PENNY PLANE:

Carl Hedley 4:27

MANHATTAN/BOSTONIAN EVENT: (New Rules)

1. Walt Everson	222.0	Charts: 1.2
2. M. Wells Wee-B Bost.	157	
3. M. Arak	151.0	
X M.W. Everson Rudolph Bost.	108.9	1.5
4. J. Martin Komet Bost.	33.0	1.6

OLD (CLASS A) R.O.G. Event:

1. Mike Arak	5:01
2. Walt Everson	4:56
3. Dave Kiefer	2:48
4. M. Wells	2:06

Well, gang it was back to the College gym, which isn't so bad considering it's 40 feet lower than IM&C, and 42 feet lower than the blimp hangar. It sure takes a different trim.

We are probably the first meet to use the new AMA peanut rules since we are still looking for the new rule book, due a couple of months ago. Jim Miller sent a copy for our use. Too early to comment on 'em.

It sure was great to see Roman Szymula back in action after about 2 years absence. His Easy B flight of 7 1/2 Min. won the event.

There is all kinds of activity to locate new sites. Bill Criss has made two good suggestions. So has Ellis Oglesby, and Phil Bayly. We are also working on a NART site with nothing new to report. It is apparent that obtaining sites is the major function of any free flight club.

We prefer to do it Indoors.

A HISTORY OF INDOOR CO_2

(3) Indoor CO2 powered models have been doing a lot of nothing in the USA, with very few exceptions. In Great Brittain there has been much activity in this field, both for indurance, and scale. We are indebted toAEROMODELLER for their coverage of CO2, and a little bit in Indoor News and Views. This issue of Hangar Pilot presents much of the current, and recent past CO2 developments.

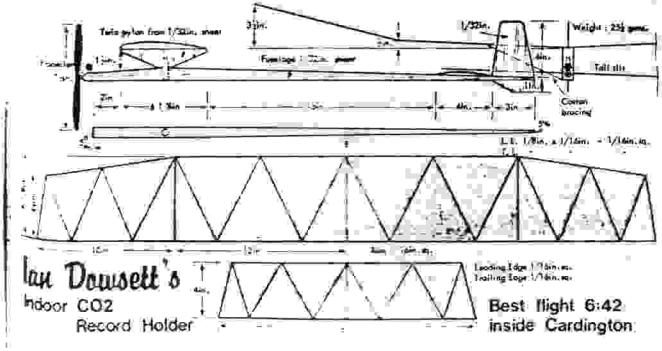
I know at least 3 MIAMA members who have Brown A-23 (Myself included) and most have done nothing with them. The warm climate of Florida should be conducive to good CO2 flights.

Jerry Skrjanc has kindly contributed a "how to" article telling, briefly, how he gets his A-23 to perform indoors.

Aeromodeller contributes the bulk of the info, and we rank this publication first among the major commercial model publications (The older Model Builder came a close rival). For Free Flight, and for indoor, subscribe to AEROMODELLER

We also thank TONY SUTTER who collected many of these articles from the magazine collection of the late George (Little Toot) Meyer.

Hangar Pilot is soliciting material for R.O.W., Multiengine, Ultra light, ornothopter, and anything that turns YOU on for future issues. Like TV we go through material fast and always need new, so send in your favorite stuff to keep this rag from getting BORING !!



Ian Dowsett's Indoor CO2 Record Holder

Best flight 6:42 inside Cardington

CO_2 DURATION - A NEW INDOOR CLASS

Since CO_2 motors became generally available again, thoughts at Cardington turned to wondering how long it would be possible to keep a lightweight model powered by one of these motors in the air. Expectations were initially in the 3 min mark. The Indoor Tech Committee elected to hold a contest at Cardington after the serious stuff – the Indoor Trials – was over. Owing to publication errors in the well known mags many people didn't bring their models. As a result, there were only three entries – Ron Green, Steve Bennett and myself. Ron eventually won (two flights from six as per usual) with around 7½ mins total; this immediately indicated something of the potential performance. Ron and I used Sleek Streak props, these being better than the originals. Ron's model was 4ft span, mine 3ft. and both weighed about 28g all up. Geoff Lefever turned up at the next meeting with a similar size model with a wide bladed prop of the same diameter (6in.) and pushed the best time up to 4.50.

Some new models appeared at the last meeting in April, much bigger and with cotton braced wings, but testing troubles have prevented their potential from being assessed yet. At this meeting, I managed to break 5 min in practice with the 36in. span model but couldn't get the charges right for the comp flights; otherwise more could have been achieved. Models up until now were tissue covered.

Ian Dowsett had been studying these efforts for some time and came up with a somewhat different layout – EZB type wing ribs and tapered tips (no round outlines) and covered in ¼ thou mylar. The model has a larger prop – the Super Sleek Streak 7½in. dia prop – and weighs 26g. The wing section not shown is about 5–6 per cent camber (estimated) and tail section 3–4 per cent.

As you can imagine, the glide is superb (much better than an A/2) and the large prop allows a long run. Ian has pushed the best time up to 6.42 with a motor run in excess of 4 mins from the standard charger.

The next logical development is a balsa prop – how big? I don't know yet, we shall have to wait and see. We have arranged an extra CO_2 contest at Cardington on 30th July – make a note of that and come along and have a go. The models aren't that difficult to build; standard outdoor building technique is used – no indoor 'specials' are necessary. You will need to transport the model in a box – the one for your outdoor jobs will do nicely.

Incidentally, Telco are taking a keen interest, and it is on the cards that we shall receive a trophy for an annual CO_2 event – can't be bad.

Ian Dowsett with his CO_2 indoor model, which made an amazing 6:42 flight on its first day's flying!



A NEW INDOOR CLASS--CO_2 DURATION

FROM INAV Jun/July 1978 by Geoffrey Lefever

Last year for the first time, the Indoor Technical Committee held a contest at Cardington for CO_2 Duration. It is unfortunate that conflicting dates appeared in the modeling press; the result was only three entries. Ron Green was the winner and his best flight was 3:56. However, the Technical Committee is sufficiently confident in the appeal and performance of these models to provide three competitions for CO_2 Duration in the next season's indoor programme, including one at the Indoor Nationals.

At present, the class is without restrictions and is open to any CO_2 engine-powered models, the sum of the best two out of six flights to count. Although currently available CO_2 motors have a very modest power output, the models can produce a high performance when indoor model techniques are used to give a very light airframe. The models can be impressive at Cardington, although it must be admitted that they cannot perform anywhere else. The amount of flying that can be fitted into a day at Cardington is enormous, and this goes a long way to compensate for the traveling involved. Also, every day is a flying day and is largely free from the vagiaries of weather which plague outdoor meetings.

→ Next page

The drawing opposite shows my own model which is the first of what I hope will be many. The construction and size and weight were something of a shot in the dark and were arrived at as follows. The model must climb to the top of the great shed--that is about 150 feet, take a fairly long time to get there and then produce a very acceptable glide. Obviously, the power to weight ratio must be very high. I set the balance at 1/2 oz motor, tank and prop, to 1/2 oz airframe. The engine speed adjustment could give a run of up to two minutes but at a fairly low power output. I hoped this would be sufficient for a steady climb. Finally, a one ounce model which needed a sinking speed on the order of one foot per second would have to be quite large or very clean aerodynamically. I wanted the model to fly slowly to reduce stresses and so Easy B-type construction was adopted. I wasn't sure if wing bracing would be necessary but the first hand launch resulted in massive dihedral--and so bracing was provided. No further problems were encountered. The wing and tailplane are both covered with lightweight Japanese tissue which was ironed between sheets of newsprint but not treated in any other way. The power unit is the 'Telco', one of two types currently in this country. Both types are similar in size and weight. The propeller I changed for one of greater area produced by Jiri Kalina's model factory in Prague. The fuselage is a simple box of light 1/32 inch sheet, the fin and wing supports are also 1/32 inch sheet. The motor is fixed to a 1/16 inch ply bulkhead with 'Zap'. I included 5° right thrust, but no downthrust. The fin is set at 5° right turn. Wing incidence in zero relative to the fuselage datum line and also the thrust line. The tailplane trailing edge is 3/8 inch above the top of the fuselage.

Once the wing was braced on site and the glide elevation established, no further adjustments were needed. With generous dihedral and a forward CG, the model climbed steeply in a rolling climb--it was rather reminiscent of a slow-motion old time 'Banshee' (For those old enough to remember such ships--Ed.).

With a good charge, the model levelled out just under the centre catwalk. The glide is slow and quite good. The best flight to date is 4:57 from a very good charge which gave a 2:30 engine run. With such a performance, there must be the basis for an excellent competition class. Why not give it a go?

S.M.A.E. CO_2 Rules (4)

1. The max. capacity of the CO2 tank and piping system shall be less than 3.25 cc (0.1983 in³) Note: Brown, Humbrol, Shark, and Telco standard single cylinder tanks & motors meet these rules.

2. For contest flights, the CO2 system must be filled with a Sparklets type bulb.

3. Non standard motors, tanks, piping or filling systems may be used if the CD is satisfied that all reasonable precautions have been taken to ensure that the equipment is safe.

Above CO2 rules amended as per:

1. Non standard equipment may be used provided the CD and Sparklets International are satisfied that the equipment is safe.

2. For contest flights, CO2 bulbs, supplied free by Sparklets Int. must be used. *

3. For indoor only, the overall result of the series of 4 indoor meets will be taken as the best 3 of an entrants 4 scores (Gee, they sure talk funny). In the event only 3 meets are held, the 2 best scores will be used.
(May 1979 - Still in effect)

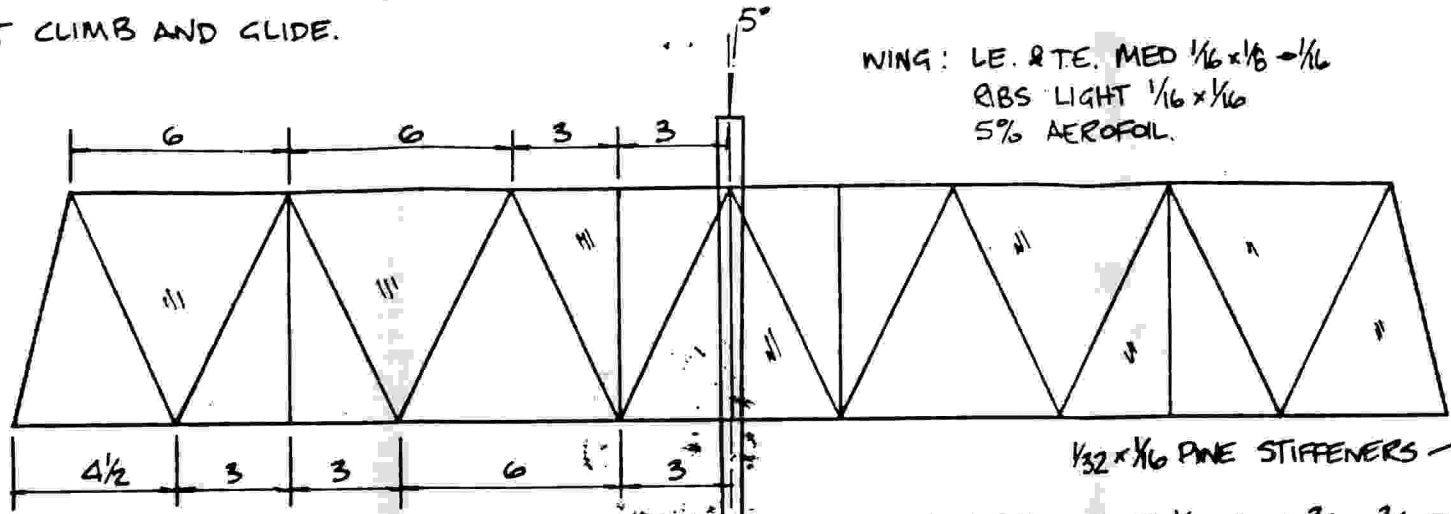
* Looks like they have a deal with the manufacturer (Sparklets Int.) for some FREE bulbs! Let's look into THAT, Someone out there in Indoorland.

(5)

ALL DIMENSIONS IN INCHES.

ADJUSTING YOUR CO_2

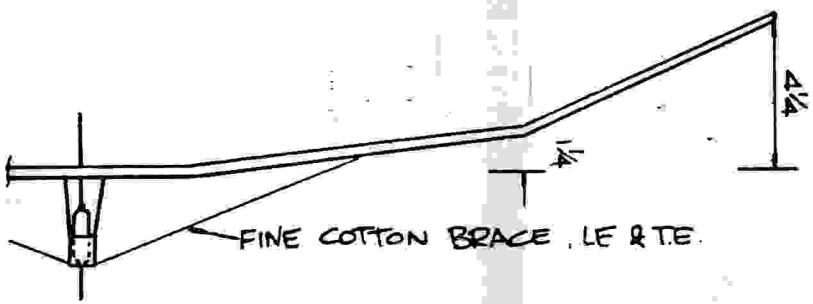
RIGHT CLIMB AND GLIDE.



WING: LE. & T.E. MED 1/16 × 1/8 → 1/16
RIBS LIGHT 1/16 × 1/16
5% AEROFOIL.

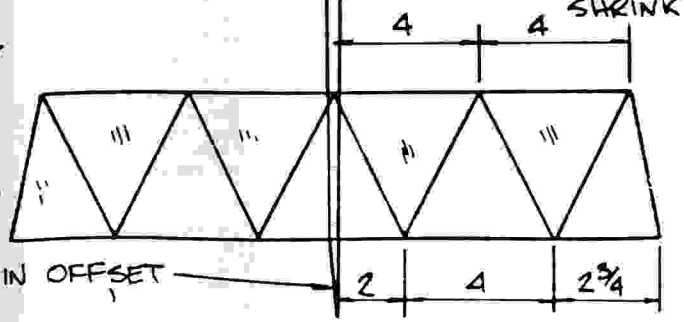
1/32 × 1/16 PINE STIFFENERS

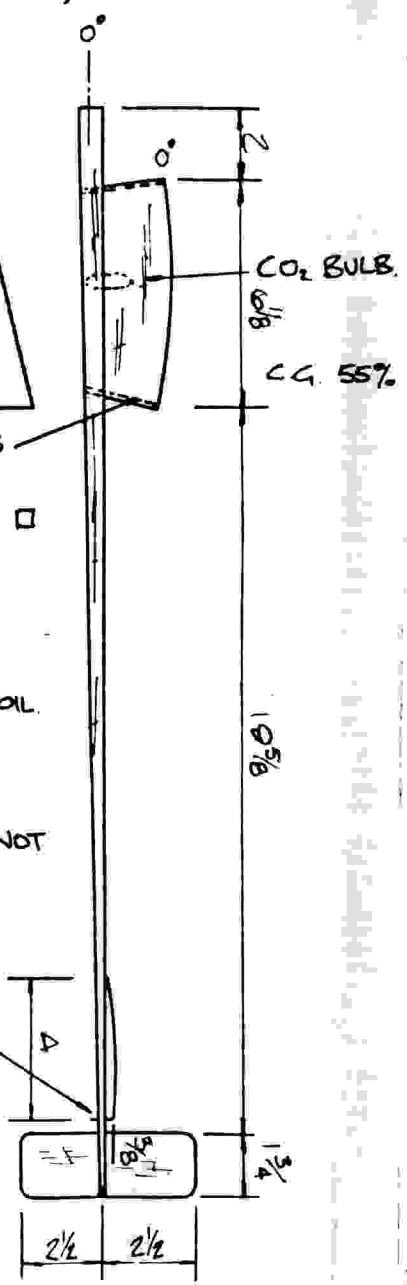
FUSELAGE: LIGHT 1/32 BOX 3/4 → 3/8 □
WING MOUNT AND FIN LIGHT 1/32



TAILPLANE: LE. & T.E. LIGHT 1/16 × 1/16
RIBS LIGHT 1/16 × 1/16, 5% AEROFOIL.

COVERING: LIGHTWEIGHT JAP OR ORDINARY NT CONDENSER PAPER, IRON BEFORE USE DO NOT SHRINK





1/16 ROUND IN TISSUE SOCKET.

WEIGHTS:

TELCO CO_2 + PROP	14
FUSELAGE	9
WING	4
TAIL	1
TOTAL (GM.)	28

1978 VINTAGE

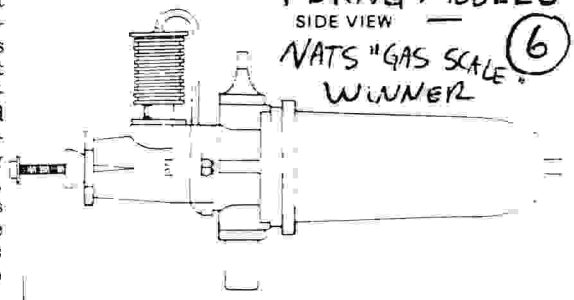
'INDOOR CO_2 DURATION' by Geoffrey Lefever.

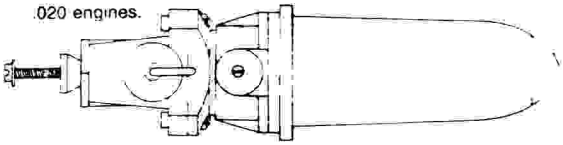
CO_2 comes of age

By Larry Kruse

FROM MARCH 1984 FLYING MODELS

SIDE VIEW — NATS "GAS SCALE" WINNER (6)





Telco's new Turbotank 3000 is an integral unit offering easy mounting, filling, and an increase in power (**above**). Bob Davis latest offering (**left**) from Davis Diesel Development isn't . . . diesel, that is. Check the text for details on his CO_2 conversion for .020 engines.

Carbon dioxide has been around a long time as a F/F power source, dating back at least to Bill Brown's original CO_2 piston engine, through the larger OK Cub versions and the pseudo-jet Berkeley Cat-O-Jet launchers. Presently, CO_2 engines are available in anything from Brown's Peanut-sized Campus A-23 up to the multicylinder offerings of Brown, Telco, Shark, and probably several other manufacturers I've overlooked. The bulk of "standard" sized CO_2 motors falls into the .05 to .06 cc displacement range and can be counted on for 30-40 second runs using standard tanks, most of which fall into the 2.5-3 cc range.

Personally, I've had a great deal of success with CO_2 as a power source for scale ships over the last five years, but have always been concerned with weight and size limitations imposed on any model considered for CO_2 power. It's simply never been practical for me to design any model with over a 30 inch wingspan or with a projected weight in excess of $2\frac{1}{2}$ - 3 ounces in order to get any kind of performance at all.

Recently, however, new developments in the CO_2 world may have removed some of the size/weight restrictions and made CO_2 a more viable power source for those who like larger models.

Bob Davis of Davis Diesel Development, Inc. is now offering a CO_2 conversion kit for the popular Cox .020 Pee Wee or T.D. engines. Not being content with just dieselizing the little critters, Bob's offering now makes it possible to eliminate fooling with fueling and still get a satisfactory two minute run on larger "school yard scale" sized airplanes. The conversion consists of an adjustable valve head assembly, an on-board 10 cc refillable tank and a filler valve. The engine is rated to swing an 8 × 4 prop at 6000 peak RPM or a 10 × 8 (Gads!) at 2000 peak RPM. The RPM's can be adjusted via a knurled knob atop the cylinder head.

Filling the 10 cc tank or its replacement 20 cc tank can be handled through a soda jet charger, or more economically, from a one pound disposable cylinder available from Cryodyne Specialty Gas. The price for the conversion kit alone is $39.95 plus $3.00 postage and handling from Bob at Davis Diesel Development, Inc. Box 141, Milford, CT 06460. Bob will be happy to send you price information on the Cryodyne charging unit, also.

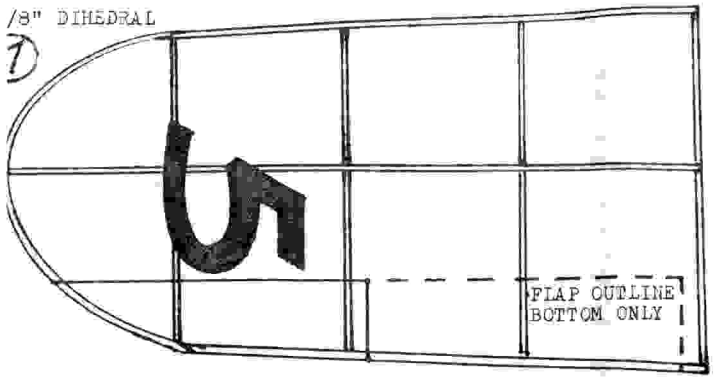
Another step in the right direction for CO_2 power has been taken by the makers of Telco engines, imported from England by Sig Manufacturing and several other firms. Their *Turbotank 3000* is a decided improvement over the garden variety Telco that's been available in the past. I've been an avid Telco fan since the introduction of the little engines several years ago, having them to thank for several first place National wins in Gas Scale. However, as economical and reliable as the engines have been, they've just never satisfied my craving for that little bit of extra that would make a 3 - 4 ounce airplane practical. I believe the *Turbotank 3000* is going to do that.

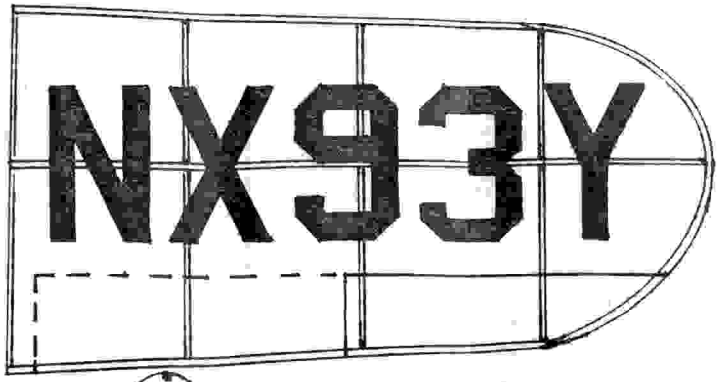
From a performance standpoint, the *Turbo* offers a significant increase in thrust at a medium power setting producing a peak thrust of 40 grams compared to the 28 grams produced by the standard Telco unit. The increase in running time is nearly as dramatic, with the *Turbo* showing a 27% increase over the standard tank. At a high power setting the *Turbo* can be expected to run for 50 seconds, producing a peak thrust of 75 grams compared to the standard's 38 second run and 38 grams of peak thrust. As added features, the *Turbo* has an integral filler nozzle built into the tank housing and the tank is attached directly to the engine proper. Most of the delicate and sometimes vexing copper tubing has been eliminated or internalized for increased reliability and ease in mounting. The *Turbo* is available from your local hobby shop or Sig Manufacturing at $34.95 which includes mounting screws, charging gun, one

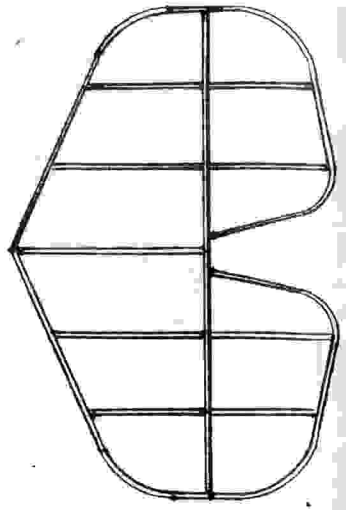
CONTINUED INSIDE FRONT COVER

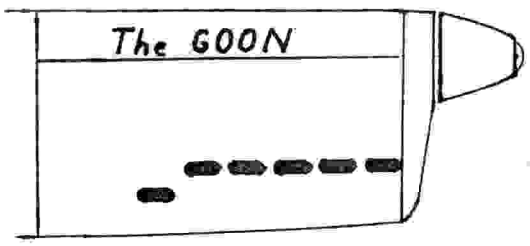
/8" DIHEDRAL

1

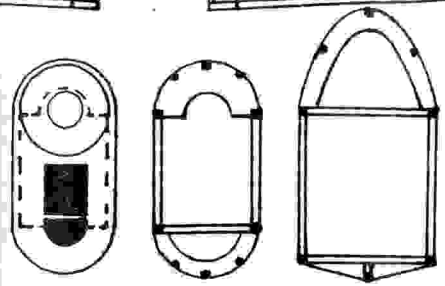








GOON IS CREAM WITH BLACK MARKINGS.



NOSE BLOCK 1 2

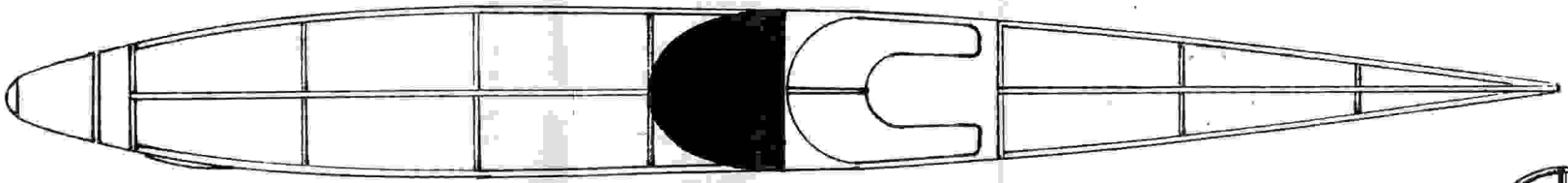


TYPICAL WING SECTION
SHEET PARTS ARE 1/32"

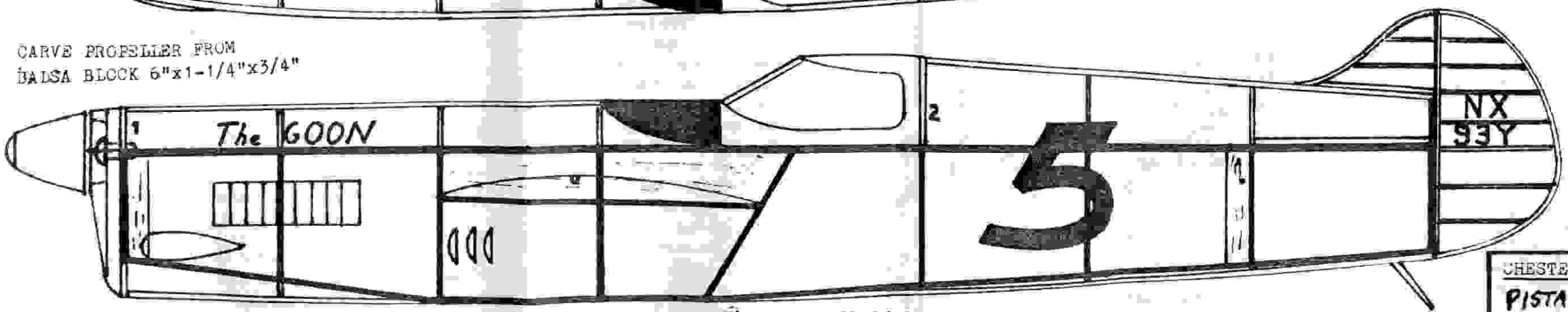
USE 1/20" SQ. FOR EVERYTHING BUT OUTLINES AND TAIL.
USE 1/32" SQ. FOR THOSE.

SOAK OUTLINES IN HOT WATER AND WRAP AROUND CARDBOARD TEMPLATE.

DAVID ARONSTEIN
50 PASTURE LANE
POUGHKEEPSIE, N.Y. 12603



CARVE PROPELLER FROM
BALSA BLOCK 6"x1-1/4"x3/4"



BUILD 2 FUSELAGE SIDE FRAMES ON SOLID LINES.

I WAS IN ONCE
IT WAS FUN-
HAVE FUN,
DAVE

CHESTER "GOON"
PISTACHIO SCALE
© 1982 DAVID ARONSTEIN

CONTRIBUTED BY DAVE ARONSTEIN

GRAPENUT SCALE (8")

FARMAN MOSQUITO
GREAT FOR SMALL IN-
DOOR PLACES



$.75

HEINKEL HE-100
ANOTHER LONG RACER

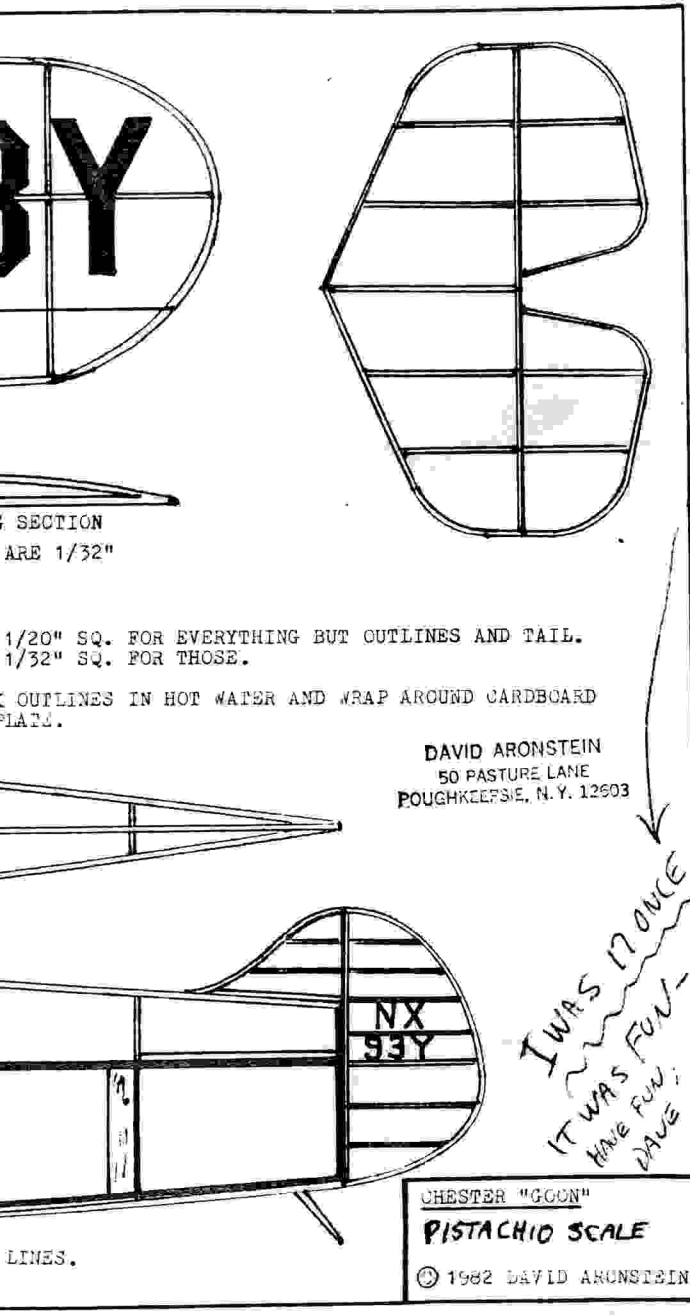
PEANUT SCALE

$1.00



$.75 EACH

BRISTOL SCOUT D:
6½" SPAN, GOOD FOR
VERY SMALL PLACES.



SECTION
ARE 1/32"

1/20" SQ. FOR EVERYTHING BUT OUTLINES AND TAIL.
1/32" SQ. FOR THOSE.

OUTLINES IN HOT WATER AND WRAP AROUND CARDBOARD
PLATE.

DAVID ARONSTEIN
50 PASTURE LANE
POUGHKEEPSIE, N.Y. 12603

LINES.

CHESTER "GOON"
PISTACHIO SCALE
© 1982 DAVID ARONSTEIN

I WAS ONCE
IT WAS FUN-
HAVE FUN!
DAVE



$.75 EACH

BRISTOL SCOUT D:
6½" SPAN, GOOD FOR
VERY SMALL PLACES.

David Aronstein plans

BY LARRY KRUSE, FLYING MODELS

(8)

You may have seen small classified ads in several of the model magazines, including FM, for plans available from David Aronstein. FM's own Earl VanGorder from time to time has mentioned David's plan service in his column, and I, like most readers, took passing note of it and read on. Well, this past summer I had an opportunity to meet David Aronstein at the Springfield Nats and I want to fill you in on some details.

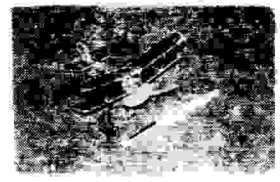
David is not an old-timer who's just gotten back into the hobby, or a middle-aged modeler trying to make an extra buck by marketing a random collection of plans. To begin with, David is just 17 years of age, and a meticulous and dedicated modeler with skills and insight that surpass those of most adults. His plans are his own designs, all rendered with clarity and ingenuity, and all capable of producing contest caliber aircraft.

Inasmuch as the proof of any freeflight ship is its ability to fly, David's latest design, the Bellanca "Aircruiser", is a gem, winning both indoor and outdoor Senior scale at Springfield with beautiful rock-steady flights. And, as I examined the rest of his plans, I found the same engineering excellence and concern for potential flight performance in each of his blue line drawings.

As David indicated to me in our conversation at Springfield, he may be forced to bow out of modeling for a while as he begins college at Princeton University, but his plans are still available. A SASE to him at 50 Pasture Lane, Poughkeepsie, NY 12603 will get you a complete listing of his designs. I highly recommend this enterprising young man and his plan service to you.

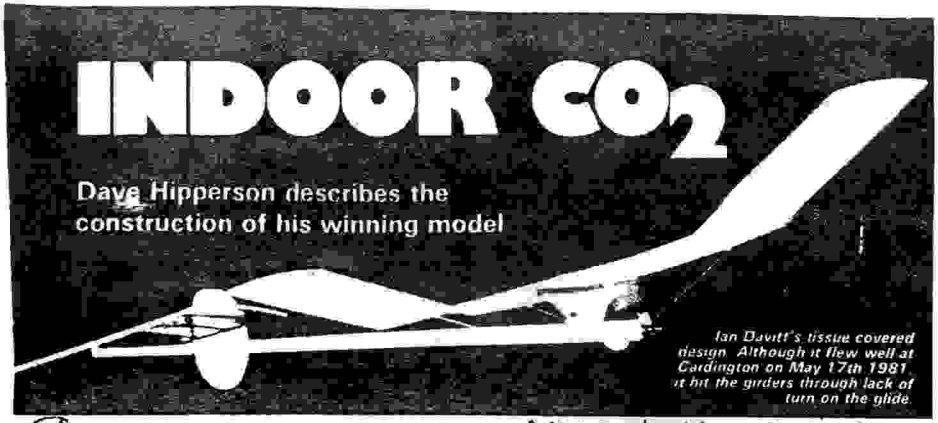
PISTACHIO IS FLOWN TO NEW AMA P-NUT RULES, H.L. ONLY. DOUBLE COVERING NOT NECESSARY.

(A SMALL SAMPLE OF DAVE'S PLANS



INDOOR CO_2

Dave Hipperson describes the construction of his winning model



Ian Davitt's tissue covered design. Although it flew well at Cardington on May 17th 1981, it hit the girders through lack of turn on the glide.

(9) Aeromodeller OCT. 1981

NOW THAT PROPRIETARY CO_2 units — particularly the Telco — are more consistent in their performance and handling and outdoor CO_2 duration is gathering support, some of you may well be interested in trying the delights of indoor flying. This is not intended to be an introduction to conventional indoor — EZB would be a better path to take — but it is a way of sampling indoor flying without the need to invest in any more wood and equipment than you use already. The design here is built very much in outdoor fashion but with very much smaller wood dimensions. That is to say that no jigs are used and leading and trailing edge spars are — dare I admit it — pinned to the board during construction! The fuselage is soft straight grained 1/32" rolled around either a billiard cue or an A2 fuselage blank if you have one handy. The seam is stuck with cyano.

Air frame

Unlike a rubber model a CO_2 airframe has to absorb reciprocating vibration from the engine and I found some improvement on the original designs when I increased the wing post size from 1/16" (1.5mm) to very hard 3/32" (2.5mm) and hence reduce the amount the wing 'flapped about' on the climb. These posts taper off to less than 1/16 (1.5mm) at the top of the bracing triangle above the wing. Tail posts are 1/16"" (1.5mm) and this unit should be built stiff enough to withstand flight loads without bracing — weight finished 1 gram to give you a guide. If it twists when it encounters turbulence it can be nasty!

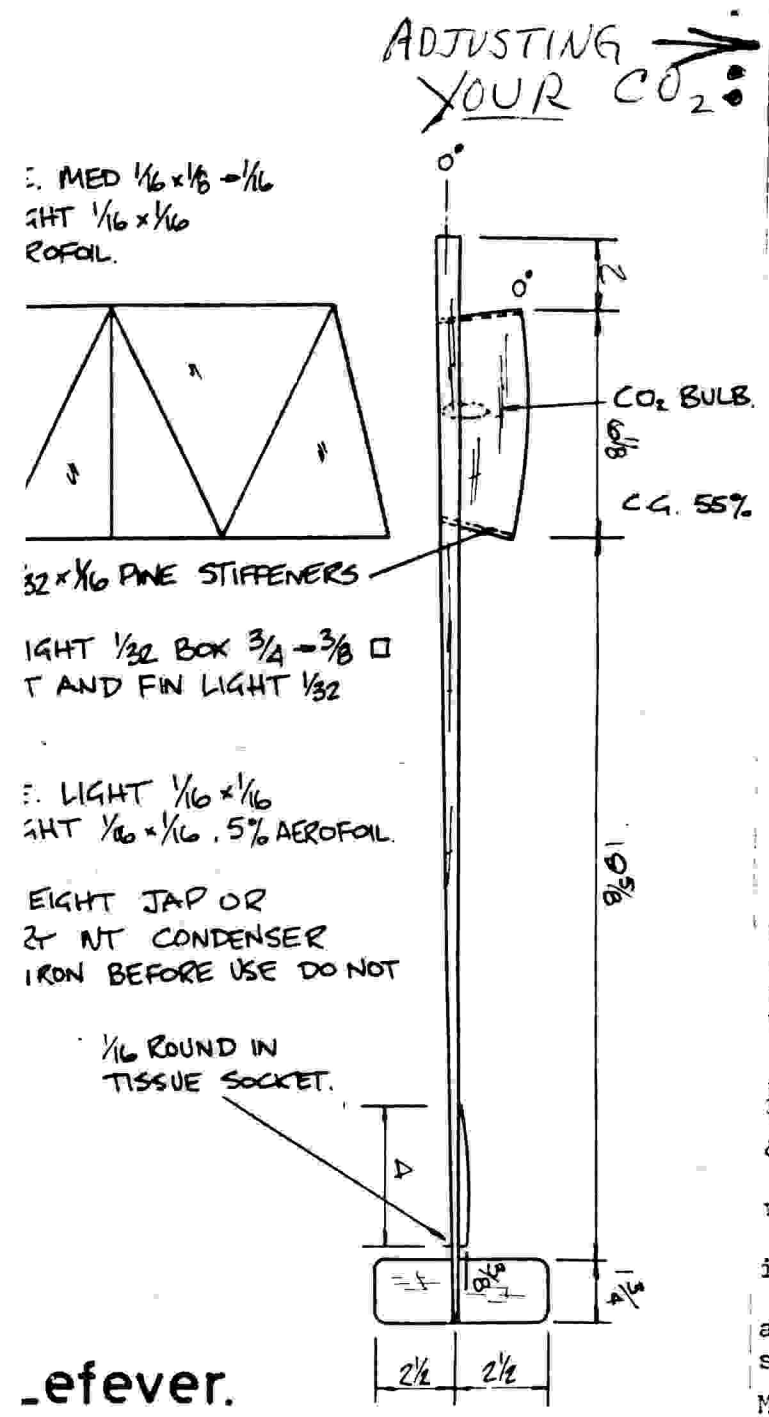
Covering

Wing and tail surfaces are covered with 1/4 thou. silver mylar bought from Ian Dowsett and although fractionally heavier than condenser paper is considerably preferable aerodynamically, particularly if applied smoothly as it is completely air tight. I stick it on with cow gum (available at stationers) thinned with lighter fuel. There are other more specialised adhesives such as 'Grab' but I have found that they tend to do the job a little too well and the mylar is impossible to get off the structure again if it goes in the wrong place. Cow gum allows a couple of 'tries' or at least a little movement before it dries. Of course whatever you use covering should be done by offering up the glued structure to the mylar laid out on the table rather than trying to man-handle the mylar which would be virtually impossible.

This way the tail can be covered in one piece (the mylar is 6" wide) and wing in a number of pieces laid on chordwise — hence the slightly strange rib spacing. So as not to be handling the complete wing at the covering stage I complete the tip joints but leave the center dihedral until I have covered tips (3 pieces) and outer ends of inner panels (one piece each). The final centre section is then covered after the centre joint has been made. Wing post tubes are formed by wrapping damp glue impregnated model-span tissue around piano wire of the appropriate diameter — 4" of tube can be made at a time quite easily. Posts are push fitted into the fuselage and the covered wing can be glued (cyano) into the cabane and the cotton thread bracing completed from the top down keeping it nice and tight and the wing flat.

* Rubber Cement in USA

(Continuing the above article) PROPELLER: The prop is carved balsa 5 1/2 x 7" and virtually doubles an indoor models performance compared to the standard yellow plastic one. Larger commercial plastic ones are also an improvement, but not as good as this small balsa one. It should be weighted with 3/4 g of lead in each tip. This is also a very convenient way of balancing it. Carve it from hard, close grained wood and keep the section thick, and the blades a little undercambered. The finished prop...2 grams. The CG should be 60% as long as you have a nice light fuselage. The entire model should shouldweigh 1 oz.or less . This foreward CG gives a steady and non-critical trim but it may be beneficial to experiment with moving it a little further back as decalage is rather excessive, and might be wasteful. The motor run of about 3 min. takes the plane to 150' ceiling at Cardington. For lower ceiling sites, CO2 contests would be quite practical as it is relatively easy to adjust these motors until the model hardly climbs at all. At such a setting the run will probably be 4 min. or so, but remember a slower run will tend to allow the power turn to open up. At the last mmeting (at Cardington) most models seemed to be trimmed for quite a tight power turn 30' diameter and similar on the glide with motors running between 1500 and 2000 r p m something like half the speed we use outdoors.



JERRY'S TIPS: (10)

Take A-23 or Campus or MJ-70 Or twin and give a one second chg. with charger nozz le pointing up.

2. Flip prop. When engine starts unscrew cylinder(Counterclockw.) until it stops. Tweak it back (Clockwise) and restart engine.

3. At this point the engine should be running very slowly..2 to 3 min. run to a charge!!

4. Same thing in plane, but when it is running very slow test glide it. If it lands without going up very slightly, turn the cylinder clockwise a smidge and try again. If the glide is extended but still comes down, try again till it climbs slightly. This will give the longest flight times.

5. Use Campus or MJ-70 prop on a P-nut A-23..Clip it about 1/4" each tip. The Micro-X P-nut cub has been very successful. (Plug) Any engine position is OK as long as you can get at the cylinder. It needs constant adjusting because it is influenced by room temperature.

Install tank as upright as possible so on a liquid charge the CO2 will not run into engine & form ice...scratches piston!!

Charging with nozzle down will give a liquid charge (Longer)

After 2 or 3 charges(especially wet) the Sparklet is pooped,

The A-23 is a powerful engine and flies the 16" Micro-X semi-scale line at very low throttle.

MICRO-X SUPPLIES P.O. Box 1063
LORAIN; OHIO 44055

(11)

DEC 79 AEROMODELLER

Dave Hipperson reports....

CO_2 MOTORS FOR MAXIMUM PERFORMANCE

I have been experimenting with filling techniques and temperatures to find out just why it is that so many people report inconsistent runs from CO_2 motors. You have probably noticed already that the second charge from a bulb is usually best and this was the key to the investigation.

My initial attention was to the Sparklets bulbs themselves – I weighed a large number of these quite accurately. They varied from anything between 27 and 31 grams (this included some of the foreign 'gold' bulbs that we had been told were so consistent). As the empty weight is pretty steady at 22 grams you can see that this variation represents enormous fluctuations in actual CO_2 available. Initially I thought this could have a bearing on performance, so discarded the very light ones and for the sake of simplicity have used only 29 gram bulbs in these tests.

A standard Telco unit was used, and fitted with a 5 x 7½ Balsa ballasted prop. The unit was mounted firmly to a piece of 1in x 3/8in hardwood which was in turn held in a vice. The tank and piping was allowed to 'flap about' behind the engine and directly in the prop wash. The motor was set up at a reasonably fast rpm level and *not* altered during the test.

A number of bulbs were run through the unit in this position. As you can see, in the first case the second fill gave the best run. However continued tests with no interval between runs showed the first charge from a bulb to be better than any other in all the next four tests. The sixth bulb was run through after it had been warmed to body temperature (in the filler inside my pocket for 15 minutes prior). Immediately the run was improved and the second and third fills benefitted too. Remember there had been no alteration of valve setting.

The next series of tests were done the following day in similar conditions. Once again, using a cold bulb the second charge was better from the first bulb but tests that followed immediately showed the first charge to be the best on all subsequent bulbs.

Once again a bulb was warmed to body heat, and once again a considerable improvement in run was achieved. As a final trial, a bulb was warmed by electric light to approximately 40 degrees above ambient (100°F), just warm to the touch. Once again the run was improved even over the length achieved with just body warmth. As a final test a bulb was taken in controlled conditions to 120°F. (This is a dangerous level and something both I and the manufacturers recommend against.) The run from this fill was a staggering 5 mins plus once again without any adjustment. In these latter two tests the motor ran slowly at first and gradually increased speed until the end of the run with a little burst just before it ran out. This I have come to recognise as a good charge in a well adjusted motor. However in the case of the very hot charge, the speed of the initial part of the run was such that it probably would have had little practical use even in the lightest of indoor models.

Conclusions from this part of the experiment were clearly that it is beneficial to fill with warm CO_2 into as cold a tank as possible. Heating the bulb increases the pressure in it and thus injects more CO_2 into the tank which if it is already chilled, cools some of the CO_2 and allows even more in before pressure becomes equalised between bulb and tank. However although this seem to be acceptable up to a point it can be overdone as with the very hot pre-heat which seems to create so much back pressure in the engine valve that the unit runs too slowly for too long. Perhaps in this case throttling up would be the cure. This would need more tests. Certainly it seems that at any practical setting considerable improvements in run length and consistency can be brought about by heating the bulb to 30°–40°F above ambient – usually the pocket is enough for this.

One more point on pre-cooling the tank. Don't run the charge out by turning the prop. A short cut is to bleed the charge out of the filler again. This can be done by pushing in a pin with a flat ground end into the nozzle until it dislodges the ball valve. The ensuing rush of gas cools the tank very quickly and to a lower temp than running the prop.

SPEED ADJUSTMENT

Of course, speed adjustment on these units is not the same as compression adjustment on a diesel – some people are treating the two similarly. The valve in the cylinder top is opened and shut by the crown on the piston. Each time the piston hits TDC the ball valve is opened and the pressurised gas squirts in and pushes the piston down again – momentum of the prop etc keeps it going until the next 'stoke'. If the valve *is* adjusted to open too much then although the power derived from the squirt is more, so also is the back pressure as the valve is opened earlier and some gas escapes before the piston is at TDC and is thus both wasted and slows the stroke. Bearing this in mind, I have found these units to operate most efficiently with the *smallest* valve opening possible.

However it is reasonable to assume – as with all other similar duration events using lower power – ie rubber – the larger the prop the better the performance. With CO_2 this theory is in doubt. Large props are undoubtedly more aerodynamically efficient but due to their size and hence resistance to turning require a more open valve setting. At such a setting the prop will still be turning slower than a prop of smaller diameter and therefore the valve is open long enough to waste a certain amount of gas on each stroke. You will get that popping sound. Thus I believe it is most efficient to use the smallest size prop possible and this is, of course, also beneficial on the glide-in terms of reduce drag when the prop stops.

PROPS

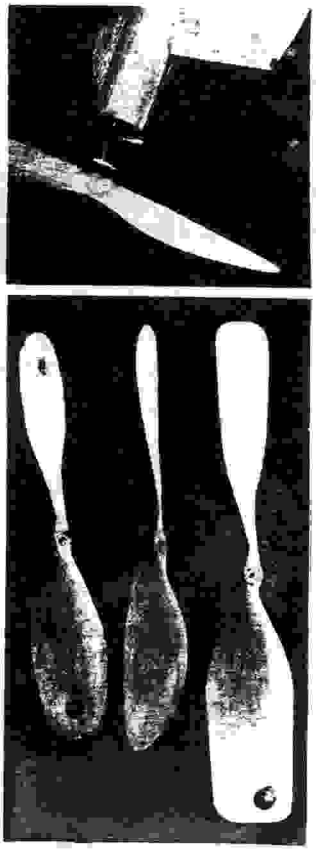
From my experience, the standard plastic props particular in the case of the Telco is very inefficient, particularly at low speed. I use a similar size prop, ie 5in diameter 7½in pitch, but carved from balsa with much larger blades than the original Telco. This has to be ballasted with 1½ grams of lead in each tip to maintain the flywheel effect necessary. More recently I have had some success with 6in x 6in pine props carved once again helically from a full X blank. These are just that little bit more robust and due to their higher density, do not require ballasting. Therefore I would recommend them for general use if you can get the wood.

WEATHER EFFECTS

As if all this isn't enough, I have noticed humidity has a considerable effect on performance at any given setting. Generally it has been found that runs lengthen appreciably in humid/raining conditions. In dry 65°F conditions, a test unit was adjusted to run off at a consistent 90 seconds – the ideal sort of setting for outdoor duration use. However this same motor at the same setting with the same ambient and charge temperature ran slower but for over double that duration on a rainy day. It might therefore be reasonable to maintain run length and power – some throttling up on wet days will be necessary.

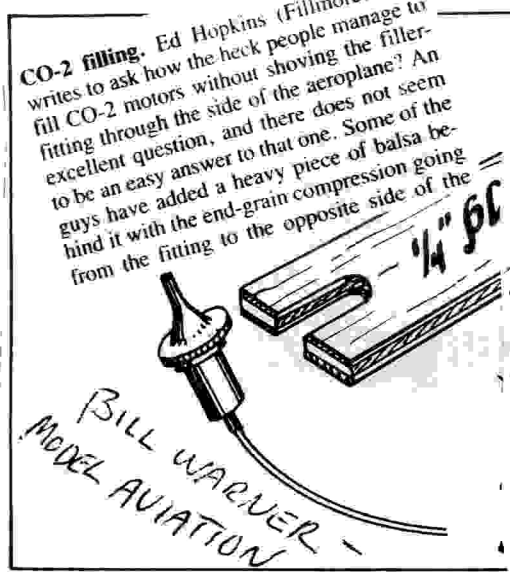
CONTINUED ON BACK COVER

MIAMA INDOOR MEET #5 MIAMI/ DADE SOUTH COLLEGE, SUN. MARCH 18 9 TO 5



Above: *Close ups of Dave's carved wooden props. Black spots are lead ballast to achieve flywheel effect.*

CO-2 filling. Ed Hopkins (Fillmore, CA) writes to ask how the heck people manage to fill CO-2 motors without shoving the filler-fitting through the side of the aeroplane? An excellent question, and there does not seem to be an easy answer to that one. Some of the guys have added a heavy piece of balsa behind it with the end-grain compression going from the fitting to the opposite side of the plane where they can back it up with their hand. Many people just leave the fitting dangling at the end of the copper tube and hold it in their fingers. This may result in frostbite from leakage during the filling operation, however. Holding it with needle-nose pliers is better, but it often squeezes the filler into an oval, which is not ideal. Bobby Haight of Las Vegas has come up with a clever and simple holder which consists of a length of ¼-in. plywood with a .200-in. notch cut in one end to receive the fitting. Works like a charm. The concealment of the fitting and tube, if important, can be done by putting it under a hollow pilot bust, trap door, or other removable panel.



No more frozen fingers or pushed-in fuselage sides when you use the new Vegas Vulture Unpatented CO-2 Charge-Fitting Holder! Bob Haight (Las Vegas, NV) proves that the best ideas are the simplest.

See back cover for DATES of coming Indoor meets, or call 305-658-6363 for details

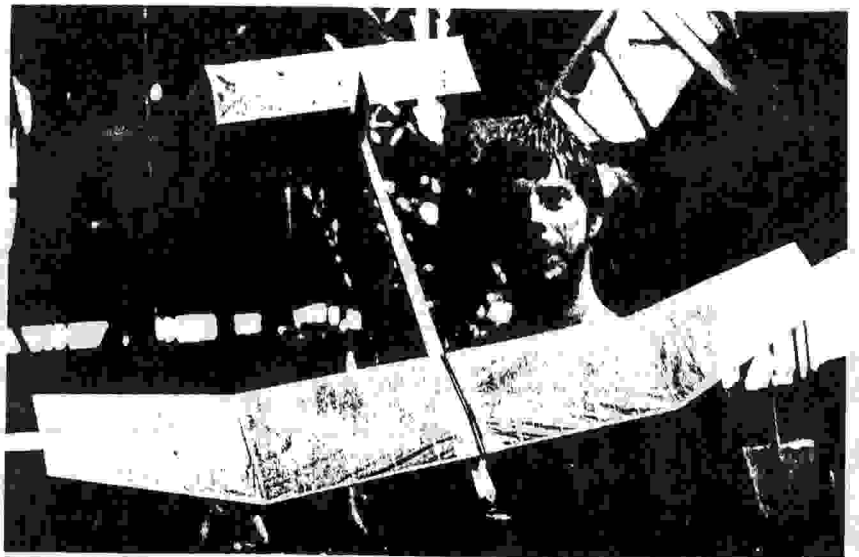


We all know of the growth of activity in Free Flight Scale here in the U.S., but in England, too, activity is continuing as strong as ever. A new newsletter which looks promising is called *Scale Flight* and can be obtained by writing Alan Carr, 57 Carlton Rd., Gidea Park, Romford, Essex RM2 5AP, England.

COLLECTING MAGAZINES?

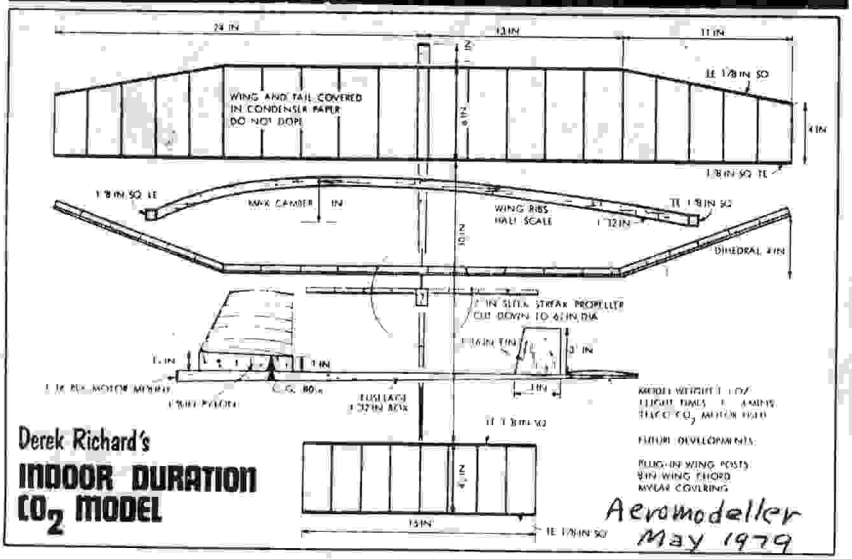
R.J. Twohy, of 24246 Crenshaw Blvd., Apt. 103, Torrance, CA 90505, specializes in used aviation magazines. Included are such titles as *Aero Digest, Air Pictorial, Air Progress, Popular Aviation, Air Trails, Aeromodeller* and *Flying Aces*. Why not send a pre-addressed, stamped envelope for the list and prices?

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Above left: ***Derek Richard's duration model uses strong wing requiring no bracing.*** Above: ***Dave Hipperson favours super light approach, 42in x 6in mylar covered wing depends on cotton bracing lines to take flight loads.*** Below: ***'From the sublime to the ridiculous,' Ron Green couldn't believe his eyes after Tim Gray produced this creation. Built the night before, it hit the roof 180ft overhead after about one minute and regularly turned in two minute plus times.***





UNOFFICIAL FREE FLIGHT EVENTS - NATS

OUR MAN OUTSIDE

Terry Rimert

WE NEED A JUNIOR PROGRAM!!!

It seems like someone or other is always printing something about needing a program for teaching juniors, and urging us to do somthing about the junior problem. * *We can tell from past performance, that most modelers arn't going to do anything about it except maybe teach their kids a bit, and talk about it. There are some people who would teach kids about models, even people who don't know anything about models try to teach kids about models. Thats the big problem. Most of the people who will spend time teaching kids, don't know anything about model planes. What is needed is a place for these people to go to get the information they need for this project of theirs that will let them do a great job helping us get new youngsters into building and flying airplanes. If you contact the AMA they have a neat lesson guide for building and flying AMA Cubs, and thats it. Nothing further. Our esteemed District 5 Vice President has a good workable plan, worked out by a teacher who is a modeler, and has taught a lot of kids about models. But he says he has to put this program in lesson guides. He has had the program for nearly two years now, and still hasn't converted it to lesson guides. Maybe someone could help him a bit!! If this ever gets converted into an acceptable program, the AMA should talk a few manufacturers of kits into paying the printing costs for printing up a few thousand to hand out to anyone who wants to start teaching kids about modeling. The biggest problem a lot of clubs have with new members is that they don't know anything about the basics of building and flying models. Maybe they would grow better with one of these programs around too. It is a sure thing that a good program would help a lot of would be teachers accomplish something. Its just as sure that there isn't one of these programs available to most people when they want one. Even after AMA has been around for after 50 years, none of its members have developed a good beginners program for juniors that is good enough for universal useage. After God only knows how much time and space have been used on discusing the "Junior Problem". The solution to the problem is to get Bill Mathews to finish this program and get AMA to publish it without the rest of the VP's having to get their two cents worth in and making forty or fifty time consuming changes to something they don't know anything about. If it needs changes it can be changed in a couple years or so when a new printing is needed, and it will be for sure from feed back from users that it needs changing.*

* Someone or other, not me - Doc - More next issue on Jrs

NEXT MEET

MIAMI/DADE S. COLLEGE MAR 18 9-5

CONFIRM 858-6363

INDOOR MEETS • CONFIRM 858-6363 • COLLEGE

CO_2

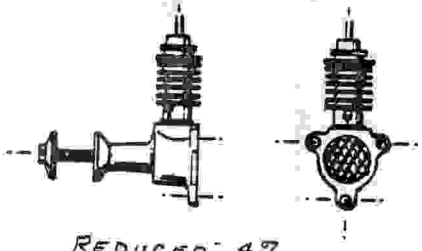
MARCH 18 - MEET 5 MIAMI-DADE SOUTH 9 TO 5

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WEIGHT OF BULB

As I mentioned at the start of this piece, the 29 gram bulbs were used in these tests. Further tests – with which I will not bore you – have proved that as far as the first two or three charges are concerned the weight of the gas in the bulb is not critical. Its only effect – which seems reasonable – is that the better filled bulbs go to perhaps four or five reasonable fills whereas the light ones are useful for only three. This is irrelevant to contest use where it is recommended to use only the first or at most the second charge from a bulb anyway.

CO_2 MOTOR TEST

All Sparklet Bulbs used full weight 29-29.5 grams; Ambient Temp 68°F (Weather dry and bright); 5in x 7in Balsa prop (Tank in prop draught).

Bulb	*1st*	*2nd*	*3rd*	*4th*
1	1.23	2.12	1.57	1.45
2	1.53	1.50	1.35	1.12
3	1.48	1.46	1.37	1.36
4	2.28	2.00	1.35	1.31
5	2.10	1.57	1.38	1.28
Tank wiped dry next bulb at body temp (30°F above ambient)				
6	3.05	2.27	2.13	1.17
Break of 12 hours. Test re-commenced, weather similar				
7	1.29	2.00	1.50	1.33
8	1.53	1.48	1.42	1.30
Next bulb at body temp (30°F above ambient)				
9	3.35	2.33	2.08	0.56
Next bulb at approx 40°F above ambient – just warm to touch				
10	3.40	3.17	3.00	1.25
Final bulb at approx 120°F				
11	5.13	4.00		

THE LATEST INDOOR NEWS INSIDE

THE HANGAR PILOT

EDITOR: DR. JOHN B. MARTIN MIAMA

2180 TIGERTAIL MIAMI FLORIDA 33133

MAR 23 PM 1984



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CINCINNATI OH 45240

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