CLEVELAND FREE FLIGHT SOCIETY

CROSSWINDS

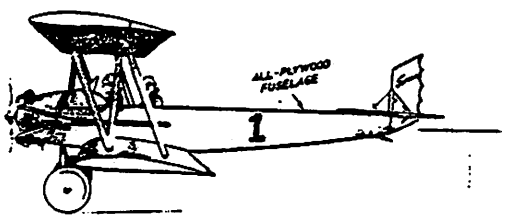
ISSUE 63 4Q '81

CO_2 DIAMOND DEMON

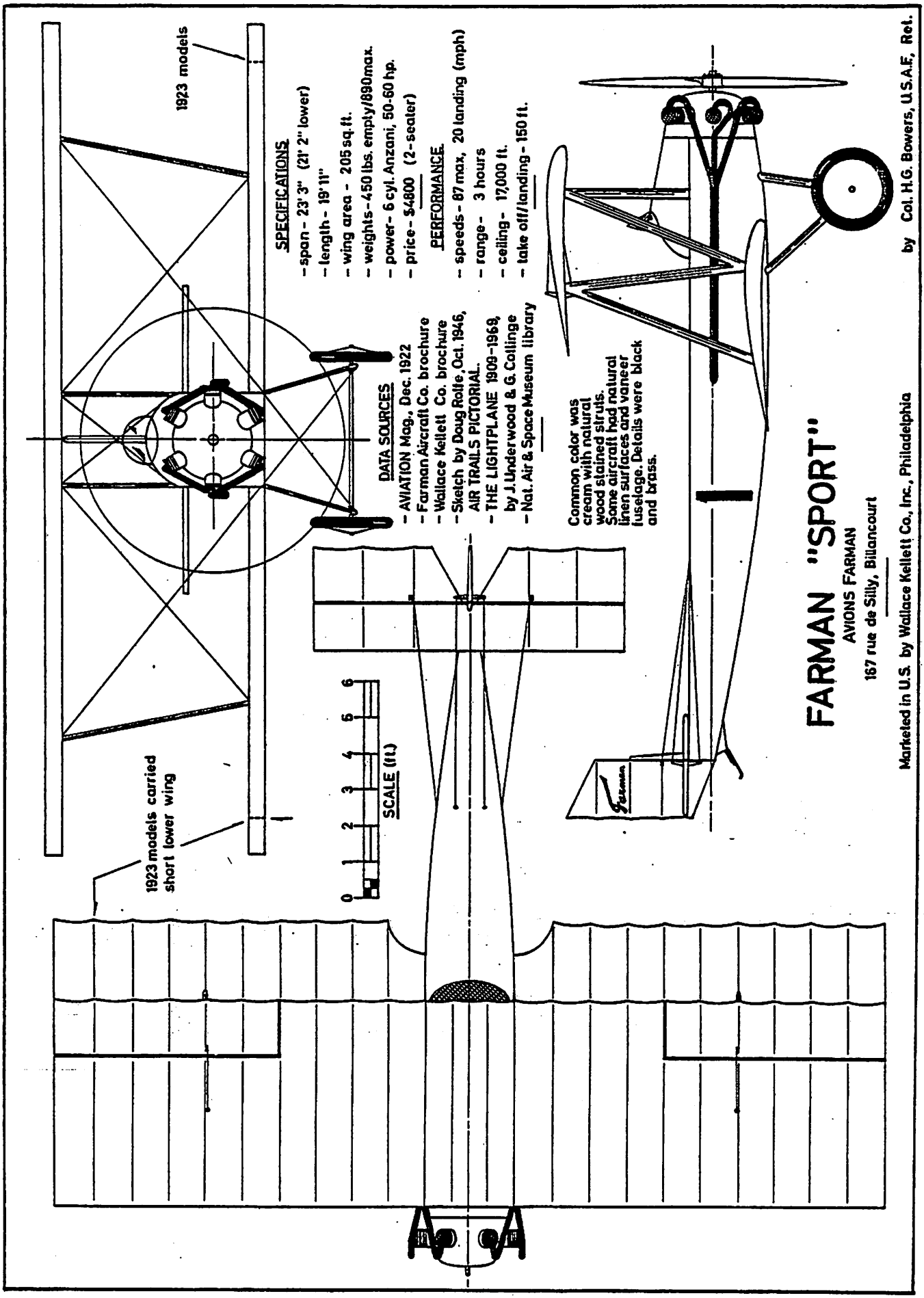
T R W T/M 2833

23555 EUCLID AVE.

CLEVELAND, OH 44117



FARMAN "SPORT" 60-70-h.p. Anzani radial engine.



Courtesy Hurst Bowers, Model Aviation, August 1979

CROSSWINDS QUARTERLY

THE JOURNAL OF THE CLEVELAND FREE FLIGHT SOCIETY

ISSUE FOR OCT., NOV.
AND DECEMBER,1981.
VOL. 8, NO. 4
ISSUE NO. 63

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SEVEN HILLS, OHIO 44131
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EDITORIAL COMMENT

As editor for this issue of Crosswinds I would like to present to our readers some suggestions concerning how to enhance one's building and flying sessions through the use of various styles of music. In this way I can introduce myself as a teacher of public school music, as well as an active member of our model building fraternity.

First of all, in order to further decrease building time, try your favorite cyanoacrylate glue and Chopin's Minute Waltz, or the Flight of the Bumble Bee by N. Rimsky-Korsakoff. Then as we are all preparing for the first outdoor contest of this year, what could be more appropriate then Stravinsky's Rite of Spring? The never ending search for a flying site might be enhanced by Beethoven's #6, the Pastoral Symphony.

Various F.A.C. events conjure up ideas for their own unique accompaniments. For instance, consider the following two match-ups:

Jet-Cat- "I'm Leaving On A Jet Plane"
Embryo - "Flying Home" (better than flying away)

As for my own personal favorite, I am constantly reminded of my lack of success in our various combat events by the fourth movement from the Fantastic Symphony of Berlioz. This is entitled March to the Scaffold which is appropriate for all of us who continually get our heads chopped by all of the F.A.C. Generals especially Roberts, Norman and their ilk.

In closing the following story seems appropriate:

A little boy showed his teacher his drawing depicting the song "America the Beautiful." In the center there was an airplane covered with apples, oranges, bannanas, and pears. "What's that?" his teacher asked pointing to the airplane. "That," answered the boy, "is the fruited plane."

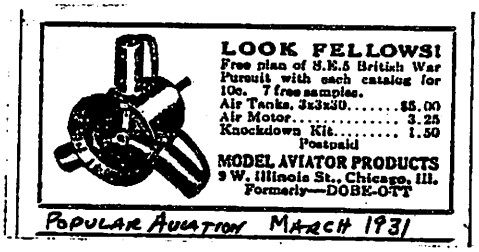
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INDOOR CONTEST NOVEMBER 20, 1981 Brookpark Armory

Results

E.Z.B.

Larry Mzik	285	382	427	524	
Larry Loucka	435	339			
Gerry Skrjanc	281	389			
Robert Mullins	380	314	349		
Dave Rigotti	282	63	273	213	119
Robert Skryanc	57	222	127		
Vic Peres	67	191			



Scraps

Robert Mullins	216	33	
Gordon Roberts	146	149	210
Larry Loucka	138	166	
Andy Medovitch	15		

AMA P-Nut (R.O.G.)

		Flying	Scale
Michael Zand	Davis	13 11	2 =1
Andy Medovitch	SE-5	- -	1
Gordon Roberts	Itoh	- -	4
Michael Zand	Farman	- -	3

Jetco R.O.G.

Larry Loucka	149	73	92	110	32
Gerry Skrjanc	43	110	39		
Robert Mullins	102	99	34		
Andy Medovitch	6	44	55	27	50
Ken Peres	11	10	11	14	15

Jr. P-Nut

				Scale	Total	Place
Robert Zand	Taylorcraft	19	15	4	23	1
Mike Peres	Luton Minor	-	-	48	-	

F.A.C. P-Nut

Vic Peres	Gadfly	25	55	56	63	119	1
Michael Zand	Farman	19	29	21	59	88	2
Ross Mayo	Dayton	40	36	36	44	84	3
Vic Peres	Piper J-3	38	50	53	46	99	2nd Entry

Pioneer-Biplane Combined P-Nut (F.A.C.)

Michael Zand	Bleriot Canard	24	18	31	83	114	1
Ross Mayo	Andreason	30	31	30	59	90	2
Ross Mayo	Avro	32			50	82	2nd entry
Andy Medovitch	SE-5A	DNQ			67		

The contest was enjoyed by all who attended, however the weather did hold down the crowd. The following companies contributed prizes.

Model Builder Magazine
Micro-X
Peck-Polymers
Model Airplane News
National Hobby

*****

This issue is devoted to CO2 building and flying. Dick Woodward will share some of his thoughts and experience with you, but first here are some recent references that could help you choose your subject for Old-Time replica. Suitable models have appeared from time to time in the hobby magazines. Two interesting subjects are the CO2 Powerhouse, a 1939 Taibi design (M.A.N. 9/78) and the Super Skyrocket (Flying Models 1-80), a 1942 Shulman design. Both are drawn for Co2 by Al Lidberg.

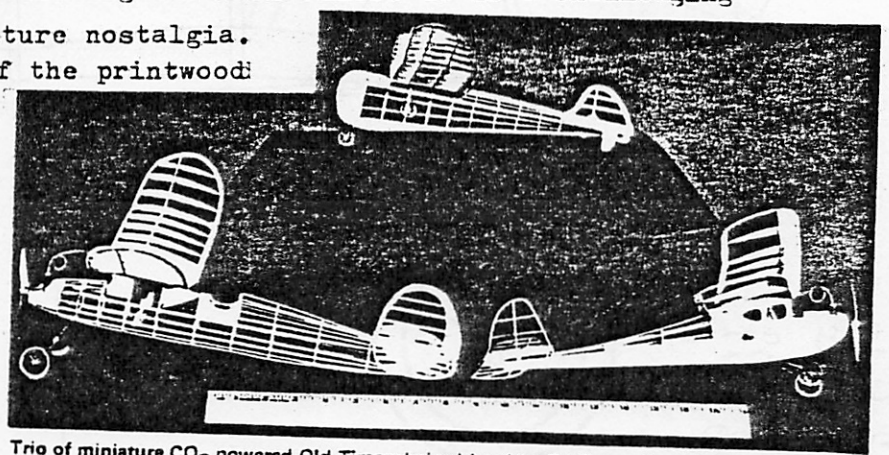
I would like to call to your attention the items available from Ed Toner of Buzzer Model Airplane Company. For CO2 replica there is the:

American Ace (Mini-New Ruler)	20"
Buzzard Bombshell	18"
Super Sunduster	19"

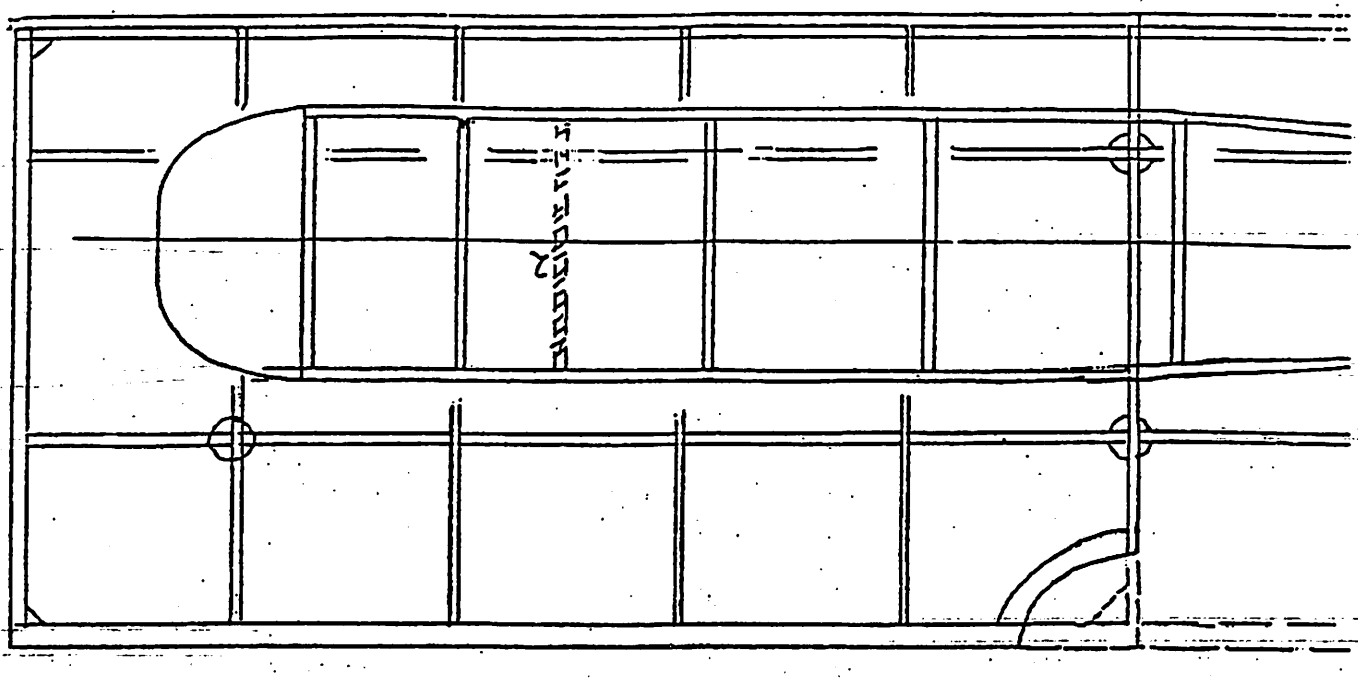
The above are available as partial kits (plans and printwood) for $4.25. Toner also has a ¼" Playboy plan for $1.75. Write for a listing of these and other goodies. Send a SASE to:

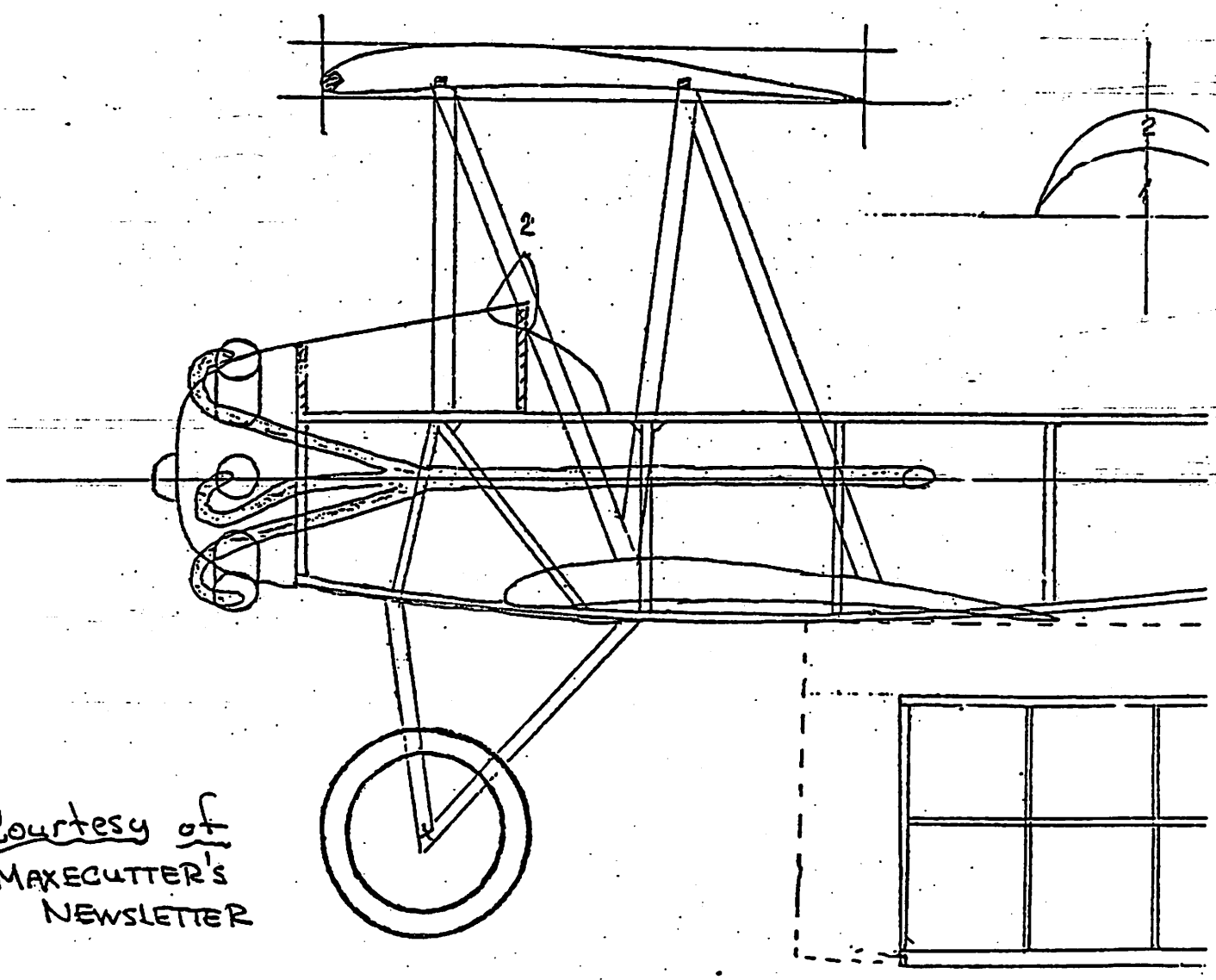
Buzzer Model Airplane Co.
P.O. Box 124
Howell,N.J. 07731

I am currently building the Mini-Ruler. It is a challenging subject full of minature nostalgia. Be sure to cut all of the printwood parts a little oversize to insure an accurate fit if you choose to build one of these.

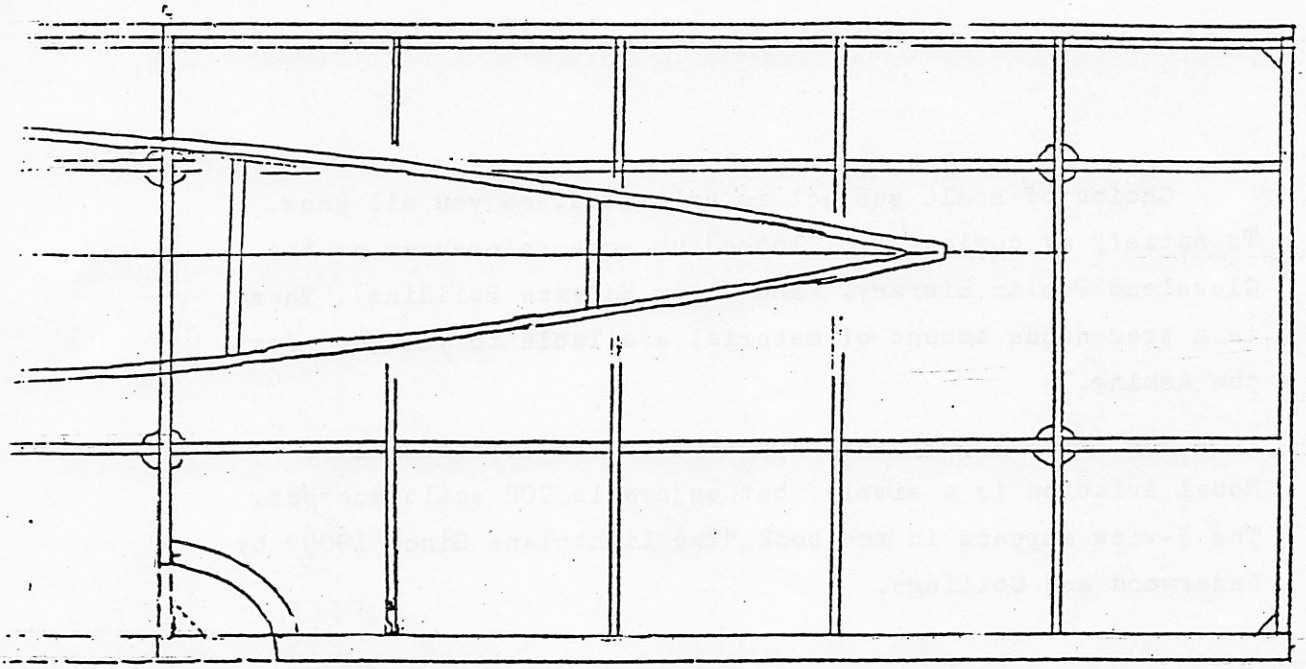


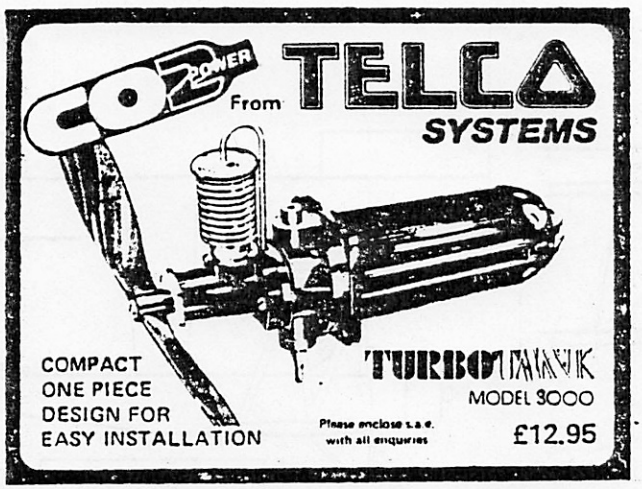
Trio of miniature CO_2 powered Old Timers being kitted by Ed Toner. Each kit includes printed wood by Peck-Polymers. Recognize the designs?

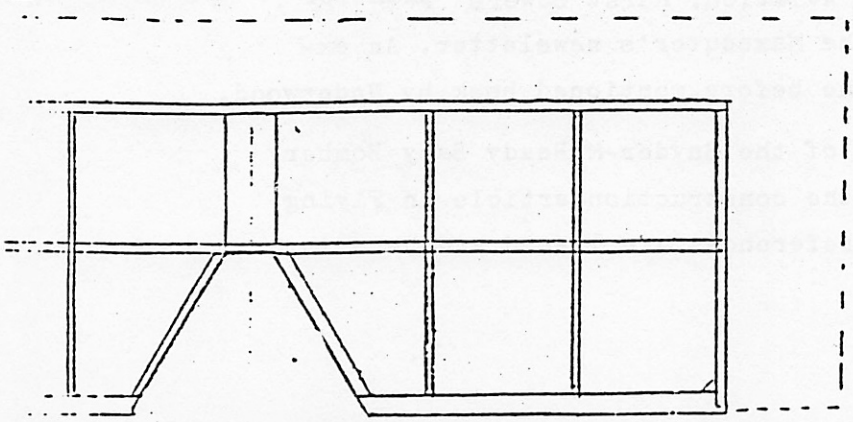




Courtesy of
MAXECUTTER'S
NEWSLETTER







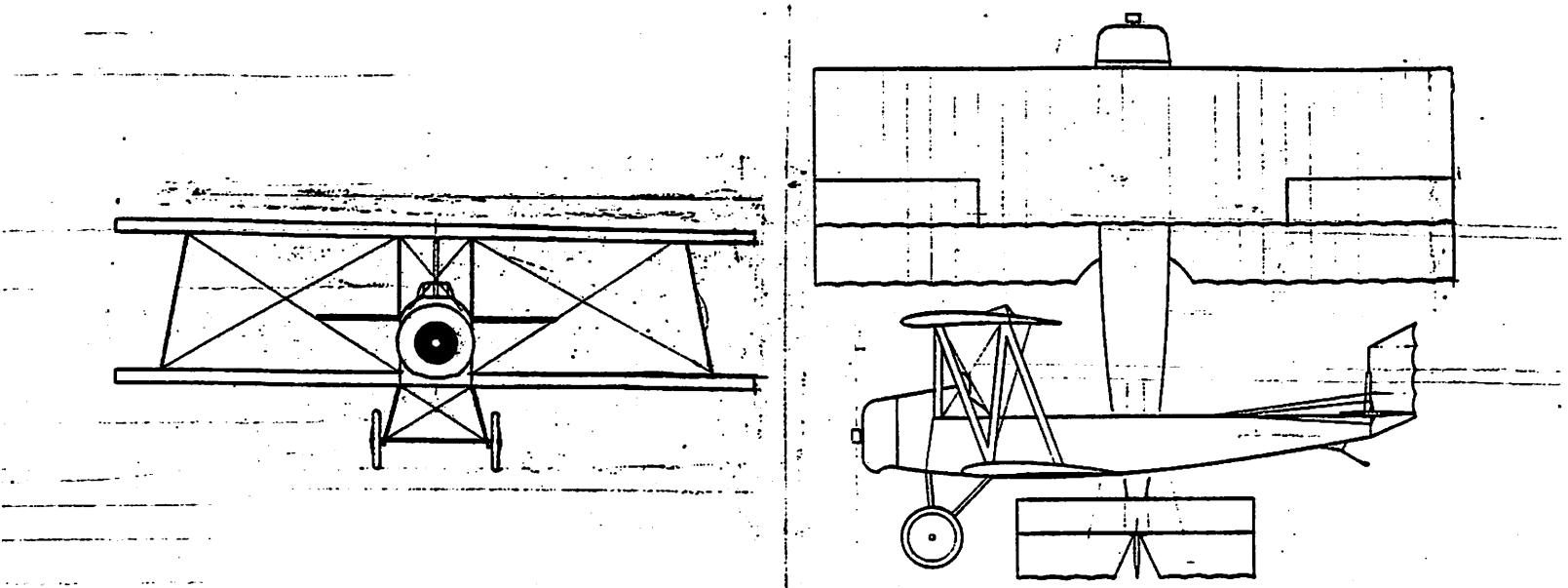
ENLARGED STAB

FARMAN SPORT

by HURST BOWERS

Choice of scale subject is unlimited, as you all know. To satisfy my curiousity I looked up some references at the Cleveland Public Library. (2nd floor Science Building). There is a tremendous amount of material available to you just for the asking.

The Farman Sport that appeared in the September 1977 Model Aviation is a simple, but enjoyable CO2 scale subject. The 3-view appears in the book "The Lightplane Since 1909" by Underwood and Collinge.



Farman Sport: *60-hp Anzani; span, 23.3 ft; length, 20 ft; area, 280 sq ft; empty weight, 445 lb; gross weight, 880 lb; maximum speed, 87 mph; stalling speed, 35 mph; normal range, 200 miles*

Another version of the Farman Sport is 3-viewed in the August 1979 issue of Model Aviation. Hurst Bowers' plan for this version appeared in the Maxecuter's newsletter. An excellent photo appears in the before mentioned book by Underwood.

A fine full size plan of the Snyder-McReady Baby Bomber biplane is published with the construction article in Flying Models (August 1978). All references are listed and here is

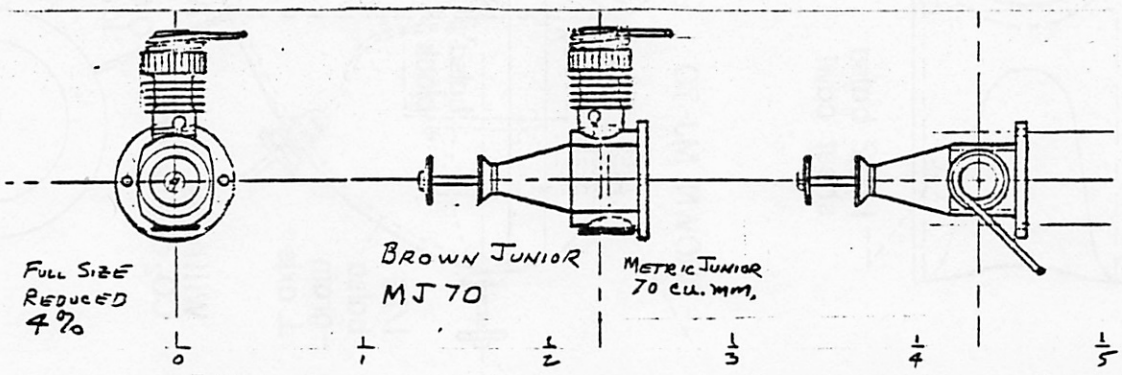
a copy of the photo that is in the Underwood book.



O.H. Snyder's Baby Bomber (15-hp Indian) was one of the few practical and proven designs available to amateur builders in the early '20's. The prototype, built in 1921, participated in the 1924 Dayton Air Races. Note the streamlined fuel tank.

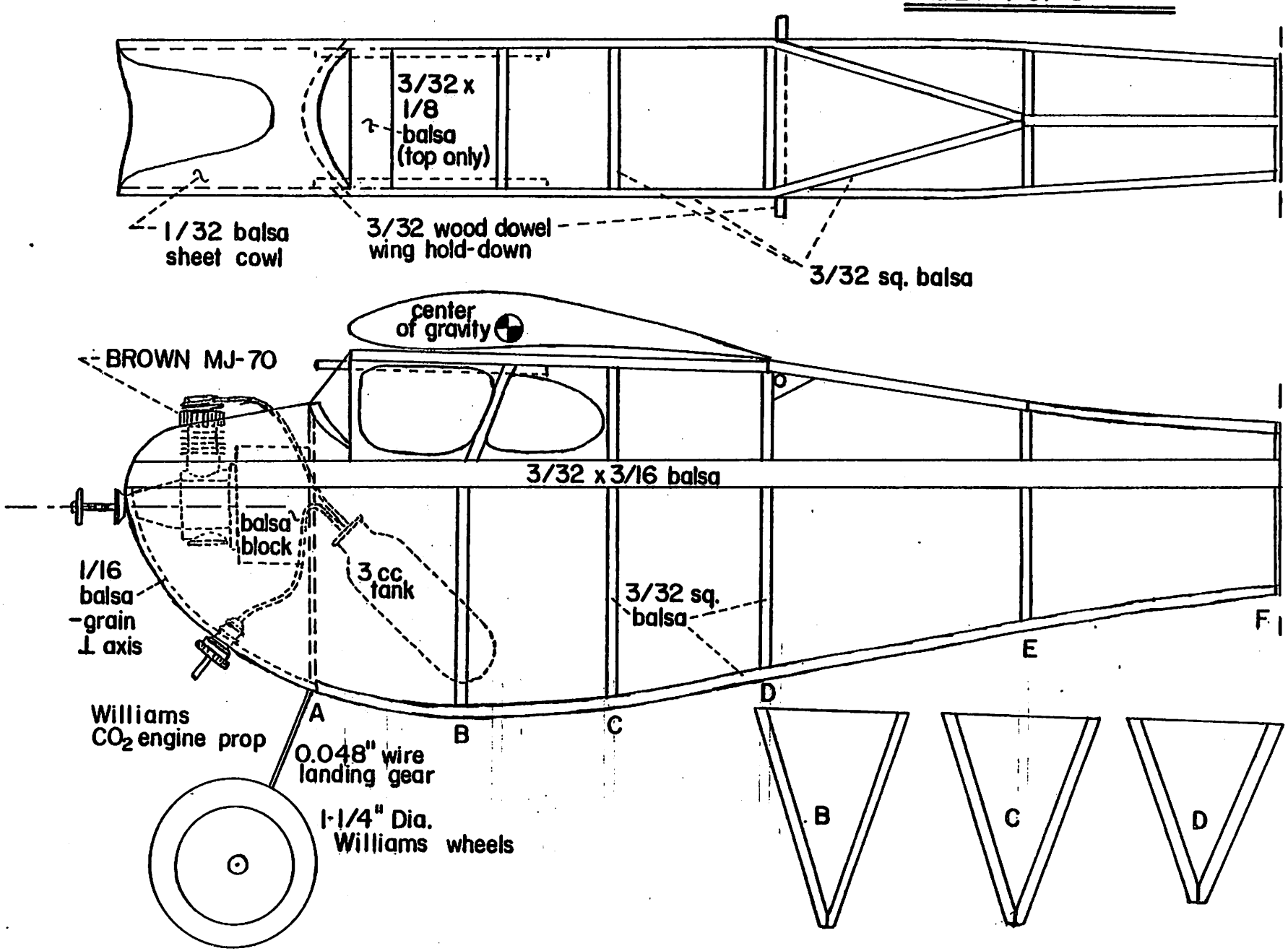
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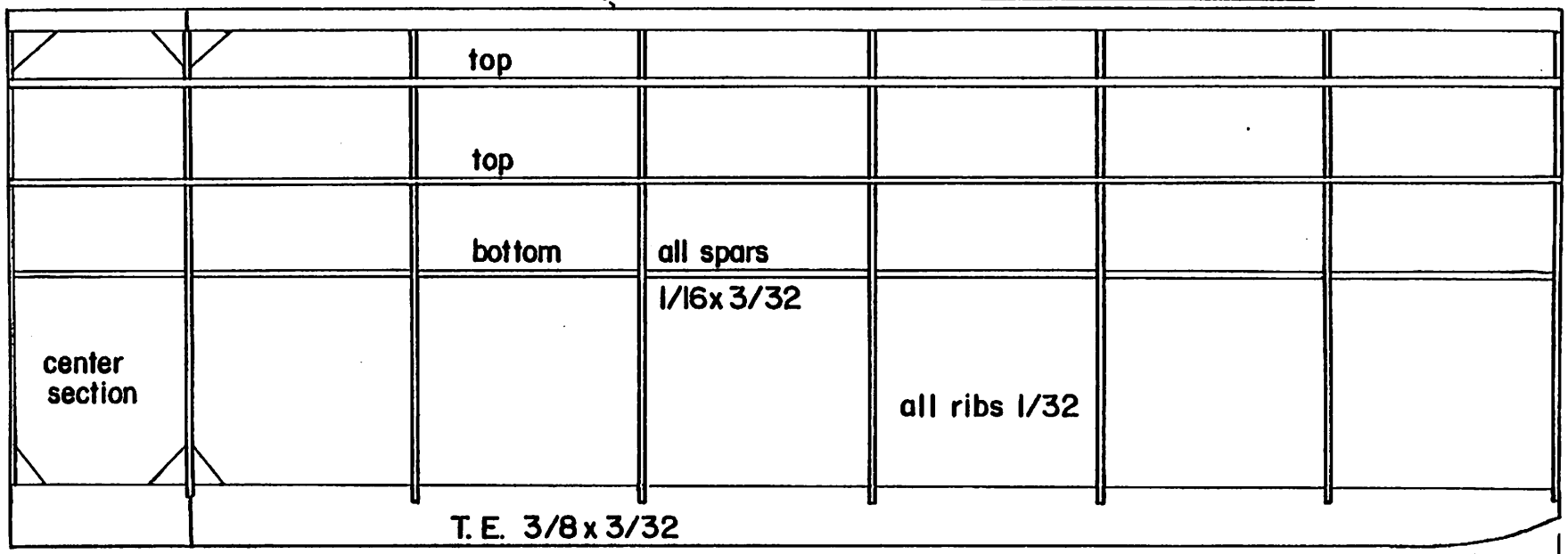
On Thursday, April 22, 1982 at 7:00 p.m. CFFS will present a Delta Dart building session for the P.T.A. of Green Valley Elementary School in Parma. This will be a parent-child event and we hope to have a good turnout of club members, kids, and parents. Green Valley School is located directly across from Normandy High School between Broadview and State Roads in Parma, Ohio.

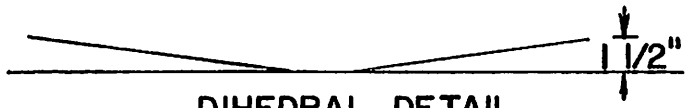


CO_2 DIAMOND DEMON

SHEET 1 OF 3

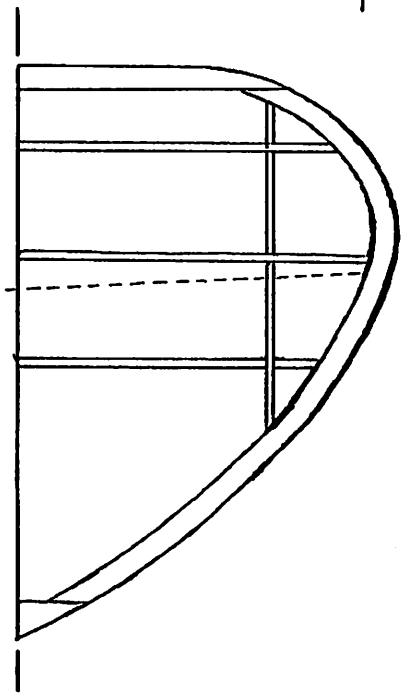






DIHEDRAL DETAIL





CO_2 DIAMOND DEMON

ORIGINAL 1939 DESIGN BY TERRY O'MEARA; CO_2 VERSION BASED ON .020 DESIGN WHICH APPEARED IN JUNE, 1975 MODEL BUILDER MAG.

SPAN 22"
FLYING WT. 1 3/8 oz. (36 gm)

BUILT & FLOWN BY R. WOODWARD, 1980
DRAWN JAN., 1982 BY R. WOODWARD
FOR C.F.F.S. NEWSLETTER

SOME THOUGHTS ON THE CARE AND FEEDING OF CO_2 ENGINES

-- R. Woodward

Interest in CO_2 power for free flight model airplanes is at an all time high. What other form of power -- especially for scale models -- is clean, light weight, and has an easily-variable speed? Electric power has many of these features except that it is much heavier. Any rubber-power flyer has known the frustration of rubber lube spattered throughout the fuselage or the damage caused by several strands of broken rubber releasing its energy on the fuselage structure. Also, uniformity between batches of rubber often leaves something to be desired. Gas power is fairly light weight, but has the problem of gooey castor oil being sprayed throughout the model. And, if your basement is anything like mine, this castor oil soon becomes the base for an oil-dust sludge that really loves to fill in the scale details of the model.

So that leaves CO_2 power as the modeler's choice for scale and some sport models. But how do we get the best performance from the CO_2 engine? Also, how should the engine be installed in the model?

I feel that it is best to think of the CO_2 engine more in terms of a rubber motor than as a gas motor. A gas engine needs to maintain a fairly high RPM to operate -- often in the 15-25 thousand range for the smaller .020 -- .010 cu. in. sizes that are most common in scale models. Speed control is very limited in these engines, and is most usually obtained through prop selection. On the other hand, the CO_2 engine, in common with a steam engine, works off a supply of compressed CO_2 (compared to steam). By varying the amount of compressed CO_2 available during each power stroke you directly affect the power output of the engine. Since the supply of gas is limited, it makes sense to get the most out of each power stroke. Thus it is desirable to use a higher pitch prop more similar to those used on rubber models.

The speed or power output of a CO_2 engine is basically controlled by changing the spacing between the cylinder top and piston top at TDC (top dead center). The piston usually has a pointed projection which opens a ball bearing valve in the cylinder top, allowing a charge of gas to enter the cylinder. So changing this spacing affects the amount of gas entering the cylinder during each stroke.

Another reason for choosing a high-pitch, low RPM prop for your CO_2 engine is to improve the engine heating. A gas engine has cooling fins to get rid of excess heat; on the CO_2 engine these fins are to warm the engine. The expanding gas which poweres the engine really cools down on expansion in the cylinder, and can literally cause the engine to freeze up in cool weather. This idea opens the door for experimental types to try to supercharge their engine through the use of gas pre-heaters in the fuel line. Perhaps a length of DT fuse could be wrapped with the copper gas supply tube to form such a pre-heater.

Down thrust is almost always used on a gas or rubber powered model to control the excessive thrust associated with these engines/motors. With CO_2 it is often possible to install the engine with zero down thrust. Since a scale model should have a scale rate of climb, this is a much more efficient use of power. Part of trimming the model now becomes adjusting the engine thrust level. I should also mention that an extra benefit of a lower speed setting is that the engine will idle down at the end of the flight run and you will often get a satisfying low power-on landing.

Mounting the engine in the model takes some thought. Besides being crude, a simple epoxy gluing of the engine to the "firewall" is not so good. The extreme temperature changes of the engine during operation will often loosen the glue joint. 2-56 bolts are about right for mounting the engine. One approach is to use a length of aluminum bar stock of about 1/16" x 1/8" and drill & tap it in two places to form a back plate for engine mounting. You can safely glue this aluminum bar to the back side of the firewall, and the engine is easily removable.

If you are one of those kinds of people who builds several models for one or two engines, you may want to consider ways to make the engine mount removable. Probably the easiest way to do this is to mount the engine on a firewall (1/16" ply works well for this) using the tapped aluminum backing strip, but then install the firewall on vertical runners in the model. If you watch your dimensions, this setup should be interchangeable with several models.

It is important that you install your engine gas storage tank with the outlet tube at the highest point. The reason for this is that the CO_2 gas under the pressure of the storage tank is about 2000 psi and the gas is really part liquid. (You can sometimes see this liquid line from the condensation on a cold tank.) So if the engine supply line is at the top of the tank you get gas into the engine; otherwise you could be trying to run the engine on liquid CO_2.

Along the same idea of the CO_2 being both gas and liquid at storage pressure, it is possible to control the length of the engine run by how you charge the engine. If you hold the charger downward, you can expect to be charging the engine with liquid CO_2 for a maximum engine run. However, by charging the engine with the charger held upright, you will give the engine a "gas" charge with a resulting short engine run. This gas charge could be just the thing for trimming flights.

Sources for CO_2 gas are sometimes a problem. Most engine chargers are designed to use the small "soda" cartridges sold at beverage and model stores.* Bill Brown sells an adaptor to use an Ansul fire extinguisher cylinder. This cylinder is about 8 inches long and will give you many more flights. It is also possible to obtain large CO_2 cylinders and use them to charge smaller tanks such as the Ansul tank.

There are a number of CO_2 engine manufacturers. Currently the most common are the Telco and Shark. However, Bill Brown has produced CO_2 engines since before WW II. and was also the first to produce the current smaller, more efficient engines. Although perhaps slightly higher in cost, it is my opinion that the Brown is still the best made/ best running engine available. Brown's marketing leaves something to be desired, but they are available. Also, Brown has a wide variety of replacement storage tanks; its made nearby; and parts are available. I have included full-size sketches of Brown's three engine models for comparison and help in model planning.

As a final idea for modeling, it would seem that the CO_2 engine is ideally suited for multi-engine scale models. All engines could be plumbed to a common tank or group of tanks so that the thrust from each engine would be about the same throughout the flight. (Similar to reed-valve gas engines, the CO_2 engine will run in either direction, possibly helping to eliminate torque effects in multiengine models.)

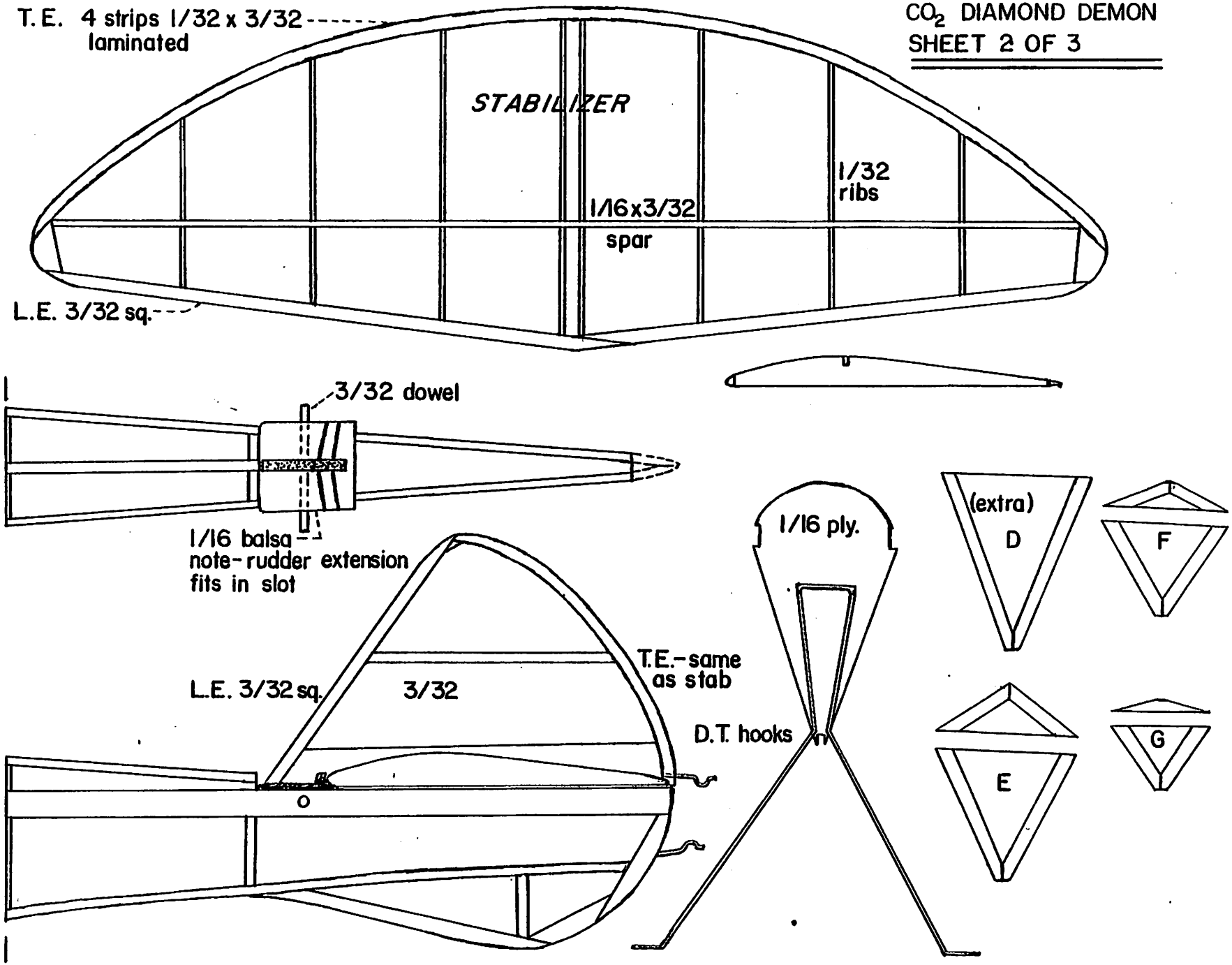
So that's a short introduction on CO_2 engines. Try it -- you'll like it!

CO_2 DIAMOND DEMON

I have included a plan for a CO_2 version of O'Meara's 1939 Diamond Demon. It seems that a model of about 22" span works out well with a single engine. This model has flown well a number of times and was entered several times in CFFS CO_2 old timer events. Perhaps the only unusual aspects of the model constuction are the built-up wing tips and the triangular fuselage. The trick to the fuselage is to start by building the 3/32 x 3/16 longerons using 3/32 sq. balsa to complete the top projection. Add the top & bottom triangular structures to complete the fuselage structure.

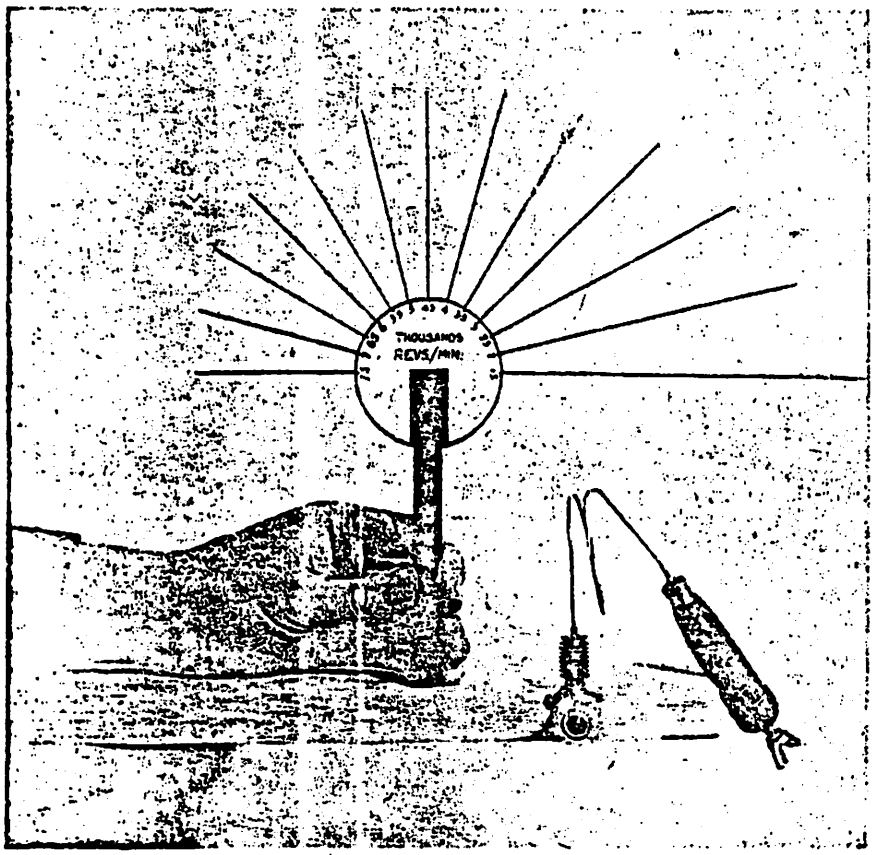
* NITTAN BRAND IS GOOD.

CO_2 DIAMOND DEMON
SHEET 2 OF 3

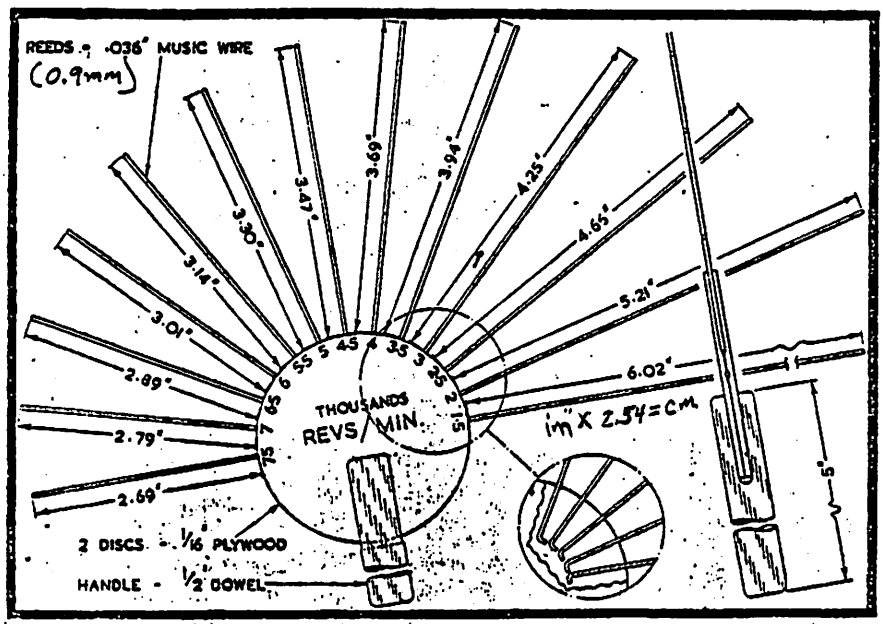


CO^2 Tachometer

by J. H. MAXWELL



Tachometer in action—note vibration of 3500 rpm



Construction of the instrument is very simple. Follow wire length figures closely

EVERY CO_2 enthusiast, it seems has his own ideas about how to get the last inch ounce of energy out of those cartridges. Some fellows go in for long motor runs with the cylinder screwed well up; others prefer short runs with plenty of power. Still others file down the pin on the piston head, fit a water jacket on the bulb, or solder washers on the pipe line.

The trouble is, nobody can *prove* that his favorite technique is effective, without being able to quote RPM figures. But how can you quote RPM figures when none of the tachometers now available can cope with the constantly changing speed of a CO_2 motor?

With this problem in mind, we went to work on some experiments and eventually devised the instrument described in this article. This tachometer is a development of the vibrating reed principle, but instead of having a single reed of variable length it has a battery of reeds of fixed length. If it is held in contact with the motor or motor mount, each reed in turn vibrates. The speed of the motor, at any instant, is given by the RPM figure against the reed which happens to be in motion.

CONSTRUCTION. The materials required to build this tachometer are a piece of 1/16" plywood, a 5" length of 1/2" diam. dowel, and about 6' of music wire. The diameter of the wire determines the lengths of the reeds. We used .036" wire as shown on the drawing, but if you cannot obtain this size take the nearest available, and calculate the lengths by multiplying the .036" wire lengths by the appropriate factor from the table below.

Wire diameter	*mm*	*Factor*
.030"	0,76	.912
.031"	0,79	.927
.032"	0,81	.942
.033"	0,84	.957
.034"	0,87	.972
.035"	0,89	.986
.036"	0,92	-1.000
.037"	0,94	1.014
.038"	0,97	1.027
.039"4	(1mm)	1.040
.040"	1,02	1.053

(Example: —Suppose you are using .034" wire and want to know the length of reed for 3000 rpm. The length of .033" wire at 3,000 rpm is 4.25". From the table, the factor for .034" wire is .972. Therefore the new length is 4.25" x .972 = 4.13".) If possible, have the wire miked so that you know its exact diameter.

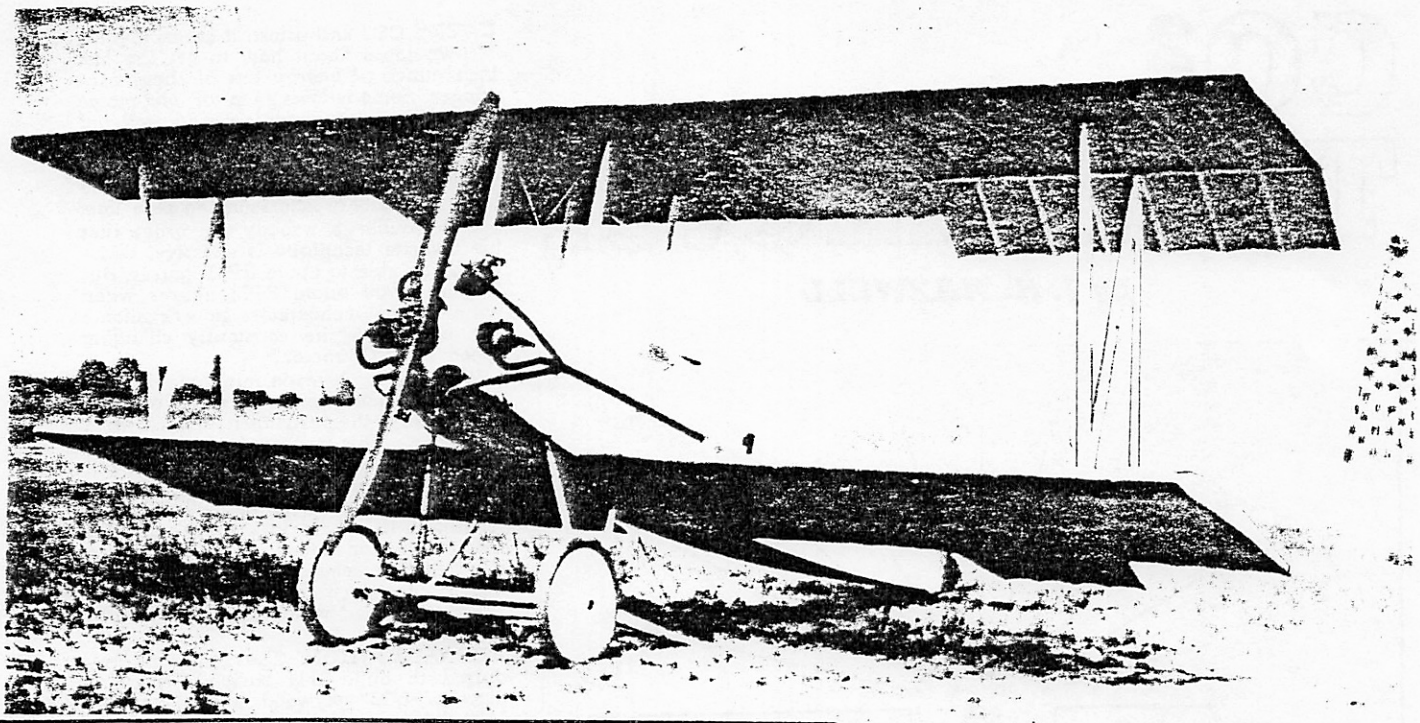
Start construction by cutting two 2-1/2" diam. discs from the plywood. Next cut 13 pieces of wire, making each one an inch longer than the length required. Make a right angle bend in each wire at 3/32" from one end.

On a sheet of paper draw a 2-1/2" diam. circle, with 13 lines radiating from it at 15° intervals. (If you prefer you can trace this off the drawing, or use the drawing itself). Lay one of the discs on the circle and fix each wire to it with a spot of glue. Now apply liberal quantities of glue (not balsa cement) all over the disc, and place the second disc on top. Press the two firmly together in a vise or clamp and leave overnight, or until the glue is really hard.

Cut a slot 1/8" wide in one end of the dowel. The easiest way of doing this is to drill a 1/8" diam. hole through the dowel 1-1/4" from the end; then make saw cuts from the end, running into the hole. Fit the disc and wire assembly into the slot, and glue.

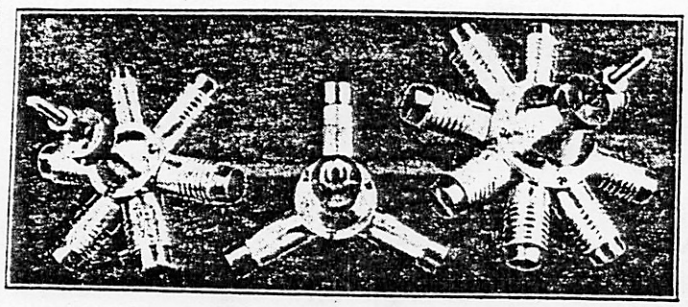
(Turn to page 16)

COURTESY MODEL AIRPLANE NEWS — April, 1949



Courtesy John Underwood

Above: the Farman Sport (60-hp Anzani), 1923. A number of these popular French side-by-side two-seaters were imported into the U.S. by Wallace Kellett. Several were operated by the Ludington Co. of Philadelphia for joyriding and actress-aviatrice Andree Peyre helped publicize the type by flying her own airplane at various U.S. meets. The Sport won many important European touring events and was probably the most successful commercial production of its day.



The finest, strongest, most realistic compressed air motors made. 1-12 to 1-6 Horsepower. $7.50 for 4 cyl. motor complete. Motor and rubber driven models for sale. Send 10c for illustrated catalog.
MINIATURE AIRCRAFT CORP.
83 Low Terrace
New Brighton, N. Y.

Popular Aviation March 1931

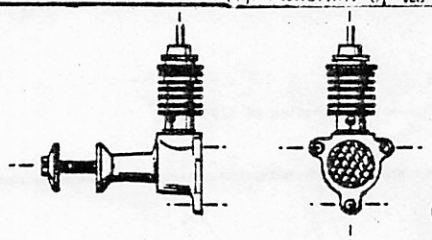
BROWN JUNIOR ®

BROWN JUNIOR MOTORS, INC.

P. O. Box 77 — Pine Grove Mills, Pa. 16868

— Model Aircraft Engines —

Courtesy Bill Brown



Reduced 4% from full size

CAMPUS A-23
PEANUT CO_2 ENGINE

CO2 Tachometer

(Continued from page 15)

Make a paper dia., copied from the one on the drawing. Stick this on one side, making sure the numbers register with the correct wires.

The final job—trimming the wires to length—must be carefully done, for upon it depends the instrument's accuracy. Use an engineer's steel ruler, preferably graduated in hundredths, for measuring; for removing the last few thousands of an inch, a small grinder is the best tool.

OPERATION. To make the fullest use of your tachometer, adopt the following procedure. Have an assistant equipped with a watch (a stop-watch is best), pencil and paper. Ask him to write down the numbers 7500, 7000, 6500 ..... 1500. Hold the tachometer against the motor mount and start the motor. As each reed vibrates, call out the rpm, and against this number your assistant will write down the time, in seconds, from the beginning of the motor run. In this way you will obtain a set of readings from which a graph, similar to the one shown here, can be plotted. From the graph, you can arrive at the average rpm which we shall call N. You already know the motor run—call this T seconds. Now, if E is the Energy, or work done by the motor, it is true to say that

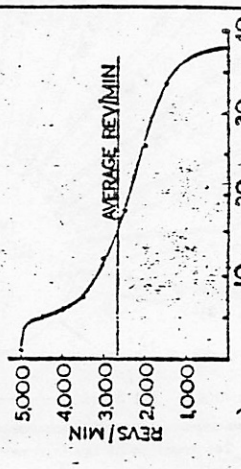
$$E = K N^2 T$$

K is a constant, which depends upon the propeller. Thus, provided that one propeller is used, different motors and different settings of the same motor can be compared by seeing which gives the highest value of $N^2 T$. To show how this works in practice, take our sample graph. N, the average rpm, is 2660 and 'T' is 38 seconds.

Therefore $N^2 T = 2{,}660^2 \times 38$

$= 72 \times 10^6$

Now, we found that if we warmed the cartridge, by holding it in the hand for a few minutes, this figure could be raised to 101×10^6. This proved conclusively that, in this case, hand warming the cartridge increased the energy released by about 40%.



Graph of motor RPM plotted against time

Courtesy Model Airplane News • April, 1949

WATCH OUT! THAT SHARK CAN BITE...
or THE FEEDING OF CO2 ENGINES

One 4th of July I was out flying models in 90° F+ temeratures. After piercing the "soarklet" CO2 cylinder with the Shark loader, it separated at the threaded joint, whizzing the cylinder and aft half past my neighbor's head and continuing on for 20 feet. I immediately shut down CO2 flying and flew rubber jobs for the next half hour. Upon reaching home I tried the Shark loader again. Again it pooped its threads. This time I was holding both halves and the gas escaped harmlessly. I tried another Shark loader ... same results. Upon checking my CO2 pressure charts, there is over 1250 psi at that tempeeature for the standard 68% fill. This turns out to be too much for the Shark loader. The plastic threads separate with out damage to themselves not unlike a zipper and release the cylinder to do what it may.

This only applies to the Shark, as both the Brown and Telco have a surrounding mechanical housing which is not dependent upon plastic threads to hold it togeather. Both units were well behaved at 95° F. You know, you can charge the Shark unit with the Telco Charger but not the other way around.

On hot (over 88° F) days beware of that Shark loader. It can let go with results that vary from embarressing to dangerous. Let us hope no one gets hurt, causing some idiotic do-gooders' ban on CO2 motors. I can just see Ralph Nader killing this great form of power for flying scale.

While on the subject of CO2.... Do you know what is going on in the system? First let's treat it on an emperical basis, I refer you to the fig 6 curves taken from Doug Mchard's erdicle in the 72-73 AEROMODELLER ANNUAL. We see that witha gas charge(the charger pointing up), the RPM(a function of the pressure present) falls off exponentially. With the liquid cbarage(the charger pointed down) there is a longish plateau not unlike a rubber torque curve.

The physical state of carbon dioxide in containers smiled upon by the ICC is a liquid with a filling limit of 68% of the water weight of the cylinder. Now what this means in plain english is that if the cylinder can hold 10 grams of water and you fill it with 10 grams of liquid CO2 (specific gravity 1.47) then it holds 10/14.7 or 68% of the maximum possible.

The critical temperature for CO2 is 88° F. It will not exist in the liquid state above this temperature, but only as a super heated vapor (gas). Below this temerature it can exist as both a liquid and a gas and we have a rather simple relation ship between temerature and pressure.

As an aside, the reason I lost my Co2 powered SES at our first summer contest is appearent, That day was schot, as you may well remember, that it was impossible to get the usual short run gas charge. Every charge was always a saturated vapor charge with an energy content at least as much as the liquid charge.

Below 88°F as long as the liquid and gas are both present the pressure will re main constant, a function of temerature only, untill all the liquid boils off. Then it will behave as a gas and decay according to the old gas equation PV=RT.

It isn't quite that simple, of course, since it takes some heat to boil off tthe liquid CO2. This heat must some how be supplied to the system. One good way is to exposse the tank and line to the air flow. If enough heat can't be input from the outside, it is withdrawn from the liquid; lowering the temperature and therefore the pressure of the system, and the the engine sags and loses a few hundred RPM.

I have included a few curves and a simple linear approximation for the 68% fill system that we use.

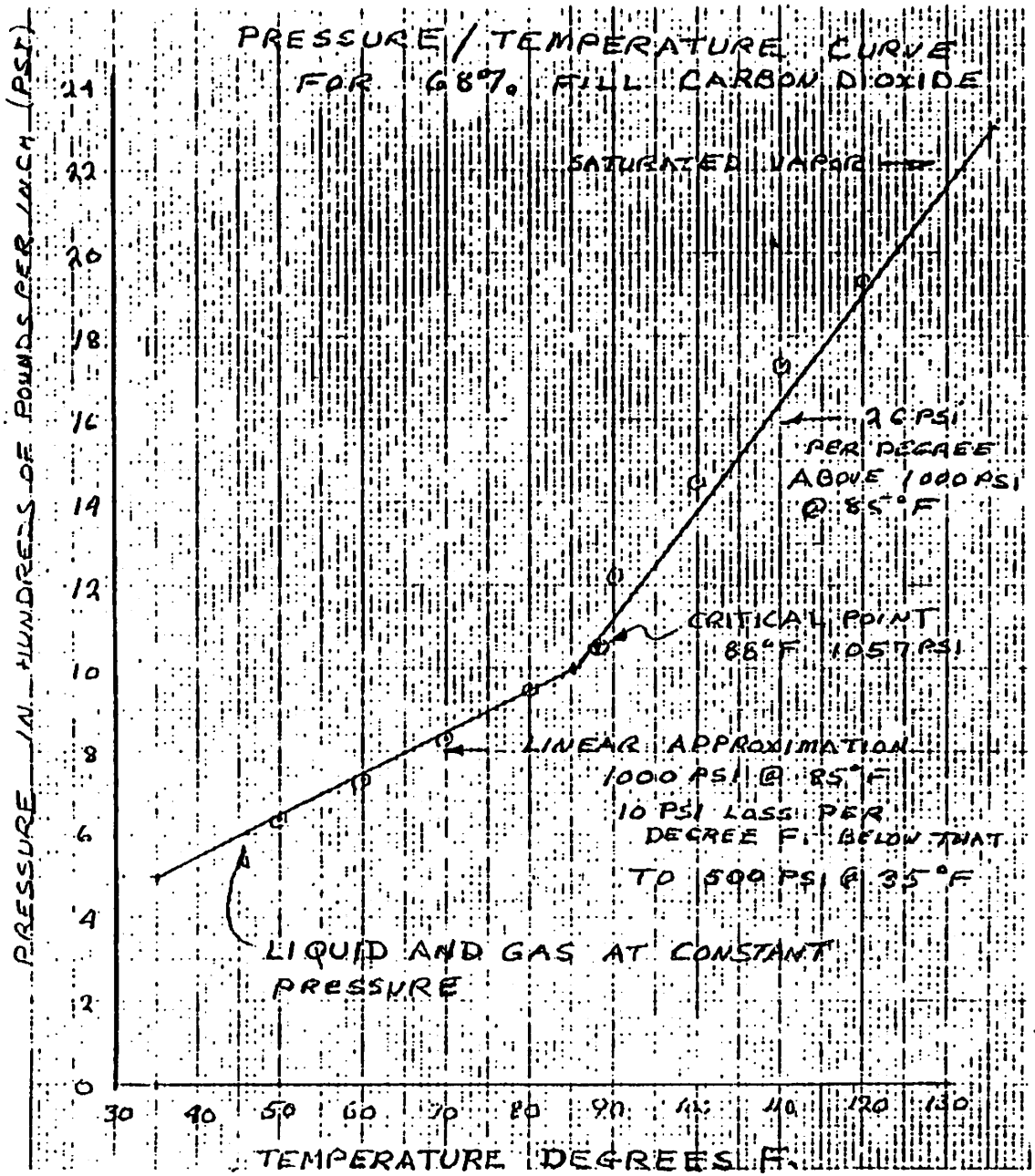
11 FLY SAFELY"

Steve MEYERS

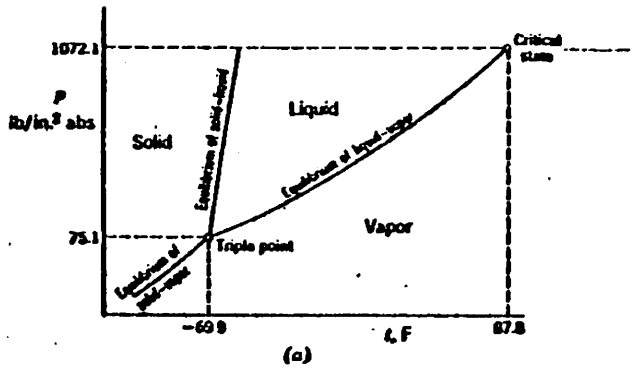
COURTESY MAX FAX

COURTESY MAX FAX, STEW MEYERS

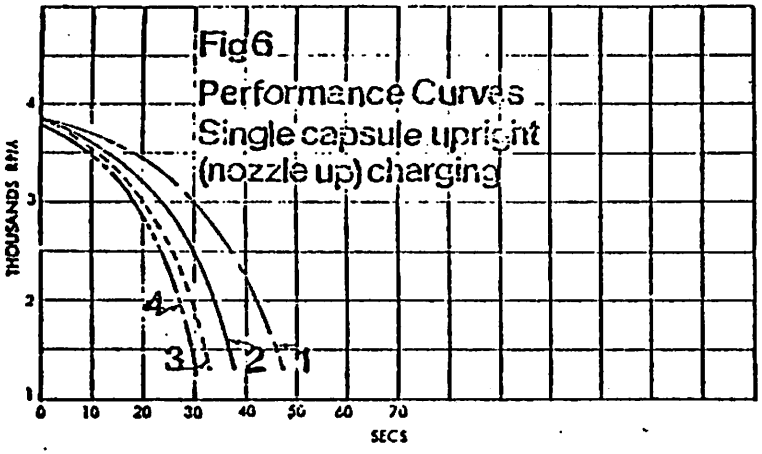
HEAT OF VAPORIZATION 138.1 g.cal./gm.
SPECIFIC GRAVITY OF GAS 1.53 LIQUID 1.44

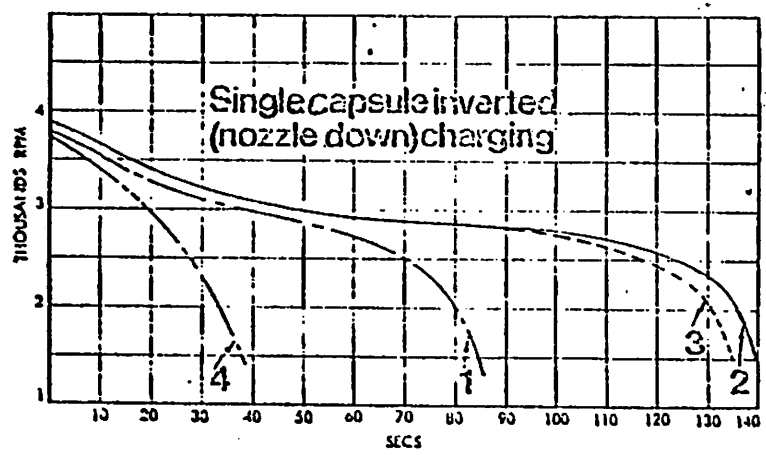


Engineering Thermodynamics



AEROMODELLER ANNUAL





FLYING ACES CLUB RULES

OFFICIAL FAC EVENTS

1. Flying Aces Rubber Scale
2. G.H.Q. Peanut Scale
3. Embryo Endurance
4. No-Cal Rubber Scale
5. Shell Speed Dash
6. Greve Trophy Race
7. Thompson Trophy Race
8. Aerol Trophy Race

Victories in any of these events will be credited on the FAC Kanone list. Credits will also be given to winners of the following unofficial events.

UNOFFICIAL FAC EVENTS

1. Jumbo Rubber Scale, using FAC rules.
2. Peanut Rubber Scale, " " " .
3. Jet Catapult Scale.
4. WW-II Combat, mass launch, scale qualifications, but no scale scoring.
5. Peanut Division, as above.
6. Jumbo Division, as above.
7. WW-I Combat, as above.
8. Peanut Division, as above.
9. Jumbo Division, as above.
10. FAC Power Scale, using FAC Rules. Int. comb. eng. +0 pts. Co/2 +10 pts. Electric motor +15 pts.
11. Pre-publicised special events limited to rubber power, and retaining the spirit of other FAC events.
12. Any of the above flown indoors.

WW-I and WW-II Combat events have a max. wingspan of under 30 inches.
All racing events have a max. wingspan of 24 inches.
All mass launch events must have a minimum of 40 scale pts. to qualify. This must not include pts. for bonus or handicap.
Minor modifications to fit local conditions, or trends is left to the discretion of Contest Directors.
Wingspan for Jumbo scale will be 30 inches or more for bi-planes and 36 inches or more for monoplanes.

GENERAL RULES FOR ALL EVENTS

1. All official and un-official events are for rubber powered models except FAC Power Scale. Any model not powered with rubber must fly in the FAC Power event or not fly at all.
2. No folding, or feathering props allowed.
3. Only one example of each design permitted each builder. (No duplicate back up models allowed.) However, each contestant may enter two different models in each event. Only one model per contestant in mass launches.
4. Each entrant must be the builder of the model he enters.
5. At least three models by three different builders must be entered in an event before the winner can be credited with a Kanone. In the event all three models do not make a qualifying flight, then an attempt must at least be made to score the Kanone.

HANDICAP REPRESENTATIVE SCALE

INTENT

The intent of these rules is to permit the modeler to have the opportunity to exercise his skill in producing a good flying model which retains most of its scale appearance without being burdened by scale rib spacing, an inadequate tail area, too small a prop due to ROG requirements, or other similar restrictions that bring a penalty if deviated from.

It is hoped that the handicap section will, by its bonus system, bring forth here-to-fore neglected subjects which have been considered non-competitive due to their complexity of design, or lack of inherent flight qualities.

BASIC RULES

1. Any two models built from published plans, kit plans, or from original plans of any heavier than air, full size aircraft, built or proposed may be entered. Model plans, kit or published, may be embelished upon to make the model more closely resemble the real machine.
2. If the model is built from original plans, the builder must present 3-views photos, and any other material used by him in creating his entry.
3. Models built from kit or published plans must be accompanied by the building plan. Additional 3-views, photos, etc. used by the builder should also be presented to aid the judges in verifying coloring, marking and details.
4. Any model built directly over a 3-view or factory drawing will require the same endorsements as those above.
5. Tail surface area and dihedral may be increased, but not to a point that will destroy the scale appearance of the model. The general outline of all surfaces and fuselage cross sections must be reasonably retained.
6. No model must conform exactly to any scale 3-view drawing in respect to outline proportions, but all models must closely resemble the full scale aircraft. The opinion of the judges in this matter is final.
7. All flights are hand launched. Consequently, there is no limit to prop diameter, and any retractable landing gear may be represented in the up or down position. Full flush retracting gear may be represented by nothing more than ink lines, or the like. Props will not be considered for scale or workmanship points except those on dummy engines.
8. All surfaces must be double covered, except where single surfaced on full scale machine.
9. No condensor paper or other ultralite material may be used such as mylar.
10. No extra points for scale rib spacing, tail area, or the like.

CONSTRUCTION POINTS

1. A maximum of 30 pts. will be given for the extent of detail; struts, rigging, engine, cowl, exhausts, armament, etc. No cockpit or cabin interiors will be considered, except for the windscreen and instrument panel, except where a full panel is impossible due to a high thrust line.

NOT MUCH	SOME OF IT	MOST OF IT	ALL THERE
0 to 10	10 to 20	20 to 29	a full 30

2. Coloring and marking.
A maximum of 20 pts. will be given for accuracy, and extent of coloring and marking. Flat or gloss finishes where applicable, insignia, numbering, striping, etc. Correct coloring/or serial number for a particular subject modeled.
Where a model is built of a proposed design, the full scale prototype never having been built, then its color and marking should reflect its designed purpose, and era of its creation.
In some instances, the color of the material used in the intended construction of the prototype might be appropiate, such as silver to represent polished aluminum.

3. Workmanship.
A maximum of 12½ pts. will be given for workmanship, good covering, alignment, neatness, etc.

FLIGHT POINTS

A maximum of 82½ pts. will be awarded as follows;

0-60 seconds 1 point per sec.
61-90 " ½ " " "
91-120 " ¼ " " "

Over 120 seconds, no points.

Three official flights. A flight of at least 20 seconds is considered an official flight. At least one official flight must be made to be awarded the scale score. In the case of large entries in any one contest, the CD may want an official flight before the model is judged for scale points.

HANDICAPPING

The following table will be used in giving, or subtracting points in proportion to inherent flight qualities of different types of models;

-5 points for high wing cabin types.
0 points for parasol wing types.
+5 points for shoulder, mid, and mid-low wing types.
+10 points for low wing types.
+15 points for biplanes.
+20 points for more than two wings.

In addition, the following bonus points will be awarded;
+5 points for seaplanes, flying boats, and amphibians.
+10 points for tandem wings.
+10 points for pushers.
+10 points for tandem engines, if both props are powered in such a manner as to contribute generously to the thrust and duration of motor run needed for flight. (viz. Fokker D-XXIII)
+15 points for unorthodox designs, canards, flying wings, autogiros, etc.
+20 points for multi-engines, if at least two props are powered in such a manner as to contribute to the thrust and duration of motor run needed for flight, and if props are carried on both sides of the aircraft.
+5 points for each additional powered prop that contributes generously to the thrust, etc.

Any model of a prop driven, or jet propelled multi-engined airplane with thrust provided by a single prop in a non-scale position on the nose, or tail of the fuselage may be entered.
+2 points will be given for each dummy nacelle with a scale diameter free wheeling prop.
+1 point will be given for each jet engine pod, regardless of how many engines were contained in it on the real ship.

Some examples;
Convair XB-46, (with non-scale prop on nose or tail.)
+5 points for shoulder wing.
+2 points for each jet engine pod.
+7 points total bonus pts. to be added to flight score.
Sikorsky S-40 (with two props driving, and two dummies.)
0 points for parasol wing.
+5 points for being amphibian.
+20 points for being multi-engine, both sides of center line.
+4 points for two dummy props.
+29 points total bonus to be added to flight score.

Highest total point ship wins. In the event of a tie score, a flyoff will be held. Handicap and bonus pts., plus scale pts., once again added to the flight score to determine the winner. Where two ships are entered, by one contestant, only the higher scoring of the two will be used to determine modelers standing.

NO-CAL PROFILE SCALE

1. A simple event for recognizable profile models with a wing span limit of 16 inches.
2. Total of three flights to determine score. Highest total score wins. Fly-off to break a tie.
3. Any flight of 20 seconds or more is official. All flights to be hand launched. No maximum flight time.

G.H.Q. PEANUT SCALE

1. Open to any scale model of not more than 13 inches in wingspan.
2. Flight score determined by total of three official flights, hand launched.
3. Unlimited attempts to gain three official flights. Any flight of 20 seconds or more is official.

4. There will be no maximum flight time.
5. All models must be covered with Jap tissue or equivelent.
6. All surfaces must be double covered, unless real ship was single covered, then you must show proof.

Scale Points;

a. Color, reasonable effort to use tissue and/or dope to simulate realistic coloring. plus 3 points

b. Marking, civil registration & stiping, or military insignia, serial numbers, sqad. markings etc. plus 3 points

c. Details, struts, cowls, cylinders, pilots, rigging, armament, windshields, exausts, steps, control surface outlines, and any other outstanding details shall be scored thus;

1. Stark minus 3 points
2. Lax zero .0 points
3. Good plus 3 points
4. Great plus 6 points

7. Planes with retractable gear may be built with gear represented in the up position, with no penalty.
8. Scale points determined by judging, using tables above.
9. Scale score determined by multiplying scale judging points by the first two digits of the best Peanut flight score of the day. Example, if a peanut turns in a 3 flight total 279 seconds, and is not bested by any others, then everyones scale score are multiplied by 27. If only two digits comprise the top flight score (say 97), then only the first digit will be used as a multiplier, everyones scale score being multiplied by 9.
10. Highest total of flight and scale score wins. Ties to be broken by a single flight "flyoff", multiplied by 3, and added to the scale score.

EMBRYO ENDURANCE

1. Not over 50 square inches of wing area for monoplanes or 70 square inches for biplanes, 45 square inches max. for largest wing area. Stab area not to exceed 50 percent of wing area.
2. Fuselage volume to enclose a space 1¼ X 1½ X 3 inches or larger.
3. Wing and tail to be built up, covered on both sides with Jap tissue or equivelent.
4. No folding props. All models rubber powered only.
5. Model must ROG from a card table top UNASSISTED from a 3 point rest.
6. Landing gear legs must have 3/4 inch diameter wheels or larger.
7. Four attempts for three official rise above table top level flights.
8. Highest flight total plus bonus wins. Fly off to break ties.
9. A bonus for the following details will be given; 5 sec. for a raised cabin, or windscreen with open hole and headrest, 3 sec. for three dimensional wheel pants, 1 sec. for three dimensional exhaust pipes.

SHELL SPEED DASH

All models must enter this event first in order to qualify for the Greve or Thompson races. The results of this race to determine the arrangement of planes in the heats for the Greve and Thompson races.

Three official timed flights will be made. Highest total wins the race. Flyoff to break a tie.

AEROL RACE

One large mass launch for all the planes that did not qualify for the Greve or Thompson race. Last one down is the winner.

JET CATAPULT SCALE

1. Any man carrying jet or rocket propelled aircraft.
2. Model is launched by stretched rubber catapult.
3. Profile fuselages.
4. Scale scoring; Basic aircraft and markings (no bare balsa) 5 points.

markings 0-8, coloring 0-8, outling 0-8, workmanship 0-4, extra detail 0-3.
Bonus points, flying wings or canards 5 points, 1 point for each scale engine, pod, or fuel tank not contained within the contours of the airframe.
5. Flight scoring, 1 point per sec. 20 sec. minimum flight. Unlimited attempts to make three official flights. Highest total time wins. Flyoff to break a tie.

MASS LAUNCH EVENTS

Once the mass launch event starts, there will be no replacing rubber motors or any repairs made to the model. There will also be a time limit set by the contest director as to when and how much time contestants have to retrieve their models and be ready for the next heat.

****

There you are skysters, the rules for 1982. If you look closely you will see that there are some minor changes. These changes were brought about by your comments to me over the past year. Some you may like and some you may not. But this is what we will be flying with for the next year. Now lets all get to the building board and get ready for the FLYING ACES NATS MARK III.

NEWS ON THE WING!

The Flying Aces Nats-Mark Three is shaping up nicely. As we go to press I can tell you that it will be held in Johnsville, Pa. at the naval air station, on July 17-18, 1982. On Friday, the sixteenth we will hope to be able to do some of the scale judging so as to take some of the workload off of the judges on the days of the actual flying. We would like to urge all of you who can, to have your entries judged on Friday evening if at all possible. About all we can add at the present time is to give you a list of the events that will be held so you will be able to get that special model or models built in time for the big bash.

1. FAC Scale
2. Jumbo FAC
3. Peanut FAC
4. Peanut GHQ
5. FAC Power
6. Embryo Endurance
7. WW I Combat
8. WW I Peanut Combat
9. WW II Combat
10. Greve Race
11. Thompson Trophy Race
12. Golden Age Mass Launch



These are only the official events that are being held. I am sure if your favorite event is not listed that someone may hold it as an un-official event, maybe even you yourself would like to handle it.

By the next issue we should have all the facts and other trivia for you to dwell on as you ponder over what to build for the greatest aerial circus of them all. There will be info on the banquet and the headquarters motel as well as other motels, etc. Courtesy Flying Aces Club News. '82

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RED X SEASON

Signs of Spring include the Lazy Red Cross brand on many of your newsletters and magazine renewal blocks. Looks like the carrier pigeon tracked in bleed on it; probably landed on the editor picking up mail! Issue renewal reminder numbers on your CROSSWINDS address were adjusted down when we went quarterly, with #63 for up through 1981. A $10 contribution, care of Russ Brown at 4909 N. Sedgewick Lyndhurst, Ohio 44124 USA will extend your X date plus four. Thanks. We didn't short sheet you! Three at once here follows the extension of 50 years in pulps to the '80's state-of-the-art by Dick Bennet. The exceptional is worth taking longer to do it right Nes Paw? How does it grab you wingster?

X

SIXTH ANNUAL SNOWBIRD INDOOR MEET

Sponsored by the Erie Model Aircraft Assn. A.M.A. Sanction #14 MARCH 7,1982
TIME 9:00 AM till 5:00 PM SITE: McComb Fieldhouse, Edinboro College
Edinboro, Penna.

EVENTS:

1. Hand Launch Glider
2. E-Z-B no film covering 9:am till 12:00 pm.

Following events from 12:00 pm till 5:00 pm.

3. Unlimited rubber- built up fuselage & must be covered with Jap tissue.
4. No-Cal Profile Scale- must be recognizable, max. span, 16" Jap tissue.
5. F.A.C. Rubber Scale- as per F.A.C. rules.
6. Peanut Scale- as per F.A.C. rules.
7. WW-I Peanut Combat, mass launch, at 3:00 pm.

Models must be scale judged by 3:00 pm, no condenser paper covered models.

Special JR/SR events combined for events #1 and #6.

Prizes: Kits and/or merchandise through at least three places, except first place prize only in WW-I Combat.

Entry fee: $3.00 first event, $1.00 each add. event, Max. fee $6.00.
JR/SR fee, $2.00 flies everything.

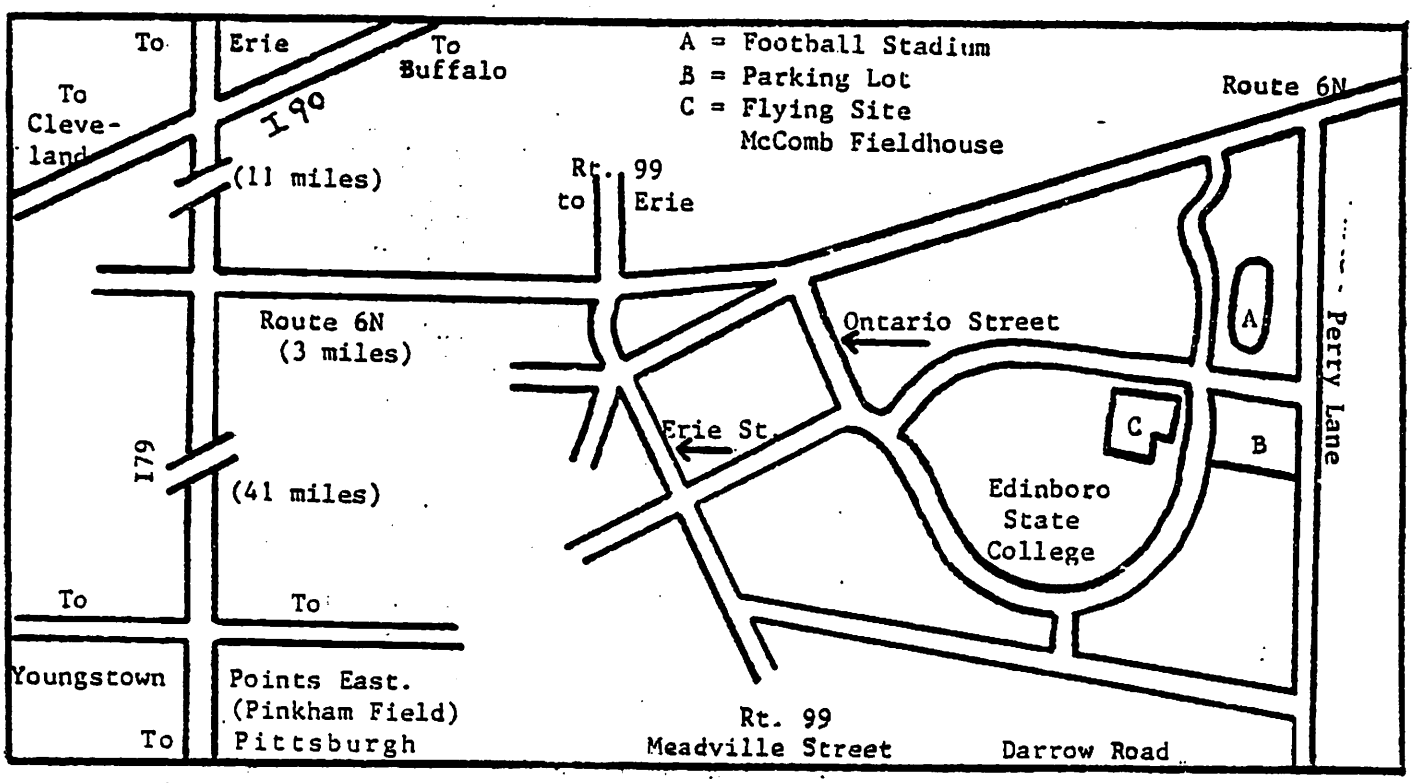
Be sure to bring proof of scale with you, must have to be awarded scale pts.

Contest Director; Lin Reichel 3301 Cindy Lane Erie, Pa. 16506 (814-833-0314)

****

SWAP SHOP AFTER THE CONTEST!!! BRING YOUR GOODIES TO BUY SELL OR TRADE!!!

GYM SHOES ONLY



Buzzer Model Airplane Co., P.O. Box 124, Howell,. N.J. 07731

Addendum, erratta and more Buzzings: COURTESY DIRTY ED.

The O.T. CO2 kits are $4.25 EACH. I now offer an additional O.T. CO2, plan only, 1/4 Playboy at 20", a beaut!! $1.75.
Two new peanuts, Fletcher FL-23 observation, only P-Nut with functional slotted wings. Also, Stahls Globe Swift reduced to 13", $1.75.

Bill Brown has consented to build a new Co2 engine exclusively for Buzzer. I will market it by direct mail only, price $32.00. It will have components compatible with the other Browns for loading. It has a .016 cu. in. displacement, swings an 8" prop around 4000 RPM for about 60 sec. on 1 tank.:. It is ideal for many of the fine Flyline, SIG, Guillow and Sterling kits on the market just waiting for such a powerplant. Hopefully, the first production will be by 15 Jan. 1980. NOT ON LINE 1/82. B

Each engine will be serialized. To order, send $16.00 for your number. It will be logged, and as the engine is produced, you will be notified by mail. Send the other $16.00 and the engine will be mailed by return mail.

Aside from being an immediate collectors item, I feel that it makes indoor R/C a reality. Bill is also producing a P-Nut size Co2 [Campus A-100 for you old timers, but improved and with a separate tank] which I will be a dealer for. It will also be ready around 15 Jan. 1980. I have reduced my Bombshell to 12",* and all parts printed separately, $1.75. Have it built and ready for this new Engine [I have no price info.]

* MAY BE TOO SMALL! B

31 Aug. '81

Gentlemen;

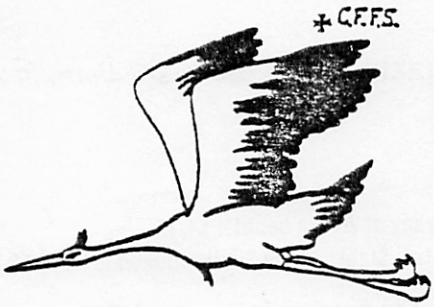
I took a vacation well after my advertisements had run their normal course, not expecting any other business for the summer. Seems though that my buddy Earl Van Gorder gave me a plug, and my mailbox runneth over. Some of the orders and inquiries are a month late. Sorry.

I can no longer handle the MODELA because of import restrictions imposed on this Czech. product ($10/ engine!). However, as individual orders are not subject to such scrutinity, I would suggest that you remit the $38 to a Japanese dealer, a friend of ~~mine~~ OURS B, Mr. Ichiro Yamada
10-12 Chiyodadai-Cho
Kawachi Nageno-Shi
Osaka Prefecture, Japan, 586

I do have a good supply of Brown A-23 midget CO2's for $40 post Paid. Loaders are an additional $10. I also have the Telco Turbotank CO2 for $35 pp.
£12.95 UK

Late additions to the plans lists are the SWISH, the cutest seaplane you ever saw, variable span (20" to 23") for anything from rubber, to CO2, or .olo to .o2o glow types. $3.30 pp.. Also GO-AIR by Walt Winberg, a classic 1930's type, 30", land and sea versions shown, $3.30 pp..

Best Regards, ED TONER B





T.G.I.F.

ANOTHER FRIDAY WALLBANGER

ON C.F.F.S.

CFFS WALLBANGER : FRIDAY FEBRUARY 26,'82 AT ENGLE RD. ARMORY 7:30 PM to 10:30 PM.

7:30 - 8:30 SCRAPS STOCK CLASS; Same outlines, weed size may be changed. No microfilm. No bracing or hollow sticks. Use 5" dia. weed or plastic prop, not built up. Dihedral, trim tabs, and thrust bearing optional. Best one of three official flights 10 seconds plus. Five attempts.

8:30 - 9:00 CFFS MEETING Talk fast, wind slow.

9:00 - 10:00 FAC GHQ PEANUT SCALE; Original Peanut Scale Points X 10% of best total time for all, plus three flight total. No max; > 10 sec, Three entries minimum for KANONE credit.

NO ENTRY FEE, NO CHROME LADY HARDWARE. PASS THE HAT AND POT LUCK. Mike Zand CD.

1982 CALENDAR

SUN MAR 7 ERIE MAA at Edinboro St. Teachers Col. Pa. Indoor.

MAR 12-14 CAS Annual Randall Mall Show.

SUN MAR 28 CFFS FRIGID AIR 9th Annual Outdoor FF. at Warrensville, Richmond Rd. 9-5 PM, for HLG, Embryo Endurance, Peanut FAC GHQ, and Jet Catapult Glider. DAP.

APR 2- 4 Toledo Weak Signals Trade Show.

THR APR 22 7:00 PM CFFS Delta Dart Class at Green Valley School, Parma. W. Pleasant Valley.

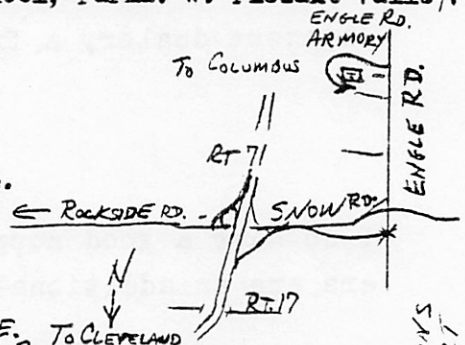
SUN MAY 16

SUN MAY 23 CFFS at L.C.C.C.

SUN MAY 30 Dayton Buzzards working on a FFS meet, and a site.

SUN JUN 6

SUN JUN 13 ERIE FAC



JUN 13-16 INDOOR WEEK at West Baden, IN. AMA NATS * JUN 14-16? VII NART JUN 17-19 and; 24 HOUR 3rd WORLD & GRAN PRIX 8:00 PM JUN 18-19. Entry, lodging, and vital consumables per HANGAR PILOT. $5/ year. to Dec Martin, 3327 Darwin St. Miami, Fla. 33133. Proxy entries and proxs pilots signn in with Mike Arak; 10900 SW 61 Ct Miami Fla. 33156 USA for special packing and shipping data.

* Also Reported as at Lincoln, Neb.

SUN JUN 20 CFFS FAC in works

SAT JUL 3 CFFS CALM AIR AND WATER ROW. 1-9 PM. at L.C.C.C. in planing. Lake Butchsan. B.Y.O. H$_2$O!