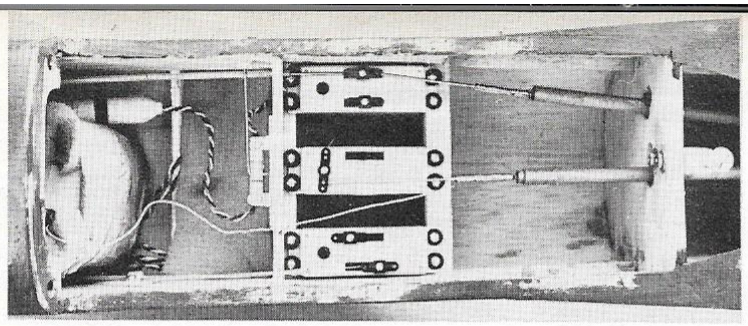
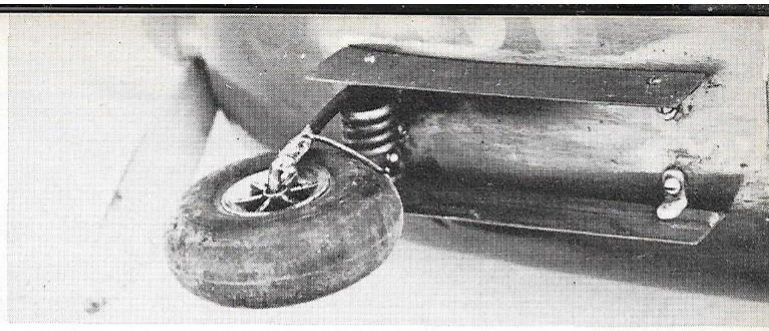
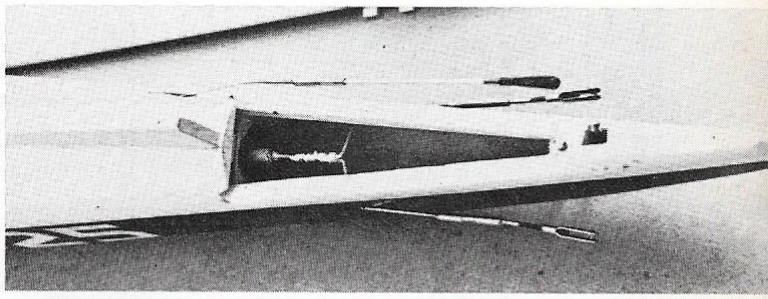




Room for anything in the cavernous fuselage. Kraft-Hayes servos shown here with interesting methods of connecting pushrods.

Upper right: Nose-wheel installation is made realistic by addition of doors. Steerable nose gear is a floor-mounted homemade unit.



Right: Twin elevator pushrods are used because of the swept forward hinge lines of the flippers. Empennage is mounted by dowel and nylon bolt system — also permits easier transportation.

Mooney/Mark 21

GERALD NELSON

Designed as a functional stunt model, our semi-scale R/C continues the trend towards realism. It has that "Looks-Like" appeal. Span is 70 in.

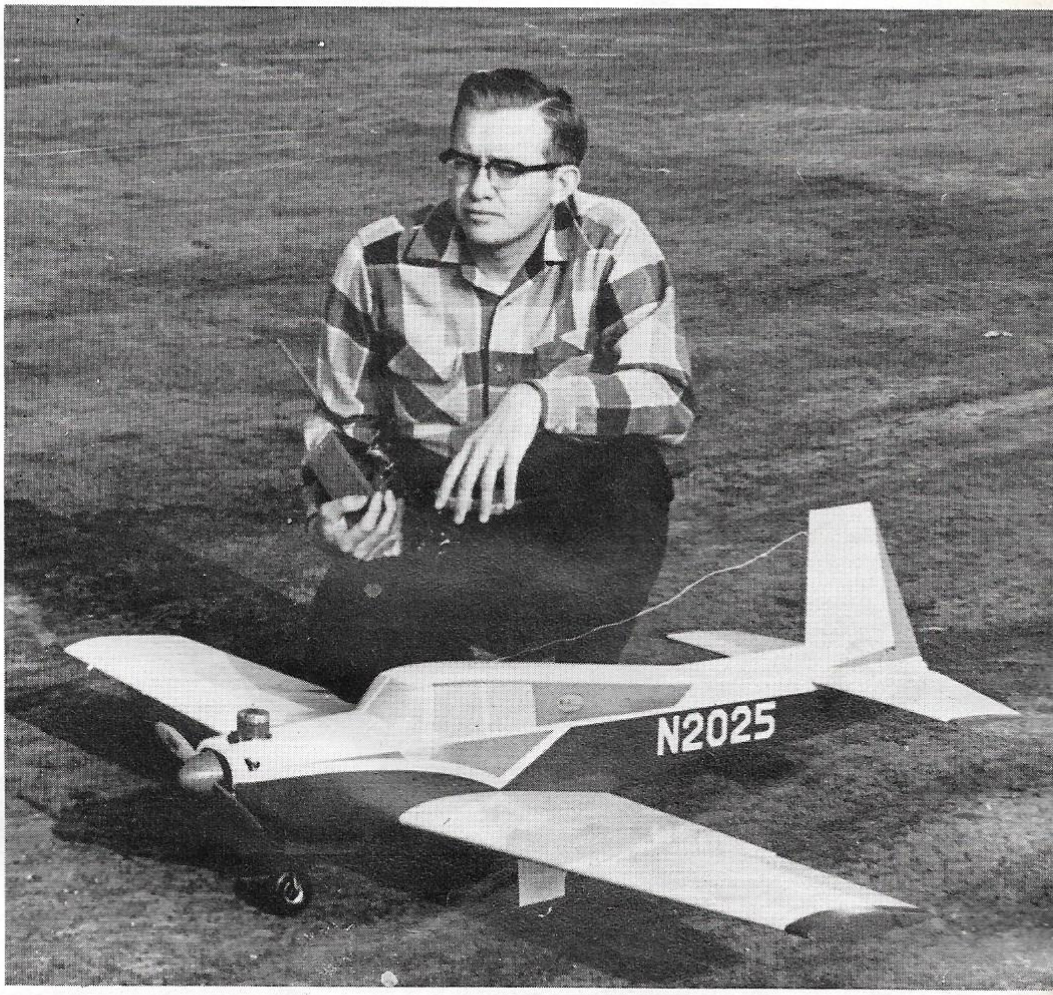
MY Mooney is a semi-scale stunt model which resembles a 1963 Mooney Mark 21. It is intended to be a stunt job first, a scale job second.

No major breakthrough in the state of the art has been made with this design. It is intended to be an interesting looking, functional stunt model using basic construction techniques and materials. Regarding the semi-scale aspect of this ship, several excellent articles have been written lately noting the trend towards realism in stunt models. This trend is gaining momentum and I am pleased to see this happen. One of the purposes of Mooney design is to encourage and promote this trend.

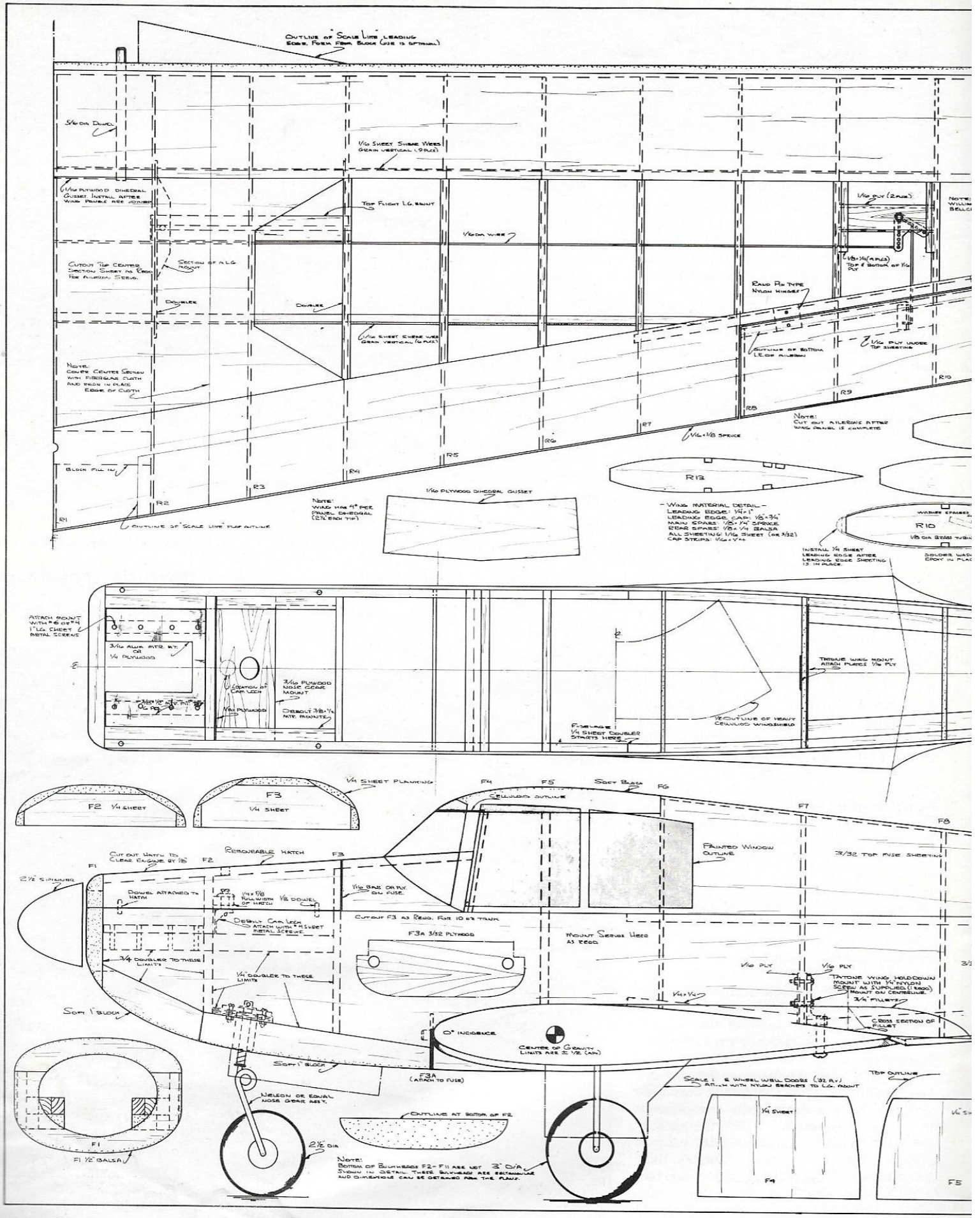
The original, classic stunt job theme (Kwik-Fli, Taurus, etc.) will be with us for some time. This type of model flies excellently, is easy to build, and has an excellent contest record. However, there are flyers who are looking for something different. They want a design that they can identify with a full-scale aircraft.

R/C models are tending to become miniature aircraft, and not toys. To help the image of R/C model airplane flying as a sport, realistic-looking designs are needed instead of our standard "toy airplanes." Take a design like the Mooney to a flying session and watch the spectators group around the ship. They may or may not recognize it as a Mooney light aircraft, but they will recognize the fact that it looks like a miniature light aircraft. When you fly the ship all eyes are watching its progress in the air. After the first flight, the flyers of the unrealistic ships can be seen comparing their stereotyped jobs to the Mooney. They usually go home saying something to the effect, "Maybe I should build something like that Mooney."

You are not at a competitive disadvan-



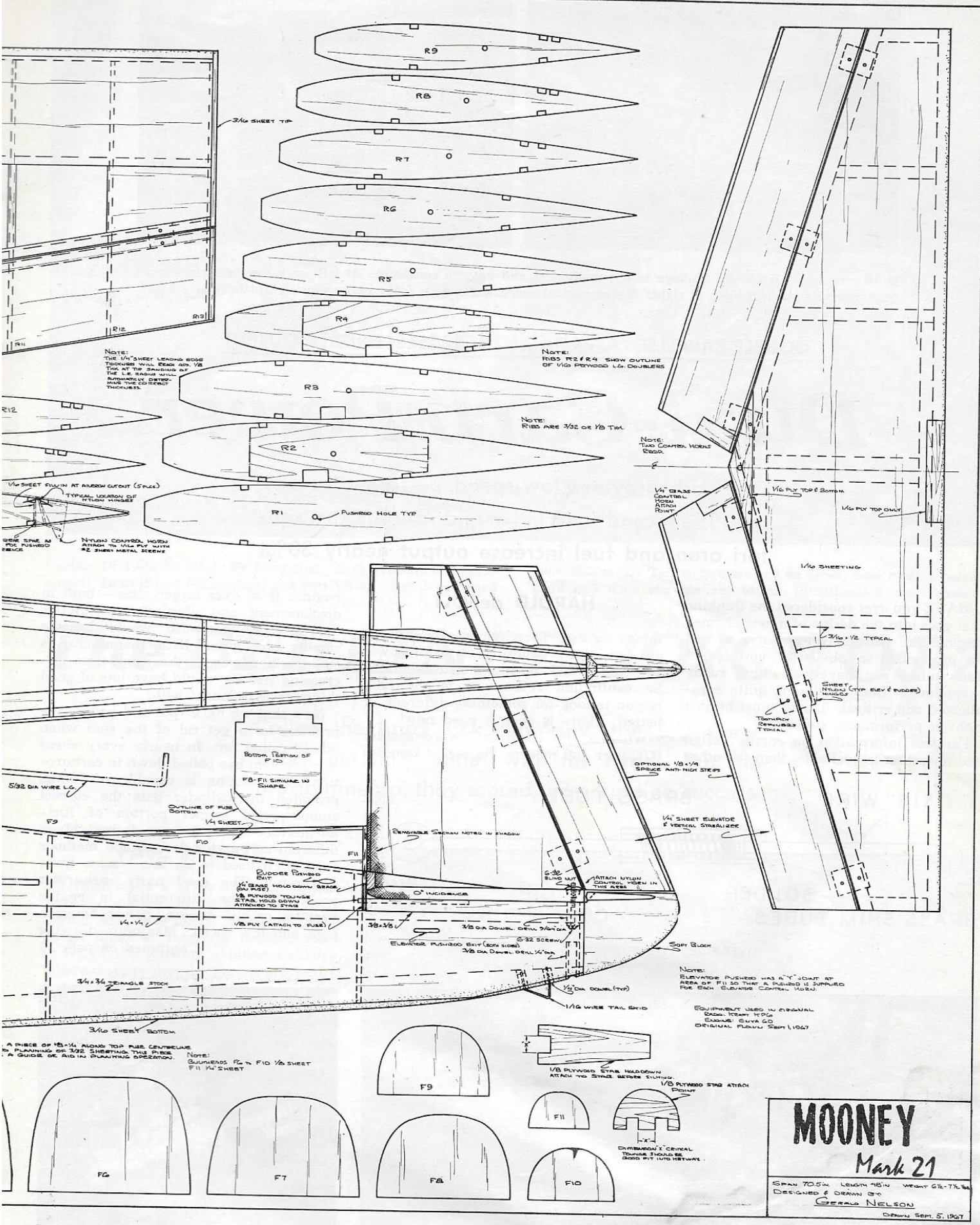
To keep light wing loading for aerobatics, the sharply tapered wings have long span. Airfoil is fully symmetrical which minimizes attitude changes with power variations.



tage with this design. It will do all the new 1968 AMA maneuvers, plus a few other maneuvers that might come into effect in 1969. The list of 1968 maneuvers will probably grow. The Mooney has the requirements for the future maneuvers.

The only disadvantage of the Mooney's design is a little extra work in building the fuselage. There are a few extra deals, like the hatch, rounded fuselage top, wheel-well doors, and a scale-like paint job. When you think about it, the extra work isn't very much.

The almost scale fuselage width will allow any kind of radio to be installed with room left over. There is also ample room for a retractable landing gear system, if you want one.



The wing span is somewhat large by current standards (70"). It is highly tapered, which brings the wing area down to normal areas. The airfoil is a relatively thin, symmetrical section. This section is advantageous for the flying performance we now require. The ship flies at a good speed, and can slide through the maneuvers instead of being pulled through them by brute force. The section also provides an excellent glide path by forcing the

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FULL SIZE PLANS AVAILABLE SEE PAGE 60

A.M. Reviews

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New classifications were added: Knight's Cross with Oak Leaves; with Oak Leaves and Swords; with Oak Leaves, Swords, and Diamonds; with Golden Oak Leaves, Swords, and Diamonds (for those who had been awarded all other classes of the Knight's Cross); and ultimately, the Grand Cross of the Iron Cross.

Ernst Obermaier has compiled here a list of 568 Luftwaffe (German Air Force) Knight's Cross holders, with photographs and records of accomplishments of each. These include the pilots of fighters, night fighters, destroyers and fighter bombers. Holders of the Knight's Cross are presented in alphabetical order, while the holders of the higher classifications of the Knight's Cross — with the Oak Leaves, Swords and Diamond combinations — are presented in chronological order of bestowal.

Printed in German and an accompanying English translation, this book makes a valuable addition to the aviation reference library.

Aeronautica, New and Antiquarian Aviation Publications, a catalogue by John W. Caler, 36 pgs. plus many inserts. Free with all orders or for 25c. John W. Caler, 7506 Clybourn, Sun Valley, Calif. 91352.

JOHN W. Caler gives a most complete listing of used aviation books and periodicals. The list includes back numbers of all aviation magazines. Catalogue also contains an alphabetical listing by author's name of hundreds of old, and current books. In addition to aviation publications, there are offered a wide variety of model building plans, scale drawings and supplies and a huge assortment of decals for modelers.

Albin Receiver

Continued from page 35

fashion. Albin has utilized the German Bentert "large" actuator (this one and the much smaller one by the same maker are stocked by Polks) which has a 40-ohm coil. He prefers to make preliminary tests with a #49 pilot lamp connected to the set in place of the actuator; current drain is about the same. (The smaller Bentert unit has an 80-ohm coil, so will draw much less current; with it you must take more care to see that linkages and rudder hinges are absolutely free in operation — which is the reason Bill prefers the bigger unit). About all there is to do in testing is to turn on a 27 MHz transmitter that has modulation around 800 cycles (this value is optimum, but the set will work on modulation from perhaps 500-1200 Hz) and tune L1 to maximum brilliance. If you wish to test the set with a meter, it's preferable to put it only in the lead from the collector of Q5 to battery minus; it is possible for a meter in the battery lead from the entire receiver to produce erratic action — as is the case with quite a few super-regens.

If you get good operation near the transmitter, try a distance check. If you find that the bulb (or meter, if you use one) lights up steadily when there is no incoming signal, it is a sure sign that C10 should be increased in capacity. Insert the extra .05-mf capacitor that is part of the Ace kit, and try again. Optimum value for C10 is to have the bulb or meter show erratic current indication, with no transmitter turned on, but to show practically zero current with the transmitter on, and no modulation. With modulation, you will get full output, of course. The bulb can't show you much about low current in the actuator circuit, of course, and we personally prefer a meter in the Q5 collector lead, for this reason. With a 3V battery, the meter should indicate close to 60 ma with the bulb or large Bentert actuator, and about 32 ma for the small Bentert. With a CW signal coming in these receivers show only about 1-2 ma total current, but with tone, you will have some 10-12 ma battery drain *in addition* to whatever drain you have through Q5.

It is just possible that your receiver might be too insensitive, in which case C10 should be lowered in value. However, none of the test models have shown this fault. We did have one receiver that showed just about zero actuator current without an incoming CW signal, but still had quite reasonable sensitivity. So don't jump to conclusions until you have made distance tests. If the no-signal current shows erratic jumps (and it might even average up to 20 ma or so) you know the set is "hot" enough, and ready to go.

While Bill Albin intended the receiver for pulse propo operation, it could certainly be used with an escapement. It would be wise to choose escapements with enough coil resistance to keep the current through Q5 to 300 ma or less.

The Bentert actuators for which this receiver was intended have a single coil, and the rotor is magnetically biased to one side; when current is applied to the actuator coil, the rotor pulls to the other side (provided coil polarity is correct — if it isn't, the rotor would try to turn ever further to the biased side). Other single-ended actuators with a reasonably high coil resistance can also be utilized, of course. Or you can spring-load the rotor of such units as the Baby Adams to one side, when full current will pull it the other way. On this actuator, and any other that has a center-tapped winding, use the entire winding and disregard the center tap. If there are two separate windings (as on Septalette actuators), connect the two in series — again, they must be polarized correctly.

Minimum installation weight with the Albin receiver, the small Bentert actuator, and the smallest practical cells, we have been able to find (the Eveready S76 silver oxide cells are the lightest for their operating capabilities) is about .65 oz. If your model can carry a bit more weight, you could go to size N flashlight cells, much smaller button nickel-cads, etc. The small Bentert actuator weighs .25 oz., the large one twice this — but the latter has considerably more than twice the power (it takes twice the battery current, too). When figuring battery drain, don't forget that with a "single-ended" pulse propo system such as this receiver provides, the actuator current is only high for half the time; the other half the receiver drain is only a couple of ma. Also, don't forget this receiver draws an added 10 ma or so on tone, that does not show up in the actuator circuit.

The .65 oz. noted above brings possibilities of converting small rubber scale jobs to R/C, of applying R/C to rocket "boost-gliders," of controlling tiny cars and boats. The possibilities for indoor R/C models are very good. We would like to hear what readers fly or operate with this micro-miniature equipment; drop us a line and send a few photos!

Mooney/Mark 21

Continued from page 25

model to fly slightly nose high, thus producing a good rate of descent.

The tail assembly is removable for assistance in transportation (mainly so it will go into a smaller shipping box). It can be glued on, thus saving a bit of work. How-

ever, if you attend many contests involving much traveling, you will find that the removable stab is worth its weight in gold.

The Mooney flies like any other contest-type, low-wing design. It is responsive, but it will let you have time to figure out how to correct for a goof you made during a maneuver. The takeoffs and landings are almost automatic. You can get nines and tens on the takeoffs and landings like falling off a log.

So you like the design, but want to change it a little. I have heard this comment many times with my other designs, and other people's ships. Here are a few suggestions to try. Make it a Piper Commanche by changing the rudder and elevator shape, along with a higher slanted windshield (the full-scale Mooney and Commanche are quite close in design), side mount the engine with the possibility of also cowling in a muffler, lengthen the tail moment to cut down the elevator sensitivity, thicken the wing to 18% or so, maybe also thicken the elevator to 10-12%. Why not a full-flying tail like the Commanche? Add flaps? (On the Mooney use 2½" wide flaps to the ailerons.) Who knows what other changes you can make? Really, the ship is a pretty good bird just the way it is, but change it if you must.

Building is straightforward. I usually build the wing first, so that it can be fitted to the fuselage when the time comes. I used 1/16" sheet for the wing sheeting, but if you have some good 3/32", then I would recommend using it instead of the 1/16". Build the wing on a piece of 1-in. straight plywood. First step is to glue the ribs to the bottom trailing-edge sheeting, and let dry. Now locate the ribs on the bottom spar, which is attached to the building board, letting the trailing edge sheeting suspend in the air. Make a 1/4" balsa sheet shim so that the trailing-edge sheeting will rest on the shim with the centerline of the ribs parallel to the building board. With the bottom spar and trailing-edge sheeting now supported, continue with the rest of the construction. Flip the panel over when the top sheeting is completed, and attach the wing back onto the building board with the trailing-edge shim in place. Continue construction. The ailerons are cut out after the wing is complete.

The rest of the construction is basic. The bending of the top fuselage sheeting can be aided by soaking the balsa in ammonia at the sharp bend area.

I use a non-shrinking butyrate dope. Glidden Paint and Sig have such dope. This dope eliminates the sags in the sheeting completely. The open areas in the wing are almost flat; a tightening dope isn't needed. Four to five thin sprayed coats of color dope will provide ample shrinkage.

The nose gear shown on the plans is of my own design. Any belly-type mounted gear can be used (deBolt, Tatone, etc.). With some minor structural changes the firewall-type gear can be used.

The mounting plate used on the original Mooney is 3/16" aluminum. This works great. No mounting nuts are required because the mounting screws are threaded into the tapped plate. If the aluminum mount isn't used you can use 1/4" plywood, made out of two pieces of 5-ply, 1/8" plywood, or 3/16-1/4" micarta or fiberglass.

The celluloid windshield is covered with the silk. In my opinion, leaving the windshield clear detracts from the appearance of the ship unless the rest of the windows are clear. To me, this would be too much work. (We are building a stunt, not a scale ship.)

I think you will be pleased with the design. Having a model that flies well, yet looks like something real will give you more pleasure and satisfaction.