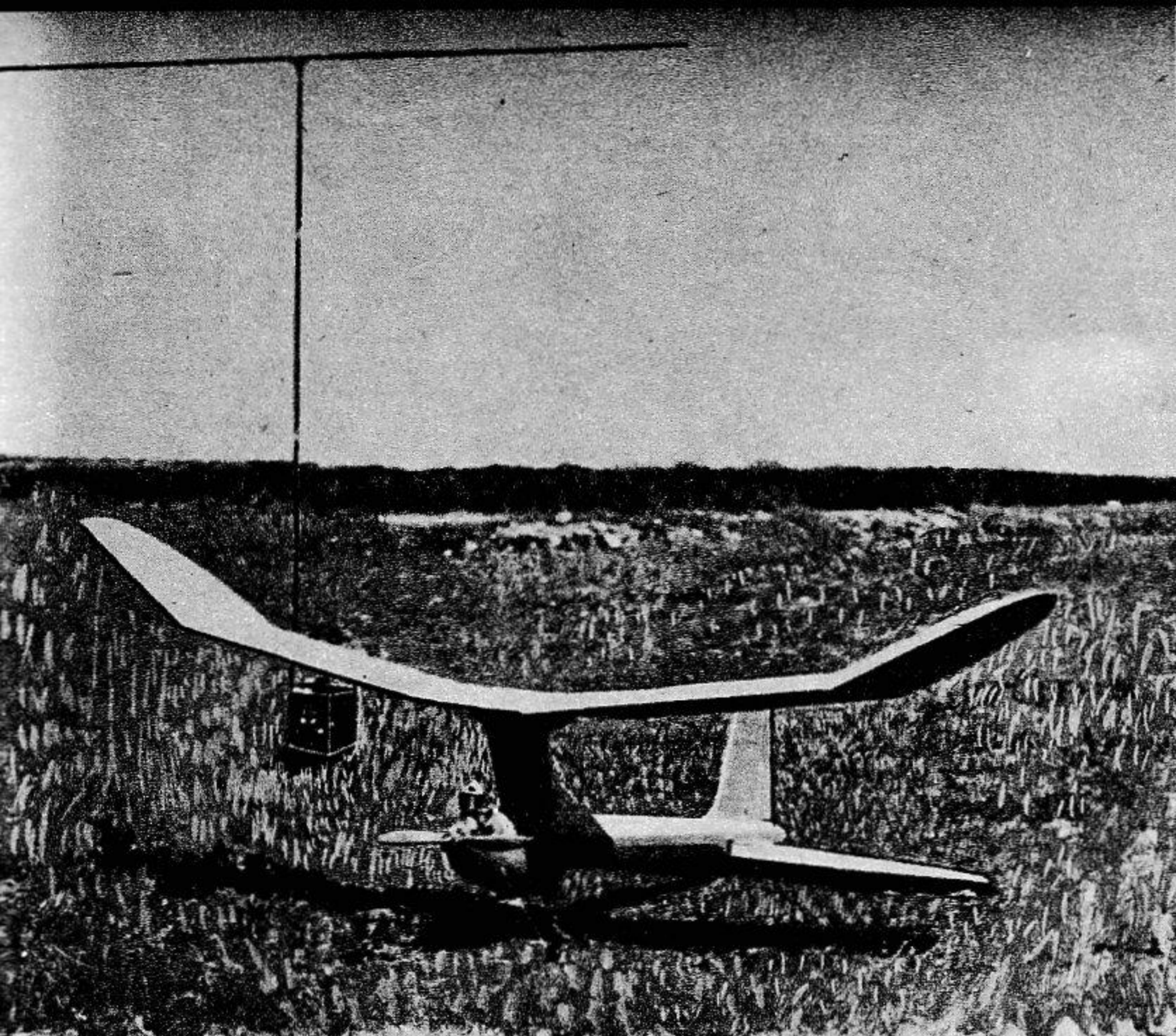


The radio controlled, class "D"  
Free Flight Contest model -

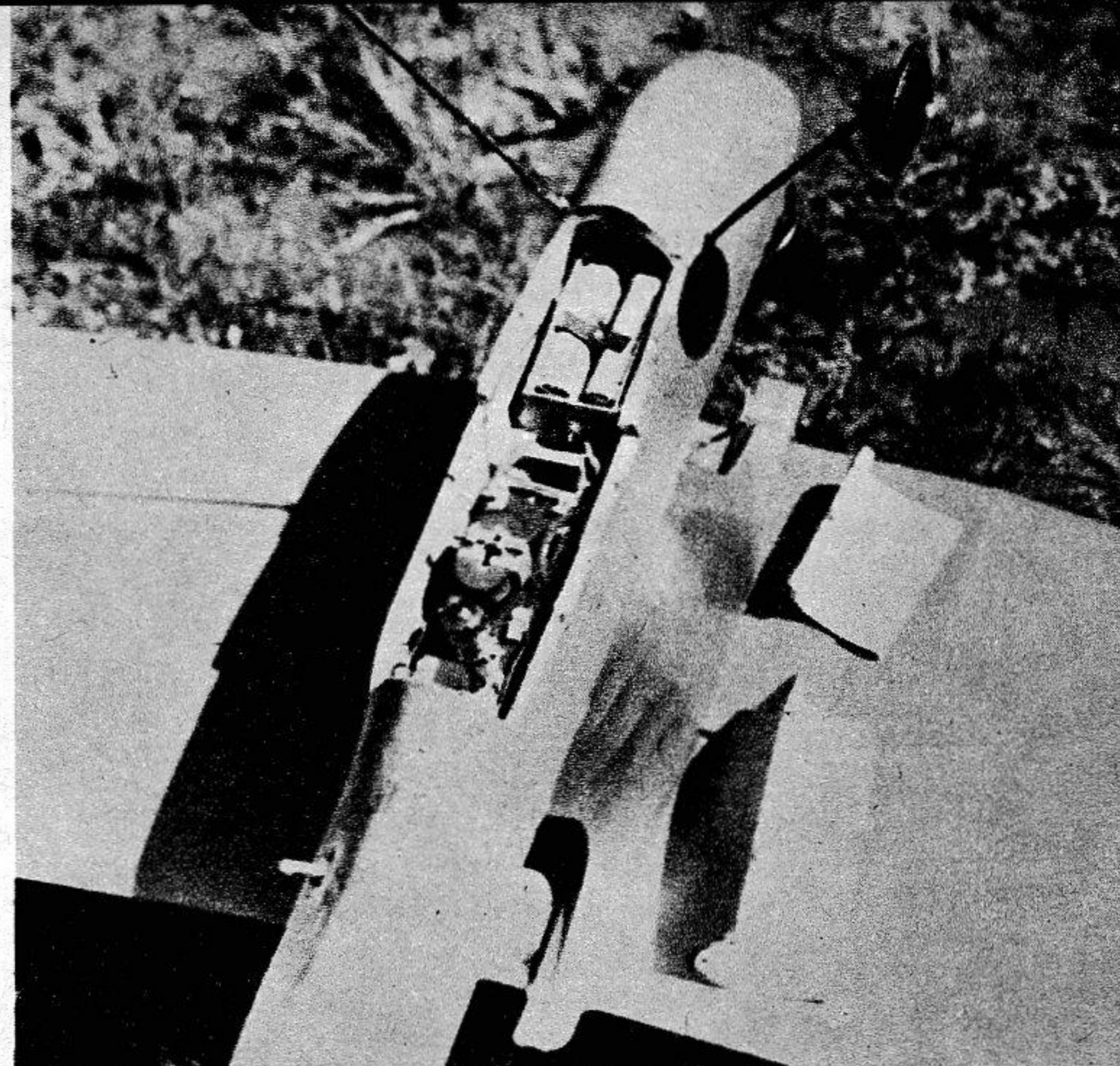
# FREECON

by: **Dick Everett**  
Plans By: **Wally Wasser**

1/8" = 1" Unless marked otherwise



Freecon ready for a record breaking flight; transmitter is in background



Hatch covers removed from receiver and battery compartments

# Freecon

by **DICK EVERETT**

**A new concept of radio control—  
use it for F. F. contest work**

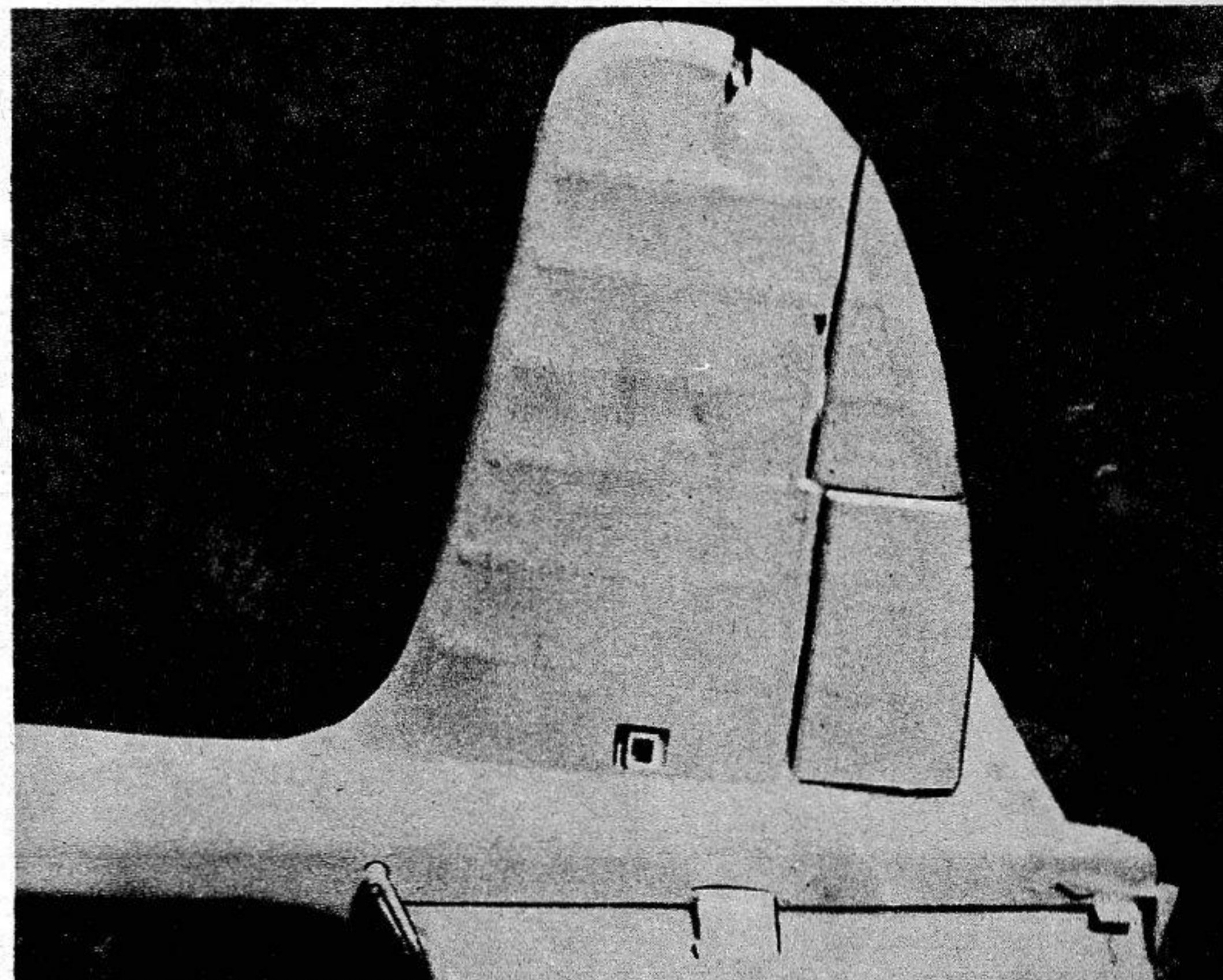
**WE HAVE** had radio controlled models for about 10 years—big bulky, heavily loaded models with a slow rate of climb, lumbering along like a transport; models that the builders have been able to fly any place they please and control through any kind of maneuver. The receivers used in these models were for a large part complex pieces of equipment which were heavy and needed a lot of model space, both for mounting the receiver and for the power supply needed for operation. The equipment was so intricate that it was continually getting out of tune and consequently out of control. With all this the modeler really had to know radio inside and out in order to install a set.

There have been instances when model builders in different sections of the country have collaborated with radio amateurs, or "hams," and by working together each on his speciality, have constructed and installed a set in a model. A few actually flew them; but for some reason most of these projects were dropped and in consequence radio controlled models were a novelty; their scarcity was alarming.

Then came the revolution—a commercial, single channel, *lightweight*, outfit was put on the market; this first one was soon followed by a second. Although the prices of these two units will undoubtedly drop once the initial cost is met, the upkeep is very low and the satisfaction unlimited. These units come from the factory completely finished, ready to install in your model. The instructions included are very complete and any builder who can follow the plans to build a model will find himself quite capable of installing one in his ship. One fact must be taken into consideration before any flying can be done: your transmitter must be operated by a ham, or a licensed radio operator. A lot of false hopes were built up during the past year about the so-called "Citizen's band" for our models. Practically every radio man with whom I talked about this higher frequency of operation has told me that for the present this channel should be forgotten, since a lot of research will have to be done before this band will be practical. Estimates in time ranged from 1½ to 5 years. (See page 36, April 1948 M.A.N.)

The *Freecon* was only an idea for quite a few years; controlling the glide by radio so the time could be built-up by keeping the model overhead in the timer's sight seemed like a practical scheme. With the advent of the new rules the idea is still good, for you are able to keep the model in sight for the full ten minutes and land near the launching site. The model isn't very big when compared to the models being flown under the present rules. The weight is not high; in fact several coats of dope were added to bring it up to weight (the original model weighed only 58 oz. complete). The model was built exception-

(Turn to page 46)



Rudder is in two parts; one is radio controlled—other is for adjustment  
Extension switch allows the operator to fly ship in any direction with ease



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## Freecon

*(Continued from page 25)*

ally strong; nothing was sacrificed to save weight and the entire model was color doped to a good finish. The cross-section is a little large compared to what a lot of the fellows are using under the new rules, but this does not seem to hinder the model's flight in any way, for its usual time is higher than the average ship is able to do. It grabs plenty of altitude while under power, to enable the glide to really stretch out.

There was no trouble encountered in

flying the model, with the exception of vibration caused by bumping the fuselage when starting the motor. This was handled by adjusting the relay points.

While designing the model, and during its construction, all effort was spent in trying to make a model that would be easy to service, light in weight, stable in design, with no conflicting adjusting surfaces, no electrical troubles, and a model strong enough to take the beating required of it in contest flying, for it is expected to fly in a lot of contests! Consequently there are hatches for easy access to the receiver and the "B" batteries. The escapement is mounted directly under the vertical tail, where it is easy to get to when the horizontal tail is removed. The "A" batteries and the escapement batteries are in boxes which open to the side, and the antenna is mounted outside the fuselage. To some of you this may not seem to be the proper place for the antenna, but there has been no difficulty encountered from this mounting. It was placed there for ease of maintenance, and since it works all right it was left there.

Although there was no wood spared in constructing the *Freecon*, the wood used was placed where it would do the most good and was carefully picked for size and weight. The fuselage is planked with sheets of 1/8 inch balsa, fairly hard, then covered with parachute nylon. The wing has 3 large spars of very hard wood as well as big leading edges and trailing edges; the horizontal tail has a full depth spar and each rib is gusseted to keep warps at a minimum. The half inch square hollow spar for the vertical tail encloses the rubber power supply for the escapement. The ribs were from 3/32 sheet, flush with the spar, then capped with 1/16 to 1/4 balsa. The landing gear was equipped with 2 inch solid rubber wheels to protect the receiver from hard landings, and with this gear the model makes surprisingly good landings.

The hinges for the rudder were made from 1/32 dural, drilled to take .040 wire. The hinge pins were imbedded in the leading edge and the shank allowed to move freely. Every effort was made to eliminate all possible slope from the control surface since it was deemed necessary to keep the rudder in a strictly neutral position while under power; this has turned out to be the correct position for power flying since the model flies fast during the climb. The control arm was bent from 1/16 music wire, and the channel which the escapement pin runs in is a very close fit. Particular care was spent in bending the slot so it would provide a good sliding fit, with no loose or tight spots during the complete cycle. This allows the escapement to run smoothly and to provide a positive rudder movement throughout the action.

The rudder can be trimmed in any direction by bending the control arm in the direction desired. This allows a tight circle in either direction desired or will provide circles of equal diameter. It has been found that it is practical to have the circle much tighter in one direction than the other so that the model could be put in a near spin glide to bring it down fast. Recovery from this near spin glide is made by merely returning the rudder to neutral and then in the opposite direction. Spins on different models may vary a little, but recovery should be fast and positive or the control forces will build up until they are too high for the rubber escapement power to counteract.

The complete receiver unit was installed in the plane, suspended from 2

hardwood uprights with 1/8 inch rubber. The uprights to which the wire hooks were suspended were 1/8 plywood, firmly cemented and gusseted in place to withstand the full of the rubber. The rubber was fastened from the hooks thru the fahnstock clips on either end of the receiver and then back to the hooks. This type of suspension mounting is very practical and simple to install, but was used in lieu of the 10 oz. Lord mounts which were not available at the time of construction. The Lord type mounting should prove to be the better for an instrument as sensitive as the receiver for they provide metal to metal surfaces for the screws, as well as a very flexible rubber diaphragm to absorb all shocks. They are available for practically any weight desired to mount on and are fairly cheap.

The battery box for the "B" batteries was constructed from 1/16 plywood with the ends re-inforced with 1/8 inch hard balsa. The contacts are spring brass. The batteries are firmly held in place with a long machine screw which goes thru a top clip of 1/32 brass to a nut cemented to the bottom of the box, between the batteries. The "A" batteries mount in a box in the side of the fuselage, constructed in much the same manner as found in most gas models. The escapement batteries and ignition batteries are similarly mounted.

The complete wiring system of the model was color coded so as not to get the wires mixed up. It is advisable to do this on all radio jobs, for you have so many different voltages that it is perfectly possible to run too much current to the wrong place and burn up some section. A double pole single throw switch was installed so that the batteries could be turned off when the set was not in oper-

ation. It is advisable to mark all the battery boxes for polarity to avoid confusion.

There were 2 changes made to the stock transmitter which in the author's opinion improves its operation. The first was a Micro-switch in parallel with the control operation switch on the box. This was hooked-up with about 5 feet of wire so one can stand upright while flying the model. The other change was a calibrated geared dial with a locking device which allows very close tuning and locks in place.

Since the commercial units are not complete with antenna poles it is necessary for the operator to construct his own. The first poles used in this transmitter were constructed with wood and swayed in a slight breeze. It was thought that perhaps extruded aluminum channels or angles would be better, so a search of the war surplus houses started. At first we found the ideal material, one-half inch square hollow tubing. The walls were 1/64 inch thick. A small triangle of .051 dural was used to bolt to either of the two sections. The result was a very sturdy and light antenna support.

The flying qualities of the model are excellent, having the fairly fast climb needed for contest work and a glide which is flat and seems to hang-up and never want to come down; it really floats, making is very easy to control. The rudder is easy to trim by bending the control rod in either direction you desire. With the present model flying the way it is, we are able to get a good tight left circle, almost a spin, merely by hitting left rudder. If one wants a large right circle, hit the controls twice from left position, the first being to neutral, the second to right rudder. When the rudder is in this position the circle is fairly large, being almost straight. To bring it back overhead, it is only necessary to hit a series of control deflections until the model is traveling in the direction desired and then gliding with right rudder most of the time; the few instances when left rudder or neutral is used are only to bring the model back on the correct path.

It is fairly easy to lose altitude fast with a series of control deflections from right to left—not real fast deflections, but ones where you watch the model and time your signals until a semi-'fish-tailing' effect is obtained; this isn't the violent maneuver obtained with real planes since we have so much effective dihedral and so small a moving surface.

Low power maneuvering flights can be made by trimming the model to fly straight with neutral rudder. On the occasions that the model was flown and controlled under power, the timer was tied back so that the motor would run itself out. The model handled very easily and responded to the control deflections at will. One word of caution about these power flights as well as all other controlled flights: get plenty of altitude before attempting maneuvers until you are experienced with your model's characteristics. Try to make all your low altitude turns into the wind so the model will have plenty of lift when you bring it out.

All that is necessary for good efficient operation of the radio equipment is to follow the instructions with your set and you will have an easy time with your first radio controlled model—a little more complicated than the usual gas model, but one which will provide you "endless joy" in flying! One last word to the wise: get a "ham" to operate your set for you, or to stand by while you are flying!