Norm Rosenstock launching an AA job, transmitter in hand. Portable unit eliminates desperate dash back to transmitter, permits moving after a plane.

for the R. C. fan

If flying fields are a major headache, small low-cost ships are lifesavers. Save money, too.

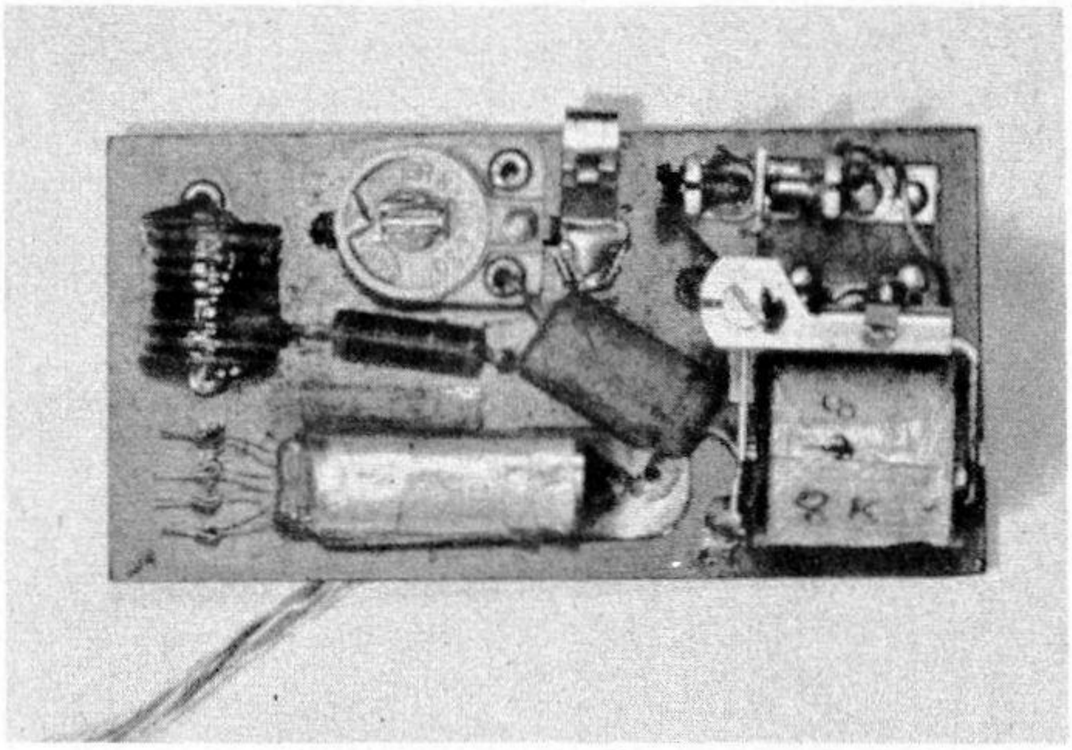
by NORMAN ROSENSTOCK

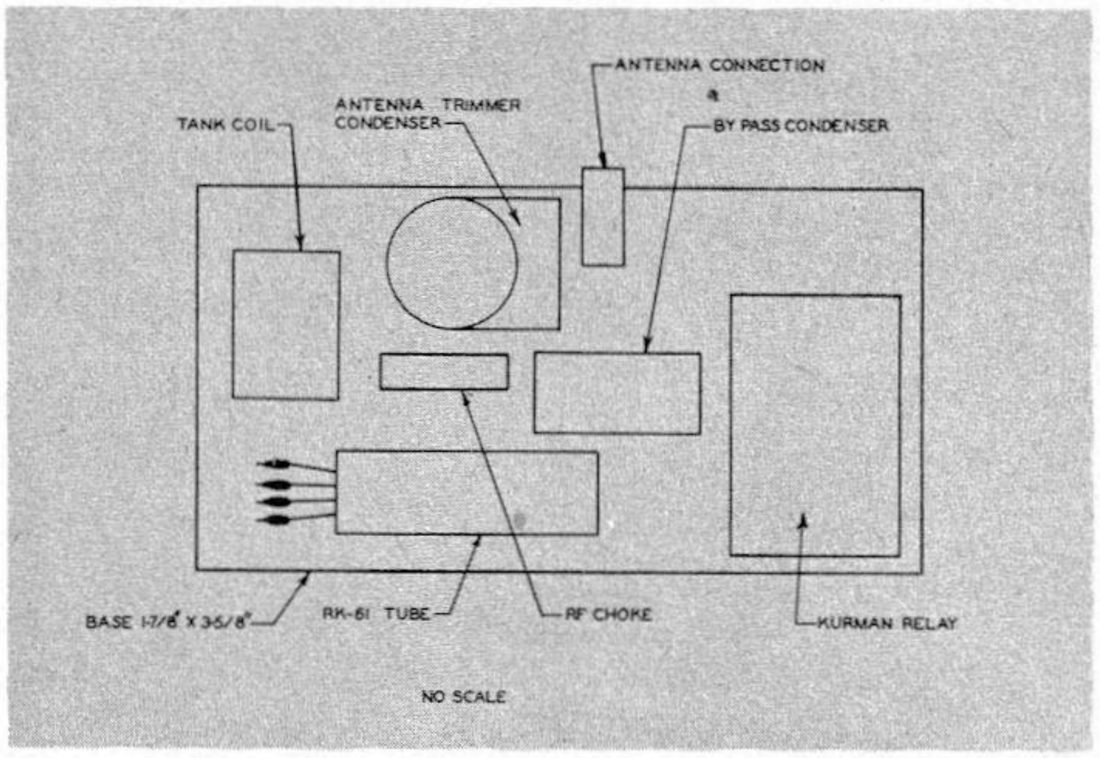
▶ With the coming of the AA engine, whole concepts of model flying changed. AA models for their size and weight are stronger and more durable than other models. Also the cash layout for the engine and plane rarely runs more than six to eight dollars.

To a radio control builder this makes interesting figures when you consider that he has other expenses besides the model and engine. Too, it offers an interesting challenge to his modeling ability, being able to cram all the necessary radio gear in an AA job and still have a consistant flying r. c. model.

The idea for the AA radio job occurred to me one day when I found my flying space becoming smaller and smaller, and it was necessary to travel from 30 to 40 miles each Sunday to find a flying field. Up until then I had been flying 60-inch radio jobs which by the old standards were not large planes but according to today's standards not small ones either. It still required a field of considerable size. (At least 2 blocks square.) It was obvious that if I could build an AA radio control ship, I might be able to fly it in the local baseball diamond or athletic field since an AA model has a turning radius of only a fraction of a large plane. I took my 60-inch *Rocket,* (original design) which I was developing into a fair r. c. job, and scaled it down to the 40-inch *Rocket* or about 280 sq. in. of wing area. Due to scale effect, I knew I could not hope to fly this model with the same wing loading as the original, which may have varied from 18 to 22 ounces. I chose a 12-ounce wing loading as more suitable for this size plane, and that left me with a maximum gross weight of 1-1/2 pounds. Until this time the radio gear I had been using weighed as much as 20 ounces (receiver, batteries, and escapement), and now it is cut down to 7-1/2 ounces which leaves 16-1/2 ounces for the plane itself. With a complete radio installation of 7-1/2 ounces, the field is wide open for any size or weight plane the reader cares to build.

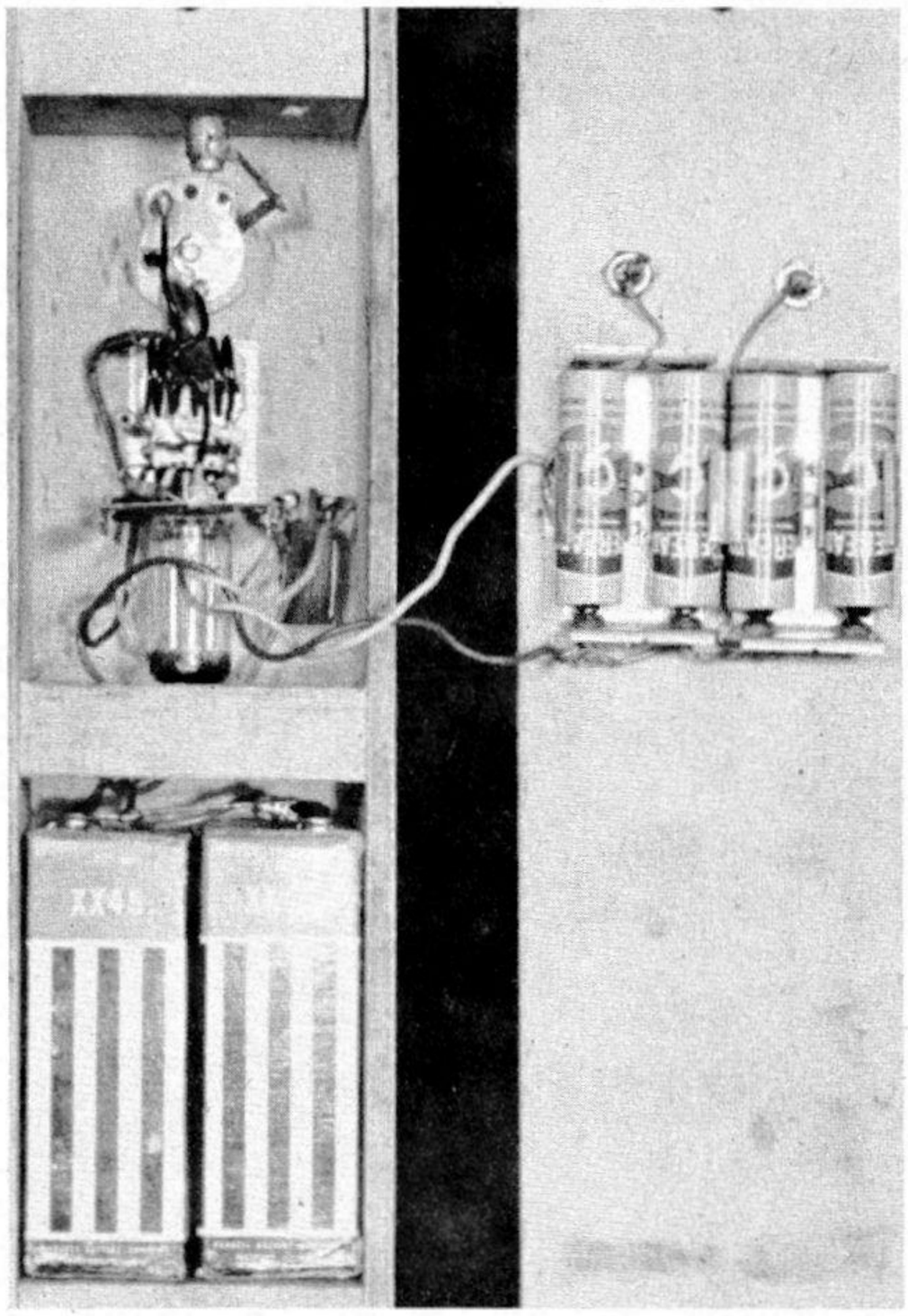
Here is a breakdown of the 7-1/2 ounce installation:



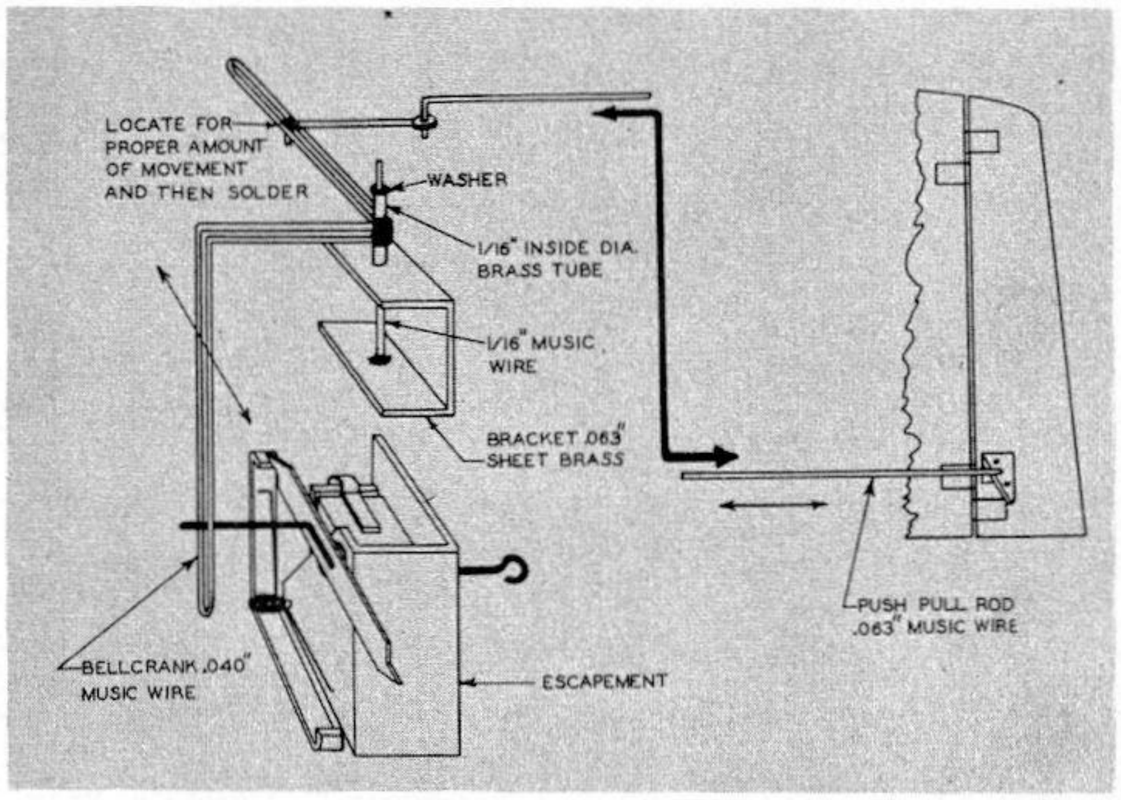


In the receiver, left, above, the author has remounted all the parts on one side of the base to facilitate the sponge-rubber mounting described. Above, right—diagram identifies all parts in the picture. The tank coil is cement covered before tuning up so that receiver frequency remains stable.

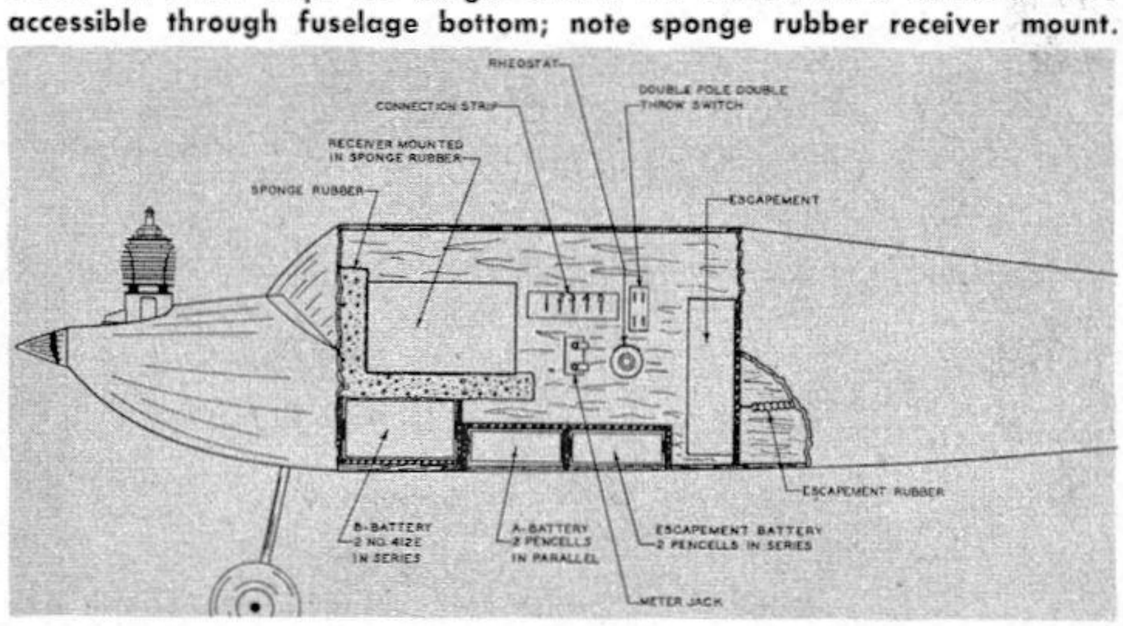
Below—Hand-held whip-antenna transmitter enables launching of ship while holding transmitter. Despite experts, it works satisfactorily.



Through use of a pushrod connection to the rudder, small-ship builders are able to keep the escapement weight well forward; mounts near cabin.



Below—In small ships all weight should be concentrated. Batteries here accessible through fuselage bottom; note sponge rubber receiver mount.



2.25 oz.	2 #412E *Ever-ready* batteries in series complete with balsa battery box.
2.00	4 penlight batteries and 2 metal battery boxes.
2.00	*Aero-trol* receiver or any receiver utilizing an RK-61 tube and a Kurman relay.
.75	Control Research escapement or any 1/2 oz. escapement plus plywood backing, bell-crank and push rod.
.25	1 double-pole, double-throw slide switch, 10,000 ohm button reostat ad light weight phono-jack.
.25	Sponge pad about 2 x 6 x 1/2" and terminal strip.
7.50 oz.	

For purposes of stability in operation two pencells are necesary for the filament supply since it takes almost one hour for two fresh pencells to drop to 1.3 volts, while it takes one pencell less than 20 minutes to drop to the same voltage. A receiver will function properly in respect to sensitivity and range until it reaches 1.3 volts, when efficiency falls off rapidly and operation becomes unstable and undependable.

In a larger plane you would ordinarily use a five-prong plug and socket so as to easily remove the receiver from the airplane. In an AA model to save about one ounce, make a terminal strip out of 1/16" plywood and five soldering lugs which should be numbered or color-coated to correspond with the receiver wires. (See sketch.) The wiring in the plane should be hooked up to the terminal strip as you would to a five-prong socket. The receiver (with about an inch longer leads) should then be lightly soldered to the very tips of the soldering lugs. This way it is a semi-permanent arrangement making the receiver readily removable by the touch of a hot iron.

The value of the double-pole, (*Continued on page* 45)

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double-throw slide switch is that it serves the same purpose and weighs half as much (1/10 oz.) as two slide switches. The only conversion necessary is to cut off the two lugs on one side of the switch since all that is needed is the double-pole, single-throw. This type of switch is made but is difficult to find.

The rheostat used is the small button type as supplied with the *Aero-trol* equipment and the meter plug is the small phono plug-in socket that comes mounted on a Bakelite disk.

Receiver Installation—The receiver in this ship, as you probably noticed, is not the usual rubber-band suspended set-up. Instead I mounted the receiver with the relay side up and forward on a sponge pad, part under, and part in front of the receiver protecting the relay, as shown in sketch. Of course this should be so situated where there is solid bulkhead forward of the receiver and a solid floor below it. Very often it is mounted over th top of the B supply batteries. There should be a hook on each side of the cabin at the floor level about mid-way the length of the receiver so that a retaining rubber-band may be stretched across the top of the receiver keeping it firmly down and forward against the sponge pad. This installation might seem unusual or different but actually it is not. The receiver so mounted can withstand a tremendous amount of punishment insofar as damages are concerned. Another important fact is that you can go out flying in an afternoon, tune up once and retain the original tuning frequency even though you might spin the ship in two or three times during the day through carelessness or some other foolhardy maneuver. Another good tip is to take model cement and coat the tank coil of the receiver before you tune up, so that the glue forms a shell over the windings and keeps your receiver frequency stable.

If you are the kind of person who likes to build your own gear, take your receiver apart and make yourself a new chassis, replacing everything so that all your components are on the top side, which makes it a more suitable type of receiver for sponge rubber mounting than the Aero-trol which has the tube underneath. See sketch.

Escapement—As you notice the escapement is mounted in the rear-most portion of the cabin. Many people prefer to mount an escapement in the tail end of the airplane which gives you the advantages of short mechanical linkage and an escapement rubber band which may be extended as far as the nose block of the airplane. (I've seen them.) The disadvantage of this is that on a large plane the escapement is installed at such a location that even if it were made accessible it would only mean another hatch opening or hole at the tail end of the aircraft and longer escapement leads making the wiring more complicated and spread out. On a

smaller ship such as an AA model, the same installation is almost impossible since the maximum width of the airplane at the cabin may be about 2-1/2"; at the tail it couldn't be more than a half inch wide. The escapement used in the model is a Control Research escapement which is mounted on a small piece of 1/16" plywood with a bracket and bellcrank fabricated as shown in the drawings and mounted above the escapement. The 1/16" wire shaft which the bellcrank pivots on should be directly above and in perfect alignment with the shaft of the escapement. The bellcrank is bent out of .040" music wire and soldered to the 1/16" I.D. brass tube. The bracket on the extended arm of the bellcrank is left unsoldered until the complete linkage is assembled in the plane and the proper amount of leverage or turn is determined, then a drop of solder will hold it in its proper place. The rudder on the *Tiny Rocket* is 3/8" wide and the full height of the vertical fin. The movement is about an 1/8" in each direction.

Transmitter—When I first started with r.c. a number of years ago, it seemed to me that the r.c. builder was ham strung with a maze of wires and poles which took anywhere from ten minutes to a half hour to set up before he could even think of looking at the model. Realizing this handicap I started looking toward the whip antennae as the answer to simplification of the transmitter gear. (According to the experts I was told you could never get range from a whip antennae. They still tell me this as they watch my ship going through its paces over three-quarters of a mile away.) When I started to experiment with r.c. speed models, I found that launching the model took me as much as 30 to 50 feet from the transmitter so that by the time I returned to it the model was a quarter of a mile away and disappearing fast. After all when a model flies between 50 to 60 MPH a quarter of a mile only takes 15 seconds.

Eventually I worked around to the transmitter gear which I use today. It is a hand-held portable transmitter with an automobile whip antenna. It measures 3" x 3" x 12" high and contains an *Aerotrol* transmitter, two 67-1/2 volt batteries and four pencells in parallel for the filament battery. To convert a standard tranmitter for portable operation, ground one end of your antenna pick-up loop to the transmitter chasis and run the other end of the pick-up loop through a 75 or 100 mmfd. air-padder condenser to the antenna. The antenna can be purchased at any automobile supply store and trimmed to about 56-1/2" fully extended. To adjust the transmitter coupling for proper loading, a field strength meter is a great help although not entirely necessary. Loading can be accomplished by putting a 0 to 50 m.a. meter in series with one of the B supply leads, and loading the transmitter about 85 to 90 per cent of its maximum plate current which usually runs, for the *Aerotrol*, between 25 to 30 m.a. The loading should be accomplished with a minimum coupling of the pick-up loop and a maximum coupling of the air-padder condenser.

Procedure Step 1—Insert a 0-50 m.a. meter in your B supply lead. 2—Turn your air-padder condenser until the plates are fully meshed. 3—Start with pick-up loop out of coupling and push pick-up loop in, observing your plate current until it reaches the peak or maximum. 4—Take a screw driver or alignment tool and uncouple the plates of the air-padder slowly until you've dropped about 10 or 15 per cent of your maximum m.a.

The air-padder condenser plates should not be out of coupling more than 10 degrees. If they are then you have loaded too much. Pull pick-up loop out slightly and repeat procedure with the air-padder.

When field checking the transmitter hold the antenna vertical and make long field checks. When flying, hold the transmitter in the crook of your arm with your antenna at about a 45 degree angle from the ground and operate the push button with your other hand. Always face the airplane when flying so that the end of the antenna is never pointed at the plane.

At the last Nationals at Dallas, Texas, on their tremendous runways I field-checked this portable transmitter for over a half mile ground range (which is easily doubled in the air). I've flown a five-foot radio job in the rain with it until the plane was practically out of sight, about three-quarter of a mile away and 60 feet high always under perfect control. It is small enough to be held in one hand while you launch the plane with the other, and another advantage is that it fits into a standard 14" tool box along with the props, batteries, small meter and the rest of the usual model supplies. The antenna is removed and clipped to the outside of the box, and upon your arrival at the flying site it takes but a few minutes to take the transmitter out, plug it in and extend the antenna. This is a great convenience with any size plane you might be flying, but, with an AA radio job it is a most valuable piece of equipment since it is even possible with the plane under one arm and the tool box in the other to travel by any public conveyance as I've done when a car was not available.