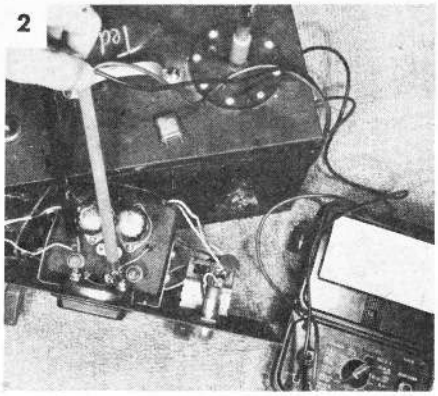
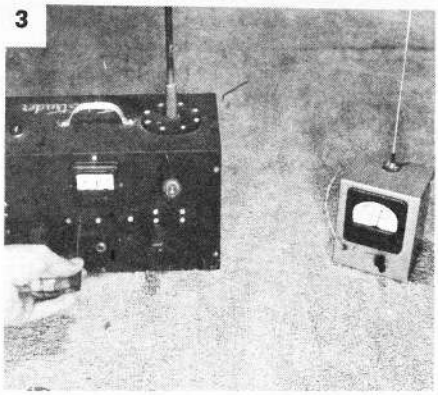
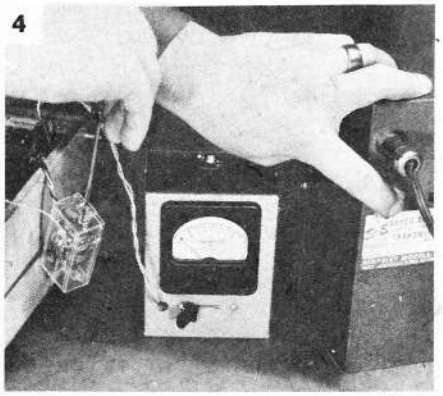
Transmitter, control box and field strength meter.



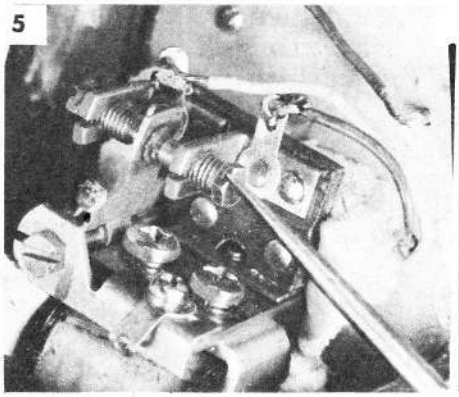
Transmitter batteries and operation are checked.



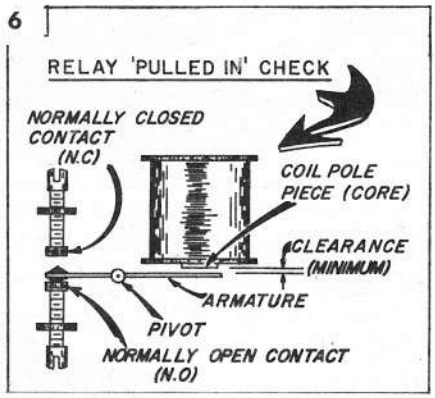
Field strength meter is used to set the X-mitter.



The receiver is tuned at home before going flying.



Adjust the relay at home if it requires adjustment.



Armature does not touch core piece when pulled in.

R/C PRE-CHECK

by Ted Strader

A popular Midwest disc jockey spins the platter on how to set up your equipment for R/C flying

● It was a beautiful day for flying and all of us were prepared to make the most of it. Many hours had gone into preparing for this break in the weather. The equipment was all set up, batteries had been checked and we were now concluding our usual gab session which always precedes our flying sessions.

Suddenly we heard a clatter and looking off in the distance we noted that Joe Slipshod had decided to join us. Joe did everything in a hurry—even decided to join us at the last minute.

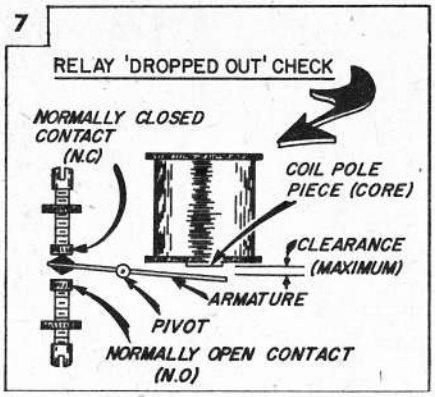
As usual Joe pulled up to a screechin' halt and was out in a dead run before the engine wheezed its last halting gasp. What a sight it was. Plane in one hand (engine running rather sickly) transmitter in the other Joe yelled, "Hi," as he heaved the model skyward just as both of them reached flying speed.

This was too good to miss so we sat down to watch. The plane trembled and the engine leaned out. Then things took a turn for the worst which caused Joe to hit the panic button. That did something. The ship did an abrupt about face. This turn was worse than the first. By now, Joe was not quite sure whether he was afoot or on horseback. Panic had turned to chaos. The rudder found the position it had been seeking and stayed there. Joe turned to us with a sickly grin. What could we do?

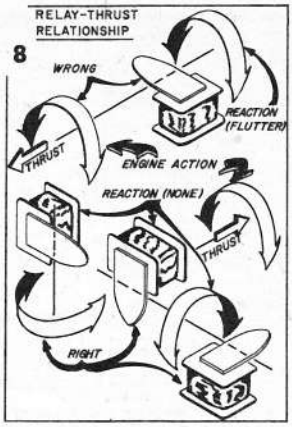
Fortunately for Joe, this was not the end of the story. His ship went down in an uncut clump of hay which held the damage down to a few holes, a broken prop, and a snarled mess inside. Joe is also tenacious. He set to work immediately repairing the damage and rectifying his errors. He also spent the rest of the day dodging the hot sun while trying to find the bugs in his "rig."

It wasn't until the end of the day, after we had all completed what we considered to be a most successful day of flying, that Joe broke down and asked, "So alright, what did I do wrong?"

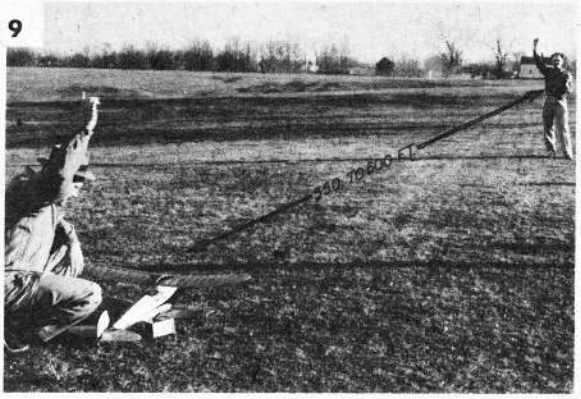
This bit of fictional exaggeration may not be exactly how it happened, but as for the crash and the wasted day, that did and does—all too often. It wasn't what Joe did wrong that led to this, rather, it was what he didn't do at all.



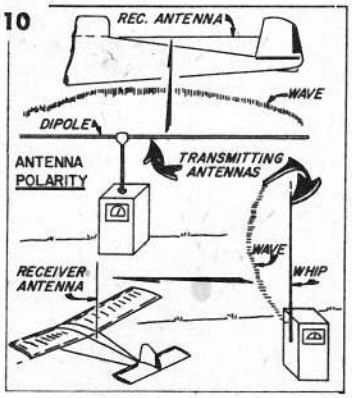
Maximum clearance determines pull-in of relay



Relay mounting is important.



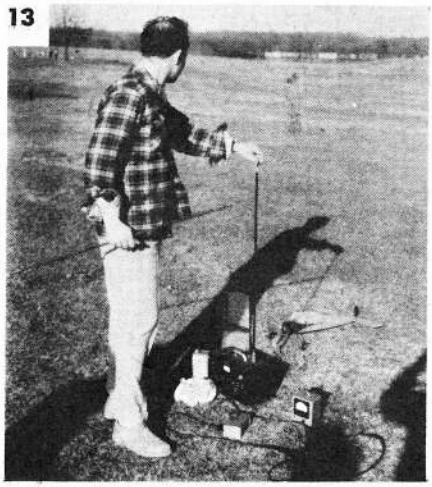
Always make distance checks before attempting to make any flights.



Note antenna polarity for best range.

A final ground check should be made with the engine running.

If all checks out, you launch it for flight.



Set up your equipment in a good location.

Bugs! "I say, are you there?" They are. Inside the control box no less.

First and foremost, you need a system—a modus operandi (MO). Then, you have to diligently apply this system so that it pays off.

Starting from the beginning means getting ready for your R/C outings at home—in the workshop. Here, amid the tools, accessories, and spare equipment it is possible to leisurely prepare for a weekend of flying. You can be cool, relaxed and unhurried while you get everything squared away. Setting up on the field should take less than 10 minutes!

Picture 1 shows the field equipment which we also need to synchronize the complete outfit in the shop. The transmitter and coding device (in this case a pulser for proportional control) are shown with a field strength meter (FSM) which is used to indicate the output of the transmitter. The FSM has a selector switch which permits it to double as a receiver plate current meter. We will use it both ways in our discussion.

The first step is to check the transmitter to see what bugs you can find. Use the specifications supplied by the manufacturer and check each point carefully. We'll use the FSM when we're finished checking to indicate the success or failure of our bug hunting expedition.

Improper voltage is one of the greatest causes of malfunction. For proper checking you need a voltmeter. Check the batteries under load, switches on, to see if you have sufficient voltage to meet the requirements. If the discrepancy is large you may just have enough to make the transmitter oscillate and trigger the receiver on the bench. This amount would barely be enough to cover a good test glide range. Replacement of batteries is in order. Keep in mind that the "A," or filament batteries, should be "hot." Use fresh batteries whenever possible.

If you employ a power supply, this situation may only require charging the storage battery. The vibrator may be another source of trouble since the points may become pitted resulting in poor output—or none at all. These are difficult to check and require a pin diagram. The test, if a diagram is available, consists of checking across the points

(*Please turn to Page* 34)

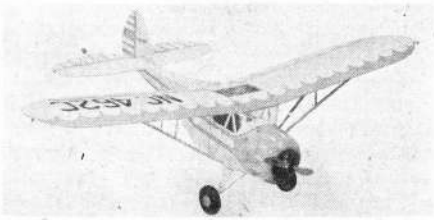
R/C EQUIPMENT NEWS

● **RAYTROL MFG. CO.** (N. Y. C.) is now manufacturing 27.255 mc., multi-channel, tone equipment to supplement their R/C line. Their latest transmitter utilizes 3 tones and is equipped with a power supply that works on a 2 v. storage battery. The tones are adjustable. Input runs in the range of 2½ watts. A companion 3-tone receiver uses a 3-reed unit and Jaico relays. It is designed around 3A5 and 1L4 tubes. Range is up to 2 miles according to the manufacturer.

Prices of the assembled units are: $55.00 for the Model TN 300 transmitter and $64.50 for the Model RT 300 receiver.

● **BERKELEY MODELS INC.** (W. Hempstead, N. Y.) announces their new sub-miniature potentiometer which operates in the range of 10,000 ohms resistance. This item, complete with adjustment shaft, threaded neck and collar mount, sells for 65c.

● **STERLING MODELS** (Philadelphia, Penna.) has added a new scale model to their line of R/C plane kits—a Monocoupe. The kit includes die-cut and shaped plywood and balsa parts plus hardware, spun-aluminum cowl, formed wire landing gear, and complete instructions for building and flying the model. The completed model is suitable for control-line flying with engines up to .45 and is ideal for engines of about .19 when flown R/C. The price of this 64"-span model is $11.95.



STERLING'S MONOCOUPE

● **MONARCH MODEL AIRCRAFT** (Brooklyn, N. Y.) announces their new R/C scale model—the Aeronca Champion. The kit builds into a model with a wingspan of 5 feet and is an excellent flyer, we are told. Engines from .19 to .35 are recommended for R/C flying. Price of the kit is $12.50.

R/C PRECHECK

(*Continued from Page* 21)

with an ohmmeter. There should be no resistance. Presence of resistance indicates pitted points and the vibrator should be replaced.

Assuming an adequate power supply, and you find that you cannot get a field strength reading when keying the transmitter, check the batteries under load. As an example: With a "no load" voltage of 230 v., and with the transmitter turned on, the meter shows 230 volts. Look for: (1) Blown tube; (2) Broken wire; (3) Burned out resistor.

On the other hand, a "no load" reading of 230 v. drops to 180 v. when the transmitter is keyed indicates: (1) Detuned transmitter; (2) A blown crystal. Note that there is no FSM reading during these tests.

Picture 2 shows a voltage check—failure to obtain an indication on the FSM pointed to a blown crystal. Beginners should note that a transmitter should not be operated without an antenna. The "unloaded" circuit will usually blow the crystal instantly.

Picture 3 shows the transmitter "packing a signal" after we replaced the defective crystal.

Now that the transmitter has been checked, **let's debug the receiving end.** Here again, it is necessary to have the manufacturer's instructions and readings to properly check the equipment. We will discuss trouble spots rather than specific conditions.

Assuming we have proper voltage "under load," tune the receiver to frequency with the plate meter in the circuit. Follow the instructions of the manufacturer. Picture 4 shows this operation and shows everything working properly—on the testing bench, that is. We can now look for other troubles which may not present themselves until: (1) The engine is running; (2) We get some distance between the transmitter and receiver.

Let's work on the prospect of troubles caused by vibration, first. Many of these trouble spots can be ferreted out without running the engine. Leave the plate meter in the circuit, turn the switches on, and wiggle them one at a time; turn the plate potentiometer slightly; press the battery box ends against the batteries; and check the receiver plugs. While doing these things, watch the milliammeter for fluctuation which would indicate a momentary disconnection. The meter may move slightly showing changes caused by "body" capacitance, or a rise and fall in accordance with the "pot." When you are satisfied that there are no serious breaks in continuity, repeat the procedure with the engine running and the transmiter off.

During this check you may have noticed a wide fluctuation in meter reading. Here are some possible causes and the reasons: Switches, those of the ball-contact slide type, cause trouble due to faulty contact between the ball and leaf contact—usually due to dust accumulation. Stick to knife-contact or toggle-type switches.

A wide fluctuation in meter reading which occurs when the "pot" is turned slightly indicates "noise" in the "pot." A new part should be installed.

In the case of battery boxes, a fluctuating reading indicates poor contact which can cause momentary disconnect from engine vibration. It's a good idea to sand, or scrape, the ends of batteries before inserting them in the boxes to assure a clean contact. Battery box connections should receive similar treatment if they show signs of oxidation which would impede the efficiency.

The item which is most affected by vibration is the relay. It is one of the most sensitive pieces of equipment found in an R/C rig. There are two sides to its operation—electrical and mechanical. Electrically, it holds up its end of the work load regardless of where it is mounted in the plane. If the coil is complete, it is half working.

The mechanical side is less simplified, particularly the part which is affected by vibration—the armature. The points and contacts must have a definite relationship with one another for proper operation.

Picture 5 shows us adjusting the relay to obtain the proper clearance between the armature and the pole (core) piece of the relay coil. A piece of paper, about the thickness of a FLYING MODELS' cover, can be used in lieu of a gage. The gage, or paper, is placed between the coil pole piece and the armature holds the gage snugly when the relay is energized (pulled in). **The armature does not touch the pole piece.**

This point is important. Though the armature and pole piece are made from soft iron and cannot be permanently magnetized, they can both hold some magnetism momentarily. If the parts touched, they would tend to "hang up" causing a delay which could prove serious during a critical control or maneuver. This temporary magnetism in a non-permanent magnet is called "residual magnetism." It remains after the electro-magnetic field has been re-

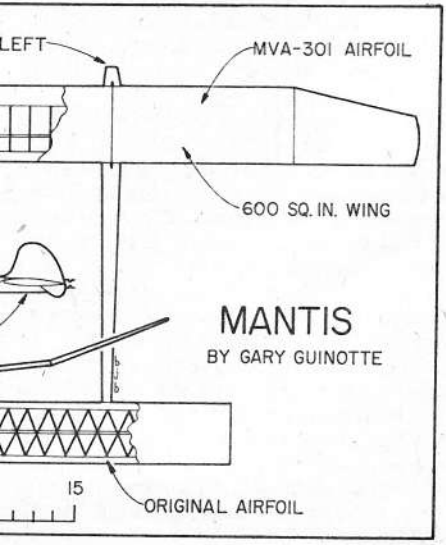
(*Please turn to Page* 37)

R/C PRECHECK

(*Continued from Page* 35)

moved. It is constantly present. However, the lingering lines of force are short and are rendered ineffective by the break between the pole piece and the armature with the aid of the armature tension spring.

The other adjustment concerns the space between the armature and pole piece when the relay is not energized (dropped out). The normally-closed contacts are touching at this time. The distance between the armature and pole piece varies with different receivers but we feel safe in suggesting that it should be about twice the energized tolerance —twice the thickness of an FM cover. The closer you can get the armature to the pole piece, without getting too great an arc-over between the points during operation, the more anti-vibration control you will get from the tension adjustment on the relay.



The position of the relay in the plane sometimes makes it impossible to apply enough tension to the armature to overcome vibration and provide a compatible working arrangement. In sketch 8 we show one relay position which should never be used and three positions in which vibration would be held to a minimum. The wrong position shows the armature pivot parallel with the thrust line of the engine. Reciprocating action of the engine will start a "sympathetic" reaction causing the armature to flutter. This can be offset by arranging the armature pivot axis at right angles to the thrust line.

Pre-checking should include a look-see at the actuator. Here again, the biggest headache usually results from the manner of installation of the unit or linkages. Electrically, the actuator usually causes little trouble, particularly if it is an escapement. If there is any friction or binding, ya might as well have stood in bed. Check for smooth operation with the engine running.

(*Please turn to Page* 39)

needle jet inside the tank. The fuel line to the jet should be neoprene for long life, since it is immersed in the fuel and is not easy to inspect.

At the time of engine testing the operating instructions by Cox were not at hand. But judging from the past, the Babe-Bee will come complete with a full-size mounting layout and the other information needed to operate and service the engine.

Bore is .406", stroke is .386"—to give an .049" cubic-inch displacement. Weight is 1⅝ ounces, complete with fuel tank.

After ten minutes running, the following speeds were obtained using Thimbledrome glow fuel:

7" diam./2" pitch Tornado Plasticote — 12,300 r.p.m.
6" diam./3" pitch Top Flite—14,200 r.p.m.
5½" diam./2½" pitch Kaysun plastic—15,000 r.p.m.
5¼" diam./4" pitch Power Prop—13,700 r.p.m.
5" diam./5" pitch Tornado Plasticote — 12,800 r.p.m.
4½" diam./6" pitch Power Prop — 13,800 r.p.m.

Price of the Cox Babe-Bee, complete, is $3.95.

R/C PRECHECK

(*Continued from Page* 37)

We rashly stated that setting up on the field should take no more than 10 minutes. This is true. If you have properly checked your equipment and accessories in the manner just presented, only high wind or rain will stop you. Of course, we can never rule out the possibility of a tube blowing out at the last minute! Why think of unpleasantries?

Out on the field, you should set up your equipment in a clear and unobstructed area. If you use a car, park it so that it is behind you and your equipment, and at right angles to the wind. Naturally, all flights should be made in front of the car.

Set up the transmitter and make a distance check. This will determine if you are on the right frequency or a harmonic. Use a check distance of 350′ to 500′ between the plane and the transmitter. It is often best to hold the model as far away from you as possible when distance checking to minimize "body" capacitance which might cause the receiver to be set improperly. With the milliammeter in the plate circuit, tune the receiver to a maximum "signal-on" drop per the manufacturer's instructions.

Antenna polarity can help to increase the range of operation. Sketch 10 shows that best operation is obtained when transmitting and receiving with the same antenna set-up. If you are transmitting with a whip and receiving with a parallel antenna, you have a lot to gain if you match your equipment. Nuff said.

Here we are ready and rarin' to go. But wait! Don't forget that final check before flying. Start the engine, turn on the switches (this is important), check the rudder and make a mental note of the control position if you are not using selective actuators before launching.

Alas and alack. We goofed! We forgot to check the control box. We listened as it ran—nothing. The drum was not making contact with the wiper strip. Investigation showed a renegade, and subversive, pomegranate seed was gumming the works. Just shows that you can't be too careful or thorough.

Picture 12 (all's well) shows the model going aloft. A slight run gets up speed. One last suggestion—don't trip.

HYDRO BUG

(*Continued from Page* 25)

for the lower ⅛" balsa nose planking. Cement the ¼" square hardwood strip at the bow and plank the nose section as shown on the plan.

At this point you should install the engine and accessories. We suggest that you use an O&R Mariner as we did.

(*Please turn to Page* 41)