

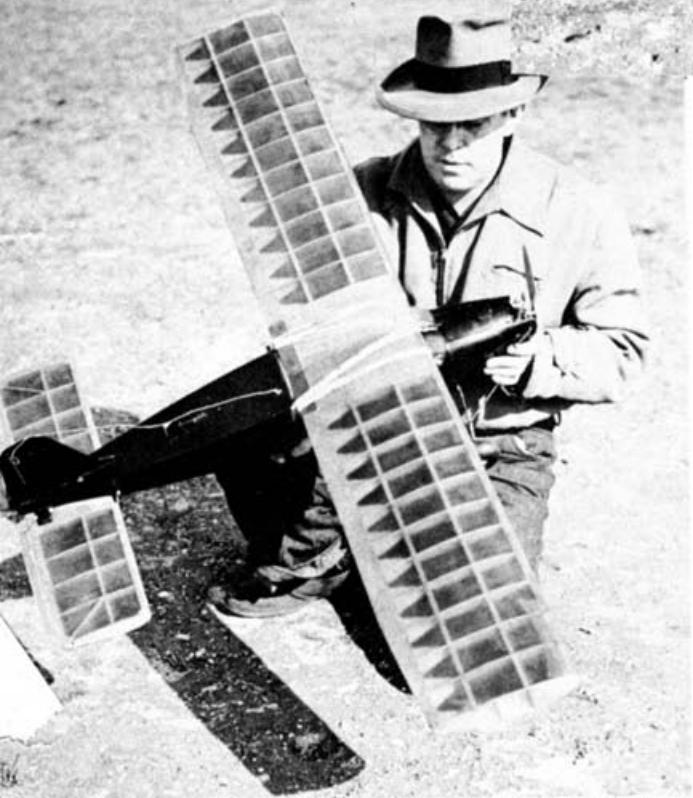
# Acrobat



With rudder and elevator control, this sturdy little rc job does tight loops, Immelmans, true stalls, and flew inverted. Fine on rudder only.



With a span of only 54 inches and an area of 475 sq. in. this is a "minimum" plane. With flippers in use wing must be securely tied down.



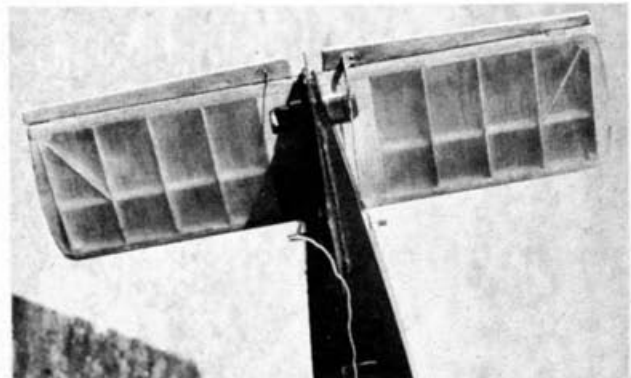
Stumpy design gives fast response. Ship combines features of Live Wire with Windy Joe, flies more like former only faster. Sheet fuselage.

▶ The *Acrobat* is a small (less than 4-1/2 feet) radio job, utilizing two controls by means of the Bonner compound escapement to give both rudder and elevator on a single channel. Although the plane weighs three pounds 11 ounces, it is on the fast, peppy side when powered with the *Cub 14* a 9 x 6 Power Prop, and a good fuel. Tight consecutive loops, vertical dives, true stalls, and even brief inverted flights have been achieved.

However, the combination of rudder and elevator is not for the beginner in rc and is recommended only for an experienced flier who has quick reactions and can anticipate the performance of a plane in various maneuvers. The beginner should fly with rudder alone; the moderately experienced pilot should leave the elevator mechanism disconnected until he is familiar with the ship and only then gingerly begin to feel out the flippers.

Anyone capable of building an rc job will not need construction details; instead let's concentrate on the control systems and how to fly the plane. It is imperative that the radio, escapements, and linkages be in perfect order at all times and, secondly, the operator must be positive that he can obtain any desired control without mistakes. The finished plane should be bench tested until it is obvious that the system works perfectly and reliably, and that the flier can work either a beep box, ground control switch or microswitch without picking up the wrong controls. It is particularly important that the compound escapement be thoroughly checked out and that the proper rubber size and length be determined for your ship, as well as the range of turns in the rubber that provide safe operation.

There is a possibility for a compound escapement to hang up on the third position (the electrical contact then being closed to operate the second escapement) on 1/8" rubber. Should this occur in flight, any subsequent pulses to obtain rudder will give up and down elevator instead. We relieved the pressure and drag on this contact as much as possible without interfering with its proper functioning and used 3/16" rubber. With 3/16" rubber it is necessary to pulse the control switch as rapidly as possible; the speed can be obtained and practiced in bench tests. When these things have been worked out, the safety of the plane thereafter depends on reliable operation of the radio. Whereas a bad radio can spin in a rudder only job, it may dive in a flipped ship.



Close-up shows flipper area, control horn in U-control style, and solder counterweight necessary for easy elevator operation. Silk covering.

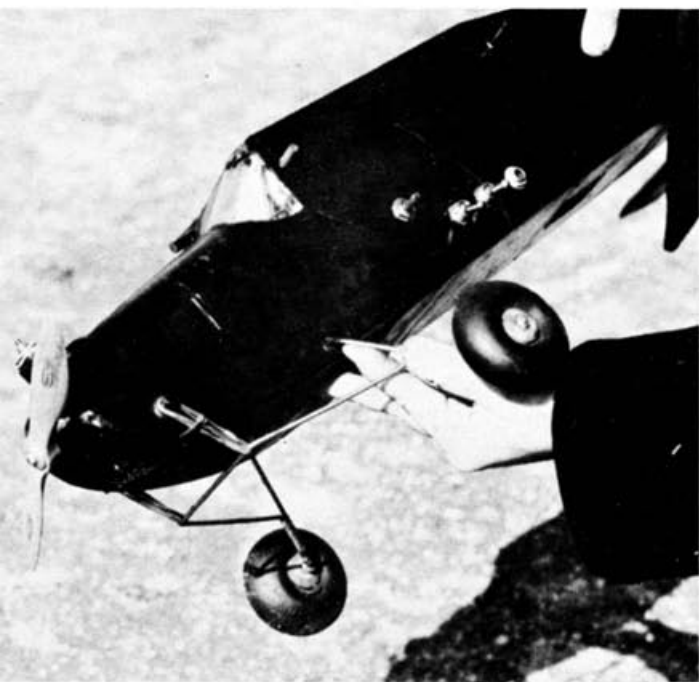
The receiver in the pictures is the Miller from the January 1953 issue, assembled on one side of the chassis to permit an installation that is both crashproof and quickly interchangeable for more than one airplane. Other receivers also may be used, such as the Aerotrol, the McNabb 27, and Control Research two-tuber. The available cabin space may be rather confined for the McNabb 465.

The battery installation consists of two Hillcrest plastic boxes each holding four pencells, and any hearing aid B batteries, (or up to a 67 volt K45 as shown). One Hillcrest box (four batteries) was used for escapements (when the third control operates, two escapements are being held in), and the other for the A supply. Two pencells are sufficient, but four can be carried with no ill effects and allow several weeks flying without replacement. It is desirable to maintain a wing loading of about 18 ounces per square foot.

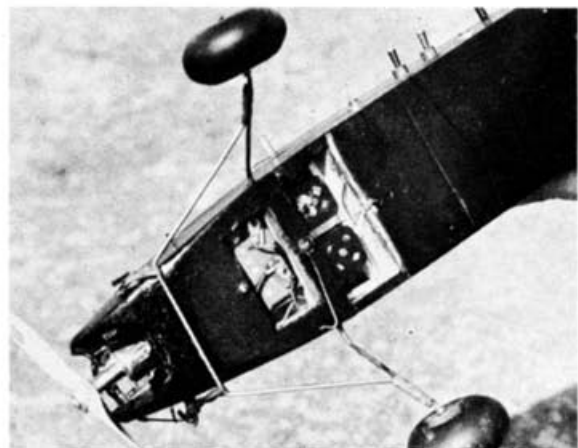
The compound escapement is located in the rear of the fuselage, forward of the fin. The elevator escapement is in the rear of the cabin. Bonner's literature describes the wiring and use of these escapements. In brief, one pulse gives right rudder on the compound, two gives left, and three gives the added control.

The ship should be hand glided until it has a fast glide, touching down two point. It should appear slightly nose heavy at this point. Make the first power tests on short runs with prop reversed. Measure the fuel for test hops. Do not use elevator at any time in tests. The plane should always be flown like a rudder only job, calling on the elevators only when the plane is positioned in the air for a special maneuver which has been planned ahead of time. Stall approaches should be broken by rudder, never by elevator. (This does not apply to reed radios like Rockwood which give smoother response than is possible by repeated applications of three impulses.)

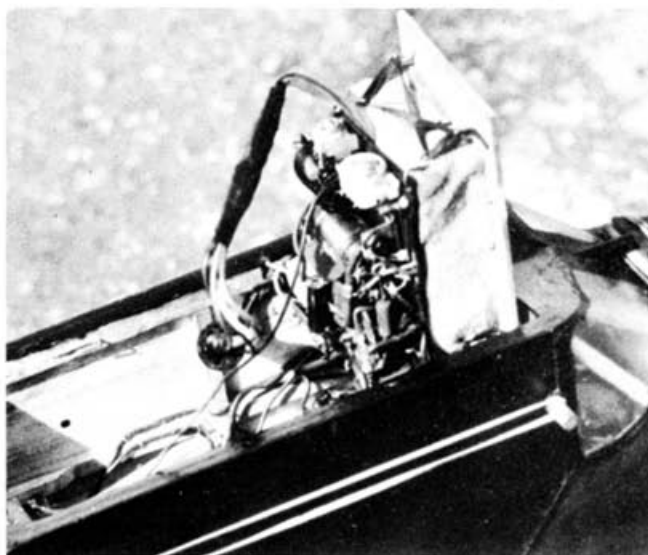
Before launching make sure that up elevator is the next flipper position. To eliminate having to remember elevator sequence, always use down briefly after up, in order to restore the up-next condition. Thus, if a spiral is performed on rudder, up elevator can be used in the pull out to produce a clean loop. Unless you want to perform a dive next, the down elevator position should be applied but not held, to return the escapement to up next. If a dive out of straight flight is desired run off the up position then hold down. The pull out will be a clean loop without elevator, but brief application of up will make the ship loop like a stunt U-control plane. (Continued on page 46)



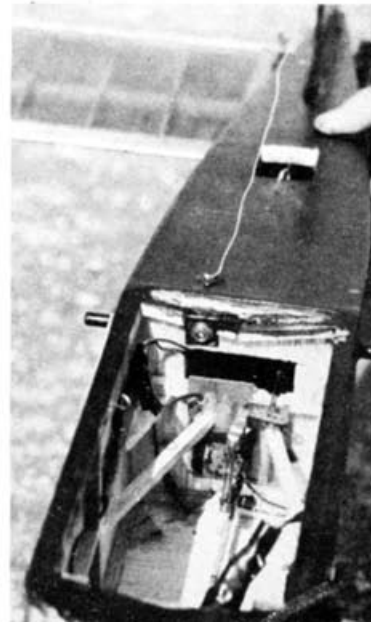
Landing gear pivots back to absorb shock. Rubber wraps around dowels. Idea used by Dick Schumacher. Lightweight air wheels.



Access hatches here removed to show location of B battery compartment and side-by-side location of Hillcrest plastic boxes.



Receivers built on one side of chassis may be mounted on foam on a slip board fitting into grooves, resting against a solid bulkhead. Miller shown. Below: Left—Walker tank is folded over between ply sheets; Right—The elevator escapement and part of linkage visible at rear of the cabin.



# Acrobat

(Continued from page 31)

Inverted flight was accomplished by heading into the wind, then performing a 1-1/2 turn spiral, allowing the ship to pull out, top to the wind. During the pull out up elevator was used briefly then, approaching the top of the loop, down was applied and held. This produced a nose high inverted position maintained for at least six seconds, after which the nose dropped. Beautiful Immelmans can be performed by applying rudder at the top of a loop following up elevator. The key to safe operation is to immediately fall back on rudder flying if things get too hot to handle.

The *Acrobat* is a sturdy plane. During its development it once dived in from 75 feet, (broken prop!) has cartwheeled several times at high speed.

Do not increase either the flipper movement or area for ordinary flying as the amount shown produces a vertical dive almost as soon as you think about it. Inverted flight was performed with flippers 3/16" wider than those shown, but that amount of area will tuck the ship under in a dive within 50 to 75 feet.

When trimming the stabilizer be careful to note whether or not the movement alters the flipper position in neutral. On the original ship, the stab was held on with rubber. For rudder only flying this is okay, but it was found that when flippers are employed it is desirable to affix the stab permanently in place. Sturdy keys were knocked loose in flight, giving changes in flipper angles which made the plane difficult to control. It is suggested that the stab be lightly cemented in place during test with rudder only, then be heavily cemented in place before use of flippers. The best way to trim for windy flying is to add solder to the nose, not to alter angles of the flying surfaces which always reduces stability.