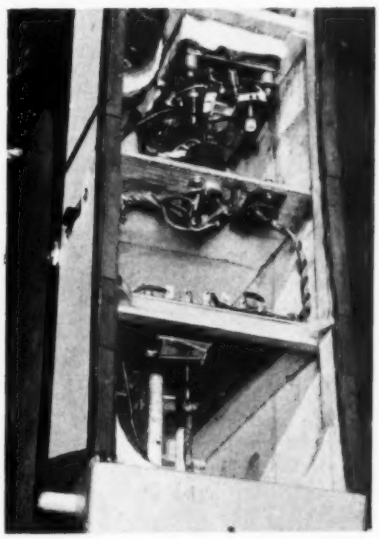
TRIPLE THREAT

Radio Control

Following popular practice, Triple Threat is easily built. A 15% thick wing, square cross-section prevent excessive dive speeds which interfere with outside loops. But climbs well.

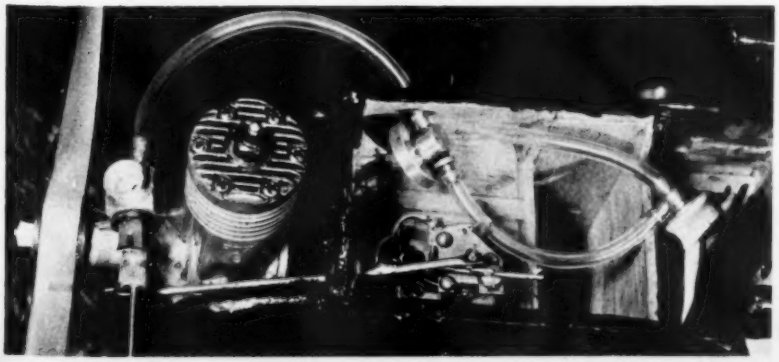
Twin hard-tube receiver mounts on foam rubber. Use Pliobond to attach foam to tray, receiver.



Cabin details, the receiver compartment and, to rear, escapement compartment. It's accessible!

Outside loops and other advanced maneuvers are easy with an escapement airplane. All you need is a good aircraft like this one. Developed for testing the VariComps or cascaded escapement deals, does well on rudder. Multi possibilities.

Bramco throttle, Fox .19, worked by SN escapement. Pressure tank (room for two) consistent.

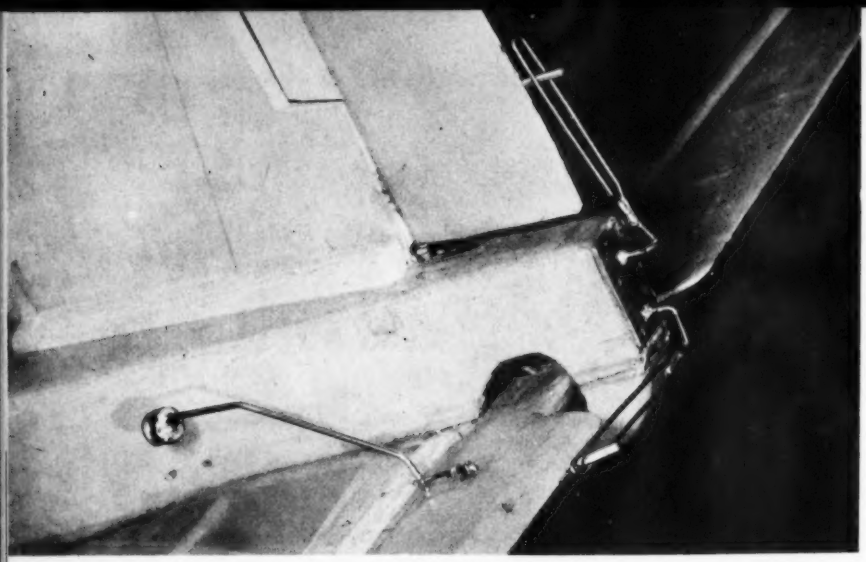


● Airplane designs truly qualified for rudder-only, cascaded escapements (Mickey Mouse), and multi-control can be counted on the thumbs of one hand. This one is outstanding as an all-purpose flier. Designed specifically for stunt on VariComp escapements—consecutive outsides and inside loops are easy, it maneuvers smoothly and easily on rudder and, with the addition of trim possible with multi-channel, would be capable of sustained inverted flight in addition to the outsides. On the VariComps, it demonstrated on 49 test flights (at time of writing) unusual possibilities as a basic, multi-class ship, assuming the necessary equipment substitutions.

Design: Good climb, moderate speed, relatively low dive speed, were required in a full-stunt machine of a size suited for escapements or servos. Five feet on a .19 is a reasonable maximum for an escapement airplane, yet is big enough for multi-channel and servos, with lightweight equipment. With heavy equipment and more than five channels, a larger aircraft would be required for top notch performance. But escapements can be marginal with big control surfaces and high air loads. Triple Threat has a 59-inch wing span with an 11 inch chord. A gross of less than four pounds gives 14 ounces wing loading and 326 ounces power loading.

Control System: Matched VariComps provide engine control through an SN escapement and Bramco throttle, on one quick blip; right rudder on one and hold, left on two and hold, up on three and hold, and down on four and hold. No timing problems occur with ¾ inch rubber escapement power with plenty of turns. Timing problems (wrong controls) exist when escapement speeds slow up—hence 3/16 inch rubber is advised against, or a low number of turns on any rubber. Engine control is really easy on lower escapement speeds, but then, fast signals for other controls frequently change engine speed. To save weight, 3/16 inch dowels were used at first with aerodynamically balanced elevators. Rudder

Continued on next page



Aft end, showing control surface drive linkage. In foreground, is mass balance on the elevator.

was sluggish, until aerodynamically balanced. Elevator was unreliable when rubber turns were expended until the mass balance was added, enabling the escapement to lift the flippers more easily.

However, 3/16 inch dowels made for a too flexible system. Pronounced elevator flutter resulted in dives, on the first half of outsides, etc., and the ship "pulsed" into the ground vertically. Incidentally, no structural damage resulted in test flight crashes with the exception of the under portion of the wing center section; due to the wing profile, there is high pressure exerted by the cabin front against the undercamber. (It is suggested that the first rib out on each side be laminated to prevent dishing in of the covering sheet wood.) One-quarter inch dowels were a must modification, but this ties in with other changes in flipper design.

Control surfaces: For "normal" stunting the rudder area and movement shown are fine but for sharp rolls, a bigger rudder may be required. If area is added, eliminate a compensating amount of area from the fin leading edge—the ship is nicely co-ordinated now on turns and does not wind (unless it is not adjusted for straight flight), so the side area proportions should not be disturbed.

The flipper area and movement shown will not give outsides if the CG is moved very far forward. However, the CG position was determined by trial and it is best to keep the status quo—unless servos permitting trim in addition to full movement are installed, as with multi-channel. The balancing of the flippers is highly important. The mass balance should assist the flipper to rise easily on signal (try with the lowest number of turns you expect to fly with), yet should not fully balance the surface which then might flutter. The aerodynamic balance is precisely correct as shown. (Area forward of hinge line.)

More balance was used at first (with a forward CG), but, though outsides were performed) a slow elevator flutter developed. When balance area was reduced drastically the flutter disappeared, but so did the outsides. A compromise amount of balance area (as shown) avoided flutter and permitted outsides. With servos the balance will not be necessary.

Airfoil: A 15% thick NACA 64 sub2 415 is used. The camber high point is well back. The true airfoil has slight undercamber near the trailing edge but this was eliminated on the model. Three engineers predicted dire consequences but model airplanes are like the bumble bee which flies, but shouldn't. No ill effects were discerned. The ship is rock steady in a strong wind, even on low motor. In fact, wind ceases to be a consideration.

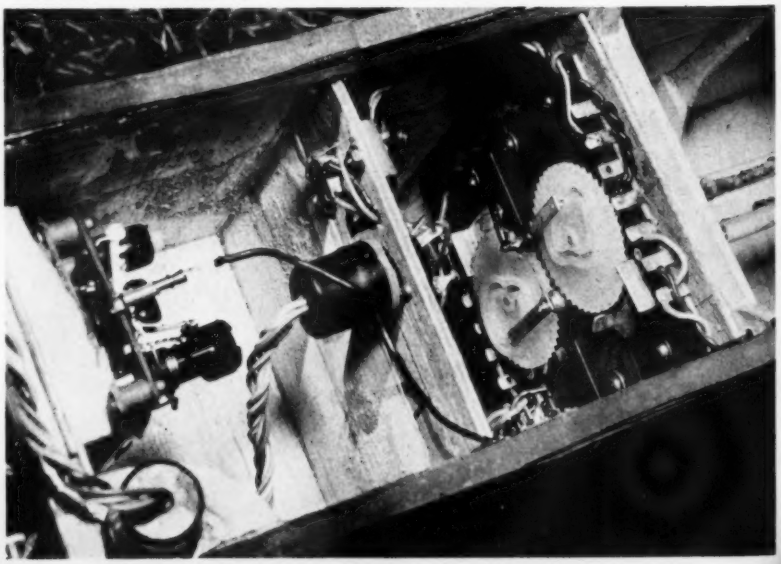
Incidence, Angular Difference, CG position: These three considerations are inseparable. It was found that a rearward CG, low incidence, and very little angular difference add tremendously to the ship's smoothness of flight and control, and enhance maneuvering. Although the CG supposedly should be much further forward according to the book, it appears that the book should be forgotten. This is true only of this type of airfoil. Without the serious travel of the center of pressure on the flat-bottomed sections, the airfoil used here is so stable that very little angular difference is needed. In fact, some people have flown such airfoils with a zero-zero line-up of wing and tail.

If the CG is displaced forward, more incidence is required in the wing and the ship immediately drags its feet and looses it's smoothness of maneuver at low speeds. With the finalized arrangement on the plan, experiments were made by adding pebbles to the nose, retrimming the tail when necessary. As weight was added, the outside loop diameter became larger and finally the loops could not be performed with the obtainable elevator reaction. A forward CG would be critical with a trimmable servo.

With greater decalage, or angular difference, the climb dropped off. Outside loop entries cannot be made properly from a nose-high attitude. Excessive decalage increases the tendency to split-S when attempting outsides—rather like having built-in up elevator.

Landing Gear: Made of two thicknesses of ⅛ in. music wire, the shock-absorbing gear not once was bent in 49 test hops, including two steep dive-ins where (*Continued on page* 56)

VariComps mounted according to instructions, given in literature. Batteries, receiver, plug in.



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more efficient breathing. As you can probably guess this motor with its many hours of time is mighty loose, which is just the thing for the new Fox Hi-Nitro fuel. The first two flights using the new Fox fuel ended rather abruptly with the engine quitting. This we found was due to the more critical setting needed for this type of fuel. No damage being done, and not to be discouraged, we tried again and much to our amazement the speed was 112.7 mph average over the 68 laps flown on that occasion. It was rather hard to believe that we could jump so easily our average speed. Many flights proved that these speeds were consistent, the only disadvantage being a more critical needle-valve setting.

Now for all you hot Rat Racing enthusiasts, here is the building data on this winning SEV Special Custom Rat Racer.

First study the plans and, after you decide to start, note the scale drawings for the fuselage formers and side plates. These should be made first. Next, cut out your motor mounts to the correct size. (About the only type of wood for mounts that we have found that will stand up to any extent are those of maple or oak.) You will notice that the type of tank is shown on the drawing. It is important to use this tank as the ship is designed around it. Now assemble and glue the boxfront end which is made up of the pieces you have just cut out, namely: plywood formers F-1 & F-2, plywood nose doublers, motor mounts, and plywood mount plate. In the assembling of the above unit be certain that the tank will fit snugly between the formers and the nose doublers. Why all the plywood in the front end? This is the secret of being able to obtain maximum engine power—a solid front end. Bend landing gear according to the plan and mount securely with J-bolts to the landing gear plate. Cement balsa sides to the front unit and add the rear formers. Cement in the landing gear plate. Cement in tail skid plate with blind mounting nuts in place. Mount engine with no offset, using blind mounting bolts. Cross plank bottom of fuselage.

Construct wing and stab as shown on the plans. Assemble elevator to the stab using plenty of hinges—with the speeds this heavy ship travels you will need them. Install control systems in the wing and stabilizer. Cement wing and tail section to the fuselage taking note of the balance point shown on the plans. Add pushrod and cut-off actuator. Carve and hollow top block and install. Now cut out rudder and cement to complete construction. For added strength, fillet underside of wing and stabilizer to fuselage.

Note that the elevator horn is mounted on plywood plates and that the pushrod hole in the horn is bushed. At speeds of 100 mph and better you'll find that details like these really pay off. Keep paint job light.

We have had most consistent results with a 9/7 Tornado prop but it is still a good idea to experiment.

Triple Threat

(*Continued from page* 36)

the gear would ordinarily bend forward. For simplicity, shock absorbing, and rigidity this gear was a pleasant surprise. The two metal straps bolt to ¾ inch ply. The rubber bands pull over the hook when the removable nose top is lifted.

Fuel system: The nose is big enough to take a clank tank, a plastic bottle tank, or at least two Walker tanks. Several arrangements were tried but it was found that the pressure tank and regulator gave consistent results. The pressure system has its annoyances, true, but when it works nothing works better. Carry a spare tank and regulator. A sport fuel, such as Testors 39 or Supersonic 100, gives desirable results with the power and weight of the original ship. Anything from a 10 x 4 to an 11 x 4 propeller is ok, though

the smaller size gives faster climb and more exciting performance. The larger props give more time to react. More power is unnecessary if the ship is not heavy and is properly rigged.

Radio: One of the new Essco two-tube hard-tubers was used. This type of receiver appears superior to the gas two-tubers which suffer from manufacturing variations in the tubes themselves. Also, the receiver is not so vulnerable to interference just off 27.255. One gas tube receiver was troubled by interference during a flying session with the Triple Threat, which was not bothered. Battery complement shown—three intermediates and two 30v hearing aides in parallel, is more than necessary. The receiver is satisfactory on two pencells; the escapements can take four pencells. The arrangement shown is not a handicap, is reasonably light and is good for several dozens of flights.

Construction is orthodox and anyone who has built a radio model, or thinks he can tackle this one, requires no "now-glue-this" information. Rather than give building instructions, it was felt that comments on this interesting test project would be preferred. Main purpose of the test was to find out what could be done with VariComps escapements. We might add a word of warning: do not have fore and aft slop in the torque rod system yet, at the same time, be sure the escapment arm and pin does not bind against the bushing, or press tightly against the front of the cam.

Radio Control News

(*Continued from page* 25)

Last month we told you that a resistor is a valve device for DC and most AC circuits. The valving action to the flow of current is dependent upon the resistance of the resistor; the voltage, we shall assume, remains the same. The next major item in almost any circuit is a capacitor. There are a variety of capacitors, used to perform their function in different types of circuits. However, you can assume, for all practical purposes, that a capacitor acts as an open switch in a DC circuit and as a closed switch in an AC circuit. Before you take this statement completely at face value, it should be mentioned that there are basically two types of capacitors used in RC work, the electrolytic and the ceramic or paper type. The ceramic and paper types are most generally used, with mica capacitors being used for applications where stability is required. A mica capacitor is built in much the same manner as a paper type. The electrolytic type must be used in a DC circuit, since it has a