THE BABCOCK '27'

Pre-wired and cabled, ready to install, a complete single channel system with rather unique engineering design. At a time when the single channel servo is the popular contender, this offering introduces a new concept in escapements. RCM wondered why . . .

At a time when most single channel fliers are turning to imported rudder and throttle servos, it came as something of a surprise that a large national manufacturer would introduce a single channel system that incorporates escapements rather than following the current trend toward motorized actuators. Our amazement was further compounded when this was advertised as a "complete, pre-tested system."

Upon obtaining a Babcock '27' system for test and evaluation, we were surprised to find that this is a "system" — that is to say, the receiver, compound escapement, throttle escapement, battery clip and switch panel, are all completely wired and cabled, ready to install without benefit of soldering iron. In addition, all '27' systems are pre-tested as a system at the factory prior to shipment. This, however, was not the only innovation. The transmitter employs a stick control which is, in effect, an electro-mechanical collector ring that eliminates pushbutton single channel flying. Although somewhat reminiscent of the older Babcock 'Digitran' system, the newer '27' bears little resemblance, either mechanically or electronically, to its earlier predecessor. Another interesting feature is the fact that the escapement arms are mounted and soldered in place with the torque rods already in position and stubbed out. A clever "universal joint" is supplied for connection to the torque rods in the airplane. Centering springs are in place on the escapement, factory installed and adjusted, to eliminate control surface centering springs on smaller aircraft.

Above: Complete '27' system as received and ready to install.

Left: Inside the transmitter, minus the four 9-volt transistor batteries.

Below: The '27' receiver — a super-regen receiver with a purpose.

Pending further evaluation, it appeared that the manufacturer's objective was to provide a single channel system that would provide a maximum amount of control for a minimum expenditure, while eliminating most of the tinkering normally associated with escapement systems, and even further compounded by multiple-function escapement set-ups.

General Description

Transmitter. Utilizing digital techniques, the '27' transmitter contains a crystal oscillator, series modulator, audio multi-vibrator, stick controlled time base, and "quick-blip" discharge circuit for motor control. Transmitter coding is accomplished electronically — short, crisp keying automatically accomplished when the control stick is moved to any one of the four positions, e.g. right, left, up, or down. The motor control is a pushbutton switch, which, when depressed, advances or retards the throttle. The transmitter itself is contained in a bronze hammertone case. Antenna is a telescoping, collapsible chrome plated unit. On the transmitter face panel is an on-off switch, plus tone and timing adjustments. Power supply is four 9-volt transistor batteries.

Receiver. The '27' receiver consists of a super-regenerative detector followed by two cascaded stages of frequency selective audio amplification (6000 cycles), a driver transistor,

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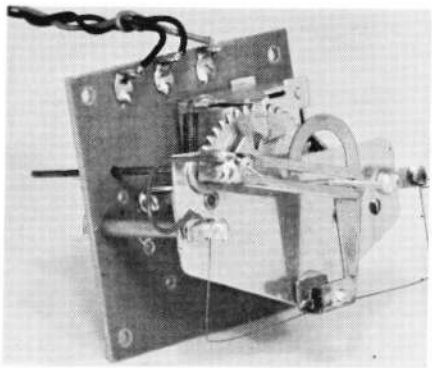
which in turn, directly drives the rudder-elevator escapement. In addition, another output transistor drives the motor control escapement. This very high selective audio frequency allows a super-regenerative detector to be used with immunity to CB interference — the latter being caused by modulation at much lower frequencies. The audio selectivity of this receiver is so great that an exact adjustment of the transmitted modulation frequency is required. This is accomplished by the Tone adjust function on the '27' transmitter. Power supply for the receiver and escapements consists of two 9-volt transistor batteries.

Escapements. The compound escapement used for selective control of the rudder and elevator surfaces is a recent development of Babcock Controls. Spring centering has been installed at the factory so that no external control surface springs will be required on the smaller aircraft in the .020 size. Additional centering will be required on models larger than this. Static and aerodynamic balancing is also necessary for models in the .15 displacement category.

Bonding for noise suppression has been built into this 9 volt escapement. Torque rod stubs have been preinstalled, and universal joints included, for ease of installing the aircraft torque rods while reducing any chance of torque rod binding. The throttle control escapement is of the two-position variety and is complete with its own mounting bracket and drive rubber.



A new concept in escapements—torque rod arms in place for rudder and elevator. Note centering springs for smaller-sized ships. Loop of hook-up wire on left is bonding for noise suppression.

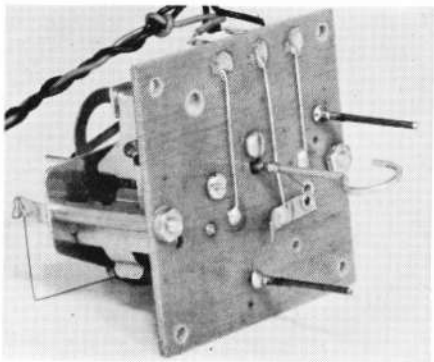
Price and Availability. The Babcock '27' is available only as a complete system and priced at $79.95. It is currently in production and available at all Babcock Factory Representative Dealers, or direct from the factory. '27' system owners may purchase additional receivers, escapements, etc. separately, as desired. A charger for "topping-up" the 9-volt transistor batteries is available separately for $4.95.

Findings

Three of the Babcock '27' systems were selected for testing by RCM. They were installed in a D.Q.A. 704 (.049 version) and in the Schoolgirl design by Ken Willard (.049). The manufacturers instruction manual accompanying the system is one of the most complete brochures of its kind we have seen and leaves very little to the "trial and error" process. The entire '27' system takes only a few minutes to install, but the single channel sport flier is cautioned to take time to pay close attention to details. This **is** an escapement system, and although most of the "tinkering" and tedious bench work has been eliminated by the manufacturer, all of this engineering consideration cannot overcome a sloppy installation hastily made. Make sure there are **no** binds in your system, that your escapement rubber is of the proper type and length, that you run the escapement through several hundred times on the bench to make sure there are no burrs that will cause it to hang up. Be sure your hinges are free of dope and glue and are connected to the torque rod arms without any form of binding or constriction. On the motor control escapement, make absolutely certain the pushrod runs as straight as possible to the throttle arm, eliminating any unnecessary bends or areas of friction.

Quite a few flights were made with the Babcock '27' system over a period of several weeks. The system proved to have more than adequate range when tuned according to the manufacturers instructions. The quick blip function worked at all times and regardless of the position of the aircraft with reference to extremes of range.

1¾" square escapement mount facilitates easy installation. Note torque rod wires stubbed out ready for "universals." Thin wire arm and shim brass strip is quick blip contact.



No problems of interference were encountered despite the fact it was continuously tested in an area congested by CB voice channels.

It is apparent, as mentioned earlier, that the manufacturer has intended the '27' system to fill a definite void in single channel sport flying. Offered as a pre-tested, complete system at less than $80, it offers the sport single channel enthusiast a method of obtaining rudder, elevator, and throttle control without spending $200 for a six channel reed rig. To be sure, the Babcock '27' is not intended to compete with the reed systems, and as an escapement system, will not perform the same functions. Rather, it is intended to control the smaller variety aircraft, enabling the pilot to obtain a maximum amount of control, flyable from small local fields, at a minimum expenditure.

RCM find the Babcock '27' system to perform its intended functions admirably and with considerable improvement over any other form of cascaded or compound escapement setups available in the past. The manufacturer states that although motorized actuators were originally considered for this system, the weight and space requirements for them precluded their use in smaller aircraft and also substantially raised the manufacturing costs to a point where the list price would have been above the $80 mark. As it stands, the single channel devotee with some experience in rudder only flying, and with careful attention to installation details, should reap many hours of flying pleasure from the Babcock '27' single channel system.