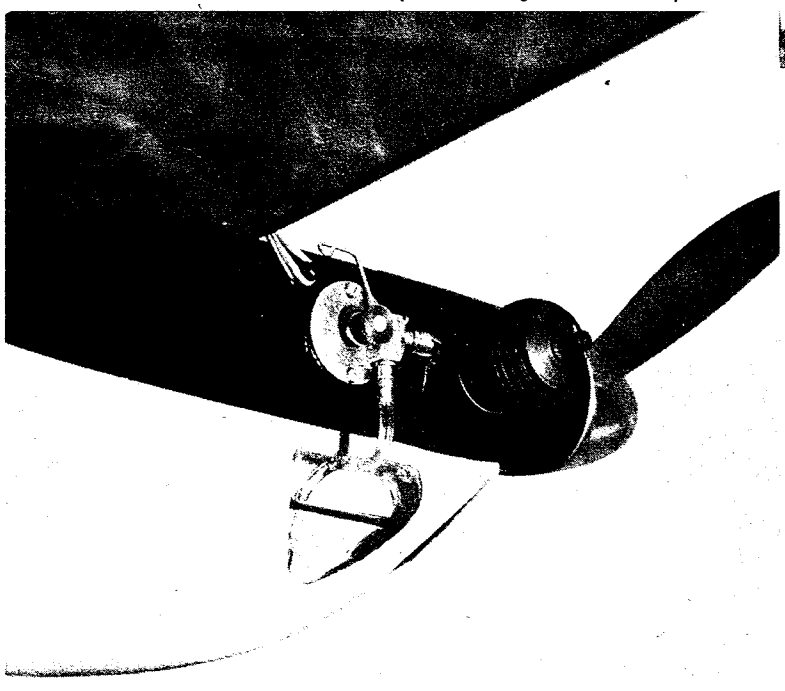
Vertical take-offs are routine with the fast climbing Amazoom. High thrust line and underslung fin just two of many features.

the Amazoom

By STAN HILL

Fourteenth in a series, this surprising free flight goes on from where the designer's well known Amazon left off. It is tops for .15's!

Built-in transparent tank and arrangement of side-mounted Diesel and fuel shut-off timer. The profile fuselage fairs to the spinner.



▸ The Amazoom is the fourteenth in a series of aerodynamically similar ships begun in 1942 out of a desire for more stability under power than models of the day could offer. The more significant developments are described as they affected the characterstics and performance of the basic design. It should be kept in mind that these data are presented as they affected one design and shouldn't be applied indiscriminately to all free flight types.

The first model was not unlike a thinner and longer Powerhouse but, between a dirty engine on every landing and Charlie Grant's influence, the thrustline and CG were raised as much as possible. With center of thrust, CG and center of drag nearly on the same line, the previously tight (and, therefore, power-wasting) spiral climb opened up to a loose one-turn-per-five-seconds while the rate of climb almost doubled. Except for the inevitable effect of careless adjustment, which no ship can entirely overcome, spiral dives under power disappeared.

A tour of duty flying P-47's during the war interfered somewhat with my modeling activities, but did not stop them, and five ships from '44 to '48 showed minor refinements, such as buried belly wheel, higher aspect ratio (8:1), a thinner, more penetrating airfoil and general clean-up re-

Having designed 1948 version Amazon, Mrs. Hill cheers Stan's super duper Amazoom, one of which she displays here for the camera.

sulting in further stability and about 15 per cent increased performance. Playing around with stabilizer dihedral demonstrated clearly that stab dihedral increased spiral instability, while anhedral created resistance to spiral dives.

In 1948, my wife, basing her work on the latest developed model, designed the Amazon to take advantage of the then-new glow engines. Aspect ratio went to 9:1 (about the limit for a hot ship) and loading went down, giving a beautiful glide. Its construction was a little complex but was exceptionally rigid to stop in-flight flexing and warping in the sun between flights. The second version of the Amazon was modified in structure only and was flown to victory at the '52 Nats.

While we were testing two new ships to use in England at the '53 FAI finals, it became evident that the "balance" of thrust offset against twin rudder offset was a balance at one speed only, with thrust being more effective at a low speed and rudder at high speeds. What was needed was a set-up permitting a good balance of forces at all speeds under power while still maintaining a good glide turn without trick gadgets such as auto rudders or drag (*Continued on page 45*)

Pen Pals

► An English modeling club makes bid for friendship and correspondence with an American group of wide general aircraft modeling interest that would also like to swap plans and equipment. Write to A. Dowdeswell, Gloucester Model Club, 7 Victoria St., Gloucester, England . . . Letters from aircraft racing pilots (or from anyone who worships them) would be welcomed by Charles Mandrake, 434½ Center St., Ashtabula, Ohio, who can trade photographs and similar material on historic racing aircraft from 1909 to 1939 in return for assistance in his racing plane research project. . . . Others who'd like to switch from dope can to inkwell occasionally are CAP Sgt. George W. Dart, 7226 Penarth Ave., Upper Darby, Pa., stick and solid scale. . . . A. Coccon, C.B. Ayres 49, Milano, Italy, flying scale, A.2, will also trade . . . William P. Todd, 3 Kingswood, Park Drive, Port Elizabeth, South Africa, solid scale, especially 1918-1939 . . . Colin Legge, 11 Grange Rd., Mt. Eden, Auckland, New Zealand, ages 22-24, flying scale and solid.

On the swap mart are two Cubs, .049 Diesel and glow, offered by Frank Collier, R. 2, Box 187, Madison, Fla., for any German or English .09 Diesel . . . Half-A engines and kits for RC and Class A engines by Jerry Kramer, 14925 Garfield Drive, Leisure City, Fla. . . . New European motors for American by Ivan Gause, Bankogatan 9, Goteborg V, Sweden . . . English modeling goods for plans of de-Bolt Live Wire Sr. or Live Wire Cruiser by Cliff Craythorne, 32 Skipworth St., Leicester, England . . . and Raymond Leone, 219 N. Jefferson St., Batavia, Ill., will buy your spark ignition engines, all types.

More SOS calls on hard-to-find equipment from David L. Buhrman, 642 Trail Ave., Frederick, Md., 16 and 18 in. props for OK Twin . . . Stephen A. Lambert, P.O. Box 3421, Fayetteville, N.C., 1929-1932 issues of MAN (we don't have, either) . . . Albert Pendergraph, 811 Spring St., Durham, N.C., out-of-print MAN booklet on P-47 Thunderbolt . . . But for a switch, Charles Donald, P.O. Box 186, Union City, N. J., offers WWI reference material.

The Amazoom

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tabs. The answer seemed to be elimination of tip rudders and offsetting the fin at the angle at which the propeller wash flows over the tail. Result was a trim set-up that was neutral on the way up and right as soon as the engine stopped.

Next came VTO as a logical solution to the usually inadequate take-off site, as it usually allows a little more altitude, when used with a suitable prop. Blade area should be on the generous side to give a quick, "solid" vertical take-off.

A surplus of Amazons allowed us to satisfy our curiosity about minimum dihedral, stab and fin areas. Absolute minimum stab area was 15 per cent and anything less than 25 per cent proved rather sensitive to adjustment. Reductions to 25 per cent improved glide, particularly in respect to recovery from turbulence displacement. Finally, a 30 per cent stab was fixed as a happy medium of adjustment for adjustment ease and performance. Dihedral angles of 6° inboard and 15° outboard with the outer break at 60 per cent out from the root gave all the stability necessary while maintaining a really good glide. Less than this amount didn't roll well enough and more than this spoiled the glide somewhat.

Bill Kaupp, our club president and contest director, tried turbulators on his 310 in. Amazon and, while glide went unchanged, altitude loss in stalls was halved. This prompted a change to a turbulent-flow section of the sharp-nosed variety. To keep a fairly high mean camber in a thin, flat-bottomed section, the entry point is as low as possible, giving a mean camber of five per cent in a ten per cent thickness section. This wing had better penetration, far better stall recovery and a better glide.

One Amazon was tried with various combinations of downthrust and stab thickness, downthrust varying from 0° to 10° and stab thickness from 6 to 12 per cent. Result? Stab thickness variance was found to be much more effective in controlling looping tendency. Stab thickness of eight per cent with downthrust of 0° to 3° seemed to offer the best combination for good control without undue sensitivity. These data in particular are very specific for one design and vary a lot with wing and stab moments.

Then the AMA changed its rule on the use of wheels, allowing the fin to be brought to the bottom of the fuselage and omitting the wheel. Immediate advantages were less complex and more stable VTO platform and a fin that couldn't be knocked out of alinement. Not foreseen but very welcome was a beautiful climb-glide transition resulting from a more upward-inclined rolling axis.

That was about as far as the Amazon could go under the same name, since everything had undergone structural and functional change except the fuselage contours. On the theory that most model turns are "skidding" ones, the next ship had a 5° forward sweep at the LE to give more lift to the inside wing. This method is preferable to wash-in because it doesn't add a turning tendency of its own that has to be compensated for at high speed.

Summing up the flight characteristics of the entire line, the ships have an excellent ability to punch through turbulence with minimum upset; left climb turn and a marked resistance to spiral dives. The Amazoom combines the best features of the ships it succeeds with simple and quick construction.

Although construction is straightforward, we've discovered a couple of tricks that will speed things up. In the "crutch sandwich" type of construction, trace off the fuselage plan onto the right side sheeting with carbon paper and build directly on that, adding the left side sheeting before removing it from the board to insure perfect alinement. Build the left wing half directly on the bottom of the right wing (with waxpaper in between, 'natch). This saves the plan and gives perfect similarity of the two wing halves.

The fuel tank is pretty clear on the plan. But note that for operation on very high nitro content fuels, such as Ohlsson 2000, it is advisable either to drain the tank between flights or to use metal rather than plastic for construction. Use ethylene dichloride as a cement for the lucite glow fuel tank.

Of course, silk covering is preferable to paper for its greater strength. If you're using a Diesel, here's a good dope mix by courtesy of Johnny Carroll, secretary of the Irish AMA: one part clear or pigmented nitrate dope, one part banana oil and five to ten drops per ounce of castor oil. It gives a good sheen and doesn't tighten too much. About four to six coats will do the job.

The light weight of the design permits use of heavier engines, such as ED 2.46 and Oliver, as well as ballasting to exact FAI requirements. Add the ballast in holes cut in the nacelle top. This also helps place the CG at exactly 70 per cent of the wing chord.

To fly, just block up the front of the stab, adjust glide until it is definitely too steep, then remove just enough for a flat, straight

glide. Take the first few flights at low power, adjusting with rudder tab or stabilizer tilt for a wide left climb and wide left or right glide turn, choosing the one that comes most easily to your ship. A little right thrust may help in some cases. Any looping tendency may be controlled by shifting the wing forward and lowering the stab TE to retrim the glide.

Under full power, it should do one to two turns in a 15-second run. Contrary to the usual preference for a tight glide turn, I prefer a wide one because it averages the effects of thermals and downdrafts rather than leaving the ship dependent on the right kind of current. This is no handicap as the ship is easily capable of a maximum flight without thermal aid. VTO launches should normally be made downwind if it is at all windy; otherwise, it's not critical.

You and your Amazoom should get along well. Just take time to think out adjustments before you make them—same procedure you'd follow with any "hot" airplane.

Radio Control News

(*Continued from page 22*)

receiver, while competing in the multi-channel event. European and British flying has swung to quite a few multi-channel units and they do quite well. One item which is often overlooked when going over to multi-channel work is the plane itself. As mentioned previously, the fact that you have been flying with rudder-only, successfully, does not mean you may expect the same results when you put a multi-channel unit into it, especially on elevator control.

Anyone who is a member of the AMA is familiar with the insurance provided. In the days of rubber-powered models and free flight gas jobs, this was something to be considered. Now with RC flying, the fliers have somewhat ignored this insurance business, believing that RC was the solution to all "irregular and uncontrolled" flight patterns. However, the planes in some cases have become bigger and heavier and more costly and therefore insurance is something that should be given consideration. We aren't out to sell insurance, but Bill Pythruss of Kingston, N.Y. points out that a special policy is issued by Heber Smith Morris, Inc., 113 North St., Alexandria, Va. This will cover personal accident, baggage, models and equipment. This, plus your AMA insurance, should give you full coverage.

CLUB NEWS

Although the KC/RC Association of Kansas City, Mo. held their AAA meet on June 18 and 19, we thought you'd be interested in the results. As a two place home-made soaring glider, towed up from the flying site at Stanley, Kan., maneuvered overhead during the contest, Dick Arland picked up first place in rudder-only and Dan Walters took first in the multi-channel event. Out of the 33 official entrants, Kenny Wright, Kansas City, Mo. took first prize for the worst crack-up. Second place in the multi-channel event went to the grand-daddy of builders, Charles Siegfried of Wichita, Kan. Looks as if the multi-channel event will get Charlie and his "flying lab" back in circulation.

It won't be until next month that we'll be able to bring you the winners of the New England RC Championships held near Wellesley Hills, Mass. on August 14. However, it might be interesting to know how the contest was run as far as events are concerned. The rudder-only and multi-