



# THE SB-1 ACE

By J. T. Benich and F. E. Spiewak

(Editor's Note)—The SB-1 Baby Ace, the pride of Joseph T. Benich, 28230 Gilbert Drive, Warren, Mich., and Florian E. "Larry" Spiewak, 20666 Woodmont, Harper Woods, Mich., both EAA members, was born in September, 1958, as a result of reading the article on building of the MI Baby Ace that appeared in *Mechanix Illustrated Magazine* in 1955.

Both of these industrious EAA men are to be commended for their excellent workmanship and, especially so, in the preparation of what probably is the first maintenance and operation manual adapted to an amateur-built aircraft. This 50-page manual is very complete and would be invaluable to any future owners of the airplane, FAA personnel or mechanics who in some way become associated with flying, certification or maintenance and repairs of this aircraft. We believe that all builders of amateur-built aircraft should consider preparing such a manual. Now to their story—

Along with the Heath Parasol and Long Longster, the Corben "Baby Ace" ranks high on the list of famous homebuilts. Not only was this ship popular in the 30's, but when Federal regulations permitting homebuilding became a reality in the late 1940's, one of the first sport plane designs revived was the Corben "Baby Ace". This little ship is of the classic parasol open cockpit type so popular earlier. The modern re-design retained all of the outlines and basic construction of the original. The reliable 65 hp Continental engine is used for power, giving the new Baby Ace considerable more pep than earlier versions. In those days, the 40 hp Szekeley and Salmson radial or the 30 hp Ford and Harley-Davidson (Harley-Davidson cylinders) engines were used.

Except for some minor beefing up here and there, the only change on the new Baby Ace has been slightly increased fin and rudder area to take care of the higher horsepower. The old and new Baby Aces have fabric covered wood structure wings with steel strut bracing. Fuselage and empennage are steel tube construction with fabric covering. Many parts from older J-3 Cubs are adapted, such as landing gear, wing struts and tail wheel. The new Baby Ace is a fine performer, well suited to the Sunday afternoon sport flyer. It is rated "non-aerobatic" which prevents a lot of dangerous nonsense engaged in during earlier days in inadequate airplanes.

## CONSTRUCTION INFORMATION

### WINGS

The wing ribs and wing assembly were made from Model "D" Baby Ace Wing Assembly drawings. Each wing panel consists of 14 wood modified Clark Y ribs. The ribs were made from 1/4 in. square spruce capstrips, 1/16 in. mahogany 3-ply plywood gussets held with urea resin glue and cement coated 20 gauge aircraft nails. The wing spars are of 3/4 in. aircraft quality Sitka spruce. The aileron spars are made from 3/4 in. Sitka spruce. Drag and anti-drag wires are 9/64 in. steel rod. The wing tip bow is 1/2 in. by .035 in. 1020 steel tubing. The leading edge, forward of the spars is made from 24ST .020 aluminum. The spar root fittings, spar strut fittings and aileron horns are made from .093 4130 steel. The center wing fairing is .025 24ST3 aluminum attached to the butt ribs with PK screws.

### WING-TO-FUSELAGE ATTACHMENT

The wing spars are attached to the cabanes with 3/8 in. bolts and to the struts with 3/8 in. bolts. The wing struts are modified J-3 struts with large adjustable forks on the rear struts. The wing to fuselage drag wire is 1/8 in. dia. (7x19 type) prestretched cable. The jury struts are 1/2 in. .035 4130 steel tubing.

### FUSELAGE

The complete fuselage is made from 4130 steel tubing. The longerons are 3/4 in. dia. .035 wall tubing. Upright members vary from 5/8 in. .035 just aft of the pilot seat, 3/4 in. .035 forward of the pilot, and 1/2 in. .035 aft of the pilot. Cross members and diagonal members vary from 3/4 in. to 1/2 in. .035 wall. Tail post is 7/8 in. dia. .035 wall. The engine mount lugs are 1/2 in. dia. .062 wall tubing. A J-3 engine mount is used. The firewall is .025 stainless steel. The cabane struts are 1 in. .049 wall tubing with the top fittings made from 1 in. square .125 wall. The landing gear and strut fittings were made from .125 steel. The top and bottom cowl fairings were made from 1/4 in. .035 wall tubing. The bottom fairing strips and side stringers are 1/4 in. x 3/4 in. spruce. The turtledeck bulkhead fairings are 1/4 in. 3-ply plywood with 1/4 in. x 3/4 in. deck stringers. The headrest is formed .025 24ST aluminum. The cockpit flooring, pilot seat and back are made from 1/4 in. 3-ply plywood. The seat and back are air foam padded and naugahyde covered. An aircraft approved seat belt and shoulder harness is included. A door is provided on the right side



of the fuselage. The cockpit fairing is .050 aluminum. The bathtub and engine cowl is .025 24ST3 aluminum. The nose cowl is a modified J-3 cowl.

#### MAIN LANDING GEAR, WHEELS, AND TIRES

A standard J-3 gear is used with one shock cord on each gear. The main wheels are Goodrich G-3-787. The main tires are of the 6:00x6 size.

#### MAIN WHEEL PANTS

The wheel pants were made from a mold belonging to James Miller, 6545 Asbury Park, Detroit, Mich. Three layers of fiberglass cloth were used with a polyester resin.

#### HORIZONTAL STABILIZER

The leading edge and ribs are  $\frac{1}{2}$  in. .035 steel tubing. The trailing edge is  $\frac{1}{4}$  in. .049 steel tubing.

#### ELEVATOR

The leading edge is  $\frac{3}{4}$  in. .049 steel tubing and the trailing edge is  $\frac{1}{4}$  in. .035. Tapered channel ribs are made from .040 steel. The elevator horn is .125 steel.



#### VERTICAL STABILIZER

The leading edge is  $\frac{1}{2}$  in. .035 steel tubing. The trailing edge is  $\frac{7}{8}$  in. .049 tubing with a  $\frac{3}{4}$  in. .049 tubing insert at the bottom. The bottom horizontal tube is  $\frac{3}{4}$  in. .049 tubing. The ribs are tapered channels of .040 steel. Diagonals are  $\frac{1}{4}$  in. .035 tubing.

#### RUDDER

The leading edge is  $\frac{3}{4}$  in. .049 tubing and the trailing edge is  $\frac{1}{4}$  in. .035. The ribs are tapered channels of .040 steel. The diagonals are  $\frac{1}{4}$  in. .035 wall tubing. The rudder horn is .125 steel.

#### CONTROL CABLES

The flight control cables are all  $\frac{1}{8}$  in. dia. flexible (7x19) type pre-stretched aircraft cable with AN 210 anti-friction bearing pulleys and  $\frac{3}{4}$  in. fairleads.

#### COVERING

The engine cowl, bathtub cowl, and nose cowl are aluminum. The remainder of the fuselage, the landing gear, the empennage, and wing panels are Grade A cotton aircraft fabric (dated May 1959) with cable openings reinforced with leather patches. The rib stitching is of No. 7 waxed cord. Drain grommets are located at all areas where the possibility of water may exist. Inspection openings, covered with metal domed covers, are located on the underside of the wings and fuselage.

#### FINISHING

Wood—All wood material used in the aircraft has a minimum of three coats of spar varnish.

Fabric—Five coats of clear nitrate and three coats of silver nitrate were used to fill the fabric. The fabric was wet sanded between the silver coats with fine sandpaper. Three coats of color nitrate (white, red, black) were sprayed. Finish is hand rubbed and waxed.

Metal—All metal was zinc chromated and sprayed with enamel.

#### POWERPLANT

##### ENGINE

The engine is a Continental A-65-8F, serial no. 3896268. Maximum horsepower—65. Maximum continuous RPM—2300 rpm. Fuel—73 octane. Oil—(Ambient air 70°-100°) SAE 30. Bore—3.875 in. Stroke—3.625 in. Displacement—171 cu. in. Compression ratio—6.3:1. Dry weight (Eng. and Mags.)—176 lbs. Oil sump capacity—4½ quarts (fill to 4 qts.). The engine on the aircraft has "0" time since major.

The cylinders were bored .015 over to 3.890 dia. by Shores Motorcycle Shop on June 2, 1959. Four (4) new pistons p/n 4648+.015 and a ring set p/n 4—R+.015 were

purchased from Fresno Airmotive. More complete engine data can be found in the Engine Log Book.

##### PROPELLER

The prop is a Sensenich wood prop Model 72CK42, serial no. H4773 (Counterbored for flange crankshaft). It has been factory reconditioned and certified airworthy by the factory December 5, 1958.

#### WEIGHT AND BALANCE REPORT

Spiewak Baby Ace, Serial No. SB-1,  
Registration No. N-85Y

##### Computation

1. Datum is leading edge of wing.
2. Leveling means: level top longeron between instrument panel and rear cabane.
3. Main wheel weighing point is located +4 in. aft of datum.
4. Actual measured distance from main wheel centerline to tail wheel is 160 in.

##### Actual Empty Weight (Includes Gas and Oil)

Weighing Point	Scale Reading	Tare	=	Net Wt.
Right Wheel	310 lbs.	9 lbs.		301 lbs.
Left Wheel	310 lbs.	—0—		310 lbs.
Tail Wheel	45 lbs.	—0—		45 lbs.

Total Net Weight

656 lbs.

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### Center of Gravity as Weighed

C.G. relative to main wheel weighing point:

$$\frac{160'' \times 45 \text{ lbs.}}{656 \text{ lbs.}} = \frac{7200}{656} = 10.9''$$

C.G. relative to datum:  $10.9'' + 4'' = 14.9''$

### Aircraft Empty Weight and C.G. (Less Gas and Oil)

	Weight	x	Arm	=	Moment
Aircraft Empty	656		14.9		9774.4
Less Oil	7		-20.5		-143.5
Less Gas	9		0		0
Empty Total	640 (a)				9630.9 (b)

$$\frac{(b)}{(a)} = 15.0'' \text{ Empty Weight C.G.}$$

### Weight and Balance Fully Loaded

Approved Fwd. Limit 11.88". Approved Aft Limit 18.36". Maximum Weight 950 lbs.

	Weight	x	Arm	=	Moment
Aircraft Empty	640		15.0		9600.0
Oil	7		-20.5		-143.5
Pilot	200		27.5		5500.0
Gas	72		0		0
Baggage	10		47.0		470
Total	929 (tw)				15426.5 (tm)

$$\frac{(tm)}{(tw)} = 16.6'' \text{ Fully Loaded C.G.}$$

May 22, 1960.

June 20, 1960

Dear Paul,

As for the first day of N85Y, May 22, 1960, Larry towed the aircraft and carried a wing panel on top of his

car while I followed in my car carrying a wing. Upon arrival at McKinley Airport, we found a group of Chapter 13 members waiting since we had set the 22nd as the first flight date about a week earlier. While Larry and I started assembling, the wives, Aline and Anna Marie, and the rest of the family were enjoying the picnic atmosphere and the shade of a group of large trees that decorated the southwest corner of the airport. In two hours the aircraft was assembled. Before putting it on the scales, Larry wanted to burn out some gas so he started taxiing. Well, he got clear to the other side of the airport when the engine quit. So it was quite a laugh to the group to see Larry walking N85Y back while I drove over to buy a gallon of gas which would get us to the gas pit after weighing. The C.G. looked good so we took time out for a real barbecue lunch put on by the girls. After lunch Larry tried three high speed runs, wheels up, then aborted the take-off. On the fourth, he kept on going. He made a large pattern and came in for a landing. (He took the first flight because he has had considerable J-3 time and has the light plane feel). Without shutting the engine, he motioned me in and I lost no time in making a few taxi runs and my first take-off. We found the airplane to be very peppy, and initially right wing heavy and flying in a slight skid. After correcting this, it flies "hands off" at 2150 rpm, level flight. We also find that it has the "big plane" feel on landing since it has excellent control over the fence and after flare-out it pays off nice without the tendency to float.

The aircraft is a crowd-pleaser especially since the front page picture in the Detroit News. We have had many comments regarding the beautiful workmanship and finish we have on the plane. These kinds of comments we had hoped to get since our goal in the beginning back in 1958 was to win workmanship awards rather than to build a plane to get some cheap flying.

Joseph T. Benich  
Florian E. Spiewak

## GROUNDING BY COYOTES . . .

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I was removed from the wreckage and taken to the Enid General Hospital, Enid, Okla. What a contrast to my experience of the preceding Sunday, when I won the cash prize for shooting the biggest coyote at the Big Four Community coyote hunt, in Kingfisher County.

The surgeons straightened up my facial structure but I am marked for life. In 1952, I thought I had a boil on my right cheek bone; however, the doctor removed a piece of aircraft aluminum from my face. My injuries required a total of three periods in the hospital and literally thousands of dollars in medical expense and lost farm profits. In spite of my flying experience, this happened to me.

My advice to new pilots is that if they must hunt coyotes, do so with binoculars from a safe altitude. The dogs on the ground can then catch them after you have spotted them for the ground hunters.

Nevertheless, as I sit here on the farm in the evenings, I hear coyotes yapping in the fields west of my house. That old spine tingling starts in again and I want to get my gunner and go on another hunt. I look across the kitchen table at my charming wife; she gives me a cold, hard look. No, this 58 year old pilot will not hunt again. But, the coyotes are still yapping out there in the night air.

## STATEMENT OF OWNERSHIP

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Robert E. Nolinke, business manager

Sworn to and subscribed before me this 29th day of September, 1960.

(Seal)

Margaret H. Baas, Milwaukee County, Wis.  
(My commission expires April 7, 1963)