Spanning over five feet this Jumbo rubber-powered job, offers simplicity of line, striking appearance, and the ultimate in performance. RC designers could have a field-day in adapting it to Sport Scale.

■ Bill Noonan

THE name Messerschmitt conjures up a mental picture of the Me109, surely one of the most famous German aircraft. But Willy Messerschmitt, like his British counterpart, G. de Havilland, was responsible for many other aircraft designs, both military and civil, which were not well known, but possessed characteristics which makes them worthy of attention. The M20b, I believe, is one of them.

The Messerschmitt M20b, sometimes identified as the BFW M20, after Bayerisch Flugzeug Werke, the company which built it, is an uncelebrated aircraft which deserves more regard.

It is an interesting airplane in the respect that it seems to represent the archetype of a successful design formula which marked Messerschmitt creations, starting with the diminutive S-15 powered glider of 1924 and maturing in the immediate predecessor to the Me109, the Bf108, Taifun. These design peculiarities, thick, tapered wings, knife-like fuselage shapes, were incorporated to some extent by other contemporary designers, but Messerschmitt had a certain finesse when it came to putting all the parts together in a particularly pleasing and efficient way.

The M20b, which first flew in 1928, was described as being a ten-passenger transport of metal and fabric construction. A total of 15 aircraft are known to have been built, most being operated by Lufthansa between major European cities between 1929 and 1937. One was still on register as late as 1942.

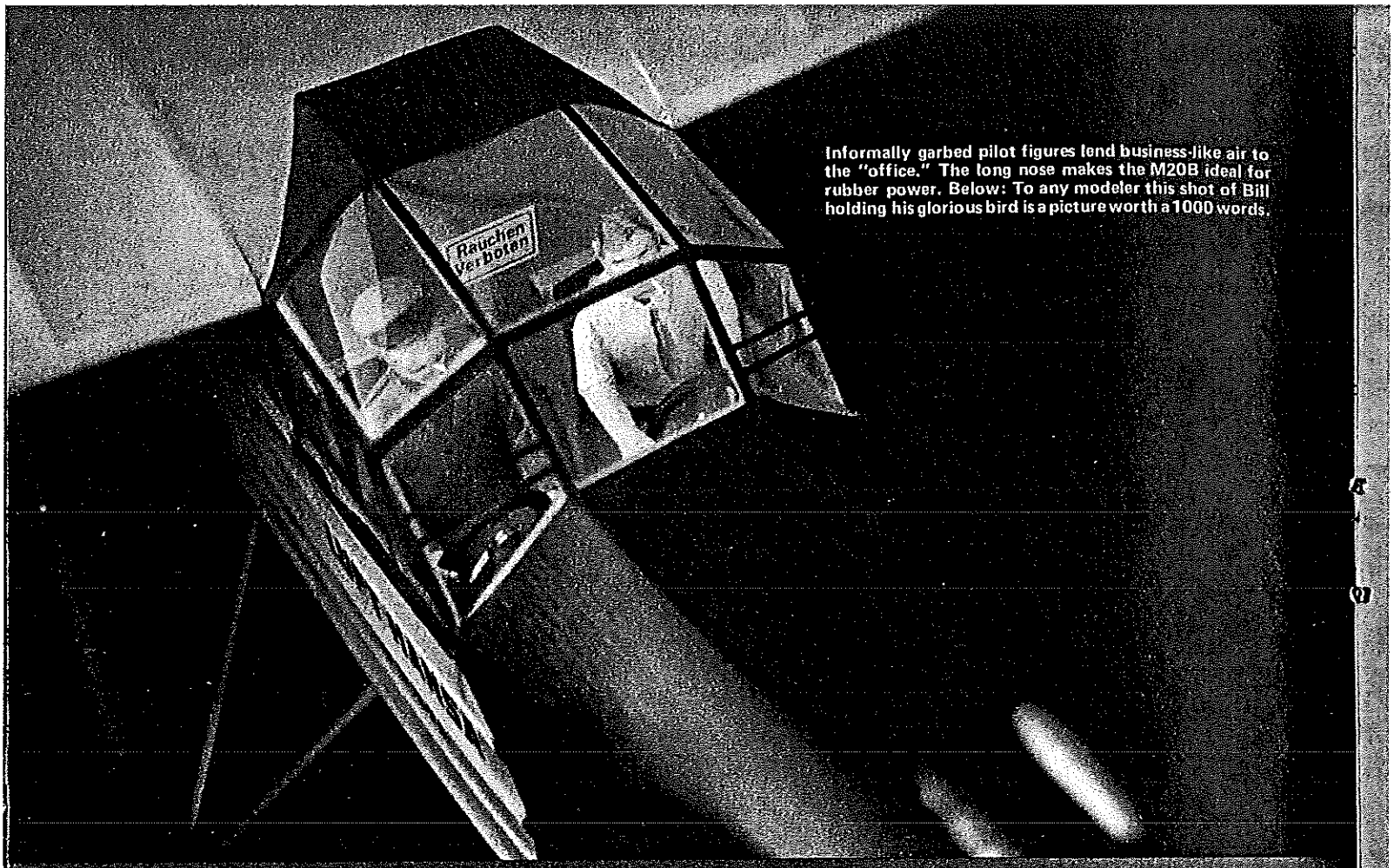
The plane makes a good modeling subject for a number of reasons. Its relatively long nose is advantageous for rubber scale, and the simplicity of the box-like fuselage makes it easy to build. The thick-section tapered wing is extremely strong.

Our model was developed from 3-view drawings which appeared in an *Aero Digest* magazine of 1929. Details were confirmed through photographs and specifications from other sources, namely, archives of the San Diego Aerospace Museum, correspondence with Messerschmitt-Bolkow-Blohm, Lufthansa German Airlines, Hans Justus Meier (Bremen, Germany), and Bill Hannan, Escondido, California.

Observant readers will note that the horizontal stabilizer on the plans incorporates a lifting airfoil section and is slightly larger than the one shown in the photos. These changes, made to the model after the photos were taken, moved the C.G. aft and improved the spiral stability.

Fuselage: Construction is simple and results in a strong, light structure. Longerons are made by laminating 1/8 × 1/16 balsa. (See typical cross-section on plans.) These are secured over plans after cement has been applied sparingly to one side of the

Nor, does it seem that Bill ever picked an uninteresting subject. A modeler's modeler, his every project assures the epitome of performance.



Informally garbed pilot figures lend business-like air to the "office." The long nose makes the M20B ideal for rubber power. Below: To any modeler this shot of Bill holding his glorious bird is a picture worth a 1000 words.

3/32 sq. and joined with the 1/8 × 1/16 part. The laminated lay-up serves two purposes: it allows the 1/32 sheet in the cabin section to be "let in" the fuselage sides, and also provides rigid longerons which retain their contour once dry.

All upright pieces are 3/32 sq. balsa, with the exception of the 1/8 × 3/32 piece immediately under the wing spar.

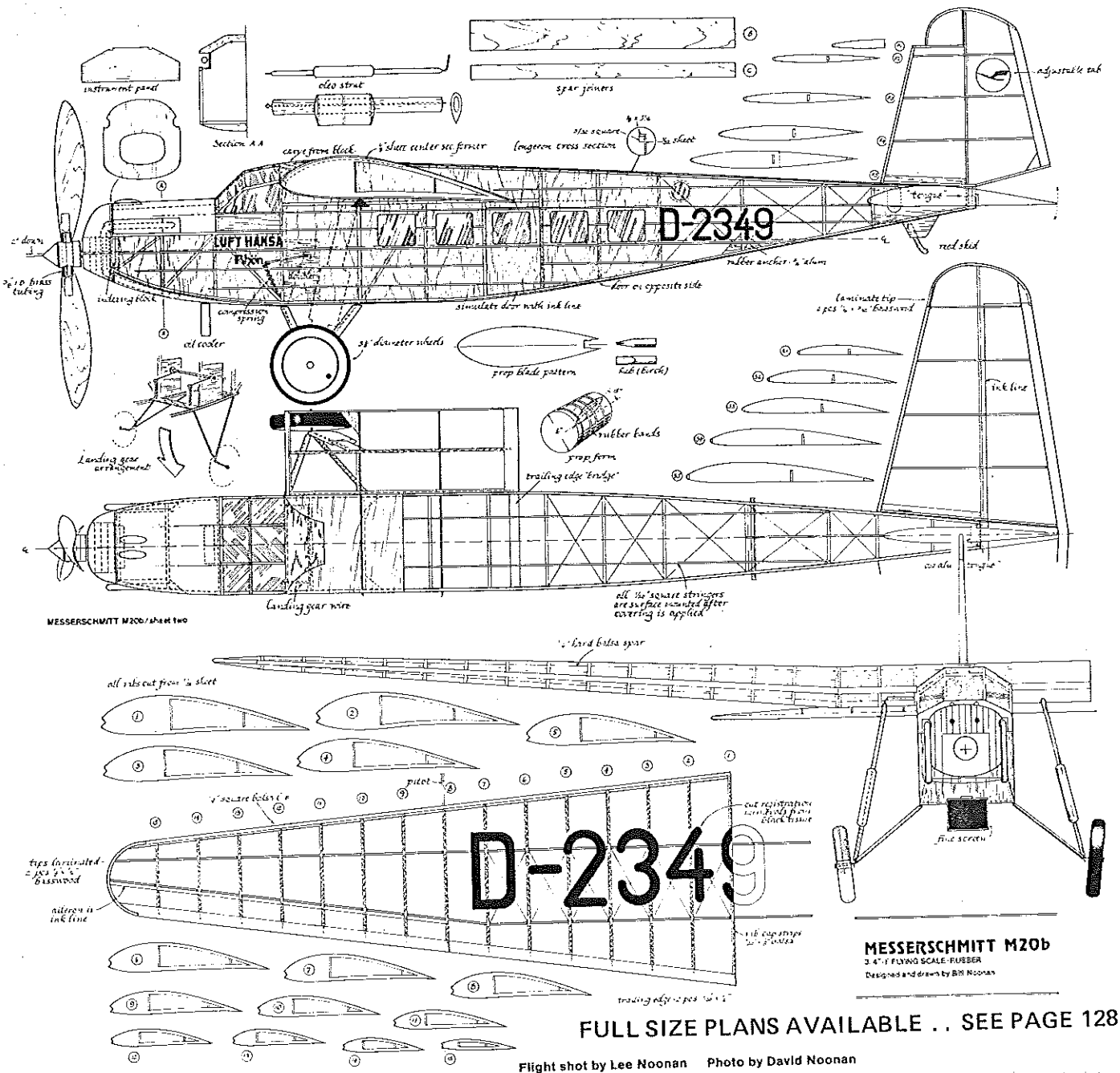
When laying up the sides, be sure to make a right and a left. This requires the 3/32 component of the longeron to be on the inside.

After both side frames are complete, fill in sides with the 1/32 sheet, starting at the nose and working aft. The sheet should fit neatly in the notch provided along the longeron. Note that the sheet grain runs vertically. Mark off windows on the inside of the sides. The "coved" corners can be easily made by fabricating a circle cutter by removing the eraser from a pencil and sharpening the metal ferule. After all the corners have been cut, merely run a razor or X-Acto between the corners and remove the balsa.

Join the two sides, starting at the tail, which is box shaped, working forward with 3/32 sq. cross-pieces. These cross pieces should cement to the 3/32 part of the longeron, which puts a 1/16 in. air space between the tissue covering and the cross-pieces, resulting in a neater appearance.

Check the fuselage periodically with a square as you progress toward the nose. Make any corrections necessary to assure true alignment.

When all cross pieces are located, cement the nose former and instrument panel former in place. These both are cut from 3/32 sheet. Cockpit "floor" and back wall are 1/32 sheet balsa. The engine cowling immediately in front of the cockpit (in between these two formers) is cut from soft balsa



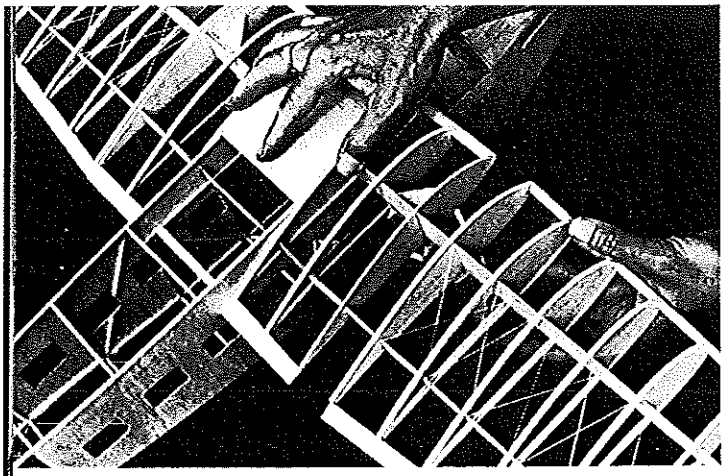
FULL SIZE PLANS AVAILABLE . . SEE PAGE 128

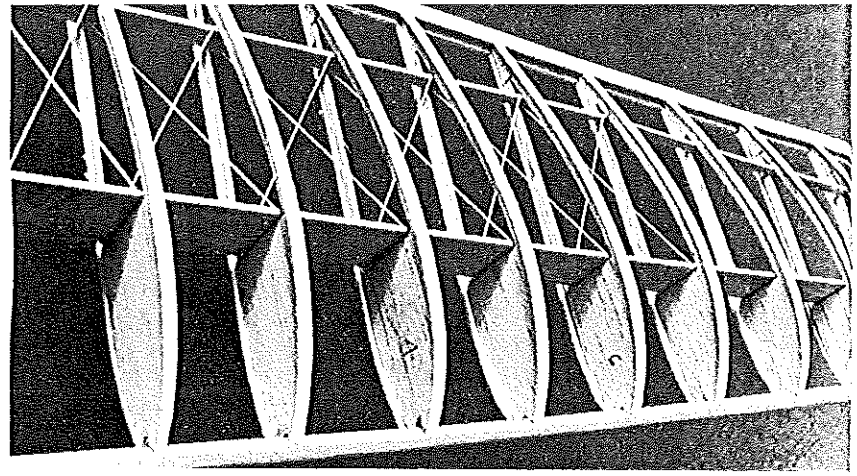
Flight shot by Lee Noonan Photo by David Noonan

block. Position accurately the cut block between the formers and trace former outlines on block ends. Remove the block and carve to correct contour. Hollow out to about ¼-in. wall thickness. Take care when sanding to make the smooth transition from the three-faceted shape of the instrument panel former to the oval shape of the nose. This is a rather distinctive and handsome cowl. Cut in exhaust pipe channels.

The nose block is made of laminated ¼ balsa. Note the removable portion which allows for rubber access and winding. The peculiar exhaust pipe configuration necessitated the removable block fit in between the "cheeks." This works very well and results in a robust nose section, mandatory for a model that needs 12 strands of ¼ rubber four feet long for power. All edges of the nose are liberally coated with cyanoacrylate glue which forms an abrasion

With a wing span of over five feet, the M20B is a dramatic flier. Bill feels it can be converted to power without significant changes.





Left: Wing panels are slipped in place, with the stub spar extending to ply spar joiner in the center section. Right: Rib and spar details suggest that the wing frame has a high strength-to-weight ratio. Cap strips yield better appearance but may be left off if maximum duration is your game.

resistant shield.

After final sanding, drill the removable nose block to accept a 1/16 I.D. brass tube which acts as a bushing for the rubber hook, installed later. It is well to provide about 2 degrees downthrust. Cement indexing block to the back of this piece. This fits snugly in cut-out in nose former.

The exhaust pipes, which are cemented in place after the model is covered, are made of ¼ O.D. thin wall rubber tubing. Black tubing, lightly sprayed with silver, simulates the worn look found on this type manifold.

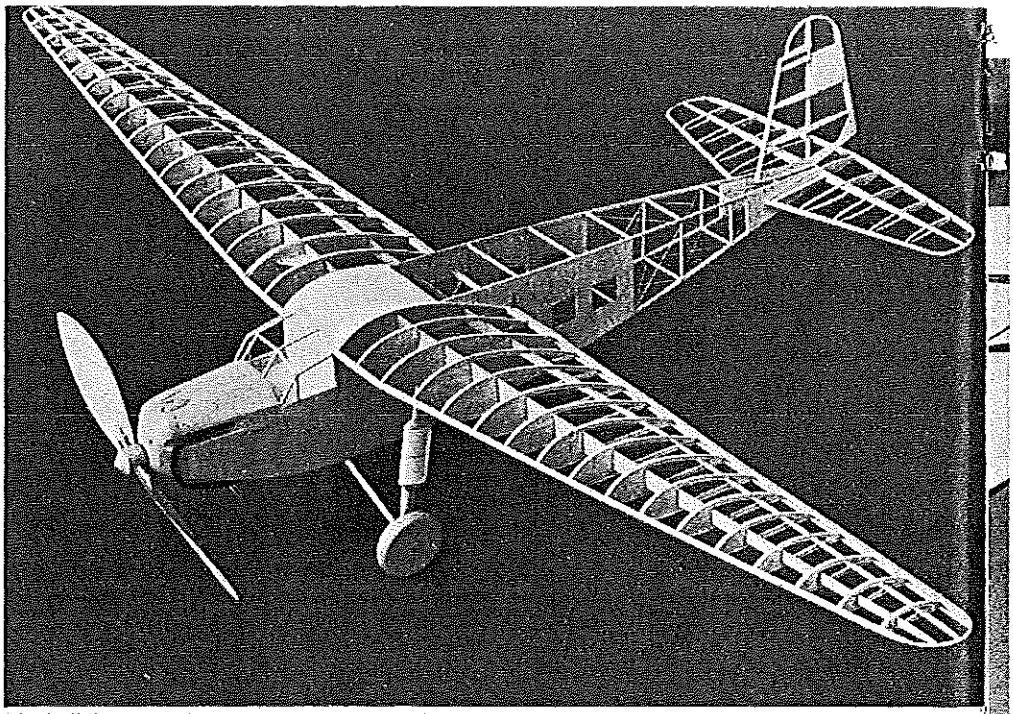
The wing center-section is built as an integral part of the fuselage. Position transverse 1/32 plywood spar joiners in place, slip on ribs, and cement in place, checking carefully for alignment. Add leading and trailing edges. Note that end ribs are solid, with the spar slot cut oversize to allow for passage of wing spar, installed later on. Add gussets and trailing edge "bridge" inside fuselage. The center fuselage section which maintains airfoil contour, is covered with 1/32 sheet balsa. Shape block balsa cabin fairing and cement to the 1/32 sheet.

The cabin canopy structure is made of 3/32 sq. balsa. Mitre intersecting parts. The cockpit on our model received a considerable amount of detail, including carved balsa pilots. The amount of detail is left up to the individual builder. The minimum would be preparing the inside with a couple coats of sanding sealer and the application of light gray dope, prior to the glazing with .010 acetate, cemented in place with Wilhold RC 56 cement.

The rubber anchor at the rear of the fuselage is a 3/16 O.D. aluminum tube held in a friction fit in hard 3/32 sheet balsa gussets which have been backed up with 1/64 plywood.

The integrity of both the fuselage and wing is enhanced by using unwaxed dental floss as brace wires. Use Hot Stuff where the floss intersects structural members.

Landing gear: This takes considerable abuse on a model of this size, so it incorporates simple spring shock absorbers at the top of each front strut. (See sketch.) All landing gear and strut wire is 1/32, with the exception of the front struts, which are .045. Bind joints with fine brass wire before soldering.

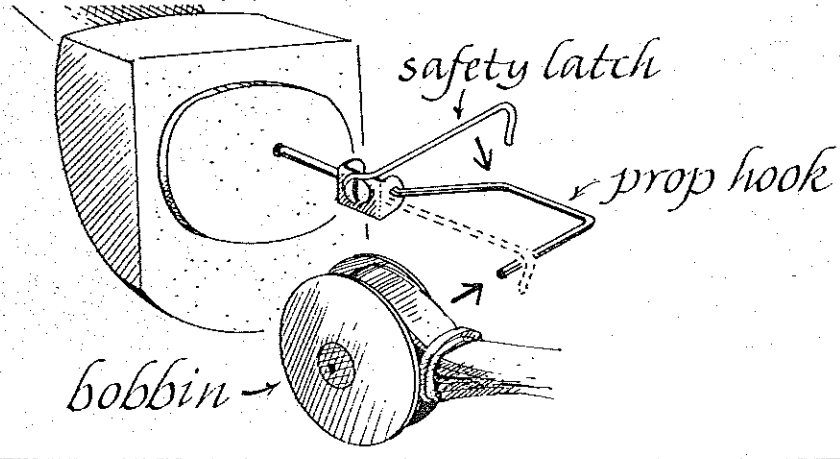


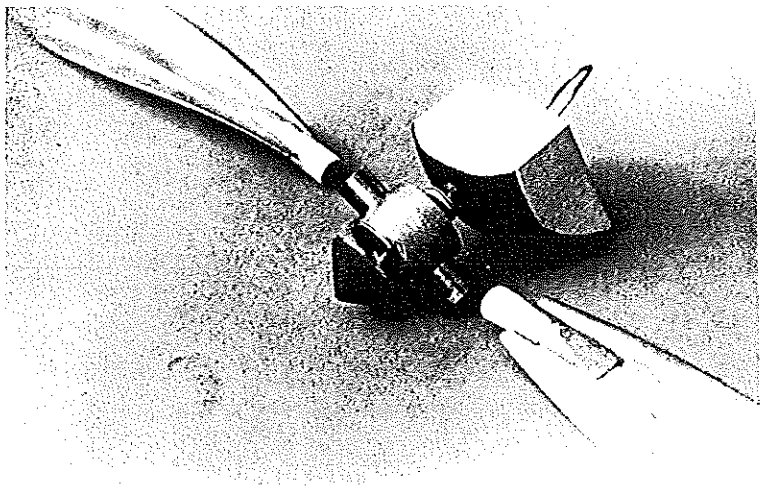
The judicious use of wood size and extensive laminations—the longerons for example—minimizes the structural weight. The integrity of both fuselage and wing is enhanced by unwaxed dental floss bracing wires. Hot Stuff is applied wherever the wires intersect structural members.

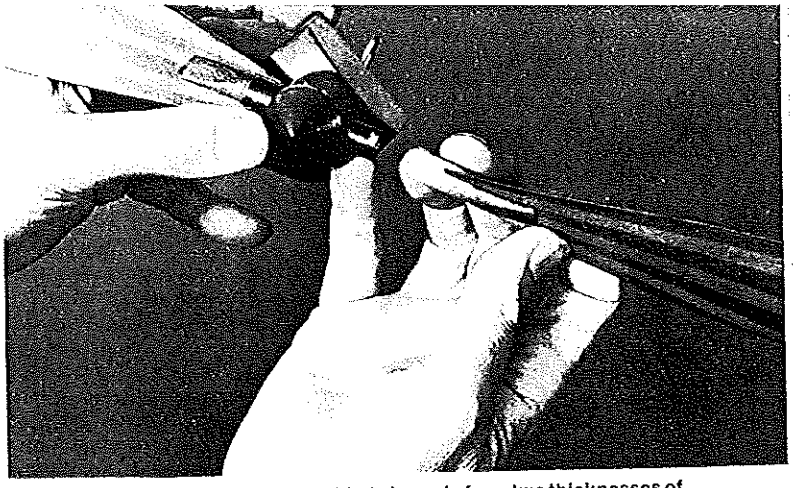
The oleo strut is secured at the top by insertion of the 1/32 wire into an aluminum tube about ½ inch long. epoxied along the bottom of the plywood spar joiner. The bottom of the strut has the 1/32 wire bent into an eye which slips over the axle before the wheel is put on.

Wheels are made of two pieces of ¼ hard sheet balsa laminated at 90 degree angles,

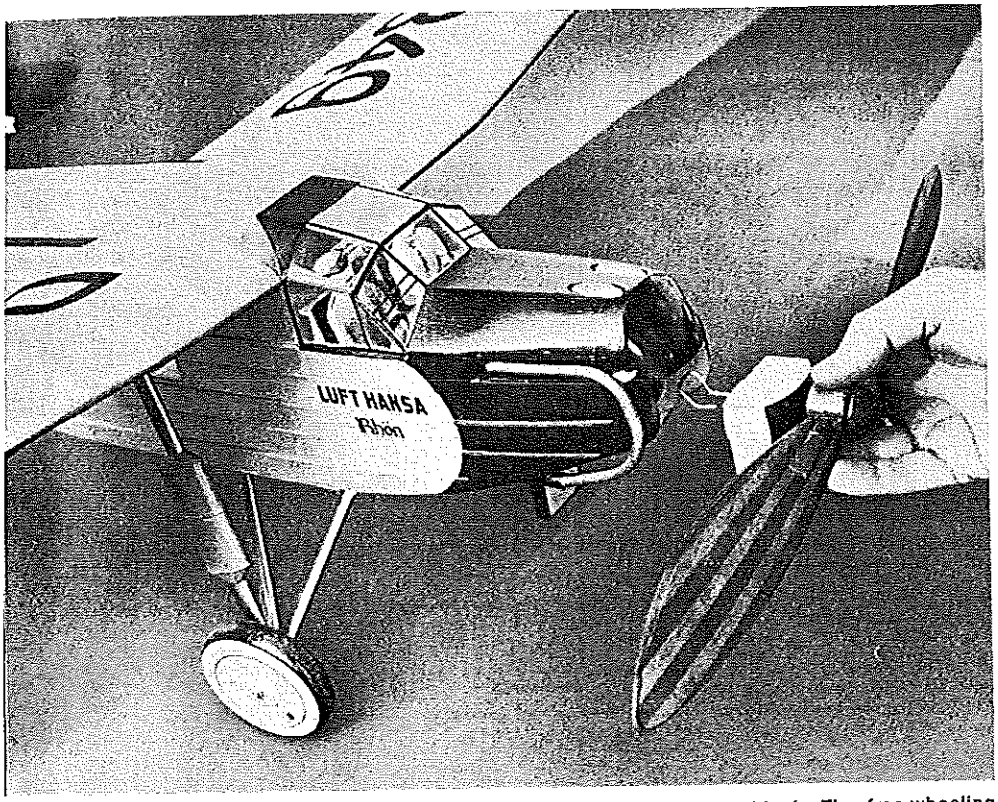
Diagram showing rear view of removable nose block and prop hook with locking device to prevent bobbin from slipping off hook. The safety latch is secured with a machine screw to brass U-shaped part which is soldered to the propeller shaft.





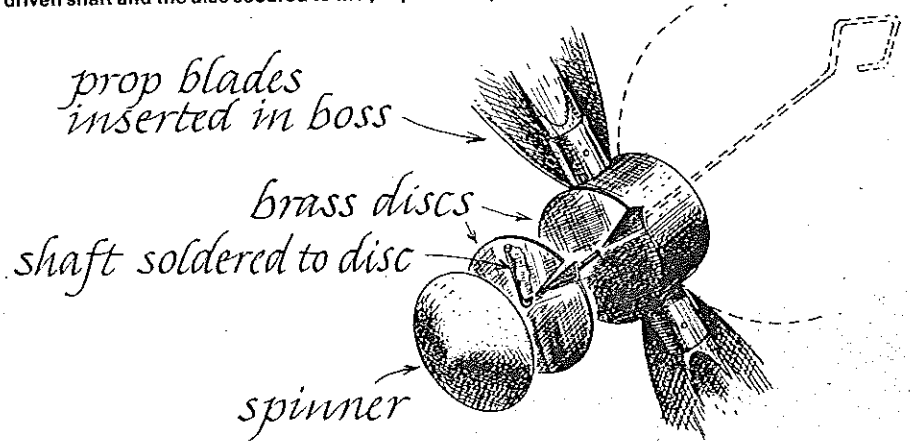


Left: The nose block assembly with propeller blades removed and, right, method for removing the blades. Each blade is made from two thicknesses of 1/64 plywood. After applying cement between laminations, blades are bound to 6-in. (about) can, center lines offset about 15 degrees from can center line. Blades have about a 45-degree angle at their centers to set the pitch. The prop boss is ⅜-in. inside-diameter brass tubing.



Close-up of the nose showing the method of removing the prop block. The free-wheeling mechanism consists of two brass clutch discs, one soldered to shaft, other to balsa cylinder at hub.

Free-wheeling diagram showing arrangement of brass clutch discs. A slit is cut radially from the center of each, and a wedge-shaped tab is bent to create a means of engagement between the driven shaft and the disc secured to the prop. Balsa spinner is epoxied to the face of the front disc.



to bring the thickness to ½ inch. Rough-cut wheels to about 3⅜ inch diameter. Drill ¼ inch center, and cement in birch dowel, letting about 1 inch surplus protrude from one side. This can be chucked in a drill press (or a drill motor on a stand) and the wheel brought to final contour by progressive use of garnet papers, used as flexible "lathe tools." (Note cross-section on plans.) Cut off surplus dowel after wheel is completed. Drill the wheel center (dowel) to receive .045 I.D. brass axle bushing. Apply three coats of sanding sealer to the wheels prior to application of tire and wheel paint.

After landing gear is installed, cover underside of nose with hard 1/32 sheet balsa, from nose former to cross-piece at front landing gear strut.

Propeller: Construction follows a procedure which has been found to have a number of advantages. The blades are cut from 1/64 plywood (2 pieces each, making final thickness 1/32). Cement is sparingly applied between the two pieces, and they are bound to a coffee or tobacco can about 6 inches in diameter. Offset the blade centerline about 15 degrees from the can centerline. When the blades are dry, a ⅜ diameter birch dowel is fitted to form hub. (See plans.) The blades are sanded to airfoil contour, finished with sanding sealer and inserted in ⅜ I.D. brass tubing which forms the prop boss.

Blades should have about 45-degree angle at their centers, to set the pitch. This is one of the advantages refered to earlier. Pitch experimentation is easily made by adjustment of retainer pin, seated in hole drilled in the brass tubing and birch hubs. The second advantage is expeditious replacement of a broken blade in the field, something a carved prop won't allow. You can also make up a number of prop shapes and diameters, observing which offers best results.

Free-wheeling is effected by the use of brass clutch discs, one soldered to the driven shaft, the other epoxied to the balsa cylinder that surrounds the brass tube in which the blades are inserted. The discs

Continued on page 124

allow local announcements of the show. He points out that the show is expressly for "Mac" the modeler who has driven several hundred miles and would be very unhappy to find the Arena jammed with the non-modeling public. So part of Bob's job is to prevent local advertising of the show! He also points out that exhibitors are screened to provide the widest variety of RC products by allowing only original or exclusive items to be shown, thus reducing needless repetition of same items. This philosophy caters to the one-man companies as well as the giants.

The modeler can see a wide variety of items by stepping across the aisle rather than touring the country.

Foreign visitors again made their annual trek to the RC mecca this year. They were from Japan, Australia, New Zealand, England, Canada, Mexico, Brazil, India, Philippines, Germany and other European countries. Truly an international affair.

The success of the 25 years of the Toledo RC Exposition has been outstanding. Now the secret formula appears clear. The Weak Signals have provided three things that are needed in the RC sport. The first is a place for manufacturers to display their wares and interact directly with the customers. The second is the coveted awards to the modelers for their displays of planes, boats and cars. I still burn with envy and admiration whenever I see the modelers' displays. And the third is the Trading Post and auction which recycles RC equipment into useful channels and provides the seller with some cash towards that new item he's just seen at the show. The success formula has evolved with considerable effort on the part of the Weak Signals Club and, in particular, the dozen or so members, who each year have taken on the management of the different areas. We're sure their families have endured the annual sacrifice, too. There is not enough space to mention all of the names of those involved over the years. But today we know that Don Belote and Bob Hisey have been co-directors for almost ten years running, and we certainly hope they will at least finish out the third decade of the exposition. That will be 1984! How they will handle the future growth and the inevitable increase in displays and people, we don't know. But, based on their adaptability and performance in the past, we're sure they will find a way.

We salute the Weak Signals Club on the 25th Anniversary of their Toledo RC Exposition and thank them in advance for more shows in the future.

P.S. Toledo Show next year, April 11, 12, 13—1980. See you there.

Messerschmitt/Noonan

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each have a wedge shaped section of about 20 degrees bent to form the engaging mechanism. The front disc is finished with a balsa spinner. Insert ball-bearing thrust washer when assembling.

Wings: With the exception of spars, leading edge and laminated basswood tips, the wings are constructed of 1/20 balsa. Trace rib patterns and carefully cut from medium 1/20 sheet. Note that the two mating ribs (#1) at wing stubs are solid, as described earlier. Number all ribs for quick identification. Cut ½-in. wide trailing edge pieces (4) from the 1/20 sheet. Confirm rib contours and leading edge notches by stacking ribs in a pile, the largest on the bottom. Make any alterations necessary.

Cut tapered main spar from 1/16 straight grained hard balsa. Mark off rib stations accurately with a sharp pencil, on the front of the spar.

Slip ribs in place along spar, applying cement (we used Titebond) at rib/spar contact points. Check each for alignment before the cement sets. Pin this assembly over the plans, having positioned the bottom trailing edge part on plans first. Cement ribs to trailing edge. Re-confirm alignment by sighting down wing assembly.

After this is allowed to dry, add top trailing edge part, cementing to all rib tops and along the mating edge itself. Clamp with weak clamps until dry.

Add rear spar, which is tapered from rib 1 to rib 7. Rear spar outboard of rib 7 is constant depth, and slipped in place through rib openings. Be sure both spars protrude at root end, as this is the mating portion which joins wings with plywood joiners built into the fuselage.

Cement the ¼ sq. leading edge in place after tapering to about 5/32 sq. at the tip end.

Laminate tips from two pieces of 1/16 × 1/8 basswood which has been soaked in water overnight. The addition of about 10% household ammonia to the water seems to make the wood more pliable. The laminations are bent around cardboard forms and allowed to dry. Cement tips in place and shape to fair in to leading and trailing edges.

Slice cap strips from 1/20 soft balsa. Determine length, cut, and lay on workbench in proper order. Starting at either end of the wing, cement only at the leading edge. After the strips are dry, it is easy to force them down along the airfoil, mating at the trailing edge. Use cement sparingly. Metal spring clips used with hair curlers make good clamps for holding cap strips in place during the drying operation. Repeat this operation on the wing bottom.

Cap-stripping results in a more finished appearance on the covered wing; however, there is a weight penalty. If flight duration is your main concern, the cap-strips may be dispensed with. Finish wing frame by carefully sanding leading and trailing edges to proper airfoil contour.

Join finished wing panels to fuselage by sliding spar stubs in place alongside plywood spar joiners in wing stubs. Determine correct dihedral before cementing. Cap-strip remaining center-section ribs.

Tail Surfaces: Vertical fin and horizontal stabilizer have ribs cut from 1/20 medium sheet balsa. Both are constructed in a conventional way. Tips are laid up in the same manner as wings, using 1/16 × 3/32 basswood. A movable tab in the fin provides for turn adjustment.

Stabilizer incorporates a soft aluminum "tongue" epoxied to the spar. This inserts in a slot in the rear former of the fuselage and allows for incidence change, very important during preliminary flight testing. 1/32 plywood "ears," cemented to the front portion of the stab on the inside of rib S5, provides a means for fixing the incidence by insertion of pins into the fuselage.

When cementing fin to fuselage, allow the spar to seat down into the frame. This makes a strong installation.

Miscellaneous: Covering is white Japanese tissue. We find that white glue, diluted about 50% with water, is the easiest adhesive to use to bond the tissue to the frame. It doesn't dry as rapidly as dope. Due to the size of the model, it may demand a little more care to achieve a good covering job, but otherwise, there is nothing particularly difficult about this part of the building.

Shrink the tissue by light spray of rubbing alchohol. When this is dry, apply two coats of diluted clear nitrate dope, with plasticizer added to reduce warping. The third, and final coat is sprayed. It is clear dope, reduced to spraying consistency, to which silver powder has been added.

We have not come across specific color data in our research of the M20b, but black and white photographs all show the aircraft with a light-colored fuselage, wing and tail, embelished with a dark-colored nose and unusual stripes running parallel with the top longerons. We decided silver and wine red might be an appropriate scheme, with black numerals and lettering.

Cut the registration numerals from black tissue. Apply with diluted white glue. Remove surplus glue with moistened cotton. The Lufthansa lettering and rudder insignia were made from artwork, photographically reduced and converted to rub-off transfers by use of 3M Image 'n Transfer material, available through better graphic arts dealers.

Separation pieces on the pilot's canopy are strips of wine red tissue cut to 3/32 width. Apply these pieces to canopy after the .010 plastic has been attached, following the structure underneath. The canopy fairing at the wing leading edge is also wine red.

Landing gear strut fairings, including oleo cover, are painted dark metallic gray.

Wheels are silver, with black tires. Photos of the original aircraft show some with gray sidewalls on which the inscription "Palmer Cord Aero Tyre" is seen. Apparently the English made a superior product in 1929.

Cabin door outlines, ailerons, elevator and rudder are defined with india ink or thin strips of black tissue. Tail skid is made of 3/16 dia. reed, mounted in balsa faring. This assembly is cemented to fuselage underside.

Simulated oil cooler under the engine, is a four-sided box made from hard 1/16 balsa. Brass filter screen is used to imitate radiator, back and front. Attach with soft aluminum tab, which will absorb impact of hard landings.

Simulate prop laminations by spraying blades with two different colors of brown, masking between spray applications.

What appear to be stringers, found on top and sides of the fuselage, were probably hat-section metal stiffeners, as the fuselage was metal-clad. These are mde of 1/20 sq. balsa, surface mounted before doping.

Flying: The model, having a wing span of over five feet, is dramatic in flight. It is a totally different experience from smaller, lighter rubber scale. Handling of the 12 strands of wound ¼" rubber, four feet long, requires that the 1/16" diameter wire prop hook and nose block be carefully made. When you put 1200 turns in the rubber, transfer from the winder to the prop hook can be a bit hairy if you are not adequately prepared. The lubed rubber can get away from you, with disastrous results, unless you use special tools. We have tried both an aluminum "stirrup," a neat little gadget that acts as a gatherer of the rubber bundle which can easily be attached to the prop hook, and the familiar sewing machine bobbin. Of the two, the bobbin seems to have the advantage in that it resists having the rubber climb the hook, a common problem. Making sure your hands are free of rubber lube, and grasping the wound rubber with a clean rag, facilitates the transfer. Use of a winding tube to protect the fuselage in case of rubber breakage, seems to be prudent.

It is particularly important to have correct C.G. location, coupled with at least 2 degrees downthrust. The incidence settings shown on the plans, for both wing and stab, show the setting our model used. Depending on a number of factors, warp being one of them, yours may require stabilizer incidence change. Hopefully, your wing will be flat as an ironing board.

Start with about 250 turns on the lubricated rubber, launching the model over tall grass, if such a site is available. Observe the flight characteristics carefully. Make incidence, balance, or thrust adjustments in

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Knowing what the reader and AMA member prefers in his (or her) magazine is extremely important. What you consider most interesting and important in the monthly magazine contents will enable the staff to produce the best possible magazine, with a policy that pleases and satisfies you.

Below you will find listed the contents for this issue, item by item.

Please check off your first ten choices in order of preference, by placing a numeral "1" next to the item you consider best, "2" next to your second choice, and so on down to 10.

The few minutes you take to do this will prove well worth it—and thank you for helping.

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small increments before increasing the turns on the rubber.

The model is extremely strong, and can take a lot of abuse. It could easily be adapted to power without significant structural modifications.

The M20b fills the need for an unusual subject, offering aesthetic and aerodynamic advantages.

Letters to the Editor

continued from page 7

Wringing Our Hands?

Some comments based on Ken Simpson's letter and your For Openers article on beginners from the December 1978 issue.

Over the years (about 40), I have read with interest letters and articles on participation by young people in airplane modeling. My view is that the absence of young people today, if in fact an opportunity exists any longer for young people, is directly attributable to adult management of the hobby (sport), rather than a lack of interest on the part of young people. Moreover, I agree with you that the modeling community as a whole is not really concerned at all about the situation.

As I see it, we are simply a reflection of the nation's attitudes. With a few exceptions, no one pays any attention to kids until they get into some sort of trouble. In our case, we're too busy trimming out our super Blippo or caressing our dual-rate transmitter to really be concerned with young people who may have an interest. We simply don't have time. We have grown into an assemblage of egocentrics who have evolved the hobby to a virtually closed society.

Contributing to this isolation are such factors as the remote location of flying fields, the high level of flying that takes place and the endless list of add-on gadgetry that has saturated the hobby. The neighborhood kids may marvel as our modeler carries his super Blippo to his car for a trip to the flying field—but that is the extent of their exposure. What they have seen is essentially unattainable to them. Hopefully, they won't pick up a model magazine. What they see there will certainly scare them off.

The mention of programs and dollars as a solution is naive and well worth a chuckle. We should know by now (especially Washington folks) that people respond to people, not to programs. The hope that a manufacturer will produce a suitable beginner's kit is probably futile because there is not enough profit involved.

We also ought to quit sloganizing "patronize your local hobby shop." Some hobby shops can and will help; others can't or won't. Let's not try to pass off the idea that a hobby shop is a good source of assistance simply because it's a hobby shop. Some hobby dealers regard kids as non-customers who come in only to look and mess up the store but don't buy anything. I have seen several aspiring beginners turned off by indifference behind the counter.

It's time we stopped wringing our hands about the beginner and either accept the facts as they are or make a positive move. And I feel that there is a positive course to follow. We can require each club to have a junior activity as part of its overall program. But AMA should not try to legislate the activity. Let the local guys do some thinking to develop an activity suited to their particular interests and interests of the local community. This approach means that club members will have to contribute some of their time working with