zu Bestell-Nr. 4600

Graupner

ZELLE

BELL 212 Twin-Jet

Bauanleitung

RC Hubschrauber mit kollektiver und zyklischer Blattverstellung des Hauptrotors

Geeignet zum Einbau einer Proportional-Fernlenkanlage mit 8 Kanälen

Vorbildähnliche Modellkonstruktion nach dem Original

Mit Teilen für den Fernsteuerungseinbau

Änderungen, die dem technischen Fortschritt dienen, vorbehalten!

Technische Daten

Hauptrotor-⌀ ca.	1600 mm
Rumpflänge ca.	1370 mm
Länge über alles ca.	1930 mm
Heckrotor-⌀ ca.	300 mm
Übersetzung-Hauptrotor	9,928 : 1
Übersetzung-Heckrotor	2,5 : 1

Getriebe: ohne Ölbad, schmier- und wartungsfrei

Antrieb: Glühkerzenmotor HB 61 STAMO 9,97 ccm Hubraum, mit Radial-Kühlgebläse

Fluggewicht

je nach Fernsteuerung ca.	4300—4500 g
mögl. Zuladung max. ca.	2500 g
mögl. Startgewicht max. ca.	7000 g
Maßstab ca.	1 : 9

Eine Explosionszeichnung der Zelle ist in der Mitte dieser Bauanleitung eingeheftet. Sie kann entnommen werden und leistet gute Dienste beim Studium der Anleitung.

Für den Einbau der MECHANIK Best.-Nr. 80, ist eine gesonderte Einbauanleitung vorhanden.

Printed in Germany

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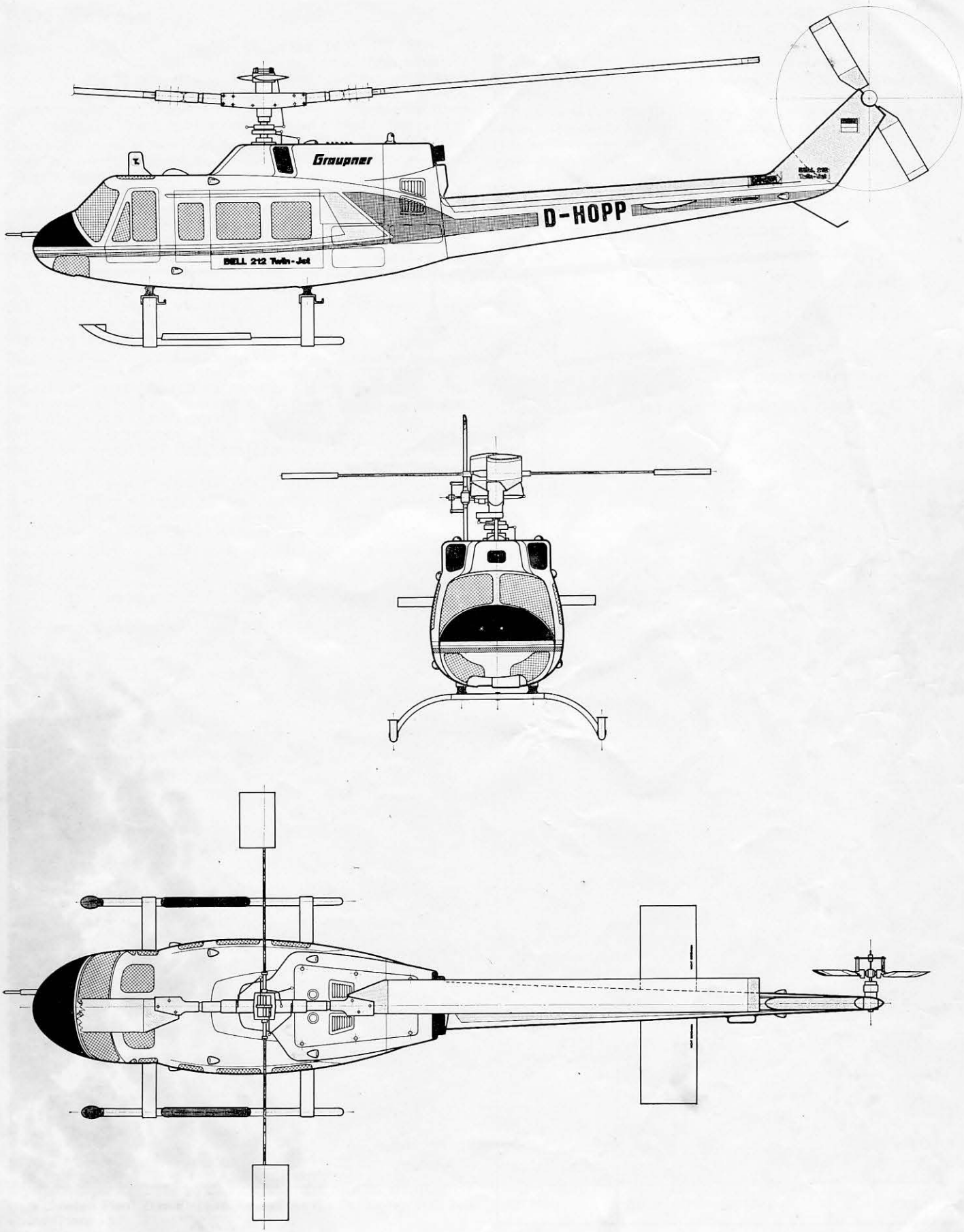

Abb. 1
System-Dreiseitenansicht BELL 212 TWIN JET

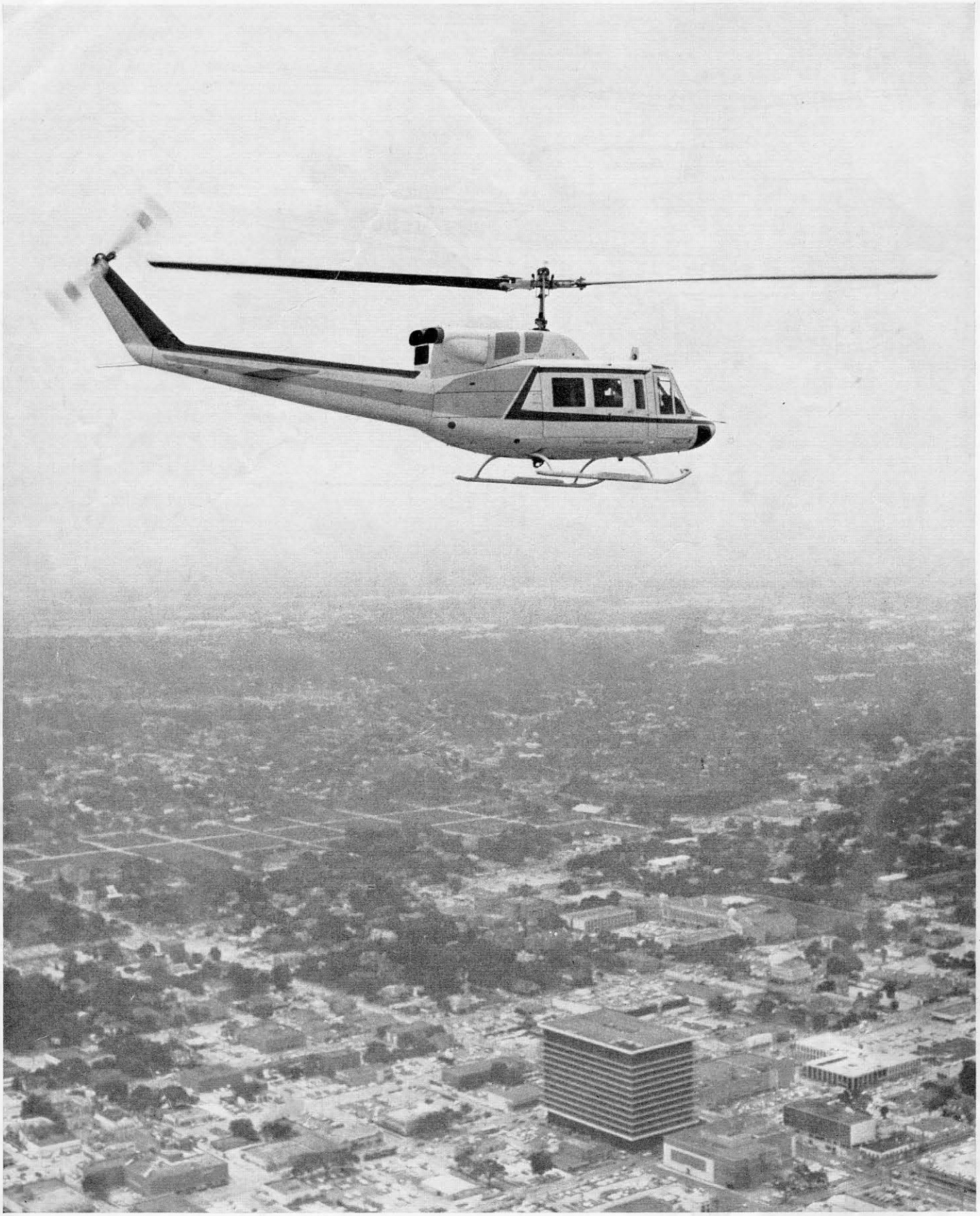

Abb. 2
Das Original im Fluge

Building instructions

ZELLE BELL 212 Twin-Jet

Technical data

main rotor diam. approx.	63"
fuselage length approx.	54"
length o. a. approx.	76"
tail rotor diam. approx.	11 3/4"
main rotor gear ratio	9.928 : 1
tail rotor gear ratio	2.5 : 1

gearbox without oilsump, lubrication- and maintenance-free

powerplant: HB 61 STAMO glo-engine with radial flow cooling fan

Weights

ready-to-fly, approx.	9.5-10 lbs.
permissible payload approx.	5 lbs. 8 ozs.
max. take-off weight approx.	15 lbs. 7 ozs.
scale	1/9th

R/C helicopter with collective and cyclic main rotor pitch control

Accomodates 8-channel proportional R/C equipment

Near-scale model patterned after the fullsize helicopter

With R/C installation accessories

An exploded view drawing

of the airframe is stapled to the center pages of these building instructions. Removed from the brochure it will be a useful aid throughout the assembly.

Supplementary instructions are provided for the installation of the mechanical parts of the MECHANIK kit No. 80.

Subject to changes serving technical progress.

Printed in Germany

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Fig. 1 3-view BELL 212 TWIN JET

Fig. 2 The fullsize helicopter in flight

1. The fullsize helicopter

The twin - engined helicopter BELL 212 TWIN JET is a product of the BELL HELICOPTER COMPANY of Fort Worth, Texas, USA. The type is built for various duties; the military version has the designation UH - 1N (in Canada: CUH - 1N). The helicopter is in service with the USAF, the US NAVY and the Canadian Armed Forces.

The civil version of the helicopter, known as the TWIN 212, is also in full-scale production. Initial deliveries to customers began in 1970

The various models have basically the same configuration, but differ in their mission kits and avionics.

The military and civil helicopter models both feature the same power-plant, the „Twin-Pac" version of the United Aircraft of Canada PT6T turboshaft engine, the military designation of which is T 400. These two engines are coupled to a common gearbox with a single output shaft.

The „Twin-Pac" produces some 1800 hp., but is flat-rated at 1250 hp for take-off and 1100 hp for continuous operation.

Thanks to its twin-engined configuration the BELL 212 TWIN JET offers a degree of safety and reliability previously unknown in the case of medium-weight helicopters. For in the event of an engine failure the remaining operative engine is capable of delivering adequate power to maintain cruise performance, even at maximum take-off weight.

A single engine is capable of delivering 900 shp for 30 minutes or 800 shp continuously.

In 1972 more than 4000 engines of the PT6 version were in use all over the world in military, utility and business aircraft. The cumulative flight time of this engine exceeds the 3.000.000 h mark.

At a maximum take-off weight of approx. 10.000 lb. the UH-1N cruises at approx. 120 mph; its range is approx. 300 m.

The spacious cabin accomodates pilot and up to 14 passengers. In cargo configuration the twin-engined BELL Huey copter provides some 220 cu. ft. of internal capacity. It can alternatively carry an external load of approx. 5700 lb.

Technical data of fullsize helicopter

main rotor diam. approx.	48'
fuselage length approx.	42' 11"
length o.a. approx.	57' 3"
tail rotor diam. approx.	8' 6"
powerplant	Pratt and Whitney PT 6T6 „Twin Pac"
max. T–O weight approx.	10.000 lb
cruise speed approx.	120 mph
range approx.	300 m

2. General

The epoxy fiber glass reinforced plastic fuselage with intergral fin is ultra-light, flexible, shock-resistant thanks to correct material and load distribution. The ready-formed fuselage cuts assembly time for the airframe drastically. Sole adhesive to be used for glueing parts of the fuselage to eachother or to other parts is UHU-plus „endfest 300". A table (see end of this chapter) serves as a general selection guide for the various adhesives supplied in the Quickie kit.

Attention!

STABILIT-express or other adhesives are unsuitable for cementing fiber glass reinforced plastic parts.

Minor cavities, if any, of the fuselage shell are the result of the manufacturing process; they are removed as follows. Wet sand station in question to remove traces of release agent (use water and sanding paper grade 400). When dry fill station in question with UHU-plus „endfest 300"

All die-cut parts are carefully removed from their respective sheets, using a sharp balsa knife or a scroll saw. De-fuzz them. On principle all parts must be dry-fitted and sanded prior to their installation. Be sure to follow relevant instructions and fullsize plan when mating them to adjoining parts. Some of these parts are supplied slightly oversize to permit sanding ' fitting them properly.

A straight plane board of soft wood is required for the assembly of various groups. Protect the board by a sheet of non-sticking paper or plastic film. Assembly of the airframe follows the sequential order of the numbering of the parts. Lest they are not mistaken for parts of the MECHANIK kit No. 80, the numbering of the parts of the airframe kit starts with figure 100. Arrange the parts of the individual assy. groups in their proper numerical order. Braces (125), auxiliary formers (121), (123) consist of 2 parts each, which must be cemented together as per plan.

I Be sure to use plan, illustrations, list of materials, exploded view drawing and the installation instructions MECHANIK constantly throughout the assembly of the model.

Some of the illustrations feature legends preceeeded by numbers put in circles. These numbers help to identify quickly the relevant texts of foreign language instructions.

2.1. Definition of various symbols listed below

These figures, put in circles and printed on the margins refer to plastic bags carrying the corresponding number. The bag in question contains, among other miscellaneous parts, the parts required for the step described in the text.

When, however, capital letters printed on the margins are put in circles, such as (A), this means that the part in question is contained in the bag of the Quickie kit MECHANIK that carries the same capital letter.

This symbol printed on the margins indicates that parts of the MECHANIK kit No. 80 must be installed before proceeding further with the assembly of the airframe. Be sure to follow relevant notes in these instructions.

2.2. Important notice on adhesives and their application

The chart below provides information on various adhesives and their proper application.

materials	typical application	adhesive
wood/wood	former (100) to brace (101) formers (102), (103), (104) with longitudinal former (100) and brace (101).	UHU - coll
wood/GRP+	longitudinal formers (112/113) formers (102), (103), (104), fin spar (167), plywood insert (194) etc. to fuselage (111)	UHU-plus „endfest 300"
metal/GRP+	guide tube (160), (161), tail skid (166), handle (169) to fuselage (111)	
metal/wood	guide tube (161) to former (132), guide tube (160) with brace (138) and fin rib (162)	
metal/metal	landing gear skid cap (185) to skid (182), skid to bracket (181) etc.	
NOVODUR/wood	ring - shaped fairing (199) with ply insert (200)	UHU - hart

When joining the various parts be sure to follow instructions supplied with the adhesives in question.

* **Notice:** Lightly sand, then degrease epoxy GRP parts to be cemented in order to remove any traces of release agent.

3. Recommended equipment of BELL 212 TWIN JET with VARIOPROP R/C gear

Receiver	directional control	axis concerned	pitch control	recommended channel allocation 1	2	control servo	No.
VARIOPROP	left / right } roll	longitudinal / longitudinal	cyclic pitch control: main rotor	5	1	VARIOPROP - servo	3765
			cyclic pitch control: main rotor	6	2	VARIOPROP - servo	3765
	forward / rearward } pitch	lateral / lateral	cyclic pitch control: main rotor	7	3	VARIOPROP - servo	3765
			cyclic pitch control: main rotor	8	4	VARIOPROP - servo	3765
	left / right } yaw	vertical / vertical	tail rotor	1	5	VARIOPROP - servo	3765
			tail rotor	2	6	VARIOPROP - servo	3765
	climb (full throttle)	in direction of vertical axis	collective pitch control: main rotor	4 *	8 *	VARIOPROP - servo	3765
	descent (idle)	in direction of vertical axis	collective pitch control coupled to engine throttle: main rotor	3 *	7 *	VARIOPROP - servo	3765

Glossary:
cyclic pitch control = control mechanism for periodically varying the blade angle of each blade in a rotor in its cycle of rotation.
collective pitch control = control for changing the blade angle of all the rotor blades simultaneously.
*** Notice:** If you prefer to use channels 3,4 and 7/8, respectively for climb (full throttle) or descent (idle) instead of channels 4,3, and 8,7, the linkages (147) and (206) must be switched accordingly at the servo attach points. In some cases this may require some bending and cranking of linkages.

4. Building instructions

4.1. Preparation of the main rotor blades

Before starting with the assembly of the main rotor blades an important fact must be remembered: **the centrifugal forces acting on blade holders, connecting members and rotor head build up to some 280 lbs., that is the weight of two adults.**

For that very reason you must not, repeat not, use:

- home-made main rotor blades
- cracked, splintered, re-glued rotor blades
- in fact under any circumstances any repair work performed on rotor blades, such as glueing, is not permissible in the interest of safety.

Also keep remembering the fact that the tips of the main rotor blades travel at speeds of approx. 250 mph. A broom stick stuck into the spinning rotor will be cut through with ease by the latter.

And still another word of warning: a rotor blade flying off, hitting you or a spectator, could prove a deadly missile; remember that broom stick..!

4.1.1.
If main rotor blades are assembled from the pack of 10 sets No. 82/10, select unfinished blades of matching weight. Use a letter balance for checking the weights. The pair of unfinished main rotor blades supplied with the airframe kit has been factory-matched for identical weight.

4.1.2.
Carefully remove the edge at the blade shank of each main rotor blade, as per illustration.

Fig. 3 Main rotor blade shank

Both rotor blades must be of equal length; check carefully.

4.1.3.
The rotor blades are preferably balanced accurately by applying coats of GLATTFIX porefiller, No. 207. Sand between intermediate coats with fine sanding paper, grade 400.

4.1.4.
The centers of mass of the two blades must coincide exactly. Position of the center of mass is found by carefully balancing the blades on a straight edge or triangle, as per illustration.

Fig. 4 Determination of the center of mass of the main rotor blades.

Matching centers of mass position of the two blades is obtained by applying more varnish (coats) to the lighter blade half. Both blades are finally checked for equal weight. Differences in weight, if any, are compensated by applying another coat of varnish uniformly over the lighter blade, until proper balance is obtained.

Be sure to take this balancing business seriously: a scant 1 g of static unbalance between blades results in an unbalance of approx. 400 grams when the rotor spins at 1.000 rpm!

4.1.5.
Paint rotor blade roots approx 2 1/4" wide, startint at the inner end of the blade. Use black paint, such as UNIVERSAL varnish No., 921/7. Apply thin coats only (same applies to the porefiller coats) and sand between coats. This is important, as too liberally applied coats of varnish may make insertion of the rotor blade in the rotor blade holders of the rotor head difficult, if not impossible.

4.1.6.
Colour-code the tips of the two rotor blades by applying stripes of different, easily recognizable colours, some 3/4" from the tip proper. Differently coloured tips come in handy when testflying and adjusting the helicopter model.

4.1.7.
Cut patterns from foil supplied and cover rotor blades with them. Place rotor blades in front of you, with the three holes facing right and their trailing edges facing toward you. Covering is started at the trailing edge of the rotor, as per schematic of fig. 5.
Overlap foil at bottom side of rotor blade.

Fig. 5 Schematic of method of covering the main rotor blades.

The rotor blade tip facing left, remain uncovered for a length of 3/4". Stick to this dimension in the case of both rotor blades, leaving the tips uncovered simplifies balancing the main rotor properly.

Attention! Be sure to apply the covering film in the manner described by the sketch. If the film is not overlapped as described it may separate in some places; spoiling the airflow and causing it to separate from the blade. A helicopter equipped with incorrectly covered rotor blades will crash.

For the same reason, e.g. their spoiler effect, decals and similar labels must not be applied to rotor blades. Do not dress up rotor blades in this manner.

The box lid illustrations of the airframe kit ZELLE show a model the rotor blades of which carry inscriptions, This is, of course, merely a demonstration model, not an operative one. So be sure to follow instructions given above.

Do not unnecessarily expose main rotor and tail rotor blades to hot sunshine for prolonged periods. Use some kind of sunshade to protect these parts against heat and sunshine.

4.1.8.

Carefully check both blades of the main rotor for equal weight and corresponding centers of mass position.

4.2. Preparation of tail rotor blades

Treat and balance the tail rotor blades in the same manner as described above, omitting paragraph 4.1.4. of the main rotor blade instructions. In the case of the tail rotor blades it suffices to provide blades of equal weight. Remove corners of blade shanks as per sketch.

4.2.1.

In order to balance the tail rotor the covered and varnished tail rotor blades are assembled with the two die-cut parts supplied in the Quickie kit MECHANIK, as per illustration 6 and balanced by inserting a pin in the two central holes.

4.2.2.

The tail rotor is then balanced by screwing self-tapping screws of appropriate weight (not supplied in kit) into the front edge of the pine section of the rotor blade.

Diameter of the self-tapping screws should not exceed 3/32". Screws of various lengths are available from hardware shops.

Fig. 6 Balancing the tail rotor blades joined to the die-cut parts.

4.2.3.

Cement screw in position.

Attention!

Be sure to screw the self-tapping screws serving as ballast weight into the pine section of the tail rotor blade only. If screwed into balsa wood they'll get loose and drop out.

4.3. Field kit

Assembly and adjustments as well as pre-flight checks require the use of a field kit.Fig. 7 shows the recommended layout of such a field kit. Material required for building it is neither contained in the kit, nor available generally from the GRAUPNER range of materials. Your local wood working shop should have it readily available.

Prepare a list of the materials required, using the sketch for a guide.

Be sure to protect the field kit by several coats of fuelproof varnish, such as UNIVERSAL varnish. For ease of transport the four legs of pine mouldings should be made removable, using eyebolts to hold them in their operative position.

4.4. Airframe ZELLE, complete with R/C gear installation

Start by assembling the assy. groups consisting of parts (100) through (110). The straight building board mentioned before is required for this assy. group.

Add braces (101) to parts (100), mirror-fashion. Braces (101) must sit flush with longitudinal formers (100) at the front end (in the direction of flight) and stand 5/64" proud at the rear end. The longitudinal edges of parts (100) and (101) must also sit flush. Be sure to press the joints of parts (100) and (101) firmly together with clamps, until the cement has set.

When dry the clamps may be removed. Provide holes for mounting the bellcrank in the starboard (right) longitudinal former. Then clamp **the assembly of braced longitudinal formers to the 8 x 2 7/16 x 1 3/16" balsa block. See fig. 8. Attention! The balsa block serves to** properly position the two longitudinal formers only and must **not** be cemented to the latter **under any circumstances.** This requires use of a straight bulding board on which all parts rest properly.

Fig. 8 Formers (102) through (104) ready for installation

Former (104) must be cut out to suit to allow passage of the control linkage.

Attention!

Be sure to work carefully when fitting these parts. Check for proper spacing. Make sure that they coincide with those given on plan. Under any circumstances do not alter the relative lateral position of formers.

Parts carrying the designation „R" belong to the right, starboard, side. The direction of flight is indicated on the longitudinal former by an arrow. After fitting them, the three bulkheads Nos. (100)/(101) are cemented in place, at proper right angles and flush with the building board. Use the narrow front face of the balsa block for an abutment for former (104).

Fig. 9 The sub assembly being cemented

Attention! Do not cement former (104) to balsa block. This phase of the assembly is shown by fig. 9. It may prove necessary to clamp braces (101) to the building board. Attach bellcrank (105) with parts (106) through (109) freely movable at the right inner face of longitudinal former (100), fit cross brace (110) and cement firmly to adjoining parts. The distance between the outer faces of parts (101) should be exactly 3 15/16". The finished sub assembly is shown in fig. 10.

Fig. 10 The finished sub assembly

Give sub assembly a thorough coat of fuel proof varnish prior to its installation in the fuselage, excluding those parts which still have to be glued. **Attention! Do not** fuel proof those stations! Mark centerline of former (104) with a felt pen on the outer face of fuselage (111) prior to the installation of the former. Spacing of centerline of former and top rear edge must be 11 13/16", as per side view and fig. 11.

In view of the curvature use of a straight object, such as a sheet of wood etc., is recommended for this step to simplify finding the correct position.

Fig. 12,13,14 Insertion of sub assembly into lower fuselage opening.

Now slip sub assembly provisionally into lower fuselage opening. Proper insertion sequence is indicated by fig. 12., 13., and 14.

Provided everything has been properly assembled, the assembly group should now fit properly. If it does not re-work the parts in question accordingly. Former (104) must be positioned right on the center of the marker line at the top; proper position can be easily checked from the outside. All formers must snugly fit the inner face of the fuselage shell. Mark positions of all formers on the o u t e r face of the fuselage, using a felt pen or marker. Then remove sub assembly from fuselage, sand the **inner** face of the fuselage at the former stations lightly and de-grease them if necessary. The bellcrank (105) is taped to the longitudinal former to prevent it from tipping over and getting in contact with adhesive.

Now apply UHU-plus „endfest 300" to formers, insert the sub assembly as shown and move it to its proper station (11 13/16"!) Use fingers to smear the cement into corners and check glueing stations from outside for uniform application of glue. Press down sub assembly with ballast so that it is securely held in place until the cement has thoroughly set. Then put fuselage aside. Cement braces (114) flush with right and left longitudinal formers (112), (113).

Attention! Beware of cementing braces to the wrong side!

Preferably pin the longitudinal formers with braces to the straight building board while the cement is setting.

After the cement has thoroughly set the parts may be removed from the building board. Carefully sand longitudinal edges to remove excess cement. Then pin parts to the building board, their longitudinal edges touching eachother and with their front ends flush. Now transfer positions of the five lower formers onto the longitudinal formers with a lead pencil, as per plan instructions (2 9/16", 6 5/16", 12 7/8").

This is shown on the plan by dotted lines at the appropriate stations. Meanwhile the glueing stations of the assembly group (100) in the fuselage have dried. Fit the two longitudinal formers (112/113) now. At the sides they must properly contact the inner face of the fuselage and their longitudinal edges must be flush with those of parts (100). If this is the case sand the glueing stations at the inner face of the fuselage lightly with sandpaper, de-grease these stations, then cement the two longitudinal formers. In order to ensure proper joints clamp parts together as per fig. 15. Cut the four short mouldings for the clamps from 13/32" sq. pine strip. Slip two of them through openings provided in longitudinal formers (100).

Fig. 15 Cementing the two longitudinal formers (112) and (113) in place.

Saw slot in former (115) for the slotted plate (22) of the pitch lever (contained in the MECHANIK kit). Proper dimensions must be derived from plan. Then put on the slotted pitch plate and transfer hole centers for the mounting hardware. Hole diameter for the blind nuts (116) should be 5/32".

Check plan for proper position of hole for the outer tube of the tail rotor transmission. Drill 1/8" diam. hole.

Cement blind nuts (116) to rear face of former, tighten them with M 2.6 x 10 bolts (117). Secure nuts in place with UHU-plus „endfest 300".

Fashion hooks (118) from the aluminum strip material supplied and fasten them to former (115) by wood screws (119). Secure parts in place with UHU-plus „endfest 300".

Finally cement brace (120) to the station of the former marked „R". See also relevant plan illustrations. Press former and beech wood part

firmly together until the cement has thoroughly set. When dry cautiously cut off protuding ends of beech wood part, sand ends well. Be careful not to spoil the shape of the former!

Cement the auxiliary former (121) from two identical parts, then add three braces (122) each on both the right and the left sides.

In the same manner the auxiliary former (123) is cemented from two parts and braces (124) are added, 3 each on the right and the left sides. Also cement braces (125) from two parts each. Press joints firmly together until dry. After the cement has set drill hole through auxiliary former (123) to accept the fuel line and attach hook (118) to former (126) with woodscrews (119) (secure in position with UHU-plus „endfest 300"). Alternatively the aluminum hook may be fastened by three eyebolts (118a). In this case reinforce the rear face of the bulkhead with scrap wood.

Now remove the two clamps and the four pine mouldings from the fuselage, then fit part (127), the cross brace. It is cemented in position after former (115) has been glued in place.

Mark positions of cutouts for formers with braces (121/122) and (123/124) at the lower fuselage opening, remove material cautiously. Be sure to make cutouts only as large as is necessary. Now carefully mate the prepared formers to their appropriate stations, making sure that proper interface is provided and that they rest on parts (112/113) at the indicated stations. Work with care when fitting former (115)! Then cement the former which must sit perpendicular on parts (112/113). Use a small set square for trueing up the proper angles. When these joints have set, fit and cement braces (125) and (129). Use spring clamps to firmly press them while drying. The inner rims of braces (130/131) are cautiously tapped with the narrow side of a hammer until the curvature of the braces matches that of the fuselage; they are then cemented in position. These braces too are pressed home by spring clamps until dry.

Fig. 16 + 17 The fuselage with formers cemented in place.

Check plan for proper position of former (132), then transfer station to the outer face of the fuselage, using a felt pen, and fit the former in place. File slot for the guide tube of the tail rotor transmission in the former, as per plan. Then cement former in position, with the inscription VORN (forward) facing forward, in the direction of flight.

4.4.1. The servo sub assembly

The assembly group for mounting the servos with bellcranks consists of parts (133) through (148). Start assembly with these parts.

Cement top part (133) onto servo panel bottom part (134), press parts together with spring clamps, remove excess cement, in particular in the edges. After the cement has set, the four servos are placed on the servo panel and their hole positions are transferred to the panel. Then drill eight holes for the pronged blind nuts (116), cement the latter to the bottom face of the panel, using 2 - component adhesive. Then add part (135), press it down with spring clamps until dry.

Fig. 18 Servo mounting parts

This phase of the assembly is shown by fig. 18. Now drill a hole of 1/8" diam. in part (136) and drill 5/32" diam. holes through each of the side parts (137). File a slot in the top side of brace (138) to accept the aluminum tube.

After the cement has set remove spring clamps from parts (135),(133), remove protuding ends of part (135) and sand it flush with and at right angles to the servo panel (133/134). Now cement parts (136) through (139) as per plan. Allow all glueing stations to set thoroughly. Fasten bellcrank (105) with parts (106) - (109). The bellcrank must be freely movable! If required drill a new hole, farther inboard, in the horizontal shank of the bell crank. See instructions MECHANIK, chapters 15.3.2, 15.3.7. and sketch of Quickbuild plan. Remove reinforcing edge of bellcrank, as required.

Slip bellcrank (105) and spacer sleeves (141, 142) onto brass tube (140) as per plan. Then insert brass tube (140), complete with these parts, between sides (137), then slip rivets (143) into position from outside on either side, securing them in position with cement (UHU-plus"endfest 300"). Hold, until cement has set. The two bellcranks must be mounted freely movable. Now fasten the four servos on a common sheet of foam rubber glued onto the servo panel for vibration damping.

Fig. 19 The fully assembled servo group still without the foam rubber sheets which are to be glued to the sides.

The cranked links (146/147) are fashioned from iron wire, as per plan, and fastened by safety clips (148), as per sectional views (K - K), (L - L) and (M - M).

The servo panel assembled in this manner is shown by fig. 19. If the helicopter is to be flown without collective pich control the plywood abutment (217) must be glued to the starboard fuselage side, as per plan.

The side parts (137) are lined with foam rubber in order to protect the power supplies and receiver system.

4.4.2. Continuation of airframe assembly

Mark outlines of cutouts on port side of fin with the aid of patterns (S 1). Cement brace (149) for the tail rotor gear box to the inner face of the fin on starboard side. It stands 1/4" back from the outer edge of the trailing edge. Be sure to watch for correct position of (S 1) and 149, as per plan. Remove cement from edge of brace (149), press it against the wall of the fin with spring clamps until the cement has set. The inscription "HINTERKANTE" on parts (S 1) and (149) must face aft, towards the trailing edge of the fin.

Now fit and cement the braces (150) through (152) for the top opening. Press parts firmly in place with clamps until the cement has set.

Cut out lid (153), drill 1/8" diam. holes, as per plan, cement braces (154) through (156) to bottom face with UHU - hart.

Apply cement sparingly! When cementing the above-mentioned braces to the lid, be sure to support the latter by 13/32" sq. pine mouldings, as per fig. 20.

Fig. 20 Braces are cemented to lid (153)

After the cement has set put lid on top opening of fuselage in such a manner that opposite sides are equidistantly spaced to the rim of the opening, then transfer lid hole positions to the top of the fuselage, using a pointed lead pencil. Then drill six holes of 5/32" diameter. Press pronged blind nuts M 2.6 (116) into place from below, applying UHU - plus „endfest 300" and tighten them in place by cylinderhead bolts (117). Then fit and cement fairing (157), fair in the corners formed by fuselage and part (157), filling it with UHU-plus „endfest 300". Finally drill holes for the main rotor shaft and the linkage, as per plan and sketch below, respectively.

Fig. 21 Spacing of the four upper holes

Now fit and cement part (158) between formers (121) and (126) in such a manner that it rests flush on longitudinal former (112).

Fig. 22 Fuselage during assembly

The aggregate with the servos is now cemented in place. Be sure to cement all parts well in order to provide safe, strong joints! Align carefully as per plan. Cut out opening for stabilizer in both fuselage sides (drill, file). Proper positions of cutouts are marked on the fuselage. The pre-cut stabilizer (159) is sanded to airfoil section as per plan and fitted. Do not yet cement it in position.

4.4.21.

Fitting and cementing the two tubes

File a slot in the left (port) side of the fin for the aluminum tube (160), as per sectional view J-J of plan. The tube is then pre-bent, as per plan, and cut to proper length, using the side view and plan view as a guide. Install the tube stress-free! At the front end it is cemented in the slot of part (139). The tube is cemented with the fuselage and braced against the latter with scrap balsa, using UHU - plus „endfest 300". The cement is applied with the aid of 1/8" sq. pine strip supplied with the kit, inserting the pine strip at the fin. Do not cement the tube to the fin. After the cement has thoroughly dried the likewise pre-bent brass tube (161) is also cut to proper length and carefully cemented in place, excepting the front and rear ends of the tube. The front end of tube (161) is temporarily slipped into the hole of former (115). Second connection is made in former (132). Apply cement with care where the tube touches the inner face of the fuselage shell (using the pine strip method once more).

The **bending radii** of guide tube (161) and tail rotor transmission must **not** be **too narrow**; kinks must be avoided under any circumstances. Be sure to thoroughly cement the tube at the supporting stations.

If this is not done properly the guide tube may be dislocated as a result of hard landings. This will in turn cause an alteration of the length of the transmission and thereby excessively load the bearings of the tailrotor gear box.

File slots for the two tubes in fin part (162), as per plan. Then fit part (162), with the tubes provisionally slipped (not glued!) into the slots, then cement part (162) in place. Use spring clamps to ensure firm joints.

After the cement has set the

4.4.22.

MECHANIK is now fitted.

Refer to chapter 6 of relevant installation instructions.

When this step has been performed, drill two holes in the fuselage to ac-

M

cept the tail skid, cement the latter. When dry fit the fin spar (167), cement it in place. After the cement has set add the aft fairing (168) to the fin; secure in place with pins until dry.

4 The two handles (169) with washer (170) must also be cemented now (drill 1/8" diam. holes)

Next comes the Venturi tube (171), fashioned from beech dowel, as per dimensions given on plan. Drill 1/4" diam. hole in fuselage for the

4 brass tube, as per plan, file to oval shape. Then slip brass tube (172) into hole, cement fast with UHU-plus „endfest 300"; align well. The Venturi tube is installed later.

Now drill two 13/64" diam. holes for the nipples (173) in the fuselage. They are fastened in place by parts (174), (175) after the outer face of the fuselage has been painted. Three more holes must be drilled through the left side of the fuselage. Two of them are required for the mounting bolts of the exhaust, which must be readily accessible; hole diameter should be 13/64". The third hole, of 23/64" diameter is required for access to the carburettor needle. Check proper spacing and positions of

M these holes on plan or, preferably, use the mechanical parts of the MECHANIK kit for a guide when transferring them to the fuselage.

4.4.23.
Painting the inner face of the fuselage

Before continuing with the assembly of the fuselage all wood parts accessible inside the fuselage are given several coats of fuel proof varnish, such as UNIVERSAL-varnish No. 921/1. Permit coats to dry thoroughly before applying the next one!

4.4.24.
Installation of fuel tank

Install tank No. 263 (not contained in the kit) as per plan. Screw nipples and vents should be installed as per plan, not as described in the installation instructions supplied with the tank. The tank is mounted with the aid of elastics wrapped about the three hooks (118) and eyebolts (118 a), resprectively.

4.4.25.
The landing gear

Lay on the landing gear attach points (176) at the indicated stations and properly aligned, to permit t r a n s f e r r i n g the positions of holes (121/122) and (123/124). Do not use the parts (176) proper as a jig for drilling these holes! Then drill the four 1/4" diam. holes, per-

2 fectly p e r p e n d i c u l a r . The outer diameter of the threaded inserts is only slightly larger than 1/4", so don't drill oversize holes! In-

2 stall the threaded inserts (177) into the holes, properly aligned, using a robust screwdriver. The two threaded inserts in part (120) stand a little proud of the fuselage contour so that they can accept the vibration-damping-elements (179). The latter are now inserted and tightened firmly!

Now put on the two landing gear strut attach points (176) and fasten them with countersunk bolts M 4 (180). The clamp holder for the V - belts must face to starboard, as per plan!

File semi-circular grooves into lower ends of the landing gear struts (178) and bend clamps (181) as per sectional view B-B of plan, providing a tight fit.

2 Slip two clamps each onto skids (182), add the landing gear struts and align the assembly, as per plan and model. Spot-cement the lower ends of the clamps to the skids with UHU - plus „endfest 300".

Fig. 23 Landing gear assembly

2 Permit glueing stations to dry thoroughly. Then drill 1/8" diam. holes for bolts (183) through clamps and struts. Firmly clamp struts and clamps together for drilling. Then insert bolts (183), screw on nuts (184).

2 Drill a 5/32" diam. hole at top center position in all struts. The landing gear assembled in this manner must fit the two strut attach points (176) stress-free. If they do the landing gear strut attach points are once more removed. Saw the two skid front caps (185) from the aluminum supplied and bend them to proper shape. Steps (186) are fashioned from

2 balsa wood and parts (187) are cut from extruded plastic sheet. Mate the beech dowels (188) with skids and skid aft caps (187). Connect all parts to the skids with UHU-plus „endfest 300". Permit all glueing stations to dry throughly, then paint the landing gear.

Steps (186) and parts (185) may later be covered by pieces of wet - and - dry sandpaper No. 700/1 (not contained in kit), cut to suit.

2 The landing gear assembly is attached by screws, washers, spring washers and hexagonal nuts (189) through (192) to parts (176) only after the mechanical parts of MECHANIK have been installed.

Slip stabilizer (159) into appropriate cutout, check for proper alignment, cement in place. Secure in position until the cement has set!

Carefully cut the eight navigation lights (193), fairing (195), fairing (197) (1 right, 1 left), the ring - shaped fairings (199) and louvers (201) through (204) from the extruded plastic sheet. Cement plywood insert (194), (196), (198), (200) and (205) at appropriate stations to parts (193), (195), (197), (199) and (201) through (204) with UHU-hart.

Join parts (197) and (198) in the manner indicated on the plan. Proper location of these parts is shown on the plan. Slightly roughen all glueing stations with sanding paper, de-grease them with a solvent, then cement parts at proper stations with UHU-plus „endfest 300". The fuselage is then prepared for the colour finish.

Balsa parts (157), (159) and (168) are carefully sanded and given several coats of GLATTFIX porefiller. Carefully sand all stations between intermediate coats. Bond fin aft fairing (168) firmly to the fuselage by adding a strip of Perlon ribbon (144)! Carefully sand all stations of fuselage filled with putty (see relevant hints in chapter "General"

4.4.26.
Training-type landing gear No. 90

Under any circumstances the training-type landing gear should be used for initial flights. The wide track counteracts any toppling tendencies of the helicopter landing in a banked attitude.

4.4.2 .
Float kit, order No. 91

The float kit enhances the operational capability and versatility of the BELL 212 TWIN JET model helicopter. Equipped with floats the model may be operated from water and firm ground as well as snow, as desired. Use of floats instead of the standard type skid landing gear is recommended for initial flights. The dampening effect of the air-filled floats helps to cushion the shocks of rough landings on firm ground.

4.4.28.
Conversion kit, order No. 92

This conversion kit has been developed for the purpose of providing optimum safety during the crucial **first training flights.**
The conversion kit permits moving the rotor head, and with it the main rotor blades, approx. 1 3/16" upward as compared to the normal position. No modifications required on the rotor head proper.

Fig.

A helicopter model equipped with floats and converted with kit No. 92 is effectively protected against damage in the training phase, even if subjected to high landing loads.

4.4.3. Painting the fuselage

The fuselage is given a primer coat of UNIVERSAL - Haftgrund No. 715 (not contained in the kit). If imperfections still show up after the primer coat has dried fill them with nitro-putty and sand stations in question when dry again. Nitro-putty is available at motor car accessories shops. Apply a final coat of primer now.

The box lid illustrations indicate a variety of colour schemes. Use coloured UNIVERSAL-varnish (your choice of colours) for the colour finish. Preferably fashion 1/64" plywood patterns (not contained in the kit) of windows, doors etc. The outlines of these parts are indicated by fine lines in the side view of the model.

A supplementary plan is provided, showing the size and proportions of the various patterns. He who so desires may dispense with painting on doors and windows and use instead pressure-sensitive film, such as d.c. fix or equivalent material, using either grey or silver - coloured patterns.

Fig. 24 The model equipped with the training-type landing gear.

4.4.4. Continuation of airframe assembly and installation of R/C accessories and receiver.

The throttle linkage is fashioned from parts (145) and (206) through (208), installed, as is the linkage consisting of parts (145) and (208) through (211) connecting bellcrank and engine. The front bellcrank (105) is installed as shown on plan. 1 3

The pitch lever linkage follows next; it consists of parts (145), (207), (208) and (210).

Prepare the two linkages (210 a); connecting the servos with the swash-plate, with parts (145), (207). Screw threads of linkages into plastic parts of ball links. Be sure to follow hints concerning depth of engagement of threads etc., paragraph 2.2., of instructions MECHANIK.

Then install the Bowden cable consisting of parts (145), (206), (207) and (212). Begin by soldering one of the threaded sleeves; insert cable, then solder the other sleeve. Be sure to follow instructions concerning length of Bowden cable in MECHANIK instructions (paragraph 15.1.2). Viewed in the direction of flight the receiver is located at the right side of the servos, while the power supplies are accomodated at their left 3 M

side. Mount receiver and power supplies shock - proof, packed in foam rubber or rigid plastic foam (from transmitter emballage). Mount the switch of the power supply cable at the upper right side where it is easily accessible, as per hint in plan view of model. The antenna is exited at the starboard (right) fuselage side, aft of the receiver, and run straight to the **starboard tip** of the stabilizer (159), where it is anchored by parts (213) – (215) (as per illustration of Quickbuild plan). Leave end of antenna to dangle free.

Under any circumstances the antenna must not, repeat not, be run below the fuselage, parallel to guide tubes (160), (161) otherwise the operation of the receiver will suffer badly from interference and uncontrolled R/C signals. File slot, if necessary. Mount the two nipples (173) next. Then install the fuel lines. The carburettor line is run to part 3 via bracket later on. Close one of the nipples by cap (216).

Now follows the final installation of the mechanical parts as described in chapters 7 through 15 of the instructions MECHANIK.

After installation of the power plant the landing gear is fastened.

For additional information on test running, test flying, the mechanics of flight of the helicopter etc., refer to relevant chapters of the MECHANIK instructions.

Here's wishing you much fun for the ensuing steps and, finally, the operation of your BELL 212 TWIN JET model helicopter. Happy landings!

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Edition 2/74/III

Subject to changes serving technical progress!

List of materials airframe ZELLE BELL 212 TWIN JET

Part No.	Designation	Amt. req.	Material	Dimensions in inches
100	longitudinal former	2	plywood	5/64, a.t.p.
101	brace	2	beech	8 29/32 x 43/64 x 13/32
102	former	1	plywood	5/64, a.t.p.
103	former	1	plywood	5/64, a.t.p.
104	former	1	plywood	5/64, a.t.p.
105	90° bellcrank	4	plastic	comm. item
106	bearing bolt	4	plastic	comm. item
107	semi roundhead bolt	2	iron, nickel-plated	M 3 x 20 (shorten)
108	washer	5	brass, nickel-plated	5/16 OD, 1/8 ID x 1/64
109	hexagonal nut	3	brass, nickel-plated	M 3
110	cross brace	1	plywood	3 15/16 x 2 39/64 x 5/64
111	fuselage	1	FRP	comm. item
112	longitudinal former (right)	1	plywood	5/64, a.t.p.
113	longitudinal former (left)	1	plywood	5/64, a.t.p.
114	brace	2	plywood	13 3/4 x 3/4 x 1/8
115	former	1	plywood	5/64, a.t.p.
116	pronged blind nut M 2.6	16	iron, nickel-plated	comm. item
117	cylinder head bolt M 2.6	8	brass	M 2.6 x 10
118	hook for holding the tank	3	aluminum	3/64, a.t.p.
118a	optional screw-eye	3	iron	comm. item
119	semi roundhead wood screw	3	iron, nickel-plated	5/64 x 9/32
120	cross brace	1	beech	6 46/64 x 19/32 x 15/32
121	aux. former, right (2 parts)	1	plywood	5/64 + 5/64 = 5/32, a.t.p.
122	reinforcement	6	plywood	5/64, a.t.p.
123	aux. former, left (2 parts)	1	plywood	5/64 + 5/64 = 5/32, a.t.p.
124	reinforcement	6	plywood	5/64, a.t.p.
125	brace (2 parts)	2	plywood	5/64 + 5/64 = 5/32, a.t.p.
126	aux. former, right	1	plywood	5/64, a.t.p.
127	cross brace	1	plywood	2 61/64 x 2 7/16 x 5/64
128	aux. former, left	1	plywood	5/64, a.t.p.
129	brace	1	plywood	5/64, a.t.p.
130	brace	2	pine	approx. 3 3/8 x 13/64 x 1/8
131	brace	2	pine	5 29/32 x 13/64 x 1/8
132	former	1	plywood	5/64, a.t.p.
133	servo panel, top part	1	plywood	5/64, a.t.p.
134	servo panel, bottom part	1	plywood	5/64, a.t.p.
135	fillet	1	balsa	3 43/64 x 3 3/4 x 13/32
136	web	1	plywood	1 3/16 x 5/8 x 5/64
137	side	2	plywood	5/64, a.t.p.
138	brace	1	plywood	5/64, a.t.p.
139	gusset	1	plywood	1 3/16 x 23/32 x 5/64
140	brass tube	1	brass	3 43/64 x 1/4 OD, 11/64 ID
141	space sleeve	2	brass,	1 1/4 x 9/32 OD, 1/4 ID

142	spacer sleeve	1	brass	11/16 x 9/32 OD, 1/4 ID
143	rivet	2	metal	5/32 x 1 3/16
144	Perlon ribbon	2	Perlon	approx. 8 x 1
145	hexagonal nut	9	brass, nickel-plated	M 2
146	cranked linkage	2	iron, zinc-plated	1/16 Ø, a.t.p.
147	cranked linkage	1	iron,	1/16 Ø, a.t.p.
148	safety clip	6	plastic	comm. item
149	tail rotor gear-box brace	1	plywood	5/64, a.t.p.
150	main rotor bearing brace	1	plywood	5/64, a.t.p.
151	brace	2	pine	7 31/64 x 19/32 x 5/64
152	brace	1	pine	3 x 19/32 x 5/64
153	lid	1	plastic	comm. item
154	longitudinal brace	1	pine	5 51/64 x 13/64 x 1/8
155	cross brace,front	1	plywood	5/64, a.t.p.
156	cross brace, aft	1	plywood	5/64, a.t.p.
157	fairing	1	balsa	19/32, a.t.p.
158	support	1	balsa	29/32, a.t.p.
159	stabilizer	1	balsa	12 5/8, a.t.p.
160	guide tube	1	aluminum	32 3/32 x 1/8 OD, 3/32 ID
161	guide tube	1	brass	33 1/2 x 1/8 OD, 1/16 ID
162	fin rib	1	plywood	5/64, a.t.p.
163	pronged blind nut M 4	10	iron, nickel-plated	comm. item
164	pronged blind nut M 3	4	iron, nickel-plated	comm. item
165	tailrotor shaft	1	steel wire	40 9/16 x 3/64 Ø
166	tail skid	1	steel wire	3/32 Ø, a.t.p.
167	fin spar	1	balsa	1/4, a.t.p.
168	fin aft fairing	1	balsa	29/32, a.t.p.
169	handle	2	aluminum	1/8 Ø, a.t.p.
170	washer	4	brass	1/4 OD, 1/8 ID x 1/64
171	Venturi tube	1	beech	2 41/64 x 1/64 Ø
172	brass tube	1	brass	51/64 x 1/4 OD, 13/64 ID
173	nipple	2	brass, nickel-plated	a.t.p.
174	washer	4	brass, nickel-plated	7/16 OD, 13/64 ID x 1/32
175	hexagonal nut	2	brass, nickel-plated	M 5 x .5
176	landing gear strut attach point	2	plastic	comm. item
177	threaded insert	4	steel	comm. item
178	landing gear strut	2	plywood	comm. item
179	vibration damping connector	4	rubber/ metal	comm. item
180	countersunk screw M 4	4	iron, nickel-plated	M 4 x 8
181	clamp	4	aluminum	3/64, a.t.p.
182	skid	2	aluminum	comm. item
183	cylinderhead bolt M 2.6	8	brass	M 2.6 x 15 (shorten)
184	hexagonal nut	8	brass	M 2.6
185	skid front cap	2	aluminum	3/64, a.t.p.
186	step	2	balsa	5 3/4 x 19/32 x 13/32
187	skid aft cap	2	plastic	a.t.p.
188	beech dowel	2	beech	13/32 Ø x 1
189	cylinder head bolt M 4	2	iron, nickel-plated	M 4 x 20
190	washer	4	iron, nickel-plated	23/64 OD, 11/64 ID x 1/32
	spring washer	2	steel	comm. item
192	hexagonal nut	2	iron, nickel-plated	M 4
193	navigation light	8	plastic	a.t.p.
194	plywood insert	8	plywood	1/32, a.t.p.
195	fairing	1	plastic	a.t.p.
196	plywood insert	1	plywood	1/32, a.t.p.
197	fairing, 1 right, 1 left	2	plastic	a.t.p.
198	plywood base plate	1	plywood	1/2, a.t.p.
199	ringshaped fairing	2	plastic	a.t.p.
200	plywood insert	2	plywood	1/32, a.t.p.
201	louvre	1	plastic	a.t.p.
202	louvre	1	plastic	a.t.p.
203	louvre	1	plastic	a.t.p.
204	louvre	1	plastic	a.t.p.
205	plywood insert	4	plywood	1/32, a.t.p.
206	threaded rod	1	iron, zinc-plated	approx. 8 3/8 lg.
207	threaded sleeve	7	iron	comm. item
208	clevis with springsteel shanks	9	springsteel	comm. item
209	threaded rod	1	iron, zinc-plated	approx. 2 3/4 lg.
210	threaded rod	1	iron, zinc-plated	approx. 1 3/16 lg.
210a	threaded rod	2	iron, zinc-plated	approx. 1 7/8 lg.
211	ball link	1	plastic	comm. item (comes mounted to power pod assembly
212	Bowden cable	1	flexible steel cable	approx. 36 x 5/64 Ø
213	glasshead pin	1	glass/steel	comm. item
214	elastic	1	rubber	1 9/16 Ø x 3/64 sq.
215	aluminum tube	1	aluminum	1/8 OD, 3/32 ID x 13/32
216	cap	1	plastic	a.t.p.
217	abutment	1	plywood	a.t.p.

a.t.p. = according to plan; true dimensions of parts in question must be derived from plan.

5.1. Also required and contained in the kit:

1 pair of main rotor blades — No. 82
2 foil patterns for main rotor blades

1 pair of tail rotor blades — No. 83
2 foil patterns for tail rotor blades

1 pack UHU - plus „endfest 300", No. 950/20
1 plastic bottle UHU - coll
1 tube UHU - hart, No. 534/11
1 foam rubber panel, pressure-sensitive, single-coated, 1/8 x 12 1/4 x 8 5/16", No. 730/3, for the shock-proof installation of servos, receiver and power supplies.
2 elastics, 3 1/8 Ø x 13/32 x 3/64, No. 50/80 for mounting the fuel tank
1 decal BELL 212 TWIN JET

5.1.1.
For the fuselage assembly
1 pattern (S 1) of 5/64 plywood for transferring the outines of the tail rotor cutout in the fin
1 pine strip, 39 3/8 x 1/8 sq., serving as a handy tool for cementing the guide tubes
1 balsa block 8 x 2 7/16 x 1 3/16, for the assembly of the former assembly group

5.1.2.
For balancing the main rotor with rotor blades, see instructions MECHANIK, paragraph 13
2 supports U 1 (5/64 plywood)
1 support U 2 (pine)

The Quickie kit contains plastic bags containing miscellaneous parts. The bags are designated by figures 1 through 7. Each bag contains various parts required for one specific assembly group.

The following charts list the contents of the various bags and the purpose of the parts contained in them.

5.2. Table contents of plastic bags

Bag No.	Application	Part No.	Item	Amt.	Remarks
1	R/C gear installation	206	threaded rod M 2 x 500	1	shorten
		209/			used in conjunction
		210/210a	threaded rod M 2 x 200	4	shorten with bag 3
		146/147	wire linkage, cranked	3	shorten
2	Parts for landing gear assembly	181/185	sheet aluminum 3/64"	6	
		188	beech dowel 13/32" diam.x 1"	2	
		179	circular rubber bearing	4	
		177	threaded sleeve M 4	4	
		180	countersunk bolt M 4 x 8	4	
		189	cylinderhead bolt M 4 x 20	2	
		190	washer 23/64 OD, 11/64 ID	2	
		192	hexagonal nut M 4	2	
		183	cylinder bolt M 2.6 x 20	8	
		184	hexagonal nut M 2.6	8	shorten
3	R/C installation	148	safety clip	6	
		145	hexagonal nut M 2	9	
		207	threaded sleeve M 2	7	
		208	clevis with spring steel shanks	9	
4	Venturi tube, handle	172	brass tube 51/64 x 1/4 OD, 13/64 ID	1	
		171	beech dowel 2 41/64 x 16/64 Ø	1	
		169	aluminum handle 1/8" diam.	2	
		170	washer 1/4 OD, 1/8 ID	4	
5	tank mounting nipples for fuel and vent tubes	173	screw nipple	2	
		176	hexagonal nut M 5 x .5	2	
		174	washer 7/17" diam.	4	
		118	sheet aluminum 3/64"	1	
		118a	screweye	3	
		119	semi roundhead woodscrew 5/64 x 9/32"	3	
		–	elastic 3 1/8 diam. x 13/32 x 3/64	2	
		216	plastic cap	1	
6	mounting hardware for bellcrank of servo group, bellcrank for servo and throttle linkage	143	rivet 5/32 x 1 3/16	2	
		105	90° bellcrank	4	
		106	bolt	2	shorten
		107	semi roundhead bolt M 3 x 20	2	
		108	washer 5/16 OD, 1/8 ID	3	
		109	hexagonal nut M 3	3	
		141		2	
		142	spacer sleeve 11/16 x 9/32 OD, 1/4 ID	1	
		140	brass tube 3 43/64 x 1/4 OD, 11/64 ID	1	
7	mounting nuts for engine group, lid, antenna bracket etc.	116	pronged blind nut M 2.6	16	
		163	pronged blind nut M 4	10	
		117	cylinderhead bolt M 2.6. x 10	8	
		213	glasshead pin	1	
		214	elastic	1	
		164	pronged blind nut M 3	4	Blind nuts M 3 for top rotor shaft bearing (10) MECHANIK kit
		215	aluminium tube	1	
		144	Perlon ribbon approx. 8 x 1	1	

5.3. Required, but not contained in kit:

GLATTFIX, No. 207, primer coat for balsa and plywood surfaces

UNIVERSAL - Haftgrund, white, No. 715, primer coat for the fuselage

SPANNFIX-Immun, No. 1408/1, for weather-proofing

UNIVERSAL-varnish, No. 921/2-16, for the colour finish or, alternatively,

SPANNFIX-Immun, No. 1408/2-16, for the colour finish, your choice of colours

SPANNFIX-thinner, No. 1409, for thinning GLATTFIX porefiller or SPANNFIX-Immun

UNIVERSAL-thinner, No. 922, for thinning UNIVERSAL-Haftgrund and UNIVERSAL-varnish

wet & dry sanding paper, grade 320 or 400, Nos. 700/1 and 700/2, respectively, for sanding parts and imitating step boards

1 stunt tank (kit), 2.53 cu. in. capacity, No. 263

Neoprene fuel line 1/8" ID, ex No. 1625/2 length to suit, for fuel lines, vent and fuelling lines sheet lead, No. 548, for balancing the model

Receiver and power supplies are shock-proof mounted in hard foam plastic or foam rubber. Dimensions to suit.

Quicki kit MECHANIK, No. 80, with ready-to-install power pod, ready-to-install rotor head, main rotor shaft etc. and ready-to-install tail rotor gear box etc.

Training type landing gear, No. 90

Floats, order No. 91

Conversion kit, order No. 92

Spare parts

No. 82	pair of main rotor blades and covering film
No. 82/10	pack of 10 pairs of main rotor blades and covering film
No. 83	pair of tail rotor blades and covering film
No. 3582	ball link with ball, for hook-up of control functions
No. 107	set screw AM 3 x 3 (4)
No. 105	Allen key 1.5
No. 564/3	brass tube 1/8 OD, 1/16 ID
No. 515/2	aluminum tube 1/8 OD, 7/64 ID
No. 4600/2	ready-formed epoxy GRP fuselage
No. 4600/3	Set of 10 tail rotor transmission shafts (165) of spring steel wire, 3/64" diam., 43 5/16" lg.
No. 4600/4	pair of plastic strut attach points (176)

For other spares available for the Quickie kit MECHANIK No. 80, refer to installation instructions for that kit.

6. The receiver:

available 1973

1 8-channel VARIOPROP digital/proportional receiver (see prospectus RC P)
4 VARIOPROP servos, No. 3765
1 receiver power supply pack, No. 3607
1 quadruple core power supply cable, No. 3606

Subject to changes serving technical progress!

Quickbuild plan texts ZELLE 4600

(1) transfer hole center positions for blind nuts, using servos for a pattern. Drill holes after cementing parts (133),(134)
(2) file slot
(3) view B
(4) center of gravity
(5) sand part (157) to suit, mate to fuselage; fill joints of fuselage and part (157) with UHU - plus
(6) RIGHT – LEFT
(7) sectional view M - M
(8) view A
(9) clevises of servos shown in neutral position
(10) to engine throttle bellcrank
(11) IDLE
(12) FULL THROTTLE
(13) sectional view K - K
(14) abutment (217)
(15) put on pattern (S 1), mark outlines of shaded areas, cut out outlined parts.
(16) left fin section
(17) drill 3/32" diam.
(18) tail rotor transmission
(19) sectional view J - J
(20) file slot to accomodate outer Bowden cable on port side
(21) sectional view H - H
(22) recommended method of fastening the antenna
(23) plywood, approx. 1/32"
(24) antenna
(25) be sure to cement brass tube (161) aluminium tube (160), firmly to fuselage; important!
(27) tunnel
(28) pattern (S 1), 5/64" plywood
(29) to pitch lever
(30) pitch control
(31) sectional view L - L
(32) FORWARD – REARWARD
(33) to tail rotor pitch control
(35) brass tube (161)
(36) line sides of parts (137) with foam rubber
(37) inboard profile of fuselage
(38) brass tube
(39) run antenna from receiver to end of fuselage
(41) aluminum tube
(42) solder
(42a) solder, tin
(43) these two dimensions are important; stick to them!
(44) 11 1/16" to center of gravity
(45) 10 53/64" to center of rotor shaft
(46) mount power supply switch on starboard side
(47) pitch lever
(48) clunk tube
(49) vent
(50) fill and drain
(51) to carburettor
(52) fuel line bracket
(53) drill on starboard side
(54) bearing plates (6 and 7) of power pod rest flush on parts glued to fuselage
(55) bend here
(56) mounting screws of clamps omitted for clarity
(57) sectional view N - N
(58) cut off, if desired
(59) sectional view A - A
(60) ATTENTION! Sectional views of fuselage not shown true scale
(61) carefully fit all formers!
(62) beech 13/32 x 43/64 x 8 29/32"
(63) mark and drill after part (15) has been cemented
(64) sectional view B - B
(65) fit former
(66) recess fuselage
(67) cut hole for exiting fuel line
(68) sectional view D - D
(69) balsa, 59/64" thick
(70) fuel tank, 2.53 cu. in., No. 263
(71) hole for throttle linkage
(72) sectional view E - E
(73) sectional view F - F
(74) hole for outer tube of tail rotor transmission
(75) slot dimensions
(76) sectional view G-G
(77) sectional view C - C
(78) double-pointed arrows indicate the direction of the grain of the wood, in the case of plywood that of the outer layers
(79) opening for throttle linkage
(80) this side open
(81) several parts not shown separately
(82) receiver compartment side-by-side with servos
(83) power supply switch
(84) hole for bolt
(85) lids omitted in plan view
(86) tank omitted in plan view
(87) cap
(88) from tank
(89) tighten and counter parts (109, secure in place with UHU-plus
(90) fasten part (217) to starboard part (177); optional. Refer to illustration (top right, near sectional view K - K and paragraph 15.24 of instructions MECHANIK.
(90a) carburettor fitting
(91) layout of fuel line connecting tank and carburettor
(92) power supply compartment, side - by - side with servos
(93) sectional view O - O
(94) sectional view P - P
(95) cement part (114) underneath
(96) glue part (127, sandwich - fashion
(97) sand to uniform airfoil shape
(98) transfer hole positions to former from part (22) MECHANIK
(99) SUBJECT TO CHANGES!
(100) cut out
(101) fit
(102) round edges well
(103) alternative: use eyebolts
(104) scrap wood
(105) FRONT
(106) TRAILING EDGE
(107) brace outer tube (160) towards fuselage with scrap balsa
(108) new hole
(109) actual rotor head position farther up than shown by plan
(110) **IMPORTANT RECOMMENDATION!** The model helicopter should be modified for initial training flights by taking advantage of CONVERSION kit, No. 92, and FLOAT kit, No. 91.
(111) move nut to this side, if necessary
(112) remove bracing web to suit
(113) cement well
(114) cement rivet in position, use UHU-plus „endfest 300"
(115) run antenna straight to starboard tip of stabilizer

Window pattern plan texts

(1) 1 right, 1 left
(2) window
(3) vent
(4) louvre
(5) patterns for windows etc. BELL 212 TWIN JET, to ind. No. 4600
(6) spacing of individual windows to suit
(7) top side!

Legends to illustrations of airframe building instructions ZELLE

Fig. 5
(1) top side of blade

Fig. 6
(1) direction of flight

Fig. 7
(1) hold
(2) pins for retaining the struts
(3) tape, No. 741
(4) view A
(5) view B
(6) struts removable from pockets

Fig. 11
(1) centerline of fuselage
(2) line at right angle to centerline of fuselage
(3) round
(4) straight restraint

Exploded view of airframe ZELLE
(3) subject to change!

① Verschiedene Einzelteile sind in der Explosionszeichnung nicht dargestellt.

Die Texte sind mit eingekreisten Nummern versehen. Diese Numerierung erleichtert das Auffinden der zugeordneten fremdsprachigen Texte in der jeweiligen Anleitung.

The texts are provided with encircled numbers. This numbering facilitates the locating of the adjoined texts in the respective instructions.

Les textes ont des numéros encerclés. Ce numérotage facilite de trouver les textes des langues étrangères adjoints dans les instructions respectives.

Le testi sono provvisti di nùmere accerchiati. Questa numerazione facilita di trovare il testo del'istruzione respettiva in lingua straniera.

② Zur besseren Übersicht ist der Rumpf in Mitte Längsrichtung getrennt gezeichnet.

③ Änderungen vorbehalten

Graupner

zu Bestell-Nr. 4600

Explosionszeichnung (Schema)

BELL 212 Twin Jet
Schnellbaukasten ZELLE

JOHANNES GRAUPNER · 7312 KIRCHHEIM-TECK · GERMANY

6/73

Aufl. 2/74/III

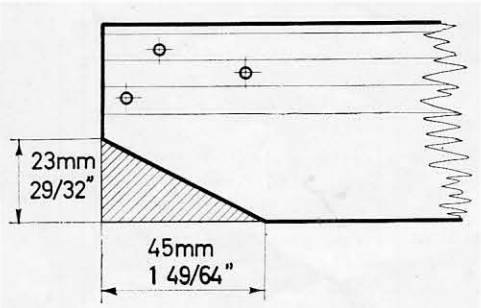
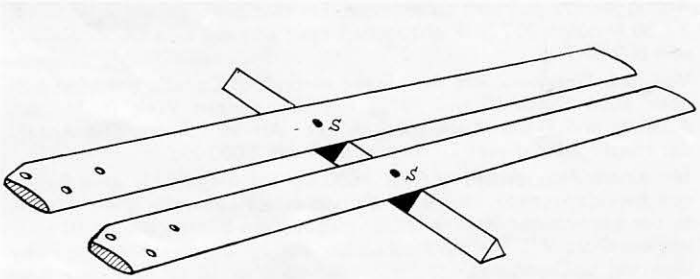


Abb. 3



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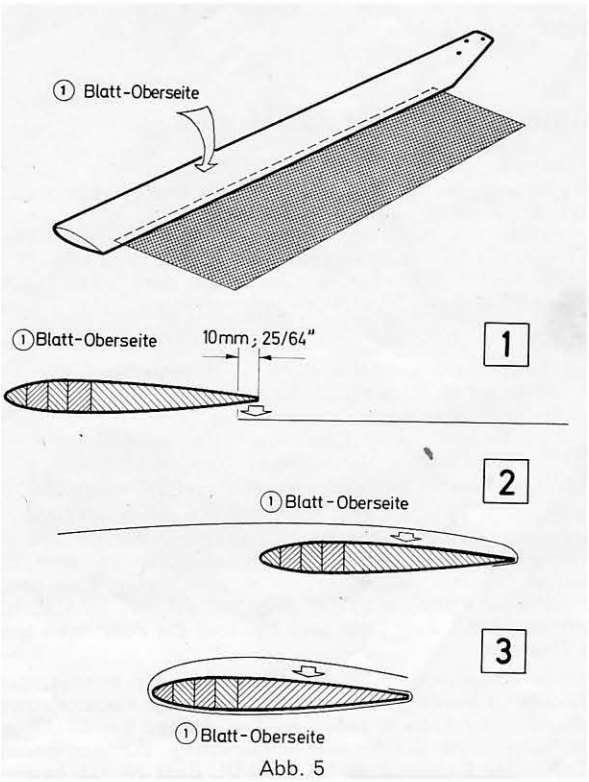

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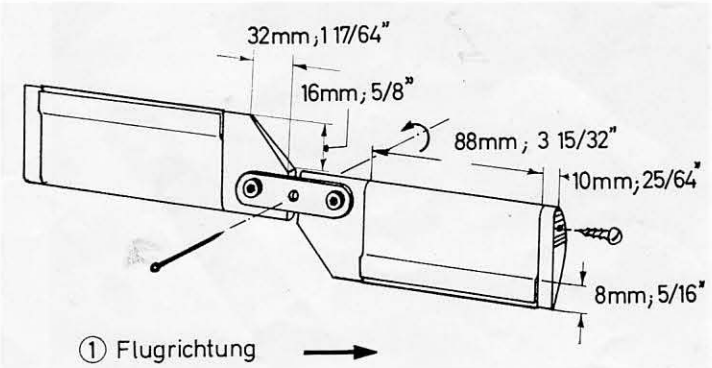

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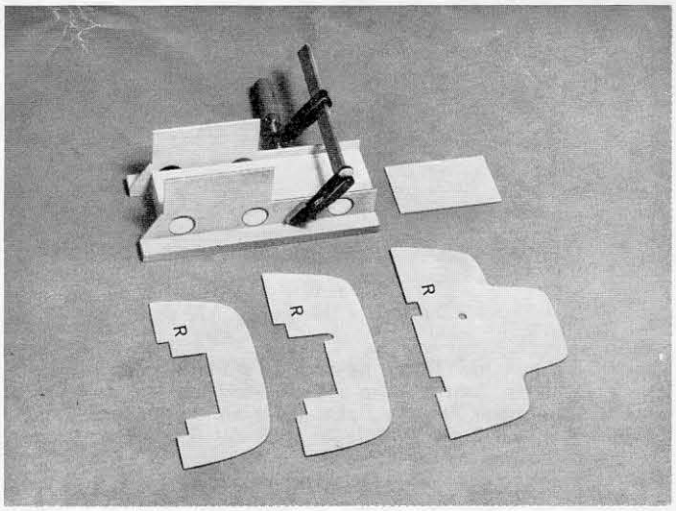

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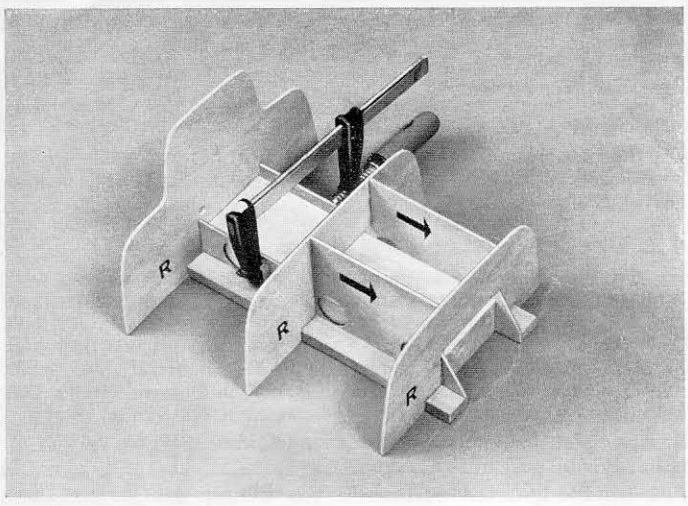

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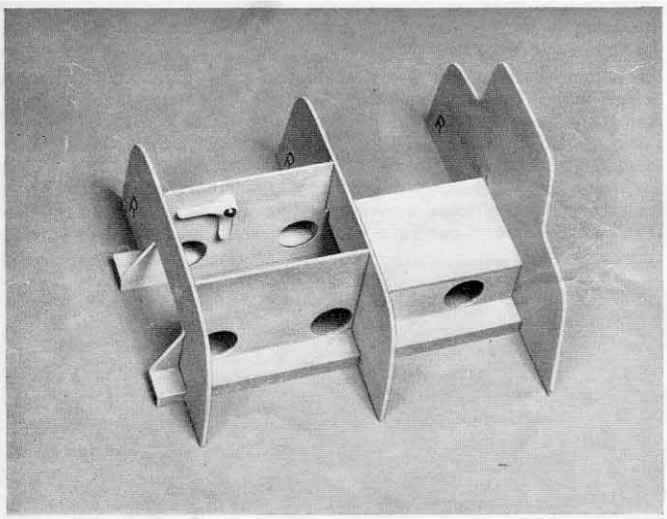

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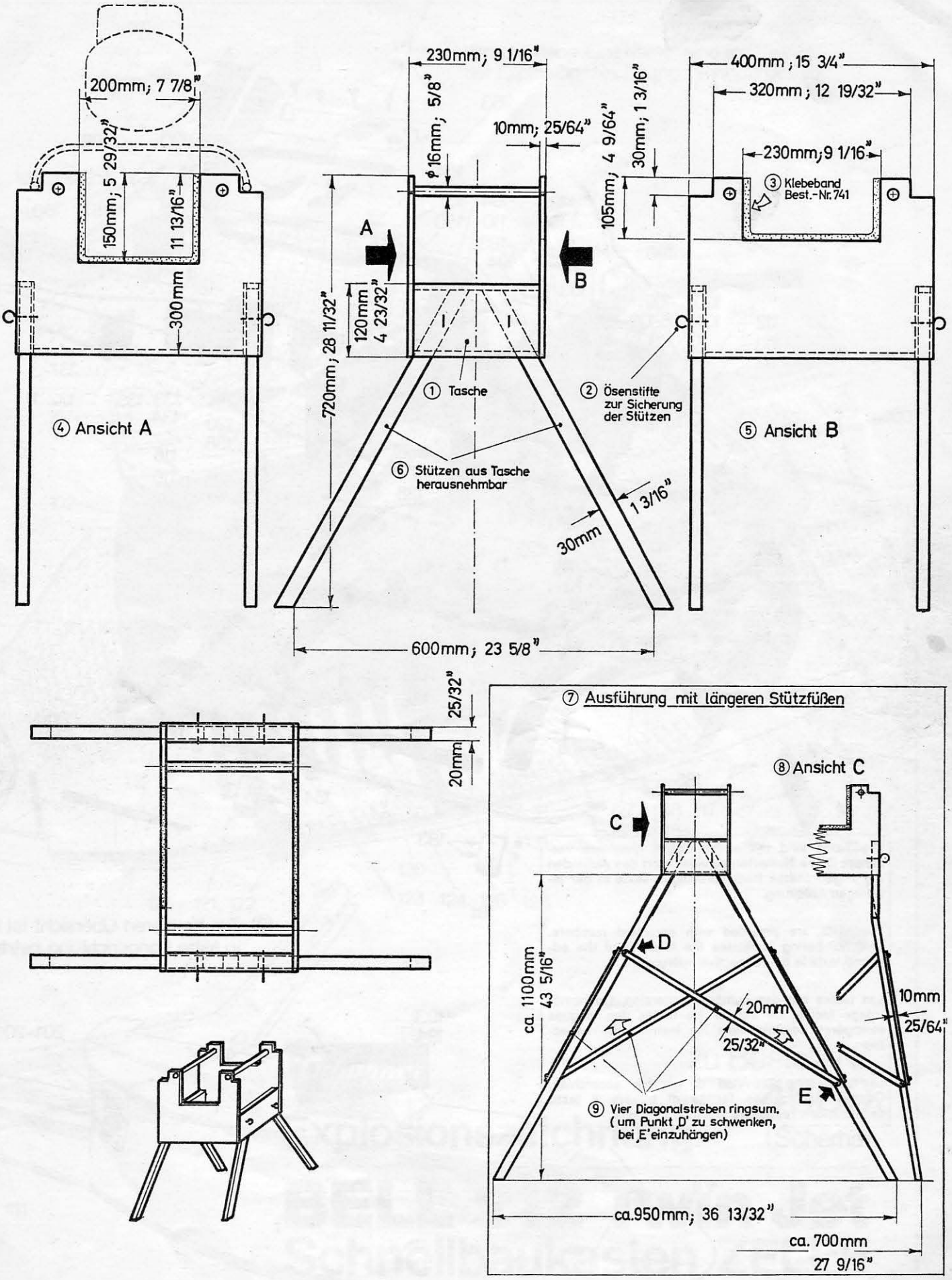
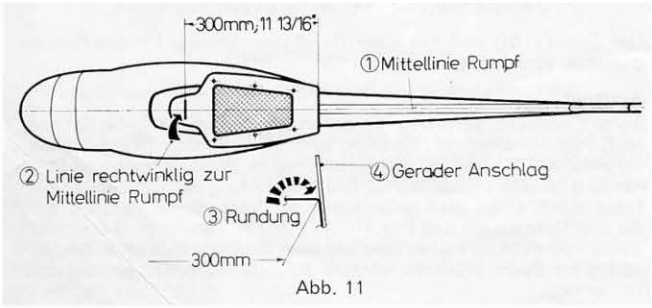


Abb. 7
Der Startkasten



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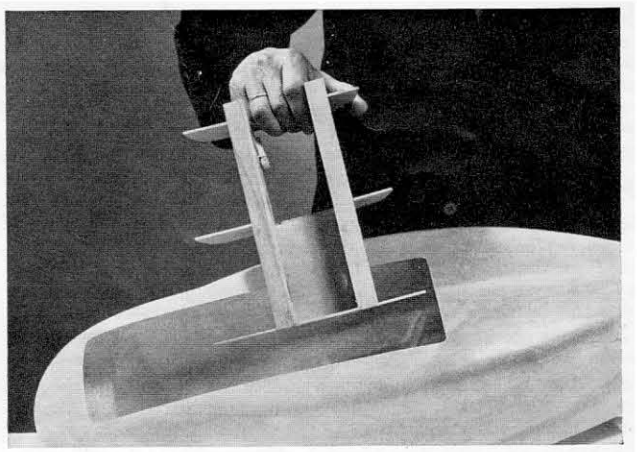
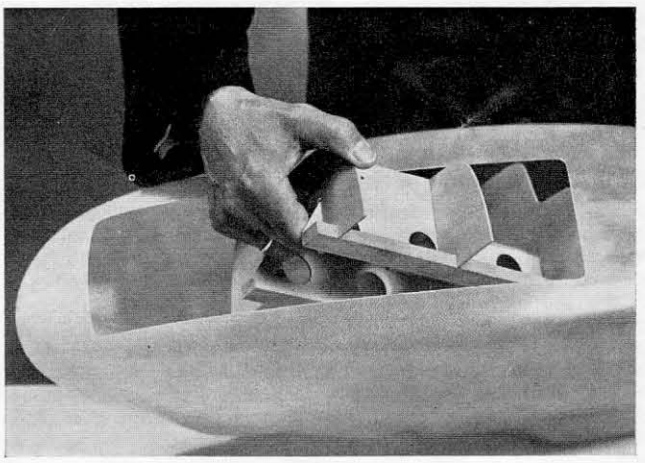
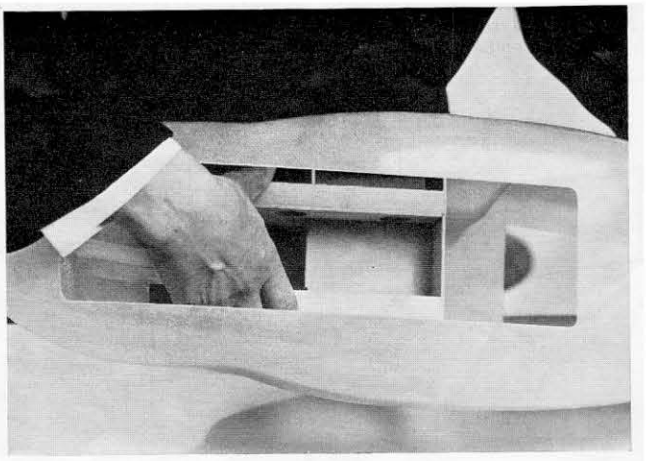
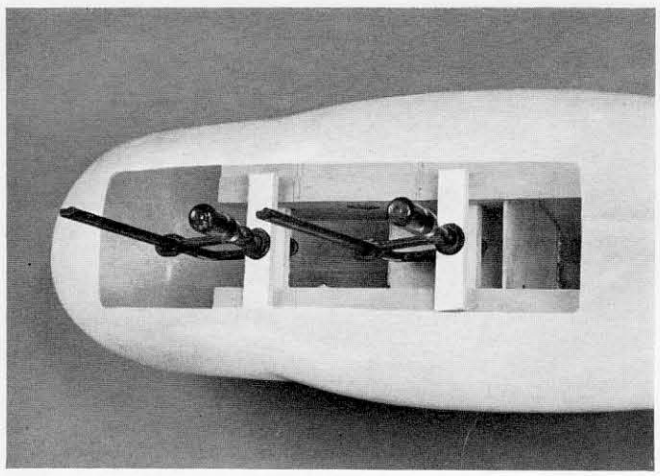






Abbildungen 12, 13 und 14:



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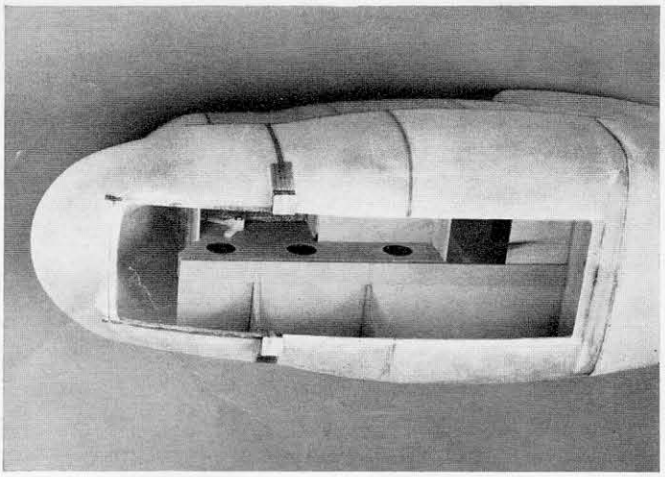


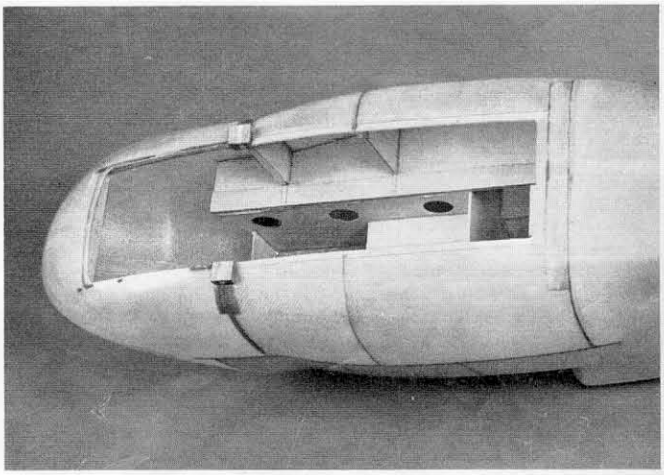
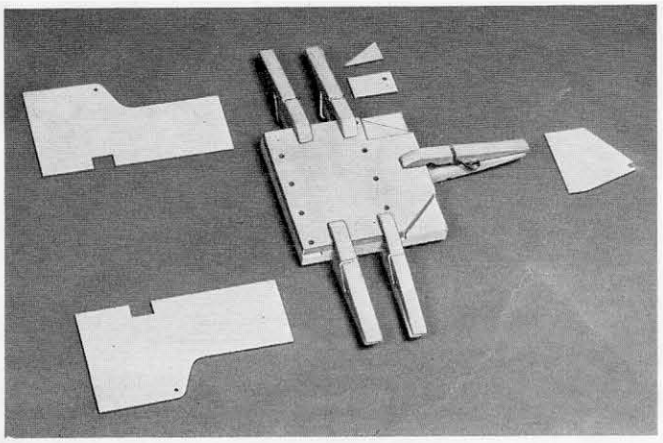


Abb. 16 und Abb. 17



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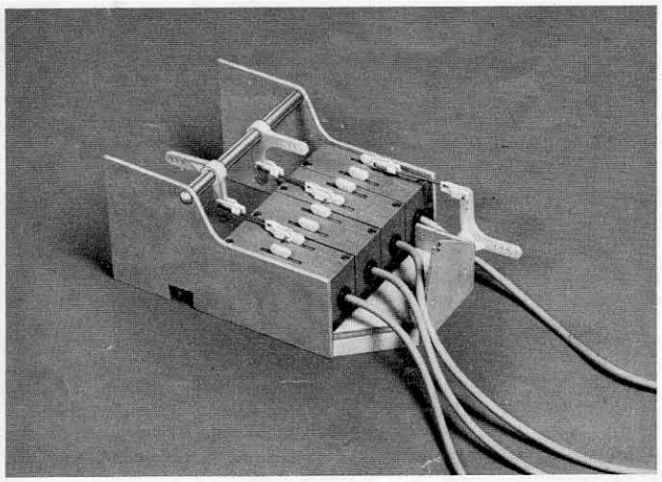

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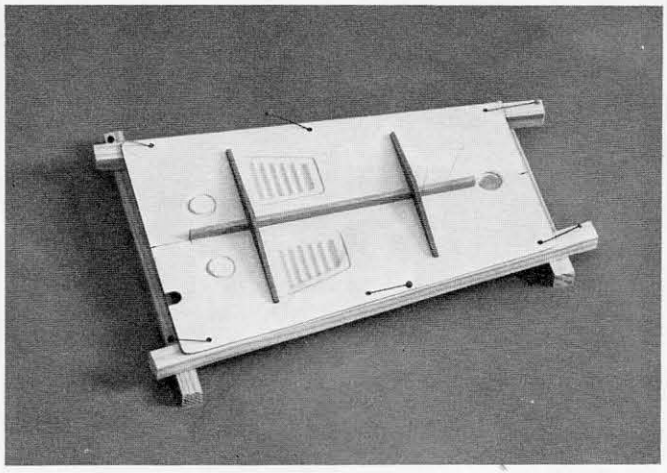

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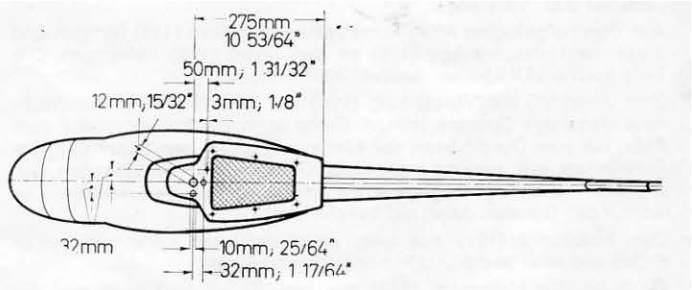

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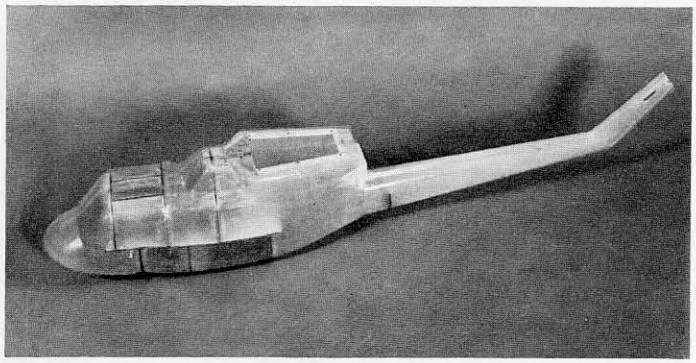

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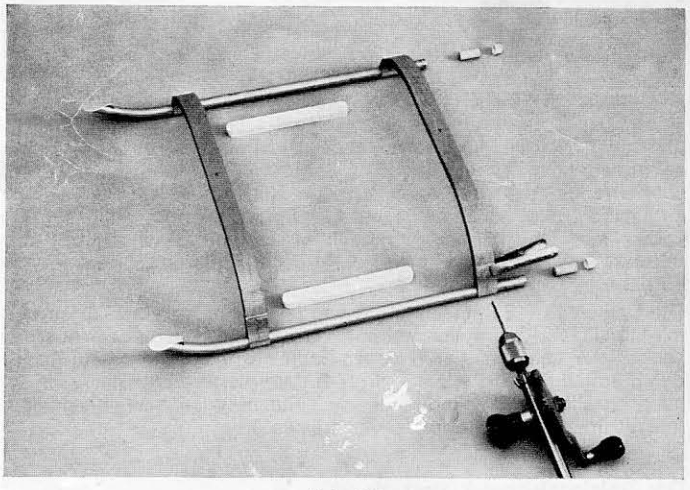
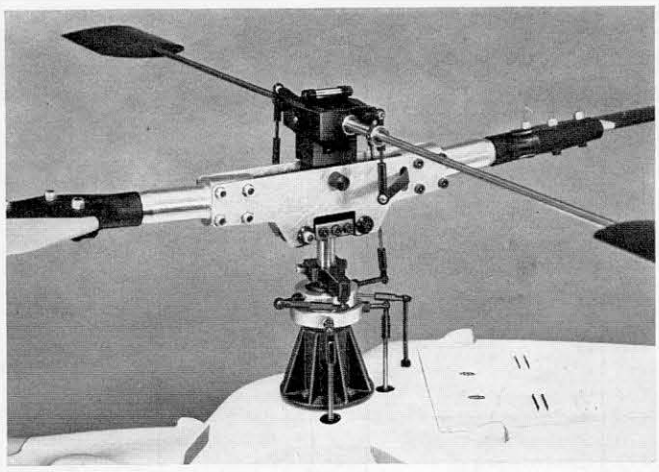


Abb. 23

Abb. 24

Abb. 25 und 26



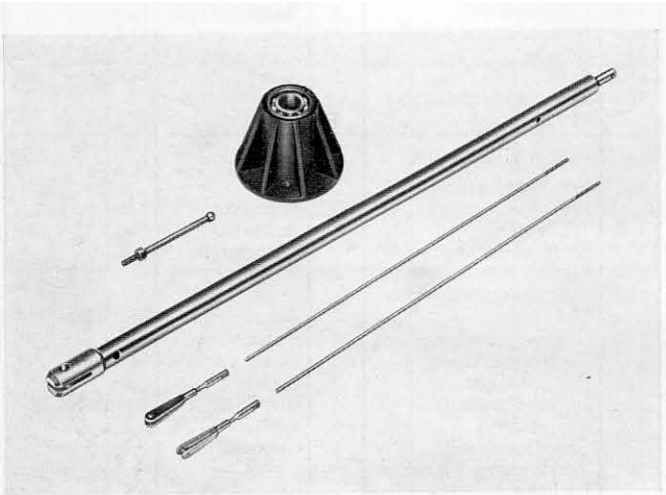


Abb. 27 und 28