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pipe organ
Sales & service
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Presenting:

ORGELBAU-
MEISTER
HOFBAUER 1923

The "20er Selberbauen"

Congratulations on your decision to build your own Dre-Orgel. With a little love, a little patience and a modest amount of do-it-yourself ability you are guaranteed a tremendous amount of pleasure with your completed organ. You will soon discover the great joy of sharing this experience with others, too.

This old style folk instrument was entirely redesigned by me in order to provide you with a project you may complete yourself with the finest-possible results. The precision air system is unique and easily produces a generous amount of wind for a perfect quality and quantity of sound.

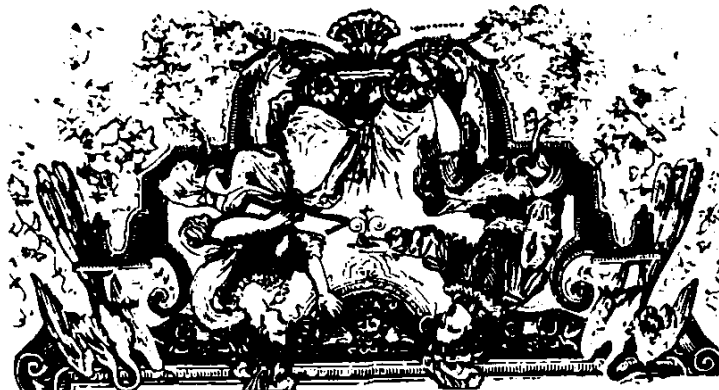
Please take time to read through the instruction manual at least once before starting the project. You will soon become familiar with the terminology and the parts. You will also soon realize that the project is more assembly and less fabrication. Only a very little amount of sawing, sanding, etc. is required. Your kit was carefully inspected at the factory to assure that all parts are included and are of the finest quality and workmanship.

Now, I wish you the best of success and much joy both during and after your project. You have truly made a sound investment.

FISCHER ORGANS, INC. for



Carl Heinz Hofbauer



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Note: This document is provided to assist owners in maintaining their own organs. Neither Fischer nor Hofbauer provide service or parts for these organs today.

I N D E X

	page
INTRODUCTION	1
"100" THE ORGAN CASE	1-1
"200" DRIVE MECHANISM	2-1
"300" SPOOL BOX	3-1
(cont.)	3-2
(cont.)	3-3
"400" BELLOWS	4-1
ATTACHING THE LEATHER TO THE BELLOWS	4-1
(cont.)	4-2
(cont.)	4-3
"500" WINDCHEST	5-1
(cont.)	5-2
"600" WOOD BASS PIPES	6-1
MITERING THE WOOD PIPES	6-1
FITTING THE STOPPERS	6-2
VOICING THE PIPES	6-3
INSTALLING THE BASS PIPES	6-3
"700" ZAUBERFLUTE PIPES or "MAGIC FLUTES"	7-1
FINAL ASSEMBLY	8-1
(cont.)	8-2
(cont.)	8-3
<u>APPENDIX</u>	
ON GLUE, ITS PREPARATION AND APPLICATION	9-1
CARE AND REGULATION OF THE "HARMONIPAN" 20er ORGAN	9-2
SERVICE, ASSEMBLY SERVICE, PARTS, MATERIALS, TOOLS	9-2
MATERIALS LIST, 20er "HARMONIPAN" KIT ORGAN	9-3
<u>PRINTS, DRAWINGS, SCHEDULES</u>	
"100" EXTERIOR CABINET	10
"200" DRIVE MECHANISM	11
"300" SPOOL BOX, TUBE LENGTH SCHEDULE, TRACKER SEQUENCE	12
"400" LEATHERING THE BELLOWS, SEQUENCE SCHEDULE	13
POUCH BOARD NOTE SEQUENCE, BELLOWS IN CASE	14
"500" CROSS SECTION, WINDCHEST; WOOD PIPE MOUTH DETAIL	15
VERTICAL CROSS SECTION, COMPLETE ORGAN, FROM RIGHT END	16
ZAUBERFLUTE SEQUENCE, BASS PIPE SEQUENCE, MITERING	
SCHEDULE	17
BASS PIPE CLAMPING DETAILS, STOPPER DETAILS	18

"100" THE ORGAN CASE

The precut plywood case consists of essentially two parts, the upper case and lid and the lower case or base. The case is supplied unfinished in order that you may finish it according to your own desires. It is suggested that such finishing or painting be done after the assembly of the parts has been completed. Some recommended finishes would be stain and clear coatings, hand painted motifs, wood inlay marquetry, or anything of your own creativity. It is highly recommended to finish the inside of the case as well. This need not be as elaborate, however, and is essentially to protect the wood panels from the elements.

Both the upper and lower case sections are assembled using the wire finishing nails #170. Refer to the sketch "EXTERIOR CABINET" and note that the side panels fit inside the front and back panels. The case panels are cut to precise size so align the edges perfectly flush when assembling. Start several finish nails along the ends of the front and back panels. Drive these through far enough that the points project slightly from the back of the panel. Now align these panels with the appropriate side panels and drive the wire nails partially into the side panels. DO NOT NAIL TOGETHER PERMANENTLY YET. The parts are now separated again and the nails are driven back slightly until the points protrude only slightly again. Apply white wood glue along the edge of the side panels and nail permanently together. "Set" the nail heads slightly so they are a little below the surface of the wood. Wipe off excess glue. Control the right angle of the case as noted on the sketch. A good method is to use the BASS PIPE PANEL #600, to check for square. The diagonal measurements "A" and "B" should be equal.

Allow the 2 case sections to dry at least two hours. Next, screw in the bass pipe panel SUPPORT #107. These two supports are fastened to the sides of the lower case section. A line indicates the top of the support on each panel. Glue and screw the supports in place using the wood screws #153. Careful not to overdrive the screws and break the surface on the outside of the case panels.

Screw the WOOD BLOCK #132 (for bellows spring) in place on the right side of the upper case unit where marked. The general location may be noted on page 14 in the sketch showing the "BELLOWS IN HOUSING". This view is from the rear of the organ so it only appears that the block #132 is on the left. It is actually on the inside of the right end when viewed from the front.

Install the SPOOL BOX SUPPORT #109. This L shaped support is glued and screwed in place along the line indicated on the back and right end panels of the upper case. The line indicates the top of the support piece.

The 2 case sections are now basically completed and should be finished as desired. Locate the 2 CABINET LID PIECES #108 and familiarize yourself with the proper location of each. This can be determined by positioning the wider lid piece with the elongated holes toward the back of the organ. With the proper position determined install the 2 hinges #181. The hinges are located about 3" from the ends of the lid and as further shown on the top of the sketch "VERTICAL CROSS SECTION, COMPLETE ORGAN". Position the lid on the upper cabinet so that the overhang is equal on all sides. Forebore the screw holes for the front lid piece and screw in place temporarily with wood screws #178. Carefully locate the center of the elongated holes in the rear lid section and forebore for the 2 screw eyes. Install these HOOK AND EYES #182. The lid is now removed and the hardware removed for finishing. It is desirable to sand the lid and "break" the sharp edges before finishing. You may even wish to shape the outer edges of the lid with a more rounded contour before finishing. Once the lid has been finished it should be laid aside and will be the last part to be assembled to the completed organ.

"200" DRIVE

Locate the CRANK BEARING BLOCK #201 and install the 2 ball bearings #2250 into the recesses as shown on the sketch "DRIVE 200". Fit the CRANK SHAFT #210 with the washers #2270 and the SNAP RING #224 in the sequence shown. Put a further washer #2270 on the axel of the shaft and insert the axel through the bearings in the direction shown.

Add another washer #2270 to the axel. Add the SMALL PULLEY #212 to the axel and lock in place with the short set screw. The axel should be seated against the bearing block and the washers should seat firmly to the bearings when the small pulley is locked in place.

The CRANK BEARING BLOCK #201 is now screwed into position in the upper case as indicated. Use the wood screws #253 for this purpose. NOTE: The crank bearing block absorbs a considerable strain as a result of turning the crank handle so it is advisable to glue the block in place but only after the organ has been completely assembled and tested for proper operation.

The CRANK HANDLE #221 may be varnished or finished as desired and fit to the crank using the HEX NUT #223. A small amount of vaseline may be used to lubricate the handle shaft before assembly. The WING SCREW #222 is started where indicated and the wood handle cap is glued on.

"300" SPOOL BOX

Remove the plastic cover from the lid. Remove the ball bearings and plastic insert bearings from the lower spool box. Tap these out carefully from the inside using a screwdriver and hammer.

Sand the upper and lower spool box pieces and finish as desired (stain, lacquer, polyurethane, etc.). When sanding remove the sharp corners but do not round them. Finish all edges and surfaces but avoid the holes where the bearings and bushings are inserted. Fast drying spray finishes work quite well.

Drill out the hole in the wood spool #311 with a number 8 drill bit. Sand the wood spool and the two spool flanges #312 and finish as desired. Pay particular attention that the flanges are quite smooth when finished as the paper roll may otherwise wear along the edges.

Put a ring collar #3260 into the center hole of the wood spool core and install a long set screw into the collar through the #8 hole. The set screw must enter the collar but must not project into the center hole. This will allow the axel to pass through later.

Attach the 2 spool flanges to the spool core using 6 screws #352. It will be necessary to forebore for these screws. Select a bit that is slightly smaller than the screw size and allows the screw to be easily turned in without stripping. It is not recommended to glue the spool ends to the spool core in case they should ever need to be removed. The spool is now completed and may be set aside.

Reinstall the previously removed plastic bearings #3256 as per the sketch. The flanges should be on the inside of the box.

Polish the reroll axel #328 and remove any burrs. Insert the split roll pin #317 so that an equal amount extends from each side of the axel. Insert the axel from the side shown in the sketch. The axel should "aim" directly toward the opposite bearing. If the axel tends to angle off slightly this can be corrected by exerting slight pressure on the axel in the direction required. Repeat this alignment step on the opposite bearing and then insert the axel as shown. The axel must be absolutely free when installed through both bearings. The end of the reroll axel which contains the pin must be toward the handle as shown. Add 2 ring collars #3263 to the reroll axel as it is inserted but do not lock yet.

Temporarily slip the reroll handle #329 on the axel with the pin seated in the slot. Lock the 2 ring collars against the plastic bearings when the reroll handle is very close to the box but not touching it. Careful not to put too much pressure against the bearings so as to prevent free rotation of the axel. Tighten the set screws in the ring collars firmly. The large aluminum pulley #314 is added and locked in place about 6mm from the box. Observe that the reroll handle does not touch the wood box when the pin is seated in the slot.

Insert the 4 bearings #3253 in the spool box, 2 from the outside and 2 from the inside. A C clamp or wood clamp is handy for pressing these into place. Do not clamp directly onto the center of the ball bearing or it might be damaged. Use a thin wood block or piece of metal which covers the whole bearing when clamping. When properly installed the ball bearings should be flush with the spool box. The bearings are now locked in place. Locate the 4 wood screws #350. With an awl or small drill bit make a hole along the circumference of the bearing in the wood and install a screw #350. Put another screw opposite the first. These 2 screws simply prevent the bearing from ever falling out of

hole. Only the 2 bearings on the outside of the spool box must be locked in place.

From inside the box insert the Music Spool Holder Axle #341 through the bearings on the proper side as shown. Add a flat washer #3272 and a hex nut. Secure the nut firmly; the axle should now turn freely in the bearings. Add the small aluminum pulley #315 and lock in place when it contacts the hex nut. The short rubber belt may now be installed on the reroll pulleys. Observe that the 2 pulleys are well aligned with each other. If adjustment is necessary relocate the larger pulley to align with the smaller one. The reroll axle assembly must now turn smoothly but need not coast freely.

Slip the Coil Spring #345 onto the Music Spool Holder Axle #340 and insert from inside the box. From outside the box add a Ring Collar #3263. Lock this collar in place when the coil spring is compressed to approximately 10mm. The entire reroll and music holder mechanisms are now complete.

Examine the Steel Axle #327 to be certain it is clean, smooth and free of any burrs. Insert a Roll Pin #317 in the hole provided. Equal amounts should extend from each side of the axle. Polish the Hollow Axle #326 so it is smooth and free of burrs. The Teflon Sleeve Bushings #355 are normally factory installed but if not they should now be inserted into the hollow axle until flush. On the slotted end the bushing should be flush with the bottom of the slot. Insert the steel axle into the hollow axle and check that it turns freely.

Sand the Large Wood Pulley #313 and finish. The groove for the drive belt should be free of roughness when finished. Press the open Ball Bearing #3250 into the pulley until it seats firmly. Use the method previously described or you may use your drill press as a press. In either case be certain to use a buffer between the pulley and the bearing so as not to damage either with the clamp or press. When the hollow axle is inserted into the bearing #3250 the pulley should rotate in one plane and not wobble like a bent wheel. The bearing is now locked in place using 2 Wood Screws #360 in the same manner as previously used. If the pulley should wobble on the axle the bearing can be influenced to shift slightly by tightening the appropriate screw. The wood pulley should be flush on the outside with the end of the hollow axle. To the hollow axle add 2 Washers #3270. The slotted end of the axle must be the end further from the pulley. Pass the slotted end of the axle through the bearing toward the bottom on the sketch. Add a Ring Collar #3260 with Set Screw #3266 but do not lock. Pass the hollow axle through the center hole of the wood spool. Be sure the set screw #3265 does not extend into the hole. Continue to pass the axle out through the bearing on the opposite side of the spool box. When the wood pulley and backing washers are seated against the bearing, slide the ring collar #3260 against the inner bearing surface and lock in place. The hollow axle should now rotate in the bearings but should not move fore and aft. Again check the wood pulley to be sure it rotates without a wobble. The wood spool should still slide on the axle and will be aligned and locked in place later.

Pass the steel axle through the hollow axle from the slotted end. The pin should slide freely in the slot. Some filing may be necessary. Add the Ring Collar #3263 and long Set Screw #3267 to the steel axle and lock in place on the flattened area. The steel axle should now move freely and the pin should remain always within the slot.

The tapered Lift Block #316 is now fastened to the wood pulley. Slide the steel axle in, with the ring collar #3263 against the pulley. Note that the lift block has one edge which is beveled. Lay this beveled edge of the lift block against the left edge of the long set screw #3267 when the set screw is facing upward.

The lift block should nearly touch the ring collar. Forebore the holes for the screws in the lift block and secure in place. It may be necessary to put a small washer behind the lift block screws to raise it far enough from the surface of the pulley in order to pick up the set screw with a positive action.

When the steel axel is disengaged from the lift block the set screw must clear the lift block and its screws. Later the brass heads will be screwed onto the spool holder axel and the take up spool axel threaded ends.

Carefully clean the Wood Tracker Bar #310. Do not sand or otherwise distort the surface where the holes are. If you wish to finish the tracker bar it is recommended that a clear spray finish be applied. Brushing may clog the holes. Using the Gasket Material #320, enclose the rectangular hole in the spool box. The gasket should be fit along each edge and must be tight at the corners. The spool box must be air tight when closed and this gasket must not have any gaps. Please note the distinct pattern to the tracker bar holes as noted on the sketch. It is imperative that the bar be installed with hole #1 toward the same side of the box as the large wood pulley. Align the tracker bar over the oblong opening so that it is square within the spool box and all exhaust holes are within the opening when viewed from beneath. Forebore for the screws #364 at a point mid-way in each of the 4 slots. Secure the tracker bar in position with the screws #364 and washers #3273 as shown. Observe that the screws are tensioned to compress the gasket uniformly.

Place a spool of music on the holder axels. The wood spool is now locked onto the hollow axel when the inner edges of the flanges on the wood spool are the same distance from the edge of the spool box as the corresponding edge of the music spool. Lock in place with set screw #3265.

The tracker bar is now aligned under the appropriate holes in the paper roll. All exhaust holes in the bottom of the tracker bar must still be within the opening in the bottom of the spool box.

Using the Gasket Material #320, form the gasket seal on both the top and bottom edges of the lid frame. Screw the plexiglass lid onto the lid frame. Forebore to avoid splitting the frame.

Position the lid on the spool box and install the Hinges #385. Slight pressure should be applied to the lid when installing the hinges to ensure that the gasket is slightly compressed and will be air tight. A good method is to compress the lid slightly and tape in place while installing the hinges. Compress and tape the opposite end of the lid and install the Clasp and Hook #386 on the end where shown.

The spool box assembly is now complete and it can be installed in the case. Lay the spool box in the case on the support #109. Position the Spool box against the back of the case and against the left corner as viewed from the back. Be sure the drive belt is placed on the pulley before securing the spool box to the support. Forebore and then use the screws #357 and #3581 to secure the spool box in the cabinet.

"400" BELLOWS

The framework of the bellows is furnished with the intake check flaps already installed and one side is leathered. Observe the relative position of the leather, ribs, etc. in order to familiarize yourself with the next steps. If you have never worked with "hot glue" please read the section at the end of these instructions dealing with same. You may wish to prepare a small quantity of hot glue and practice before attempting the next steps. A pot of hot glue may be left to cool and then reheated as desired. Remember, the greatest success when using hot glue will be achieved when you work with reasonable haste once the glue has been applied to the work. Hot glue "sets" very fast and the bonds will not hold well if not made within a few seconds after application.

Remove the wire clamps #490 from the frame.

Spread thinned hot glue on all surfaces and edges of the bellows where leather will eventually be glued. For this purpose set aside some of your prepared hot glue and thin it out further in the ratio of about 1:1. This step is known as glue sizing and assures that the wood does not absorb too much glue in the later glueing processes. When the glue-sized edges are dry sand the rough edges and sharp spots which have arisen. It is recommended, because the wood is porous, that all inner surfaces of the bellows be glue sized.

After thorough drying, the leather pieces are glued in place in the following order: (this sequence is further noted on the illustration page "LEATHERING THE BELLOWS".)

1. the center hinged intake panel
2. lower panel
3. upper panel
4. upper reservoir panel (storage)
5. lower reservoir panel (storage)
6. draw the side leathers of the storage bellows around the end over the hinges
7. leather the front next; use the same sequence as above; also, glue the front leather overlapping the long side leather

ATTACHING THE LEATHER TO THE BELLOWS

Attaching the leather with the 4 wedge shaped ribs (already glued to the leather) to the sides is done next as follows. The center is glued to the edge of the slotted air intake panel first. Apply glue to the entire surface of the edge and about 5mm of the surface of the panel. (Refer to the illustration.) Lay the leather in place and press firmly. (See "APPLICATION OF GLUE".) Allow to dry for about one hour. Carefully observe the exact location of the factory installed leather and locate the other leather panel in precisely the same proximity. You may find it easier to leave the glueing of the narrow end onto the wedge shaped heel block until after the leather has been glued to the edges of the upper and lower panels. The narrow end can then be glued more easily over all three edges and the wedge shaped heel block. Be certain to glue the entire edge surfaces so that no air can travel from the upper section to the lower section .

Using a razor blade or Exacto knife, cut the leather out of the air intake opening.

In order to prevent the edges of the stiffner ribs on the leather from being glued to the panels the following step should be taken. Before glueing is started lay out the leather with the factory applied ribs and lay a strip of

masking tape or Scotch tape along the edges which will be glued. The tape is put on the leather leaving about 1/16" of leather showing along the length of the rib. Rub the edge of the rib with a crayon or wax candle and then remove the tape. The wax will prevent the glue from making a secure bond of the rib to the frame or panel. another method would be to simply fold back the leather along the rib edges and rub the edge of the rib with a wax candle or crayon. BE CAREFUL NOT TO GET WAX ON THE PART OF THE LEATHER TO BE GLUED TO THE PANEL OR FRAME EDGES.

After the side leathers are glued on and before the bellows is completely enclosed the inner edges are brushed with talcum powder to further prevent the edges from adhering to one another. A long slender artists brush works well for this purpose. Be generous with the powder but be careful not to get any talcum on the edges and surfaces yet to be glued. Be sure to powder every hinged edge.

Next, the leather front piece is glued in place. This is the piece with the 4 trapezoid shaped stiffner ribs already glued in place. Glue the center section to the air intake panel front edge in a manner similar to the sides and allow to dry for about 1 hour. Push the trapezoid ribs into the upper and lower bellows chambers. At the same time work the hinged air intake panel up and down and you find that the ribs will nearly fall into the proper location for glueing. Once the proper position is established glue the front leather to the upper and lower panel edges.

There should now be about the same amount of leather extending to the 2 sides of the front. Put a cut in each of these flaps from the outside edge to the center of the air intake panel. This slit is normally started at the factory and needs only to be extended up to the panel.

Next, draw these flaps around the sides and glue in place, overlapping the long side leathers. Trim away any excess leather only after the glue has completely dried. Cut out any leather which extends over the air intake opening.

Leather the STORAGE BELLOWS section in the same manner as above. The leather panels for the storage bellows are those with only 2 stiffner ribs glued to each. The side leathers have long "tails" of leather on the narrow end. These tails are drawn around the hinged end and are glued over the hinge with some overlap.

Find the LIFT BLOCK #437 and observe it's location as indicated in the illustration "BELLOWS IN HOUSING". The lift block is mounted on the front edge of the air intake panel of the bellows. It is positioned in the precise center of the panel. Before mounting the lift block mark the leather where the block will be mounted and cut out the leather from that area. Glue the lift block #437 in place in the dowell holes provided. NOTE: WHEN CUTTING THE LEATHER FOR THE POSITIONING OF THE LIFT BLOCK IT IS ONLY NECESSARY TO CUT OUT THE 2 HOLES FOR THE DOWELLS. BE CAREFUL NOT TO CUT AWAY TOO MUCH LEATHER AND BREACH THE BELLOWS CHAMBERS.

Reinstall the 2 wire clasps again into the upper and lower side panels. Locate the holes with a pin or needle. Check for free movement of the hinged air intake panel. Connect the WOOD BAR #432 connecting rod to the axel on the lift block #437. This connecting rod is "split" and is easily installed by removing the screws and springing the rod open. Lightly lubricate the axel with vaseline before reinstalling the screws snugly.

Install the slotted WOOD BLOCK #435 (spring holder) on the location marked on the hinged end of the storage bellows. Refer to the illustration "BELLOWS IN HOUSING" for proper position of the slot.

Next, install the PRESSURE RELEASE VALVE LEVER #430 in the position marked on the top of the storage reservoir. Refer to the illustration for relative orientation. This assembly consists of 2 pieces, the leathered block with small hinge attached and the wood lever arm. Screw the hinged block in place first and then mount the arm on the block. It will be well to drill a small pilot hole in the block and be careful that the mounting screw does not breach the leathered side of the block. The felt piece #440 is now glued to the tip of the lever arm.

Next, install the WIRE TENSION SPRING AND BLOCK #431. Locate the small block with 2 holes and position it on the spot marked on the top of the bellows. The holes, you will note, are of different size. The smaller hole is for the wire spring and faces the pressure release valve. The larger hole is for the mounting screw. Locate the wood block with 3 holes. Put the tension wire through the center hole of this block. Now insert the short 90° bend into the remaining hole of the previously installed block. The slightly bent end of the tension wire should lay in the groove on the top of the pressure release valve block. With the tension wire laying in this groove position the small tensioning block so that the 2 screw holes are about 1" from the end of the spring mounting block. Screw the tension block down just far enough that the wire holds the pressure release valve closed firmly. Careful, not too much tension.

The storage bellows, when positioned in the cabinet, should expand to a nearly horizontal position at which point the pressure release lever should contact the wood block #132 (refer to illustration "VERTICAL CROSS SECTION, COMPLETE ORGAN"). The lever, being directly mounted on the leathered valve, opens slightly and thereby vents excessive pressure to atmosphere. The tension spring wire closes the valve again once the bellows starts to contract and the lever arm loses contact with the wood block #132. It may be necessary to adjust the position of block #132 to achieve the above. Once properly aligned, block #132 should be glued and screwed in place. The factory marking on the side panel for this block is normally quite accurate and relocation is not normally required. The objectives in this adjustment are A) to be certain that the ribs of the storage bellows do not blow up so far as to become wedged in the fully open position, and B) to be certain that the storage bellows does indeed open far enough to ensure a maximum capacity of stored pressurized air for the demands of the organ.

"500" WIND CHEST (or valve chest)

The wind chest is supplied in partially assembled form and should be disassembled into individual pieces. DO NOT DISTURB THE FACTORY INSTALLED SAMPLE VALVES AND PUFF.

Using a small pointed file or wood drill, clean out the holes in the boards #502 and #503 where the aluminum valve wires #511 are to be located. It is critical that these holes be clean and free of splinters or burrs. The valve wires must move freely in these holes.

Next, check the BLEED HOLES along the back edge of the puff board #503. Refer to the print of "500" for the location of the bleed holes. IT IS CRITICAL THAT THESE HOLES BE ABSOLUTELY CLEAN AND OPEN BUT MUST NOT IN ANY WAY BE ENLARGED. Clean and blow out the wind canals.

Affix the GASKET MATERIAL #514 along the outer edges of the chest box where the top #502 will be relocated. Affix GASKET MATERIAL #514 completely around the inner edges of the thin BUNG BOARD #504. This gasket must meet snugly at the corners for an air tight corner but must not overlap.

Find the 40 WOOD VALVE DISCS #510. Inspect the discs and remove any splinters. Note that the grey rubber insert is flush on one side of each valve and recessed on the other side. The leather valve discs will all be affixed to the flush side. The valve leathers are furnished as strips of prepunched leather with a self adhesive backing. Peel off the backing paper and locate a wood disc precisely over each of the small punched holes. You may find it easy to use a toothpick to be most accurate in this alignment. Firmly press down the valve discs and then cut apart individually. Using a scissors, carefully trim away the excess leather to conform to the size of the wood disc.

The outside or lower valve is now installed on the wire as follows. Carefully observe the factory installed valve for proper orientation of the leathered side of the disc. The lower valve is to be installed flush on the end of the wire. Do this by placing a thin board (about $\frac{1}{4}$ " thick) under the disc. Put a wire down through the chest hole and press the wire firmly onto the valve. BE VERY CAREFUL NOT TO KINK THE WIRES.

Next, add the inner or upper valve to the wire. Again, observe the orientation of the leathered side of the valve. Push the valve down the wire (against the thin board as above) just far enough that there is a space of 2 to 3mm between the valve and the chest board 501. This space (about $\frac{1}{8}$ " scant) represents the valve motion and should be carefully set with a gauge block about 2-1/2mm thick. Proceed to install all of the valve wires and valves as described. When all have been installed observe that each appears to "seat" squarely against the surface of board #501.

When all wires installed set the wind chest in the upright position and observe that each wire extends slightly above the line of the chest top board and is not lower. The wires must travel within the holes in the top board. Check each wire and be certain that none has any burr or roughness which will impair its travel within the top board hole.

The top board #502 is now installed. Slip the valve wires into the respective holes and fasten the top in place using the WOOD SCREWS #553.

Glue the LEATHER POUCHES #513 onto the puff board #503 as per the factory installed sample. OBSERVE THE ORIENTATION. ONLY THE FIBRE RING IS TO BE GLUED TO THE BOARD, NOT ANY OF THE LEATHER. Carefully mark the precise location

"500" WIND CHEST continued

for each pouch (or puff). Using white glue, put a modest ring of glue around the oriface for the pouch. It is adviseable that the glue ring be put on the board rather than on the fibre ring. It is further recommended that the glue ring be somewhat smaller in diameter than the fibre ring. This will minimize the possibility of glue squeezing out onto the leather part of the pouch.

Carefully glue a pouch to each hole on the pouch board. It is important that the this glue joint be air tight but it is equally important that the leather portion of the pouch is not glued down at any point. Immediately upon affixing each pouch gently blow the pouch up in the event a spot of glue has internally glued the upper leather to the lower leather. After the pouches have completely dried test each with a rubber tube. Each must move freely and must further be air tight.

Cut 20 pieces of plastic tube each 180mm long. This is the TUBE 516-A and is 6mm \emptyset . Shape the ends of these tubes slightly by using a pencil sharpener. Insert one tube into each hole in the edge of the chest board #503.

Cut 20 sleeves of tube (#517) each 30mm long. This is the plastic tube 8mm \emptyset . Push one tube onto each of the tubes installed in the previous step. These coupling tubes are pushed on about 15mm or half way. Check the airtight seal of the wind chest through these tubes.

Screw the pouch board #503 back onto the wind chest. There must be an air space between the pouch top and the valves. Check the functioning of the valves by inflating each pouch. Do this by blowing into the tubes.

Screw the wind chest to the proper place on the BASS PIPE PANEL #600.

"600" wood bass pipes (refer to prints #500 and #600)

Coat the inner surface of the pipe back plank entirely and evenly with hot glue. (see appendix on "HOT GLUE") The mouth block has been glued between the side boards in the factory. Place the side boards onto the glued back plank in exactly the correct position as per the sample pipe and press in place. You will note that the round hole in the back plank must line up over the hole in the pipe block. The small solid block in the opposite end of the pipe, and the thin bridges in the mid-section of some pipes, are simply spacers and will be cut off or removed later. The small wood block with the tiny hole which you found loose in the pipe will become the plug or stopper in a later operation. Slip the previously assembled glueing clamps into place over the body of the pipe. Clamp securely onto the body with a maximum distance between clamps of 10 cm (about 4"). Tighten the wing nuts on the clamps only with your fingers. Do not use tools or otherwise exert undue tension. Allow the clamped back plank to dry for about 2 hours. Remove the clamps and then remove the thin wood bridge piece found at the mid-section of the larger pipes. Be certain to remove all remnants of this piece. Do not remove the solid block from the top of the pipe yet.

Examine the sample pipe and observe that the mouth "cap" is positioned precisely even with the block at the mouth or "windway". Install the cap on the pipe as per the sample using the thin cardboard shims to create the "windway" slit. By removing the cap from the factory assembled pipe you may carefully observe the manner in which the cardboard shims are fit. When properly fit, the cap will stand out from the block about 1/2mm. Using thinned glue affix the cardboard shim to the cap. Position the cap exactly in place and fasten with the appropriate screws. Although the pipe sides are of soft wood it may be best to use a tiny drill bit to forebore for the cap screws to avoid the possibility of splitting out the sides. Careful that the drill bit is not too large or the screws will "strip".

Next the front plank is coated with hot glue and fit into place. The end with the tapered slot is set against the cap as per the sample pipe. Do not glue the tips of the front plank to the cap piece. The cap should remain removeable. As in the sample pipe the thinned edge of the tapered slot must be nearest the inside of the pipe. When properly positioned, clamp the front plank securely and allow to dry about 2 hours. All glue joints must be air tight along the length of the pipe.

Assemble all pipes to this point using the above procedures.

After the pipes are thoroughly dry sand them and "break" the edges lightly but do not "round" them.

MITERING THE PIPES

Study the various prints of the Bass Pipes and the MITERING SCHEDULE. You will note that the factory assembled pipe is Pipe #1 and it is mitered to the right. You will further note that all other pipes are mitered up or over the mouth side. This reference is made with the cap facing you and toward the bottom of the pipe. A miter "up" is illustrated just to the right of the miter schedule on the print.

Transcribe the measurement "A" from the schedule onto the back of the pipe. Using the miter box that is furnished, cut the pipe on a 45° angle. Careful that the angle cut is on the sides of the pipe and the cut leaves the front of the pipe somewhat shorter than the back. The saw used to make the miter cuts should be very sharp and make a fine, straight cut. It is recommended that several test cuts be made on scrap pieces until you feel comfortable about the operation.

To achieve measurement "B" a square cut must be made on the end of the pipe which contains the solid spacer block. Careful to cut off the correct end. Clean the edges of this cut on the inside of the pipe using a fine file or nail file emery board.

Coat all the edges of the 45° cut with white cabinet glue and press firmly together in place. Rub the excess glue into the entire joint so the dried joint is especially air tight. Lay the glued miter joint on a piece of aluminum foil or waxed paper to dry. To increase certainty that this joint is air tight you may wish to glue small strips of thin leather over the joint lines of each miter. Allow to dry overnight.

Carefully clean the thin edge of the upper lip of any burrs. Very lighty file or sand the sharp inner and outer edges of the upper lip but do not distort the edge or otherwise shorten it.

FITTING THE STOPPERS

From the illustration "BASS PIPES" note how the stopper plug is installed. The edges of the stopper plug inside the pipe should be rounded generously. These are the edges opposite the side with the small hole for the screw eye. The stopper is then "fit" according to the thickness of the furnished leather #620. Install a screw eye #621 into the small predrilled hole in the stopper. This screw eye is to pull the stopper in and out of the pipe for tuning.

The inner surfaces of the pipe should be smoothed for about 2" at the stopper end. A good method is to glue some fine sandpaper to a thin stick and use it like a file. Use talcum powder during this operation for a smooth result. To obtain a proper fit of the stopper lay the packing leather #620 over the open end of the pipe and press it slightly into the opening with the rounded edges of the wood plug. If it is obvious that the stopper will be excessively tight it must be filed or sanded on the appropriate sides. Tap the plug lightly with a small hammer. The plug and leather must fit air tight into the end of the pipe and must be snug. It must not be so tight as to break the sides of the pipe or the glue joints, however. Do not drive the stopper fully into the pipe just yet. Once you are satisfied of a good fit put a small pencil mark on the plug to notate the front of the pipe. This will assure proper orientation when the plug is finally installed.

Remove the plug and spread glue on the bottom surface only. Do not spread glue on the edges or top. Place the glued block back on the leather over the opening and tap it into the pipe until the top is flush or even with the top of the pipe. Trim away the excess leather just a bit longer than the plug.

Pieces of leather may now be glued to the backs of the pipes similar to the sample pipe. Be sure to cut the leather from the hole where the wind enters. The pipes should now sound when you blow into the wind hole.

Finish the pipes as desired. Careful not to get varnish, paint, etc. into the windway opening slit. Do not get finish material on the leather pieces on the backs of the pipes. The hardware store spray cans of fast drying clear finish works very well for this purpose. Simply mask off the leather pieces before spraying. The stopper end of the pipes may be sprayed, also.

VOICING THE PIPES

Clean out each pipe one at a time by removing the cap and removing all debris from the mouth block and also the body of the pipe. Replace the cap.

The stream of air through the windway which generally controls the sound and loudness of the pipe can be controlled. This is done by narrowing or widening the opening to make the pipe softer or louder. Should a pipe need to be louder the cardboard shim under the cap must be increased in thickness by adding additional shims of paper of the same shape until the pipe speaks at the proper volume. Making the windway narrower will make the pipe softer. Voice each pipe in this manner. When you blow into each pipe you should be satisfied that each pipe speaks/sounds quite like the others.

The Bass Pipes can now be pre-tuned by sounding against the proper pitch (from the schedule) on your piano, organ, etc. When the pipe and the corresponding pitch note are sounded together there will most likely be a slow "wavering" between them. Once you have identified this wavering it must be minimized or eliminated in order to bring the pipe into tune. While listening to the waver or beat, place your fingers near the mouth of the pipe. This causes the pipe to go flat. If the waver or beat slows down this means that the pipe is sharp and must be flattened. Do this by slightly withdrawing the stopper plug until the waver or beat stops. If the wavering or beat increases when you put your finger near the windway while comparing the note to the piano or pitch note, the pipe is flat and must be made more sharp. Do this by tapping the stopper into the pipe further until the waver or beat is eliminated. Try to use the same degree of wind pressure while tuning each pipe. Fine tuning can be done after final assembly of the organ.

INSTALLING THE BASS PIPES

Identify the proper location for each bass pipe on the BASS PIPE PANEL #600. Once you are certain that each pipe is in the proper sequence and location outline or mark the locations. Each pipe must line up precisely over its corresponding wind hole in the panel. Spread glue on the leather swatches on the backs of the pipes and glue in place on the panel. Allow glued pipes to dry overnight.

Install the completed Bass Pipe Panel into the lower case on the support bars #107. Screw in place. It is important that precisely enough space is left between the inside surface of the lower case front board and the support for the windchest. This space must accomodate the front board of the upper case. When the upper case sits firmly against the inner surface of the lower case the bass pipe panel should be slid forward until the wind chest support just about touches the upper cabinet. In this location screw the bass pipe panel in place to the supports.

Now the bellows can be installed. Position the bellows in such a way that the drive shaft operates freely. The remaining space is divided and the bellows is screwed into place through the holes in the bass pipe panel. Install the bellows spring #436 and check its supports to be certain that the spring closes and opens freely and does not become trapped or otherwise interfere with any other mechanisms. If necessary, relocate the spring support.

"700" ZAUBERFLUTE PIPES OR "MAGIC FLUTES"

The wood block #701 for the Zauberflute pipes is virtually finished as supplied. Check the block to be sure it is free of splinters, burrs and debris. Do not in any way disturb or otherwise distort the thin upper lip at the mouth of the block. The wood blocks #701 may be varnished or lacquered as desired but no finish material must get into the very thin slit at the windway or into the opening for the metal tube or body. A modest coat of spray lacquer is the most safe method of finishing. If finish is to be brushed onto the block please stay away from the hair thin windway slit at the mouth. The block #701 is in fact supplied in such a manner from the factory that you may be quite content with the condition as furnished. In most instances this will be the more prudent option in order to preclude harm to this critical part of the pipe.

Remove all burrs and/or rough edges from the metal pipe bodies and polish with any good metal polish. The metal body is identified on the print as part #702. The body for each pipe must be glued into the proper block using a metal glue or perhaps epoxy glue. Be absolutely certain that you are matching the tubes in descending length to the blocks in ascending numerical sequence. In other words, the longest tube mates with block "00", the next longest with "0", the next with "1", etc. The shortest tube will then mate with block "11". Apply a modest amount of glue around the inner surface of the tube hole and a small amount around the end of the tube. Insert the tube into the hole in the block being certain not to push out the thin upper lip piece.

Put a screw #755 into the center of each cork #703 as per the sample pipe. Push a cork stopper #703 into each pipe. The cork should be fairly snug and, if loose, can be made tighter by wrapping with scotch tape or similar. The pointed end of the screw through the cork should project from the visible side of the cork. The body tubes #702 may be finished with a clear metal varnish or lacquer to inhibit oxidation and finger printing.

The small brass tubes #704 serve as foot pieces or supports for the Zauberflute pipes. Remove any burrs and polish these tubes. Using metal glue or epoxy adhesive, glue a tube #704 into each pipe block #701. Insert about $\frac{1}{2}$ of the length of the tube into the block. Allow adhesive to dry overnight.

Mount the Zauberflute pipes on the windchest. Pipe "00", the largest pipe, goes on the first hole at the left end of the chest as viewed from the front. Continue according to the sequence shown on the print; largest to smallest, left to right. Each pipe is to be set into the chest squarely and with the tops of the blocks #701 all the same height above the chest. This is controlled by placing the spacer ring #705 onto the small tube #704 prior to installing the pipe on the chest. Insert the pipe so the ring #705 seats against the chest and the pipe block. It is not necessary to glue the pipes into their holes. The next operation links all of the pipes together and secures them.

Install the wood support bar #710. This piece has holes pre-drilled to the proper spacing. It is fastened across the top of the blocks #701 just to the rear of the metal pipe body. It may be necessary to rotate the pipe slightly in order to align the screw hole in the bar with the pilot hole in the block. Use the screw #752 and washer #7273 to fasten the bar to the pipes.

FINAL ASSEMBLY

Please note that some of the steps in the final assembly may have already been indicated in previous steps. Upon reading the steps in the final assembly it will become obvious that certain steps need not be completed in the earlier stages but can be left until this time. For instance the installation of the bellows on the bass pipe panel is referred to in an earlier section of the instructions but you will observe that it may have been set aside until this time. Essentially, each of the completed sub-assemblies can be brought together at this point in time for final assembly. After reading this section it will immediately be obvious which components need not necessarily be assembled earlier.

The bellows "400", with the connecting rod #432 already installed, may now be fastened into place on the bass pipe panel. Fasten from underneath with 5 screws #457 in such a way that, as viewed from the front, the right and back sides are almost flush with the inner wall of the upper case. This should be somewhere between 1 cm and 2 cm from the edges of the panel. This positioning should result in free movement of the connecting rod #432 on the left side of the bellows..

Lay the bass pipe panel #600 into the lower case on the support bars #107. Set the upper case into the lower case keeping it frontward as far as possible. Slide the bass pipe panel forward as far as possible or until the windchest support bar just contacts the inside of the upper case front panel. In this location fasten the bass pipe panel to its support bars in the lower case using the screws #103.

Once the bass pipe panel is fastened in place the upper case is inverted and the lower case is set on top of it, also inverted, of course. Careful that the sections are front to front. Fasten the lower case to the upper case with the screws #153. The pre-drilled holes for these screws are in the bass pipe panel along the front and back edges as viewed from under the organ. With the cabinet inverted as it is, these holes are to be found from above, of course.

Install the bellows spring #436 in the manner described in the last paragraph on page 6-3. The upper shank of the spring sits in the stop block #132 which is located beneath the spool box support. The lower shank of the spring sits in the slotted block #435 which is located in the center of the top of the storage bellows. The lower block must be positioned in such a way that the expanding spring moves freely and does not interfere with anything else. Reposition the block if necessary.

The connecting rod #432 may now be joined to the crankshaft #210. Remove the screws from the rod. This will permit you to spring the split rod apart far enough to slip it onto the crankshaft. Apply a little vaseline or Lubriplate to the crankshaft beforehand. Replace the screws and tighten adequately but not so far as to cause the rod to bind on the shaft.

The bellows may now be tested for air-tightness. Plug or cover the 2 holes on the bellows. When the handle is cranked the bellows should expand to horizontal at which point the pressure relief valve should engage and open, thereby venting excess air. Adjust the relief valve if it does not open at the proper location. The bellows, if adequately air-tight, should take about 4 or 5 seconds or longer to collapse. The longer it remains inflated the more air-tight is the bellows. If the bellows fails to expand fully and open the pressure relief valve then it is leaking air and the leak must be located and corrected.

The windchest "500" may now be installed. Check to be certain that the gasket #515 is in place and that the air holes are free. Refer to print "500". Fasten the windchest onto its support using the screws #559.

Next, the flexible wind conductor #438 (30mm Ø) is connected from the bellows to the windchest. Remove the previously installed plug or cover and twist the tube into the proper holes on the bellows and windchest.

Install the spool box on its supports in the upper case if it was not previously installed as per the last paragraph on page 3-3.

The flexible wind conductor #439 (21mm Ø) may now be installed in the same manner as above. This conductor connects the spool box with the bellows.

The organ is once again tested for air-tightness. Tape off the row of holes on the tracker bar in the spool box. Close the spool box lid and clamp the latch. When the organ is cranked there should not be any significant loss of air as compared to the previous test. Theoretically there should be no loss of air at all. When you are satisfied that the bellows and spool box are adequately air-tight the 2 flexible air conductors are to be glued in place in the holes on the bellows only. White glue will work nicely for this.

Next, the holes in the tracker bar are interconnected with the holes on the windchest. Carefully determine the location of hole #1 on the bottom of the tracker bar #310 and tube #1 on the windchest. The proper sequence is illustrated at the bottom of print "300 SPOOL BOX". Study this sequence and be absolutely certain that you connect the tubes in proper order. Do not actually install the tubes yet but rather, be certain that you understand the sequence.

The long wood dowell #135 is now installed. This rod supports the note tubes and fits between the cabinet sides. The approximate location of this rod is shown on the print "VERTICAL CROSS SECTION, COMPLETE ORGAN". It appears as a small circle just above the upper left corner of the bellows in the drawing. The dowell should be slightly longer than the distance between the upper case sides. Flex the dowell and insert into place in the spot faced holes found in the case side panels.

One at a time cut the plastic tubes #516 to the precise lengths shown on the chart on print "300 SPOOL BOX". Start with tube #1. The lengths are shown in mm. Insert tube #1 into the proper hole on the bottom of the tracker bar as far as possible. Route this tube in front of the support rod #135. This rod holds the tubes forward in order that they will not interfere with the bellows. Insert the free end of tube #1 into the coupling #517 for note #1. Press firmly into place. Continue to install all of the tubes, one at a time, in similar manner.

The Zauberflute Pipe Board #518 may now be installed on its support across the front of the windchest. The gasket #515 must be in place and the air holes through it must be cut out for each note. Set the pipe board in place and, using the long screwdriver furnished, fasten in place with the screws #576.

You will note a thin slot in the upper case sides behind the Zauberflute pipes. If desired you may insert a colored piece of art board, "formica" or similar panel decorated as you prefer. This is simply a screen for visual purposes. It is intentionally not provided to permit your own creative result. A nice picture or painted scene is quite often used for this background.

If the wood Bass Pipes were not installed in previous steps this may now be done. Refer to "INSTALLING THE BASS PIPES" on page 6-3.

If the Zauberflute pipes were not installed in previous steps this may now be done. Refer to the last 2 paragraphs on page 7-1.

Install the cabinet lid once again using the oval head brass screws #178.

The assembly of the organ is now complete.

Insert a roll in the spool box on the holders. Note that the spool and holders have hexagonal fittings which must be properly mated. Hook the loop onto the pin on the take-up spool. Engage the take-up spool by pressing the knob "in". Disengage the rewind handle by pulling the handle "out".

Crank the organ. The take up spool will advance the paper roll and the perforated holes will approach the tracker bar. Observe whether or not the hole are about to align over the corresponding holes in the tracker bar #310. Before attempting to relocate the tracker bar perform the next setting.

The take up spool #311 was locked into place as per paragraph 4 on page 3-3. Double check its setting. The paper of the roll must not bear heavily against either side of the wood flanges of the take-up spool. Further, the paper must not distort as it advances. If adjustment is necessary do so according to paragraph 4 on page 3-3. The Allen key used to make this adjustment is 2.5mm.

Once again double check the alignment of the holes in the role as compared to the holes in the tracker bar. If further adjustment is necessary refer to paragraph 5 on page 3-3.

No further adjustments should be necessary and the organ is now ready for use.

To rewind a roll be sure to disengage the clutch knob by pulling it "out". Engage the rewind handle and turn it counter-clockwise until the paper is completely on the left hand spool.

REMEMBER, THE LID OF THE SPOOL BOX MUST ALWAYS BE CLOSED AND LATCHED IN ORDER FOR THE ORGAN TO PLAY.

APPENDIXON GLUE

Hot glue (sometimes called warm glue) is made from sheep's hide and is commonly used in organ building. This hot glue has been proven with several hundred years of use. This is particularly true in the case of adhering leather to any other surface and is due to the fact that both come from the same source in nature, that is the glue and the leather. To achieve good results when working with hot glue the following must be observed.

PREPARATION OF THE GLUE: The glue can be identified as the amber granulated crystals in the kit. Place about 2/3 of the granulated glue crystals in an adequate jelly jar or similar. The jar must be very clean and free of any trace of sugar. Add water to the jar until the glue is just covered. Let steep for 1/2 hour.

Place the jar in a small sauce pan and add water to the pan until it is about 3/4 full. Place the sauce pan on your stove or hot plate and heat until the glue almost boils. The water in the pan may boil vigorously but the glue should not boil. Slowly, the glue will become "runny". Stir the glue occasionally using a flat, clean brush. This brush should have fairly stiff bristles and should be about 15mm wide for easy use. If the bristles are too soft the brush will soon become floppy and difficult to use.

When the glue is completely dissolved, warm water from the pan is added until the glue is just the right consistency. This can be determined by dropping glue from the brush held about 4 inches over the jar. When the glue "splashes", it is ready for use. The water in the pan must be kept near boiling during all of the work in order to maintain the proper fluidity of the glue. One should often test this fluidity of the glue and add slight amounts of water as it evaporates away from the heat. Also, be careful to maintain the level of the water in the pan as it too, evaporates. The jar of prepared hot glue may be allowed to cool after each use and may be reheated as above. Do not add water to the glue when reheating until you have determined that it is indeed needed.

APPLICATION OF GLUE: The temperature of the work room should not be under 20°C or 68°F and the parts to be glued should be exposed to this room temperature for several hours prior. In other words the room and the parts alike must be warm. It is desirable that the parts to be glued are actually warmed additionally by placing them in an aluminum disposable type food tray and placing this on a radiator or over a warm air register or duct. Do not put parts into an oven or other appliance which may overheat the parts. Warming the parts and leather prevents premature jelling of the glue and allows good penetration. Apply the glue evenly and thinly. You will find that it is necessary to work with moderate haste when using hot glue as it "sets up" quite quickly. Remember, not too soft a brush. When glueing leather to leather apply glue to both pieces. Quickly join the pieces being glued and press firmly into place. Excess glue can be wiped away with a wet cloth, even after it has started to set. When glueing wood to wood apply glue only to one side and somewhat more thickly. For a wood to wood joint apply the glue to an unwarmed side. When glueing leather to leather or leather to wood, bring the glued surfaces together and immediately

APPLICATION OF GLUE, continuation

moisten the entire glued area with hot water applied by brush. Do not "soak" the area. Glue which has already started to jell will be absorbed into the leather and will be transparent when dry. A "not too sharp" kitchen knife which has been warmed in hot water can be used to smooth out the glued surfaces and press the leather into the right position. Careful not to cut into the leather or otherwise mar or damage the surface. Keep the knife or creaser warmed throughout your work.

CARE AND REGULATION OF YOUR 20er HARMONIPAN ORGAN

The right spool (take-up spool) should always take up the roll paper in such a manner as to nearly not touch the edges of the wood flanges #312. This would eventually result in excessive wear and/or damage to the edges of the music roll paper. If the paper appears to continually push against one side of the take-up spool the spool must be moved slightly to the right or left as previously described in paragraph 4 on page 3-3. Loosen the set screw with a 2.5mm Allen key and reposition the spool for optimum operation. Be sure to lock the set screw once again.

Occasionally check the alignment of the tracker bar under the holes of the music roll. If repositioning is necessary loosen the screws and move the tracker bar to precisely align under the proper holes. Reset the screws, of course.

If it appears that one edge of the paper is lifted very slightly above the tracker bar as the roll is being advanced it may be that end of the tracker bar is drawn down more tightly than the other. The gasket beneath the tracker will permit a slight adjustment of this height by loosening and/or tightening the appropriate screws holding the tracker in place. The tracker must, in any case, remain well seated against the gasket and continue to remain air-tight.

Occasionally use a vacuum cleaner with crevice attachment to clean out the spool box. At the same time clean out the tracker bar by placing a Kleenex tissue over the holes and suck out the air passages with your mouth. If you should happen to have a small hand vacuum pump used to clean out the tracker bar on a player piano that will work nicely, too.

The music spool holder axels must move freely. It may be necessary to add a drop of oil occasionally. This further applies to the crankshaft axel and the rewind axel.

Complete service is available at your disposal. If you should desire that any component part(s) of the organ be assembled for you this will be quickly expedited by sending them to us. Pipe assembly, voicing and tuning or simply tuning of your self assembled pipes are examples. Quotations for such service will gladly be made. Parts and materials as well as specialty tools are also available. Such items as waterless electric hot glue pots, leather, granulated glue, special latex white glue, etc. may be purchased directly from us.

FISCHER-TELLERS ORGANS INC.

P.O. BOX 1383

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MATERIALS LIST

"20er" Drehorgel Kit

100 CABINET

- 101 - 2 upper cabinet side panels
- 102 - 1 upper cabinet back panel
- 103 - 1 upper cabinet front panel (above pipes)
- 104 - 1 upper cabinet front panel (under pipes)
- 105 - 2 lower cabinet panels; long
- 106 - 2 lower cabinet panels; short
- 107 - 2 support blocks (for bass pipe panel)
- 108 - 2 cabinet lid pieces
- 109 - 1 support member for spool box (L shaped, wood)
- 170 - 40 wire finish nails, approx. 30mm long
- 163 - 6 wood screws, 3mm x 20mm flat head (for 600 to 107)
- 175 - 3 wood screws, 5mm x 50mm round head (for 109)
- 176 - 2 wood screws, 4mm x 40mm r.h. (for 109)
- 181 - 2 ornamental hinges with screws
- 182 - 2 screw eyes with hooks, brass; with 2 brass screws
- 178 - 4 wood screws, 3mm x 25mm oval head, brass; for lid
- 132 - 1 wood block, bellows spring holder; with 3mm x 35mm screws
- 135 - 1 wood dowell, 10mm \emptyset ; support for tubes 516; see page 16)
- 153 - 16 wood screws, 3mm x 20mm r.h. (for 600 to 102 & 104)

200 DRIVE

- 201 - 1 crankshaft bearing block
- 210 - 1 crankshaft
- 2250 - 2 ball bearings
- 212 - 1 small pulley with set screw
- 220 - 1 crank
- 221 - 1 crank handle; wood, 2 pieces
- 222 - 1 wing bolt
- 224 - 1 snap ring washer
- 2270 - 4 flat steel washers, 10mm \emptyset I.D.
- 253 - 3 wood screws, 3mm x 20mm r.h. (for 201 to 101)
- 258 - 2 wood screws, 3.5mm x 30mm r.h. (for 109 to 201)
- 223 - 1 hex nut, 8mm \emptyset

300 SPOOL BOX

- 301 - 1 spool box, lower section
- 302 - 1 spool box lid with plexiglass and screws
- 385 - 2 hinges with screws, for lid
- 386 - 1 clasp and hook, for lid
- 310 - 1 tracker bar, wood
- 320 - 1.9 meters of gasket material, 13mm wide
- 311 - 1 spool core, wood
- 312 - 2 spool flanges, wood
- 313 - 1 large pulley, wood, 120mm \emptyset
- 314 - 1 medium pulley, aluminum, 70mm \emptyset
- 315 - 1 small pulley, aluminum, 35mm \emptyset
- 3251 - 2 ball bearings, enclosed, 26mm \emptyset
- 3250 - 1 ball bearings, open, 26mm \emptyset
- 3253 - 4 ball bearings, enclosed, 19mm \emptyset
- 3255 - 2 bushings, teflon (pre-installed in 326)

(continued)

- 3260 - 2 ring collars, 10mm \emptyset I.D.
- 3261 - 1 ring collar, 9mm \emptyset I.D.
- 3263 - 4 ring collars, 6mm \emptyset I.D.
- 3270 - 2 flat steel washers, 10mm \emptyset I.D.
- 326 - 1 hollow axel, brass, 10mm \emptyset
- 327 - 1 steel axel, 6mm \emptyset
- 328 - 1 reroll crank axel, 6mm \emptyset
- 316 - 1 small lift block, wood, with screws
- 329 - 1 reroll handle
- 317 - 2 split hollow pins, 15mm long
- 340 - 1 music spool holder axel, 6mm x 65mm with 4mm threads
- 341 - 1 music spool holder axel, 6mm x 30mm
- 345 - 1 coil spring
- 3273 - 4 flat steel washers, 4mm I.D.
- 3272 - 2 flat steel washers, 6mm I.D.
- 318 - 2 brass knobs
- 360 - 6 wood screws, 3mm x 10mm f.h. (for bearing fastening)
- 352 - 6 wood screws, 3mm x 16mm r.h. (for fastening spool flanges 312)
- 357 - 2 wood screws, 3.5mm x 20mm r.h. (to secure spool box)
- 3581 - 2 wood screws, 3.5mm x 30mm r.h. (to secure spool box)
- 364 - 4 wood screws, 3mm x 25mm r.h. (for 310 tracker bar)
- 345 - 1 drive belt, long
- 346 - 1 reroll belt, short
- 3256 - 2 insert bearings, for 328 reroll axel
- 350 - 4 wood screws, 3mm x 10mm r.h. (for bearing fastening)
- 3265 - set screw, 5mm x 20mm
- 3266 - set screw, 5mm x 9mm
- 3267 - set screw, 4mm x 20mm
- 3268 - set screw, 4mm x 6mm

400 BELLOWS

- 420 - 1 bellows assembly; 1 side pre-leathered
- 426 - 1 storage bellows plate
- 429 - 1 hinge with screws (for 426)
- 490 - 2 clamps, wire
- 430 - 1 pressure release valve and lever; with hinge and screws
- 431 - 1 flat spring with tension piece and screws
- 422 - 1 leather with 4 ribs (for side of intake bellows)
- 423 - 2 leathers with 2 ribs (for sides of storage bellows)
- 424 - 1 leather with 4 ribs (for fronts of intake bellows)
- 425 - 1 leather with 2 ribs (for front of storage bellows)
- 437 - 1 lift block with sxel screw (goes on front of intake panel)
- 432 - 1 wood bar, crankshaft connector, partially split
- 435 - 1 wood block, holder for bellows spring, with screws
- 436 - 1 bellows spring, flat steel, compass type
- 457 - 6 wood screws, 3.5mm x 20mm r.h. (to secure bellows to 600)
- 438 - 1 flexible hose, 30mm \emptyset
- 439 - 1 flexible hose, 21mm \emptyset
- 440 - 1 felt piece

500 WINDCHEST

- 501 - 1 windchest main assembly
- 502 - 1 top cover board
- 503 - 1 pouch board
- 504 - 1 bung board, synthetic material, thin
- 510 - 40 valve discs, wood

(continued)

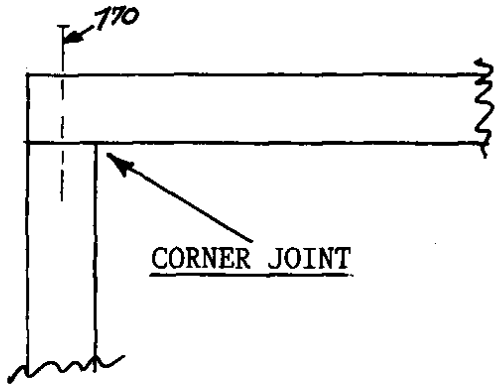
- 511 - 20 valve wires, aluminum
- 512 - leather for valve discs (part 510)
- 513 - 20 leather pouches
- 514 - 150cm of gasket material, 13mm wide, (for bung board and top cover)
- 515 - 120cm of gasket material, 30mm wide, (for over and under note channels)
- 516A - 380cm of plastic tubing, 6mm \emptyset (cut 20 pcs. 18cm long)
- 516B - 525cm of plastic tubing, 6mm \emptyset (20 pcs. lengths as per schedule, page 12)
- 517 - 70cm of plastic tubing, 8mm \emptyset (20 pcs. 30mm long; sleeve for 516A to 516B)
- 518 - 1 pipe board
- 553 - 8 wood screws, 3mm x 20 r.h. (for 502 top cover)
- 550 - 18 wood screws, 3mm x 10mm r.h. (for 504 bung board)
- 559 - 2 wood screws, 3.5mm x 35mm r.h. (for 501 windchest)
- 579 - 2 wood screws, 5mm x 80mm f.h. (for pouch board)
- 576 - 2 wood screws, 5mm x 50mm r.h. (for pipe board)

600 BOTTOM PIPES

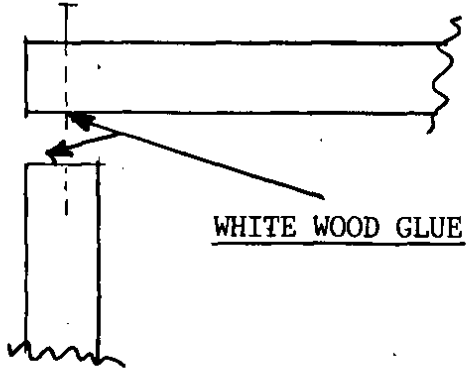
- 600 - 1 bass pipe panel with drilled overpiece
- 610 - 9 pipe bodies, with loose front and back, stopper plug, mouth cap
(1 pipe pre-built)
- 620 - leather for pipe stopper plugs
- 621 - 9 screw eyes for stopper plugs
- 622 - cardboard (to create windway crevice)
- 633 - instruction book
- 634 - sandpaper
- 635 - clamp assemblies for glueing bass pipes
- 636 - miter box
- 640 - granulated hot glue

700 ZAUBERFLUTE PIPES

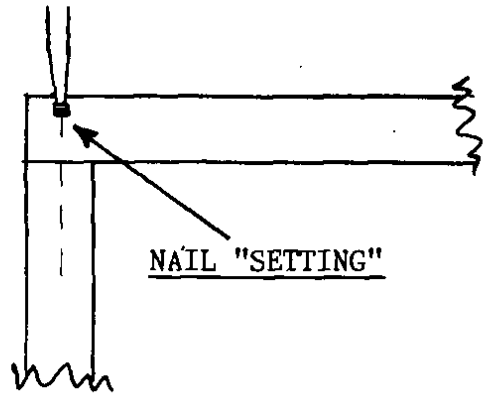
- 701 - 13 pipe blocks
- 702 - 13 brass tubes
- 703 - 13 corks (for stoppers)
- 704 - 13 tubes (foot pieces)
- 705 - 13 spacer rings (for 704)
- 710 - 1 pipe support piece
- 755 - 13 wood screws, 3mm x 30mm r.h. (for corks)
- 7273 - 13 flat washers (for pipe support board)
- 752 - 13 wood screws, 3mm x 15mm r.h. (for pipe support board)



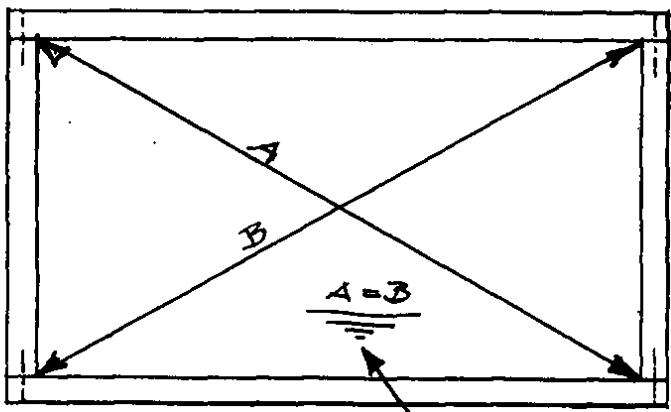
CORNER JOINT



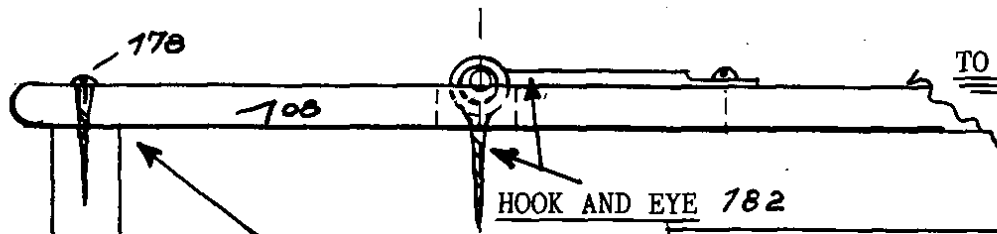
WHITE WOOD GLUE



NAIL "SETTING"

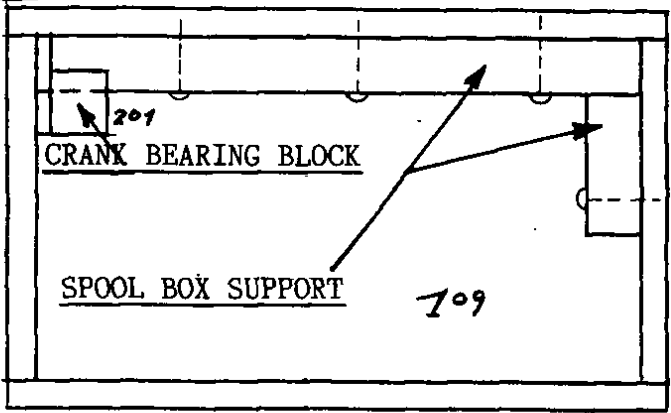


TO ASSURE SQUARE CABINET



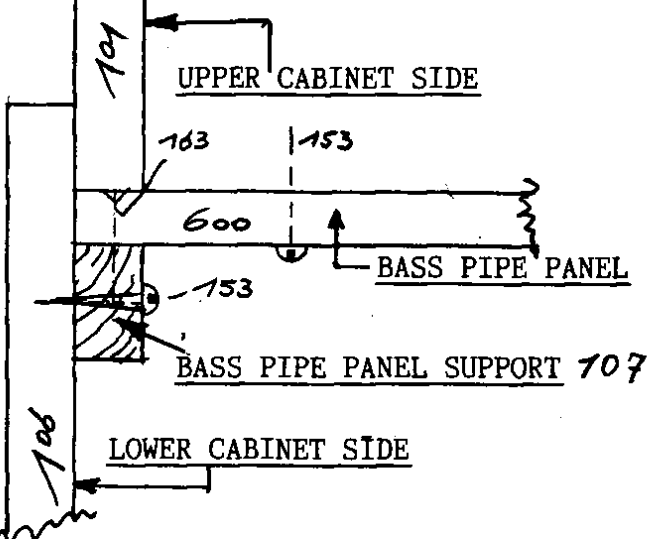
HOOK AND EYE 182

LID ATTACHMENT



CRANK BEARING BLOCK

SPOOL BOX SUPPORT 709



UPPER CABINET SIDE

BASS PIPE PANEL

BASS PIPE PANEL SUPPORT 707

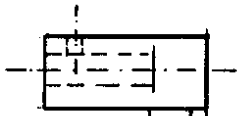
LOWER CABINET SIDE

EXTERIOR CABINET - "20er KIT DREHORGE

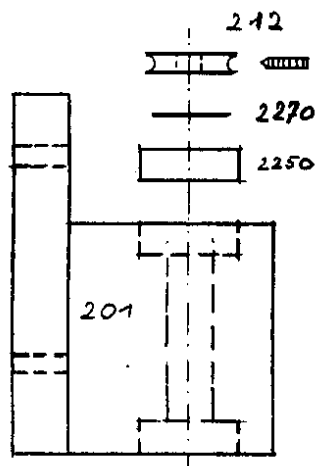
100 (use all parts in the 100's)



222



220



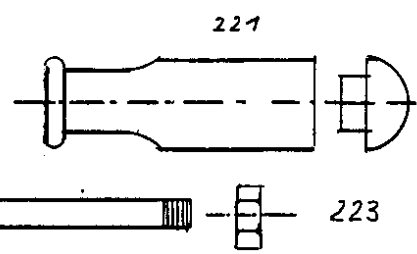
201

242

2270

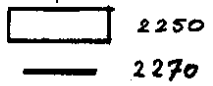
2250

DRIVE 200 - "20er KIT DREHORGEL
(use all parts in the 200 series)



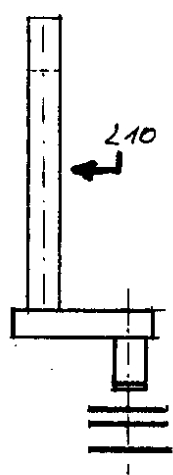
221

223



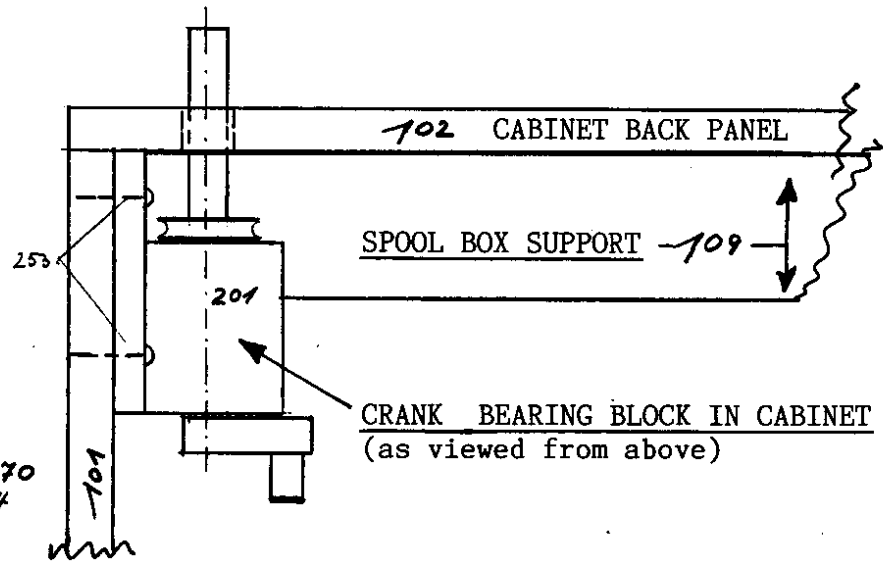
2250

2270



210

2270
224



102 CABINET BACK PANEL

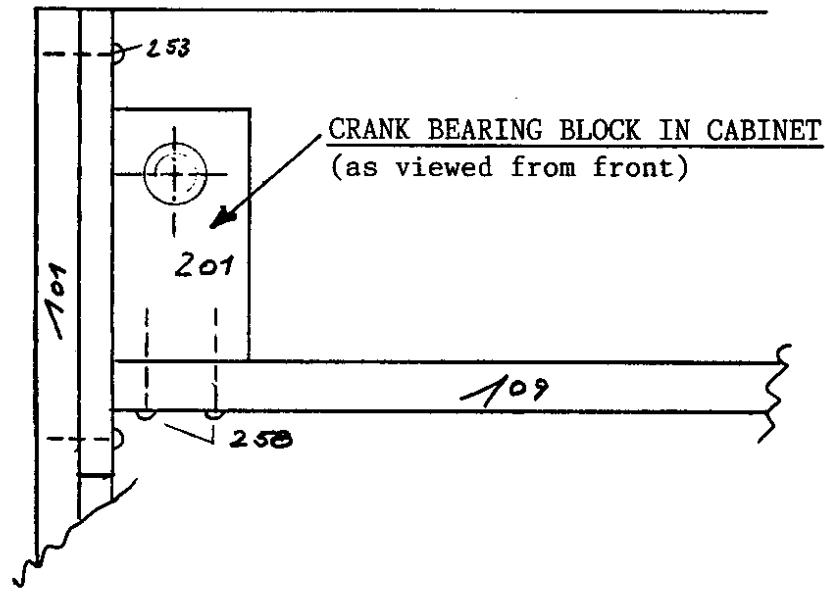
SPOOL BOX SUPPORT 109

201

253

101

CRANK BEARING BLOCK IN CABINET
(as viewed from above)



253

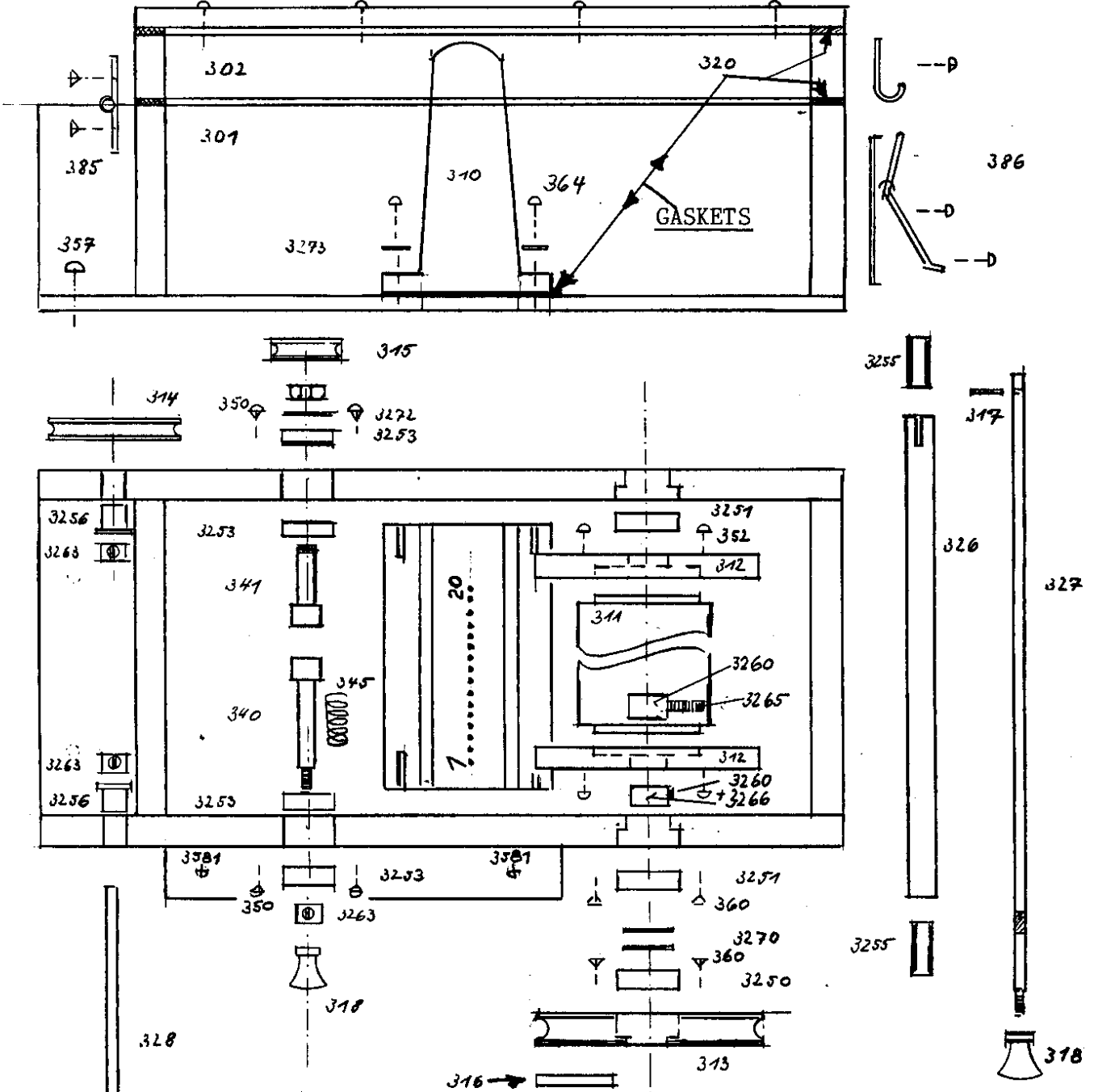
CRANK BEARING BLOCK IN CABINET
(as viewed from front)

201

101

109

258

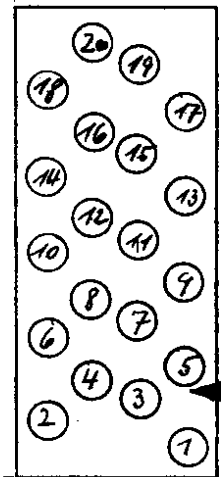


3263 + 3269 COLLAR AND SET SCREW

(516) TUBING LENGTHS (CM)

1	2	3	4	5	6	7	8	9	10	11
26	35	42	26	27	33	22	33	37	28	28
12	13	14	15	16	17	18	19	20		
28	24	22	21	21	19	19	20	22		

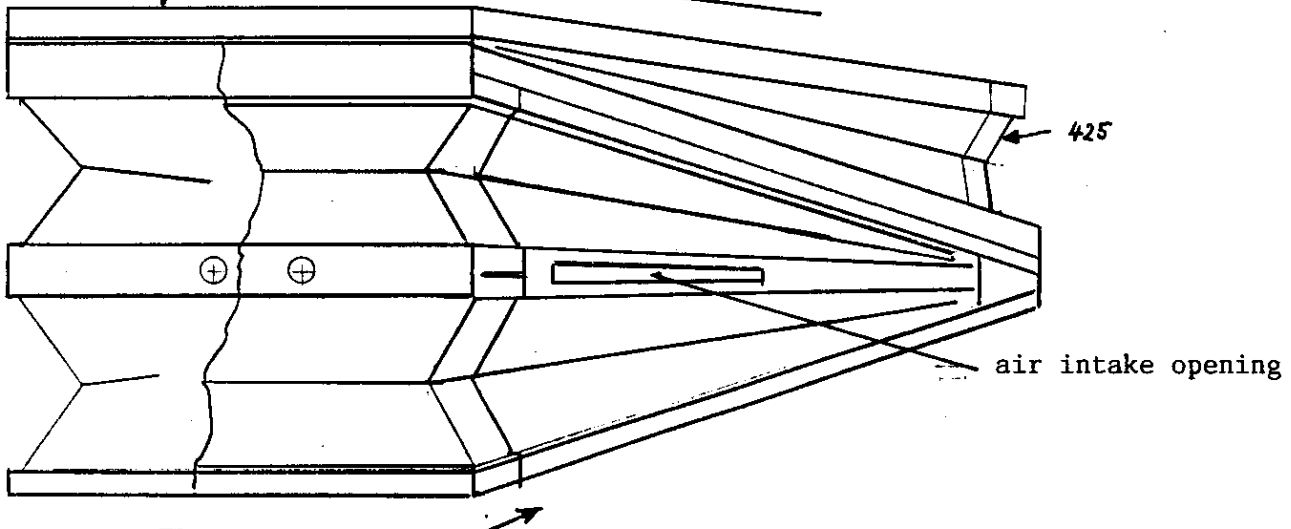
TRACKER BAR SEQUENCE
AS VIEWED FROM THE BOTTOM



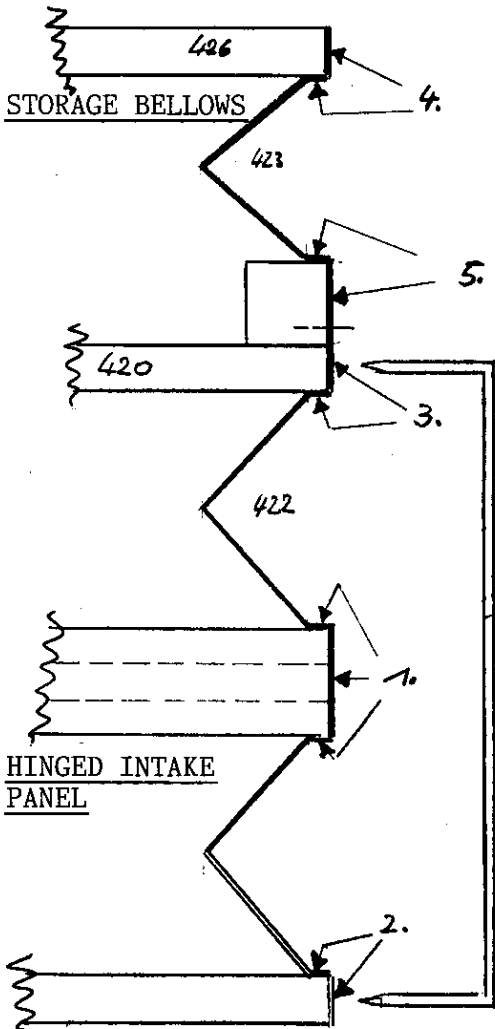
SPOOL BOX - 300
"20er" KIT DREHORGEL
(use all parts in the 300 series)

420

DRAW THE SIDE LEATHER AROUND AND THE OVER THE HINGES



DRAW THE FRONT LEATHER AROUND AND OVERLAP THE SIDES

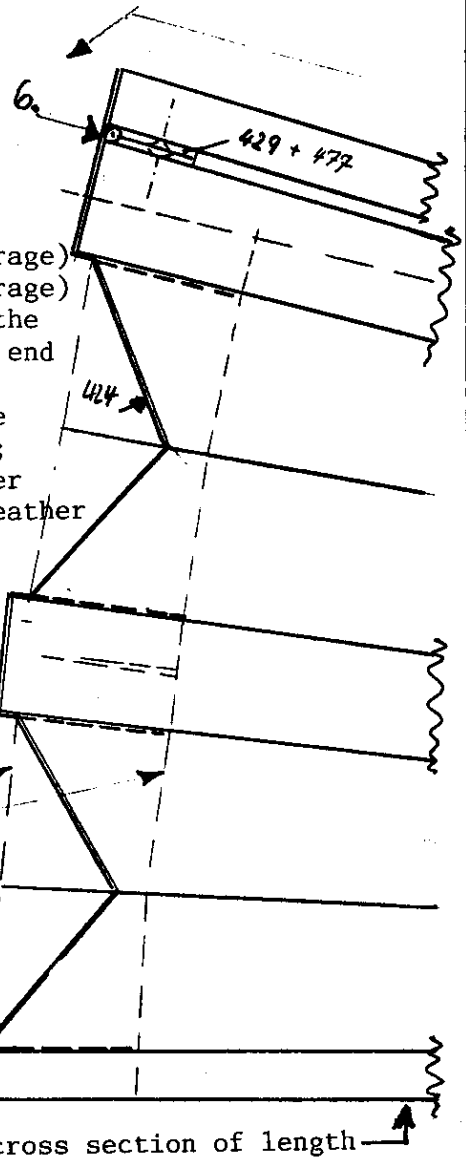


CROSS SECTIONAL VIEW OF BELLOWS

FRONT VIEW

SEQUENCE FOR LEATHERING

1. center hinged intake panel
2. lower panel
3. upper panel
4. upper reservoir panel (storage)
5. lower reservoir panel (storage)
6. draw the side leathers of the storage bellows around the end and over the hinges
7. leather the front next; use the same sequence as above; also, glue the front leather overlapping the long side leather

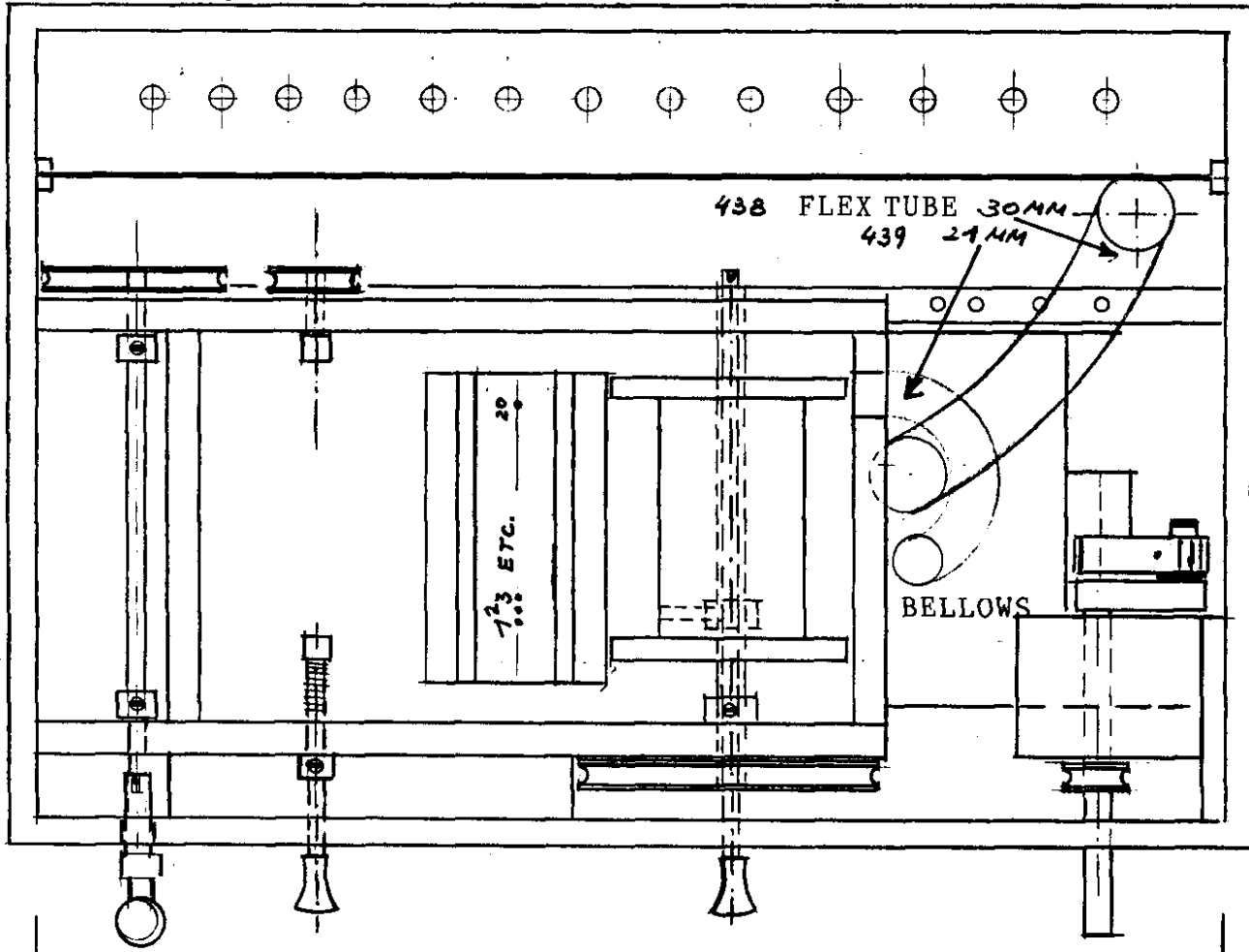


LEATHER FROM THE FRONT SHOULD OVERLAP THE SIDES

cross section of length

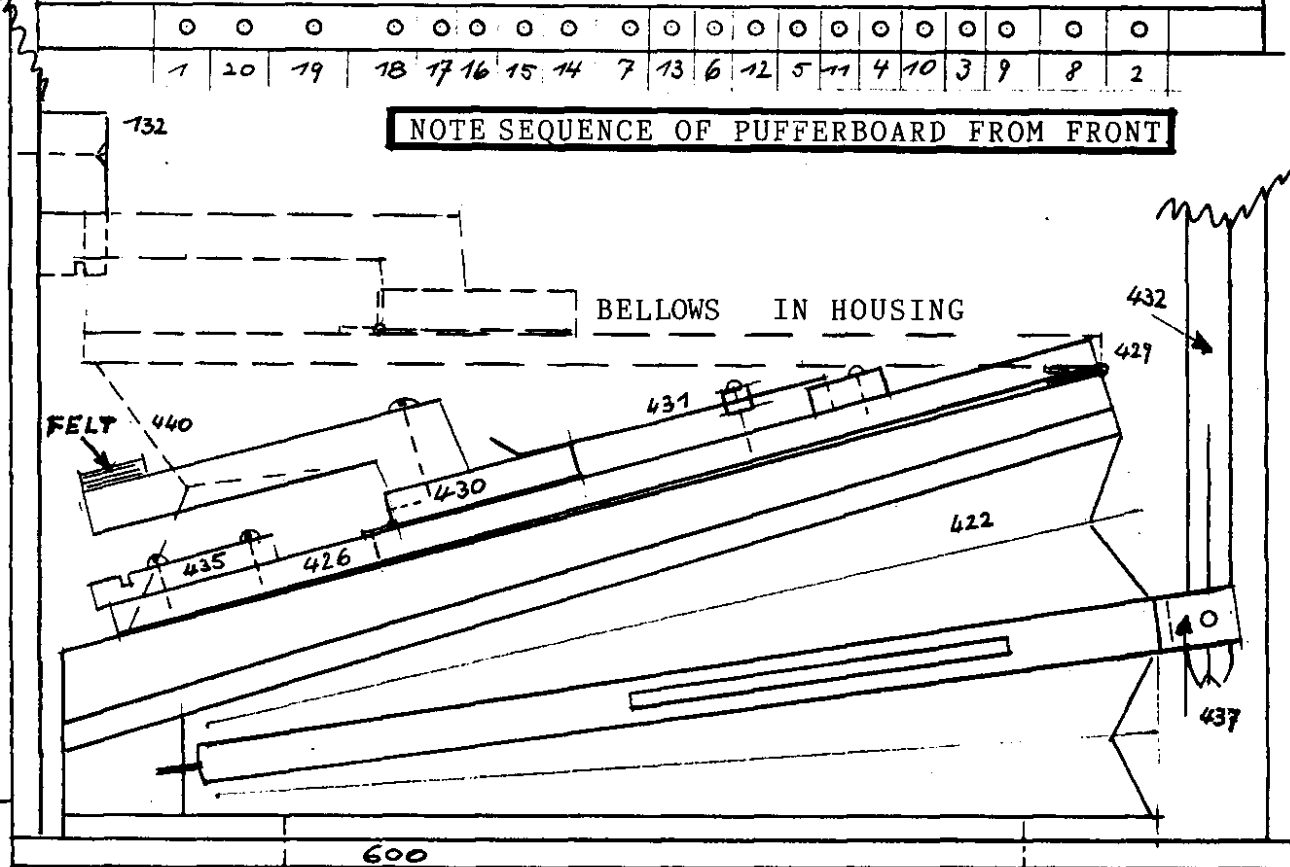
LEATHERING THE BELLOWS - 400 - "20er KIT DREHORGEL"
(use all parts in the 400 series)

CROSS SECTIONAL VIEW FROM ABOVE



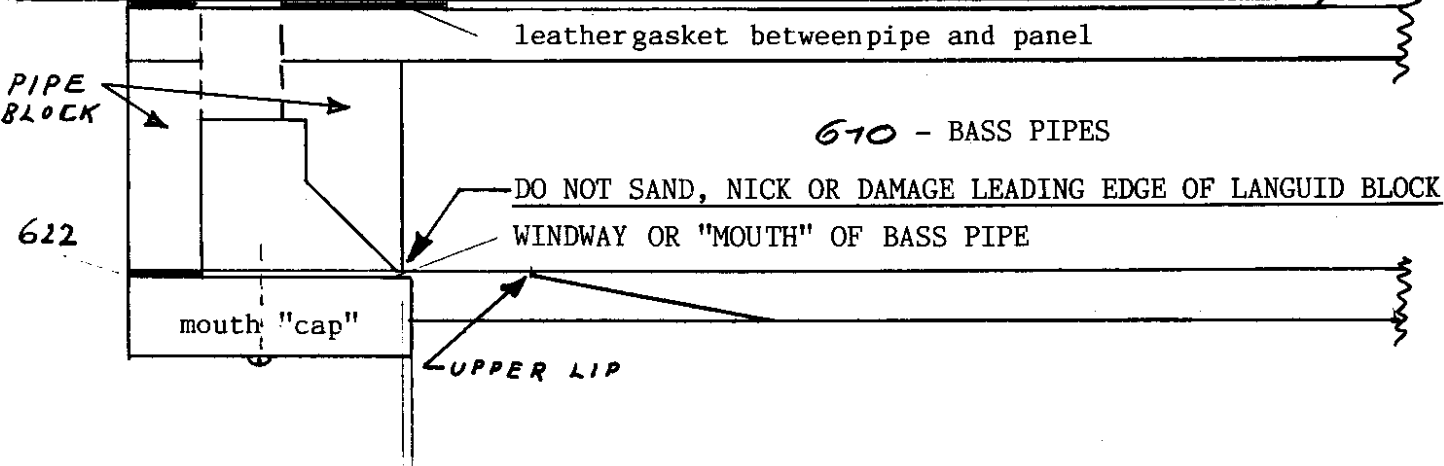
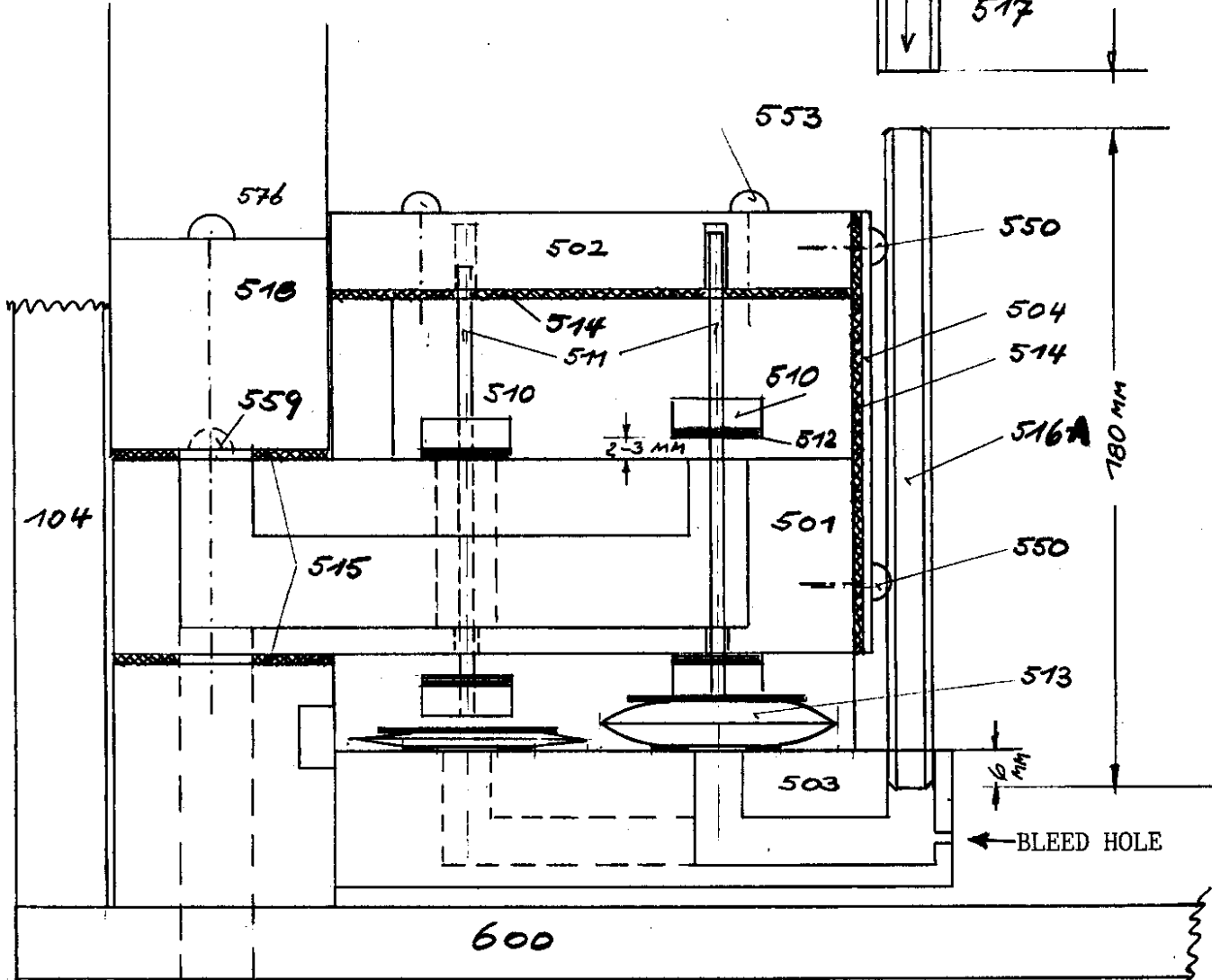
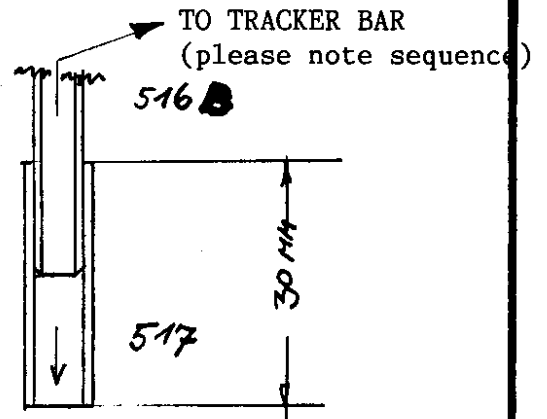
1	20	19	18	17	16	15	14	7	13	6	12	5	11	4	10	3	9	8	2
---	----	----	----	----	----	----	----	---	----	---	----	---	----	---	----	---	---	---	---

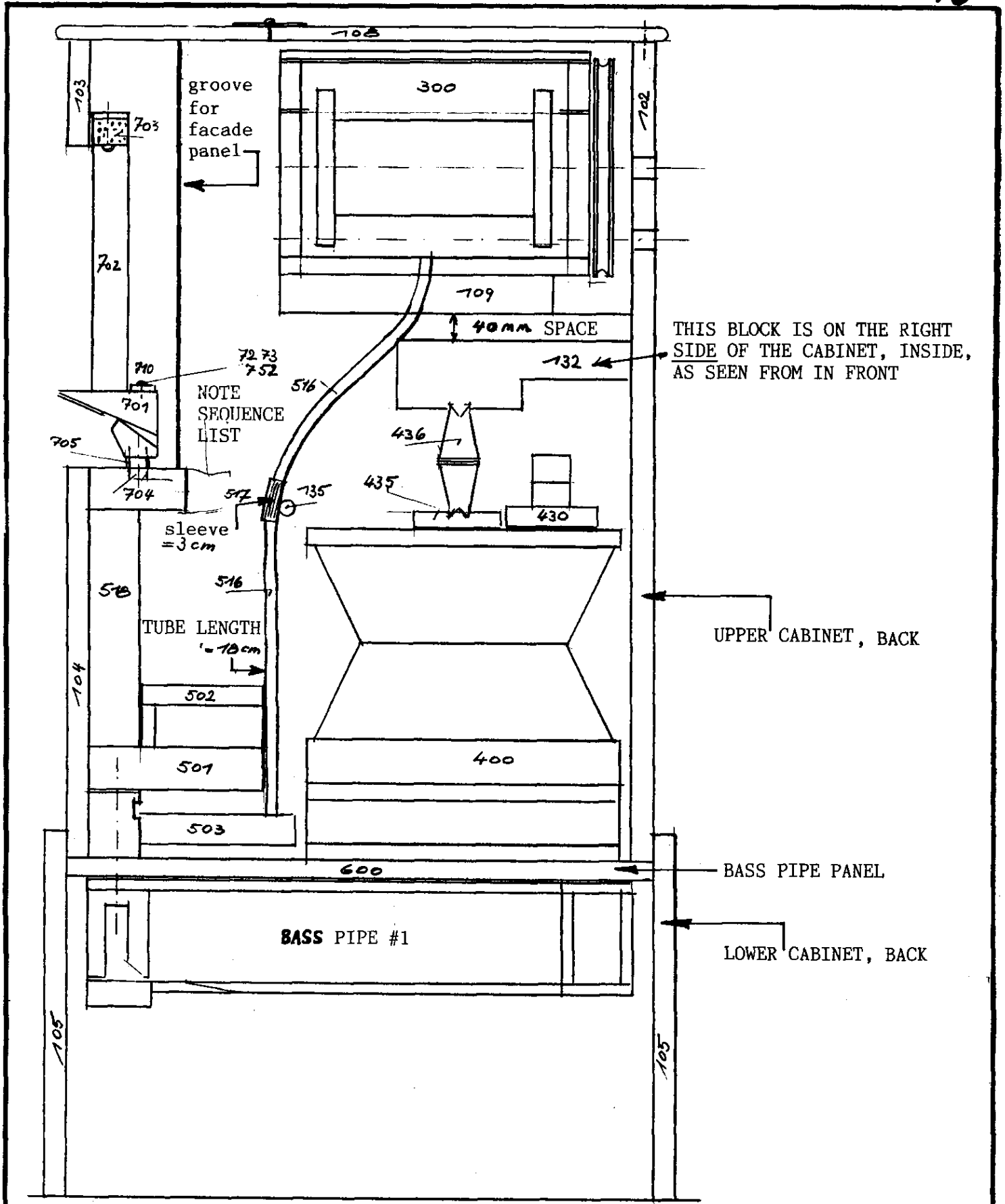
NOTE SEQUENCE OF PUFFERBOARD FROM FRONT



"20er DREHORGEL KIT"

500 - CROSS SECTIONAL VIEW
 THROUGH WIND CHEST (VALVE CHEST)
 use all parts in the 500 series
 "20er DREØRGEL"KIT





THIS BLOCK IS ON THE RIGHT SIDE OF THE CABINET, INSIDE, AS SEEN FROM IN FRONT

groove for facade panel

NOTE SEQUENCE LIST

sleeve = 3 cm

TUBE LENGTH = 18 cm

UPPER CABINET, BACK

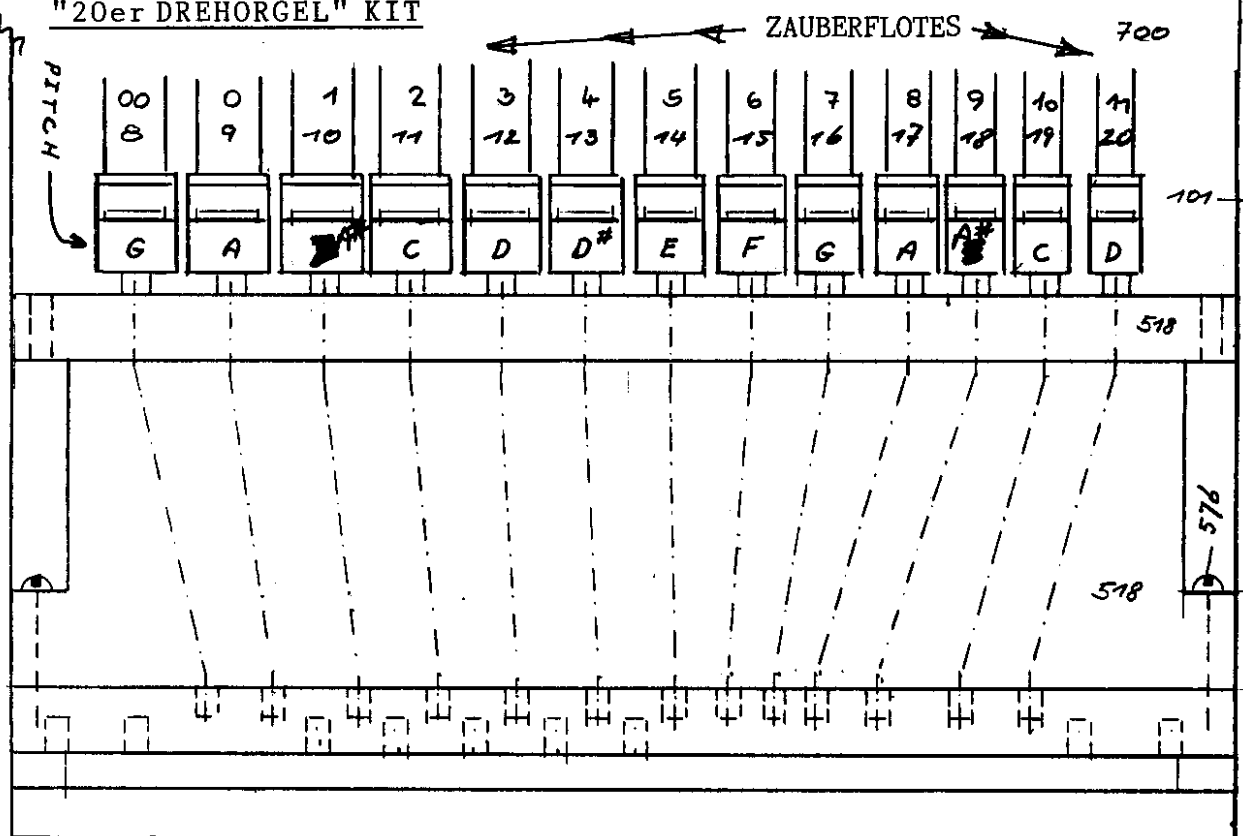
BASS PIPE PANEL

LOWER CABINET, BACK

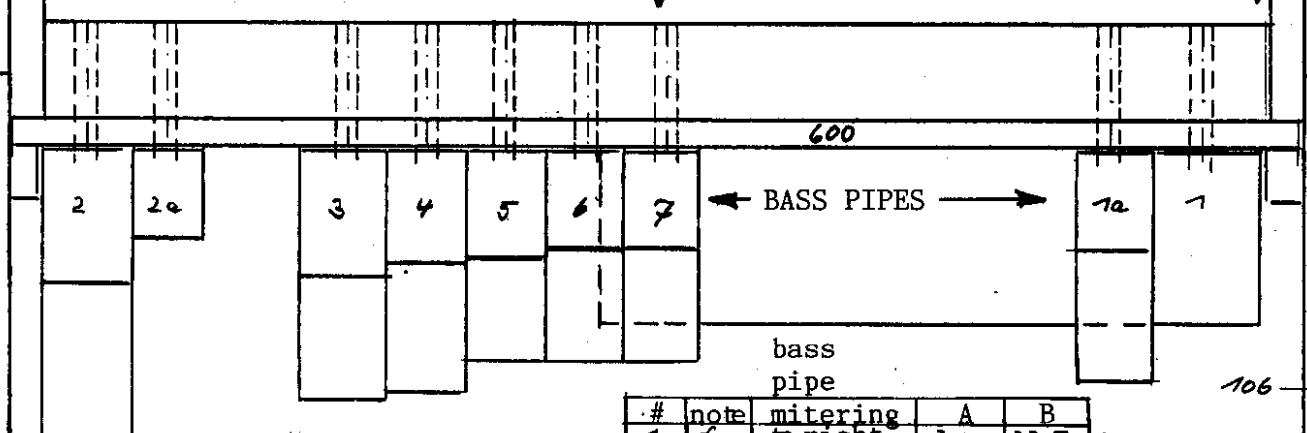
BASS PIPE #1

VERTICAL CROSS SECTION, COMPLETE ORGAN
"20er DREHORGEL" KIT

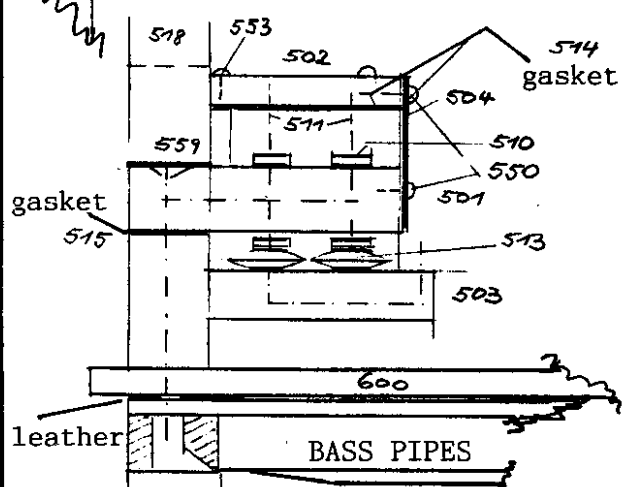
"20er DREHORGEL" KIT



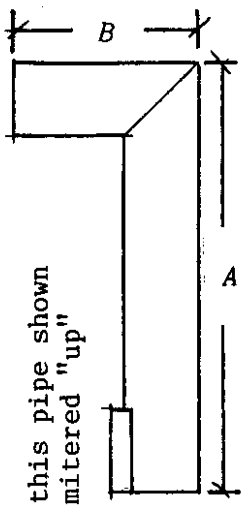
CROSS SECTIONAL FRONT VIEW



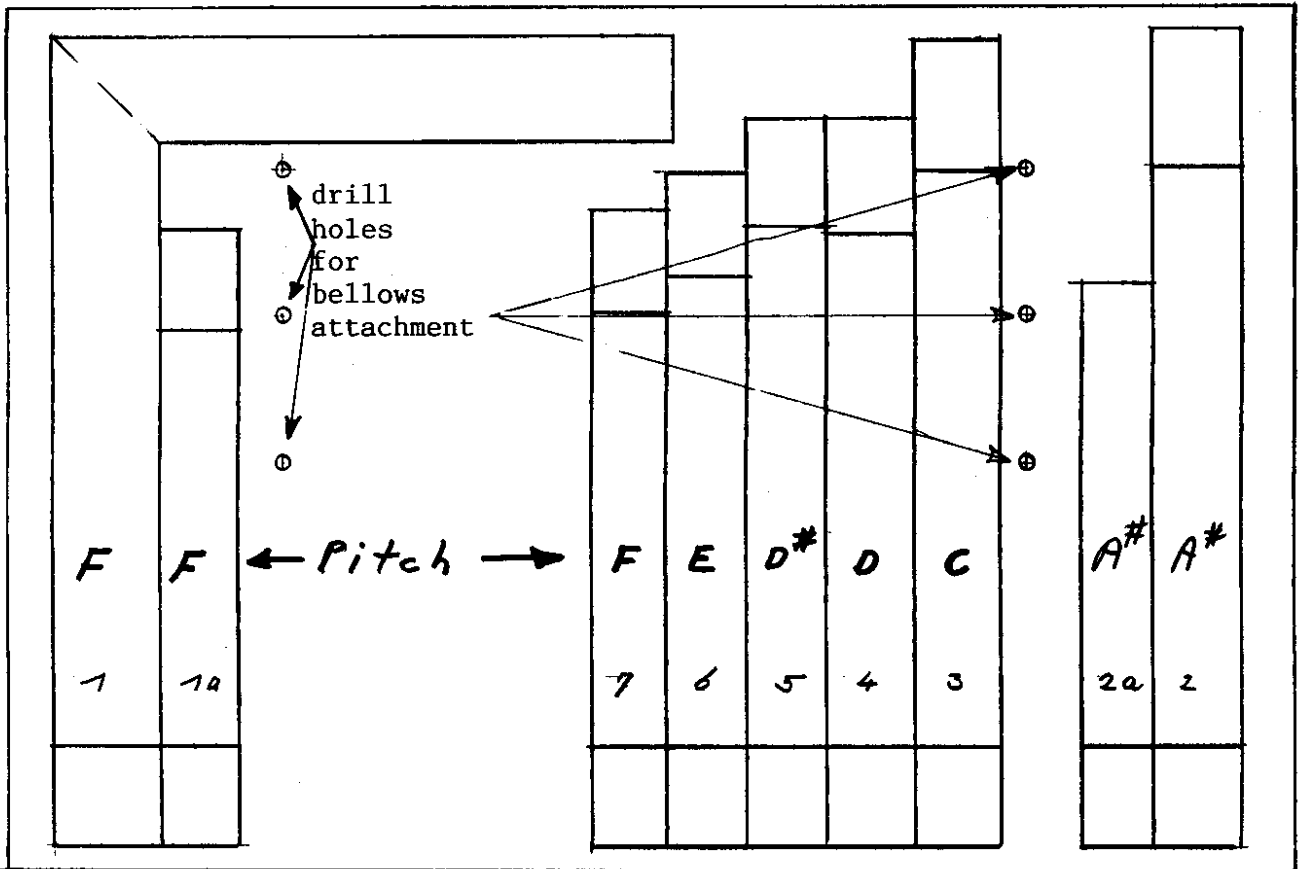
CROSS SECTION OF BASE



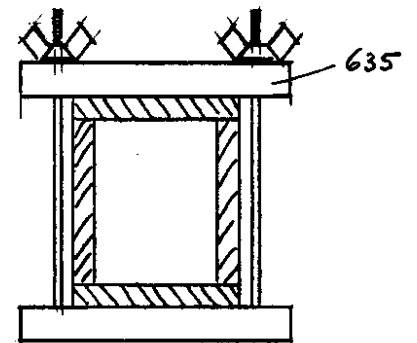
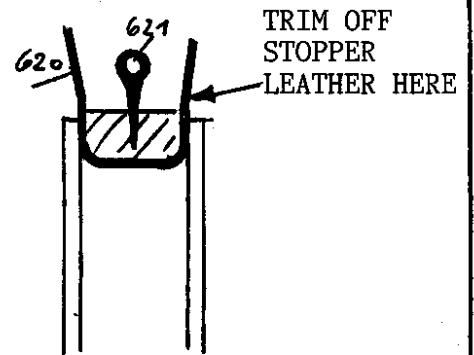
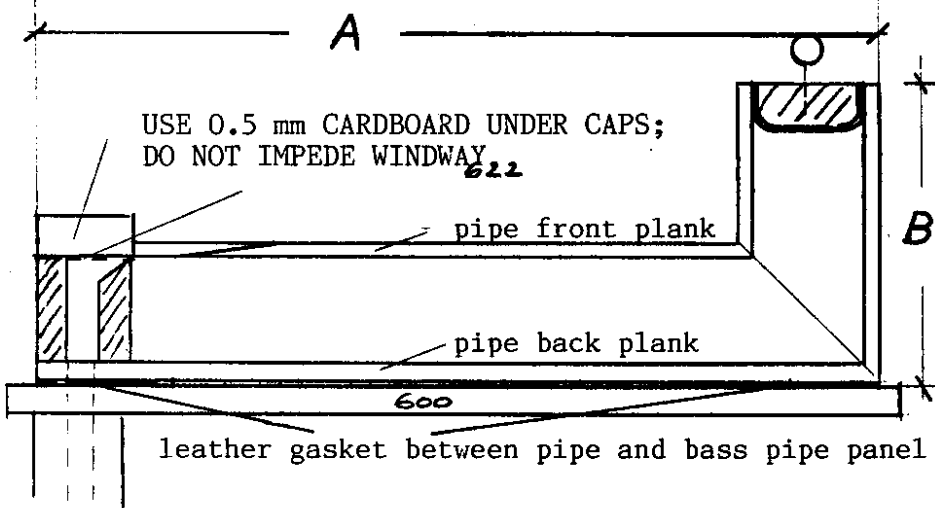
#	note	mitering	A	B	cm
1	f 0	to right	30cm	22,5	
1a	f 1	up	28	8,5	
2	b 0	up	30,5	11	
2a	b 1	none	21	—	
3	c 1	up	30	9,5	
4	d 1	up	27	9,0	
5	d s 1	up	27	8	
6	c 1	up	25	8	
7	f 1	up	23,5	8	
00	g 1	ZAUBERFLOTEN			
0	a 1				
1	b 1				
2	c 2				
3	d 2				
4	d s 2				
5	e 2				
6	f 2				
7	g 2				
8	a 2				
9	b 2				
10	c 3				
11	d 3				



CROSS SECTION - WIND CHEST, FROM RIGHT



BASS PIPES AS SEEN FROM THE BOTTOM



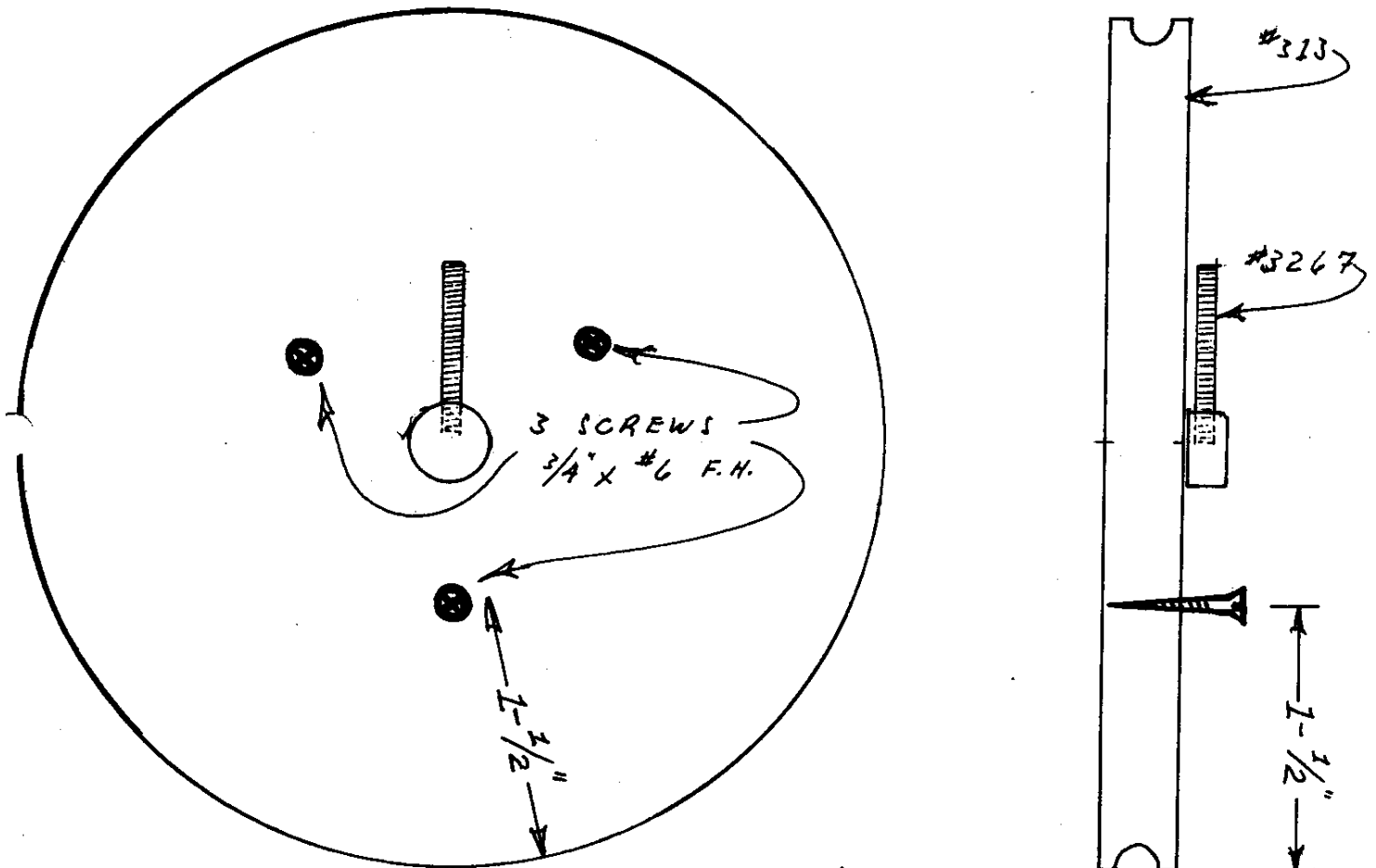
GLUE AND THEN CLAMP PIPES USING MODERATE PRESSURE

"20er DREHORGEL" KIT
BASS PIPES

MODIFICATION NOTICE

HOFBAUER "20er SELBERBAUEN" DREHORGEL KIT

If the kit you received seems to be missing part #316 (small beveled wood block to be attached to the large wood pulley on the spool box) the following modification should be made. This modification may be made even if part #316 was included. It is essentially a simplification of the manner in which the take up spool is driven. In this modification part #316 is eliminated. It is replaced by 3 wood screws, 3/4"x#6 (or #8) Phillips or flat head, installed as below,



Forebore for the 3 screws 1-1/2" from the outer edge of the large pulley and about 120° apart. When the take up spool axel knob is engaged or "in" the long set screw #3267 should engage any one of the 3 screws just under the beveled underside of the screw head.