

C A T C H I N G P E R S I A N G U S H E H



S A N T U R Z I T H E R M A K E R S



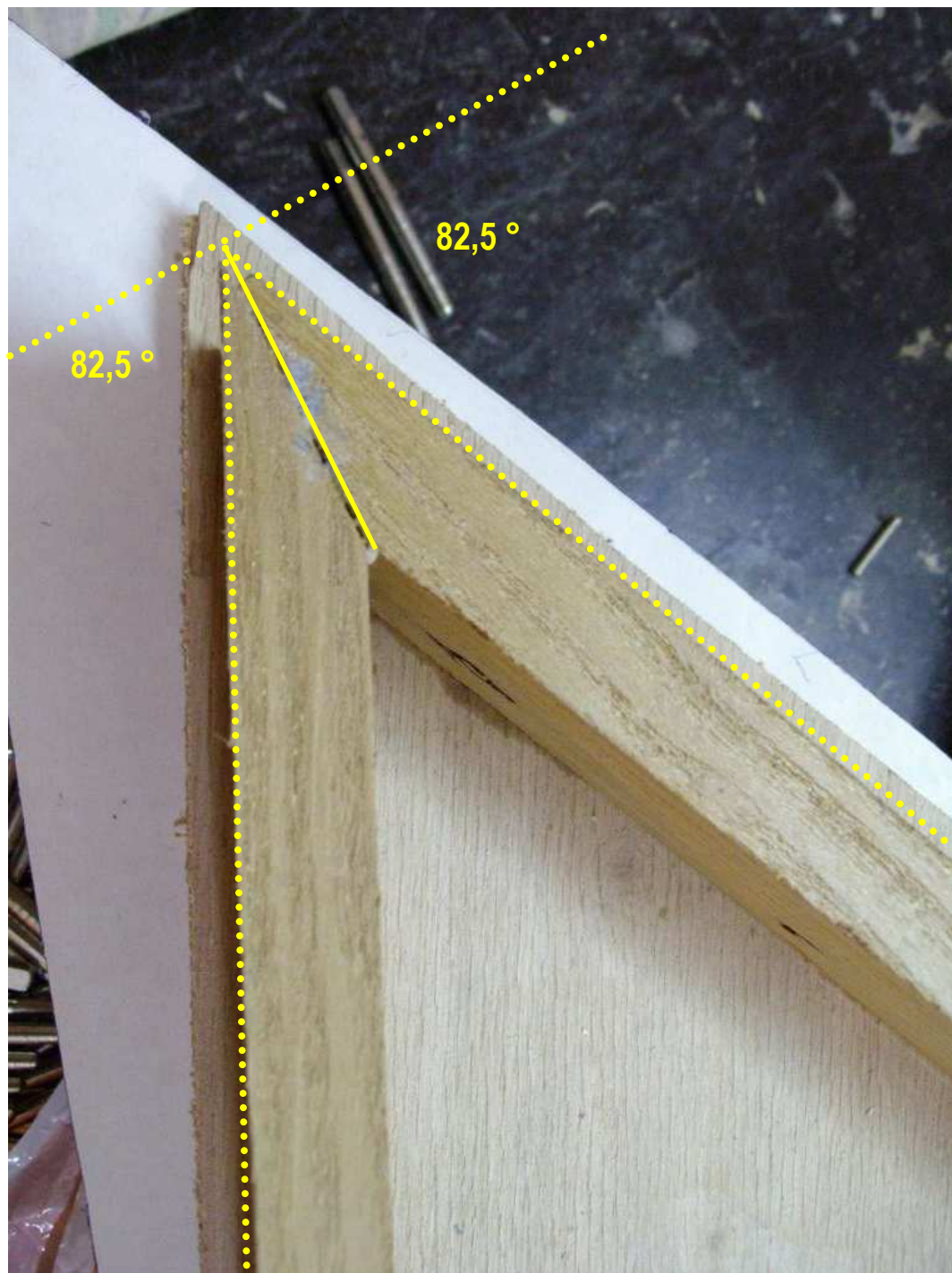
TOOL BOX OF THE ZITHER MAKER : additional electric heaving tooling are widespread too.

Size Variants :

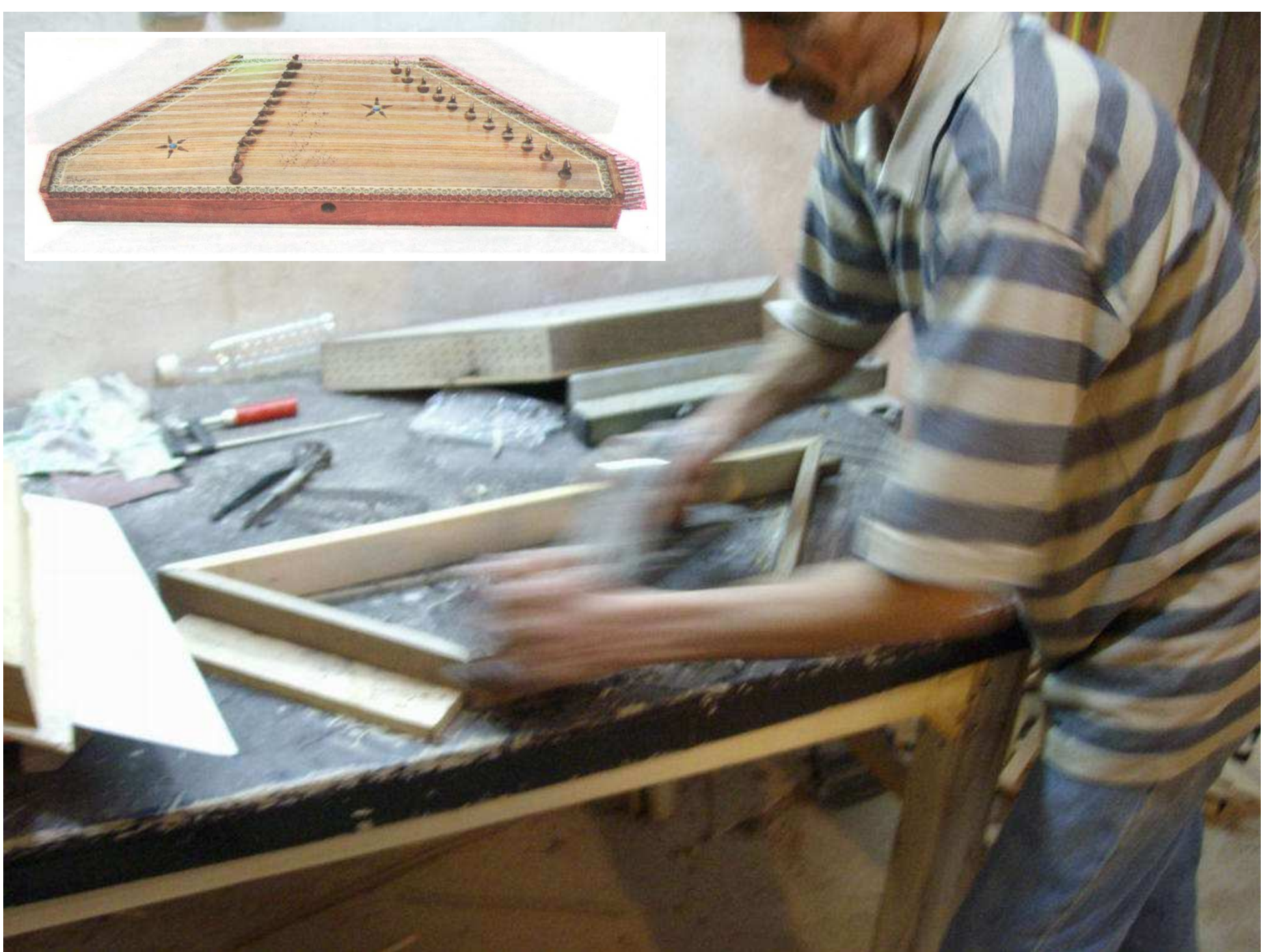
REZAEI - LA (A) frame / REZAEI - SOL (H) frame / VARZANDEH



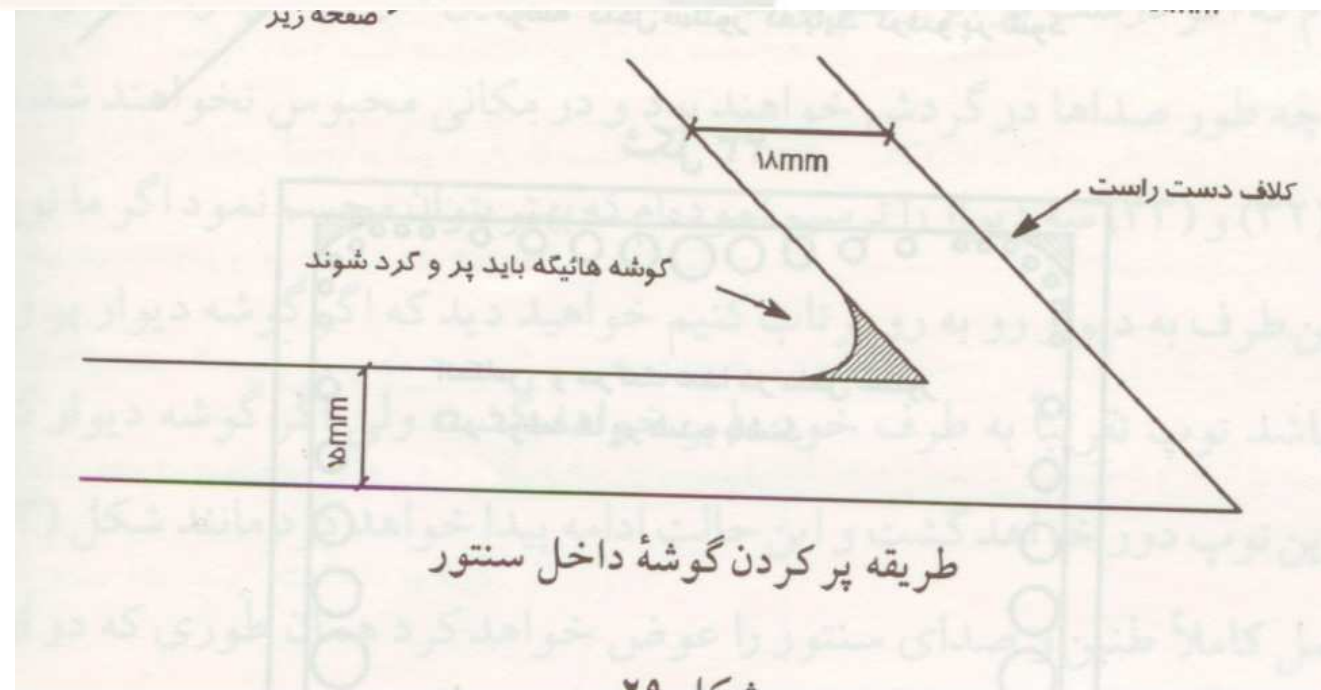
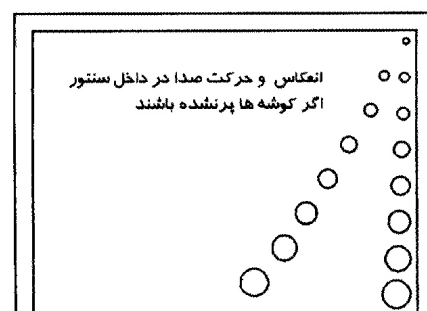
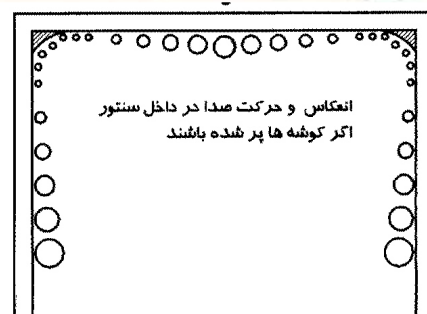
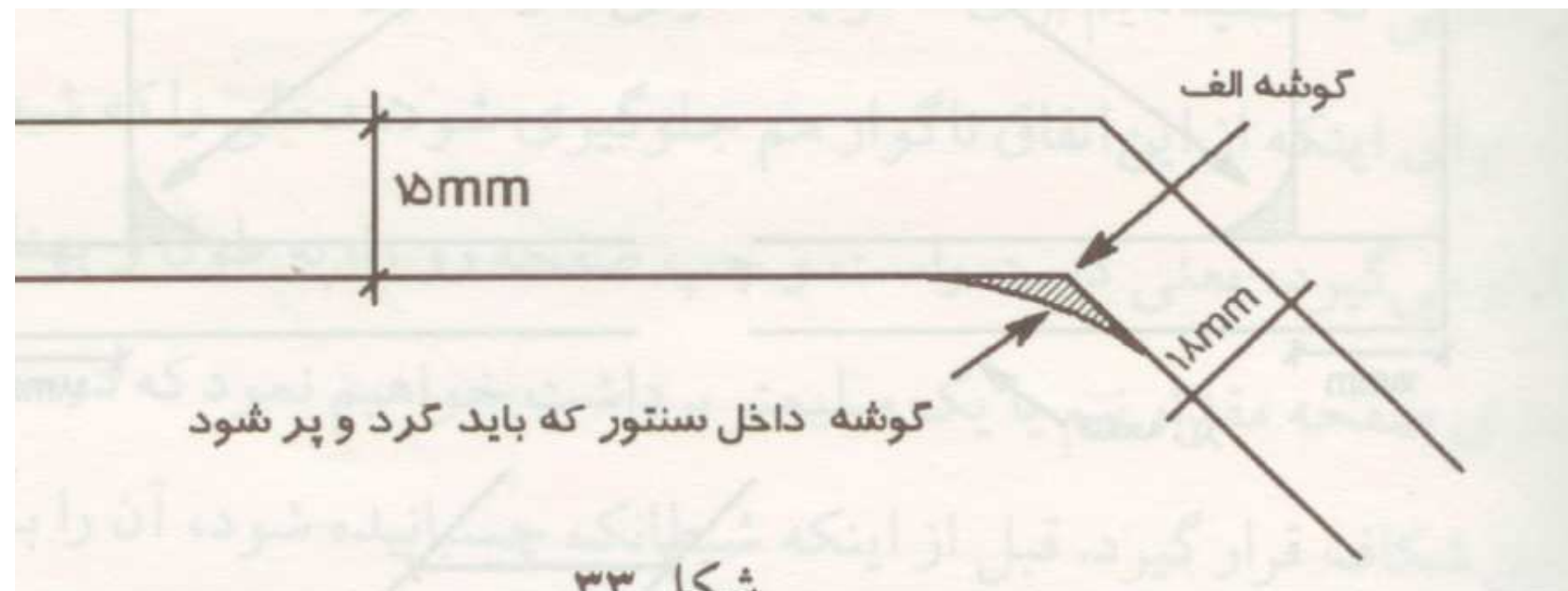
GLUEING WOODEN FRAME : The length and choir distances vary for chromatic or VARZANDEH variants (2 x 12 choirs) and training variants (2 x 9 choirs).



GLUEING WOODEN FRAME : preadjustment is frozen thanks to a pneumatic staple-fitter. Item illustrated here is made of high quality *geredu* wood



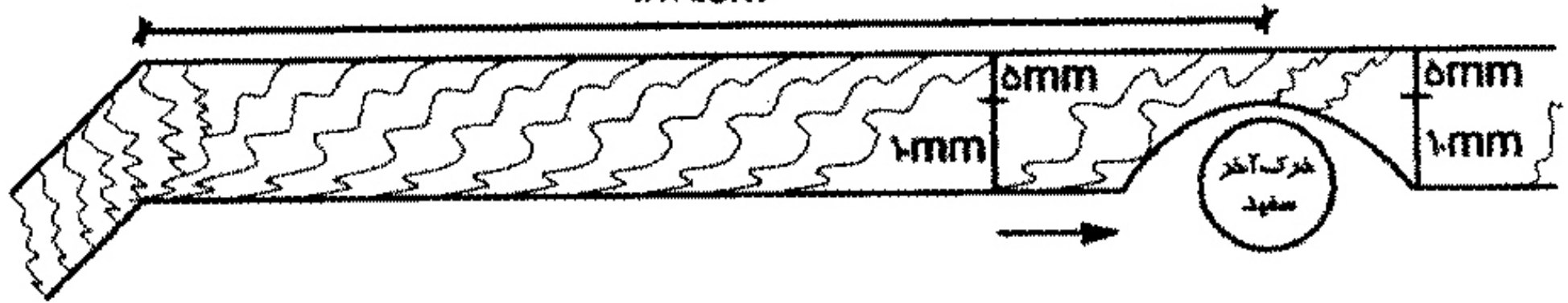
WHEN FRAME TURNS TO SOUNDBOX : adjusting the frame. Background : high quality *geredu* wooden item. Inserted illustration features an ancient design – flatened ends -.



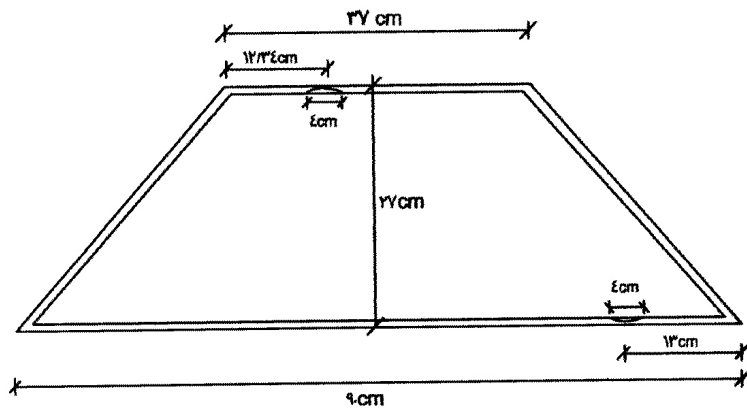
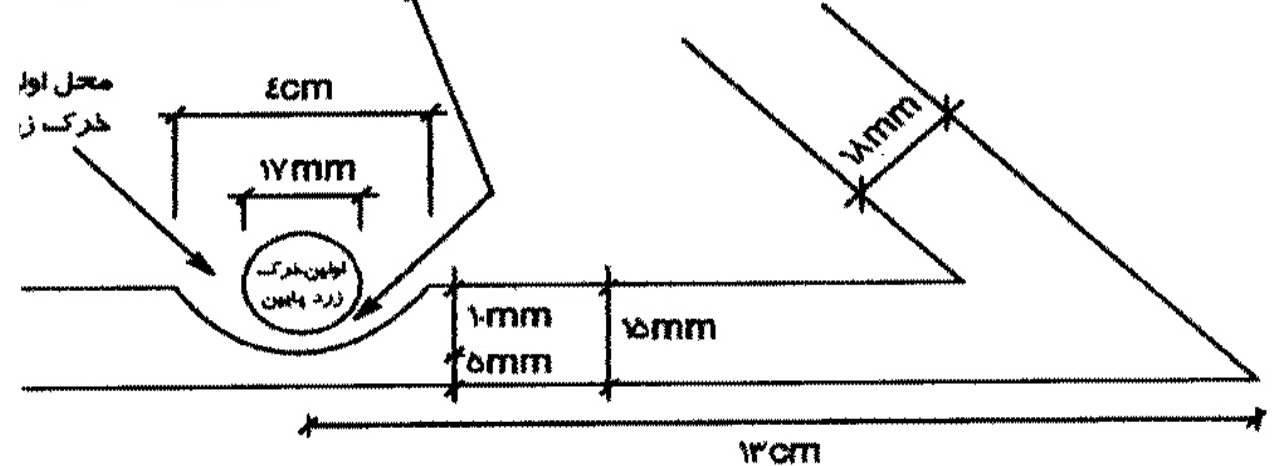
WHEN FRAME TURNS TO SOUNDBOX (ALTERNATE DESIGN) : In « *Shiveh Santour sazi* », Masoud MISSAGHIAN emphasizes that ancient construction of advanced santour zithers requires rounding every interior junctions. I never was given to observe it. The added material in unidentified.

کلاف بالا جای خالی برای حرکت آخر سفید

۱۲/۳۴cm



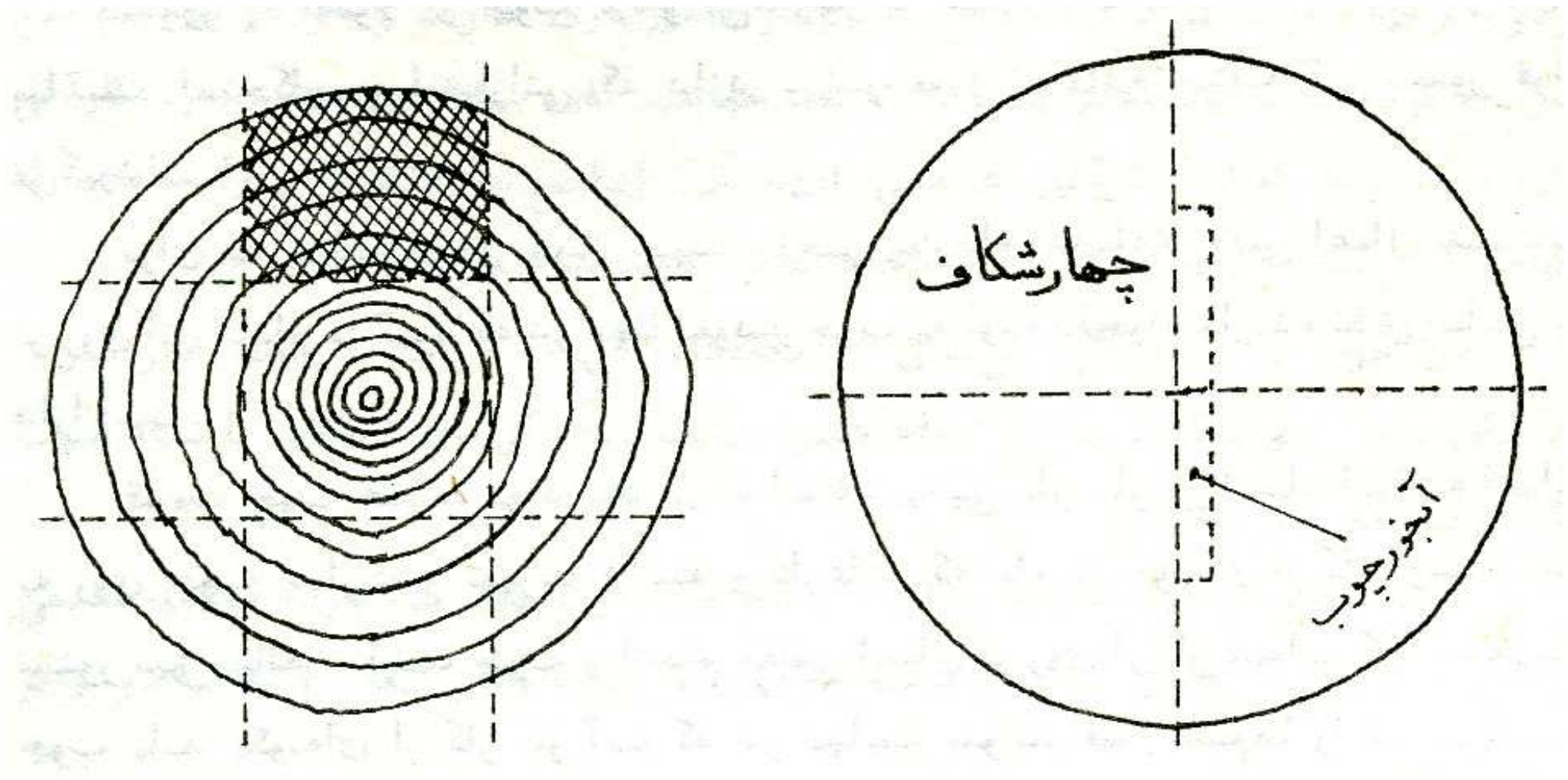
کلاف جلو محل برداشفت
چوب برای اولین حرکت زرد



WHEN FRAME TURNS TO SOUNDBOX (ALTERNATE DESIGN) : In « *Shiveh Santour sazi* », Masoud MISSAGHIAN emphasizes that ancient construction of advanced santour zithers requires 2 cavities for a better echo.



GLUEING THE SOUNDBOARD (1) : spreading the glue



GLUEING THE SOUNDBOARD (2): According to REZAEI & MOTALEBI (Semnan), high quality soundboards are cut out of *geredu* wood. This wood can be found in cold, humid mountainous areas between Firuzkuh and Sari town, in Mazandaran province, as these trees used to grow there strongly in such environment. Recommended thickness for soundboards is 4 mm but Reza VARZANDEH suggested 6 mm is better for base board, so that the instrument to be dimensionally steadier vs thermal changes.

On the right view by Mehdi SETAYESHGAR, the soundboard is carved out of the heart area of aged trees such as walnuts.



GLUEING THE SOUNDBOARD (3) : shaping 4mm thick boards out of *geredu* and *tchub* woodboards .



GLUEING THE SOUNDBOARD (4) : clamping the soundboard on frame, til them to be assembled.



GLUEING PINEWOOD-MADE « POL » BRIDGES : variants exist , depending on wood quality (2, 3, 4 pols)

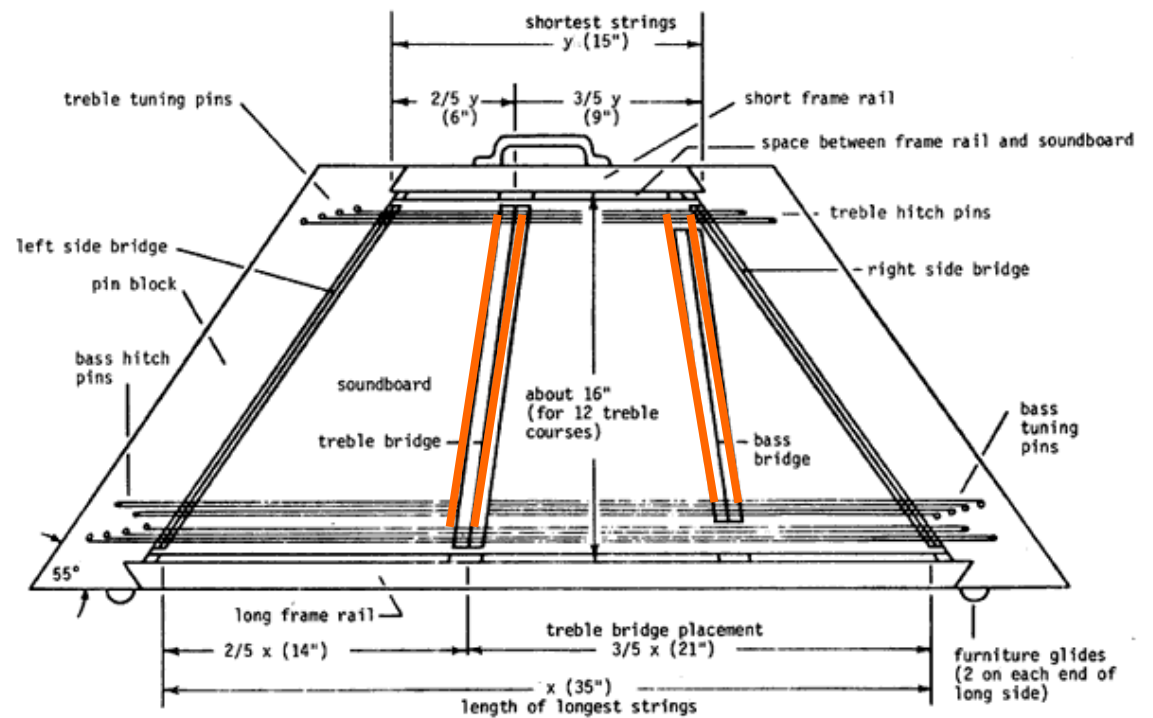
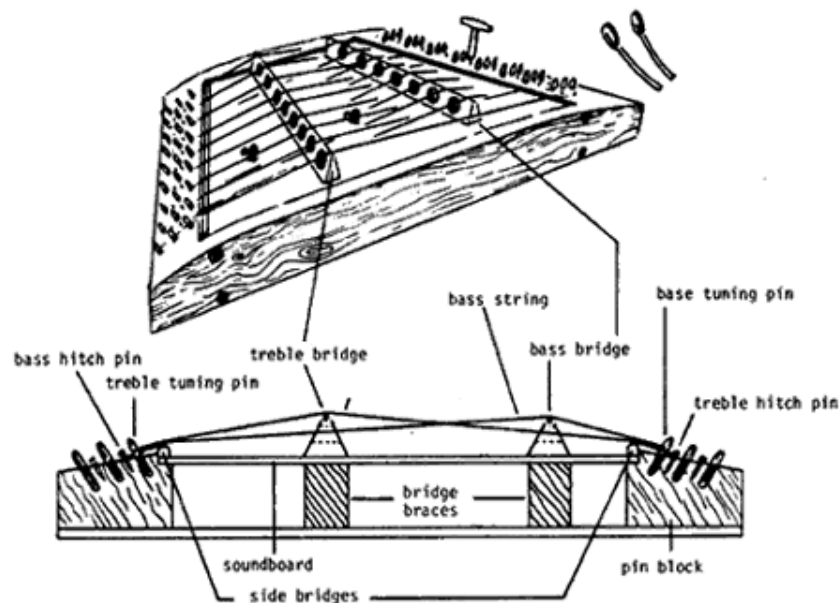
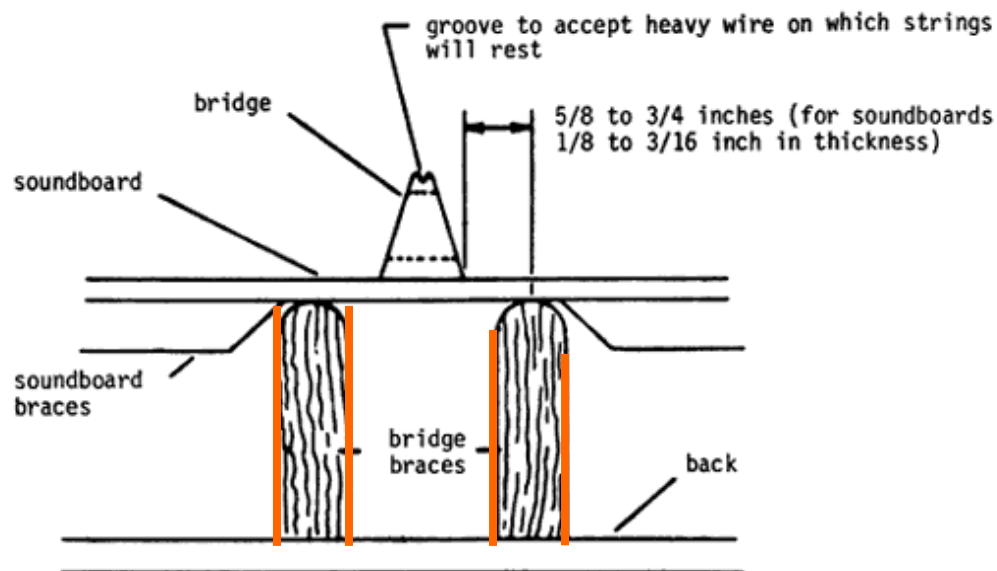


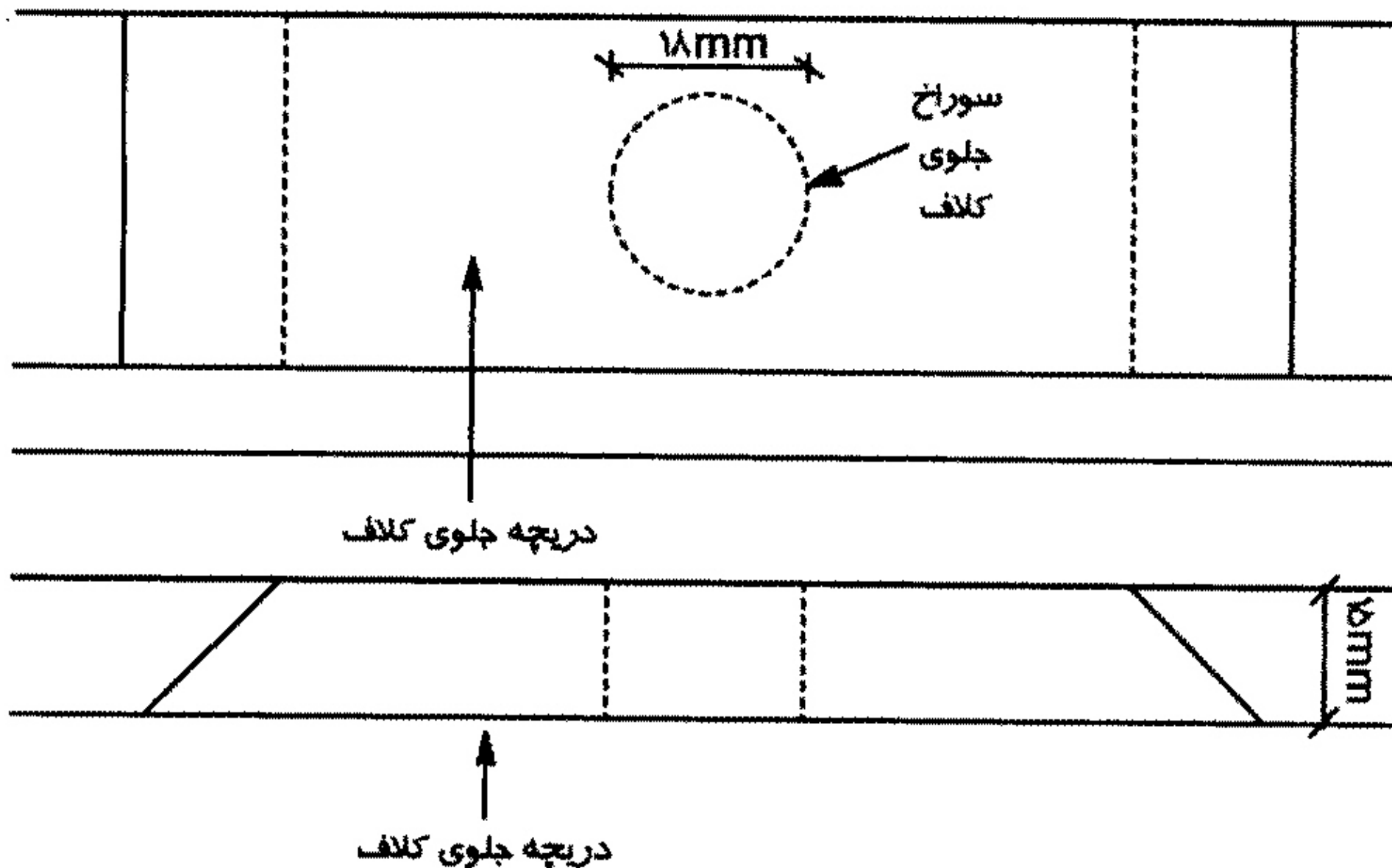
FIGURE 1

Hammer dulcimer diagram - top view



PINEWOOD-MADE « POL » BRIDGES (ALTERNATE DESIGN) : modern variants in the West consist in using rounded bridges or full beams for bridges.

(pictures by Smithsonian Institute)



کلاف جا

STRENGTHENING THE LATERAL OUTLET (ALTERNATE CONSTRUCTION). In « *Shiveh Santour sazi* », Masoud MISSAGHIAN emphasizes that ancient construction of advanced santour zithers requires adding an additional wooden block inside the soundboard, in the axis of the main outlet.



GLUEING THE 2 ND SOUNDBOARD : on a clamping table. Recommended thickness for base board is 6 mm.



SHAPING THE SOUNDBOX : flattening the side-boards with an electrical saw



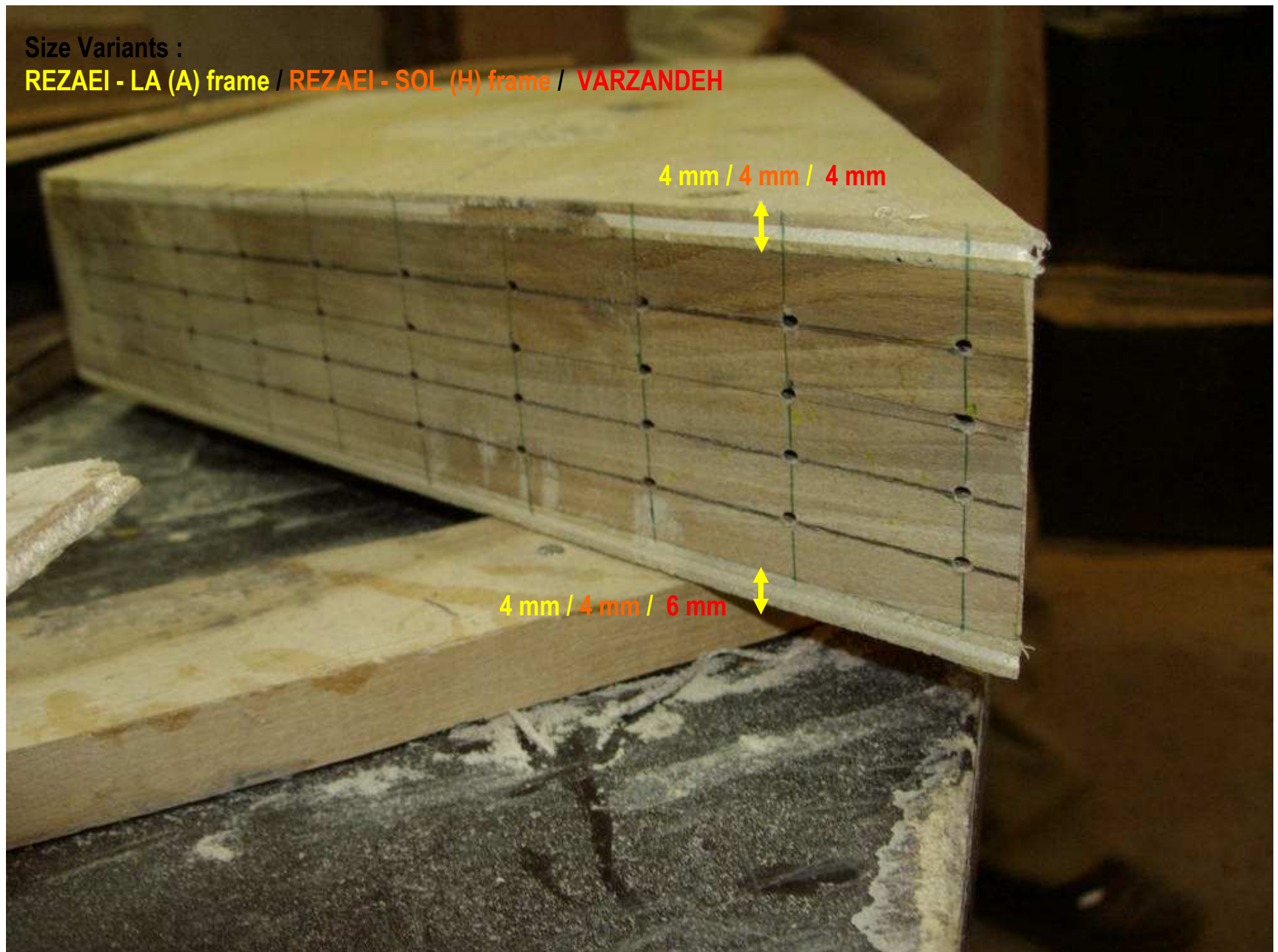
DEBURRING THE SOUNDBOX : flattening manually the side-boards



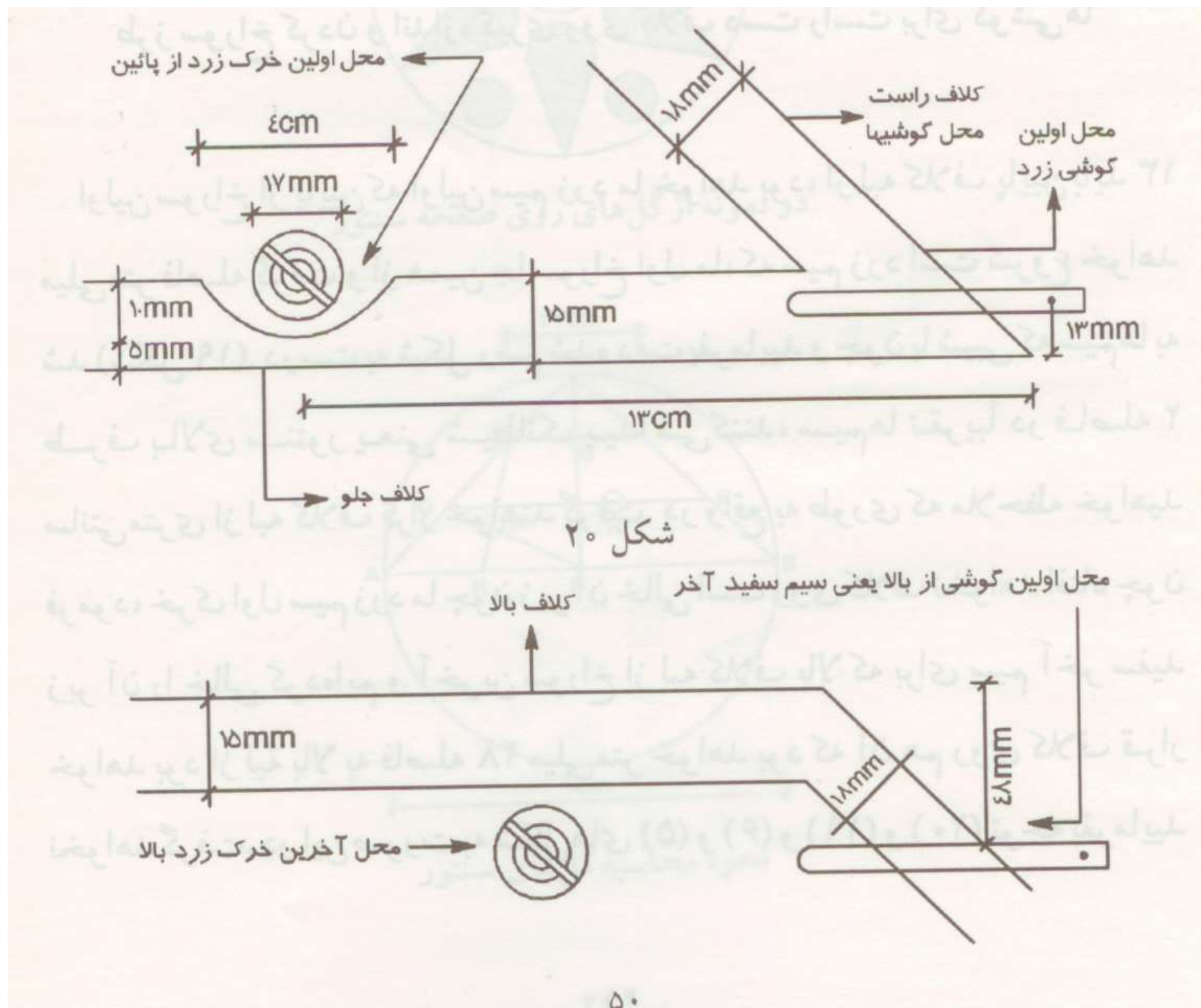
POLISHING BURRS : on electrical polisher. This sophisticated item is prepared for 9 x 2 choirs. Advanced sub variants exist, featuring 5 stringed choirs - instead of 4 stringed -.

Size Variants :

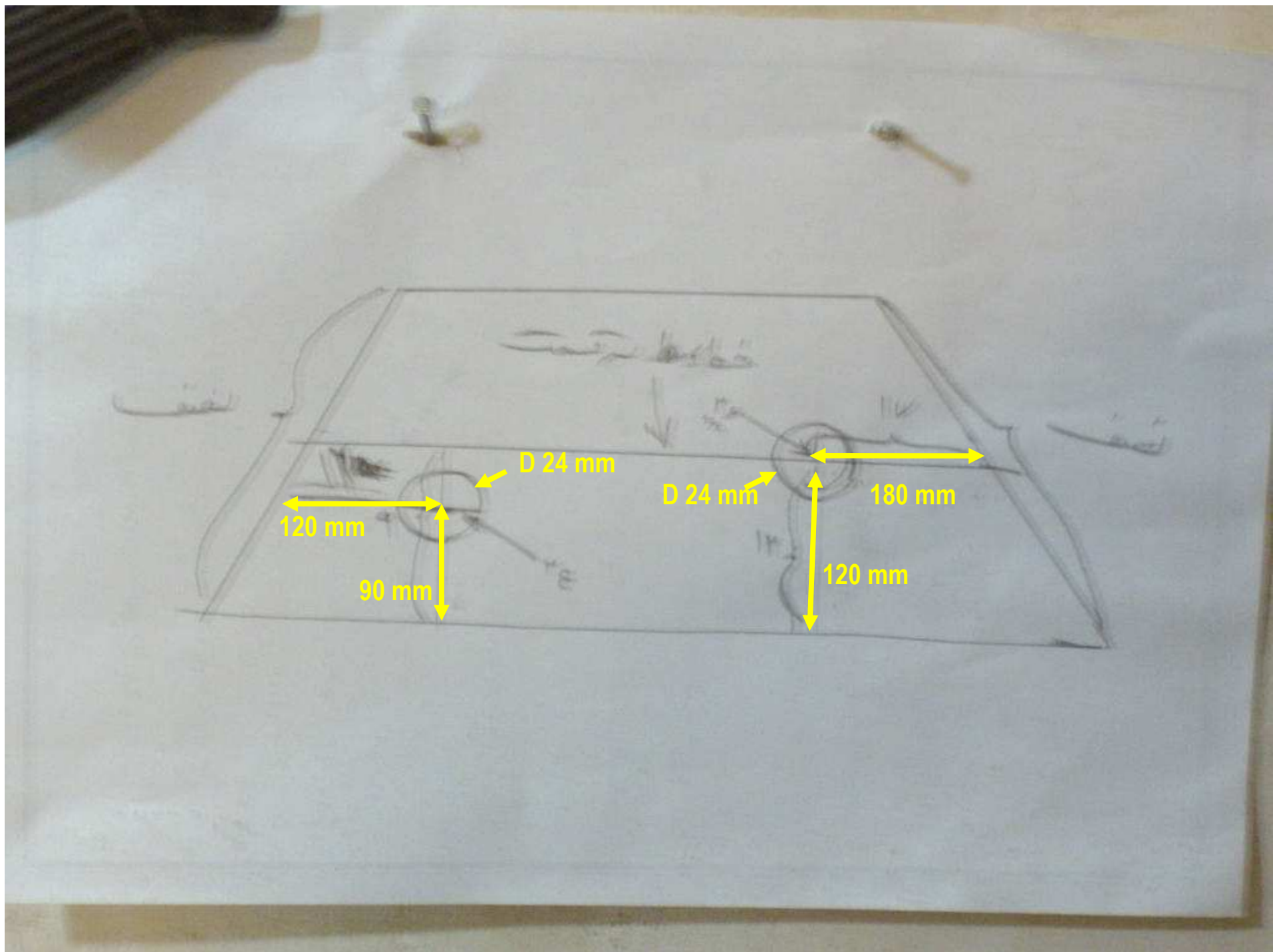
REZAEI - LA (A) frame / REZAEI - SOL (H) frame / VARZANDEH



PIERCEING PEG HOLES (1) : with manual driller. This low quality instrument features a cheap multi-layer soundboard , and frame is drilled for 5 x 2 choirs only.



PIERCEING PEG HOLES (2) : Holes are positionned aside the sideboards of the frame

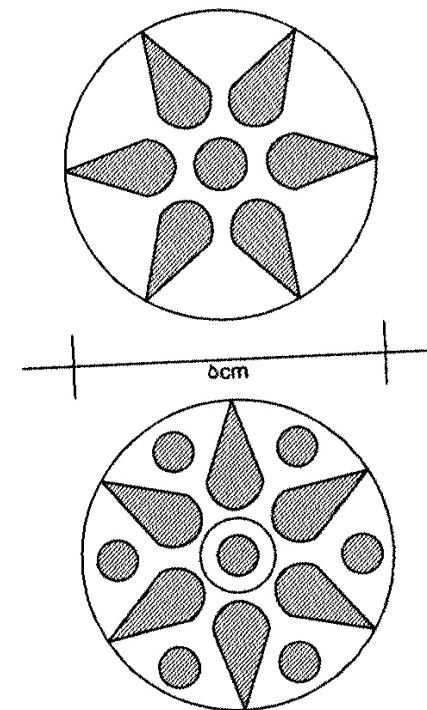


CARVING SOUNDBOARD OUTLETS (1) : positionning the assymetric Gol (« flowers ») outlets.

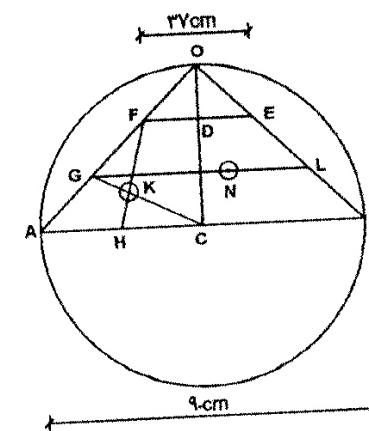


CARVING SOUNDBOARD OUTLETS (2) : with gouge.

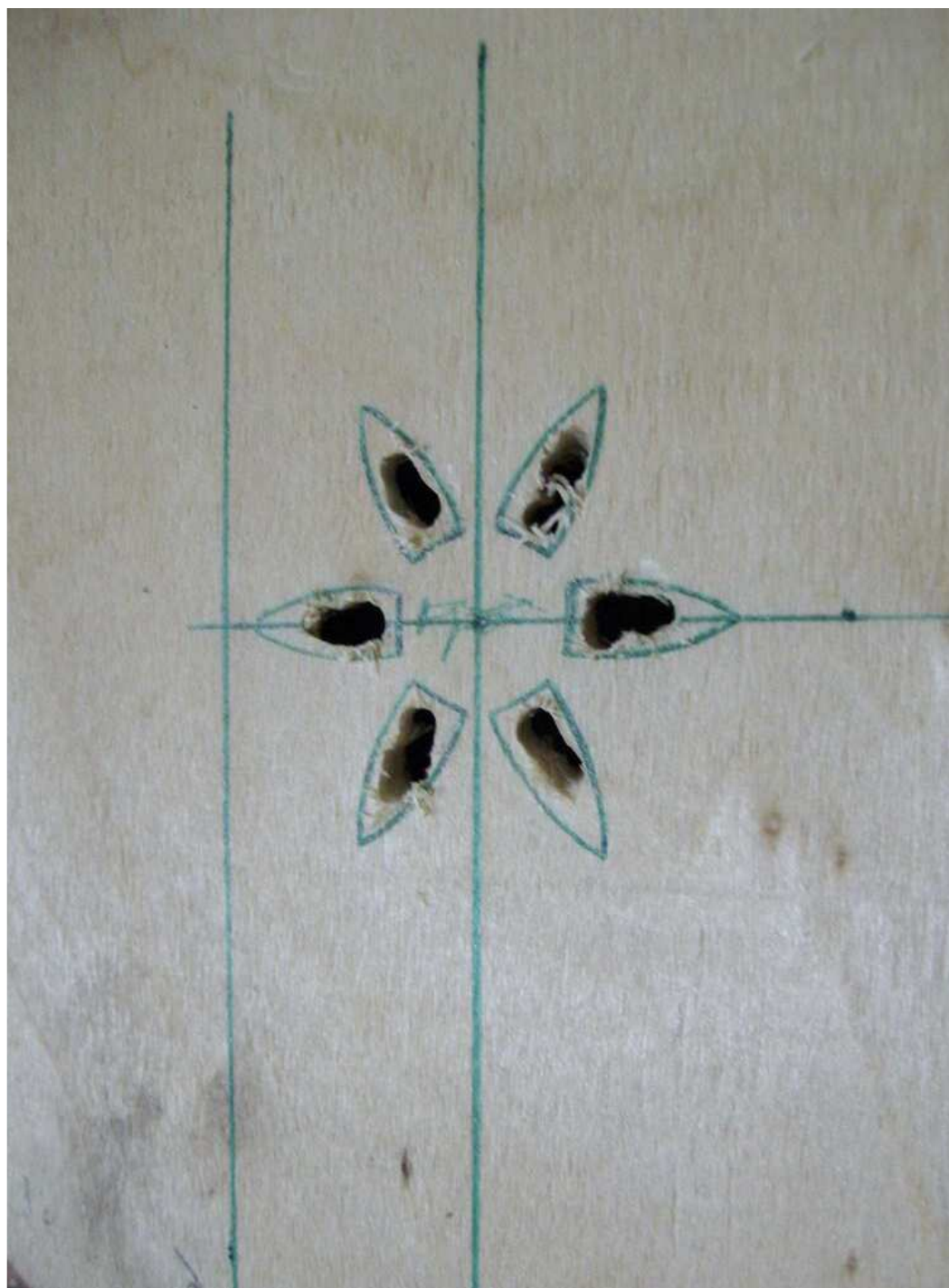
شکل ۱۷



دو نمونه از گل های روی صفحه سنتور

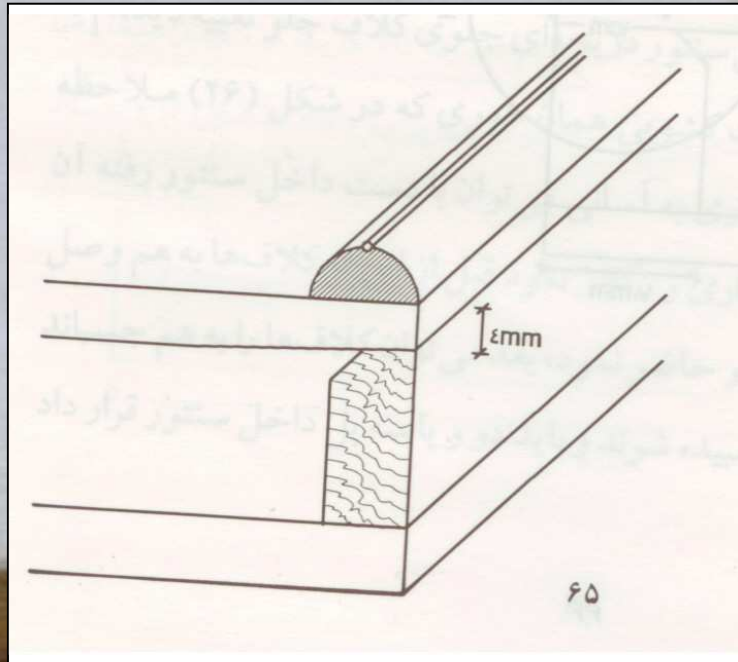


نحوه محاسبه گل های سنتور



CARVING SOUNDBOARD OUTLETS (3) : in progress with gouge ; right : a **geredu** wood made soundboard.

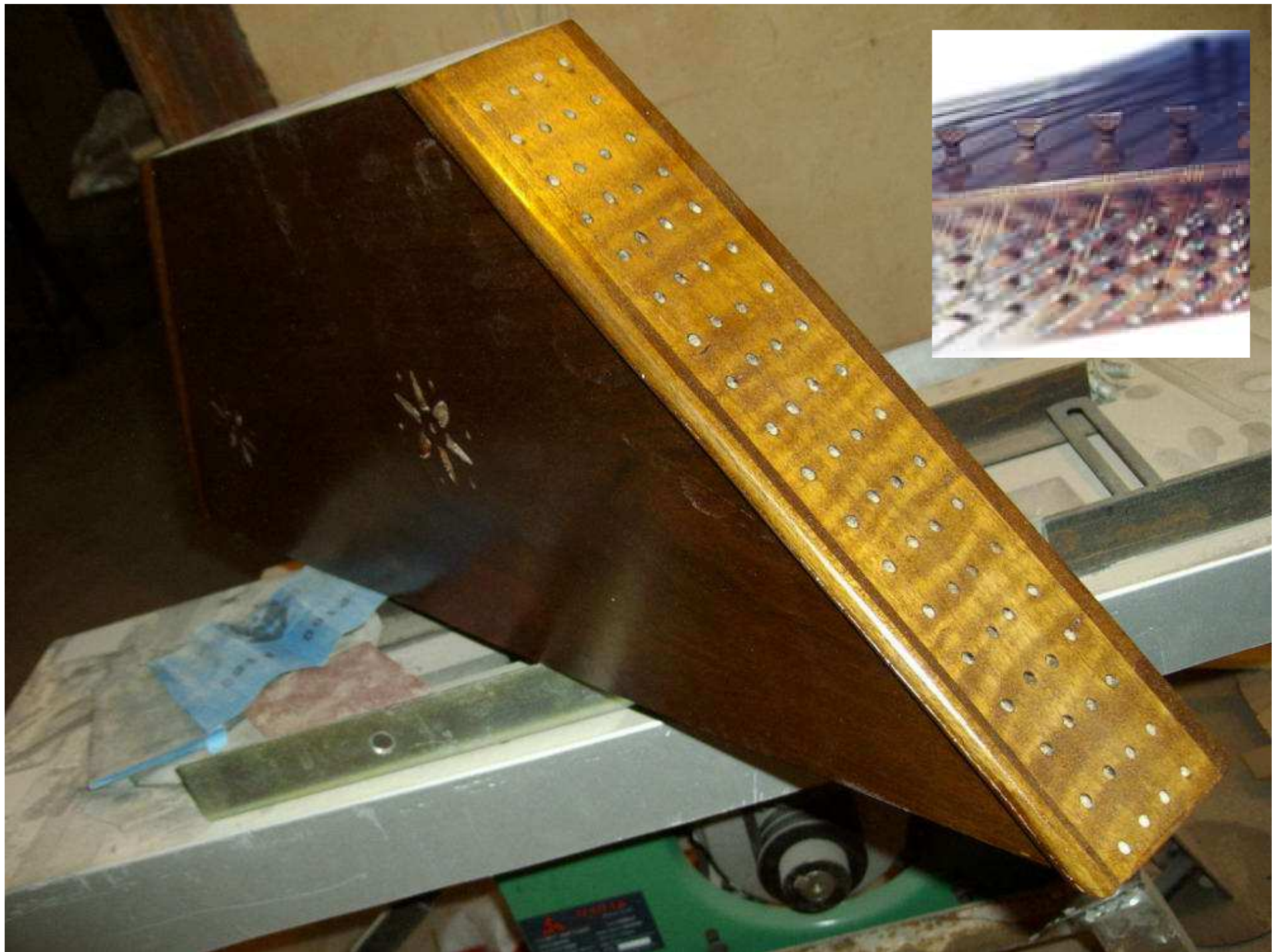




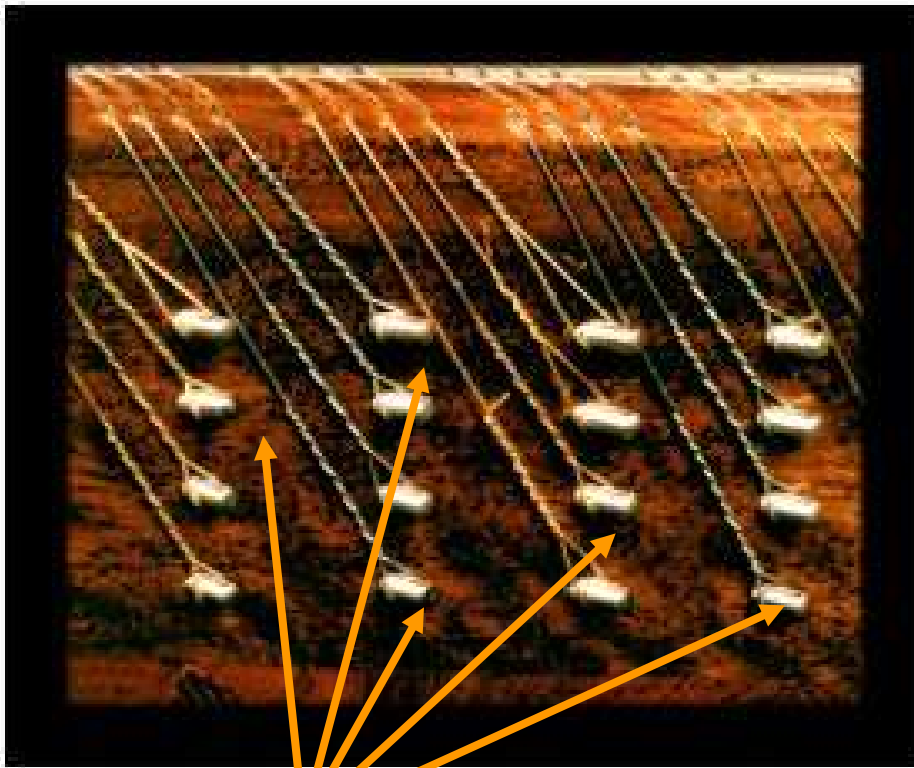
GLUEING LATERAL « SHAYTANAK » MAIN BRIDGES : glueing grooved strip on **geredu** wooden table. Insert detail (top left) shows off alternat section shape for side boards (MISSAGHIAN).



TIN FINISHER UPON THE « SHAYTANAK » : inserting a tin strip in the groove. According to VARZANDEH, the higher is the *Shaytanak* ($< 0,75''$), the easier is the tuning, by moving *Kharrak* bridges.



VARNISHING THE SANTUR



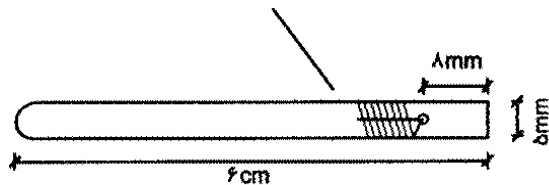
Left side : string holders are nails

شکل ۲۲

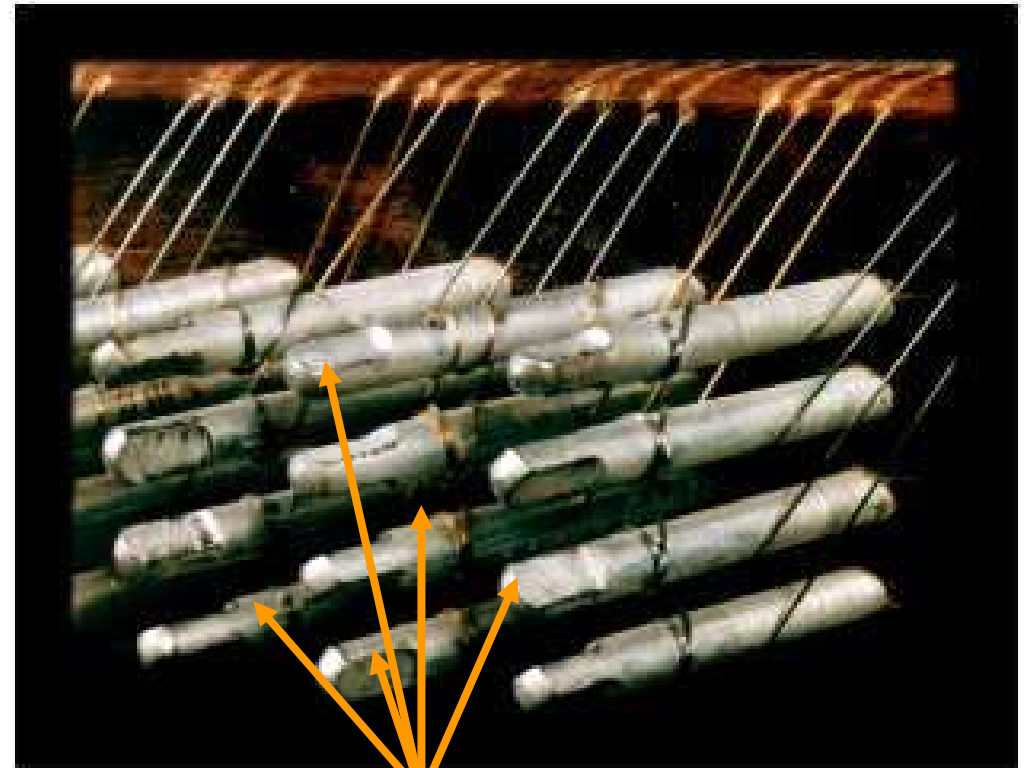


طرز سیم پیچی روی گوشه به حالت زنجیر وار

شکل ۲۳



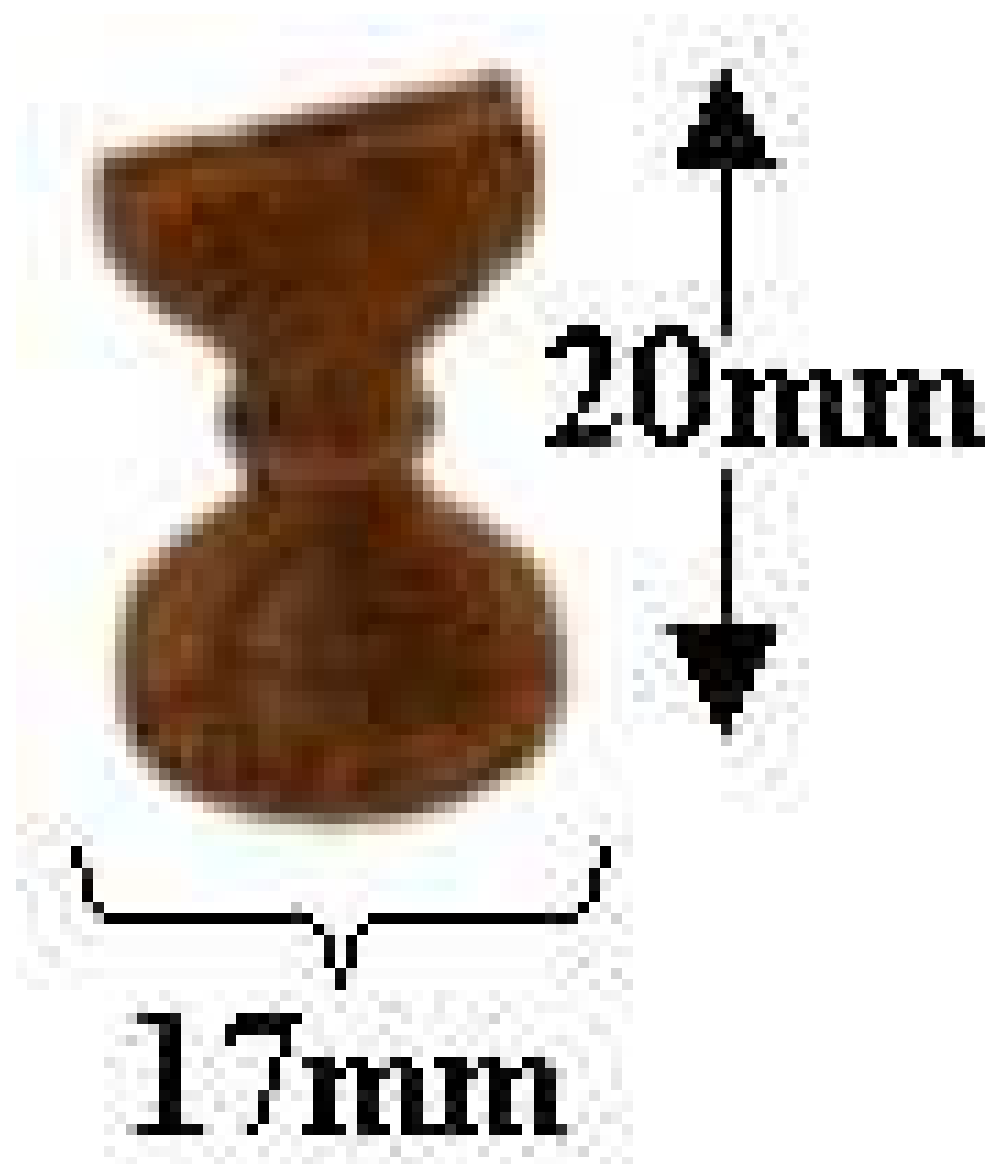
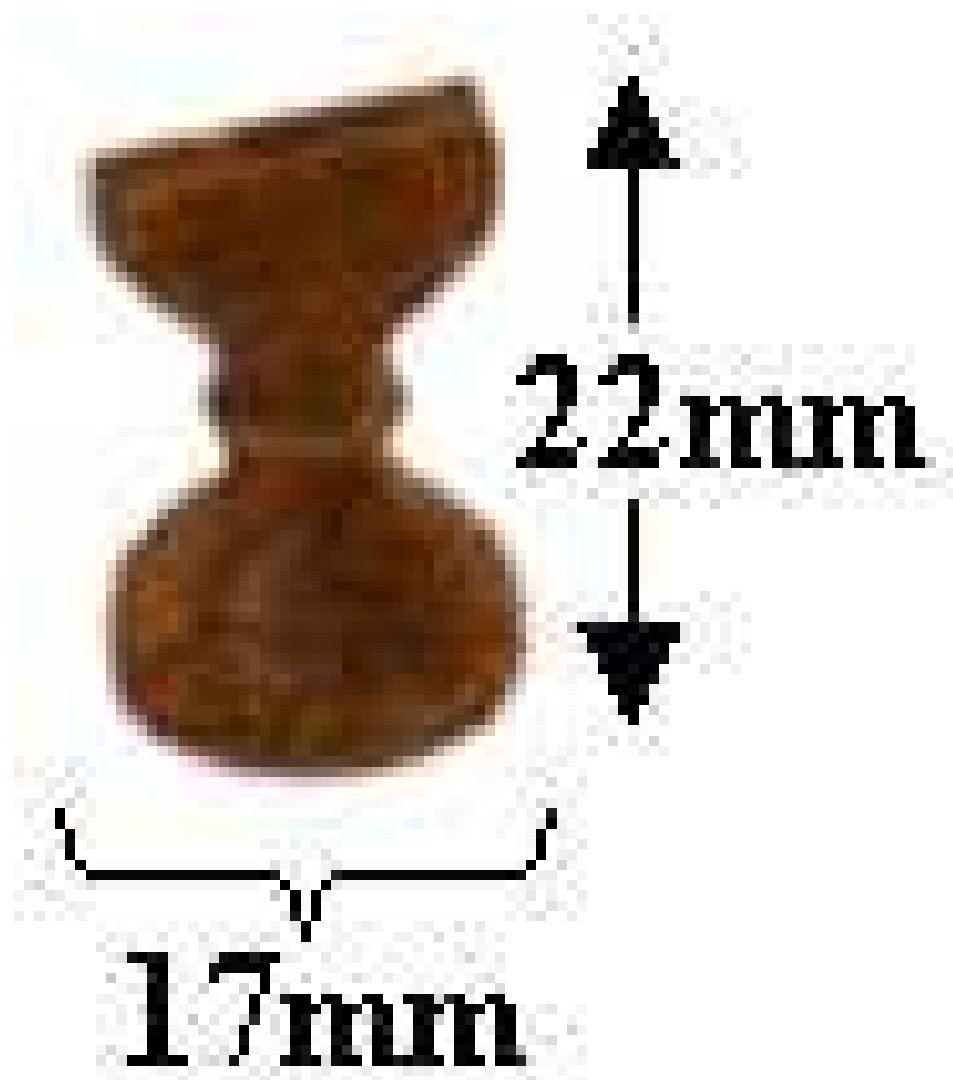
طرز سیم پیچی روی گوشه



Right side : molded pegs are named « gusheh » (an ambivalent persian word for « ears », « tunes », « listening »)

BOWERY : Strings are fitted on the instrument and set on *kharrah* bridges.

(pictures by REZAEI)



BOWERY : Molded *Kharrak* bridges : left row bridges (trebbles, 22 mm) are higher than right side row (bass, 20 mm).

(pictures by REZAEI)

B I B L I O ...

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