

REBUILDING THE PLAYER PIANO

Turn the pneumatic onto its other side, and do the same thing, as shown in Figure 15. Always remember to keep the cloth tight as it is laid onto the boards, as this will prevent any buckling or looseness at the corners of the pneumatic.

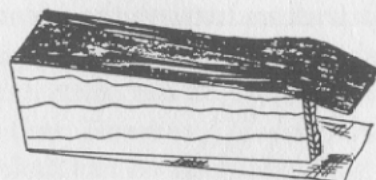


Fig. 15. The Third Step in Gluing a Pneumatic

Stand the pneumatic on end. If the cloth has been properly centered, the two portions which fold over onto the hinge end should be approximately equal.

Spread glue onto the hinge end of the pneumatic. Fold one end of the cloth down onto the board and press very lightly. Then lift this end back up off the board, and fold the other end down quickly. Press the second end down tightly onto the board—and then fold the first end over again and press it down firmly. In this way, the first end which is pressed onto the board picks up a supply of glue, and is then lifted off. The second end is then glued down; and the first end, which already has glue on it, is pressed on. This procedure eliminates the tedious and messy job of spreading the glue onto the cloth ends, and it is by far the fastest method of processing the hinge end of pneumatics of any type. Figure 16 shows the pneumatic after the cloth has been glued onto all four sides.

A word about application of the glue should be inserted

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here. If the repairman elects to use hot glue, he will, of course, apply it with a brush. However, if he employs any of the white glues, or other non-heated glue, he will experience difficulty in spreading an even layer on the pneumatics and



Fig. 16. The Fourth Step in Gluing a Pneumatic

other parts if he attempts to remain fastidiously clean. The best spreader for glue which has ever been discovered is the *finger*, pure and simple! No repairman has ever rebuilt a player action without getting his hands dirty; and whatever glue sticks to the fingers can be easily removed with hot water and soap.

When glue is applied to the edges of the stack pneumatics and other parts of the action, it should be spread evenly in a layer just thick enough to conceal the surface beneath it, yet not so thick that it will begin to form runs if the surface is raised to a vertical position. When the cloth is pressed onto the pneumatic boards, only a little glue should squeeze out from the joints. If no glue at all shows, probably an insufficient quantity is being used—and if the glue squeezes out in abundance, too much is being applied. Large pneumatics will require a somewhat thicker layer of glue. A little practice will enable the repairman to judge this as he applies the glue.

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After the pneumatics have been covered and have dried for at least an hour, they must be trimmed. This is done using a sharp scissors, preferably long-bladed ones which can trim an entire side of a pneumatic in one bite. Place the scissors such that the interior surface of one of the blades is flat against the wooden board of the pneumatic. Cut the cloth perfectly flush with the wood. Figure 17 illustrates the scissors position and the method of procedure. Trim all the edges on one board, then trim the other board, and proceed to do the entire set in this manner.

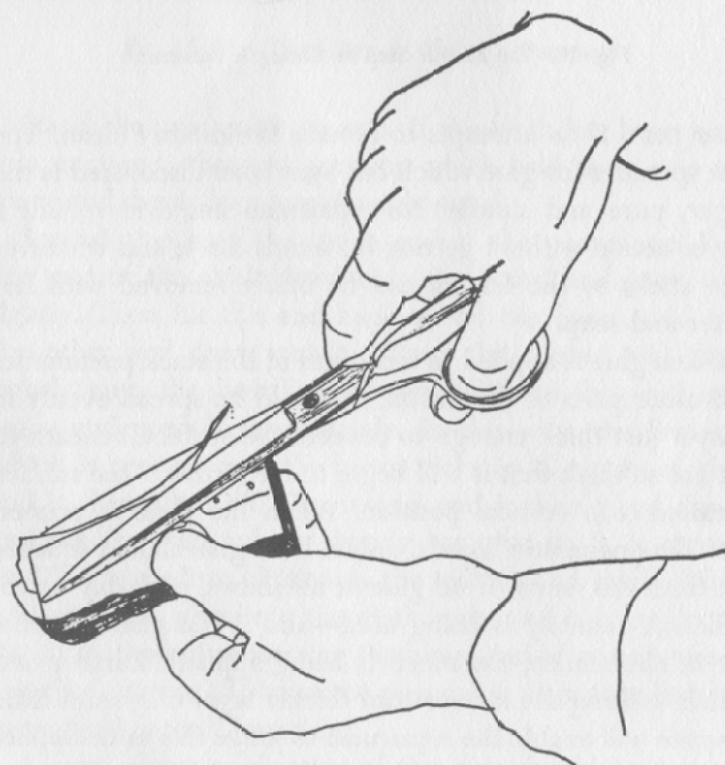


Fig. 17. Trimming a Pneumatic

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The pneumatics should then be creased. This is done by holding each pneumatic completely open, and placing the thumb and middle finger on the cloth near the open end. With the forefinger, press the cloth covering the open end

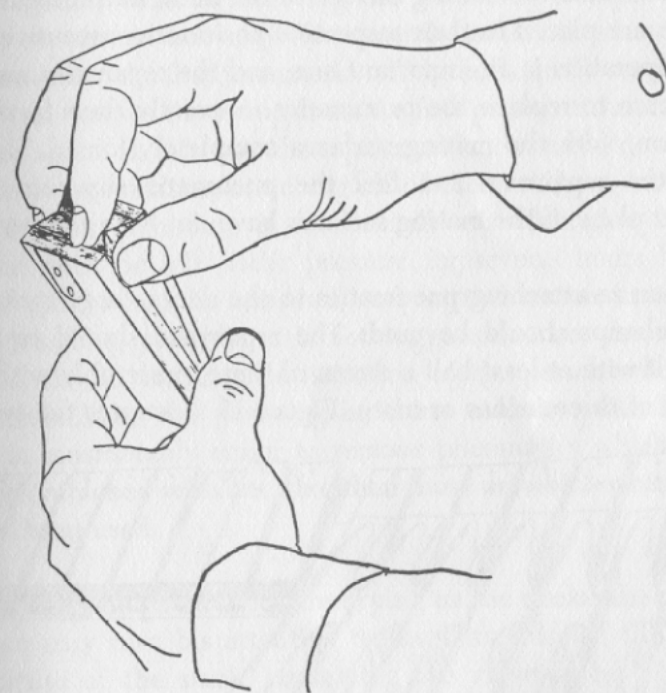


Fig. 18. Creasing a Pneumatic

of the pneumatic downward, back into the pneumatic, as shown in Figure 18. Keeping the cloth in this position, close the pneumatic and squeeze it tightly, which will impart a permanent crease to the cloth.

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The pneumatics are now ready to be glued back onto their respective decks. The pneumatics for a single deck are laid out on the workbench in their consecutive numbered or lettered order. The deck is also placed on the bench in front of the pneumatics in its proper position to receive them. Glue is spread onto the mating surface of the deck, and the pneumatics are placed in their respective positions consecutively. This operation is an important one, and the repairman must take care to replace the pneumatics in exactly their former position, with the mating surfaces completely joined. Usually, the repairman can feel the pneumatic slip into its proper place, if the mating surfaces have not been tampered with.

When re-attaching pneumatics to the decks, large spring-type clamps should be used. The repairman should equip himself with at least half a dozen of these, preferably with a throat of three inches or more. Figure 19 illustrates the type

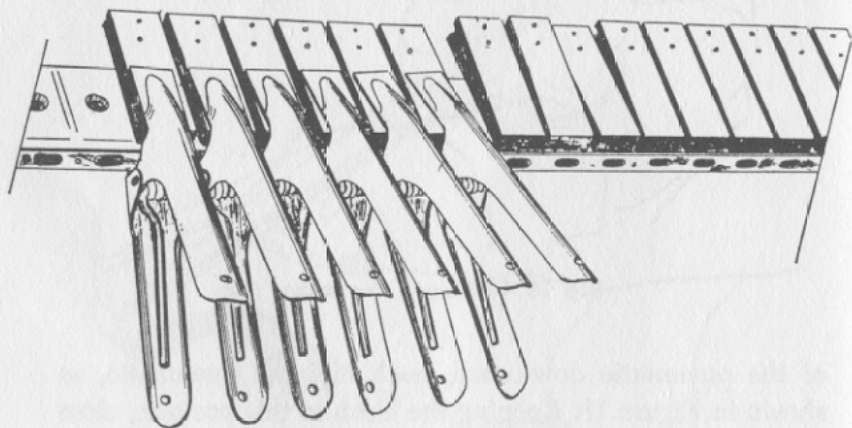


Fig. 19. Re-gluing Pneumatics to a Deck

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of clamp required. For re-attaching the pneumatics to their decks, hot glue should be used. After the glue has been applied to the deck and the pneumatic has been pressed into its position, a clamp should be quickly put on to hold the pneumatic under pressure. This should be done in consecutive order, without removing the preceding clamps. When the repairman has used his seventh or eighth clamp, the glue under the first pneumatic will be sufficiently set so that he can remove the clamp from the first pneumatic and use it over again. In this way the repairman can proceed down the line of pneumatics, attaching all of them without interruption. This procedure is usable only with hot glue. White glue must be left under pressure for several hours before the clamps may be removed, and for this reason its use for re-attaching pneumatics is not suggested. Also, the repairman should consider the situation of the person who may be rebuilding the piano again, thirty or forty years hence. It is considerably easier to remove pneumatics which have been attached with hot glue than those on which white glue has been used.

While the pneumatics are drying on the decks, the repairman may turn his attention to the remainder of the lower portion of the stack, containing the valves, pouches, and bleeds. Proper operation of these parts is essential to a well-running player piano.

Ideally, every valve in the pneumatic stack should be inspected and cleaned. Naturally, they must be removed from the stack for this operation. The location and positioning of the valves in player actions differs so widely from maker to

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maker that any generalization would be useless. The repairman must use his ingenuity in locating the valves and in determining how to remove them.

Figure 20 illustrates one fairly common method of valve positioning. The view shows the front side of the lower part

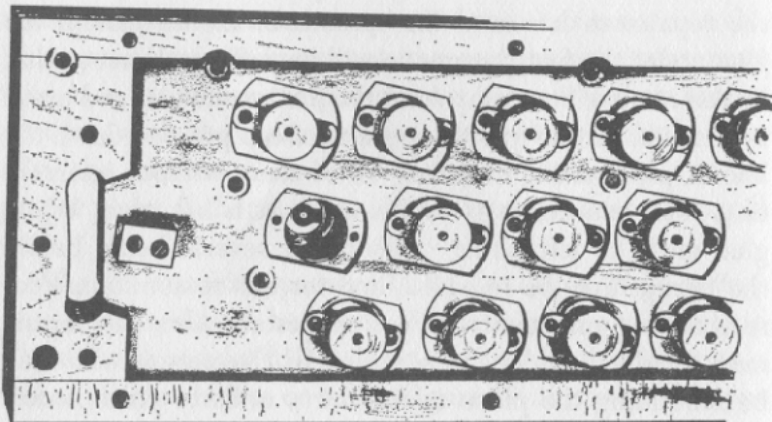


Fig. 20. A Valve Deck with One Valve Removed

of the stack with the long screwed-on pouch board removed. The valves in this type of action travel horizontally. They are removed by unscrewing the wood screws fastening the metal valve seat to the valve deck, and then slipping the valves out frontwards. One valve is shown removed from the stack. The wooden knobs on the front end of the valve

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stems merely prevent the pouches from being pierced by the end of the stems.

Figure 21 shows valves of the so called "unit block" type. These unit blocks, which contain the pouch, valve, and bleed, unscrew separately from the front of the pneumatic stack, which makes service on them quite easy. They are found in

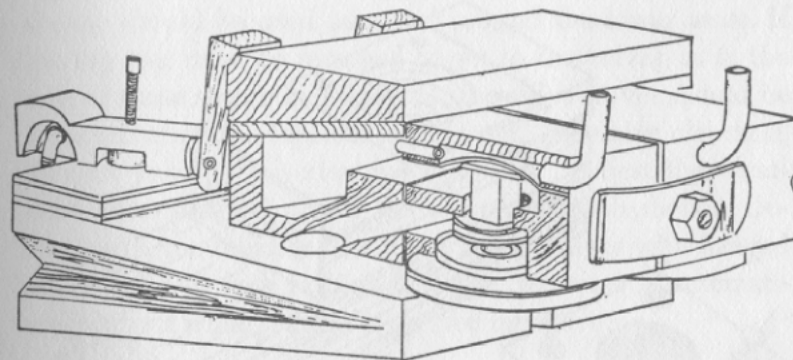


Fig. 21. The Unit-block Type of Valve, as Manufactured by the Amphion Action Company

both upright and inverted styles; the ones in the drawing, with the pouches above the valve, are of the inverted type.

Occasionally the pouches, valves, and bleeds are built into the top of the individual pneumatics. Figure 22 illustrates one of these. Some manufacturers built the valve-pouch-bleed assembly directly into the pneumatic decks. In any case, the repairman must examine the stack to determine the method of construction, and thus the method of removal, of the valves.

The valves should be removed one by one, and their fac-

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ing surfaces brushed with a stiff brush. An old toothbrush is ideal for this purpose. The valves must be replaced in the same units from which they came, so the repairman should remove only one at a time, clean it, and replace it. Every particle of dirt must be removed from the valve facings, and the seats should also be cleaned if necessary.

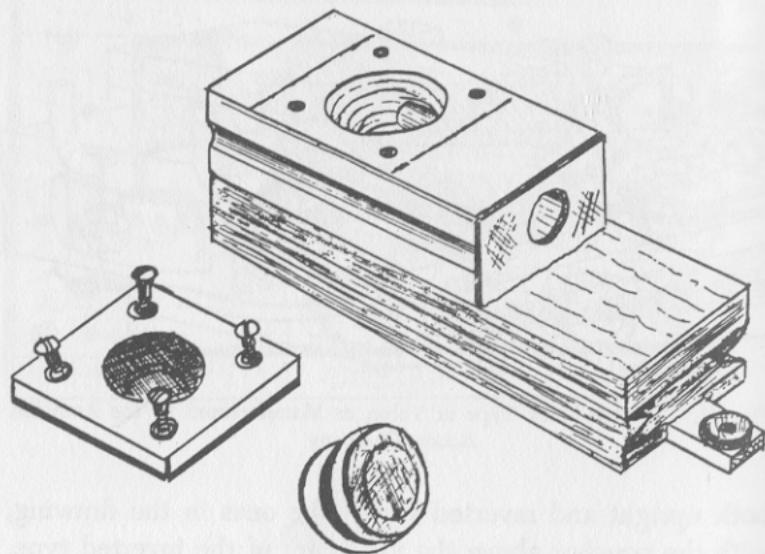


Fig. 22. A Unit Containing the Valve, Pouch, Bleed, and Pneumatic, with Valve Taken Out

If the leather valve facings have deteriorated and are rotten, this will evidence itself by the flaking off of powder from the leather when its surface is rubbed or brushed. In this case the facings must be replaced. In the case of the valves shown in Figure 20, the discs supporting the valve leather must be removed and new leather punchings in-

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serted. In the case of the valves shown in Figure 21, the valve stem must be removed, the top and bottom valve faces cleaned with sandpaper, new leather punchings glued to the faces, and the stem replaced with a drop of glue.

When replacing the valves in the stack, care should be taken to get the seal around the valve seats completely airtight. If the valves are the type shown in Figure 20, a little shellac should be used as a seal around the lower seats. If the top seat must be removed to get to the valves, as in the case of those shown in Figure 21, the valve travel should be adjusted when the top seat is replaced. The valve clearance in most pneumatic action valves is $\frac{1}{32}$ ". Adjust the clearance, then seal the rim of the valve seat with shellac. Occasionally, the repairman will run across valves with flanged seats, made in such fashion that the clearance is automatically correct when the seat is pressed into position.

The pouches are next on the list to be considered. Here again, as with the valves, a generalization as to pouch positioning in player actions is impossible due to the variety of manufacturers' practices. However, since the repairman has already located the valves in the stack, his task is made easier in locating the pouches—as they are positioned at the lower end of the valve stems, perpendicular to them.

Many manufacturers placed their pouches in large removable boards. The board shown in Figure 23, which happens to be the board which covers the valves shown in Figure 20, is such an item. Some makers, however, constructed their pneumatic stacks in such a way that they must be split apart to reach the pouches. The pouches in the valves shown in Figure 21 are located in the lower portion

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of the unit blocks, which must be broken apart to reach the pouches and bleeds (see Figure 24). Most players which are constructed with the valve, pouch, and bleed in the upper part of the pneumatic itself are difficult when it comes to pouch replacement. The pneumatic must be split apart (see Figure 25), the pouches replaced, and the pneumatic must then be glued back together.

Fortunately, the pouches in many player pianos are well

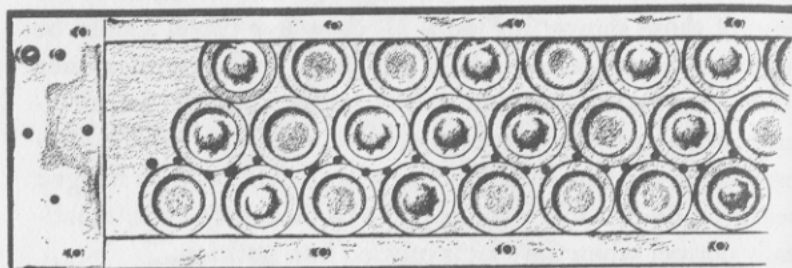


Fig. 23. A Pouch-board

preserved and not in need of replacement. Pouch leather will retain its life over long periods of time, if it is kept inside a box or other unit which prevents the circulation of atmospheric air around it. Players which have the pouches arranged in a single board, as shown in Figure 23, present no problem in checking and/or replacing pouches. The pouches should be felt with a light rotary motion of the finger, to determine whether the leather is still perfectly soft and flexible. Pouch leather which is in good condition should feel very smooth, pliable, and soft. No traces of stiffening should be evident. The repairman should inflate several of the pouches with a short length of tubing to his mouth, and should carefully watch the pouches' travel when

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inflated. The entire pouch should rise uniformly and smoothly, with no traces of crackling or stiffness in its motion.

Pouches which are not accessible can also be checked with a short length of tubing, through which the repairman

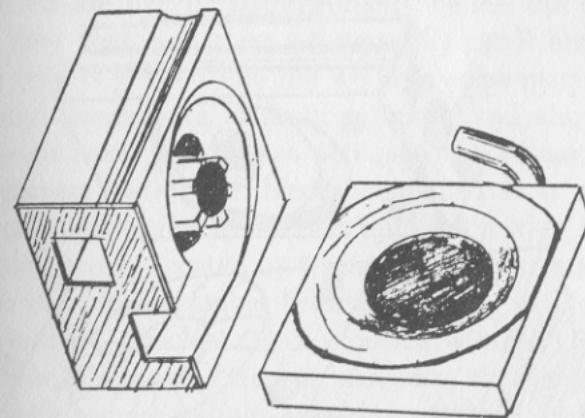


Fig. 24. A Unit-block Broken Apart to Show the Pouch. This is of the "upright" Type, with the Pouch Underneath the Valve.

can inflate the pouches. The action or unit blocks must be held such that the valves are in a vertical position, so that they can move freely. As the valves rise, carefully watch their motion. Any jerking or unevenness in their travel indicates stiff pouches. Any sort of crackling noise also spells trouble. No resistance to the rise of the valves should be noticed. The repairman should be able to hold the end of the tube several inches away from his mouth, blow on it, and watch the pouches and valves rise.

Occasionally piano manufacturers used very thin pneu-

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matic cloth for their pouches. In most cases, this has stiffened and should be replaced.

If the repairman determines that the pouches have deteriorated and need replacing, his job is made considerably easier if the pouches are mounted on a single board, as

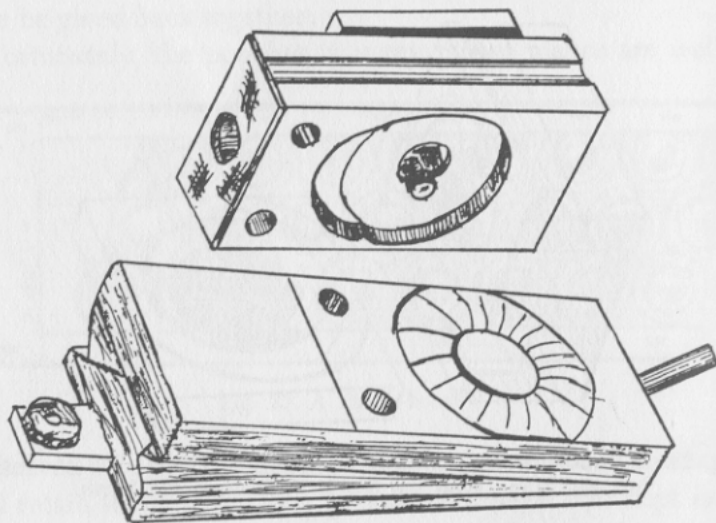


Fig. 25. The Unit Shown in Figure 22, Broken Apart to Show the Pouch

shown in Figure 23. In this case, after removing the fiber disc in the center of some pouches, the old leather is merely scraped off the board, which is then finish-cleaned with sandpaper and blown off with compressed air. Care should be taken to get all the dust and fine scraps of leather out of the crevices. If the pouches are of the inaccessible type, the individual blocks or other units must be broken apart using a mallet and putty-knife. The broken halves of the units

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must be kept together and not mixed up, as the two pieces must be replaced against their matching halves. Once the units have been broken apart, the leather is scraped off and the surface cleaned.

While the pouches are off the boards and the air passages are unobstructed, check the bleeds to see that they are clean. The bleeds are usually found directly beside the pouches which they vent, and they are generally small brass cup-shaped objects pressed into the wood in some manner. Occasionally bleeds were made of celluloid, and also of stiff paper—but most player piano actions contain brass bleeds. Some players have their bleeds contained in a separate chamber which is fed by suction from the supply bellows, and which can be located by tracing the tracker-bar tubing through this bleed chamber before the tubing makes its entrance into the pouch units. Run a fine wire through each bleed hole to clear dirt from it, and blow through it, preferably with compressed air. Also blow air through the holes under each pouch to remove dirt or dust which may be there.

The new pouch leather must be cut to the proper diameter. Measure the diameter of a pouch cavity, add $\frac{3}{8}$ " to it, and use this figure as the diameter of the new pouches. If the repairman has access to a lathe, an excellent pouch cutter may be made from a piece of scrap pipe of the proper diameter. Turn a sharp edge on the end of the pipe, and cut the leather with a rotary motion against end-grain wood. If no lathe is handy, the pouches can be cut by hand. In this case, a disc of the proper diameter is cut out of a piece of tin or other metal, and is used as a template around which the leather can be cut with scissors to a circular form.

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The pouches are applied as follows: spread a thin layer of glue around the edge of each pouch cavity from its rim to about $\frac{1}{4}$ " from its edge. See that the glue is spread completely evenly and not too thickly. Take care that all glue which runs over the rim into the cavity is removed, or the motion of the pouch will be impaired. Centering the pouch over the cavity, lay it into place, smooth side up, without pressing the edges down yet.

If the repairman has a lathe, he can make a very handy tool for imparting the proper amount of "dish" to the pouches. Using wood, metal, or any material which is available, he can turn a flat-rimmed cylindrical tool with a curved bottom (see Figure 26). The depth of the curve on the bottom of the tool's face is $\frac{1}{64}$ " less than the depth of the pouch cavity in the board. Using this tool, the proper amount of curvature may be uniformly produced in all the pouches,

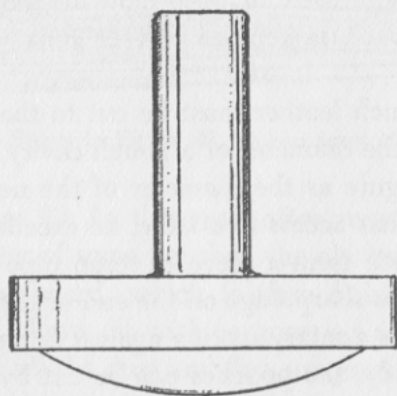


Fig. 26. Tool for Imparting the Proper "Dish" to Pouches

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and the rims of the pouches may be pressed against the glued surface of the pouch board.

If no lathe is handy to make a tool, the pouches can be "dished" by hand. After the pouch is laid gently onto the glued surface and centered, press the *center* of the pouch down lightly until it touches the wood beneath it. Holding the center down, smooth the edges of the pouch down and press them gently against the board with a motion away

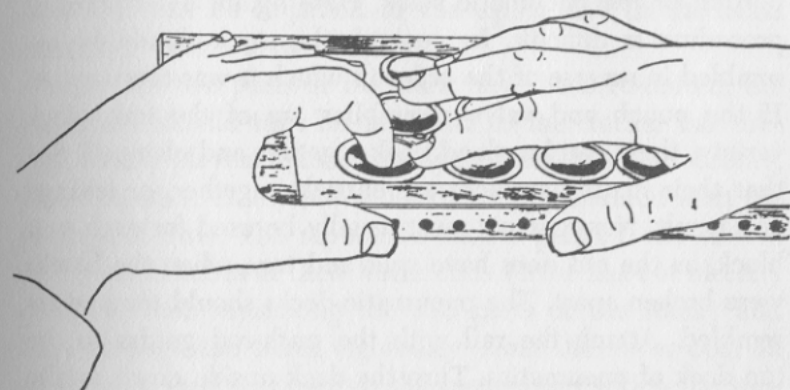


Fig. 27. "Dishing" Pouches by Hand

from the center, thus tending to draw the pouch snug (see Figure 27). See that no wrinkling or unevenness appears in the leather. If the pouch is held down in the center and the edges are smoothed down with the finger, a perfect job will result. With a little practice, the repairman will get the knack of this process. On multiple-pouch boards, the edges of adjacent pouches may overlap, but this will cause no trouble providing the overlap does not extend into the working portion of the neighboring pouches.