

REBUILDING THE PLAYER PIANO

both ends: naturally, these must be removed before lifting the action out of the piano. Occasionally pianos have supporting brackets which run from the top of the player action back to the iron frame, and these must be detached. Pianos which have an automatic sustaining pedal will be equipped with a tube leading from the spool box to the left end of the player action, thence to the bottom of the piano, and this should be disconnected.

The lower bellows may be removed from the piano by loosening the screws or bolts which hold the bellows in place, and by lifting the entire unit out of the bottom of the piano. Generally the control rod linkage must be disconnected before the unit can be removed. If the suction supply hose for the automatic sustaining pedal pneumatic runs directly from the bellows unit, it should be removed before the unit is lifted out. Different piano manufacturers varied the structure of their pianos greatly, and any general description of the methods of anchoring units in place or of placement of component parts would be virtually impossible.

All the "accessory" devices, such as the automatic sustaining pedal pneumatic, the expression pneumatics which operate sections of the hammer rail, and any other such mechanisms, should be removed from the piano at this time.

The reader may think it odd that the first step in doing the work on a player piano should involve not the player action, but the piano itself—yet this is indeed the case. This writer strongly recommends that as soon as the repairman has removed all the player mechanism from his piano, he should set the mechanism aside and turn his attention to

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the piano itself. It is an undeniable fact that any player is only as good as the *piano* in which it is installed. A perfectly-operating player mechanism cannot give satisfactory musical results if it is coupled to a piano which is in need of attention.

It is not the province of this book to attempt to instruct the repairman in making the necessary adjustments and repairs to the piano action and frame. Suffice it to say that the piano action should be carefully inspected for lost motion and wear in bushings, the hammer butts should be checked for clicking noises, looseness, and sloppy travel, and the backcheck and let-off adjustments should be regulated if necessary. Bridle straps should be replaced if they are worn or broken. All felt parts should be checked for moth damage. The hammers should be dressed, if necessary, to remove grooves cut in their felt by the strings. The sounding-board should be checked, and if it is badly cracked it should be repaired. The piano should be tuned while the player action is removed and the action and strings are accessible. If new bass strings are necessary to replace ones on which the windings have loosened, they should be installed at this time. If the player mechanic does not wish to do this work himself, a qualified piano technician can undertake this part of the job. But the fact should never be forgotten that unless the piano itself is in top condition, the repairman is wasting his time on the player action, for the musical results can only be unsatisfactory.

Figures 7 (a, b, and c) are included here merely for the purpose of giving the inexperienced repairman an opportunity to identify the parts of a piano action.

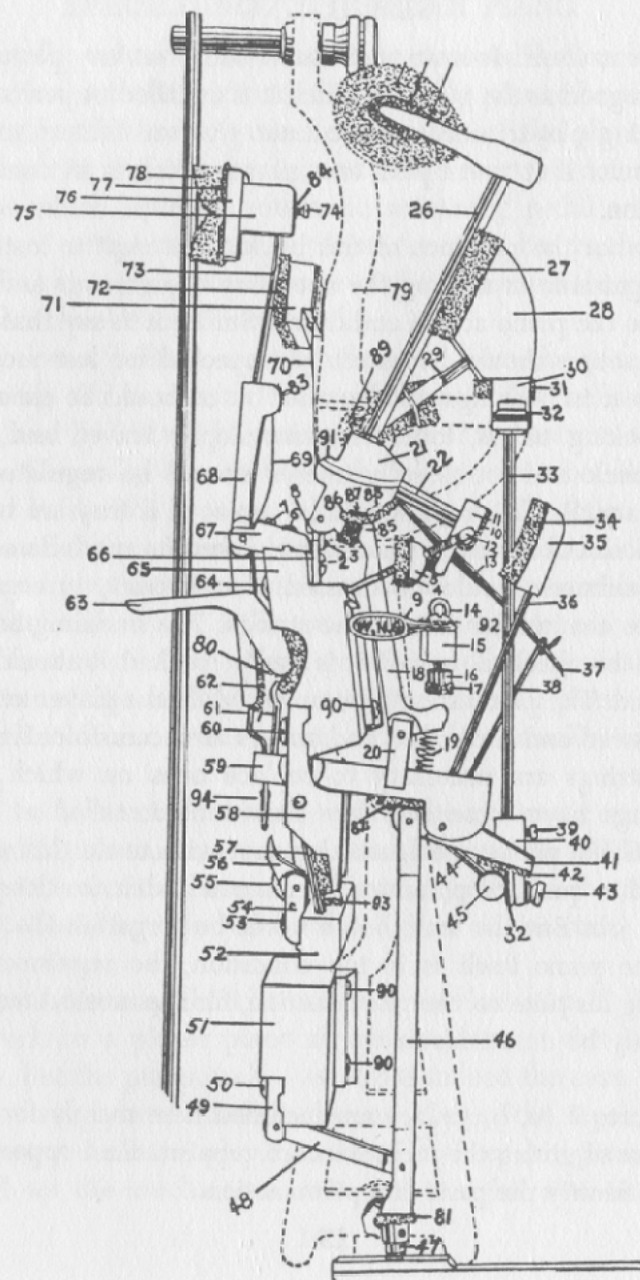


Fig. 7 (a)

DIAGRAM OF UPRIGHT PIANO ACTION

Sectional View

- | | |
|---|----------------------------------|
| 1 Upr. Spoon. | 24 Upr. Hammer Underfelt. |
| 2 Upr. Brass Flange Rail Screw. | 25 Upr. Hammer Head. |
| 3 Upr. Brass Rail Plate. | 26 Upr. Hammer Shank. |
| 4 Upr. Block Rail Felt. | 27 Upr. Hammer Rail Cloth. |
| 5 Upr. Block Rail. | 28 Upr. Hammer Rail. |
| 6 Upr. Damper Flange Screw. | 29 Upr. Hammer Rail Hook. |
| 7 Upr. Damper Spring Reg. Screw. | 30 Upr. L. M. P. Top Piece. |
| 8 Upr. Brass Rail Plate Screw. | 31 Upr. Hammer Rail Block Felt. |
| 9 Upr. Regulating Rail Bracket. | 32 Upr. L. M. P. Rubber Bushing. |
| 10 Upr. Butt Chack (Buckskin) Covering. | 33 Upr. L. M. P. Connecting Pin. |
| 11 Upr. Butt Check. | 34 Upr. Backcheck Felt. |
| 12 Upr. Right & Left Regulating Screw for Block Rail. | 35 Upr. Backcheck. |
| 13 Upr. Bridle. | 36 Upr. Backcheck Wire. |
| 14 Upr. Regulating Screw. | 37 Upr. Bridle Leather Tip. |
| 15 Upr. Regulating Rail. | 38 Upr. Bridle Wire. |
| 16 Upr. Regulating Button. | 39 Upr. L. M. P. Set Screw. |
| 17 Upr. Regulating Button Punchin. | 40 Upr. L. M. P. Bottom Pin. |
| 18 Upr. Jack. | 41 Upr. L. M. P. Lever. |
| 19 Upr. Jack Spring. | 42 Upr. L. M. P. Cloth. |
| 20 Upr. Jack Flange. | 43 Upr. L. M. P. Rod Screw. |
| 21 Upr. Butt | 44 Upr. L. M. P. Rod Hook. |
| 22 Upr. Butt Shank. | 45 Upr. L. M. P. Rod. |
| 23 Upr. Hammer Felt. | 46 Upr. Extension. |
| | 47 Upr. Capstan Screw. |
| | 48 Upr. Extension Guide. |
| | 49 Upr. Guide Flange. |

Fig. 7 (b)

50 Upr. Guide Flange Screw.	74 Upr. Damper Block Screw.
51 Upr. Extension Rall.	75 Upr. Damper Block.
52 Upr. Sostenuto Rall.	76 Upr. Bass Damper Plate.
53 Upr. Sostenuto Flange Screw	77 Upr. Damper Undercovering.
54 Upr. Sostenuto Flange.	78 Upr. Damper Felt.
55 Upr. Sostenuto Lever Spring.	79 Upr. Bracket.
56 Upr. Sostenuto Lever.	.80 Upr. Damper Rod Felt Cushion.
57 Upr. Sostenuto Rall Hook.	81 Upr. Extension Cloth.
58 Upr. Sostenuto Hook Flange.	82 Upr. L. M. P. Wippen Cloth.
59 Upr. Wippen.	83 Upr. Damper Lever Punching.
60 Upr. Wippen Flange Screw.	84 Upr. Brass Damper Block Studs.
61 Upr. Sostenuto Wire.	85 Upr. Butt Felt.
62 Upr. Damper Lever Cloth.	86 Upr. Butt Leather.
63 Upr. Damper Rod.	87 Upr. Butt (Scarlet) Undercovering Cloth.
64 Upr. Damper Rod Hinge.	88 Upr. Butt (White) Undercovering Cloth.
65 Upr. Main Rall.	89 Upr. Bracket Bushing Cloth.
66 Upr. Brass Rall.	90 Upr. Bracket Screw.
67 Upr. Damper Flange.	91 Upr. Butt Punching Cloth.
68 Upr. Damper Lever.	92 Upr. Regulating Bracket Punching Leather.
69 Upr. Damper Spring.	93 Upr. Sostenuto Lever Felt.
70 Upr. Spring Rall Spring.	94 Upr. Sostenuto Wire Cloth.
71 Upr. Spring Rall.	
72 Upr. Spring Rall Felt.	
73 Upr. Damper Wire.	

The action from which this diagram was made is a WESSELL, NICKEL & GROSS model.

Fig. 7 (c)

To be discussed at this point is the operation of overhauling and rebuilding the upper action, or pneumatic stack, of the player piano—probably the most important part of the entire job. The pneumatic stack contains delicate, precision parts. Unless these parts are handled and rebuilt with care, the results will be disappointing.

The first step in rebuilding the stack is separating it into

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its upper and lower parts. The stack is examined to see where the "break" is located, then separated. Usually the two parts separate at a point near the lower ends of the tubing which runs from the tracker bar into the action, just above the top row of pneumatics. On some actions, this tracker bar tubing may have to be detached at its lower ends before the parts will separate. Examination will determine this. Some ingenuity may be required, as manufacturers' practices varied to such an extent that it is impossible to give any general procedure for this operation.

When the two sections are apart, the upper half should be set aside and work on the pneumatics should be begun.

On many player actions, the decks to which the pneumatics are glued are fastened together by long screws which pass through the junction areas at the ends of the stack, or else by metal brackets outside the ends of the stack. On others, the decks are screwed onto a board which supports all the decks at once. In the latter case, access to the screws which hold the decks to the main board is gained by removing the screwed-on board on the front face of the stack. The screws are in the chamber beneath this board. Occasionally the decks are glued to the supporting board, and must be carefully worked off with a putty-knife and mallet. In any case, examination of the stack will enable the repairman to discover its structure.

Unscrew or otherwise loosen the decks from the supporting body, but do not attempt to remove them from their approximate position.

After all the decks have been loosened, turn the stack upside down, with the pneumatics facing you. Remove the screws from the individual pneumatics' push-rod brackets

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and break the brackets free from the bottom of the pneumatics (see Figure 8). Do the uppermost deck first, and after all the brackets have been detached from the pneumatics the deck will be free and can be lifted away from the remaining decks. Care should be taken to number or

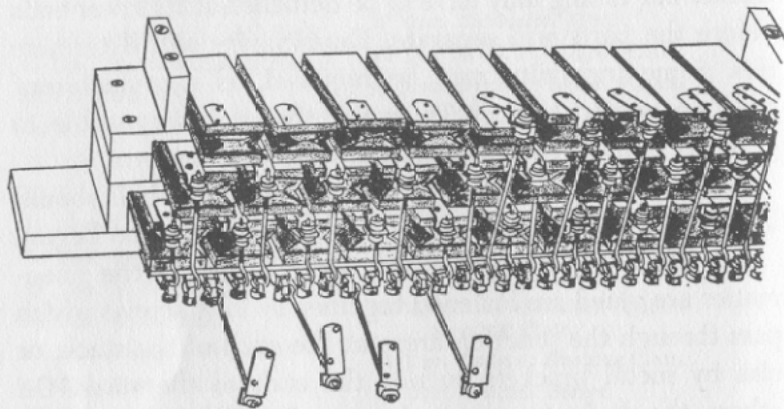


Fig. 8. Removal of Push-rod Brackets

otherwise identify the decks so that they can be replaced in their proper order when the action is reassembled.

Use the same procedure to free the remaining decks, and when the last deck is freed of its push-rods, the long rail holding the push-rod guides should be removed from the top side of the deck, if it is removable. The screws which hold the push-rod brackets to the pneumatics should be put in a small container and placed where they will not be disturbed.

The individual pneumatics should now be removed from the decks, in preparation for recovering them. With a soft pencil or ball-point pen, mark each pneumatic on each deck such that it can be replaced in its proper position when the

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decks are reassembled. Number or letter each pneumatic consecutively, using a different identification system for each deck, to prevent confusion later. Make a mark on the end of each deck to indicate where the identification system

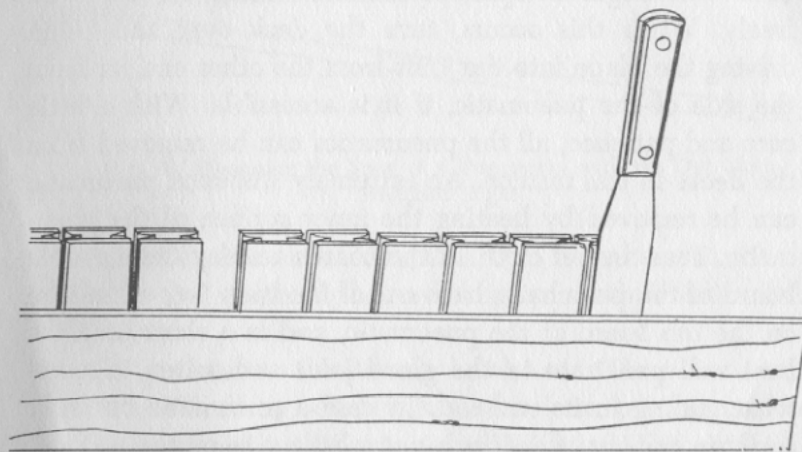


Fig. 9. Removal of Pneumatics from Deck

begins, to prevent replacing the pneumatics in reverse order during re-assembly.

After the marking is completed, the pneumatics should be removed from the decks. This is done by gently driving a thin putty-knife or other flat-bladed instrument between each pneumatic and the deck. Most pneumatics were originally attached to the decks with animal glue, which is brittle enough to make them removable without much damage. Stand the decks on edge on the workbench, and gently drive the blade into the point (see Figure 9). Be sure that the blade enters the joint completely parallel with the two mated surfaces, to prevent its digging into the wood. Use a

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wooden mallet or other non-metallic hammer, and be gentle. Most pneumatics will pop off the decks without trouble after a few taps of the mallet. Occasionally, however, pneumatics in which the wood grain runs at an angle with the deck will begin to split, rather than come off the deck freely. When this occurs, turn the deck over and begin driving the blade into the joint from the other end, or from the side of the pneumatic, if it is accessible. With a little care and patience, all the pneumatics can be removed from the decks in this fashion. An extremely stubborn pneumatic can be removed by heating the inner surface of the pneumatic. Tear the old cloth off the boards and lay the movable board of the pneumatic back out of the way. Lay a hot iron on the top board of the pneumatic, and in a short time the heat will penetrate to the glued joint and soften it somewhat, aiding in its removal. In case a pneumatic has split badly in coming off its deck, put a little glue on the surfaces of the split and secure it with a small clamp, taking care to wipe away all glue which squeezes out. The decks can now be set aside until the pneumatics have been re-covered. *Do not* plane or otherwise attempt to smooth off the surfaces of the decks from which the pneumatics have been removed. Leave them just as they are—for the pneumatics must later be glued back onto the decks in the exact position from which they were removed, and any disturbance of the mating surfaces of the deck or pneumatic will result in a weakened joint.

The span of the pneumatics should be measured and noted. With a ruler, measure the span of cloth covering the open end of one of the pneumatics, including the boards (see Figure 10). Be sure to stretch the pneumatic open to

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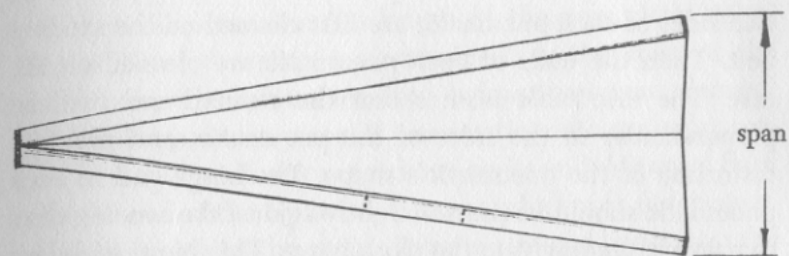


Fig. 10. Measuring the Span of a Pneumatic, with the Old Cloth Stretched Tight

its fullest extent while doing this. This measurement will determine the width of the new strips of cloth which will be glued on.

The pneumatics should now be cleaned. There are a number of methods by which this can be done, but for purposes of illustration the power sander will be used. This writer has found the sander to be by far the most satisfactory method.

If a combination disc and belt table sander is available, this is the ideal tool for cleaning the pneumatics. Figure 11

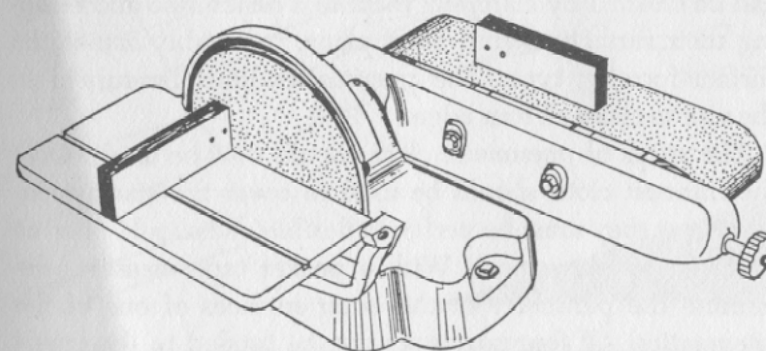


Fig. 11. Cleaning the Old Cloth from a Pneumatic

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illustrates the position of the pneumatics on the sander. The two sides of each pneumatic are first cleaned on the sanding belt. Then the ends of each pneumatic are cleaned on the disc. The disc table insures that the cleaned ends will be perpendicular to the sides of the pneumatic, and prevents distortion of the pneumatic's shape. The hinge end of each pneumatic should be pressed lightly against the sanding disc, to prevent sanding into the cloth hinge. This hinge end does not necessarily need to be cleaned down to the bare wood, as this might endanger the hinge. The other three sides, however, should be sanded down to clean wood. Coarse sandpaper should be used. The old pneumatic cloth does not need to be removed before cleaning, as the sandpaper will quickly cut through the dead cloth, and the folded piece in the interior of the pneumatic can be plucked out and discarded.

If a combination sander is not available, a separate disc sander or belt sander can be used, providing care is taken to sand the pneumatics' surfaces evenly and not to distort their shape. If no sander of any type is available, the pneumatics can be cleaned by clamping them in a bench vise and cleaning their surfaces with a hand plane, preferably one of the surface-forming type. The pneumatics must be turned in the vise to clean all four edges.

The strips of pneumatic cloth should now be made. Only the thinnest cloth should be used to cover the stack pneumatics, as they must be perfectly flexible and should offer no resistance to movement. With a pocket tape measure, determine the perimeter of the outer surfaces of one of the pneumatics. All four surfaces must be totaled to determine the perimeter. Add approximately a quarter of an inch

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for overlapping cloth at the hinge end of the pneumatics, and this will determine the length of the new cloth strips. The width of the strip is determined by the span of the pneumatics, which was measured before they were cleaned. Lay the large uncut piece of pneumatic cloth on a flat surface, and square off any raggedness on its end. Measure back from the end of the cloth the distance which was determined to be the length of the strips. Draw a straight line across the cloth parallel to its end, on the white side of the cloth. Then, cut the cloth along this line with sharp scissors. Figure 12 shows the pattern of the cloth. With the measuring tape or

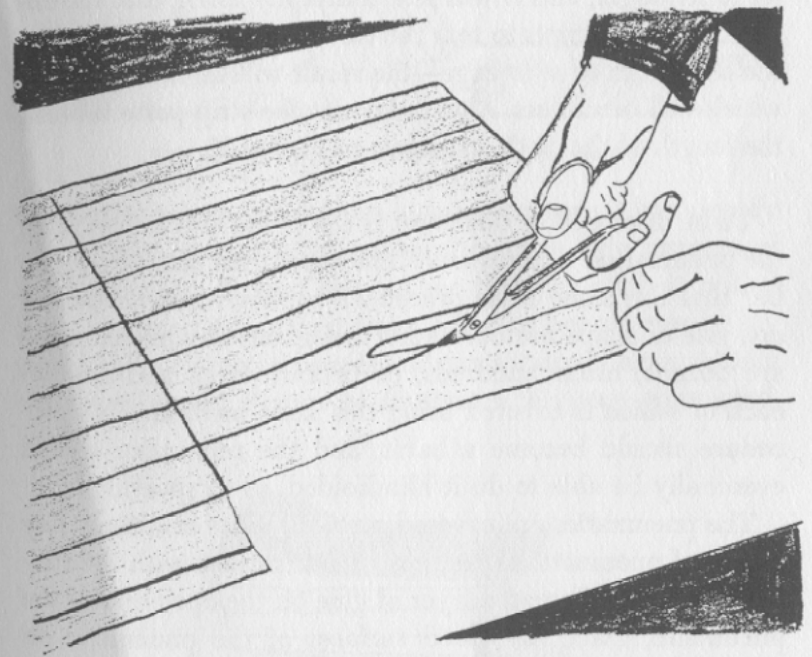


Fig. 12. Cutting Pneumatic Cloth into Strips. It may also be Torn to Size, as indicated in the Text.

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yardstick, measure along the cut edge and make a series of small pencil marks at intervals which mark the span of the pneumatics. Then, cut small nicks in the edge of the cloth at these marks. The pneumatic cloth can then be smoothly torn into strips, using the scissor nicks as "starters" for each strip. Repeat the above operation until enough strips to do the entire set of pneumatics have been made.

Pneumatic cloth strips can be torn, rather than cut, and this saves much time. However, it should always be remembered that the cloth can be torn only along its length as it comes from the supplier. The weave of the cloth runs parallel to its edges, and it will tear uniformly along that dimension. If one attempts to tear the cloth cross-wise—i. e., across the strip from edge to edge—the result will be crooked strips which will be useless. Always lay out the strip pattern along the length of the cloth, as shown in Figure 12.

To be discussed at this point is the procedure for covering the pneumatics. *Heed it well!* The repairman should remember that this same basic procedure applies when bellows of any size or shape are covered. Throughout any player piano are dozens, often hundreds, of bellows large and small—each of which is covered using this same method. This procedure should become a habit, and the repairman should eventually be able to do it blindfolded, so to speak.

The pneumatics are covered, naturally, one at a time. Lay a strip of pneumatic cloth on a smooth surface with the rubber side down. Spread a layer of glue on the open end of the pneumatic. Place the glued surfaces of the pneumatic on the edges of the center of the strip of cloth. Rock the pneumatic back and forth crosswise to press the entire surface of

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each board down tightly against the cloth—being careful, at the same time, not to shift the boards' position on the edges of the cloth. Figure 13 shows the position of the pneumatic when this step is completed.

Lay the pneumatic on one side, folding the lower side of the strip of cloth back underneath the pneumatic and pull-

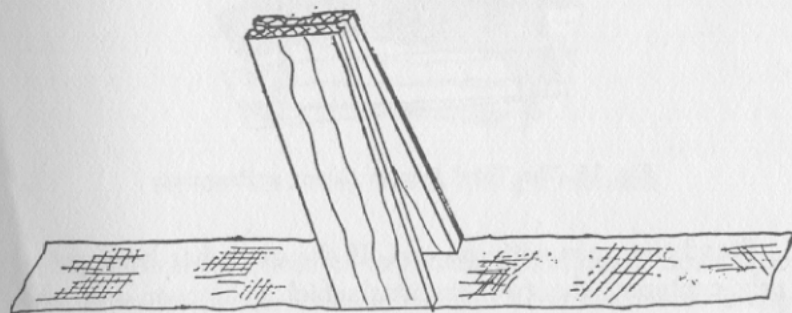


Fig. 13. The First Step in Gluing a Pneumatic

ing it snug to prevent it from loosening where it has already been glued. Spread glue on the uppermost side surfaces of the pneumatic. Taking care to see that the cloth is pulled tight to insure its coming down onto the boards evenly, lay the cloth down on the boards and press it firmly against them with the fingers. Figure 14 illustrates this step completed.

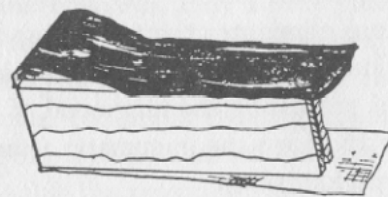


Fig. 14. The Second Step in Gluing a Pneumatic