

PLAYER & NOTES

BY

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"Air" - Atmospheric & Vacuum.

A player action is operated by reduced air. The atmospheric or heavy air, seeking a lower level rushes in when the reduced or vacuum air is let out through the exhaust bellows.

The atmospheric air enters the hole in the tracker bar through a perforation in the music roll.

After it enters the hole in the tracker bar it passes down through the tube connected with the tracker bar into the primary valve channel. When the air enters this channel the primary valve seat is closed to atmospheric air and opened to reduced air. After the atmospheric air enters the channel, the atmospheric air being heavier than the reduced air, inflates the primary valve pouch, pushes up the

primary valve seat to atmospheric air and closes to exhaust or reduced air.

The atmospheric air then rushes in the top opening of the primary down into the secondary valve channel.

The secondary valve seats at this time being closed to exhaust air & open to atmospheric air, the air in the valve channel inflates the secondary valve pouch, which in turn pushes up the secondary valve opens the seats to exhaust air & closes to atmospheric air, which opens the exhaust to the pneumatic.

The atmospheric or heavier air pressing against the out-side of the pneumatic causes the pneumatic to collapse and its air to be exhausted through the secondary valve chamber, into the windchest and down through the equalizer and exhaust bellows where it is let out through

- 3 -
flap valve

the palate or flap valve.

The flap or flap valve tracker bar again hole in closed to atmospheric air prevents the heavier air from getting into the primary valve channel, the air then being in the channel is taken out through the flaps causing the pouch to deflate again lowering the primary valve and closing its upper seat to atmospheric air which opens the channel to the pneumatic to atmospheric air and again inflates the pneumatic.

~ "Bottom Action." ~

To test Bottom Action - disconnect tube - also tube between tops and bottom action, place leather over openings in elbow. If there is no resistance when treading, it shows there is a leak.

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First tighten all screws that support exhauster & equalizer bellows. Check that the valves, tempo & scroll box, governor valve in governor pneumatic & silencer or speed valve are clear & properly seated. Replace all caps & screw tight. Examine all tubes connecting to exhaust in Bottom Action.

If leak is in exhauster or equalizer bellows, remove Bottom Action by removing necessary screws - tip treadle into pairs, lean top of action towards you, raise high enough to clear toe rail and then lift out.

~ "Leak in Top Action" ~

Before taking action out tighten up all screws in the pouch board and the L shape groove board and then try the instrument as in most cases it will only need

tightening. In case of further leak take action out!

1: Take off L-shape boards and main pouch to get full view of primary and secondary valves.

Take and try each secondary valve and see if they have $\frac{1}{16}$ " in travel. If too small push valve back against its back seat and turn stem to right.

If too much travel, push valve back against seat and turn stem to left.

In former types the wooden button which is screwed to the valve stem should come just even with straight edge. If they do not, hold the valve stem with a pair of pliers and draw the front valve up against the cup and turn wooden button up or down as the case may require.
In case secondary valve only

rests on one side of cups, use a pointed instrument such as needle or hat pin and while holding stem, ease front part of valve until all sides of valve rest on metal cups. The new design valve button should be regulated $\frac{1}{16}$ " higher than level of valve chest.

Tighten all screws on inside of chest which holds pneumatic shelves. There are large headed screws and there are three rows of them.

2 = Next take off spool box and primary valve boards.

While spool is disconnected clean out all dust out of tubing by blowing through holes of tracker bar with rubber tube. Also clean out all dust in the channels of primary action leading to pouches. Always blow from front of action as dust will be found back of patented sieves. Blow out each vent. Then clean primary boards with tube, turn same on back and

and gently raps it on bench to be sure all dirt is removed.

#4: Check that each primary valve has a $\frac{1}{32}$ " throw. If the punchings in the valves have become swollen take a little light hammer and tap under valve gently which will have a tendency to pack the leather again and give right throw.

#3: Look over pouches, if leather is stiff rub each pouch gently with finger and soften the leather.

#5: Examine the top buttons of valves to see that there is no dirt under valve and clean out dirt that may have gathered in the little grooves around the top button.

#6: Screw the primary action together.

#7: Examine leather nuts on pneumatic wires. Buttons should fit snugly on hinge extension, not too tight or the pneumatic will bind.

-8- -8-
#8 = Take secondary valve punch board, lay it on bench and examine each punch. If leather is stiff rub it with finger until punch touches bottom of punch hole.

#9 = Screw punch board on to body action. Don't over-turn screws.

#10 = Set action in pairs and screw in position.

#11 = Regulate flexible strikers. They lift the wipers. Take off the regulating rail and the strikers and capstan screw will be exposed to view.

Capstan screws should rest snugly against the underside of wiper. If they do not touch the wiper, turn the capstan screws up using a pointed tool to turn them but not so high as to raise the back check of pairs action. If the key bottom of pairs settles and capstan screws cannot be raised slip a piece of card board under each end of the action rest-blocks

so as to turn the capstan screws down.

#12 = Put back regulating rail. This rail is used as a stop or check on the pneumatic so that when same closes the pneumatic will not block the string.

#13 = Should the pneumatic seem to check while doing this, take a small rubber tube and blow in channel of punch board which will force the secondary valve to seat and keep the pneumatic from blocking when regulating striker. Set action in gears.

— "Bleeds" —

#1 = Bleeds are necessary to let out the air between the tracker bar and the punch when the hole in the tracker bar is again closed to atmospheric air.

#2 = If bleed is too large the ham-

men will only play against the rail.

#3: If bleed is too small the hammer will lay against the strings.

#4: The size of bleed is $\frac{1}{8}$ size of opening of hole in the tracker bar.

#5: To make a bleed smaller, take a piece of heavy steel wire large enough to fit snugly in the eye of the Bleed a little from the reverse side until the hole becomes the desired proportion.

#6: If it should be closed too much or too small, ream it out to required opening.

~ "Exhaust Bellows & Equalizer" ~

The Equalizers take the place of and do the work of the Exhaust Bellows while the Exhausters are closing.

If the spring in the Equalizer is too weak the playing would be uneven & jerky.

When there is a kick on the treadle the Exhauster flap called palate valve is leaking.

Equalizer acts like a shock ab-

sober bellows are covered with Rubberized cloth.

How to test Bellows & Equalizer
First remove Equalizer from wind-chest, carry one sq. ft. of packing medium leather and same amt. of pouch leather. Cover holes with packing leather leaving spring in Equalizer. Collapse Equalizer and if it opens up before 40 seconds, it shows a leakage. A good strong bellows should hold up from 60 to 75 seconds.

Exhaust bellows work in opposite directions - cover back - try and open it; if it opens hard it is tight; if it opens readily, it is leaking.

— "Hissing Sound When Note is Played" —

#1 = Pouch may be torn or loose.

#2 = Dirt may have lodged under

valve seat preventing it from seating correctly on atmospheric port.

#3 = May be due to a leaking or torn pneumatic.

#4 = When bleed is too large.

"Motor Governor"

The Governor is placed on wind-chest over Tempco valve box. It sustains a uniform air exhaust regardless of the tension applied through the treadle. Strong pedaling exhausts the air from the Governor pneumatic causing it to partly collapse and automatically moving knife valve across the holes in channel block thus ~~governing~~ governing the air that is being exhausted through the Motor and thereby keeping the proper exhaust equivalent at any set tempo.

The long outside Governor spring acts as a counter-balance, its tension

always seeking to reopen the ports under knife valve so that uniformity of exhaust is invariably maintained. The button or regulating screw is used as a bumper or stop to prevent a total collapse of the Governor pneumatic and incidentally a complete cut off of the air through the channels block which might occur were the Motor overloaded through undue friction.

To regulate the button screw so that Governor does not close knife valve completely, hold down the top side of governor pneumatic put indicator pointer at 130 and while operating the treadles in the usual way, adjust screw so that music roll travels the same as though pointer were at ten or one foot to the minute.

- "How to Regulate Motor Governor" -

- #1 = Check that the Motor, transmission, brakes and all parts are in place and properly adjusted.
- #2 = Open tempo valve to 80 or 90 then remove spring from Motor Governor;
- #3 = Pedal normally, turn regulating screw of Motor Governor to the left until Motor moves slowly.
- #4 = Replace spring and start to treadle. If the motor spring is too weak the motor will slow down on hard pumping. If the spring is too strong the motor will speed up on hard pedaling.

To regulate tension of spring unhook at bottom and turn to right to stiffen and to left to weaken.

- #5 = Set tempo valve so that motor creeps when the indicator is at 10. Set at 30 and if music slows up, the slot in tempo valve is too small and should be filled out a little.

#6 = Test at 50 and if it runs slow, then file slot out until it runs at right speed.

#7 = File out if running too slow and paste a thin strip of leather in valve opening if running too fast.

- "Trouble" Motor Governor -

#1 = Leaking pneumatic (holes)

#2 = Spring being too strong or weak.

#3 = Knife Valve being too tight or loose through spring.

#4 = Slides being warped.

#5 = Slides not regulated properly.

#6 = Timing of Governor to determine speed.

#7 = Buttons on regulating screw.

- "Glue And Shellac" -

Cold glue is called prepared or fish glue, and is used for plugging, putting on new pouches, new leather and any parts where

wood is against wood.

Hot glue is used for covering bellows and pneumatics - cannot use on metal. Never use Hot Glue where something must set.

Always use Cold Glue for patching.

Cold Glue should be thinned with vinegar.

Hot Glue should be thinned with hot water.

Shellac - Thick or brown shellac is used mostly against metal.

~~Never~~ Metal against wood - leather felt against metal.

Never use shellac on metal against wood or valve seats.

Thin shellac or white only is used for painting surfaces such as windchest or channel boards.

Stick shellac is used only for burning in purposes; E. Gony, White or mahogany.

Can also use a solution made of saw dust and glue - making a paste.

~ "Trouble - Hammers." ~

When two hammers strike side by side when either of the corresponding holes in tracker bar are open, the cause of the two notes speaking together is undoubtedly due to a leak between the two channels.

Tighten all screws around the affected notes, then trace from tracker bar to primary pouch and from there to secondary pouch.

~ "Hammers And Rail Dampers." ~

A hammer will remain up as long as the perforation in the paper roll covers the hole in the tracker bar. The dampers are raised from the strings by one of three devices -

- #1 = Mains-Pneumatic (Buttons)
- #2 = Auto-Pneumatic (Tracker)
- #3 = Mains-Mechanical (Levers)

- "Keys." -

#1- When a key remains down occasionally, the bleed of the affected note is clogged. Take a thin wire bent at one end and insert into the bleed to dislodge the dust. If that does not remedy the trouble, then test for leak around affected note.

#2- When keys rattle and notes are silent, examine leather note on wire of striking pneumatics. If note are stripped and loose on wire, replace with new buttons. Also examine primary and secondary valves to see that they have required play and proper throw.

- "Motor" -

The purpose of the Motor is to furnish the motive power to move the music roll over the tracker bar through the transmission.

Never use oil and grease on slide valves. Re-lubricate slides with

powdered graphite. I should have a trifle play endwise to the crank shaft. Leather buttons should not be screwed too tight.

To test if Motor is tight, disconnect the exhaust tube, disconnect sprocket chain, cover or block the opening over elbow, then try to revolve the motor in reverse. If it blocks the Motor is tight; but if you can turn the shaft the Motor leaks. If slides rattle or leak, they may be warped.

— "When Motor Runs Uneven^d Sluggish" —
 #1 = May be caused by a bind on the crank shaft either in the sprockets or in the bearings or the links tight on the shaft.

#2 = See if valve guide wires are tight against the side of the valve.

#3 = Valves may be warped or Motor may need re-facing.

#4 = Brake spring might have to

be straightened - or weakened - use no oil on brake but graphite with vaseline.

— "When Motor Crops ^{with} Tempos at Pause." —

- #1 = Tempos slide valve or scroll valve not covering their ports tightly.
- #2 = Slide valves may be warped.
- #3 = Dirt or glue on tempos slot plate.
- #4 = Leather on valves may be turned over wrinkled, loose or too hard.
- #5 = Glue or dirt may be under leather.
- #6 = Regulation screw may be turned in too far.

— "When Motor Speeds" —

- #1 = See that Re-wind slide valve seats tight.
- #2 = Dirt under knife valve.
- #3 = Regulating buttons may be turned out too far.
- #4 = Governor spring might be too strong.
- #5 = Re-wind slide valve may remain open or leak badly.

— "When Motor Slows Up" —

- #1: Top brake may have become gummed.
- #2: Brake may press too strongly in the wheel.
- #3: Transmission gearing and bearings of take up spool may need lubrication.
- #4: Motor may bind somewhere.
- #5: { See if } Motor from sprocket chain
Disconnect { and see if Motor runs ^{smoothly}

"Causes for Motor not running right" (Chain Off)"

- #1: Shaft slightly bent.
- #2: Valves leak.
- #3: Ridges on face of motor.
- #4: Valves not regulated right.
- #5: Motor not having proper slant.
- #6: Cloth hard.
- #7: Holes in cloth.
- #8: Loose pneumatic.
- #9: Rubbing of pneumatic.
- #10: Binding of arms.
- #11: Bind of shaft. #12: Binding slides

- "Lost Motion" -

If there is Lost Motion between the player and the piano action, it is best to raise it from its seat. Insert sufficient beneath the two ends of the action so as to bring the pneumatic hogs or fingers near to the wippen. Rescrew action to its bed and complete regulations by turning the Lost Motion screws up or down as required.

"Music Roll Buckles or Jumps on Tracker Bar"

#1: When roll is wound twice around spool the roll should be tight across tracker bar. If it is loose the brake needs tightening. Causes music roll to buckle.

#2: May be caused by large gear on end of take-up spool and the small gear with shaft which runs from the transmission through

chuk of spool box and meshur with the large gear may not be adjusted properly. If teeth of small gear have been worn down through improper meshing, replace it with a new shaft and pinion.

"Notes go to Strings and stay there as you start to Treadle may be caused"

#1= Leak in tube between tracker bar and pouches.

#2= Blend may be clogged.

#3= May be leak in pouch board.

#4= Music roll may buckle or warp.

#5= When two or more notes speak air may leak from one pouch to another.

"Notes speaking when Notes in Tracker are Closed"

#1= May be due to a leak in the tubes leading or leading } from tracker bar to pouches.

#2: Tubes may be loose when joined to tracker bar or the action.

#3: Dirt may be lodged under the valves which would prevent them from seating to exhaust.

"Notes Speaking On Re Roll" May be caused

#1: Gate valve may not seat properly due to dirt or glue underneath the leather.

#2: Slide valves (if any) may be warped.

#3: See that connections have not slipped along the wires.

— "Trouble" "Silent Notes" —

#1: Probably due to dirt in fluid.

#2: Tube leading from tracker bar clogged up.

#3: Examine wind trunk connecting top and bottom action.

#4: Examine action tube.

#5: Examine gate valve.

#6: Examine valves.

When Player is Choked Up & Get's No Response.

- #1 = Gate valve may not uncover ports sufficiently when re-roll is set to play.
- #2 = May be caused by hammer rails going up as soon as you start pumping which would be caused by a leak in the tubes leading from the buttons in key-board to the soloist pneumatics.
- #3 = Tubes may be disconnected - spring valve under button may not seat properly.

"When Player Slips"

See if secondary valves are seating properly.
See if pouches have shrunk.

"When Player Knocks"

- #1 = Pneumatics may need regulation.
- #2 = Examine felt on the bottom of

the wipers of piano action. Felt may be too thin and the friction of the capstan screws on striking fingers wear through to the wood.

#3: May be a hard surface under felt caused by glue soaking through by careless gluing.

- "When Player Does Not Accent Properly." -

#1: Examine pallets and inside pallets. Dirt or chips may have lodged there preventing them from seating properly.

#2: Lost Motion between player action and piano action.

- "Pneumatics" - {Voice in -

#1: Look at felt under the wipers of piano action

#2: See if capstan screws are tight.

- "When Pneumatics Do Not Collapse." -

#1: Primary and secondary valves may not seat properly.

#2: Pouches may have shrunk.

#3: Tubes between channel board and tracker bar may leak.

#4: Pneumatic cloth may be porous causing a leak.

- "Soloist Pneumatic" -

There are two - one in the treble and one in the bass.

Purpose is to bring hammer rail either in bass or treble or both, nearer to the strings causing a soft tone.

Operates same as Loud Pedal pneumatic with the exception that they are not connected to the tracker bar and operate only by buttons on key bed.

- "Loud Pedal or Sustaining Pneumatic" -

The purpose is to lift the dampers from the strings when loud playing is desired.

Is operated by pressing down

button on key bed allowing air to rush down through its tube, inflates pouch and raises valve opening to exhaust and causes pneumatic to collapse which lifts the dowel connected with the pneumatic and the damper rod lifting the entire line of dampers.

Is also connected to tracker bar and is operated through cut off valve in spool box.

When a puffing noise occurs like the escaping of air, regulate the valve by giving it less motion or travel or else by putting a piece of felt in the end channel opening (from out-side).

To regulate the bleed in the old style bellows there is a little screw underneath the valve box, this is to be turned in or out as the case requires to open or close the vent. On the later designs primary valve is $\frac{1}{32}$ " and secondary valve is $\frac{1}{16}$ "
 Check that vent or bleed is always clean.

When pneumatic does not raise dampers at all when playing - the spring on damper may be too heavy.

Regulating screw may need adjusting so pneumatic can collapse properly.

- "Slow Repetition Or Slow Response" -

- #1: Bleed may be clogged.
- #2: Dirt may have lodged under valve.
- #3: May be Lost Motion between player action and piano action.
- #4: Tracker tubes may be partly clogged with dirt or lint.
- #5: Examine metal ring and leathered side of valve seats and valve buttons for dirt.
- #6: See that seats are not wrinkled or defective.
- #7: Pouches may be shrunk.

- "Slow Or Heavy Rewind." -

- #1: May be caused by rewind valve not opening its port sufficiently.
- #2: Transmission gearing may

need lubrication.

#3: Motor may be binding.

#4: Gate valve may leak slightly but not enough to make notes speak.

~ "Transmission" ~

The purpose of the transmission is to transmit the motive power at the proper speed and proper direction for the moving of the music roll across the tracker bar - also for rewind.

See that transmission is kept clean and oiled occasionally.

Chain should never be stretched but should be loose. Can be regulated with idler spool.

Lubricate occasionally with oil the brake drum and shaft under clutches. Felt bushings should never be oiled.

Gears in mesh of the pinion teeth must line up with the teeth in the large gear attached to take-up spool, and be adjusted by

forcing the bracket for take-up spool up or down as the case requires.

Take up spool should be free and not binding.

When music roll is wound twice around spool and roll is not tight, the brake needs tightening.

— "Transmission Trouble" —

#1 = Brake being too tight or loose gummy.

#2 = Bushings being gummy or need lubrication.

#3 = Idler being tight or loose.

When pinion does not mesh with take up gear, bushing around shaft with the pinion where shaft goes through the right of the roll box has fallen out.

— "Valves Primary" —

To test Primary Valves, remove front strips or L-board - place

rubber tube over holes in tracker bar and see if there is sufficient play in primary buttons.

To regulate primary valves, remove primary section - Loosen primary button from stem by using small hammer and tapping tightly tops of valve. Get proper play by using gauge and reglue, using cold glue.

"Valve Secondary Removing Replacing Reg."

Find effected valves by counting holes in tracker bar from bass end.

Remove screws in fibre guide cups and with a pointed tool lift up from board.

Clean up thoroughly and after repairing valve replace same by coating under edge of cups with thick fish glue and screw on tight.

- "Regulating" -

Draw valve up close to cups and when in this position button should project $\frac{1}{16}$ " beyond the under edge of ~~cups with~~ straight edge which must be placed across the lining of valve board.

Hold stem of valve with small pointed pliers and screw button in or out as may be required to get the proper gauge.

Pouch should have depth of $\frac{1}{8}$ ".
Valve should have $\frac{3}{32}$ " space between cups and valve.

Solid valves must be regulated from the atmospheric seat.

Stem or screw valves must be regulated from the stem.

When regulating valve - valve buttons never rest against pouch.

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- "Primary And Secondary Valve Trouble" -

- #1 = Bleed being clogged.
- #2 = Stiff or shrunken youch.
- #3 = Cracked face board.
- #4 = Leaky youch or loose.
- #5 = Valve not seating properly.
- #6 = Loose or leaking sticking pneumatic.
- #7 = L-board not tight.
- #8 = Sticking valve stem.
- #9 = Valves not regulated properly.
- #10 = Leaky tube between tracker bar & youch.
- #11 = Leaky channel board.
- #12 = Swollen disc valve.
- #13 = Loose guides & bushings.
- #14 = Corroded valve seats.
- #15 = Swollen guides.
- #16 = Loose valve on stem.

- "Tempo Valve" -

Purpose is to regulate the speed of the Motor to any desired degree.

It is operated by a lever in key bed. which opens and closes the slot in Tempos box through which the air that is exhausted from the Motor, passes through to the Motor Governor when record is on play.

"Regulations" - See that all tempos levers in key bed, wind-chest and the one connecting tempos wire are at right angles to each other.

See that Tempos valve is in its correct position. Set tempos at 10. When setting at this point the vertical oblong hole in the Tempos slot should be completely exposed - the rest of slot should be closed.

— "Silencer Valve" —

Purpose is to silence notes while music roll moves over tracker bar.

Is operated by pressing down on button on key bed allowing

air to rush in through to its tube, inflates pouch, raises valve, closing port hole in windchest thereby cutting off top action and preventing pneumatics from playing.

- "Speed Valve" -

Purpose is to connect Motor direct with main exhaust allowing a larger escapement of air from motor thereby speeding up Motor operation in connection with re-roll and silencer valves.