The AMPICO

Reproducing Piano

INSPECTOR'S REFERENCE BOOK

Foreword

THIS book is for the purpose of giving the inspector a thorough understanding of the working principles of the AMPICO.

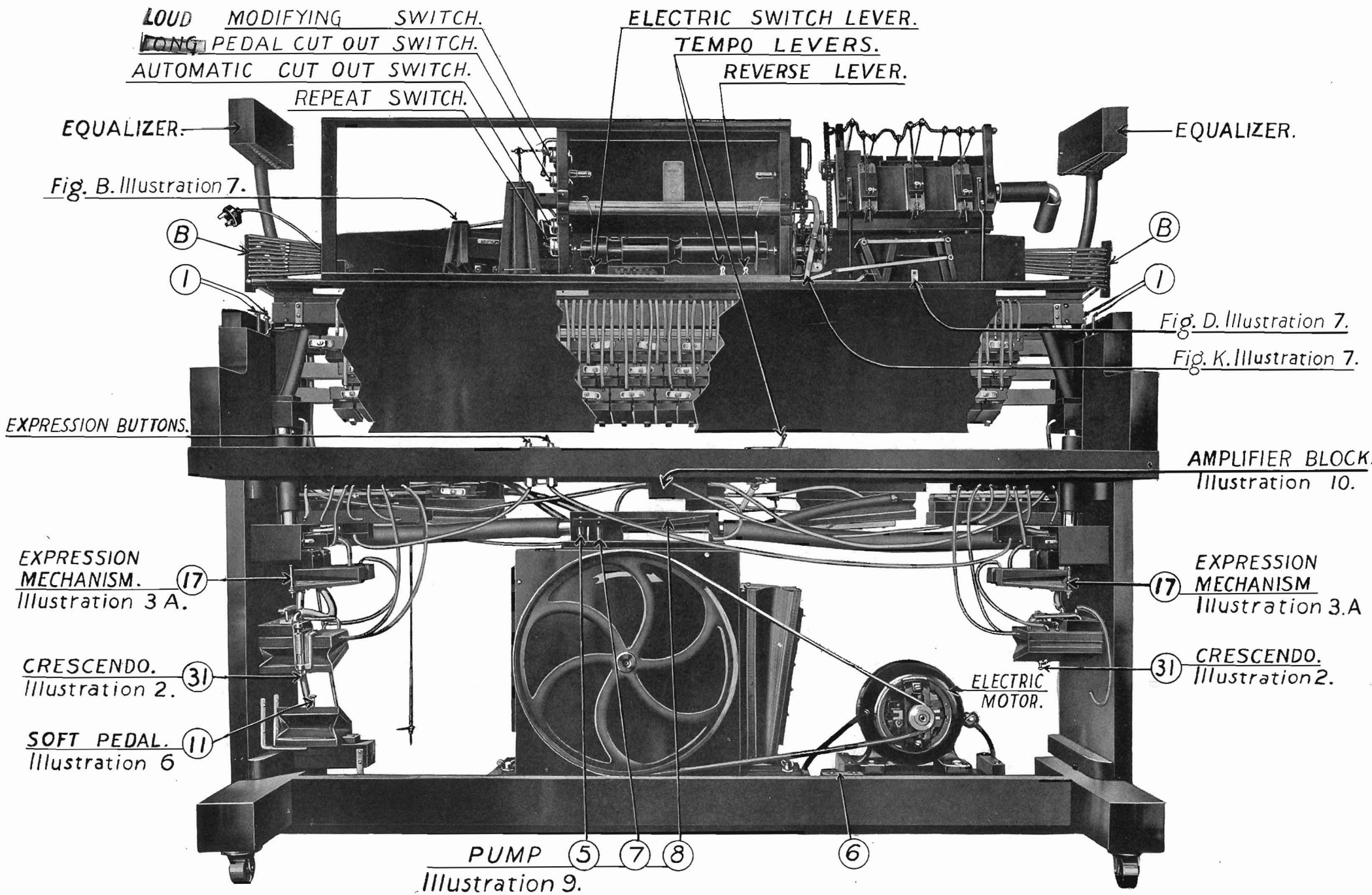
Most of the illustrations are made from photographs of actual installations which have been retouched to show clearly the arrangement of the channels, valves, etc.

The first part of the book is devoted to an explanation of the headings on the test roll which in itself gives sufficient information to enable an inspector to determine whether an instrument is in perfect order, or in need of adjustment or repair.

The second portion is a thorough explanation of the various mechanisms of the AMPICO. No attempt has been made to describe the player action as all repairmen and inspectors are of course thoroughly familiar with it.

All the explanations are based on the upright AMPICO, but apply equally well to the Grand, as both work on the same principle.

ISSUED BY THE SERVICE DEPARTMENT
OF THE
AMERICAN PIANO COMPANY
NEW YORK, U. S. A.



FRONT ASSEMBLY ILLUSTRATION

Testing and Adjusting the Ampico

READ AND STUDY THIS BOOK CAREFULLY AND MAKE NO ADJUSTMENTS UNTIL MECHANISM IS THOROUGHLY UNDERSTOOD.

OWING to differences of electric current in different localities it is sometimes necessary to change the electric motor of an instrument before it can be operated.

Before installing a new electric motor, inspect it and see that the grease cups are properly filled with grease and that the shaft bearings are properly lubricated.

Make certain that electric motor pulley is firmly screwed to shaft.

When installing an electric motor in a grand piano, be sure that the rods which support the motor are properly set in felt bushed blocks.

Make sure that there is no lost motion between the striking fingers and the whippens on Uprights, or striker puppets and keys on Grands.

Lubricate the transmission and driving chains. Extreme care should be taken at all times that no oil or grease get on rubber tubing.

Explanation of Test Roll Headings.

These headings are from test roll No. 61391 which is designed to be used in conjunction with the illustrations in this book.

HAVE YOU PUMPED OUT THE TRACKER BAR?

This should be done before attaching the roll to the take-up spool.

EXPRESSION CODE

BASS	TREBLE
1 — Slow Crescendo	1 — Slow Crescendo
2 — No. 2 Intensity Valve	2 — No. 2 Intensity Valve
3 — Loud Pedal	3 — Soft Pedal
4 — No. 4 Intensity Valve	4 — No. 4 Intensity Valve
5 — Fast Crescendo	5 — Fast Crescendo
6 — No. 6 Intensity Valve	6 — No. 6 Intensity Valve
7 — Cancel Valve	7 — Cancel Valve
	8 — Re-Roll

MODIFYING SWITCH AT BRILLIANT

Test for quietness in electric motor and pump. Test for leakage.

Listen for any noise from the electric motor, the pump, or other mechanisms and eliminate them if found.

MODIFYING SWITCH AT BRILLIANT

Test tracking device. Test automatic expression cut out. Then, with automatic "Off", test expression buttons.

Distance between tracker ears should be 11-1/4" plus 1/32" clearance. With roll on, both valves should be closed.

Turn automatic switch to "Off" position and Crescendoes should open, and hammer rail should drop back.

With automatic "OFF" run finger over chord on tracker bar. Repeat with finger expression buttons depressed. First chord should be SOFT — next should be LOUD.

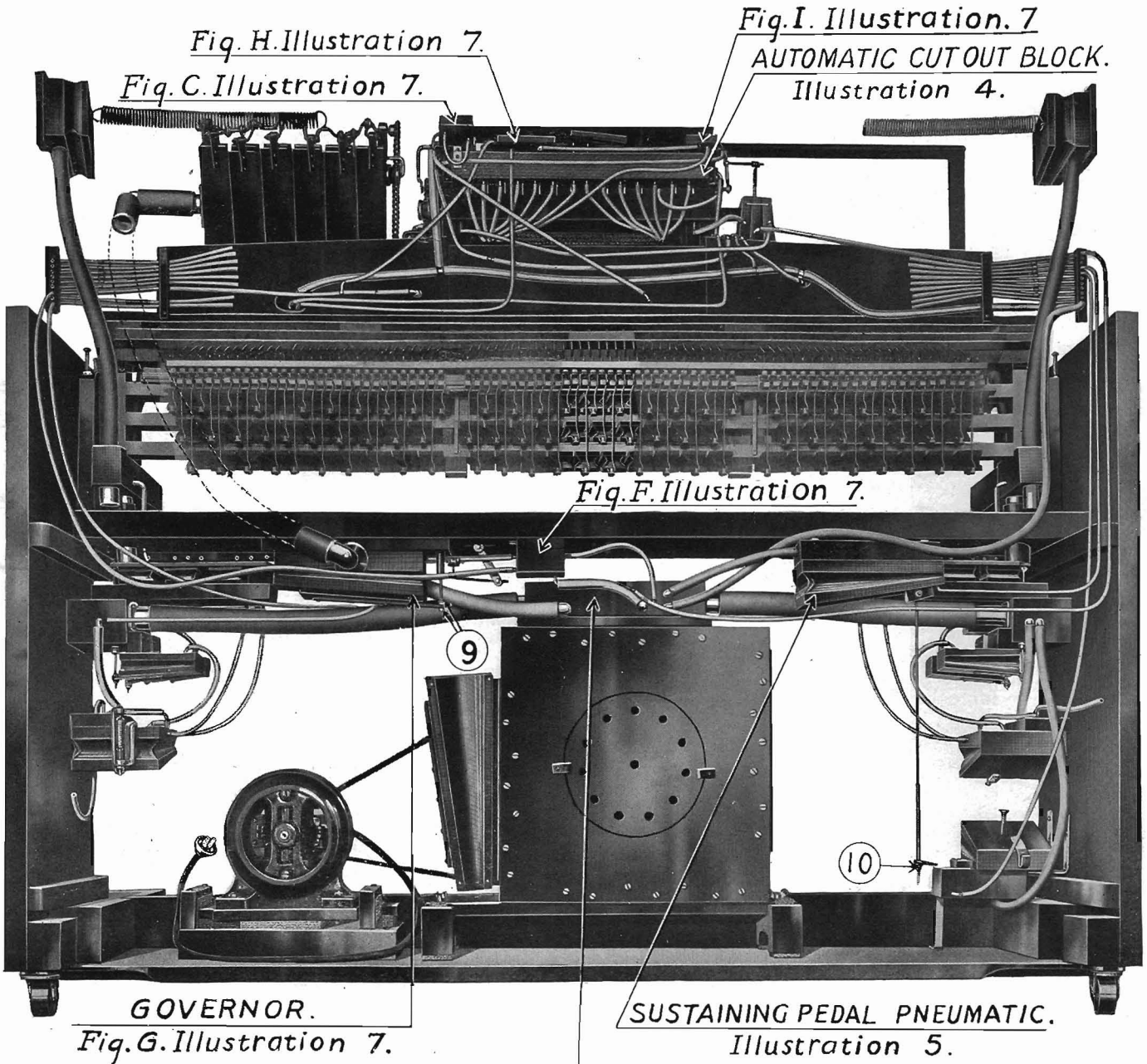
PUMP TENSION TEST

Automatic Expression On Modifying Switch at						
	SUBDUED	10" to 12"	ADJUST	17	FRONT	ASSEMBLY
	MEDIUM	20"	"	7	"	"
	BRILLIANT	27" to 30"	"	8	"	"

With a mercury or water gauge take readings at the tracker bar of the suction produced by the pump.

First with modifying switch at MEDIUM. Gauge reading should be 20".

Adjustment is made at No. 7, Front Assembly, which is the spill valve spring — turn spring up if reading is less than 20", down if more.



REAR ASSEMBLY ILLUSTRATION

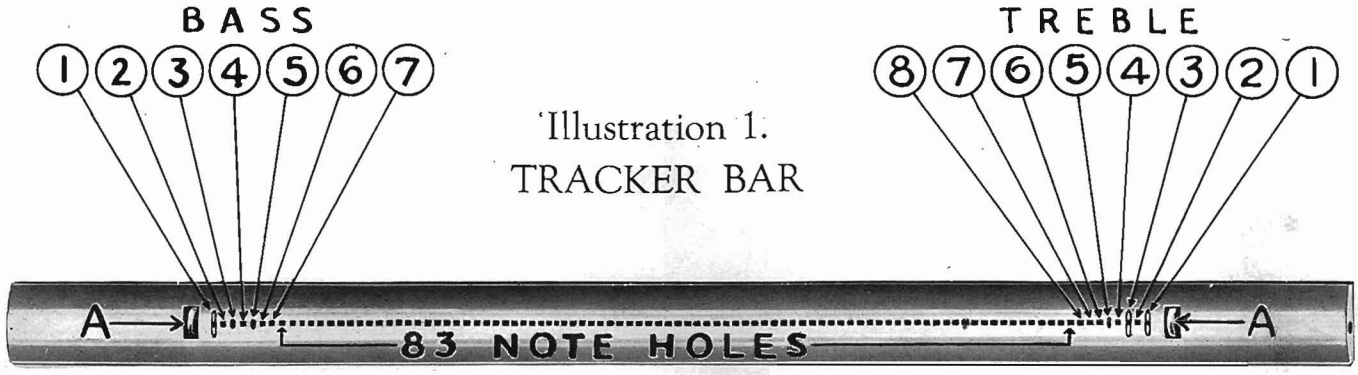


Illustration 1.
TRACKER BAR

BASS

1. Slow Crescendo
2. No. 2 Intensity Valve
3. Loud Pedal
4. No. 4 Intensity Valve
5. Fast Crescendo
6. No. 6 Intensity Valve
7. Cancel Valve

TREBLE

1. Slow Crescendo
2. No. 2 Intensity Valve
3. Soft Pedal
4. No. 4 Intensity Valve
5. Fast Crescendo
6. No. 6 Intensity Valve
7. Cancel Valve
8. Re-Roll

A. Tracker Ears

Numbers of holes start from treble and bass ends of tracker bar. Eighty-three holes are used for notes.

Explanation of Test Roll Headings—*Continued*

With modifying switch at SUBDUED. Gauge reading should be 10″ to 12″.

Take readings (and make adjustments if necessary) at BASS and TREBLE.

Adjustment is made at No. 17, Front Assembly, which is a nut under the spring in the re-regulating valve stem. Turn nut up if gauge reading is less than 10″ — turn nut down if gauge reading is more than 12″.

With modifying switch at BRILLIANT. Gauge reading should be 27″ to 30″.

Adjustment is made at No. 8, Front Assembly, which is a screw in top of amplifier pneumatic. Turn screw up if gauge shows less than 27″ — turn screw down if gauge reading shows more than 30″.

CAUTION: *Gauge Readings Must be Taken with Tube Vertical*

AMPLIFIER TEST

Modifying Switch Lever at Brilliant. Amplifier pneumatic should be partially closed. Make this test with roll running. Amplifier should be fully closed. No. 5, Front Assembly.

INTENSITY VALVES TEST

Modifying Switch at Medium. Valves should open at points indicated.

LOCK AND CANCEL TEST FOR INTENSITY VALVES

Valves should open with chord and close with single note.

TEST FOR SLOW CRESCENDO VALVE

Crescendoes should collapse slowly with operating hole open and should open slowly as hole is closed.

TEST FOR FAST CRESCENDO VALVES

Crescendoes should collapse quickly with operating holes open and should open quickly as holes close.

TEMPO TEST

Tempo lever at 60. Single note and chord alternate at distance of 6″. Music should travel from first chord to last chord in 60 seconds. Adjust No. 9, Rear Assembly.

This adjustment is a pair of nuts on the governor regulating wire. To increase the tempo turn nuts down — to decrease the tempo turn nuts up.

REPETITION TEST

At tempo of 70 notes should just repeat distinctly. Adjust No. 31, Front Assembly.

This adjustment is the No. 1 Intensity regulation. Increase tension of spring if gauge reading is below 5″. Decrease tension of spring if gauge reading is above 7″. "CAUTION" — Always adjust No. 1 Intensity as low as possible.

FIRST INTENSITY CHECK

Gauge reading. Bass and treble should be same.

SLOW CRESCENDO TIME TEST

Tempo lever at 60. Crescendo should start to close on first chord. Be fully closed by second and fully open by third chord.

FAST CRESCENDO TIME TEST

Tempo 60. Crescendo should start to close on first chord. Be fully closed by second and fully open by third chord.

PEDAL TEST

Loud and Soft. Test loud pedal cut out switch. Adjust No. 10, Rear Assembly — adjust No. 11, Front Assembly.

Dampers should rise until about ⅛″ from strings.

Hammers should rise until about 1″ from strings.

Adjustment No. 11, Front Assembly. Turn screw up if more than 1″ from string — down if less.

TEST RE-ROLL AND REPEAT

Repeat switch at "on."

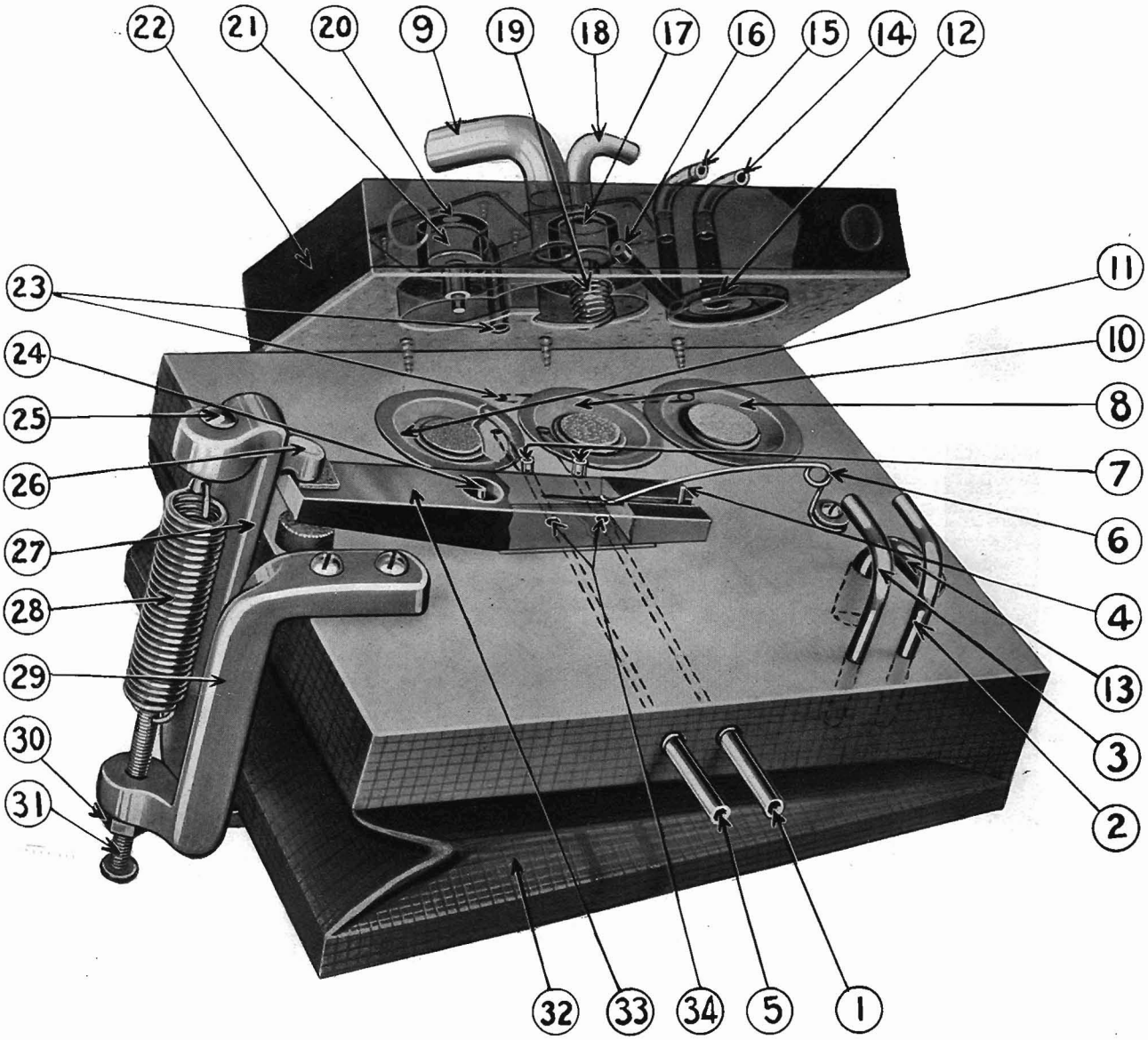


Illustration 2. CRESCENDO

Reference to Illustration No. 2

1. Connection to No. 1 hole in tracker bar thru expression cut out block.
2. Fast connection to crescendo pneumatic.
3. Slow connection to crescendo pneumatic.
4. Pallet valve quide pin.
5. Connection to No. 5 hole in tracker bar thru expression cut out block.
6. Pallet valve spring.
7. Bleeds.
8. By-pass pouch.
9. Supply tube.
10. Slow crescendo pouch.
11. Fast crescendo pouch.
12. By-pass pouch seat.
13. Connection to spring pneumatic.
14. Connection from by-pass chamber to crescendo pneumatic.
15. Slow crescendo time bleed.
16. Fast crescendo time bleed.
17. Slow crescendo valve.
18. Atmosphere port muffler tube.
19. Slow crescendo coil spring.
20. Atmosphere port for fast crescendo valve.
21. Fast crescendo valve.
22. Crescendo valve block.
23. Channel to underside of by-pass pouch.
24. Pallet valve center pin.
25. Crescendo spring swivel.
26. Bracket hook.
27. Movable bracket.
28. Crescendo spring.
29. Stationary bracket.
30. Lock nut.
31. Crescendo spring regulating screw.
32. Crescendo pneumatic.
33. Pallet valve.
34. Ports on the pallet valve to No. 1 and No. 5 Channels.

Crescendo and Spring Pneumatics

The spring pneumatic No. 23, Illustration 3A, is connected by means of a rubber tube at No. 13 to tube No. 13 in the crescendo pneumatic, Illustration 2. The suction in both pneumatics is, therefore, the same. Suction in the spring pneumatic causes up pull on the regulator valve. Gradual increase of suction in the crescendo pneumatic will, therefore, cause gradual increase of up pull on the regulator valve, causing it to rise from its seat gradually and producing a crescendo effect.

A slow crescendo is obtained by opening No. 1 hole in tracker bar. This allows atmosphere to pass through No. 1 connection in crescendo, Illustration 2, raising pouch No. 10. This in turn raises regulating valve No. 17, shutting off the atmosphere coming through muffler tube No. 18 and allowing suction to pass through fast adjustment No. 16 and through slow adjustment No. 15, through tube No. 3 from crescendo pneumatic and slowly collapsing same.

A slow decrescendo is obtained by closing No. 1 hole in tracker and atmosphere is admitted through mechanism as explained above and allows crescendo to open slowly.

A fast crescendo is obtained by opening the No. 1 and No. 5 holes in tracker. Now, as well as the action taking place as explained for slow crescendo, atmosphere passes through No. 5 channel, inflating pouch No. 11, raising fast crescendo valve No. 21, shutting off atmosphere to channel No. 23, causing by-pass pouch No. 8 to drop away from its upper seat No. 12. This allows suction coming from slow crescendo valve chamber to pass through fast time bleed No. 16 and by-pass around slow adjustment No. 15, and pass through channels No. 14 and No. 2 from crescendo pneumatic, thereby collapsing same quickly.

A fast decrescendo is obtained by closing No. 1 hole in tracker and leaving No. 5 open, admitting atmosphere to mechanism as explained above and allowing crescendo to open quickly.

As the crescendo pneumatic collapses, the tension on spring No. 28 increases. This increases the suction inside of crescendo pneumatic No. 32. This pneumatic is connected by means of a rubber tube on No. 13 to the spring pneumatic No. 23, Illustration 3A. Therefore, the suction in the spring pneumatic is gradually increased as the crescendo collapses. This causes a gradual increase of up pull on the regulator valve No. 20, Illustration 3A, which produces the crescendo effects by gradually increasing suction in main action.

The pouches No. 10 and No. 11 are connected by means of channels No. 34 under a pallet valve No. 33, which is operated by a hook No. 26 connected on bracket No. 27 on movable board of crescendo pneumatic No. 32. The hook No. 26 is of such length that it engages the pallet valve No. 33 just before the crescendo pneumatic No. 32 becomes fully distended. The crescendo pneumatic No. 32 is pulled open by the spring No. 28 which is adjustable. This adjustment is for the purpose of setting the No. 1 intensity to the proper loudness.

When the crescendo pneumatic is open nearly to its full extent, the hook No. 26, Illustration 2, engages the pallet valve No. 33 and raises it, thereby admitting atmosphere to port No. 34 (connected with channel No. 1) and under slow crescendo pouch No. 10 and raising valve No. 17. As soon as the crescendo pneumatic begins to close on account of the slow crescendo valve No. 17 being raised, the hook No. 26 allows the pallet valve No. 33 to close and the valve No. 17 again seats itself. The slow crescendo valve No. 17 actually floats between its upper and lower seats, mixing just enough atmosphere from above it with suction from below to produce the right degree of tension on the suction in the crescendo pneumatic to counteract the spring No. 28.

If there is a sudden demand for suction, caused for instance by the playing of a big chord, there will be a perceptible movement of the regulating valve No. 20, Illustration 3A, and likewise the spring pneumatic No. 23, Illustration 3A, will close a little and the crescendo pneumatic open somewhat, thereby lifting the pallet valve No. 33 away from its seat further than normal. The channel No. 34 from the fast crescendo pouch is located nearer the fulcrum of the pallet valve so that it does not open effectively until after the other hole No. 34 is wide open. When this sudden demand takes place not only is the latter hole opened wide enough to cause the slow crescendo valve No. 17 to go up against its upper seat, but the fast crescendo port No. 34 in also opened, which causes fast crescendo valve No. 21 to rise, thereby admitting suction to the by-pass pouch No. 8, drawing this pouch away from its seat, which allows crescendo pneumatic to return to its normal position very quickly, so that normal conditions are almost instantly restored.

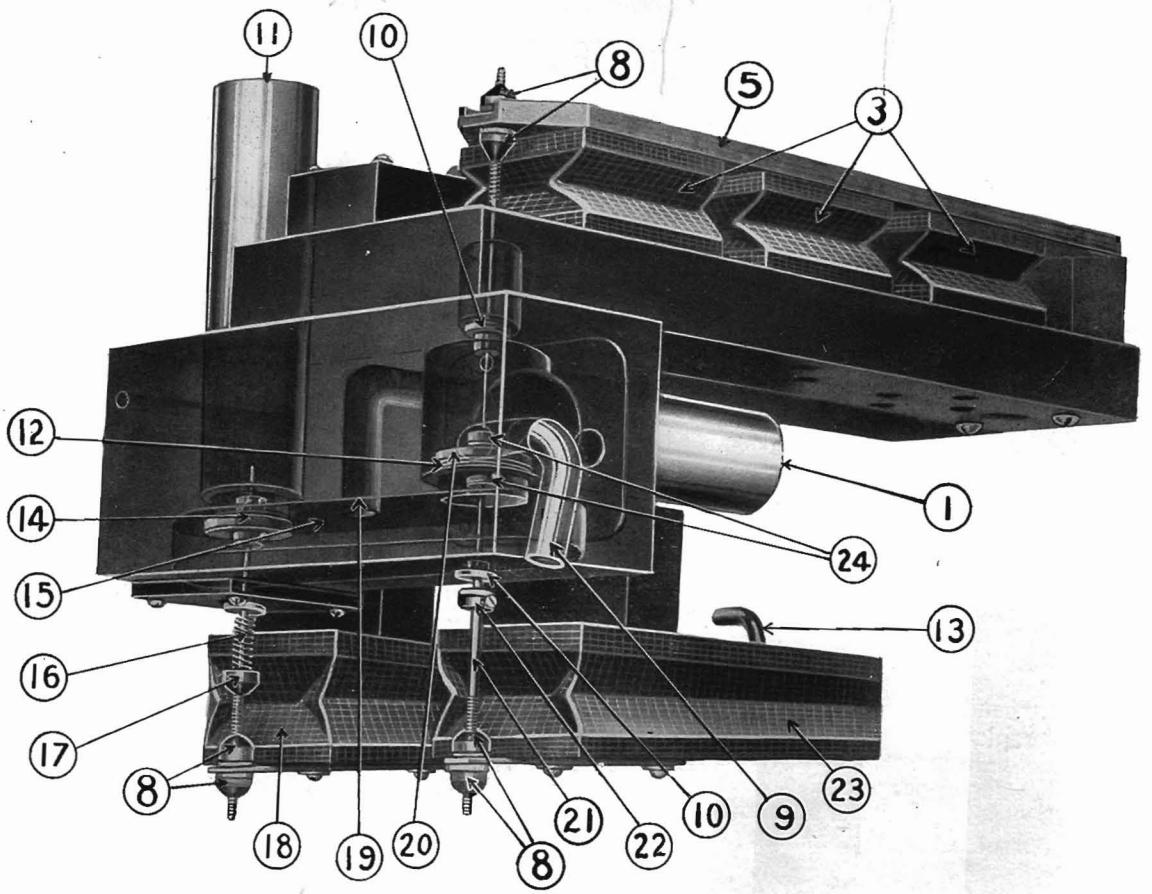


Illustration 3A

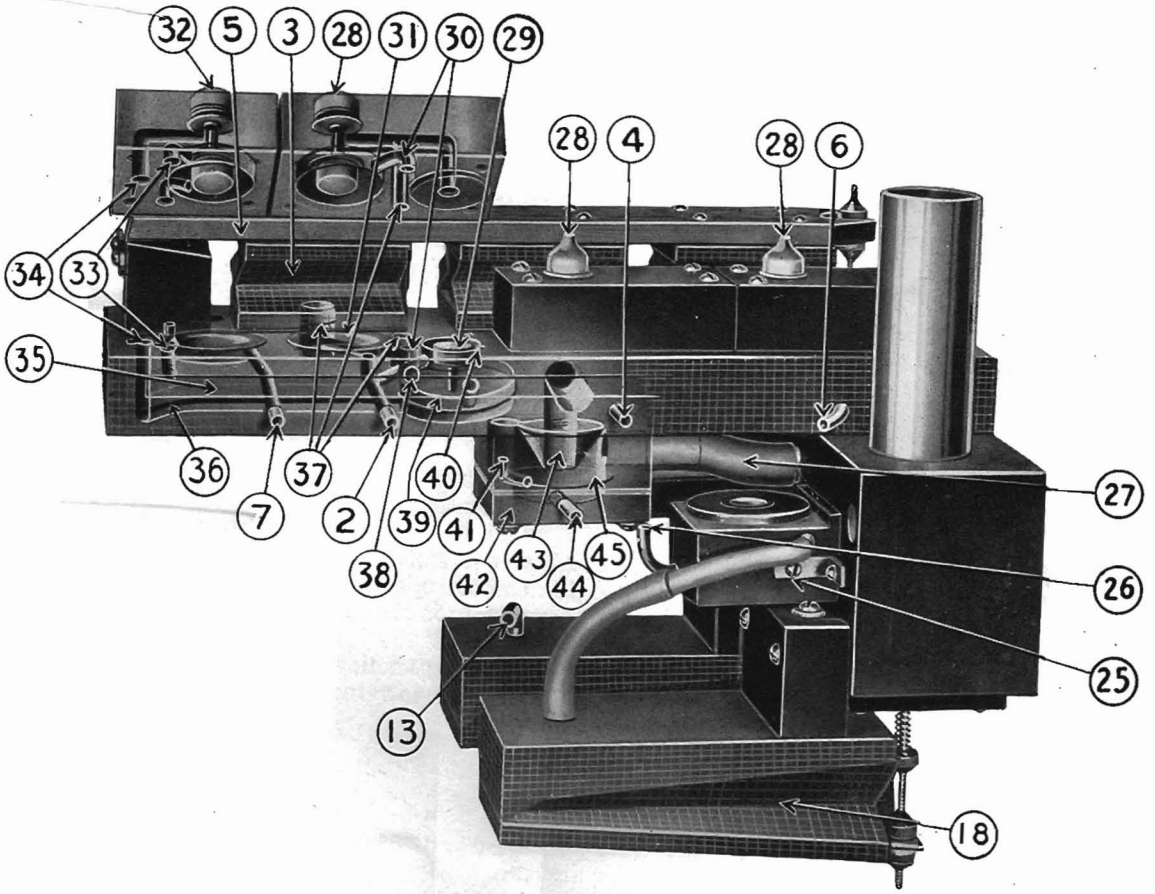


Illustration 3B

References to Illustrations 3A and 3B
Expression Mechanism

1. Supply from pump.
2. Connection to No. 2 tube in expression cut out block.
3. Intensity pneumatics.
4. Connection to No. 4 tube in expression cut out block.
5. Lever arm.
6. Connection to No. 6 tube in expression cut out block.
7. Connection to No. 7 tube in expression cut out block.
8. Leather nuts.
9. Supply for crescendo.
10. Metal guide bushings.
11. Supply to main action.
12. Regulator valve seat.
13. Connection to crescendo pneumatic.
14. Re-regulator valve.
15. Regulated air channel.
16. Re-regulator valve spring.
17. Re-regulator valve spring regulating nut.
18. Re-regulator pneumatic.
19. Supply channel for intensity pneumatics and valve blocks.
20. Regulator valve.
21. Regulator valve stem.
22. Stop collar on valve stem.
23. Spring pneumatic.
24. Stop collars over and under regulator valve.
25. Re-regulator pneumatic valve unit.
26. Connection to subdued side of modifying switch.
27. Intensity supply tube connection.
28. Intensity valves.
29. Lock valve.
30. Supply channel to intensity valve chamber.
31. Intensity valve pouch.
32. Cancel valve.
33. Supply to cancel valve chamber.
34. Connecting channel from cancel unit.
35. Supply chest.
36. Channel under lock valve pouches.
37. Channel to intensity pneumatic.
38. Bleed for intensity valve pouch.
39. Lock valve pouch.
40. Lock valve chamber.
41. Bleed to finger expression block pouch.
42. Expression button valve block.
43. Supply channel.
44. Connection to expression button.
45. Expression button pouch.

ILLUSTRATION 3A

The regulator valve No. 20 is secured to the regulator valve stem No. 21 which is in turn fastened to the lever arm No. 5. Three small intensity pneumatics No. 3 fastened to the underside of the lever arm No. 5 are fed by regulated air the same as goes to the striking pneumatics: while the spring pneumatic No. 23 which is fastened to the underside of the expression device is fed suction from the crescendo pneumatic, Illustration 2, which controls the softest intensity.

The three intensity pneumatics No. 3 pull down on the lever arm No. 5 and tend to close the regulator valve No. 20, while the spring pneumatic No. 23 pulls up and tends to open it. When there is no crescendo taking place the up-pull and down-pull balance. When a crescendo is taking place the up-pull of this pneumatic gradually increases. Therefore, the valve gradually rises from its seat.

If atmosphere is admitted to one of the intensity pneumatics No. 3, the down-pull on the regulator valve No. 20 is lessened and it immediately jumps to that point where the suction in the remaining two pneumatics No. 3 is equal to the up-pull of the spring pneumatic No. 23.

ILLUSTRATION 3B.

With blank paper on the tracker bar, intensity valves No. 28 are in a down position, as well as the cancel valve No. 32. Regulated suction is admitted to valve block chambers and intensity pneumatics No. 3 through channels No. 30 and 37.

When intensity valve hole is opened in tracker bar, atmosphere is admitted and passes through expression cut out block, Illustration 4, to underside of intensity valve pouch No. 31. Pouch No. 31 is inflated and raises intensity valve No. 28 shutting off suction to channels No. 37 and allowing atmosphere to pass over lock valve No. 29 to underside of intensity valve pouch No. 31 and into intensity pneumatic No. 3. The intensity valve is locked open during this operation because it has shut off suction to the bleed No. 38.

The cancel valve No. 32 acts as the primary valve for all three lock valves No. 29 and when it is sprung from the No. 7 hole in the tracker bar, all three lock valves No. 29 are raised, and any intensity valve No. 28 which is up will drop back.

When the lock valve No. 29 is raised it shuts off the channel No. 37 from the intensity valve No. 28 and connects the bleed No. 38 with suction, thereby neutralizing the pouch No. 31 and allowing the valve No. 28 to come back to its seat.

Re-Regulator Valve and Pneumatic

The re-regulator pneumatic No. 18, Illustration 3A, is operated from the modifying switch (Assembly Front) and controls the re-regulator valve No. 14, Illustration 3A. This valve is so-called because its function is to re-regulate the tension of the suction after the main regulator valve No. 20, Illustration 3A, has regulated it. Without losing the dynamic effects, it softens the playing by proportionately reducing the tension of the suction supplied to the main action.

References to Illustrations 3A and 3B—*Continued*

When the modifying switch (Assembly Front) is in the "Subdued" position, two ports are opened which connect to the bass and treble re-regulator valve units No. 25, Illustration 3B, in the regular way operating the valves and collapsing the re-regulator pneumatics No. 18.

As 5″ water suction is the minimum at which the instrument will play properly, it would not do to reduce this pressure. For the purpose of keeping the No. 1 Intensity the same at all times, a spring No. 16, Illustration 3A, is placed on the re-regulator valve stem with just strength enough to counteract the pull of the re-regulator pneumatic No. 18, Illustration 3A, on the No. 1 Intensity.

Finger Button Expression Control

As can be seen in the cut of this device No. 42, Illustration 3B, there is a simple pouch No. 45 which shuts off the supply of regulated suction to the intensity valves No. 28 when pouch is raised. It is equipped with a bleed No. 41 which is somewhat larger than the ordinary primary pouch bleed.

By gradually depressing Expression button (See Assembly Front) atmosphere is admitted in greater quantity through tube No. 44 to underside of pouch No. 45, gradually overcoming bleed No. 41, raising the pouch No. 45 and gradually shutting off supply of regulated suction as mentioned above.

Lowering the tension of the regulated suction, reduces the down pull of the intensity pneumatics on the regulating valve No. 20, Illustration 3A, and, therefore, lets more suction through to main action which makes playing louder.

Finger control should be used with automatic expression lever at "Off" position.

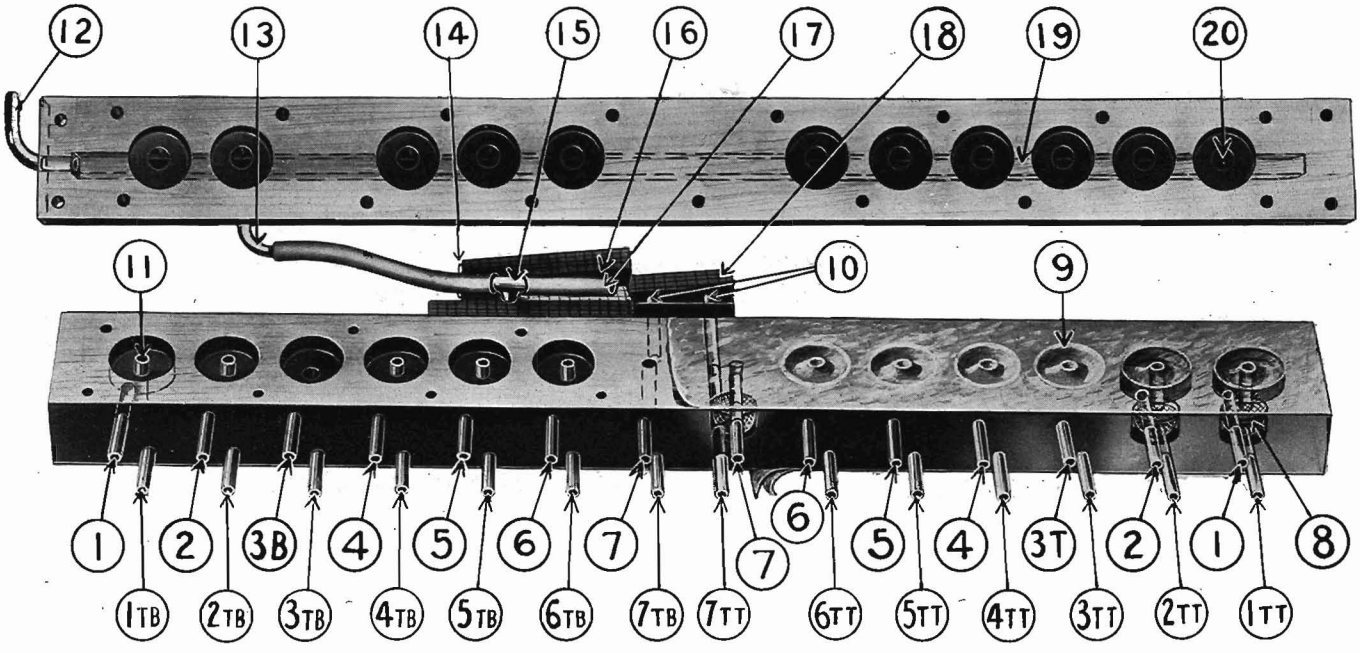


Illustration 4. AUTOMATIC EXPRESSION CUT OUT BLOCK

Reference to Illustration No. 4

T. B. represents tube leading from tracker bar on bass side (viz.) 1 T. B. first hole in tracker on the bass side.

Expression tubes leading from corresponding holes in tracker bar, (bass end).

1	T. B.
2	T. B.
3	T. B.
4	T. B.
5	T. B.
6	T. B.
7	T. B.

Expression tubes leading from corresponding holes in tracker bar, (treble end).

1	T. T.
2	T. T.
3	T. T.
4	T. T.
5	T. T.
6	T. T.
7	T. T.

1. To crescendo tube marked No. 1.
2. To No. 2 intensity valves.
3B. To loud pedal valve box.
3T. To soft pedal valve box.
4. To No. 4 intensity valves.
5. To crescendo tube marked No. 5.
6. To No. 6 intensity valves.
7. To cancel valves.
8. Sieve.
9. Cut off pouch.
10. Cancel tubes.
11. Tube connecting channel from tracker bar to mechanism.

Reference to Illustration No. 4—*Continued*

12. Supply to cut out block. Leads through automatic cut off switch.
13. Supply to cancel pneumatic.
14. Spring on cancel pneumatic.
15. Tee leading into pneumatic.
16. Cancel pneumatic.
17. Tube leading to re-roll cut out block.
18. Cancel pneumatic arm.
19. Suction chamber.
20. Channels to suction chamber.

Suction through nipple No. 12 keeps pouches No. 9 away from nipples No. 11 when automatic expression lever is at "on" position and also keeps cancel pneumatic No. 16 collapsed, allowing cancel pneumatic arm No. 18 to close the nipples No. 10. Thus, when expression hole in tracker bar is opened, atmosphere has a clear passage through cut out block mechanism.

When automatic expression lever is at an "off" position, atmosphere is admitted through nipple No. 12 which inflates pouches No. 9, allowing them to seat themselves over nipples No. 11 closing off channel from tracker bar to mechanism and thereby causing mechanism to be inoperative. Also atmosphere is admitted to cancel pneumatic No. 16 allowing same to open. Two tubes No. 10 are then opened, allowing atmosphere to pass to cancel valve pouches causing cancel valves to be sprung while automatic expression is "off". This is to prevent the chance of any of the intensity valves being locked open.

It will be noticed that No. 3B has no pouch or nipple in this block as there is a special cut out switch, (Assembly Front), provided for sustaining pedal, Illustration No. 5.

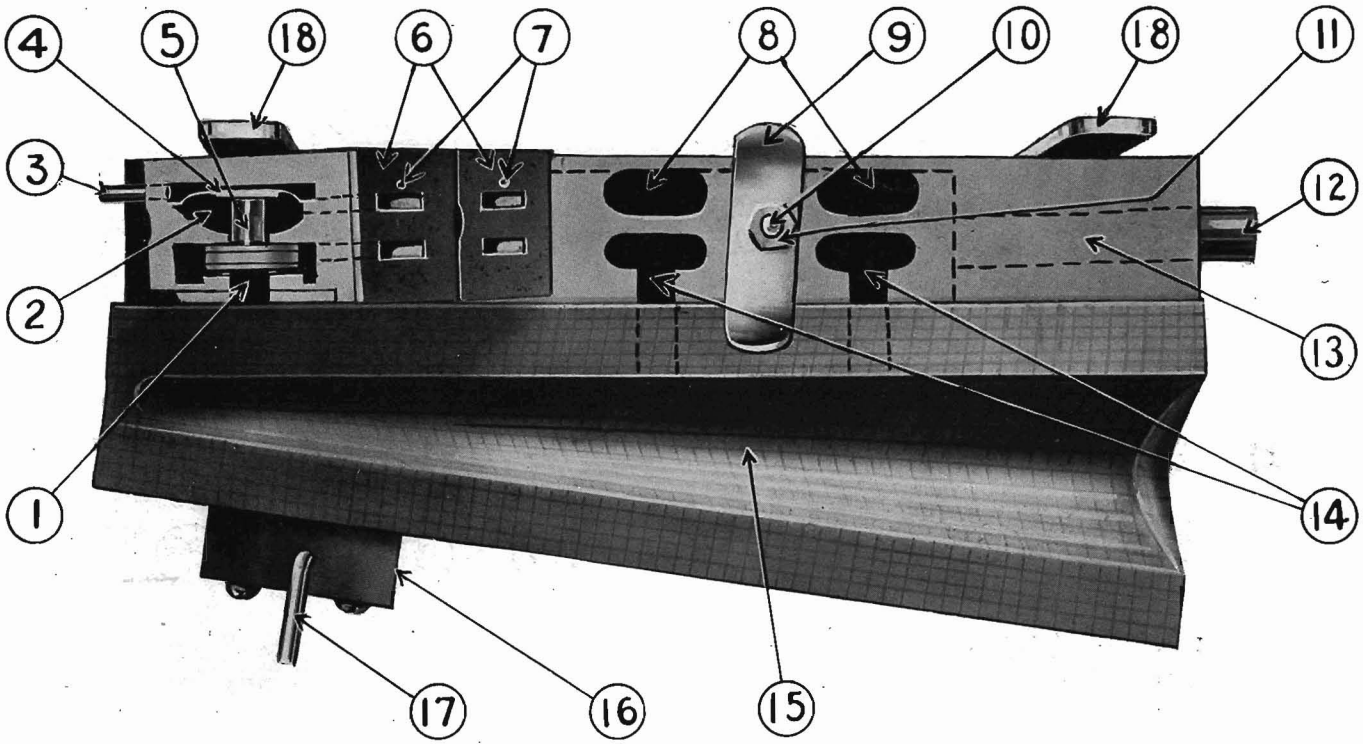


Illustration 5. LOUD PEDAL PNEUMATIC

Reference to Illustration No. 5

1. Atmosphere port.
2. Suction chamber in unit.
3. Nipple to No. 3B in tracker bar through pedal cut off switch and automatic expression block.
4. Pouch.
5. Valves.
6. Primary valve units.
7. Bleeds.
8. Supply chambers.
9. Spring.
10. Stud.
11. Spring nut.
12. Supply leads to No. 12 — Illustration 8.
13. Channel leading to supply chambers No. 8.
14. Atmosphere port to pneumatic.
15. Pneumatic.
16. Block holding lifter rod to pneumatic.
17. Lifter rod.
18. Brackets.

The loud pedal pneumatic, Illustration 5, is controlled from the third hole in the bass end of tracker bar 3B, Illustration 1. When a perforation in the music roll uncovers this hole, atmosphere enters same, passing through loud pedal cut out switch, (Assembly Front), then through automatic expression cut out block tubes 3TB and 3B, Illustration 4, to the underside of the two pouches, No. 4 in units No. 6. These pouches are inflated raising valves No. 5, shutting off atmosphere from entering port No. 1 and allowing suction to pass over valve No. 5 through channels No. 14 and from pneumatic No. 15, collapsing same. Pneumatic No. 15 is attached to damper raiser dowel by lifter rod No. 17. When pneumatic No. 15 is collapsed lifter rod No. 17 is raised and raises dampers away from strings.

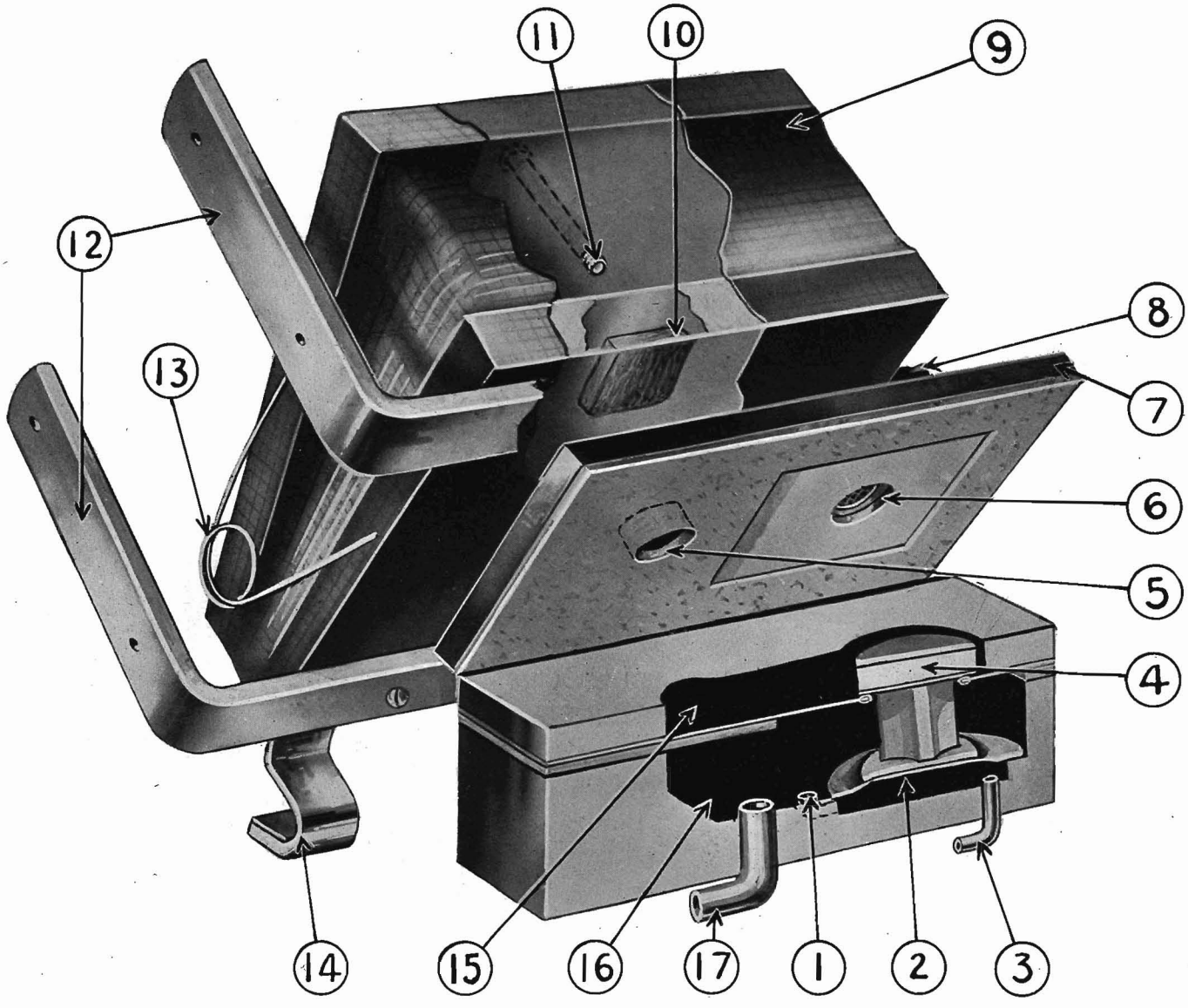


Illustration 6. SOFT PEDAL PNEUMATIC

Reference to Illustration No. 6

1. Bleed.
2. Pouch.
3. Leads to No. 3T in tracker bar through automatic expression cut out block.
4. Valve.
5. Suction port to pneumatic.
6. Atmosphere port.
7. Top board of valve box.
8. Screen cap.
9. Pneumatic.
10. Stop Felt.
11. Regulating or stop screw.
12. Brackets.
13. Pneumatic spring.
14. Lifter arm.
15. Valve chamber.
16. Suction chamber.
17. Supply from high air side of bass expression end.

The rail lifting mechanism, Illustration No. 6, is controlled from the third hole in treble end of tracker bar 3T (Illustration No. 1). When a perforation in the music roll uncovers this hole, atmosphere enters same, passing through sieve and over pouch in the automatic expression cut out block, tubes 3TT and 3T, Illustration 4, to underside of pouch No. 2, Illustration 6. This pouch No. 2 is inflated, raising valve No. 4 which closes off atmosphere with its upper seat and allows suction to pass under the under seat through chamber No. 15 and from the pneumatic No. 9 through port No. 5, causing pneumatic No. 9 to collapse. Attached to pneumatic No. 9 is a lifter arm No. 14 which sets under extension hook in raiser dowel. When pneumatic collapses, this arm No. 14 raises dowel which in turn raises hammer rail.

IMPORTANT

Be sure to instruct somebody in the household how to use the tracker-bar pump and that this should be done at least twice a month.

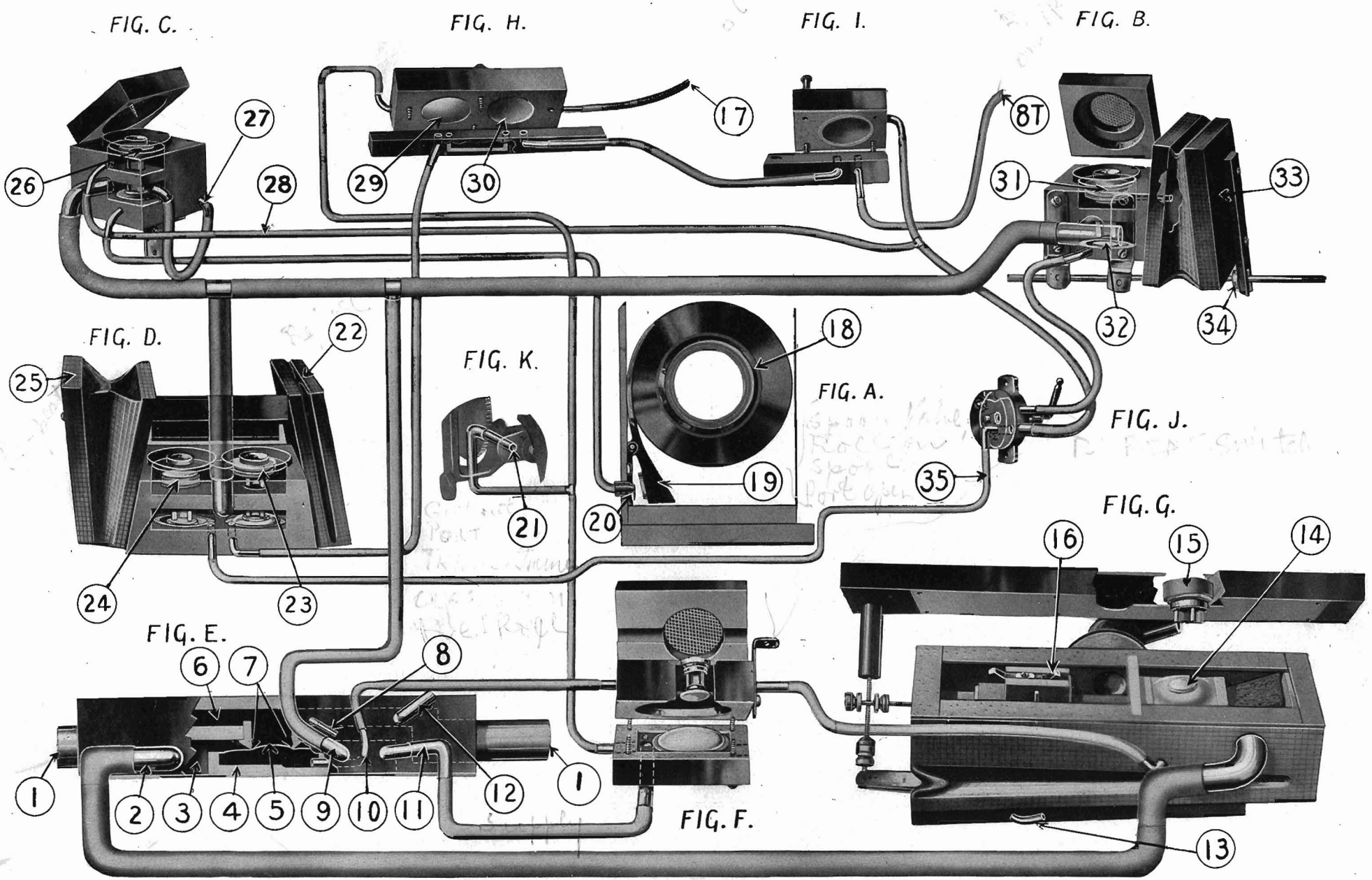


Illustration 7. RE-ROLL — REPEAT — ELECTRIC CUT-OFF MECHANISM

Reference to Illustration No. 7

1. Supply to bass and treble expression end.
2. Governor supply tube.
3. Channel from pump.
4. Action cut out pouch block.
5. Action cut out pouch.
6. Channel to No. 1.
7. Action cut out pouch seat.
8. Supply to tracker pneumatics.
9. Supply to switch pneumatic, switch primary block, auto cut out block, re-roll and replay pneumatics.
10. Nipple to universal vent block.
11. Supply to universal vent block.
12. Supply to sustaining pneumatic.
13. Nipple to treble end of action.
14. Re-roll pouch.
15. Re-roll valve.
16. Tempo slide valve.
17. To cancel pneumatic.
18. Groove.
19. Spoon valve.
20. Atmosphere port.
21. Cut out port in transmission frame.
22. Reverse pneumatic.
23. Reverse valve.
24. Repeat valve.
25. Repeat pneumatic.
26. Switch primary valve.
27. Bleed.
28. Tube leading to switch primary box.
29. Pouch.
30. Pouch.
31. Switch secondary valve.
32. Switch secondary pouch.
33. Switch pneumatic.
34. Collar.
35. Tube leading to repeat valve block.

Re-Roll

Illustration No. 7 shows mechanism immediately after re-roll hole No. 8T in tracker bar has been opened.

The re-roll tube No. 8T leads to the re-roll cut out block, Figure 1, to the re-roll cut out block Figure H, and then to re-roll valve box, Figure D. When the re-roll lever is thrown to the re-roll position a port No. 21, in the transmission frame, Figure K, is opened; atmosphere passing through this port inflates the pouch in the universal vent block, Figure F, raises the valve and admits atmosphere to tube No. 10, Figure E, passing through tube to the underside of cut off pouch No. 5 in the pump supply block, Figure E. The atmosphere thus admitted raises the pouch No. 5 against the seat No. 7 and cuts off supply of suction to main action.

When the valve in universal vent block, Figure F, is raised atmosphere is admitted to underside of re-roll pouch No. 14 in governor, Figure G, inflating pouch and raising valve No. 15, allowing a direct passage of suction from the wind motor independent of the tempo slot No. 16.

When port in transmission frame No. 21, Figure K, is opened, atmosphere is admitted also to top of pouch No. 29 in re-roll cut out block, Figure H, inflating same and covering channel leading from re-roll hole No. 8T in tracker bar to re-roll valve block, Figure D. This prevents any possible leakage from tracker bar while roll is re-rolling and prevents re-roll valve No. 23 from chattering.

Automatic Repeat

Repeat device is controlled by repeat switch, Figure J, when lever is at "On" position.

When lever is turned to the "On" position, the tube No. 28 leading from the switch primary, Figure C, to the switch pneumatic, Figure B, is cut off. The switch primary, Figure C, is then connected through the repeat switch, Figure J, and tube No. 35, to the repeat valve box, Figure D.

As roll finishes re-rolling and uncovers the groove No. 18, Figure A, in take up spool, the lower end of spoon No. 19, Figure A, covers valve port No. 20, Figure A. Valve No. 26 in switch primary, Figure C, drops, allowing atmosphere to the tube No. 28, leading through repeat switch in tube No. 35, Figure J, to underside of repeat pouch. This pouch raises valve No. 24, Figure D, allowing suction to collapse repeat pneumatic No. 25, Figure D, throwing transmission into play position and repeating roll.

Also atmosphere is admitted to cut out block, Figure 1, inflating pouch, thereby cutting off channel leading to re-roll valve No. 23, Figure D. This prevents re-roll valve No. 23, Figure D, from operating and neutralizing re-roll and repeat pneumatics No. 22 and No. 25 should the tapered end of roll come off the tracker bar and open the re-roll hole, No. 8T.

Electric Cut-Off

As the music roll finishes re-rolling the last end uncovers the groove No. 18, cut in the take-up spool, Figure A. The upper end of the spoon valve No. 19, Figure A, drops into the groove, No. 18, causing the lower end to close the valve port No. 20.

This port No. 20 is connected to the primary valve box, Figure C. The valve No. 26 in this primary box moves between its seats so that when the spoon valve No. 19, Figure A, is closed the valve No. 26, Figure C, drops down and admits atmosphere to the tube No. 28 leading through the repeat switch, Figure J, to underside of the pouch No. 32, Figure B, inflating pouch. The valve No. 31, Figure B, then raises and admits suction to the switch pneumatic No. 33, Figure B, collapsing same and shutting off switch.

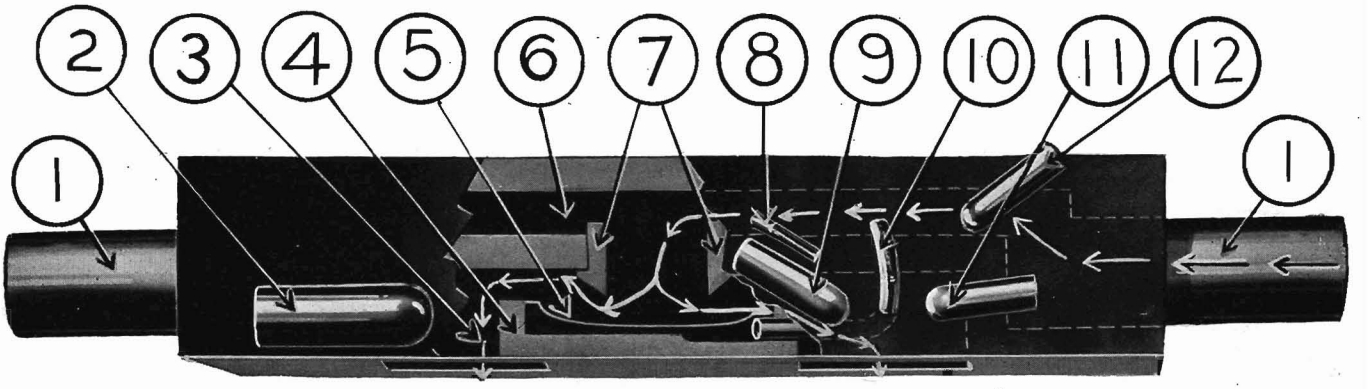


Illustration 8. PUMP DISTRIBUTER and ACTION CUT-OFF BLOCK

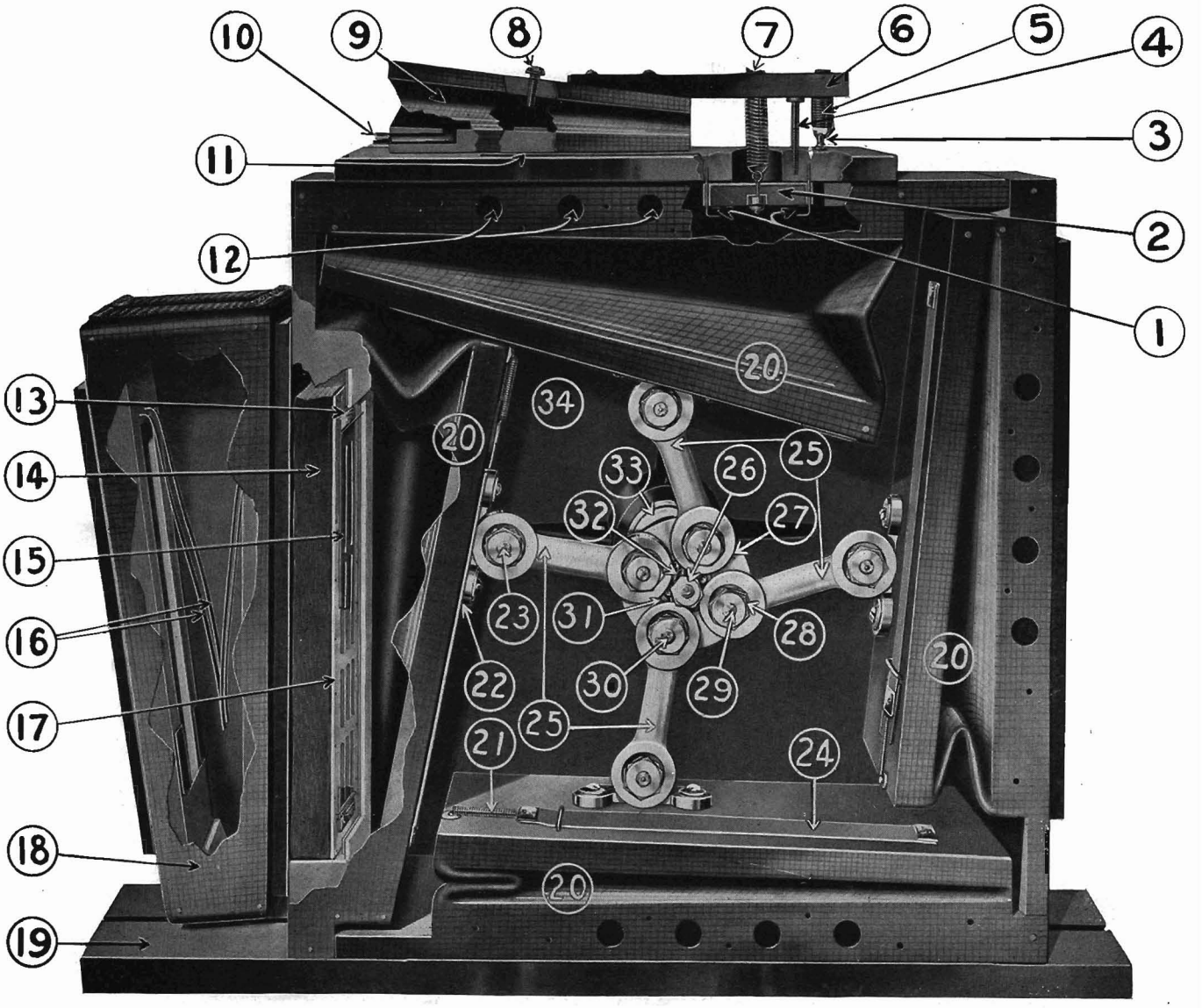


Illustration 9. PUMP

Reference to Illustration No. 8

1. Nipples lead to treble and bass expression ends.
2. Nipples lead to governor.
3. Channel from pump.
4. Action cut out pouch block.
5. Action cut out pouch.
6. Channel to No. 1.
7. Action cut out pouch seat.
8. Nipple leading to tracker pneumatics.
9. Supply nipple leading to switch pneumatic, switch primary block, automatic cut out block, re-roll and replay pneumatic.
10. Nipple leading to universal vent block.
11. Nipple leading to loud pedal pneumatic.

Action cut out pouch No. 5 is in correct position while playing. Arrows show the direction of air while pump is in operation.

Reference to Illustration No. 9

Pump with Back Air Chest Removed. Amplifier and Spill Valve with Distributing and Muffler Block Removed

1. Spill valve guide hooks.
2. Spill valve.
3. Swivel.
4. Amplifier pneumatic stop screw.
5. Amplifier adjustment spring.
6. Amplifier arm.
7. Medium adjustment spring.
8. Brilliant adjustment screw.
9. Amplifier pneumatic.
10. Nipple leading to amplifier block.
11. Channel leading to No. 3 in distributing block.
12. Holes leading from each feeder pneumatic to the chest board which forms the back of the pump.
13. Inside valve spring.
14. Muffler felt.
15. Inside valve.
16. Reservoir spring.
17. Aluminum valve seat.
18. Reservoir.
19. Base board.
20. Feeder bellows.
21. Outside valve spring.
22. Feeder bracket.
23. Feeder bracket ball raising stud.
24. Outside valve.
25. Spider arm.
26. Center shaft nut.
27. Center disc.
28. Cone nut.
29. Lock nut for spider cones.
30. Center disc ball raiser stud.
31. S. K. F. disc bearings.
32. Crankshaft.
33. Dust cap.
34. Pump front plate.

The Pump and How It Works

The large driving wheel in front of pump is belted to the pulley of the electric motor which furnishes the motive power.

The main shaft is offset to form a crank, No. 32. Actuated by the crank is a disc or center plate No. 27, with four connecting arms No. 25, extending and attached to each of the four feeders No. 20.

When the crank No. 32 is rotated the feeders No. 20 are successively closed and opened. As the feeder bellows open, valve No. 24 is closed by the suction developed inside the feeder. This suction also opens valve No. 15 between the windchest and the feeder, allowing air to be withdrawn from the reservoir No. 18. When the feeder is fully extended it has done its work and starts to close; with this change of direction the position of the valves No. 15 and 24 are reversed. Suction in the reservoir draws valve No. 15 shut, and the air inside the feeder forces valve No. 24 open.

The four feeder bellows No. 20 are connected by means of an air chest which forms the back of the pump. to a common reservoir No. 18. As air is withdrawn from the reservoir No. 18, the suction produced causes the movable parts of the reservoir No. 18 to collapse. Springs No. 16 inside of the reservoir No. 18, oppose the collapsing member and their resistance determines the strength of degree of the suction maintained within the reservoir. As the reservoir is collapsed by the suction, the tension of the air is raised in proportion to the increased pressure of the springs, No. 16. The spill valve No. 2 is pulled away from its seat, thereby preventing the tension of air from raising further. The medium or pump pressure should be 20″ on gauge. See No. 7 (Front Assembly) for correct adjustment.

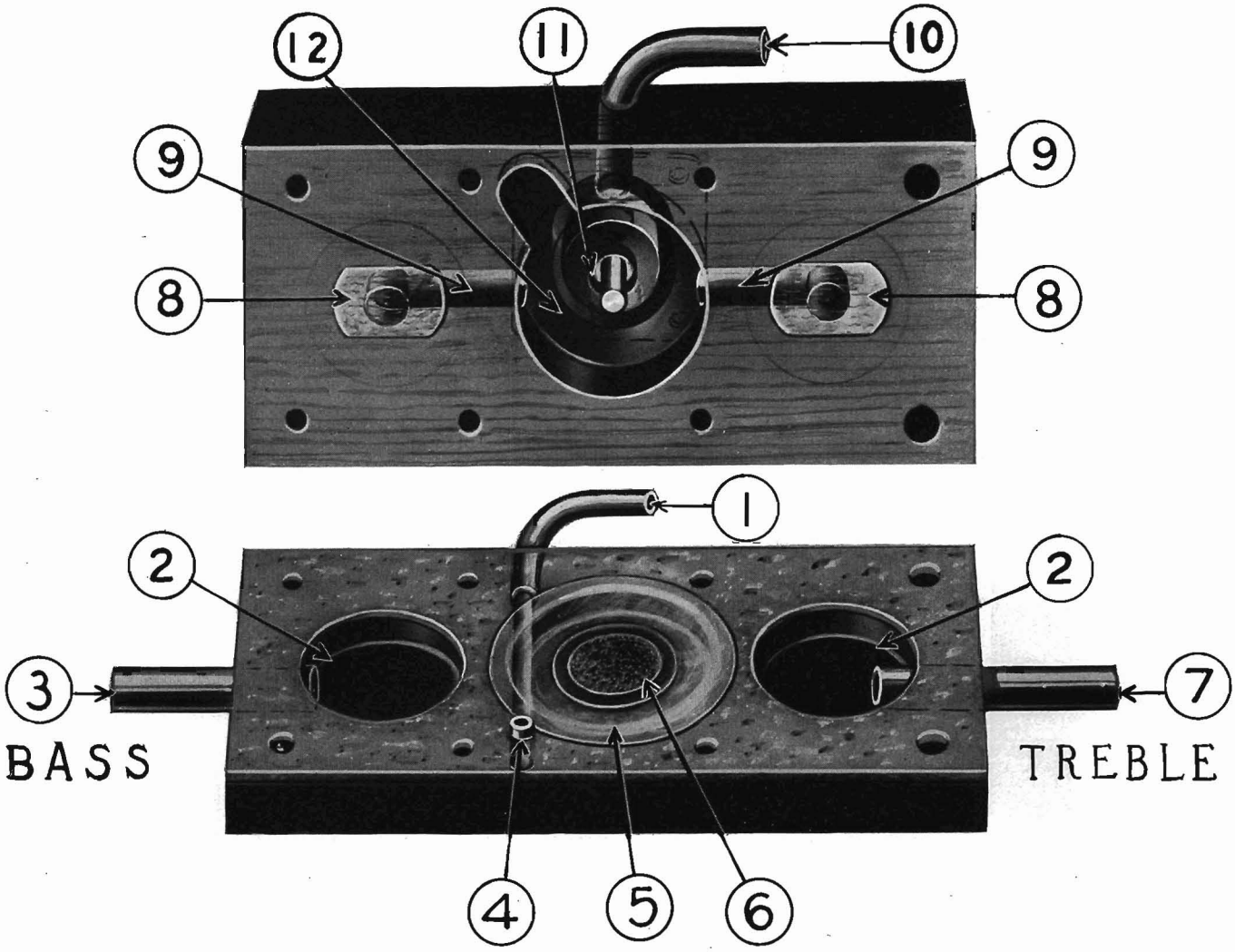


Illustration 10. AMPLIFIER CONTROL BOX

Reference to Illustration No 10

1. Connection to brilliant side of modifying switch, (Front Assembly).
2. Check valve chambers.
3. Connection to bass side of action.
4. Bleed.
5. Pouch.
6. Pouch cap.
7. Connection to treble side of action.
8. Check valves.
9. Connecting channels.
10. Connection to amplifier pneumatic nipple No. 10.
11. Valve.
12. Suction chamber.

The amplifier pneumatic No. 9, Illustration 9, is connected by tube No. 10 to nipple No. 10 on amplifier block, Illustration 10. When tube No. 1 in amplifier block is opened by throwing the modifying switch to the brilliant position, valve No. 11 in amplifier block is raised shutting off the outside atmosphere to the amplifier pneumatic No. 1 and connecting it to suction chamber No. 12 in amplifier block.

This chamber has two connecting channels, No. 9, leading to nipples No. 3 and 7, which connects to Bass and Treble end of action, each of these channels being equipped with a check valve No. 8, to prevent any flow of air from treble or bass or vice versa when the pressure is different on the two sides of the action.

As the tension in either side of the action reaches a point of 15″, or little above the fifth intensity, the amplifier pneumatic No. 9 collapses, increasing the tension on spill valve spring No. 7 and decreasing the spill around valve No. 2, thereby increasing the pumping pressure. Screw No. 8 determines the amount of amplification. Spring No. 5 determines when the amplification should start. See Front Assembly for correct adjustment.

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