PHILIPS RECORD CHANGER

TYPE AG 1003

TECHNICAL: Speeds—78, 45 and 33⅓ r.p.m. Consumption—8W (approx.). Loading—10 discs. Intermixing—Will mix 7", 10" and 12" diameter discs, but necessary speed adjustments to be made manually. Muting switch on pick-up is incorporated. Record thickness—For automatic playing, records should be within thickness tolerances of 0.1" and 0.07".

WARNING: The turntable should not be turned in an anti-clockwise direction otherwise damage may occur.

Whenever the turntable is turned for observation of functions of various parts, the changer should be in a horizontal position. The "start" button should not be held down for a longer period than is necessary to start the changing mechanism.

PACKING FOR TRANSIT: When the changer unit is part of a radiogram mounted in a cabinet, it is advised that it be packed correctly for movement in transit.

In each corner of the base plate, screws can be passed through the plastic decorative covers of the mounting springs. These serve to screw the changer down and remove any strain from the mounting springs.

The speed selection knob should be put in the "O" position, thus removing the intermediate wheel from the driving collar and preventing damage to its rubber shoe.

The pick-up arm should be tied to its rest by string passed through the hole in the rest provided for this purpose.

The overarm and record spindle should be either tied in position to the changer or else removed and parcelled separately.

PICK-UP HEADS: The pick-up heads and the various styli which can be used with this changer are detailed below.

Head	AG3010	AG3012	AG3013	AG3015	AG3025
Stylus, normal	AG5008	AG5005	—	—	—
Stylus, micro.	AG5009	—	AG5006	—	—

LUBRICATION: The mechanism is adequately lubricated before despatch from the factory. After time, attention has to be given to lubrication to ensure drag-free operation.

The three lubricants used are castor oil, ball-bearing grease and graphite grease. The oil is used on pivot points, the grease on sliding surfaces.

All lubricants should be applied sparingly and all excess wiped off. Lubricants should not be allowed to get on to rubber parts or surfaces which are in contact with rubber.

PRINCIPLES OF OPERATION

This description assumes that the user operating instructions have been read and understood.

A brief description of the function of the mechanism will first be given followed by a more detailed description of individual portions. A section on adjustments which may be necessary to correct faulty operation after heavy transit handling or user tampering follows.

To gain a good working knowledge of the principles of operation, it is recommended that these notes be read in conjunction with reference to a changer which is operated slowly by turning the turntable by hand. This then gives time to observe the various operations in correct sequence and relationship. It also enables the mechanism to be stopped at any time for closer inspection. Remember though, the turntable should only be turned in a clockwise direction and the changer should not be left with the mechanism part of the way through the changing cycle.

BRIEF DESCRIPTION: When the "start" button is pressed, a triangular fibre plate is pushed into the mains switch and brings the contacts together, thus energising the motor and causing the turntable to rotate. It also causes the starting wire to press against the starting trip crank. This is coupled to the plastic feeler lever and moves its tip over behind the cam which is cast into the underside of the turntable. The shape of the cam and the rotation of the turntable causes further movement of the plastic feeler lever. This in turn causes the end of the feeler lever remote from the turntable cam, to contact a loose metal tooth which is part of the central plastic pinion, and turn it until it engages the worm gear cast with the turntable.

The plastic pinion then rotates and the two cams which are mounted on the same spindle as it, also rotate. The cam at the centre of the changer controls record dropping whilst the one under the pick-up arm pivot controls the movement of the pick-up arm. The whole changing cycle is carried out in one rotation of the cams. The locking of the mechanism in the rest position is provided on the central cam. Operation of the pick-up muting switch is provided by the cam under the pick-up arm pivot.

Selection of setting down position of the pick-up, according to the diameter of the last record to drop, is done by the diameter selection lever which protrudes from the plastic housing above the frameplate.

The commencement of the changing cycle at the completion of playing of a record, is provided by a friction clutch arm driven from the pick-up arm spindle. This arm contacts the starting trip crank on the impulse imparted by the pick-up running into the run-out portion of the record groove.

More detailed descriptions of individual sections of the mechanism now follow.

THE MAINS SWITCH (Refer Fig. 1): The contact springs of the switch are so made that they will not remain in a stable position other than in the upper or lower positions. With the pick-up arm 54 resting on pin 5, as at (a), the switch contacts are pushed apart. When the "start" button is pressed, the triangular fibre plate 32 pushes the lower switch contact against the upper one, as at (b), and applies power to the motor. When the button is released the contacts remain together in the upper position, as at (c).

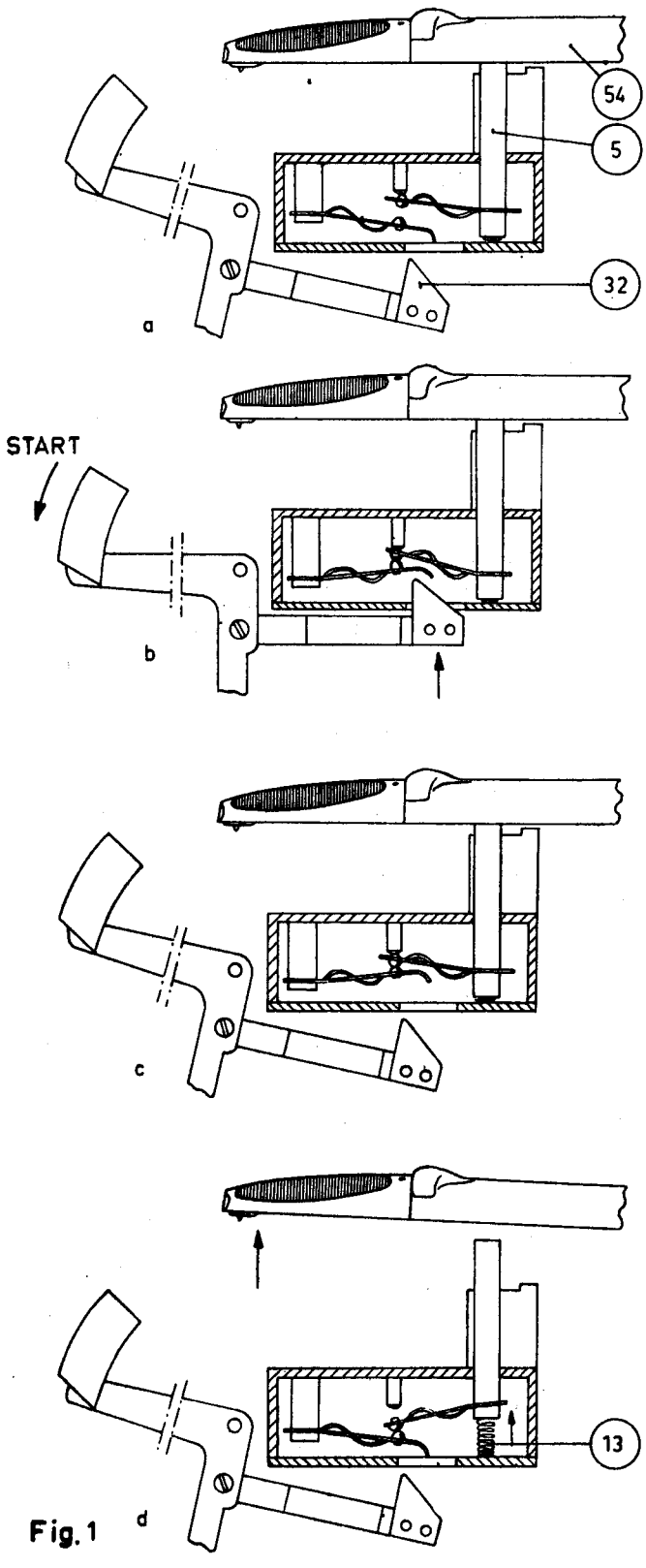


Fig. 1

When the pick-up arm lifts from its rest, spring 13 pushes pin 5 up and this causes the contact springs to move in a downward direction and remain there during the time the arm is off the rest, the contact still remains made, as at (d). On the pick-up arm coming back on to the rest, the upper contact spring is forced upward by the downward movement of pin 5, as at (a). This breaks the contact and causes the motor to stop.

THE MOTOR AND DRIVE (See Fig. 2): The motor is the shaded pole self-starting induction type. Armature alignment is done by movement of the lower bearing 270/271. Feeler gauge MW.258.93, four per motor needed, are available to assist with this.

The drive to the turntable is through a three diameter pulley 261 and rubber shod intermediate wheel 195. Tension spring 200 maintains firm running of the intermediate wheel between the driving pulley and turntable. The position of the intermediate wheel with respect to the lower edge of the turntable in the 78 position must not be allowed to be under 2 m.m.

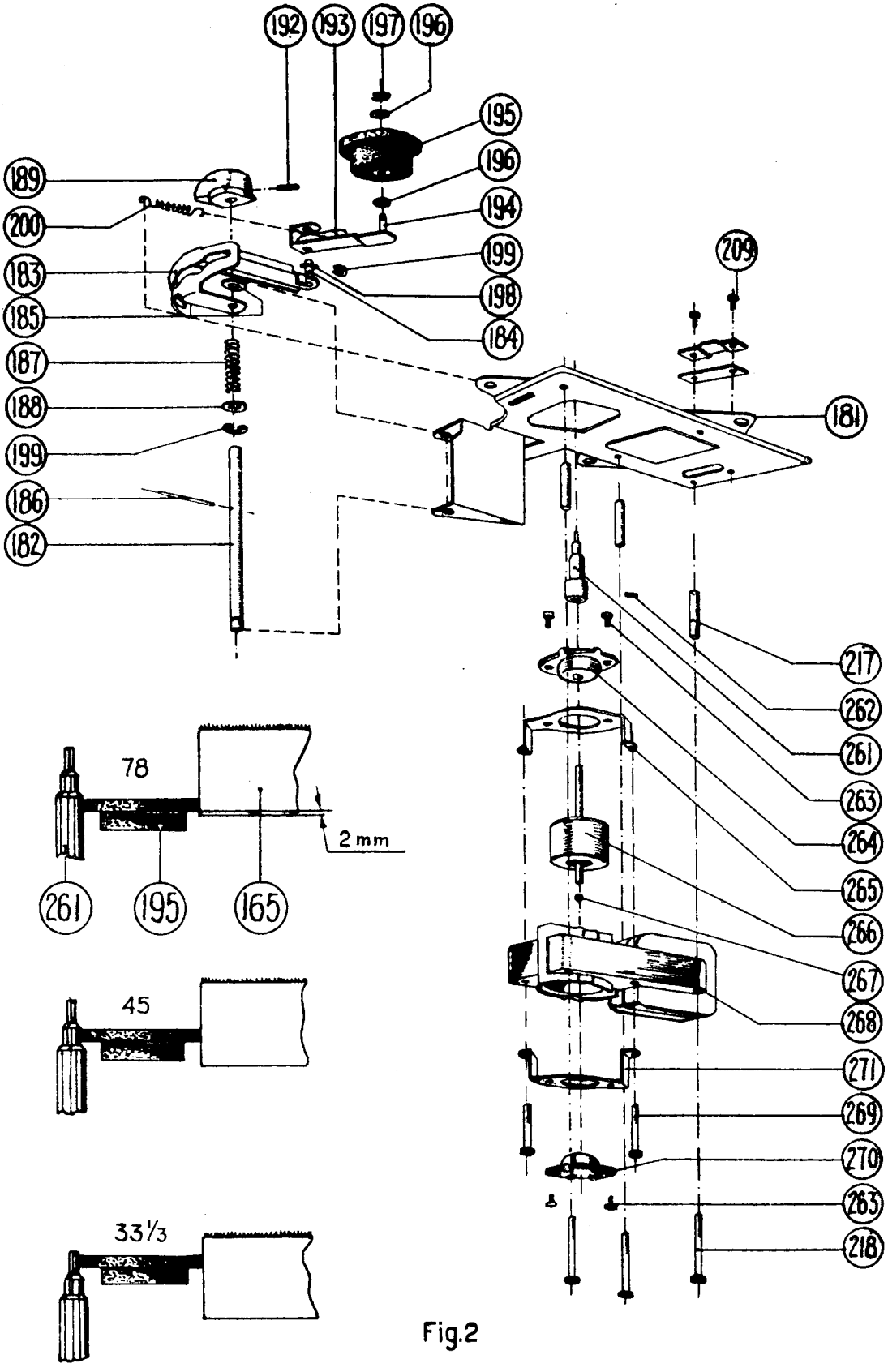
If any speed adjustment is needed, and this should only need be a small adjustment, it can be accomplished by altering the tension of spring 200. In the case of a reduction in speed being required the spring should be lengthened, and in the case of an increase in speed being needed, the spring should be shortened. Before making these adjustments, it should be ascertained if there is any other cause of speed irregularity such as misaligned bearings. This can be corrected by tapping the frame of the motor with a screwdriver handle while it is running.

For prevention of wow and rumble, the motor mounting plate should be at least 1.5 m.m. from the main changer frame-plate.

STARTING MECHANISM (See Fig. 3): .On pressing the "start" button, the motor is started as described under "The Mains Switch." Arm 37 moves forward and carries starting wire 38 with it. Wire 38 turns starting trip crank 144 on its pivots. To trip crank 144, is attached plastic feeler lever 143. Movement of the trip crank causes the tip of feeler lever 143 to move toward the cast cam on the underside of turntable 165.

Contact of the feeler lever against the cam causes it to move further and eventually bear against loose metal tooth 139 which is mounted on plastic pinion 137. The tip of the loose tooth picks up the thread of the worm gear cast as part of the turntable and this causes the plastic pinion 137 to rotate. The spindle carrying the cams for record dropping and pick-up arm movement is also rotated with the pinion.

When the cam spindle has completed one revolution the untoothed portion of pinion 137 comes opposite the cast worm gear and the action stops as the loose tooth 139 has fallen back to its original position.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270
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78
2 mm
261
195
165
45
33⅓

Fig.2

AG 1003

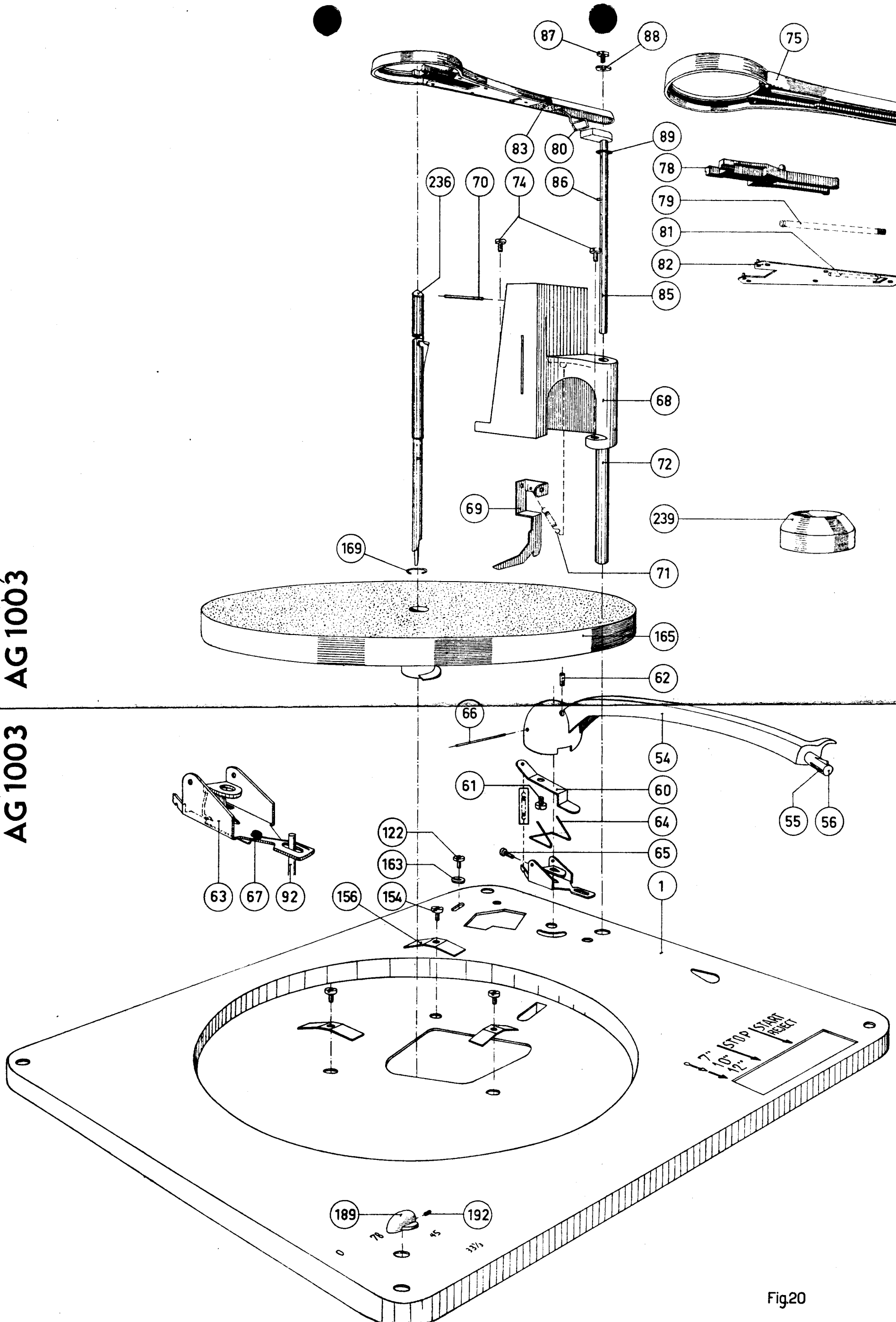

Fig.20

AG 1003

1
175
176
111
118
108
110
121
237
221
223
222
224
Fig2
225
220
224
Fig18
2
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Fig18
12" 10" 7"
STOP
START
Fig17
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163
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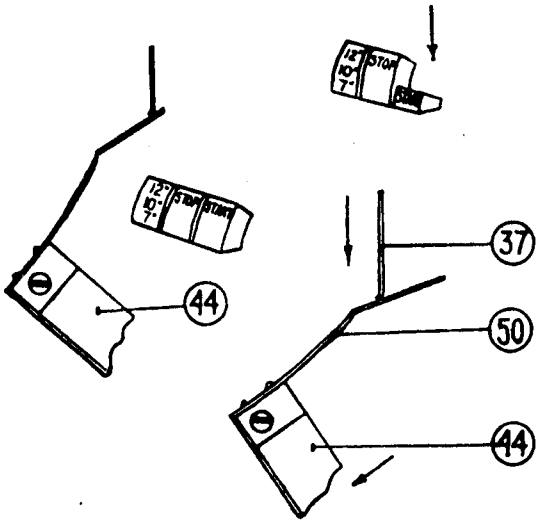
Fig.19


STOP
START
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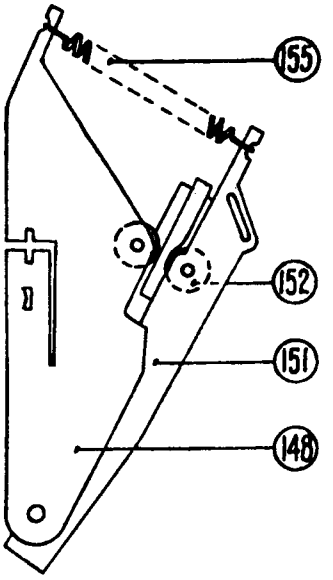
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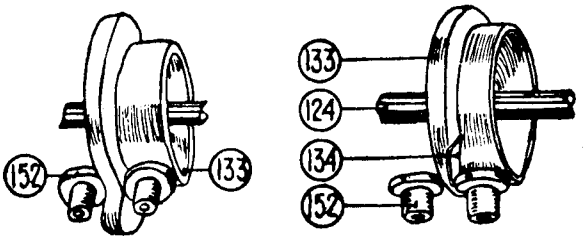
152
151
148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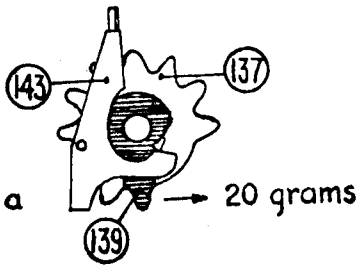
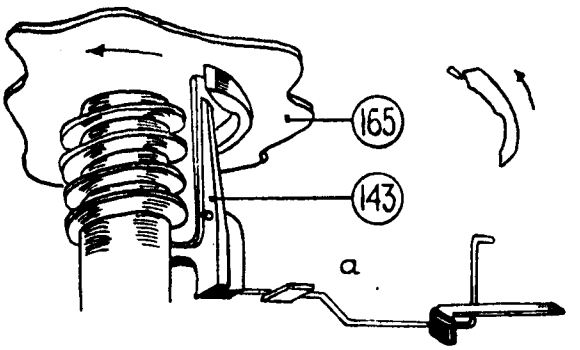

143
137
a
20 grams
139


b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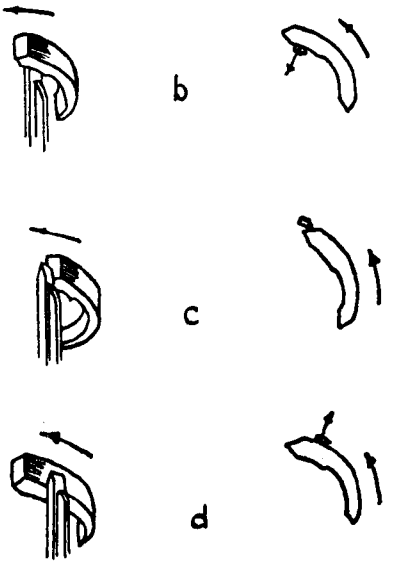
143
a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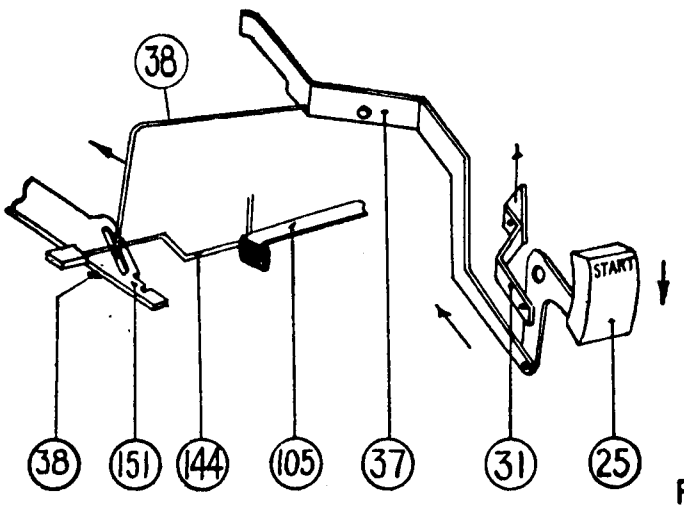
38
START
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151
144
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31
25

Fig 3

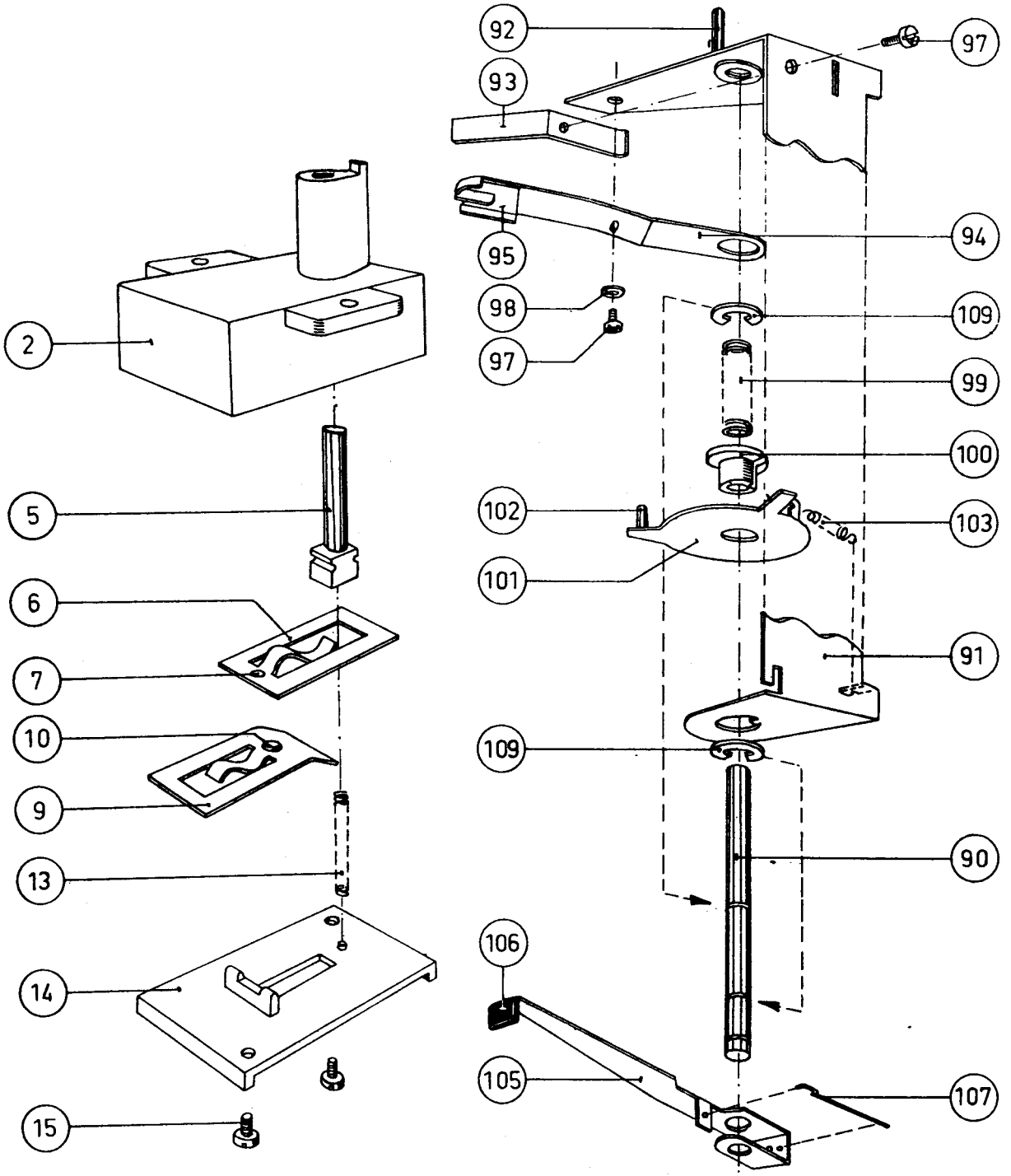
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Fig.18

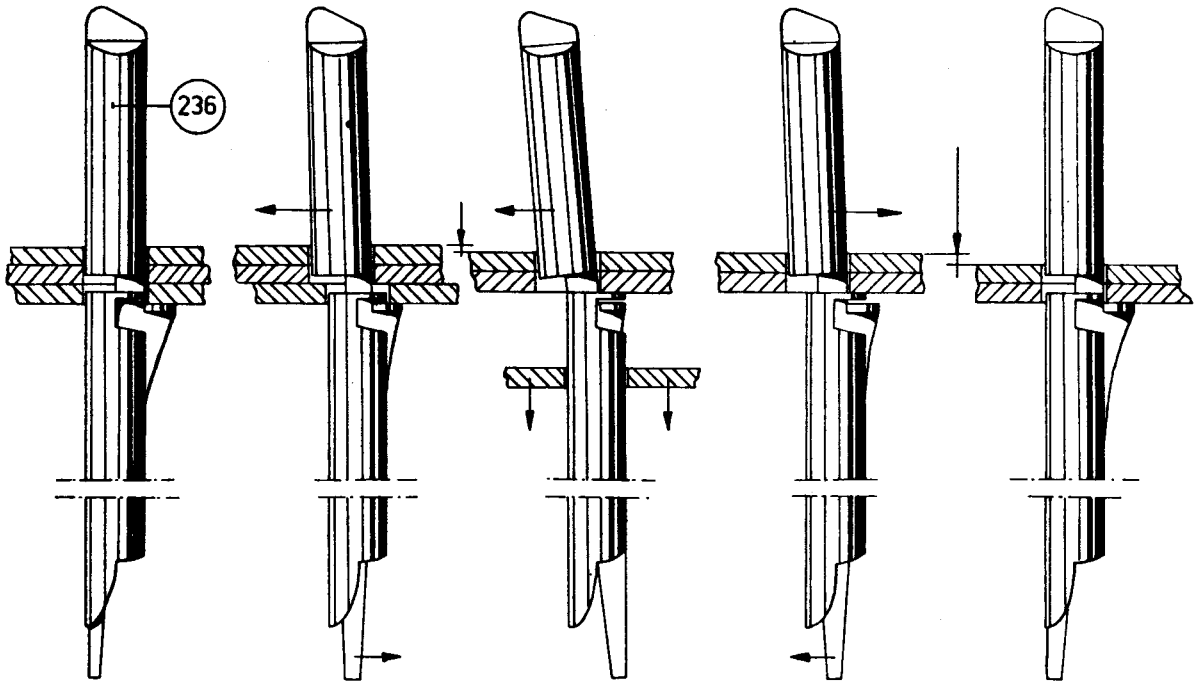


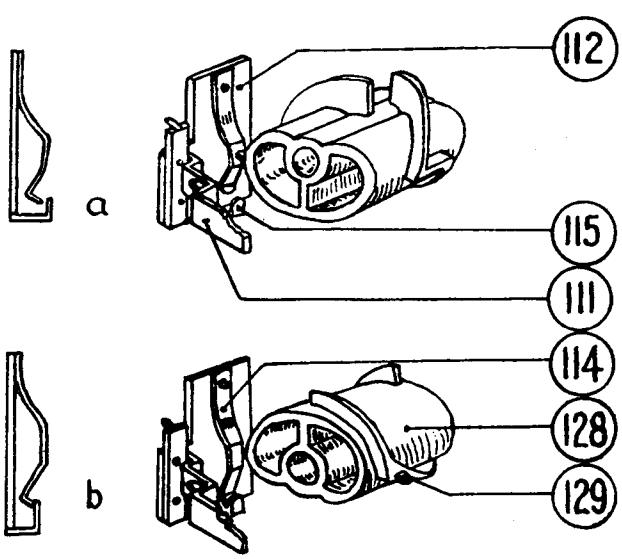
Fig 4

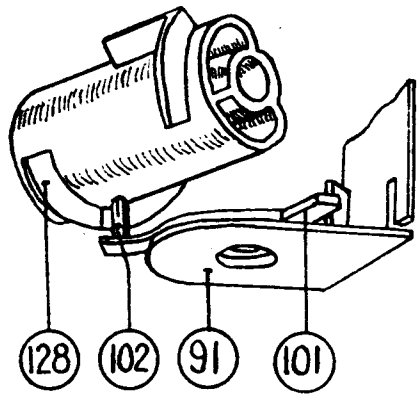
RECORD DROPPING MECHANISM (See Figs. 3 and 4): Dropping of records from the stack on the record spindle is controlled by the cam 133 at the centre of the mechanism. As cam 133 rotates, the two rollers 152, which are pressed against the running surfaces by spring 155, are forced apart by the contour of the running surfaces. This causes plate 148 to move. Into plate 148 is inserted the movable tip of record spindle 236 and this moves with the plate.
Movement of the centre portion of the spindle carries all the records but the bottom one across with it. The bottom one accordingly drops. Refer Fig. 4.
As the cam 133 is nearing the completion of its rotation, one of the rollers 152 approaches the spring 134 which is secured to the cam. This spring is V-shaped and the roller runs into it with a snap. This serves as the mechanism locking while it is in the rest position.

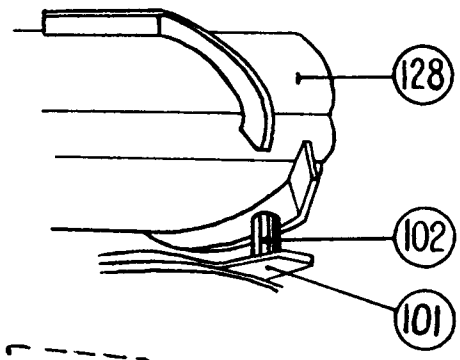
PICK-UP CONTROL MECHANISM (See Fig. 5): Movement of the pick-up arm is controlled by the cam 128 under the pick-up arm pivot. Movements concerned are, lifting and lowering, and turning out and turning in.
As cam 128 commences to rotate, its running surface picks up pins 127 which form part of pick-up lifting bracket 126. The eccentrical form of cam 128 causes bracket 126 to lift as rotation continues. In being lifted, bracket 126 carries bracket 91 and lifting pin 92 with it. Pin 92 pushes against the pick-up arm 54 and thus causes it to lift.
Further rotation of cam 128 brings one of its helical ribs to bear against pin 102, which is part of bracket 101. Bracket 101 has a friction drive to bracket 91. While the pick-up arm is in the lifted position, the spring 99 is compressed and thus imparts a heavy coupling between bracket 101 and 91. Therefore, as the rib of cam 128 bears against pin 102 the turning moment imparted to it is transferred to the pick-up arm 54 via bracket 101, bracket 91 and pick-up arm spindle 90. This movement turns the pick-up arm outwards.
Further rotation of cam 128 brings its second helical rib to bear against pin 102. In between pin 102 leaving the first rib and contacting the second one, the next record has dropped. The second helical rib causes movement of pin 102 in the reverse direction, thus swinging the pick-up arm over the record preparatory for lowering. The amount of this movement is set by the appropriate diameter stop, see "Diameter Selection."
Lowering of the pick-up arm is achieved by pins 127 following the running surface of the cam until they come down once again on the flat portion of the running surface.

MUTING SWITCH (See Fig. 5): The muting switch on the pick-up is also controlled by cam 128. Mounted into the cam is a small plastic pin 129. In the rest position, this pin bears against spring contact 114 and holds it away from the other contact of the switch, contact 115. As soon as cam 128 starts to rotate, pin 129 moves away from contact 114 and allows it to come against contact 115, thus shorting out the pick-up.
Just as cam 128 completes its rotation, pin 129 again bears against contact 114 and opens the switch ready for playing.

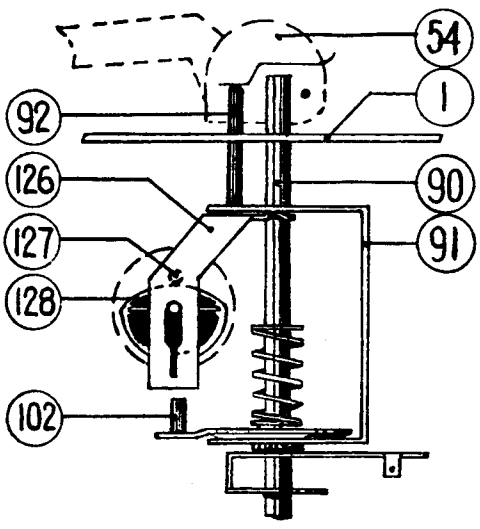
DIAMETER SELECTION (See Fig. 6): The control of the setting down position of the pick-up is done by the diameter selection lever which protrudes from the moulded housing on top of the changer, or manually by the diameter selection button.
When the diameter selection button is in the full up position, i.e., showing "12" 10" 7" ", all three diameters can be played. When "12" 10" " is showing (half down) both 12" and 10" diameters only can be played. When "12" " only is showing (right down) 12" records only can be played.
The point of setting down of the pick-up is determined by the bracket 44. This bracket is positioned either under control of the diameter selection button or the diameter selection lever. Control by the button is by way of lever 40, connected with the button, bearing against spring 49.
A lip formed on bracket 44 forms an obstruction for bracket 94, which is coupled to the pick-up arm spindle and moves with it. This lip forms a stop for one or the other of two tongues on bracket 95, depending on whether the button is in the 12" or 10" position.
In the 7" position, bracket 44 is moved clear of brackets 94-95 and the stop this time is a stud 237, mounted on the frameplate.
Control of movement of bracket 44, by way of the diameter selection lever, is through the different amounts of movement given to it by different diameter records. A 12" record, when dropping from the stack on the record spindle into the playing position, pushes the lever to its full extent and thus imparts the maximum movement to bracket 44. A 10" record in dropping imparts only a small movement, sufficient to bring bracket 44 to the 10" position. When a 7" record drops it does not touch the diameter selection lever, and thus no alteration to bracket 44 is made in the 7" position to which it was automatically placed as the pick-up arm moved outwards from playing the previous record (curved portion of bracket 95 brushes bracket 44 aside).

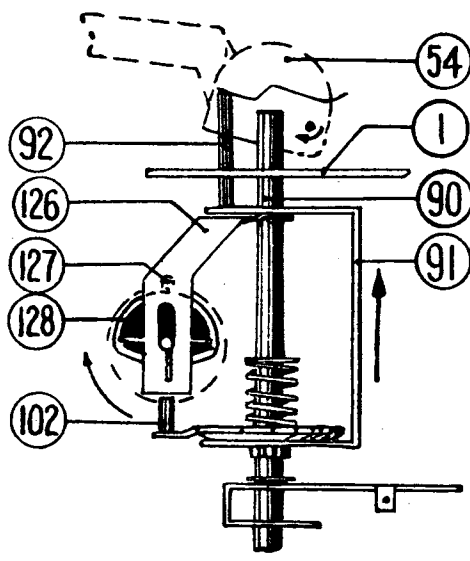


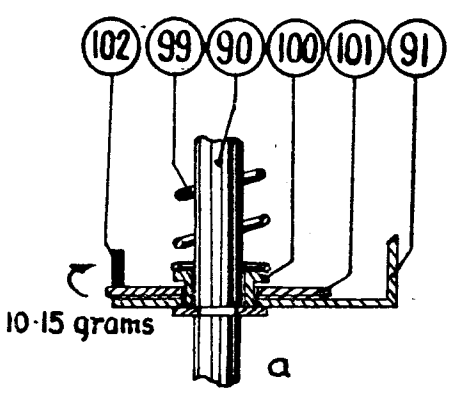




Muting switch contacts (114-115) are closed (across the pick up until the changing cycle is completed.







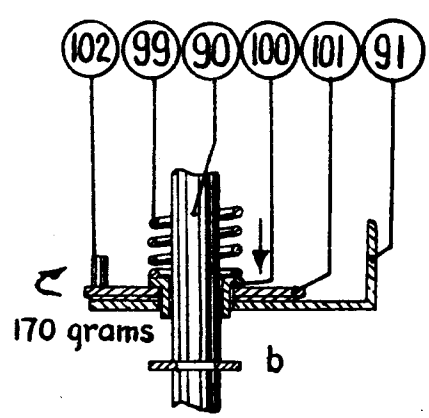
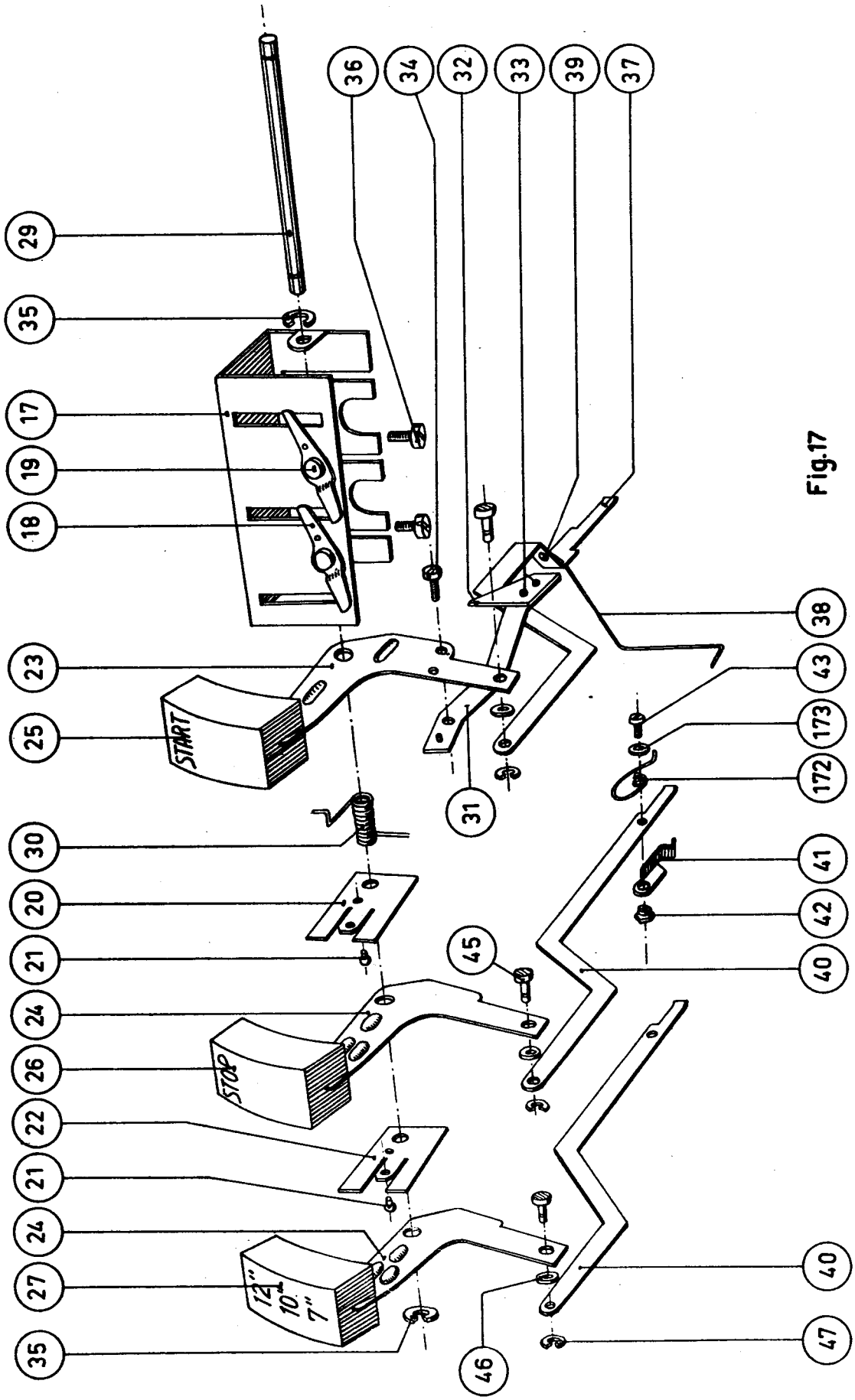


Fig.5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START
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173
172
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STOP
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21
24
27
12"
10"
7"
40
35
46
47

Fig.17

STARTING MECHANISM ADJUSTMENTS (Fig. 3): The movement of spring 38 in the slotted hole of bracket 151 should be free. The distance between spring 38 and trip crank 144 should be 3 m.m. If necessary, bend spring 38.

Rotate the turntable until the end of feeler lever 143 is free of the cam on the underside of the turntable and the lever can move freely. Press in the "start" button and hold it down. Push in the trip crank 144 so that movable tooth 139 comes out of pinion 137. At this point the spring 38 must still be touching trip crank 144. The whole movement of trip crank 144 should be very free.

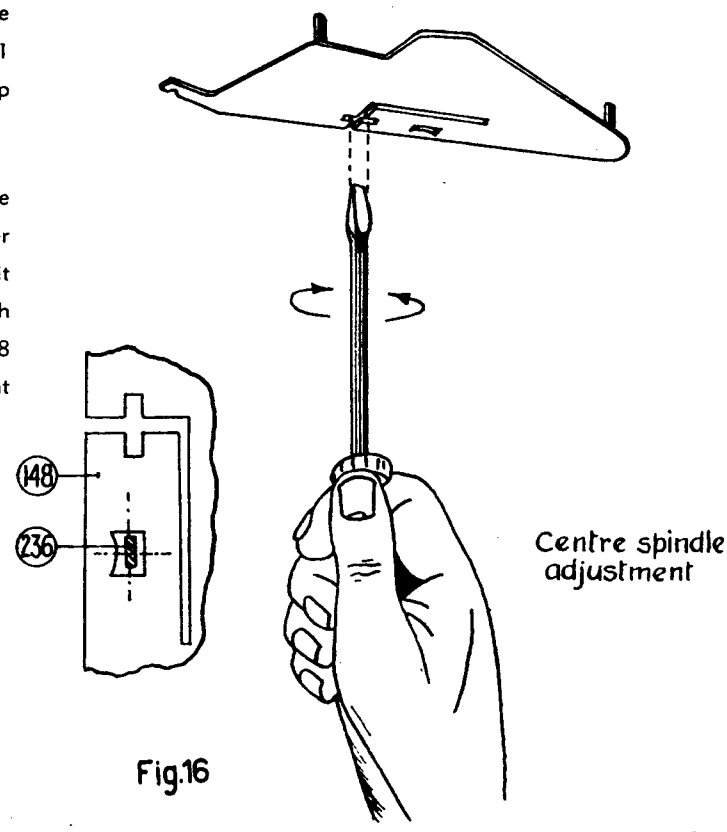
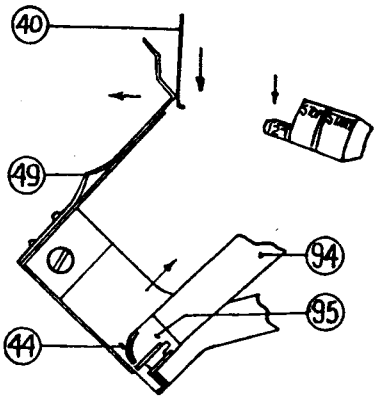


Fig.16

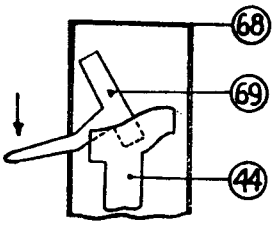
RECORD SPINDLE ADJUSTMENTS (Fig. 16): The end of the spindle 236 must not be tight in its hole in plate 148.

If necessary, bend the tongue on the plate 148 with a screwdriver as shown. The need for this adjustment is shown by the failure to drop records.

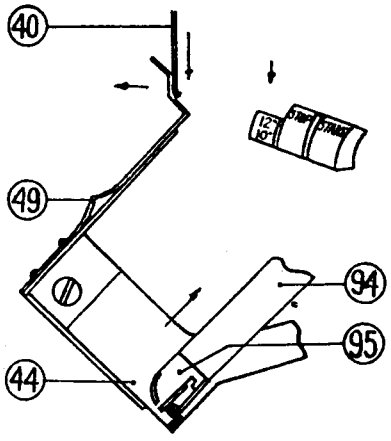
CAM SHAFT ADJUSTMENT (Fig. 19): The cam shaft 124 should not have any axial play. If it has, irregularities in control of pick-up arm and record dropping can arise. The metal bracket which carries the pick-up muting switch (located under the plastic housing 68) is also arranged to prevent axial play in the cam shaft. This bracket should be adjusted to remove axial play, but at the same time not be so tight as to restrict rotational movement. Lubricate with graphite grease.



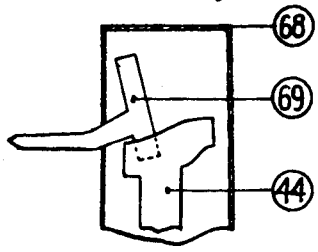
Lever Fully down



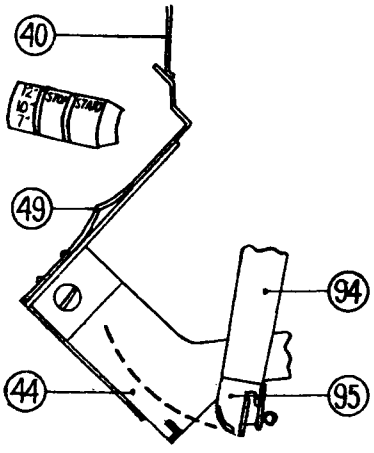
12" Position



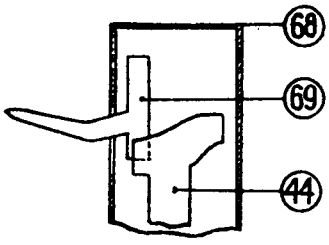
Lever Partially down



10" Position



Lever Unmoved



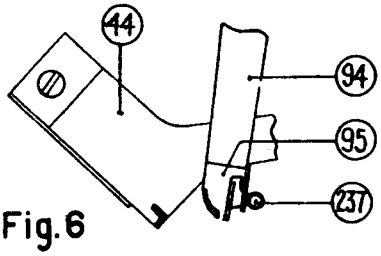
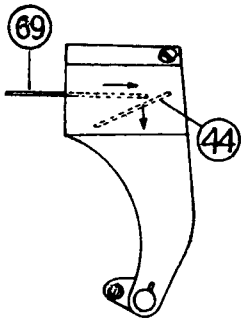


Fig. 6



7" Position

STOPPING MECHANISM (Fig. 7) : When the impulse of the stylus running into the run-out portion of the groove of the last record triggers the changing cycle, the operation is normal except that instead of a record dropping, the overarm 75 drops.

This causes hook 80 to position itself in the way of the pick-up arm 54. Then instead of the arm moving out, it is held in position over its rest. When the pick-up lowering portion of the cycle is in operation, the arm is lowered on to its rest and this causes the mains switch to open and switch off the changer.

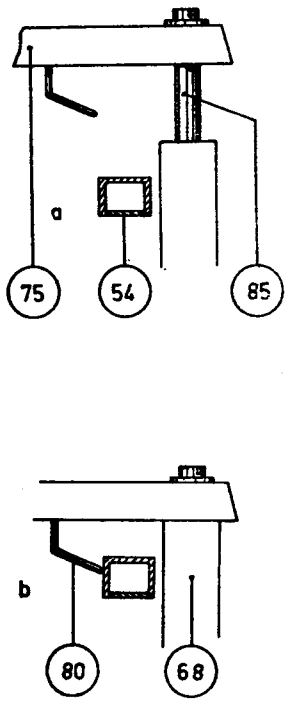


Fig.7

MANUAL STOP (Figs. 8 and 9) : When the "stop" button is pressed down, arm 40 moves forward carrying spring loaded and movable hook 41 with it. As the pick-up arm moves outwards to clear the last played record, it moves bracket 91 and also stop bracket 93 which is attached to it.

By the time the pick-up arm has moved fully outwards, i.e., above its rest, bracket 93 has positioned itself behind hook 41.

This prevents the inward movement of the pick-up arm after the next record has dropped, and then when it is lowered it comes down on its rest and thus stops the changer.

ACTION ON "REJECT": When the "reject" button is pressed, the changing cycle is immediately started just as it is for "start," except that the switch contacts are already made. The pick-up lifts from the record and swings out, the next record drops, the pick-up sets down on to it and playing commences.

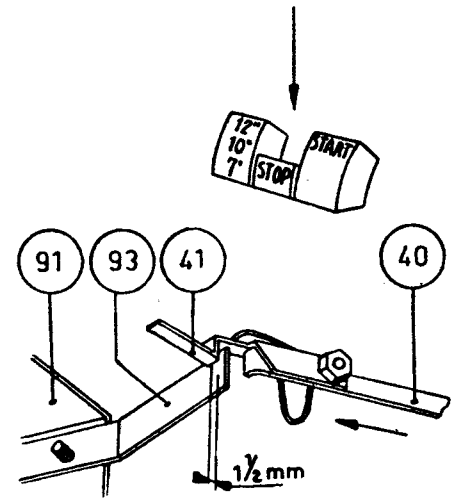


Fig. 8

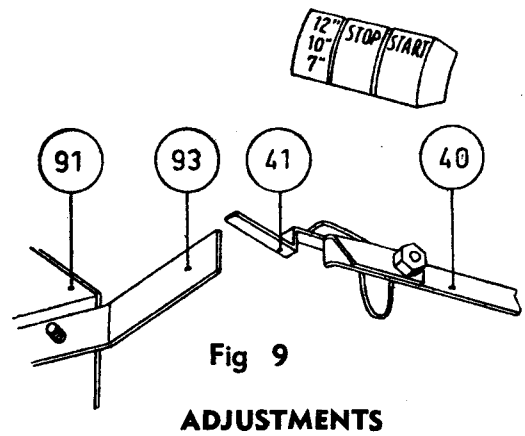


Fig 9

ADJUSTMENTS

STYLUS SETTING-DOWN POINT (Figs. 6 and 10) : The use of Philips Test Record D99051L will considerably assist with these adjustments.

Before making any adjustments the following points and clearances should be checked.

(a) Press the "start" button. In this position the distance between spring plate 49 and lever 40 (on diameter selection button) should be about 0.3 m.m. As the "start" button is released the leaf spring 50 should be able to follow lever 37 for about 3 m.m. If necessary bend spring 50 so that this is so. The need for this adjustment would be shown by the failure to set down correctly on a 7" record.

(b) Press the diameter selection button to 12" (right down).

There should still be some small anti-clockwise movement available in bracket 44. When bracket 44 is turned fully anti-clockwise, the distance between spring 49 and lever 40 should be from 1 to 1.5 m.m. If necessary, adjust by bending bracket 48. The need for this adjustment would be shown by the failure to set down correctly on a 12" record.

(c) Movement of bracket 44 in either direction is limited by the cut-out in the frameplate. A check should be made to see that it touches the frameplate on either side. If it does not, it indicates a fault inside the pillar moulding such as bracket 44 deformed and touching the moulding, or lever 69 bent and preventing normal movement of bracket 44.

PICK-UP HEIGHT ADJUSTMENT (Fig. 14): The highest point of travel of the pick-up should bring the stylus 26.5 m.m. above the felt of the turntable. If this is not so, turn screw 62 fully out. Loosen screw 65 and move bracket 63 on spindle 90 to a position where the stylus is 25 m.m. above the turntable felt. Tighten screw 65. Screw in screw 62 until the stylus is 26.5 m.m. above the turntable felt.

The need for this adjustment is shown by the failure of the pick-up to clear the record stack (too low) or by the fouling of stop 80 (too high).

In the "at rest" position, the stylus point should just clear the felt of the turntable. This then obviates damage if the pick-up should come down on the turntable. Adjustment for this is given by bending the lip of bracket 63.

OVERARM ADJUSTMENT (Fig. 15): The overarm shaft 85 should move freely in pillar 68. Check for bent shaft, also lubrication (ball-bearing grease, very lightly smeared).

Put a record on the record spindle and check that it is horizontal. If necessary the angle between the shaft and overarm can be corrected by careful bending.

If the overarm also drops with the last record, move it more toward the record spindle by slackening screw 87, repositioning the overarm on shaft 85 and tightening screw 87.

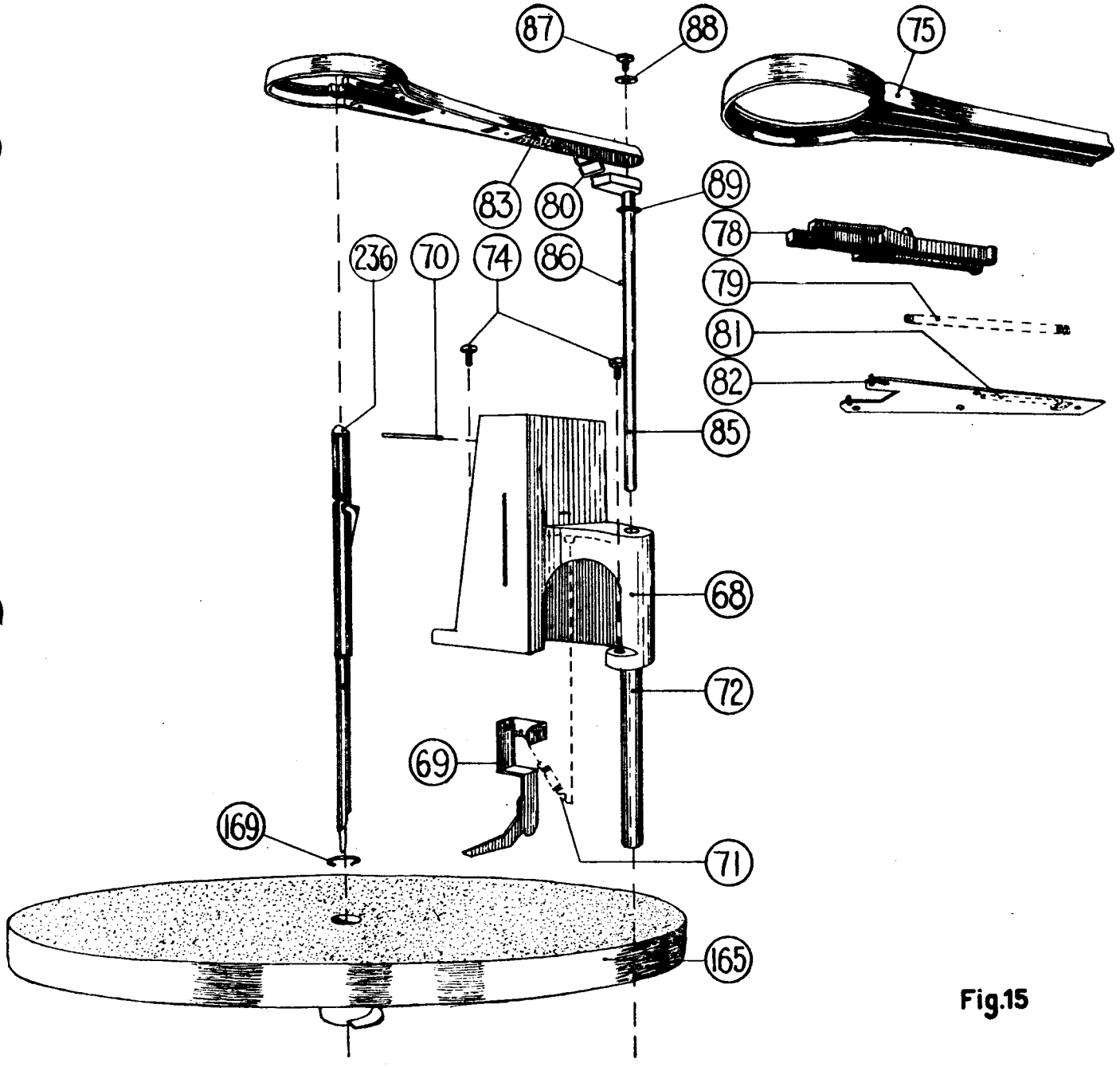
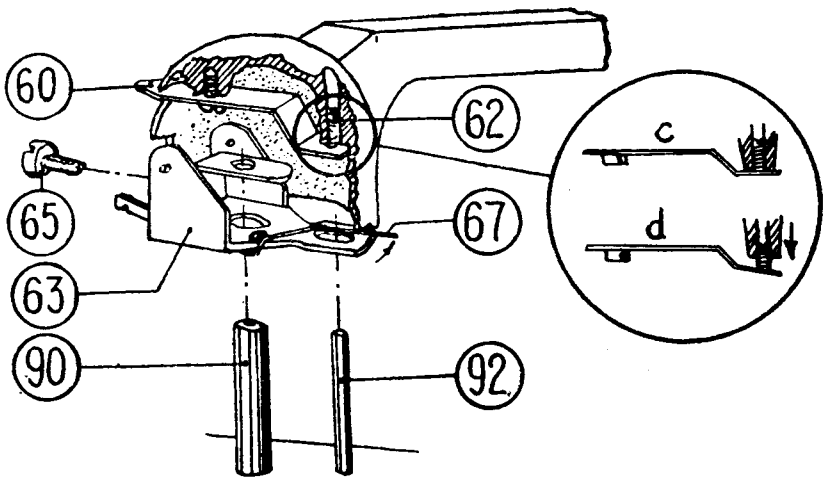
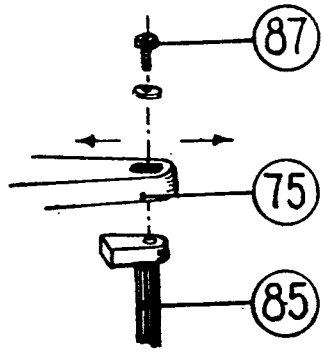
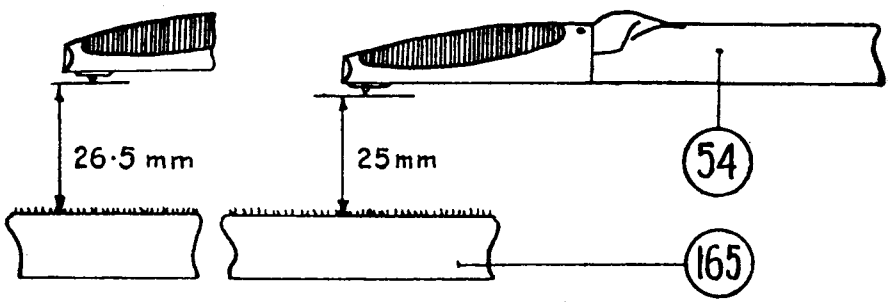


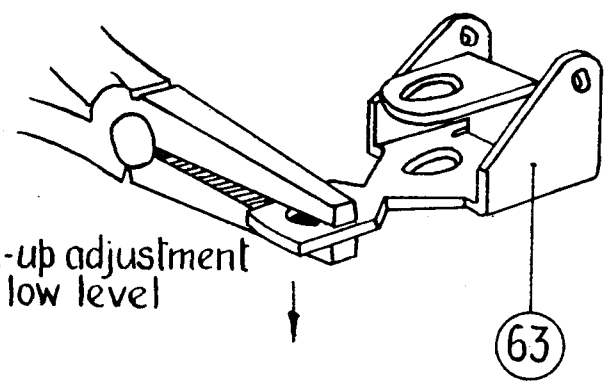
Fig.15





Pick-up height adjustment





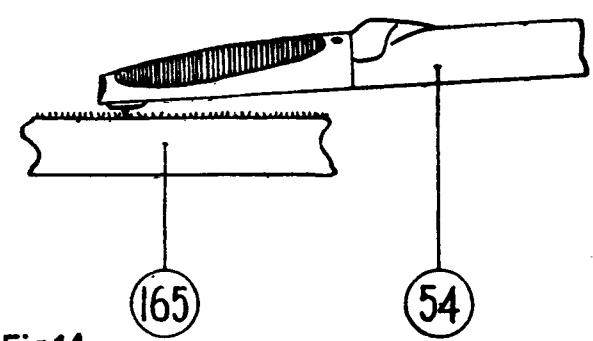
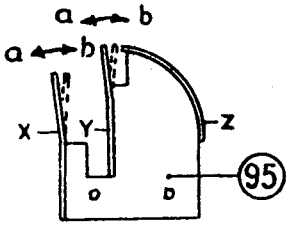
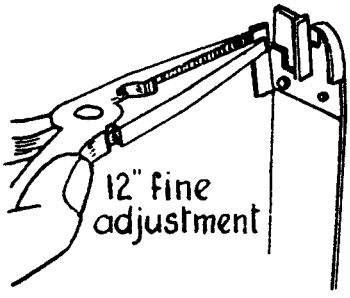
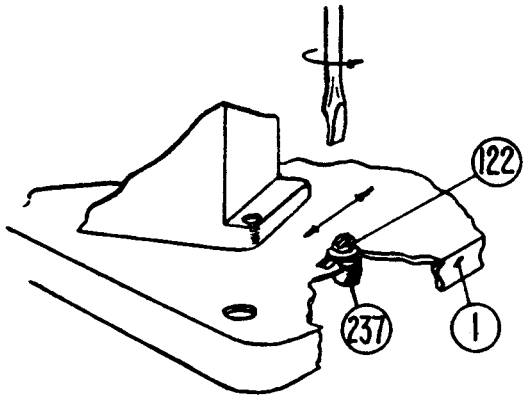


Fig.14

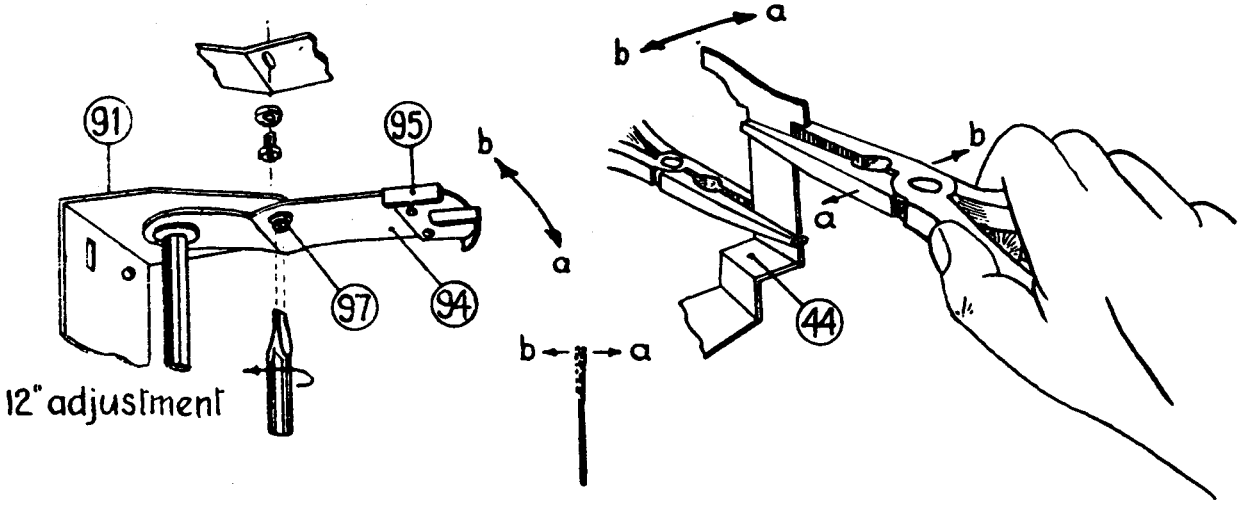


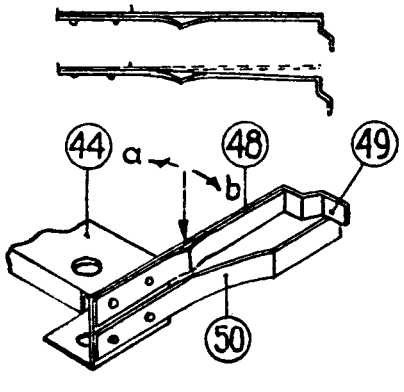
10" and 12" adjusting tongues





7" Stop adjustment





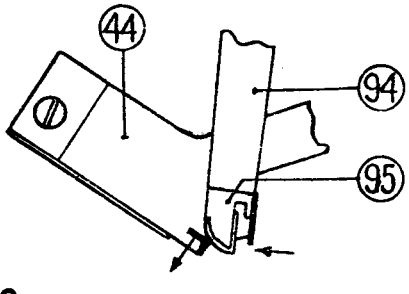
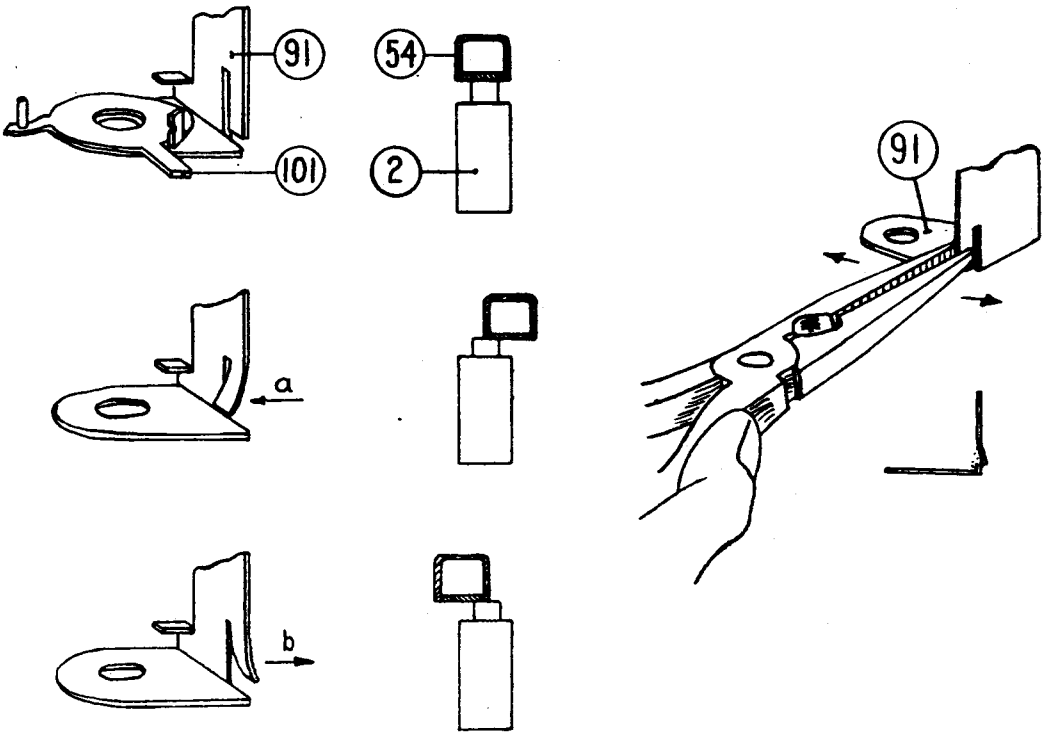
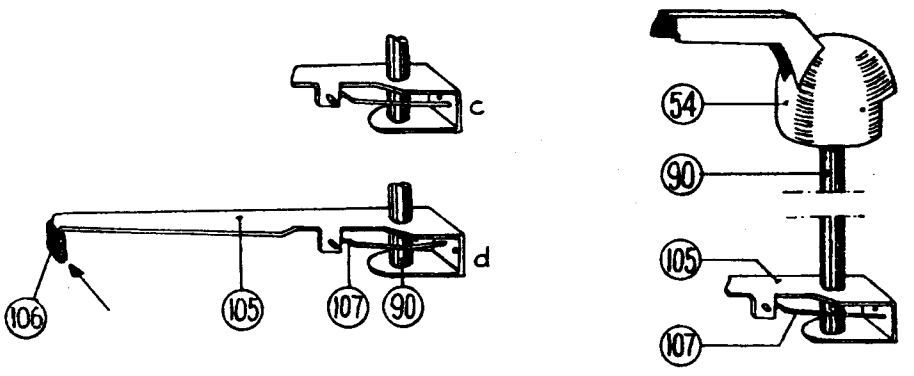
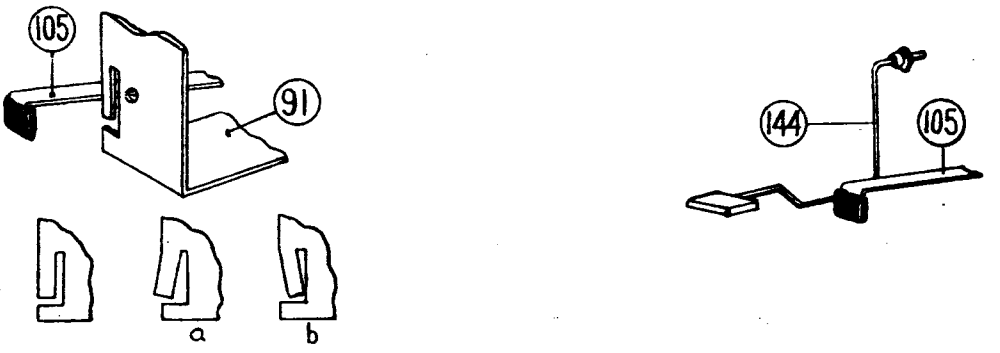


Fig.10



Pick-up rest position adjustment





Knock off lever adjustment

Fig.11

Again, the need for this adjustment would be shown by the failure to set down correctly on either 7" or 12" records. After checking the above, adjustments to alter the individual setting down points may be made.

12" RECORDS: If the adjustment needed appears to be fairly large, slacken screw 97 and adjust plate 94 in respect to bracket 91 until correct setting down is obtained. A fine adjustment is provided by bending tongue "X" on bracket 95.

10" RECORDS: Before making this adjustment, check that the 12" adjustment is correct. Fine adjustment of the 10" position is given by tongue "Y" on bracket 95.

7" RECORDS: The 12" adjustment must be correct before attempting this one. It is provided by moving the position of stud 237 in the slotted hole of the frameplate.

PICK-UP RETURN ADJUSTMENT (Fig. 11): This adjustment ensures that the pick-up arm will return centrally over its rest, thus being in position to come down on the switch pin in the stopping operation.

The distance out the pick-up arm moves is set by the point at which bracket 101 contacts bracket 91. This is adjusted by a lip on bracket 91. Check also "Pick-up Trip Adjustment" below.

PICK-UP TRIP ADJUSTMENT (Fig. 11): When the stylus is 65 m.m. from the centre of a record, the "knocking-off" lever 105 should just touch trip crank 144. If necessary adjust by means of the tongue on bracket 91. Check also "Pick-up Return Adjustment" above.

If this adjustment does not prove sufficient the friction between lever 105 and spindle 90 can be adjusted by means of spring 107. Two holes in the back end of lever 105 are provided for this adjustment.

STOPPING MECHANISM ADJUSTMENT (Figs. 12 and 13): As there are two methods of stopping the changer, manually and on playing the last record, there are two adjustments to be checked. Before proceeding though, check on "Pick-up Return Adjustment" above.

(a) **For Manual Stopping:** Position the pick-up half-way across a record. Press in the "stop" button and by rotating the turntable and moving the pick-up by hand, trigger the mechanism. The pick-up arm should return to its rest. If it does not do this, check the engagement of bracket 93 in latch 41. If adjustment is necessary, bend bracket 93.

(b) **For the Last Record:** With the last record on the turntable, the pick-up should be able to move across it freely without impediment from the stop 80. If necessary the stop should be bent upwards to clear the pick-up arm. On playing the last record the overarm should drop and then stop 80 should be in a position to hold back the pick-up arm. If necessary the stop should be bent downwards. Check playing of last record.

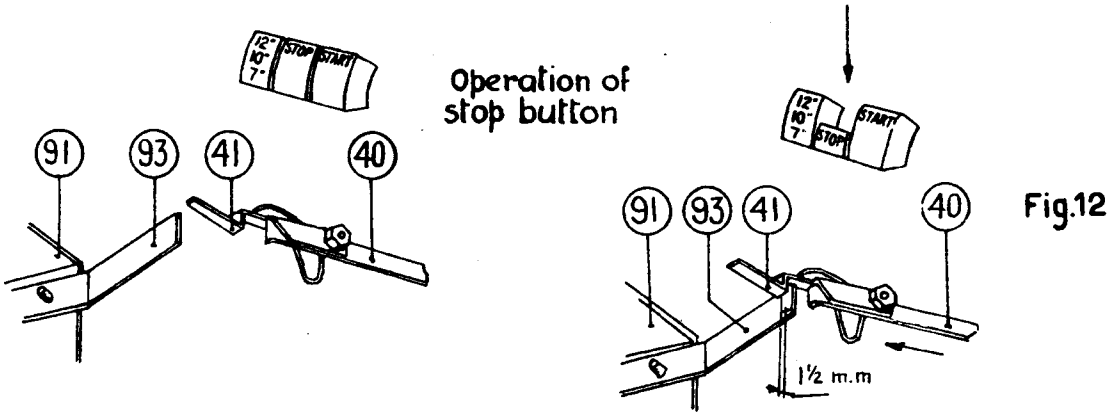


Fig.12

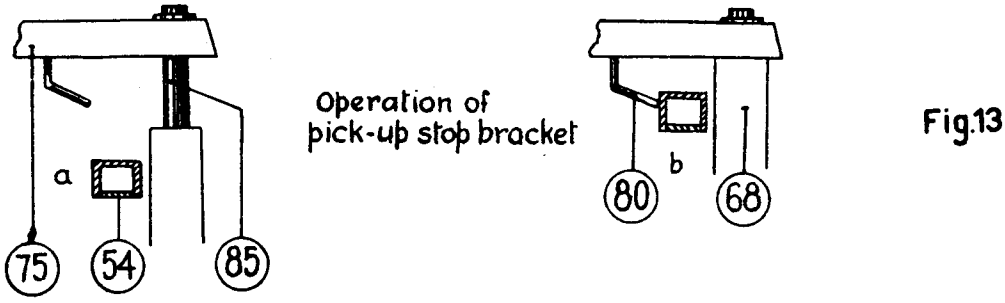


Fig.13