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Ministry of Health & Family Welfare
New Delhi

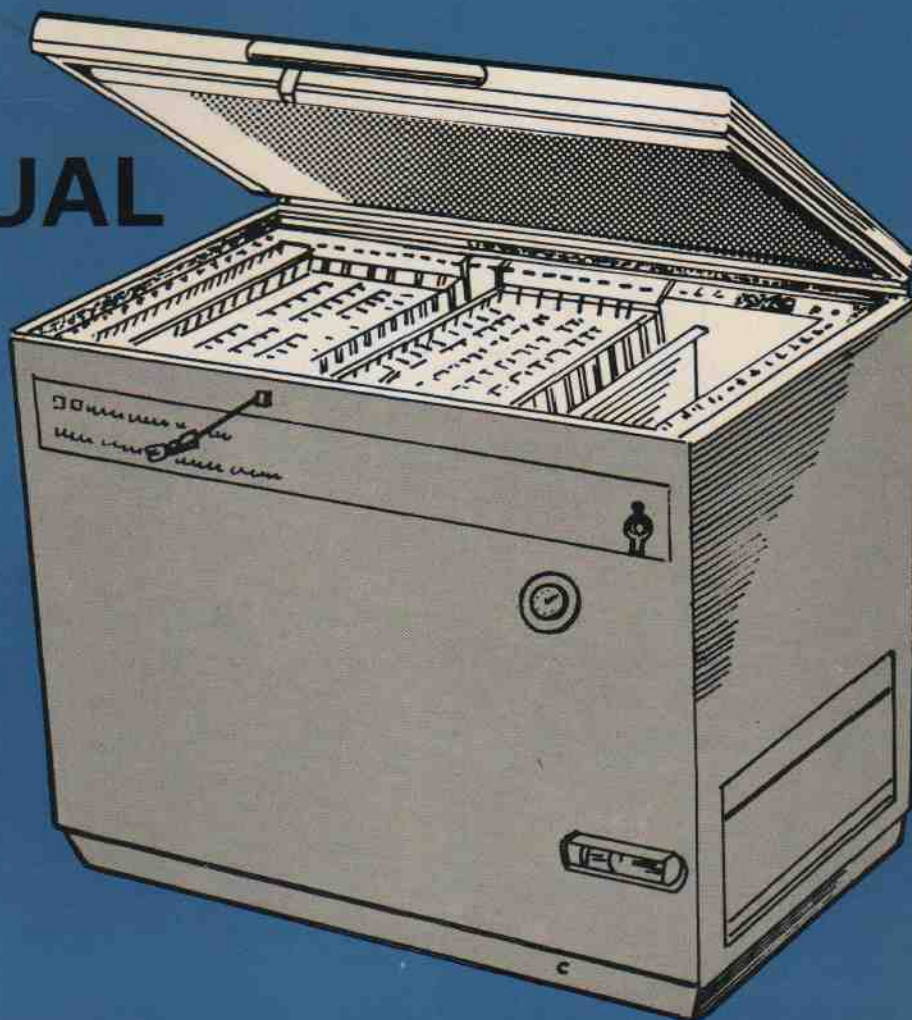
Transport & Equipment Management Section



UNICEF House, 73 Lodi Estate
New Delhi-110003.



USER MANUAL

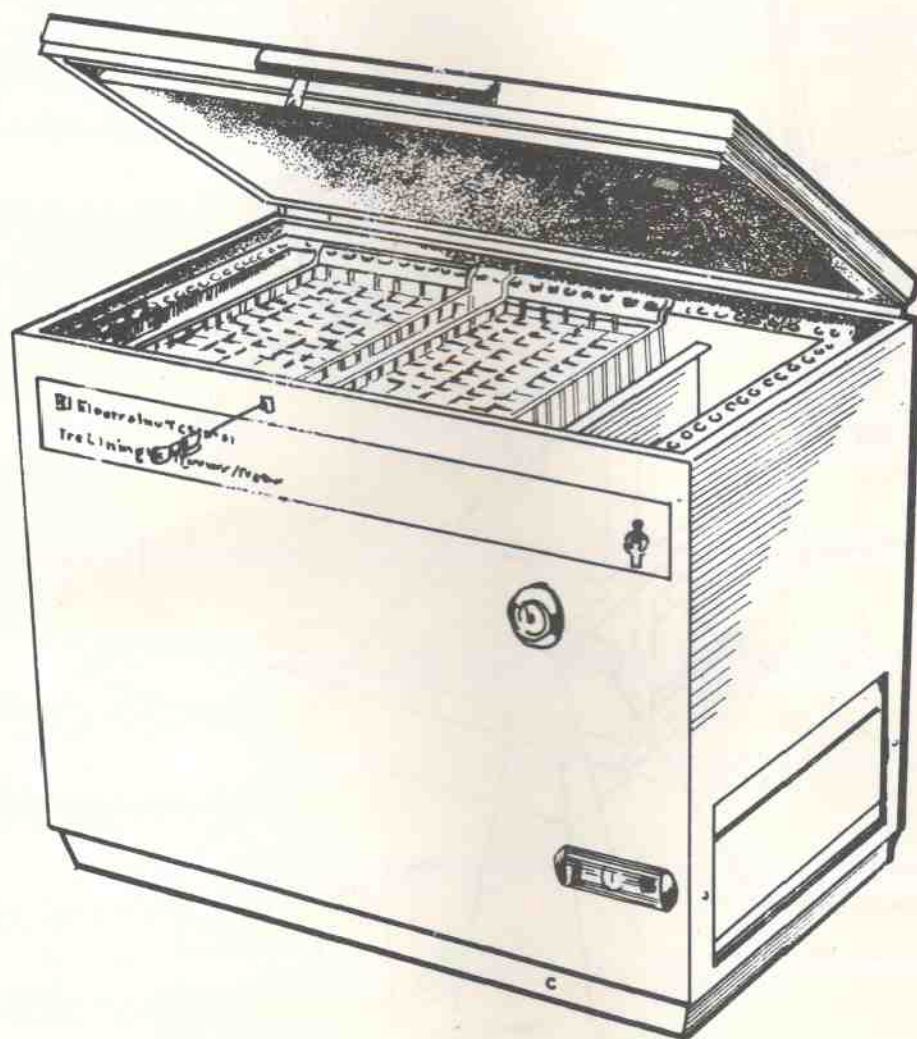


Electrolux

TCW 1151

ICE LINING REFRIGERATOR/FREEZER

USER MANUAL

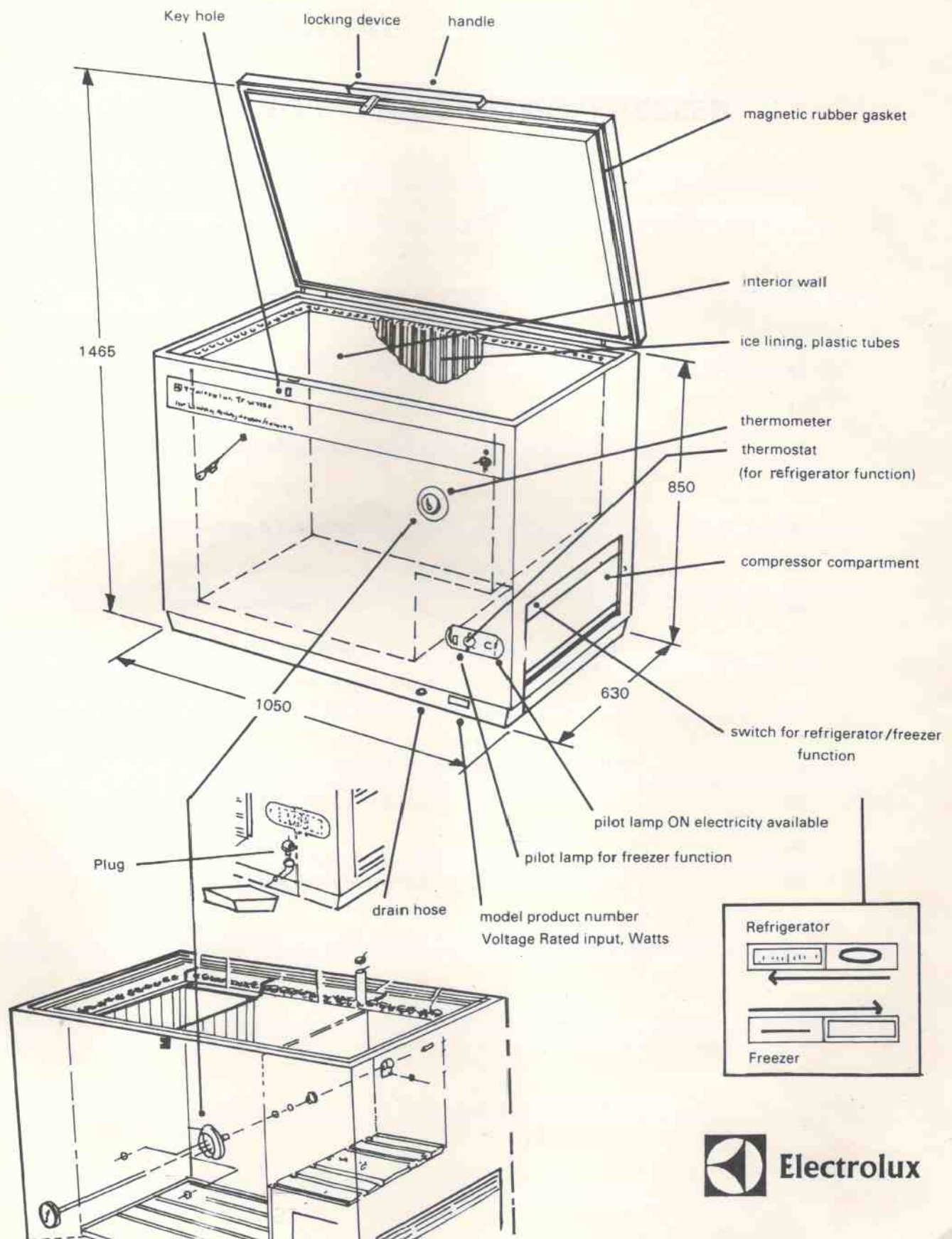


TCW1151

ICE LINING REFRIGERATOR/FREEZER

UNICEF, ROSCA, New Delhi

Ice Lining Refrigerator/Freezer TCW 1151



 **Electrolux**

USER MANUAL

ICE LINING REFRIGERATOR/FREEZER

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ICE LINING REFRIGERATOR/FREEZER

GENERAL INFORMATION:

The ILR:

One of the most important links in the cold-chain is Ice Lining Refrigerator (ILR). This is an unit which operates on the principle of vapour compression system, similar to any conventional compressor type refrigerator operating on 220 volts, A.C. mains supply. However, the ILR has top opening door to prevent loss of cold air during door opening.

Ice Lining:

As its name suggests, the ILR has a bank of frozen ice on all the four sides, inside the cabinet. The ice-lining consists of plastic tubes with water frozen during its operation. During periods of power failure and load-shedding, the ice bank acts as cold storage to protect the vaccines stored in the ILR. The ice-lining keep the temperature of the vaccine below +8°C even if electricity is available only for 8 hours a day. It has also been tested that at constant ambient temperature of 43°C the ice-lining ensures that the cabinet temperature is not above +8°C for 40 hours.

Power supply:

The ILR is fitted with heavy duty compressor which requires low starting current and also can operate within a range of voltage variations. Though the normal operating voltage is 220 volts, 50 Hz., A.C., it can work even when the supply voltage occasionally go as low as 150 volts or as high as 280 volts.

Thermometer:

To enable to measure the temperature inside the cabinet without opening the lid, a thermometer is provided with its dial on the front side. This makes monitoring of the vaccine temperature easy.

Locking system:

Inside the handle of the lid, there is a locker bar which can be swung out. The lock with the key in position is to be inserted through the hole in the bar from the front. When the key is turned and taken out, the ILR is locked. Some ILRs have conventional refrigerator lock.

Power-supply arrangement:

For smooth functioning of the ILR it is advisable to connect the same to a 15 Amps power plug socket outlet, wired from the mains with PVC insulated cables of minimum 2.5 mm² section of Aluminium. (see page.11 under 'Installation' also). The larger size of the plug and socket decreases the contact resistance, which in turn reduces voltage drop and provides an easy path for the current.

Safety of the personnel and the equipments can not be guaranteed unless the earth wire (green/yellow) of the cord is really earthed. It is advisable to get the earth connections to the socket checked by competent electrician.

Voltage Stabilizer:

Though the ILR is capable of operating within a wide range of voltage variations. for extra safety, one separate Automatic Voltage Stabilizer should be used with it.

Other Technical Informations: ILR, Electrolux, TCW 1151

Unipac code No. 11 23020

Normal voltage — 220 Volts, A.C.

Cycles/sec. — 50 Hz

Starts at low voltage - 150 Volts

Not damaged by high voltage- upto 280 Volts

Normal starting current - 8.7 Amps.

Normal wattage - 225 Watts

Consumption of electricity at 43°C/15°C ambient:

As refrigerator: 0.6 - 1.4 kWh/24 hours,

As freezer : 1.9 kWh/24 hours

Ice making capacity as freezer - 5 kg./24 hours

Cabinet insulation - 55 to 60 mm of polyurethane

Approximate 'energy leakage' 210 kJ/h at +43°C ambient.

Capacity:

The net volume of the refrigerator compartment is **about 200 lts.**

Dimensions:

Dimensions: 105 x 63 x 85 cm (LxBxH)

Net Weight:

68 kg.

UNPACKING

1. Examine the packing of the ILR before opening. If it is found to be damaged, inform transporter and concerned authorities accordingly.

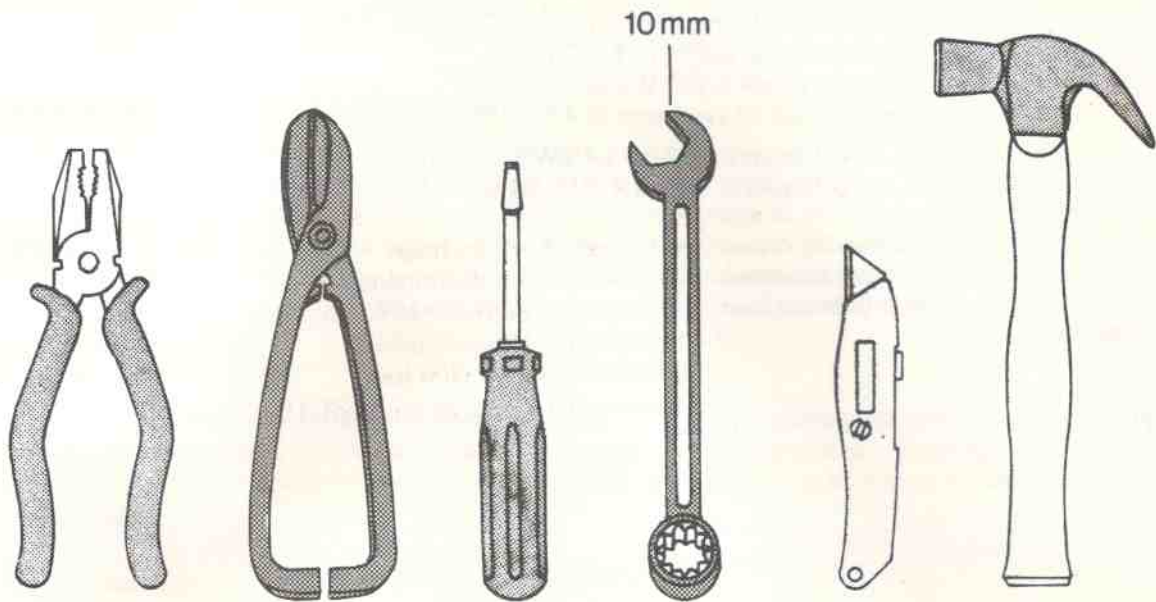


Fig. 1

2. You may need some tools, such as pliers, cutter, screw-drivers, spanner (10 mm), knife, hammer etc. for opening the packing and installing the ILR (fig.1)
3. Place the crate containing the ILR at or nearer to the place where it is to be installed, on a level floor and cut off the binding straps. (fig.2)

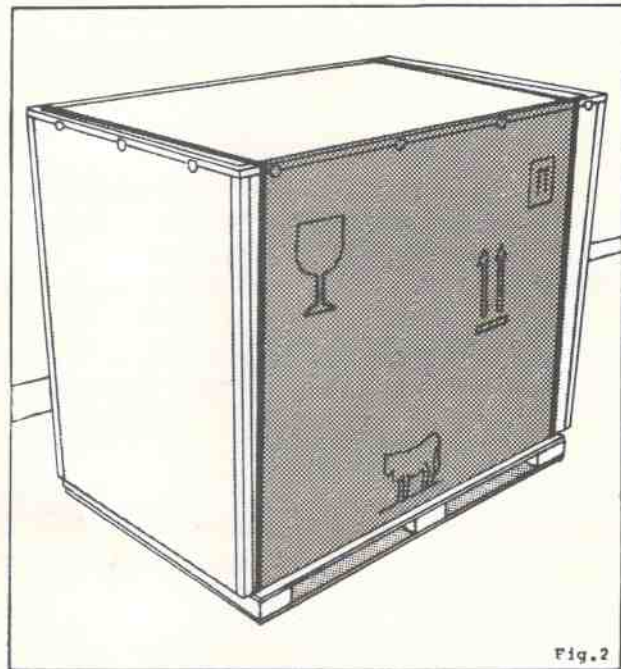
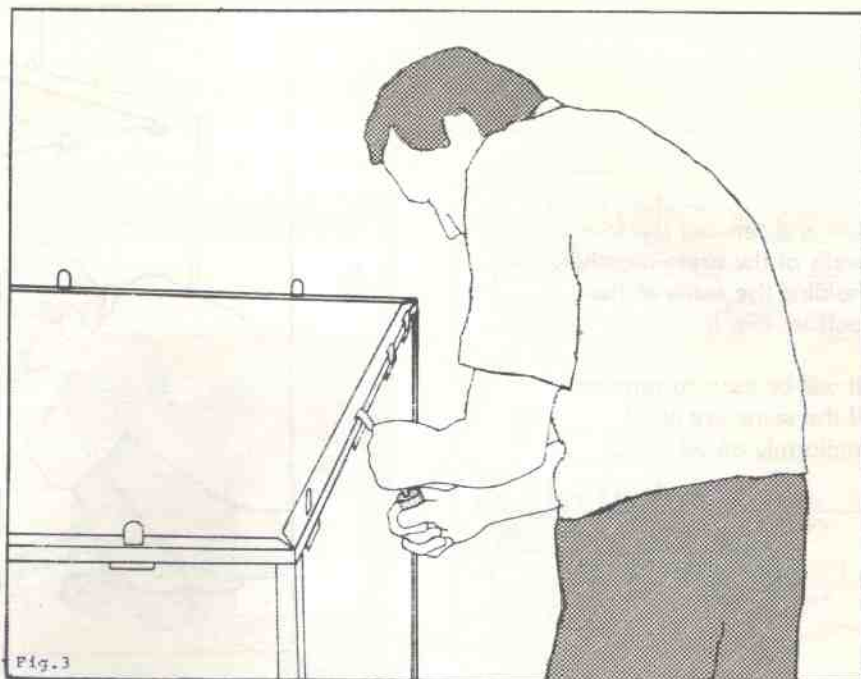
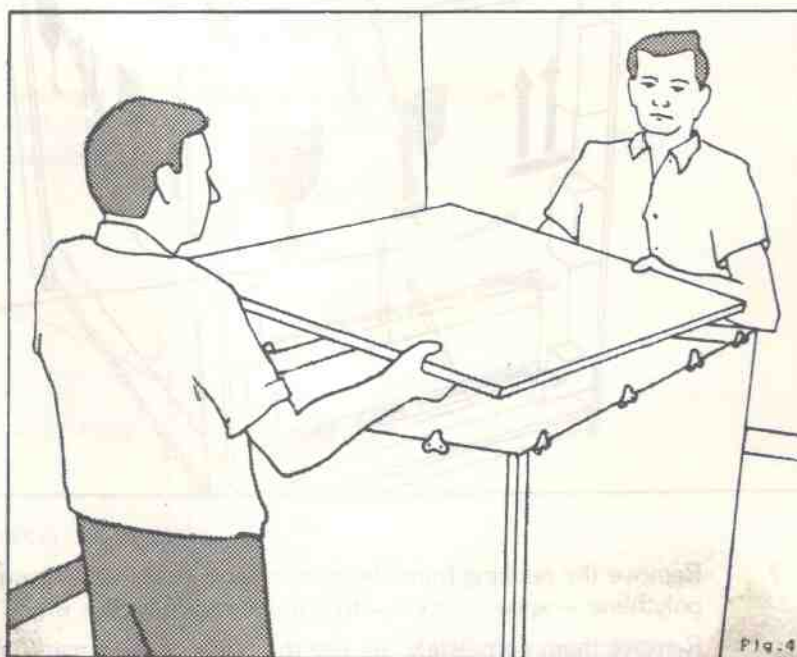


Fig. 2

4. With a screw-driver, straighten the tabs on all sides at the top (fig.3).

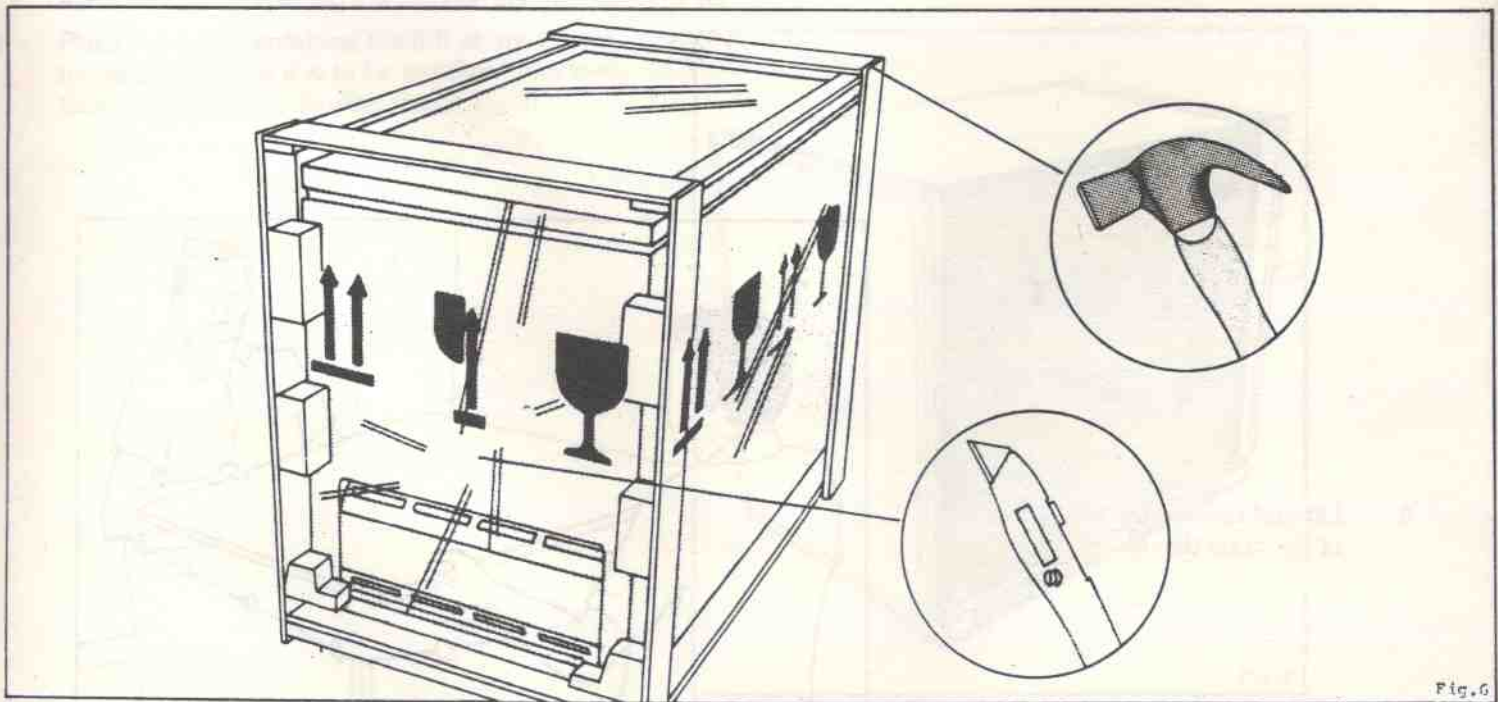
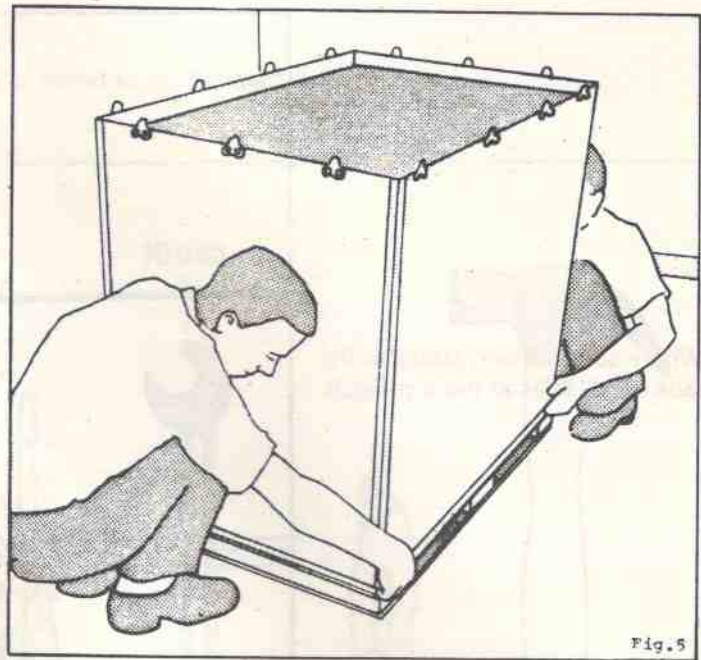


5. Lift and remove the top of the crate (fig. 4)



6. Lift and remove the four walls of the crate together, holding the same at the bottom (fig. 5).

It will be easy to remove if the same are lifted uniformly on all sides.



7. Remove the packing frame by opening the joints with a hammer and cut open the polythene wrapper (cover) with a knife, carefully. (fig. 6).
Remove them completely, so also the other packing materials.

8. Examine for any damage to the equipments physically. Minor dents etc. to the cabinet can be neglected. But if the damage is observed to be of major nature, intimate concerned authorities

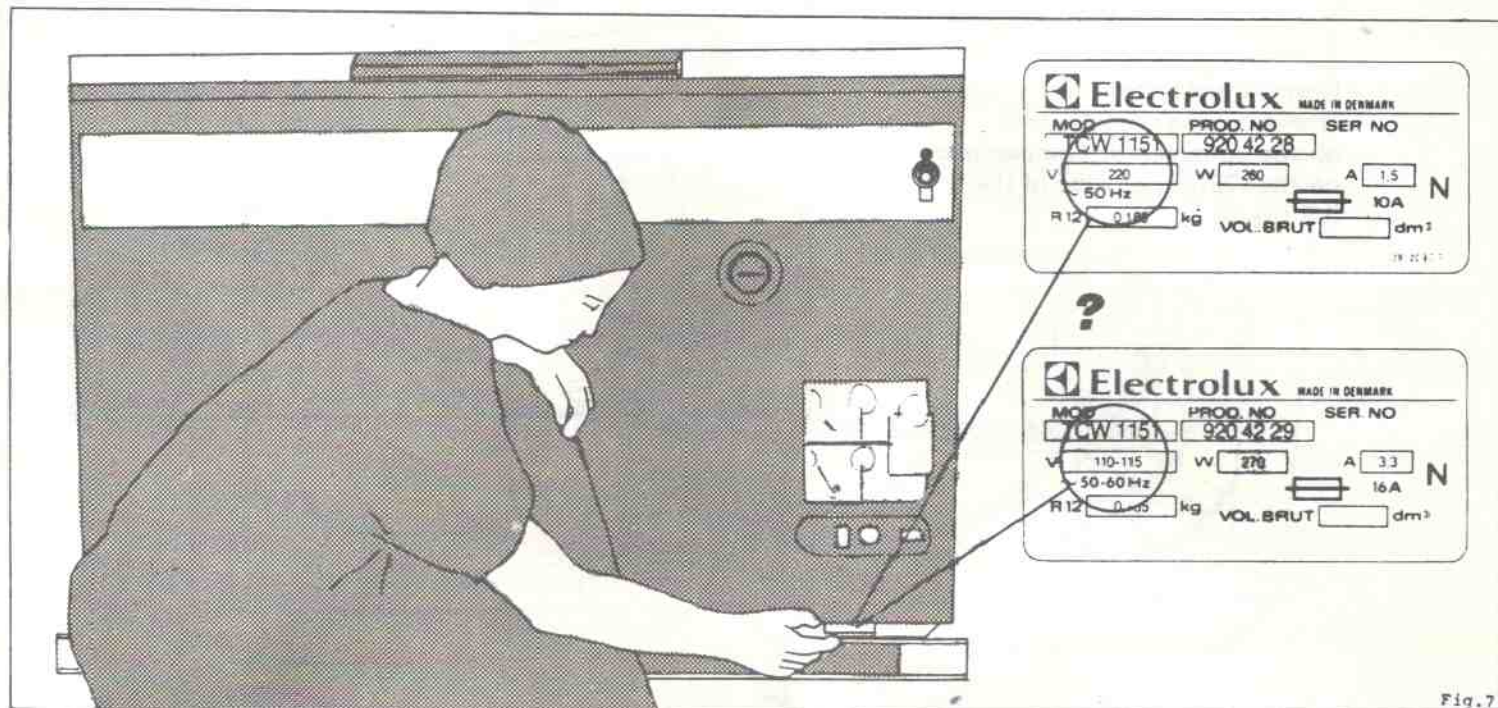


Fig. 7

9. Check the manufacturer's plate, at the front right bottom of the ILR and confirm that the ILR has correct voltage for local supply, i.e. 220 volts (fig. 7).

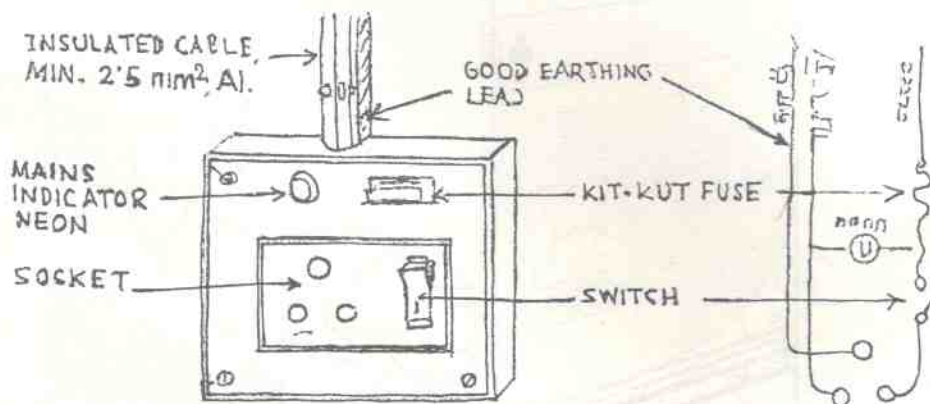
CAUTION:

Connecting the equipment to wrong supply voltage may damage it.

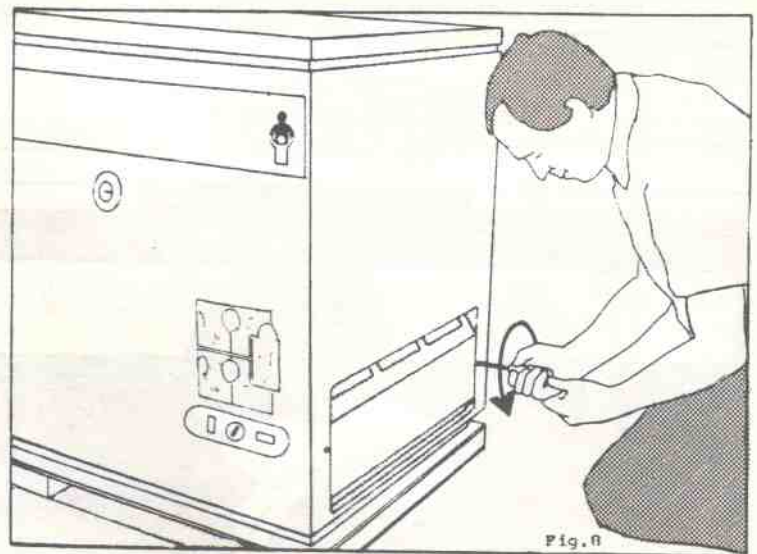
If you have received equipments of wrong voltage ratings, notify concerned authorities and keep the equipments repacked.

INSTALLATION

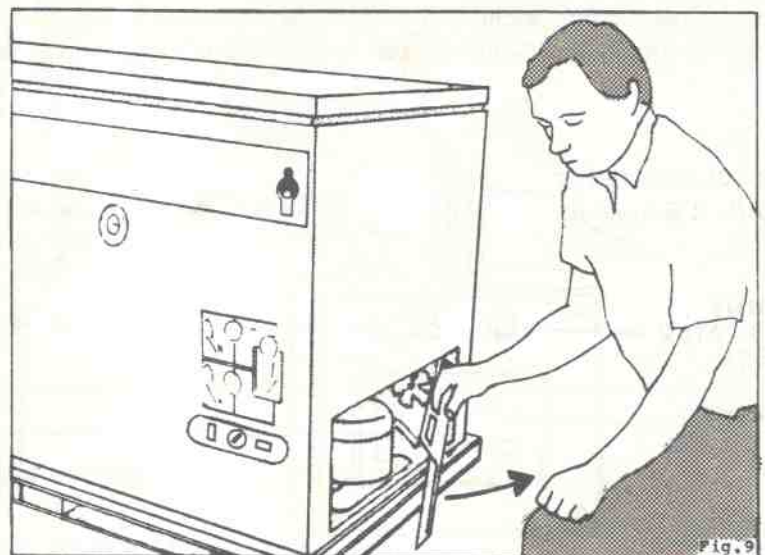
The ILR is to be installed in a well ventilated room, avoiding direct sunshine or any other source of heat. Power-supply socket (15 amps socket with switch, fuse and mains indicator lamp is advisable) should be available nearest to the place of installation of the ILR.



1. Unscrew and remove the screws holding the side-cover on the compressor compartment on the right hand side of the ILR (fig. 8)



2. Remove the side-cover of the compressor compartment carefully (fig. 9)



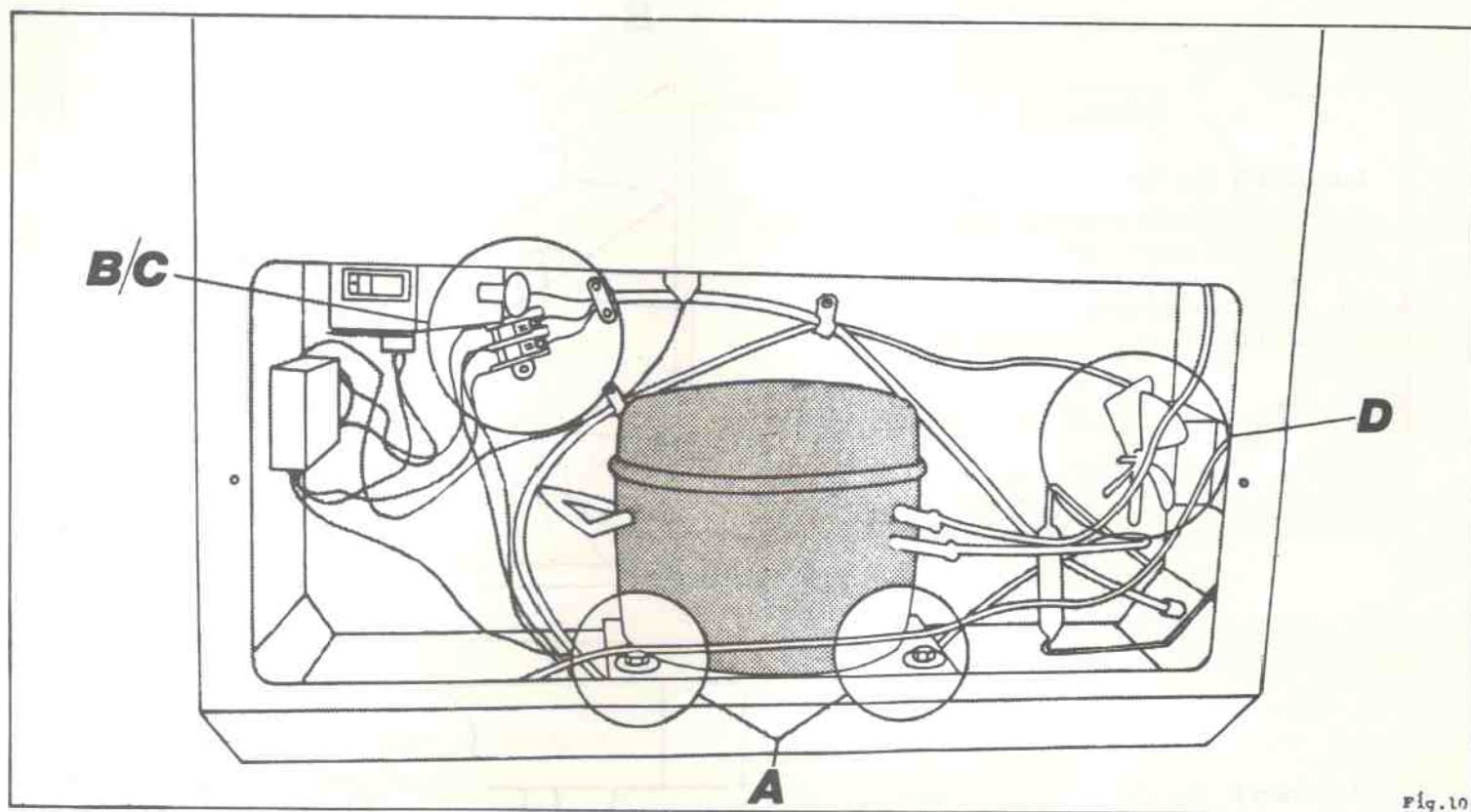


Fig.10

3. EXAMINE the compressor compartment (fig. 10). Check carefully for any damage, dislocation or looseness etc. of the components, specially at locations A, B C and D as below and rectify as necessary.

Location A :(fig. 11)

Check that the mounting bolts of the compressor are tight.

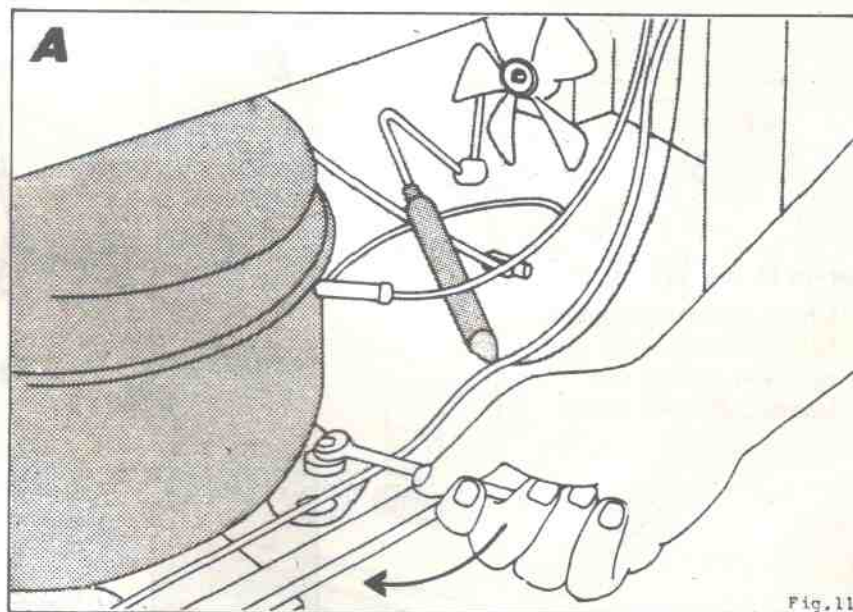
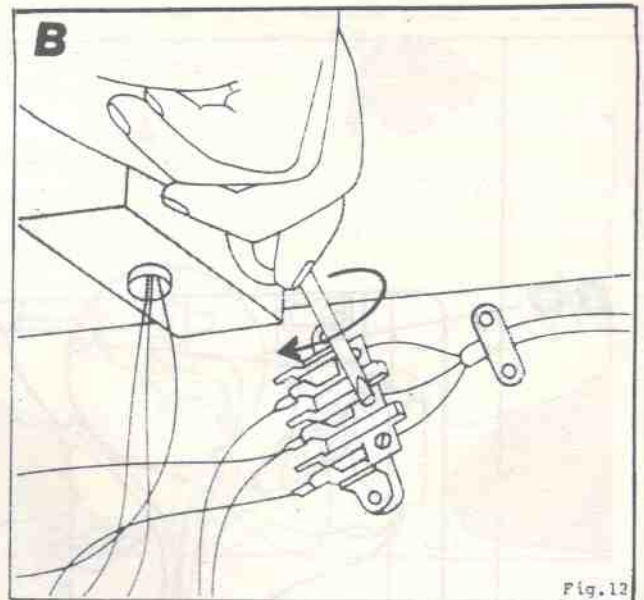


Fig.11

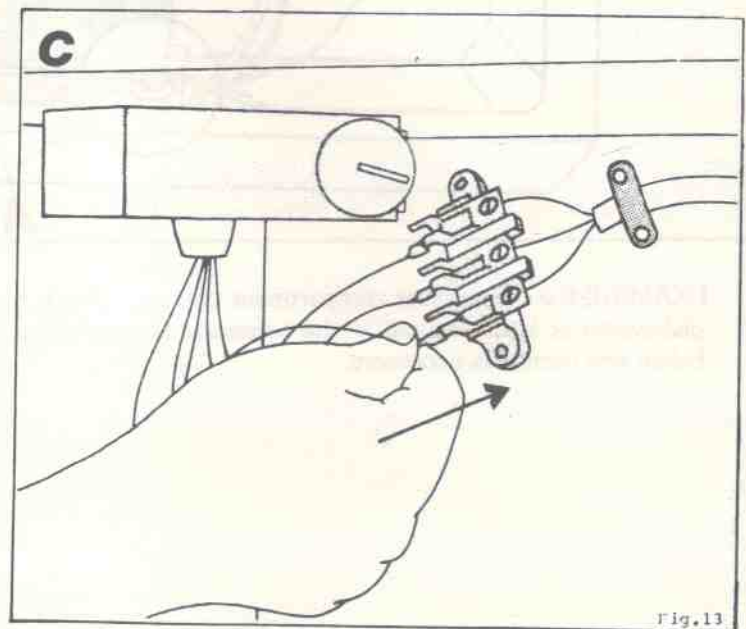
Location B: (fig. 12)

Check that the incoming electrical connections of the power-supply cord to the terminal strip are tight.



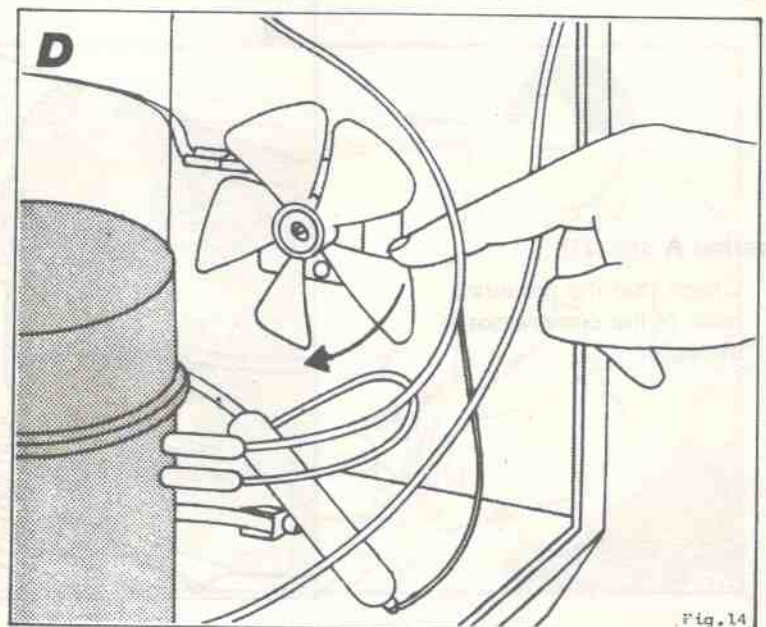
Location C: (fig. 13)

Check that the outgoing electrical connections from the terminal strip are tight.



Location D: (fig. 14)

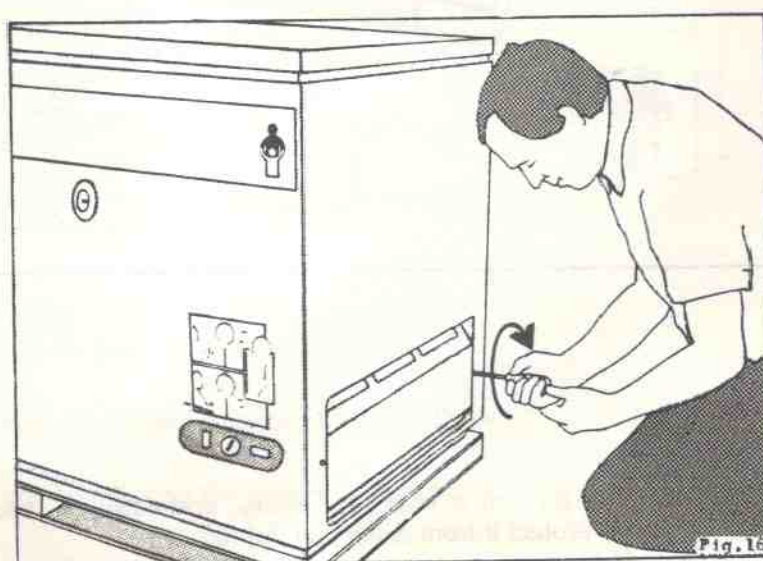
Check that the mounting bolts of the fan are tight and also the fan blades can rotate freely.

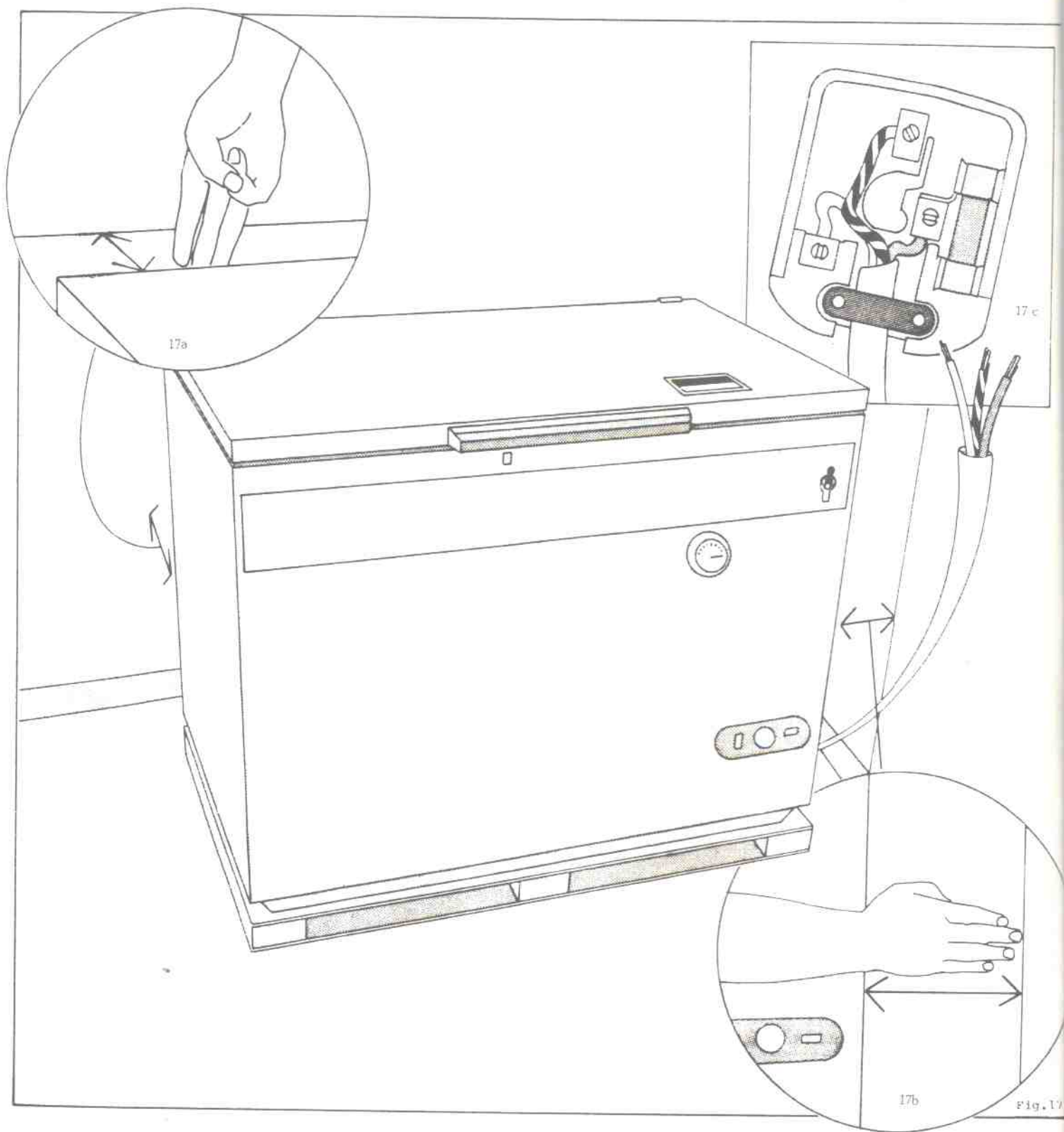


4. Fit back the side cover of compressor compartment into position (fig. 15).



5. Fix back the screws holding the side cover.





6. INSTALL the ILR on a level floor firmly, preferably on wooden blocks or an wooden platform to protect it from damp and dirt (fig. 17).

Leave sufficient space on all sides of the ILR away from the walls for good circulation of air around it, as below :

Back & left side should be **minimum 3 cm.** away from the walls (fig. 17a)

Right side should be **minimum 10 cm.** away from the wall (fig. 17b).

7. Connect the leads of the power-supply cord to a suitable 3-pin plug as below: (fig. 17 c)

Lead of cord

Green/yellow

Blue

Brown

Pin of plug

Earth

Neutral

Phase

CAUTION: DO NOT CONNECT THE 'ILR' TO POWER SUPPLY NOW

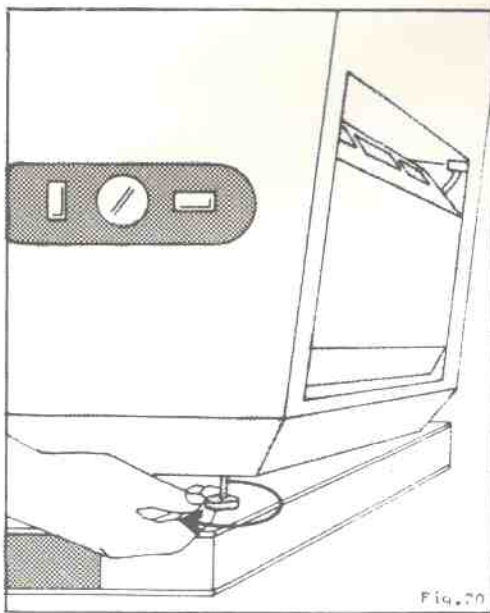


Fig. 17a

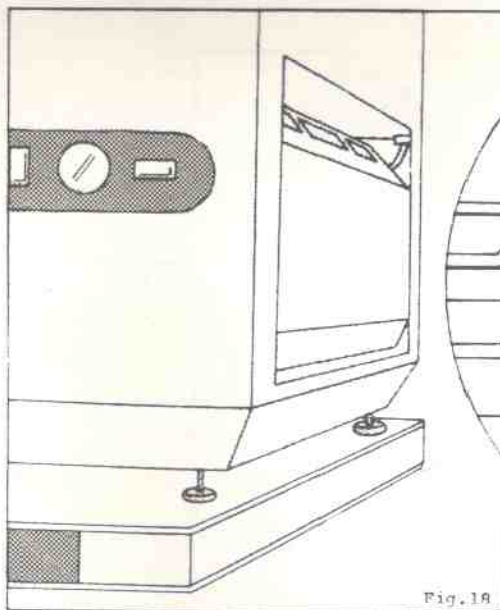


Fig. 17b

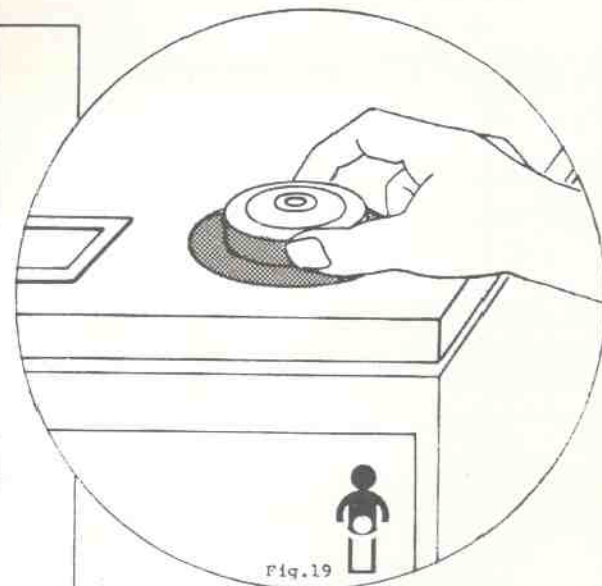


Fig. 17c

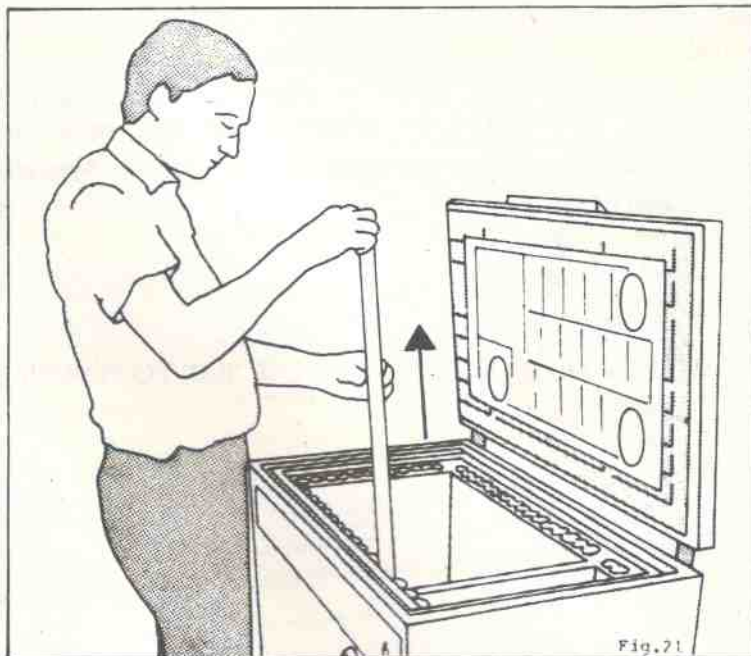
8. There are 4 screws for levelling the ILR, provided on its base. They are located on each corner on its bottom (fig. 18).

Examine the level of the ILR by placing a spirit level, at different parts of its top (fig. 19) or otherwise.

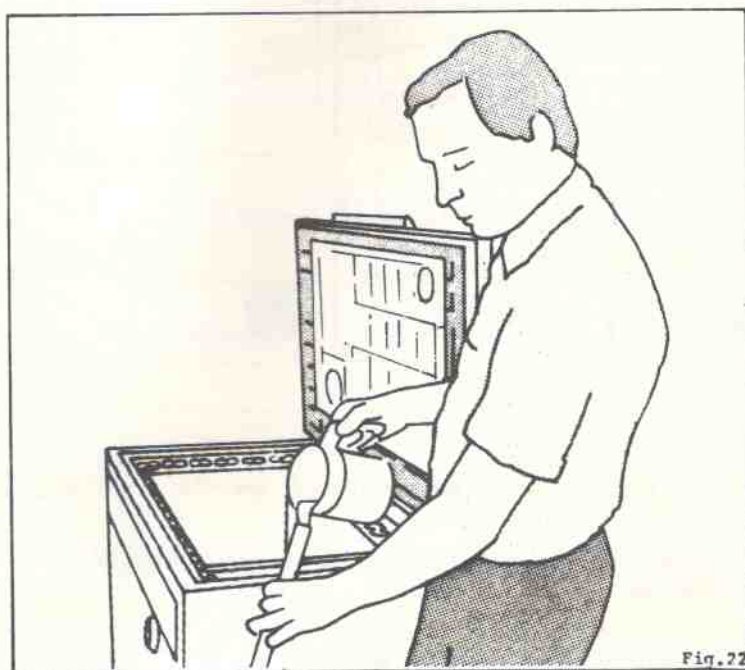
If the level is not proper, then level the ILR properly by adjusting the levelling screws at the bottom, which can be turned with hand (fig. 20).

PREPARATIONS

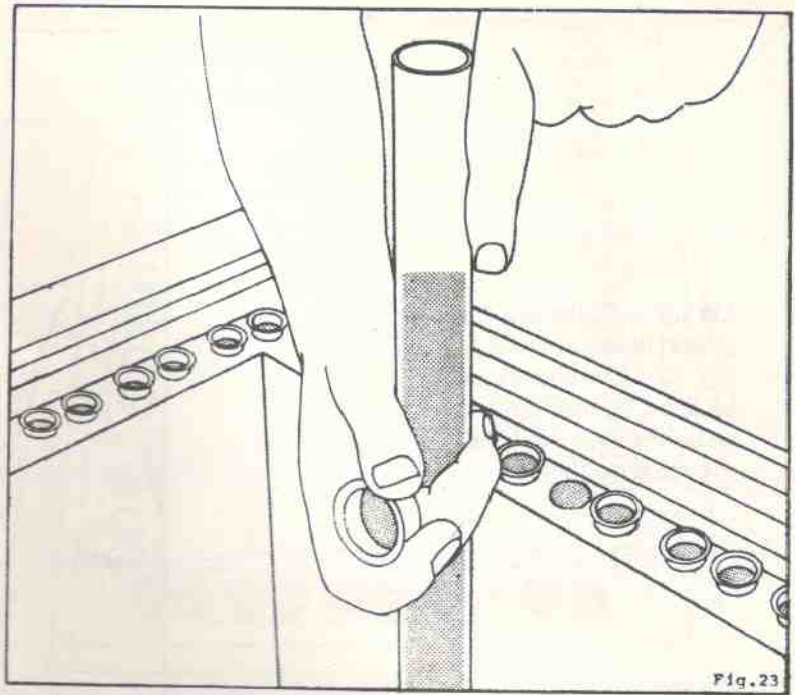
1. Open the lid of the ILR. Pull up and take out a 'plastic' liner tube. (fig. 21).



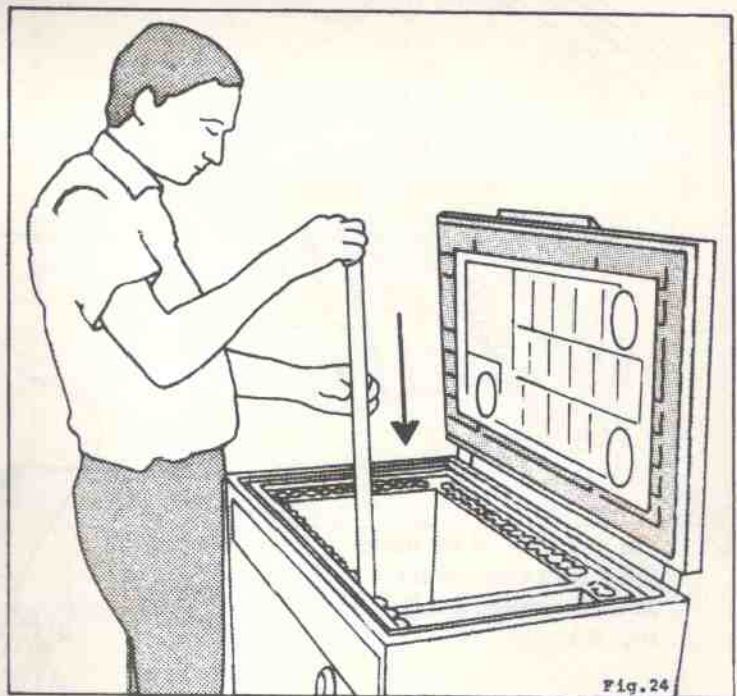
2. Remove the red plug (cap) from its top and pour clean water into the tube. (fig. 22).



Fill the tube with water leaving a space of about 10 cm. UNFILLED at the top. (fig. 23). Replace the red plug. (Examine for any leakage of water. Leaking tubes may have to be repaired or replaced). Wipe out any water on its outside.

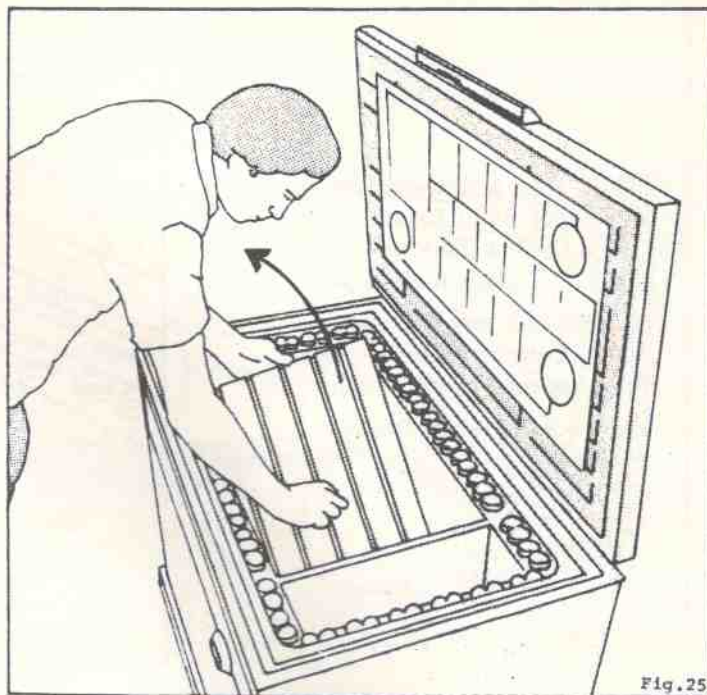


3. Put back the tube into its position slowly and carefully (fig. 24).

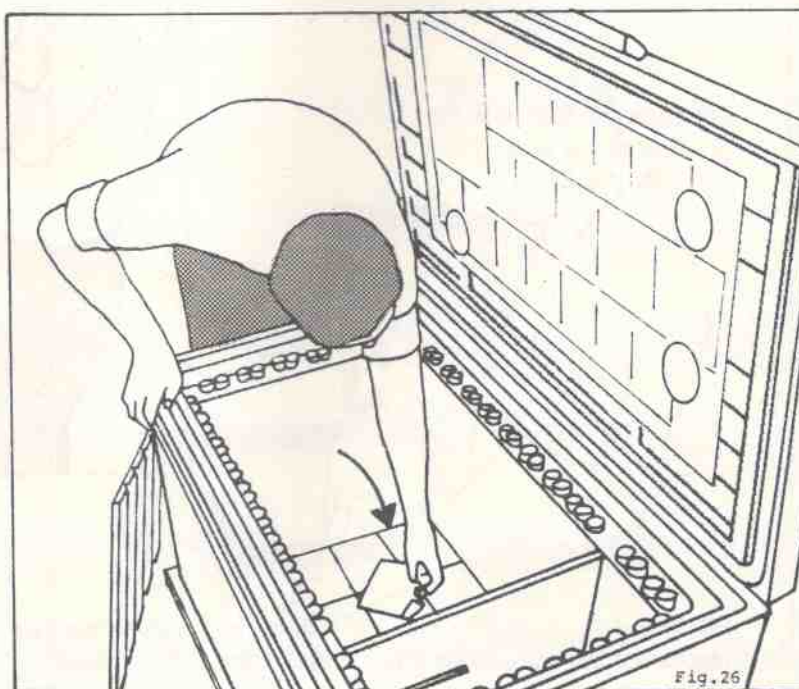


4. Fill all the tubes, one by one, with water, in the same manner and put them back in their places (i.e. repeat actions 2 and 3 above for all the tubes).

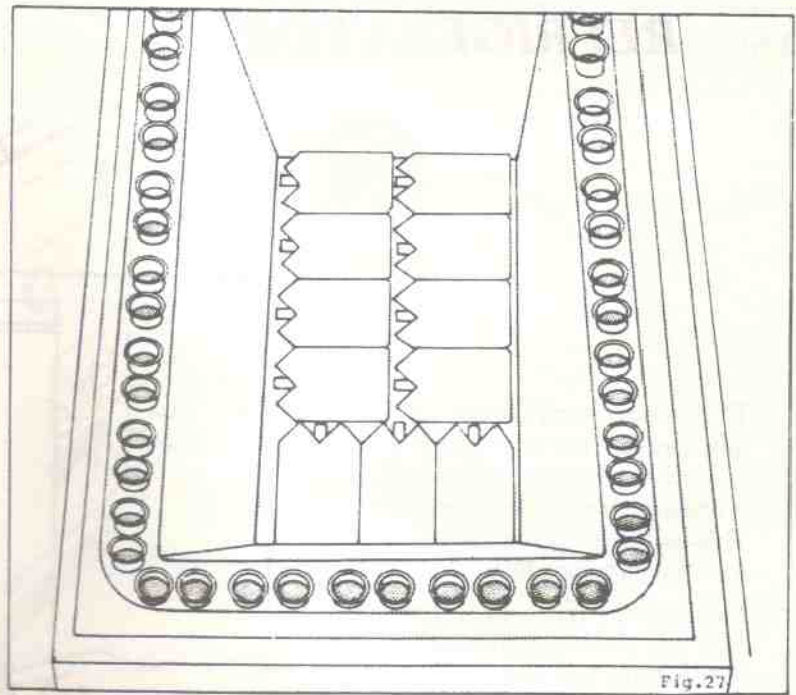
5. Lift up and take out the plastic floors of the ILR (fig. 25). The floors can be lifted by holding the same through the holes provided on them.



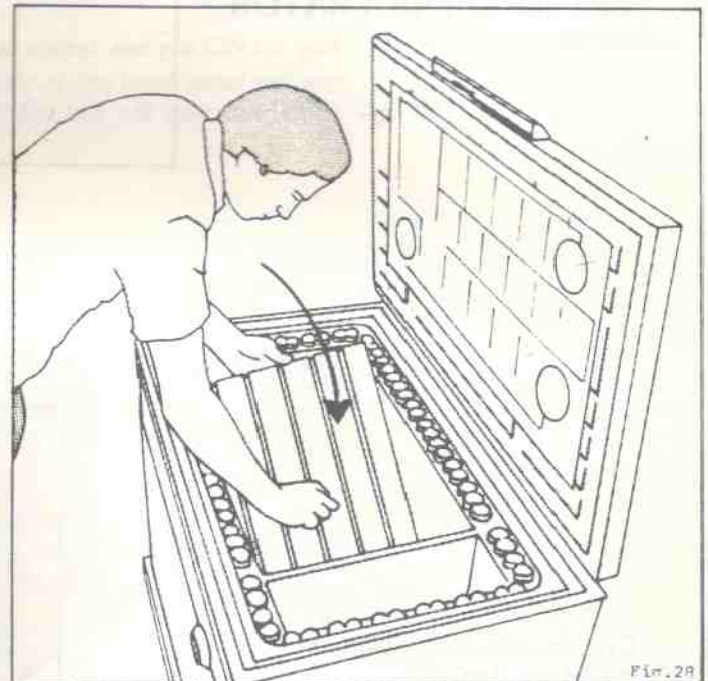
6. Put one layer of ice packs (filled with clean water to their marked level) (fig. 26).



Arrange them neatly and properly to cover the bottom of the ILR. (fig. 27).



7. Replace the floors over the layer of ice packs (fig. 28).



8. Repeat the actions 5, 6 & 7 above for the smaller chamber also.

NOW THE 'ILR' IS READY TO START

Ascertain the required function of your ILR, whether it is to be used as **REFRIGERATOR** or **FREEZER**.

FOLLOW THE CONCERNED INSTRUCTIONS AS GIVEN IN THE FOLLOWING PAGES.

TO USE AS **REFRIGERATOR**

1. The Refrigerator/Freezer function selector switch is located at left upper portion in the compressor compartment. This switch is accessible from outside (fig. 29).

Normally the ILR is delivered with this switch set for Refrigerator function.

Examine this switch, and if required, shift it to the **LEFT for REFRIGERATOR** function.

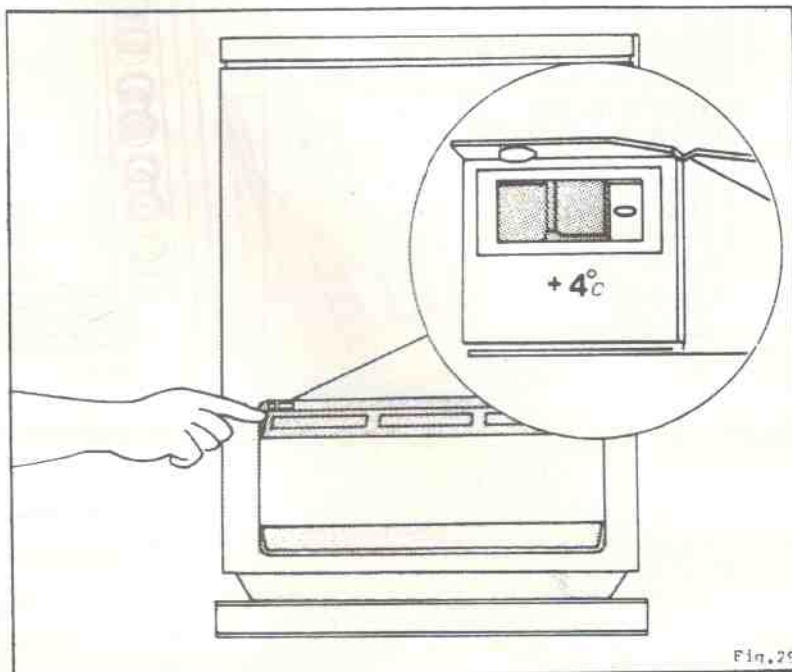
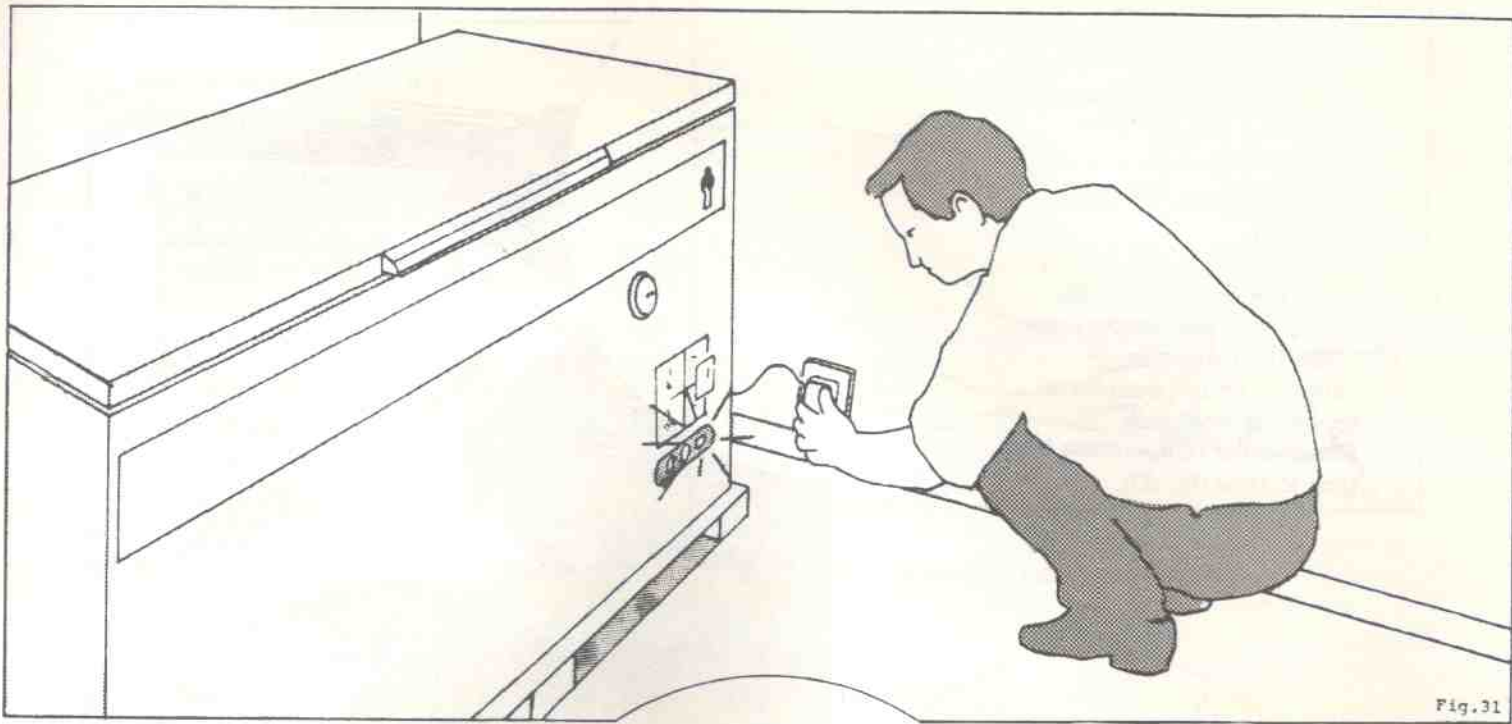


Fig. 29

2. Examine the display plate on the lid if it displays 'Refrigerator' function. If not, slide it out from its frame, reverse and put it back to display 'Refrigerator' function (fig. 30).

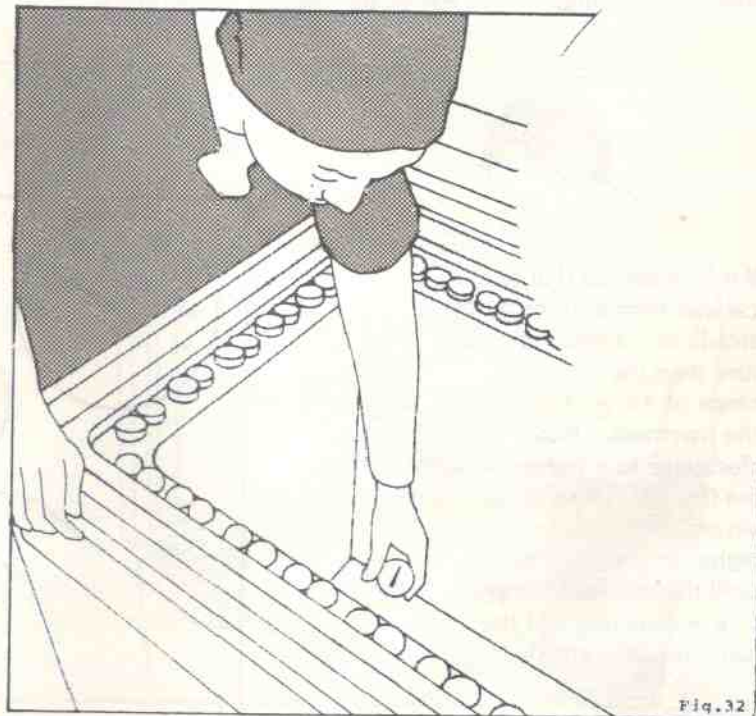


Fig. 30



3. Connect the plug of the power supply cord to the wall socket and put ON the switch, if any. The **'yellow'** indicator light on the right hand side of the front panel will glow, indicating availability of power supply to the ILR and the unit will start functioning (fig. 31).

4. Keep a separate dial thermometer at the bottom of the ILR to measure the actual temperature in the bottom portion. The temperature near the bottom is normally lower than that in other portions. (fig. 32).



5. Close the lid and allow the ILR to run. The temperature inside the cabinet is indicated on the thermometer on the front side. Observe the temperature from time to time (fig. 33).



Fig. 33

6. Initially the temperature inside the ILR will be observed to be similar to or slightly below the room temperature. It should decrease slowly and should remain steady within a small range after a day or two.
7. The control thermostat for adjustment of the ILR to the recommended temperature, is located between the 2 indicator lamps on the front panel. This has settings from 1 to MAX (maximum). To change the thermostat setting, its knob can be turned by means of a coin inserting in its groove.

Higher the setting, colder will be the cabinet temperature.

- (a) If it is observed that the cabinet temperature remains steady at a **higher** temperature than the required range of $+4^{\circ}$ to $+8^{\circ}\text{C}$, turn the thermostat knob clockwise to a higher setting (fig. 34). Observe for several hours. Select more higher setting, if required, until the required temperature is obtained and the same remains steady.

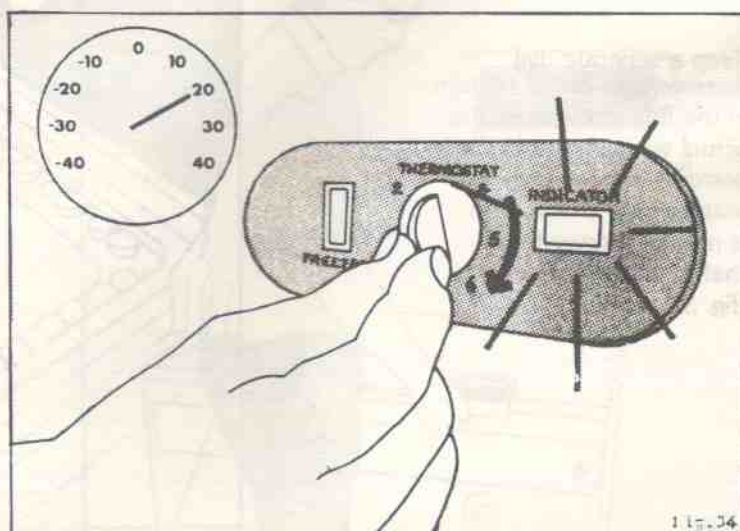


Fig. 34

- (b) If it is observed that the cabinet temperature has gone **lower** than the required range, turn the thermostat knob anti-clockwise to a lower setting (fig. 35). Observe for several hours. Select more lower setting, if required, until the required temperature range is obtained and the same remains steady.

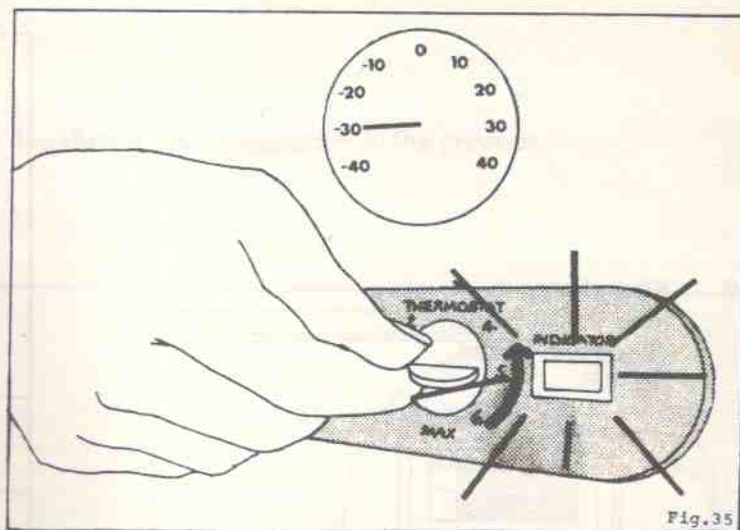


Fig. 35

NOTE: If the thermostat is turned anti-clockwise beyond setting 1, it may go off and the ILR will not work.

8. Water in the tubes will be frozen, within 1-3 days, depending upon different conditions. When the ILR is functioning as a Refrigerator it may not be frozen fully, but partially on the bottom side (fig. 36).

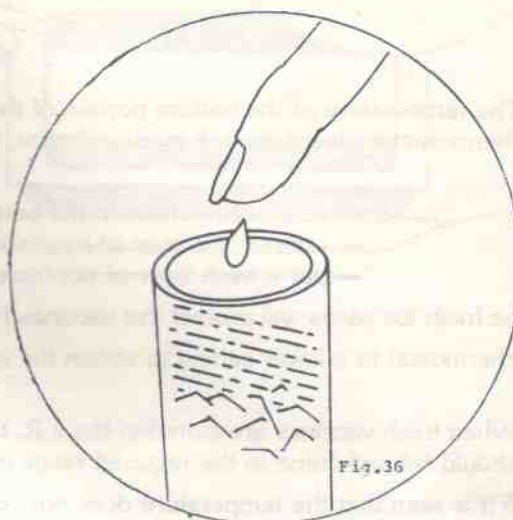


Fig. 36

9. When the temperature inside the ILR will be observed to be steady within $+4^{\circ}$ to $+8^{\circ}\text{C}$ for several hours, then only the vaccines to be preserved should be transferred to the ILR. The vaccines like DPT, which get damaged if frozen, are advised to be kept in the baskets provided, such that they will not touch any of the colder surfaces on the sides and the bottom. (fig. 37).

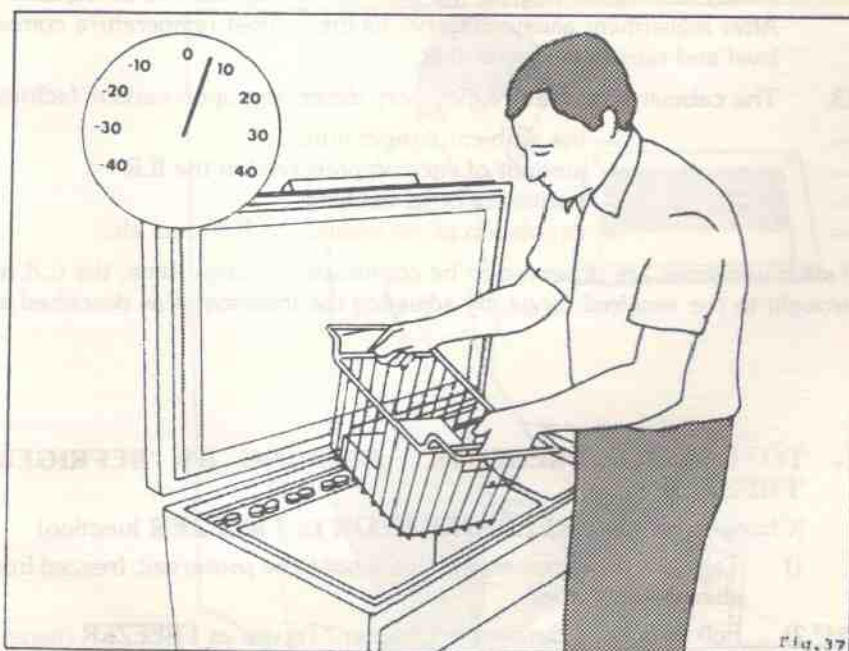


Fig. 37

10. After storing the vaccines, keep the lid properly closed and locked. (fig. 38).

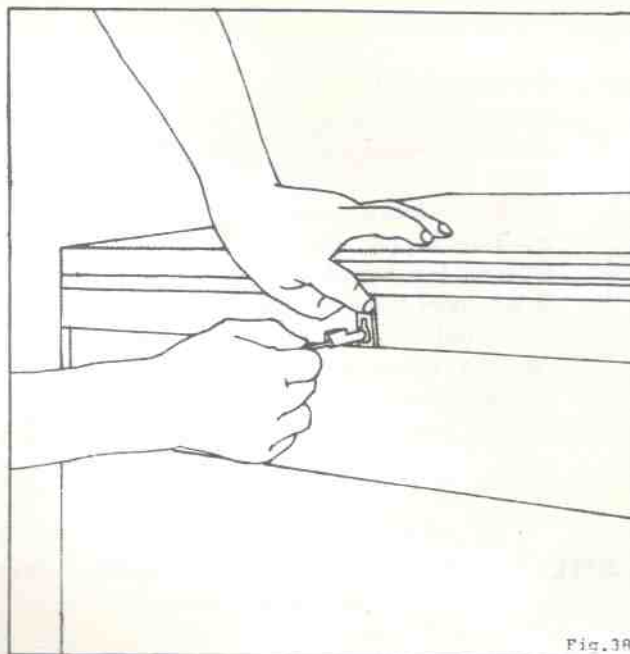


Fig. 38

11. The temperature of the bottom portion of the ILR may be observed on the separate dial thermometer placed on it. If by any chance, the **TEMPERATURE GOES BELOW '0°C'** ;

- take out the floor in the bottom,
- remove the layer of frozen ice packs at the bottom,
- put a fresh layer of not-frozen ice packs and replace the floor.

Now, the fresh ice packs will protect the vaccines from freezing.

Adjust thermostat to a lower setting to obtain the recommended temperature.

12. When fresh vaccines are stored in the ILR, the cabinet temperature may go up initially but should fall and come to the required range after few hours.

If it is seen that the temperature does not come down to the required level and remains steady at a higher degree, the thermostat may have to be adjusted to a higher setting. After adjustment always observe till the cabinet temperature comes down to the required level and remain steady at that.

13. The cabinet temperature may vary depending upon various factors, such as:

- the ambient temperature,
- amount of vaccine preserved in the ILR
- frequency of lid opening,
- circulation of air around the ILR, etc. etc.

If such variations are observed to be continued for longer time, the ILR temperature may be brought to the required range, by adjusting the thermostat as described earlier.

* **TO USE ILR PRESENTLY RUNNING AS 'REFRIGERATOR' TO WORK AS 'FREEZER'**

(Change-over from **REFRIGERATOR** to **FREEZER** function)

- 1) Take out the vaccines, which are not to be preserved, freed from the ILR and preserve them in alternative storage.
- 2) Follow actions detailed in Chapter-"To use as **FREEZER** (page. 27-29).

TO USE AS **FREEZER**

1. Install and Prepare the ILR as detailed under 'Installation' and 'Preparation' in the previous chapters.

2. The Refrigerator/Freezer function selector switch is located at left upper portion in the compressor compartment. This switch is accessible from outside (fig. 39).

Normally the ILR is delivered with this switch set for Refrigerator function.

Examine this switch and shift it to the **RIGHT** for **FREEZER** function.

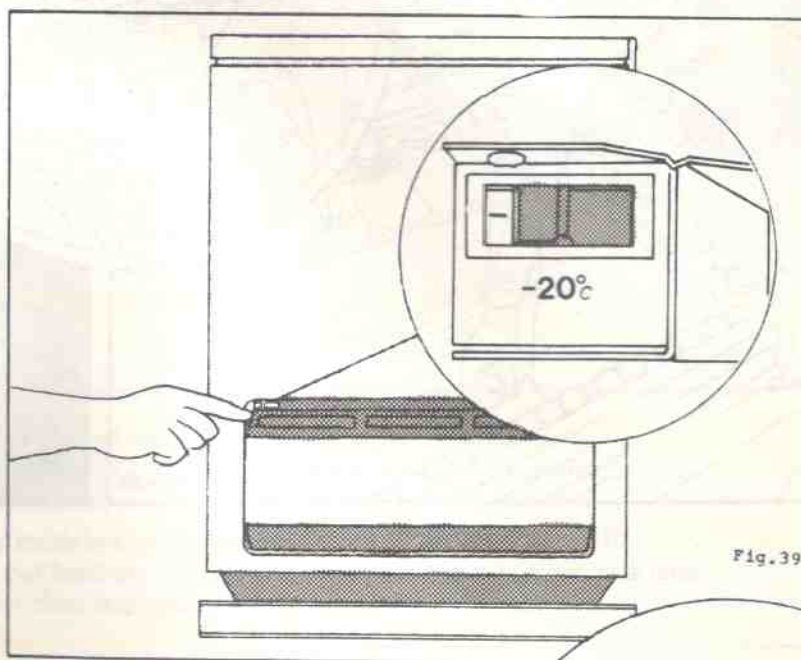
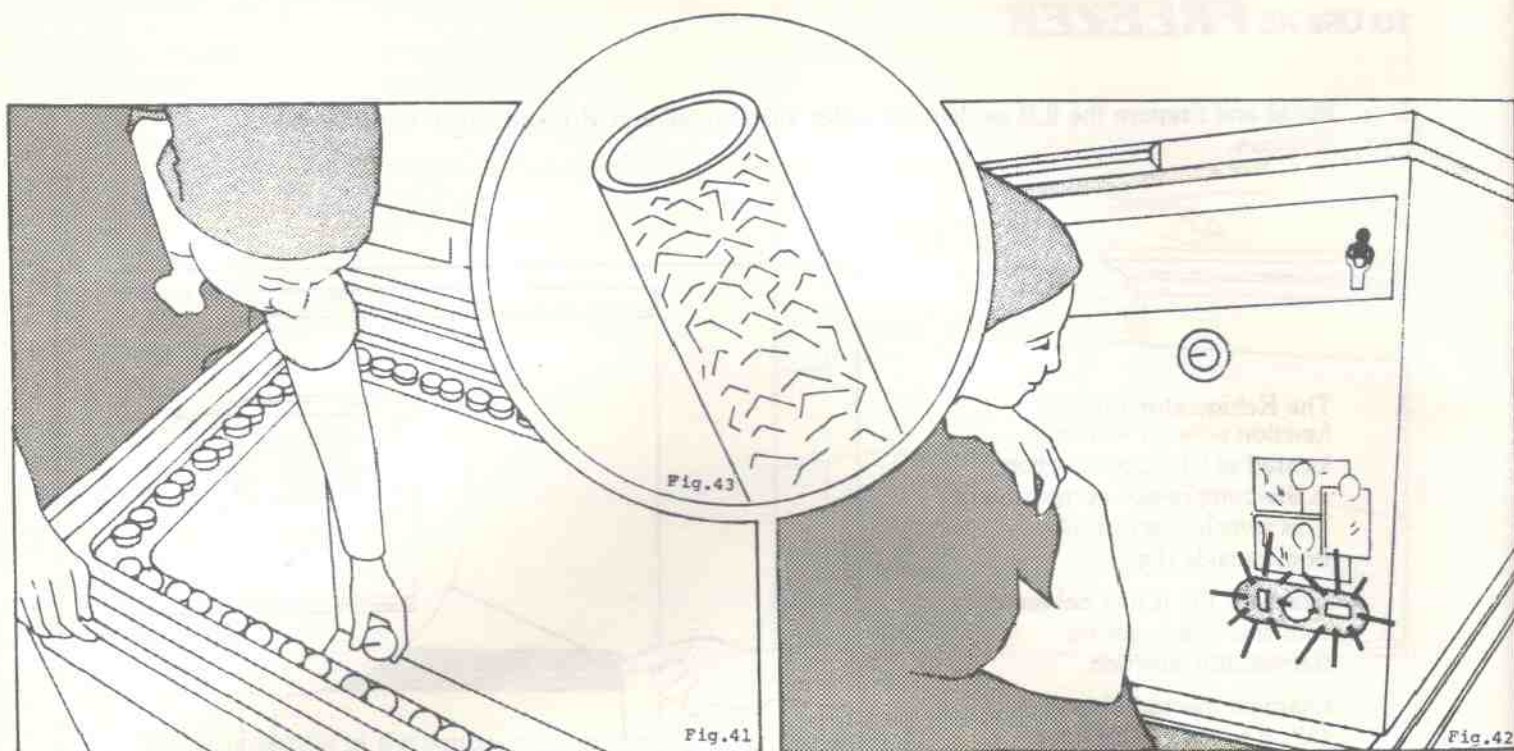


Fig.39

3. Examine the display plate on the lid. If it displays 'Refrigerator' function, slide it out from its frame reverse and put it back to display 'Freezer' function (fig. 40).

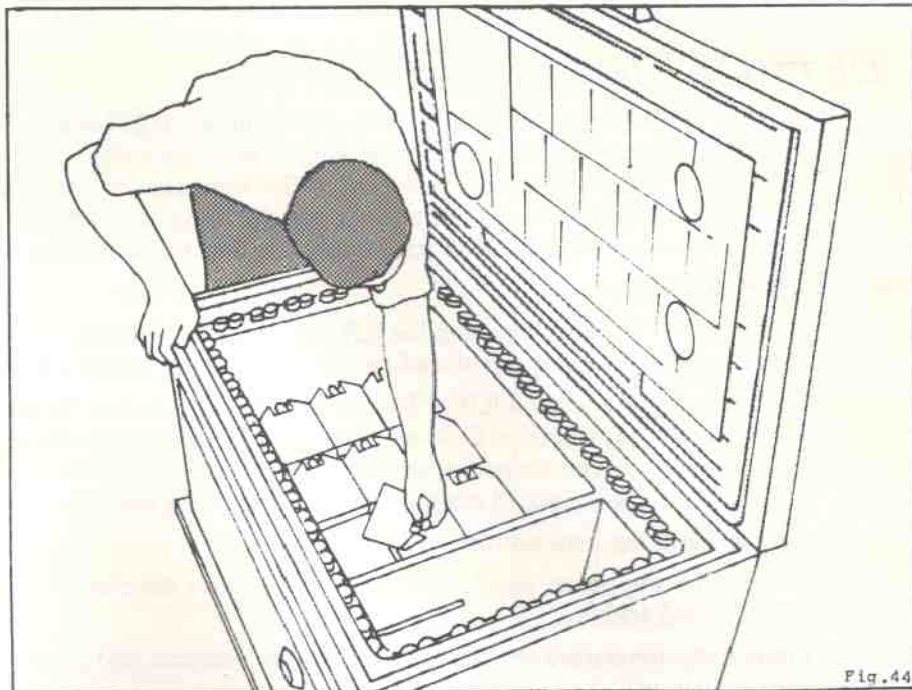


Fig.40



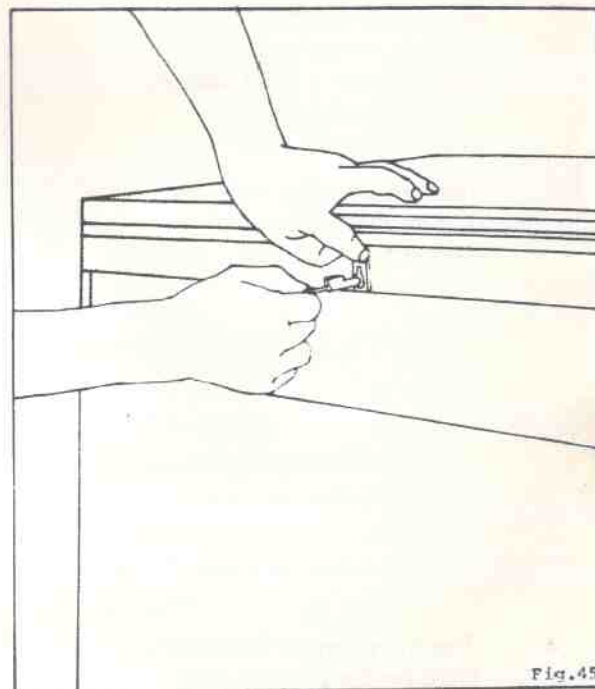
4. Keep a separate dial thermometer at the bottom of the ILR to measure the actual temperature at the bottom (fig. 41). The temperature near the bottom is observed to be lower than that at the other portions.
Close the lid.
5. Connect the plug of the power supply cord to the wall socket and put ON the switch, if any. The '**yellow**' indicator lamp on the right will glow indicating that power is available to the ILR and also the '**red**' indicator lamp on the left will glow indicating that the ILR is functioning as 'Freezer' (fig. 42).
6. Allow the ILR to run. The temperature inside the cabinet will be indicated on the thermometer on the front side. Observe the temperature, from time to time.
7. Initially the temperature inside the ILR will be similar to, or slightly below, the room temperature. It should decrease slowly and should remain steady within a small range, after 1-3 days, depending upon different conditions.
8. When the ILR is functioning as 'Freezer', the thermostat on the front panel has no function and no control over the cabinet temperature. The control is now shifted to another thermostat (freezer-thermostat) which is located behind the function selector switch in the compressor compartment. This thermostat has been factory preset on ' -18°C '. However, if the cabinet temperature does not reach the required low level after 2-3 days, the freezer-thermostat setting can be increased to a higher setting by turning its knob clockwise.
To get access to the freezer-thermostat, the side cover of the compressor compartment is to be removed as described earlier at **page 12** (actions 1 and 2).
Adjust thermostat, by steps, and observe until the required low temperature is attained and remains steady.
9. Water in the tubes will be frozen fully, within 1-3 days, depending upon different conditions (fig. 43,).

10. Put one layer of ice packs (filled with clean water to their marked level) and arrange them neatly and properly to cover the bottom of the ILR (fig. 44).



11. When all the water in the tubes have frozen and the ILR is maintaining a constant temperature around -18° to -20°C , for several hours, transfer the vaccines to be preserved in frozen condition, to the ILR for preservation.
- Ice packs for freezing may also be stored inside in a systematic way. The ILR can freeze about 15 ice packs in a day. It is advisable not to put fresh ice packs of more than the above number, at a time, else, cabinet temperature may be higher than required.

12. After storing the vaccines, keep the lid properly closed and locked (fig. 45).



* **TO USE ILR PRESENTLY RUNNING AS 'FREEZER' TO WORK AS 'REFRIGERATOR'**

(Change-over from **FREEZER** to **REFRIGERATOR** function)

- 1) Take out the vaccines and preserve them in alternative storage.
- 2) Defrost & Clean' the ILR as detailed in pages. 30-32, Actions: 1-16.
- 3) Follow actions detailed in Chapter-"To use as **REFRIGERATOR**" (page. 22-26).
Adjust thermostat setting, if required, to maintain a steady temperature between $+4^{\circ}$ to $+8^{\circ}\text{C}$.
- 4) Preserve vaccine in the ILR, **only after** the above recommended temperature is attained in the ILR.

DEFROSTING & CLEANING :

The moisture in the air, which enters the ILR due to lid opening (and also may be due to defective lid-gasket or door alignment) is attracted by the cold surfaces inside the ILR. So, formation of frost and ice occurs on the walls around the tubes inside the lining compartment. When the frost layer is $\frac{1}{4}$ " to $\frac{1}{2}$ " (6-12 mm) thick, it is time for 'defrosting' the ILR.

MOST IMPORTANT:

Before defrosting the ILR, the vaccines preserved in it will have to be removed and stored temporarily in other working ILR or Refrigerator.

If a second ILR or Refrigerator is not available, the vaccines will have to be preserved in Cold-box or Vaccine carrier, properly lining the same with frozen ice packs, such that the vaccine temperature remains within the recommended storage temperature during the defrosting of the ILR.

Defrosting & cleaning procedure:

1. Switch OFF the power supply to the ILR and remove the plug of its power supply cord from the wall socket.
2. Prepare the temporary storage and transfer the vaccines and preserve them properly with care.

3. Take the frozen ice lining tubes out. Keep them close together in a upright position, wrapping them together with a thick blanket or similar insulating material (fig. 46).

This will keep the coldness of the tubes during defrosting of the ILR.

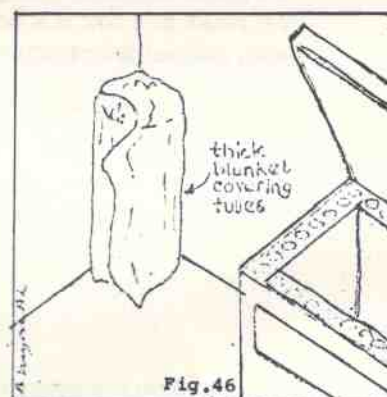


Fig.46

4. The thermometer feeler-tube is fitted on the partition wall inside the ILR. Remove the plastic cap at the end of the feeler-tube. Then, push the thermometer tube gently outwards and pull the complete thermometer unit out and keep it carefully (fig. 47).

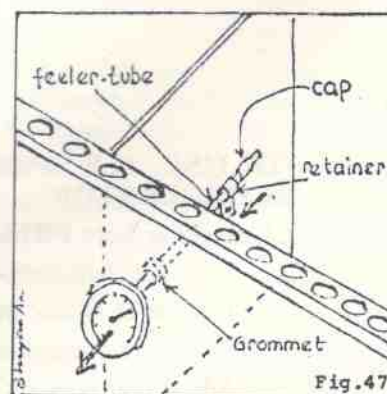
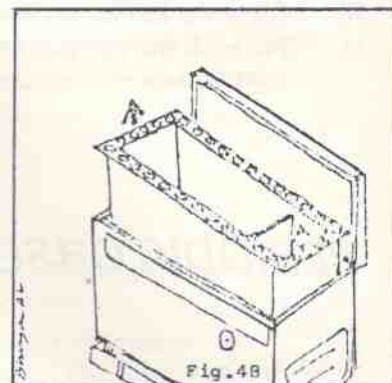


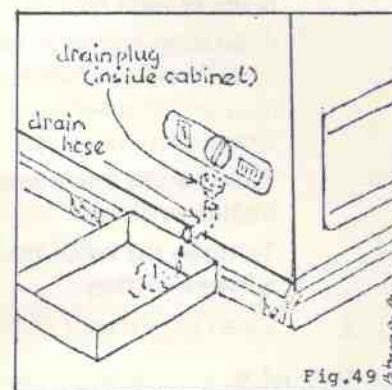
Fig.47

5. Take out the plastic floors from the bootm (see fig. 25 at **page. 20**). Also, remove the frozen ice packs from the bottom of the ILR and keep them also wrapped to preserve their coldness, similar to the lining tubes.

6. Remove gently the complete plastic inner liner (casing) by holding it on its two opposite sides and lifting the same uniformly (fig. 48).



7. Open the drainage plug at the bottom, inside the cabinet.
Keep a suitable container under the drain hose to collect the defrost water (fig. 49).



8. Keep the lid open and allow the frost to melt completely.
Never use any heat source other than hot water to speed up defrosting.
Never use any sharp-edged instrument for removing frost or for cleaning the liner etc.
9. **Clean the ILR** carefully as below:
 - (a) Wash all parts inside the cabinet with warm water and mild detergent.
 - (b) Clean the lid and the lid seal (gasket) similarly. After the rubber seal (gasket) is wiped and dried, it should be rubbed with unscented talcum powder (or french chalk) specially on the hinge side.
 - (c) Clean the plastic inner liner, floors and the outside of the ILR, also with warm water and mild detergent.
10. Allow the cleaned parts to dry completely.
11. Reset the drain plug at its position at the bottom.
12. Put back the inner liner into its position carefully.
13. Refit the thermometer, by carefully inserting the feeler-tube through the grommets and then pressing it to go inside to its original position.
Refit the plastic cap at the end of the feeler-tube.
14. Replace the layer of the frozen ice packs on the bottom, as before, wiping each ice pack before placing.
Replace the plastic floors.

15. Take the plastic ice lining tubes one by one, wipe their outside with a clean dry cloth and put them back carefully into their positions.
Examine the tubes for any leakage of water from any portion, before putting them back to the ILR. A defective tube will have to be either repaired or replaced.
16. Close the lid. Connect the power supply plug to the wall socket and switch ON the ILR.
17. Allow the ILR to run and observe the cabinet temperature on the thermometer.
18. Put back the vaccines into the ILR from the temporary storage, only when the ILR has attained safe recommended temperature range for storage of the vaccines.

PERIODIC OBSERVATIONS/CHECKS/ACTIONS :

DAILY:

1. Take temperature readings from the thermometers and note down the temperature and the time of reading. Keep the temperature records systematically. It is suggested that minimum 2 readings should be taken (in the morning and afternoon) preferably at the same hours of each day.

If the temperature is observed to be below or above the required range, adjust the thermostat (see Action 7a & 7b at page 24) by steps, allow the ILR to run for about one hour under observation. If required, adjust the thermostat further until the required temperature range is obtained.

To make the inside **more cooler**, the thermostat knob is to be turned **clockwise to a higher setting**.

To make the inside **more warmer**, the thermostat knob is to be turned **anti-clockwise to a lower setting**.

2. Clean the exterior of the ILR with a clean dry cloth.

WEEKLY:

1. Examine the liner tubes, if water have frozen inside, fully in case of 'Freezer' and partially in case of 'Refrigerator' function. If not, increase the thermostat setting by a step or two. Observe that the cabinet temperature does not fall or rise outside the prescribed limits in any case.
2. Examine the liner tube compartment and see if frost formation is more than $\frac{1}{4}$ " (6 mm.). If so, **DEFROST** the ILR as described earlier (see page 30).

If it is observed that Defrosting is required to be done each week:

- (a) Examine the rubber seal on the lid, if it sits properly (fig. 50). Any gap between the cabinet & lid seal can be checked by placing a visiting card between them. The card should resist being pulled out freely. If the card can be pulled out freely, there exists a gap. Such gap will allow outside air to go in & form frost early. In such cases the lid seal should be changed.

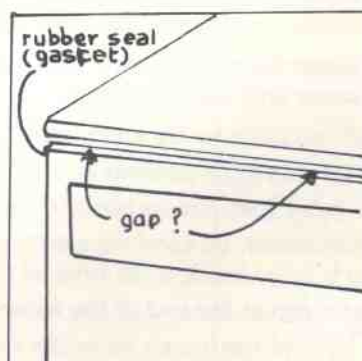


FIG. 30

- (b) Restrict and reduce frequency of opening the ILR. Open only when absolutely necessary.

MONTHLY:

1. **Clean the compressor compartment :**

- (a) Put off the switch, if any, and take out the plug from the wall socket.
- (b) Take out the side-cover of the compressor compartment (see **page 12**, actions 1 & 2). Clean the interior of the compressor compartment with a soft brush.
- (c) Check the mounting bolts of compressor and fan if they are tight. If not, rectify.
- (d) Fit back the side cover (see **page 15**, actions 4 & 5).

2. **Clean the lid seal (see page 31, action 9b),**

3. **If possible, put a standard mercury thermometer inside the cabinet and compare the readings with those of the dial thermometers and see if they are correct.**

Dial thermometers with incorrect readings may have to be re-adjusted or replaced, as incorrect readings may lead to wrong storage temperature and loss of the potency of the vaccines preserved.

TROUBLE SHOOTING :

IMPORTANT: When an ILR is found to be not working at all or not working properly, see that the vaccine temperature is within the recommended limits.

Do not open the lid unless very essential.

Observe temperature from time to time and if you feel that temperature may exceed the higher limit before the ILR is repaired—transfer the vaccines to other working ILR/refrigerator or cold-box.

If required use smaller pieces of commercial ice in polythene bags in the cold-box—in absence of frozen ice packs.

#

For any **abnormal sound, smoke, smell etc.** in the ILR, **disconnect the plug from the wall socket** and intimate refrigerator technician.

(A) THE I.L.R. IS NOT WORKING :

1. **Observe the 'yellow' mains-on indicator light on right on the front panel ;**

(a) **If NOT GLOWING:**

i) Check if wall socket switch is OFF.

ii) Check if the voltage stabilizer, if any, is working or not.

iii) Check if power supply is available at the wall socket. This can be tested by connecting an electric lamp or other appliances to the socket. The lamp should glow or the appliances should work, if supply is available at the socket.

If not available

—there may

be some defect in the power supply circuit (viz: blow-off of fuse, loose connections, faulty switch or socket, single phasing etc.) which should be rectified through competent Electrical Maintenance Technicians.

If power is available at the socket —

iv) Check that the plug is inserted properly into the socket.

v) Check the plug for loose connection or dislocation of power supply cable connections—rectify if required.

vi) **Remove the plug from socket.** Check the incoming and outgoing cable connections on the terminal strip in the compressor compartment (see **page. 12 & 14**, actions 1, 2, figs. 12 & 13).

vii) Even after actions as above, the 'yellow' lamp is not glowing—Notify Refrigerator Technician.

(b) If GLOWING:

i) Observe if the compressor cooling fan is working. If the fan is working but the compressor is not running—Notify Refrigerator Technician.

ii) If the fan is also not working, check the thermostat setting, if it is wrongly turned completely anti-clockwise. If so, turn it clockwise to a higher setting and observe if the fan and the compressor are working now.

If working—allow the ILR to run and adjust thermostat to obtain recommended temperature.

If not working—Notify Refrigerator Technician.

(B) COMPRESSOR IS WORKING, BUT CABINET TEMPERATURE IS HIGHER THAN NORMAL

NOTE:

The cabinet temperature may go little higher than normal but should come down after sometime, when:

— New vaccines are stored,

- The lid is opened frequently or kept open for longer duration,
 - Unfrozen ice packs are put in for freezing.
1. Check if recommended space is left on back and sides of the ILR for air circulation (see **page. 16**, action. 6).
 2. Check if there is too much frost formation in the liner chamber on the inside walls. If so, Defrost (see page. 30 for Defrosting & cleaning).
 - 3.) Check if the compressor is cut 'off' by the thermostat before required temperature is attained. If so, adjust thermostat setting (see page. 24, action 7a & page 28, action 8)
 - 4.) If the compressor is observed to be running continuously but no cooling is obtained-this may be due to leakage of refrigerant gas from the system or defect in the unit,—Notify Refrigerator Technician.
 5. Check if the compressor tries to start but trips-off early by the over-load protector. This may be either due to too low supply voltage or defect in the compressor or starting relay—put 'off' the ILR till return of normal voltage and try to run once again. If the defect prevails.—Notify Refrigerator Technician.

(C) CABINET TEMPERATURE IS LOWER THAN NORMAL or BELOW 0°C WHEN FUNCTIONING AS 'REFRIGERATOR'

Turn the thermostat knob, anti-clockwise, to a lower setting (see page. 25, action 7b) and observe if the compressor is cut 'off' by the thermostat. If the same does not cut 'off' even at the lowest (1) setting-the thermostat may be defective and may have to be replaced-notify Refrigerator Technician.

NOTE: In such cases, till the repair is done, the vaccines should be preserved as follows:

- (a) Take out the floors and the layer of ice packs;
- (b) Put one layer of fresh (non-frozen) ice packs on the bottom and replace the floors;
- (c) Keep some not-frozen ice packs on and around the vaccines also;
- (d) Run the ILR under surveillance and put it 'off' when lowest recommended temperature is attained. Put the ILR 'on' again when the highest recommended temperature is reached and keep it running until the lowest recommended temperature is attained again. Repeat as above till the ILR is repaired.

(D) ABNORMAL NOISE IN THE I.L.R.:

In case of any abnormal noise coming out from the ILR, try to locate the source of the noise. Generally it may come from the compressor compartment. In such cases:

1. Take out the plug of the ILR from socket and open the side cover of the compressor compartment (see **page. 12**, actions 1 & 2):
2. Examine the mounting bolts of the compressor, fan etc. are tight. If required, tighten, the loose ones. (see **page. 13**, fig. 11);
3. Check if any pipe or component has come out of its position and also touching others. If so, rectify carefully;
4. Check if the ILR is level and firm on its base. If not, rectify.
5. Even after actions as above if it is observed that the noise is still present or it is coming from the inside of the compressor—notify Refrigerator Technician.

SHUTTING DOWN :

If the ILR is to be shut down for transportation etc.

- Disconnect the power-supply plug from socket;
- Allow the ice in the liner tubes (if any) to melt and pour out the water completely and put back the 'red' plugs on the tubes;
- Defrost and clean the interior;
- Leave the lid open till the ILR is absolutely dry;
- Roll the power supply cord into a coil and bind and place it carefully to avoid damage.

STORAGE OF VACCINE IN I.L.R.:

CAUTION:

Special care should be taken to preserve the vaccines that get damaged by freezing. Never store them in an ILR functioning as 'Freezer' or touching the bottom & side surfaces in the cabinet of an ILR functioning as 'Refrigerator'. The above surfaces are at a lower temperature than that in the other parts inside the cabinet.

It is advisable to preserve such vaccines (viz. DPT, TT) in the baskets in an ILR functioning as 'Refrigerator'.

FOR STORING VACCINES

1. Keep the packets containing the vaccines in neat rows;
2. Different vaccines should be kept separately to facilitate easy identification;
3. Keep about 2 cm. space between rows for circulation of air;
4. Store DPT & TT vaccines, **not touching** the inside walls or bottom of the ILR. It is better to keep them in the baskets in an ILR functioning as 'Refrigerator';
5. Keep a separate thermometer among the vaccines to ascertain the actual vaccine temperature.