

# INSTRUCTION MANUAL FOR PANTOGRAPH AND CUTTING BENCH

## 1 PREMISE

This device has been designed to create parts of any shape by moving a magnetic pinion that follows the outline of the object to be reproduced and at the same time drives the torch for plasma cutting.

Read this instruction manual carefully before using the machine. Failure to respect the rules described herein shall exempt the manufacturer of any responsibility. Any use not described here shall be considered forbidden.

This machine may be used with CEBORA torches for both manual and automatic cutting; we recommend the use of automatic torches since they are easier to attach and have an externally accessible control cable. We discourage the use of manual torches (not equipped with an externally accessible control cable) unless the operations described in point 2.3.3 are carried out by qualified personnel.

## 2 DESCRIPTION AND ASSEMBLY OF THE PANTOGRAPH

### 2.1 DESCRIPTION OF THE CONTROLS (fig. 1 and 2)

- 1 Direction selector: the drive pinion does not turn when this is set to 0.
- 2 Knob to adjust the rotation speed of the drive pinion
- 3 Plasma arc ON/OFF switch.
- 4 Drive pinion assembly
- 5 Power on LED on control panel
- 6-7 Direction indicator LEDs
- 8 ON/OFF lamp
- 9 0.8-A fuse type 6.3x32 T.
- 10 Voltage change disk
- 11 Switch: 0/115 V - 0/230 V.

### 2.2 TECHNICAL SPECIFICATIONS

- Available work surface 600x700 mm
- Drive pinion  $\varnothing$  12.7 mm
- Movement speed 0÷2 mm electronically adjustable
- Movement direction Clockwise / counter-clockwise
- Compass diameter min. 45mm - max. 560 mm
- Single-phase power supply 115/230V - 50/60 Hz

## 2.3 INSTALLATION

### 2.3.1 Assembling the pantograph bench

Assemble all of the parts according to the instructions below:

- Arrange the bench as shown in Fig. 3.
- Slide the carriage guides A out until the holes match up, and fasten in place using 4 screws M8x16 (Fig. 3).
- Place the 4 legs on the corner brackets of the bench and insert the 16 M8x16 screws and corresponding nuts, but **do not tighten**.

**CAUTION:** the leg A, complete with threaded insert B, must be attached in the position shown in Fig. 4.

- Position the shelf B (Fig. 5) and fasten it to the legs using 16 M6x16 screws.
- Position the shelf C (Fig. 6) and fasten it to the legs using 16 M6x16 screws.
- Screw the 4 feet (diam. 100 mm) onto the legs (fig. 6).

- Turn the bench right side up (fig. 7).
- Place the side panel A, complete with inserts B, in the position shown in fig. 7 and attach it with 12 self-threading screws.
- Place the other panel identical to the previous one on the opposite side, and fasten it with 12 self-threading screws.
- Press the top surface down against the legs and firmly tighten the 16 M8x16 screws inserted previously.
- Fasten the cable support pipe C in place (fig. 7), using 3 M6x40 screws.
- The third side panel must be positioned as shown in fig. 7 and attached with 12 self-threading screws.
- Position the carriages F and G as shown in Fig. 8.

### 2.3.2 Connecting the plasma cutting machine to the pantograph

Make sure that the cutting machine chosen has been manufactured in compliance with the standards EN60974-1 or IEC 974-1, then place it in an easily accessible area in case it needs to be turned off for an emergency. Follow the manufacturer's instructions to connect the cutting machine to the power mains.

Place the torch in the support A, fitted with bushing B, and tighten with the screws C. This support must be positioned as shown in figure 9 if the torch is to be used manually, or as shown in figure 10 if the torch is to be used automatically. Torches for manual use must be fastened to the contact tip holder.

This support has a knob D (fig.9 and fig. 10) to adjust the height of the torch, and knob E to lock in place when set.

### 2.3.3 Connecting the plasma arc starter cables

Failure to follow the instructions below can interfere with operating the equipment, and especially jeopardize operator safety.

This connection must be made by qualified personnel, as follows:

- 1) torch for automatic use.  
These torches are normally fitted with a cable having two wires, which must be connected to the terminals on connector A (fig. 11).
- 2) torch for manual use.  
Parallel to the two torch trigger wires, connect two wires which must be attached to the terminals on connector A (fig. 11).

During these connections, it is extremely important to make sure not to cut out the safety device which blocks the machine when the contact tip holder on the torch is unscrewed to replace worn parts.

Connect the two wires of the cable M (fig. 7) to the terminals on connector B (fig. 11).

After all terminals have been connected, fasten the cables in place using the cable press C (fig. 11), then cover with the lid D.

Fasten the torch cable, cable D (fig. 7) and the arc starter cable (normally present only in torches for automatic use) to the cable support pipe and rings (fig. 8).

Position the pantograph and use the adjustable feet to level it properly. Tighten the feet using the counter-nut provided, and fasten them to the floor using the 4 steel screw anchors provided.

## 3 ASSEMBLING THE CUTTING BENCH

### 3.1 PREMISE

This bench has been designed for use with the CEBORA pantograph type AXIAL 607 Art. 201

### 3.2 ASSEMBLY

Assemble all of the parts according to the instructions below:

- Remove all parts from the box and position the 4 legs (fig. 12), respecting the position of the 2 legs C fitted with clip-on receptacles A.
- Attach the two corner brackets D to the legs, using 8 M6x16 socket-head screws.
- Screw the feet (diam. 80 mm) onto the legs.
- Attach the surface A (fig. 13) to the legs using 8 M6x16 screws; make sure that the holes B are correctly aligned with the clip-on receptacles C.
- Arrange the bench as shown in figure 14, and attach the reinforcement support A using 4 screws M6x16.
- Position the side panel B, with a ventilation hole, and fasten in place using 1 M6x16 screw and 6 self-threading screws.
- Position the side panel C and fasten in place using 3 M6x16 screws and 6 self-threading screws.
- Position the side panel D and fasten in place using 1 M6x16 screw and 6 self-threading screws.
- Insert the water tub with the handles facing as shown in fig. 15.
- Position the final side panel A and attach it in place using the studs B (Press and turn clockwise).
- Prepare the grid (fig. 16) on a flat surface, and fasten with the 4 M10 nuts.
- Position the grid on the bench (fig. 15).
- Screw the long or short support tips onto the tip holders, and rest them on the grid (fig. 15) so that they correctly support the metal to be cut.

### 3.3 preparing to operate

- Place the bench under the carriage guides of the pantograph, centering it within the cutting area.
- Pour at least 10 cm of water into the tub to collect the dust created during cutting.

NOTE: one side panel has a hole to which a flange may be mounted (included in the supply) to connect the bench to a ventilation device to remove the fumes produced during cutting.

## 4 OPERATION

Make sure the distance between the torch support and the support tips is the same in all 4 corners; if necessary, adjust the height of the bench by means of the four feet and fasten them in place with the counter-nut.

Rotate the arm A (fig. 19) and lean it on the bar B using the special seat so as to prevent the arm itself from falling down. Screw the drive pinion 4 (fig. 1) and lock it by means of the wrench supplied. Use the magnetic toothed type for following the serrated rods or compasses, and the type with O-Ring for following patterns.

Make sure that the direction selector 1 is set to 0, and that the switch 3 is also set to 0.

Use the knob 11 to select the power voltage.

The machine is supplied for 230 V. Should you wish to connect it to 115 V, remove the knob of the switch, turn over the lock disk 10, and replace the knob as before. Make sure the knob only turns to 115 V, then set it to 0. Plug the machine into the power socket and turn it on.

This machine may be used to cut a wide variety of shapes according to the following procedures:

### 4.1 STRAIGHT CUTTING USING THE SERRATED RODS

Two rods (830 mm long) are supplied with the pantograph for vertical cutting, and 2 rods (720 mm long) for horizontal cutting. The rods must be placed on the raised border of the work surface, and they may be arranged to create various shapes.

NOTE: the two rods not fitted with a spacer in the center must always be applied above the other two.

CAUTION: when the drive pinion must follow the internal profile created by the four rods, we recommend that you do not exceed a speed of 1-1.2 mt./min., to avoid shaking the torch when changing direction. At times it may be necessary to place a magnet (8 pieces provided) behind the rods to prevent them from shifting due to the impact of the pinion when changing direction.

To ensure firm attachment, the rubber around the magnets must be kept clean and oil-free.

To limit torch shaking as much as possible, a brake is provided on each carriage (fig. 8).

Turn the screws O to adjust the brakes.

NOTE: The brakes must be used only with internal profiles and rapid changes of direction.

### 4.2 CUTTING AROUND A PROFILE

Unscrew the knurled drive pinion 4 (fig. 1) after releasing the screw by means of the wrench supplied.

Screw tight pinion with its ring and lock it by the screw.

#### a) Internal profile

The size of the profile must take into account that the finished piece will be 12.7 mm (diameter of the pinion) smaller, as well as of the width of the cut.

#### b) External profile

The size of the profile must take into account that the finished piece will be 12.7 mm larger, minus the width of the cut.

Since it may be complicated at times to cut a profile as described above, we recommend following the procedure described below (fig. 17):

- The material from which the final profile is to be cut must be steel, 6-8 mm thick, and must be placed on the tips of the cutting bench.

- Create a pattern identical to the finished piece desired (part A or B fig. 17) out of aluminium, plastic or sheet metal 2-3 mm thick.

- Fasten this pattern onto the work surface using the magnets provided.

To fasten profiles made of non-magnetic material, place the magnets above the pattern aligned with those below.

- Manually guide the drive pinion along the outline of the pattern, and cut the sheet of 6-8 mm metal prepared. You will thereby create the profiles C and D, corresponding to A and B, respectively.

• Part C must be used as a profile to make part A, and part D to make B.  
The technique described above also compensates for the width of the cut.

**WARNING!**

- To ensure the drive pinion properly follows the pattern, it is important that all magnets be oriented with the red portion R downwards (fig. 20) and that the contact surfaces be parallel.
- When using a profile whose internal corners are less than or equal to 90°, the arm may stick. If this occurs, simply nudge the control box to restore movement.

**4.3 CUTTING USING THE COMPASS (fig. 18)**

Insert the drive pinion into the slot A on the compass, sliding the serrated wheel B in the direction of the arrow, and make sure that the latter is fitted properly into the serrated wheel C of the pinion.

Adjust according to the desired diameter, then tighten the knob D.

NOTE: it is important to compensate for the width of the cut. After choosing one of the operational modes described, simulate a cutting procedure while keeping the arc starter switch 3 set to 0. Once you have decided upon a starting point, set the cutting speed and start the motor, using the selector to determine the cutting direction. During this test, always make sure that the distance between the torch tip and the part to be cut is constant, and corresponds to the requirements of the plasma system manufacturer. The torch height may be adjusted by means of the knob D (figs. 9 and 10), and fastened in place using the knob E. Once this has been verified, repeat the operation with the plasma arc turned on.

NOTE: when turning the arc on in the middle of the sheet of metal, do so only after the motor has started, to prevent molten material from deteriorating the contact tip hole and thus compromising the quality of the cut.

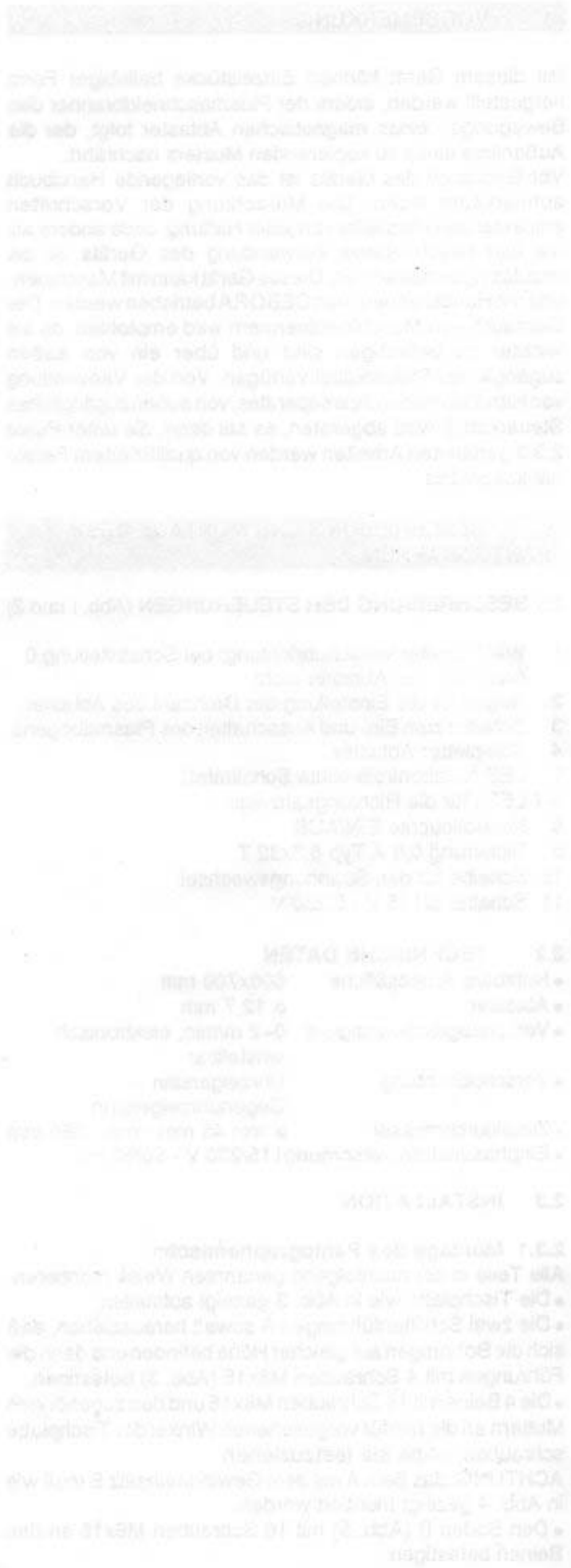
Also follow the instructions of the plasma machine manufacturer in choosing the maximum thickness upon which holes may be made.

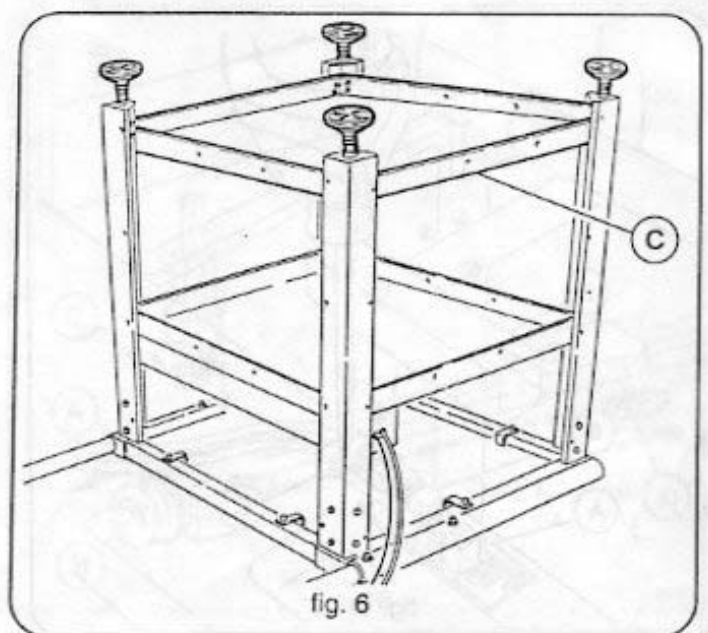
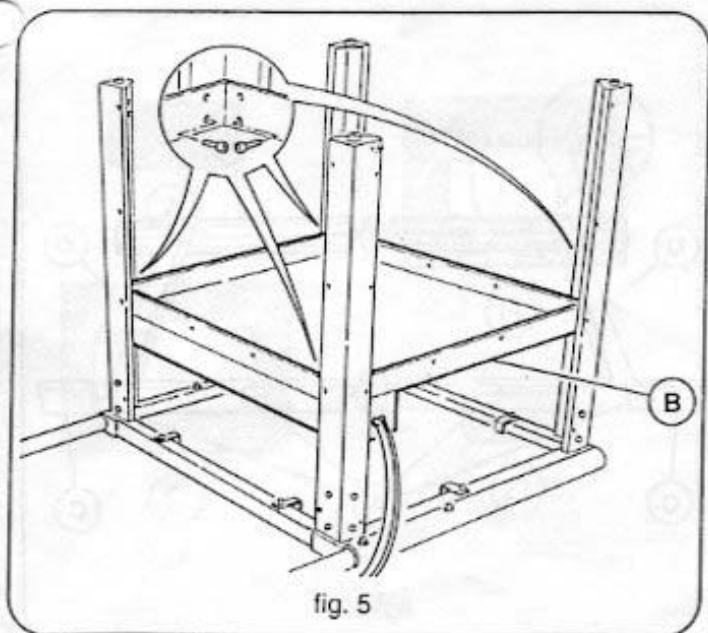
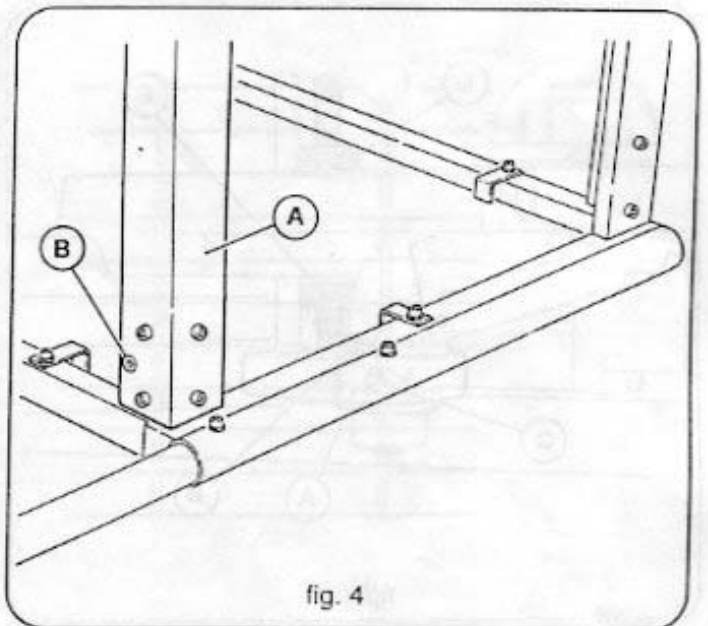
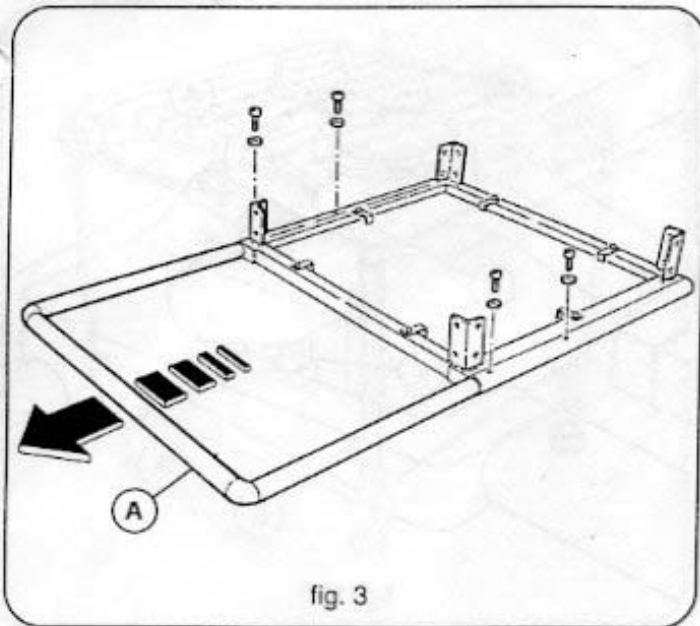
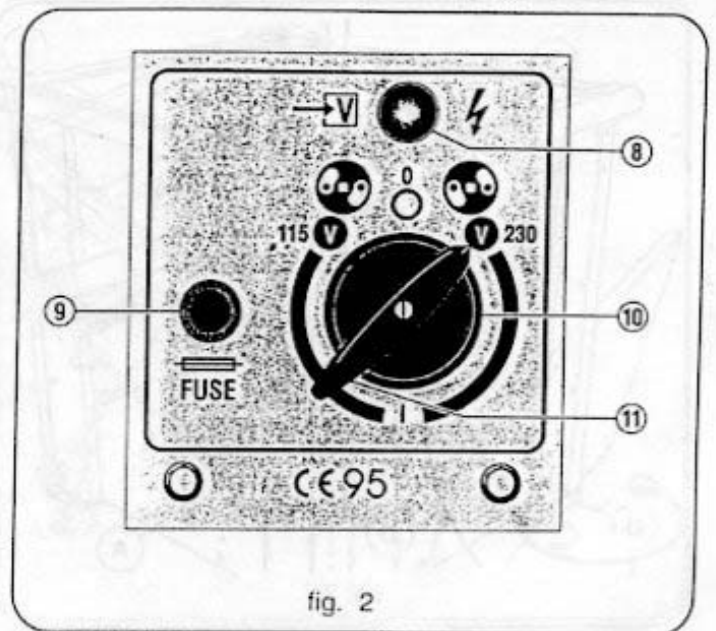
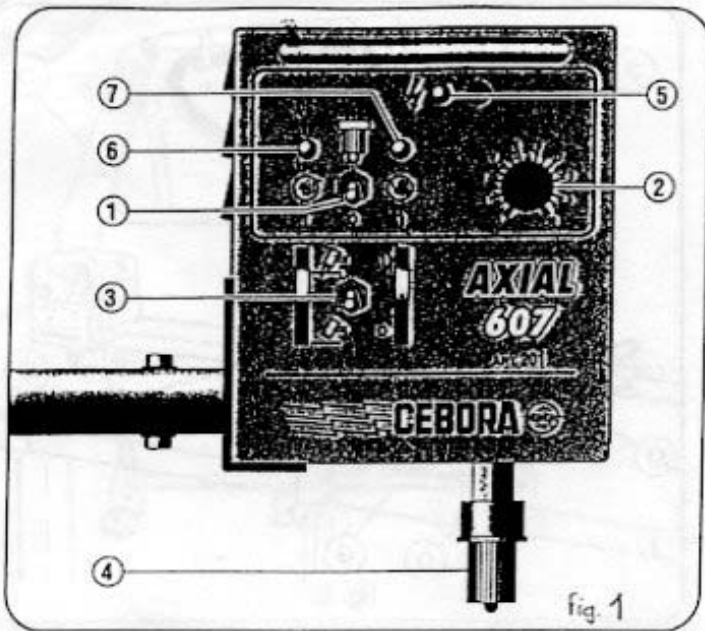
For no reason must the torch tip come into contact with the material to be cut, to avoid shaking the pantograph and thus causing a poor-quality cut.

**5 MAINTENANCE**

Before each use it is extremely important to clean the guide bar, and use an air gun to blow on the sliding bearings.

Always make sure that the switch 3 is set to 0 and that the plasma machine is off before removing the contact tip holder to replace the electrode, contact tip or diffuser.





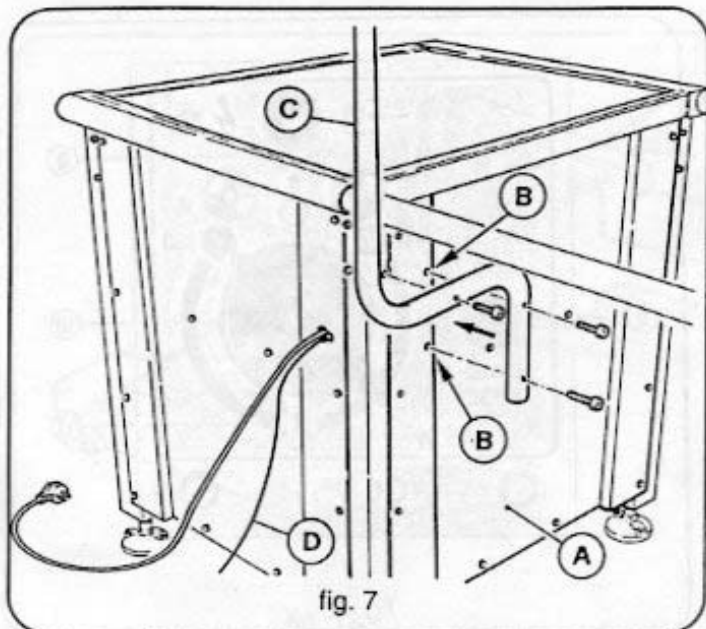


fig. 7

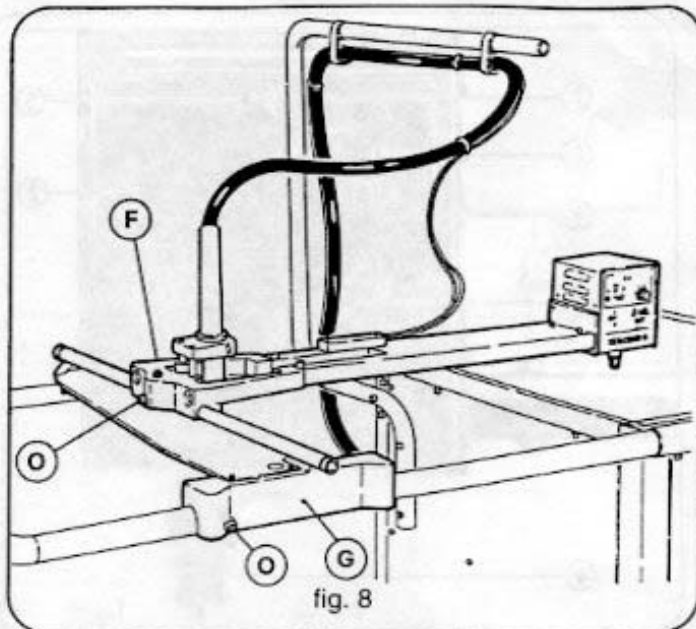


fig. 8

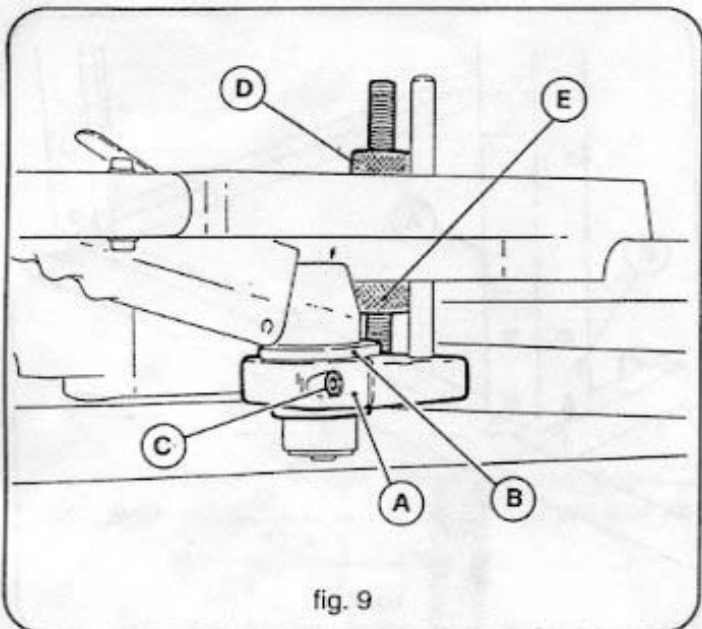


fig. 9

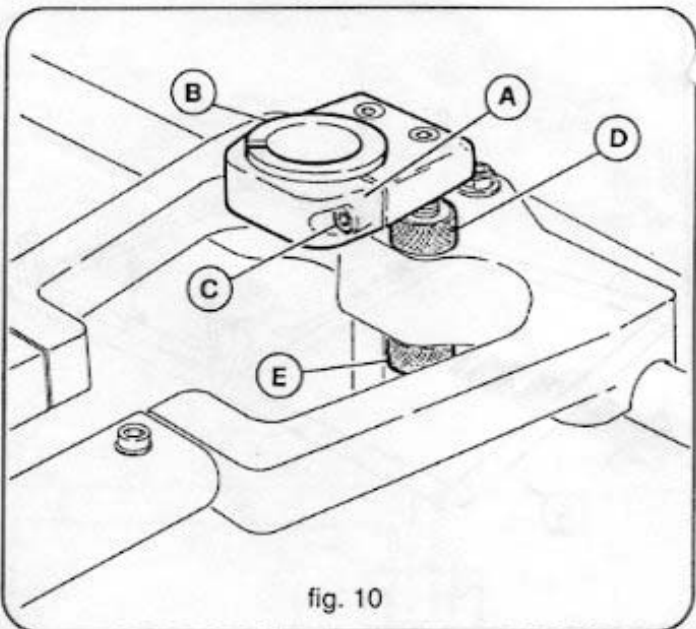


fig. 10

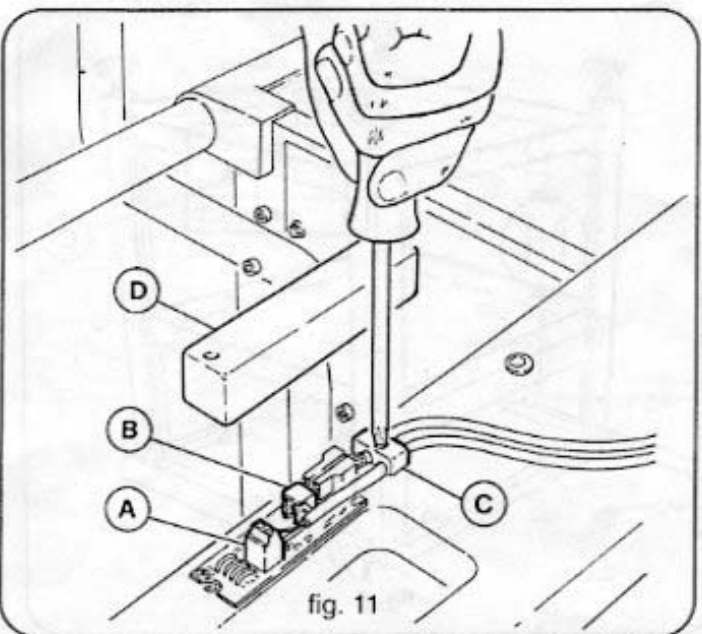


fig. 11

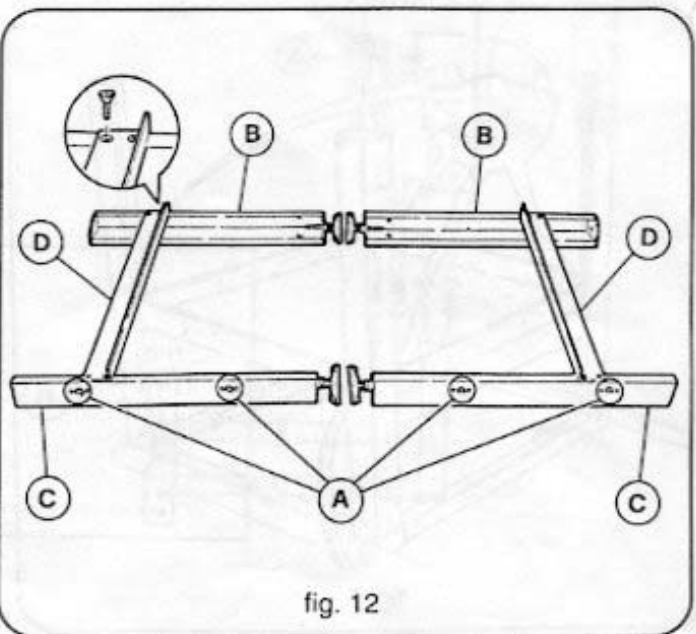


fig. 12

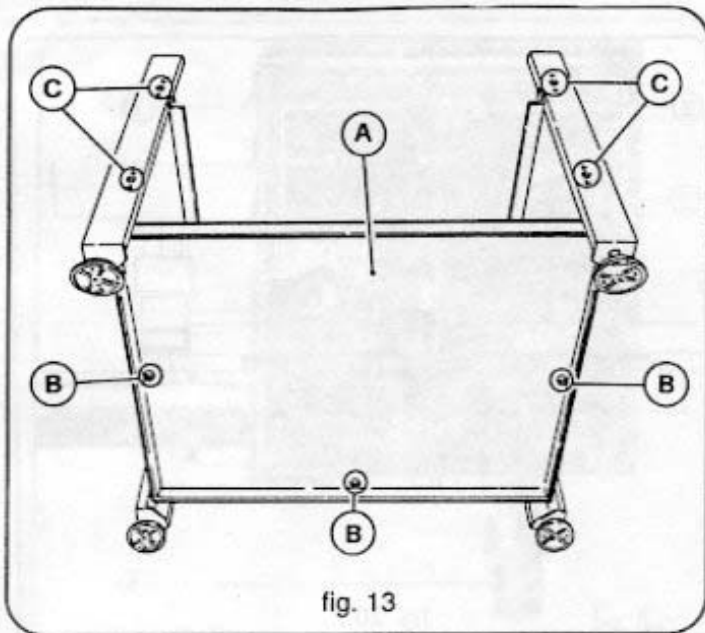


fig. 13

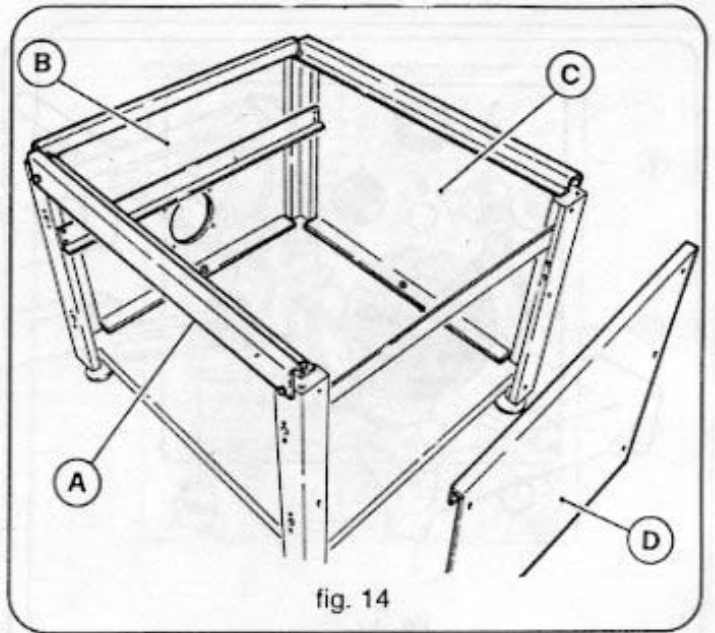


fig. 14

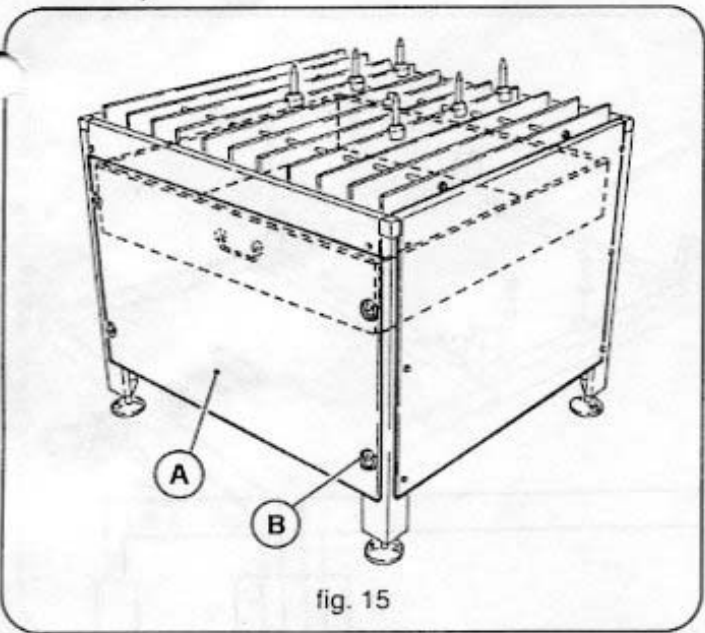


fig. 15

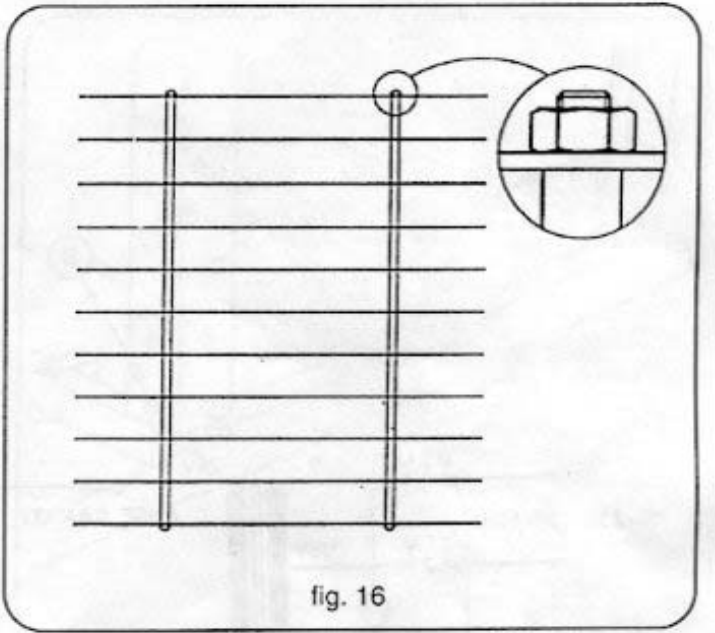


fig. 16

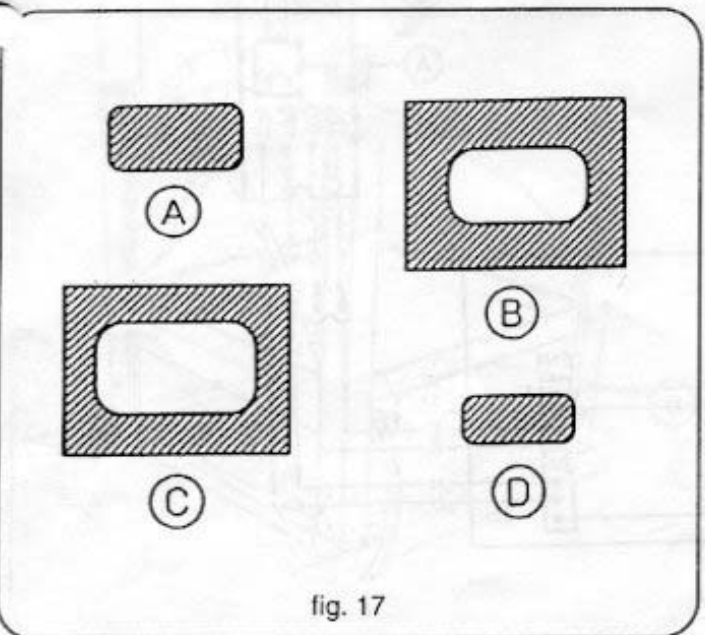


fig. 17

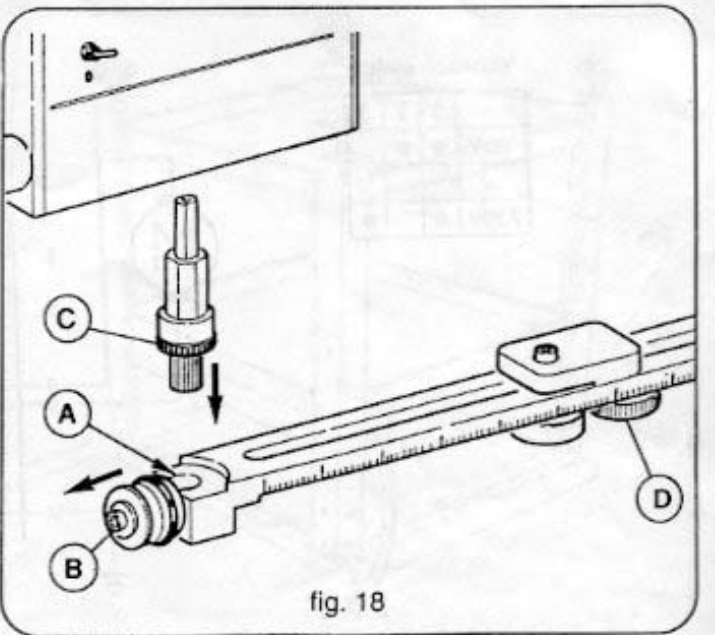


fig. 18

