

HEATER

GROUP 80

CONTENTS

Heating system

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Air conditioning system

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General description	(*)	Condenser blower fan	(*)
Controls assembly symbols	(*)	Condenser	(*)
Functional diagrams	(*)	Compressor	(*)
Installation diagrams	(*)	Electromagnetic coupling	(*)
System components	(*)	Drier filter	(*)
Air conditioning system wiring		Pressure switch	(*)
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Controls assembly	(*)	TROUBLE DIAGNOSIS AND	
Expansion valve	(*)	CORRECTIONS	(*)

(*) For the related information, refer to " **Alfa 90** WORKSHOP MANUAL "

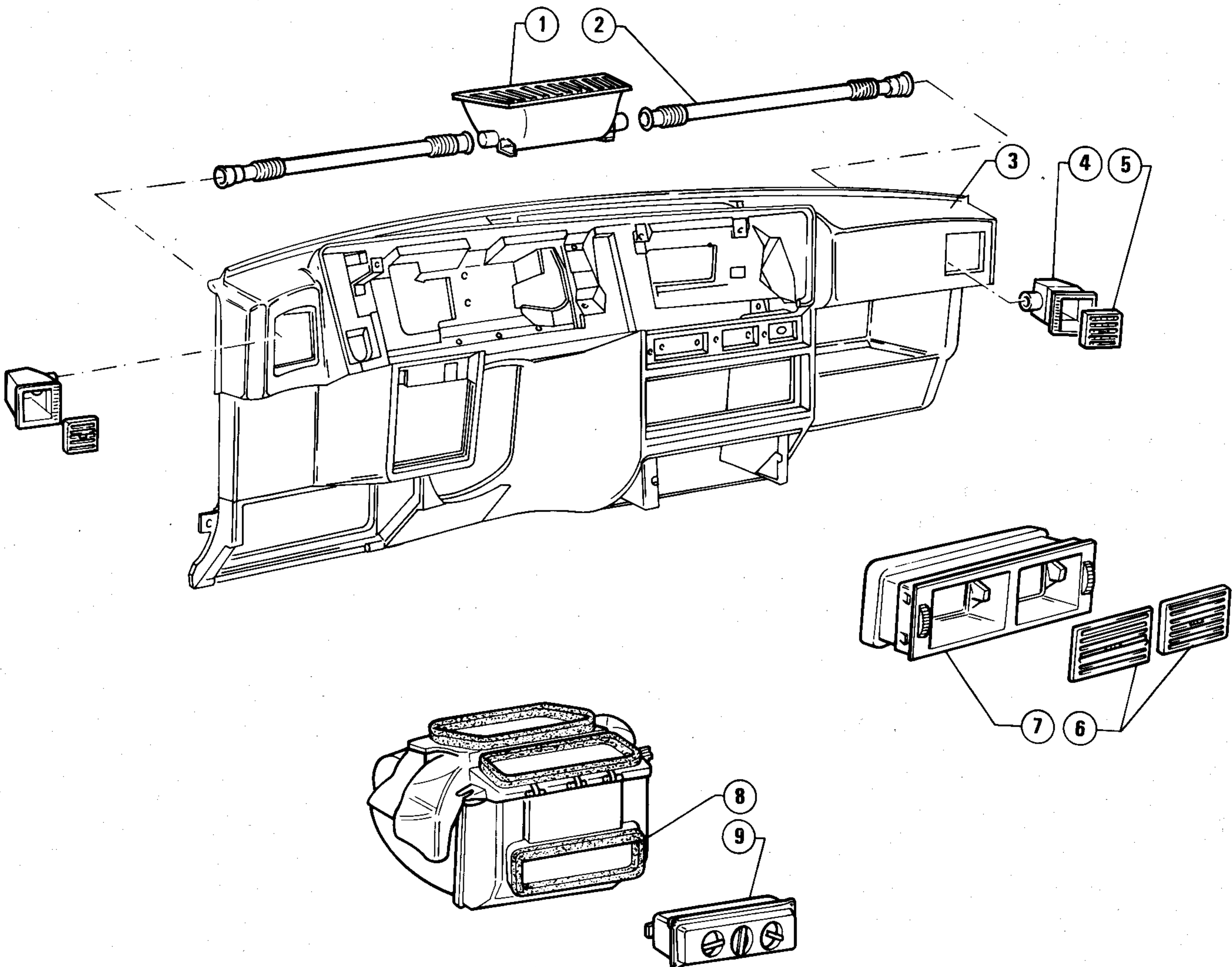
N.B. Updating of wiring diagrams relating to model **Z5** are not available at the time when going to press.

HEATER

Heating system

DESCRIPTION

HEATING SYSTEM COMPONENTS

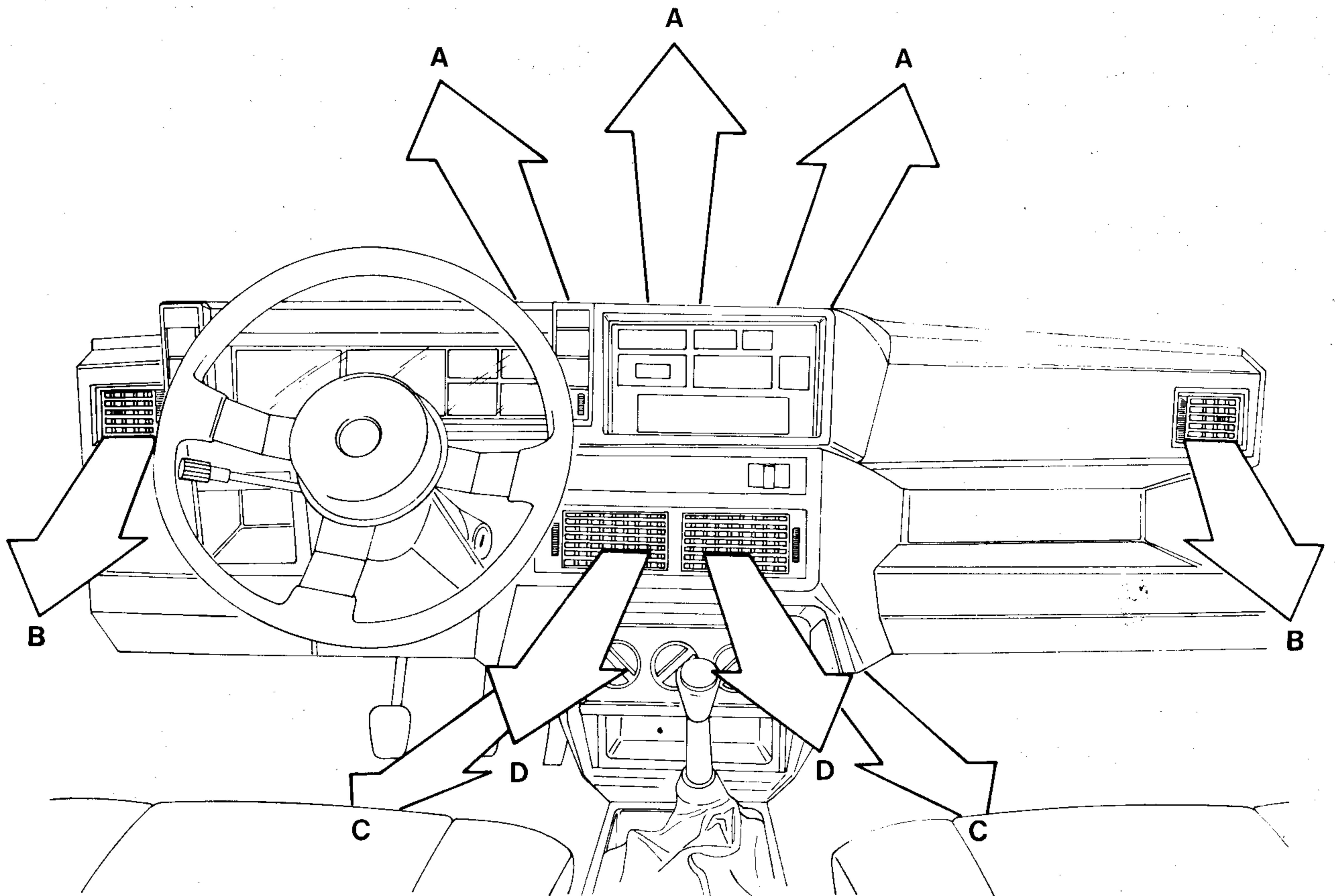


- 1 Main defrost air duct
- 2 Side defrost air duct
- 3 Dashboard
- 4 Side defrost vent support
- 5 Side defrost vent

- 6 Central air ventilation vents
- 7 Air ventilation central vents support
- 8 Air ventilation unit
- 9 Air ventilation unit controls

HEATER

AIR FLOW DIAGRAM



- A Windscreen defrost
- B Side defrost
- C Floor
- D Ventilation

CONTROLS ASSEMBLY SYMBOLS

Windscreen	Floor	Ventilation	Defrosting	Recirculation air flow	Dynamic air flow	Blower fan

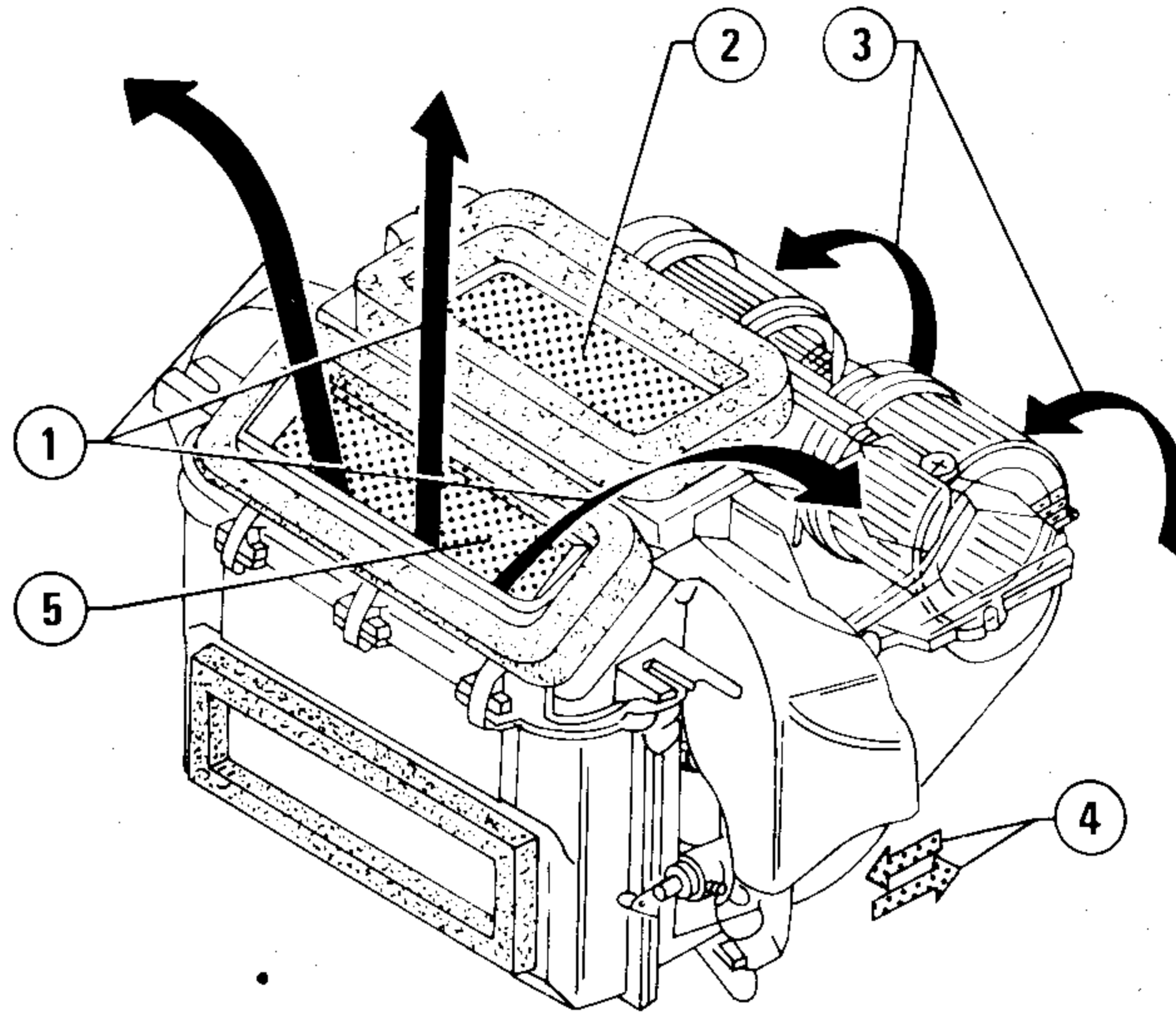
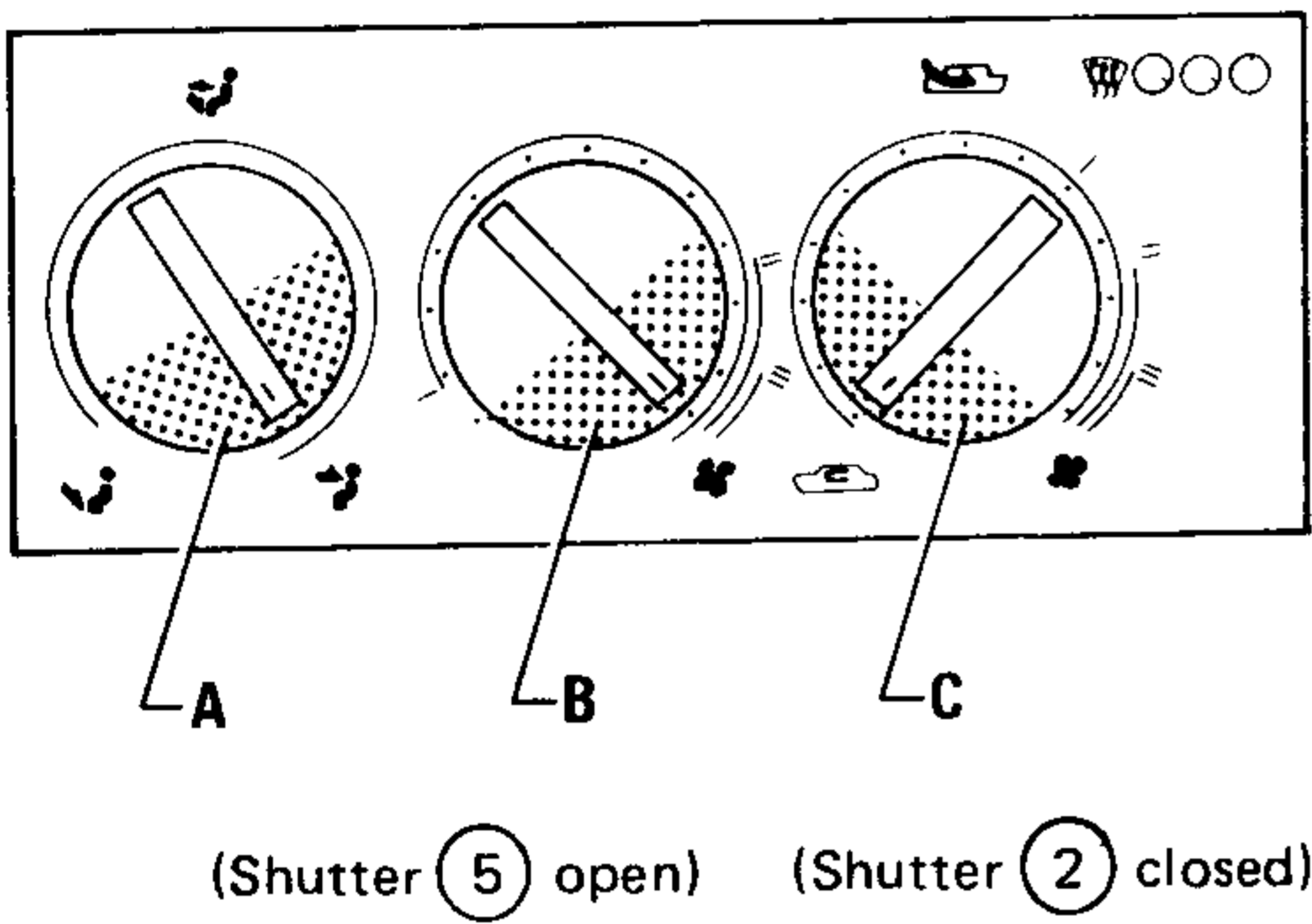
FUNCTIONAL DIAGRAMS

1. DEFROSTING

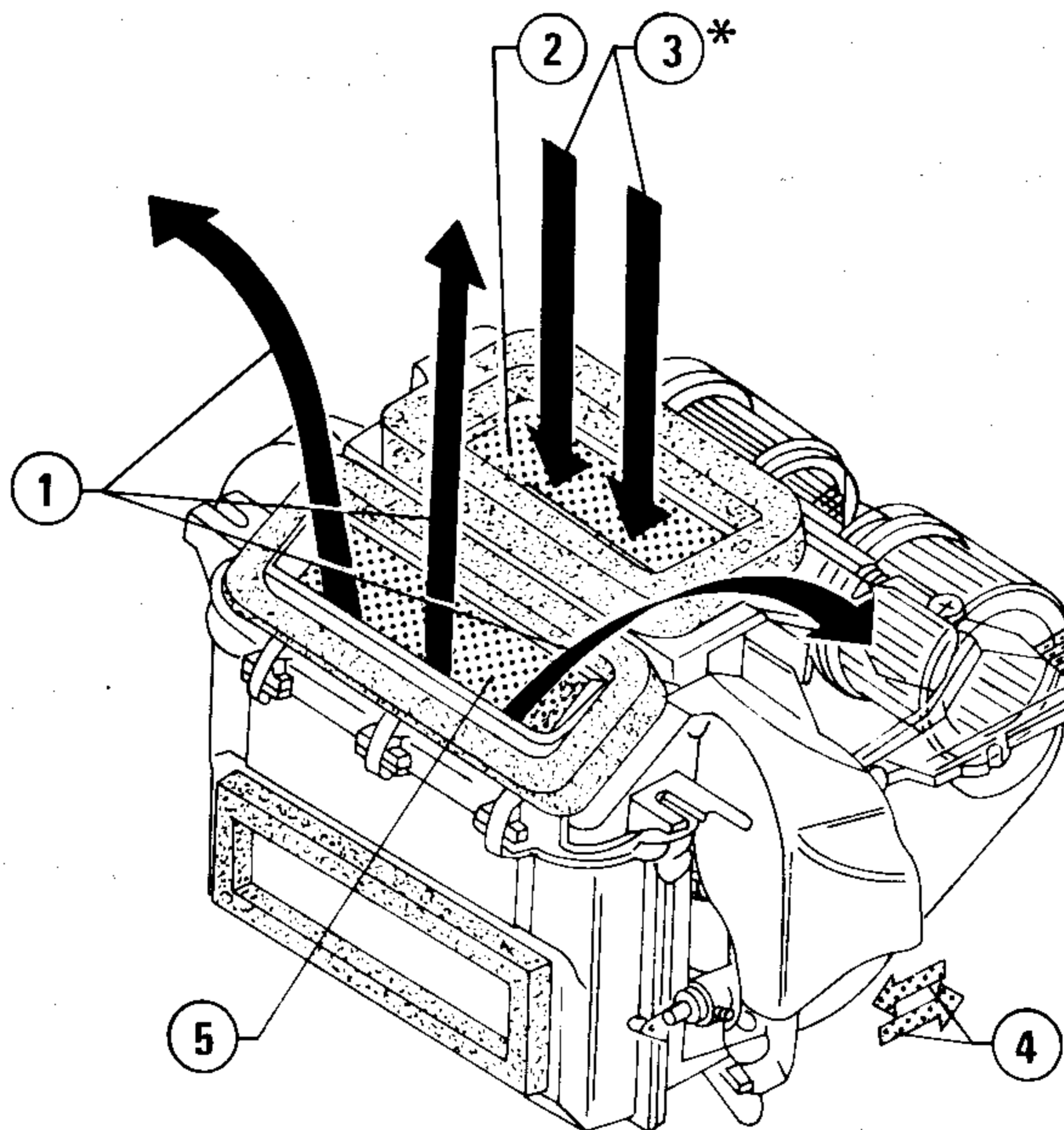
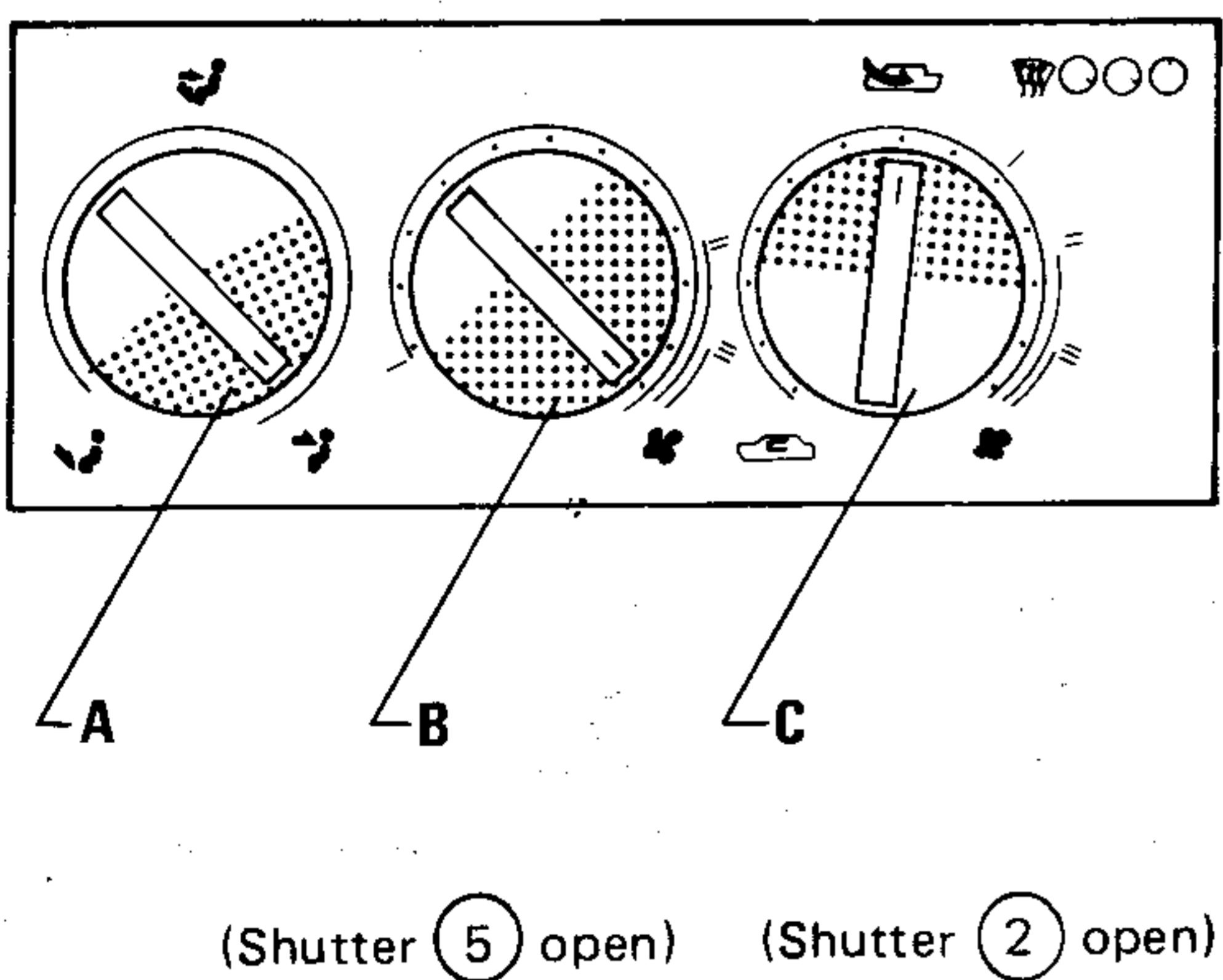
CAUTION:

To obtain the maximum air flow from the defrost louvers, the central air ventilation vents must be closed.

Position of controls for recirculation air flow



Position of controls for dynamic air flow



- A Control for air delivery shutter for defrosting and/or floor
- B Control for heater core liquid cock and blower speed for ventilated/heated air
- C Control for dynamic or recirculation air intake shutter and blower speed

- 1 Air to defrost duct
- 2 Dynamic air intake shutter
- 3 Recirculation air
- 3* Dynamic air
- 4 Liquid delivery and return to/from heater core
- 5 Air delivery shutter for defrosting and/or floor
- 6 Air to floor
- 7 Air to central vents

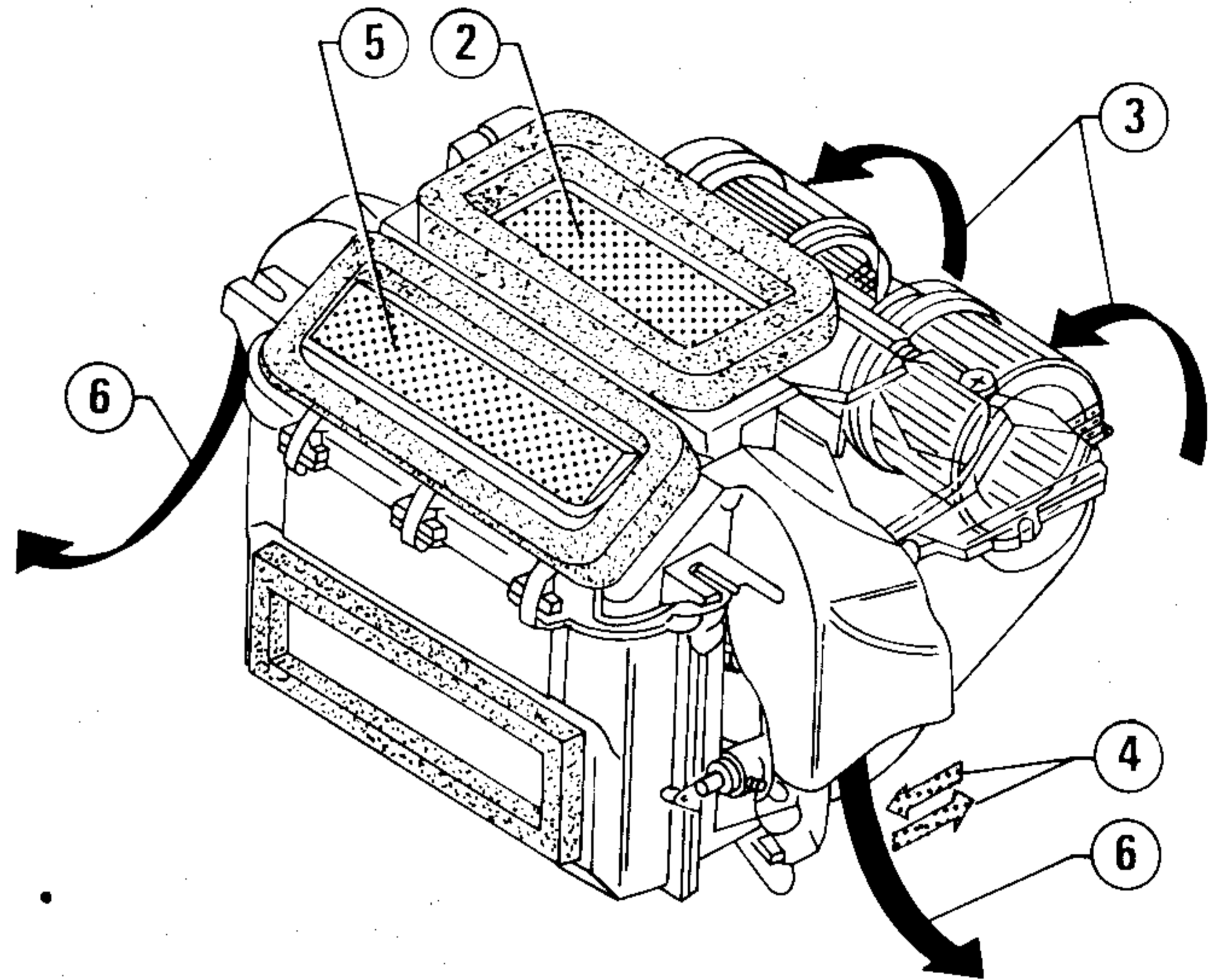
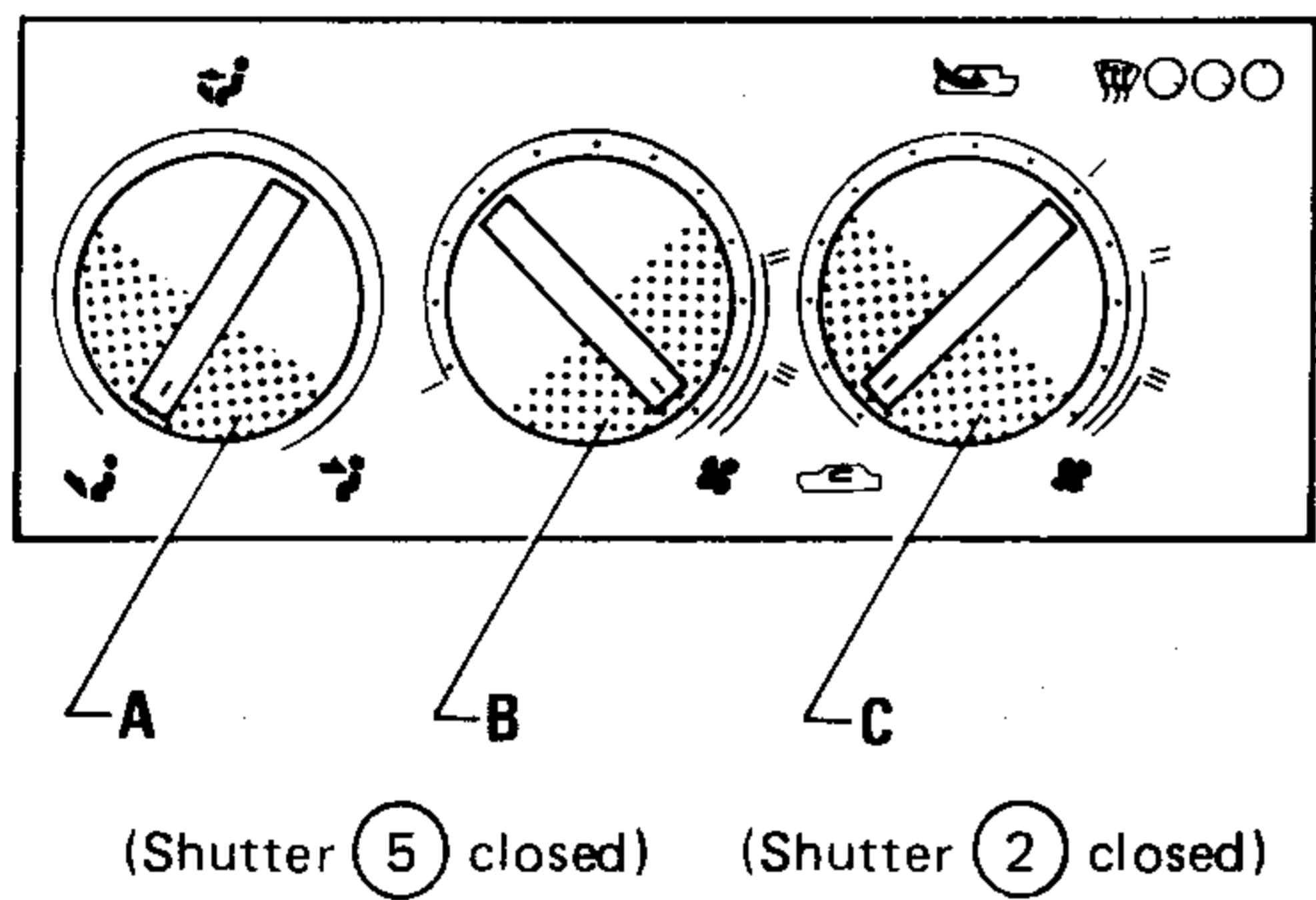
HEATER

2. FLOOR

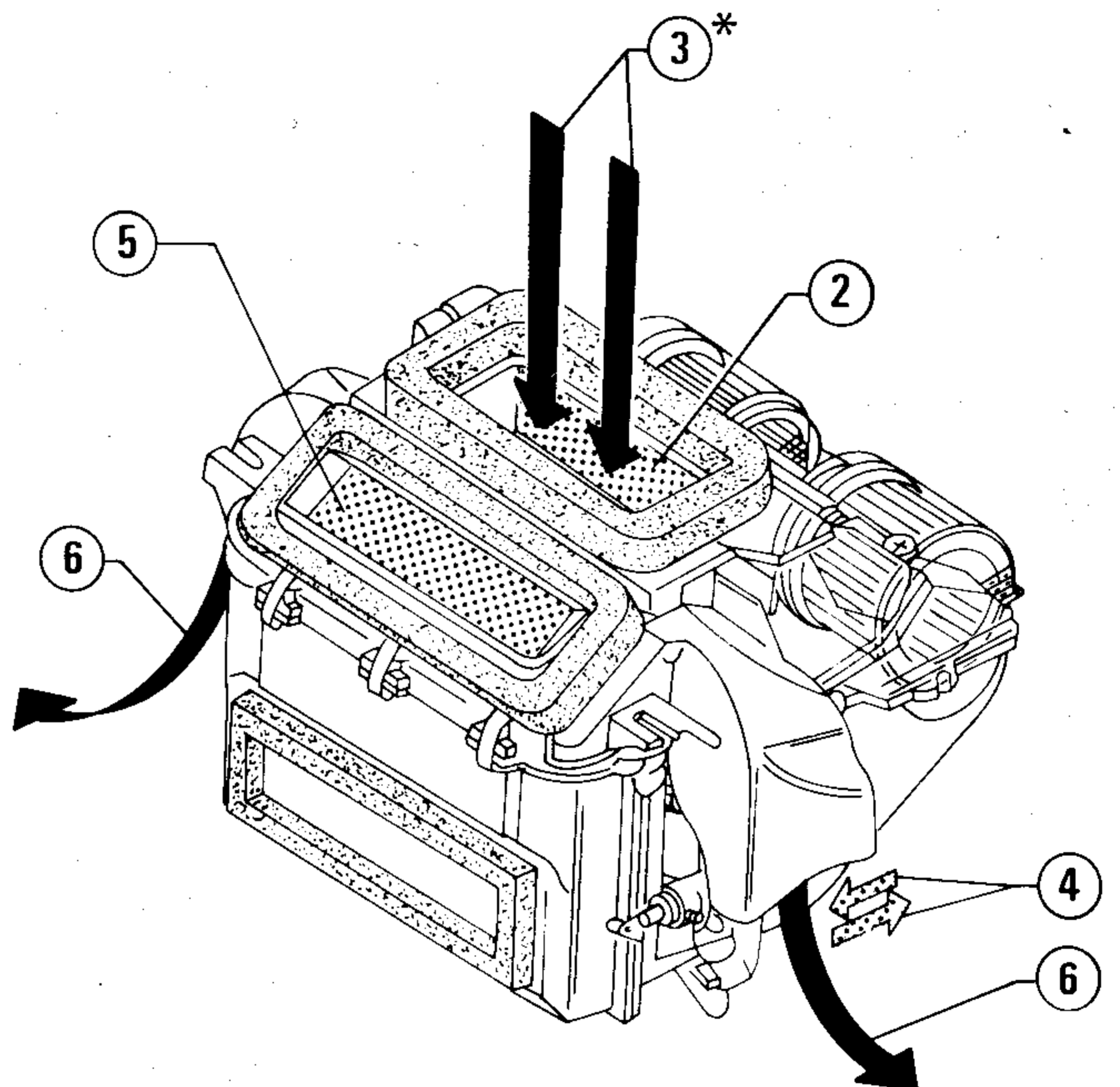
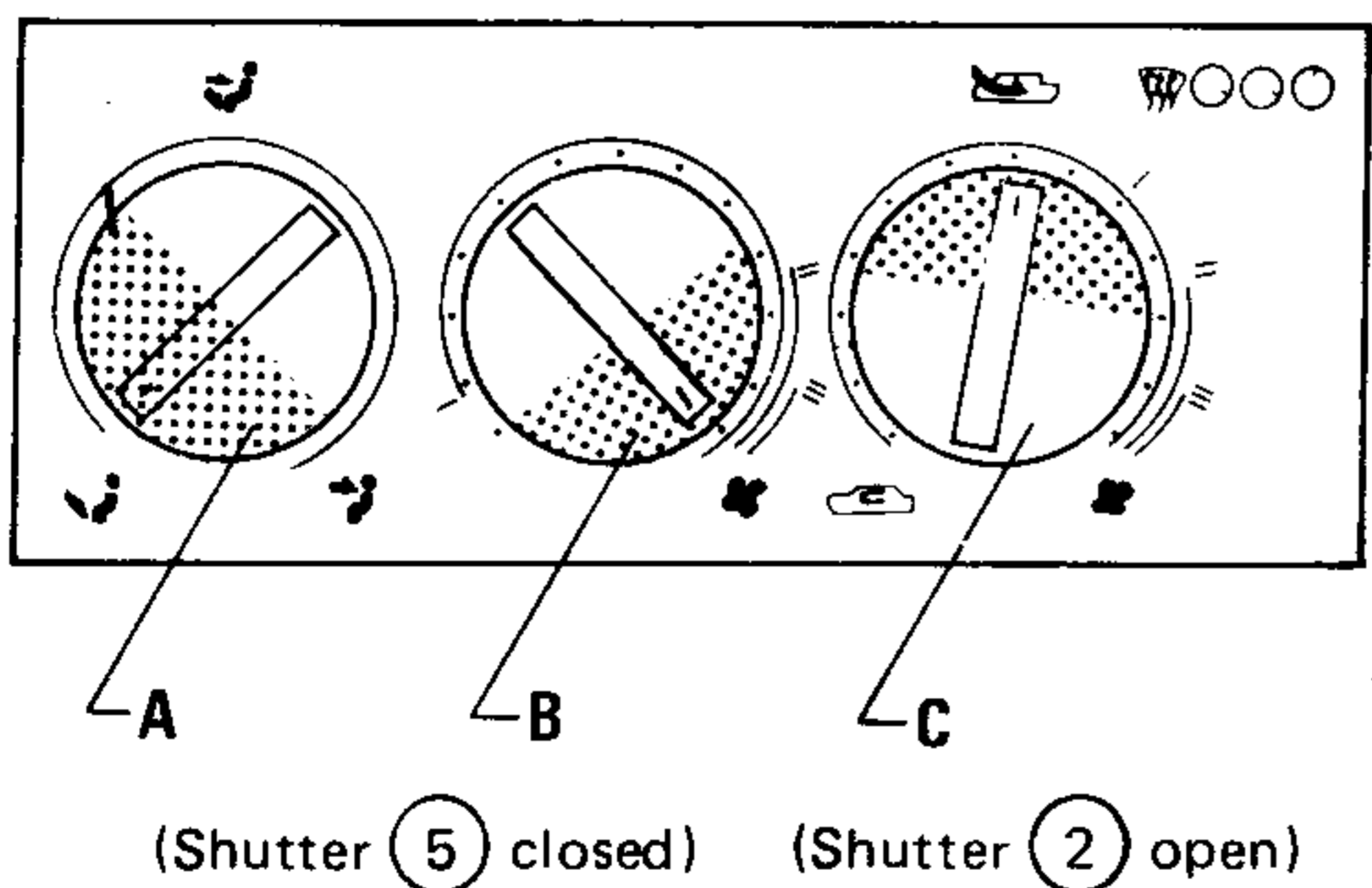
CAUTION:

To obtain the maximum air flow to the floor, the central air ventilation vents must be closed.

Position of controls for recirculation air flow



Position of controls for dynamic air flow



- A Control for air delivery shutter for defrosting and/or floor
- B Control for heater core liquid cock and blower speed for ventilated/heated air
- C Control for dynamic or recirculation air intake shutter and blower speed

- 1 Air to defrost duct
- 2 Dynamic air intake shutter
- 3 Recirculation air
- 3* Dynamic air
- 4 Liquid delivery and return to/from heater core
- 5 Air delivery shutter for defrosting and/or floor
- 6 Air to floor
- 7 Air to central vents

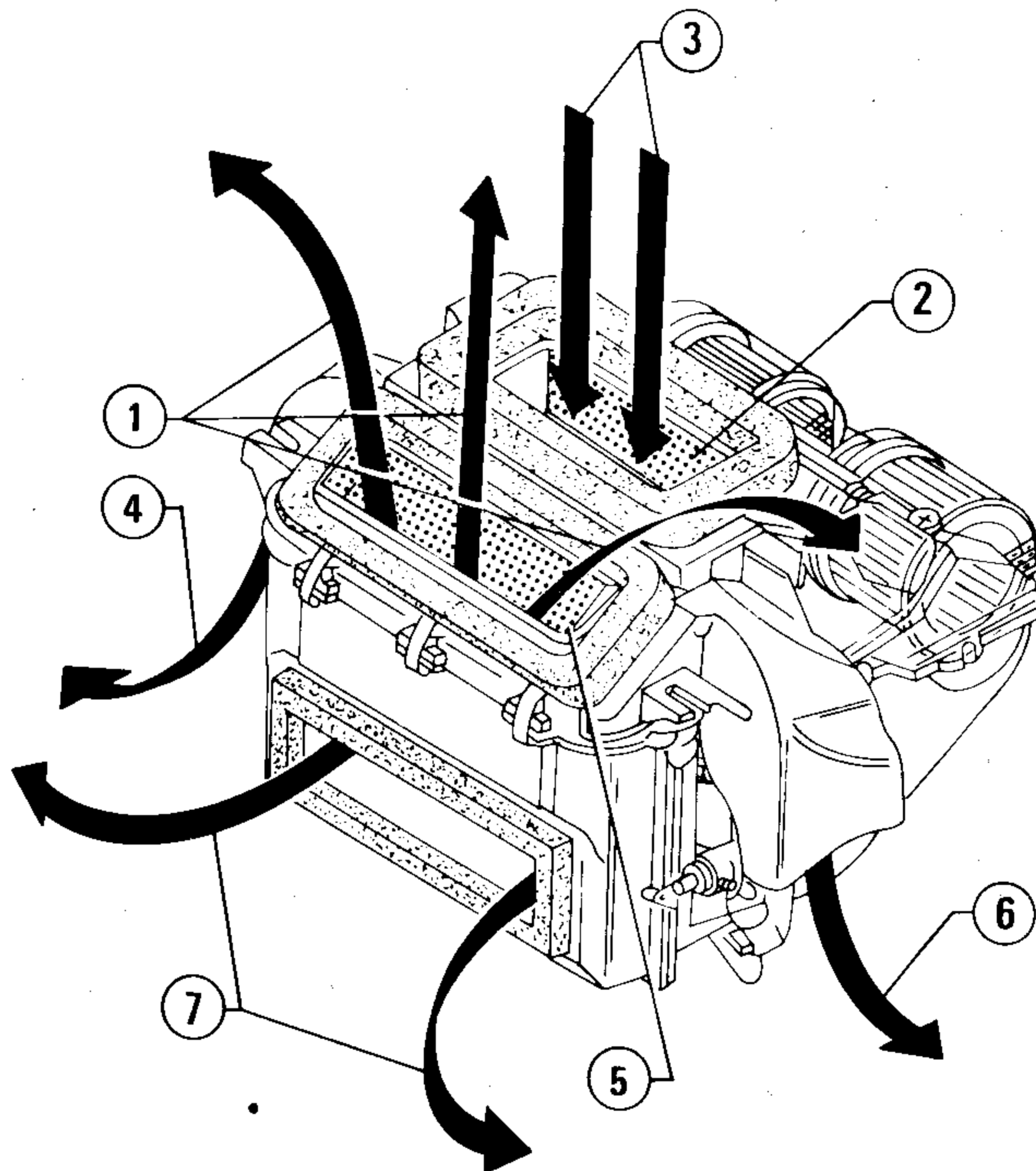
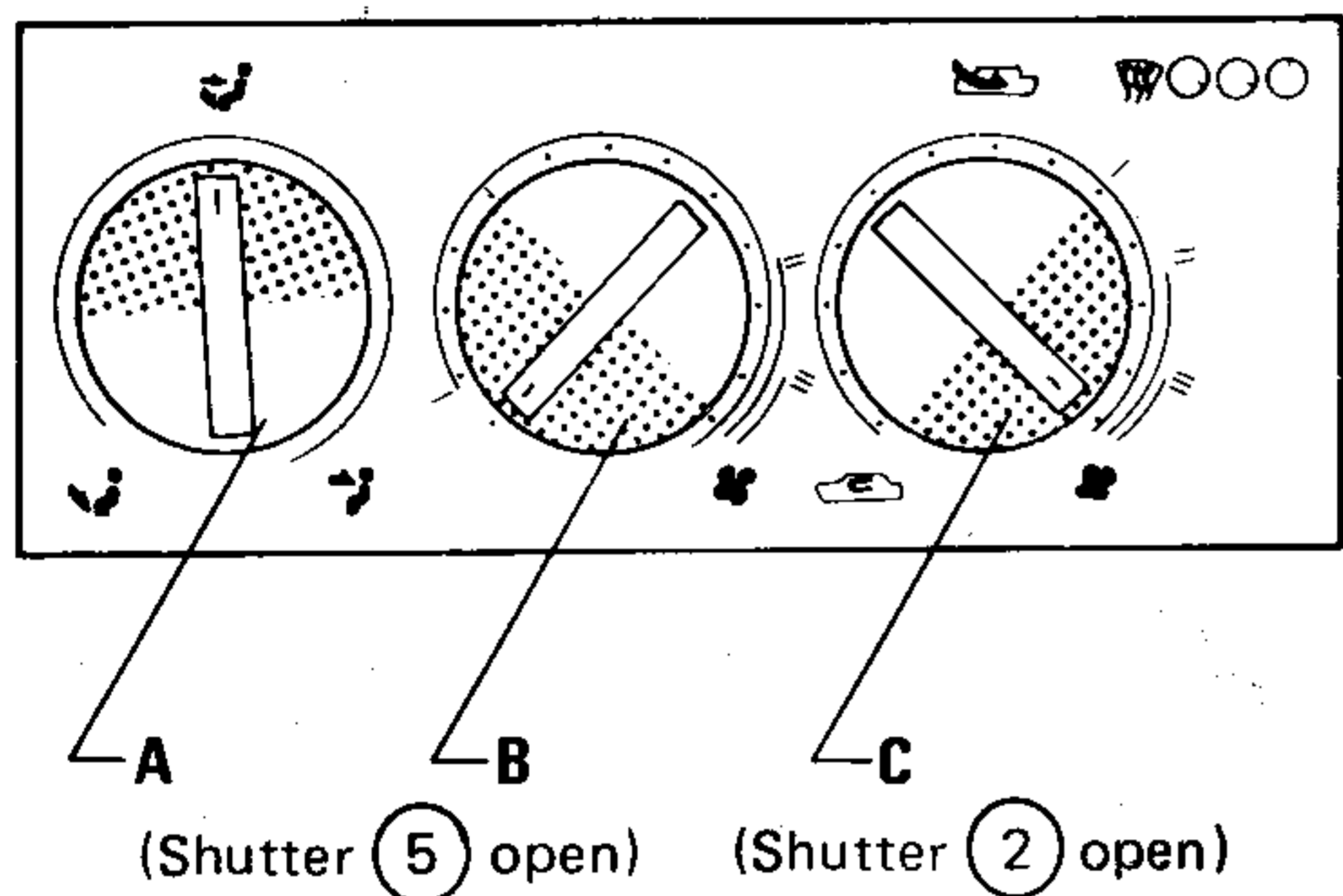
HEATER

3. VENTILATION

CAUTION:

To obtain the maximum air flow, all the air ventilation vents located on the dashboard must be completely opened.

Position of control for dynamic air flow

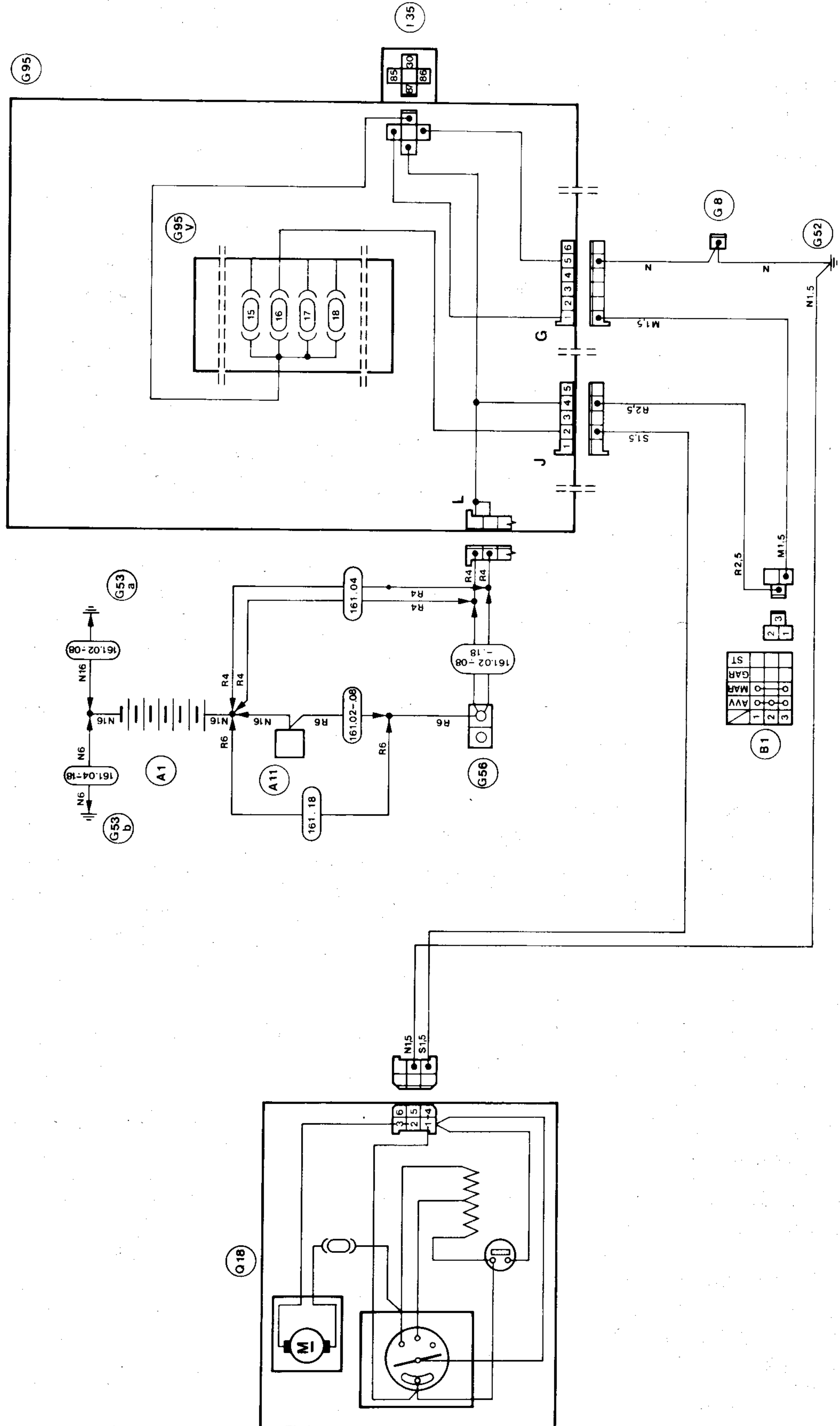


- A Control for air delivery shutter for defrosting and/or floor
- B Control for heater core liquid cock and blower speed for ventilated/heated air
- C Control for dynamic or recirculation air intake shutter and blower speed

- 1 Air to defrost duct
- 2 Dynamic air intake shutter
- 3 Recirculation air
- 3* Dynamic air
- 4 Liquid delivery and return to/from heater core
- 5 Air delivery shutter for defrosting and/or floor
- 6 Air to floor
- 7 Air to central vents

HEATER

HEATER WIRING DIAGRAM

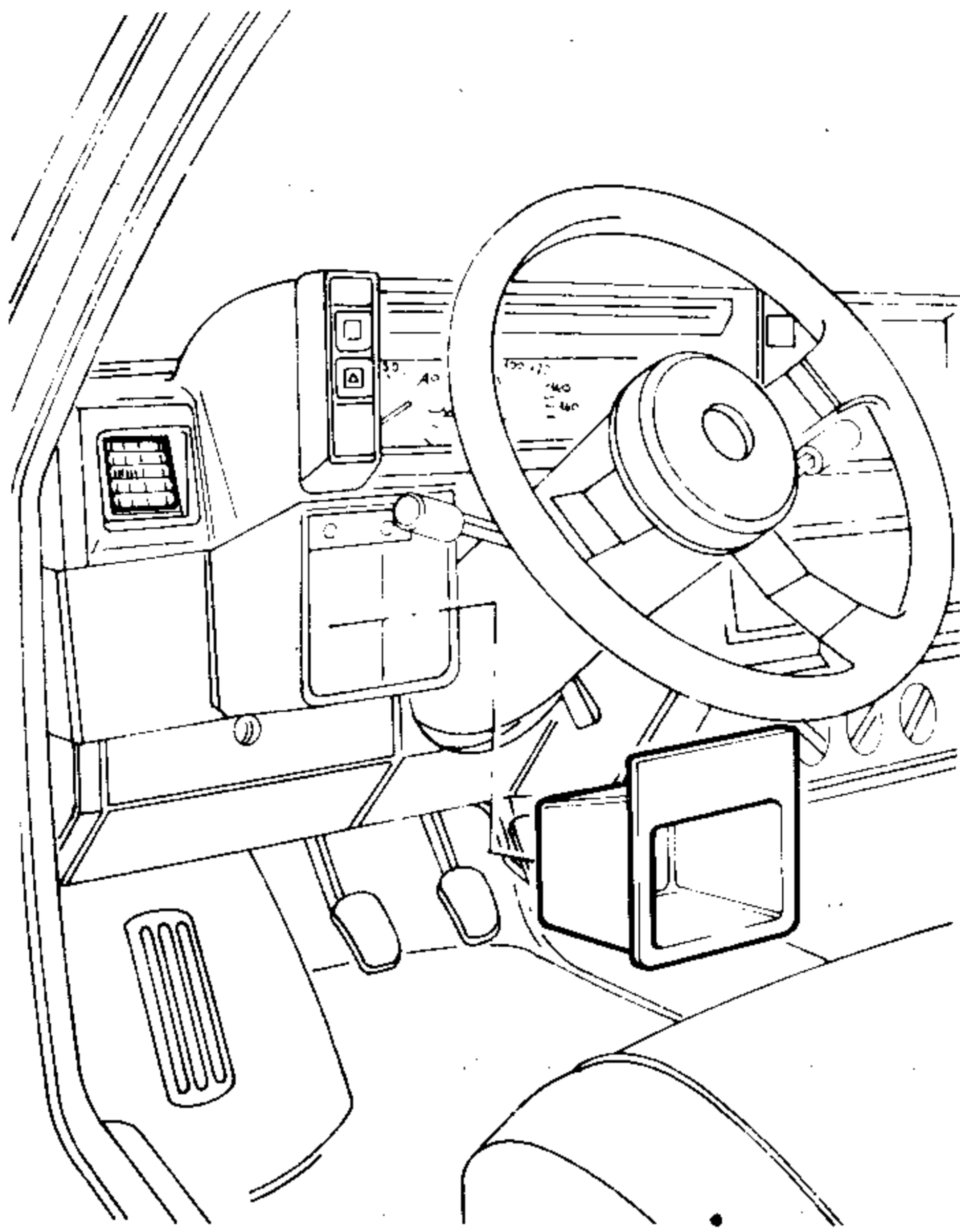


SERVICING

AIR DUCTS

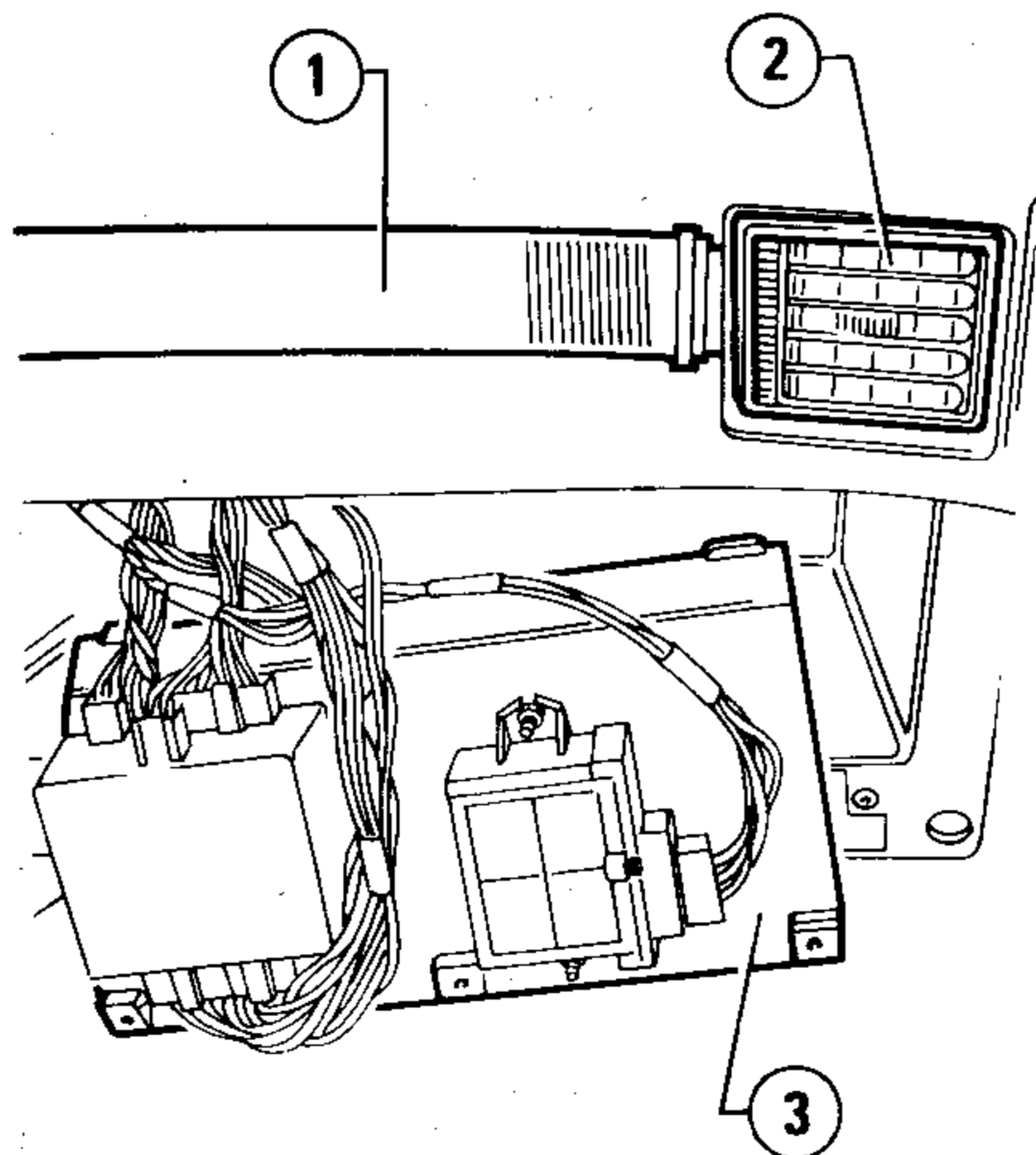
REMOVAL AND INSTALLATION

1. Use a suitable tool and extract the side defrost vents.
2. Extract the vents supports from their seats.



4b. Side right-hand vent

- Unscrew the three screws securing panel (3) and overturn it. In this way it is possible to gain access to the side right-hand duct (1) with one hand.
- Insert the vent support (2) by operating as per the side left-hand vent.



- 1 Side duct
- 2 Vent support
- 3 Panel

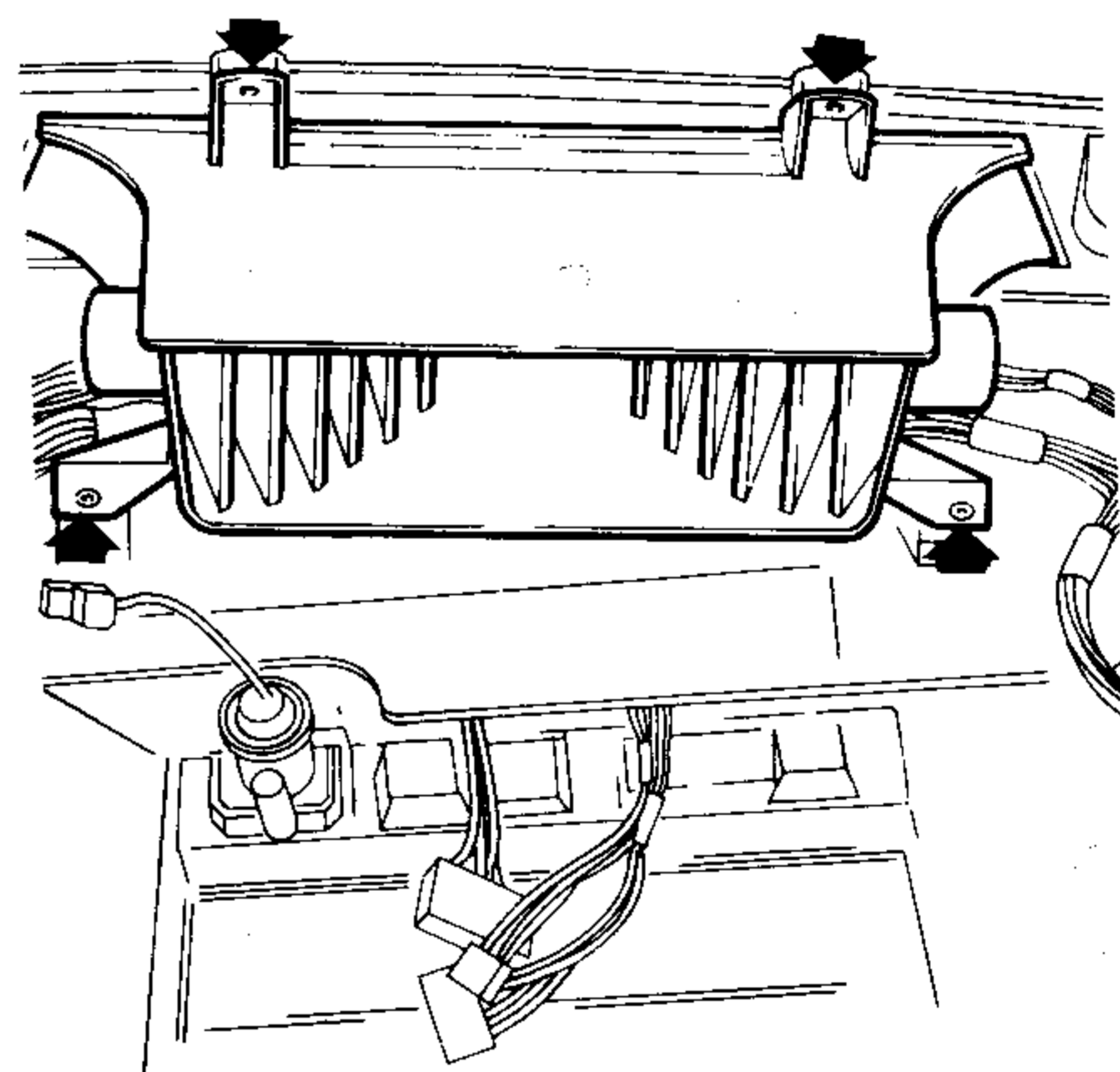
3. Remove the ventilation central vents operating likewise.
4. To install the side vents supports, after the dashboard has been installed on the vehicle, operate as follows.

4a. Side left-hand vent

- Remove the glovebox compartment so that it is possible to gain access to the side left-hand duct with one hand; keep the side duct still.
- With the other hand, insert the vent support and position it into the side duct.

5. If required, disassemble the ducts located behind the dashboard by operating as follows.

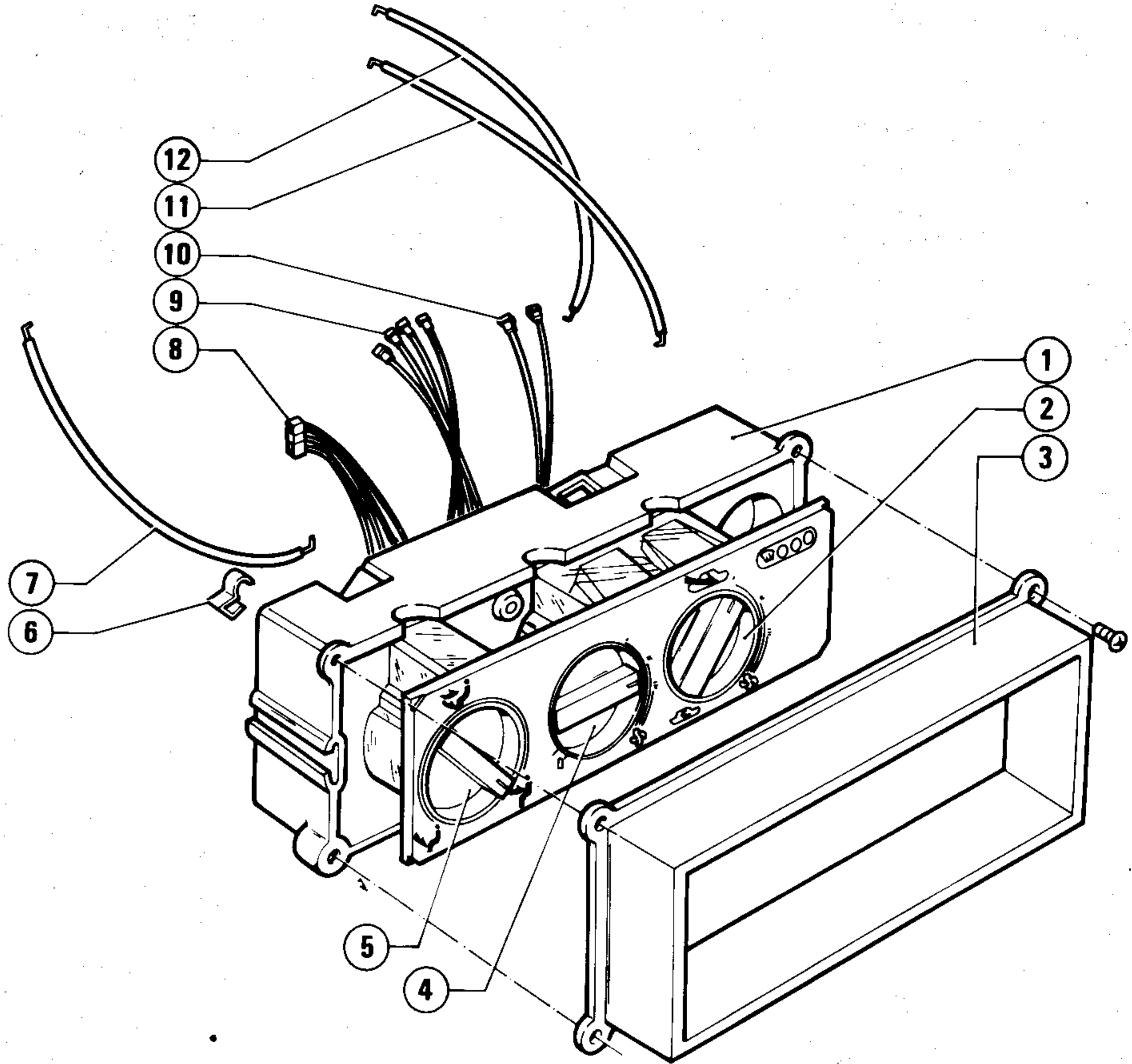
- a. Remove the dashboard (refer to: Group 66 - Dashboard).
- b. Remove the side air ducts.
- c. Use a drilling machine and countersink the four rivets securing the main duct to body; remove main duct.



6. Install the air ducts by reversing the order of removal.

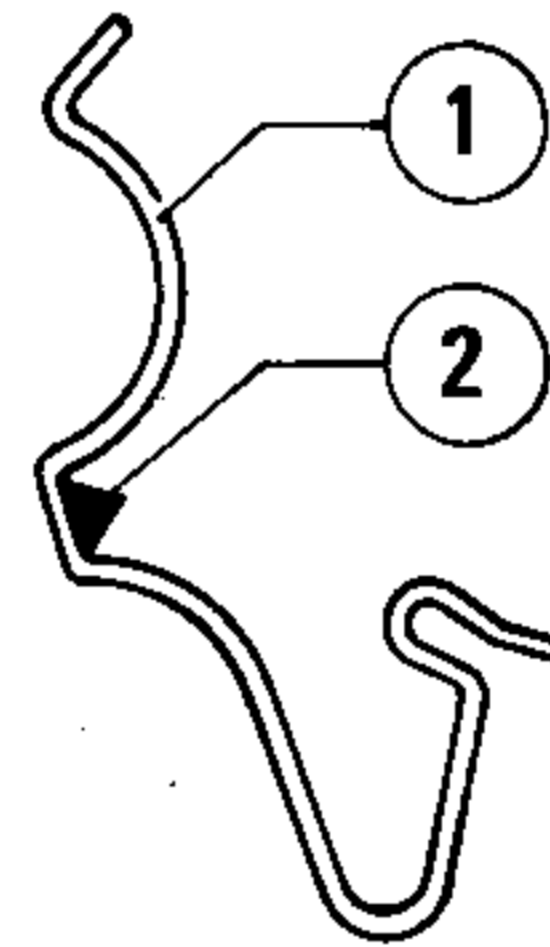
CONTROLS ASSEMBLY

- 1 Air ventilation unit controls casing
- 2 Dynamic or recirculation air inlet shutter and blower speed control
- 3 Controls casing frame
- 4 Control for heater core liquid cock and blower speed for ventilated/ heated air
- 5 Control for air delivery shutter for defrosting and/or floor
- 6 Clip securing control cables sheath
- 7 Control cable for air delivery shutter for defrosting and/or floor
- 8 Controls supply wiring
- 9 Blower resistors wiring
- 10 Heater core liquid temperature thermal switch wiring
- 11 Control cable for heater core liquid cock
- 12 Control cable for dynamic air intake shutter



CAUTION:

Make sure that clips ① securing the control cable sheath have tooth ②. If the clips do not have the tooth, replace them on re-assembly.

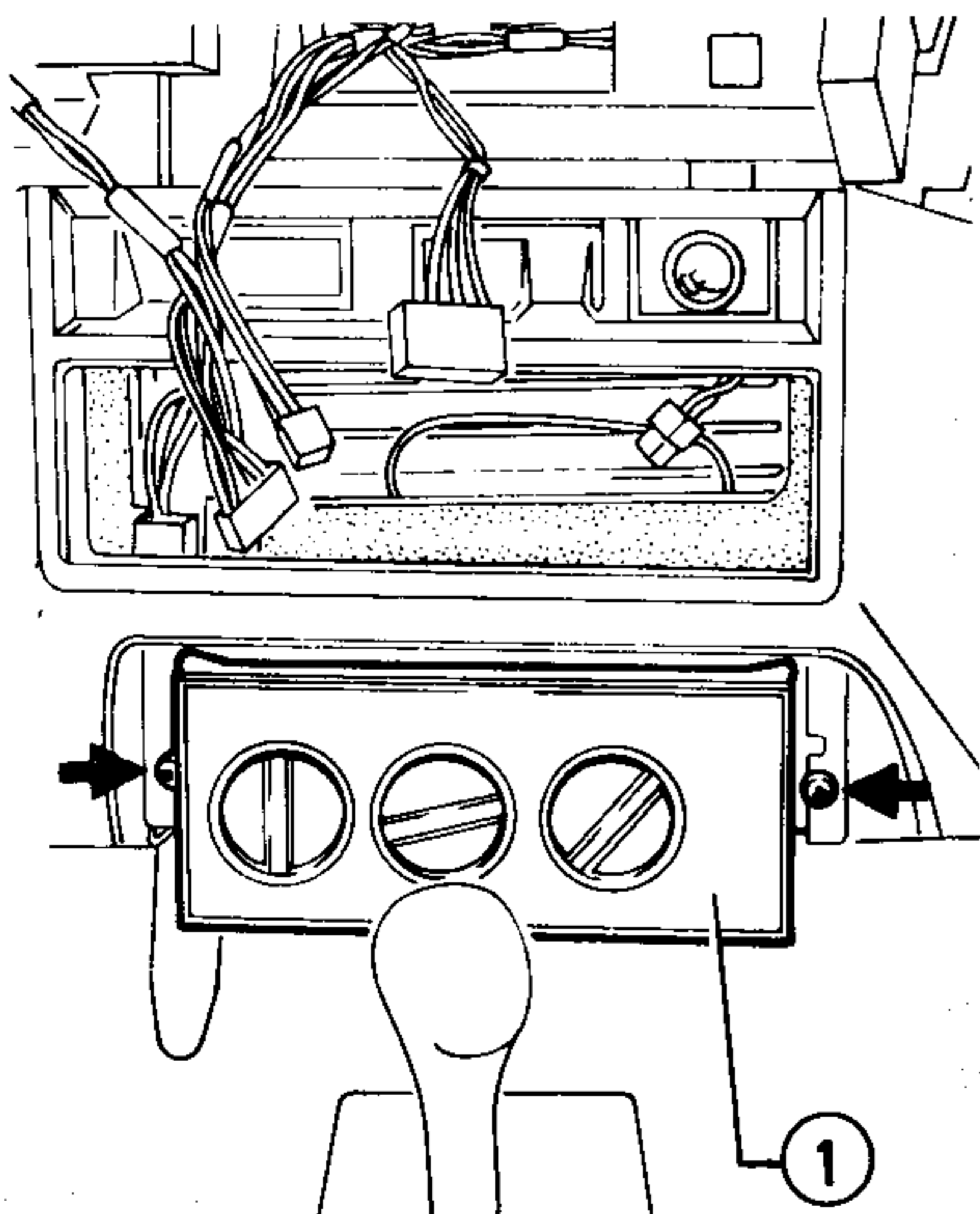


- 1 Clip
- 2 Tooth

On re-assembly, make sure that the clip tooth cuts into the sheath to be secured, so as to prevent the sheath moving.

REMOVAL AND INSTALLATION

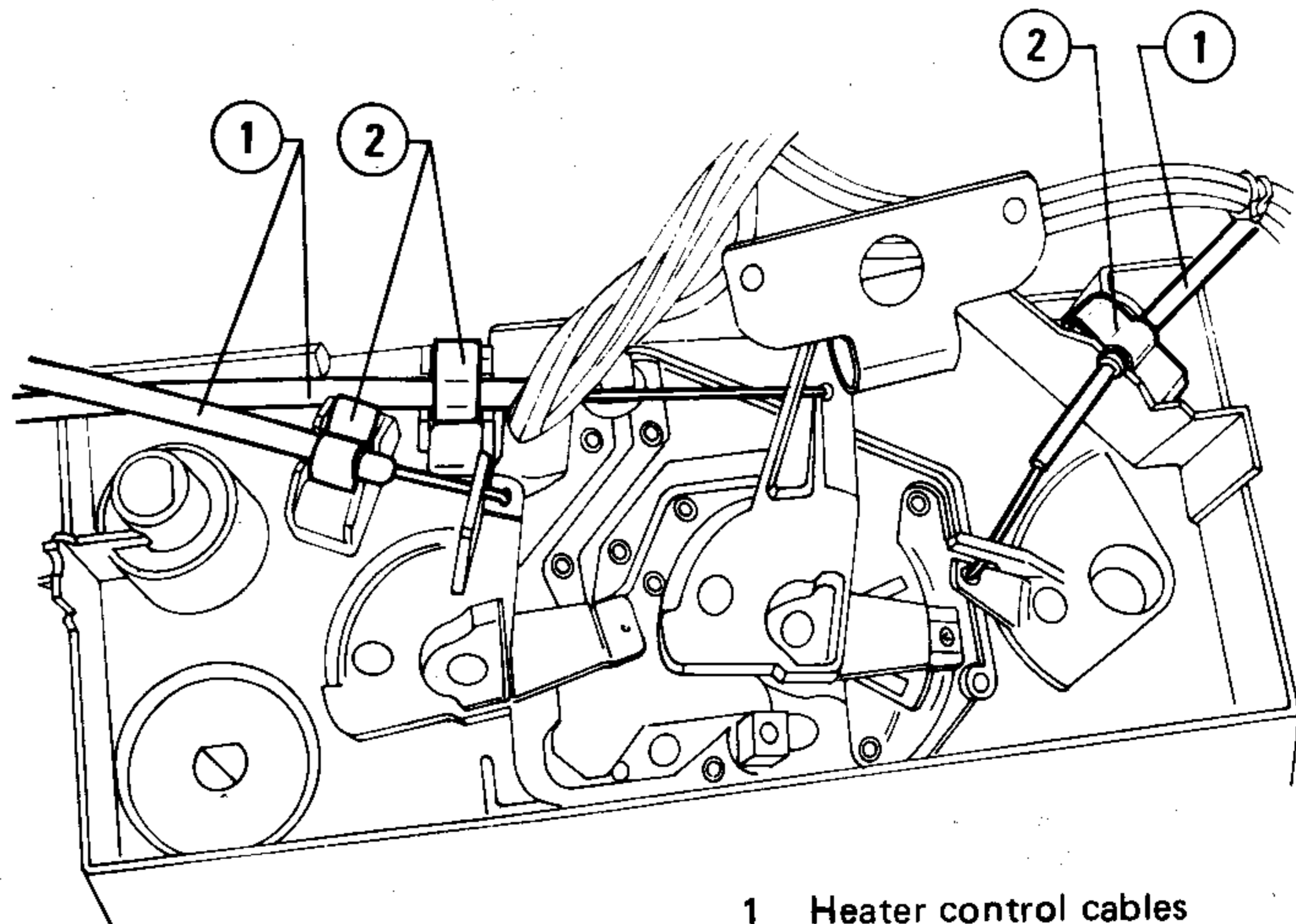
- 1. Remove the radio console (refer to: Group 66 - Radio Console).
- 2. Unscrew the two screws securing control casing ① to dashboard.
- 3. Disconnect wirings.



- 1 Control casing

- 4. Unhook the three sheath retaining clips ② and detach the three cables ① from the control casing. Remove the control casing.

- 5. Reconnect the air ventilation control unit by reversing the order of removal.
- 6. Adjust the control cables travel (refer to: "Adjustment").



- 1 Heater control cables
- 2 Clips

HEATER COCK CONTROL KNOB

When replacing the heater cock control knob, operate as follows.

1. Detach the heater controls assembly from the dashboard (refer to: "Controls Unit - Removal and Installation").
2. Slightly press the detent, and extract the knob.

3. Set the sliding contact to the position shown in figure B and insert the knob with the reference pointer in the corresponding position shown in figure A.

4. Proceed to adjust the travel of radiator liquid cock control cable (refer to: "Controls Unit - Adjustment").

Control cable for heater core liquid cock

1. Ensure that the clip securing cable to control box is hooked on.
2. Unhook clip (3) securing the air ventilation unit.
3. Position the heater core liquid cock control on "0".
4. Move lever (2) in the direction indicated by the arrow, until the closing click is perceived.
5. Secure the cable sheath with clip (3).
6. Check that lever (2) rotates completely without forcing or sticking.

Fig. A

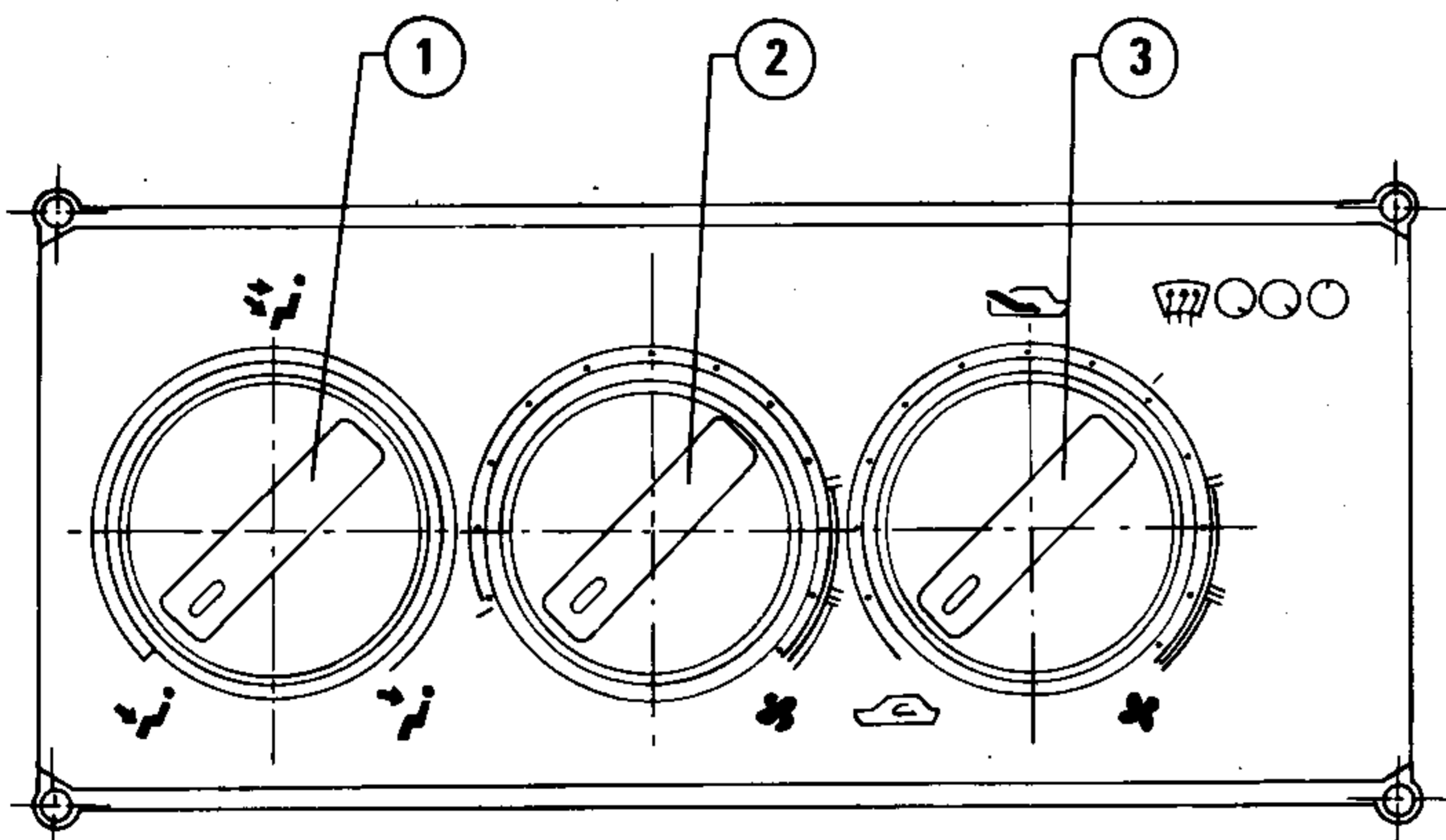
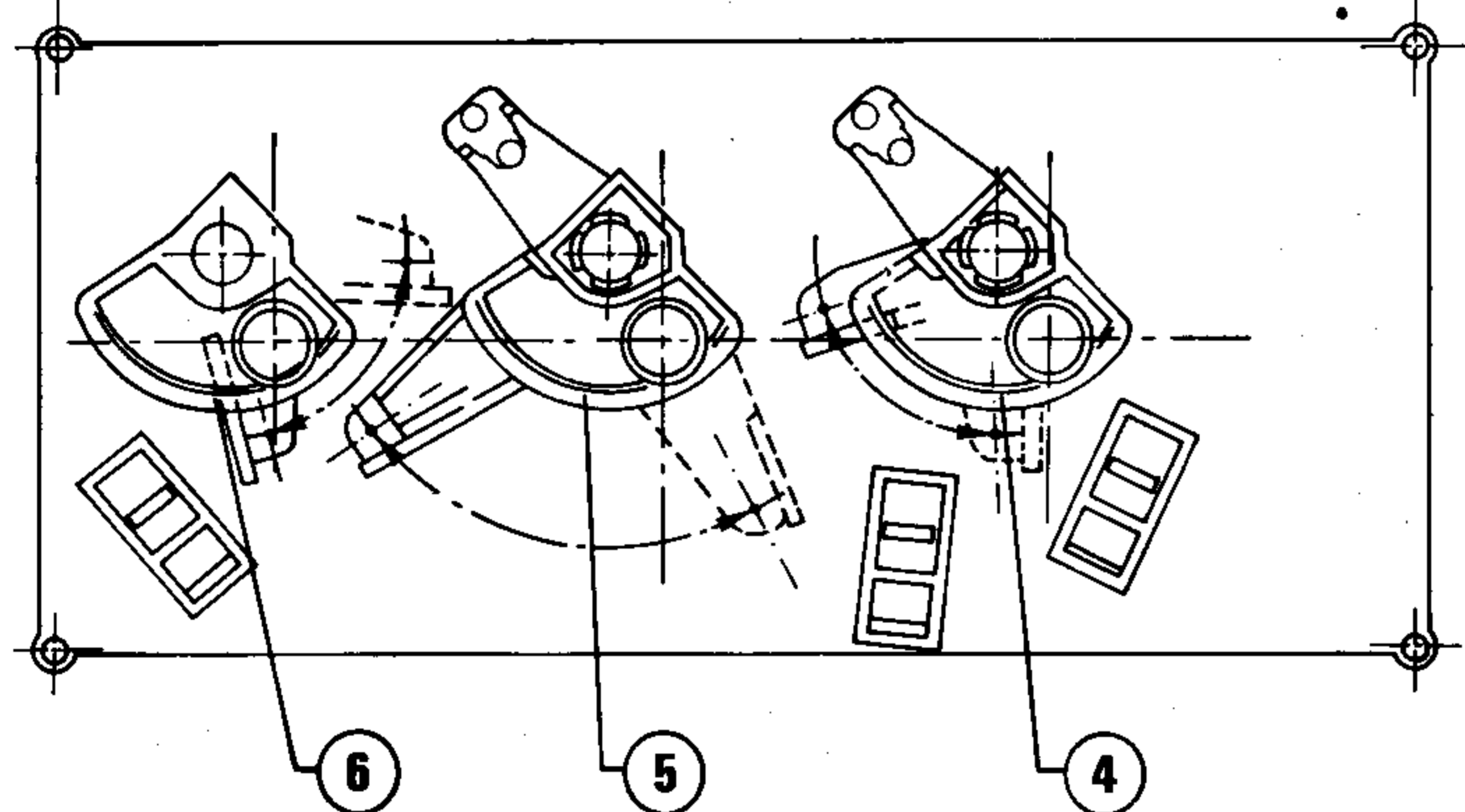
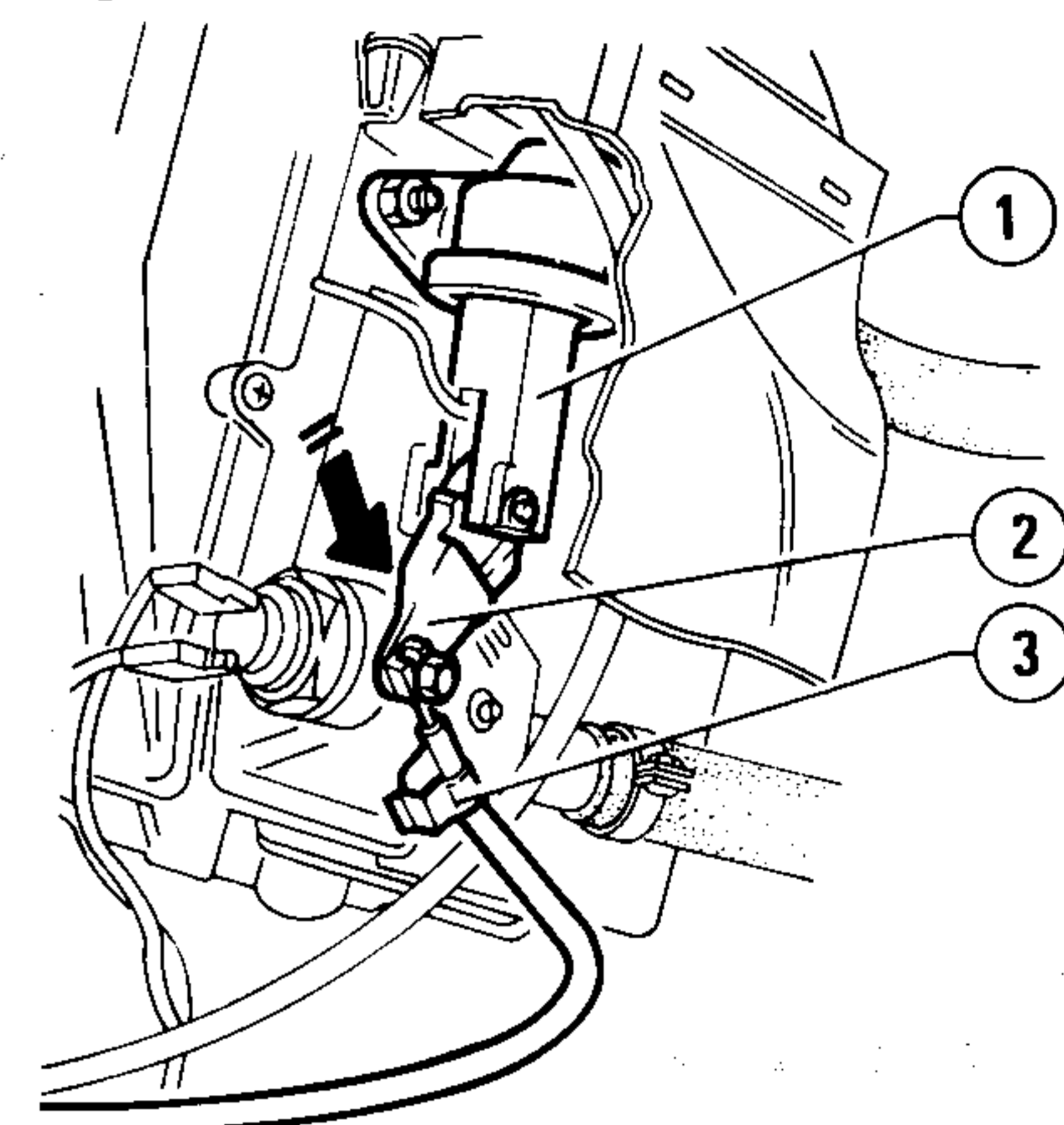


Fig. B



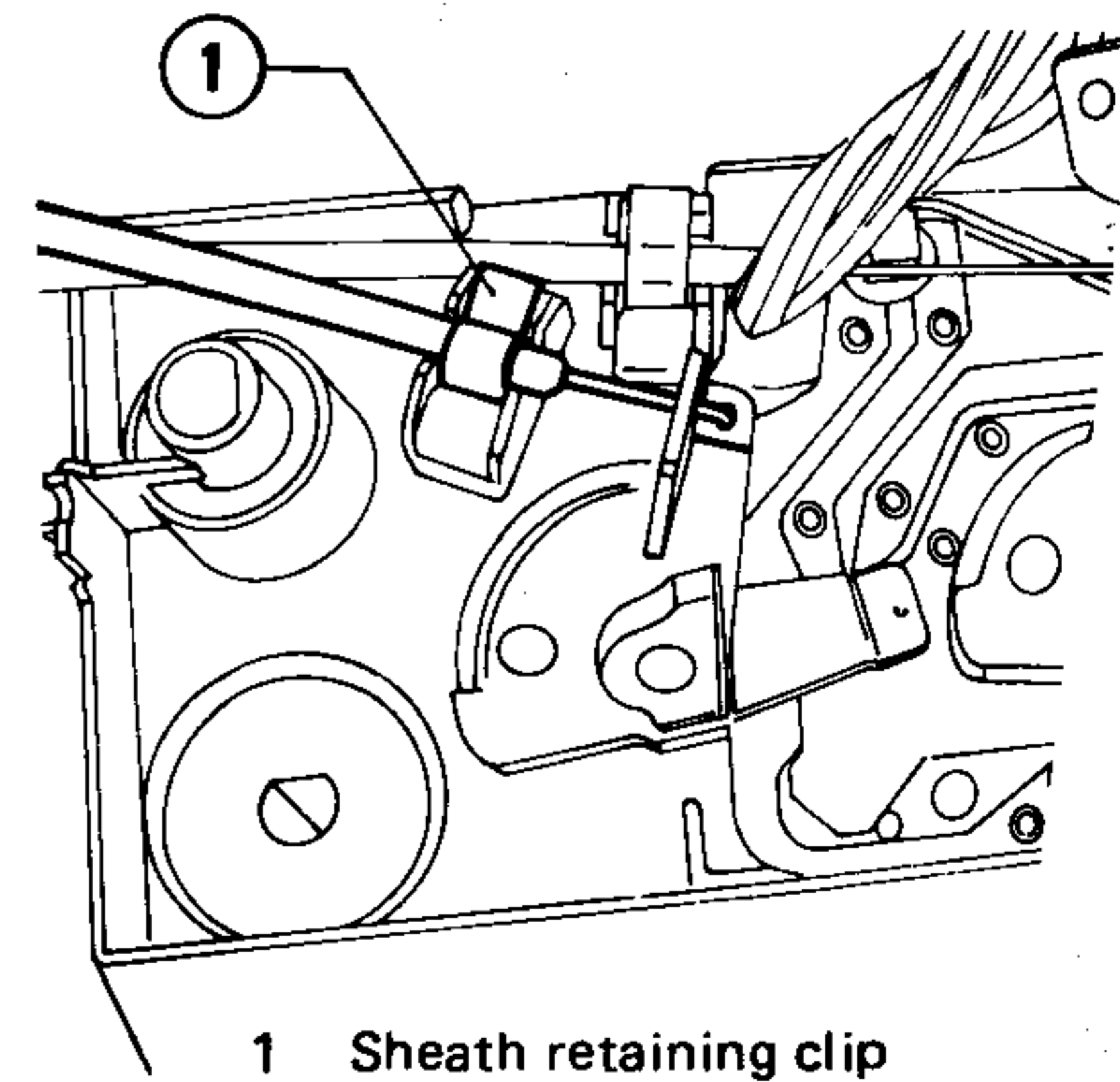
- | | |
|---|--|
| 1 Defrost/floor air lid knob | 5 Heater core liquid cock sliding contact |
| 2 Heater core liquid cock knob | 6 Sliding contact for dynamic/recirculation air lid and blower speed |
| 3 Dynamic/recirculation air lid and blower speed knob | |
| 4 Defrost/floor air lid lever | |



- 1 Heater core liquid cock
- 2 Cock control lever
- 3 Sheath retaining clip

Control cable for dynamic/recirculation air inlet shutter

1. Unhook clip (1).
2. Place the shutter and corresponding control in the recirculation position.
3. Secure the cable sheath with clip (1).



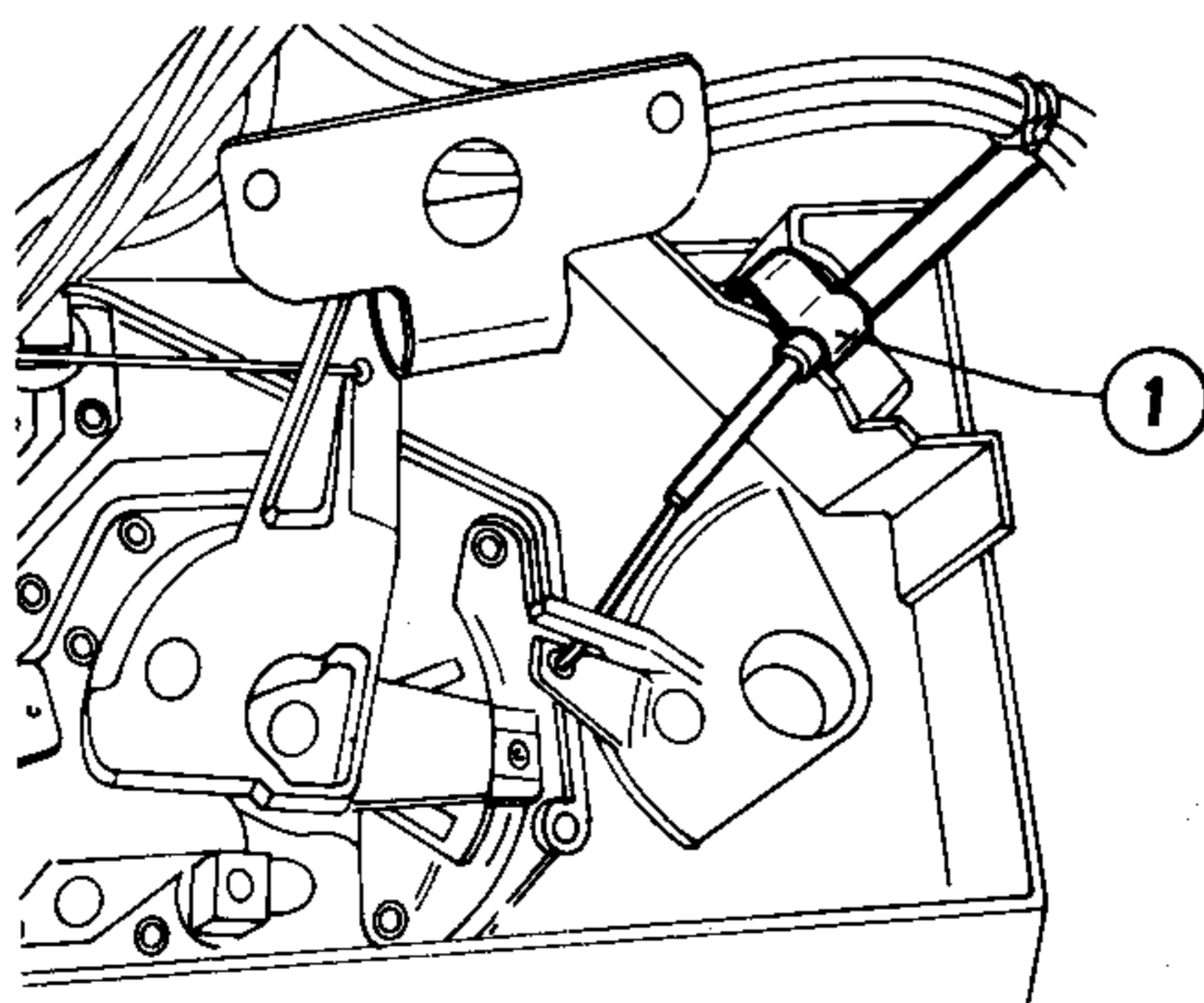
- 1 Sheath retaining clip

ADJUSTMENT

To facilitate operations, it is advisable to remove beforehand the radio console.

Cable for air delivery shutter for defrosting and/or floor

1. Unhook clip (1).
2. Place the shutter in one of the two extreme positions, then rotate the control to the corresponding position.
3. Secure the cable sheath with clip (1).



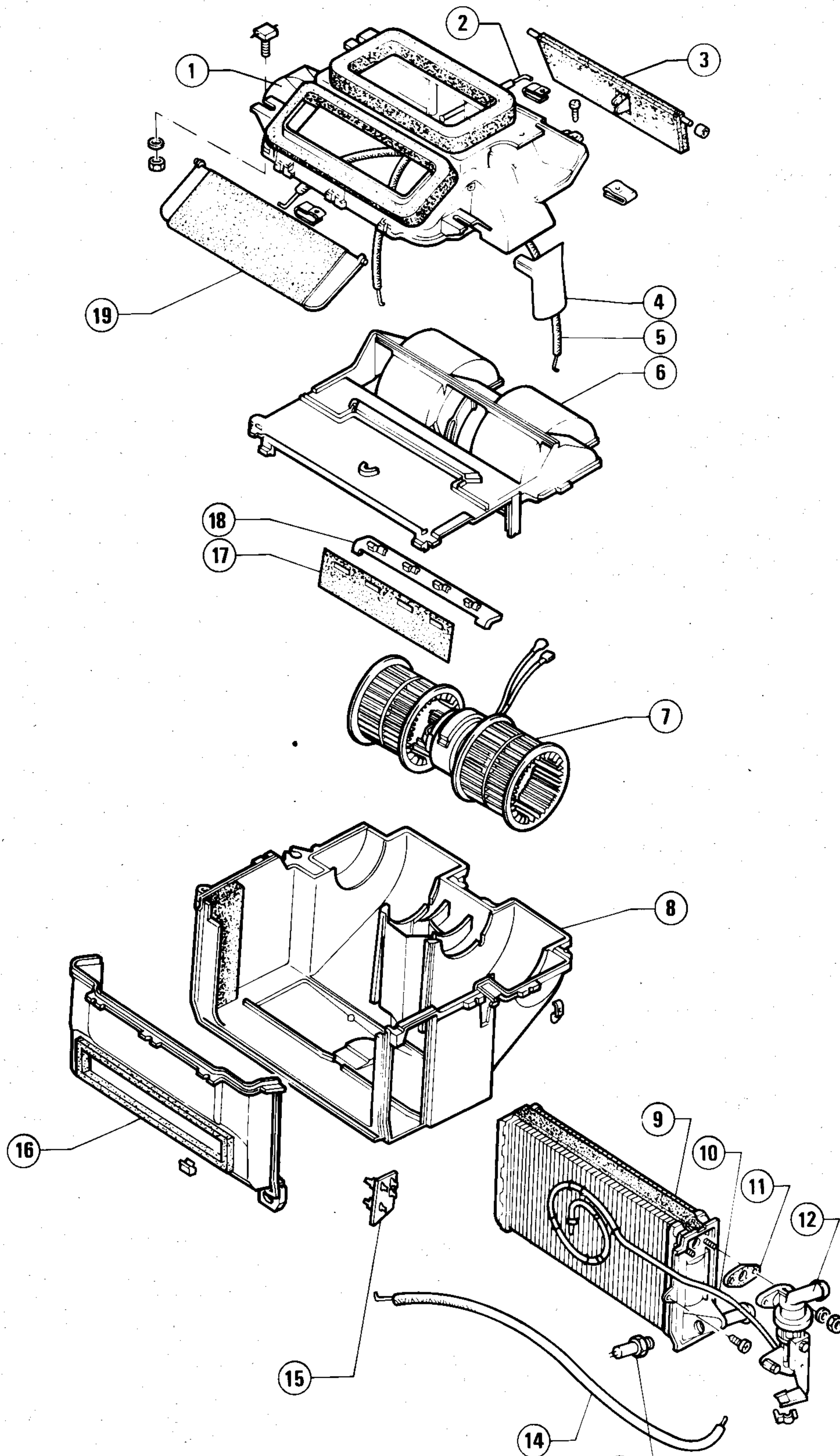
- 1 Sheath retaining clip

4. Check that the shutter moves fully without forcing or sticking.

4. Check that the shutter moves completely without forcing or sticking.

HEATER

HEATER UNIT



- | | | | |
|----|--|----|--|
| 1 | Air ventilation unit upper fairing | 11 | Gasket |
| 2 | Control cable for dynamic/recirculation air intake shutter | 12 | Heater core liquid cock |
| 3 | Dynamic or recirculation air intake shutter | 13 | Thermal switch |
| 4 | Air deviator | 14 | Heater core liquid cock control cable |
| 5 | Control cable for defrosting and/or floor air delivery shutter | 15 | Resistors |
| 6 | Cover | 16 | Air ventilation unit front fairing |
| 7 | Blower | 17 | Flap |
| 8 | Air ventilation unit lower fairing | 18 | Support |
| 9 | Heater core | 19 | Defrosting and/or floor air delivery shutter |
| 10 | Thermostat | | |

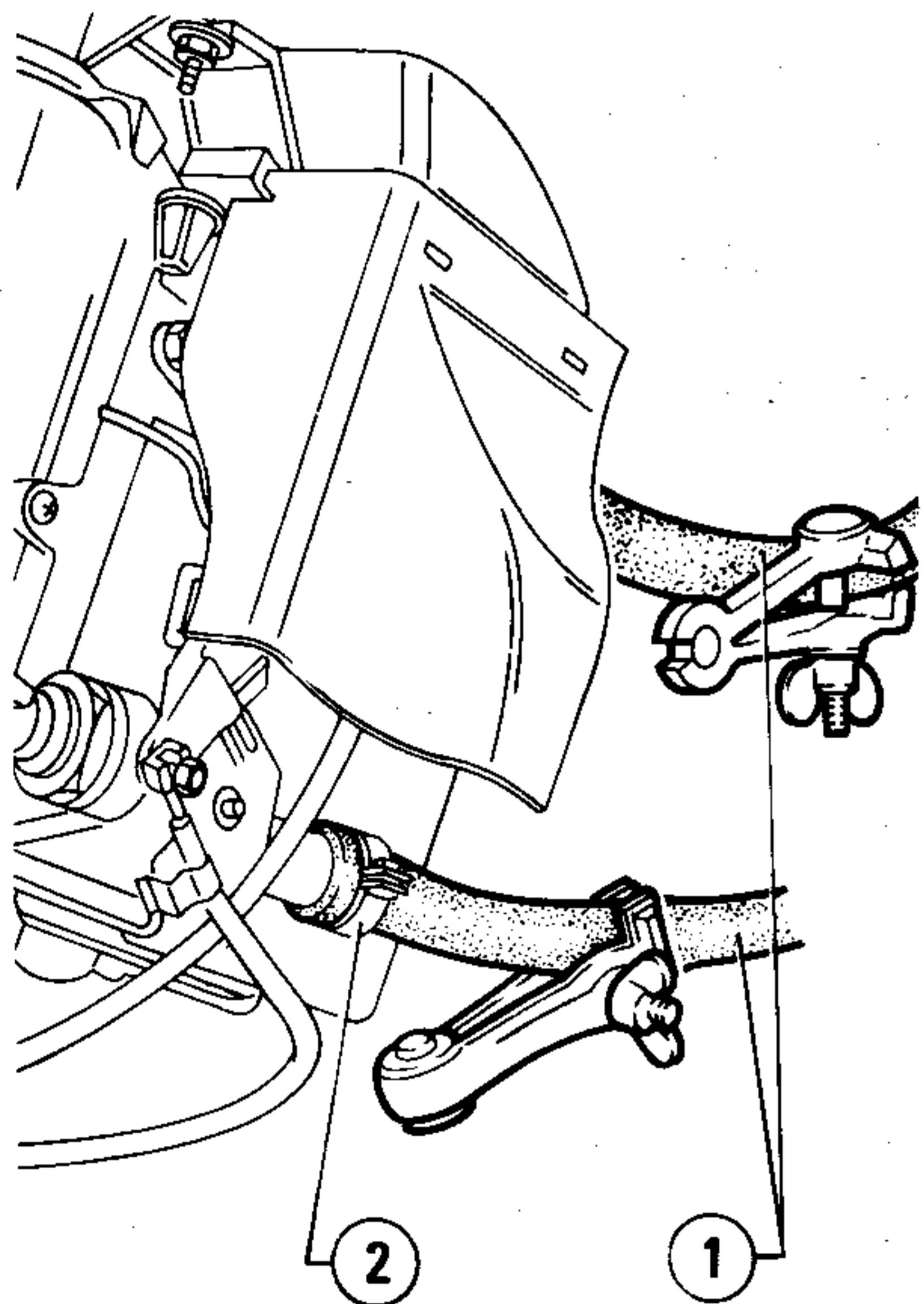
HEATER

REMOVAL AND INSTALLATION

CAUTION:

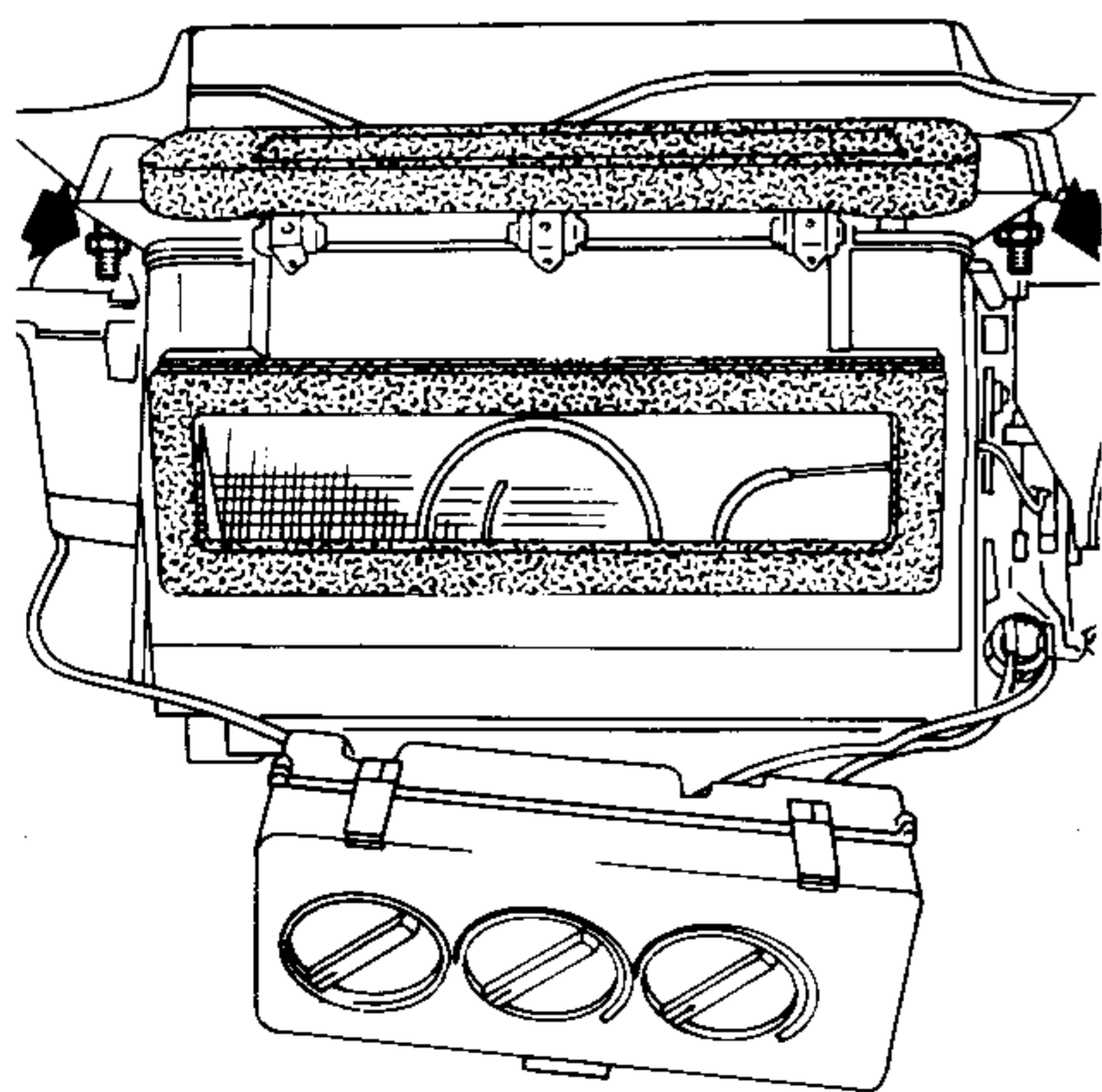
Take care when removing the air ventilation unit piping, since liquid may leak from heater core.

1. Disconnect the battery negative terminal.
2. Remove the dashboard (refer to: Group 66 - "Dashboard").
3. Disconnect the blower fan wiring.
4. Secure hoses (1) with suitable clamps, loosen clamps (2) and detach the piping.



1 Heater core liquid delivery hoses
2 Clamps

5. Unscrew the two bolts securing the air ventilation unit to body, release it from the rear securing clips, and remove it towards the right-hand side and then downwards.

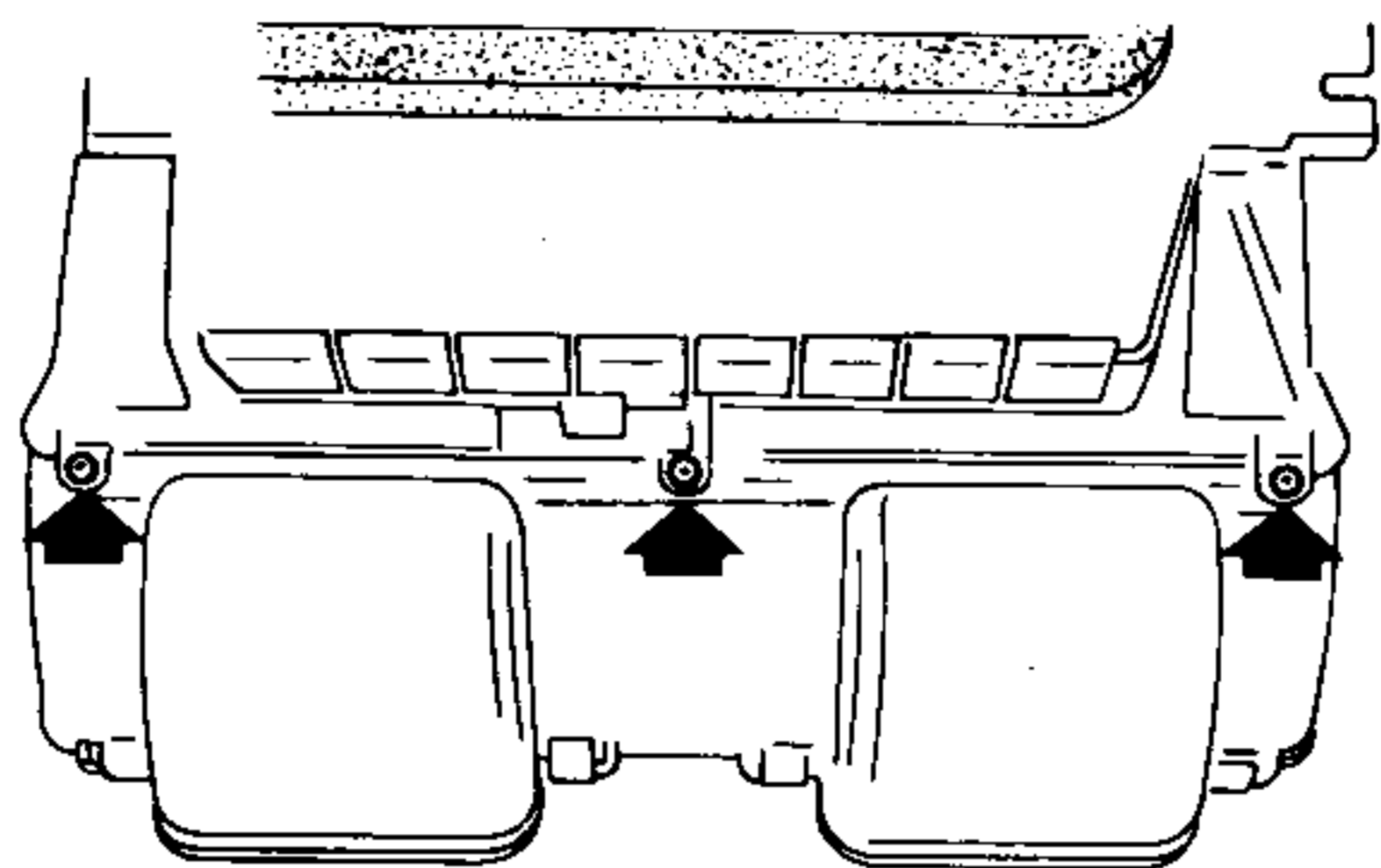


6. If required, disconnect the controls unit (refer to: "Controls Unit").

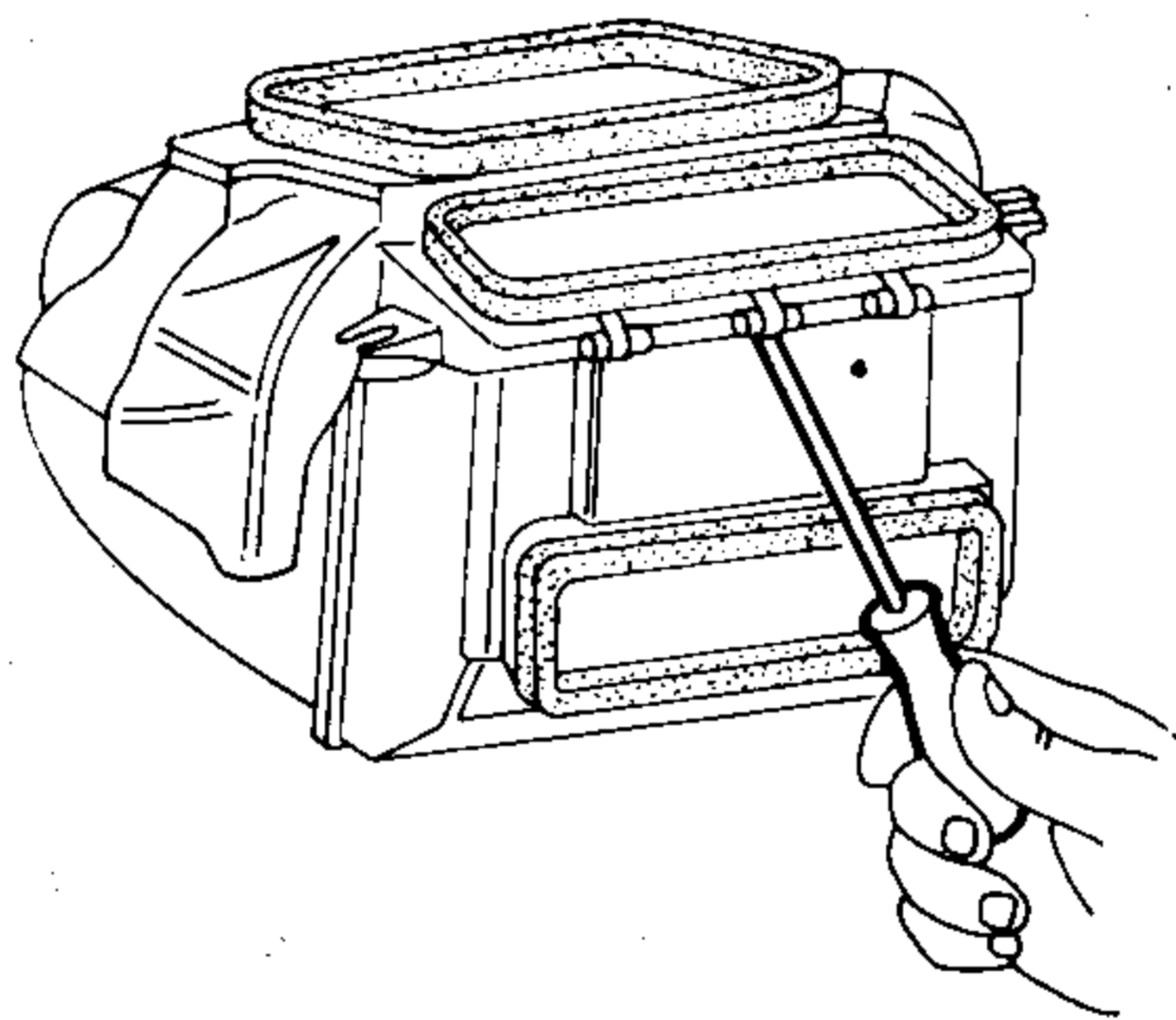
7. Disassemble the air ventilation unit.

Refer to the exploded view of page 80-11 and proceed as follows.

- a. Unscrew the three screws securing fairing (1) and cover (6).

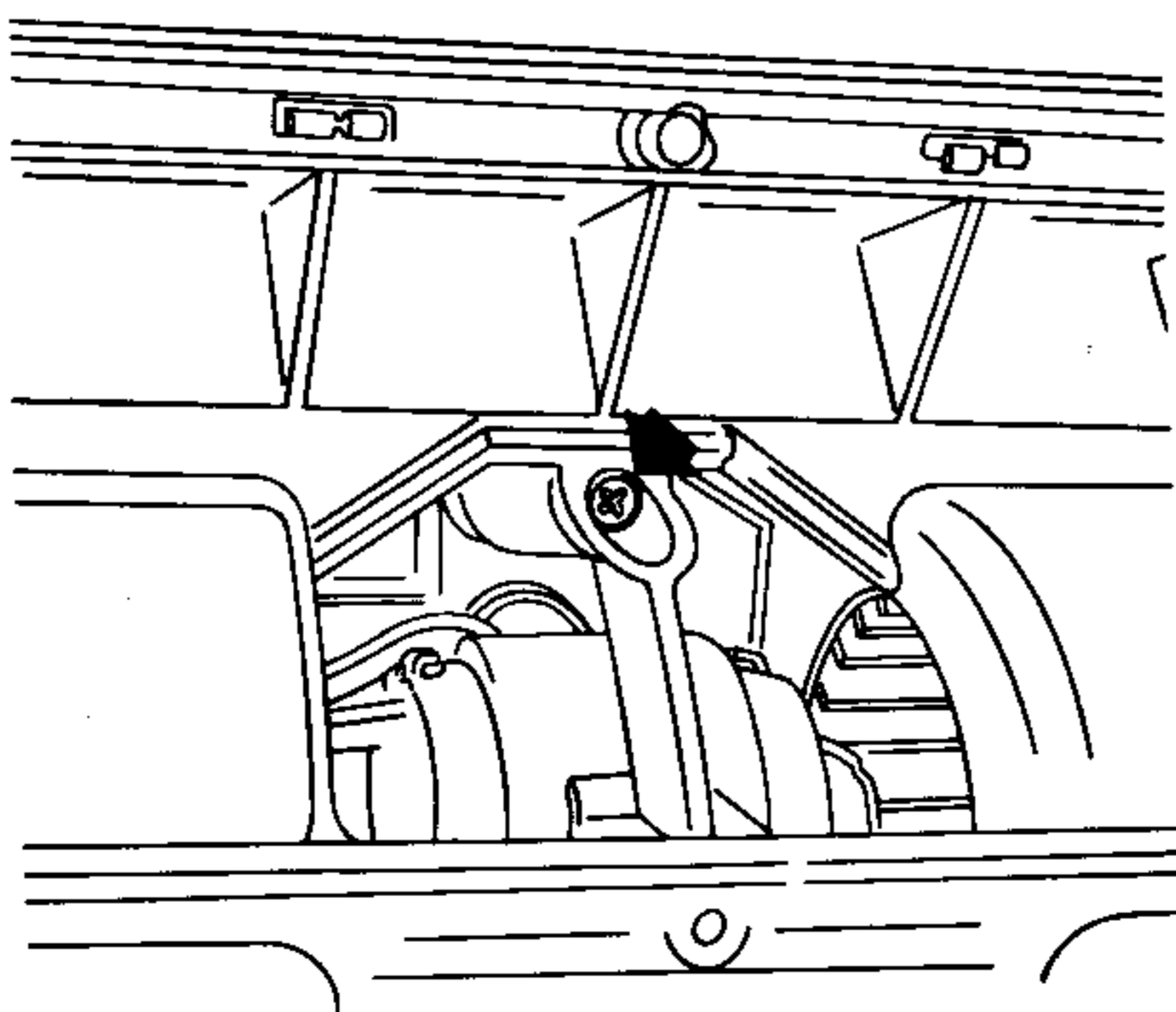


- b. Operating as per figure, remove the thirteen clips joining fairings (1) and (8), and separate them.



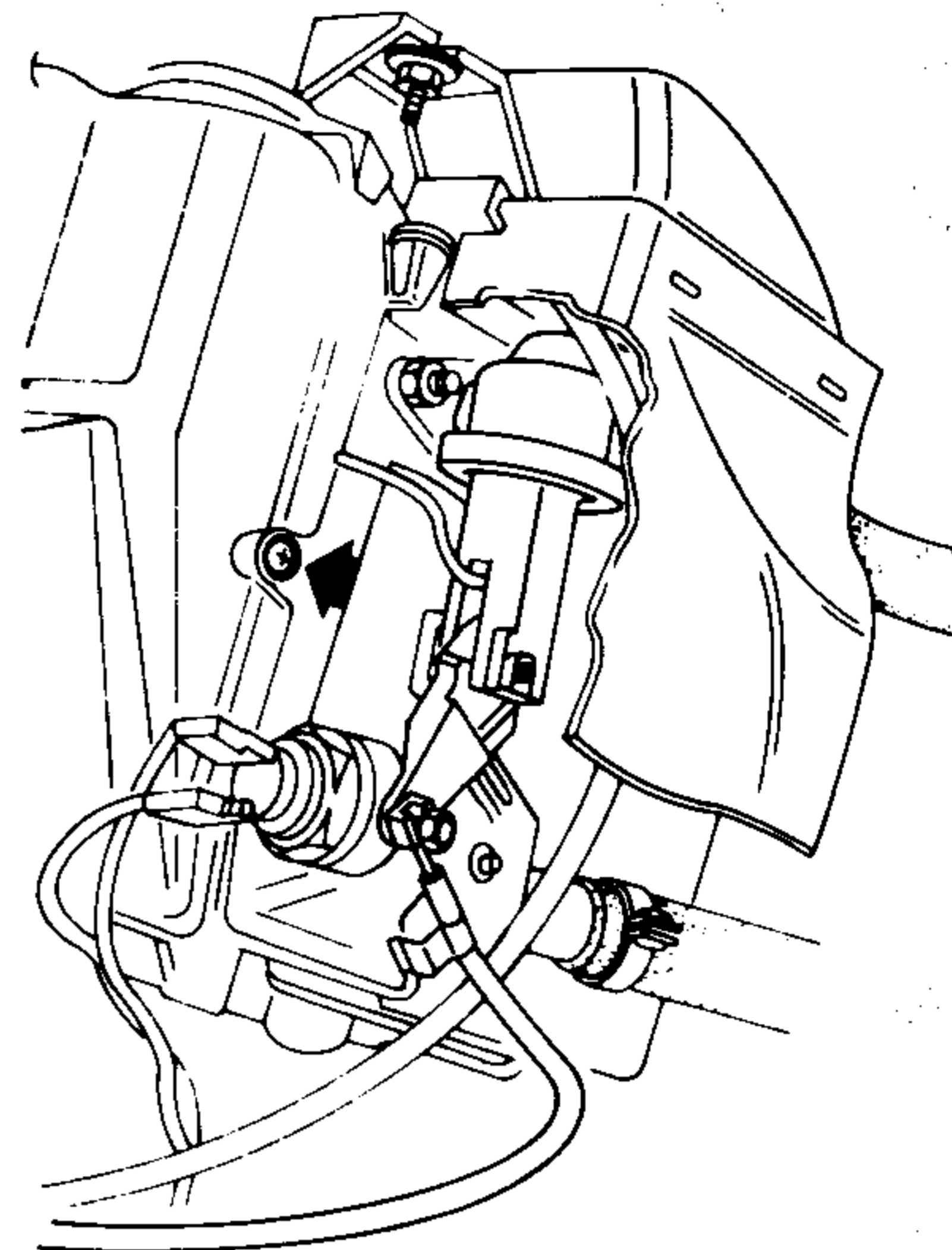
- c. If required, release the clip securing cable (2) sheath, and separate cable from shutter (3), proceed likewise to separate cable (5) from shutter (19).

- d. Unscrew the screw securing cover (6) to fairing (8) and separate them.

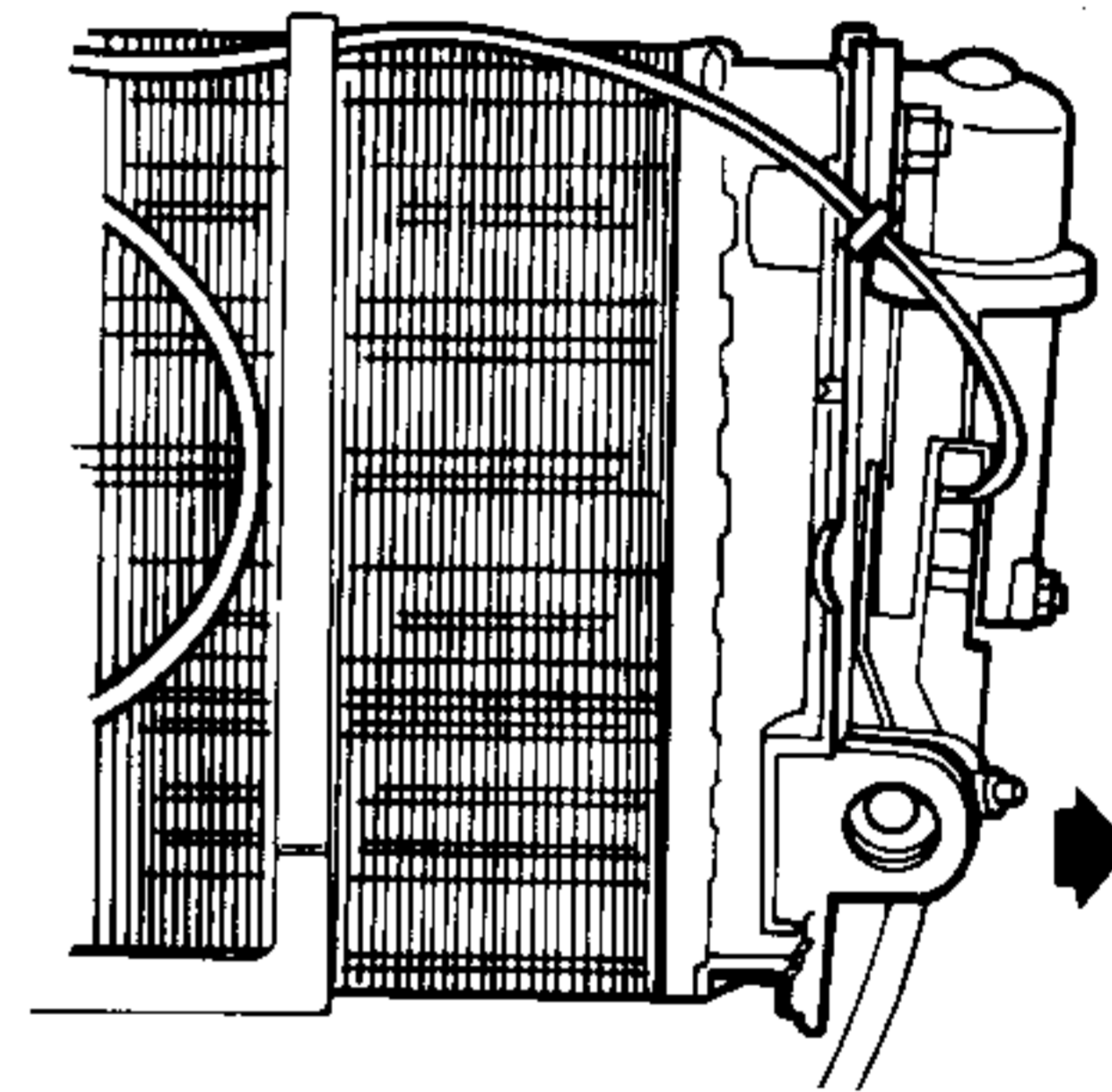


- e. Disconnect wiring and remove blower (7).

- f. Unscrew the screw joining fairings (16) and (8) then separate them.



- g. Disconnect wiring of thermal switch (13), withdraw heater core (9) complete with cock (12) and thermostat (10) from fairing (8).



- h. If required, unscrew the two nuts securing cock (12) to heater core (9), remove the cock with related gasket (11) and thermostat (10).

- i. If required, unscrew and remove the thermal switch (13) from heater core (9).

- l. If required, release the securing clip and detach resistor unit (15) from fairing (8).

8. Install the air ventilation unit by reversing the order of removal.

After having installed the blower, check that the fan is balanced and rotates smoothly.

9. Restore the engine coolant correct level.

CAUTION:

Before proceeding to refill, set the control of heater core liquid cock to position "III".

HEATER

HEATER CORE LIQUID COCK

REMOVAL AND INSTALLATION

1. Remove the dashboard (refer to: Group 66 - Dashboard - Removal and Installation).
2. Lock hose (5) with a suitable clip, loosen clamp (4) and disconnect the hose.

CAUTION:

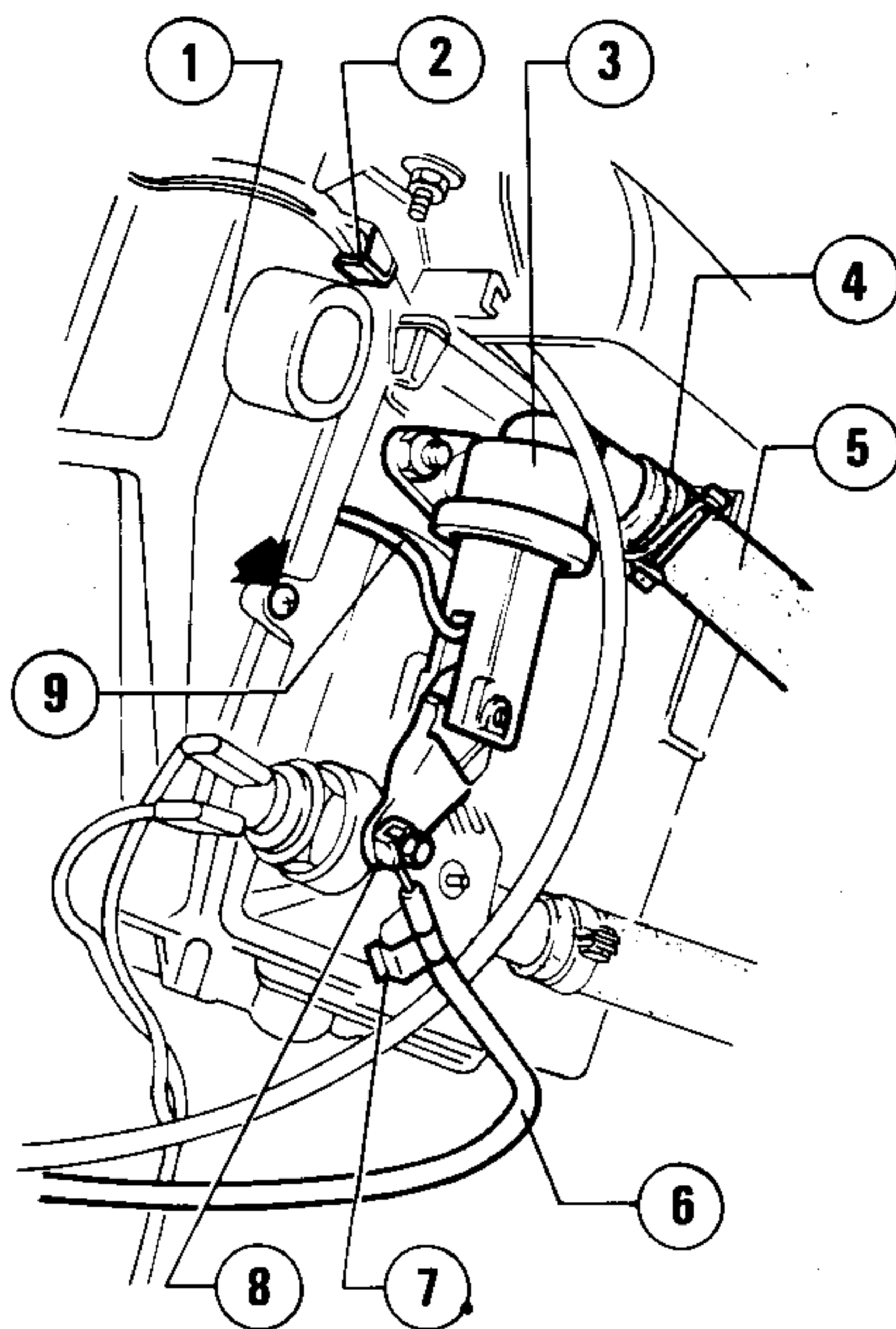
Verify that no leaks occur from heater core.

3. Unscrew the screw on fastener (8), unhook clip (7) and disconnect cable (6) from cock (3).
4. Unhook the clips securing thermostat (9) to the heater core, gaining access through the front casing opening (1).
5. Unscrew the two nuts securing cock (3) to the air ventilation unit.
6. Unscrew the screw indicated in the figure, unhook clip (2) and move the front casing (1) away from the air ventilation unit so as to allow the thermostat (9) to be removed.
7. Remove cock (3) together with the relevant seal, and withdraw thermostat (9) from the air ventilation unit.

The thermostat spiral can be straightened to make it easier to remove.

CAUTION:

Operate with extreme care to avoid damaging the thermostat.



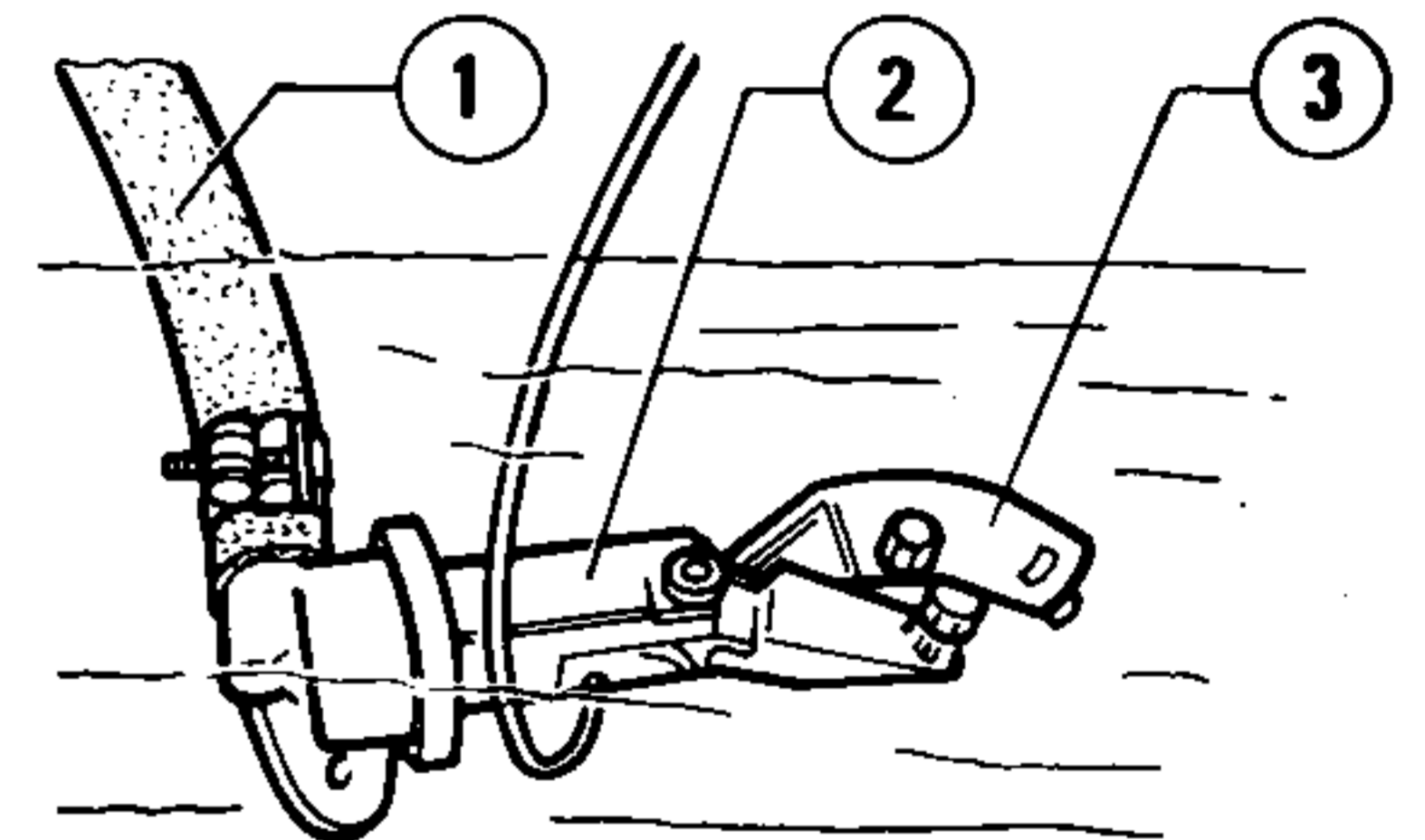
- 1 Front casing
- 2 Clip
- 3 Heater core liquid
- 4 Clamp
- 5 Heater core liquid inlet hose
- 6 Cock control cable
- 7 Clip
- 8 Fastener
- 9 Thermostat

8. Install by reversing the order of removal, inserting a new seal between cock and air ventilation unit.

Adjust the control (refer to: Controls Assembly - Adjustment).

SEALING CHECK

1. Remove the cock from the vehicle (refer to: Removal and Installation).
2. Check that the cock control lever is securely closed and that when the lever is pushed, there is a backlash of around 1 mm (0.04 in).
3. Connect hose (1) to the cock and secure it with a clamp.
4. With the control lever in closed position, submerge the cock for approximately 15' in a receptacle containing water at a temperature of 70 to 80°C (158 to 176°F).
5. Keeping the cock submerged, let compressed air into hose 1 (at a pressure of 0.7 to 1 atm).
6. If the cock is not properly sealed at any point, air bubbles will appear in the receptacle. In this case the cock must be replaced.

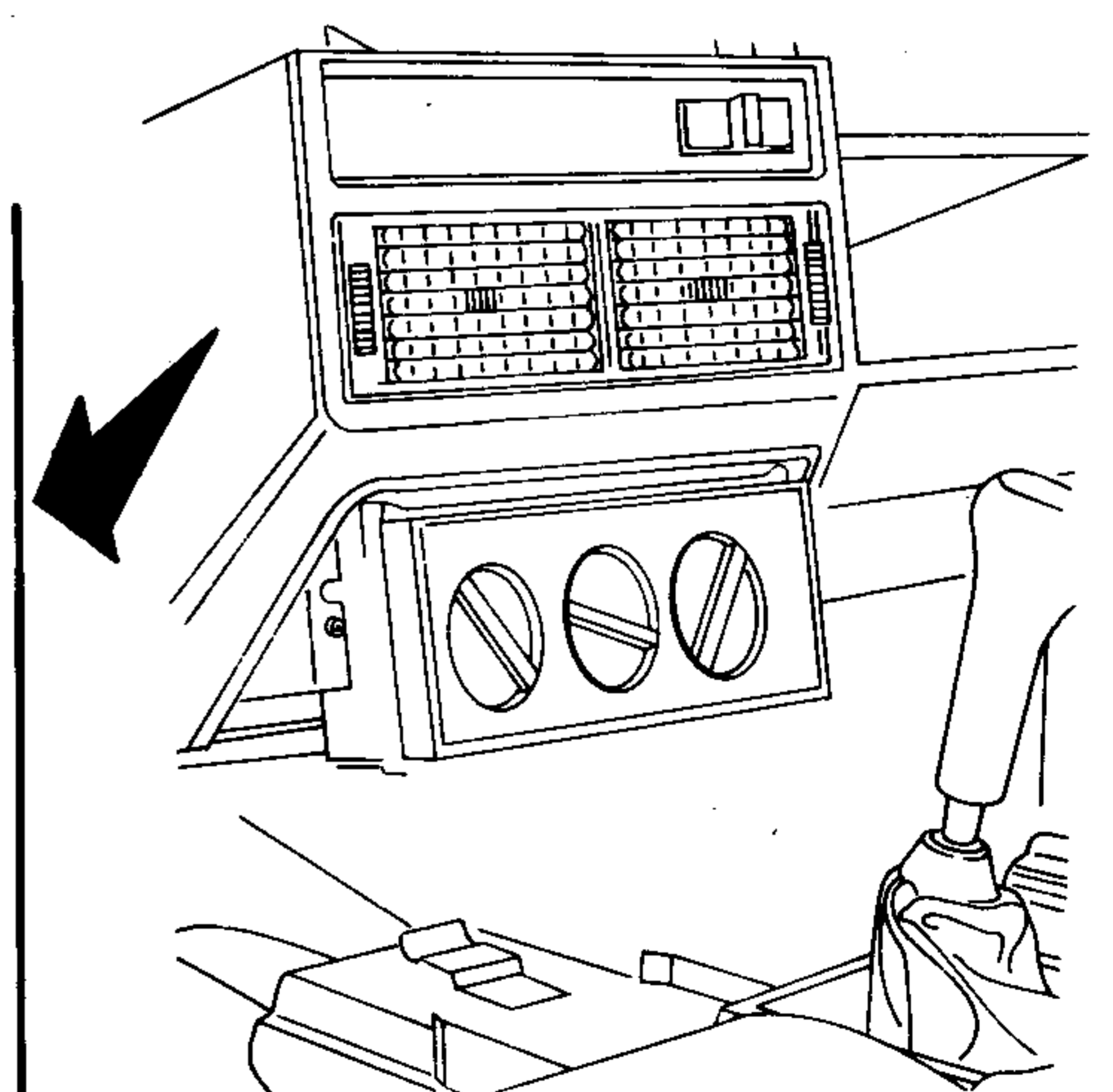
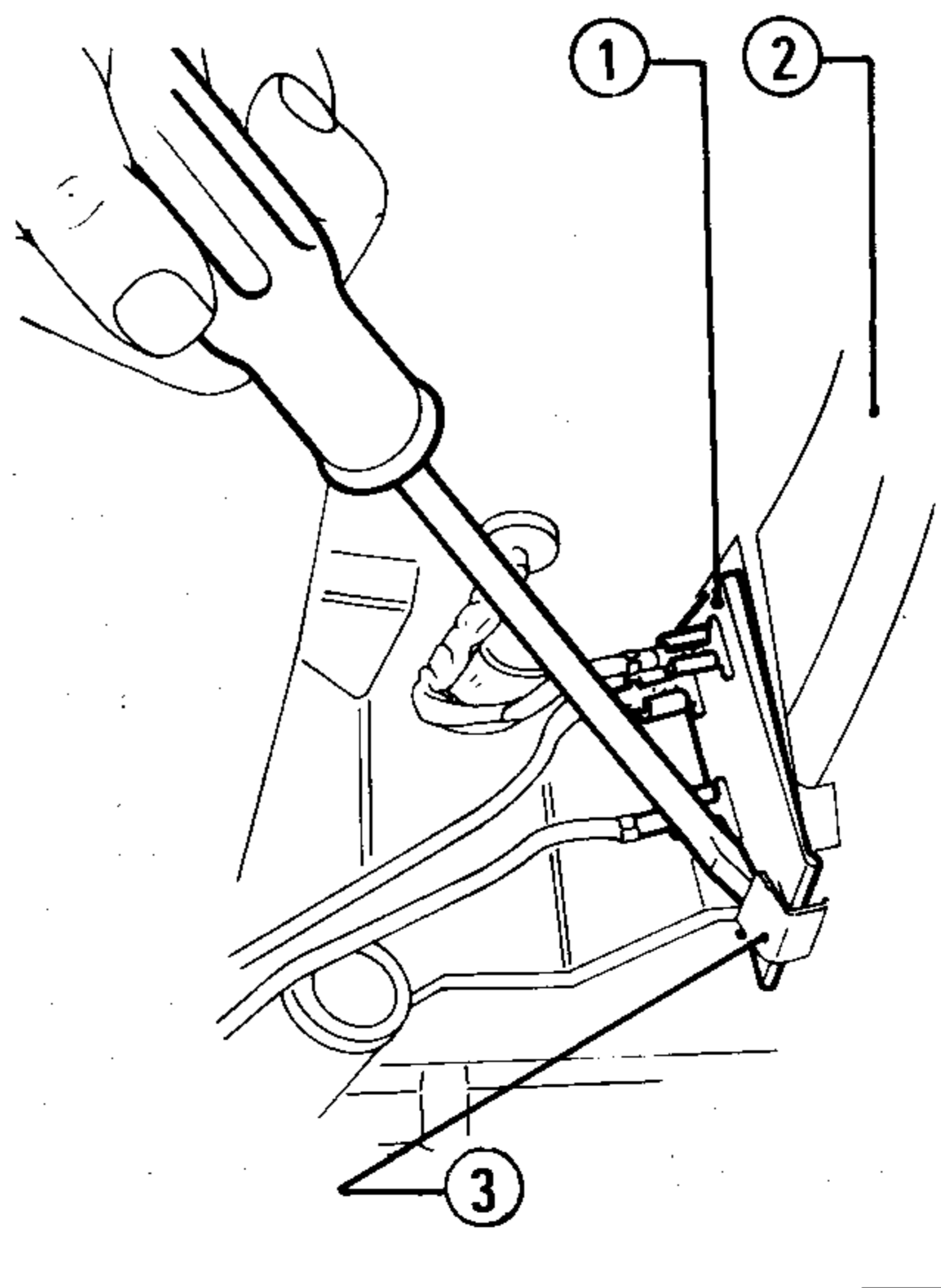


- 1 Air inlet hose
- 2 Heater core liquid cock
- 3 Cock control lever

BLOWER RESISTOR

REPLACEMENT

1. Remove the radio console (refer to: Group 66 - Radio Console).
2. Using a screwdriver, unhook the clip securing the resistors positioned on the air ventilation unit lower fairing.
3. Disconnect the wiring and remove the resistor; replace it if required.
4. Carry out installation by reversing the order of removal.



- 1 Resistor
- 2 Lower fairing
- 3 Clip

HEATER

TROUBLE DIAGNOSIS AND CORRECTIONS

Caution	Probable cause	Corrective action
Insufficient heating. Warm air fails to reach the vents	<ul style="list-style-type: none"> • Engine coolant temperature too low • Radiator clogged • Coolant level too low • Air ventilation cock malfunctioning 	<p>Check thermostat - Replace if necessary</p> <p>Clean</p> <p>Top up</p> <p>Adjust control cable. Check cock. Replace if necessary</p>
Insufficient air flow to floor	<ul style="list-style-type: none"> • Electric fan speed too low • Shutter controlling air to floor malfunctioning • Air to floor shutter controls malfunctioning 	<p>Check functioning of fan. Repair poor or broken connections. Replace the fan</p> <p>Adjust control cable</p> <p>Replace if necessary</p>
Defrosting insufficient. Cold air discharged	<ul style="list-style-type: none"> • Refer to: Warm air fails to reach the vents 	
Insufficient air flow to defroster	<ul style="list-style-type: none"> • Defroster shutter malfunctioning (or faulty seal) • Defroster shutter control malfunctioning • Defroster vents clogged • Leaks on duct-vents union 	<p>Adjust control cable</p> <p>Replace if necessary</p> <p>Clean</p> <p>Repair and replace</p>
Air does not issue from appropriate outlets	Air control shutter for defrosting and/or floor blocked	Repair
Controls stuck	<ul style="list-style-type: none"> • Control cable rubbing against inside of sheath • Control cable excessively bent • Shutters, levers etc. malfunctioning 	<p>Adjust cable</p> <p>Correct</p> <p>Check and correct</p>

HEATER

Condition	Probable cause	Corrective action
Outside air enters when controls are in the recirculation position	<ul style="list-style-type: none">• Dynamic air inlet shutter malfunctioning• Dynamic air inlet shutter control malfunctioning• Control cable of dynamic air inlet shutter not adjusted correctly	<p>Repair or replace</p> <p>Repair</p> <p>Adjust the control cable</p>
Electric fan noisy	<ul style="list-style-type: none">• Electric fan unbalanced• Air ventilation unit casing not properly secured• Electric fan not properly positioned	<p>Replace electric fan</p> <p>Check and seal</p> <p>Check and restore electric fan to correct position</p>

Air conditioning system

For the related information, refer to " **Alfa 90** WORKSHOP MANUAL" updating n. 1 (to be shortly issued).

HEATER

AIR CONDITIONING SYSTEM WIRING DIAGRAM

