

## SERVICE MANUAL

### I. HAND CONTROL

- A. The modification has been completed if;
  - 1. There is a white dot near serial number under the cabinet
  - 2. If the serial number is between 118,000 and 123,999
  - 3. If the serial number is greater than 125,000
  - 4. Visual check - twist knob clockwise and to the top, use flashlight and look for plastic tubing on contacts
- B. Inside hand control
  - 1. Check that the contact pin for twist motion does not bind on the end of the contact when knob is both twisted and pulled up or down
  - 2. To modify hand control ground ring
    - a. Remove ring
    - b. Check position of A and B contacts with respect to surface of cylinder
      - "A" should be  $0.050 + .030$  inches
      - "B" should be  $0.170 + .030$  inches
    - c. Install plastic tubing and heat such that top of tube is flush or slightly above "A" contact
    - d. Install new ring already lubricated
    - e. If ground wire is too short, reroute through "down" contact eye loop and not under nylon strap. If it is still short, replace the wire.
    - f. Check all wires for visual defects
    - g. Install ground ring in plastic housing such that ring opening is caught by the plastic ledge in handle case
    - h. Route wire through appropriate openings
    - i. Mate plastic handles and operate hand control while holding unit together. Install screw if unit operates properly.

### II. OPERATIONS

- A. Connect game to T. V. following instruction manual
  - 1. Turn power switch on
  - 2. Press reset button (picture may not be normal until reset is applied)
  - 3. Check resident game for proper operations

### III. TEST CARTRIDGE

- A. Install cartridge and reset game. T. V. screen will remain black for 6 seconds, then color test pattern will be displayed with a 3-tone sound.
- B. Press button #1 and hold until cartridge moves into the next test pattern
- C. RAM test - check for "holes" in the blue or red sweep bar
  1. A "hole" in the blue bar implies a defective RAM, either D9 or D10, most often D10. A defective red RAM is either D7 or D8, most often D7.
  2. If just a few "holes" appear, remove C33 at E-7. Whether or not this corrects the problem, leave C33 out of circuit.
- D. Press button #2 - check hand controls: Hockey will be displayed but the puck will not move. The paddles will not move all the way across the court. They will reach the bottom of the court but not the top.
- E. Press button #3 - button test
  1. Depressing any button will display the number of that button.
  2. Depressing any two buttons will display a question mark.

### VI. DISASSEMBLY

- A. Turn unit over and cut off top of rubber strip even with bottom of third vent opening near strip. Remove 4 screws from bottom.
- B. Turn unit right side up and remove top cabinet by lifting.
- C. Check that the input power connector is taped.
- D. Frequency tuning with pretuned T. V.
  1. Turn AFC off
  2. Display hockey game
  3. Turn frequency pot clockwise until picture distorts (at right hand top of cartridge chute)
  4. Turn counter-clockwise until "scoring" digits are properly adjusted
- E. Color adjust
  1. AFC must be off
  2. Install test cartridge
  3. Turn color pot fully clockwise (top left hand of cartridge chute)
  4. Turn counter-clockwise until color is correct (if color is correct, turning on AFC should show only a small change in color)

#### V. TO REMOVE SHIELD

- A. Remove screws 3 inches to left and 5 inches to right of power connector
- B. Remove 4 screws to metal chute cover
- C. Remove 4 screws holding chute in place
- D. Remove 5 buttons, springs and washers (install washers if not already there)
- E. Lift unit from bottom plastic tray
- F. Remove small sheet metal screw from four sides
  1. Screw at lower right hand of chute is to be left out
  2. Screw at connector for left hand controller to be left out
- G. Disconnect RF Cable
- H. Lift front of top shield and disconnect chute strips from PCB by pulling backwards on strips
- I. Disconnect power connector from inside of top shield

#### VI. REMOVE PCB

- A. Disconnect ground straps from PCB to bottom shield
- B. Remove screws from side of shield to heat sink for 5V regulator.
- C. Lift PCB from right hand side and remove hand control connector
- D. Install rubber pad at upper right hand edge of hand control shield

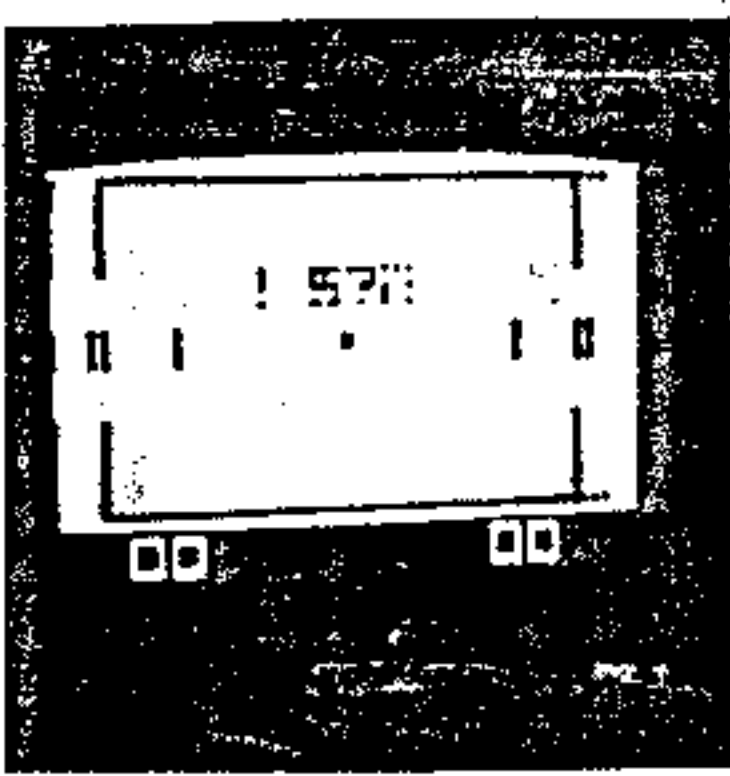
#### VII. INSTALL PCB

- A. Connect hand control cables
- B. Install screws for heat sink of 5Volt regulator and adjust PCB so ON/OFF switch is 1/16 of an inch away from shield when in off position
- C. Connect ground straps from PCB to bottom shield
- D. Connect inside power connector and chute strips
- E. Follow disassembly instructions, plus the following instructions before placing shielded PCB into bottom plastic tray
  1. Check that the edge of the speaker does not interfere with the plastic "hill"
  2. If necessary, cut edge of "hill" to clear speaker
  3. Check for screw hole clearance at C-29 at G-4 (left hand top of chute)
  4. Adjust chute to far left and front of game but with "press to eject" parallel to edge of game
  5. Push buttons down tightly

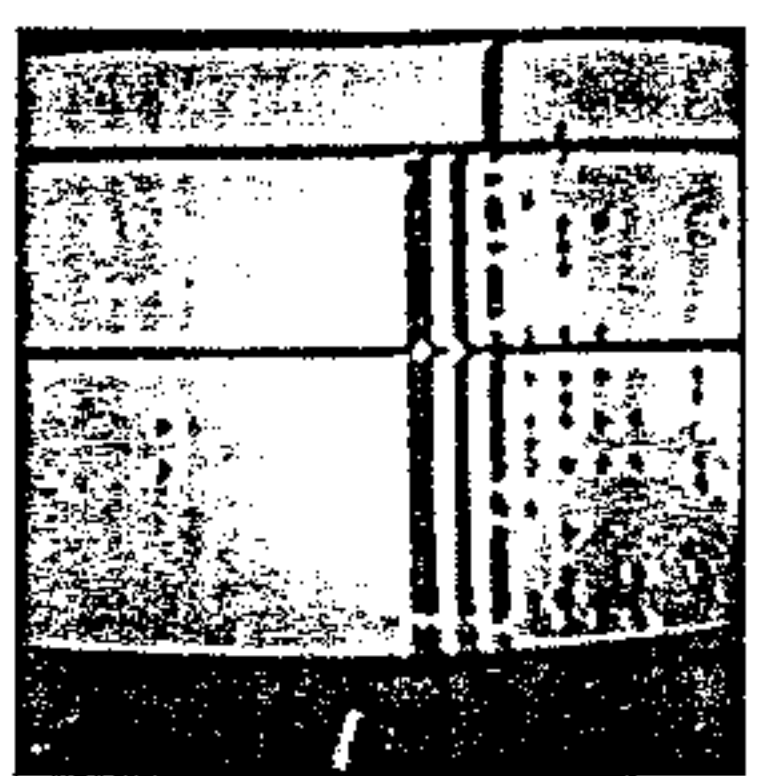
ANALYSIS AID

CONDITION	CAUSE	COMMENT
NO RESET	P S U	
GREEN SCREEN	12VOLTS	
WEAK SOUND	SPEAKER BINDING	
OUT OF FREQUENCY	RF CABLE	
PICTURE #		
100 .....	P S U	
*101 .....	UNKNOWN	
*102 .....	UNKNOWN	(SAME AS 101)
103 .....	P S U or R A M	
104 .....	P S U	
105 .....	CART #3	
106 .....	NOTHING	
107 .....	COLOR	
108 .....	FREQUENCY	
109 .....	FREQUENCY	
110 .....	RED RAM(D7orD8)	
111 .....	BLUE RAM(9orD10)	
112 .....	C P U or I C	
*113 .....	I C	(SAME AS 112)
114 .....	P S U	
*115 .....	I C	
*116 .....	I C	
*117 .....	I C	

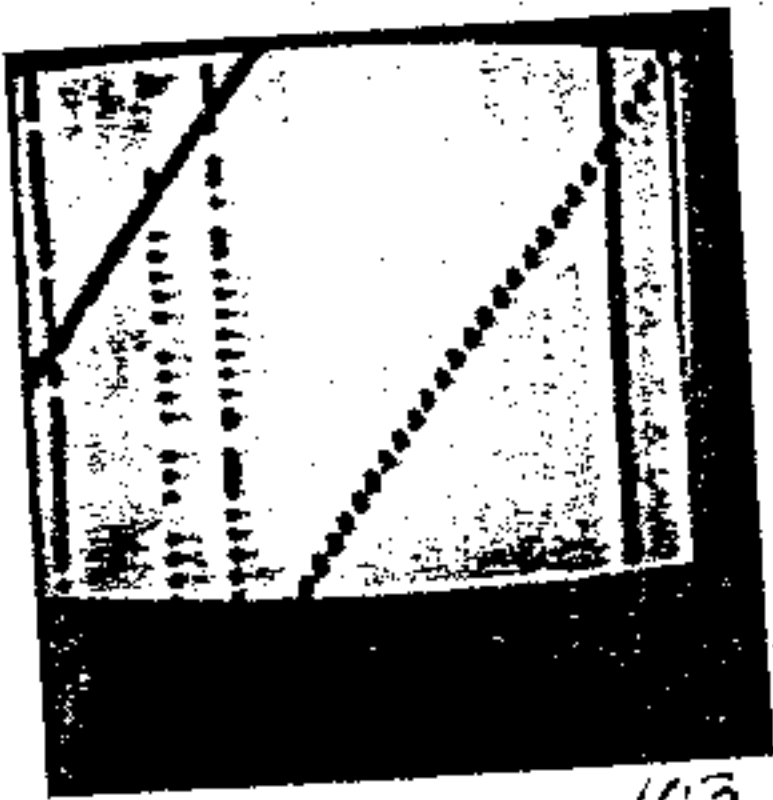
\*REQUIRES DETAILED ANALYSIS



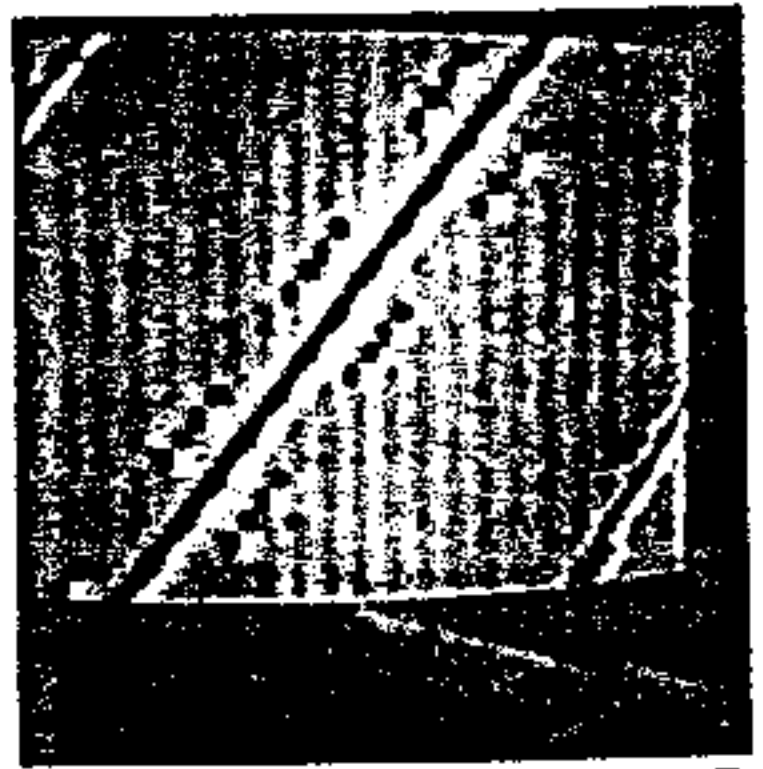
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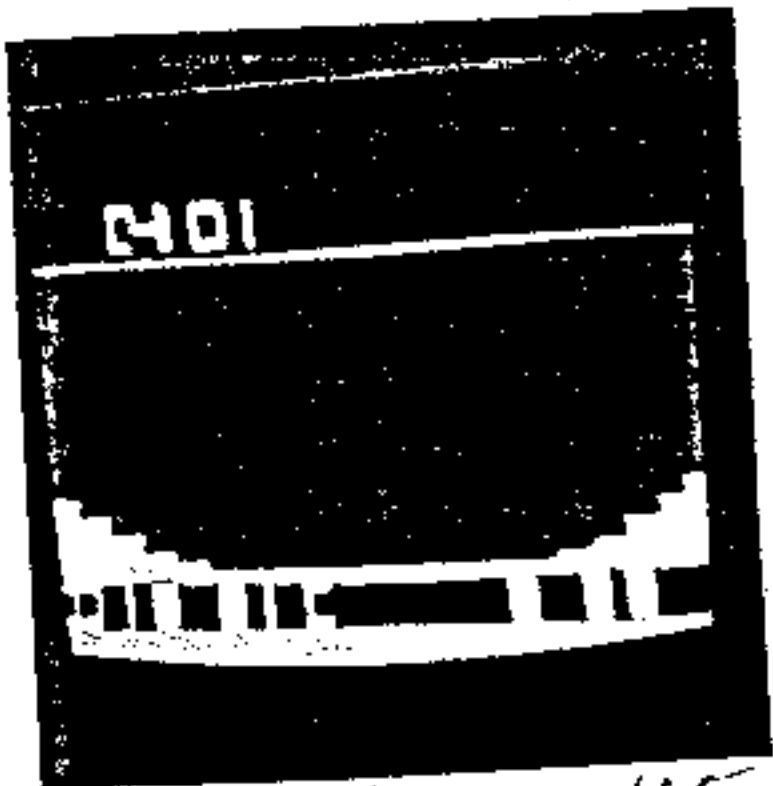
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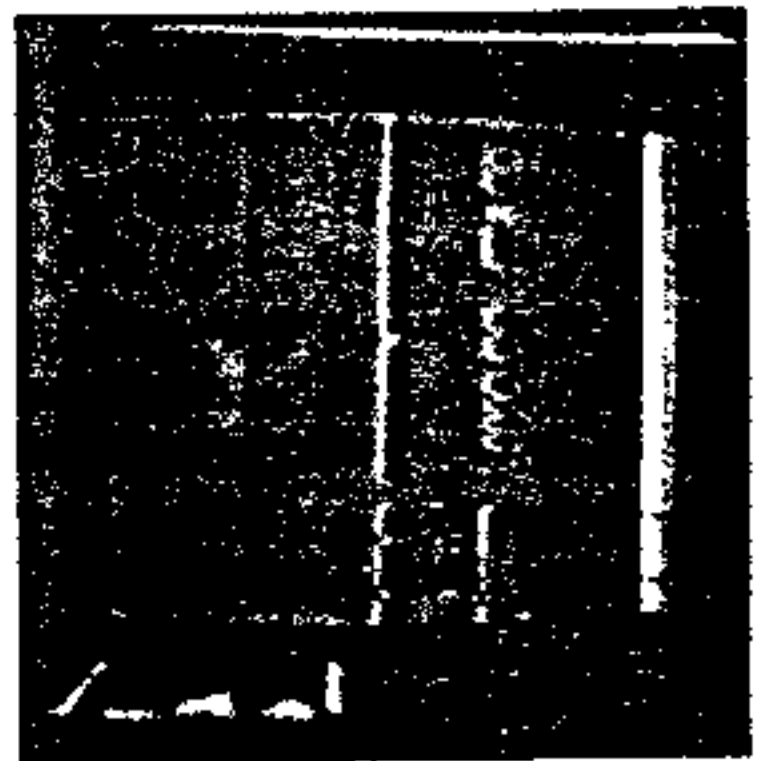
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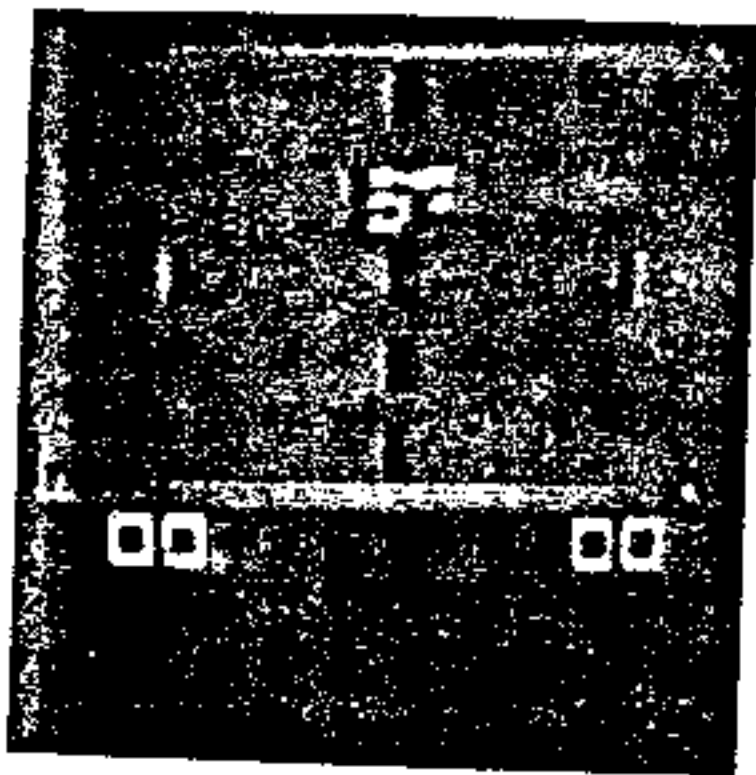
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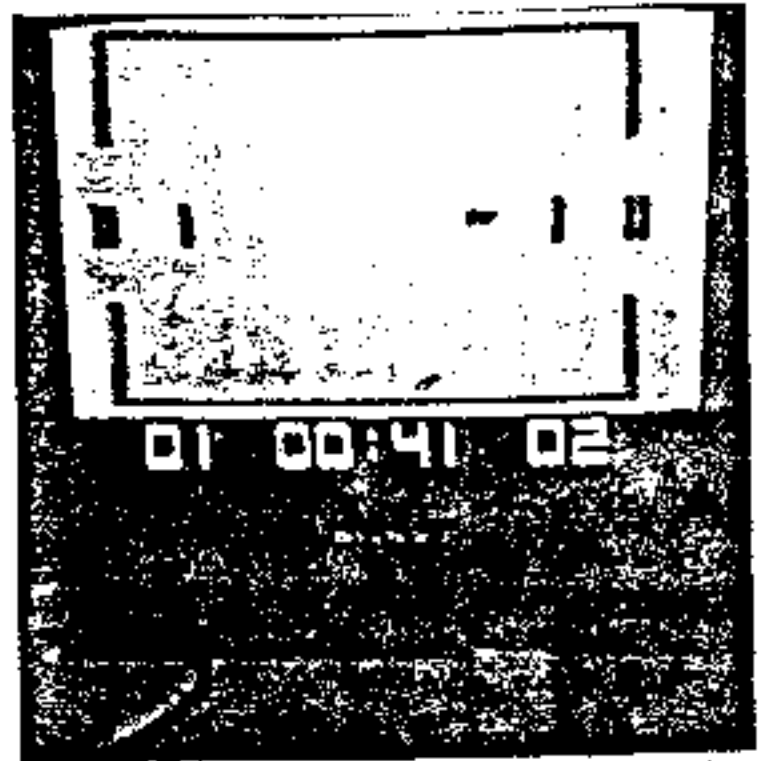
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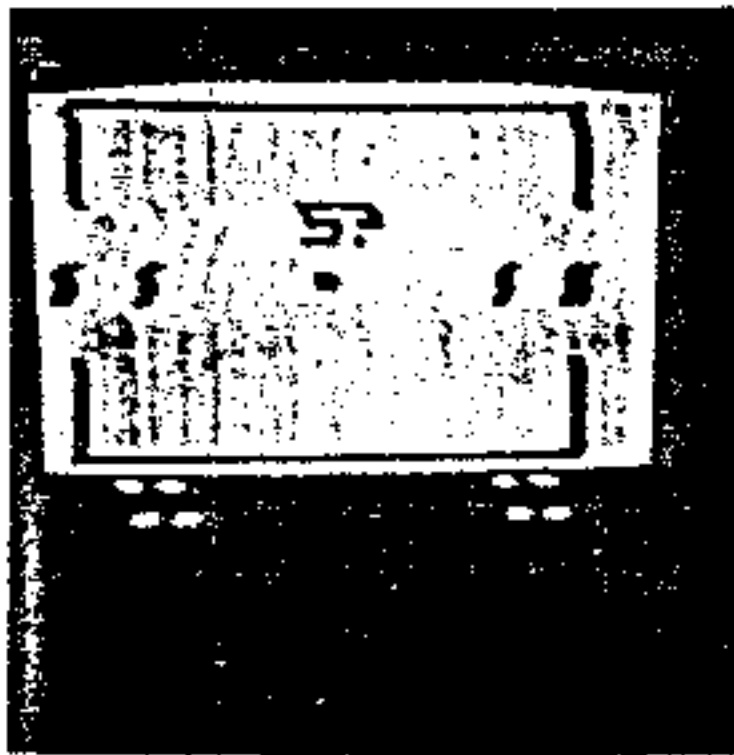
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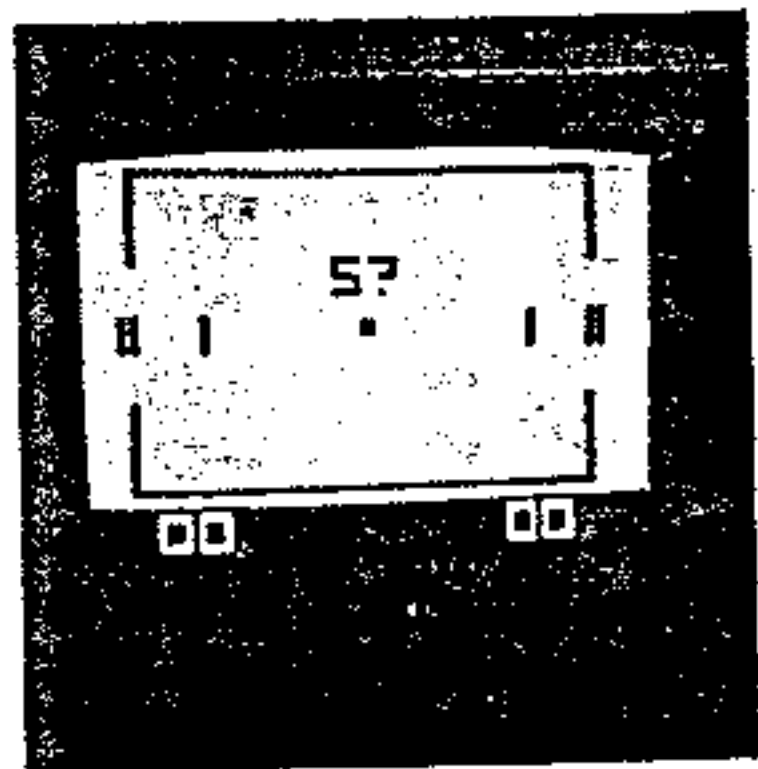
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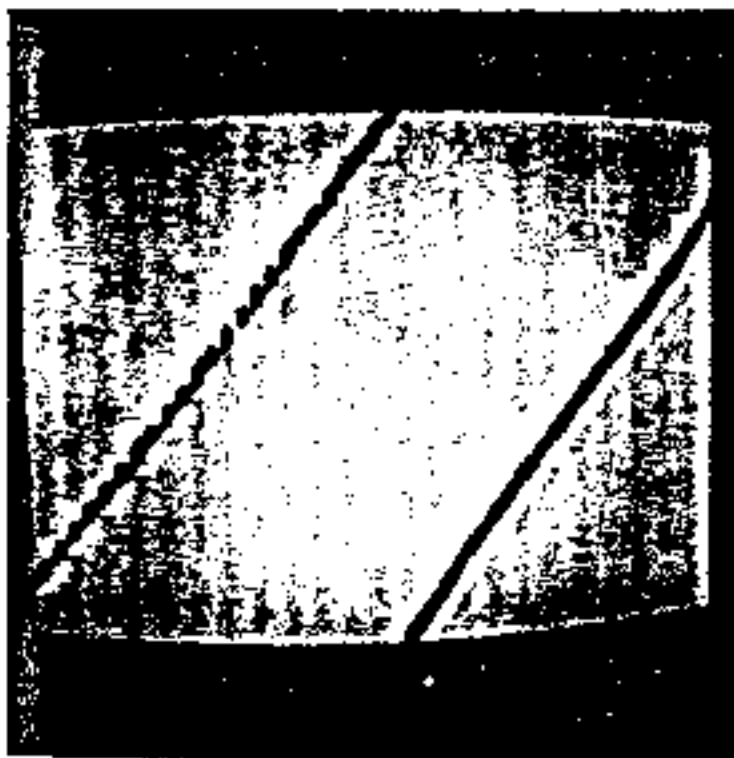
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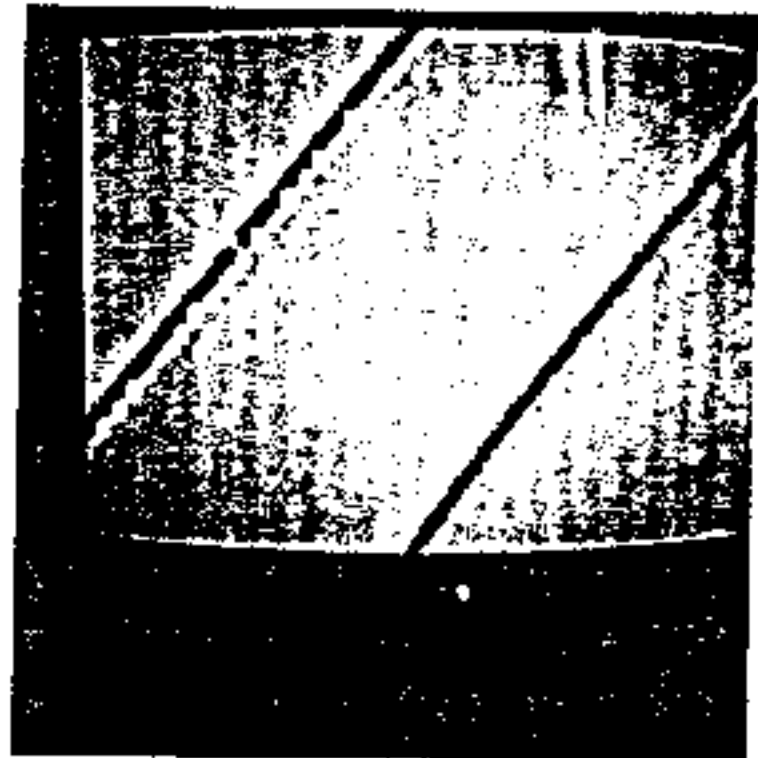
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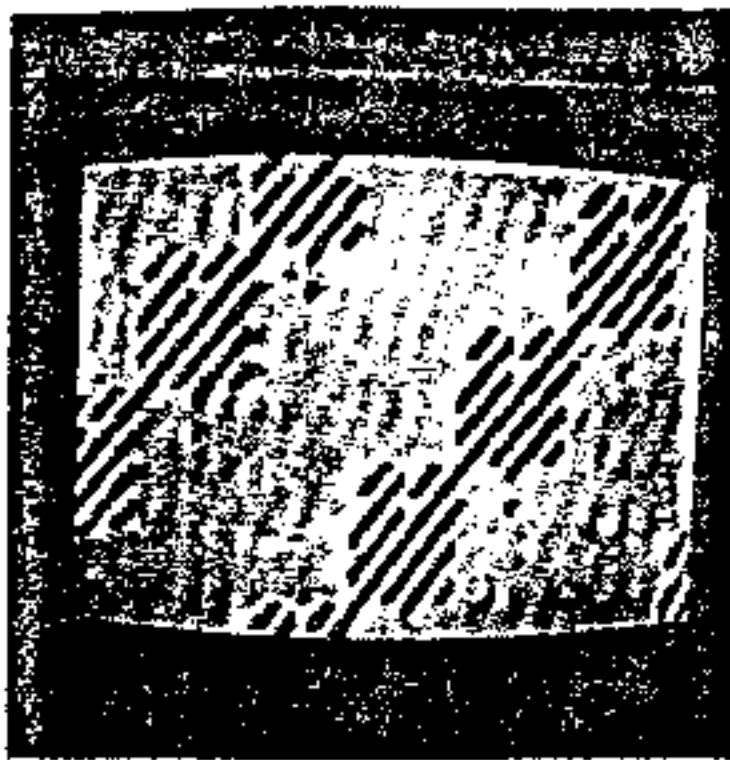
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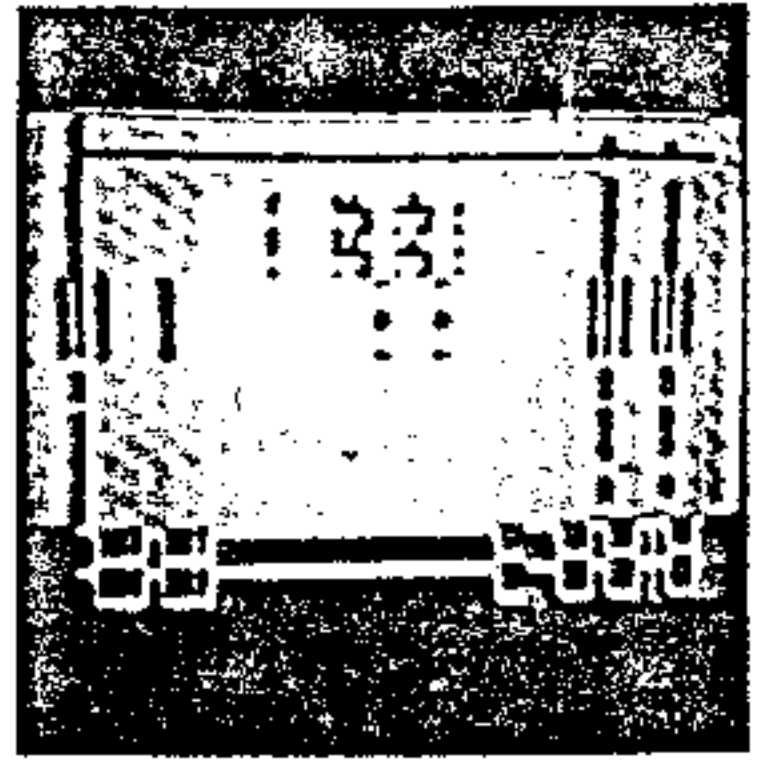
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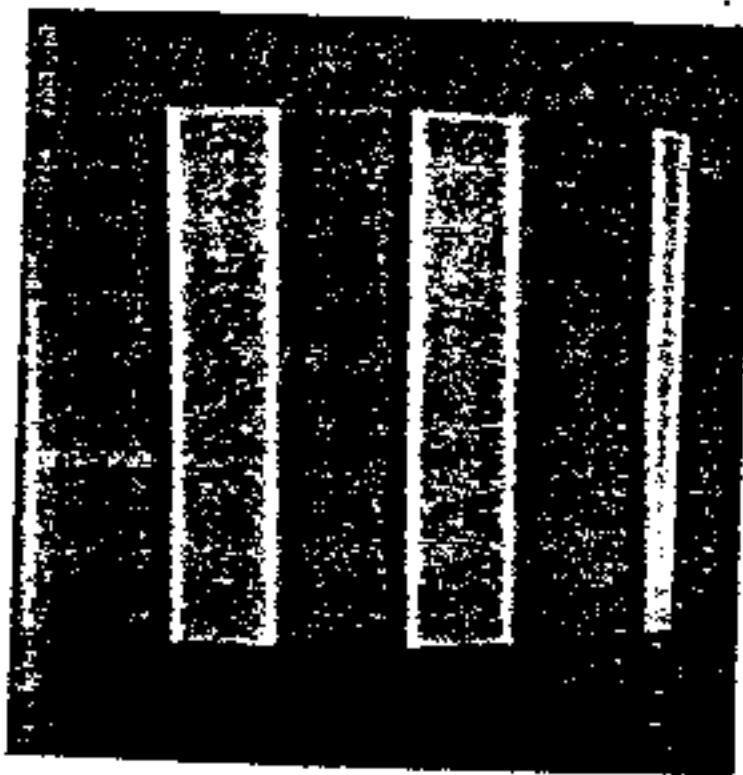
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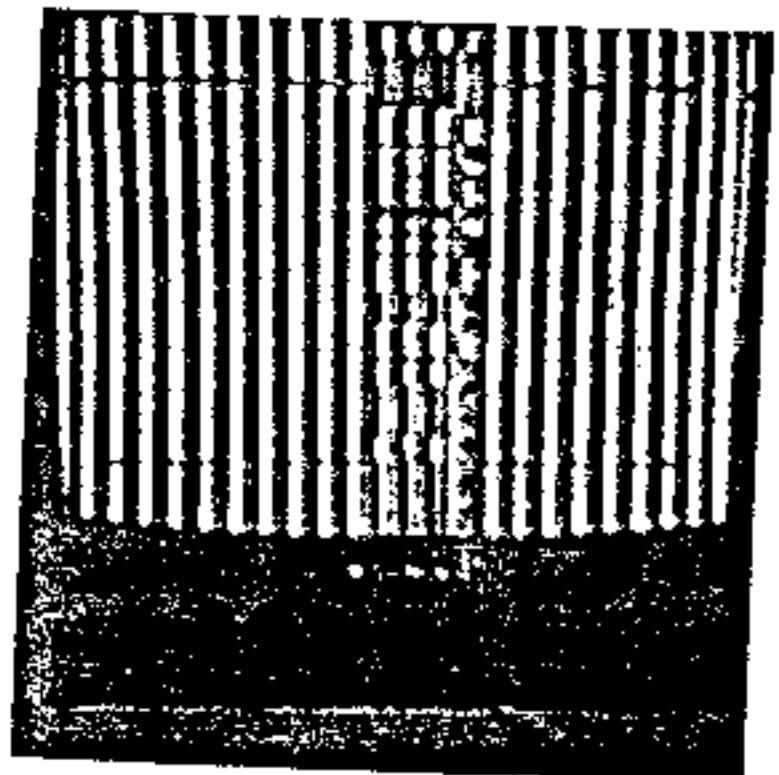
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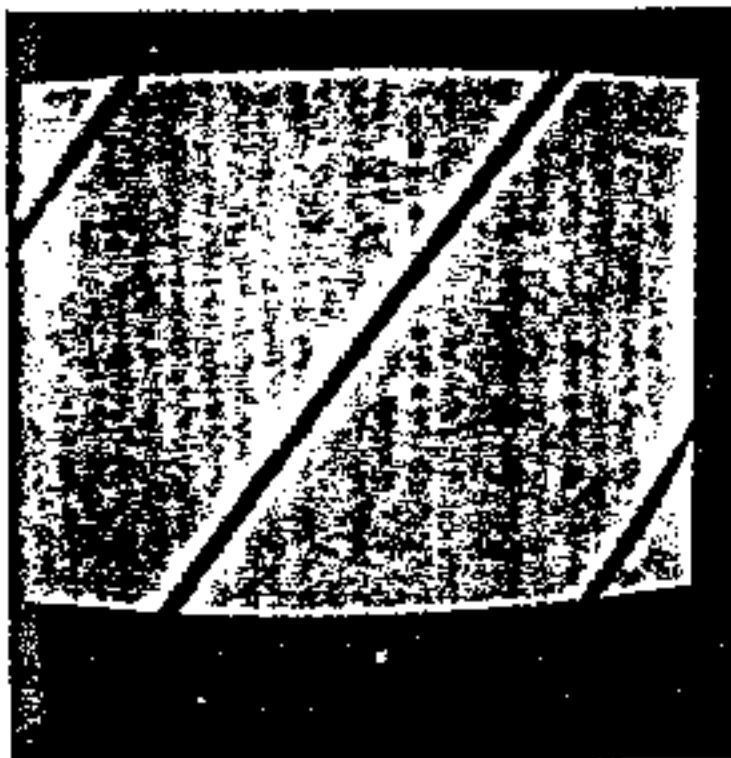
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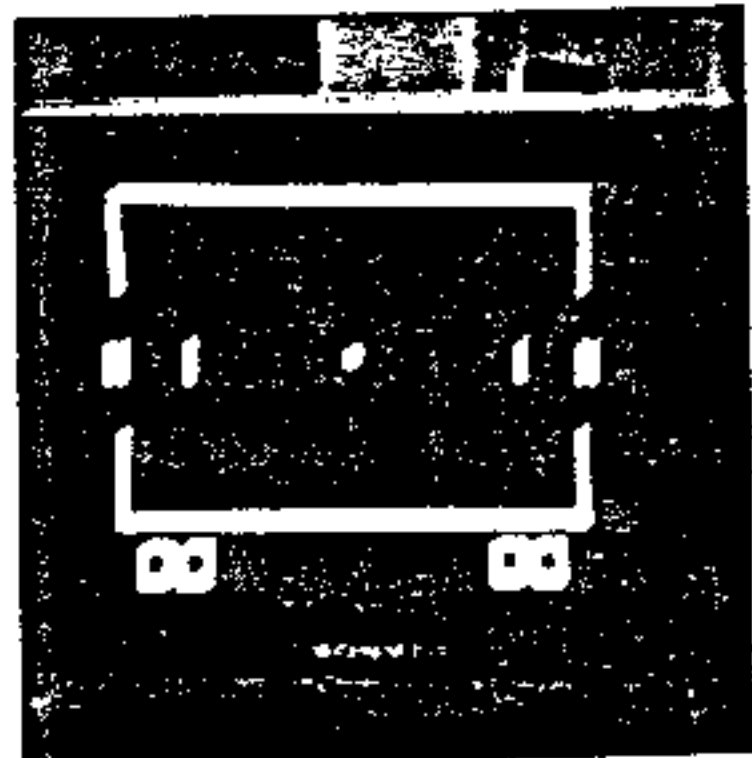
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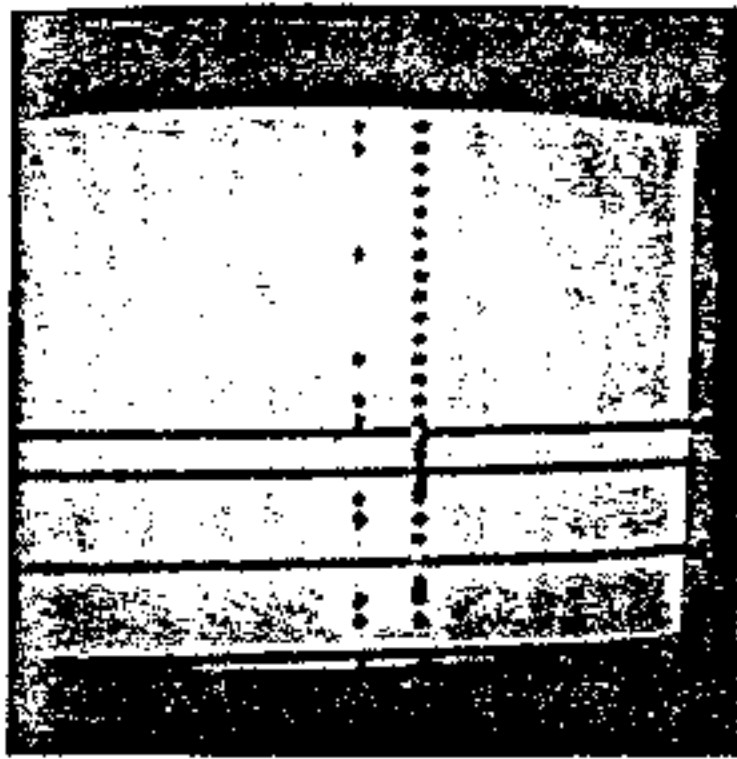
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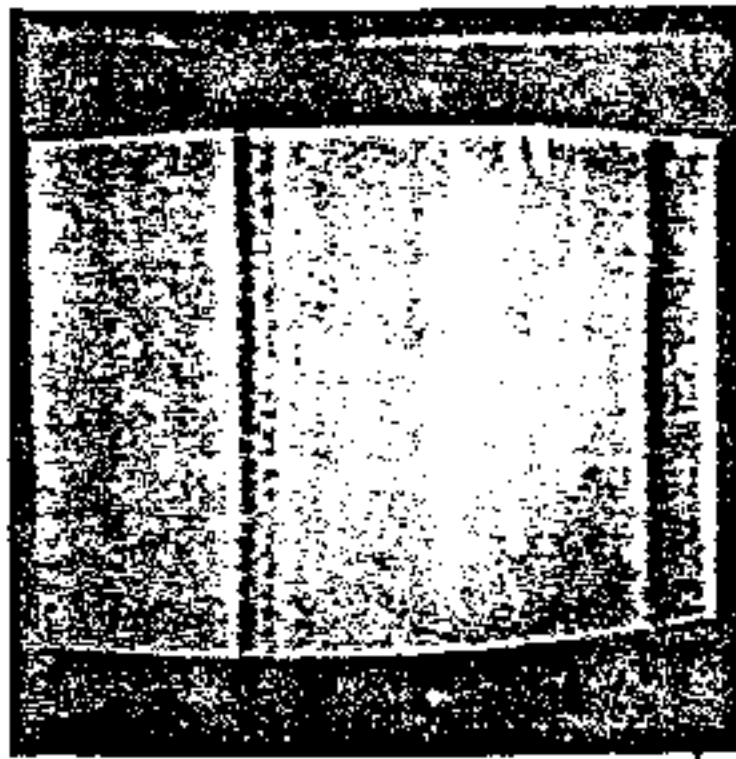
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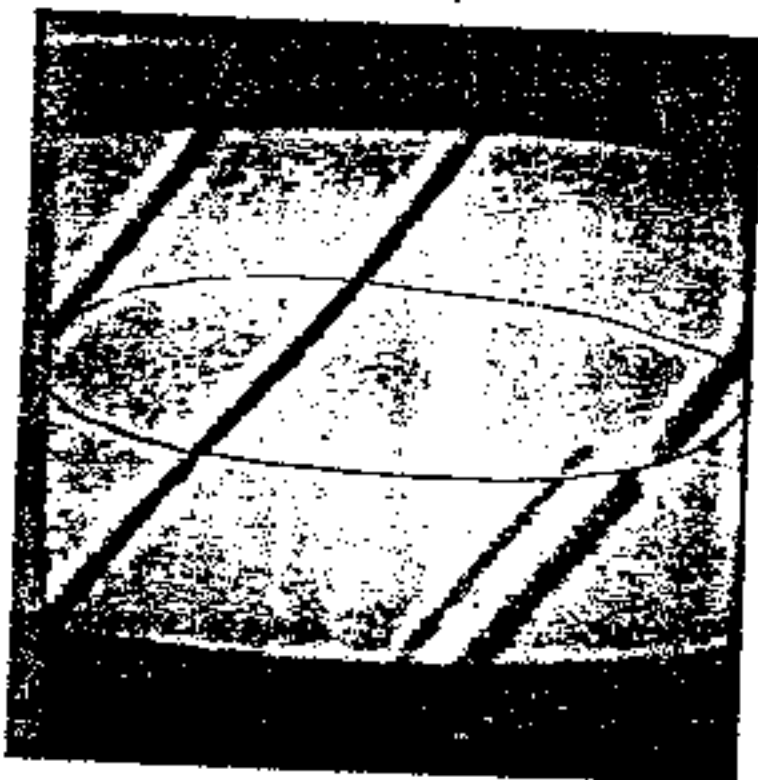
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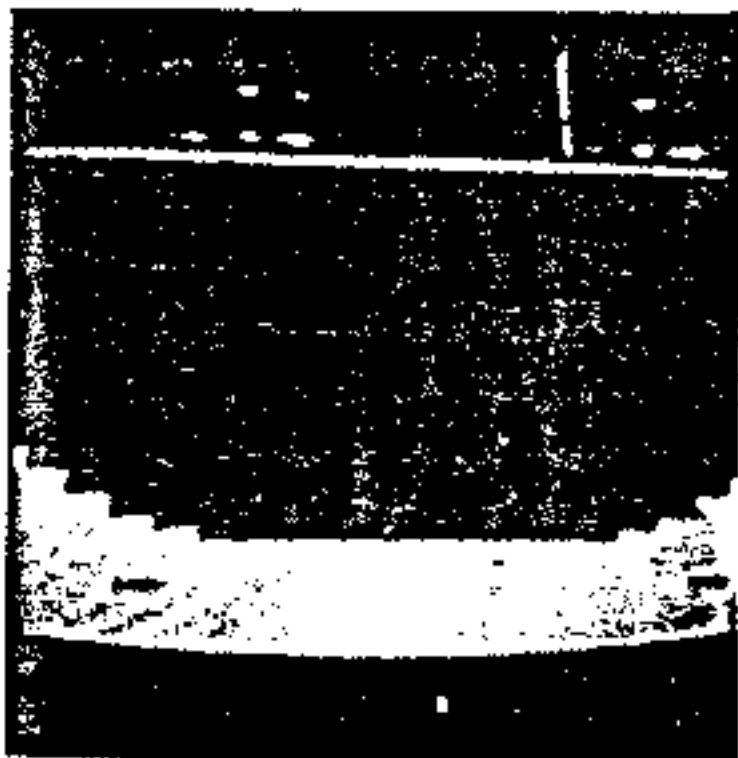
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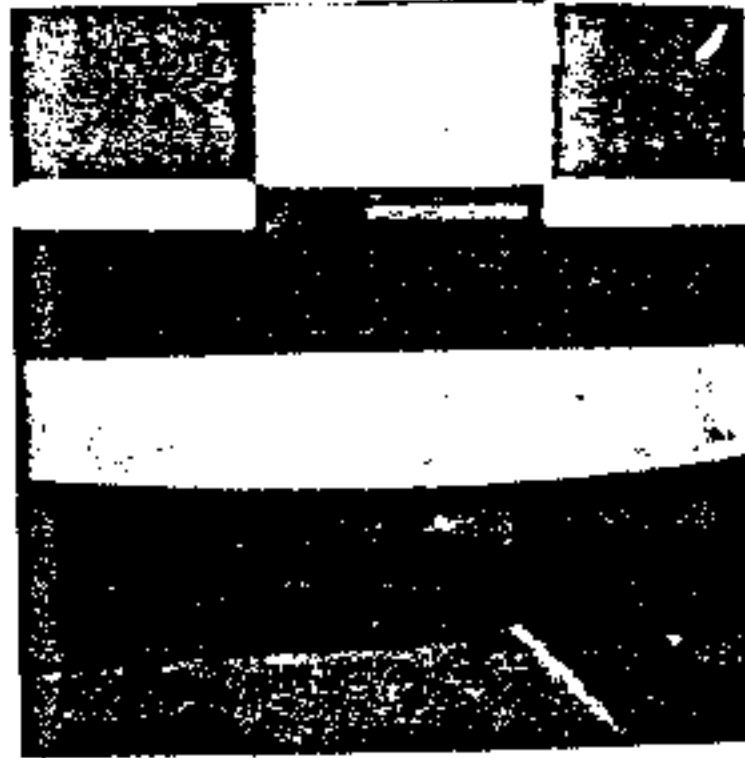
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122