

# PHILIPS

# 16 A 5

## FRAME TIME BASE AND SOUND OUTPUT TUBE

### Physical Specifications

|                                                  |                          |
|--------------------------------------------------|--------------------------|
| Cathode                                          | Coated unipotential      |
| Base                                             | Small button noval 9-pin |
| Bulb                                             | T6½                      |
| Maximum overall length                           | 3 1/16"                  |
| Maximum seated height                            | 2 13/16"                 |
| Bulb length excluding tip                        | 2 7/16" ± 3/32"          |
| Maximum diameter                                 | 7/8"                     |
| Mounting position                                | any                      |
| Basing connections -<br>JETEC basing designation | 9BL                      |

Pin 1 - Not connected

Pin 2 - Grid No.1

Pin 3 - Cathode and  
grid No.3

Pin 4 - Heater

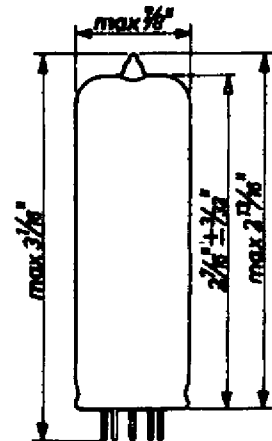
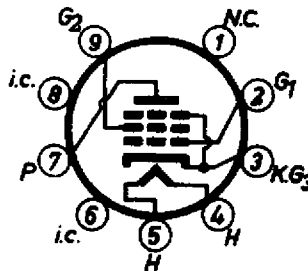
Pin 5 - Heater

Pin 6 - Internally  
connected

Pin 7 - Plate

Pin 8 - Internally  
connected

Pin 9 - Grid No.2



### General Electrical Data

|                |            |
|----------------|------------|
| Heater voltage | 16.5 volts |
| Heater current | 300 ma     |

### Direct Interelectrode Capacitances

|                                                 |              |
|-------------------------------------------------|--------------|
| Grid No.1 to all other elements<br>except plate | 11 μF        |
| Plate to all other elements except<br>grid No.1 | 5.9 μF       |
| Plate to grid No.1                              | max. 1 μF    |
| Grid No.1 to heater                             | max. 0.15 μF |

Maximum Ratings

|                                                                                                     |                          |
|-----------------------------------------------------------------------------------------------------|--------------------------|
| Plate voltage (without current)                                                                     | 550 volts                |
| Peak positive plate voltage                                                                         | 2500 volts <sup>1)</sup> |
| Peak negative plate voltage                                                                         | 500 volts                |
| Average plate voltage                                                                               | 250 volts                |
| Plate dissipation                                                                                   | 9 watts                  |
| Grid No.2 voltage (without current)                                                                 | 550 volts                |
| Grid No.2 voltage                                                                                   | 250 volts                |
| Grid No.2 dissipation                                                                               | 2.5 watts                |
| Cathode current                                                                                     | 75 ma                    |
| Grid current starting point. Grid No.1<br>voltage when grid No.1 current = +0.3 $\mu$ amp -1.3 volt |                          |
| Grid No.1 circuit resistance with<br>automatic bias                                                 | 1 megohm                 |
| Grid No.1 circuit resistance with<br>fixed bias                                                     | 0.4 megohm               |
| Heater-cathode voltage                                                                              | 200 volts                |
| External heater-cathode resistance                                                                  | 20,000 ohms              |

Operating Conditions as Class A Sound Output Amplifier

|                                                                   |        |                 |
|-------------------------------------------------------------------|--------|-----------------|
| Plate and supply voltage                                          | 170    | 200 volts       |
| Grid No.2 series resistor                                         | 0      | 680 ohms        |
| Grid No.1 bias                                                    | -10.4  | -13.9 volts     |
| Plate current                                                     | 53     | 45 ma           |
| Grid No.2 current                                                 | 10     | 8.5 ma          |
| Transconductance                                                  | 9000   | 7600 micromhos  |
| Plate resistance                                                  | 20,000 | 24,000 ohms     |
| Amplification factor of<br>grid No.2 with respect to<br>grid No.1 |        |                 |
|                                                                   | 10     | 10              |
| Load resistance                                                   | 3000   | 4000 ohms       |
| Output when distortion is<br>10 %                                 |        |                 |
|                                                                   | 4.0    | 4.2 watts       |
| A.C.grid No.1 voltage when<br>distortion is 10 %                  |        |                 |
|                                                                   | 6.0    | 7.0 volts(rms)  |
| A.C.grid voltage when out-<br>put is 50 milli-watts               |        |                 |
|                                                                   | 0.5    | 0.55 volts(rms) |

<sup>1)</sup> Maximum permitted pulse duration 10% of one cycle,  
with a maximum of 2 milli-seconds.

## Operating Conditions as Class A Sound Output Amplifier (two tubes)

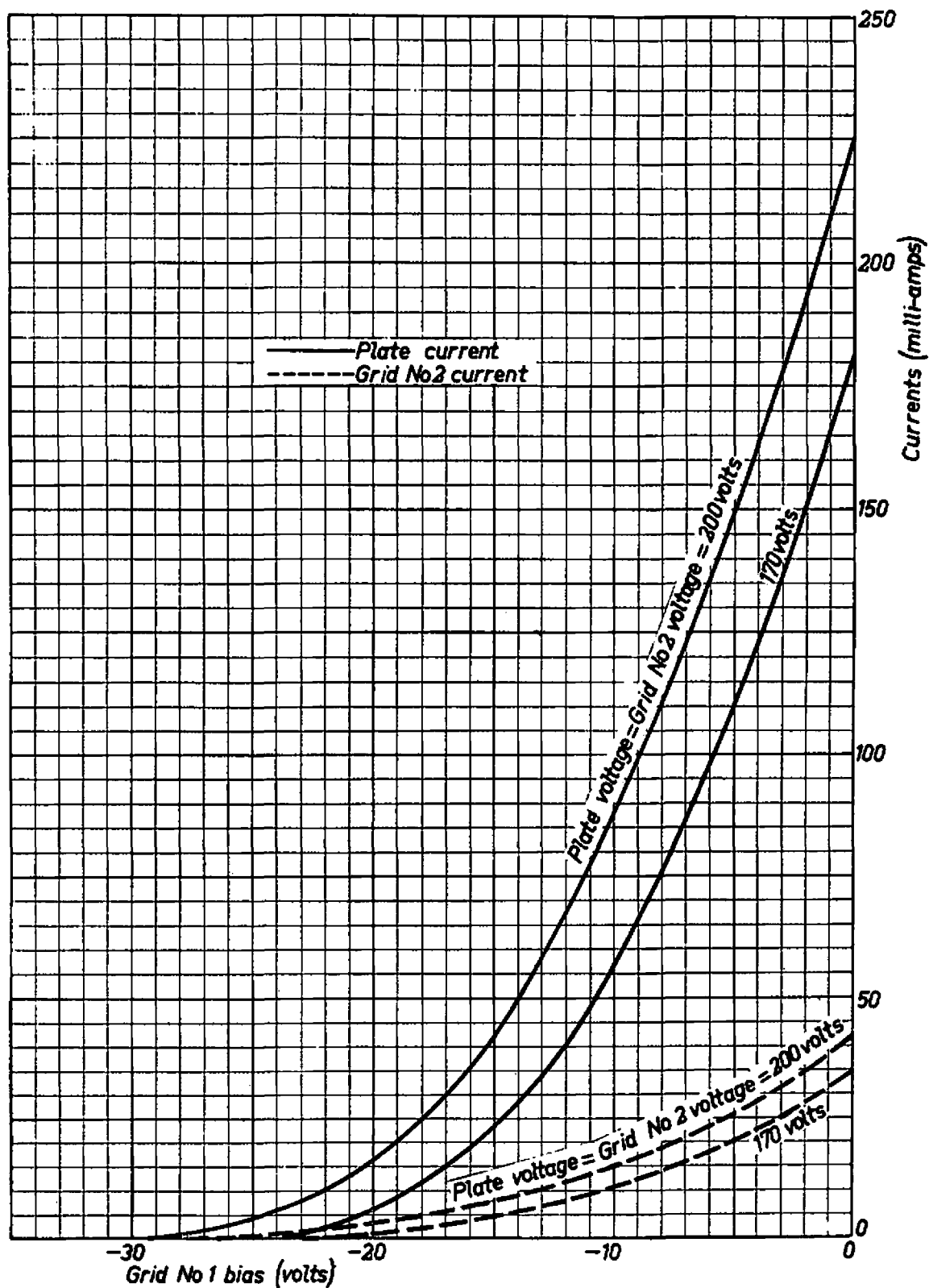
|                                     |         |      |                     |
|-------------------------------------|---------|------|---------------------|
| Plate voltage                       | 170     | 200  | volts               |
| Grid No.2 voltage                   | 170     | 200  | volts               |
| Cathode resistor                    | 100     | 135  | ohms                |
| Load resistance<br>(plate to plate) | 4000    | 4000 | ohms                |
| A.C. grid No.1<br>voltage           | 0 2x9.3 |      | 0 2x13.5 volts(rms) |
| Plate current                       | 2x46    | 2x50 | 2x45 2x52 ma        |
| Grid No.2 current                   | 2x8.7   | 2x17 | 2x8.5 2x19 ma       |
| Output                              | 0       | 9    | 0 12 watts          |
| Distortion                          | -       | 5    | - 5 %               |

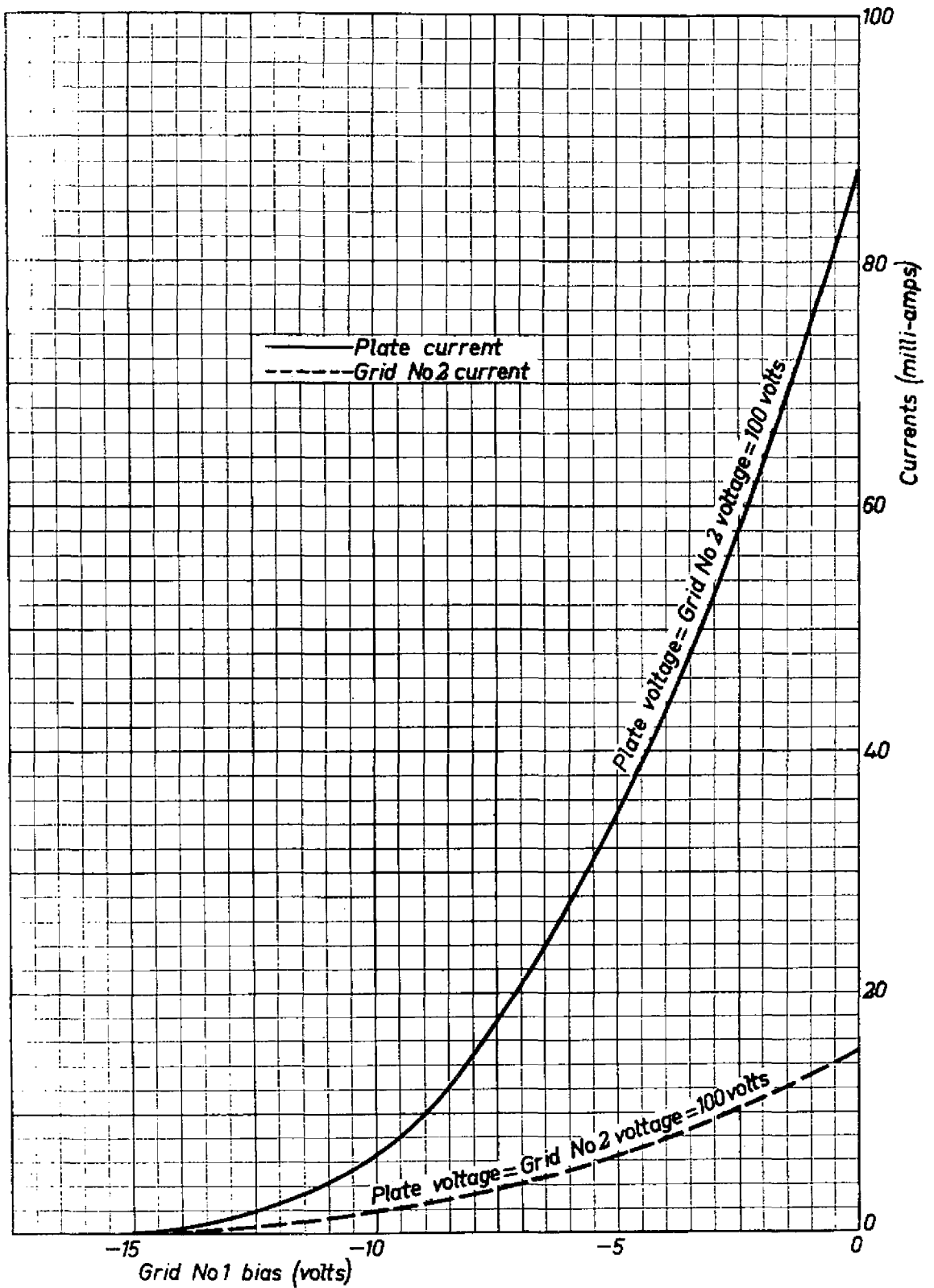
## Optimum Peak Plate Current in Frame Output Operation

To allow for tube spread and for deterioration during life in frame output application the circuit should be designed around a peak plate current not exceeding 90 ma at a plate voltage of 50 volts and a grid No.2 voltage of 170 volts and not exceeding 120 ma at a plate voltage of 60 volts and a grid No.2 voltage of 200 volts.

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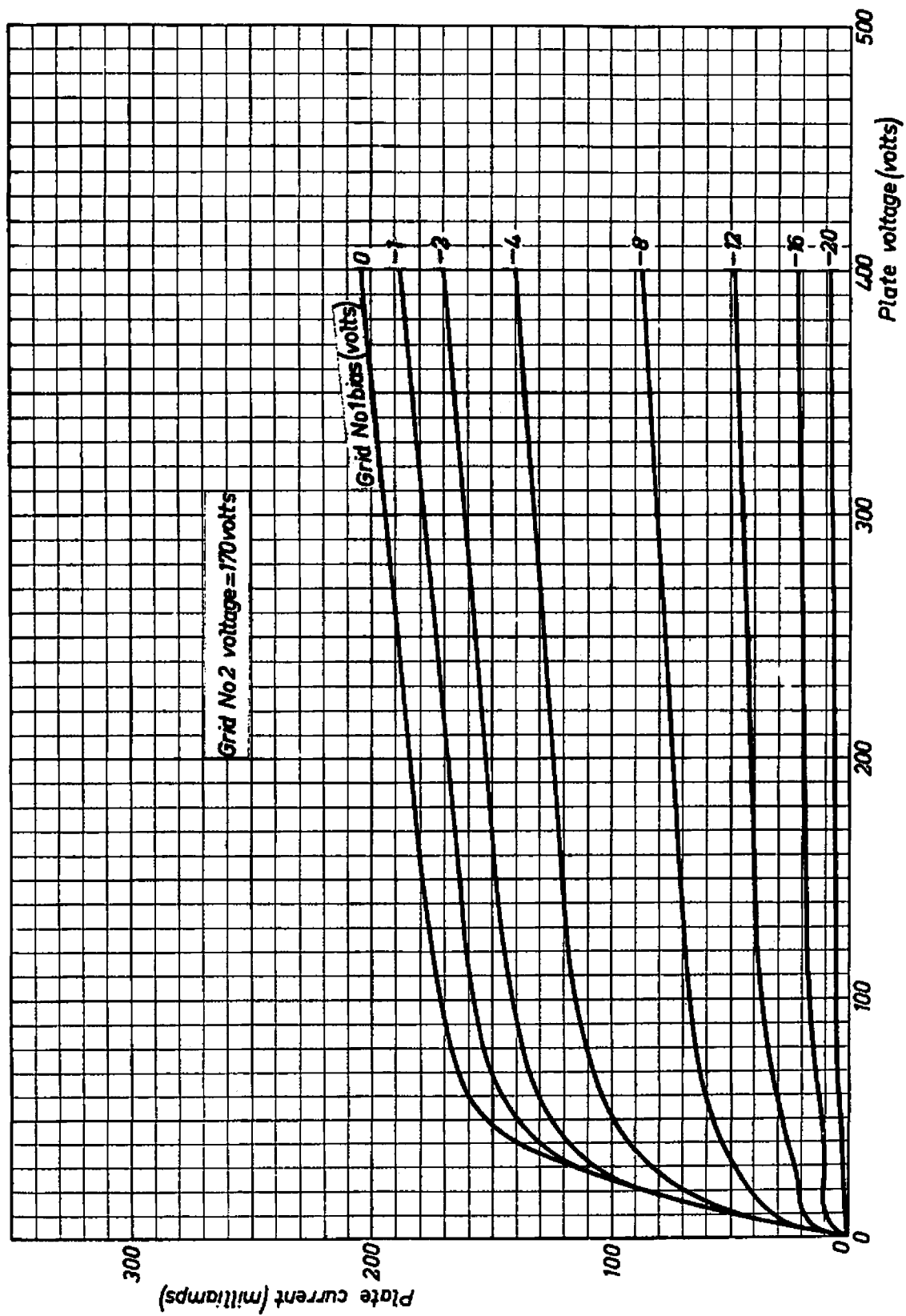
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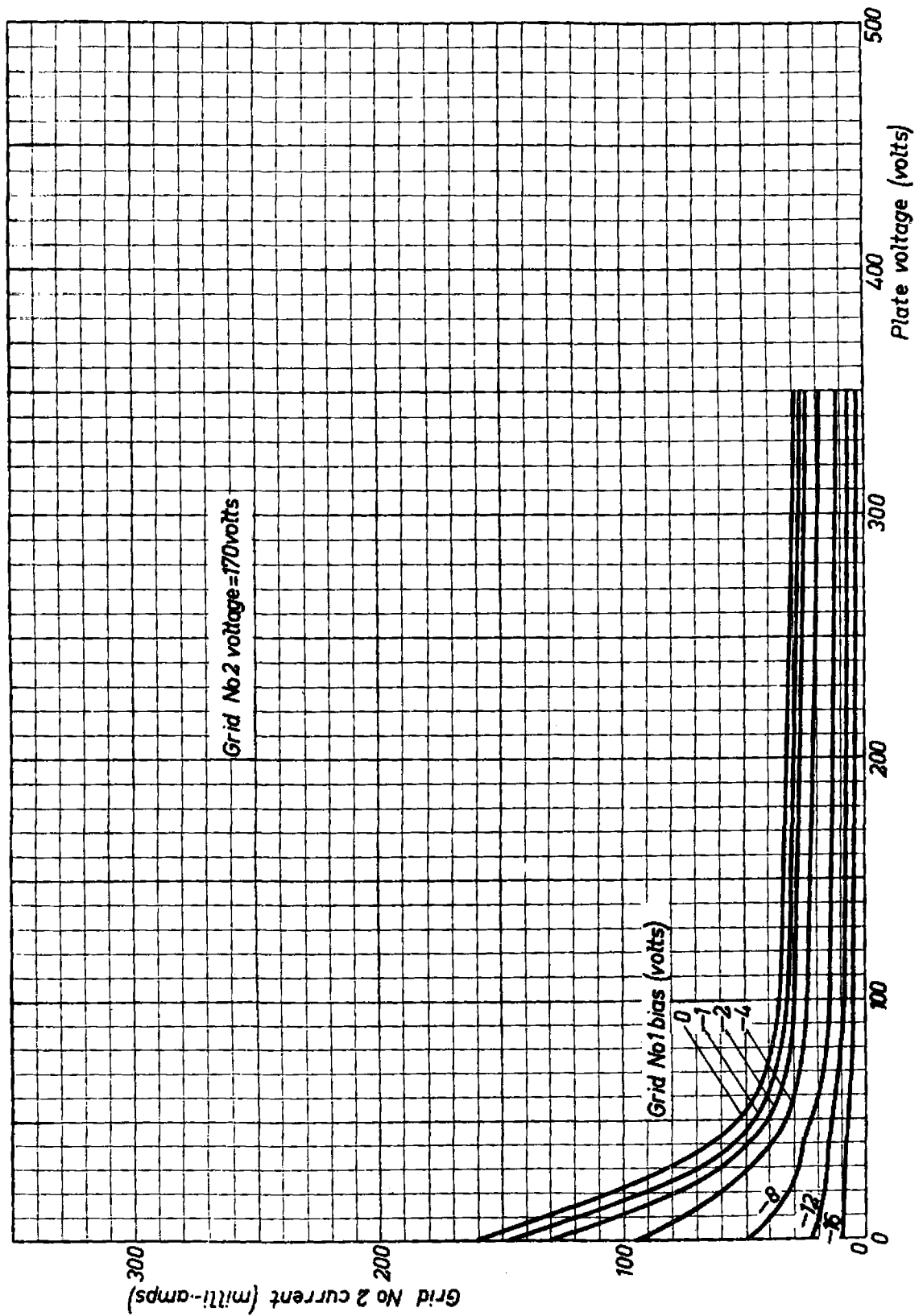




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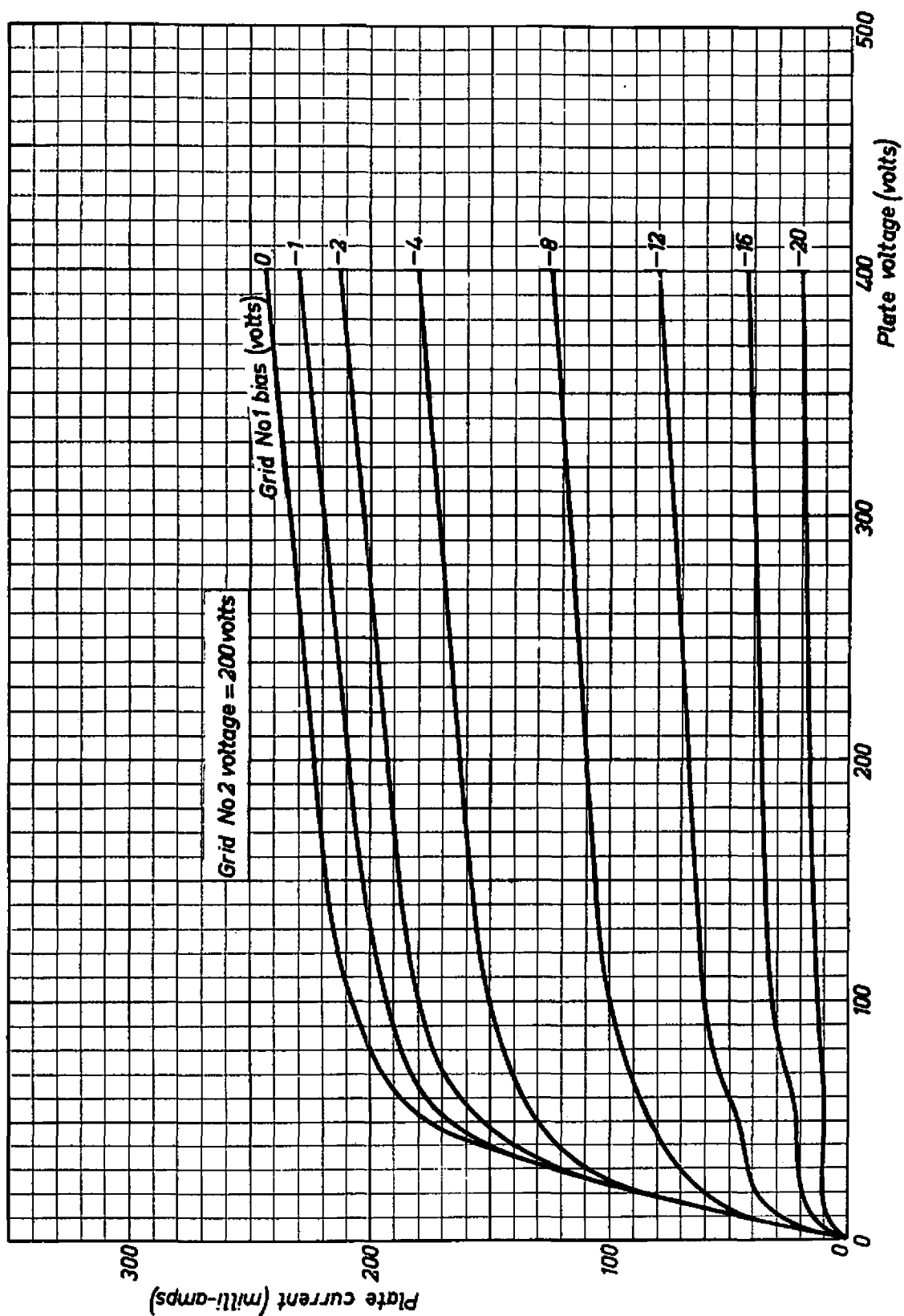
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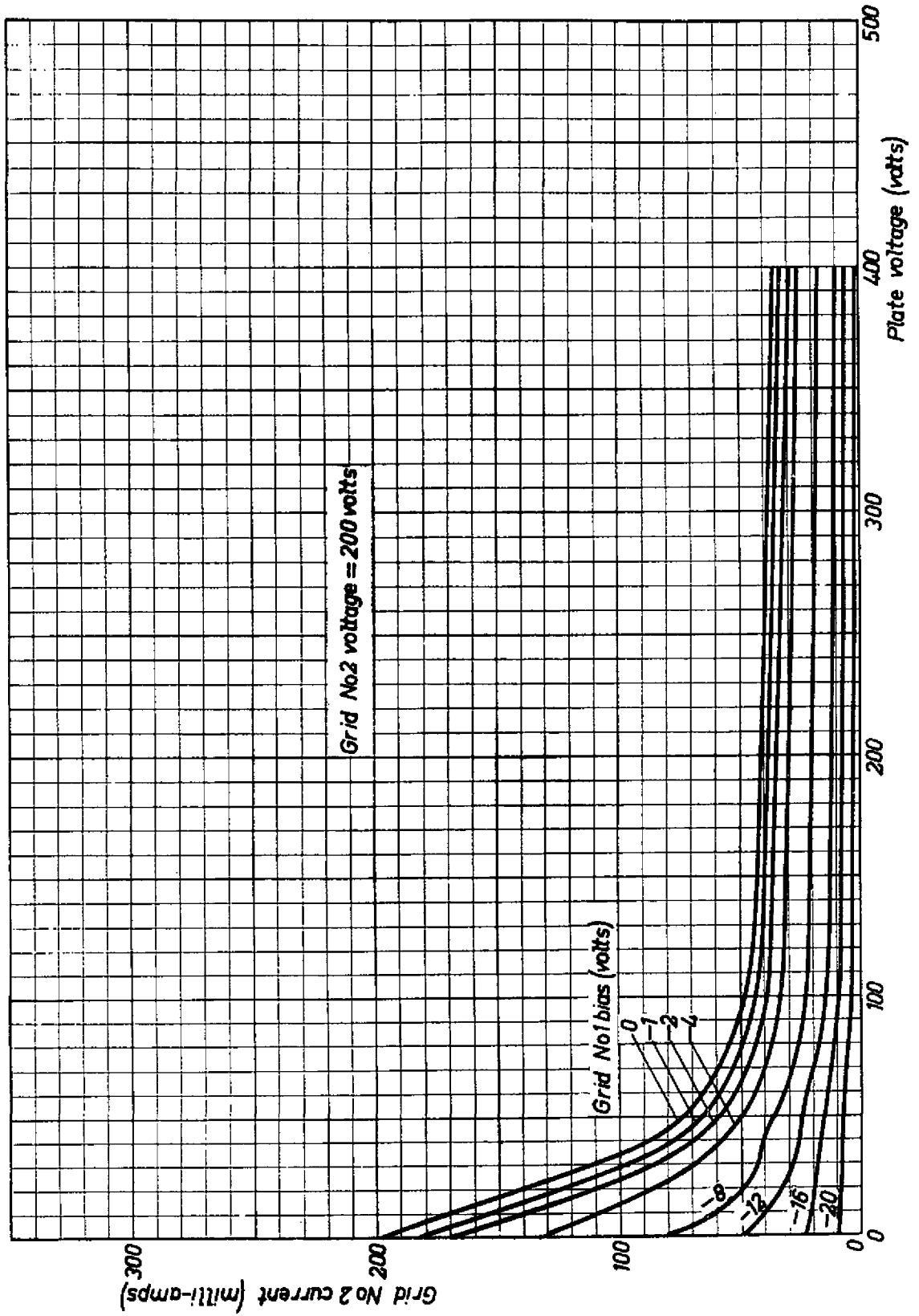


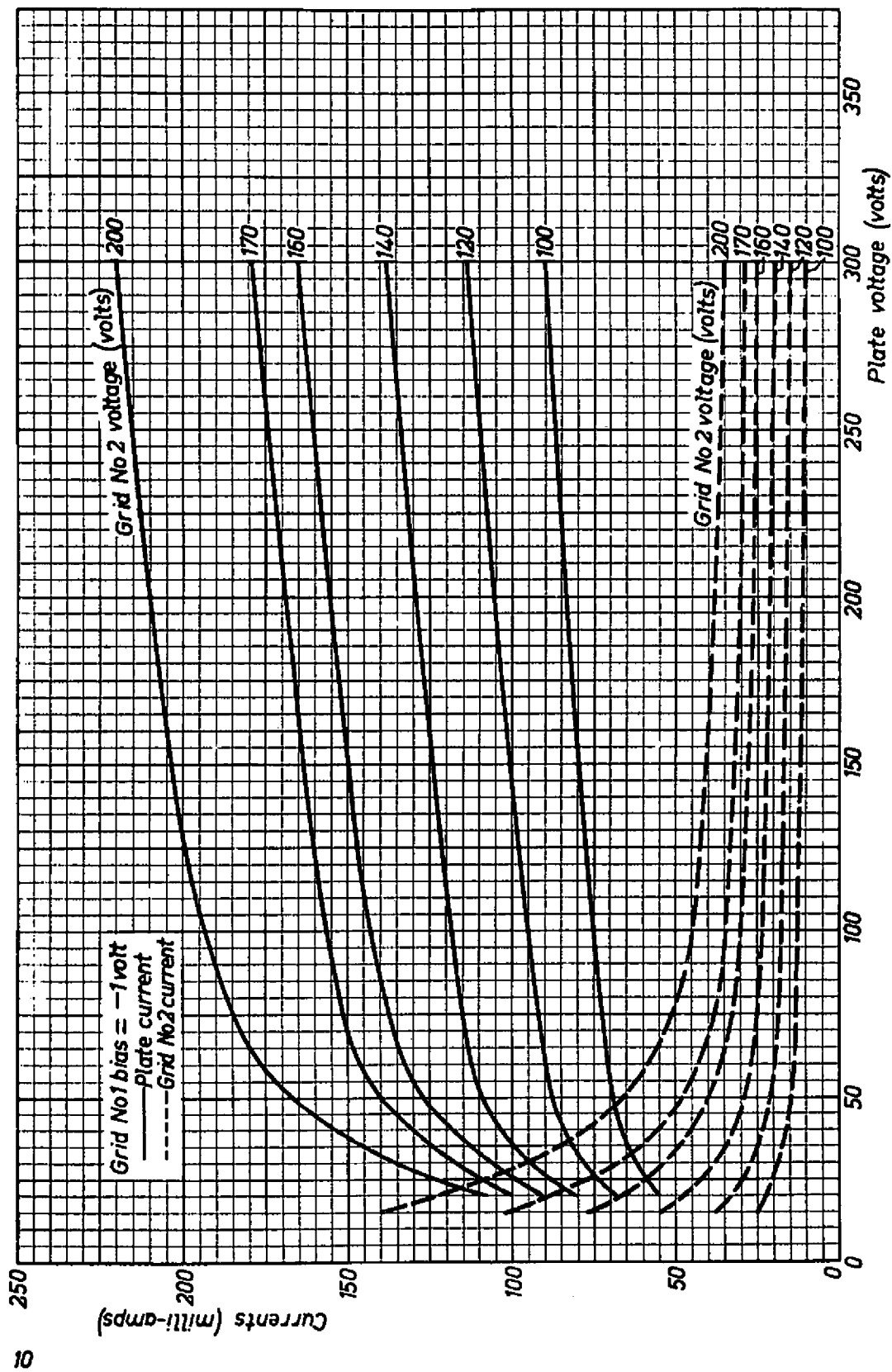


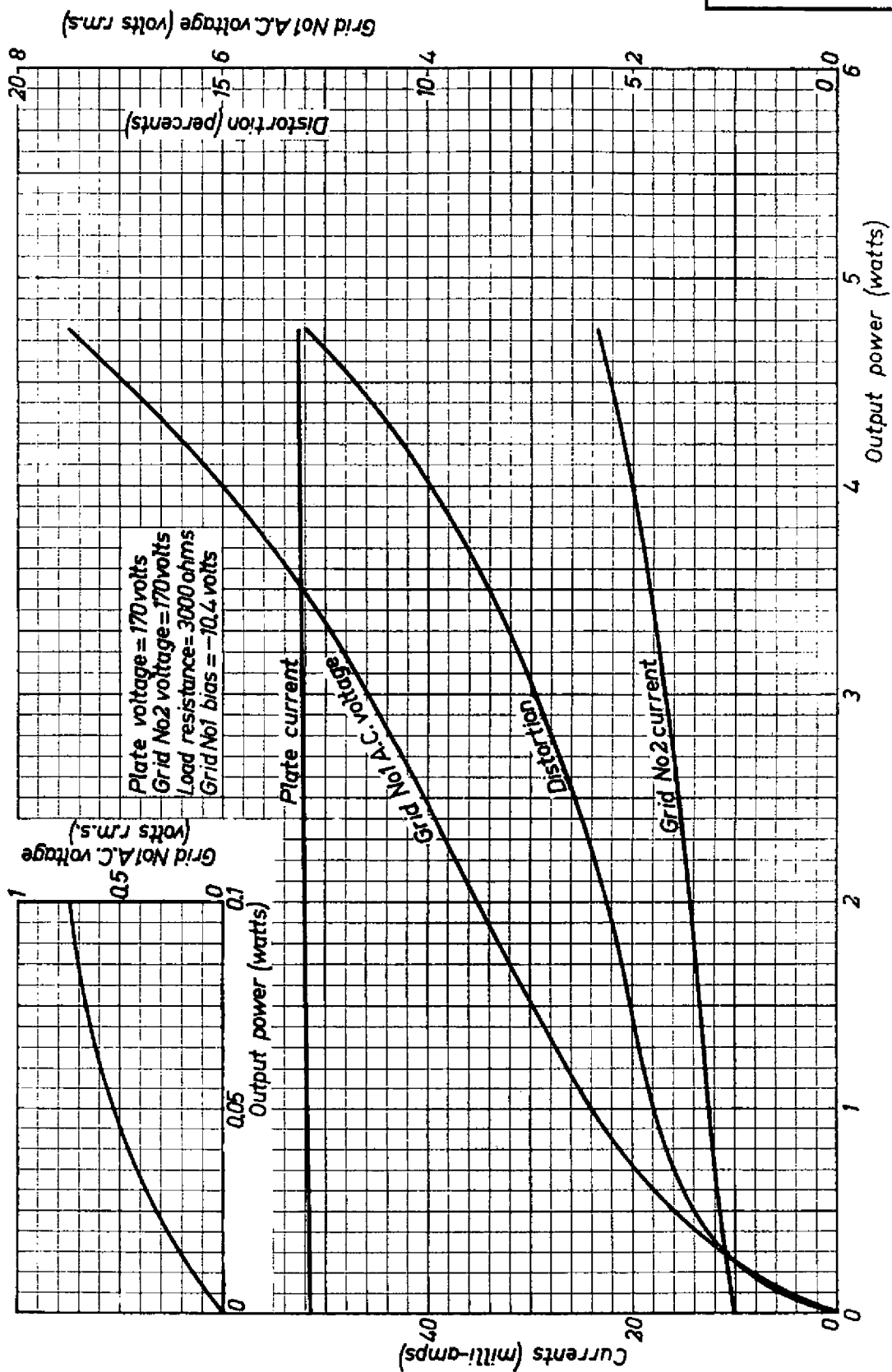
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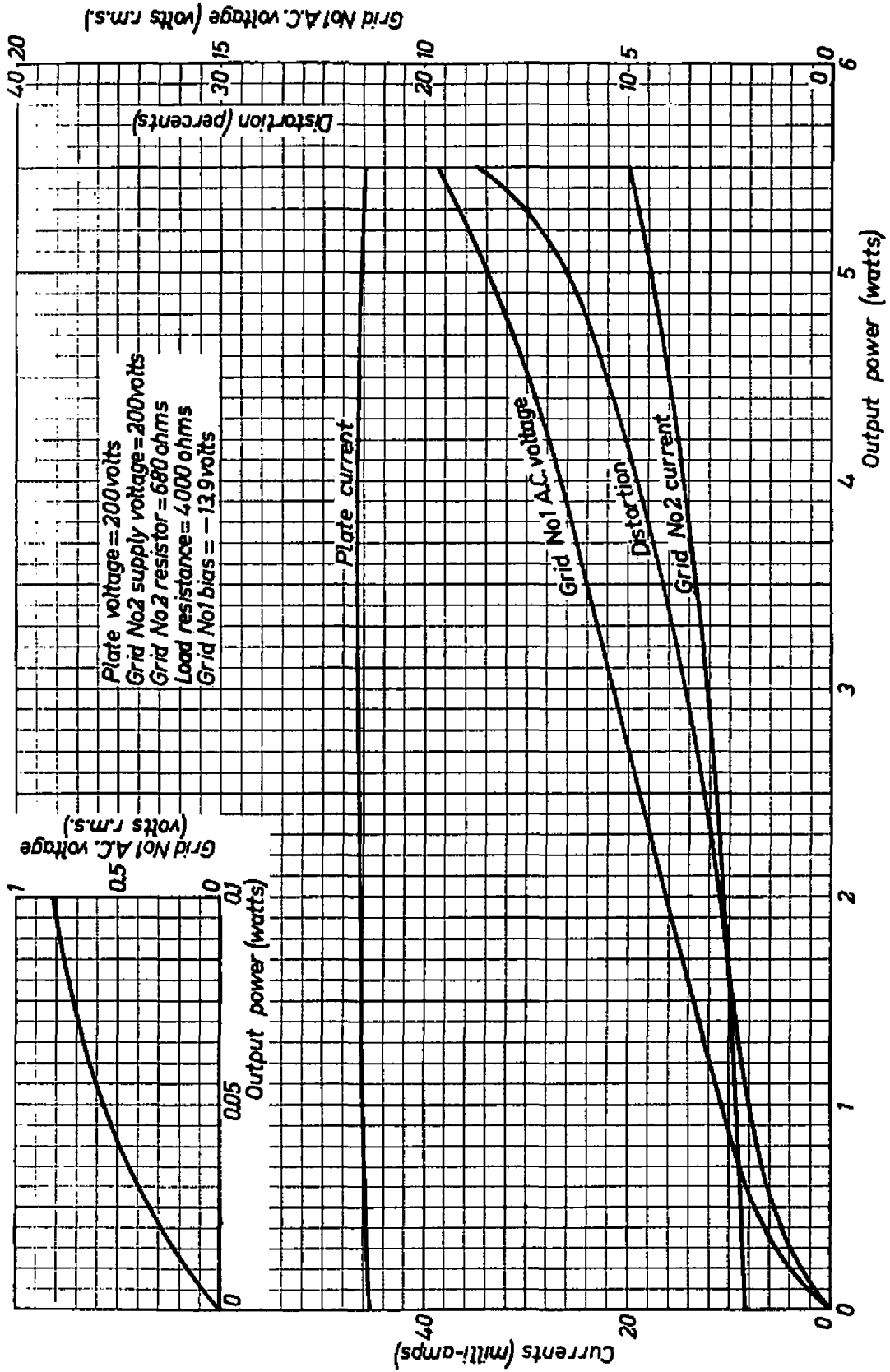


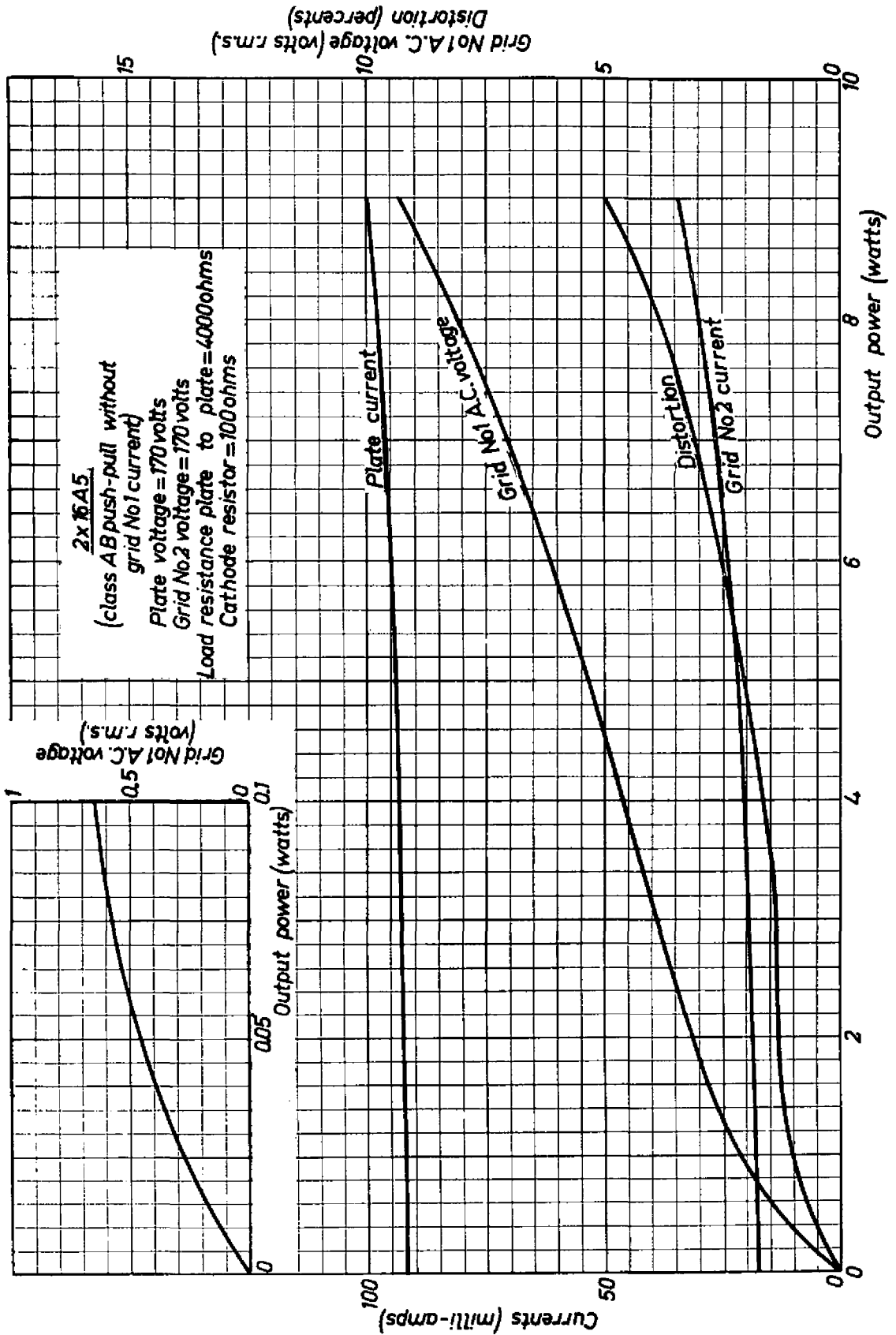




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