Invention relates to electronic technology, specifically to gas-discharge electron guns for industrial applications. Gas-discharge electron gun comprises a cold cathode with a concave emission surface arranged along its axis, a hollow anode with an opening at its base, and a cylindrical channel for guiding the electron beam out of the gun, with two magnetic focusing lenses arranged along it. According to the invention, the first magnetic focusing lens, located near the anode, is designed with pole holes of different diameters. Wherein the pole tip with the smaller hole diameter is positioned on the anode side at a distance from it equal to the diameter of that hole. The second lens, located near the lower end of the cylindrical channel, is designed with pole holes whose diameters match the width of the pole gap of the second lens. The distance between the lenses exceeds the diameter of the pole hole in the second lens. The invention improves the energy efficiency and operational stability of the gas-discharge gun.