New extensive millimeter-wave measurements of the $^{12}$C$^{16}$O dimer have been made and more than 250 new spectral transitions have been observed in the frequency range of 80 - 135 GHz. Joint analysis of these and previous millimeter-wave data yielded in determination and precise location of 34 new energy levels of $A^+$-symmetry and 21 levels of $A^-$-symmetry. Some of them belong to already known stacks and others make up 9 new stacks of the dimer. These new energy levels are located at energies from 8 to 18 cm$^{-1}$ and in a free rotation limit they correspond to the states with $(j_1, j_2, K) = (1, 1, 0), (1, 1, 1), (1, 1, 2)$ and $(2, 0, 2)$, where $j$ is a rotational quantum numbers of the CO monomer and $K$ is a projection of the total angular momentum on the intermolecular axis. One newly observed state of $A^+$-symmetry originating at 12 cm$^{-1}$ has $K = 0$ and might be tentatively attributed to the lower tunneling component of the stretching vibration of the CO-dimer.

The tunneling splitting for many different states of two isotopic modifications of the dimer, $(^{12}$C$^{16}$O)$_2$ and $(^{13}$C$^{16}$O)$_2$ was determined, and its dependence on $J$, $K$-values and on isotopic mass was studied. For some states the tunneling splitting increases in $(^{13}$C$^{16}$O)$_2$ as compared to $(^{12}$C$^{16}$O)$_2$. Possible explanations of this anomalous behavior will be discussed.