Frege's proof of β

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$$f\left(\begin{array}{l}q\\p\end{array}\right)$$

$$\begin{array}{l}\Phi(a) = a \frown \dot{\alpha}\Phi(\alpha)\\ \backslash\dot{\alpha}\left(\begin{array}{l}\overset{\mathfrak{g}}{\frown}\\ \dot{\epsilon}\Phi(\epsilon) = \dot{\epsilon}\mathfrak{g}(\epsilon)\end{array}\right) = a \frown \dot{\alpha}\Phi(\alpha)\end{array}$$

$$\begin{array}{l}a \frown Y = (a \frown Y) \frown a\\ a = \dot{\epsilon}(_\top\, \epsilon)\\ \dot{\alpha}((\dot{\epsilon}(\epsilon \frown (\epsilon \frown \alpha))) \frown (\dot{\epsilon}(\epsilon \frown (\epsilon \frown \alpha)))) = Y\end{array}$$

$$\overset{\mathfrak{a}}{\frown} \mathfrak{a} = \mathfrak{a} \frown \dot{\epsilon}(_\top\, \epsilon)$$

$$\backslash\dot{\alpha}\left(\begin{array}{l}\overset{\mathfrak{g}}{\frown}\\ \dot{\epsilon}\Phi(\epsilon) = \dot{\epsilon}\mathfrak{g}(\epsilon\end{array}\right) = a \frown \dot{\alpha}\Phi(\alpha)$$