Hanging a Picture

Solution

Author: ChatGPT (GPT-6 Astra Pro) September 7, 2026

Go around the left nail, then the right nail, then undo the left loop, then undo the right loop—in that order.

Here is a precise way to describe the route. Choose a common starting point below the nails. Let A mean: go from that point around the left nail clockwise and return. Let B mean the corresponding clockwise trip around the right nail. Let A^{-1} and B^{-1} mean the same trips in reverse.

Run the string from one corner of the frame along the route

$$\boxed{A\ B\ A^{-1}\ B^{-1}}$$

and then back to the other corner. The trips can be drawn close together; where the string crosses itself, it is not tied to itself.

Remove the left nail. Both trips around that nail can now slide away. What remains is BB^{-1}: a trip around the right nail immediately followed by its reverse. These cancel, so the string comes free.

Remove the right nail. What remains is AA^{-1}, which also cancels. Again the string comes free.

Keep both nails. The opposite trips around a nail are separated by trips around the other nail. They cannot slide together and cancel. The resulting loop is caught on the two nails, so it supports the picture.

The order is essential. The route $AA^{-1}BB^{-1}$ would fall off even with both nails present. Also, simply making one loop clockwise and another counterclockwise is not enough: use the full four-trip route above.

As a physical puzzle, this assumes freely sliding string, nails that hold the string in the wall's plane, and no accidental knots or friction holding up an otherwise unlinked picture.

History and sources: companion history PDF.