

# Supporting a Group of Double-sided Trade Banners: How rare earth magnets allow for both sides to be viewed

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## I. Introduction

A group of seventeen trade banners was produced for an October 8, 1841 parade, and carried by the Maine Charitable Mechanics Association. A painted banner was made for each trade, and no two sides were the same. However, each banner was similarly constructed of two layers of linen surrounded with fringe, and attached to an upper wooden rod.

They are the only known such group to completely survive.

The basic nature of the design is two-part, consisting of a method for both storage and display.

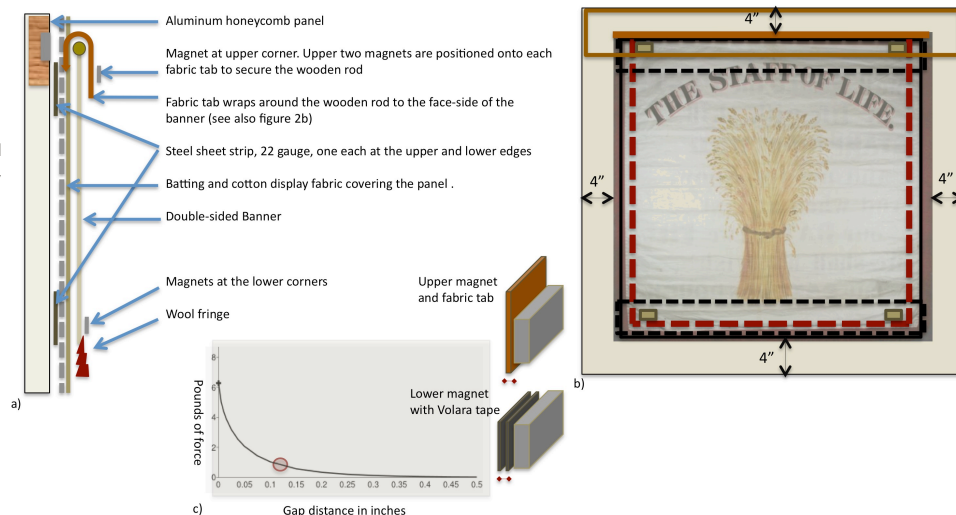


Figure 1 a) A cross-section of the panels' construction; b) The panel measurements for locations of internal wood element, steel plate, channel, and magnet locations; c) Pounds of force vs. distance in inches as represented in the graph specifically for a block rare earth magnet (1/2 x 3/8 x 1/8). The shaded area shows the estimated region of force to gap distance for this mounting system (J&K Magnetics). The layers of Volara added to the lower magnet provided additional gap distance when compared to the fabric tab used with the upper magnet.

## II. Magnetic System

The three key variables to consider with any magnetic system is: the potential strength of the magnet(s); the magnet-receptivity of the receiving steel (the ferromagnetic material); and the field distance (or gap).

### a) Magnet

Each banner is supported with four block-shaped Neodymium grade N42 magnets, measuring 1/2" x 3/8" x 1/8". Each magnet achieves 3,073 gauss or 6.25 pounds of force.

### b) Ferromagnetic material

The banners are support between two aluminum honeycomb panels, constructed with an additional 4" wide wooden upper section. Two 4" wide 22-gauge galvanized steel sheets were secured to each face, one at the top and bottom.

### c) Gap

The gap created between the ferromagnetic material and the magnet is different at the upper and lower corners. The underside of the magnets were treated differently. By knowing the working field distance for the magnetic system, both the selection of the magnet and layers can be refined.

## III. Recess for Rod

Permanent channels were needed for the wooden rods to rest easily in each panel. To prevent the channels from becoming lost once the display fabric is stretched, a thin layer of Nomex was used to "clamp" the fabric. Small brass brads and screws were used to fix the fabric down into the channel, every few inches. The Nomex was then covered with display fabric backed with Beva film.

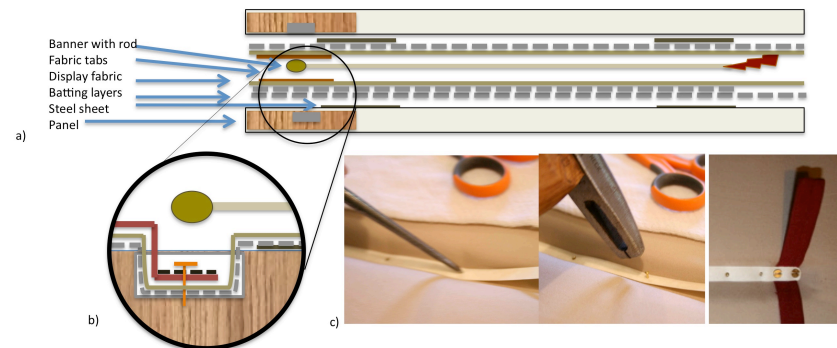


Figure 2 a) The two panels sandwich the banners during storage, with the fabric tabs lifted up and the magnets placed in their storage boxes, the two mount package is secured with twill-tape strapping. Each side of the panel is padded so the banner is evenly supported. Shallow wells in the batting are created for the thicker wool fringe, typically only necessary on one side. b) On each panel, the fabric and batting layers are held into the cut channel with a strip of Nomex secured with small brass brads. Brass screws were used for the fabric tabs. Once the Nomex is secured, it is covered with Beva film lined fabric. c) Nomex being secured with brass brads and screws for the fabric tabs.

## IV. Webbing Strapping & Storage Rack

A pair of cotton webbing straps were made for each set of support panels, consisting of 3" and 1" wide cotton twill tape, secured with Velcro.

SmallCorp manufactured a storage "baker's rack" that the mounts slide into. The spacing accommodates the double mount thickness. An image of the enclosed banner is positioned at the lower edge of each panel for easy identification.

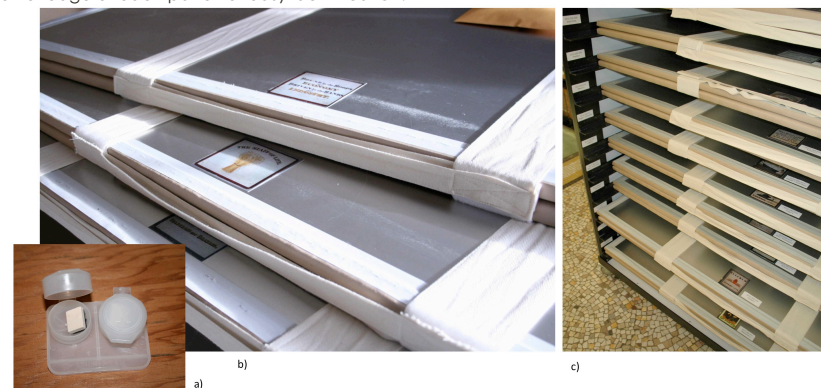


Figure 3 a) Magnets individually housed in separate compartments of a contact lens case; one case for the upper, and one for the lower magnets; b) Panels with twill tape strapping to ensure the closed package, images are positioned onto the outside of each panel to show the side of the banner that will be exposed when lifted; c) Storage rack for the banner's complete package to slide into.