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# A Tensioning Device for the Reduction of Severe Planar Distortions in Paintings

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In the wake of Hurricane Sandy the community of paintings conservators is once again reminded of the challenges posed by water damage. Planar deformations in canvas supports are of paramount concern, as are issues of lifting, flaking, and paint loss.

The treatment goal in correcting planar deformations is to equalize the tension across the entire picture plane. (Consolidation of endangered paint should be addressed prior to this procedure, even when nothing more than temporarily “holding flakes in place” is possible.)

The device proposed here is based on a stretcher model developed by Claudia Kluger,<sup>1</sup> while working with Prof. Winfried Heiber,<sup>2</sup> that utilized a system of clamps and straps. The clamps were stapled to webbing straps; the straps were then stapled to an expansion work stretcher for gradual tensioning. Individual straps were independently tightened as needed by the somewhat cumbersome method of re-stapling. (A clamping system that does not require flattening of the tacking edges has also been developed.)<sup>3</sup>

The current mechanism is capable of more precise and efficient tensioning, especially on large paintings, because the construction allows for controlled and gradual tweaking of the tension at each site of clamping – like tuning a piano.

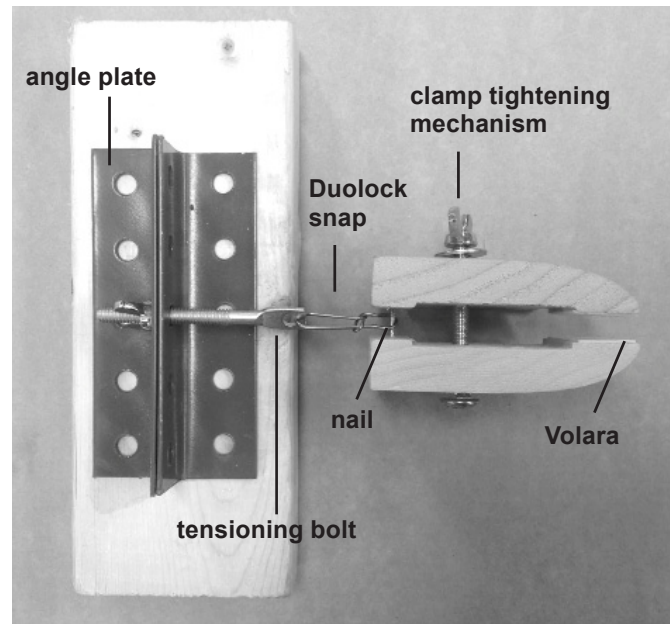
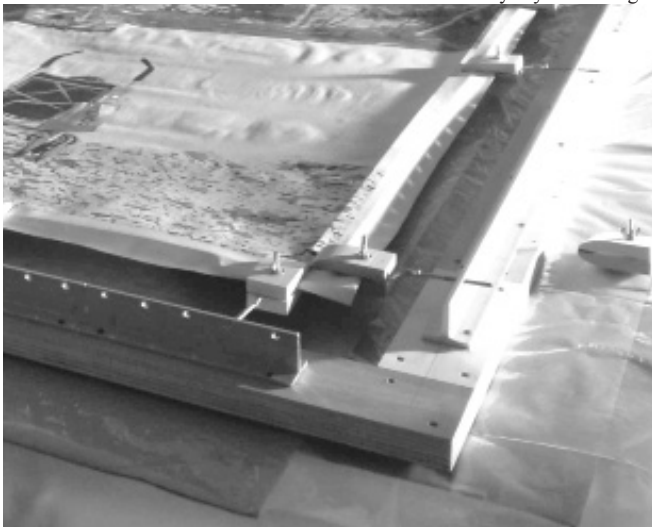
## The Components

### Framework

The framework is a fixed work strainer made to accommodate the dimension of the painting plus enough space in either direction for attaching the clamps and the bolt system used in pulling out the canvas.

Aluminum angle plates are fastened to the work strainer. These can be the “T” profiles used in the prototype or ready-made punched steel angles that are pre-drilled with holes at 1-inch intervals. For smaller-sized paintings, one “L” angle with the base mounted towards the painting would suffice.

*River by Jayne Holsinger*



### Clamps

The wooden sections of the clamps are made of lengths of baseboard molding cut into slightly under 2-inch widths. The baseboard profile should be such that when the molding pieces are clamped together, there is a space of at least ¼-inch to accommodate the tacking margin.

The front edge of the wood clamps are lined with Volara to aid in maintaining a grip on the painting’s tacking margins. Pressure sensitive adhesive is not recommended for adhesion due to “creep” of the adhesive when under tension. If Lascaux 360HV is rolled on to Volara (or other good gripping material) and allowed to dry, this material can be cut into strips and pressed on to the inside edges of the wood clamps.

The wood clamps are tightened with bolts, washers and wing nuts.

A nail is driven through the bottom half of the clamp so that it fits into a very slightly larger receiving hole in the top half. This keeps the wooden elements in alignment and also acts as the attachment site for the link to the tensioning bolt.

The tensioning bolt consists of a 3 inch flattened-end hanger bolt. It is attached to the clamp with a Duolock snap which links the eye of the bolt to the nail in the clamp. Due to its rigidity, the snap prevents the bolt from spinning when ultimately tightened by the wing nut.

The threaded end of the bolt is fitted through a hole in the aluminum angle plate attached to the strainer, and secured with a washer and wing nut. Adjustment of the wing nut is used to control the tension; as the wing nut is tightened and the bolt is drawn in, the canvas slowly tightens.

### Application

The deformed painting is freed from its stretcher and transferred to the device by attaching the clamps in the corners and centers of all sides, facing the edges first, as necessary.

*War Pieta* by Max Ginsburg



Then further clamps are systematically attached until the entire perimeter is fixed. Each of the clamps is tightened by slowly turning the outer wing nuts until even tension is achieved by “feel.”



Once the canvas is tightened around the entire perimeter, it can then be humidified. As the canvas begins to equalize, the process of tightening continues until planarity is achieved.



The chamber is created by placing Mylar or vinyl strips over the clamps and the outside of the strainer. The table is covered with plastic or Mylar. Blotters wetted with a saturated NaCl salt solution are placed within the chamber beneath the painting to maintain a relative humidity of approximately 74%. Humidity dials or cards should be placed within the chamber to monitor the increase in relative humidity. Small fans placed within the chamber equalize distribution of humidity.

As stated in *Conservation of Easel Paintings*, an appropriate fungicide can be used if prolonged humidification is needed. In the two cases tested, humidification was elevated over the course of 3 days and no fungicide was added. In the first test ambient humidity of 70% was sufficient. In the second test humidity was elevated to 75% by the introduction of ultrasonic mist fed into the chamber. (More information on the methodology of implementing humidification and heat, regardless of the stretching system can be reviewed in *Conservation of Easel Paintings*.<sup>4</sup>)

In the treatment of “War Pieta” the paint and gound layers were consolidated with a solution of hot Beva 371 diluted with petroleum distillate which was brushed through the



## A tensioning device for the reduction of severe planar distortions in paintings, continued

verso of the canvas, while still in the tensioning device. The painting was then released from the device, placed on the suction table and heat-activated with a tacking iron through silicone release Mylar through the face.

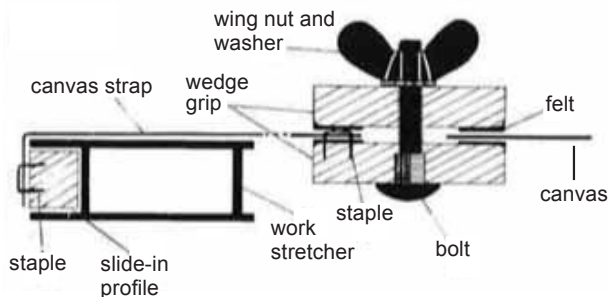
In the case of "River," tenting which was limited to minor, scattered areas, was consolidated locally with sturgeon glue through the face. Residual deformations were eliminated on the low-pressure suction table. Each case is different - each case will demand individual decisions.

### Acknowledgements

Sincere thanks to artist Max Ginsburg for allowing the treatment of *War Pieta* (water damaged in 2011) to be published and to artist Jayne Holsinger, who kindly provided her Hurricane Sandy-damaged painting for testing (*River* 2012). The tensioning device was constructed by Simon Liu with the assistance of Niko Papadimitriou. Caitlin Breare, graduate student of the NYU Program at the Conservation Center, Institute of Fine Arts, and Kieven Havens, pre-program intern, assisted in the treatment.

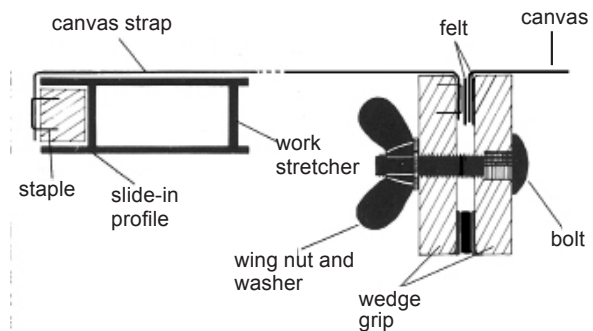
### Footnotes

1. Kluger, Claudia, Dehnmethode für Leinwandgemälde. In: *Mitteilungen des Deutschen Restauratorenverbandes* 1984/85, pp.30-32 (Methods of Expanding Canvas Paintings, In: *Communications of the German Restorers Association*.) The clamping device described in the article is shown below. Some of the design principles were adapted in the present work.



2. Prof. Heiber later developed his Gleitholzrahmen device that allows tensioning without flattening the tacking edges. Heiber W., Der Gleitholzrahmen. In: *Zeitschrift für Kunsttechnologie und Konservierung*, 2006/1, pp.47-58 (Gliding Wood Frame, In: *Art Technology and Conservation Journal*) It is mentioned in *Conservation of Easel Paintings*.

3. This clamp arrangement orients the clamp perpendicular to the canvas plane. One block of the clamp is placed on the inside of the tacking margin while the second wood block, with the canvas strap stapled to the edge facing the tacking margin, maintains the right angle of the tacking margin. The blocks are pressed together with a bolt and wing nut and the canvas strap then fixed to an expandable stretcher. This clamping mechanism could also be used with the tensioning system described in this article. Renate



Poggendorf, Doerner Institut, Munich, Germany. Personal communication.

4. Chapter 24.1.4 Expanding the entire picture plane pp. 392-395 in *Conservation of Easel Paintings*, ed. Joyce Hill Stoner and Rebecca Rushfield, publ. Routledge, October 24, 2012, 928 pages, Routledge Series in Conservation and Museology.

### Materials

Volara  
Lascaux 360HV  
baseboard molding  
3-inch continuously threaded bolt with washer and wing nut  
Duolock snap  
[gofastandlight.com/prodinfo.asp?number=FI-H926851&variation=&gclid=CMGDgvjw2rYCFUdU4Aod31QADA](http://gofastandlight.com/prodinfo.asp?number=FI-H926851&variation=&gclid=CMGDgvjw2rYCFUdU4Aod31QADA)  
flattened-end machine screw hanger 1/4"-20 thread, 3" overall length with washer and wing nut - [mcmaster.com/](http://mcmaster.com/)  
steel angle with holes  
[fastenal.com/web/products/details/41183](http://fastenal.com/web/products/details/41183)