THE DESIGN OF A COLLAPSIBLE HUMIDIFICATION CHAMBER

by Holly Maxson *

The collapsible humidification chamber described and diagrammed in this short paper was constructed in a very brief period of time with common materials I had on hand in my studio and garage. As with many other innovations, it was born out of necessity to solve a specific problem. In this case, the problem was limited work and storage space in a small paper conservation laboratory.

The chamber's precursor was a rigid, plexiglas, pyramid-shaped, humidity chamber, designed by Marilyn Weidner. This transparent pyramid could be placed over the surface of the suction table and by means of armholes, the object could be manipulated within the chamber. An opening at one side allowed the attachment of an ultrasonic humidifier, which maintained the desired level of humidity during the treatment. Chambers fashioned after this one are now standard with many of the commercially available suction tables.

The fierce competition for space in my small laboratory dictated that my humidity chamber would have to either fold or collapse for storage when not in use. When I renovated my studio almost two years ago, I had mounted a series of 2" x 4" wooden beams 36" apart, and eight inches below the ceiling. These cross beams conveniently support oversized packing materials, a flexible ventilation system, and now, my suspended humidity chamber.

MATERIALS

Note: All measurements are based on the size of the table described; Base - 4 feet square, height - 31" length of sloped walls - 43".

Pulley (1)
Nylon cord (3 yards)
Wooden strips (4 - 1/2" x 2" x 4')
Small nails (16)
Polyethylene sheeting, (5 feet wide x 8 yards)
Clear polyester tape (Permacel)

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MATERIALS (cont.)

Picture hanging wire (approx. 6 yards)
Screw eyes (4 small, 2 large)
Flat tacks (4)
Counter weight (e.g. window sash weight)
Binder clips (2 - No. 10, large)
Cleat (1)
Nylon cord (approx. 12 feet)
Plexiglas "memo cube"

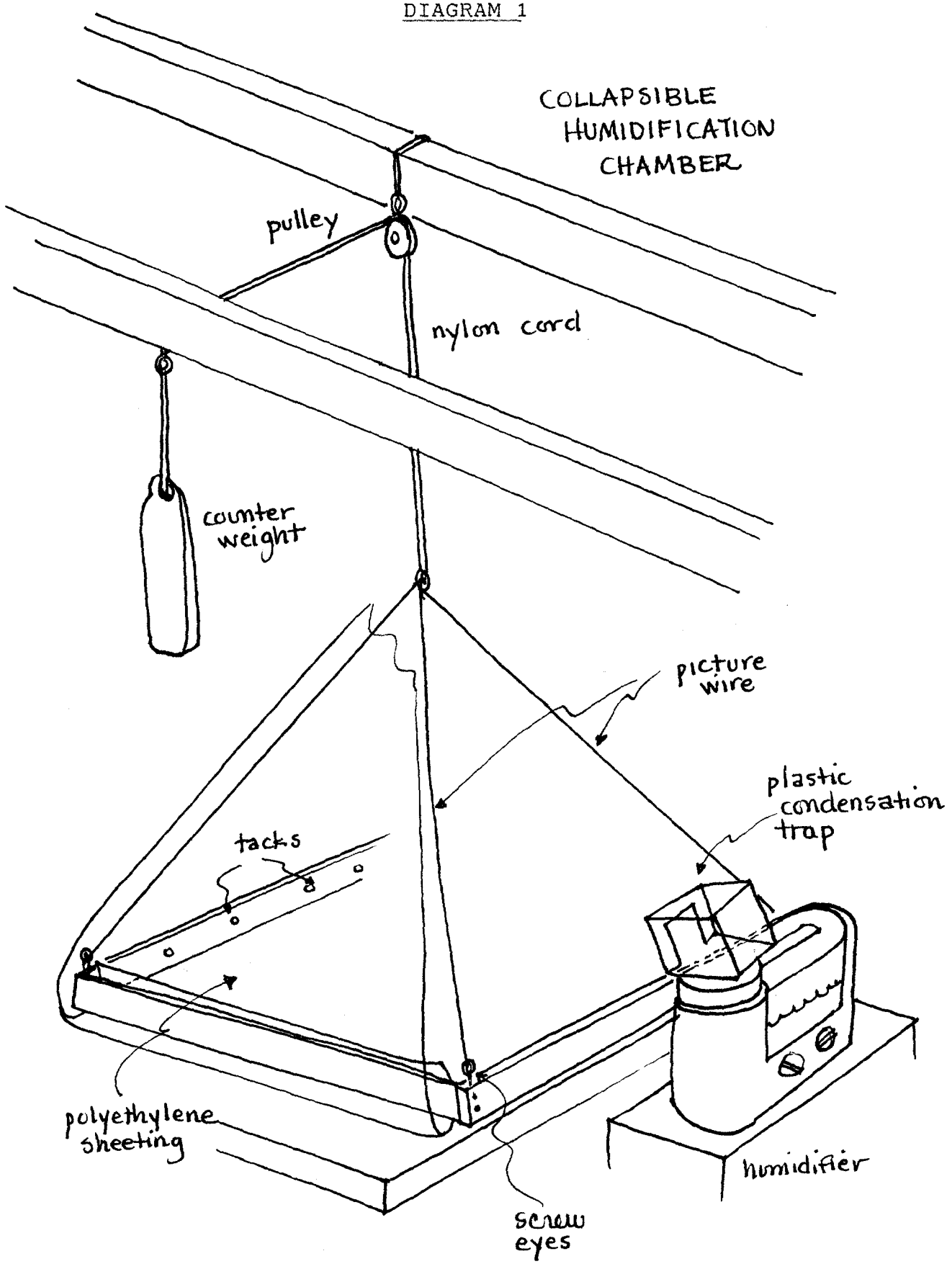
CONSTRUCTION

Just over the center of my largest lab table, I mounted a small pulley on one of the cross beams. In order to move the pulley along the length of the beam, I threaded a piece of braided picture wire through the pulley and tied the wire around the beam. Through this pulley I threaded a nylon rope approximately 3 yards long. (Diagram 1)

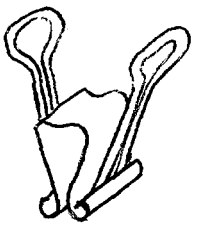
To construct the base of the pyramid-shaped chamber, I cut four lengths of wood 1/2" x 2" x 4 feet long and joined them at the corners with small nails to create a deep frame. In the top edge of each of the corners of this frame, I inserted a screw eye. A piece of braided framing wire (approx. 48") was knotted through each of the screw eyes and brought towards the pulley where all four were joined and knotted to the end of the nylon cord. (At this time, all of the wires were made equal in length.) Next, I cut triangular panels of transparent poyethylene, and using clear polyester film tape (Permacel), secured the plastic sheeting on each of the pyramid's sides. This was accomplished by folding the polyethylene over the taut wire and taping the folded edge underneath. Clothes pins were used to hold the folded plastic temporarily in place. The bottom edge of the polyesthylene was folded under the wooden frame and tacked to the inside surface of the wood. All four sides of the pyramid were covered in this way.

The nylon cord was pulled upwards until the apex of the humidity chamber touched the beam. The cord was threaded from the pulley through a sturdy screw eye in the adjacent beam, and then to a counter weight, which balances the chamber when lifted. The chamber is lowered onto the table once the object is positioned correctly.

DIAGRAM 1


COLLAPSIBLE
HUMIDIFICATION
CHAMBER
pulley
nylon cord
counter
weight
picture
wire
plastic
condensation
trap
tacks
polyethylene
sheeting
humidifier
screw
eyes

Collapsing the flexible chamber was a simple task. (Diagram 2) Two large binder clips (No 10 Large) were clamped to the center of two opposite sides of the wooden frame. The arms of the clips were swivelled upwards and a nylon cord was tied to the outer arm of each. The two cords were threaded through a screw eye in the beam above and from there, were extended to the adjacent beam, where they were secured to a cleat. When the chamber is not in use, the wooden frame is hoisted up to the cross beam with these nylon cords, and the polyethylene pyramid collapses to about 14 inches.



A square opening was cut near one of the corners of the pyramid and a plexiglas "memo cube" was taped to the polyethylene wall. When in use, this cube serves as a trap for excess condensation. The ultrasonic humidifier, supported by a low stool, is placed at this opening and an additional polyester film (Mylar) skirt joins the memo cube to the humidifier. Weights positioned at the sides of the chamber keep it from shifting while in use.

So far, I have used this collapsible chamber for general humidification of oversized objects. I would expect that flaps could be cut in the walls for access to an object during humidification (e.g. mending sprung tears) and that with modifications, it could be used in conjuction with the suction table. I welcome adaptations of it and suggestions for improvements.

DIAGRAM 2