

Can the labor intensive task of making cloth covered boxes be made inexpensive enough to serve the book and manuscript housing needs of libraries and archives? In order to answer yes to that question, the boxmaker must solve a number of problems at work in the economy of boxmaking. A basic antagonism is at work: boxes must be made by hand quickly and to high standards, but the task is terribly repetitive and physically taxing. In the economy of boxmaking, an equilibrium must be found where human workers can meet the demands of such an EEG-leveling, back-bending task, which itself must meet the standards and budgets of potential customers (including, especially, libraries, archives and private collectors), whose business must yield enough profit to cover overhead expenses and provide adequate paychecks for the boxmakers. When such a point is reached, there is no better way to make boxes -- any other way is wasteful to some degree. During my two years at the Jensen Bindery, the struggle to reach such a point of equilibrium was central concern of the company (I am confident that it is still). And this is where the air press fits in.

This is a brief paper, then, about Jensen Bindery's large format, semi-automatic press for making Library of Congress style" boxes quickly and humanely enough to sell them at competitive prices while paying (by Austin, Texas standards, at least) competitive wages. Air bag presses and even the idea for applying them to conservation purposes have been around a long time. The idea was brought to our attention through Bob Futernick, who suggested a press whose moving platen is raised and lowered by an inner tube. According to Futernick, the air press as it has been developed in his lab had its genesis in 1973, when Roy Perkinson and Ralph Bennett designed and built a small model using a foot pump and an inner tube.

The first permutation of the Jensen press, with its platen size of 35 1/2" by 53 3/4", its rectangular air mattress, separate intake and exhaust plumbing, and electric air compressor, was our adaptation of Futernick's model. With its countertop and its wheel mountings, it is also designed to be a portable work station. Our second generation press is composed of the same basic components, but they are more or less altered in response to our practical experience with the original machine, as I will discuss below.

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Made of wood, the press is strong yet relatively simple and inexpensive to build. Our total cost came to \$600 for the original press, with an additional \$400 in upgrading costs. The machine very quickly paid for itself. The press has several advantages. Because of the laws governing the expansion of gases like air, the bag provides uniform pressure over the entire platen. This is a relative advantage over screw type presses, which distribute pressure from the center point with an efficiency that diminishes toward the edges of the platen. Also, with its electric air compressor to bring air in, and with a plate metal weight atop the bag to let gravity assist in pushing air out quickly, the pressing cycle is speeded up and automated, so that more pressing can be done with little extra physical wear and tear on the boxmaker.

Both the top and bottom fixed platens are composed of "ribs," 2 by 8 "SPF" (spruce-pine-fir) beams held in place with 4" lag bolts between two pairs of legs on rollers and two plywood "flanks." The moving platen is independent, able to move in and out of the "mouth" of press on metal wheel rollers, and up and down with the inflation and deflation of the air bag. Shorter bolts sheared off in early use and had to be replaced by the larger ones. Reinforcing beams run perpendicular to the ribs at either end, which are designed to provide the fixed platens with stability against the shearing force of a routine press. Routine stress has in fact caused the beams ("ribs") to bow in the middle. Our modification (which has not been entirely successful) was to cover the top of the ribs with a composition board "skin." A better design for all three platens (two fixed and one moving) is the torsion box configuration.

This is the configuration that we used for the moving platen. The dimensional stability of the moving platen -- previously just a sheet of 3/4" particle board -- proved to be a crucial design problem. The particle board warped badly after months of use, making further pressing difficult and unreliable. The new torsion box moving platen is a more stable one. its internal latticework of "ribs" keeps the pressing surface rigid and true within the pressures involved in boxmaking. Austin woodworker, Steve Pinckney, constructed our torsion box platen.

Pinckney lap-joined poplar "ribs," to form the rigid latticework inside a medium density fiberboard "skin." The new platen, which is heavier than its predecessor, rolls in and out of the press on casters, which replaced the old wooden tracks of the previous model. The tracks are raised to allow enough room for the inflatable air mattress and a metal plate. This brings us to the inspiring business of how this monster breathes.

We began, and achieved perhaps greater reliability, with a generic rectangular car air mattress. It was inexpensive, was stocked in a local army surplus store, but was too large and had

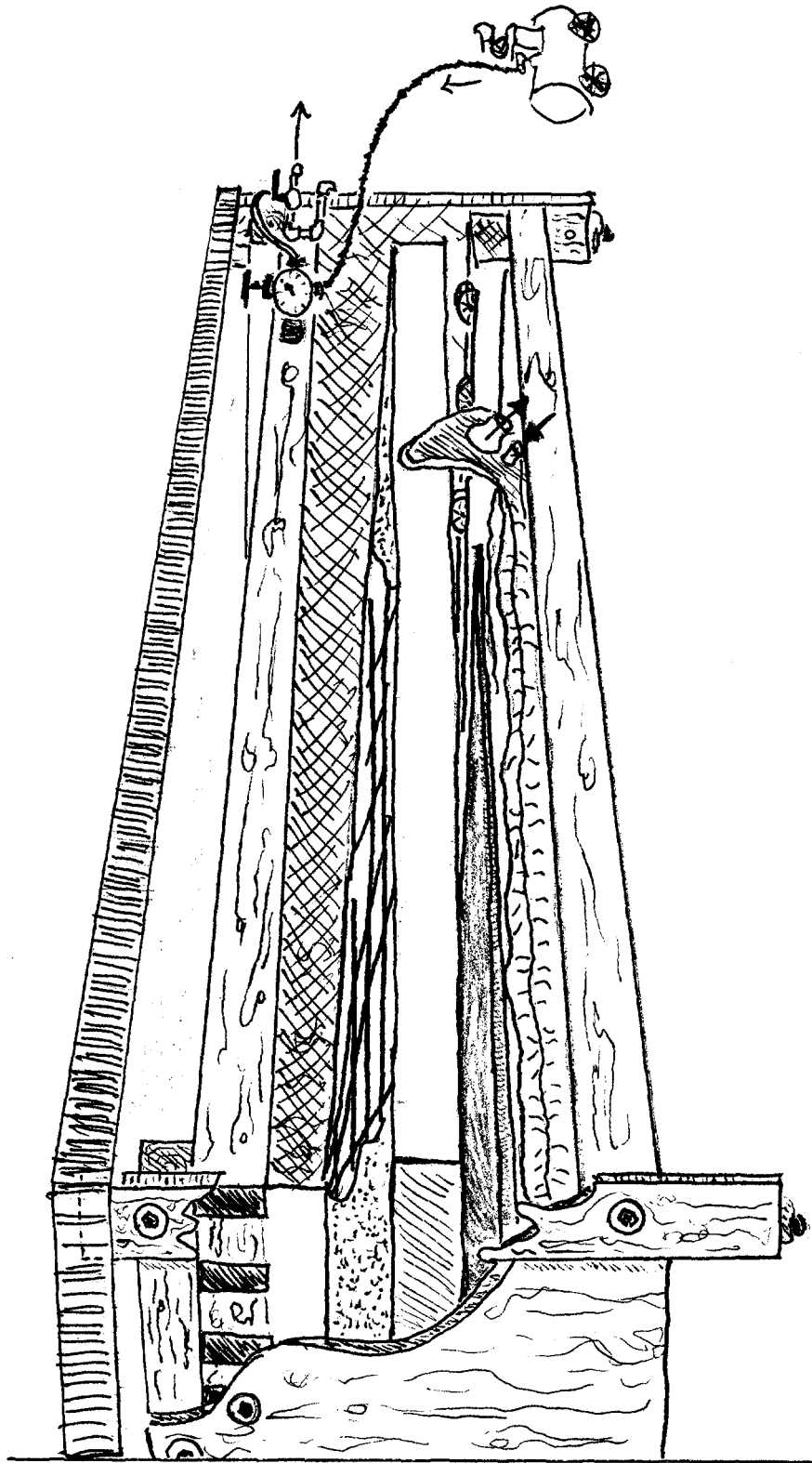
to be folded over on itself to fit the platen. This did not prove to be a significant liability, with only one seam rupture in two years of almost constant use. But it was inelegant, and our urge to reform compelled us to specially order a mattress that fit the platen exactly, that would be smaller and therefore take less time to fill and empty (though the bottom rather than the side of the press, as before). In either case -- big bag or small -- the bag lies flat across the surface of the lower fixed platen under a single 1/2" sheet of aluminum, itself slightly smaller than the dimensions of the platen surface and whose 60-70 pounds help exhaust the bag more quickly. Gary McLerran rigged the plumbing: separate plastic piping brings air in and out; a regulator monitors air pressure in (usually up to 8 psi), while a simple release valve lets the press hold its breath or blow air out.

The press in action, as I have hinted, is a portable workstation. As such it facilitates fast boxmaking not only mechanically but logistically as well, focussing the boxmaking activity on a central location where pressing and other tasks can be done in teams. At its fastest, this press-assisted teamwork has achieved a steady rate of 5-8 pressings per hour (with a variety of numbers of boxes per pressing), where in every pressing cycle, cases are assembled at the press, trays are glued and pressed to them and pressed boxes are lined. Trays are prepared elsewhere in the shop. At the press two people work in tandem, developing a certain "choreography" with repetitions of the cycle 5-8 times per hour, several hours per day, many days in a row -- something we've come to call the "stress dance" (better known as the Box Trot).

We have also replaced our wooden pressing blocks with ethafoam blocks, milled and laminated to different dimensions but always to 4" in height. The density of the ethafoam must be the same in all the blocks for successful pressing. These special ethafoam blocks solve a problem created by harder wooden blocks, which can leave an undesirable impression on the trays of the box (not to mention on the buyer!). The height of the blocks, together with the thickness (4 1/2") of the new platen raised on its rolling tracks, takes up all but 1/2" of space in the maw of the press. This is all that the bag must move through to accomplish a press. Moving the plate, platen, and boxes through such a relatively small distance speeds up the pressing cycle.

The air press brings us closer to the point where custom, cloth covered boxes can be made an affordable conservation alternative for libraries, archives, and other owners of homeless books, and where they are profitable to the boxmaker. Now, if only there were someone out there with a machine for covering the trays...

PNEUMATIC PRESS



JENSEN BINDERY