Hand Operated Tabletop Letterpress
Assembly Instructions 1.0

George Chiu
Brendan Domos
Spencer Herzog
Nathan Sandidge
Kevin Weinstein

RIT Kate Gleason College of Engineering
RIT Cary Graphic Arts Collection

Table of Contents

Introduction

In the past two decades I have seen letterpress printing make an epic comeback in the world of printmaking, graphic design, and fine arts printing. Desktop publishing didn't herald in the demise of letterpress as was expected. Rather, people began to use computers to design plates that could be mounted on and printed by analog presses. And all the vintage metal and wood type, that was so quickly dismissed in the '80s and '90s, once again became "cool" to print rock concert posters, wedding invitations, quirky packaging, and so much more.

The one hitch in this letterpress renaissance is that printers have to rely on 60-, 80-, or sometimes 150-year-old printing presses to do their contemporary work. Over the years the parts on these presses, even with careful maintenance, might break, wear out, and rust. (Now every good letterpress printer I ever met would never let a broken part stop her. Almost all of these mechanical pieces can be fixed, replaced, or re-machined.) But what if a modern press could be designed

to be made out of easily-sourced standard parts? And perhaps all the drawings could be freely offered so techies could build their own presses, and scale or modify them to suit their own purposes? And what if the material cost was relatively inexpensive, compared with the price tag of buying and restoring a vintage press? And what about improving weight and portability? These questions helped me form parameters for working with a group of engineering seniors at Rochester Institute of Technology (RIT) to design a 21st century press for letterpress printing.

At RIT, teams of Mechanical Engineering senior students are paired with external clients to work on real-world engineering design projects over the course of an academic year. This two-semester class gives the students experience with client relations, product design, object manufacturing, and potentially bringing their design work to market. In summer 2014, the RIT Cary Graphic Arts Collection, a rare book library, had been asked to be one such client. Outwardly, perhaps we would appear to be an odd choice to collaborate with a group of engineers, as our collections span thousands of volumes of books and hundreds of paper archives. But the Cary also maintains a unique technology collection of historic (heavy cast-iron) printing presses and all the accouterments used for letterpress printing. We also have a printer on staff, (me), and do many teaching demonstrations and print jobs throughout the year.

In Fall 2014, I met the team of 5 gents who was assigned to the project. They interviewed me several times to understand the scope. Early on, I decided that the new press should be a

platen model, so I also taught them the basics of letterpress printing using a table top lever-actuated Golding and a standing Daughaday platen press with a fly wheel and a foot treadle. I also loaned the team a 1950s-era Craftsmen table top press that was in disrepair, so they could take it apart and examine all the pieces. I did not steer them in any way to influence the press's design, but I did specify that the new machine had to meet the following criteria:

- be under 30 pounds
- fit in a 24-inch square table top space
- be manufactured with a majority of components which could be purchased from a standard parts supplier
- be able to print with commonly manufactured ink rollers, ink, letterpress chases, spacing, and furniture
- the platen and packing had to be adjustable to accommodate many thicknesses of substrates
- the press had to accommodate vintage metal and wood type, as well as modern relief and polymer plates
- the quailty of the prints had to match excellent printing that could be obtained with vintage platen presses

Over 30 weeks the team designed, manufactured, and tested the press. I was consulted occasionally to evaluate its functionality and supply printing forms. Not only did the students meet and sometimes exceed my expectations, but happily, the press prints!

The new press's ultimate design is reminiscent of an Adana Hortizontal Quarto Platen Press that was manufactured during the post-World War II era. It is much lighter though, as most of it is constructed from aluminum. The assembly

takes a simple, IKEA-like approach—it is easy to put together with only a few hex-wrenches. The team met my budget of $700 to purchase parts from McMaster-Carr and also pay for limited machining time in the shop. The press has adjustable components as specified, weighs about 25 pounds, and fits in a 24 x 18 inch space. We tested printing with metal, wood type, and magnesium photoengraved plates. The press also withstood a rigorous testing at the Imagine RIT festival where hundreds of amateur printers young and old put the machine through its paces with various applications of force and skill. It survived!

Of course, even looking back at its short life, I think the press might need a few improvements that could be solved with continued testing. First, use of the press assumes that the operator will supply his/her own ink rollers, trucks, and a chase. The two rollers we used have 11.75 inch-long cores, and the actual rubber component measures 8.75 inches long by .75 inches in diameter. The chase is 6 x 9 inches. In this iteration of the design, the roller trucks do not meet the bearers or rails near the form. Perhaps the bearers should be built up so they meet. That could be easy enough with tape or leads. Finally, the actual printing impression on the form might be able to be gradually intensified with an addition of some kind of lever that magnifies the force. I look forward to hearing about any future modifications by other users, as the press's design is completely extensible, and the Creative Commons license to its plans is conducive to creative alteration.

I fully realize that this project may serve just a small niche of the printing public, and the press may not be as robust as the tried and true professional models. However, maybe this press could make letterpress printing more accessible to arts programs in schools and to home hobbyists—that would make it a resounding success in my book! For my part, I already am a better printer as a result of my affiliation with the project. I have had a lot of experience with printing over the years, but this is first time I was involved with designing a press in all stages of development. I have enjoyed witnessing this creative process and getting a glimpse into the minds of my new friends, now graduates of the RIT Kate Gleason College of Engineering: George, Nathan, Kevin, Brendan, and Spencer. Well done, guys!

Amelia Hugill-Fontanel
Associate Curator
RIT Cary Graphic Arts Collection

Frame Assembly

Frame Assembly

Lay out two nylon washers, two t-nuts,
one short 80/20 bar, six ½ inch bolts,
and two end caps.

Frame Assembly

Gather one of the end caps, one bolt, one nylon washer, and one t-nut.

Place the bolt through one of the holes in the end cap as shown, making sure to have the nylon washer on the side opposite the t-nut.
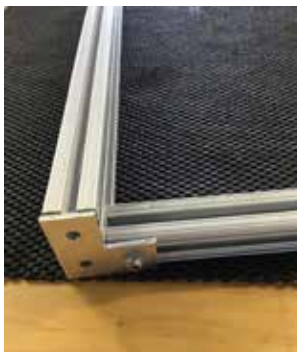
Slide the end cap with the t-nut into the short 80/20 bar. Repeat this process with the other end cap, bolt, nylon washer, and t-nut.
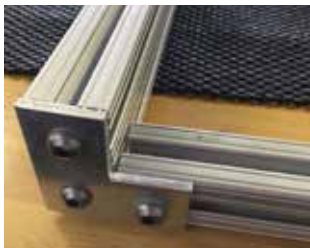
Frame Assembly

Take out the two long 80/20 bars and four ½ inch bolts.
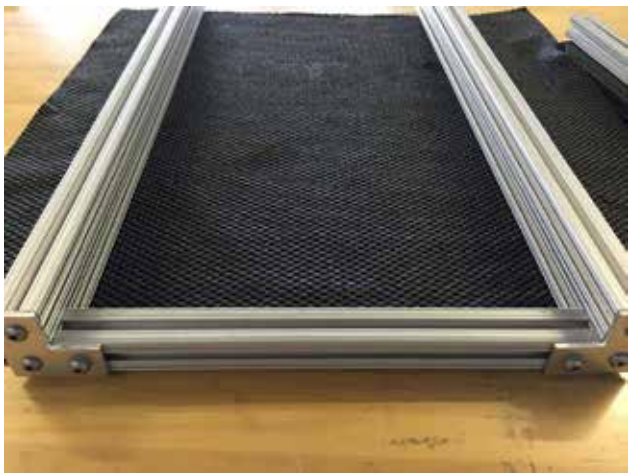

Place the short 80/20 bar up against one of the long 80/20 bars.

Place two ½ inch bolts into the holes, then tighten all three bolts down. Afterwards, repeat this step for the other long 80/20 bar.

Frame Assembly

Repeat the prior steps to make the second end bar, **but do not mount it yet**. You will need one side of the frame open for the next steps.

Platen Bracket Assembly

Platen Bracket Assembly

Lay out the pivot bar and the hinge system. Remove the hinges themselves from the anchors.

Platen Bracket Assembly

Attach the hinges to the pivot bar, using two ½ inch bolts on each side. Tighten the bolts down with an allen wrench.

Repeat this step on the other side of the bar to create a symmetrical unit.

Hand Operated Tabletop Letterpress
Assembly Instructions

Platen Bracket Assembly

Attach the hinges to the anchors using the supplied loctite bolts. Be careful not to overtighten the system, as it must be able to turn.

After screwing in the bolts, let the system sit for a few hours to ensure that the loctite is set. Place the nylon washers as shown.

Platen Bracket Assembly

Slide the anchors on the top rail of the frame, adjusting them until they are two inches away from the end. Tighten down the top of the anchor. The second allen wrench (metric 4.5) must be used for this, as it is a different size than the other bolts.

Locate the Platen Bracket and lay it out in the orientation shown.

Hand Operated Tabletop Letterpress
Assembly Instructions   21

Platen Bracket Assembly

Attach the handle as shown, using two ¾ inch bolts.

Lay out one roller arm bar, one platen arm mounting piece, six nylon washers, one ¾ inch bolt, and one 1 inch bolt.

Hand Operated Tabletop Letterpress
Assembly Instructions

Platen Bracket Assembly

Fit the ¾ inch bolt into the roller arm bar, making sure to place the nylon washers as shown.

Screw the 1 inch bolt into the top of the roller arm bar, making sure to place the two nylon washers as shown.

Repeat this process to create a second roller arm bar system.

Platen Bracket Assembly

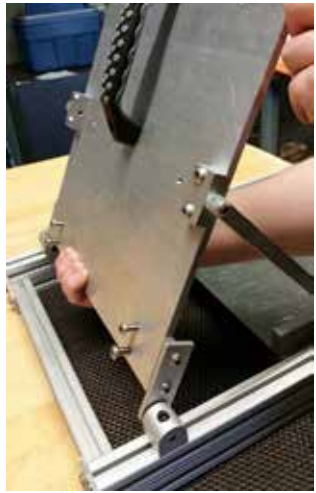Lay out the two roller arm bar systems along with four ¾ inch bolts.

Tighten down the four bolts to mount both roller arm bar systems to the platen bracket.

Platen Bracket Assembly

Slide the platen bracket into the platen bracket hinge bar. It will be easier to get the platen bracket in place by holding it from below.

Place all four of the ¾ inch bolts into the platen bracket, as shown. Tighten down all four of the bolts to ensure that the platen bracket is securely fastened.

Platen Bracket Assembly

Assemble two roller stops, using one ½ inch bolt, four nylon washers & one t-nut for each stop.

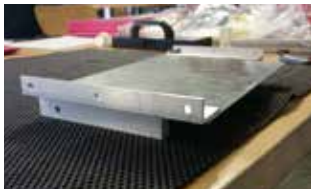Slide one roller stop into the top of the long 80/20 rail. **Do not tighten this stop yet.**

Repeat this process for the other long 80/20 rail.

Chase Bed Assembly

Chase Bed Assembly

Lay out the chase bed, chase registration, and chase bracket along with six t-nuts, ten ½ inch bolts and six nylon washers. You will also need the 5/32 Allen wrench.

Place the chase registration on the table with the side hole away from you. Set the chase bed on top, with the centered bolt hole towards you. Make sure to line up the holes between the two.
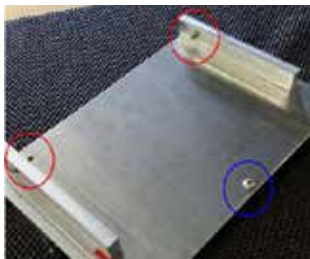

Set the two chase brackets on top of the registration. Make sure to line up the holes. Insert bolts into the two holes on the side, then repeat for the other side.
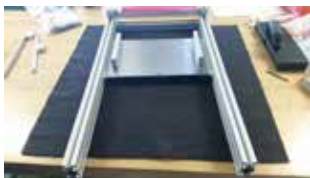
Chase Bed Assembly

Fit a nylon washer onto all six bolts, then set the bolts into the side holes of the chase bracket. Screw a t-nut on each of the bolts, but do not tighten them.

Slide two ¾ inch bolts into the holes in the registration to act as stops for the chase, indicated here by the red circles. Only add the ¾ inch bolt circled in blue after the chase is inserted. This acts as a final stop to prevent the chase from moving during system actuation.

Slide the chase into the frame with the two bolts in the registration away from you. Secure by tightening down the t-nuts. Do not worry about the location of the chase bed, it will be adjusted at a later step.

Roller System Assembly

Roller System Assembly

Take out the two linear sliders, four nylon spacers, and the two rollers.

Place one end of a roller, with one of the nylon spacers, into one of the two larger holes in the linear slider.

Place the second roller into the linear slider in the same manner.

Repeat this step for the other linear slider. Make sure that both roll without much resistance. Check that there is nothing preventing movement in the holes, and that the nylon spacers are not oversized.
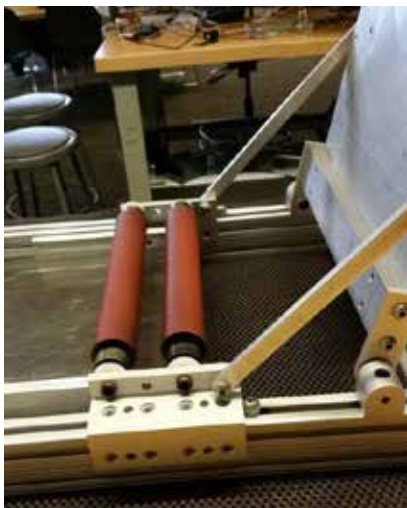
Roller System Assembly

Slide the roller assembly onto the two long 80/20 bars. Do this slowly to ensure that both linear sliders are able to glide freely on the rails without getting stuck.

Attach the roller arm bar to the linear slider as shown. Make sure to place one nylon washer on either side of the linear slider, and then add two nuts. Tighten down the nuts into each other to ensure the bolt does not loosen up with continued usage of the system.

Hand Operated Tabletop Letterpress
Assembly Instructions

Roller System Assembly

Make sure both of the roller stops
are untightened, then use the handle
to tilt the platen bracket backwards.
Once the roller stops are in the desired
position, tighten them down.

Chase Bed Calibration

Chase Bed Calibration

Take the chase guides off of the chase bed, then take the chase bed plate off of the chase brackets. Add as many shims or washers as desired around each of the bolts on the chase bracket. Use the roller height to determine if the chase bed is at the correct height.

Once the desired number of shims are inserted, screw the chase registration back onto the chase bed. The chase bed can then be moved to the desired location, so that there are roughly 8 inches from the back of the bed to the back of the short 80/20 bar. Then, tighten it down to ensure it does not move.

Ink Tray Assembly

Ink Tray Assembly

Take the two L-brackets, four ½ inch bolts, four t-nuts, and four nylon washers, and assemble them as shown. Do not tighten the t-nuts, as they need to be somewhat loose for a later step.

Place the ink tray plate on top of the two brackets as shown. Take four ½ inch bolts and thread them through both of the brackets and the plate. Lightly secure them with four nuts.

Insert one of the ½ inch bolts into the top of the smaller threaded aluminum piece. This will serve as a stand for the spring in the ink rotation system.

Ink Tray Assembly

JB Weld all of the aluminum pieces except the piece circled in red, as it must be bolted in from the bottom.

Place a retaining clip onto the "birdie" or pawl of the ink tray rotation system.

Place down the "birdie" system onto the resting pin, as shown.

Attach the tension spring between a ¾ inch bolt in the "birdie" bar (circled in red) and the spring stop. Slide the ink tray plate into the two long 80/20 bars, but do not tighten down the four L bracket bolts.

Ink Tray Assembly

Set the ink tray into the ink tray holder on the ink tray plate. When positioning it, make sure to tilt the "birdie" towards you to ensure that the ink tray has the proper rotating motion.

Move the ink tray plate so that, when fully extended, the rollers go slightly further than the halfway point of the ink tray. Tighten down the four L-bracket bolts to secure the ink tray system in place.

Platen Assembly

Platen Assembly

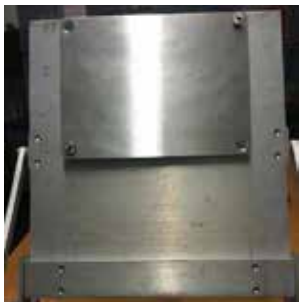Lay out the Platen, one ½ inch bolt, and four ¾ inch flathead bolts.

Start by hand tightening the ½ inch bolt into the back of the platen bracket.

Use the 5/32 allen wrench to finish tightening the bolt.

Platen Assembly

Insert two flathead bolts into the platen, and lightly tighten. After they have been secured, add and tighten the remaining two flathead bolts. These four bolts, plus the one bolt in the back of the platen, are used to adjust the angle of the platen to produce an even print.

Adjust the locations of the chase bed and ink tray rotation system so that the chase bed aligns with the platen, and both ink rollers pass the halfway point of the ink tray.

Platen Assembly

Gather the two tympan bales and the four tympan pins.

Place both tympan bales onto platen, and secure them with the tympan pins.

Final Frame Assembly

Final Frame Assembly

Place one spring and one plastic spacer into the top rail of one side of the long 80/20. Repeat this step for the other long 80/20 bar.

Note: If you are having difficulties getting the short 80/20 bar to fit between the long 80/20 bars, try loosening the ink tray plate. Be sure to tighten down the plate again if this technique is used.

Platen Registration Assembly

Platen Registration Assembly

Take out the registration assistance pieces. The wider L-bracket type piece will go on the top of the platen, whereas the thinner pieces (finger and bale spacer) will be placed between the bottom of the platen and the bottom tympan bale.

Close the bottom tympan bale over the finger and bale spacer. If it is difficult to close the tympan bale, try moving the finger and bale spacer, as some areas may be too tight to fit them into.
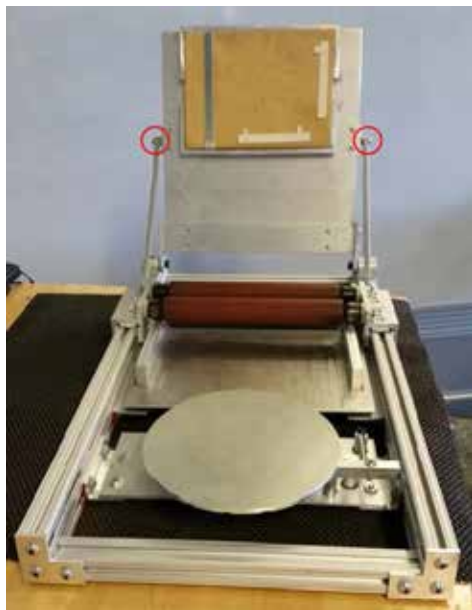
Platen Registration Assembly

Close the top tympan bale over the wider L-bracket piece. Make sure the back part of this piece goes behind the platen, not in front of it.

Note the position of the registration assistance pieces. The wider L-bracket is circled in red, and the bale spacer is circled in blue.

Final Assembly

Final Completed System

Note: The bolts circled in red may need to be loctited if you find that they are loosening with continued use of the system. Blue (removable) loctite is advised, as any errors made will be fixable without remaking parts.