# Maker Studio

## Letterpress User Manual

Printing is something you do, not something you read about. But before you get started, it is important to have some context for the materials and tools you are working with. What material you choose to print with and how you manage the press is a learning process; all presses have a personality, and all paper and inks have different *feels* to them. It's something you experience with your senses. This will give you vocabulary to talk about the process, and **you are considered certified on the press after you've worked through this material and have done a practical training.**

## A Brief History of Letterpress

Letterpress refers to a kind of *relief* printing, which means that an impression is made on a raised surface that has pigment applied to it. This form of printing was popularized in the West around the 1400s because of Gutenberg's use of movable type--metal or wooden type that was arranged, printed, and then redistributed to be reused (see top right). As Elizabeth Eisenstein argued in *The Printing Press as Agent of Change* (1979), print dramatically changed the dissemination of knowledge in Europe.

China, Japan, and Korea primarily used another kind of relief printing, woodblock printing, instead of movable type because there are more characters in these languages. They also had printing technology much earlier than Europe. Mokuhanga (woodblock printing) was created by carving a block of wood, image and text together (see right). No press was used, but the block was inked and then the printing surface was applied with a baren to transfer the image.

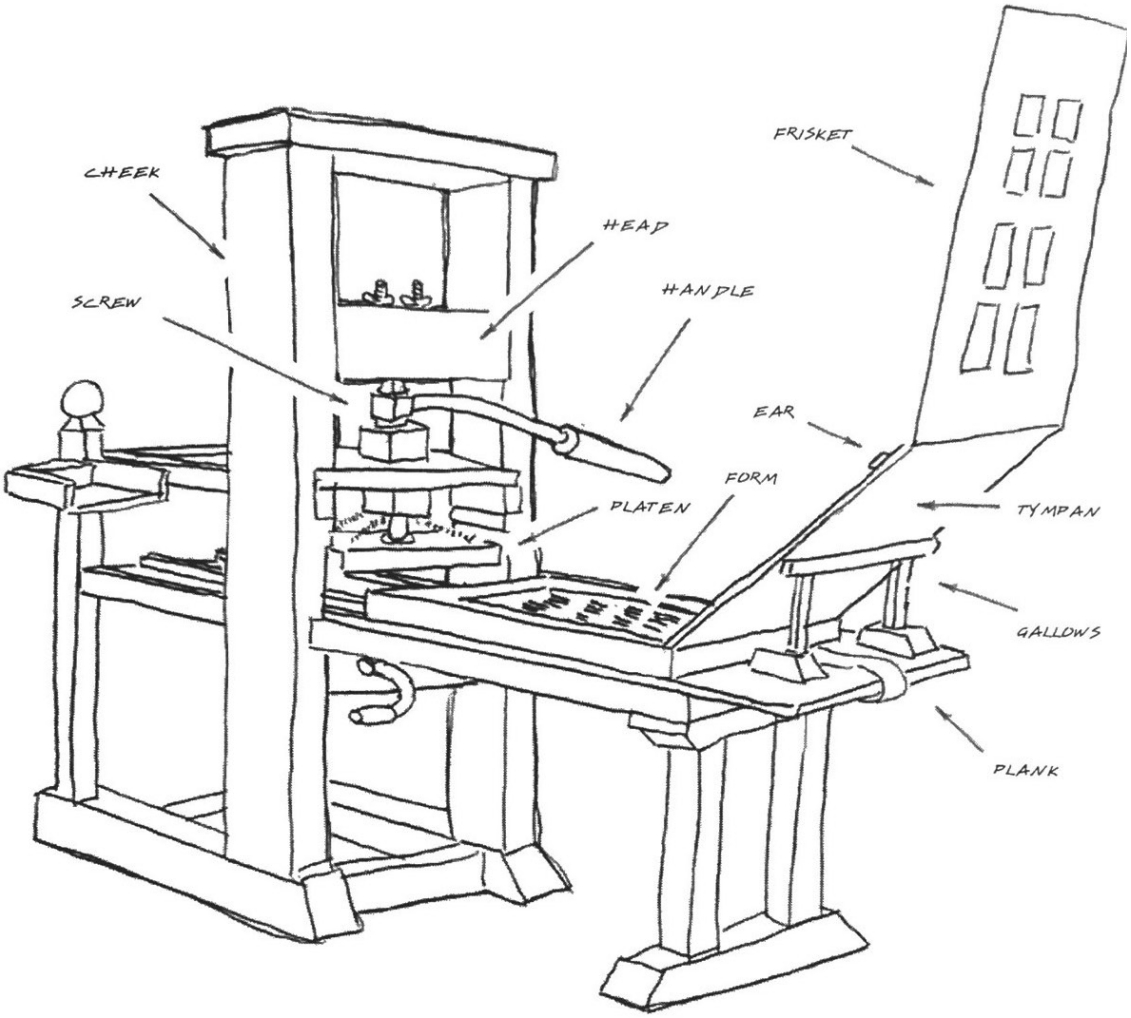
We will be printing in the Western style with movable type and using a press to transfer the pigment to the printing surface. To create our raised surface, we will be primarily be using metal and wooden type and ornaments, woodblocks or linoleum blocks, and polymer plates. Linoleum blocks and polymer plates are newer techniques that still use the same technology of relief printing.

These documents will focus on how to compose a textblock, do a lockup, prepare the press for printing, make an impression, and clean up and redistribute your type.

*Written by Kate Ozment | Updated October 2022*

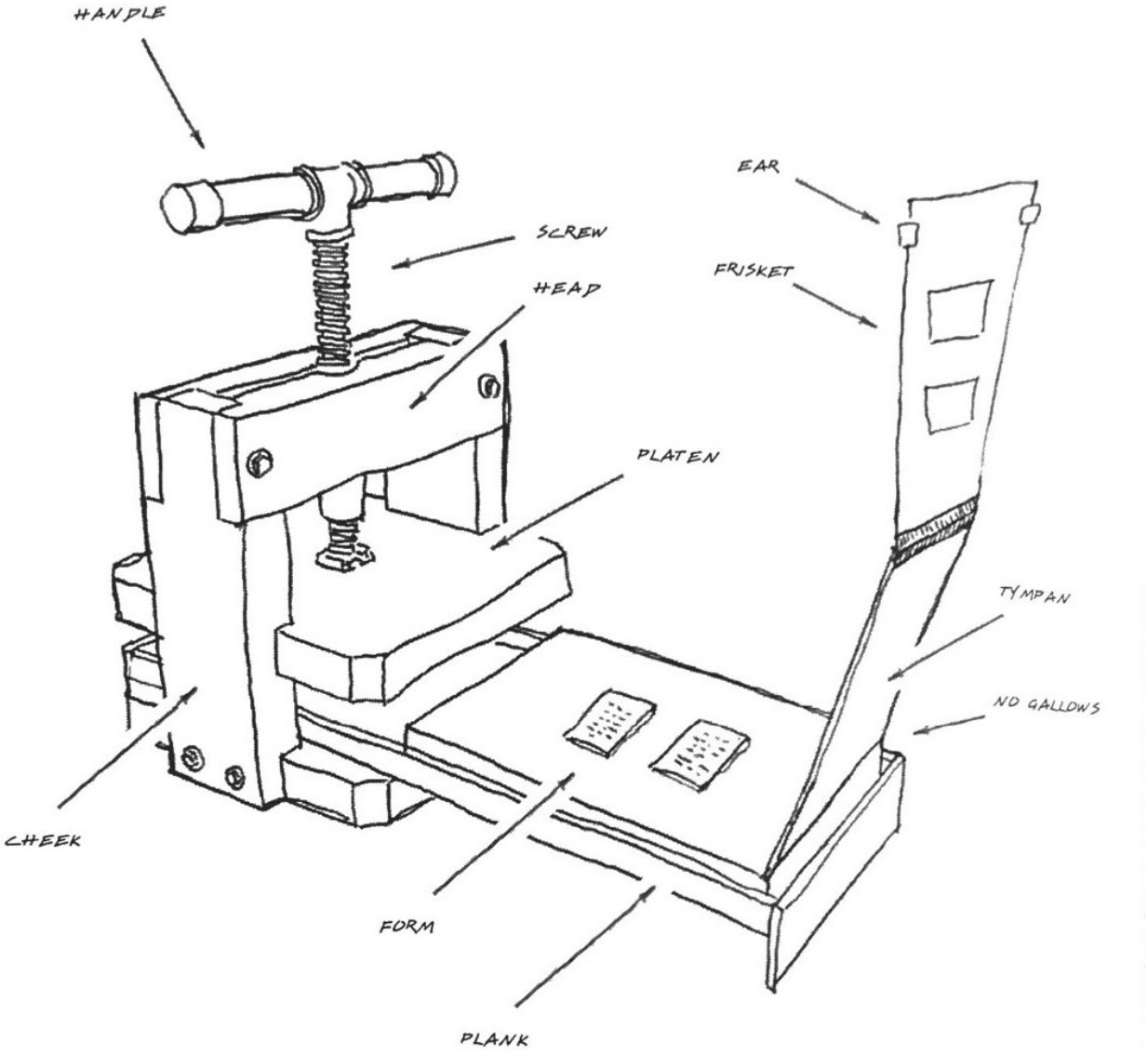
## The Press

We are using a bookbeetle press, a tabletop letterpress developed by Josef Beery in 2016 for small spaces like the Maker Studio. It uses a screw, similarly to the design that Gutenberg used, to apply pressure and transfer the pigment to the printing surface. The common press, pictured below, was used from the 15th century through the Industrial Revolution when it was replaced with iron presses. It was also called a Franklin press, a two-pull press, and a platen press. Here are useful diagrams pulled from Beery's zine on the bookbeetle. Study the terminology on the bookbeetle carefully.




THE FRANKLIN WOODEN COMMON PRESS

Circa 1750

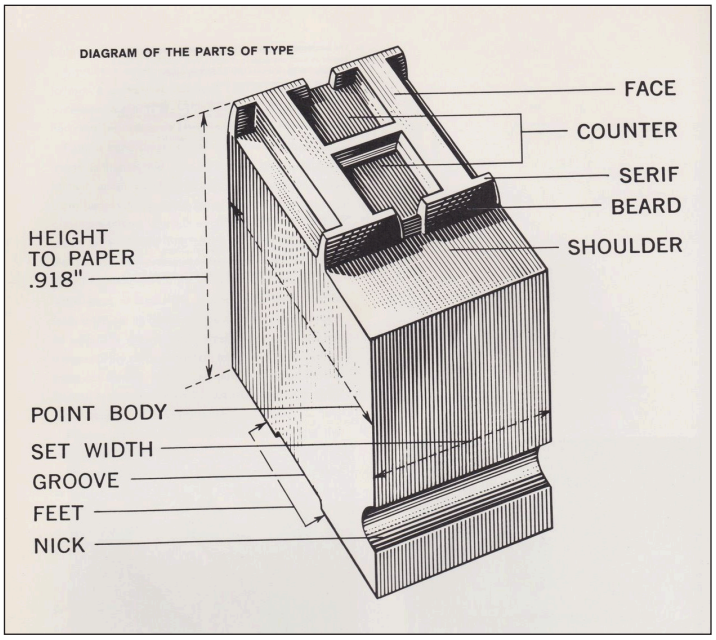



# THE BOOKBEETLE
# DESKTOP SCREW PRESS

Circa 2016

## Metal Type and Composition

The first presses used metal type cast from an alloy of lead, tin, and antimony. The face of the type is the part that is printed; thus we get the word *typeface*. Typefaces were carved by artisans, with German, French, and Dutch designers being particularly popular (ever heard of Garamond?). Designers would have the master versions, called matrices, from which as much type could be forged as necessary. When individual pieces of type broke or the face was damaged, it was thrown into a bucket and melted down to be recast as new type. Wood type is also common for large sizes, since metal is very heavy and expensive. Wood has a different impression than metal (many modern letterpress printers quite like it) and it is easier for it to be damaged.




When you organize metal type for printing, you are *composing* the type, and you use a composing stick to keep everything in order. Reference the diagram to the right. When you compose type, it can be confusing because it is mirrored from how you normally read it. Use the *nick* to know which way is up. You use pieces of metal to separate the lines of type and provide spacing so it is readable. These are called *leads* or *slugs*. How type fits together also depends on if it is a serif (has little feet on the stems) or a sans-serif (no little feet). The serifs can bump up against each other and break, so a lot of typefaces come with *ligatures* which are two letters together on a single piece of type.

Use this as a reference guide for type:

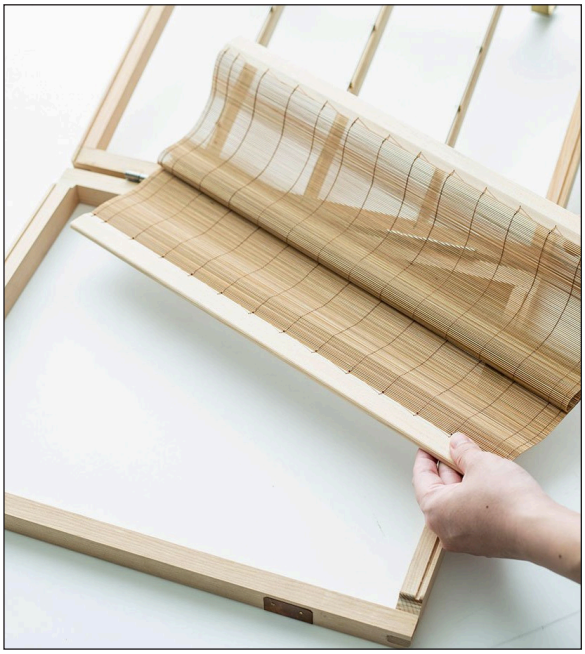
- **Composing stick** – an adjustable metal stick where you put piece of metal type to compose your text to be printed
- **Job Case** – this is the general term for these drawers of type and they can be organized in different ways. The California job case layout combines uppercase and lowercase letters, but originally there were separate cases for each, with majuscules in the case set above the minuscules. Thus, we get the terms "upper case "and "lower case."
- **Leading and spacing** – the pieces of metal you put between lines of type; sometimes we colloquially call 6 pt. piece of lead a "slug"
- **Ligature** – a character consisting of two or more letters, such as æ
- **Line gauge** – a rule with pica measurements that lets you measure type and positioning of material on the press
- **Pica** – the form of measurement we use in printing and page design; 12 points makes up a pica, which is why 12 point fonts are the standard font size
- **Pied type** – when you knock your type over and make a mess of it, it's called pie. Pie happens.
- **Printers' devils** – four tricky letters that can easily be mistaken for each other: d, b, p, and q
- **Sort** – an individual piece of type; if you run out of type, you are "out of sorts"

## Printing Surfaces: Paper and Parchment

The earliest printing surfaces were clay and stone, but the first ones used with movable type and a press were parchment and paper. *Parchment* is made from animal skins, most commonly cow, deer, sheep, and goat. A general rule is you read what you eat, so if goats are the most common source of meat in an area, odds are the books are made from goat parchment. A special and expensive kind of parchment is called *vellum*, which is made from calfskin. After the introduction of paper, parchment was still used for expensive editions and books that people thought were very important, as it was believed parchment lasted longer than paper. Gutenberg printed his Bible on both vellum and paper, and the British Library estimates each copy of the vellum Bible would have taken 170 calfskins. See a picture of medieval parchment preparation to the right.

Paper was introduced around the 11th century and became more widely used around the 13th century. Western paper was usually made from linen and cloth; in East Asia, they used mulberry and other plant matter. Rag pickers would wander the streets and take people's old clothes to be beaten for paper, which means that paper made before the 19th century is much stronger and less likely to degrade than paper made after. The introduction of wood pulp and other chemicals made paper acidic, and 19th century novels have yellowed and degraded at a much faster rate than 14th century books.

While most modern paper is machined, people still make paper in both the Western and Eastern styles. The images to the right show paper moulds, which are put into a vat of *stuff* that is suspended in water. The moulds are shook, carefully, collecting a thin layer of stuff that dries into paper. We have both kinds of paper in the Maker Studio. Here is useful vocabulary on papermaking:



- **Mould + deckle** – screen and form that allow paper to be made in the Western style
- **Parchment** – surface made from prepared animal skins used for printing and manuscript
- **Stuff** – fibers suspended in a liquid to make paper
- **Su + geta** – screen and bamboo sheet that allow paper to be made in the Japanese style
- **Vellum** – parchment made from calfskin
- **Washi** – Japanese-style paper that is made from plant matter such as kōzo (mulberry) or gampi


## Pigments: Ink

Letterpress ink is pigment suspended in a solution that allows it to be evenly applied to type and then transfer to paper. Western letterpress ink is tacky because it allows for a good *impression*, what we call the transfer of ink from the press to your printing surface. It used to be applied with tools like *ink balls*, but most modern letterpress printers use a *brayer*. Ink is stored in cans and then worked on an *inking stone* with a *pallet knife* until it is transferred to the press with the brayer. Some presses like a Vandercook proofing press have *rollers* that allow you to ink the press without an additional tool like a brayer. Other kinds of ink include those thickened with glue like *gauche* or suspended in water, popular in Japanese printing.

Ink used for contemporary letterpress is usually oil-based or rubber-based. We have oil-based ink in the Maker Studio. Both work on most presses, but printers have preferences based on things like how the ink transfers to different surfaces, how easy it is to clean up and store, pigment availability, price, and how quickly it dries. Here is useful vocabulary on inking:

- **Brayer** – a rubber roller used to apply ink to the type and printing objects, a modern adaptation of older practices
- **Gouache** – pigment suspended in water thickened with glue
- **Impression** – the printed copies we made from the press; every impression from the same setup for type, blocks, etc. comprises an edition
- **Ink Balls** – wooden sticks with teased wool covered in leather or another smooth surface that is nailed together and used as a surface to work ink and transfer it to the type; this process is called "knocking up the balls"
- **Inking stone** – the surface where ink is mixed and worked until it is ready to be transferred to the press; this can be any smooth surface including a piece of polished granite or a piece of acrylic
- **Iron-Gall Ink** – ink popular in the medieval period of Europe that was composed of gallnuts, iron, and gum arabic
- **Pallet knife** – a flat knife used to work the ink into a smooth surface that can be applied evenly to the press
- **Pigment** – color added to oils or other materials to make ink; certain colors such as blue or shades of indigo were the hardest to make and therefore more expensive
- **Rollers** – rubber cylinders on presses like a C&P or Vandercook that ink the bed of the press
- **Varnish** – made from processing linseed or walnut oil

## Letterpress Work Flow

This is the basic work flow of a letterpress project.

1. **Review safety guidelines.** Make sure you're familiar with how to protect but yourself and the material before you get started. Doing an inventory of the material and make sure you have everything you need to proceed safely.

2. **Choose your text and decide the size of your project.** This includes how many pages you want to print, how much text on each page, what you want it to look like, etc. Calibrate your project to how much time you want to spend on it. Printing a single page of text, from start to finish, will easily take more than five hours of work.

3. **Compose your page.** Using metal type or any other objects or ornaments, compose the page. Use a composing stick for metal type and the galley to move things around while you are in the drafting process. Wood type can be simply placed on the bed of the press.

4. **Lockup the press.** Using leads and slugs, furniture, and quoins, secure the form on the bed of the press. Plane the text to make sure it is all sitting flat.

5. **Prepare the tympan and the frisket**. Make a frisket out of the correct paper and connect it to the tympan with tape (see the Book Beetle guide). Cut holes in the frisket to fit your project.

6. **Prepare the ink.** Make sure you have an apron on at this point. Using a pallet knife, mix a small amount of ink on the acrylic inking "stone." Use the knife to work the ink into good texture. You need less ink than you think and can always add more, so be conservative.

7. **Prepare the paper**. If necessary, cut the paper to the appropriate size for your project. Pay attention to chain lines or the grain of the paper, if it is finer quality.

8. **Complete the make-ready**. Start calibrating your impressions. You are looking for the quality of the impression--is it dark enough? Centered on the page? Adjust the packing and furniture as necessary. You are proofing the text--is this accurate? Use tweezers to make corrections. Use cheap printer paper for make-ready and high-quality paper only when you are ready to do your final impressions.

9. **Begin printing.** Ink the textblock with the brayer and hang the paper on the tympan. Slide the form under the platen, use the screw to make the impression, and then slide he form back out. Remove the paper and set aside to dry. Re-ink the text block, rehang the paper, and continue.

10. **Clean the press**. It is the easiest to clean your textblock while it is still locked up. Put on safety gloves, mask, and eye protection and check the area to make sure it is safe to use the California wash. Put a small amount of cleaning supplies on shop rags and clean the type and furniture thoroughly. Make sure you also clean the inking stone and the brayer and leave them to air dry. Then use fresh rags to dry the type. Store used rags in the orange bucket for later cleaning.

11. **Unlock the press**. Release the quoins. Put all materials away. Carefully redistribute the type! Messed up typecases cause huge problems. Mind your Ps and Qs. Put all of the other materials back where you found them in a careful and logical way.

12. **Wash your hands thoroughly**. After taking off your gloves, eye wear, and smock, take the Gojo pumice soap to the bathroom and thoroughly wash your hands, going up to the elbow and getting all the ink out from your fingernails.

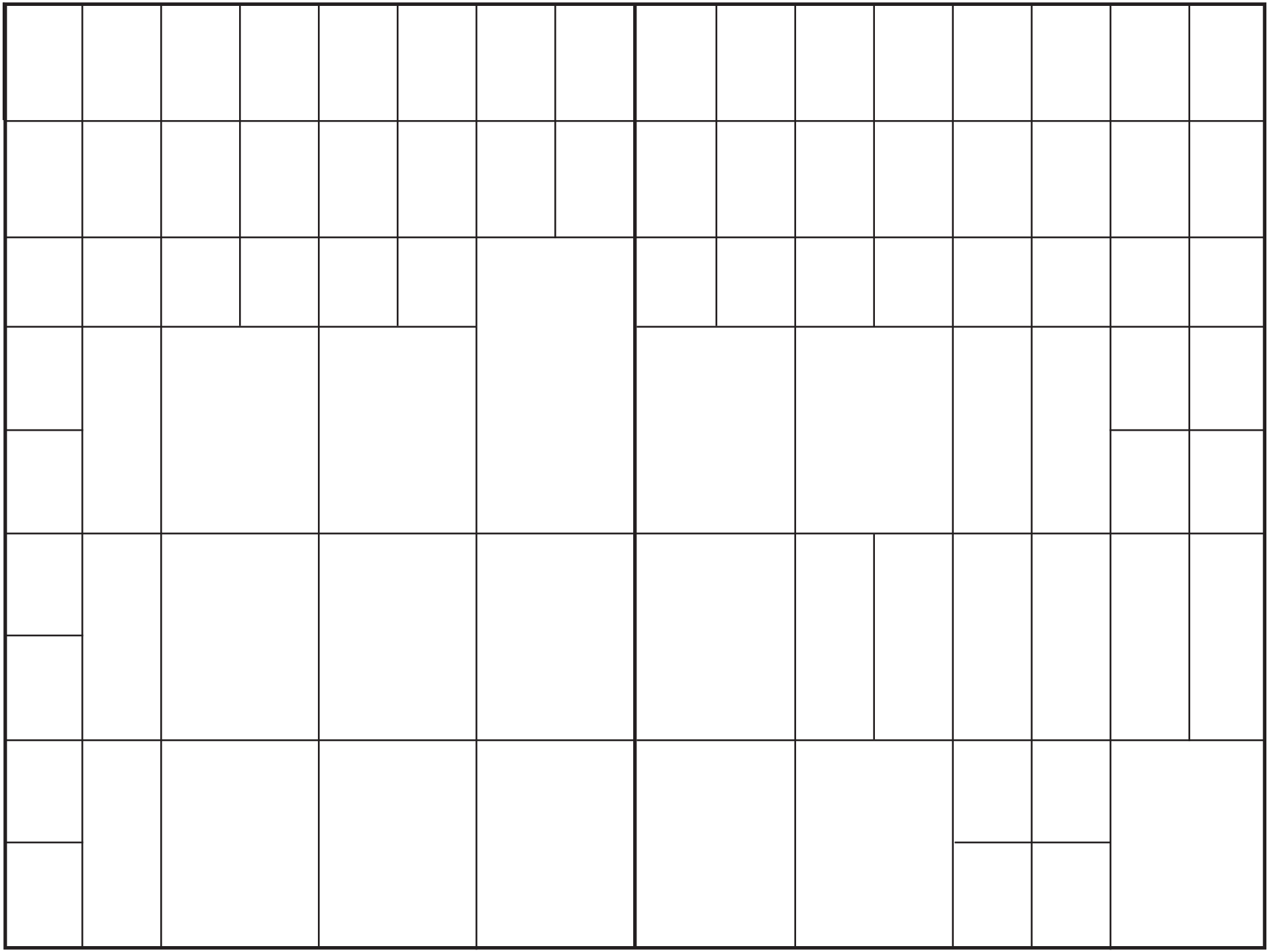
## Safety Concerns

There are several important hazards to keep in mind while you operate the bookbeetle press. In addition to these, you need to follow all guidlines laid out in the SIIL Maker Studio safety training you completed on Canvas, and you should follow all guidance from the Maker Studio staff and ambassadors.

- **Mess hazard** – using the letterpress can be messy, including getting ink on your skin and clothes. Be sure you are wearing an apron or smock, and it is recommended you wear a shirt and pants that you are okay getting dirty. Having your hair pulled back helps with the need to touch your face.
- **Crush hazard** – wear close-toed shoes in case you drop any of the letterpress equipment. Keep your hands clear of the platen when you are making an impression. If you use objects like the rubber mallet or arrange pieces during lockup, be sure that you do not hit your fingers and are not trying to lock the press up so tight you cause it to buckle.
- **Toxicity hazard** – several aspects of letterpress printing are hazardous if ingested, specifically the lead in the type, the chemicals in the typewash, and the chemicals in the ink. Always wash your hands thoroughly with soap when you are done handling the type and press; it is recommended you use our Gojo pumice soap. You should use gloves and protective eye wear when handling the typewash and rags and put all dirty rags into the appropriate bucket to be washed. Similarly to materials like rubber cement, typewash and ink can be hazardous if ingested or if fumes are inhaled. Use only as much as you need and avoid deliberately inhaling the fumes.
- **Fire hazard** – the chemicals in the typewash are flammable. Follow safety procedures on the package, including keeping it away from live sparks and open flames.
- **Cut hazard** – using cutting tools like the lead cutter, scissors, the paper cutter, or the x-acto knife can result in injury if not handled according to design. Be careful to keep your fingers and other body parts away from the blades of the scissors, lead cutter, and paper cutter as you operate them. Do not run with sharp objects, and when you pass them to another person do so with care not to offer them the blade. For the x-acto knife, always cut on a safe surface like the cutting mats and do not put your hands or other body parts within the path of the knife.

## If Injured

Immediately remove yourself from the area and attend to the injury. Use the first-aid equipment, and if necessary contact the Maker Studio or library staff for more assistance. Do not return to the letterpress area and resume work without thoroughly cleaning and bandaging the wound and checking the area and equipment. Everything should be cleaned before work continues.



The layout of our California job cases of metal type.

## Appendix A: Vocabulary

- Brayer – a rubber roller used to apply ink to the type and printing objects
- California Job Case – where we organize pieces of type, sorted by alphabet; you will notice that the most common letters have the largest boxes and common combinations like i and s are next to each other
  - Job Case – this is the general term for these drawers of type and they can be organized in different ways. The California job case layout combines uppercase and lowercase letters, but originally there were separate cases for each, with majuscules in the case set above the minuscules. Thus, we get the terms "upper case "and "lower case."
- Composing stick – an adjustable metal stick where you put piece of metal type to compose your text to be printed
- Furniture – metal or wooden pieces that surround your type and help create a lockup that keeps everything in place while printing
- Galley - a metal drawer where you put composed type as a holding place or to transfer to the press
- **Gouache** – pigment suspended in water thickened with glue
- Impression – the printed copies we made from the press; every impression from the same setup for type, blocks, etc. comprises an edition
- **Ink Balls** – wooden sticks with teased wool covered in leather or another smooth surface that is nailed together and used as a surface to work ink and transfer it to the type; this process is called "knocking up the balls"
- **Inking stone** – the surface where ink is mixed and worked until it is ready to be transferred to the press; this can be any smooth surface including a piece of polished granite or a piece of acrylic
- **Iron-Gall Ink** – ink popular in the medieval period of Europe that was composed of gallnuts, iron, and gum arabic
- Leading and spacing – the pieces of metal you put between lines of type; sometimes we colloquially call 6 pt. piece of lead a "slug"
- Line gauge – a rule with pica measurements that lets you measure type and positioning of material on the press
- Lockup – putting all of your printing elements, furniture, and quoins into place in the bed of the press to keep it tight and ready for printing
- Make-ready – the process of preparing for a good impression by testing the setup, amount of packing material, lockup tightness, and positioning of the materials on the press
- **Mould + deckle** – screen and form that allow paper to be made in the Western style
- Nick – the line on pieces of metal type that shows which way is up when you are composing
- Packing – material used for make-ready to ensure a good impression
- **Pallet knife** – a flat knife used to work the ink into a smooth surface that can be applied evenly to the press
- Pica – the form of measurement we use in printing and page design; 12 points makes up a pica, which is why 12 point fonts are the standard font size
- Pied type – when you knock your type over and make a mess of it, it's called pie. Pie happens.
- **Pigment** – color added to oils or other materials to make ink; certain colors such as blue or shades of indigo were the hardest to make and therefore more expensive **Parchment** – surface made from prepared animal skins used for printing and manuscript
- Quoin – a wedge or metal device used to lock text and furniture into place; speed quions are metal quoins with a key that expands the quoin to help lockup
- **Relief printing** –
- **Rollers** – rubber cylinders on presses like a C&P or Vandercook that ink the bed of the press

- **Stuff** – fibers suspended in a liquid to make paper
- **Su + geta** – screen and bamboo sheet that allow paper to be made in the Japanese style
- Sort – an individual piece of type; if you run out of type, you are "out of sorts"
- **Typecase** – also known as a job case, usually this is used when there is type in the case
- **Varnish** – made from processing linseed or walnut oil
- **Vellum** – parchment made from calfskin
- **Washi** – Japanese-style paper that is made from plant matter such as kōzo (mulberry) or gampi