There it is, a bit of the details of staining [dyeing] wood, at least those that most cabinetmakers use, or which I myself have employed in the attempts that I have made. These have succeeded rather well, but they have not been followed by a long enough time to be assured of the success of my attempts. It would be highly wished that those who are currently making use of these dyes, or who will be using them later, apply themselves to perfect them which, I believe, is not absolutely impossible. Having done this, they would be rather good citizens to not make a mystery of their discoveries, but only succeed by rendering them public.

Cabinetmakers dye not only their woods for veneer to use them in the place of the natural color of the woods. They also use these same dyes to accentuate various parts of their works while they are being worked. As such, these dyes, like the red of Brasilwood, the violet of the Campeachy, the black, etc., are used hot, which is very easy to do because it is sufficient for only the exterior of the woods being dyed. Other than these dyes, woodworkers in furniture sometimes use a type of yellow color for bedsteads, which is composed of yellow ochre and common varnish, or of this same ochre and the very clear English glue, sometimes they even put it in only water, which is of little use.

Before finishing the dyeing of wood, I believe I ought to give a least-costly method of dyeing white wood red, which is done in the following manner:

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You take some horse dung, which you put in a bucket of which the bottom is pierced with many holes, and you place it above another bucket, into which falls the water from the dung, as it gradually rots. When it does not rot fast enough, you water it from time to time with some horse urine, which helps a lot and at the same time gives a red water, which not only stains the surface of the wood, but penetrates the interior 3 to 4 lines deep. In staining the wood with this dye, one must take care that all the pieces be of the same species, and about equal in density if one wishes that they be of equal color throughout. This observation is general for all water-based stains, which have no palpable thickness nor even appearance [they leave no residue or any evident change in appearance], which requires the cabinetmaker to make a choice of wood of equal color and a density as I mentioned before. This demands a lot of experience and attention on the part of the cabinetmakers. And with the exception of the way to compose and use dyes, it is hardly possible to give theoretical rules on this part, for which success is not often due to anything but experience, which is not acquired except with a lot of time, attention and work.

Section II
On the sawing of Wood appropriate for Cabinetmaking

Plate 278
The Way to Split Veneer Wood, and Its Explanation

As the wood that one uses for cabinetmaking is for the most part very expensive, because it costs roughly 10 sols up to 30 sols, and sometimes even one crown per pound, according to the different types of wood, we have great interest in using these woods sparingly; that is why instead of making furniture or other pieces of cabinetry in solid wood, we have tried to execute splitting [sawing] wood

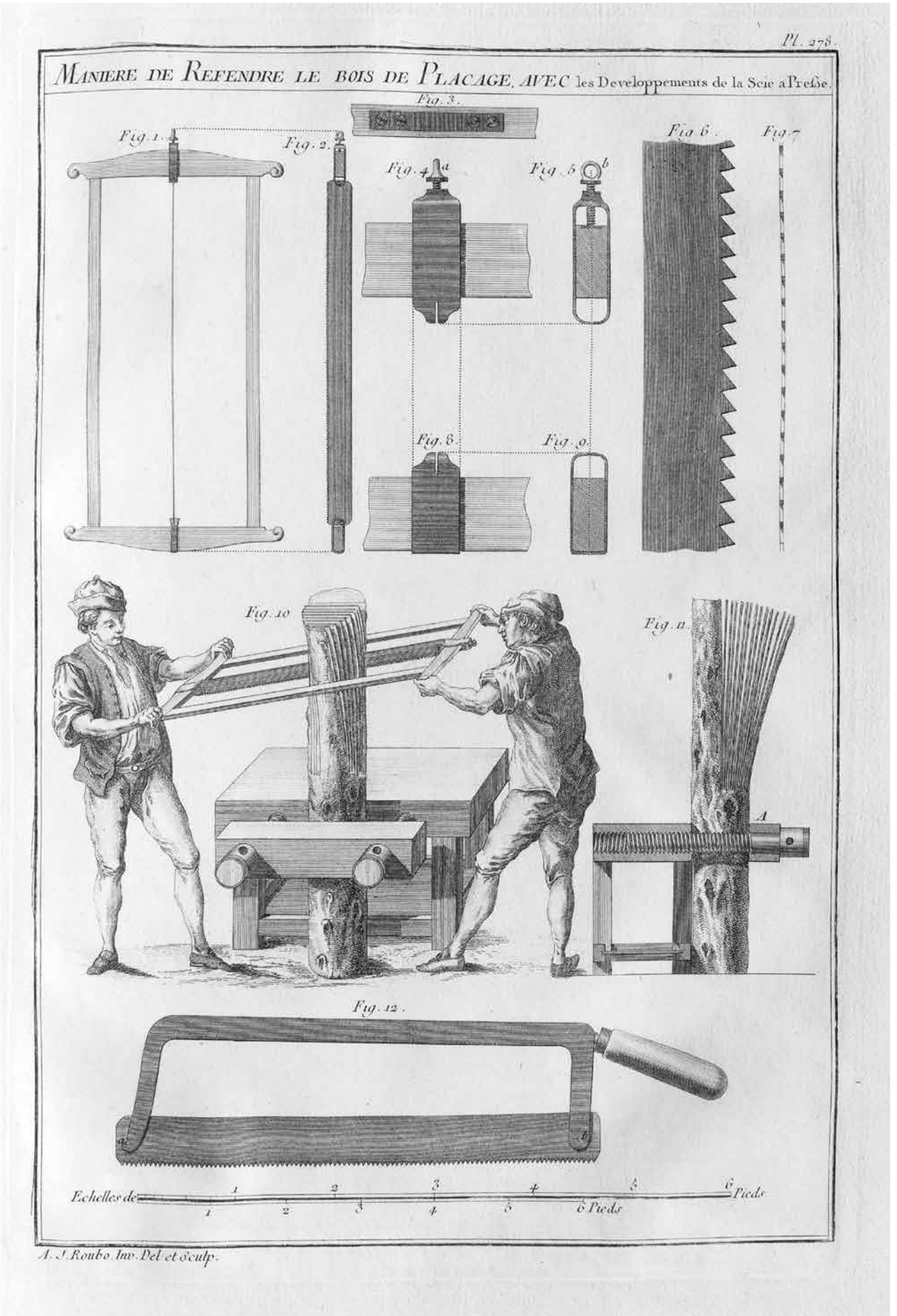


Plate 278. *The Way to Split Veneer Wood, and Its Explanation*

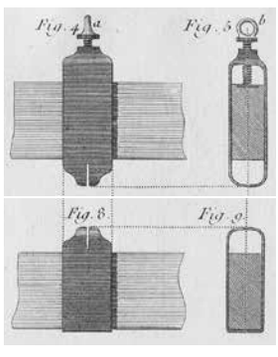
into laminates, or very thin sheets, that one applies on the furniture cases made of ordinary wood.

It is not the carpenter-cabinetmakers who split [saw] their wood, but the workers [sawyers] who do only this work, and who saw not only for the cabinetmakers, but also for the musical instrument makers, and generally all those who use thin wood. These workers or sawyers are paid by the pound, that is to say, according to the weight of the piece of wood that they use, including the waste-wood and sawdust, rendering the wood close to two-thirds more expensive, which makes a piece made in this manner very important.

Veneer wood is split [sawn] at about a thickness of 1 line at most [1/12" to 1/14"]; when one wants to spare it, one makes from 10 to 11 leaves from a thumb-thickness [inch], which is worthless because even before the veneer is polished, it has left only a half-blade of thickness [1/24" to 1/32"], which is then reduced almost to nothing when the piece is finished; it is absolutely necessary to avoid making veneers this thin, although that is used a lot at the present. When one wants to cut up a piece of wood to make a veneer, one begins by choosing the side of the log that allows for the easiest sawing, the goal being to orient the wood for the best advantage, and to yield the largest
Plate 278 sheets of the veneer; then one puts the piece of wood in the vise, and with a standing saw [a saw to be used while standing, and a vise designed to facilitate that action], one saws it to a thickness that one judges appropriate (which I am going to explain, after having provided the description of the bench or vise with a standing saw, and of the saw appropriate for this task).

Page 800 The saw appropriate for cutting wood from India, which we name also the saw with vise, *Figs. 1 and 2* [to increase or decrease the tension on the blade] is a little bit similar to the saw for cutting used by the woodworking builders [often known in the modern era as a frame saw]. It is composed of two verticals and of two crosswise or crossbeam elements, of which the ends project out and are rounded, so that the two sawyers can hold the saw easily. The middle of these crosspieces is convex on the outside, in order to give them more strength, and that they not bend while one increases the tension on the saw blade.

The inside [interior] of the vise saw is from 15 to 18 thumbs [inches] wide [or approximately 9 inches on either side of the blade], is about 3 feet long, as measured from within the crosspieces or support piece. The blade of the saw has a 4–thumbs [inches] depth, at least, and is held at each end by a frame of iron, through which passes the crosspieces of the saw, or, better said, of its chassis. These frames of iron, represented by *Figs. 4, 5, 8 and 9*, are made of iron plate, and the largest possible, so that the saw cannot turn easily, and one tightens a nut to that above, for putting there a screw *a b*, *Figs. 4 and 5*, which serves to control the tension of the saw blade.

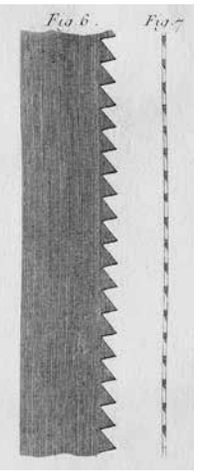


On the outside of the cross-members one insets a steel contact plate attached with some screws,

which prevents the pressure of the screw of the frame to not ruin anything nor to make any holes. *See Fig. 3*.

The blade of the saw, as I just said, is 4 thumbs [inches] size at least, tapering barely toward the back [away from the teeth]. We do not put a set on these sorts of saws, because that would eat

up the wood excessively with an unnecessarily wide kerf, and one takes great care that the teeth be perfectly straight on the horizontal, and that their teeth be also perfectly equal in height, so that they grab all equally, and that they do not chatter, resulting in uneven thickness of the wood, which is also to be feared, which ruins so many sheets of veneer. The teeth of these saws should be spaced equally, about 5 to 6 lines from one tooth to the next one at least, and should be positioned in such a way that the bottom [what we now call the tip] of each tooth is level with one another, because being so arranged, they are less subject to become dull, which would happen unfailingly if they were made ordinarily, as is seen that almost all wood from India is hard, and consequently causes more resistance to the teeth of the saw. *See Figs. 6 and 7*, which represent one part of the saw blade viewed from the front and side, half-size.



The standing saw vise, represented in *Fig. 11*, is one type of small bench, about 3 to 3.5 feet long, by 2 feet high, at the base of which one puts the vise, which serves to hold in place the piece that one wishes to saw.

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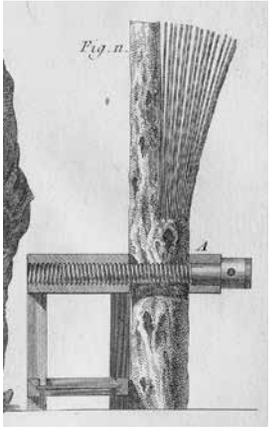
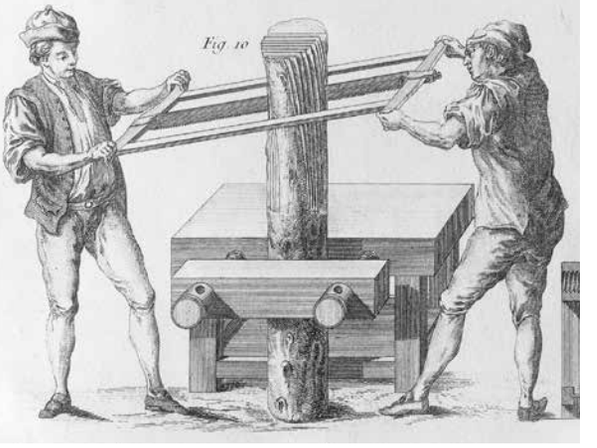
Plate 278

In order for this vise to be solid [a stout twin-screw face vise], it is good that the brace [the jaw] *A*, *Fig. 11*, have about 6 thumbs [inches] thickness, as well as the top of the bench, in which the screws enter, which to be good, should have at least 2.5 to 3 thumbs [inches] in thickness, and the threads be long enough so that when there is a piece of wood 8 to 10 thumbs [inches] thickness placed in the vise, there remains at least enough length of the screw in the bench, as observed in this figure. As this bench is very short, and is subject to vibration by the movement of the saw, one loads stones on the bottom shelf to make it more solid; but I believe it would be better to make the legs of the bench long enough to be anchored to the floor of the shop, then one makes a hole in front of the bench to set in the piece of wood to be sawn in order to not extend upwards more than 3 feet above the top of the vise, locating it thus both for the comfort of the sawyers and for maximizing the yield of the piece being sawn. Not all the standing saw vises are part of an overall bench, such as the one represented here, in *Figs. 10 and 11*; this is why ordinary vises attached to a little bench are less solid than making them as I propose here.



When one wishes to saw with the vise, one begins by placing the piece to saw in the vise, of which the screws tighten with an iron lever, that one removes after being worked, so that it is not in the way; then, with an ordinary saw, one begins to mark all the lines to be sawn on the end of the workpiece, just up to 2 to 3 lines deep [3/16"], then one uses the frame saw, *Fig.*



1, which is guided horizontally by two men, observing the advantageous slight incline on the side of the tooth rake, and of the lifting up of the blade while pulling back, so as to relieve it, and that it not bind in the wood, or at least that the sawdust does not obstruct it. *See Figs. 10 and 11*, which represents a vise press upright, viewed in perspective, with the sawyers located as they should be.

When one saws with a vise, one begins with the outside edge of the log, so that the first sheets sawn bend away from the log and facilitate the passage of the saw, which could not be the case if one sawed in the middle; as one does when one saws large pieces of wood being used by carpenters or by ordinary woodworkers, given that the frame saw blade is very thin, and that it has no set. Sawyers at a vise do not lay out or mark a line on the side of the piece that they wish to saw; but after having begun on the end with an ordinary saw, they continue the rest by eye, which they do very well, for the most part; they are very sure to saw their veneers not only very straight, but still perfectly of equal thickness, as well. *See Fig. 11*, which represents the cut of the bench or upright vise saw, and a piece of wood sawn into sheets just up to the middle.

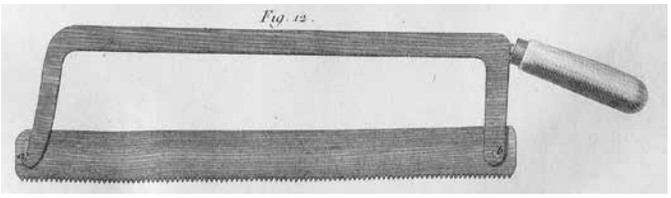


Plate 278

To finish what this looks like at the cutting of wood appropriate to the cabinetmaker I have represented in *Fig. 12*, a saw named the carving saw, which serves to cut up not only hard wood, whether wood with the grain or cross-grain, or standing wood, but also coral, ivory and mother-of-pearl. The framework of these sorts of saws is all iron, of which the upper branch is widened on the outside, so that one can adapt the blade and set it as one judges appropriate, which is done in the following manner.

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After having pierced a hole in the blade of the saw, *b*, corresponding with that of the lower arm of the frame of the saw, you put this one [arm], and the one that is opposite, in a vise or other thing capable of bending them [squeezing them together], in a manner that they tend to meet one against the other, and tightens them as much as is judged appropriate, to give the saw all the tension necessary; then the blade of the saw, being stopped at point *b*, one makes it enter in the upper arm of the frame, and one traces the place for the hole at point *a*, which one pierces to place there a peg; this being done, one again bends the arms of the frame, just until it gives liberty to pass the peg below, and which serves to hold the peg in place, as one can see in this figure.

The blades for these sorts of saws are very thin, and one does not give them a set, so they have a very narrow kerf and lose less material, and they pass easily; one thins them on the back [away from the teeth], which one does with a file that one passes down the length just until they are thinned enough as one judges appropriate; then one rubs them with sand to remove the unevenness that the filing could have made; this operation is called “demaigrir” [thinning], a worker’s term.

When the carving saws serve to saw ivory or other hard materials, it is necessary that their blades be harder than for ordinary wood; so one uses saws of tempered steel, or of springs from pendulums [clock springs], which are appropriate for this use, and which one thins on the grindstone, their hardness making them impervious to the teeth of a file.

On Sawing Veneer

In plate 278, Roubo illustrates methods for re-sawing lumber, or more precisely, sawing veneer from solid stock.

I use the phrase "more precisely" self-consciously for reasons you will learn in a moment. A short session of hand re-sawing veneer instantly demonstrated the level of hand skill required to do what I treated as being akin to breathing air, so natural as to not need a lot of explanation. Like much of Roubo, attempting to replicate the work is a challenging and humbling experience.

The practice of re-sawing as described in Roubo, and also illustrated in Denis Diderot's *Encyclopédie*, requires a substantial dedication of space with its sawing bench, a 4'-long frame saw and two sturdy lads, one at either end. In the near future I expect to have all the space I need for a 4' saw, but for now that is not practical. My day-to-day personal workshop is not capacious – perhaps it could even be described as cramped – so I pursued a scaled-down version of the same general concept.

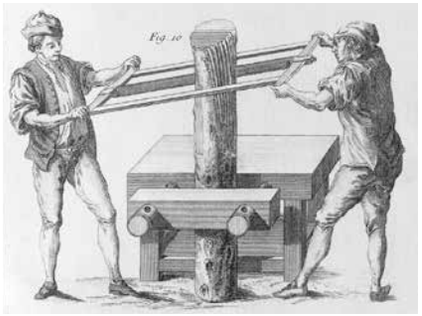

Fig. 1 The figure suggests the ability of sawyers to cut numerous complete 1/12" leaves of veneer from a standing log. The level of skill and the quality of the saw required for this endeavor is nearly incomprehensible.

The frame saw I built holds a 28" x 2" x 3 tpi rip-tooth blade I bought at a tool store. The frame itself is 8/4 hard maple with stout but unglued mortise-and-tenon joints. Long, straight and robust tenons are the key to keeping the saw frame straight and planar when under tension and in use. With good joinery, the mere tightening of the saw blade holds everything square and true. The hardware used to affix the blade to the frame was made with bar stock, screws and bolts from the hardware store. Using wrenches to tighten the tensioning bolt, I can get the blade so tight it sounds like a piano string when plucked.

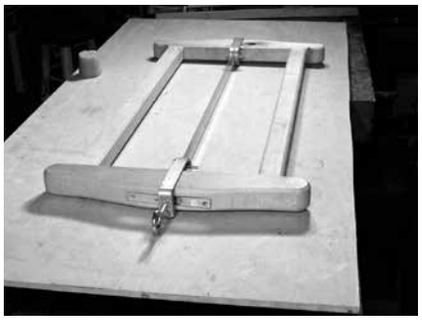

Fig. 2 A frame or "sash" saw for resawing lumber or veneer is a fairly simple and straightforward tool, requiring only a few careful hours of work to complete its fabrication. The stout saw is surprisingly heavy, a help in advancing it through the wood on its downward path.

The second step was to construct a suitable vise to hold the work. Numerous attempts led me back to where Roubo pointed in the first place, a freestanding massive bench with a vise up to the task. With a pile of 24/4 tulip poplar timbers and an oak 6x6 I constructed a sawing bench approximately 30" square by 24" high. The dimensions do not need to be exact, but what is critical is that the height be somewhere around mid-thigh, and that you build in as much weight as possible. Notwithstanding the weight of the bench, some additional mass might be required when sawing to hold everything steady. The shelf underneath the bench serves as a perfect platform for stacking it with stones, bricks or an anvil or two.

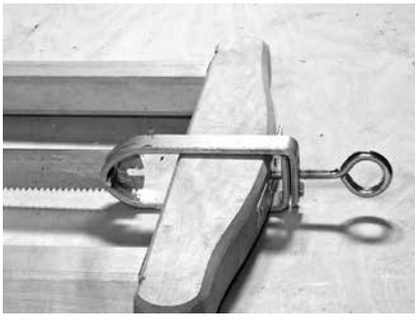

Fig. 3 A simple hardware store eye bolt threaded through the two overlapping sections of bar stock provides plenty of purchase to pull on the bar stock stirrup and tighten the blade to the necessary tension.

For clamping screws I re-used (actually, cannibalized) two

The teeth of these saws are normally inclined; and to these ends when sawing ivory, one files them diagonally from both sides, in order that they present an acute point [double rake], which divides the material without splitting it.

Carving saws are of different sizes, according to different needs. The one represented here is 1/4 scale and is of average size.

There are other saws, named English saws, where the blade tension is kept by the means of a screw [like a modern hacksaw where the blade is affixed to a threaded rod with a pin that tightens

vintage leg-vise units I picked up at an auction a few summers ago. Because I do not yet possess the tap of the size required to shoot threads all the way through the width of the top, I merely drilled holes to accommodate the screws and affixed the thread nuts to the face of the bench. It was sufficient. A pair of wedging plates to hold a round log in place while sawing completed the bench, and the sawing could begin.

Working alone at first, I placed some old-growth antique cypress lumber into the jaws and started sawing. Remarkable! Re-sawing a 6" piece by myself, I averaged almost 1–1/2" per minute. Effortlessly. Eight inch old-growth mahogany you ask? Like butter. With the weight of the 8/4 maple frame pulling the sharp teeth through the wood, all I had to do was steer and keep it moving steadily back and forth.

Fig. 4 The resawing bench is a fairly crude tool, but elegance is not really called for. My experience is that there is no way the bench portrayed in Figure 10 could have sufficed unless it was bolted to the floor. The only way I could get the bench to stop dancing across my concrete floor during sawing was to load it down with several hundred pounds of ballast.

Fig. 5 Sawing this air-dried plum log was by no means effortless. With the tools and skills that I possess, it took us nearly three-quarters of an hour to saw this in half. Turning it into a complete flitch of veneers would have taken several days, and it raised my respect for the old craftsmen immensely.

The only negative in my report is that the saw is so precise that it has no forgiveness in its heart, and so it amplifies any errors on the part of the sawyer. Keep to the line and everything is glorious! Wander a little and the workpiece is wasted. There is just no way to recover from a misdirection, an unfortunate feature of this technique that I found disheartening, because almost every other technique of hand sawing allows for some recovery from a wandering saw.

To use this simple and powerful tool effectively requires a level of hand skill that comes only with diligent practice. A second sawyer is necessary for precise work, as two sets of hands and eyes are required to control the saw and follow the desired cut line on both the front and back sides.

The fact that cabinetmakers of the past cut acres of 18"-wide veneers less than 1/12" thick is a tangible testimonial to the virtues of an apprentice system that nurtured craftsmanship and demanded perfection

via a butterfly nut]. I will mention these when treating the Tools of the Woodworker-Cabinetmakers, for which the description is going to be the object of the following paragraph.

Description of Cabinetmakers' Tools

The tools of the cabinetmakers are identical to the ones of the woodworkers, as long as it refers to the basics of woodworking construction, as per example the workbench and sharpening tools; however there are many more that are very different from the ones of the ordinary woodworkers and require a particular explanation, and as follows I will give a short description of the lathe and its tools in all relativity to the cabinetmaker, as well as other tools and instruments, which their use is necessary in this type of cabinetry.

Because cabinetmakers are making a lot of small works, they need to be more cautious in their construction than for other types of woodworking; this is why we have created a workbench more convenient than the one used regularly [for joiners].

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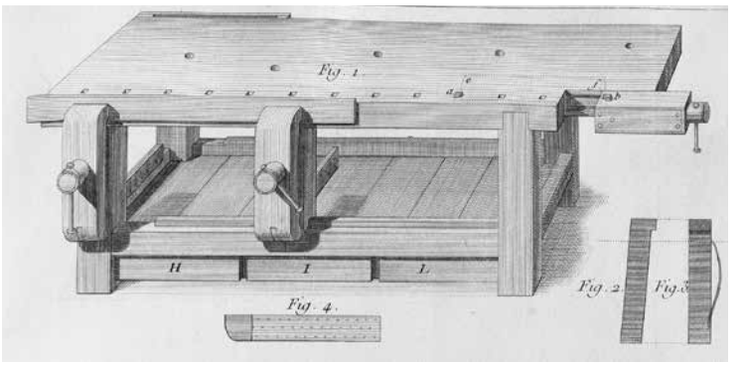
Plate 279
*The German Bench with Its Explanation of the "*Boite a Rappel*" [Moving Box Vise]*

This bench, represented in *Fig. 1*, is named the *German bench* (being that it was invented in Germany, or, more likely, by German cabinetmakers, which are great in numbers in Paris).This bench, as I say, is made, like all others, with four feet and at the extreme end of which is placed a fully housed [or "boxed"] end vise serving to hold the wood in place on the bench, of such length that it fits whatever pieces are being worked, and without having a need for a clamp. This is done by means of two hooks or small strips of iron [bench dogs], *Figs. 1a and 1b*, of which one is placed in the vise housing [or "box"], and the other on the bench, and which one can change the place of as one judges appropriate, as I will explain later.



The end vise, which is the most essential part of the bench of which I am speaking, is 14 to 15 thumbs in length, with 3.5 thumbs of width, having a thickness equal to that of the bench, which is originally 4 thumbs. This vise box, represented full scale in *Figs. 5, 6, 7, 8, 10 and 12* is hollow inside, for the passage of the screw and its nut, and is composed of four pieces or