Ideas and thoughts on

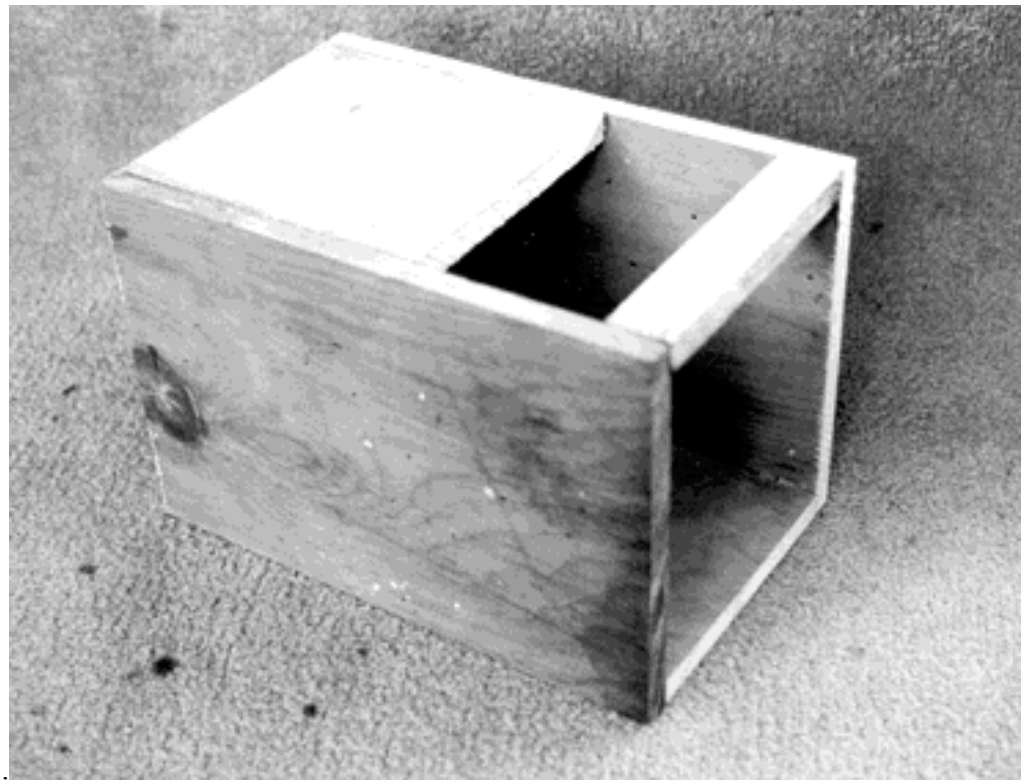
Building a

REPLICA CHAMFERED BOX CAMERA

THE BASICS:

Remembering that our initial purpose is to build a USEABLE camera , of course what better film size to start with then 4x5. All the wood for this project (as I build them) is cut using a radial arm saw, Although it is possible to do this entire camera with just a table saw. A small xacto saw will come in handy as well as a small file , some corner clamps , alot of glue **AND PATIENCE.**

Starting from the inside and working out , you first must construct the inner assembly. This is the piece that will slide in and out of the outer shell to allow focusing.



(see fig 1).

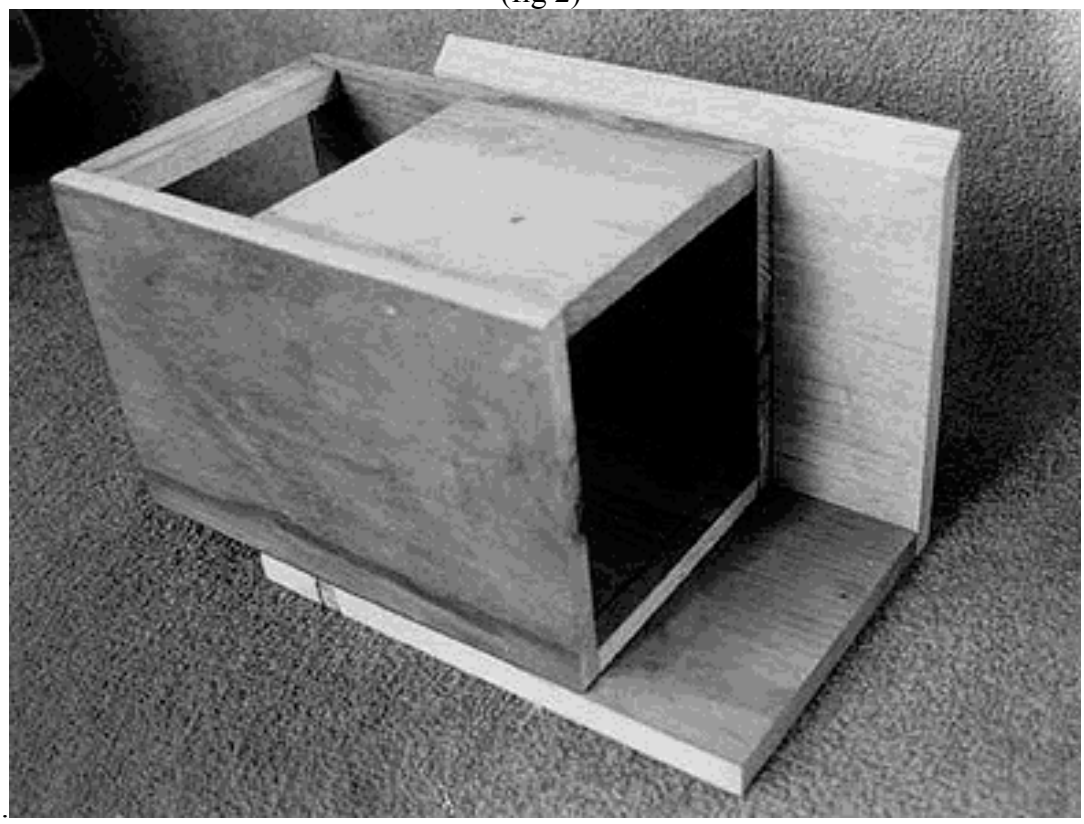
I choose to use 1/2 inch pine for this, 3/8 will also work , yet it is sometimes harder to get. Since every camera is hand made , each will vary in size alittle, so these measurements given here are not 'carved in stone'.. The inner assembly must be wide enough to insert a 4x5 film holder without an extreme amount of force. The base of this inner piece should then be the width of the holder plus 1/8 of an inch on each side, roughly 5 inches. Each side should be 9 1/2 long x 6 3/8 high. Remember these sizes apply to 1/2 inch thick wood. The height takes into consideration the thickness of the top and bottom pieces plus it allows your 4x5 film holder to 'lock' into place when inserted.

The front top piece is 5 x 5 1/2 while the small rear brace is approx 1 x 5 inches. Along the inside where the film holder will be inserted you will need to add two small strips of wood. These are to keep the film holder flush with the actual image plane.
Always use corner clamps when gluing pieces , to ensure that for the most part all the pieces are square when completed. When gluing all pieces dont be afraid to use alot of glue. No nails or screws are needed as long as the edges of your wood are flush.
Keep a damp sponge on hand to wipe any excess glue from your work before it dries..
Set this aside to dry

THE OUTER SHELL:

The base to the outer shell needs to be the width of the inner assembly's base plus its sides

(fig 2)



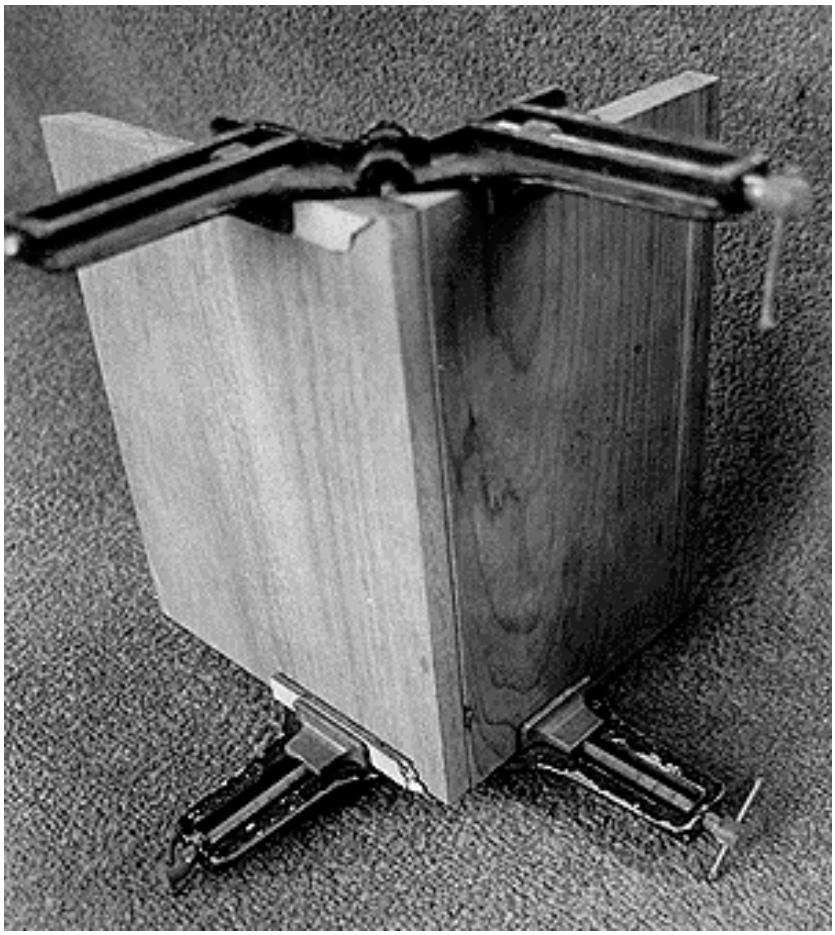
. In our case 6 inches. It is important not to make the outer shell too loose. Yes, Our goal is to have the two pieces slide inside each other, yet this needs to be achieved in a SNUG manner.

Since this base isnt too often seen we have chosen pine for it also.It shouldmeasure 6x9 1/2.

An important note for anyone who isnt used to woodworking is to remember that the grain of your wood should always run length-wise. This makes for less warpage and stronger results.

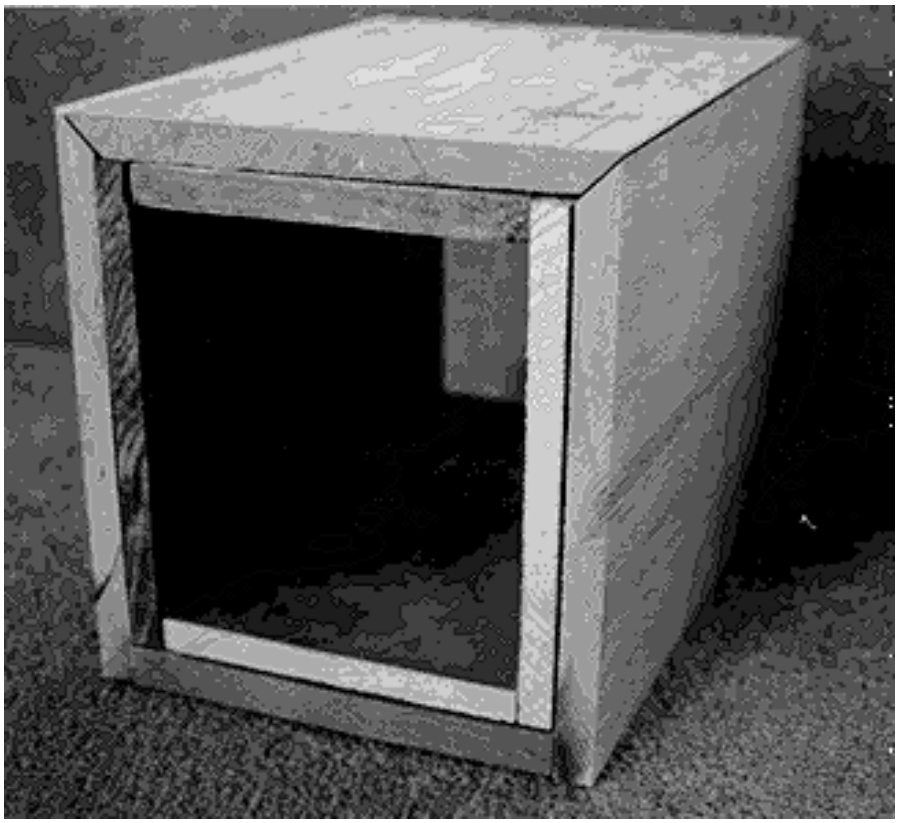
The sides as well as the rest of the pieces we will be making are now going to be made of 1/2 inch Mahogany. I have tried Rosewood yet it is extremely brittle and although it's a fancy wood , full of grain and color , it just doesnt look right (a personal judgment). Mahogany as well as pine can be ordered from Constantines/New York . Their number 3LU293 is mahogany 9 1/4 wide by 24 inches long, finished both sides. Pine they dont list yet Poplar will work just as well (#6LU293). You will need at least 2 sheets of each. In addition to these a sheet 9 1/4 x 24 inches of 3/4 inch thick Mahogany (#3LU393) will be required. Although If you're not sure of your skill with a saw, you might want to order extras of the 1/2 sizes.

One of the sheets of Mahogany will give you the two sides you will need as well as 2/3's of the front assembly (when we get to that). The sheet needs to be ripped at a 45 degree angle the entire length. The depth must include the outer shell base as well as the inner assembly plus keeping in mind a SNUG fit.



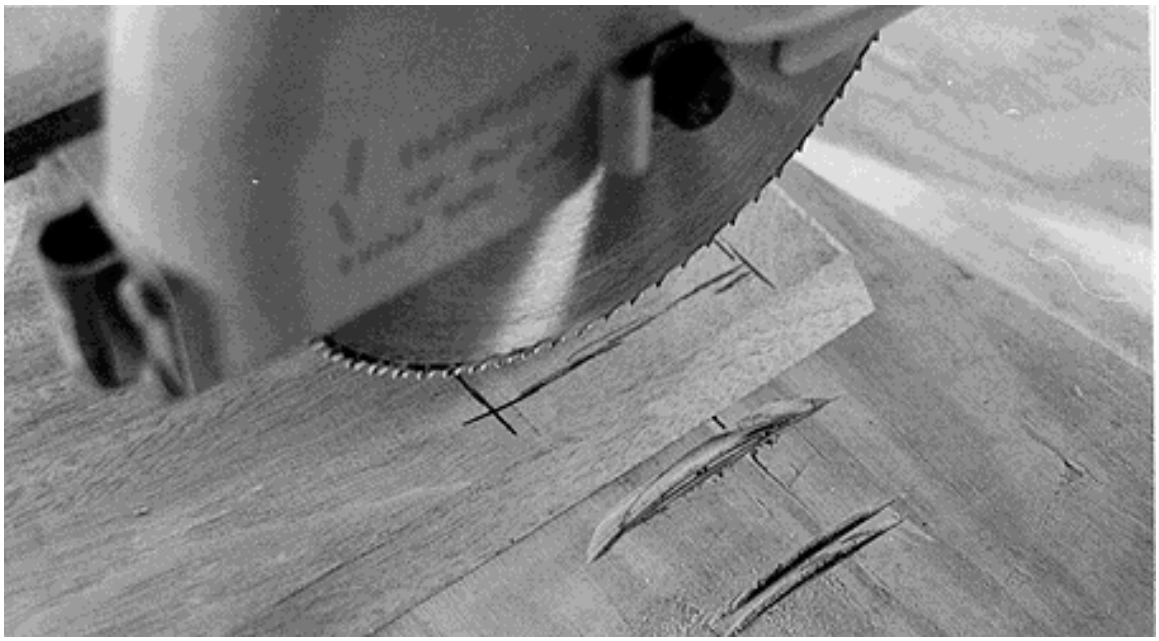
Your inside angle of your cut should be measured from the bottom edge of your side piece to the inside edge of the 45 degree angle. This specific example measures 7 1/8 inches.(fig 2) Something also to keep in mind is that if you build at a small scale using strictly measured measurements you are going to have problems. Most saw blades are from 3/32 to 1/8 inch thick and if you dont take that into consideration, you will always be coming up short !

After ripping the board its entire length , you can then cut it into the required 9 1/2 inch lengths. Gluing them to the outer shells base should also be done with corner clamps. It is also a good idea to place some small pieces between the clamp and the Mahogany as not to mar the surface when you tighten down on the clamp (fig 3). Be sure to remove any excess glue with a damp sponge. If it is allowed to dry on the mahogany you will not have a good finish when you apply stain or varnish.



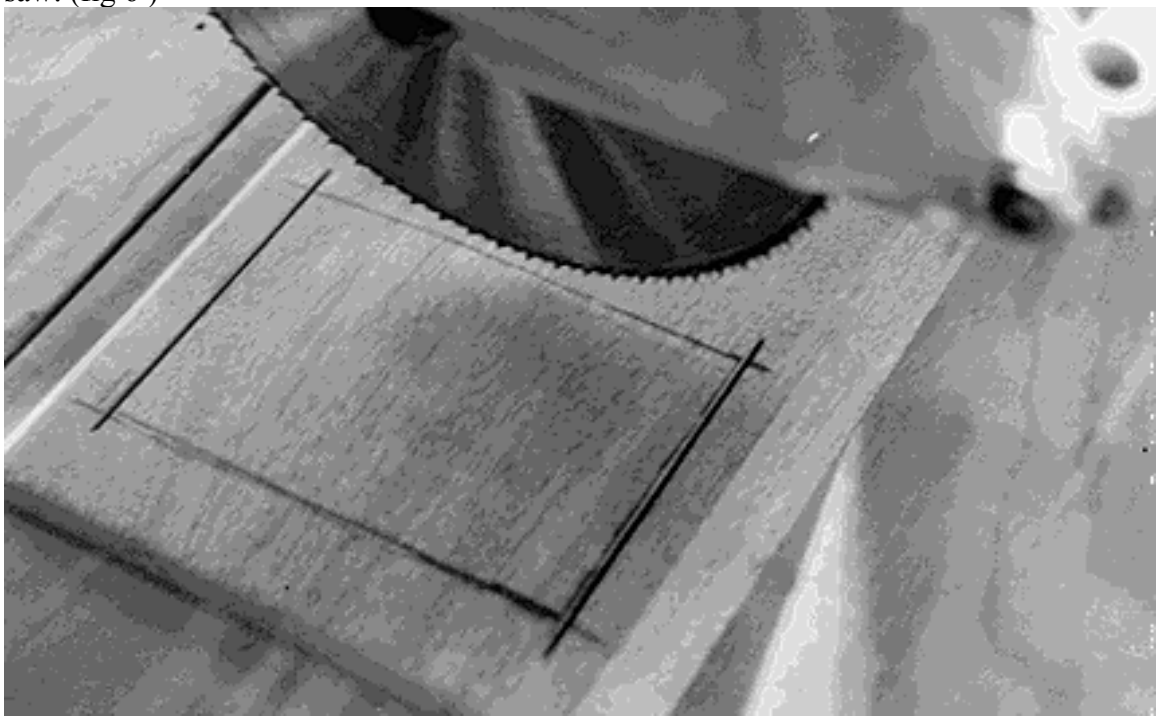
Now we need to cut the top outer shell piece. This piece needs to have 45 degree angles on both sides.(fig 4) It will also have an opening and doors/hinges etc. Use a fresh sheet of Mahogany for this. Also remember this will be the top of your camera, a piece of mahogany with nice graining might look nice here.

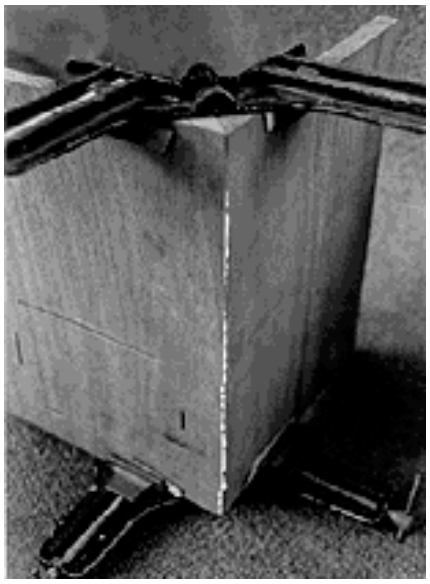
The distance between the inside of your angles should be the same as the entire width of the inner assembly also the same as your outer shells base. It's important to insure that the outer shell is maintaining it's square shape (fig 4).



You should first make the initial cuts for your top opening into this piece before gluing it into place. To achieve this roughly mark out where the opening in your inner assembly is. (fig 5). Remember you will need to compensate for the inside wall of the inner assembly. **Note:** refer to Final Comments for additional thoughts.

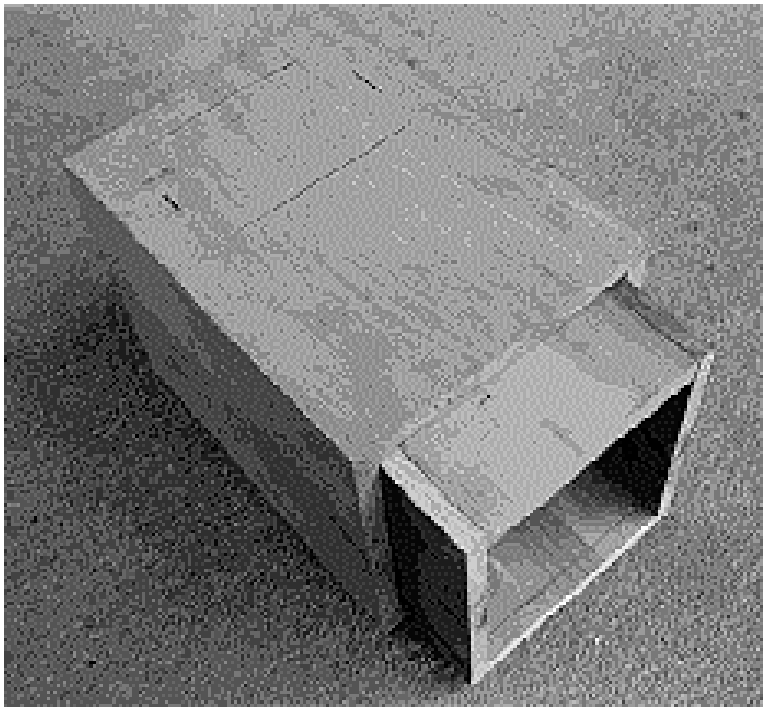
An important point to make here is to remember that your film holder must pass thru this opening also, and if you only allowed 1/8 inch play when you constructed the inner assembly , you dont have much room for error in these cuts. I choose to make the marks (on the inside) of the top piece and then position them under the blade of my radial arm saw. (fig 6)





With the saw locked in place I can lower the blade to the right depth, just barely cutting through the other side . It is important to secure the piece of wood from sliding and even more important is to keep your fingers away from the blade ! After making these four cuts ,finish with the assembly of the outer shell , leaving the opening (doors) temporarily in place for later removal. Use corner clamps to be sure your angles are flush (fig 7) and make sure you remove all excess glue.

With the outer shell and inner assembly done, we can now work on the SNUG fit needed. If all went well the two pieces should fit real tight.



To make adjustments for this use a small hand-held palm sander on the inner assembly, working on any uneven edges. Sand it down until it fits and slides smoothly in the outer shell. (fig 8).

CHAMFERED FRONT;

Now we approach some tricky angles.
Use extreme caution cutting these pieces.
If you choose to follow these ideas
We claim no responsibility for accidents bydoing so...

Locate the piece of Mahogany you had left over from cutting the outer shell sides. This should already have a 45 degree angle on one side and be about 24 inches long. Either using your table saw or radial arm saw set up for ripping , cut another angle the full length of this piece.

Note : See Final Comments for additional thoughts.

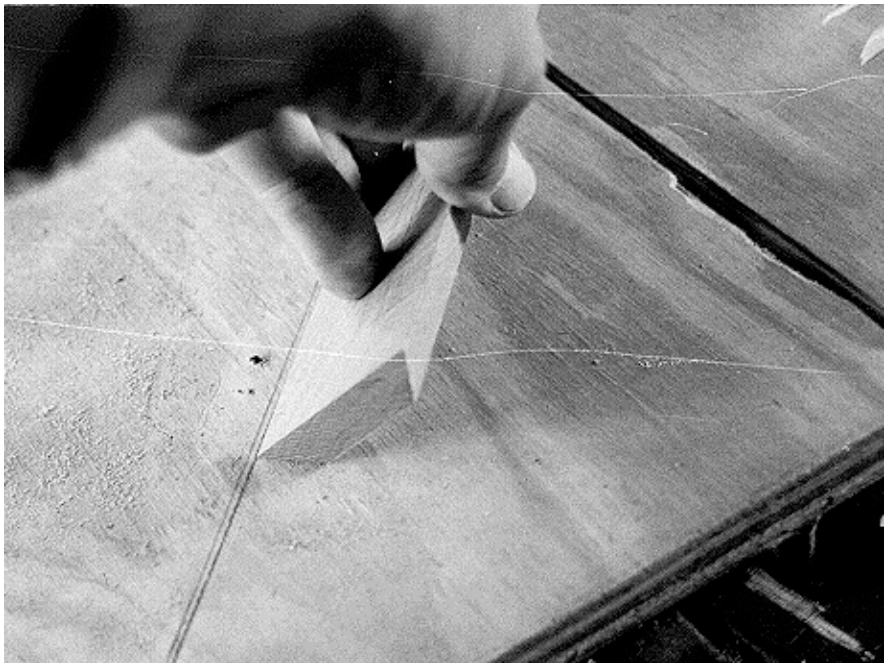
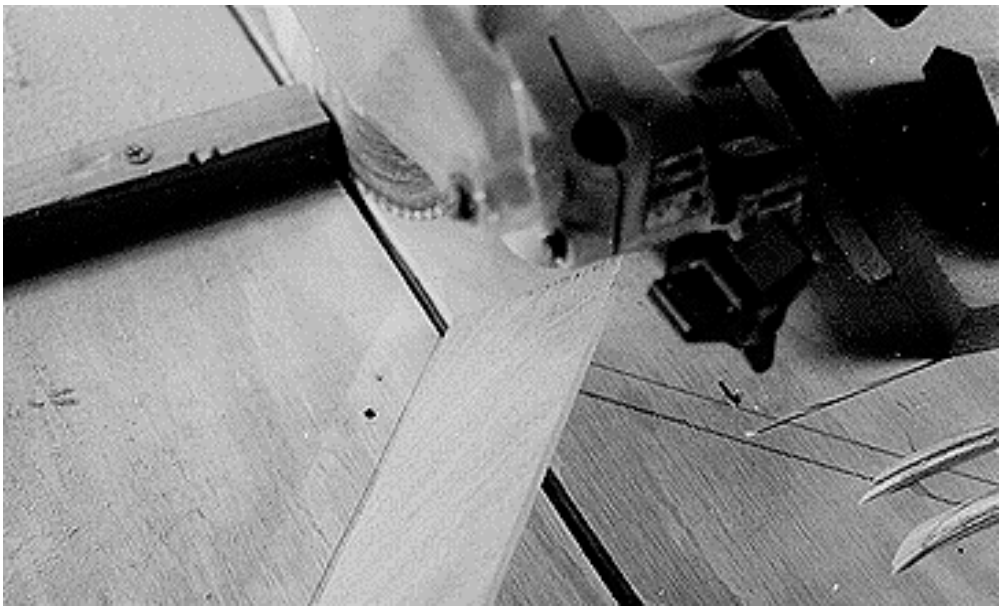
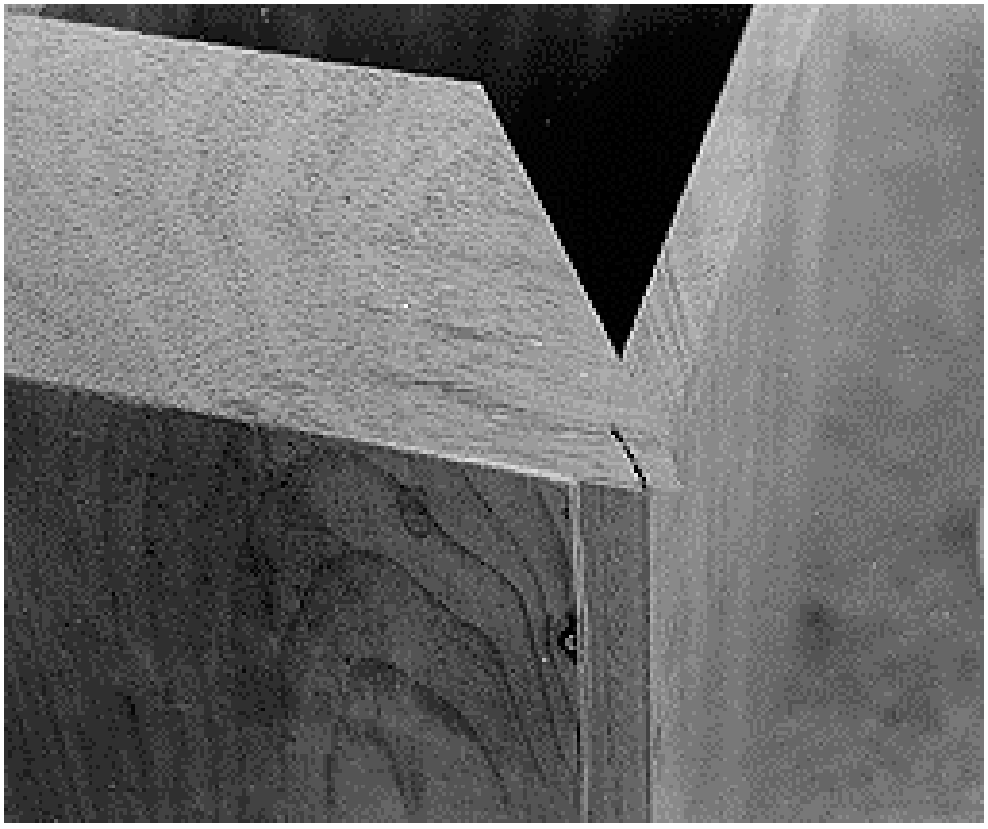


Fig 9 & 10 Illustrate how I achieve the nessessary angles to construct the chamfering effect of the front and rear of these cameras. As mentioned it's tricky and possibly not the way everyone should attempt to do it. It requires a steady hand, and a couple practice cuts on some scrap wood before you might want to be butchering up your Mahogany pieces.

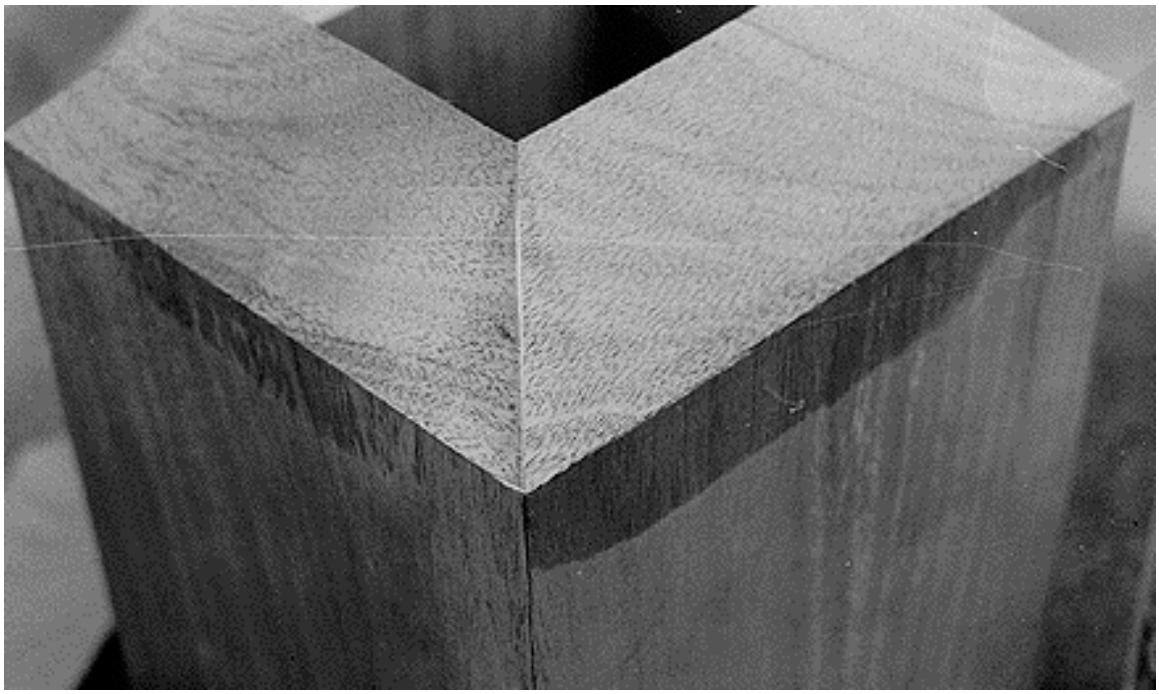
With the blade in a straight line I draw two lines 45 degrees to the angle of the blade. Balancing the right edge in line with the line drawn on the table the saw will cut the correct angle .



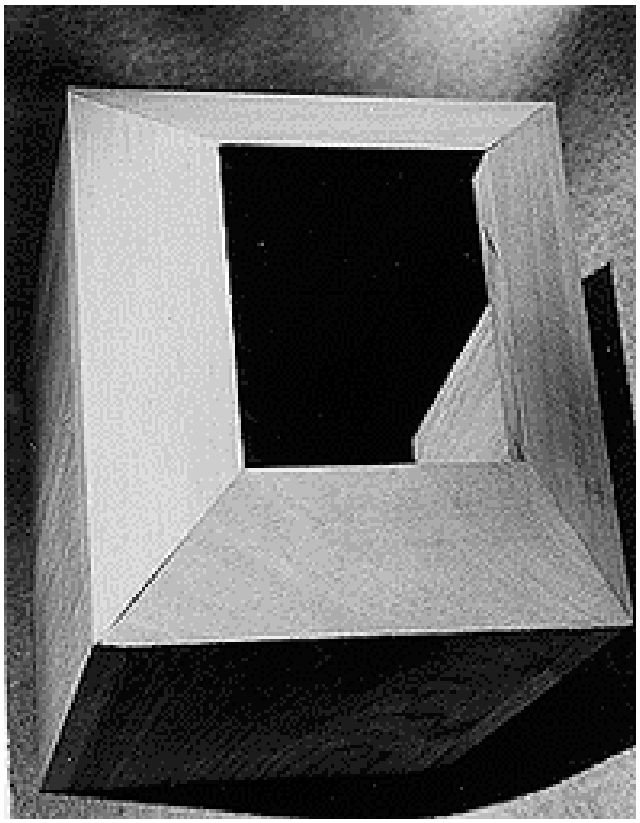
By rotating the piece of wood 180 degrees and aligning it with the left side on the left line you will get the other required angle.



I always make my first cuts a little longer than required in order to fit the pieces into place (fig 11) .

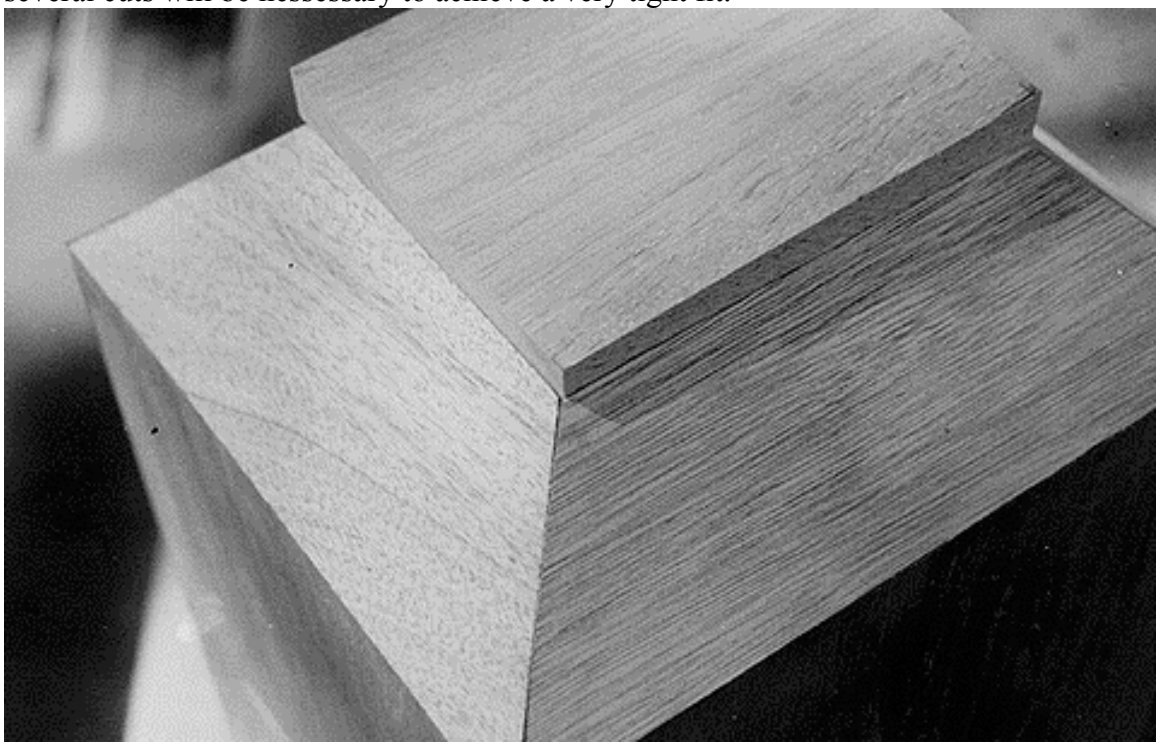


When you have them fitted into place , and ensuring that they are flush with the edges of your outer shell (fig 12 & 13) they will hold very well with a liberal amount of glue. When cut correctly you should not have a gap larger than the thickness of a straight pin.



The FRONT LENSBOARD;

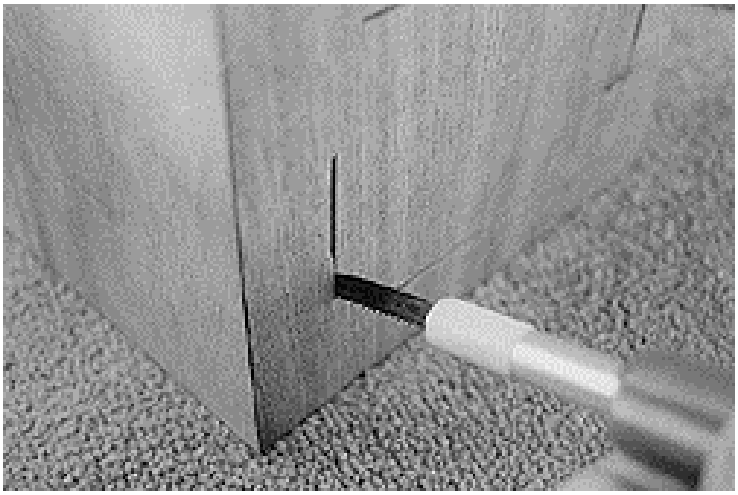
Again using a small piece approx 3 5/8 x 4 3/8 , you will need to slowly work this piece to fit into place. (fig 14) If your initial outer shell was alittle off kilter (most are) then several cuts will be nessessary to achieve a very tight fit.



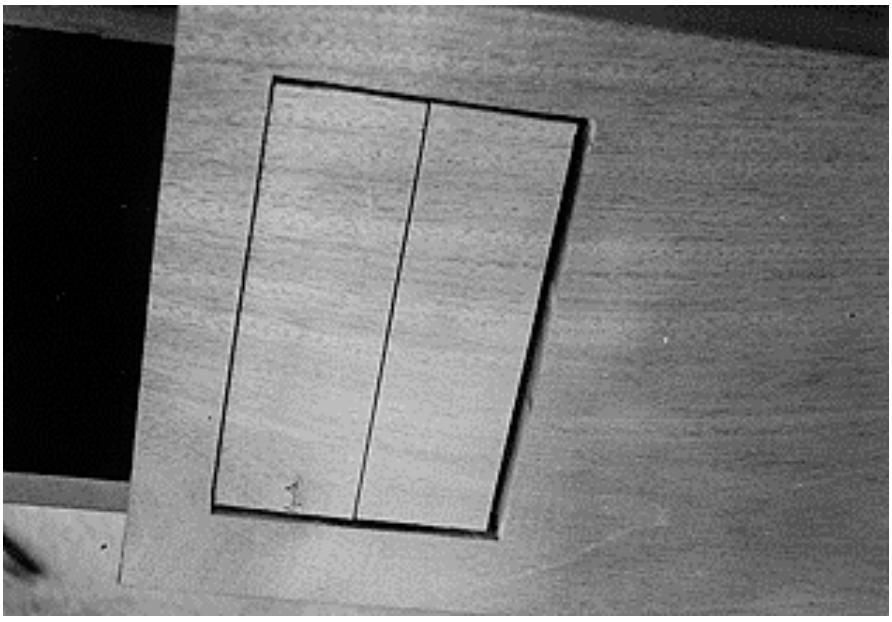
After it is fitted into place and with the excess glue removed from the out side , I like to apply a liberal amount of glue to all the joints on the inside. Working the glue smooth with your finger helps to tighten up the joints as well as seal them for light tightness.

THE DOORS;

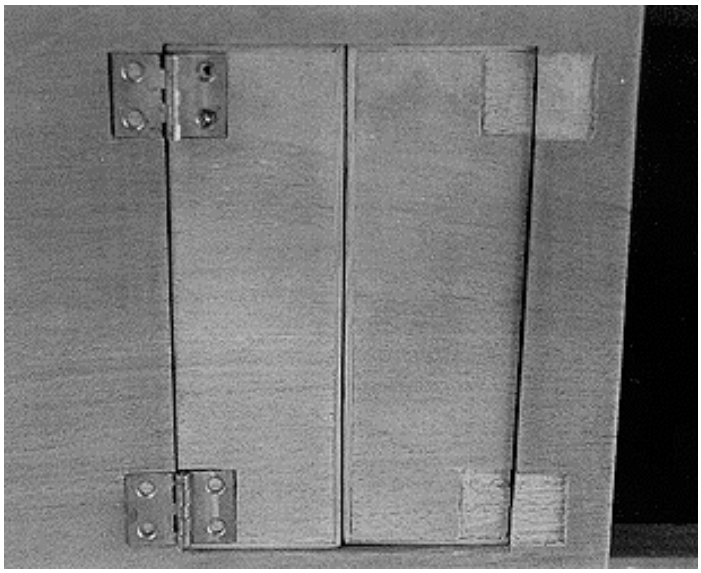
Using a thin blade xacto saw, carefully finish the cuts to expose the opening in the top.(fig 15)



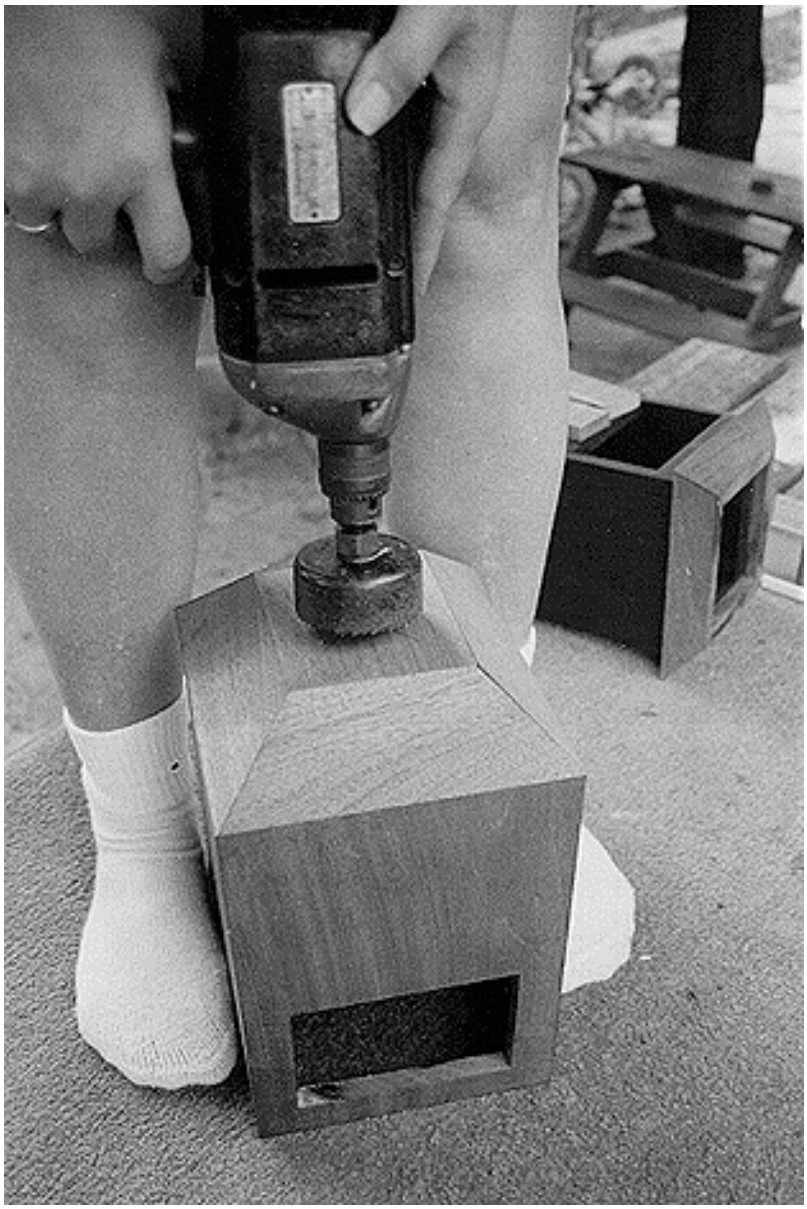
Use caution since you will be using this woodto make the doors for the top of your camera.



After removing this wood , cut it into equal halves.(fig 16) Use a small file or very sharp knife to square up the opening in the top as well as the doors.



Since the thickness of your initial saw cuts need to be compensated for , I choose to add a small frame around the doors (fig 17). Our goal here is to maintain an even flow in the woods grain to keep the end results looking nice. Once you have the doors fitted into position , we need to position the hinges . STANLEY 3/4 x 1 small brass hinges usually work well for this. Marking where they fit and counter-sinking them into position usually achieves good results. Be sure to use a small drill to pre-drill the holes for your screws, otherwise the small screws supplied with these hinges usually break.



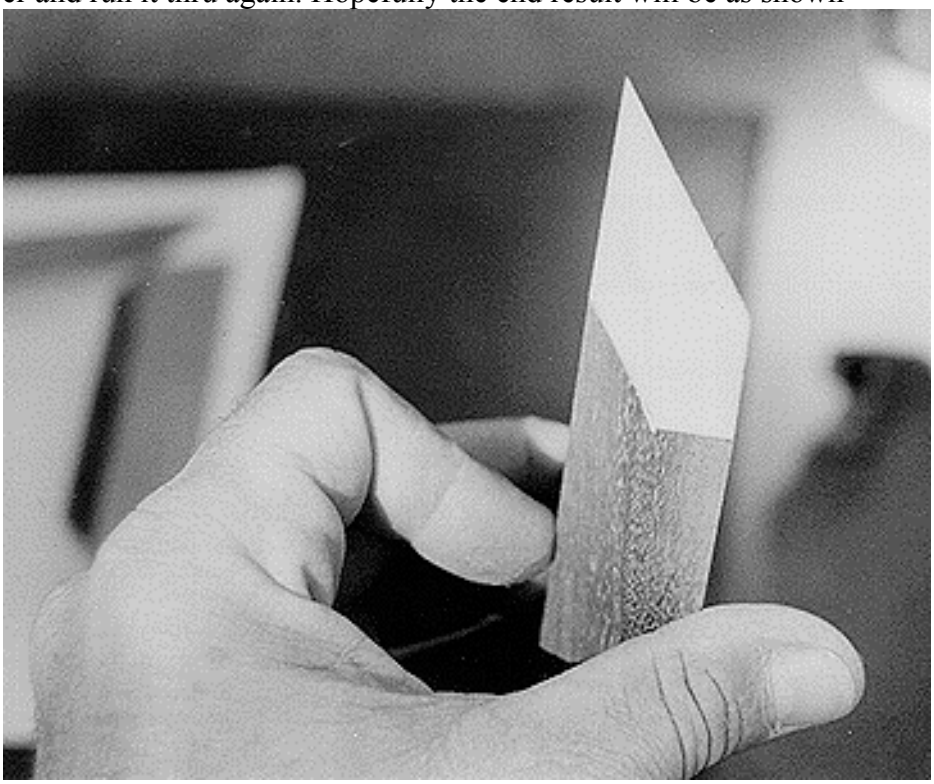
THE LENS:

Now that we are this far into this discussion on building a camera you are possibly wondering “What about the Lens”. Well hopefully you already have had plans of someday building a camera and have aquired a few misc parts and pieces to work with. Ideally a period Daguerrian style lens would be nice , yet something from the 1870’s will also work (my appoligies to those purists out there).
The lens should be approx 3 1/2 to 4 1/2 inches in actual length (not focal length) and 2 to 2 1/2 inches in actual diameter.
Usually they can be found at most camera shows , priced from $35.00 to $200.00 + .
Ideally a lens with a focal length of 6 to 9 inches will provide useable results. Although by removing the rear optics you can adjust your focal length if nessessary.

Using a standard hole cutting drill bit, (like the ones for installing door knobs) , Position the outer shell between your feet (fig 18 previous page) as not to let it slip. You would hate to goof up now.
You need to compensate for the differences in the alignment of the film holder and the different inner and outer shells. I have found that if you draw two faint lines diagonally to locate the center of the lens board , then position your drill about 1/8 th to 1/4 inch higher than dead center , you will achieve good results. Most hole cutting drill bits are about 2 1/4 inch in diameter. If your lens requires a slightly larger opening a DREMEL hand drill with a router attachment will usually enlarge the opening quite well.

THE REAR CHAMFERING:

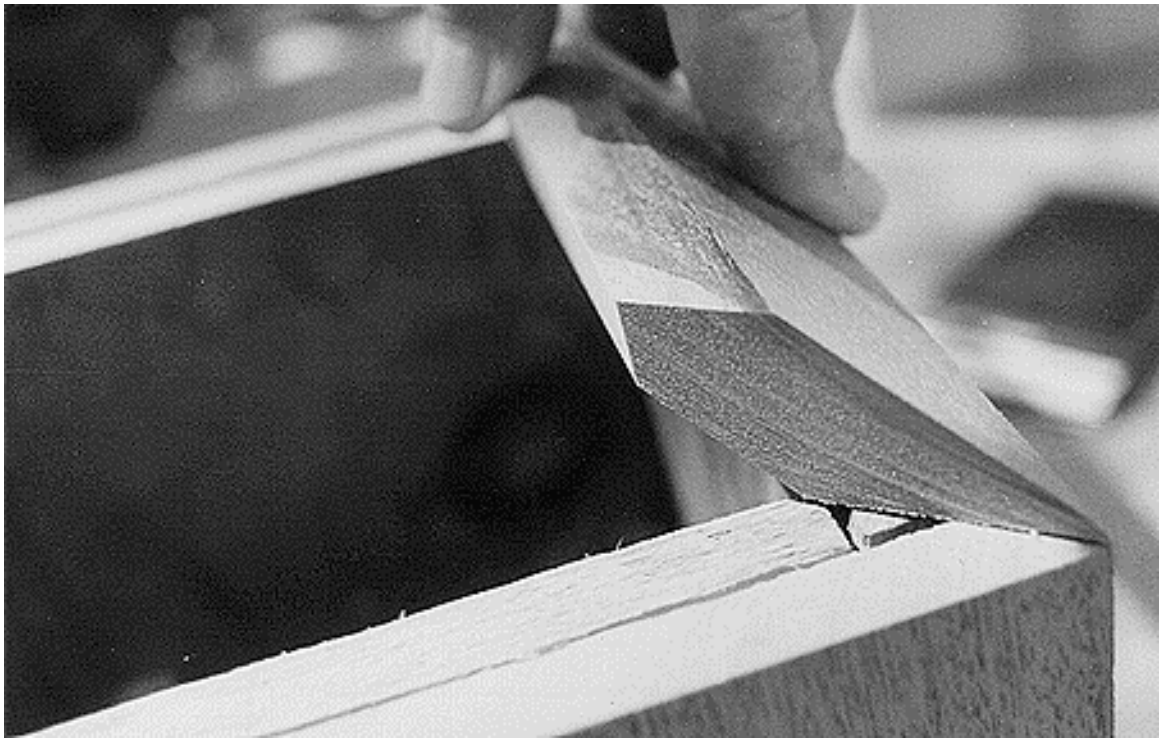
Using the 3/4 inch Mahogany , you will need to rip the length of the sheet twice ,two 45 degree angled pieces. After doing this and before adjusting your saw ,rotate the piece of wood over and run it thru again. Hopefully the end result will be as shown



(fig 19).

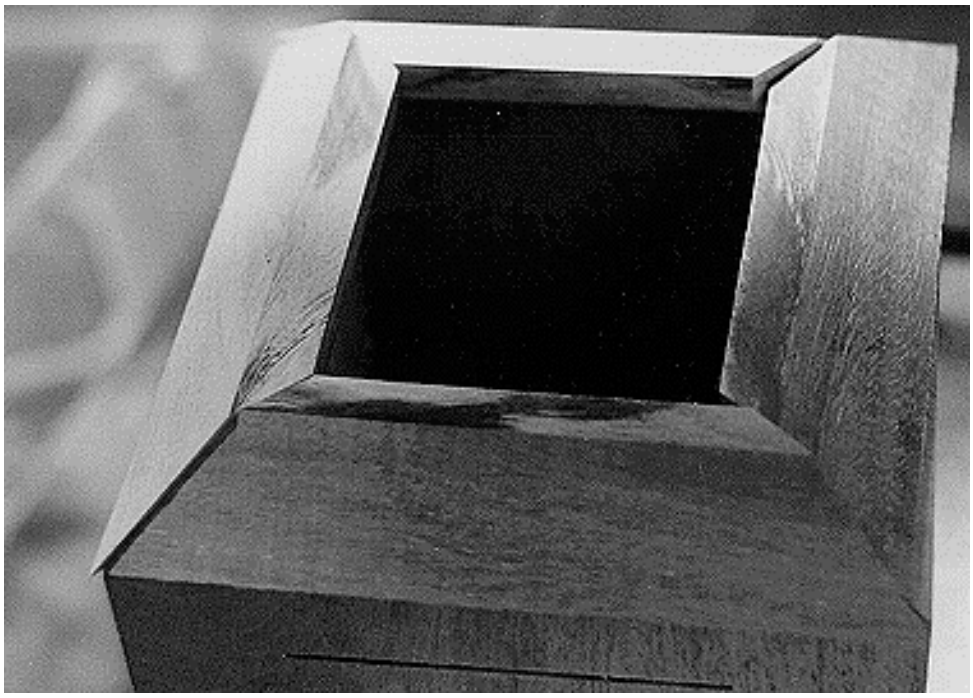
Figure 20 (next page) illustrates how the end results will be positioned.

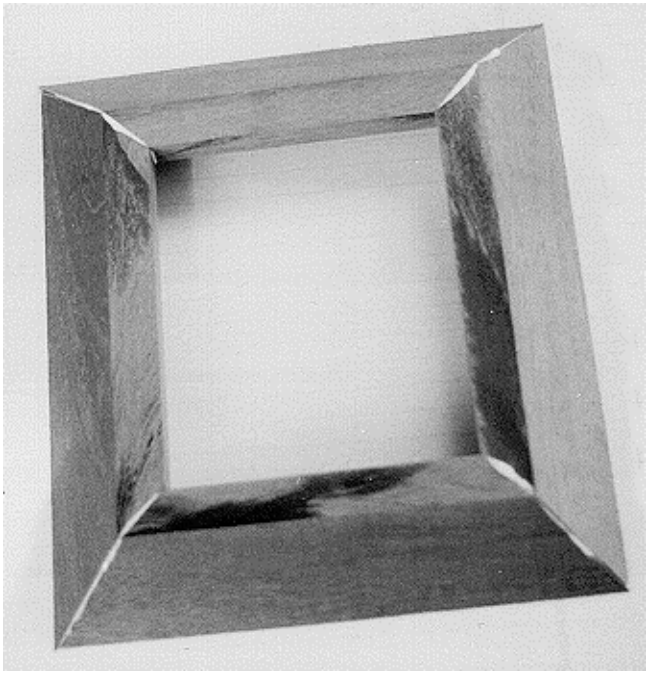
Make note that these pieces are glued to the Inner assembly and not the outer shell as the front pieces were.



After carefully cutting as before and the fitting of these pieces

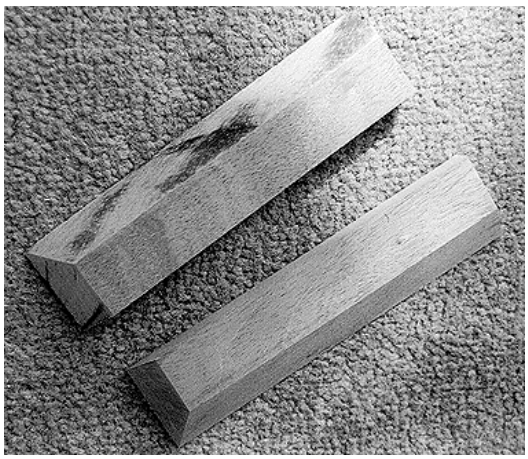
(fig 21)





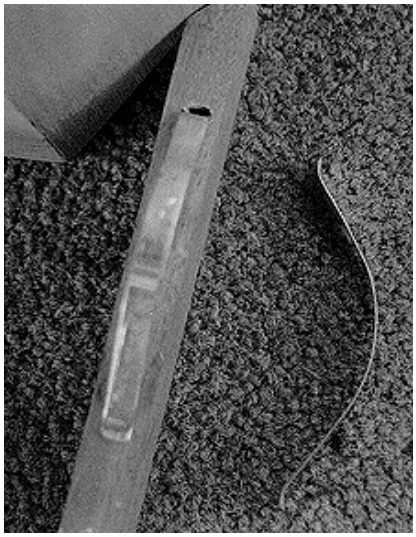
they need to be glued as shown in fig.22, on a piece of paper. Now dont glue these TO the paper , just glue where each angle meets the other and let them dry on paper.
When dry remove all excess paper and make sure all the edges are smooth, but the corners need to retain a sharp crisp edge.
We use 3/4 inch wood here in order to get enough overlap for the glue to adhere correctly. With the camera resting on its front and the inner assembly installed and slightly protruding ,apply glue to the edge of the inner assembly only. Position the rear piece so it is aligned as best as possible with the outer shell. Allow the glue to set-up before removing any excess.

INTERIOR PARTS;



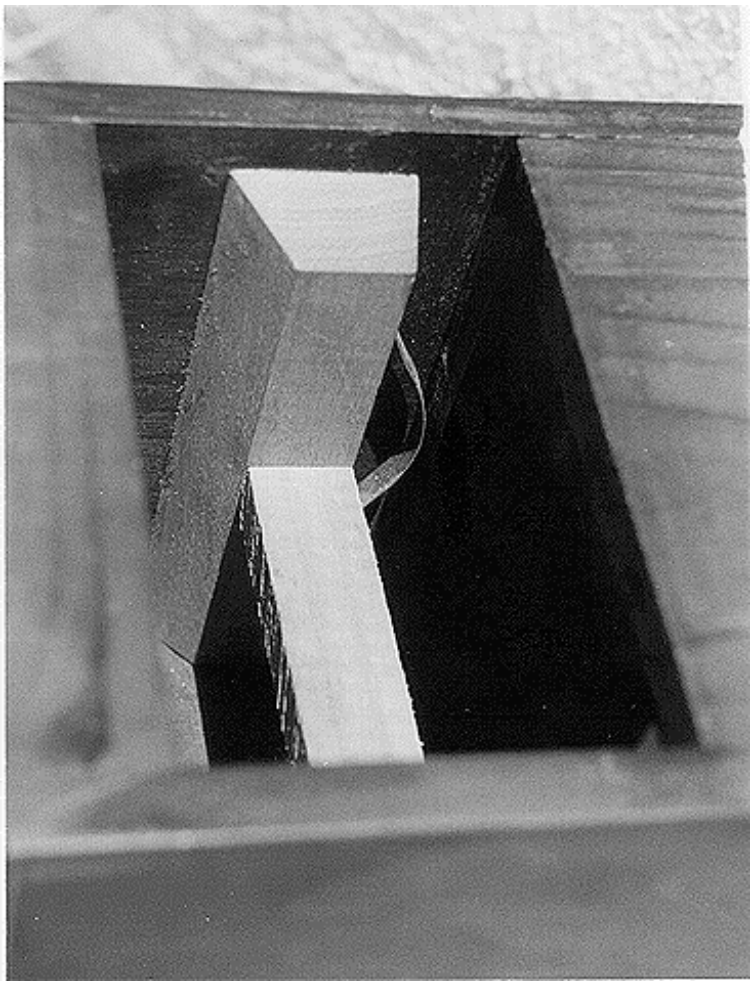
Using a couple small pieces of wood, I miter a 45 degree angle on two sides as shown in (fig 23). These along with two spring steel pieces will apply pressure to the film holder and keep it in position. These spring steel pieces are actually used in framing shops.

If you've ever been to one of those do-it-yourself framing places, they use these inside of aluminum channel frames to hold the print tight to the glass. Most shops will give you a couple for the asking.



Drill two holes as shown (fig 24) and carefully bend back a small tab of the spring to insert into these holes. While they are drying in place I insert a small wood brace ,(fig 25) cut snugly, to hold them in position.

These need to be placed so as not to apply too much pressure on the film holder yet enough so it will stay put.



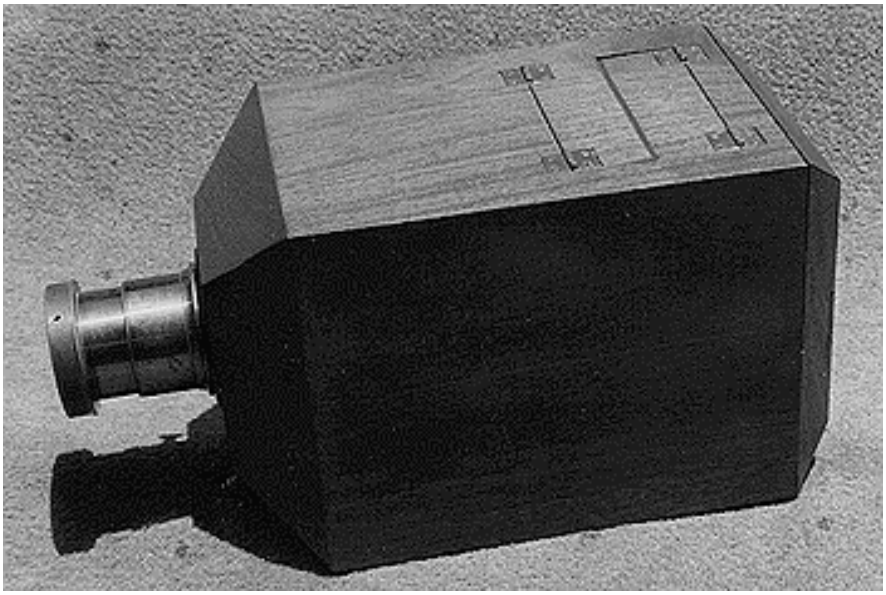
(Fig 25)

THE FINISHING TOUCHES;

Since I had applied glue to the interior of the outer shell , you need to use flat black paint or similar to darken the interior. I would also use it on the exposed rear edges of the outer shell .
The inner assembly can be stained with KIWI Black Leather Dye. Be sure to do both the interior as well as exterior of the inner assembly, film braces, etc. Be extra carefully not to get any paint or dye on what will be your finished exterior surfaces.
Using a small hand-held palm sander , do a final light touch up to the exterior if the outer shell and rear chamfered pieces.
You can build a ground glass focusing screen from an old style wooden
4 x 5 film holder. They usually have a red-brown paper inside them that say Premo or what ever. First remove the two black dark slides and the red-brown inner paper. Have a glass company cut you a standard 4 x 5 frosted or sometimes called acid-etched piece of glass. Where the glass negative would normally fit within the holder is where you install the frosted glass. Make sure you put the etched surface towards the lens, then apply a fine

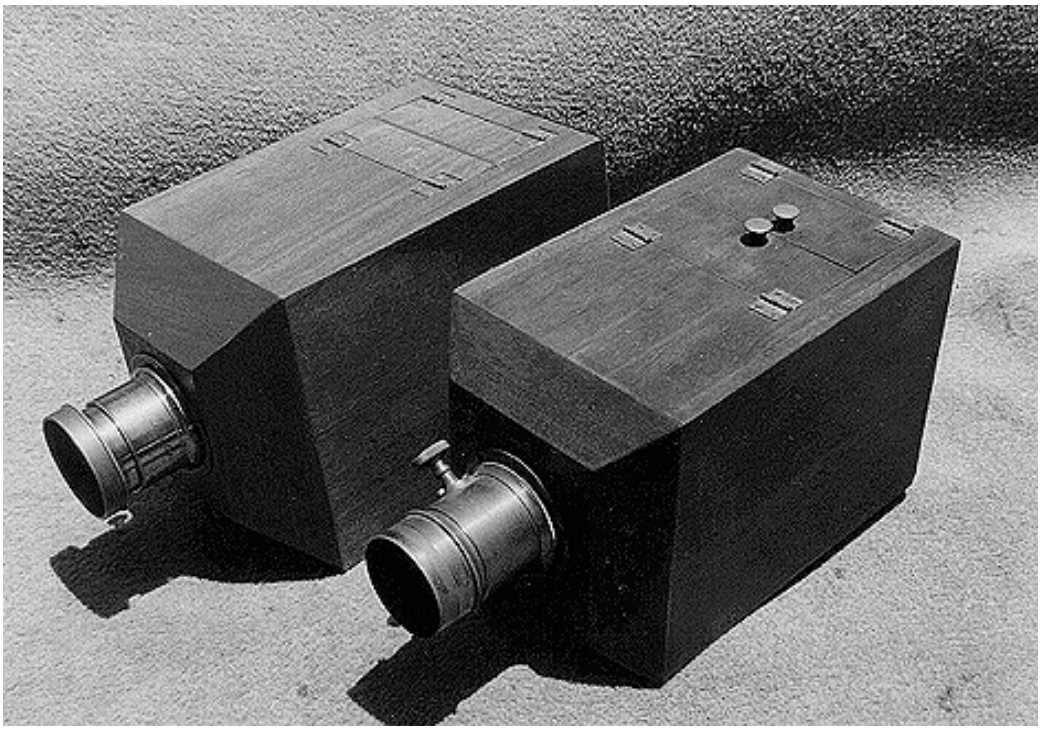
bead of silicone to hold it within the holder. The alignment should be identical to your modern 4 x 5 holder.

The color of stain you choose for the final finish is a matter of personal preference. I have found the following to work well , In this order;
First apply Golden Oak, then Cherry , then Dark Walnut , dont allow each step to dry before applying the next. After those three and after it's dried over night apply a light coat of Clear Lacquer , not varnish.
This combination usually results in a nice 'aged' color. The Dark Walnut brings out the grain usually well.

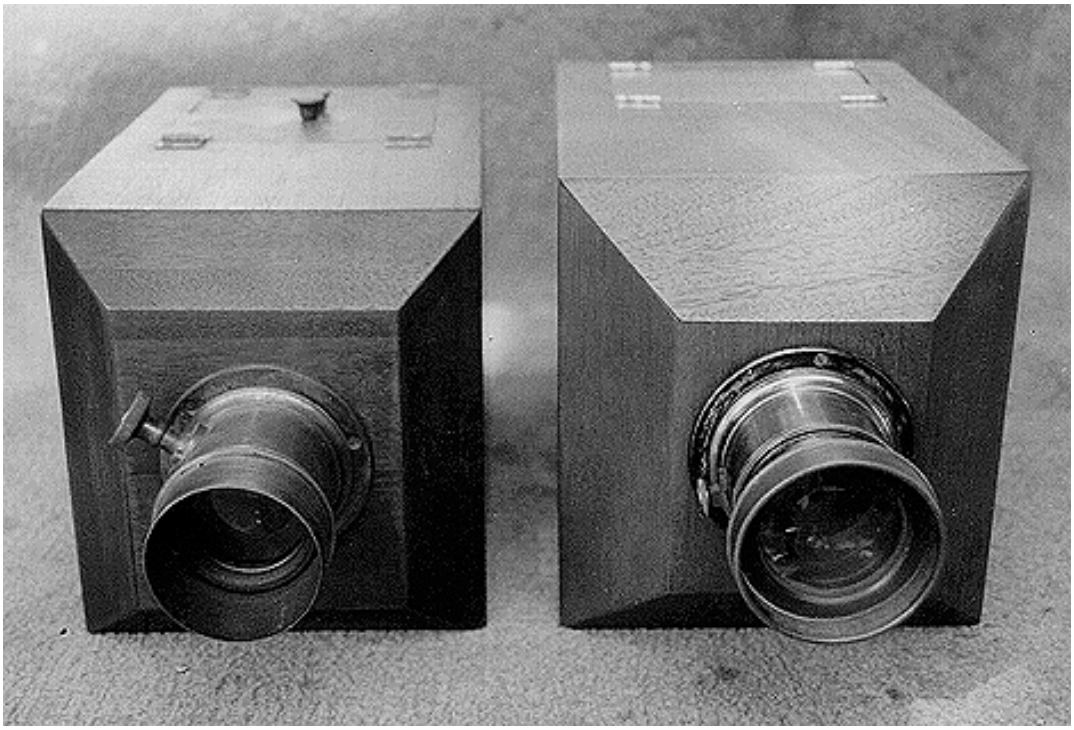


FINAL COMMENTS :

(fig 26) shows the finished product. This specific model we chose not to add small brass knobs to the doors. Mainly so you could see the difference as in the next illustration where we have them installed. .



It's important to look closely at fig. 27 & 28 . In fig 27 note how pronounced the front angles (nose) of the camera on the left is. By adding or decreasing the amount of the distance between the angles discussed under the CHAMFERED FRONT heading you can adjust the amount of overall lensboard you will have.(fig 28) In other words a piece cut with outside measurements of 2 inches will produce a lens board approx 3 1/2 x 4 1/2 where as an outside measured cut of 1 3/4 will produce an approx lens board of 5 x 4 1/4



Confusing you say, in any case , look at the lens you intend to use , If it has a large lens flange or is a little larger in diameter than we had previously mentioned , you might wish to try a smaller angle on the front pieces to your camera.
Secondly, take note of the difference in the sizes of the top door openings. (fig 27) If your lens has a shorter focal length you might want to make the doors larger and mount the film plane closer to the lens. A larger door does give you a broader area to focus in and can compensate for other problems that your lens might have or of the subject you wish to shoot.

Figure 29 shows our camera resting on a home-made studio stand made from the base of a drafting table we were able to purchase at a yard sale.

To date, I've produced approx 25 to 30 (I've lost count) of these cameras, either in kit form or already assembled.

I have had many favorable letters and comments regarding their use-ability. Very good results can be obtained in a studio setting using existing light and ASA 25 sheet film, doing it the old Lens cap-removal method.. Others have told me they use a paper negative. I guess thats the enjoyment of all this , there is always something new to learn and explore.

SUPPLIES;
Constantine Lumber, 2050 Eastchester Road , Bronx N.Y. 10461

Note:

By all means, IF YOU ARE NOT FAMILAR with Electric Power Tools , Do Not Attempt to follow these ideas... Extreme Caution should be taken at all times when using Electric Power Equipment. Safety goggles and other related safety practices should be observed.