

**Procedure to Convert a Six-16 Folding Camera
for Use with 120 Film**

by

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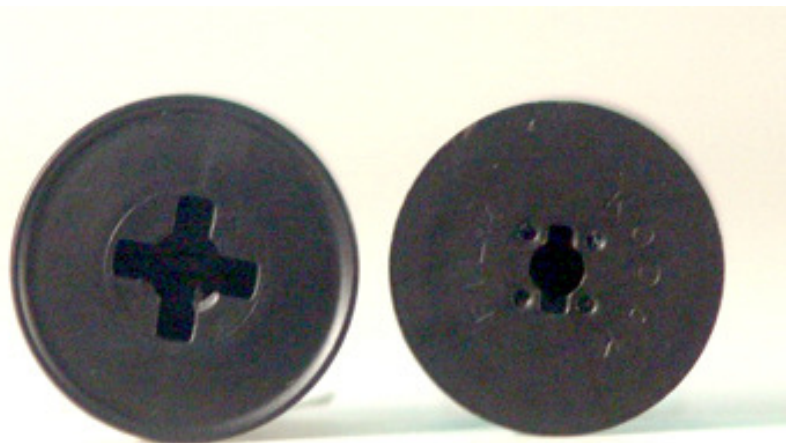
Converting that 616 Folding Camera for “Panoramic” Photography

I'd be willing to bet that among those antique camera aficionados, who delight in actually taking pictures with some of the favorites in their collection, there is a goodly number who are frustrated by the fact that so many of their fine pieces have been rendered unusable simply because the required film isn't readily available.

But this doesn't have to be the case for anyone who might have an operable 616 camera on their shelf. Take for example this Kodak, 616 Improved Art Deco model -- its Compur-Rapid Shutter, and its Anastigmat f:4.5, 124 mm lens make it an excellent candidate for conversion to panoramic photography, i.e., panoramic of a sort.



Pay no mind that the camera's prescribed film (616) hasn't been around since 1984, because 120 film is still with us today. However, 120 film just happens to come on a spool whose length is roughly 1/4 inch shorter than the that of a 616 film spool, and in addition, its end-flange-diameter is a 1/32 of an inch larger than what is found on the 616 film spool.

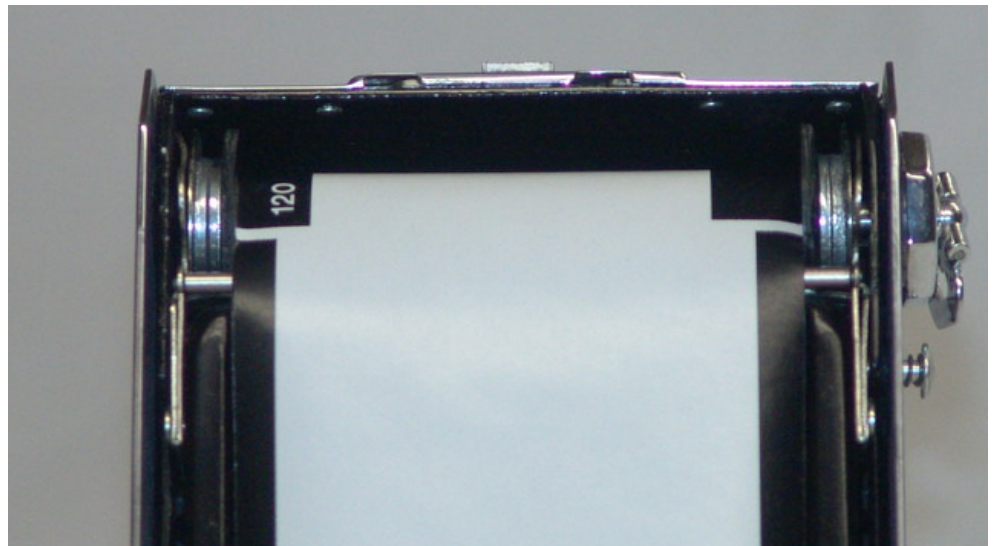


(Specifically, the Ilford 120 spool, which was shown above, has a length that is 0.274 inch shorter than the 616 spool, and a flange diameter that is .037 inch larger than that on the 616 spool.)

Fortunately, these two differences can be easily overcome with the use of two pair of home-made spool adapters, which can compensate for the length difference, along with the simple act of trimming the flanges of the 120 spool with a larger toe nail clipper (the kind with a concave cutting edge.) Of course this trimming is required on both the supply spool, and also on the take-up spool.



As a result of using two pair of adapters, and trimmed down the spool flanges, that Kodak, 616 Improved Art Deco when fully loaded with 120 film, will be made to look like this:



Hardware and Tools

The hardware needed for those adapters isn't very hard to come by – :

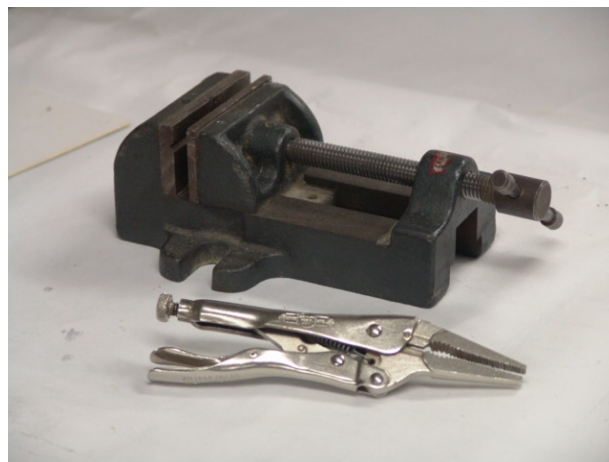


each pair of adapters requires one old fashioned 620 spool (certainly not foreign to a real camera collector), and four, standard 1/4 inch washers (the kind that's found at the local hardware supply store.)

Then, as for tools, a “Dremel” with a large cut-off wheel, and a tungsten-carbide bit are suggested.



And although, not entirely necessary, some “crazy glue” is helpful when assembling the adaptor. And finally, a small vice-grip pliers, or perhaps, more ideally, a small machinist vise is needed.



Making the Adaptors

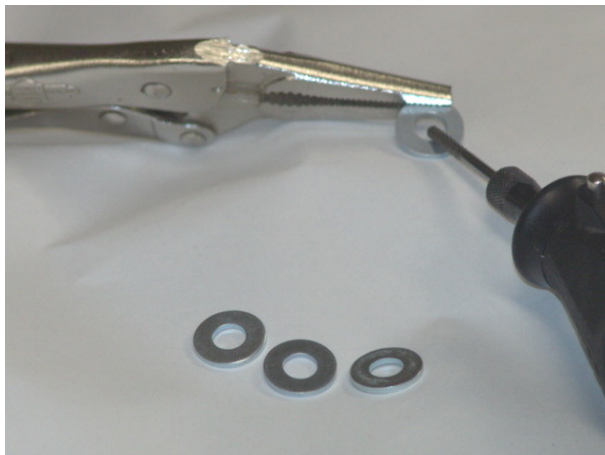
- 1) Using the Dremel cut-off wheel, cut the 620 spool, in two pieces. (An approximate 50-50 cut will be sufficient.)



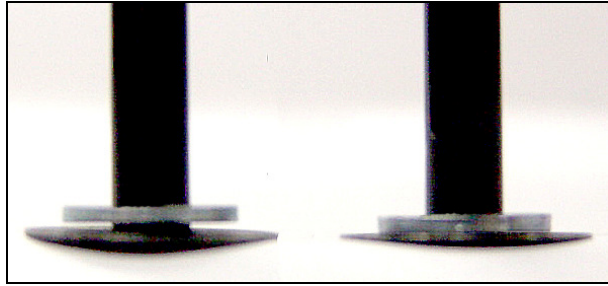
- a) As previously, stated, each pair of adaptors will require four washers. It is necessary that two of these washers be provided with a generous bevel on one side.



- b) This chamfer is produced with the Dremel tungsten-carbide bit while the washer is firmly secured with either with the vice-grip pliers or with the small machinist's vice,



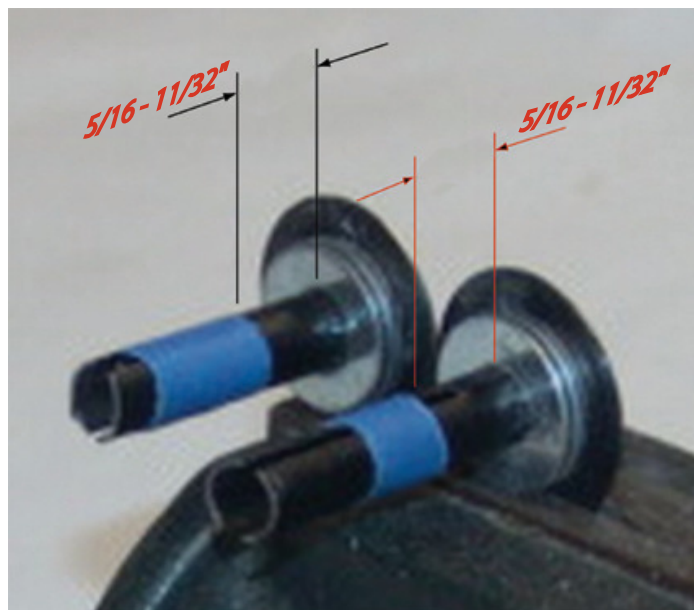
- c) The chamfer will assure that, during the assembly (described in the next step), the washer will not hang up on the flange indentations which secure the flange and axle together, but rather will seat properly against the flange of the 620 spool..



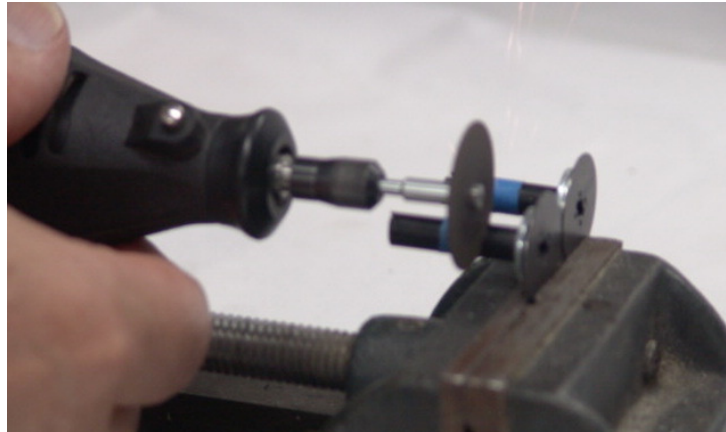
- 2) Place a tiny drop of “crazy-glue” on the inner surface of the spool flanges and then assemble one of the chamfered washers on to each spool half, with the chamfer being placed against the flange. Apply another drop of “crazy-glue” on the first washers and complete the assemblies by placing the second washer upon the first one.



- 3) Sizing the length of the washer/spool assembly:
a) With a piece of masking tape, indicate an axial distance along the spool of approximately $5/16$ to $11/32$ inch from the surface of the inner washer



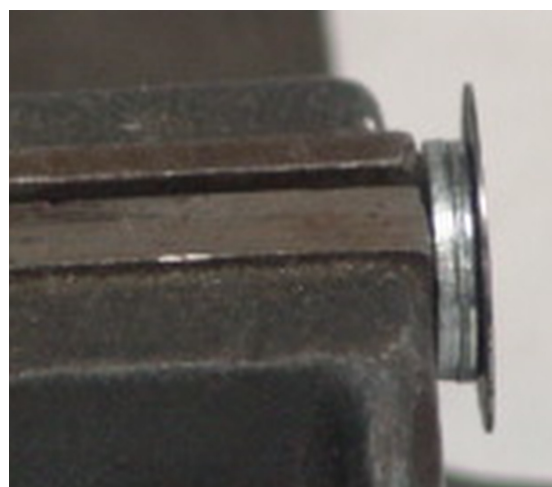
b) Using the tape as a guide cut the axle of the spool to the length indicated by the tape.



4) In the following steps, the axle of the washer/spool assembly, which was just cut to length in step 3b, will be compressed into the rectangular-like shape shown below.

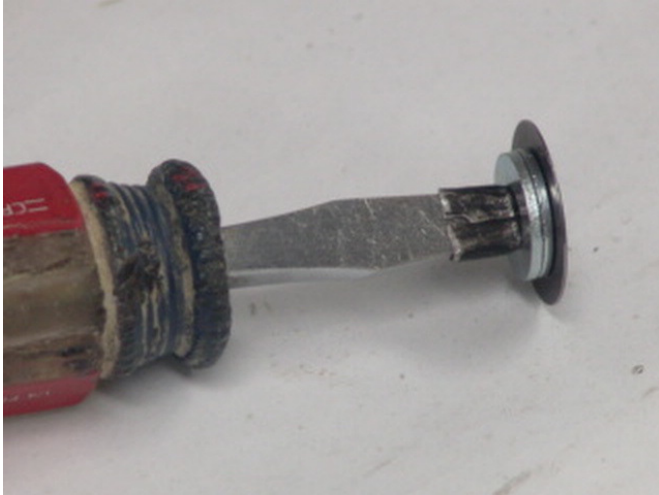


a) Place the surface of the inner washer flush against the end face of either the pliers or the vise, and carefully begin to compress the axle of the spool.

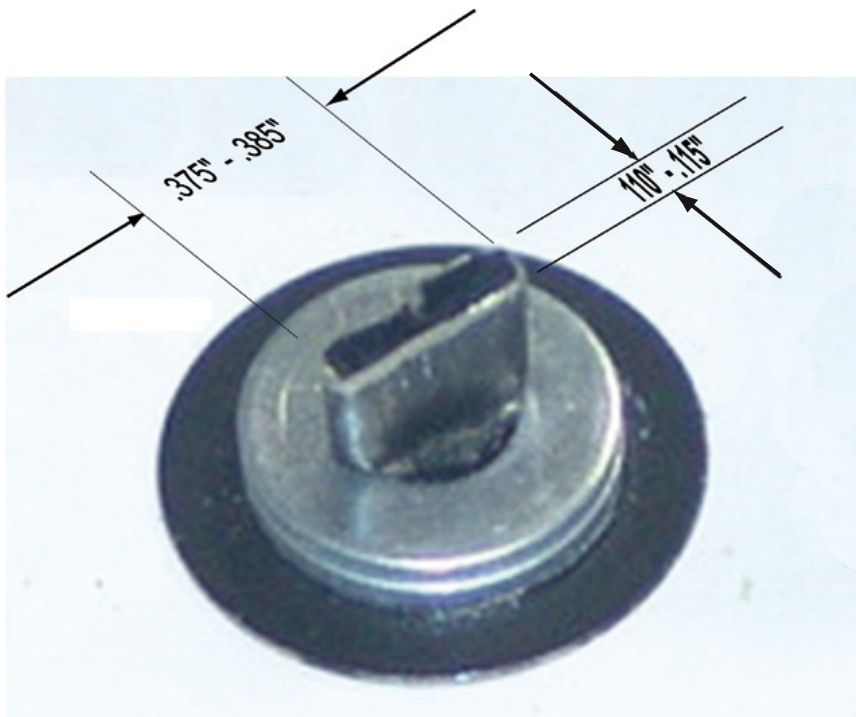


+

- b) After the initial stage of the compression process (i.e., when the axle's shape has gone from a circle to an oval), the tip of a screwdriver should be placed into the axis opening in order to insure the rectangular shape is not distorted during the remainder of the compression process. The tip of this tool should be kept in place until the compression is completed.



- c) This last step will also insure the dimensional uniformity of the final shape, which should fall within a length of 0.373" – 0.385" and a width of 0.110" – 0.115"



5) Tips to help insure the success of the finished adaptor:

- a) Although it is not readily noticeable, there is actually a split along the entire length of the spool's axle. This split is always in line with the longer of the two slots in a 620 spool.

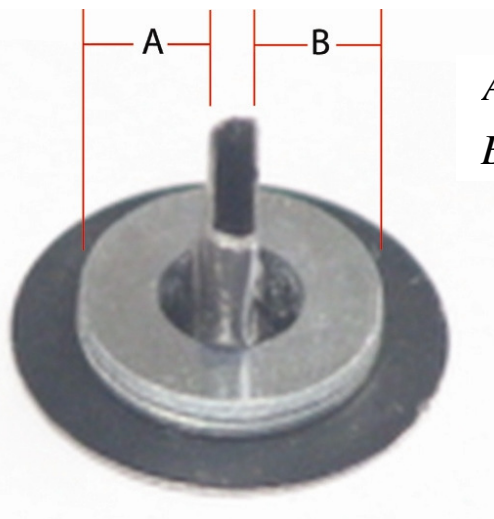


However, this split is decidedly noticeable once the compression step is completed



- b) In order to maintain the dimensional stability of the adaptor's final shape during the compression process, the spool's axle should be positioned in either the pliers or the vise, so that when the compression (step 4a) occurs, the split will eventually reside in the longer of the two dimensions as shown above on the right.

- c) One final caution regarding the lateral placement of the smaller of the two dimensions within the washer's opening: care should be taken during the compression step that the final shape is positioned evenly within the washer. The two dimensions shown below should differ no more than .015 inch.



$$A - B \leq 0.015''$$

$$B - A \leq 0.015''$$

- d) Careful attention to the preceding will assure that once the finished adaptors are inserted into the ends of the 120 film spool and their inner washers are flush up against the spool's end flanges, the axial length of the final assembly (of adaptors and trimmed 120 spool) will be nearly identical to that of an actual 616 film spool. In the example shown below, the final assembly's axial length was within .010" of that of the 616 film spool.

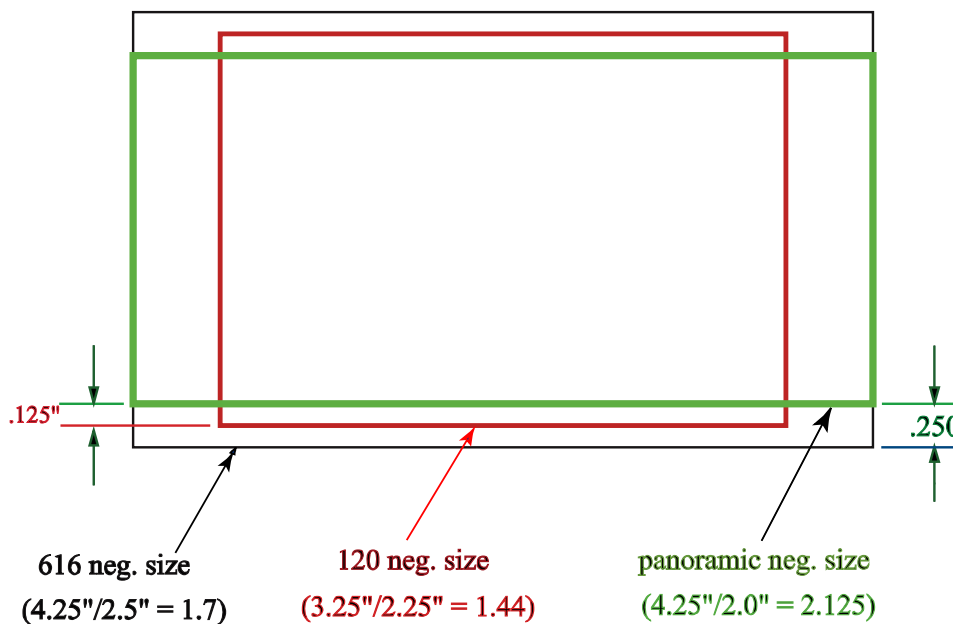


6) **The Film Mask:**

The final step in the 616 conversion is the installation of a film mask.

- a) The three most obvious factors to consider in the design of the film mask are the relative sizes of:
- i) the 616 negative
 - ii) the 120 negative and
 - iii) the desired size of the panoramic negative

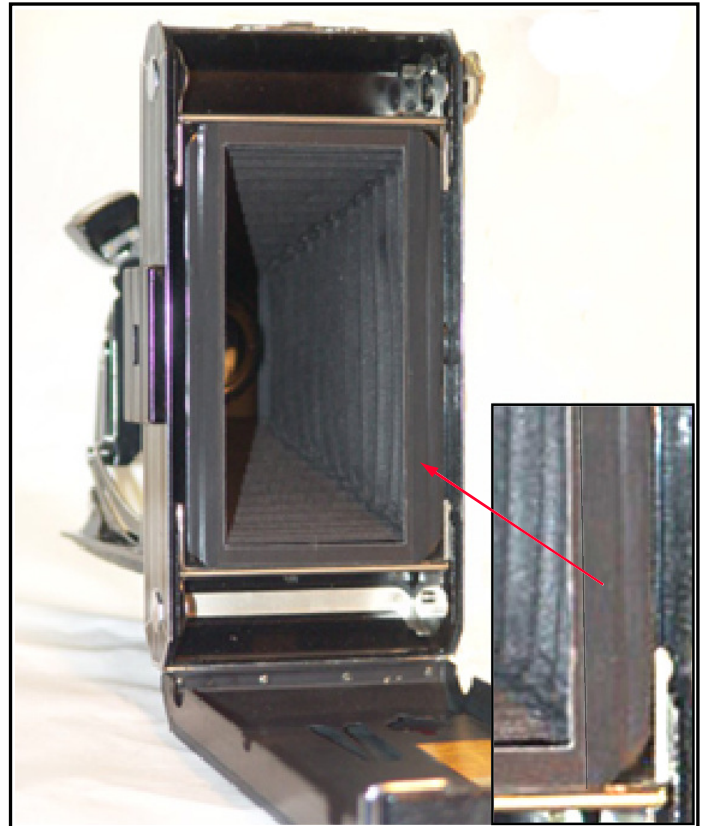
In the following figure, all three sizes are superimposed in the same view. While the aspect ratios of both the 616 and 620 (i.e., 120) negative sizes are given values, the ratio of the panoramic negative is purely a matter of individual taste. In this case, my personal preference was a 4.25" x 2.0" negative with an aspect ratio of 2.125



b) To accommodate the desired panoramic aspect ratio, a mask was cut out to the following dimensions, which yielded the resulting landscape effect:



c) The mask was cut from .040" thick (1.0 mm) black Styrene Sheet (Item No. 9515 by Evergreen Scale Models, Inc.; purchased from Hobbyline.com.)



d) The mask is mounted using only double sided tape at each of its four corners. However, in order to prevent any light from leaking past the long edge of the mask, a strip of black electrical tape was placed over the joint between the mask and the body as shown in the right hand view above.

7) **The View-Finder Mask:**

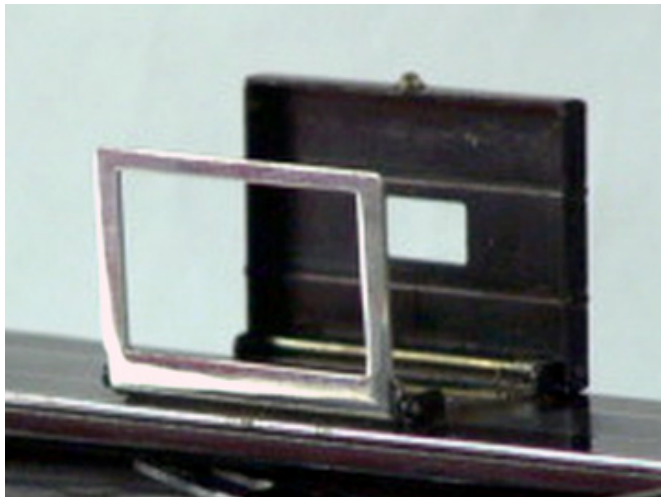
Like most of the 616 “folders” of its vintage, this Improved Art-Deco, has both a metal-frame view-finder and an optical “lantern” view finder.



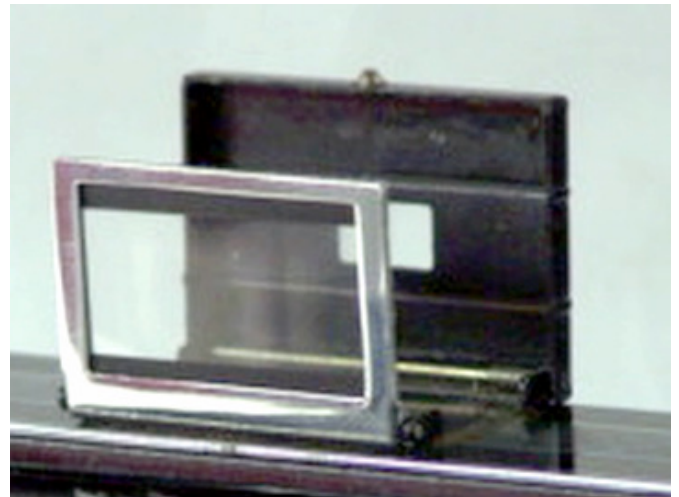
Admittedly, the necessity for masking both, or even just one of these view-finders is certainly a point that is open to discussion. However, for the purpose of presenting a total procedure in this conversion process, the following steps outline how these view-finders can be masked in order that they reflect an accurate view of the scene which is being recorded in a panoramic format.

a) **Metal Frame View-finder**

If the user feels the need to mask this item, the following relatively simple procedure can be used to provide that component with an appropriately sized mask as seen in the “before and after” views below.



View 1, Unmasked View-finder

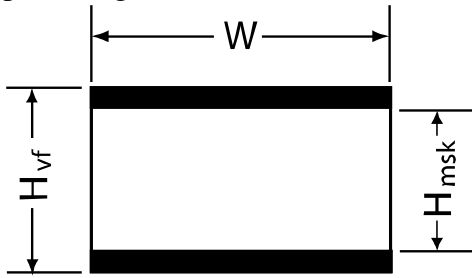


View 2, Masked View-finder

- i) The first step requires measuring the width of the inner opening in the forward element of the two piece, view-finder, i.e., the right to left dimension of that opening. Since the panoramic format yields the same negative length as of a 616 negative length, this dimension is actually the width of the mask for this viewfinder.

- ii) Divide the measured width-opening by 2.125, i.e., the aspect ratio of the panoramic mask discussed in step 6)a)iii). The result is the required height of the view finder.

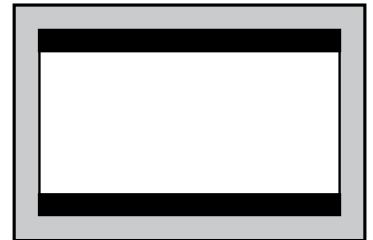
Below is a scaled graphic of the masked which was mounted on the view finder as shown in the preceding View 2.



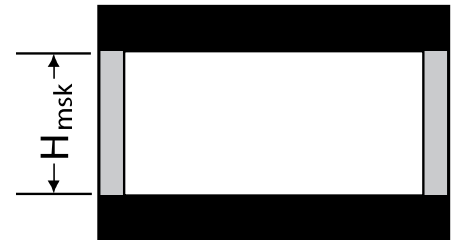
W = Width of View Finder-Opening
 & Width of Panoramic Mask
 H_{vf} = Height of View-finder Opening
 H_{msk} = Height of Panoramic Mask = $W/2.125$

- iii) As for mounting this mask, there are several options available. Two of which are as follows:

(1) The option which I chose for this project (shown in View 2 on page 11) was to print the above mask on transparency film with a laser jet printer. Using vector-based drawing software (in my case, Adobe Illustrator), I was able to create a precise layout of the mask to the dimensions determined in steps 7)a)i) & ii). When drawing the mask, I added a border around the mask that was equivalent to the width of the forward element of the view finder. With the use of double-sided tape, placed on the border, the mask was easily mounted onto the view finder's frame.

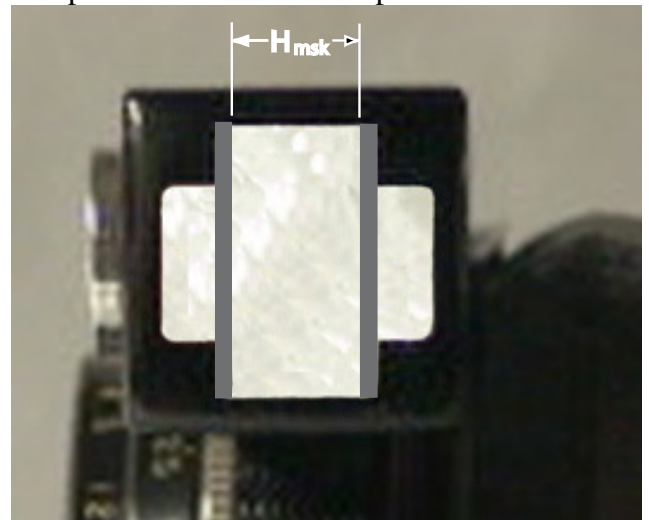
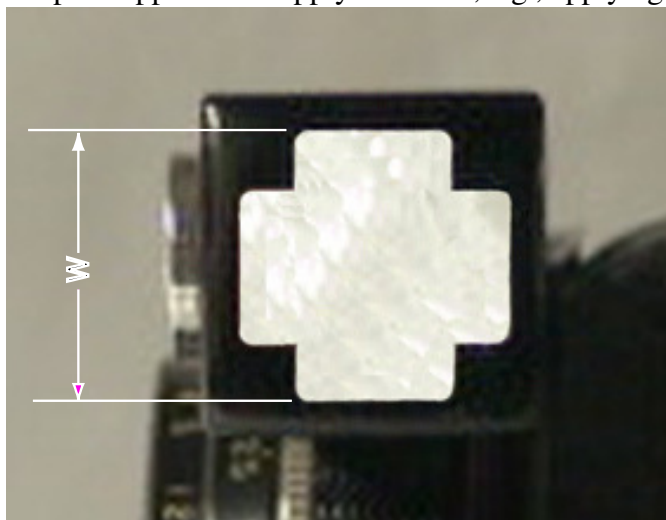


(2) A second, and certainly less elaborate option, would be to simply mount two strips of black construction paper onto the top and to the bottom surface of the view-finder frame, while carefully maintaining a distance between the two pieces is equal to the height of the mask, previously determined in step 7) a) i) ii).



b) Optical - Lantern View-finder

If one chooses to mask this element, Step 7)a)i) & ii) apply in determining the height of the mask. However, because of the relatively small size of the finder's viewing area, one should consider the simplest approach to apply the mask, e.g., applying two strips of a dark colored tape



8) **Advancing the film**

When a 616 camera is loaded with 120 film, the camera's little red observation window will actually display the 120 film's number sequence which is intended for 16 exposures, i.e., the 4½ cm x 6 cm format.

- a) Load the 120 film into to camera as shown in the two photo's on the lower half of page 2
- b) Close the camera back and advance the film to reveal the No. 3 in the red observation window.
You are now ready for the *first* exposure.
- c) Advance the film to a point midway between 5 & 6, i.e., the 5½ position, for the *second* exposure.
- d) Advance the film to the 8 position for the *third* exposure
- e) Advance the film to the 10½ position for the *fourth* exposure.
- f) Advance the film to the 13 position for the *fifth* exposure.
- g) Advance the film to the 15½ position for the *sixth* and final exposure.

Note:

In step 8b, when advancing the film to reveal the No. 3, be sure to count the number of indicators that occur between no.'s 1 and 2. As an added precaution, recheck the count as you advance the film from No. 2 to No. 3. Knowing the number of indicators that are present between the exposure numbers will enable you to identify the half-way position required in steps 8c, 8 e and 8g

. PETER A. LERRO, Sr., August 10, 2008