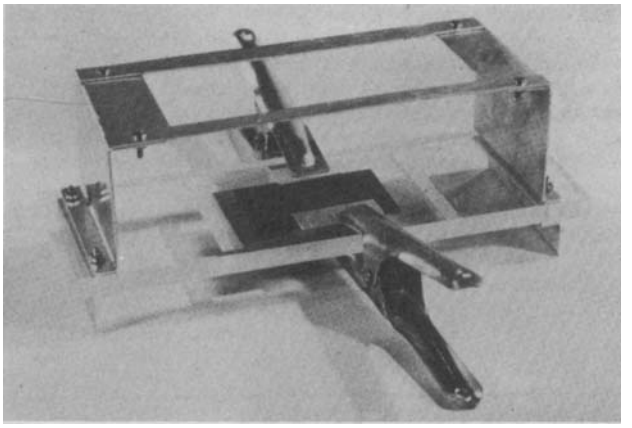

FIGURE 3

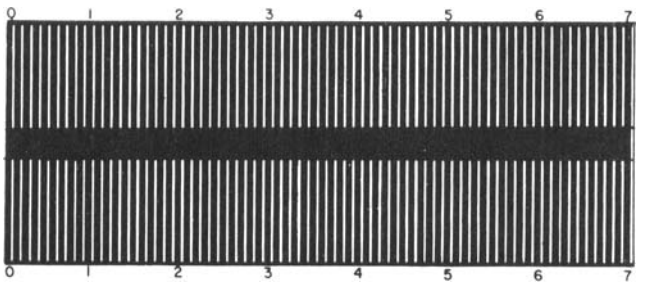

FIGURE 4

resist can be observed at this point. The resist must now be developed using the black Kodak photo resist dye. Some kind of shallow container can be used for holding the dye, as a small amount is all that is needed. The entire specimen need not be submerged in the dye; only the side with the resist need be covered. The specimen should remain in the dye for about 30 to 60 seconds. The specimen is then removed from the dye and is rinsed with 75 F to 80 F slowly-running water. Do not use warmer than 75 F to 80 F water as it will tend to lift the image off the specimen. Blot the image lightly with paper towels or Kleenex tissue to remove water spots. The image should be sharp and distinct, as illustrated in Figure 4.

Photographing Photoelastic-coating Patterns

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The conventional systems for photography of the isochromatic fringe patterns in photoelastic coatings, while excellent in most respects, can become rather awkward to use on large, complex structures such as aircraft landing gears where tripod mounting of the system is impractical.

In order to facilitate the photography of these patterns, our photographers modified a commercial "ring" strobe lamp unit so that it could be screwed onto the various lenses for a Hasselblad 500EL camera. A sheet of HNCP37 circular polarizer was cut slightly smaller than the outside dimensions of the strobe unit. A central disc with a diameter equal to the outside diameter of the largest lens was scribed in the polarizer and indexed. This disc was then cut out and sandwiched between thin glass discs with epoxy optical cement. The square of polarizer was mounted behind a 1/16 inch thick plexiglass scratch shield with the quarter-wave side away from the camera body. The central disc was then bonded to the strobe with the quarter-wave material on the same side but rotated through 90 degrees from its original orientation as identified by the index marks.

Optically, this rotation changes the system from a parallel element, dark-field polariscope to a crossed element, dark-field polariscope with closely matched quarter-wave plates. Zero order fringes (isotropic points) will now appear as crisp, black areas in the photographs and the color quality and sharpness of the colored fringes will be independent of the camera and strobe orientation.

Utilizing extension tubes and/or short focal length lenses, this unit is surprisingly effective for close-ups in tight quarters and can be operated quite rapidly if the unit is prefocused and the lens preset for a single working distance. This strobe unit can be used with virtually any camera, but is particularly convenient with cameras of the single lens reflex type.