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3.14 MANIPULATION OF STRESSED SAMPLES FOR OBSERVATION IN THE SEM -- R.J. Carroll and F.P. Rorer, Eastern Regional Research Center, Agricultural Research Service, U.S. Department of Agriculture, 600 E. Mermaid Lane, Philadelphia, Pennsylvania 19118.

A special clamping device (Fig. 1, 2) has been built to hold under tension biological specimens during processing and observation. The design of the holder permits the samples to be carried through fixation, dehydration, critical point drying, metal coating and observation in the SEM while in the original extended position. The clamping device measures 1" diameter x 1/2" high, with two spring-loaded, serrated pivoting clamps (Fig. 1). The device fits into a 1-1/4" O.D. spacer for use with the 37mm specimen holder (Fig. 2) on the JEOL 50A SEM; three of them can fit into the bomb chamber of a Denton critical point (CP) dryer. Dimensions of the clamping device can be modified to fit other CP dryers and specimen holders of other scanning electron microscopes.

Specimens which have been experimentally extended on any type of tensile instrument can be transferred to the clamping holder by a specially designed device (Fig. 1, 2) which clamps onto the extended specimen for maintaining tension during the transfer to the clamping holder. The transfer holder consists of two hemostats: one silver-soldered to a fixed position on a support (Fig. 1); the other mounted on a movable base, positioned relative to the support by an adjustable

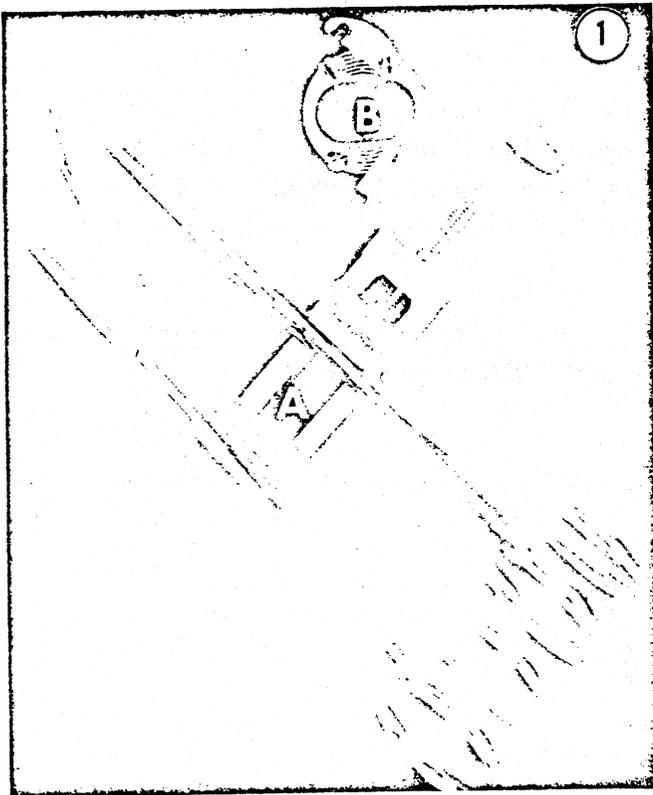


Fig. 1 Simulation of extended tissue (arrow) held in the transfer device (A) prior to insertion in the clamping device (B).

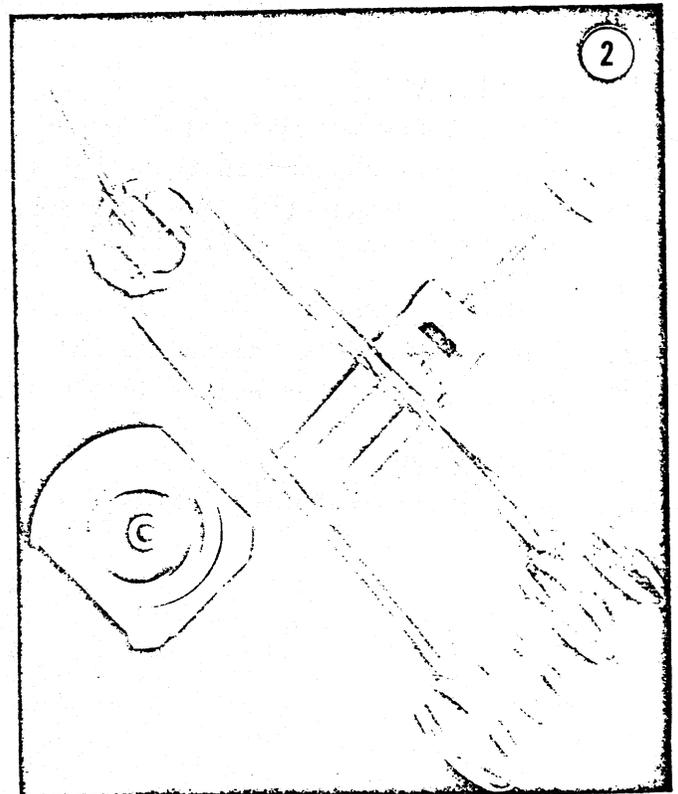


Fig. 2 Tissue secured in the clamping device (arrow) prior to insertion into the SEM specimen holder (C).

screw. The hemostats can be separated from 1/4" to 1-1/4". The transfer device clamps onto extended specimens (Fig. 1) thereby maintaining the proper tension during the transfer of the tissue to the clamping device (Fig. 2). The clamping device can hold the tissue during processing as previously mentioned prior to placing it in the SEM specimen holder (Fig. 3).

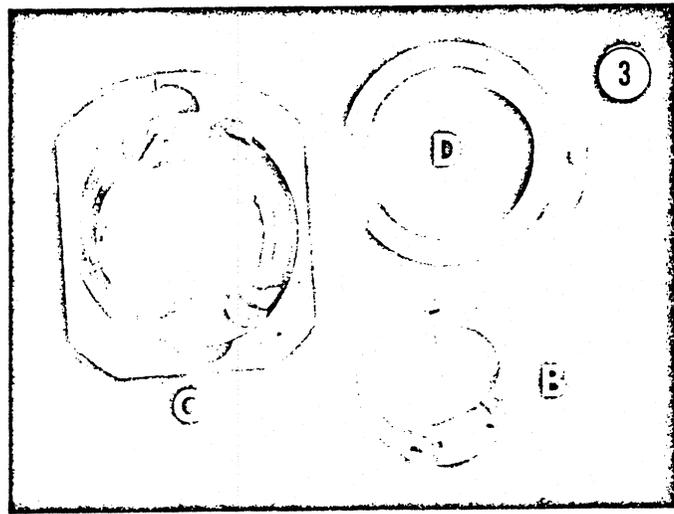


Fig. 3. Clamping device (B), spacer (D) holder prior to placement in the JEOL 50A specimen holder (C).

These two devices have been in use in our laboratory for the study of bovine muscle stressed under a variety of conditions.

The authors thank Joseph Skasko and the Instrument Shop for the construction of these devices.

The mention of commercial items is for your convenience and does not constitute an endorsement by the Department of Agriculture over other items of a similar nature not mentioned.

3.15 RESOLUTION - OPERATOR OR INSTRUMENT LIMITED? -- E. L. Thurston, Electron Microscopy Center, Biology Department, Texas A & M University, College Station, Texas 77843.

A major concern of potential purchasers of a SEM and a continuing problem for operators is the resolution performance of the instrument. The numerous control settings on the JSM-35 or any SEM permit almost infinite versatility in setting up the SEM for use on a variety of samples. These variables must be optimized for maximum performance from various sample types (see JEOL Newsletter, Vol. 2, Number 1, pages 4-7). The average SEM operator usually employs a limited number of instrument settings and samples and is usually satisfied with the results. Ideally, every operator should possess the knowledge and expertise to