

Specification 5100-316e  
August 1997  
Superseding  
Specification 5100-316d  
November 1981

**UNITED STATES DEPARTMENT OF AGRICULTURE**  
**FOREST SERVICE**  
**SPECIFICATION FOR**  
**SHEATHS, PLASTIC, HAND TOOL**

1. SCOPE.

1.1. Scope. The plastic tool sheaths described in this specification are used to cover the sharp edges of hand tools, thereby preventing injury to work crews. Sharp edges are vital in wildland fire fighting, but must be protected and ready for immediate use. These plastic tool sheaths are designed for the Pulaski, double-bit ax, shovel, brush hook, and McCleod. Tool sheaths consist of one or two injection molded sections fastened together with an integrally designed buckle and strap.

2. APPLICABLE DOCUMENTS.

2.1. Government Documents. The following specifications, standards, and handbooks form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those in effect on the date of the invitation for bids or request for proposals (see 6.2).

Federal Standard

FED-STD-595 - Colors

Copies of federal standards are available from General Services Administration, Federal Supply Service Bureau, Specification Section, Suite 200, 470 East L'Enfant Plaza SW, Washington DC 20407

2.2. Non-Government Documents. The following specifications, standards, and handbooks form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those in effect on the date of the invitation for bids or request for proposals (see 6.2).

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Beneficial comments, recommendations, additions, deletions and any pertinent data that may be used in improving this document should be addressed to: USDA Forest Service, San Dimas Technology and Development Center, 444 East Bonita Avenue, San Dimas, CA 91773-3198 by using the Specification Comment Sheet at the end of this document or by letter.

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American National Standards Institute Inc. (ANSI)/American Society For Quality Control (ASQC)

Z 1.4 - Sampling Procedures and Tables for Inspection by Attributes.

Address requests for copies to the American National Standards Institute Inc., 11 West 42nd Street, New York, NY 10036.

American Society for Testing and Materials (ASTM)

D 412 - Standard Method of Tension Testing of Vulcanized Rubber

D 2240 - Standard Method of Test for Indentation Hardness of Rubber and Plastics by Means of a Durometer.

E 380 - Practice for Use of the International System of Units.

Address requests for copies to American Society for Testing and Materials, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959.

Non-Government standards and other publications normally are available from the organizations that prepare or distribute the documents. These documents also may be available in or through libraries or other informational services.

2.3. Order of Precedence. In the event of conflict between the text of this document and the references cited herein, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

### 3. REQUIREMENTS.

3.1. Construction. Tool sheaths shall be produced by injection molding from Government furnished molds. Construction shall be as shown in Figures 1 through 13. Line drawings and overall dimensions of the individual parts are for information. Actual details are provided with the mold. The sheath is composed of a strap and a buckle section riveted together with oval head rivets and washers.

3.1.1. Sheath Type and Configuration. Tool sheath types and configurations are as indicated below:

- a. Pulaski sheath - See Figures 1 and 2 for configuration.
- b. Double-bit ax sheath - See Figures 3 and 4 for configuration.
- c. Shovel sheath - See Figures 5, 6 and 7 for configuration.
- d. Brush hook sheath - See Figures 8, 9 and 10 for configuration.
- e. McCleod sheath - See Figures 11, 12 and 13 for configuration.

3.2. Material. Where more than one type of material is used in various components, there shall be no incompatibility between materials which may cause corrosion.

3.2.1. Sheath Material. Plastic sheath material shall be made of urethane elastoplastic polymer, and shall meet minimum physical properties as indicated in Table 1. These properties are determined after a cure of 16 hours at 230.0 F (109.9 C).

Table 1. Physical Properties of the Urethane Elastoplastic Polymer Material

Physical Properties	Values
Ultimate Tensile Strength, Straight Specimen	3,000 psi minimum (20.7 MPa)
Hardness, Shore Type A, Durometer	90 $\pm$ 5 durometer minimum
Ultimate Elongation	475 percent minimum

3.2.2. Fastener Material. Fasteners shall be zinc coated steel rivets and washers. Rivet size shall be oval head 3/16 inch (4.76 mm) and tubular size 1/4 inch (6.35 mm) grip length for the Pulaski, double-bit ax, shovel and McCleod sheaths, and tubular size 1/2 inch (12.7 mm) grip length for the brush hook sheath. The washer shall be zinc coated No. 10, for a 3/16 inch (4.76 mm) bolt size.

3.2.3. Recoverable Materials. The contractor is encouraged to use recovered materials to the maximum extent practicable, in accordance with paragraph 23.403 of the Federal Acquisition Regulation (FAR), provided all performance requirements of this specification are met.

3.3. Dimensions. Dimensions shall be as shown in Figures 1 through 13. Overall dimensions of the individual parts are for information. Actual details are provided with the mold.

3.3.1. Dimensional Tolerance.

3.3.1.1. Decimals. Unless otherwise noted, the following tolerances apply: one place (x.x)  $\pm$  0.1 inch (2.5 mm); two places (x.xx)  $\pm$  0.01 inch (0.25 mm) and three places (x.xxx)  $\pm$  0.010 inch (0.254 mm).

3.3.1.2. Fractions. Unless otherwise noted, the tolerances for fractions shall be  $\pm$  1/32 inch.

3.4. Workmanship. Workmanship shall be equal to the best commercial practices consistent with the highest engineering standards in the plastics industry and shall be free from any defect which may impair serviceability or detract from the product's appearance. All component plastic parts must be fully and completely formed from the mold. Excessive material on edges shall not be allowed. The sheaths shall be free from any defects such as blisters, pinholes, pits, sink marks, crazing, wrinkles, voids, foreign material, or cracks. The surface shall be smooth and tack free.

3.4.1. Symmetry. The plastic sections shall be symmetrical and concentric to 0.060 inches (1.52 mm) around all folding lines and symmetrical sections.

3.5. Color. The color of the sheath shall approximately match color number 12199 of Federal Standard FED-STD-595.

3.6. Compression Mold. The Government will furnish an injection mold which is suitable for use with a 300 ton (2.67 MN) injection molding machine or comparable press.

3.6.1. Maintenance of Compression Molds. The contractor with possession of the molds shall be responsible for care of the molds. This care shall include but not be limited to the following:

- a. Keep parting lines clean at all times.
- b. Conduct a daily visual inspection of all moving parts such as the injector pins, guide pins, and bushings that line up the molds.
- c. Grease the leader pins daily with an appropriate lubricant. This may be done while the molds are in the press.
- d. Make sure the vents are clean at all times.
- e. Remove the mold, clean and dry out all the water lines. Wipe down the parting lines after a production run and give the mold, including the water lines, a moisture resistant, non-corrosive coating.

3.7. Marking. The letters FSS are engraved into the mold and shall be legible on the formed sheaths.

3.8. Metric Products. Metric dimensions are provided for information only, inch-pound units shall be the required units of measure for this specification. Products manufactured to metric dimensions will be considered on an equal basis with those manufactured using inch-pound units, provided they fall within the tolerances specified using conversion tables contained in the latest revision of ASTM E 380, and all other requirements of this specification are met.

#### 4. INSPECTION, SAMPLING AND TEST PROCEDURES.

4.1. General Inspection and Tests. Unless otherwise specified in the contract or purchase order, the contractor is responsible for performance of all inspection requirements prior to submission for Government acceptance inspection and tests. The contractor may utilize their own facilities or any commercial laboratory acceptable to the Government. Inspection records of the examination and tests shall be kept complete and available to the Government.

4.1.1. Inspection and Test Site. The Government shall conduct lot acceptance inspection and tests to determine compliance with the specification. If lot acceptance and tests are conducted at locations other than the manufacturing facilities, the contracting officer will specify location and arrangements. In the case of on-site inspections at the contractor's facility, the contractor shall furnish the inspector all reasonable facilities for their work. During any inspection, the inspector may take from the lot one or more samples and submit them to an independent test laboratory approved by the Government or to a Government test facility for inspection and tests.

4.1.2. Testing With Referenced Documents. The contractor is responsible for insuring that components and materials used were manufactured, examined and tested in accordance with referenced specifications and standards. The Government reserves the right to perform any of the inspections or tests set forth in this section where such action is deemed necessary to assure supplies and services conform to prescribed requirements.

4.2. Responsibility for Compliance. All items shall meet all requirements of sections 3 and 4. The inspection set forth in this specification shall become a part of the contractor's overall inspection system or quality program. The absence of any inspection requirements in this specification shall not relieve the contractor of the responsibility of ensuring that all products or supplies submitted to the Government for acceptance comply with all requirements of the contract. Sampling inspection,

as part of manufacturing operations, is an acceptable practice to ascertain conformance to requirements, however, this does not authorize submission of known defective material, either indicated or actual, nor does it commit the Government to accept defective material.

4.3. Sampling for Inspection. When inspection is performed, sampling shall be in accordance with ANSI/ASQC Z 1.4.

4.3.1. Lot. All sheaths for one type of tool presented together in one delivery shall be considered a lot for the purpose of inspection. A sample unit shall be one tool sheath.

4.3.2. Sampling for Visual and Dimensional Examination. Sampling for visual and dimensional examination shall be S-2, with an Acceptable Quality Level (AQL) of 1.5 percent.

4.3.3. Sampling for Lot Acceptance Tests. Sampling for lot acceptance testing shall be S-2, with an AQL of 1.5 percent.

4.4. Inspection and Tests.

4.4.1. Visual and Dimensional Examination. When selected in accordance with 4.3.2, each sample sheath shall be visually and dimensionally examined to determine conformance with this specification. Visual or dimensional defects shall be classified as major or minor. A defect not listed in Table 2 shall be classified as a minor defect. If the number of defects in any sample exceeds the indicated AQL, the lot shall be rejected.

Table 2 . Major and Minor Defects

Defect	Classification	
	Major	Minor
1. Sheath assembly not complete.	X	
2. Material and workmanship not as required.	X	
3. Rivets or washers not fastened as required.	X	
4. Color not as required.	X	
5. Dimensions not as required.	X	
6. Excessive material on sheath edges.		X
7. Marking not as required.		X

4.4.2. Lot Acceptance Tests. Each of the samples selected in accordance with 4.3.3, shall be tested in accordance with 4.6, to determine conformance with requirements of this specification. All inspection and testing sample(s) shall stop upon a single failure and the sample(s) rejected. The contractor will be informed as to the nature of the failure, but the Government shall not be obligated to continue testing a defective item, once it is known to be defective or when it is considered in the best interest of the Government.

4.4.3. Quality Conformance Inspection. Unless otherwise specified, sampling for inspection shall be performed in accordance with ANSI/ASQC Z 1.4. The inspection level and AQL shall be as specified in 4.3.3.

4.5. Certificates of Conformance. Where certificates of conformance are required, the Government reserves the right to verify test any such items to determine the validity of certification. These certificates shall be based on the testing of component materials and may be performed by the component material supplier. The contractor shall provide certificates of conformance for all materials used in 3.2.1 and 3.2.2. (see 4.5.4 and 4.5.5.).

4.5.1. Certification. The contractor shall provide certificates of conformance for all materials used in the manufacture of an item. The contractor shall provide the following information on certificates of conformance:

- a. Material description, i.e Aluminum 6061, T6; rubber sheet materials for gaskets
- b. Specification, Standard or Test Method (include type, class, and form when applicable) i.e. ASTM D2240, ASTM D412, or MIL-A-8625, Type III, Class 1
- c. Lot or batch number
- d. Test company name, address, and telephone number
- e. Test technician/Quality Assurance Manager's name and title
- f. Test date

4.5.2. Test Results. The contractor shall maintain complete records, including test results. At the request of the government, the contractor shall provide test results and other records, as described in the certificates of conformance, for all materials used in the manufacture of an item.

4.5.3. Certificates of Conformance in Lieu of Testing. Unless otherwise specified, certificates of conformance may be acceptable in lieu of testing end items.

4.5.4. Sheath Material. As required by 3.2.1, the sheath material shall meet the indicated material physical property requirements listed, when tested to defined test methods indicated in Table 3.

Table 3. Tool Sheath Physical Properties Test Method

Physical Properties	ASTM Test Method
Ultimate Tensile Strength Straight Specimen	D 412
Hardness, Shore Type A	D 2240
Ultimate Elongation	D 412

4.5.5. Fastener Material. As required by 3.2.2, fasteners shall be zinc coated steel rivets and washers. Rivet size shall be oval head 3/16 inch (4.76 mm) and tubular size 1/4 inch (6.35 mm) grip length for the Pulaski, double-bit ax, shovel and McCleod sheaths, and tubular size 1/2 inch (12.7 mm) grip length for the brush hook sheath. The washer shall be zinc coated No. 10, for a 3/16 inch (4.76 mm) bolt size.

4.6. Test Procedure. Finished samples shall be subjected to a visual and dimensional examination as described in 4.4.1.

5. PACKAGING, PACKING AND MARKING.

5.1. Packaging, Packing and Marking. The packaging, packing and marking shall be as specified in the contract or order.

6. NOTES.

6.1. Intended Use. The plastic tool sheaths described in this specification are used to cover the sharp edges of hand tools, thereby preventing injury to work crews.

6.2. Acquisition Requirements. Acquisition documents, such as invitation for bids or request for proposals, should specify the following:

- a. Title, number, and date of this specification.
- b. Type of sheath required.
- c. If certificates of conformance are acceptable in lieu of lot by lot testing (see 4.4.2 and 4.5).
- d. Packaging, packing and marking (see 5.1).
- e. Date of the invitation for bids or request for proposals (see 2.1).

6.3. Notice. When Government drawings, specifications, or other data are used for any purpose other than in connection with a related Government procurement operation, the United States Government thereby incurs no responsibility nor any obligation whatsoever.

6.4. Preparing Activity. USDA Forest Service, San Dimas Technology and Development Center, 444 East Bonita Avenue, San Dimas, CA 91773-3198.





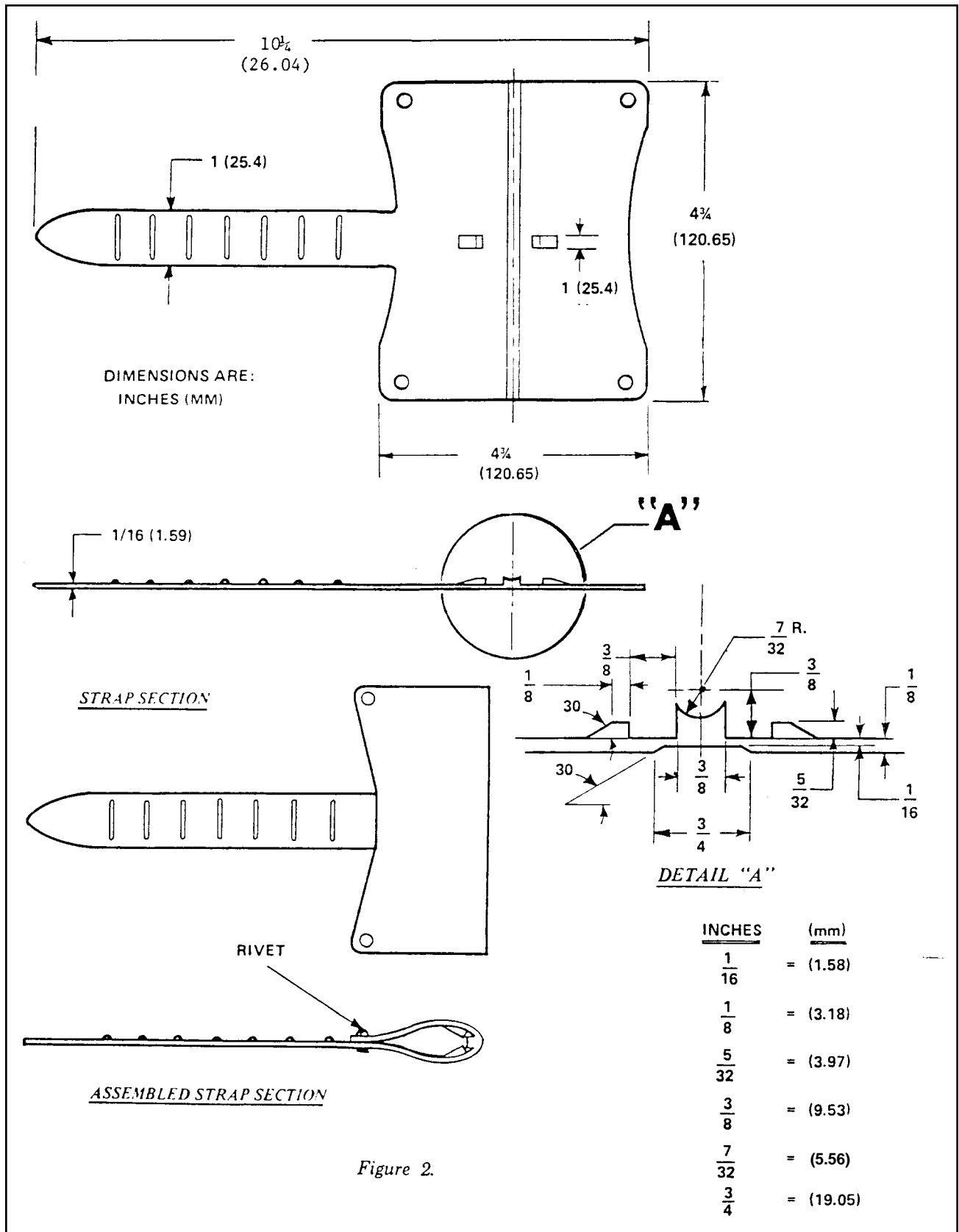


Figure 2.

Figure 2. Pulaski Strap Section.

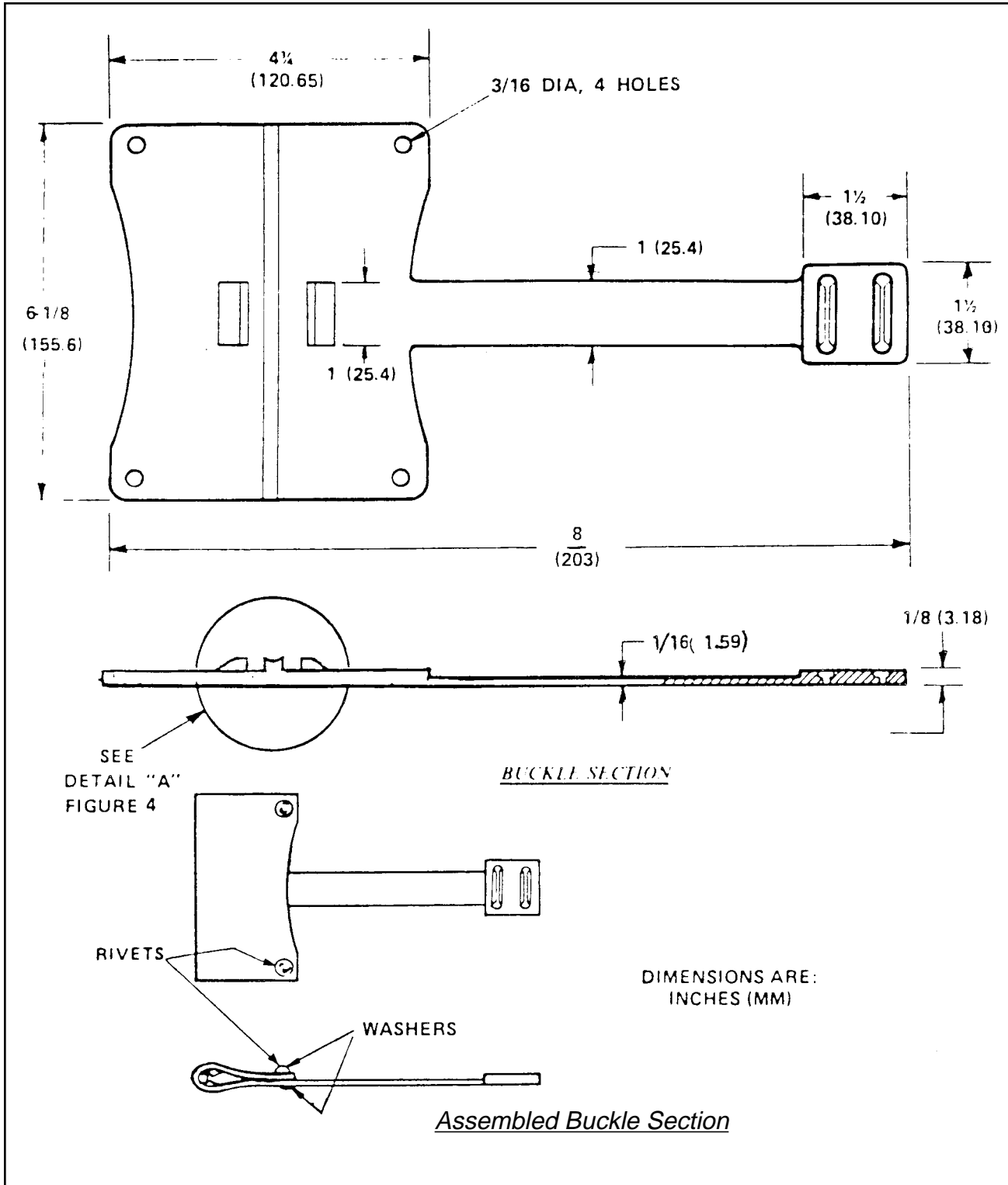


Figure 3. Double-Bit Axe Buckle Section.

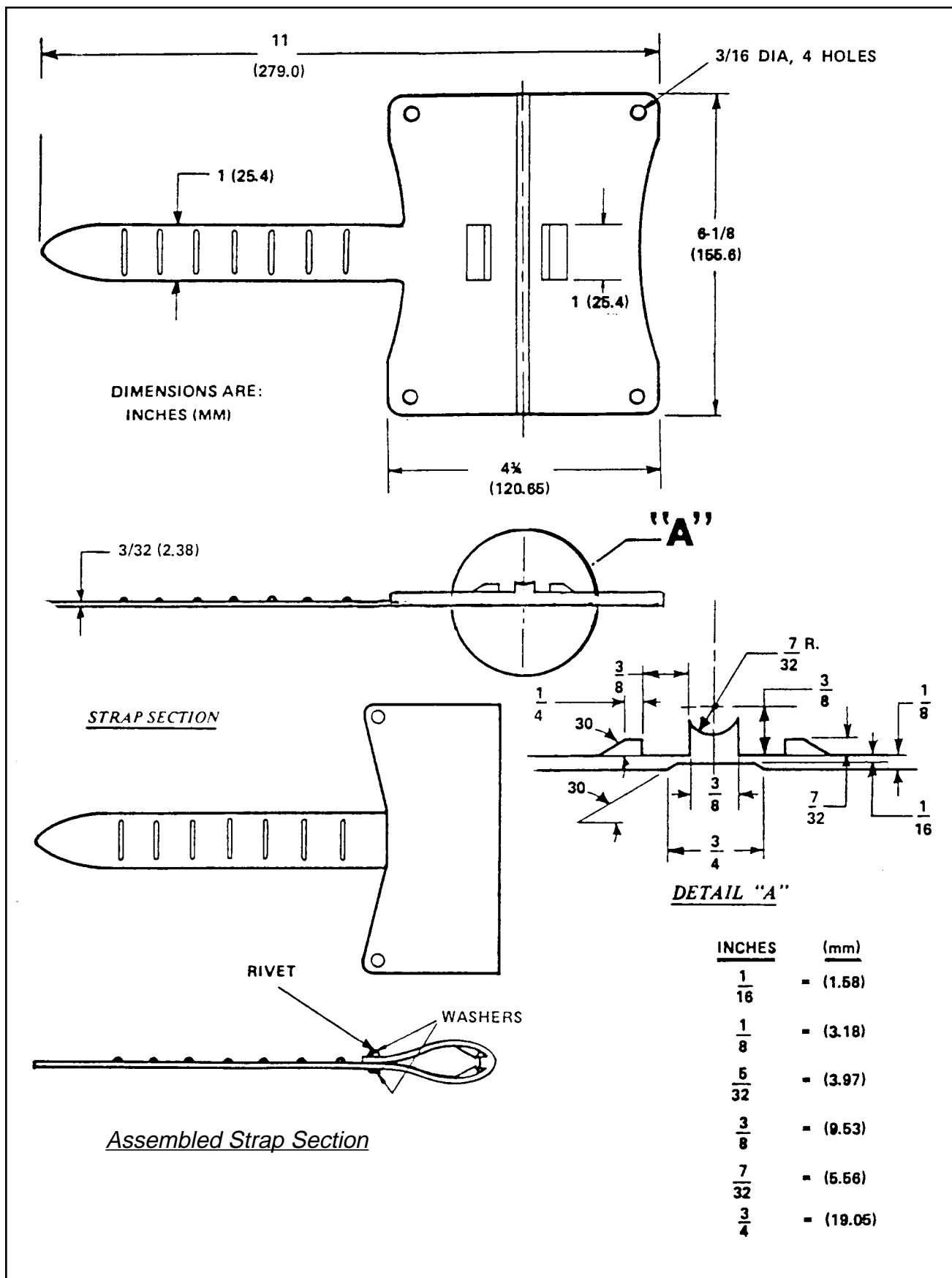


Figure 4. Double-Bit Axe Strap Section.

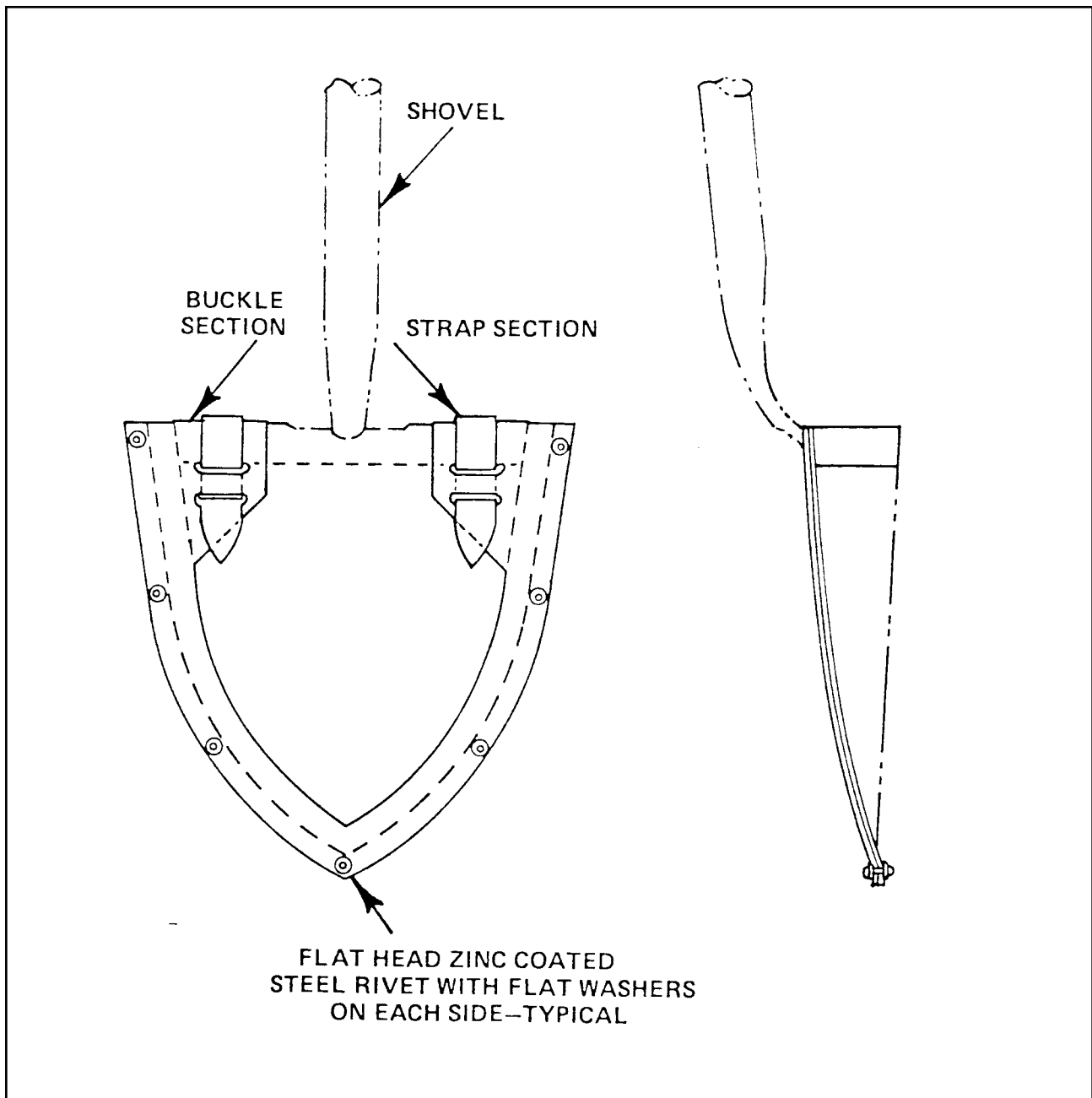


Figure 5. Shovel Sheath.

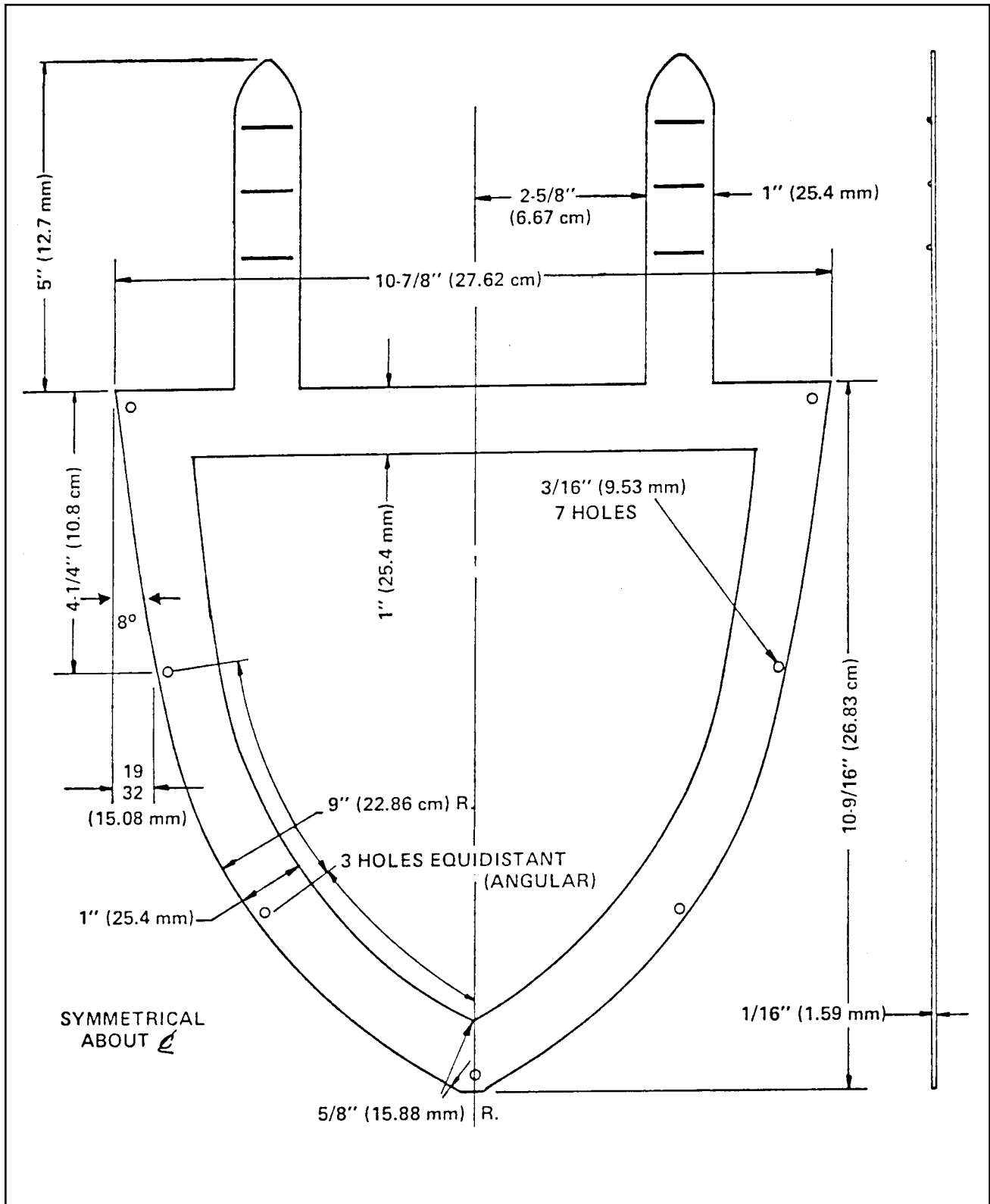


Figure 6. Shovel Strap Section.

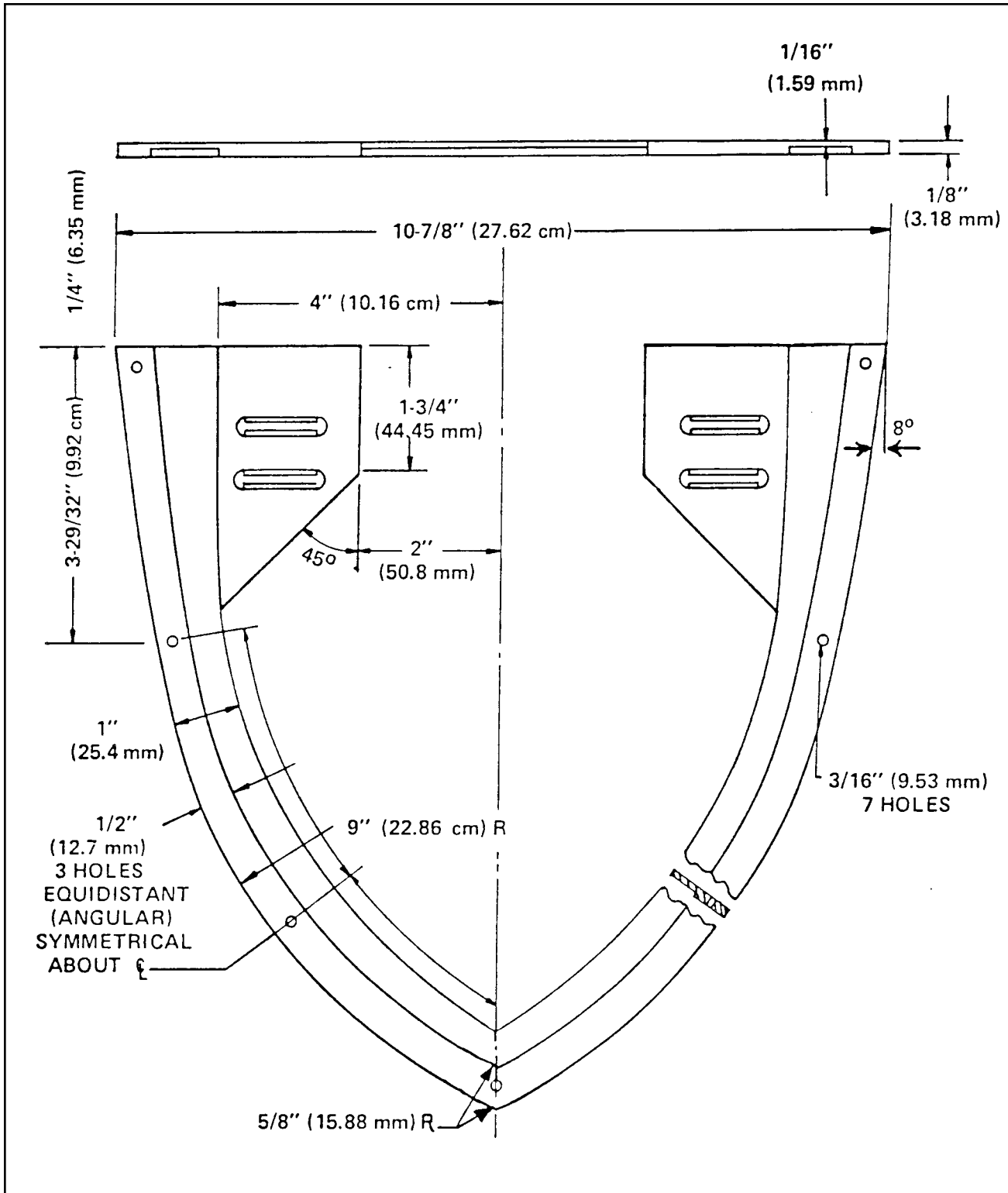


Figure 7. Shovel Buckle Section.

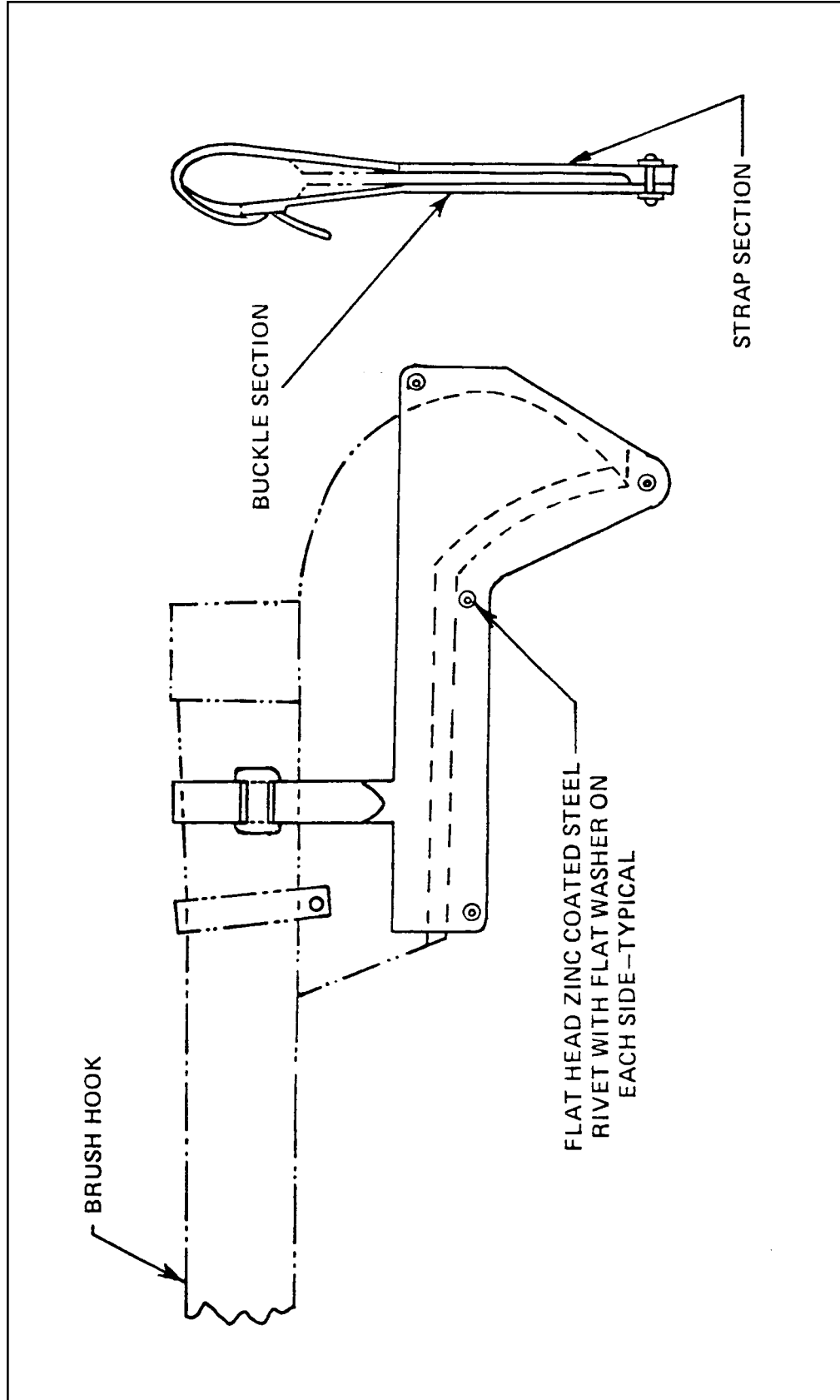


Figure 8. Brush Hook Sheath.

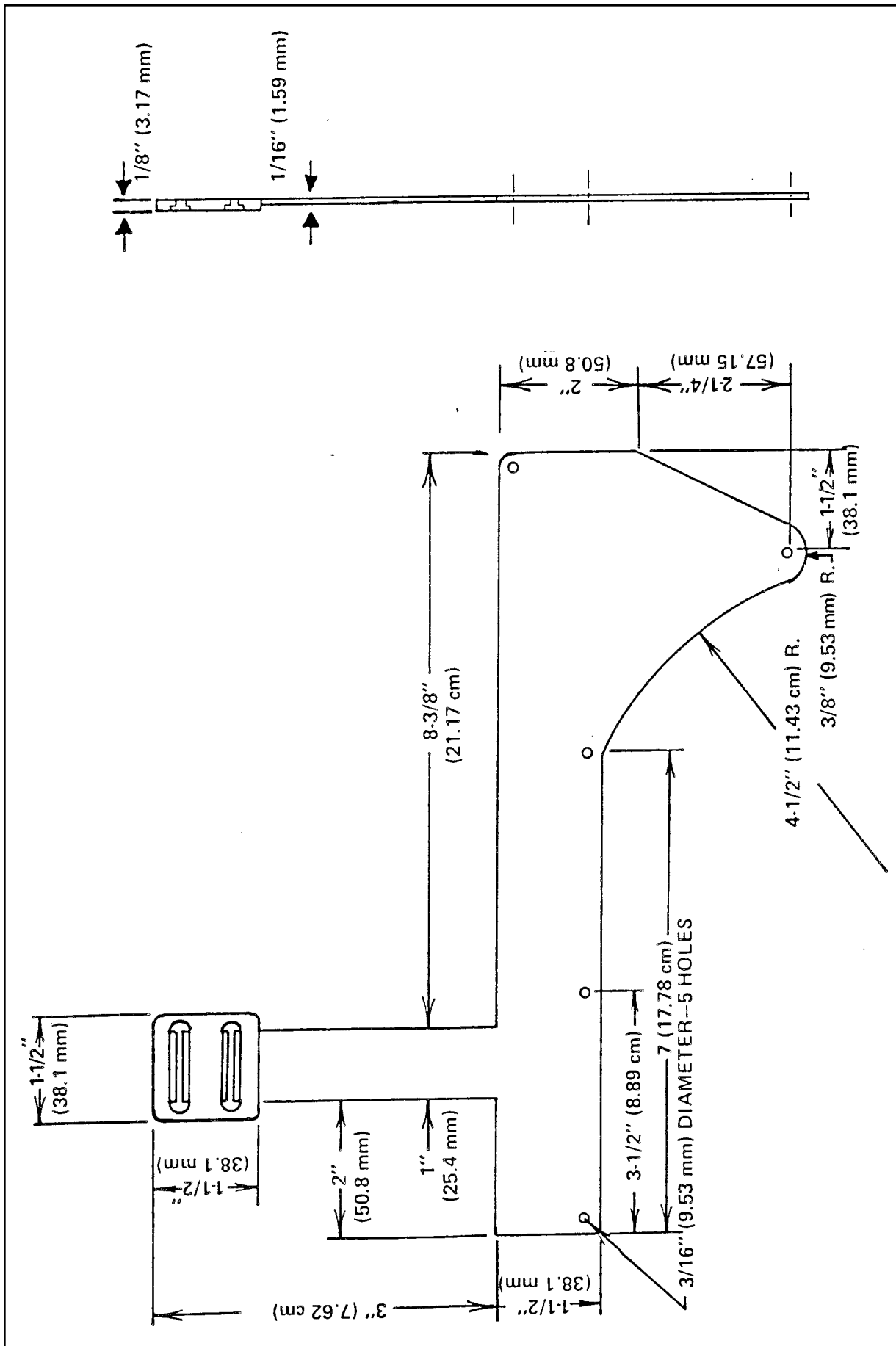


Figure 9. Brush Hook Buckle Section.



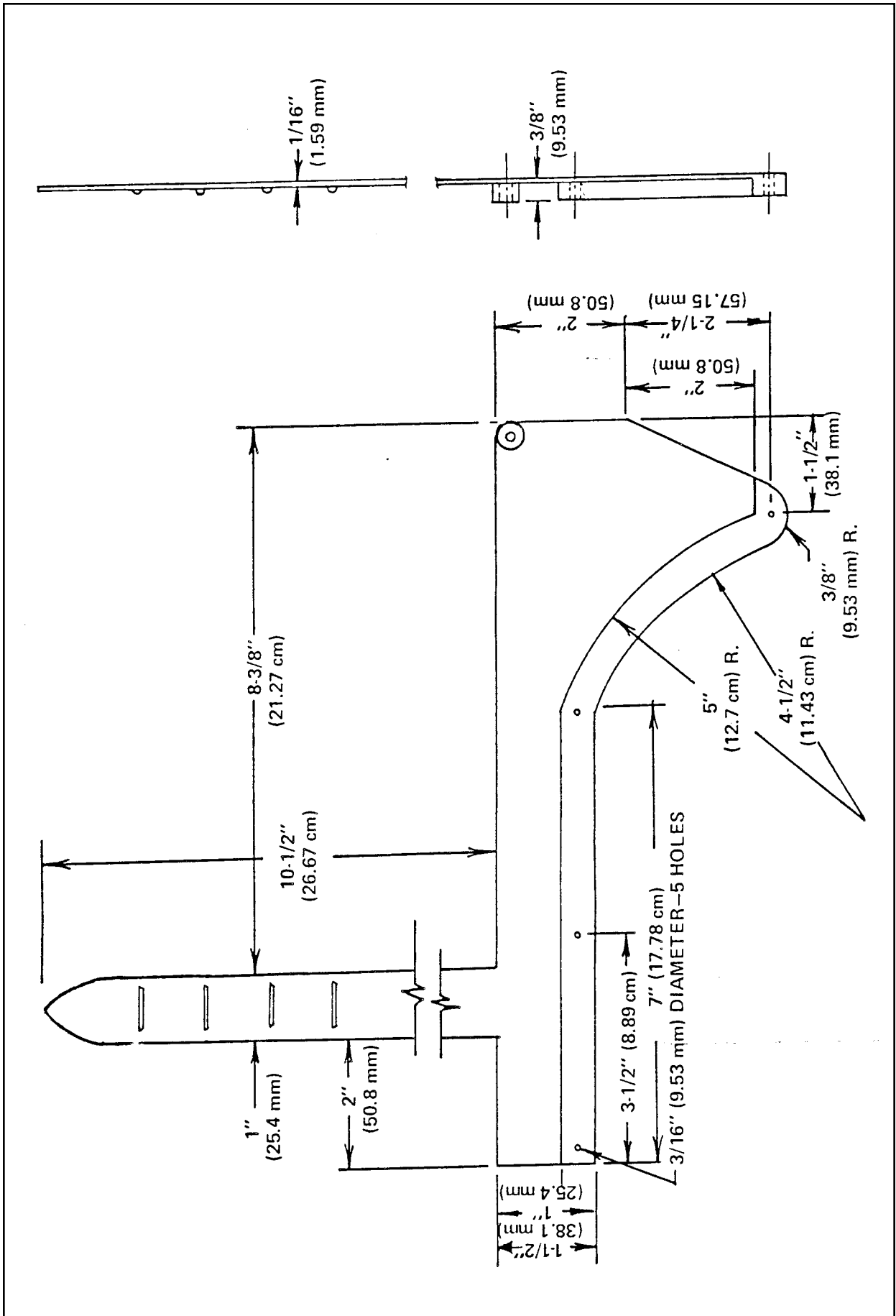


Figure 10. Brush Hook Strap Section.

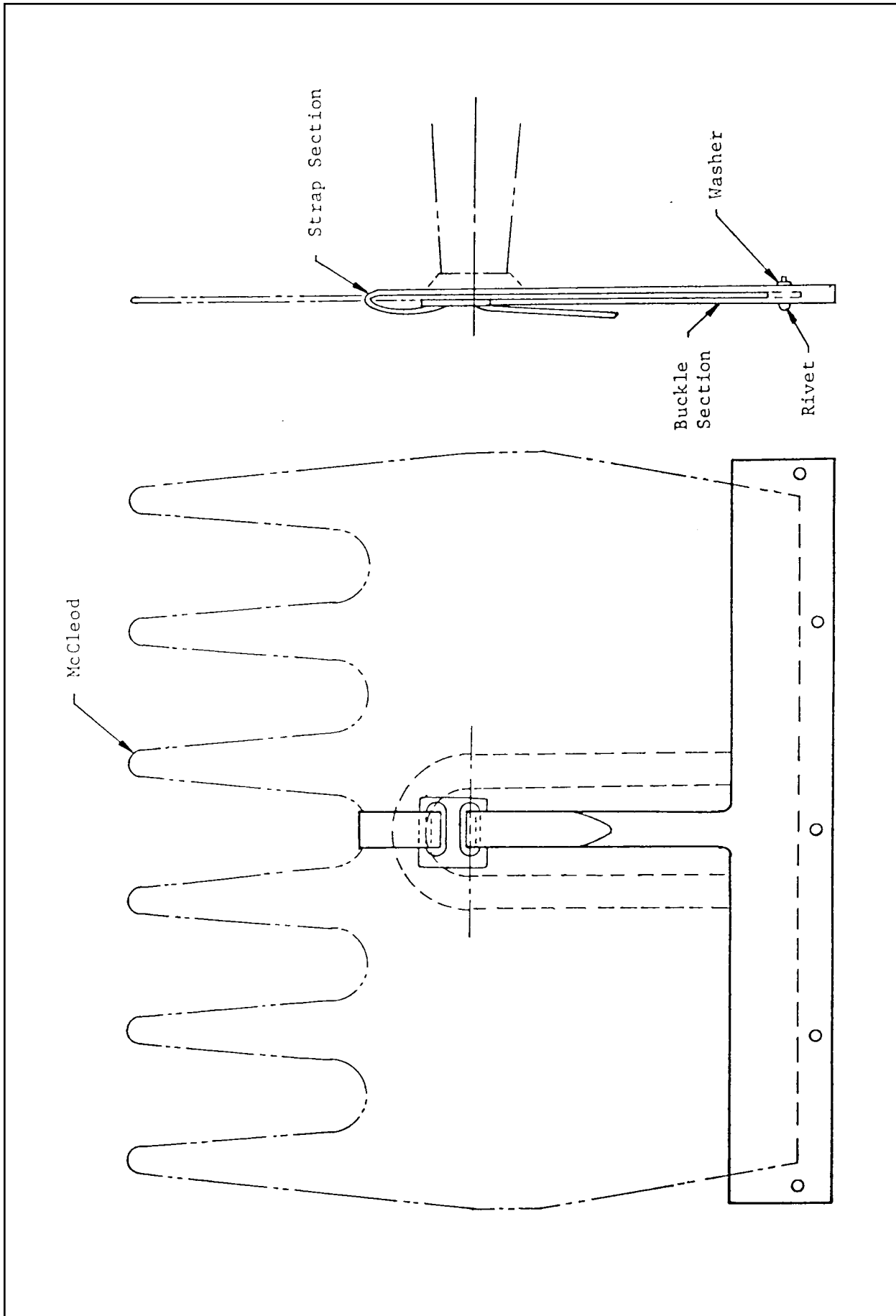


Figure 11. McCleod Sheath.



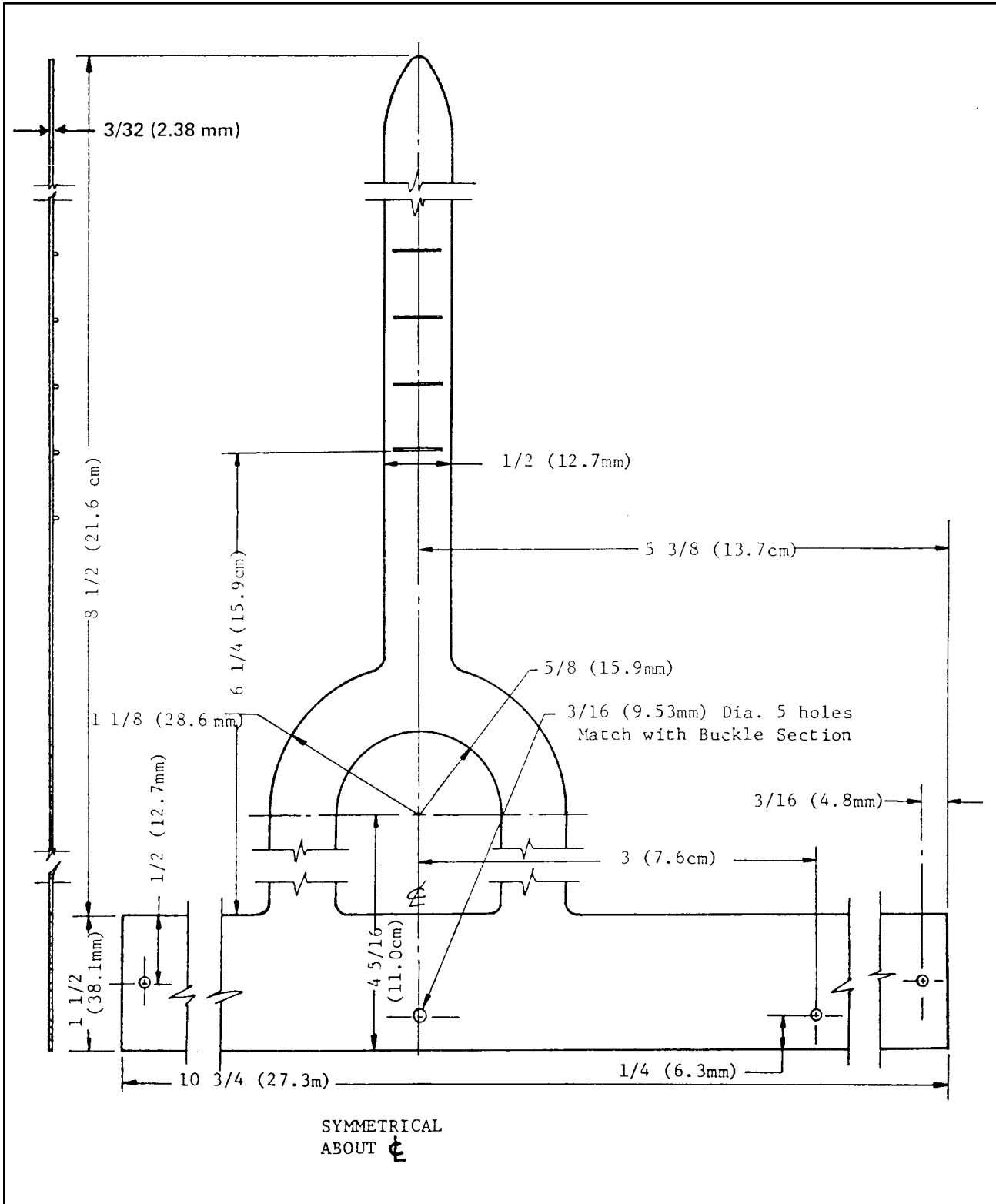


Figure 13. McCleod Strap Section.

**United States Department of Agriculture, Forest Service  
Standardization Document Improvement Proposal**

**Instructions:** This form is provided to solicit beneficial comments which may improve this document and enhance its use. Contractors, government activities, manufacturers, vendors, or other prospective users of this document are invited to submit comments to the USDA Forest Service, San Dimas Technology and Development Center, 444 East Bonita Avenue, San Dimas, California 91773-3198. Attach any pertinent data which may be used in improving this document. If there is additional documentation, attach it to the form and place both in an envelope addressed to the preparing activity. A response will be provided when a name and address are included.

**Note:** This form shall not be used to submit request for waivers, deviation, or for clarification of requirements on current contracts. Comments submitted on this form do not constitute or imply authorization to waive any portion of the referenced document(s) or to amend contractual requirements.

Standard Number and Title: **Specification 5100-316e, Sheaths, Plastic, Hand Tool**

Name of Organization and Address:

\_\_\_\_\_ Vendor                      \_\_\_\_\_ User                      \_\_\_\_\_ Manufacturer

1. \_\_\_\_\_ Has any part of this document created problems or required interpretation in procurement use?  
       \_\_\_\_\_ Is any part of this document too rigid, restrictive, loose or ambiguous? Please explain below.

Give paragraph number and wording:

Recommended change(s):

Reason for recommended change(s):

Remarks:

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ATTN: Water Handling Project Leader  
444 East Bonita Avenue  
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