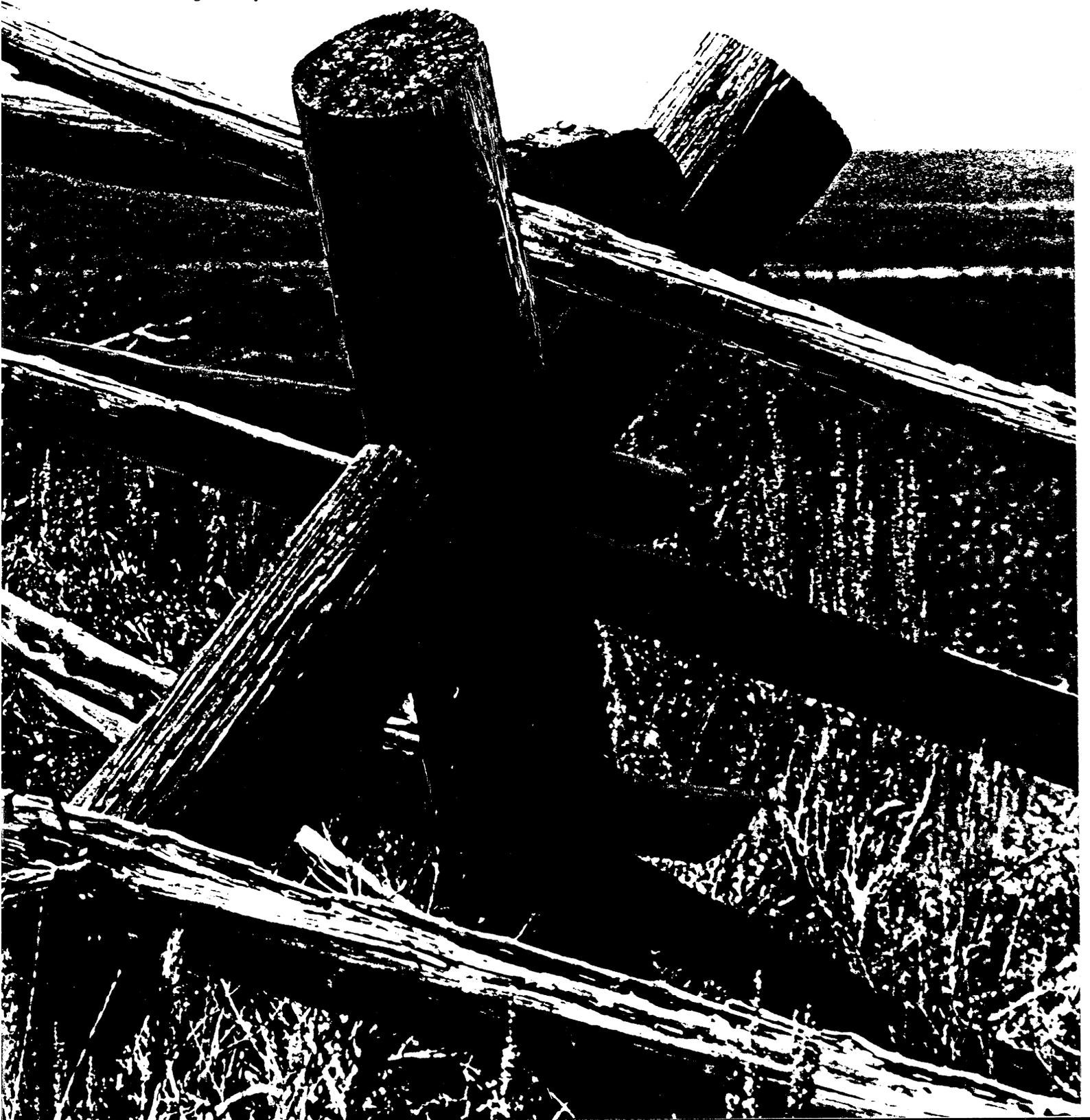


USDI Bureau of Land Management
USDA Forest Service
Technology & Development Program
Society for Range Management

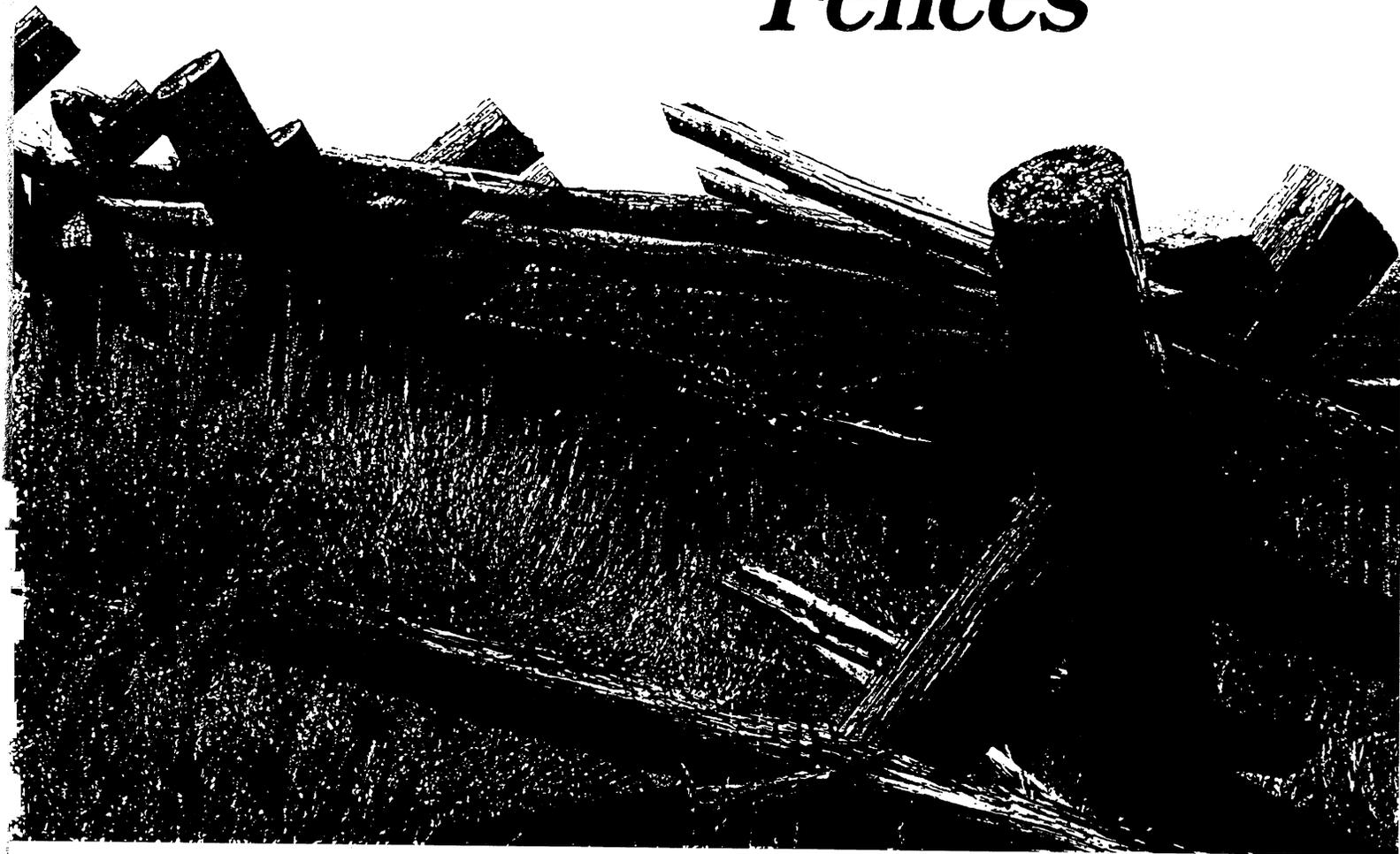
Fences



Second Printing February 1999



Fences



Sponsored by
Vegetative Rehabilitation and
Equipment Workshop

Prepared by
Missoula Technology & Development Center

Richard Karsky
Project Leader

July 1988

5E42D31—Range Structural Equipment

Acknowledgments

The Vegetative Rehabilitation and Equipment Workshop (VREW) is an informal group of Federal and State agencies, universities, professional organizations, and private citizens concerned with effective land management practices.

This handbook was prepared at their request by the USDA Forest Service Technology and Development Center at Missoula, Montana. Bill Duffy, MTDC Equipment Specialist, was the primary author; Brad McBratney, MTDC Equipment Specialist, Brenda Holland and DeLynn Colvert completed the text and illustrations. Questions should be directed to Richard Karsky, Project Leader, Missoula Technology and Development Center, Bldg. 1, Fort Missoula, Missoula, MT 59801.

Disclaimer

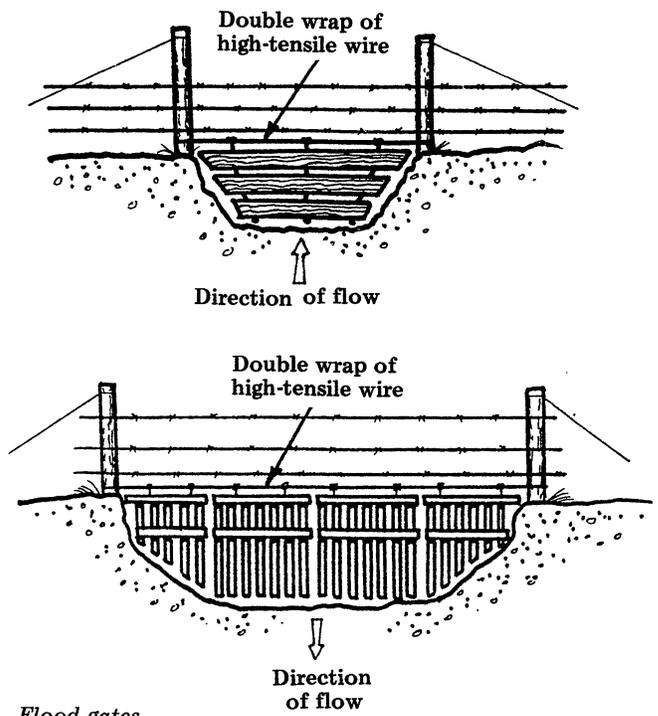
CAUTION: Pesticides can be injurious to humans, domestic animals, desirable plants, and fish or other wildlife—if they are not handled or applied properly. Use all pesticides selectively and carefully. Follow recommended practices for the disposal of surplus pesticides and pesticide containers.

The mention of products and companies by name does not constitute endorsement by the USDA, nor does it imply approval of a product to the exclusion of others that may also be suitable.

Contents

| | |
|----------------------------------|-----|
| Introduction | 1 |
| Planning | 3 |
| Gathering Site Information | 3 |
| Locating The Fence | 4 |
| Choosing A Fence Design | 4 |
| Clearing The Right-Of-Way | 8 |
| Laying Out The Fence | 8 |
| Safety | 11 |
| Components | 13 |
| Braces And Posts | 13 |
| Brace Designs | 15 |
| Gates | 56 |
| Materials | 75 |
| Tools | 79 |
| Fence Options | 83 |
| Electric Fences | 84 |
| Wire Fences | 139 |
| Wood Fences | 187 |
| Bibliography | 205 |
| Index | 209 |

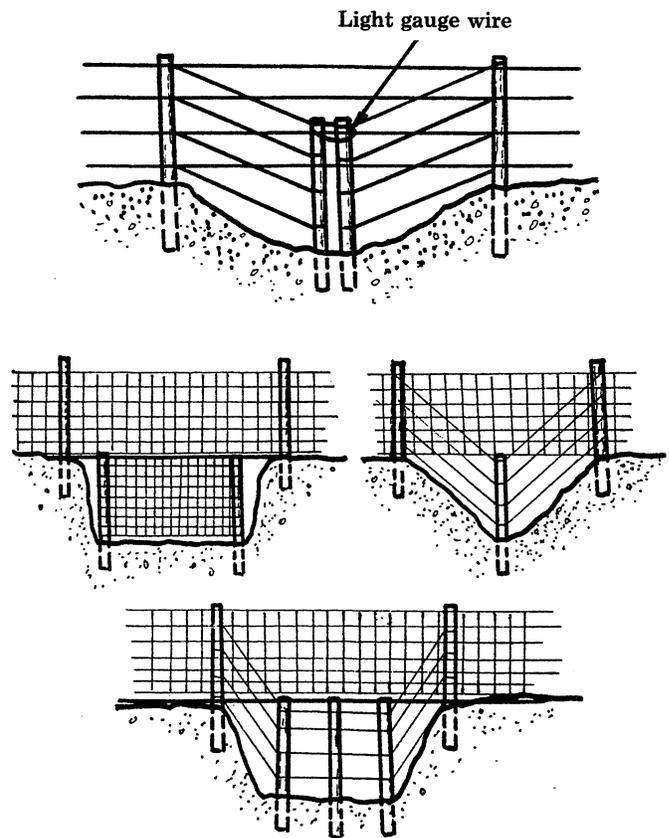
Flood gates may have to be installed in low areas subject to flash floods. As with any fence on uneven terrain, it is often necessary to install one or more self-cleaning flood gates in high tensile wire fences crossing wash gaps. While various types of flood gates have been made of sheet metal, barbed wire, and even used automobile tires, economical and functional flood gates can be fabricated of one or more panels of pressure-cresoted boards held together with high tensile wire and staples, or with wood stays and galvanized nails. The panels can be fashioned to fit the contour of the slope on each side of the gap or segmented to swing only in areas subjected to flooding. The panels can also be suspended with loops of high tensile wire from a horizontal cable consisting of a doublewrap of high tensile wire strung between the line posts on either side of the gap. These posts should be diagonally guy-wired to the adjacent line posts:



Water gaps control livestock where fences cross streams or drainages. Fences may be damaged during heavy runoff unless water and water-born debris are allowed to pass under. Consult an engineer when deciding whether or not to install a water gap. Most water gaps or flood gates are designed to be self cleaning. Sometimes the cleaning action is not totally complete and the gate is blocked partially open. Livestock are then able to get through this opening. Check gates after heavy rainfall.

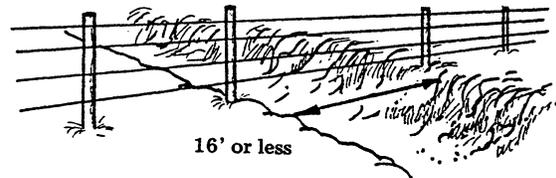
There are two basic types of water gaps: For areas with very little water and only occasional flooding, a breakaway fence will be sufficient. In areas with regular flooding, it may be best to construct floating gates or panels.

For depressions less than 16 feet wide, fence across the depression with no braces. For depressions over 16 feet wide, construct a fence that will breakaway only in the depression and leave the rest of the fence undamaged. Start by constructing braces on each side of the depression. Next, construct the fence in the depression. Set the end posts 6 to 12 inches from the brace posts. The short section of breakaway fence will then be attached to the main fence brace with a light gauge wire. This tie-wire is to break if the fence in the depression fails. When the fence in the depression breaks free of the main fence, damage to the main fence is eliminated.



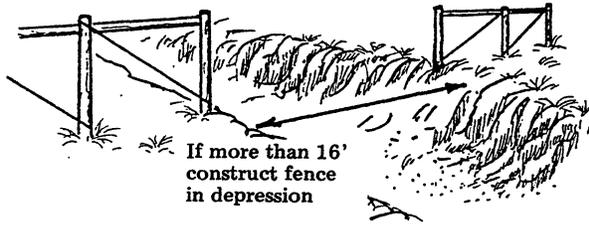
Water gaps.

Use the same posts, wire, and wire spacing as that used on the regular fence. Post depth may be reduced to 12 inches to prevent damage to the posts when the fence in the depression fails.

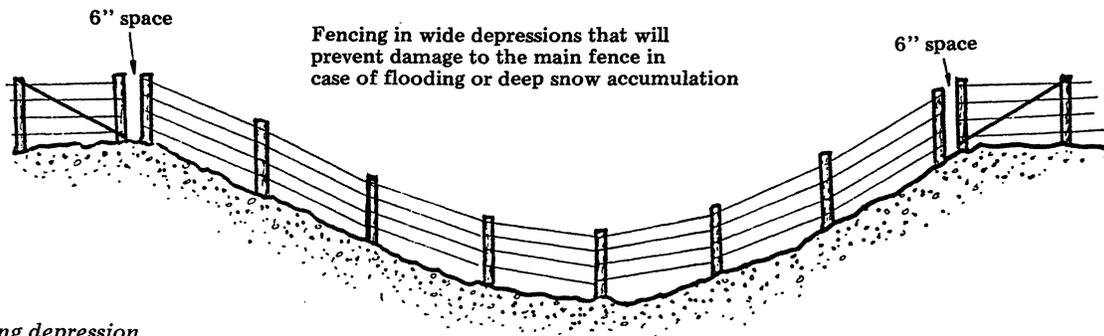


16' or less

If the depression to be fenced has regular flooding, use a swinging or floating panel. The panel must be free to swing when water comes through. Construct cross braces on the down-stream side of the panel to provide a smooth edge for the debris to slide by. Consult an engineer.



If more than 16' construct fence in depression



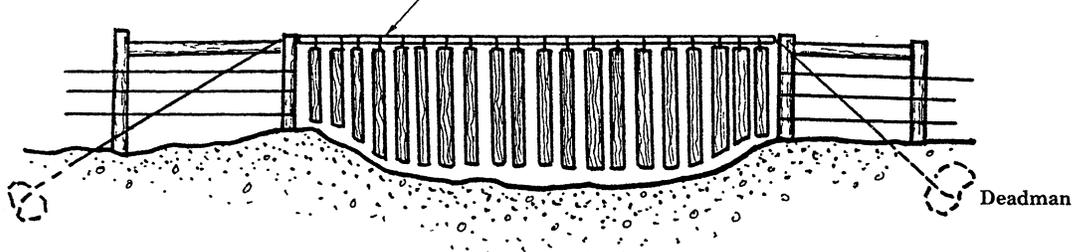
6" space

Fencing in wide depressions that will prevent damage to the main fence in case of flooding or deep snow accumulation

6" space

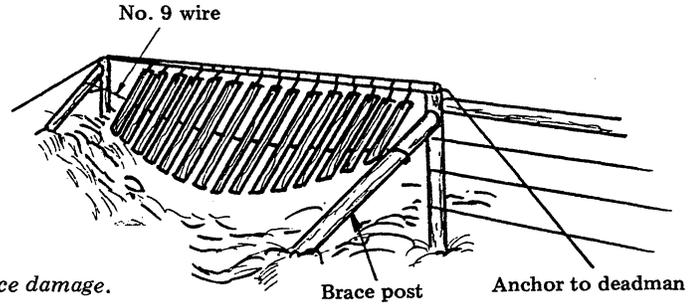
Fence crossing depression.

2 1/2" x 6" pickets.
Install with 2" x 10" "U" clamps.
1" pipe supported by 5/8" cable
(inside pipe). 1/4" pipe spacers
keep pickets in desired location



Deadman

Picket fence across streams.



No. 9 wire

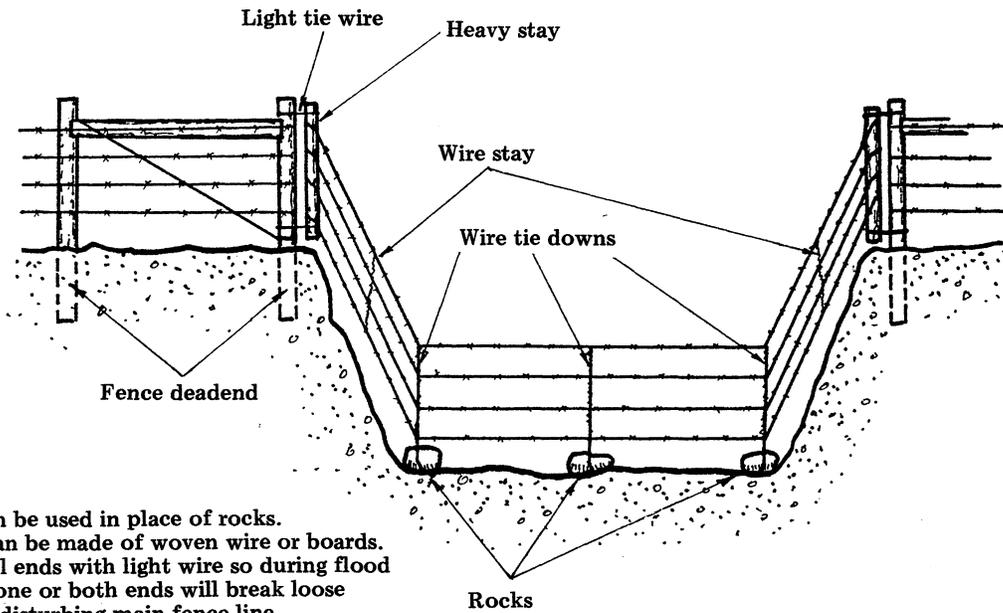
Brace post

Anchor to deadman

Lifting pickets above water to avoid ice damage.

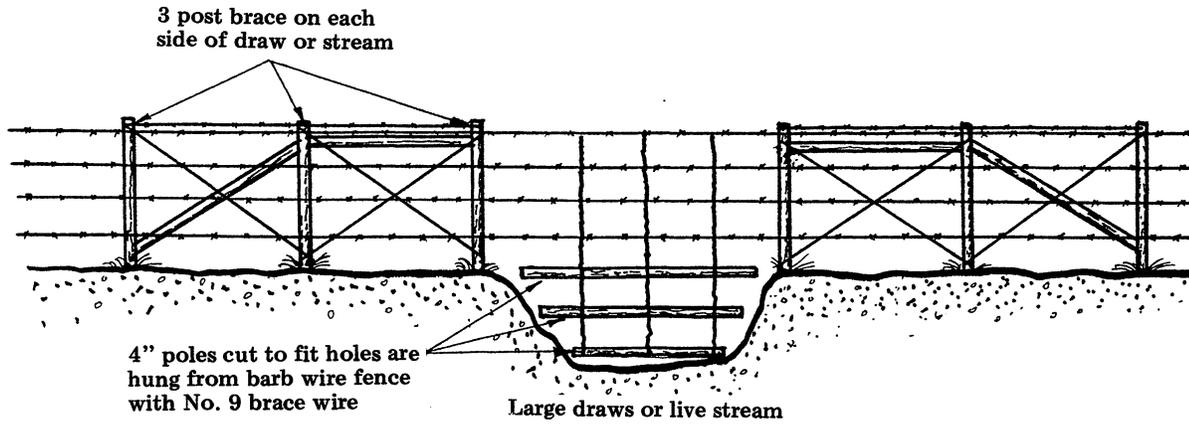


Typical swinging picket fence crossing a stream.

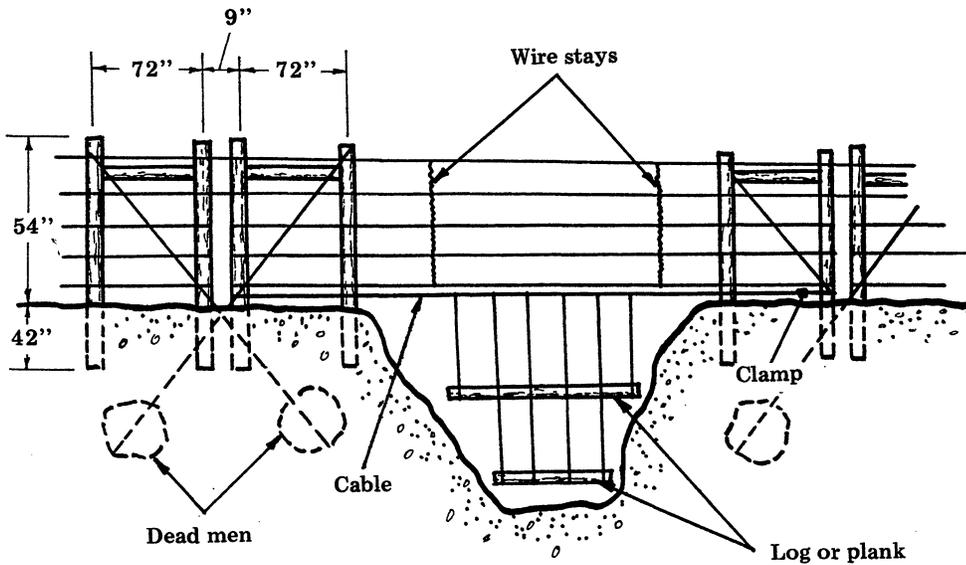


Poles can be used in place of rocks.
 Panels can be made of woven wire or boards.
 Tie panel ends with light wire so during flood
 periods one or both ends will break loose
 without disturbing main fence line

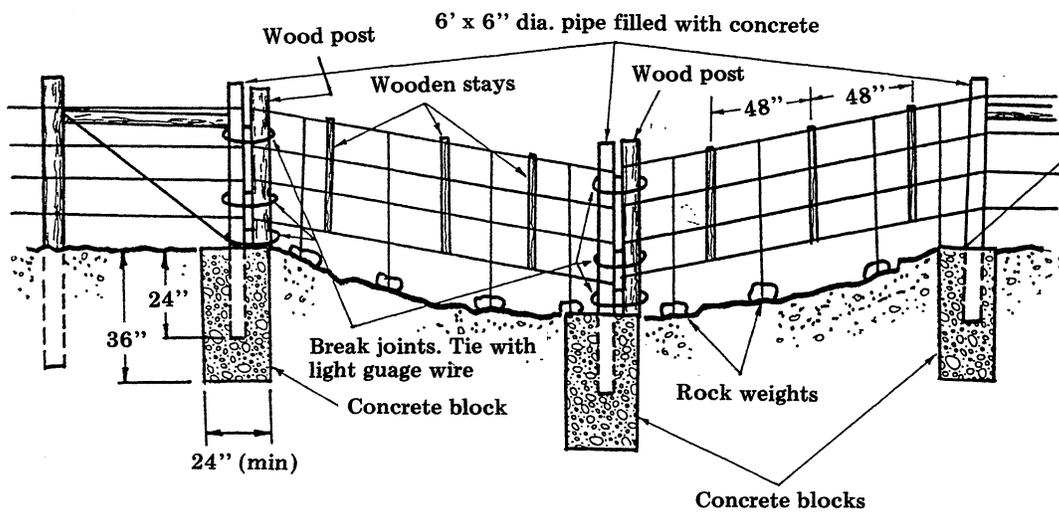
Brace design and placement considering changes in topography.



Crossing large washes and live streams.



Water gap for narrow drainages.



Break-away fence for wide, shallow water gaps.