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Adaptable, Transportable Utilization Cages

NEIL C. FRISCHKNECHT AND PAUL W. CONRAD
Range Conservationists, Intermountain Forest and Range Experiment Station, U. S. Forest Service, Provo, Utah

Several types of cages for protecting small areas from grazing have been described. A limitation of most cages is that they are bulky and cumbersome. Some range managers have solved the transportation problem by constructing cages on the sites where they are to be used. This paper describes a cage designed to fold flat for ease in transporting; one that is sturdy, moderate in cost, and adaptable to plots of different sizes. Cages can be constructed during slack work periods and later transported to field location by pickup or packhorse in much larger numbers than nonfolding designs.

The basic construction employs panels of welded wire, hinged together by No. 9 wire threaded through a series of wire loops at the edges of each panel. Cages shown in Figure 1 will accommodate a 9.6-square-foot plot, a convenient size for determining herbage yields (Frischknecht and Plummer, 1949). The four-sided cage constitutes the basic design, but when sampling needs require larger plots, the number of panels can be increased to enclose larger areas. A cage 5 feet square accommodates a 9.6-square-foot plot, five panels will accommodate a plot twice that size, and two cages (eight panels) joined together will easily enclose a 96- or 100-square-foot plot (Figure 2). The larger cages are advantageous for protecting large shrubs, patches of vegetation, and areas of sparse vegetation on desert ranges.

In addition to reducing damage from rubbing by cattle, a pyramidal design increases cage stability and reduces the cost per panel. The amount of cost reduction depends upon the angle of cut. Cages should be large enough so that plot vegetation will not protrude through the sloping sides.

When eight 5-foot-long panels (two cages) are to be joined, the panels should be cut at an angle of about 76° from the horizontal. Procedures for cutting panels from different types of welded wire are shown in Figure 3. Cages having an even number of panels will fold flat if the panels are of equal size. When

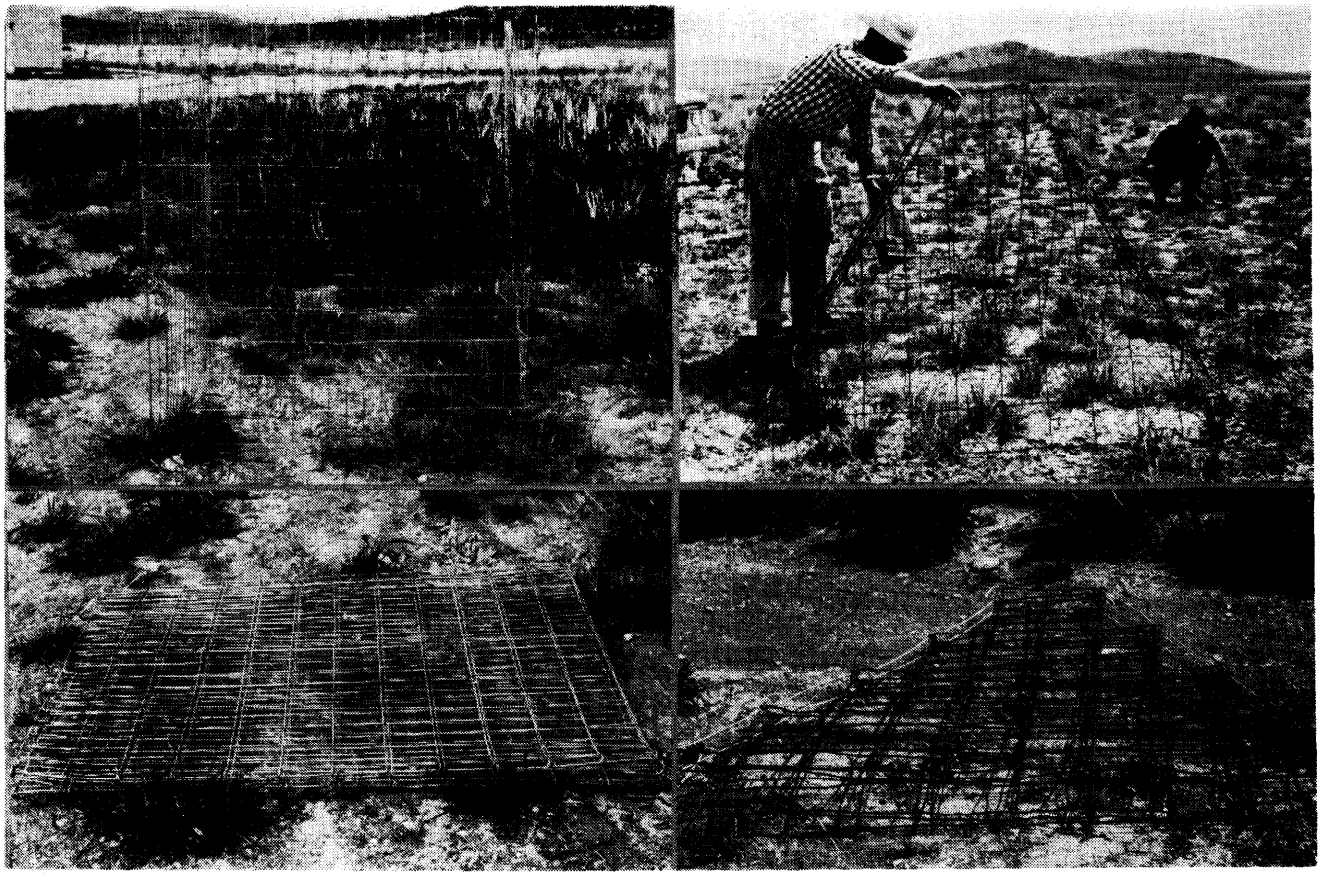

FIGURE 1. *Upper left*—Vertical-panel, open-top cages of welded wire (2- by 4-inch mesh) proved satisfactory on sheep and deer range. *Lower left*—When folded flat, relatively large numbers of these 4- by 4-foot cages can be transported by pickup or packhorse. *Upper right*—Pyramidal cage of No. 10 welded wire (6- by 6-inch mesh) was not molested by cattle during 30 days of early spring grazing. A ⅜-inch iron stake in the center of each panel holds cage rigid. *Lower right*—Cages fold flat for ease in transporting.

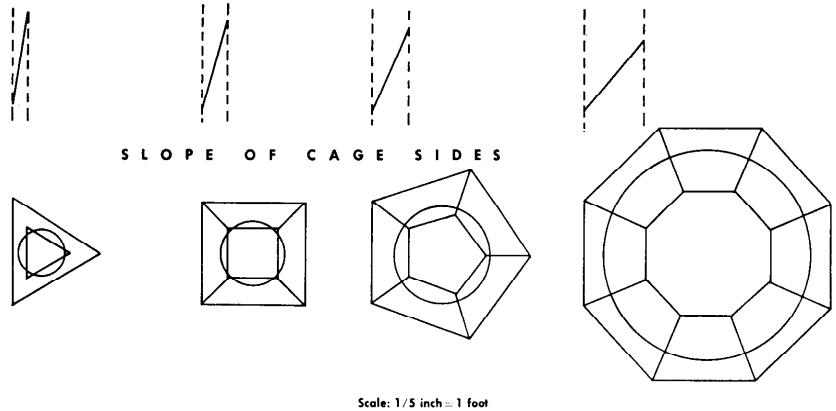

FIGURE 2. Diagrams of four cage structures produced by varying the number of panels. For these cages the basic panel would be of welded 4- by 4-inch wire mesh, cut on the following dimensions: base, 5 feet; height, 5 feet; top, 32 inches. Areas enclosed by circles within each diagram (left to right) correspond to plots of 4.8, 9.6, 19.2, and 96 square feet respectively.

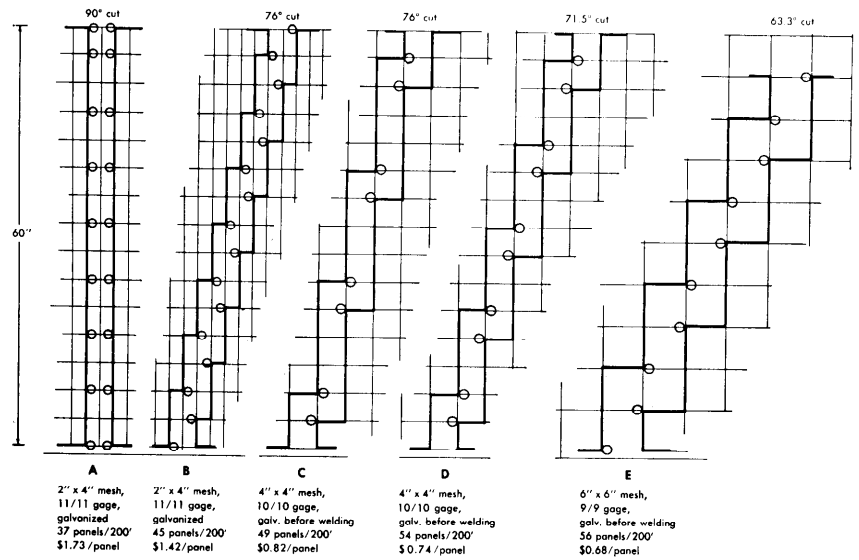

FIGURE 3. Diagrams for cutting panels and information on approximate cost of 5- by 5-foot panels for three types of welded wire. Loops are formed from horizontal wires as shown—other wires between panels are cut off. Diagrams A and E were used for cages in FIGURE 1, left and right, respectively.

an odd number of panels is joined, one wire stay must be removed to permit cages to fold flat.

The size and number of panels needed to protect an area of a given size can easily be determined. The following formulae give the radius of the circular area that would be inscribed by joining various numbers of panels of equal size (where "L"=length of one side):

No. of panels	Cage shape	Radius
3	triangular	0.2887L
4	square	0.5000L
5	pentagonal	0.6882L
6	hexagonal	0.8660L
7	heptagonal	1.0383L
8	octagonal	1.2071L

Cages of the type shown in Figure 1 proved satisfactory on sheep and deer range in 1963. In an attempt to reduce rubbing by animals, only pyramidal cages were used on cattle range. The 50 cages tested were not molested during 30 days of early spring grazing on crested wheatgrass range pastures, but some cages were damaged later in the season after bulls were added to herds. Cages were also damaged on another treeless seeded range where cattle congregated in a swale. Horned animals were believed to be responsible for major rubbing damage. Trampling of the bottom wire was the most prevalent abuse, but did not cause as much serious damage as did rubbing. The authors are studying whether using certain types of welded wire and changing the angle of cage slope would further reduce molestation by cattle.