UNITED STATES DEPARTMENT OF INTERIOR

GEOLOGICAL SURVEY

Working drawings of a Kirk Shear Wave Source

by

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Open-File Report 77-622

1977

This report is preliminary and has not been edited or reviewed for conformity to U.S. Geological Survey standards.

DISCUSSION

The Kirk Shear Wave Source is a portable device for imparting seismic shear-wave energy into the ground. The unit is 4.19 cm long, 30.5 cm wide, and 35.6 cm high. When constructed of 0.64-cm-thick steel plate, it weights about 22 kg. Materials for its construction are as follows:

1 Steel Plate, 61 x 76 x 0.64 cm;

1 Angle Iron, 3.8 x 3.8 x 152.4 cm.

The working drawings are dimensioned in inches.

To use this source, the foot piece (part D) is pounded into pre-cut crossed slits in the ground until dirt is forced upward through the slots in the base plate (part B). Then, with feet straddling the center brace (part C), the end plate (part A) is struck a few times with a large hammer until the operator feels that the foot piece is firmly set. This done, a signal-enhancement seismograph is turned on, and the end plate is sharply and repeatedly hit with the hammer. Striking the opposite end plate produces shear waves of opposite polarity.

When used in conjunction with the signal-enhancement seismograph, this source generates shallow seismic data comparable to those obtained with the conventional hammer-and-plank method.

The concept of this device was developed by Professor Keith G. Kirk, Department of Geology and Geography, West Virginia University, Morgantown, West Virginia. I am very grateful to Professor Kirk for sharing his ideas and for allowing me to present these drawings.

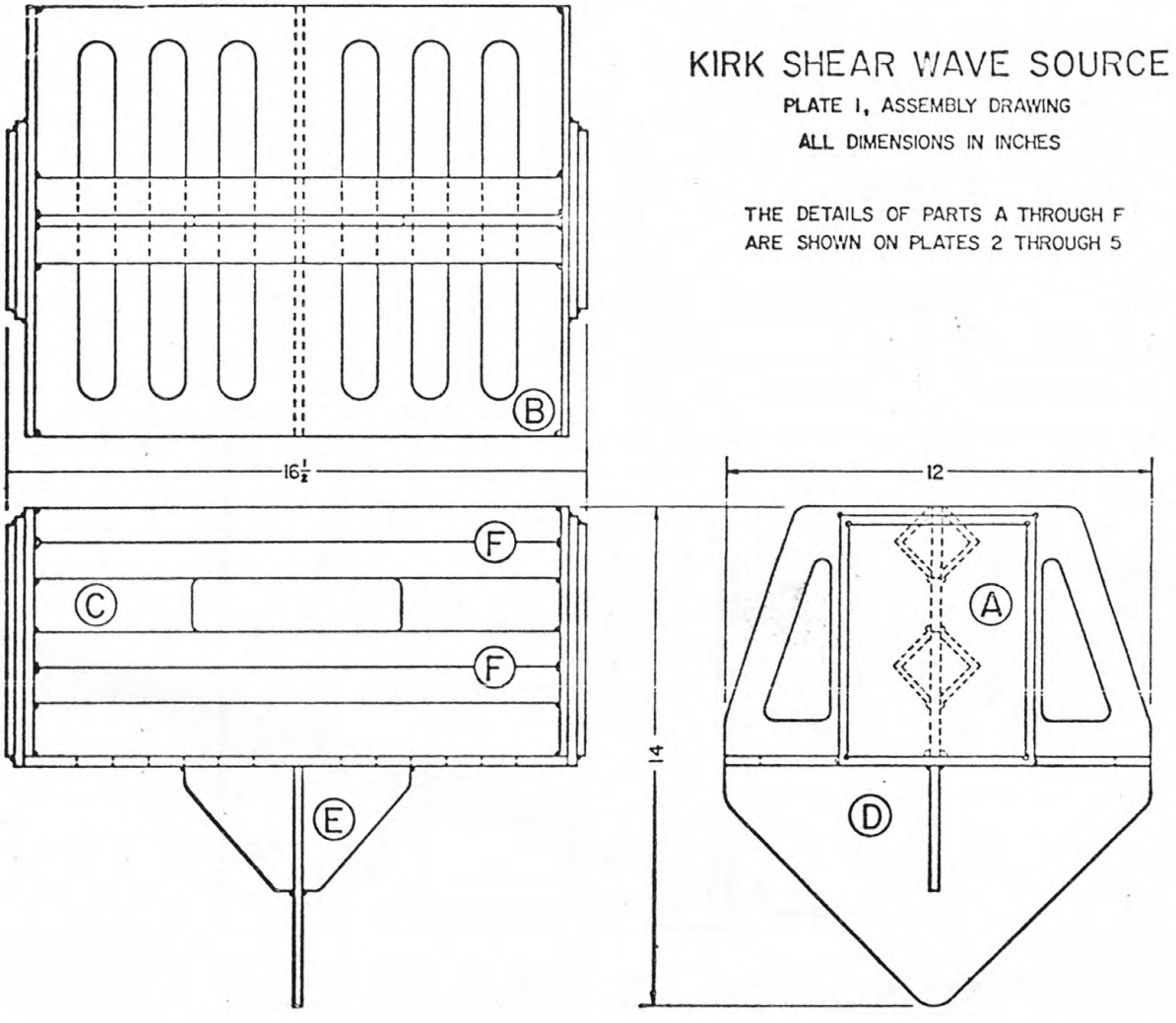
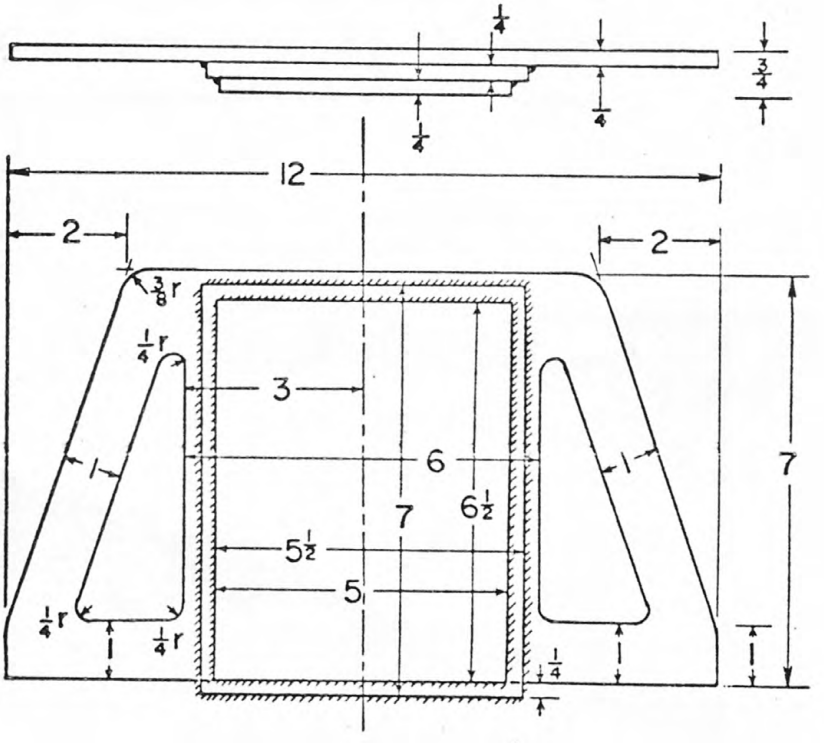

KIRK SHEAR WAVE SOURCE
PLATE I, ASSEMBLY DRAWING
ALL DIMENSIONS IN INCHES
THE DETAILS OF PARTS A THROUGH F
ARE SHOWN ON PLATES 2 THROUGH 5
B
16½
12
F
C
F
A
14
E
D

Plate 1

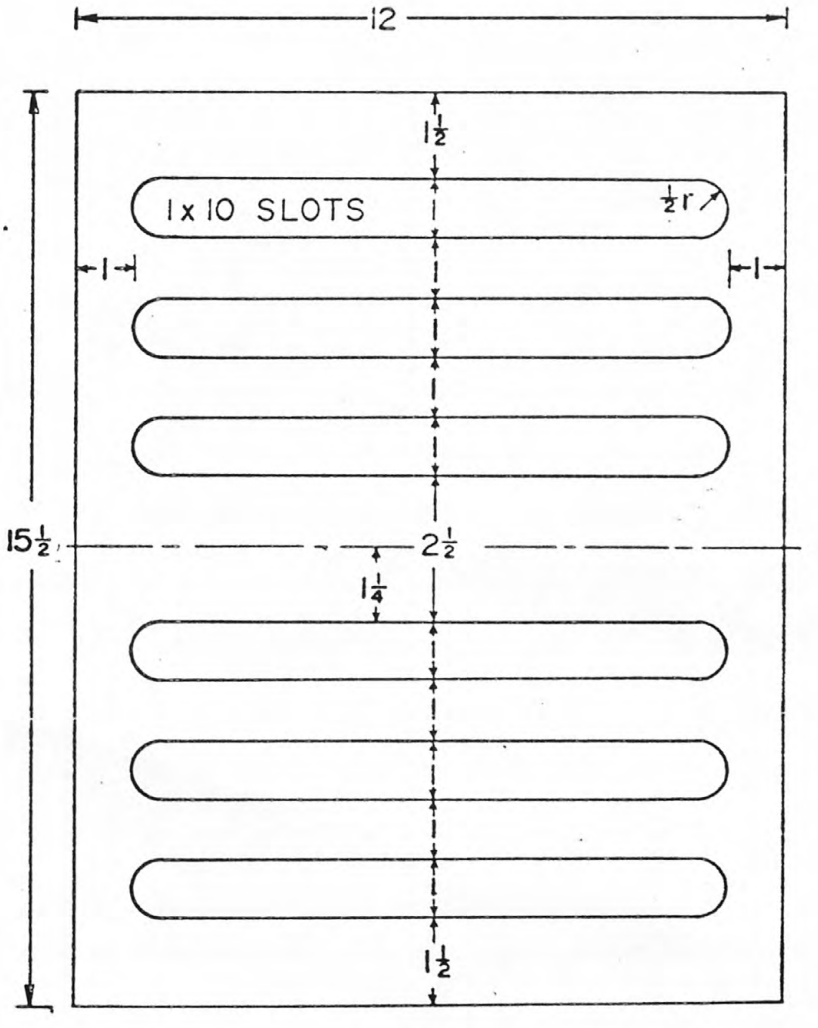
KIRK SHEAR WAVE SOURCE PART A



END PLATES, 2 REQ. 1/4 STEEL PLATE

Plate 2

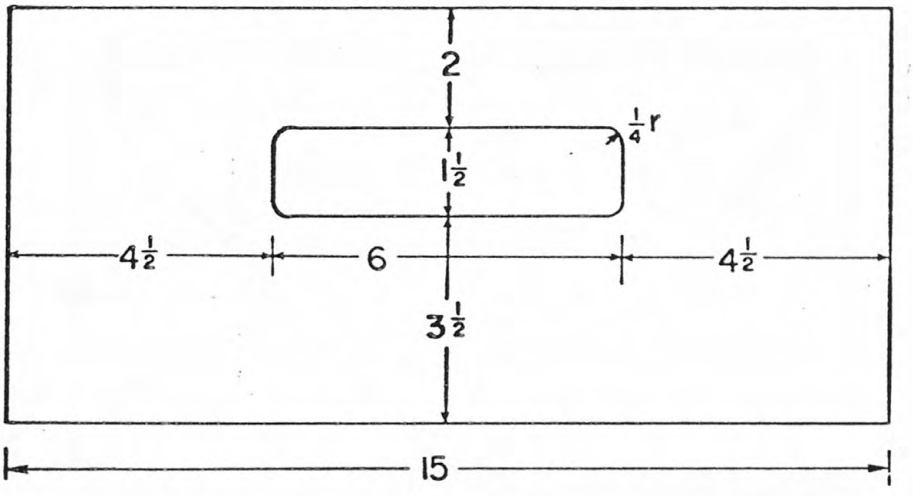
KIRK SHEAR WAVE SOURCE PART B



BASE PLATE, 1 REQ. ¼ STEEL PLATE

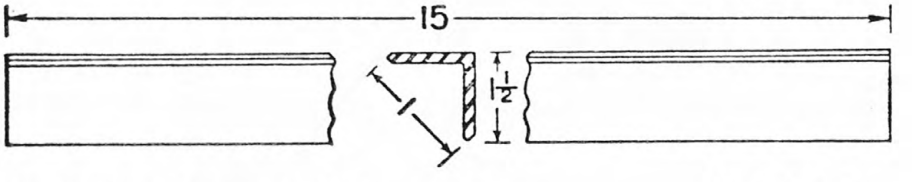
Plate 3

KIRK SHEAR WAVE SOURCE PART C



CENTER BRACE, 1 REQ. 1/4 PLATE

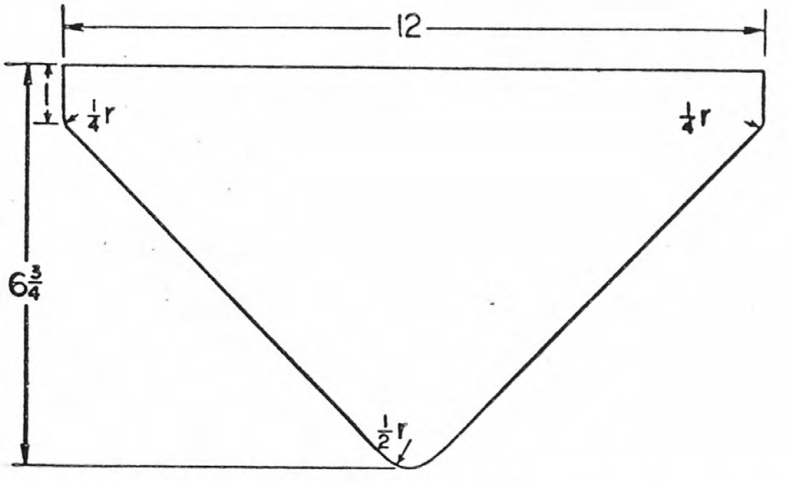
PART F



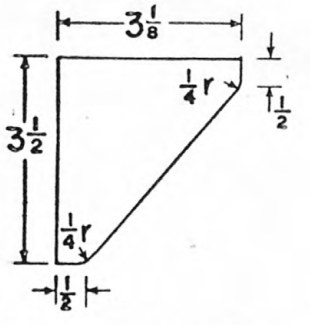
ANGLE-IRON BRACES, 4 REQ. 1 1/2 ANGLE

Plate 4

KIRK SHEAR WAVE SOURCE PART D



FOOT PIECE, 1 REQ. $\frac{1}{4}$ STEEL PLATE



PART E

FOOT BRACES, 2 REQ. $\frac{1}{4}$ STEEL PLATE

Plate 5