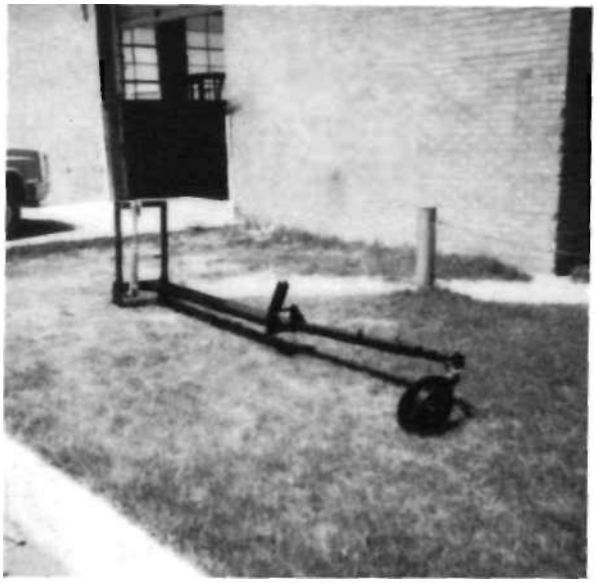
Construction of Heavy Duty Hydraulic Tillage Markers



Bill of Materials

Main Frame

4 pieces	3″ by ¾″ flat	31¾″
4 pieces	3″ by ¾″ flat	8″
2 pieces	2″ by 2″ tubing	3″
2 pieces	2″ by ½″ flat	10″
2 pieces	2″ pipe	10½″
2 pieces	3″ by ½″ flat	3″
2 pieces	2″ rod	15″
2 pieces	2″ pipe	13½″
2 pieces	6″ by ½″ flat	13½″

First Hinge

4 pieces	½″ by 3″ flat	3½″
2 pieces	2″ by 1″ flat	5¾″
2 pieces	6″ by 2″ tubing	72″
2 pieces	½″ by 2″ flat	8″
2 pieces	½″ by 2″ flat	6″
4 pieces	½″ by 2″ flat	10½″
2 pieces	½″ pipe	1″
2 pieces	1″ pipe	6″

Second Hinge

2 pieces	3″ by 2″ tubing	44″
4 pieces	½″ by 6″ flat	7″
2 pieces	1″ rod	8½″
2 pieces	2″ by 3″ tubing	3″
2 pieces	½″ pipe	6″

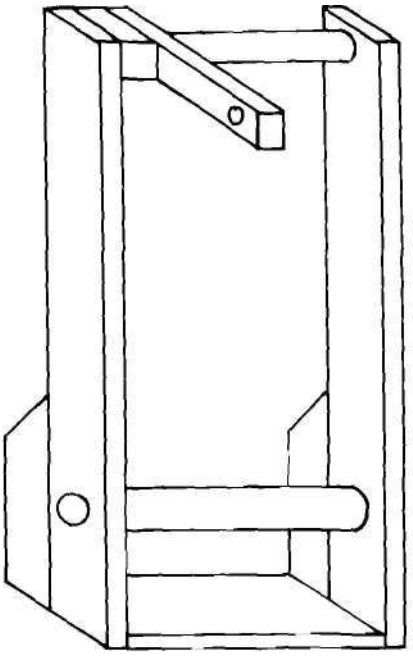
Main Frame

Cut four 3" by 3/4" by 31-3/4" pieces of metal. Cut 2" diameter holes 6" from the bottom and 1-1/2" in on each piece.

Cut four pieces, 3" by 3/4" by 8", cut at a 45 degree angle. Weld these 8" pieces to the bottom of the 31" pieces with the long side of the 8" piece welded to the 31" piece. This completes the sides of the main frame.

Cut the pieces which connect the two sides. Cut two 3" by 2" by 2" pieces of tubing, one to be used for each marker. Cut 2, 1" by 2" by 10" piece of flat. On these pieces of flat measure back 2" from the end and 1" from the sides, mark and drill 1" holes in both pieces. Cut two pieces of 2" pipe 10-1/2" long. Cut 2 pieces of 2" rod 15" long and 2 pieces of 2-1/2" pipe 13-1/2" long. Cut two pieces of 6" by 1/2" by 13-1/2" and drill 4, 3/4" holes in each, at 2" in from each side, and 3-1/4" in.

Weld the pieces of 6" by 13-1/2" flat on the inside of the bottom, (the inside on the end to which was welded the 8" flat, cut at a 45 degree angle). Weld the 3" long 2" tubing to the other end. Weld the 2" flat with the 1" hole to the tubing so it protrudes in the opposite direction of the 8" piece, cut at the 45 degree angle. After the flat is welded in place weld the 2" by 10-1/2" long pipe. Place the 13-1/2" piece of 2-1/2" pipe inside the frame which was just constructed, in the 2" diameter holes. Insert the 15", 2" rod through, and weld them at the ends.



First Hinge

The first hinge is the bottom pipe, which is over the rod, on the main frame. Cut four 3" by 1/2" by 3-1/2" from flat iron, two for each marker. Cut an arch which fits on the pipe, that serves as a hinge. Drill a 1/2" hole, 1-1/2" in from the side and 1" from the top.

Cut 2, 5-3/4" by 2" by 1" pieces of flat, drill a 1/2" hole 1" from the side and 1-1/2" from the bottom. Put a ram in the 1" hole on the piece of flat that was just cut. The other end of the ram goes in the hole on the flat which protrudes from the top of the main frame. Weld the pieces with the arches into the pipe on the bottom of the main frame.

Cut 2 pieces of 6" by 2" tubing 72" long. Notch these pieces so that they fit on the hinge. Then weld them to the pipe where the ram hooks, but on the opposite side. Weld it 1/4" from the side of the frame. Cut two pieces of 1/2" by *2"* by 8" flat and weld one on each marker, to the side of the arch. Cut two pieces of 2" by 1/2" by 6" and weld them to cap the ends of the big tubes. Cut four 2" by 1/2" by 10-1/2" pieces of flat, cut at a 45 degree angle, and drill a 1/2" hole 2" down and 1" down on each piece. Weld them to the big pieces of tubing, 4-1/2" back and *2"* from both sides, on the end opposite that welded to the pipe on the main frame. Cut two pieces of 1*/2"* pipe and put them between the two pieces and put a bolt through it. Cut two pieces of 1" pipe 6" long and weld one on each piece of the tubing, on the bottom side, 1-3/4" back from the outer edge of the tubing.

Second Hinge

Cut two pieces of 3" by 2" tubing 44" long. Cap the ends. Measure back and place marks at six and eighteen inches, and then on the three inch side, 1-1/2" from the side. Drill 7/8" holes at the marks. Weld four 3/4" nuts above the holes.

Cut four 6" by 1*/2"* by *1"* flat. On these four pieces measure 2" down on one of the 6" sides and make a mark. On the opposite *1"* side, measure *2"* in from both sides. On a band saw cut from the marks on the 6" side, to the corresponding mark on the 7" side. Drill a T'hole, 1" from the top and 1" from the side. Drill a 1/2" hole, 3/4" from the other side and 3/4" from the top.

To make pins, use]" rod cut into two pieces 8-1*/2"* long. Drill a 1/4" hole in the middle of one end, 1/2" back. Then weld washers, one to each end opposite to where the holes were drilled. Cut two pieces of 2" by 3" by 3" tubing. Weld the tubing to the piece on which were welded the two nuts, on the opposite end. Cap both ends and grind smooth.

To connect the first hinge to the second hinge, start with the two pieces cut in the shape of triangles, with square corners. Insert the pins through the triangle pieces and through the 1" pipe on the long piece off the first hinge, and then through another triangle piece. Butt the piece with the nuts to the piece with the triangle pieces. Clamp the triangle pieces up to the piece with the nuts welded on it, and weld. Cut two pieces of 1/2" pipe, and insert 1*/2"* bolts through 1/2" hole on the triangle piece, through the 1/2" pipe, and through the other triangle piece. Cut two pieces of 1-1*/2"* by *2"*, 50" long tubing. To these pieces weld the bearing and the disk. Slide these pieces into the piece with the nuts welded to them. Put bolts in the nuts. Tighten the bolts down onto the tubing.