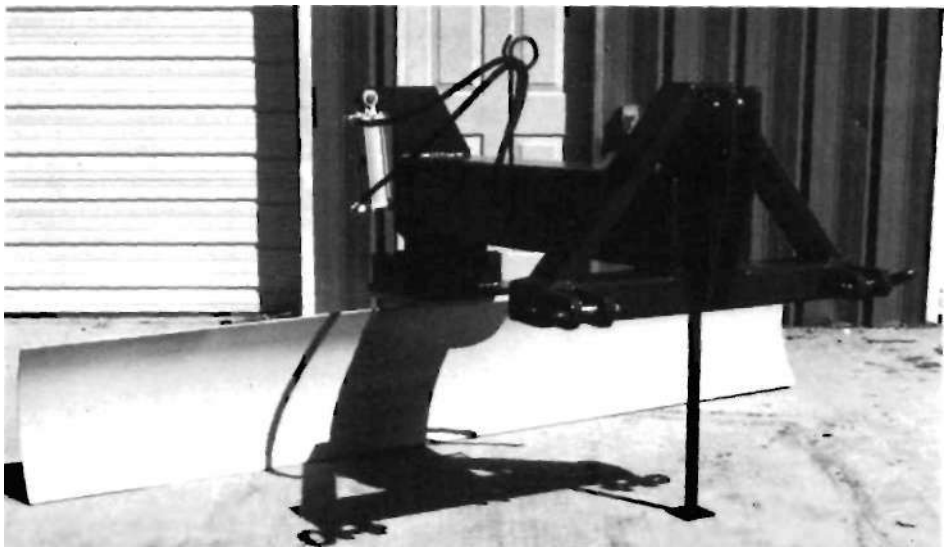
Construction of a Heavy Duty Tractor Scraper



Bill of Materials

Quantity	Material Description
4.0′	*5 x 2 x .25 rectangular tube
.75′	*5 x 5 x .25 square tube
3.1′	*6 x 4 x .25 rectangular tube
.6′	*1-1/4 x 1-1/4 x .109 square tube
1.17 sq ft	*1/4″ MS plate
1.0 sq ft	*1/2″ MS plate
6.62 sq ft	*3/4″ MS plate
4.61 sq ft	*1″ MS plate
.7 sq ft	*1-1/4″ MS plate
4.75	10 x 10 x .375 square tube
1.0′	1-1/8″ cold rolled round
1.0′	2″ cold rolled round
2.75′	1/2″ hot rolled round
3.33′	1 x 1 hot rolled square
.6′	1/2 x 1″ flat stock
9.3′	5/16 x 18″ (T-1 steel) rolled
1 ea	2″x 9″ hardened steel bolt & nut
1 ea	5/8″x 2-1/2″ steel bolt & nut
3 ea	3/8″x 1″ steel bolts
1 qt	Green enamel
1 qt	Yellow enamel
1 qt	Red primer
1	1-1/2 x 10″ stainless round
1	12″ hydraulic ram

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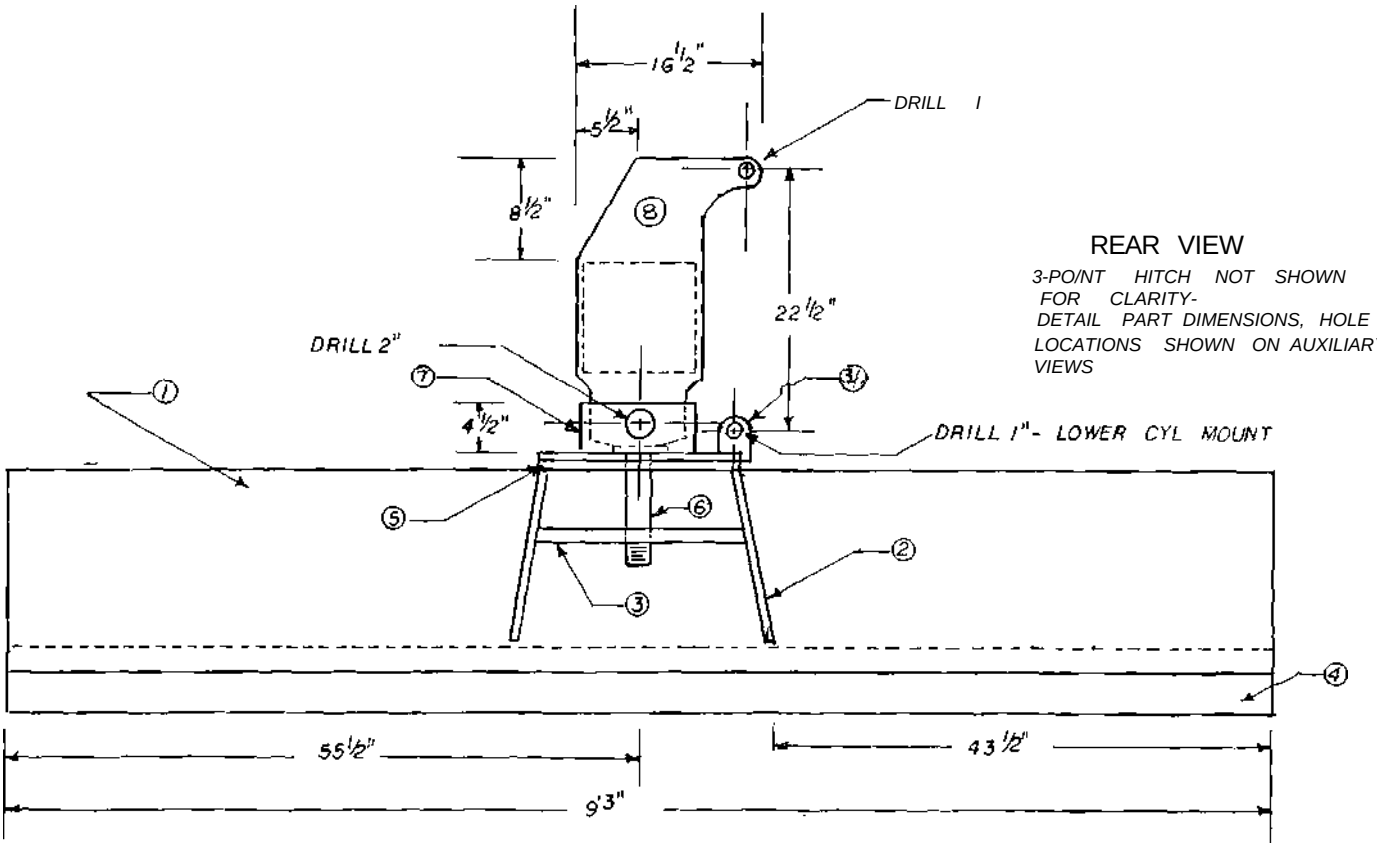
Construction Process:

/. ***Preparation:*** Following is a complete list of all the construction materials for the scraper by part number together with the description, type, size, kind and specific lengths needed for this project. Also shown are any special preparation or processes needed such as drilling, machining, grinding, etc.

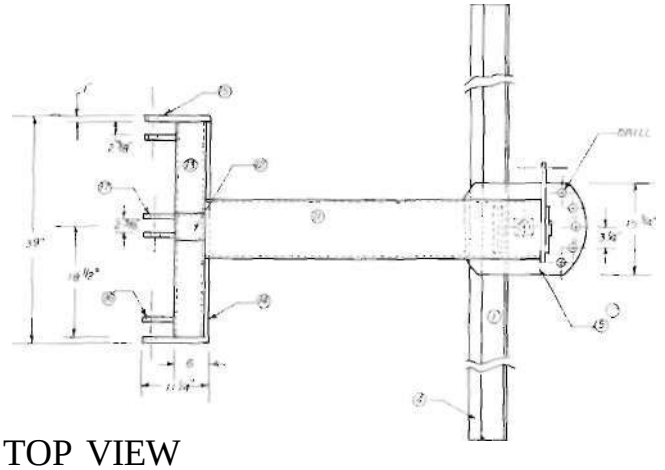
Part No.	Description	No. Pieces	Type Material	Instructions
1	Rolled blade	1	5/16″x 18″x 9′3″ plate (T-1 steel)	Have rolled.
2	Blade braces	2	½″x 4.5″x 16″ plate	Cut on tracer with pattern.
3	Swivel brace	1	1¼″x 5¾″x 17½″ MS plate	Cut on tracer. Machine hole.
4	Cutting blade	1	½″x 9′3″ hardened	Purchase.
5	Swivel plates	2	¾″x 15¾″x 20½″ MS plate	Flame cut on tracer. Machine holes to size.
6	Swivel pin	1	2″x 9″ hardened bolt and nut	Purchase.
7	Lower pivot bracket	2	1″x 4½″x 10½″ MS plate	Flame cut. Machine holes.
8	Cylinder mount pivot bracket	1	1″x 17″x 27″ MS plate	Cut on tracer. Drill holes.
9	Upper pivot bracket	1	¾″x 6½″x 10″ MS plate	Pattern cut. Machine hole.

Part No.	Description	No. Pieces	Type Material	Instructions
10	Swivel lock pin	1	1½″x 10″ stainless	Shaped on lathe-bend to right angle.
11	Main frame	1	10″x 10″x .375 x 57″ tube	Cut square.
12	Cap for part 20	1	14″x 5″x 5″ MS plate	Cut to fit.
13	Hitch braces	2	5″x 2″x .25 x 2′ tube	40° bottom end, 50° top end.
14	Horizontal hitch member	1	6″ x 4″ x .25 x 37″ tube	Cut square.
15	Outside hitch pin bracket	2	1″x 4″x 12″ MS plate	Use pattern and tracer.
16	Inside hitch pin bracket	2	1″x 3″x 5½″ MS plate	Use pattern and tracer.
17	3rd arm bracket	2	¾″x 5″x 25″ MS plate	Use pattern and tracer.
18	Main frame end cover	1	¼″x 10″x 10″ MS plate	Use pattern and tracer.
19	Tilt pin	1	2″x 12″ cold rolled round	Make head of ¼″ plate, drill retainer.
20	Upper hitch vertical member	1	5″x 5″x .25 x 9″ tube	Cut square.
21	Hitch pins	2	1⅛″x 12″ cold rolled round stock	Chamfer end, drill holes for snap pin.
22	Pivot pin lock	2	½″x 1″x 7½″ flat	Cut square.
23	Jackstand base	1	¼″x 4″x 4″ plate	Round corners.
24	Jackstand lock	1	⅝″x 2½″ bolt & nut	Weld nut to sleeve.
25	Jackstand sleeve	1	1¼″x 1¼″x .109 x 7″ tube	Tap ⅝″ hole.
26	Jackstand	1	1″x 1″x 40″ square	Weld to base.
27	Hose holder	1	½″x 33″ round stock	Bend open full circle on top.
28	Hose holder base	1	¼″x 4″x 7″ MS plate	Drill three ⅜″ holes.
29	Hose holder fasteners	3	⅜″x 1″ machine bolts	Fastens to main frame.
30	Hydraulic ram	1	12″x 2″ two-way	Mount to brackets.

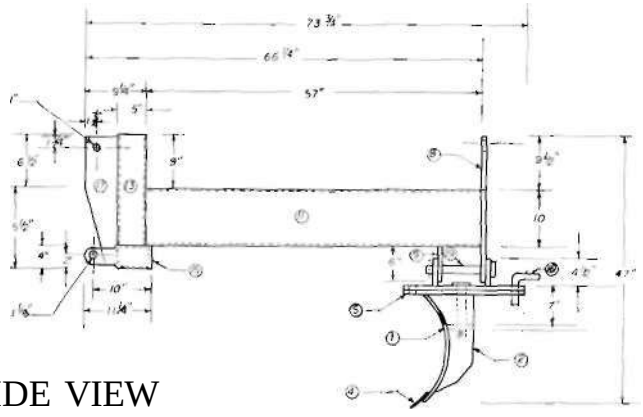


REAR VIEW

3-PO/NT HITCH NOT SHOWN FOR CLARITY- DETAIL PART DIMENSIONS, HOLE LOCATIONS SHOWN ON AUXILIARY VIEWS



TOP VIEW



SIDE VIEW

Step 1) Heavy white paper and a pen with india ink were used to make a full size line drawing of the parts that were to be cut to shape with the tracer flame cutting machine. Most of the larger holes were also flame cut, then machined to exact size. Parts no. 2, 3, 5, 7, 8, 9, 12, 15, 16, 17, 18, were prepared in this manner.

Step 2) All parts requiring flame cutting were cut out on a flame cutting machine utilizing the line drawings of each part and the tracer head on the cutting machine. Flame cut parts were chamfered on the edges to remove slag and sharp edges.

Step 3) All parts having flame-cut holes which required precision tolerances were machined to size on a vertical milling machine.

Step 4) All parts requiring straight or angled cuts were set up and cut on the horizontal band saw to the lengths indicated on the drawings and cutting list. Parts no. 11, 13, 14,19,20,21,22, 25, 26, 27, were cut in this manner.

Step 5) The necessary holes were drilled in parts 8, 17, 15, 16, 31, 5, 28, as shown on plans.

Step 6) Assembly of the scraper started by laying out (part no. 11) the 10'x 10" tubing main frame and closing in the one end with (part 18) the l/4"x 10"x 10" plate. On the opposite end was welded the 1" plate which closed off that end as well as serving as the upper anchor for the hydraulic cylinder and providing the mounting for the vertical pivot point, (part 8). The extended ear of this part was put to the right side when looking from the rear of the scraper.

Step 7) Part 9, the other vertical pivot bracket was welded to the underside of the main frame tubing and aligned to part 8 with the pivot pin which had been formed on the lathe.

Step 8) Part 14, the horizontal hitch member was welded to the underside of the front of the main frame member, centered on the main frame and making sure that it extended at right angles to it. The vertical hitch member (part 20) was then welded on so that it was even with the front of the main frame, centered on and extending vertically from it. This part (5"x 5" tube) was then capped with the 1/4" plate (part 12).

Step 9) The two hitch braces (parts 13) 5"x 2"x *2'* tube with the 40° and 50° angled ends were then welded in place diagonally so they formed a brace between the upper hitch member and the horizontal hitch member.

Step 10) The l"x 4"x 11-1/4" plate outside hitch brackets (part 15) were then welded to the ends of the horizontal frame member.

Step 11) The inside hitch pin brackets (part 16) l"x 3"x 5-1/2" plate were then welded in their proper position by inserting the hitch pin through the holes in both inside and outside hitch pin brackets to align them.

Step 12) The upper, or third arm mounting brackets were then placed in their proper location according to the plan and the holes lined up with the proper size pin before welding them in place.

Step 13) The 3/4"x 15-3/4"x 20-1 */2"* swivel plates (part 5) were then clamped together so that the holes lined up, and the l"x 4-1/2"x 10-1/2" lower pivot brackets were mounted on the top plate in the proper position. They were then tacked in position, making sure they would mate with the upper pivot brackets on the main frame underside.

Step 14) The two l/2"x 4-l/2"x 16" plate blade to swivel plate braces were positioned in place on the curved blade, to line up flush with the top of the blade. The swivel plate (lower one) was set in place on top of the blade and braces, lined up and tacked in place.

Step 15) The 1-1/4"x 5-3/4"x 17-1/2" plate swivel pivot brace (part 3) was positioned in its proper location. The pivot pin was installed through the swivel plates and this brace to insure that the holes lined up, and was tack welded in place.

Step 16) All major scraper parts have now been welded or tacked together. They are now checked for proper fit and operation, then completely welded together.

Step 17) The jackstand was assembled and the holes were drilled in the main frame for mounting. The jack was then installed to support the front end of the scraper when it is not in use,

Step 18) The hose support was bent and installed.

Step 19) All parts were cleaned, slag and splatter removed. A coat of rust resistant metal primer was applied. Two coats of enamel paint were then applied.

Step 20) The 12" hydraulic ram was installed in place.