3pt Lawn Dethatcher
for
Compact Utility Tractors

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Designer/Builder: Paul Bezeredi a/k/a MadReferee

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Revision

Revised to include better instructions for laying out the tines on the long platform sections and for welding the top link holders and tower, rearrangement of the order in which certain steps must be completed, and an updated parts and cut list.

Introduction

This document contains the construction plans for building a lawn dethatcher attachment that connects to the category 1 3pt hitch on a compact utility tractor (CUT). The attachment is actually 2 parts, the dethatcher platform and a general purpose hitch. The general purpose hitch described here is relatively lightweight but has been shown by actual usage to be more than adequate for this application. This hitch is also capable of being connected to other lightweight attachments thus expanding its usability. The platform can be sized to your individual tractor and is designed to hold 12" square cement patio blocks for additional weight. These weight blocks were proven not to be necessary for the dethatcher described here.

Your success in building this project is totally dependent on the care you take during construction. If you build it well, it will perform well. Before starting you should read thru all the instructions, drawings and pictures to get an idea of what is involved with this project. Take your time and determine if you want to change any dimensions then double check that the overall dimensions will work for your particular tractor. The dethatcher platform should at least cover your rear tire tracks plus a few inches more. The design here is for a Kubota B2710 / B2910 / B7800 which normally uses 5-6 foot implements (16 tines) or a BX series tractor with 4-5 foot implements (14 tines). A little planning goes a long way. Remember, measure twice and cut and weld only once.

Minimal welding skills are required, however you should be well past the beginner skill level to obtain optimal results.

Construction Hints and Tips

Make all metal cuts as you proceed with the assembly instructions. Dimensions shown are approximate and may vary depending on your unique layout.

It is advisable that you tack weld all sub-assemblies together then check for correct fitting and squareness. Once you are sure everything is ok, continue on to weld all joints paying close attention to proper weld penetration. This attachment was constructed using a 240 volt Millermatic 175 Mig welder using C25 shielding gas and .030 solid core wire. All welds were ground relatively smooth and spatter removed.

Basic tools that are needed are a bandsaw or chopsaw to cut metal; a welder; a ½" drill press; a ½" hand drill; 5/8", ¾" and 7/8" Silver & Deming drill bits with ½" shanks; assorted smaller drill bits; and assorted shop tools including a 4" hand grinder.

I have found that Rust-Oleum protective enamel paint gives the best finish. First spray on a good primer then brush on at least 2-3 coats of the paint. This will leave a strong durable finish.

Materials

6 ft	2” x ¼” square tubing
12-14 ft	2.5” x ¼” angle
6 ft	2” C-channel
1.5 ft	2” x 3/8” flat bar
5 ft	1” x ¼” square tubing
1.5 ft	1.5” x ¼” square tubing
2 ft	1” x 1/8” flat bar or equivalent
.5 ft	1/8” plate (use scrap)

Itemized Parts and Cut List

Item	Qty	Description	Used for	Source
1	2	2.5” x ¼” angle, size to fit (see build text)	long platform	local
2	2	2.5 x ¼” angle, 12.5” long	short platform	local
3	1	2” C-channel, 19” long	hitch mount	local
4	2	1” x 1/8” flat bar, 12” long, optional	supports	local
10	1	2” x ¼” square tubing, 23.5” long	drawbar	local
11	1	2” x ¼” square tubing, 14.75” long	top link tower	local
12	1	2” x ¼” square tubing, 26” long	hitch arm	local
13	4	2” x 3/8” flat bar, 2” long	end caps	local
14	2	2” x 3/8” flat bar, 5.5” long	top link holder	local
15	3	2” C-channel, 13” long	supports	local
16	2	1/8” plate, size to fit	triangle supports	local
20	3	1” x ¼” square tubing, 14” long	park stand leg	local
20a	1	1” x ¼” square tubing, 16.25” long	park stand leg long	local
21	4	1.5” x ¼” square tubing, 4” long	park stand holder	local
22	4	2” C-channel, 2” long	park stand feet	local
30	2	5/8” grade 8 bolts/washers/nuts, 3.5” long	hitch connectors	local
31	2	cat 1 adjustable lift arm pins	part #11930	Agri-Supply
32	1	cat 1 top link pin	part #11939	Agri-Supply
33	4	5/16” square lock pins	part #11953	Agri-Supply
34	5	¼” lynch pins (5 per pkg, need 1 pkg)	part #34035	Agri-Supply
35	16	dethatcher tines (qty to fit platform size)	part #43783	Agri-Fab
36	16	1.5” x 3/8” bolts/nuts/fender washers	tine holders	local
37	32	#7 hex sheet metal screws	tine twist stops	local
38	2	¼” round bar (cut to fit) (optional)	tine twist bar	local

Building the Platform

1. Determine the length of the long platforms (Item 1) by laying out the tines side by side on a flat surface so that they are spaced 7.5” apart measured from the center attachment point. Spacing can vary +/- ½” depending on the tines. The center attachment point bolt hole for the first tine will be approximately 3.5” from the end edge of the platform and the same on the opposite end of the other long platform. Each long platform’s tines will be offset by half the distance between individual tines on the other long platform. Be sure to include this in your length calculations. Using 8 tines per long platform, the length will be about 68.5”. For 7 tines the long platform length will be 54.75”. Cut the long platform pieces to size. See diagram for layout details.
2. Mark the position for the tine attachment holes and drill them.
3. Install all tine pairs on the platform. Drill holes for the twist stop screws (Item 37) and install as shown in the photos. These hex screws will prevent the tines from twisting when in use. Do NOT use excessive torque when installing the hex screws as this will snap the screws. Grind the pointed ends of the hex screws flat with the platform. Remove all tine pairs.
4. Bevel the angled end edges of the 4 platform pieces and tack weld the platform together. Insure that the diagonals measure the same distance. Finish welding all joints.
5. Cut a ¼” notch in the hitch mount (Item 3) C channel “ears” approximately 12” from one end so that it fits over the platform edge while the other end is up against the opposite long platform side.
6. Center the hitch mount on the platform and weld. See layout diagram and photos for details.
7. Weld the optional supports (Item 4) to the platform. See photos for details.

This next step should be done AFTER the general purpose hitch is completed.

8. Align the completed hitch with the attached hitch arm (Item 12) onto the platform hitch mount so that the end of the arm is positioned 6” from either edge of the long platform sides. The hole in the hitch arm that is closest to the hitch should be about 2” from the front of the platform. Mark both holes on the hitch mount and drill 5/8” diameter holes.

Building the General Purpose Hitch

1. Drill a ¾" hole 1" from the top in the center of the top link holders (Item 14). Do both together to insure a perfect alignment. See diagram for layout details.
2. Layout the top link tower (Item 11) and top link holders (Item 14) so that the bottom of the top link tower is 17" from the center of the hole drilled in step 1. Place an end cap (Item 13) so that it is even with the top of the top link tower and between the top link holders. It should be about 3" from the top of the top link holders. See diagram for layout details. Tack weld the end cap in place to the top link holders only. Check for squareness and that the holes drilled in step 1 are perfectly aligned. Finish welding the end cap to the top link holders.
3. Weld the top link holder assembly to the top link tower (Item 11). Proper weld penetration is important here and multiple passes will be required.
4. Drill a 7/8" hole in the center of two of the end caps (Item 13). Do both together.
5. Fit the lift arm pins (Item 31) to the just drilled end caps. If one nut is larger than the other, insure that it is installed on the side opposite the pin. Any lock washer should go on the pin side of the cap. Weld the nut on the side opposite the pin to the end cap. Do not overdo the bead but insure that you get good penetration.
6. Test fit the assembled end caps onto the drawbar (Item 10). You will probably have to grind the inside of the drawbar and/or the weld bead on the nut in order to get a good fit. The caps should sit flush against the drawbar with the pin pointing outward. Make sure the total length of the drawbar plus end caps plus outside pin nuts and washers does not exceed 26". A little shorter is OK. Cut drawbar shorter if necessary. Bevel the drawbar end edges and weld the end caps to the drawbar.
7. Center the top link tower assembly from step 3 onto the drawbar and weld.
8. Drill two holes 5/8" diameter in the hitch arm (Item 12). One hole should be centered 2" from the end. Drill a second hole 6" from the first hole. These holes will be used to fasten the hitch arm to the hitch mount (Item 3).
9. Center the hitch arm on the drawbar assembly and 90 degrees to the top link tower, and weld. See photos for details.
10. Measure and cut the three diagonal supports (Item 15) from C channel. Cut each end to a 45 degree angle and weld in place. See photos for details.
11. Measure and cut the two triangle supports (Item 16) and weld in place. See photos for details.
12. Weld the remaining end cap (Item 13) to the open end of the hitch arm.

Building the Parking Stands

1. Cut 4 park stand feet (Item 22) from C channel and drill a ¼" hole in the center of each. These holes allow any water inside the stands to drain.
2. In each park stand leg (Item 20 and 20a), drill an 11/32" hole centered on each side 3" from one end. These holes are for the square lock pins (Item 33) when the parking stand leg is in the retracted (dethatcher in use) position.
3. In each park stand leg (Item 20 and 20a), drill an 11/32" hole centered on each side 2" from the end not used in step 2. These holes are for the square lock pins (Item 33) when the parking stand leg is in the extended (parked) position.
4. Center each stand on a park stand foot and weld. The end with the holes 3" from the end (step 2) should be closest to the park stand foot.
5. In each park stand holder (Item 21), drill a 5/16" hole centered 2" from each end, completely thru the holder. These holes are for the square lock pins (Item 33).
6. Weld 2 park stand holders (Item 21) to the tractor side (front) of the platform insuring that they are not directly in front of a tine. This positioning enables the feet to be rotated in either direction. Make sure the holes are on the outside. See photos for details.
7. Weld another park stand holder to the back of the platform, centered as close as possible along the length of the platform. Make sure the holes are on the outside. See photos for details.
8. Weld the remaining park stand holder to the drawbar. Make sure the holes are on the outside. See photos for details.
9. The longer of the four park stand legs (Item 20a) is used for the holder mounted on the hitch drawbar.

Miscellaneous

1. Drill a ¼" hole near the end of the grade 8 hitch connector bolts (Item 30). These holes will be for a lynch pin (Item 34).
2. Grind all welds smooth and grind way any weld spatter.
3. Prime then paint with 2-3 coats of brushed on Rust-Oleum protective enamel in the color of your choice.
4. Attach the tines to the platform using a drop of **blue Loctite 242** on each of the 3/8" bolts. Do not use red Loctite.
5. Measure and cut the tine twist bar (Item 38) to fit lengthwise between all tines in one row. Drill a small hole in each end for a cotter key. Install the twist bar between the tines and place a large fender washer on each end and secure each with a cotter key. This bar will prevent additional tine twisting and is an optional accessory.

Design Alternatives

If you already have a 3pt trailer hitch with a 2" receiver it can be used as an alternative to the general purpose hitch. Simply take the hitch arm (Item 12) and drill a 5/8" diameter hole from the side all the way through about 6" from the end that does not have the holes drilled in "Building the General Hitch" step 8. This end will go into the 3pt hitch receiver and the holes will be for the receiver hitch pin.

As another alternative, the hitch arm can be made from flat bar stock and attached to the tractor drawbar with a hitch pin after drilling the appropriate holes.

Tine spacing can be varied for different applications.

Although landscape rake tines may be substituted for dethatcher tines, I would not recommend it due to the lightweight nature of the platform design.

Picture Gallery

Finished attachment connected to tractor.

Prior to finish painting. This dethatcher has 8 tines across each long platform.

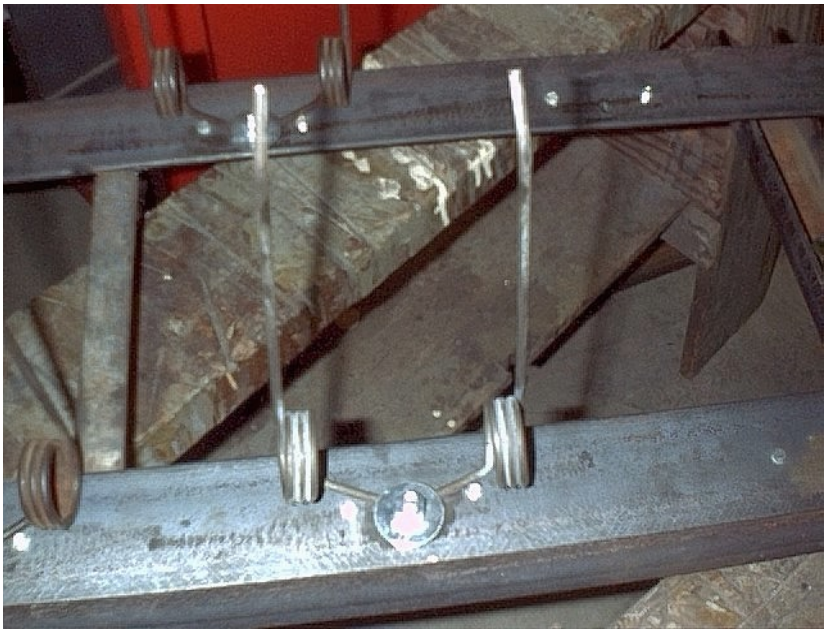
Close-up of hitch arm connection and rear parking stand. Notice how hitch mount is connected on the left by notching the C channel “ears”. Also shows optional supports installed.

Close-up of general purpose hitch. Notice diagonal C channel supports and drawbar parking stand.

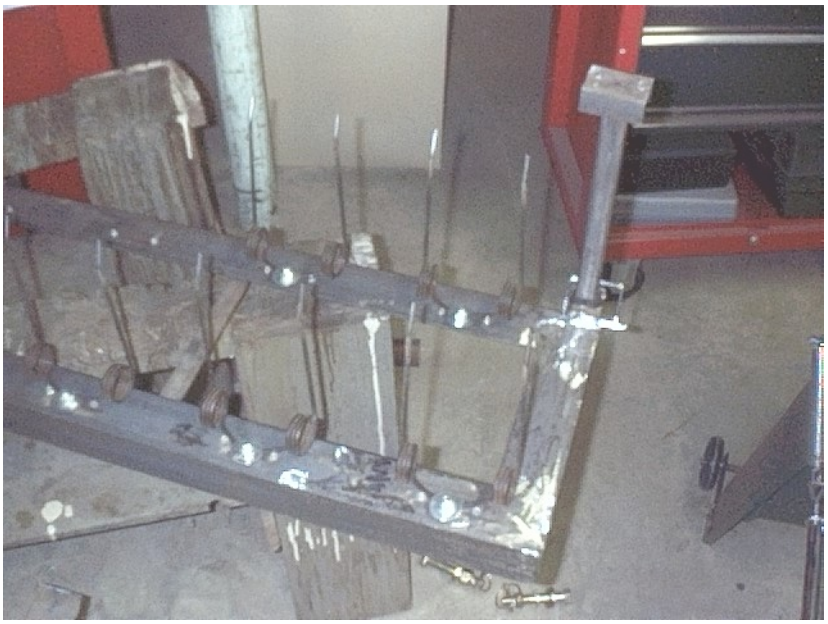
View of tine alignment and front left parking stand. Front right parking stand will be located between the first 2 tines (see above photo).

General purpose hitch. Notice hitch arm and triangle supports between hitch arm and drawbar.

General purpose hitch under construction. Notice top link holder and tower along with park stand holder.



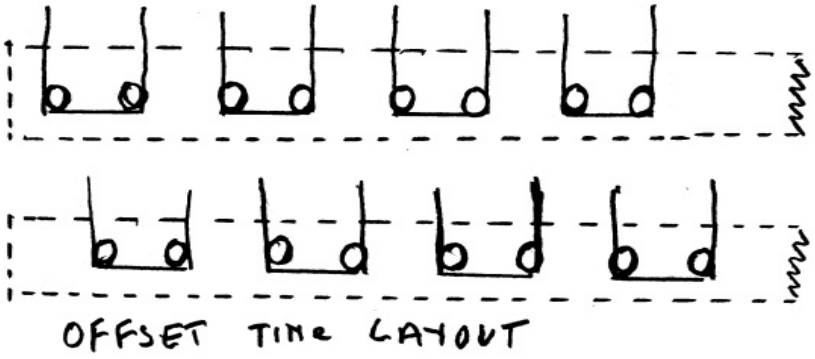
This shows how the tine pairs are attached with a bolt and fender washer. Notice the 2 hex head screws. These are placed to prevent the tine from twisting.



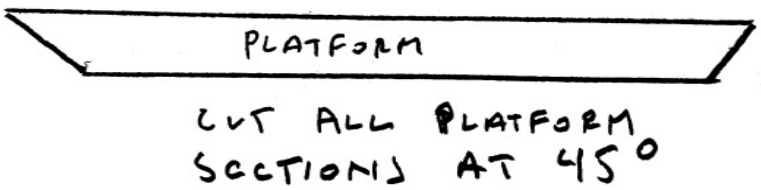
Platform under construction. Notice how the tines in each row are offset. Also notice the 45 degree cut angle at the corner.

Here is a picture of a smaller dethatcher that has 7 tines across each long platform.

Diagrams



Each tine contains 2 fixed legs. Measure the distance between the fixed legs. Space the tines so that the distance between adjacent legs is the same as the distance between the fixed legs. So, if the spacing is 3" between a tine's fixed legs, then the tines should be spaced so that there is 3" between the legs of each adjacent tine. The rows should be offset so that the legs on one row fall in between the legs on the other row.



The end angles for all 4 platform pieces should be cut at a 45 degrees.

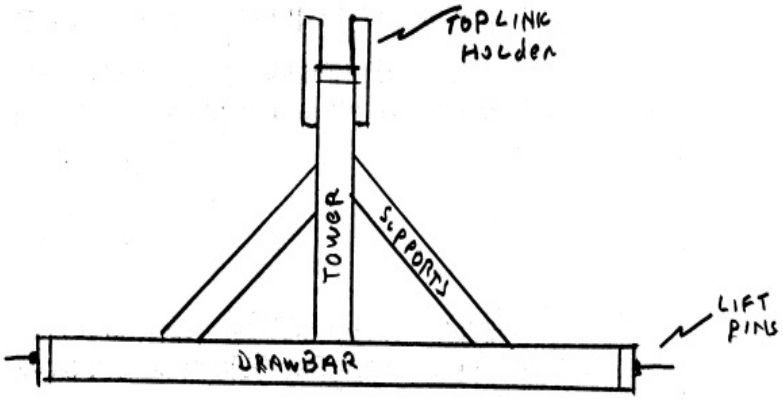


Diagram of the general purpose hitch. Cat 1 dimensions are:

18” from center line of lift pins to center of top link hole.

26” from lift pin nut to lift pin nut.

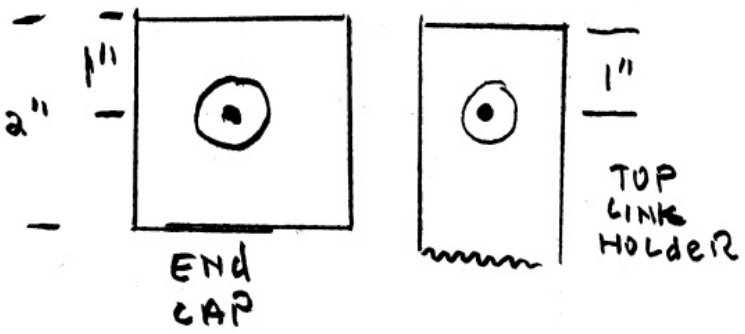


Diagram showing 7/8” holes to be drilled in end caps for the lift pins and ¾” holes to be drilled in top link holders for the top link pin.

