

THE NEW DAWN ENGINEERING BARBED WIRE MAKER

Section 1 : Assembly of the Equipment

The Barbed Wire Maker consists of 7 pieces of equipment. They are:



1. A black and red main frame with a seat and pedals.



2. A black winder frame which comes folded up.



3. A red spool with fingers of steel sticking out onto which the barbed wire is rolled.



4. A red shaft with steel fingers sticking out. The spool should already be on the shaft.



5. A red spreader which is a steel >T= shaped rod with three rings on it.



6. + 7. Two black wire stands with three legs that have an adjustable red >horn= at the top.

1. The main frame is the unit that actually produces the barbed wire. The seat can be adjusted back and forth to suit people with different leg lengths. It has a barb cutter on the opposite site. Check that the arm, which sticks out of the side of the machine is not damaged. It should move up and down freely. Check that the pedals are not damaged.
2. The winder frame must be assembled. It consists of two sides that meet at the top like a letter >A= and two angle irons that reach across the bottom with a bolt on each end. The top of the winder frame has to >U= shaped pieces that hold the spool shaft. These are supposed



to point away from the main frame when in use. If they open towards the main frame, turn the winder frame around. The winder frame at the bottom can touch against the legs of the main frame. When you are sitting on the seat, the winder must be on your right.

3.& 4. The red spool is the part that the barbed wire winds around. It goes together with the shaft with 5 fingers. The spool that slides over it. The spool slides onto the shaft, small end first so that the 5 little ribs stick between the 5 fingers on the shaft. There is a hole drilled through both of these parts so that a wire can be inserted to keep the spool in place when the machine is in use. It is near the small end of the spool. If you can't see through the hole, turn the spool until the hole in the shaft and the spool line up and put a small piece of scrap wire through the hole and bend it over so it can't fall out. Then place the shaft on top of the winder frame. It is a good idea to grease or oil the shaft where it sits on the frame so it will not wear much. The assembly looks rather like a steamer's paddle-wheel when assembled. The winder makes a cylindrical roll of barbed wire. The roll can be tied with three loops of wire BEFORE the wire holding pin is removed. After the roll is tied up, the spool can be removed from the shaft. The smaller end of the spool can then be pointed downwards and bonked onto the ground. The roll will fall neatly off the spool.



5. The spreader is a >T= shaped round bar with 3 rings on it. At the end it has a flat plate with 2 holes. This part bolts onto the left side of the main frame with two 12mm bolts which should be in the holes on the main frame. The purpose of this spreader is to keep the incoming wires separate and manageable. One incoming wire passes through each of the rings on the far end, and both pass through the ring in the middle of its length.

6.&7. These two stands are used to support the wires feeding into the machine. In the case where high strain wire (also called steel wire or spring wire) is being used to make double strand high strain barbed wire, it is advisable (though not essential) to purchase 2 rotating unwinders. These are available from your equipment dealer.

The red >horn= on the wire stand is to be put at a desired height so that when a roll of wire is placed over the frame, the wire draws off in a manageable way. If the horn is raised (lengthened) it tends to hold the wire back more, releasing one coil from the roll at a time. Lowering (shortening) it causes the wire to flick over the top more easily.

The wire stands should be placed some distance away from the left side of the machine. Three metres or more is a good start. You can move the frames as necessary and adjust the height of the horn to suit your circumstances.

GETTING STARTED

1. Cutting Some Barbs

1.1. The CUTTER BLOCK has already been set by us in the factory, however it might get knocked out of position or may one day need replacement. If it is working well skip the next paragraph.

- 1.2. Setting the Cutter Block: There is a 8mm bolt for pushing it from the side, and a 6mm bolt for holding it down. Assuming that the cutter block is out of the machine and in your hand, first place it against the knife edge and put in the 6mm bolt. Tighten the bolt a little so that with a bit of effort you can just move it little with your fingers. Next, undo the lock nut on the 8mm adjusting bolt and turn the 8mm bolt in until it presses the Cutter block gently against the knife edge. It should not press hard against the knife edge or you will not be able to move the cutter arm. Next, tighten the 6mm bolt to hold the cutter block tight. Make sure the cutter arm still moves easily. Lastly, tighten the 8mm lock nut. Check again that the cutter arm moves up and down without difficulty. Look to see that there is no gap between the cutter block and the knife edge.
- 1.3. Cutting Barbs: Lift the cutter arm and put some 2.0mm wire through the cutter block. Push it through until the end of the wire hits the stop plate. Use a sharp downward jerking motion (not a smooth press) cut off the barb. Lift the cutter arm and cut another barb. Take the second piece and have a close look at it. It should be just about exactly 60mm long. It should have two sharp ends cut at a 45 degree angle. As the right side of the cutter arm rubs against its frame, you should put some oil on it from time to time so it does not get worn. Also put some oil on the cutter block on the side that rubs against the blade. This will increase its life and reduce the pressure required to cut the barbs. There is a ball bearing on the cutter arm which is sealed and does not need to be oiled. If the barb length is not 60mm, bend the stop plate a little to adjust the length.
- 1.4. The Pedals: The pedals are not adjustable up and down to suit your leg length. They move a little to be able to tighten the Vee Belt. They are standard pedals and so are the cotter pins, if you ever have to replace them.
- 1.5. The Vee Belt: It is an A-1830 which means an >A= size 1830mm (72 inches) long. The tension on the belt does not have to very great as it does not work very hard.
- 1.6. The bearings are all UCP205's. They should be greased about once a year. They are sealed and shielded and should last for many years.
- 1.7. The Pulleys: These are >A= section pulleys, 75mm in diameter and have a bore of 25.0 mm. They are held in position with a set-screw and a 4mm spring pins. You will not easily remove the pulleys if one gets damaged. The pin must be knocked out before the pulley will come off. The barb cutter has a small sealed ball bearing which should last for a very long time without any problem.
- 1.8. The Spinner: This is the small part that actually produces the barbed wire. It is on the right hand end of the top shaft. This is the part that the feet are going to rotate when the pedals are moved. It has two holes in it and two little slots.
- 1.9. The Barb Spacer: This is a small triangular part bolted onto the top of the main frame. It is used to space the barbs. There are three settings for it, with three different holes to bolt it into. The setting made at the factory is for a 150mm space between the barb sets. This is the standard for barbed wire. The other settings are 150mm centre-to-centre and 60mm.
- 1.10. The Helper: The Barbed Wire Maker is operated by two people at once. One puts in the bards and pedals the shaft. The other advances the finished wire and rolls it onto the winder. The second operator must sit on a bench or stool or chair between the main frame and the winder frame in such a way that they can reach the spool with their left hand and the barb spacer with their right.

This requires that they sit facing the opposite direction to the First Operator.

SETTING UP

2. Threading in the Wires

2.1. Sit on the assembled machine. Place your feet on the pedals and turn the upper shaft until the spinner is oriented so that holes are horizontal and the slots are vertical. If you look into the left hand end of the top shaft you will see that there is a pin partially blocking the hole in the shaft, and this pin will be vertical when the slots in the spinner are vertical. This pin keeps the two incoming wires separated.



2.2. Take one of the incoming line wires from the wire stand, through the ring on the end of the spreader, through the centre ring and up to the entrance hole of the top shaft. Have a look to see which way it is bending - towards you or away from you, up, or down. All wire coming off the roll will tend to bend one way or another. At this time you want the end of the wire to be bending towards you, so if it is not, bend it with your hand so it curves slightly towards you.



2.3. Push the wire into the left end of the top shaft on the near side of the vertical pin. The wire will scratch along the inside of the hole, always tending towards you. When it reaches the inside of the spinner on the right hand end of the shaft, it will enter the back of the little hole in the spinner. If necessary, rock the pedals back and forth slightly and the wire will come out of the hole. It should exit the spinner through the hole on the near side. If it does not, then the wire has crossed over somewhere inside the top shaft, which is not supposed to happen. Bring the wire out of the near hole and up so as to prevent it slipping out again.



2.4. Take the second wire from the other wire stand and do the same thing: bring it through the spreader and into the top shaft. This time, bend it so it curves slightly away from you and push it into the far side of the top shaft. The vertical pin will keep the two wires apart. It should emerge from the spinner through the hole on the far side. If you curve the wires too much when trying to thread them in, they will not come through properly.



2.5. You will now have two line wires going into the left side of the shaft and emerging on the right, in such a way that they do not twist over each other inside the shaft. Test whether or not you have done this by sliding the two wires back and forth at the same time, left to right. There should be no problems like scratching or jamming. Unseen, inside the shaft, there are two other pins which keep the two wires separated

MAKING BARBED WIRE

3. To start with, cut a lot of barbs. The tray holds about 5000 pieces. You will become quite good at cutting them. The important technique to develop is not to push the cutter arm gently down until it touches the wire and then press hard to cut it. The correct motion is to jerk the cutter arm down rapidly from the top of its stroke. This takes much less total effort and us faster as well.



- 3.1. Raise the cutter arm and feed in the wire with your left hand. You should be able to cut and feed 3 or 4 barbs before you have to let go of the wire to grab it farther back. Some people get coordinated enough to cut 100 barbs per minute.

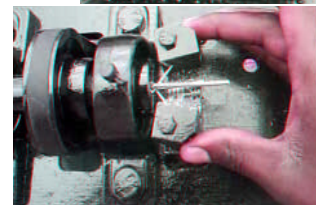


- 3.2. From here onwards, we will speak only of >line wires= and >barbs=. The line wires should be one size larger than the barbs. For example, 2.0mm line wires and 1.6 or 1.8mm barbs; 2.5mm line wires and 2.0mm barbs; 2.0mm high strain line wires and 2.0mm ordinary wire barbs. Some people make 2.5mm high strain line wires and 2.0mm barbs. If you need to use thicker wires than 2.5mm, please contact your dealer for a special spinner with larger holes. We will also speak of the barb guides - the near one and the far one, referring to the one nearest the operator and the one opposite it.

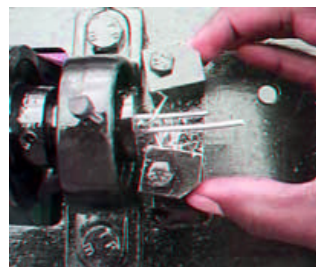


- 3.3. Hold the two line wires a bit to the right of the spinner, say, 75mm. Using the pedals, rotate the shaft until the two line wires are one above the other and two slots are horizontal.

- 3.4. Push one barb into the far barb guide. The hole will guide the barb towards the centre of the spinner. The barb must pass between the two line wires. Press it in until it has seated into the slot on the far side of the spinner. Rotate the shaft just a little if necessary.



- 3.5. Put another barb into the near barb guide. It will be guided away from you between the two line wires just as the other one was. At this point you have a choice: to put it between the line wires and then over the first barb or else under it. Both barbs will be between the line wires, but one has to be on top of the other. It does not matter which you do at first. So, put them in so that the first barb (the back one) is between the two line wires and over the second barb. It will help a little to rotate the shaft slightly forward until the slot lifts up the rear barb and allows the front barb to slide under the first one and on into the spinner.

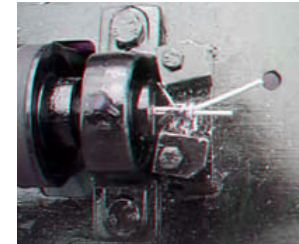


- 3.6. The back barb is now on top, so pedal backwards. Give the two barbs a little push with the thumb and forefinger of the right hand. When they are gripped by the line wires you can stop pushing.

As you pedal, the two line wires will be turned by the spinner. This will wrap the barbs tightly around the line wires. As you turn the pedals the barbs are drawn through their guides. When the barbs are drawn out of the guides you will hear a characteristic >pop-pop= indicating that you can stop turning the pedals. This should take about two turns of the pedals.



3.7. The helper should now advance the line wires by pulling them towards the winder. After passing the barb spacer, they should hook the two line wires over the vertical blade of the spacer.



3.8. Pedal backwards or forwards slightly until the slots are again horizontal. Insert two or more barbs into the barb guides. This time, make sure that the back barb is on the bottom, passing under the front barb as it goes between the line wires. Again, it will be helpful if you pedal a few degrees backward to raise the front barb a little and create a space for the back barb to pass under it. This time, as the front barb is on top, pedal frontwards. This time, as the first barb set is hooked over the barb spacer, the turning of the spinner will make a new set of barbs and twist the two line wires between the first barb set and the second.

3.9. While this is going on, the line wires which were twisted on the left side of the machine in the region of the centre ring on the spreader are untwisted by the making of the second set.

3.10. The helper must now advance the finished set ahead to the barb spacer. You have everything as it was in the beginning. Insert the next barb set so as to go backwards. That is, with the barb coming through the back barb guide being on top of the front barb. The golden rule here is: **BACK BARB ON TOP = PEDAL BACKWARDS.**
FRONT BARB ON TOP = PEDAL FRONTWARDS.

The direction has to reverse each time!



Back Twist

Neutral

Front Twist

4. Winding Up the Product

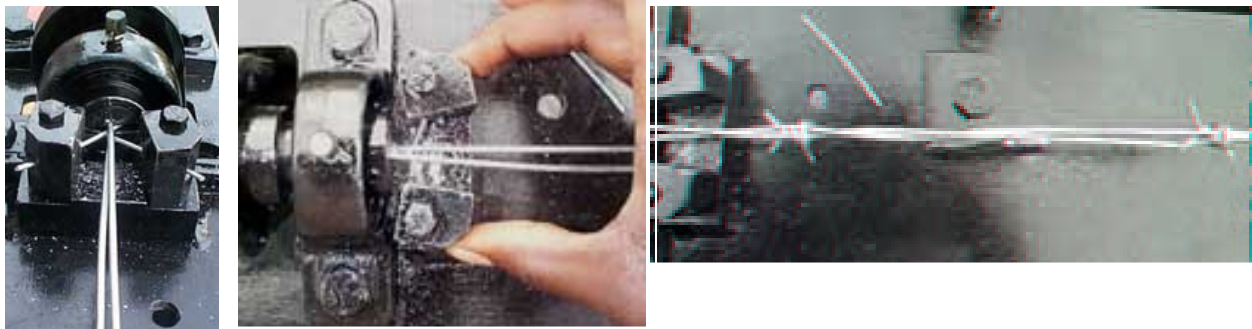
4.1. It is important to note that the wire must be wound **UNDER** the winder, not over it. This is so that the helper can pull down on the red spokes of the spool, rather than trying to lift them up when advancing the wire.

4.2. This motion for the winding of the finished barbed wire is that the second person lifts up the wire from the barb spacer and then pulls down on the spool arm. This will draw the line wires through the top shaft and roll the finished product around the spool. Then the line wires are slipped over the barb spacer to set the distance between barb sets.



5. Other Advice

5.1. There is another important consideration about this twisting back and forth. It is more important to keep an eye of the wires entering the left side of the top shaft than it is to alternate the direction of rotation each time. If for example you were to forget to reverse the direction each time, a twist will accumulate on the left side in the spreader. Also, rotating the pedal three time instead of two will also accumulate a twist on the left side of the machine. Ideally, halfway through the twisting process, whether backwards or forwards, the two line wires will go to >neutral= or >not twisted= before crossing over each other by about 1 turn. If you wish, you can rotate an extra turn here and there in order to maintain this condition. If you accumulate a number of twists on the left side of the machine it will not longer be possible to feed the wires into the top shaft.



5.2. Also, if you do not pedal in the appropriate direction as indicated by the barbs, it is not a total disaster, but you will lose two of the barb points. Try it and see. Put the back barb on top and pedal forwards. The two points inside the spinner will draw back out of the slots and you will have a barb set with two very short barbs (from inside the slots) and a regular pair from the guides. It will also take more turns of the pedal to make the barb set. This create problems on the left side as mentioned above.

5.3. Under no circumstances should you start pedaling in one direction and then, realising after a moment that the direction is wrong, reverse the pedals. This will make a mess of the barbs and you will end up having to dig them out with a pair of long nose pliers. It is helpful to have a pair of these pliers with you at all times as little problems can crop up which they are required to solve.

5.4. While it is generally true that the line wires should be larger in diameter than the barbs, it is possible to make 2.0x2.0 mm barbed wire with a little experience, and on condition that the wire is not particularly soft. Most of the wire from Zimbabwe is too soft for this. You can try it and see. To do this, there is one extra operator action required: as the pedals start to turn, the right hand

fingers should squeeze together the two line wires, keeping them centred until the barbs are well wound around them. This will help prevent the line wires being drawn hard towards one barb guide as they turn. If this should happen, the whole lot will get jammed and the two line wires will twist tight around each other. It can be quite a mess. The pliers will be needed to sort it out. Then advance the wires a bit, move the wrinkled bits out of the way and insert another pair of barbs. It is much easier to use a wire that is smaller for the barbs.

5.5. While the pedals are being turned, the operator should be picking up the next pair of barbs. While the helper is advancing the wire, the operator should be inserting the barbs. With practice you can make a set of barbs every 4 seconds. You can make about 1 kilometre of barbed wire per day with these techniques. Good operators can do it consistently in 22 seconds. One very practised team in KwaZulu-Natal discovered that the helper can advance the wires immediately upon hearing the >click-click= of the barbs coming out of the guides. They allow no delay at all between the twisting and the advancing. They also prefer to use high strain wire for the line wires.

6. Wire Consumption

6.1. The most common size of barbed wire is 2.5 x 2mm. This uses 7.5kg of 2mm wire and 42.5kg of 2.5mm wire per 500+ metre 50kg roll. Thinner wires can use lightly shorter barbs which can be adjusted by bending the plate or putting a spacer onto its face to reduce the barb length.

6.2. Problems related to the operation of the Barbed Wire Maker can be referred to techhelp@newdawn.sz for assistance.

