

Bow Fire

By Steven Dykeman

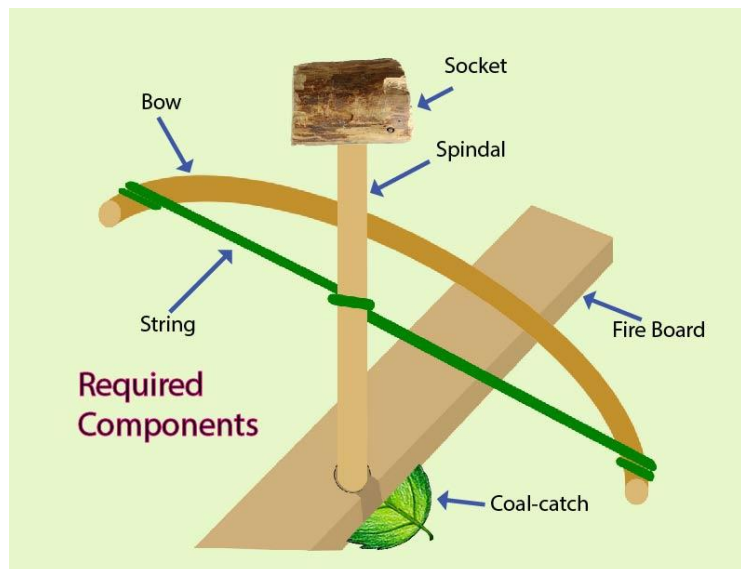
Be safe
Have fun
Better yourself



An often preferred friction fire technique is the bow-fire which creates heat from friction using a bow to rapidly spin a wooden spindle against a fire board. The friction generates heat and wears away a small amount of hot wood fiber that makes your hot coal. The popularity of the bow fire is due to it being a fire making method which can use materials entirely found in the wild and uses skills that can be learned by most people. Making bow fire can be one of the most exciting and rewarding experiences.

The Components required for making a bow-drill fire are shown to the right and are listed below:

1. Bow and bow string
2. Spindle
3. Fire Board
4. Socket
5. Coal-catch



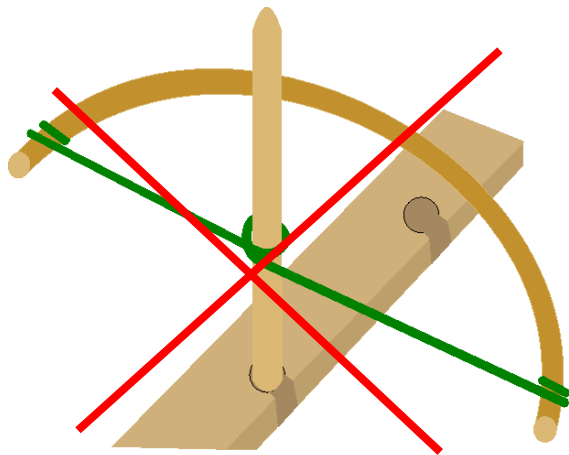
Description of Components

Bow and Bow String

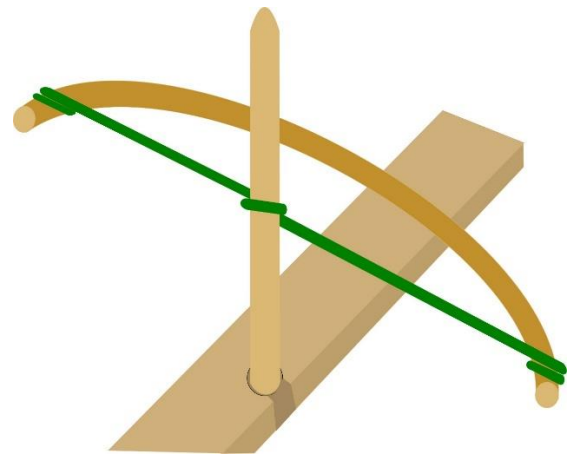
There are many examples of working bows. All three of the bows below have produced successful results. Two of the bows are simply a stick found on the ground. The third, is one that was purchased online from a small survival supply business. A purchased kit is in my opinion the best way to learn since when starting out there are many variables that effect results. It is best to have the materials to not be one of the things that can be wrong. When using a purchased kit, the only thing that can go wrong is your technique. After mastering your technique, begin to use your own materials found in nature. The bow starting should be the last thing to master since it is the most difficult thing to make well from materials found in the bush.



A common mistake is having a bow with too much curvature. A lot of curvature is not needed. The one bow in the picture above looks to the novice as too little curvature, but this is not the case. If the spindle were incorrectly on the inside of the bow string, the spindle would hit the bow at the ends of each stroke. By having the spindle on the outside of the string, this is not a concern. A bow with less curvature can provide better stability. Too much curvature in the bow may cause too much wobble. See the illustrations below.



Bow has too much curvature
Spindle is on the inside of the string



Bow has nice amount of curvature
Spindle is on the outside of the string

A means of attaching your bow string is required. Often a simple notch cut at one end using your pocket knife is preferred. A nice feature making it convenient to adjust your string tightness is to have a place to hook your bow string on the opposite end of the bow. See the examples below.



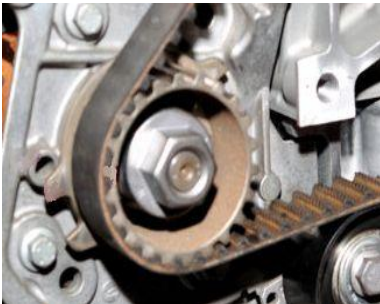
Notch out one end of the bow to attach your bow string



A stick with a natural place to hook your bow string is a nice feature

The String

One of the important elements to success is to not have slippage of your bow string on your spindle. There can be advantage to having your spindle not perfectly round. For the bow string, it is often preferred by many to use a cord that is not slippery. A hemp or jute rope is commonly used. Hemp twine or 1/8-inch rope usually does not provide enough strength. A 3/16 or 1/4 inch is preferred. Parachute cord is somewhat slippery, but can be used if it is tight enough to not slip. If you use paracord it is recommended to use the thinner 275-lb with the inner strands pulled out.



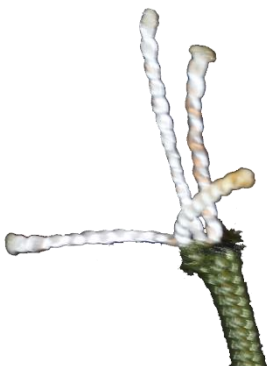
Cogged belts don't slip



Smooth round spindle with slippery cord can slip



Applying the cogged belt to bow fire making



One way to make your own bow string is to use two 80 – 100 cm lengths of 275 paracord and pull out the 4 nylon strands inside. Twist the two outer jackets together using a reverse twist. If you do not know how to do a reverse twist, look it up on the internet. It is the most basic survival cordage making technique.



What I find works well is to use the jacket from 550 paracord. Pull the 7 strands from inside the nylon jacket. The jacket is plenty strong enough to hold up to any tension you can develop in your bow fire making. With the stands pulled out, the jacket of the cord can lay flat against the spindle which will greatly increase the surface area contacting the spindle. This will minimize slippage. Some practitioners use a double twist around the spindle to grip the spindle even further. I prefer not to do this, but you try it and see what works best for you.

The Spindle (Drill)

The spindle or drill is spun at high speed against the fireboard to create heat from friction. A picture of a typical spindle is shown below along with important characteristics. Being straight is important to prevent wobble. It should be fairly round. If you choose to have the octagonal shape, it should be consistent over the entire length to avoid wobble. The length and diameters given are approximate. If it is too long, it becomes more difficult to hold it steady. If it is too short, you lose the freedom of bow position. To achieve high friction against the fireboard, the end contacting the fireboard should be slightly rounded. Using your pocket knife round up the end and then scrape it against a rock to smooth it out. The end being held with the socket should be somewhat pointed to minimize friction with the socket.



1. Straight
2. Round (or octagonal)
3. 20mm diameter
4. 18cm length
5. Pointed at one end
6. Rounded at other end

Good wood to use for both spindle and fire-board

- Aspen
- Basswood
- Blue Beech.
- Cedar
- Cottonwood.
- Cypress.
- Poplar
- Sotol
- Tamarack.
- Walnut.
- Yucca

Many types of wood can be used. Some people describe it as a hard soft wood, and others describe it as a soft hardwood. If it is too hard it will not produce good friction. If it is too soft it will crumble and the bow string will quickly wear into it and no longer spin. Most often the spindle and the fireboard can be the same type of wood. I often use Sotol for the fireboard and Cotton Wood for the spindle when demonstrating to city folk. When in the bush you often need to use what you can find. It is a good idea therefore to try different materials to gain the most confidence in your ability.



The piece of wood you get for your spindle will need some work to get it to the right specifications. Your dog can help get it started. If the wood is enjoyable for your dog to bite into, then it is most likely a good wood to use. It is preferred to use a fixed blade knife of suitable length. A pocketknife can be used, but it will take more work to whittle the wood into shape. The wood shavings can be used to help start your fire later.

The Fire Board (Hearth Board)

Making the fireboard is the most dangerous part of making a bow-drill set. Take your time and be careful. If you are teaching this to youth, be sure you watch over them at every step. The knife and saw techniques may be unfamiliar to many.

The fireboard should be 15 – 20mm thickness with a width of at least 30mm. The fireboard can be long so many fires can be produced from it. See the board below as an example. If you make your hole too close to the edge, it can breakout as the hole seen here on the corner. When starting your hole, a pocketknife or fixed blade knife can be used to drill and cut a ruff hole. The hole needs to be burned in to get it into a nice shape. You may need to read through the last section of this article to see how to use the bow-drill.



After burning in your hole, a notch needs to be cut that will allow the hot wood dust to flow out and collect on your coal-catch. A saw is recommended for this. If you have seen any of my articles or videos on knife or wood tools, you know that I recommend having a pocket

knife with a small saw in addition to a fixed blade knife. The notch should be a “V” shape that slants slightly downward and outward.

See the three pictures below to get an idea of how this is done. It is best to have the sides of the notch smooth so the wood dust does not get stuck on the sides.



Step 1:
Using your knife cut an indentation in the fireboard about 15mm from the edge



Step 2:
Using your bow and spindle burn the indentation to get the hole more defined.



Step 3:
Using a saw, cut a notch leading up to the hole

The Socket

The socket has been called other names such as: palm rock or thunder-board. I just call it socket because it doesn't have to be a rock, and it doesn't have to be a board, in fact it can even be a shot-glass.



A few examples of what can make a socket are shown here to the left. My favorite is a piece of manzanita.

The socket needs to meet the following:

- Hard and smooth
- Low friction between socket and spindle
- Fit comfortably in the palm of your hand
- Contain the spindle without slipping away
- Apply downward force to the spindle

The Coal Catch

The coal catch needs to accomplish three things:

1. catch the coal
2. keep it insulated from the cold ground
3. carry it from the ground to the tinder

This can be a leaf, sliver of wood, piece of bark, piece of cloth, or piece of leather, etc. My favorite is a thin piece of buck skin as shown to the right.



Whatever you choose, make sure you can pick it up without fumbling around and dropping it. Place it directly under the notch you have cut in the fire board before you try to make a coal.

Before attempting the bow-drill fire you need to be proficient in basic fire skills. It is recommended to have read or viewed the following subjects and have practiced them until you are prepared to teach others. Until you teach others what you think you know, you can't claim to know it.

1. Fire Safety
2. Fire Basics
3. Coal to Fire

Putting it all to use

With proper materials and skill, you should have fire in 30 seconds. The steps are for a right-handed person. If you are left-handed just use the opposite hand, leg, arm, foot, etc.

Basics outline of steps

1. Prepare your fire pit
2. Gather fuel wood, kindling, and tinder
3. Construct your tinder bundle
4. Place the coal-catch under your fire board
5. Twist the spindle onto the bow string
6. Kneel on your right knee
7. Position your left foot on the fire board close to the notched hole
8. Place the pointed end of the spindle into the socket.
9. Brace the socket against your left leg keeping the spindle straight up and down
10. Begin to pump the bow back and forth using the whole length of the bow
11. Slow and steady at first until you have the feel of it
12. You should see smoke after about 5 seconds
13. Add downward pressure to the socket against the spindle

14. Increase speed
15. Continue until you are exhausted (or about 10 seconds)
16. Stop and transfer the coal to your tinder nest.

The pictures below outline the steps necessary to wind the string onto the spindle. Twisting the string around the spindle is not easy. If it is easy, then most likely your string is not tight enough. It takes some practice. Most often once a person has the string around the spindle they lose their grip and it comes untwisted and the spindle falls to the ground. Keep trying. The picture to the right is important. Make sure you hold a good grip of the string and spindle so you don't have to start over.



Place the spindle on the inside of the string with the pointed end down



Twist the spindle to wind one turn of the string around the spindle



Grasp the spindle and string in your right hand to prevent the string from unwinding

Once you have the bow string tightly twisted around the spindle, you need to get into position. While maintaining control of your spindle and bow, get down on your right knee next to the fire board. Place your left foot on the fire board close to the notched hole. Maintain control of your bow and spindle with your right hand while setting the spindle into the hole on the fireboard. With your left hand, take the socket and place it over the pointed end of the spindle and brace your hand tightly against your leg. See the picture below and to the right. You can now slide your hand down the bow toward the end as shown in the picture.



Foot is too far from notched hole
Bow is on wrong side of spindle
Left hand is not braced against leg
Bow string is too high



Foot is close to notched hole
Bow is on correct side of spindle
Left hand is braced against leg
Bow string is low near fireboard

You are now ready to create a coal. Begin with a slow and steady motion using the whole length of the bow. The bow string should be about halfway up the spindle. If it is too close to the socket it may create

added stress to the spindle causing it to come lose from the socket hole. The bow string should always be horizontal to the ground. Apply a bit more downward pressure with the socket, and increase your speed a bit. In about 5 seconds you should begin to see smoke. When you are getting a lot of smoke, don't stop. Increase the pressure and the speed of your drilling. Try to keep it up for a good ten seconds. If you stop bowing and smoke continues, then you probably have a coal.

Transfer the coal on your coal-catch to your tinder nest and blow it into flame.



Some important considerations to help your success are:

1. No slippage bow string to spindle
 - a. Bow string tightness
 - b. Spindle to string grip
2. Low friction spindle to socket
 - a. Pointed spindle at top
 - b. Smooth hard socket
3. High friction spindle to fire board
 - a. Rounded spindle at bottom
 - b. Ruff up surface
4. Stable socket position
 - a. Brace against leg
 - b. Close in
5. Notch
 - a. Angled out
 - b. Angled down
6. Tinder
 - a. Start simple
 - b. Process material to fine fibers
7. Coal catch
 - a. Non flammable
 - b.



About the author:

Steve Dykeman is an experienced outdoorsman and survivalist. He has written many articles and produced many videos on subjects relating to outdoors and survival. He has been a course director and instructor to both youth and adults. He has also been a technical consultant to manufacturing companies relating to outdoor gear. He has over 40 years of experience working with space and defense related electronics. He brings his advanced technical abilities to the outdoors, exposing the many myths and fallacies.

In recent days he is educating people to survive into our uncertain future.

