Potato Gun Materials & Assembly Instructions

Parts List

Item	Description	Quantity
1	Igniter (BBQ pushbutton type) (Wall-Mart)	1
2	4 inch ABS pipe (approximately 6 inches needed per gun)	2 ft
3	4 inch ABS coupling	2
4	4 inch to 3 inch ABS bushing (slip fit, both ends)	1
5	4 inch to 3 inch ABS adapter (female thread on 3 inch end slip fit to 4 inch coupling on other)	1
6	3 inch to 1 ½ inch ABS bushing (slip fit both ends)	1
7	3 inch ABS threaded plug	1
8	1 ½ inch ABS pipe (barrel)	4 ft
	Note: make sure this piece of pipe that will be used for the barrel is straight, I've got pipe from the hardware store that has been setting for a while on a rack and has a slight bend.	
9	3/4 inch Schedule 40 PVC pipe (ram rod)	4 ft
10	3/4 inch PVC cap (ram rod caps)	2
11	4 inch length of 1 ½ inch PVC pipe (projectile forming tool)	1
12	6-32 x 2 ½ inch machine screws	2
13	6-32 nut	8
14	# 6 flat washer	2
15	# 6 split lock washer	2
16	Crimp or solder lug for #16 wire to # 6 screw	2
17	# 16 insulated wire (the higher the voltage rating the better.) (I used 400 volt rated wire)	2 ft
18	Roll of electrical friction tape or glass electrical tape	1 roll
19	Roll of plastic electrical tape	1 roll

Note 1.

Depending upon the igniter used. Select PVC fittings that will accept Igniter and small amount of wiring.

I used ¾" PVC coupling with a cap. You will have to take the igniter with you and try it in what ever

you decide to mount it in.

Assembly instructions:

There is a ridge on the inside, in the center of the 4 inch couplings. Measure from the ridge to the end of the pipe. Cut a piece of 4 inch ABS pipe twice this measurement, minus 1/16 of an inch (the 1/16 inch leave room for the cement to ooze***)***
Cut this piece as accurately and true as possible.
Use miter, cut-off saw, or minimum use a miter box.

Note 2.

You must work fast when cementing these parts together, the cement sets up in seconds. Make sure all parts are fully mated. Once I applied the cement, I pushed the parts together fast and hard.

2. Using ABS primer, coat this piece of pipe only about 1/3 the distance from end toward center. Then coat this same area with ABS cement and insert immediately into one of the 4 inch couplings. (Check on the inside of the coupling, to make sure no cement oozed over the internal center ridge.) Let set for a few minutes.

3. Coat the other half of pipe protruding from coupling in the same manner and insert into the other 4 inch coupling. Again check to see that no cement oozed over internal center ridge.

4. If 4 inch pipe was cut correctly and true, and couplings were forced down over the pipe to contact the internal center ridge, both couplings now should be butted against each other.

Note 3.

The pipe inside the coupling gives the combustion chamber walls the added strength required to withstand the pressure of combustion.

5. At least three inches from one end of one of the couplings (this will be the aft end of the gun) drill clearance holes for 6-32 screws (#29 drill bit), spaced 90 to 120 degrees on the circumference, apart (this is not critical). It is important that the distance from the end of the coupling be the same for both holes. (these hole are used to mount the igniter probes. (6-32 x 2 ½ inch machine screws)

6. Sharpen the two 6-32 machine screws to a point. This seems to make the spark a little more reliable. Screw on one 6-32 nut to each screw, install two flat washers and another 6-32 nut

and one more flat washer. (a wire with a lug will go between the two flat washers.) Do this to both screws.

7. Insert the two screws with hardware into the two holes previously drilled. From the inside install one # 6 flat washer, one split lock washer and one # 6 nut.

8. Arrange the tips of the screws so that they are approximately one quarter to three eighths of an inch apart. (this is the spark gap and may need adjusting, depending upon the igniter you use.)

9. Take the 4 inch to 3 inch (slip to thread) adapter, apply coating of ABS primer, then apply coating of ABS cement and insert immediately into the end of coupling that is closest to the screws just installed. (This is the aft end of the gun.)

10. Screw in the 3 inch cap.

11. Take the 4 inch to 3 inch bushing, prime and cement it into the other end of the 4" coupling.

12. Take the 3 inch to 1 ½ inch bushing and prime and cement it into the 4" to 3" bushing that you just installed into the 4" coupling.

13. Now you're ready for the barrel. Prime and cement 4ft barrel into the 1 ½ inch bushing.

14. Now you're ready to mount and wire the igniter. If the igniter doesn't have two wires, one must be added, by soldering or crimping a wire to the ground pin.
(after the wires are attached check the igniter for proper operation)

15. Install the igniter into some type of holding fixture made from PVC or ABS, run the two wires out opposite sides and as close to the end that goes against the combustion chamber. These wires should be about 1ft. long, long enough to be formed against the chamber, and connected to the screws.

Note 4: **DO NOT** run wires close to each other, for they may arc over when igniter is activated.

16. Before the wires are attached to the two spark gap screws, cement the igniter that is mounted in a holding fixture of some type to the barrel with epoxy or some hard setting cement and allow to set.

17. Connect the two wires to the two spark gap screws with wire lugs placed between the two flat washers, don't just wrap wire around screw. Make sure all nuts are tightened and that the spark gap screws are tight and firm in the chamber housing. (check the spark gap for a spark when the igniter is triggered. It may be necessary to adjust the gap for a reliable spark)

18. The final step is now to wrap the igniter / barrel assembly and the combustion chamber. First use the friction tape or glass tape. Wrap at least two layers thick, all the way from the front of the igniter to the back of the combustion chamber. Next use the plastic electrical tape and do the same, two layers thick. (this is to prevent shock hazard from the igniter and give shatter protection from the combustion chamber, in case. (this is not very likely, due that the end cap is the weakest point in the chamber..)

Make the ram rod from the 4ft. length of ¾ inch PVC pipe. Use ¾ inch caps on the ends. Form potato per operating instructions, and insert in barrel, insert ram rod and push potato down barrel until potato is approximately 1 inch from combustion chamber. Wrap tape on rod at open end of barrel to signify when the potato is seated to the correct depth, of one inch from the chamber end of the barrel.

Projectile forming tool 4 inch length of 1 ½ inch PVC pipe. Sharpen the edge on one end, on a grinding wheel, or file to a sharp edge.

Note: This tool may also be made from 1 ½ inch steel, such as a close nipple.

Operating Instructions

It is important that when firing this potato gun that the screw cap is held along side the body, not against the body in any way. If there is a fault, the cap will be the first to go. A fault could be caused by the potato or other foreign object being jammed too tightly in the barrel. This is the reason for using only fresh potato's they have a juice that lubricates the barrel, and the use of a forming tool made from the 1½ inch PVC pipe, or close nipple to get the correct diameter to the projectile.

Caution should be taken, not to fire a potato projectile larger than 3 inches in length. Any length larger than this could raise the chamber pressure to a dangerous level.

Potato projectiles are formed by first cutting a potato in half, then using the 1½ inch PVC pipe sharpened on one end. With the cut side of the potato down, press the forming tool down over the potato. This forms the potato to the diameter of the barrel.

To load the potato gun: Potato projectile is placed in the barrel, CUT END UP.
Using the ram rod force the potato down the barrel to the desired depth, about one inch from the opening to the combustion chamber. (tape mark on end of ram rod)

Remove end cap on combustion chamber. (just open far enough to insert nozzle of propane torch (which I use due to lack of residue from firing). A cheap hair spray may be used (this may leave residue and require cleaning of the chamber after a short time.) It may be necessary to experiment with the amount of fuel injected to get reliable ignition depending upon type of torch or hairspray used. Start with small quantities, (five to ten second duration) Too much or too little and the mixture will not fire reliably, if at all. After combustion chamber is charged with fuel, screw cap down only finger tight, just slightly snug.

NEVER point the Potato Gun at another person, or any item that you don't want damaged. First try it against a solid wall (brick or stone) to get the feel of the power released when firing, and the damage that may result.

Number one concern is safety for yourself and others.

Please do not hesitate to email me any questions you may have during assembly or operation of the Potato Gun. dick@eckersall.com