Abel Thomas

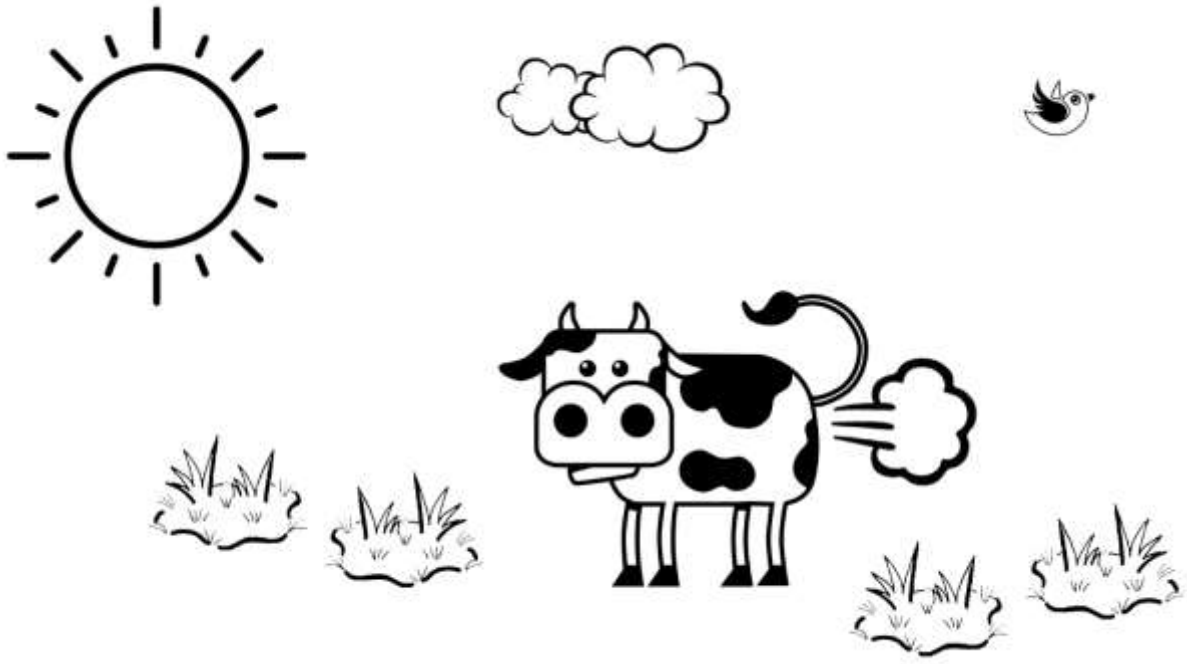
LIBERTY GENERATOR

Contents

LIBERTY GENERATOR

Introduction: What is biogas?

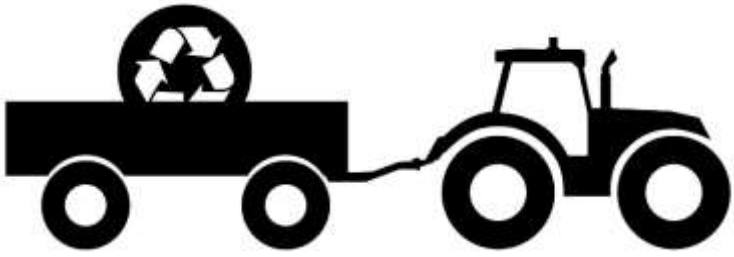
When you think of biogas, you may be thinking about this:



Well it's not only that.

Biogas comes from all types of organic waste.

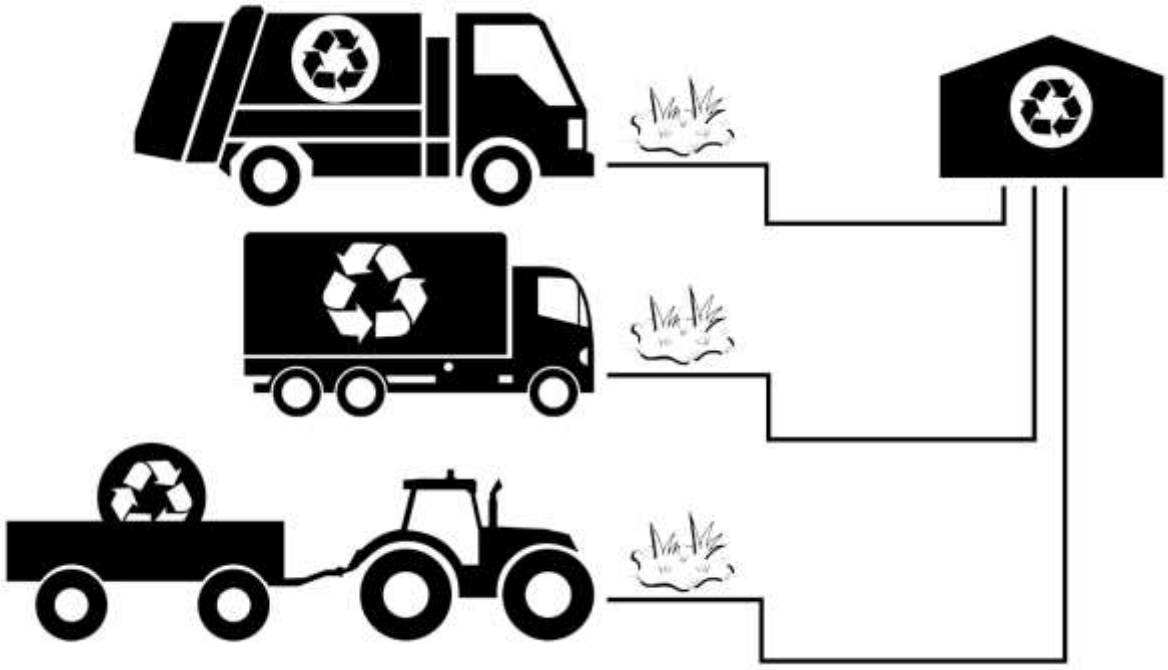
From agricultural waste, such as vegetable waste manure and cereal dust.

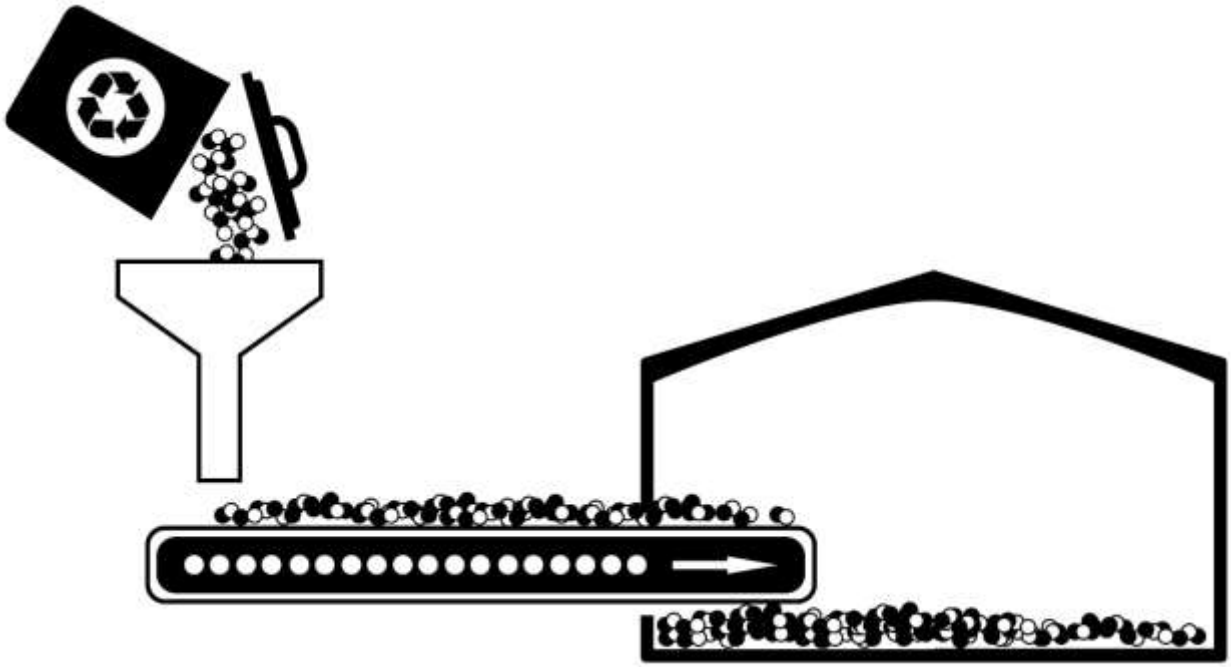


Industrial byproducts, such as sludge fats and peelings.

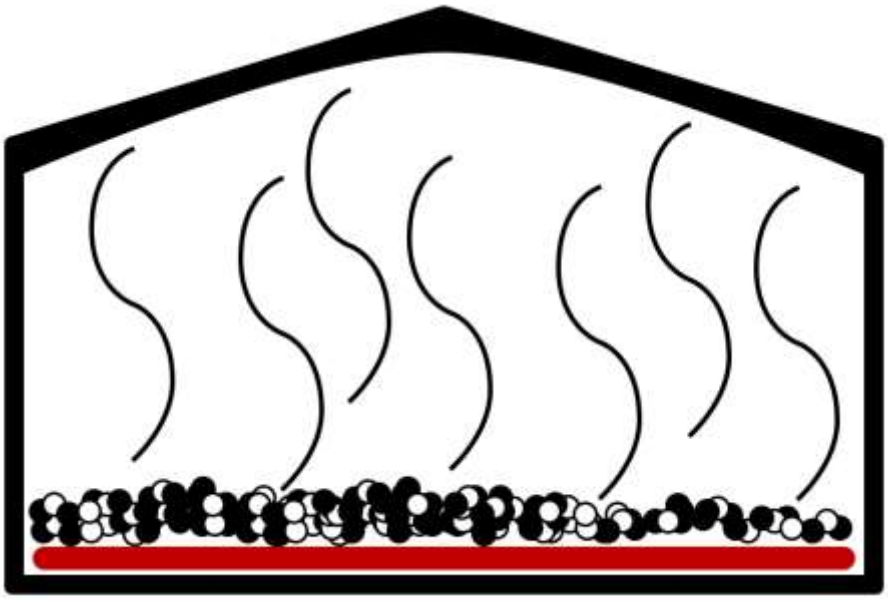
And urban waste that usually consists of green waste and household waste from homes and supermarkets.

This organic matter is then collected, sorted and placed in an anaerobic digester, where it is mixed and heated.



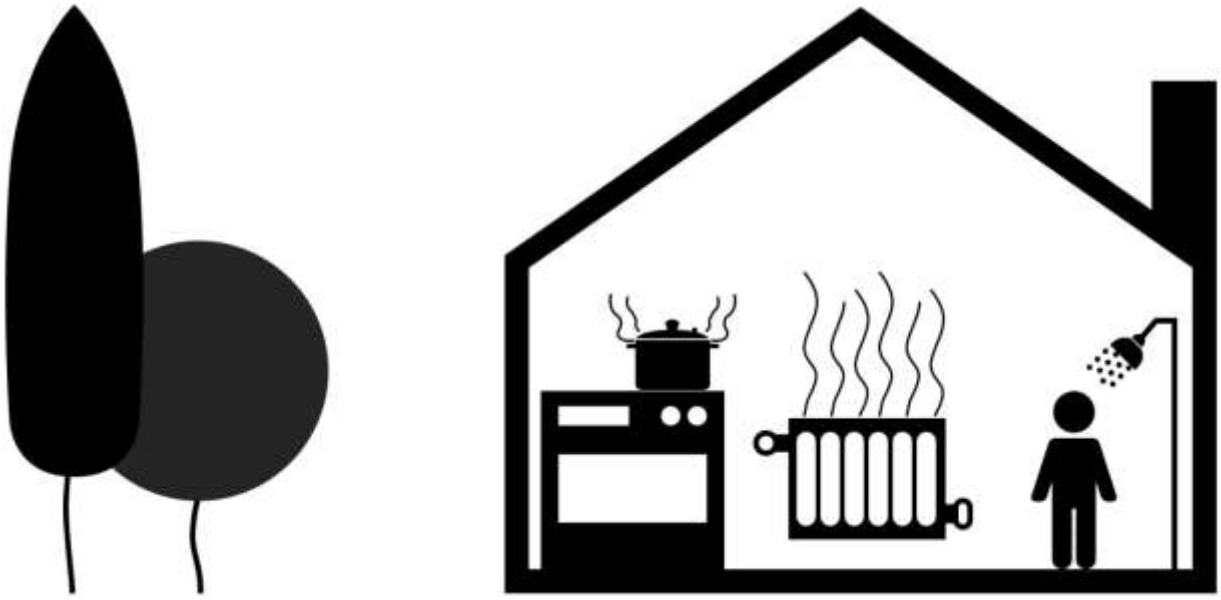


During the fermentation, the bacterial action transforms the organic matter into biogas.

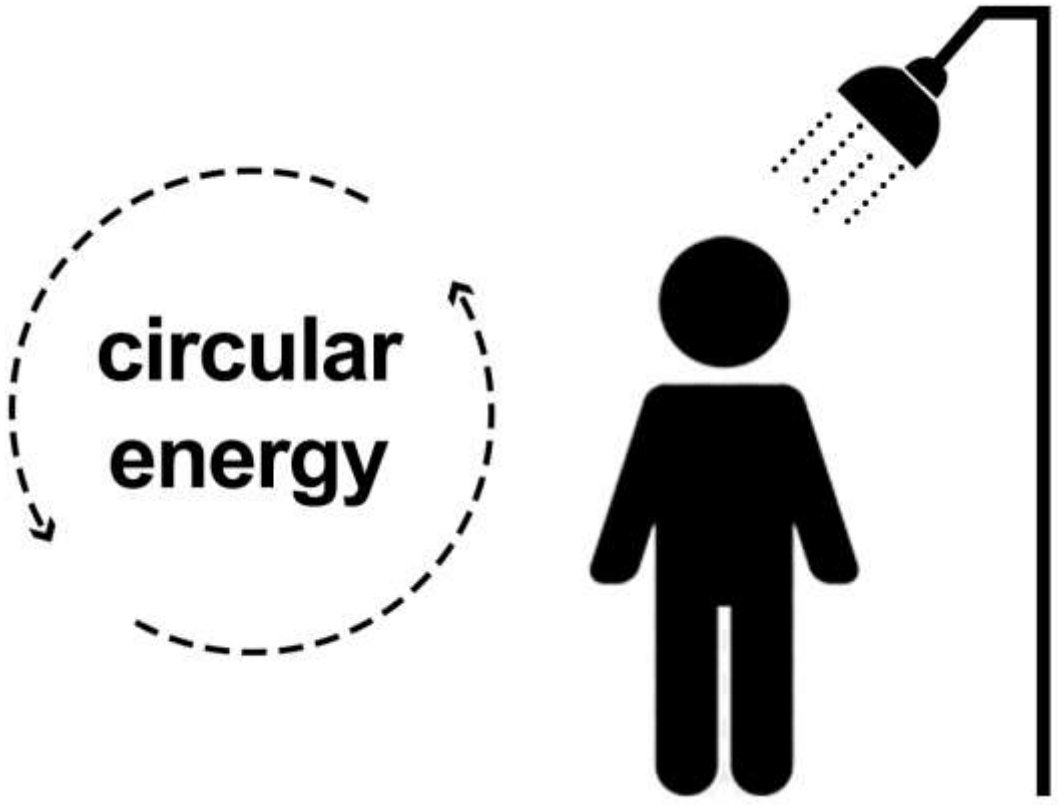


This process is called anaerobic digestion.

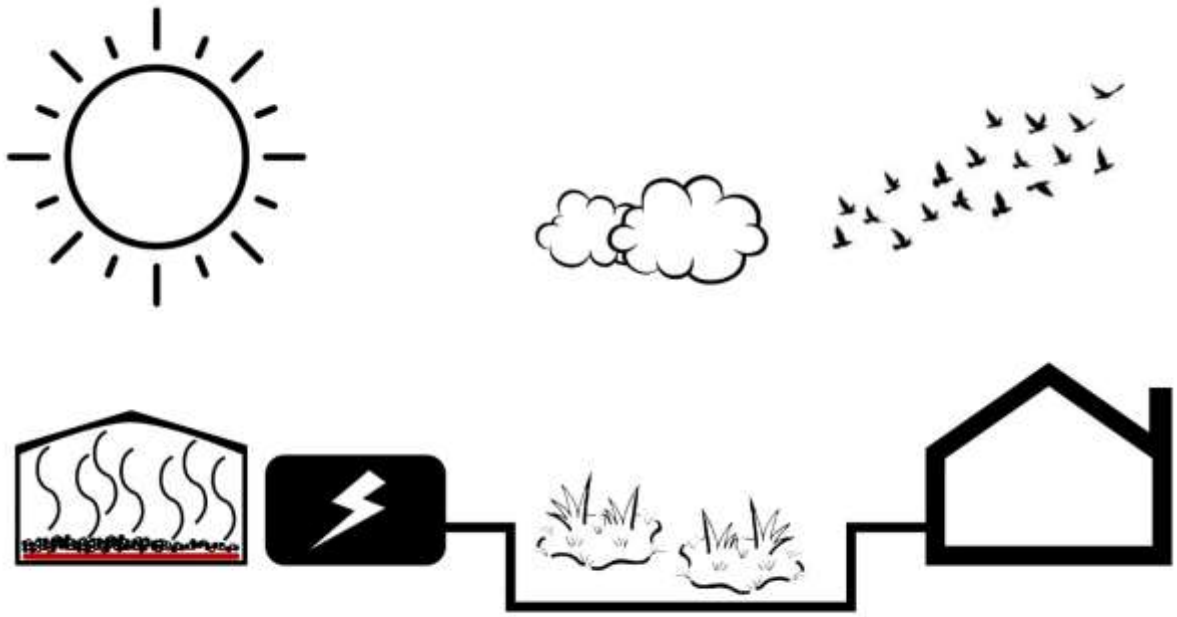
Once purified and controlled the biogas can be injected into the district gas network for cooking, heating and cut water purposes.



The biogas is a circular energy but that's not all.



Indeed due to its code generative qualities, biogas can also provide heating and electricity.



Tools:

Now I will quickly present all the necessary tools for assembling this project.

Item No.	Name	Photo
1	Hamer	
2	Hand Drill	
3	Circular Saw	
4	Table Saw	
5	Pen	

6	Cutter	
7	Marking Tool	
8	Tape Measure	
9	Ratchet with Rotating Handle	
10	PPR Welding Machine	
11	Locking Plier	
12	Scissors Board	

13	Plier	
14	Grass Cutting Machine	
15	Plumber Wrench	

Materials:

The materials you will need are:

Some wood battens;

Some thick & thin wood pieces;

4 boxes of polystyrene;

24 plastic bags;

1 filter battery;

1 cotton filter;

1 coal filter;

1 inflatable mattress;

About 3 meters of hoes;

1 gas regulator or 1 broken carburetor to run on gas;

Some self-screws;

20 meters steel tape;

Some pvc pipes;

1 “T” connection piece;

1 box glass wool;

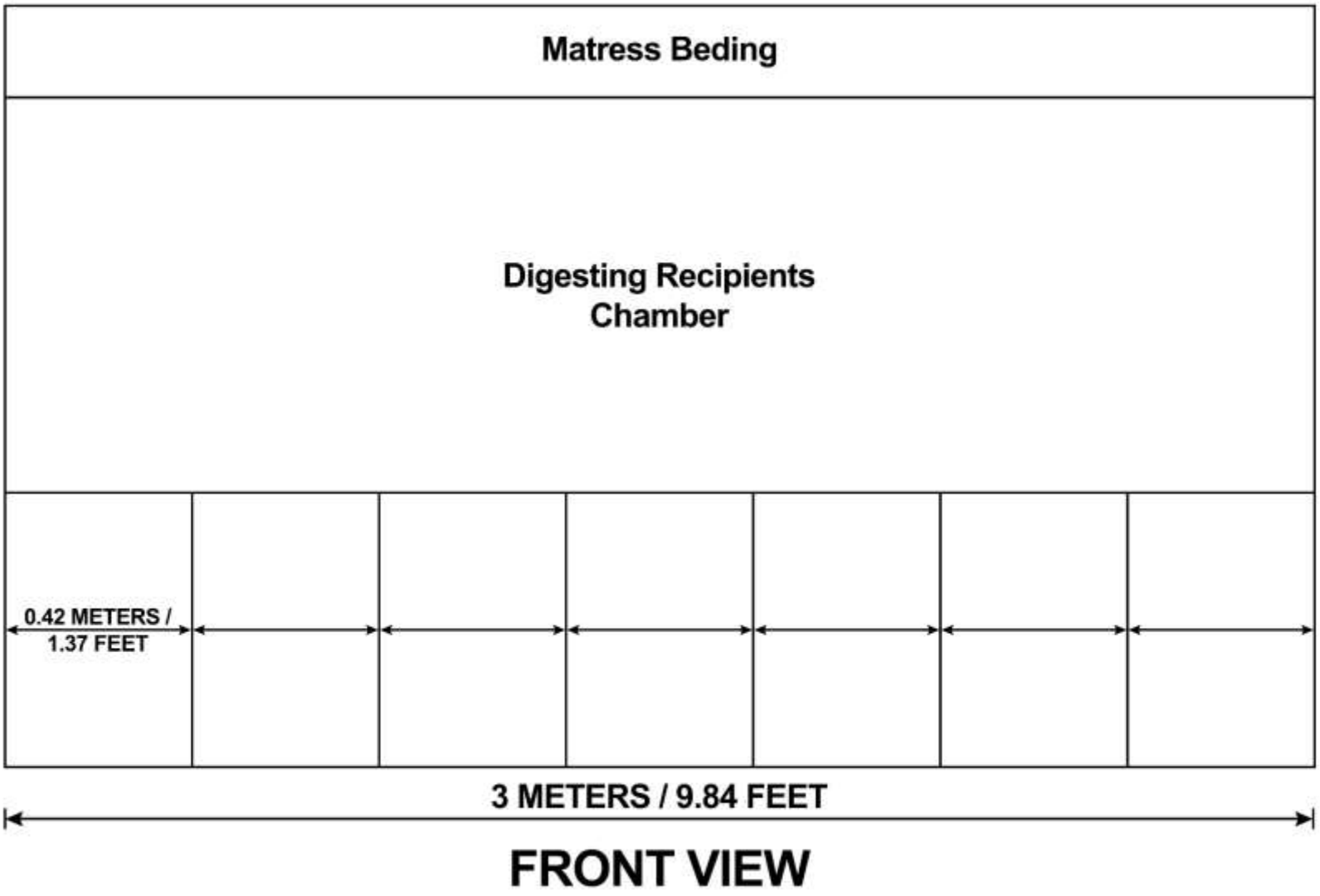
Enough grass to fill the plastic bags;

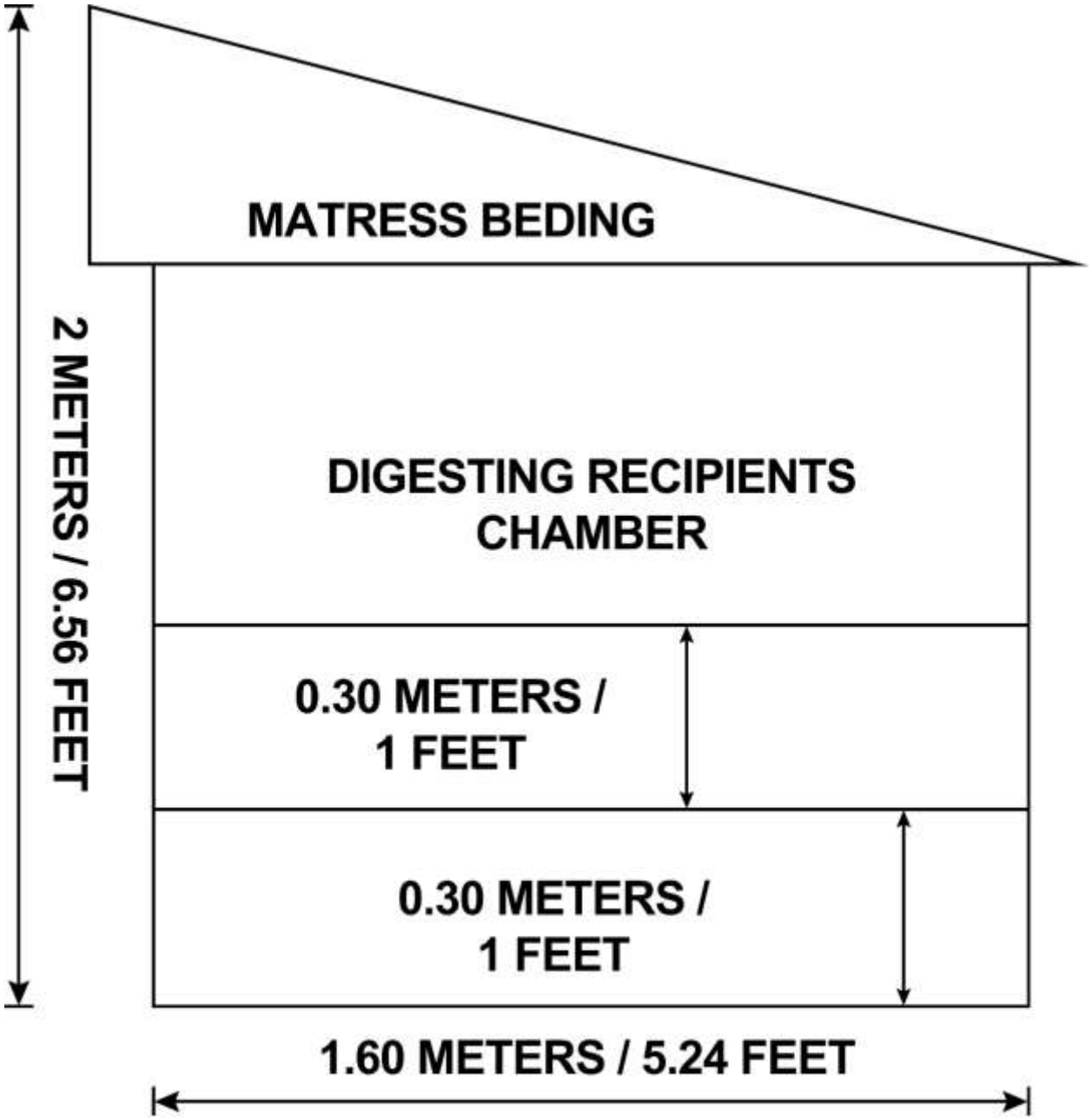
1 plasterboard;

1 thick plastic foil.

Dimensions of the Enclosure:

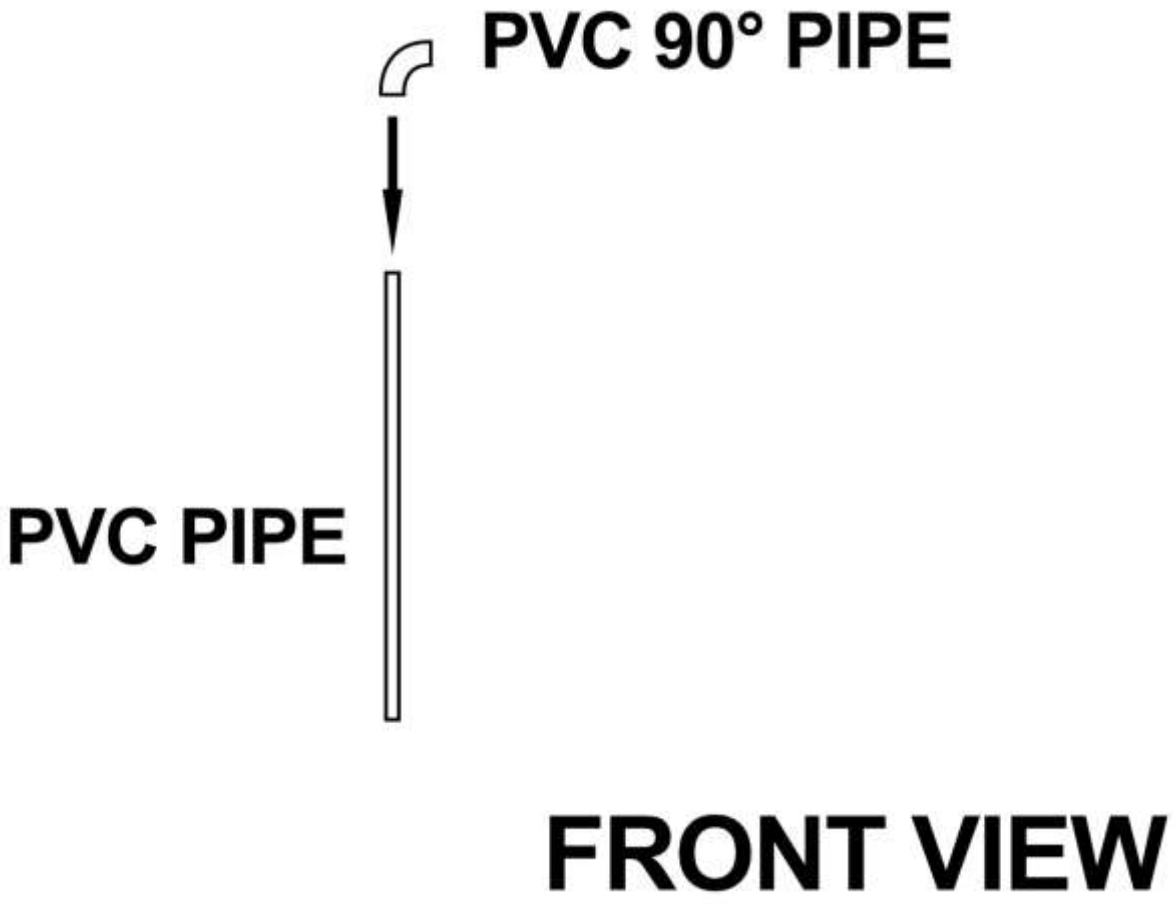
The enclosure is made out of wood.

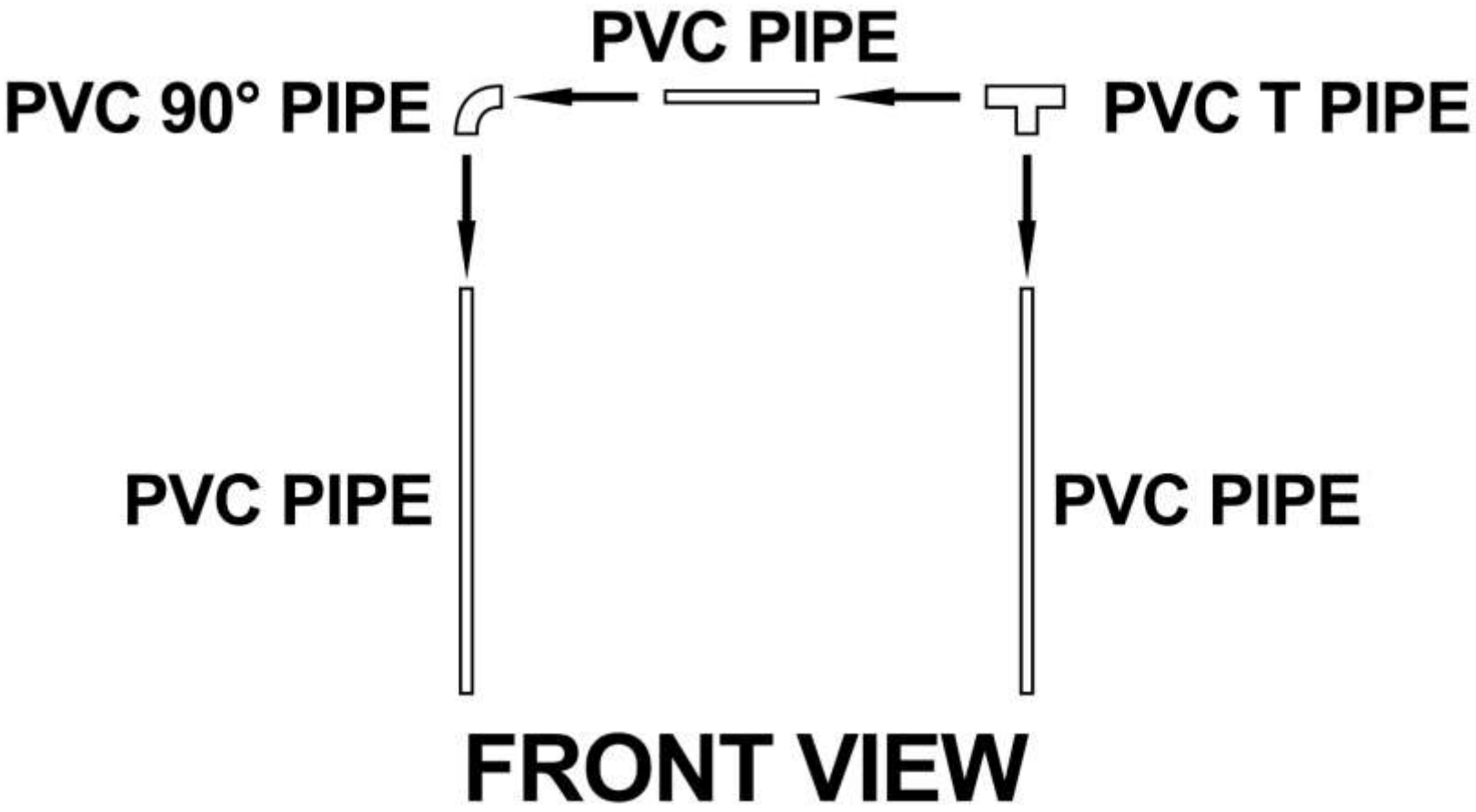


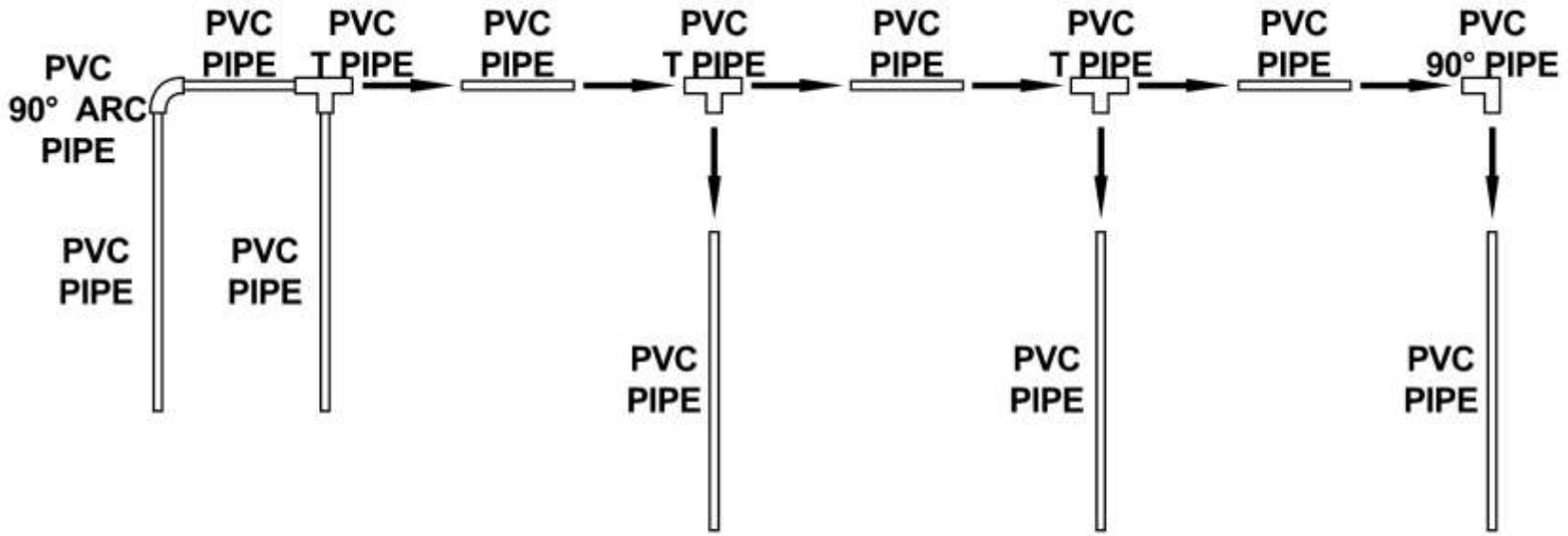

MATRESS BEDING
2 METERS / 6.56 FEET
DIGESTING RECIPIENTS CHAMBER
0.30 METERS / 1 FEET
0.30 METERS / 1 FEET
1.60 METERS / 5.24 FEET

SIDE VIEW

Making the Pipe Connections:




PVC PIPE
PVC 90° PIPE
PVC T PIPE
PVC PIPE
PVC PIPE
FRONT VIEW


PVC
90° ARC
PIPE
PVC
PIPE
PVC
PIPE
PVC
T PIPE
PVC
PIPE
PVC
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PVC
T PIPE
PVC
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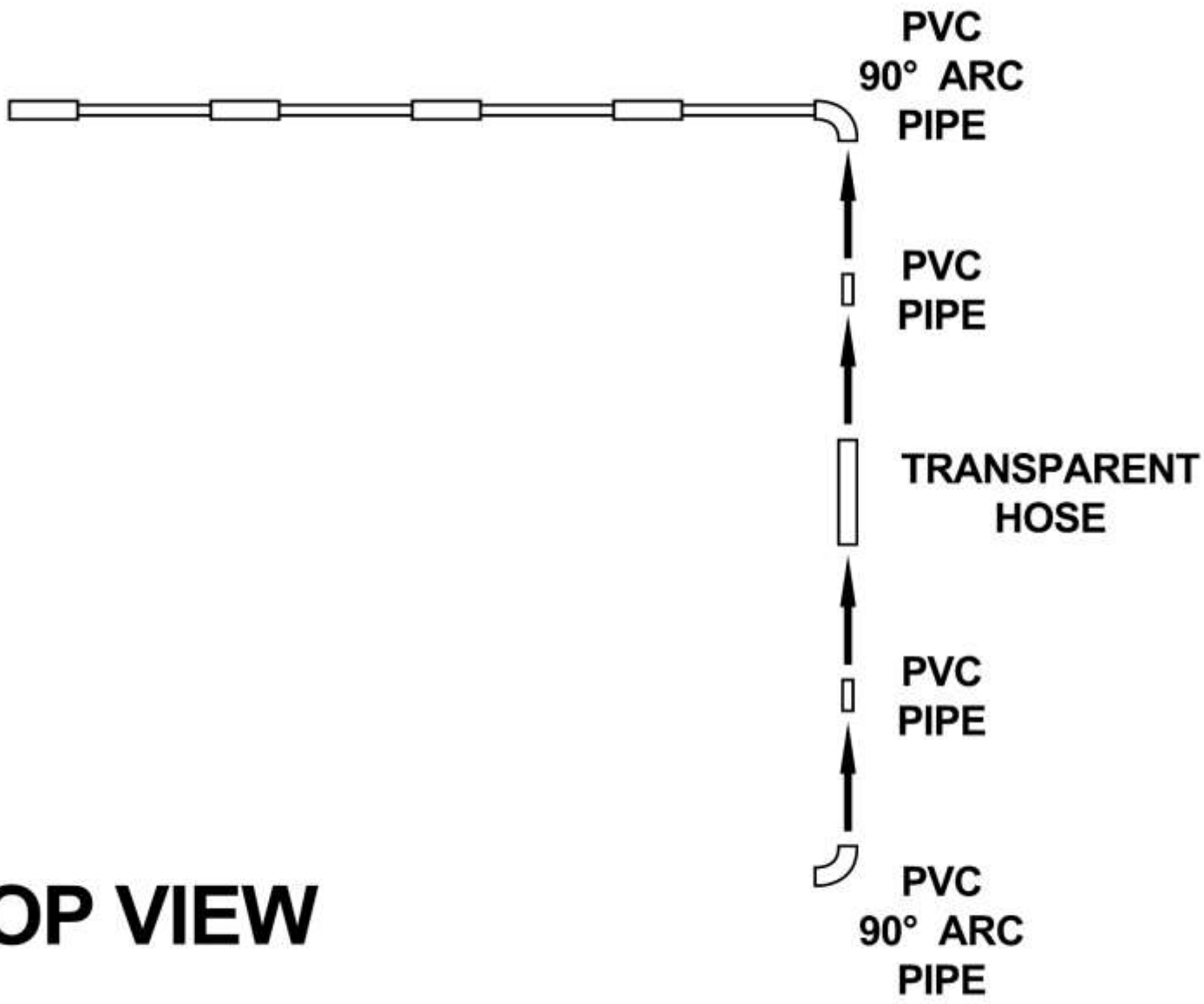
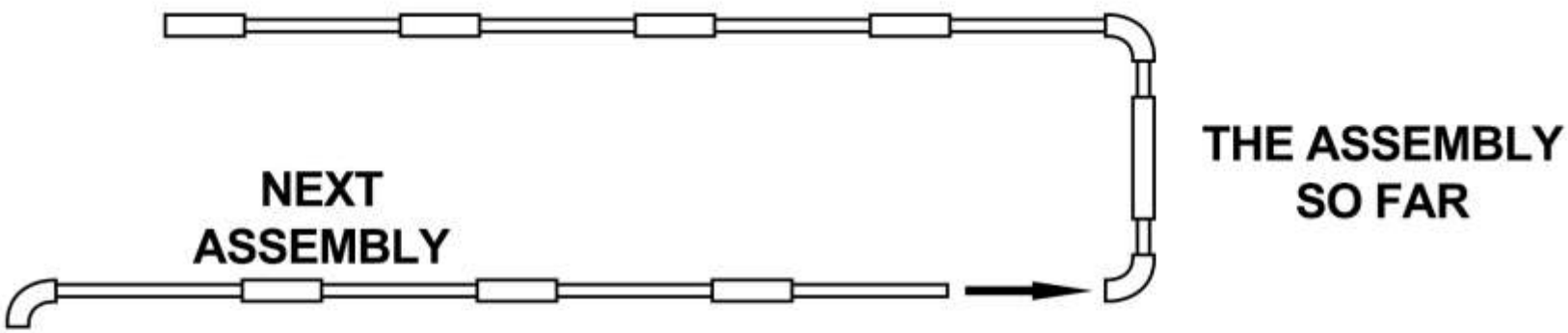
PIPE
PVC
PIPE
PVC
90° PIPE
PVC
PIPE

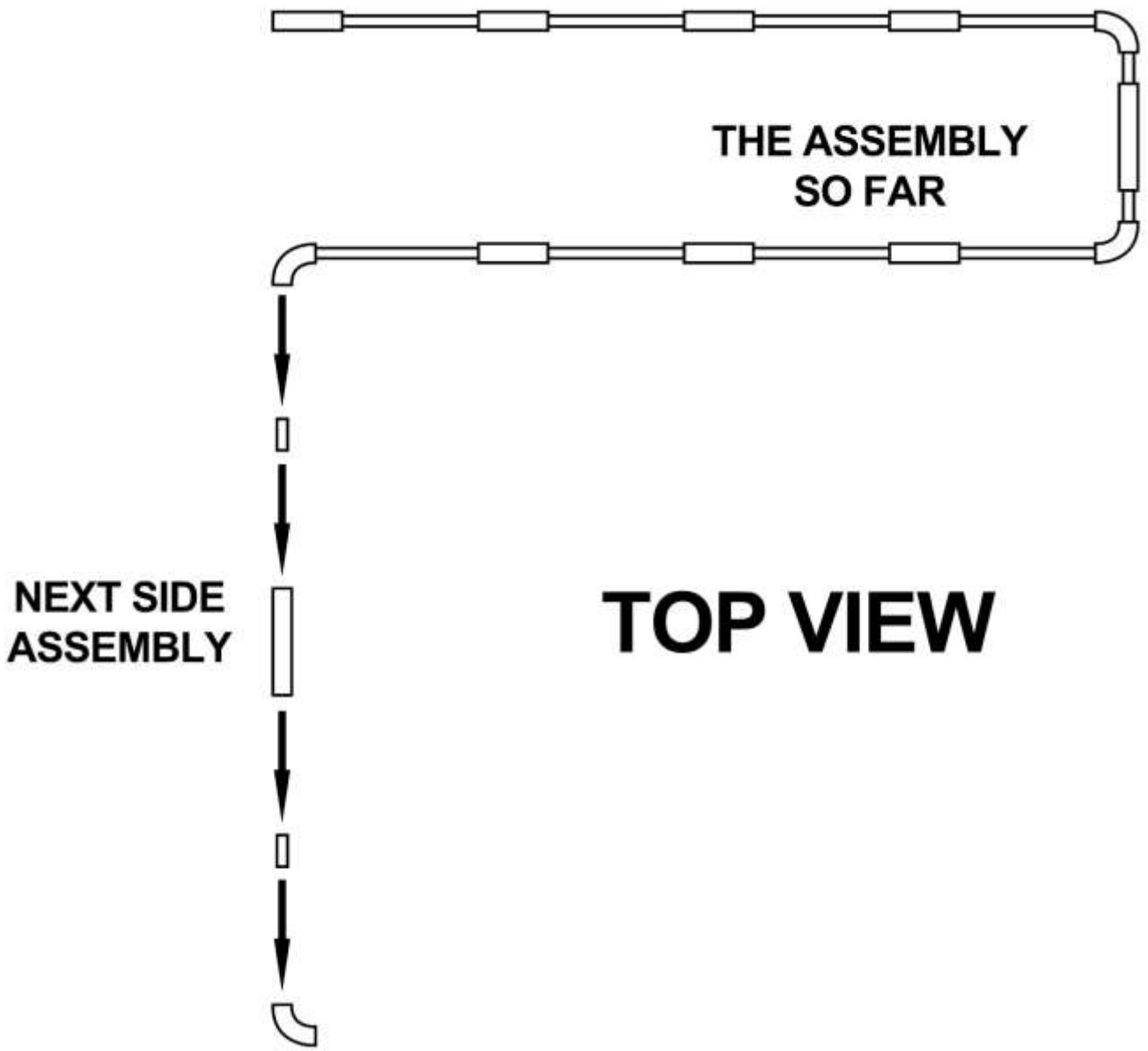
FRONT VIEW

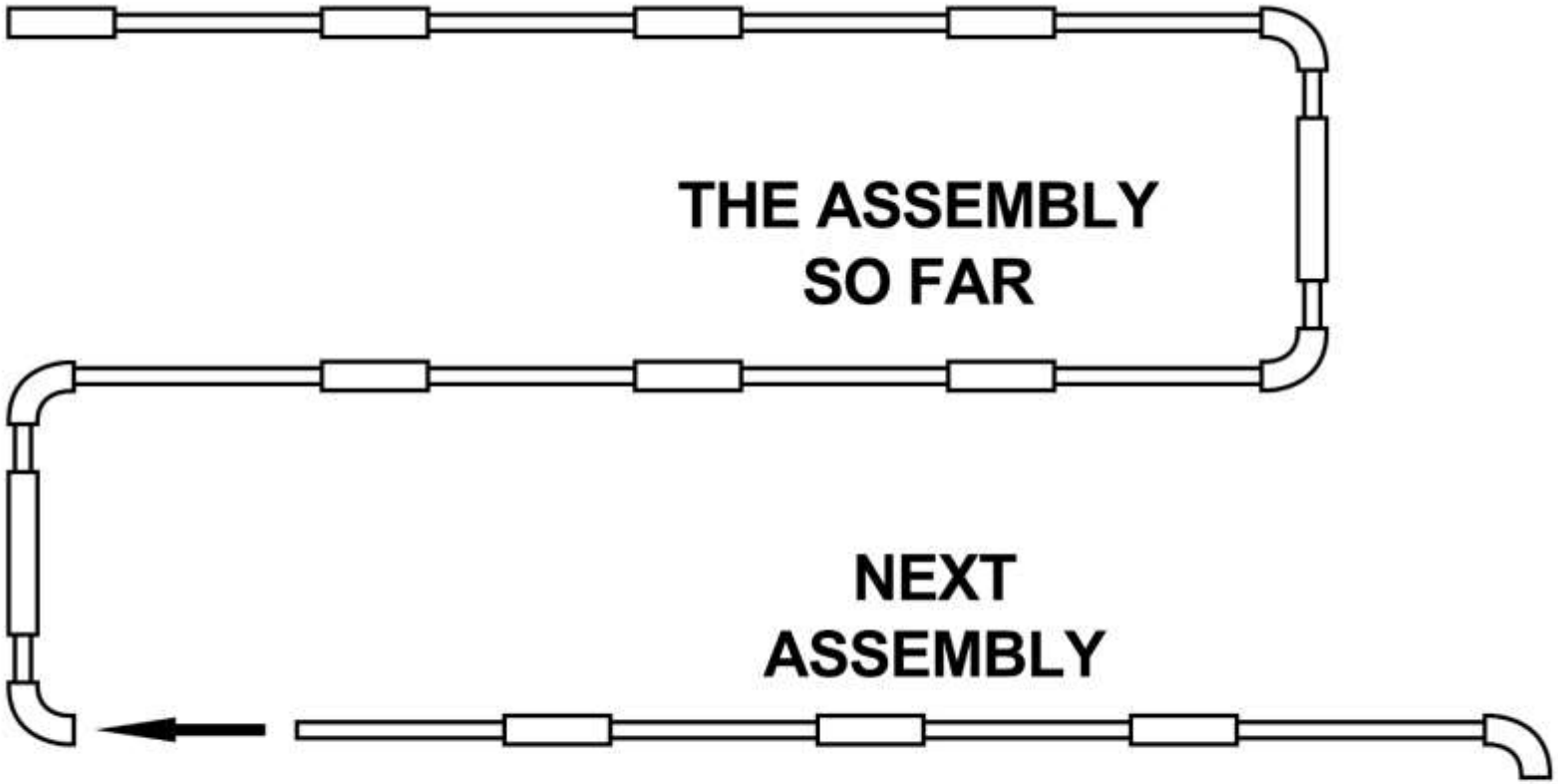

PVC
90° ARC
PIPE
PVC
PIPE
TRANSPARENT
HOSE
PVC
PIPE
PVC
90° ARC
PIPE

TOP VIEW

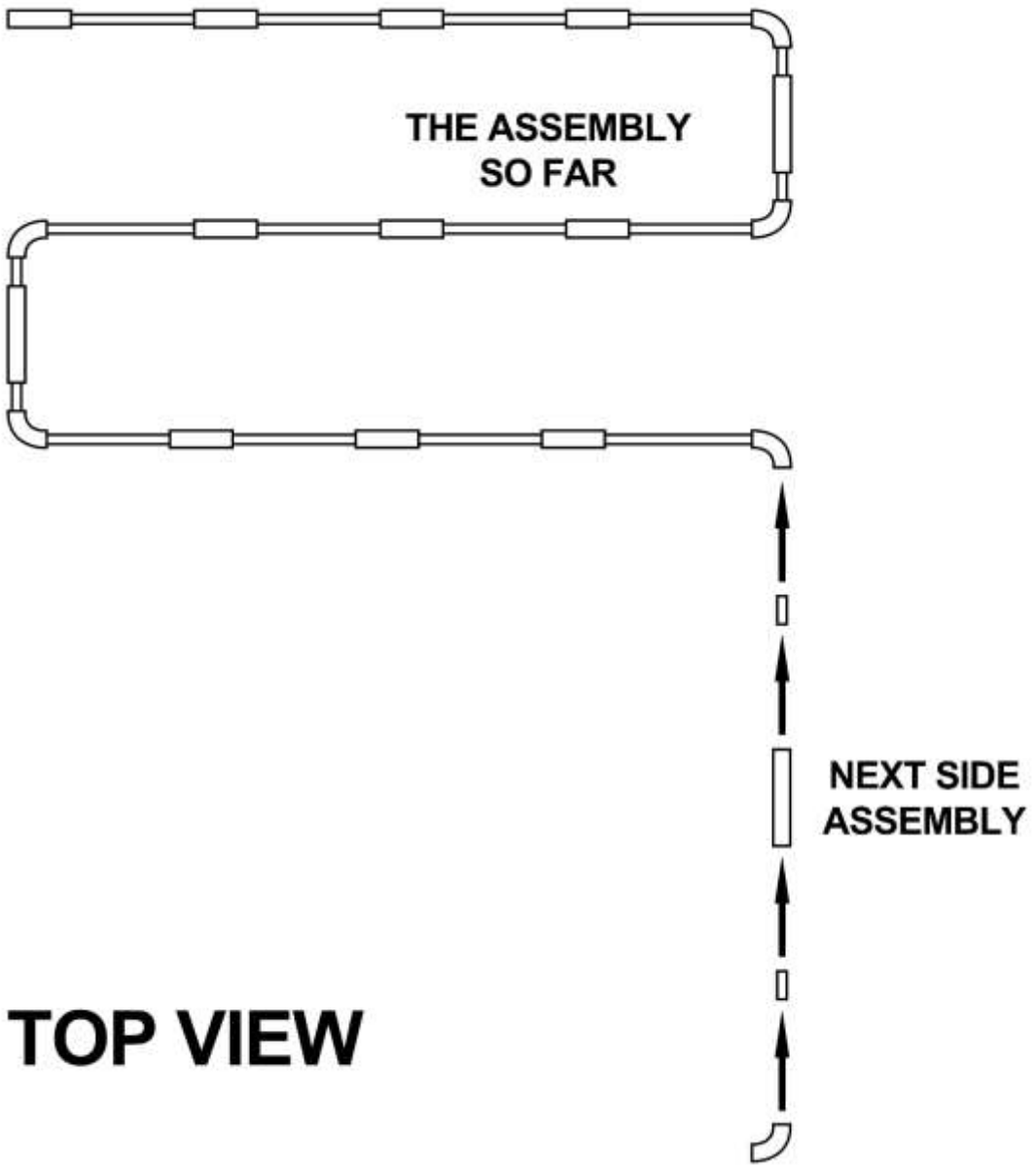


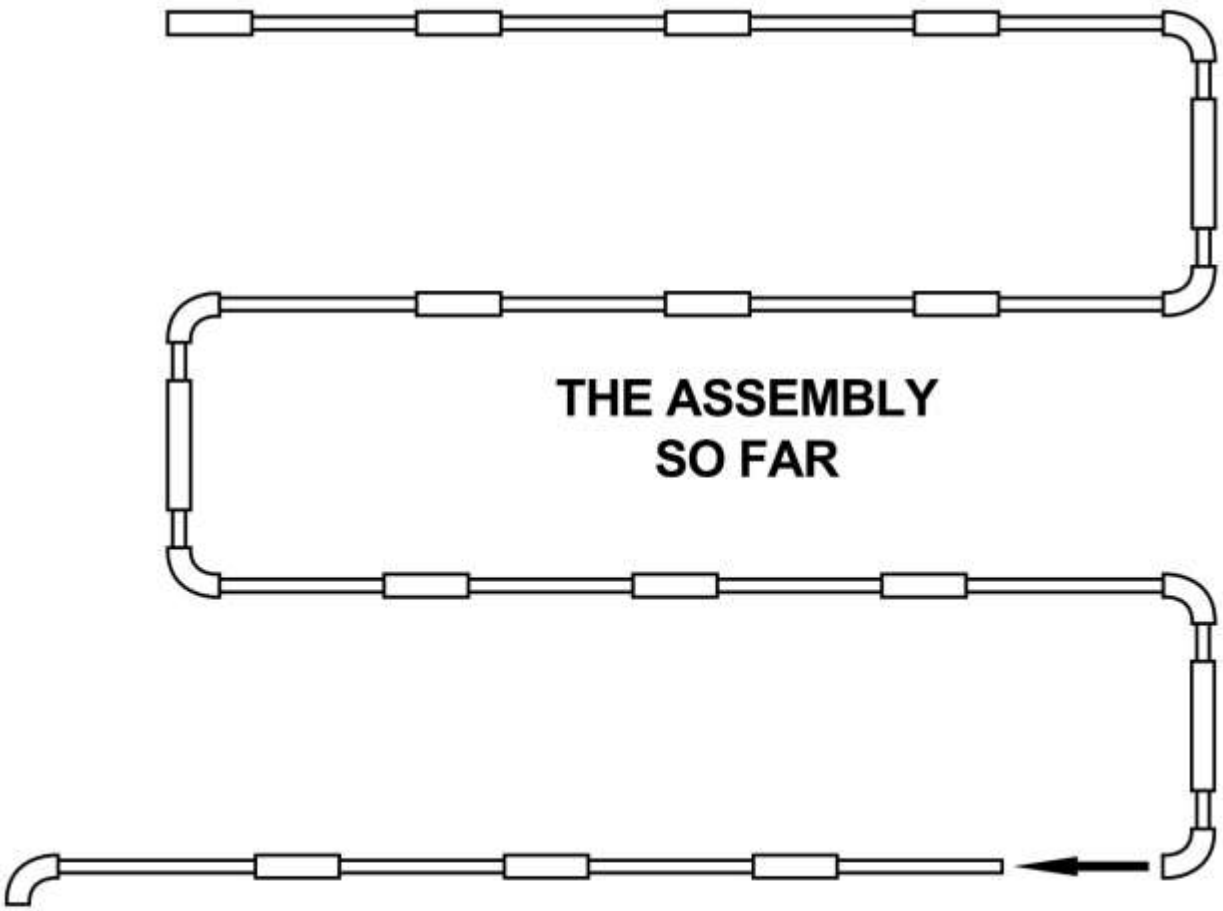
TOP VIEW


THE ASSEMBLY
SO FAR
NEXT SIDE
ASSEMBLY
TOP VIEW

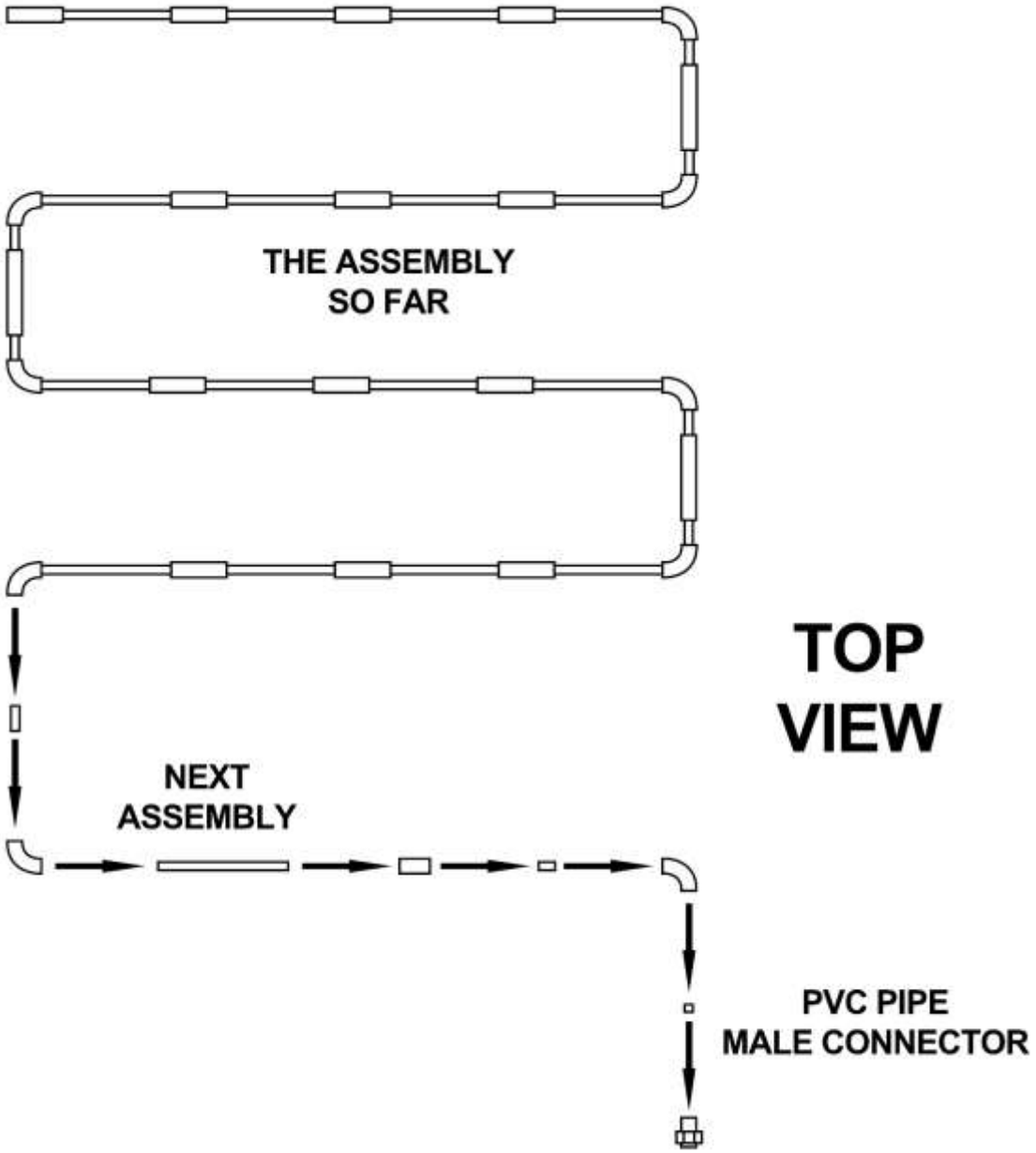


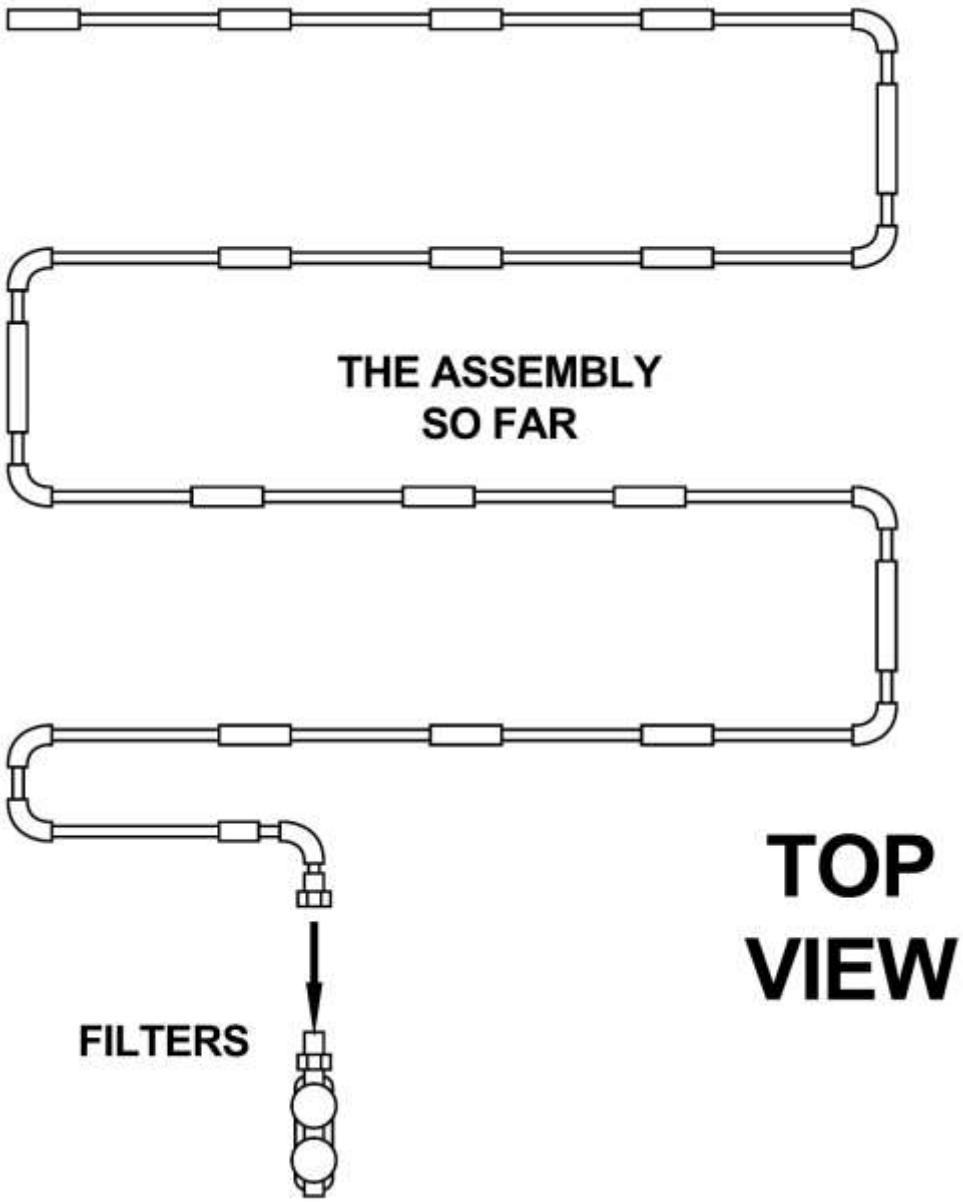
TOP VIEW

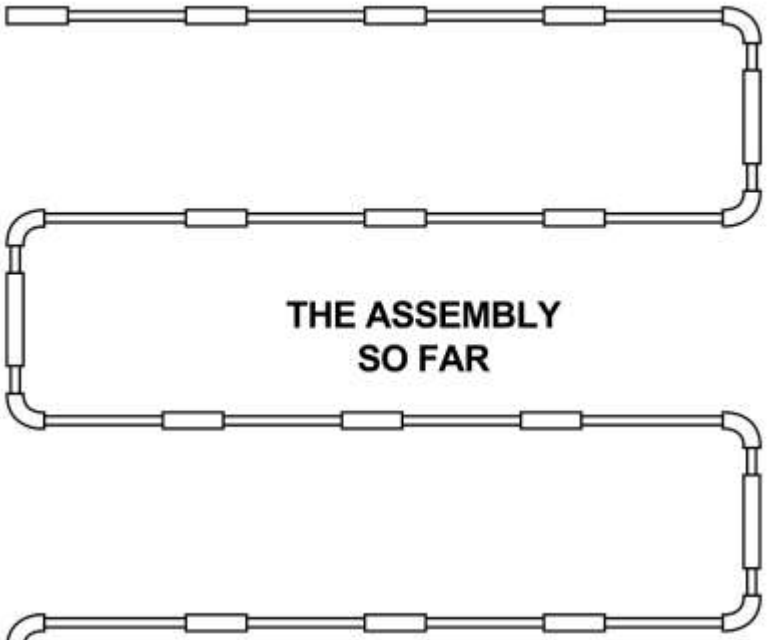

THE ASSEMBLY
SO FAR
NEXT SIDE
ASSEMBLY
TOP VIEW



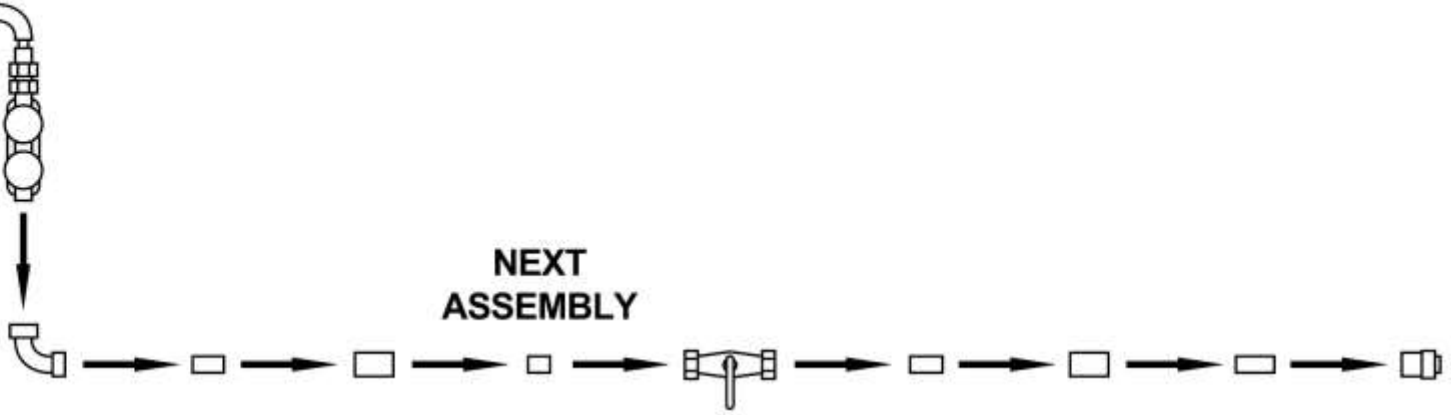
TOP VIEW

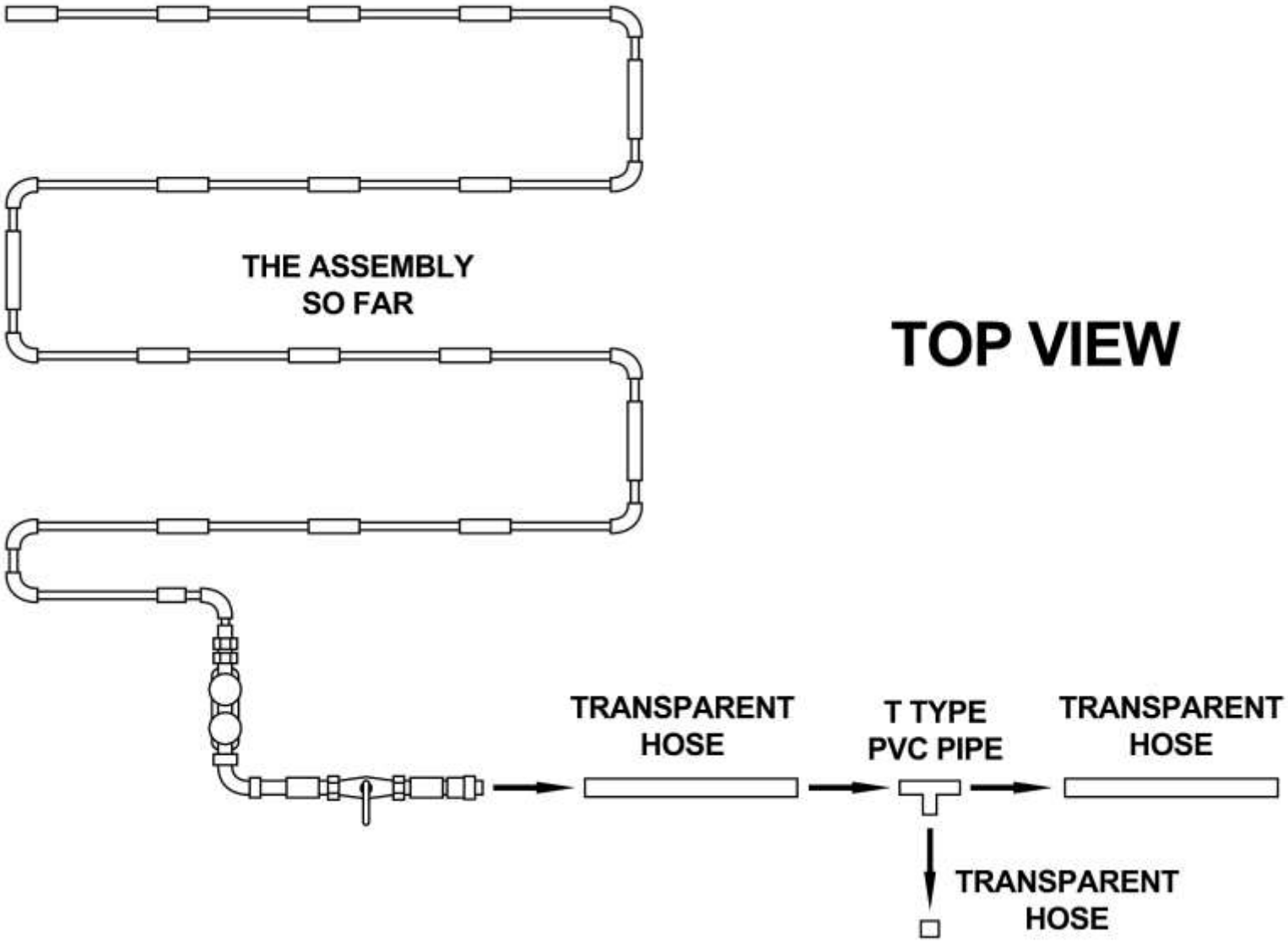

THE ASSEMBLY
SO FAR
TOP
VIEW
NEXT
ASSEMBLY
PVC PIPE
MALE CONNECTOR

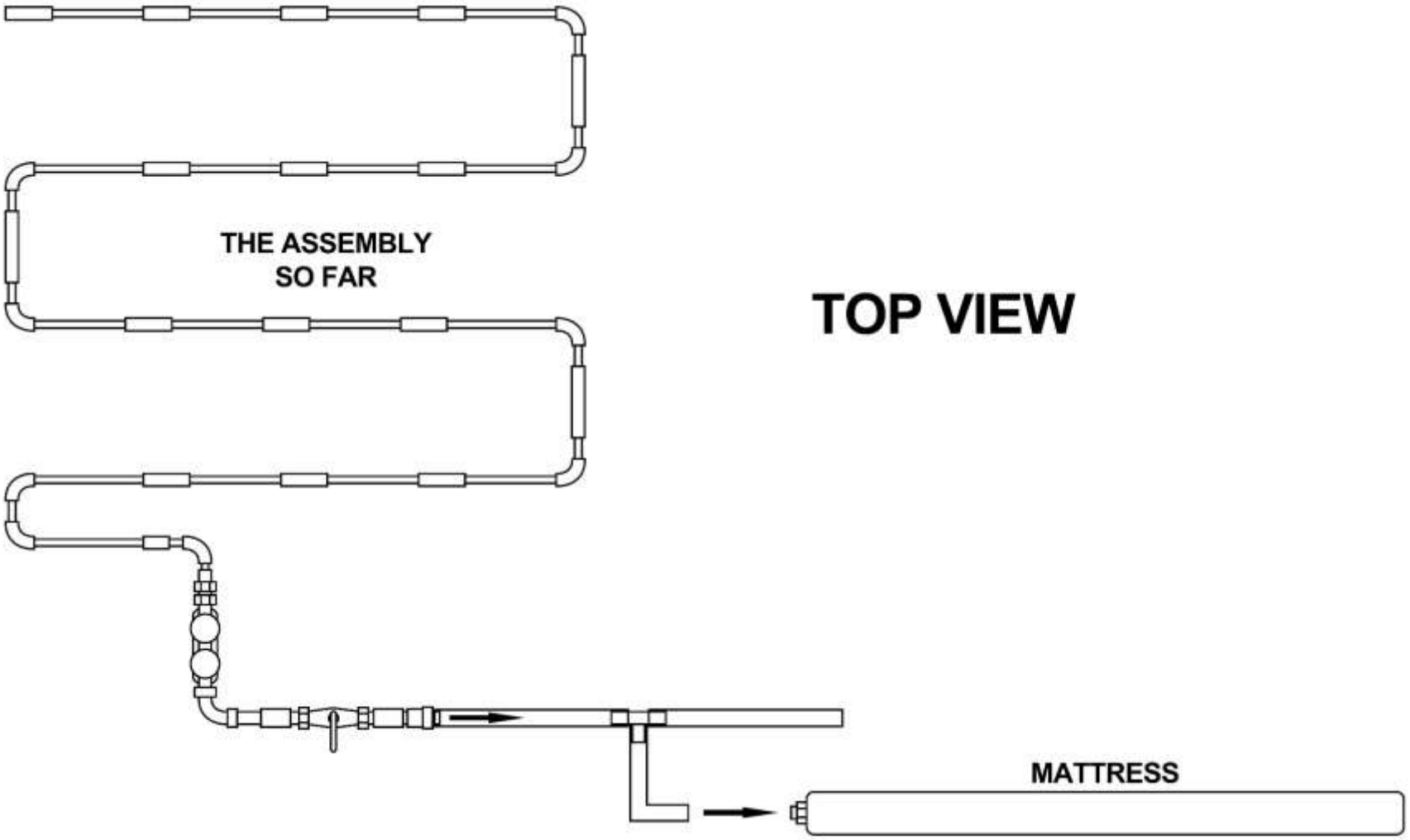

THE ASSEMBLY
SO FAR
TOP
VIEW
FILTERS

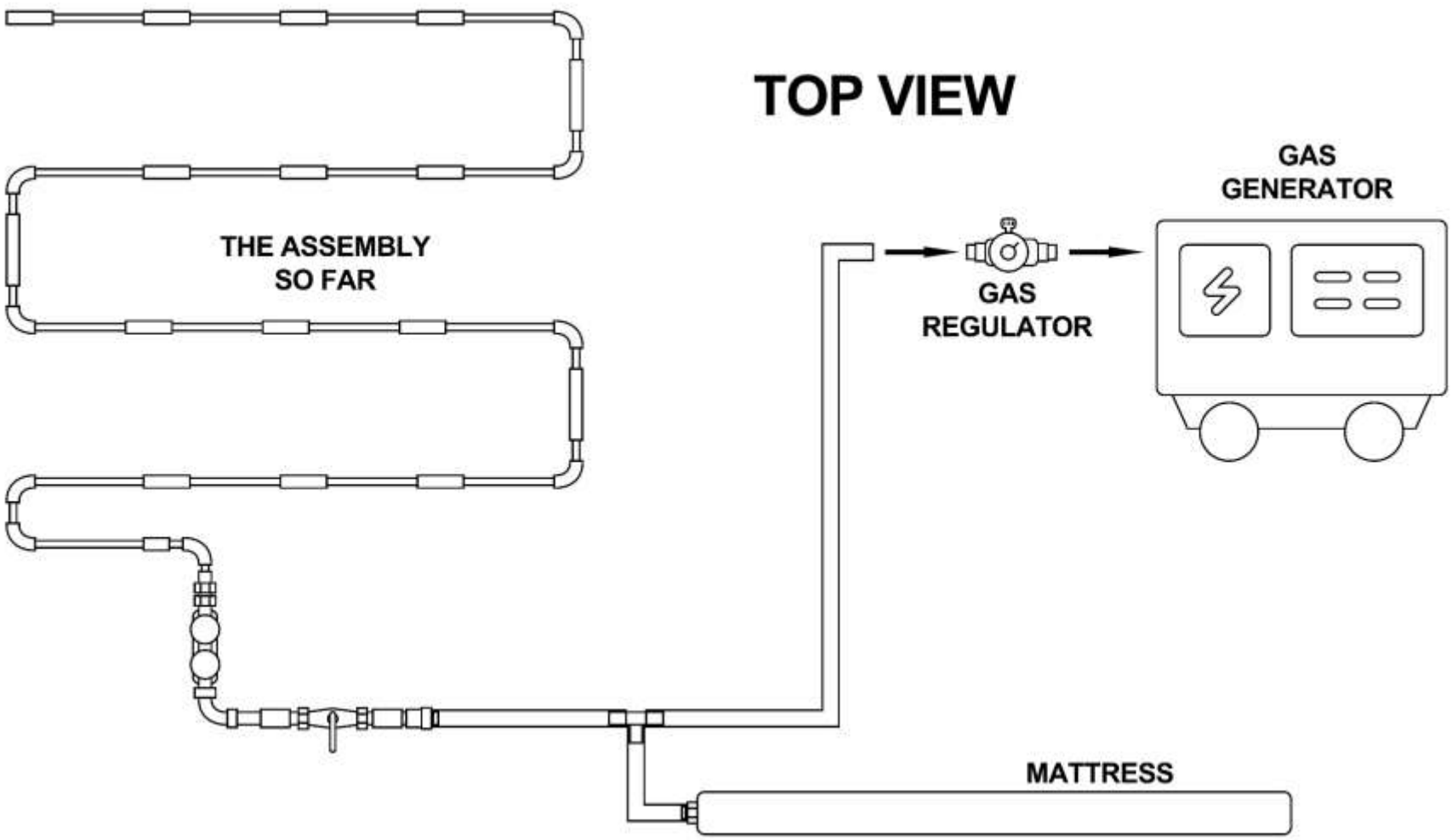


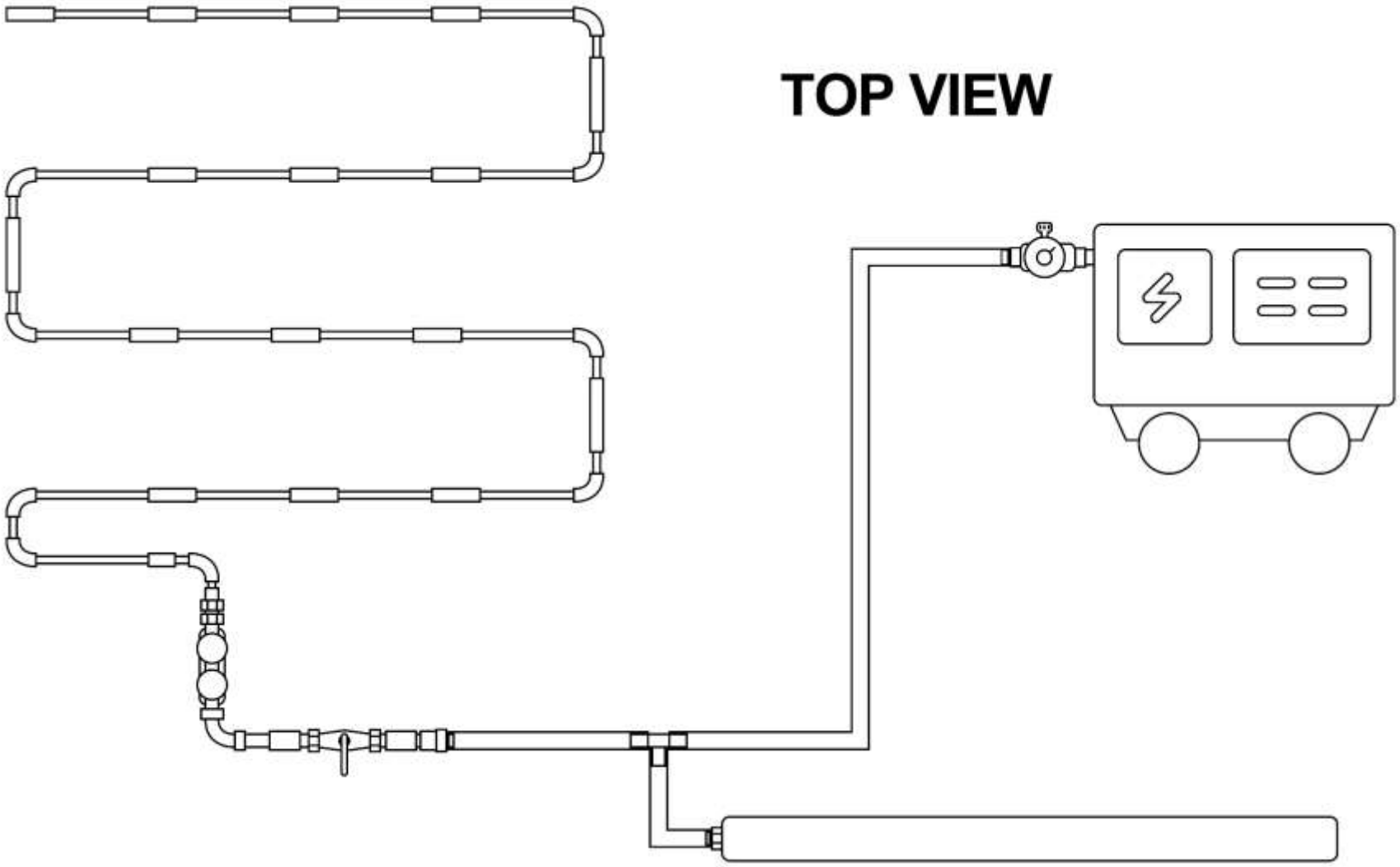
TOP VIEW




THE ASSEMBLY
SO FAR
TOP VIEW
TRANSPARENT
HOSE
T TYPE
PVC PIPE
TRANSPARENT
HOSE
TRANSPARENT
HOSE


THE ASSEMBLY
SO FAR
TOP VIEW
MATTRESS


TOP VIEW
GAS
GENERATOR
THE ASSEMBLY
SO FAR
GAS
REGULATOR
MATTRESS


TOP VIEW

Liberty Generator Made in Steps (Pictures):

1. Step 1: Building the Wood Structure.

I will begin by creating a wood structure. Keep in mind that the size doesn't have to be precise, you can build this anywhere you want, as long as it's outside, to prevent any accidents from happening because of the gas accumulation.

I am drilling pilot holes to beat the nails with ease. This will prevent the wood from splitting or the nail from going in the wrong direction.

I will lay on the floor some wood battens.

You can use anything that you have laying around to build this wooden base.

Some times when you need to cut a small portion of wood, it’s easier to use the circular saw.

After the floor is done, I am going to insulate that with expanded polystyrene. This will keep the temperature high during the winter as well. The bacteria which is digesting the compost reproduces at warm temperatures.

The side walls and the top should be also insulated.

I drill pilot wholes now for the self-drilling screws.

I will fix in place some vertical wood pieces.

From each vertical wood piece I will be adding a horizontal piece to space the plastic bags which will be used as digesters.

I will add two horizontal wood pieces, one at about 1 feet and the second one at 2 feet. Make sure that you are referring the PDF file for the exact dimension I used.

Again, you don't need to build this to scale or shape, you can even try without this wood frame, with a couple of recipients to see how it's working for you. That should give good results during summer, but in winter, you will need an enclosed and insulated space for getting any good results out of this system.

I mark where the second horizontal wood piece should be fixed in place and I start working on the second level of now.

Now I make the bedding for the mattress which will be used for gas storage.

2. Step 2: Welding and Putting Togheter the PVC Pipes

For connecting the plastic bags I will be using some short PVC pipes which are easy to weld with a hot welding tool.

It's actually pretty easy to make an air tight connecting by heating both pieces and inserting the pipe inside the junction.

The “T” connection piece is slightly larger than the pipe so the PVC pipe will fit inside nicely and because both parts are preheated, they will be welded instantly.

This array can be configured in any way and shape you want, you need just to make sure that it’s free of leaks.

Make sure that you won’t touch the hot surface of the welding tool when getting the PVC pipes out of the hot junctions.

We have the connection tubes ready for the first string of digesting recipients.

I will follow the same welding process on the second string. When I finish I will start mounting them in place using some steel ribbons.

Here you can see all the pipes secured in place.

3. Step 3: Gathering Raw Material and Filling the Bags, Adding Water and Connect the Bags to the PVC Pipe System.

Next, I will be filling the bags with grass or leaves, to show you the whole process.

I am using 2 plastic bags to make sure that I won't have any leaks into my system.

After the water is added to the grass level, I will seal the bag with a clamp.

The advantage of liberty Generator 2.0, is that you can easily load and unload the content, preserving the smell, you just tie the bags before releasing the clamp and they are ready to be transported or sold as manure, the bags are reusable, so it adds no costs for your refilling.

I will do the same with the rest of bags until the system is complete.

You may consider each bag as a battery, If you add more of them, you will be generating more gas to run your stove or generator.

I continue with the other three strings of pipes and their digesters.

4. Step 4: Mounting and Placing the Filters

After all the bags are in place, I will begin working on the filters which will filter the biogas and also act like a flame arrester.

The first filter is made out of cotton and the second one made of coal. The cotton filter will absorb any water and the coal filter will block the flames from entering the system.

I will mount the filters in place.

I will get the filters out for a second to reach the pipe easily and I will put them back after I weld this PVC pipe too.

Now I am mounting back the filters.

On this connection piece I will attach the gas hose. The tap will be used to open or close the gas flow.

5. Step 5: Placing, Mounting and Connecting the Mattress to the System.

I am using this piece of plaster board to apply some pressure over the mattress which will be filled with biogas.

I use this T joint to connect the mattress to the filters and the 3rd hose will go to my gas generator.

6. Step 6: Insulating the Biogas Farm

I will begin insulating the side walls with the same material now.

I am using some steel ribbons to secure the polystyrene in place.

After I finish mounting the polystyrene, I will cover everything with a thick plastic foil to keep water out and the heat inside.

I will secure the plastic foil on the corners to make it withstand the weather conditions.

7. Step 7: Working on the Cover for the Generator

Now I begin working on the cover for the generator. This will keep it out from the moisture and in the same time it will insulate us from his noise. As many of you might live in a populated area and you don't want to annoy the neighbors with your new energy source.

I will make a simple box and place it next to the biogas farm.

You can use any materials you have lying around, plywood, thick cardboards, some plaster boards covered with plastic or a steel sheet, etc...

To insulate the sound I will be using some glass wool on the walls. We'll be doing a sound test before wrapping up this project to show you the huge difference that this box is doing.

Other things that I am considering doing to lower even more the noise from the generator, is to attach a car exhausting system, but I need to do some tests first to see if it's not lowering the horse power of the generator.

But this will make a nice update in the future.

I will go for some cheap hinges made of a leather piece that I had lying around.

I will mount this knob to have something to grab when opening the lid of this box.

Now you can see the generator inside, the last thing that I have to do is to place some glass wool on the back of the lid to and go with this for a spin.

If you want, you can make a locking system, to keep the lid closed, but in my case, I will leave it like that for now.

8. Step 8: Mounting the kit, Final Touches and Testing

To make my gas generator work on propane and biogas, I will install this kit that I told you about, this is the safest way of converting a generator to run on propane, it has a safety valve which will close the gas flow if the generator stops from running. Giving the way I set-up the generator, putting it inside of a box, this is highly recommended to make sure that you won't have any gas leaks.

I also mounted a steel hose on the exhausting system of the generator, to get the exhausted gases out of the box.

If the generator won't run properly because of the lack of air inside the box, you can also add a hose for the air intake or make some vent holes on the box.

I am starting it on gasoline then close the gas flow and let it run only on the biogas.

To mount the conversion kit, you should follow the manual that's provided with the piece you purchased.

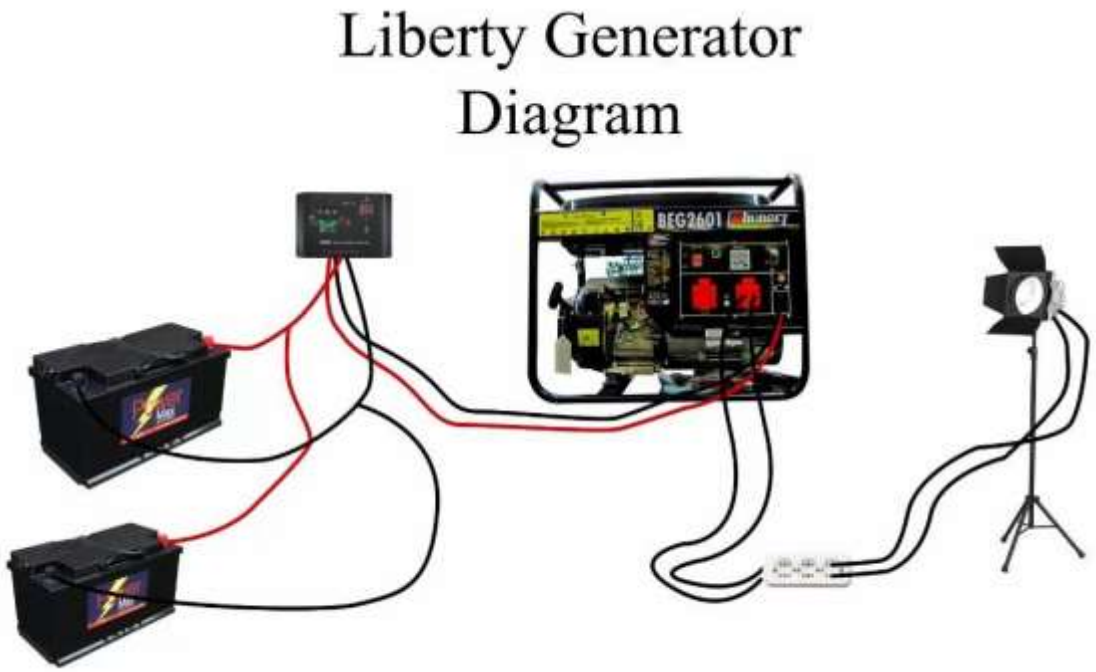
Closing the lid, it covers most of the sound.

I think that it will be a good idea to add a lock on the lid, to keep it closed, but I will let you guys to deal with this, as I think that sometimes it's a good thing to add some improvements on your own.

I showed you the basic idea of this system, you are free to improve it and make it better, easier to build, etc.…

9. Step 9: How to Store Electricity:

I will show you a wire diagram on how you can also store electricity into your batteries during regular operation of the generator.



The generator I am using has 2 plugs whit an exit of 220 Volts, depending on the type of the generator, you might be using a 110 V generator instead.

The wires coming from the regular plug can be used to power any appliance you want that uses the same voltage that you are generating, in my case I am powering a 220V Light.

The same generator has a 12V plug, I've plugged the wires coming from the 12V power source into a charge controller to charge batteries.

So you can store electricity in the same time you run the generator for your other appliances. You can then use an inverter to transform the 12V into 110V or 220V.

I hope that you enjoyed our new version of Liberty

Generator. I wish you guys the best!