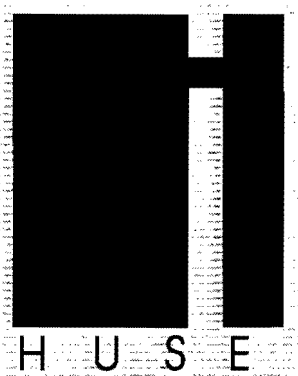


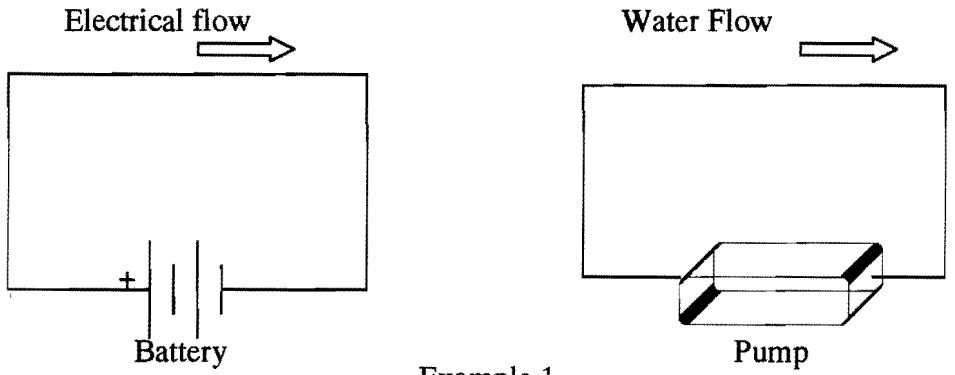
High Frequency/High Voltage and Spread Spectral Mid Voltage Systems for Transdermal and Intra Muscular Applications

Basic electrical theory:

Why is it important to have some very basic grasp of the electrical theory involved in electrical play? For the simple reason of confidence, especially in the person applying it. If one doesn't really understand simple concepts and relies on the "it's all just magic" approach, will they have confidence in their ability to use these devices? Would you have confidence in them applying them to you?

Concept one – the electrical circuit:

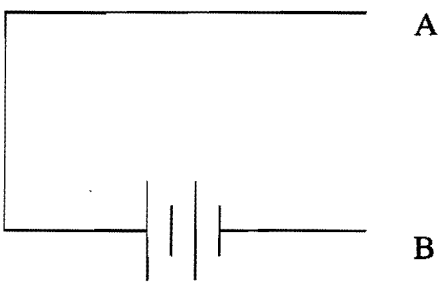
A good way to think of electricity is the water flowing in a pipe analogy. Think of the battery flowing the electrons through the wire in the same way a pump pushes water through a pipe.



Example 1

In the water pump analogy, the water is flowing out one end of the pump, around the loop and back into the intake of the pump. If the loop is broken the water will stop because the "circuit" is no longer complete, this is very similar to the way electricity behaves. Understanding this basic concept is crucial and is perhaps the single biggest customer question we get at Rupert Huse & Son.

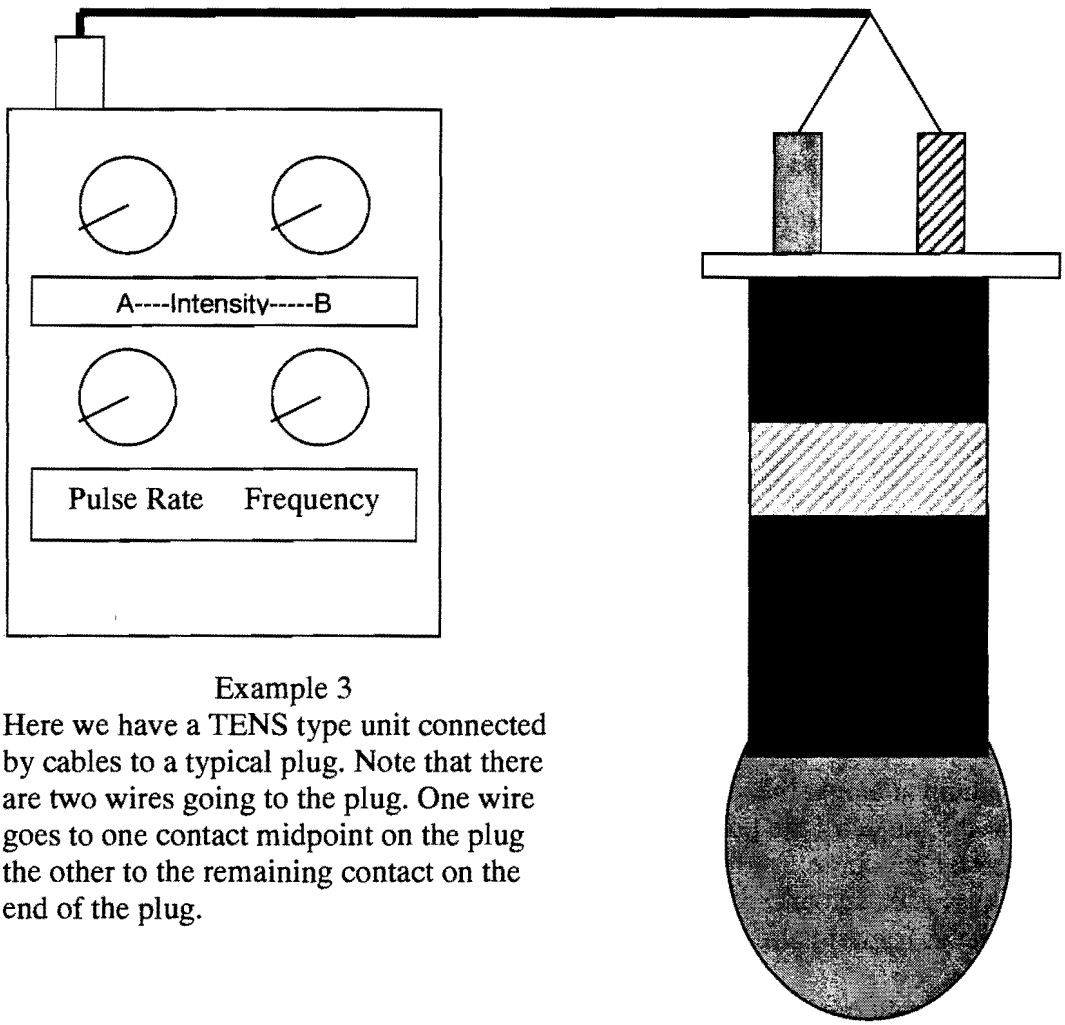
Now consider the following example:



Example 2

If we touch the wire at A and, assuming we are wearing rubber shoes, and not at B have we completed the circuit? No, we have not. If we touch both A and B, have we completed the circuit? Yes, and the electricity is flowing from A, through our body to B and back into the battery. If the battery is sufficiently powerful, we will feel quite a shock

A more practical example:



Example 3
Here we have a TENS type unit connected by cables to a typical plug. Note that there are two wires going to the plug. One wire goes to one contact midpoint on the plug the other to the remaining contact on the end of the plug.

Think of the plug as our battery in the first examples. The contacts on our plug are equivalent to the free ends of the wires as in example 2. If we turn the TENS unit on and touch one contact we have not completed the circuit, no electricity flows and thus there is no sensation. If we use one hand and put one finger on one contact, another finger on the other, we have completed the circuit, electricity flows and we will feel some sensation in those fingers.

This completes the basic outline of what a circuit is. If you do not feel you completely understand this concept go through it again as it is crucial to any sort of electrical play, especially that involving TENS units.

Even more theory:

The purpose of this section is to go a little deeper into how Violet Wands and TENS type devices work. It is not necessary to have a deep intimate knowledge of every single aspect involved here, much as one doesn't have to be an automotive engineer to drive a car. It does; however, help ones confidence on a long road trip to have a basic grasp of what a transmission is and how it is different from an engine.

Terms:

Voltage – Voltage is never an absolute value; it is a difference in electrical potential. Much like the roof of a house on a hill, the roof could be 20 feet high in relation to the base of the house, or 720 feet high in relation to sea level. In our water pipe analogy we can compare voltage to water pressure.

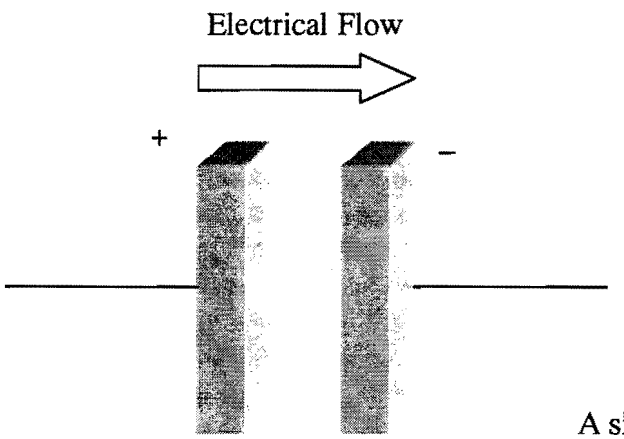
Current – Current is measured in Amperes, Amps for short. Current is comparable to volume of water flow.

Voltage and Current are analogous to specifying the pressure the water is flowing at (voltage) and how many gallons per minute (big or small pipe, Amps).

Power – Measured in Watts. Power is the voltage multiplied by the current. High voltage, low current is like a garden hose turned to one tiny stream, lots of pressure, no volume equals not much power. High current, low voltage is our garden hose with the sprayer removed, lots of flow, but lower pressure equals not much power. High voltage high current is like a fire hose, lots of pressure, lots of volume, and lots of power.

The basic parts:

Capacitor – This constructed of two plates spaced some small distance apart separated by an insulator.

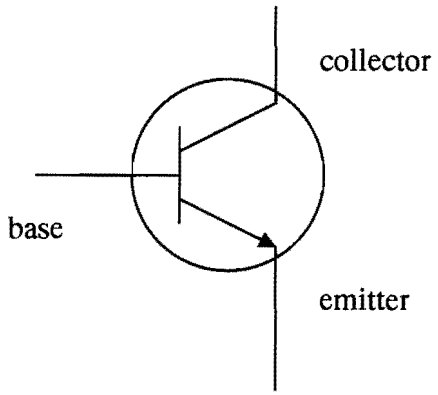


A simple capacitor

The electricity charges one plate, storing the charge until it can be released. This is analogous to a water tank. The larger the capacitor, the larger the base area, not the volume, of the water tank. In really simple terms a capacitor stores voltage.

Inductor – An inductor is simply a coil of wire. As electricity travels through a wire it generates a rotating magnetic field around the wire. This is how electro magnets work. By coiling the wire into a helix, we are able to harness this property and essentially store current. There is no good water analogy here but think of it an inductor as something that could store, and thus accumulate, mass to the water within it.

Transistor – Essentially the same as a water valve. The transistor controls whether or not electricity flows in our circuit.



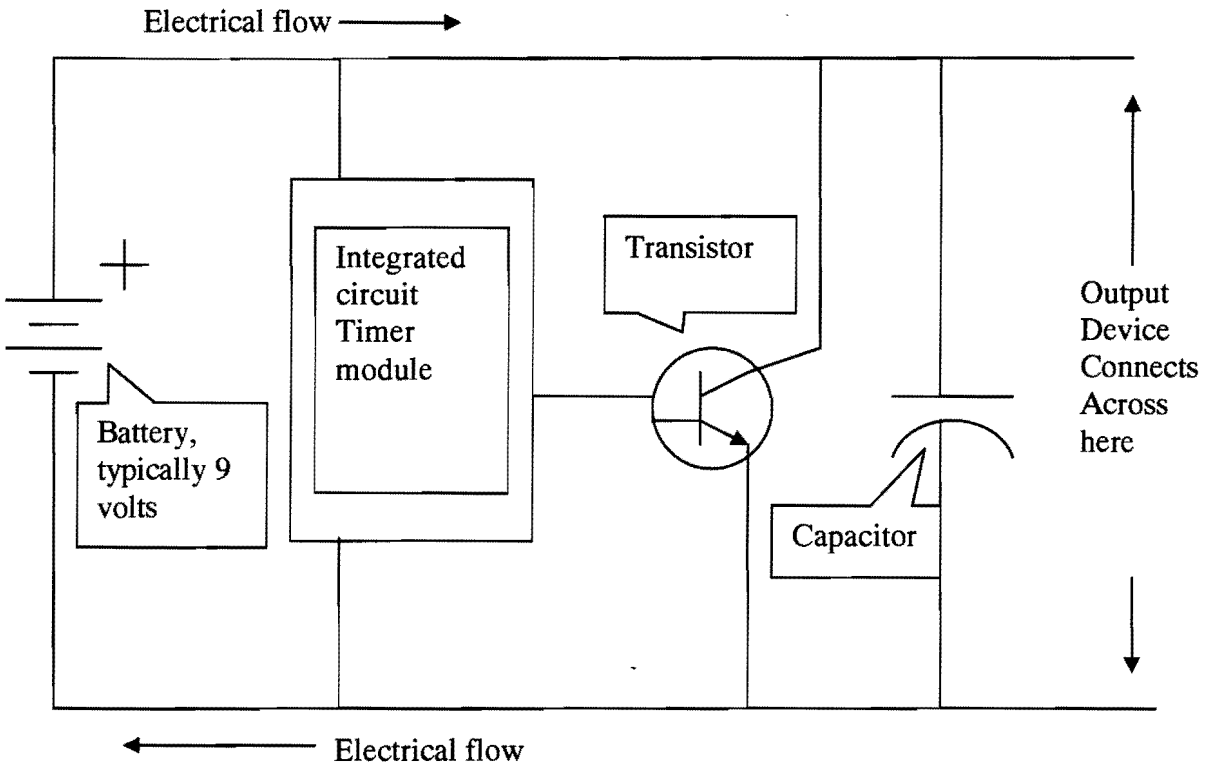
Water analogy – The transistor is like a water valve. Water enters into the collector and flows out through the emitter, the base is like the water valve hand wheel, and how much water flows is determined by what we do at the base.

Direct current – Electricity flows in one direction only. A battery is a good example. One terminal always has a higher potential difference, by a set amount, than the other. A garden hose is a direct current device.

Alternating current – Electricity flows in alternating directions. If we had an alternating current battery the minus terminal would be labeled "neutral" and the plus terminal would alternate between a positive and a negative value. A toilet plunger is alternating current, pumping up and down on the plunger induces positive pressure and then negative pressure in the water filled drain line.

Frequency – The "pitch" of our electricity, this only applies to alternating current. The faster we pump our toilet plunger, the higher the frequency.

Basic circuit function of a TENS type unit:

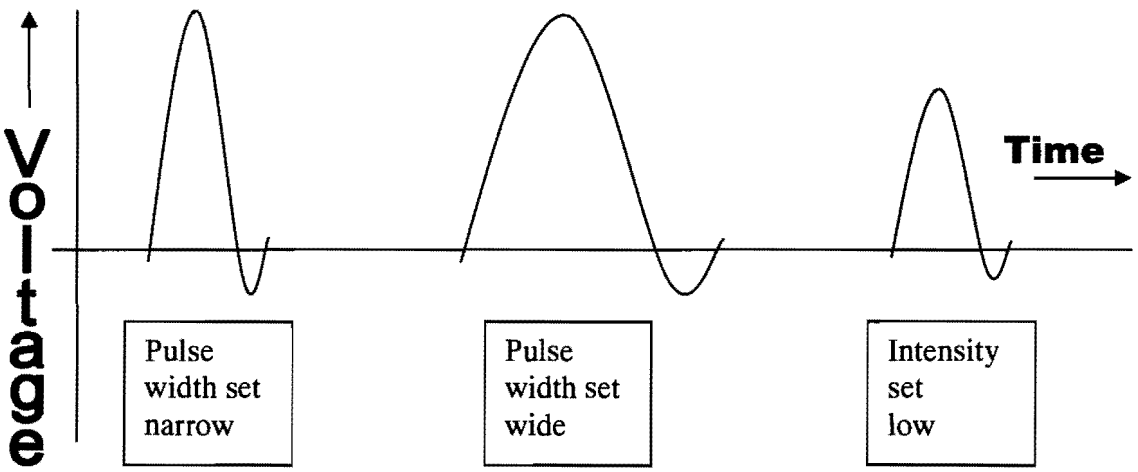


A Simple TENS circuit – Note, this is greatly simplified; this circuit will not actually work.

Above is shown a very simplified version of a standard TENS unit circuit. Understanding how it works is reasonably straightforward. The battery wants to flow the electricity from its positive to its negative terminal, just like our pump flowing water around in a loop. The electricity wants to flow in the path with the least resistance, the easiest way possible. Our transistor operates just like a water valve, it either lets the electricity flow from the "collector" (top wire shown in the diagram) straight through to the "emitter" (bottom wire with an arrow head) or not. Just like turning on and off a water spigot. Whether or not it allows this flow is determined by what happening at the remaining terminal, the wire coming in from the left, the "base". This is analogous to the handle on our water spigot. The transistor is turned on and off, either allowing flow or not, by a pulse from the timer module applied to the base. If it is turned on, electricity flows around in a loop (the water valve is open) and nothing much happens. If the transistor is turned off no electricity can flow through it and thus the electricity now tries to flow through the capacitor.

The electricity now builds up a charge on one plate of the capacitor. Think of it as a battery that charges up very quickly with an ever-increasing voltage (remember, capacitors store voltage). Unlike a battery a capacitor discharges everything all at once when it is connected to a conductor. A battery puts out a steady amount of power over an extended period of time.

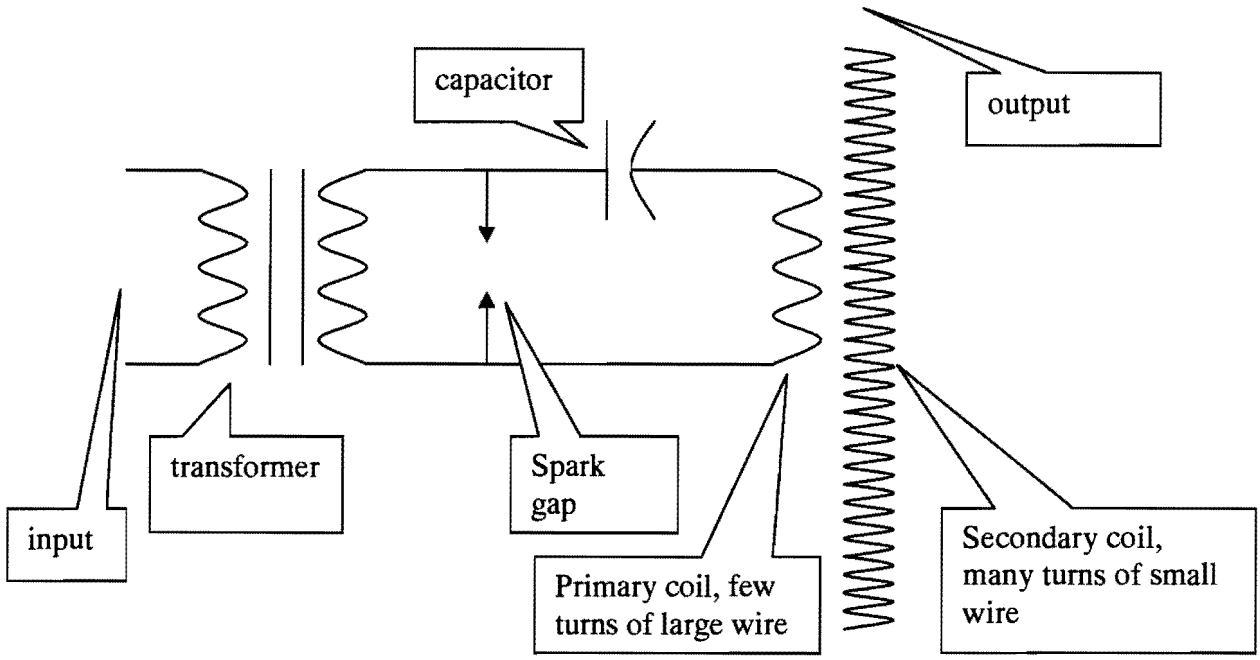
Therefore we now have a device that will charge and discharge a capacitor at some sort of regular rate determined by the timer module. With additional components the timer pulse rate can be adjusted, thus determining how fast our transistor is "open" or "closed" and for how long it remains in either state. This gives us our frequency and pulse width controls on the TENS unit. A means of attenuating the output is also usually provided, thus giving us a way to adjust the intensity of the output. Generally these devices will charge the capacitor to a level of around 200 volts before releasing the charge, the current is on the order of 10 mA, and the duration of each pulse is generally around 1 – 2 mS.



The above diagram showing the effect of varying the basic controls on a TENS unit. Changing the frequency control will cause the pulses to occur either more often or less.

On an interesting note, many TENS type units will allow you to set the pulse width so wide that it conflicts with the highest frequency setting. In other words, you are trying to fit a lot of wide pulses into too small a time frame. This can cause some interesting, and unpredictable effects. With some power sources, the Folsom Max being an example, these results in what we have termed the "Donkey on Crack fuck".

Basic function of a Violet Wand type unit:



A simple violet wand circuit. - Note, many components of an actual violet wand have been removed for simplicity.

Circuit description. The input is plugged into the wall. The transformer provides the initial voltage boost, generally doubling it or something on that order of magnitude. The capacitor then charges until it builds up enough energy to jump the arc by the spark gap. The spark gap is simply two metal rods spaced some small distance apart with the air between them acting as an insulator. The capacitor needs to build up quite a large charge to overcome this insulation but when it does the electricity is now being applied to both ends of the primary coil.

This large pulse of energy applied to the primary coil (a coil is the same thing as an inductor) causes a very large magnetic field to be developed around it. The reverse then happens in the secondary coil. The magnetic field from the primary causes the flow of electricity in the secondary. However since the secondary has far more turns than the primary, the voltage is proportionally increased.

This action happens many times each second. The turns on both the primary and secondary coils are in a set proportion, along with the timing of the capacitor bridging the spark gap to induce a phenomenon known as resonance. Basically we want the capacitor to fire across the gap at such a rate that each pulse induced from the primary to the secondary builds upon the previous one. This is exactly the same as pushing someone in a swing. If you induce a pulse (pushing the swing) at the exact right time the energy will build (the swing goes higher).

So what is the final result of all this at the output? Much higher voltage than we started with. Importantly, through timing the resonant frequency of our circuit we have also increased the frequency of electricity. High voltage will of course overcome the insulating effects of air and this is why we see sparks jumping when a wand is brought close to a conducting surface. The high frequency component aids in this quite a bit as well. This is the difference between a violet wand and a transformer. A transformer could have boosted our voltage to just as high a level as the wand. It would not add the high frequency component though, and thus we would be much less able to jump an arc.

Key concepts to grasp:

Try and have a very basic understanding of how the device you are interested in works. Having some understanding of electricity and how the device works will most likely increase your confidence level.

If you are playing with TENS type units, having a picture in your mind of what adjusting the pulse width and frequency are doing will help you in getting the results you want. You should be able to form a picture in your mind of what the waveform will look like, and thus the sensation produced, before turning the knob on the box.

With Violet Wands be aware that the device you are playing with is specifically designed to produce electricity that will behave in ways you are probably unaccustomed to. For one, this means that the electrical output is designed to penetrate insulators. It will jump through air and shock anything close to the nozzle or around the adjusting knob at the base. There is no way to guard against these effects other than careful handling of the wand.

Violet Wands send their spark through the air rather than through cables. Because of this it is easy to lose track of the fact that you are still completing a circuit. The electricity flows through the wand, into the other person and then into earth ground. Because the electricity is very good at penetrating or flowing around an insulator a person standing in thin soled rubber shoes can still get a shock. Often times though a person lying on the bed will experience a diminished sensation when compared to standing directly on the ground. Be aware that because of all these factors wands should probably be started at low intensity and brought up gradually with each new set up.

Because the energy from a violet wand will penetrate many insulators be aware that this can result in the destruction of surrounding electronic devices. Never use wands in conjunction with TENS type units; you will almost certainly destroy them. Before using a wand on someone, make sure both of you are not wearing a watch, carrying a cell phone or other things of that nature. Wands or TENS units should not be used by or on people who are using a pacemaker or any other sort of electrical medical device.

Think about what you are doing before you do it.

Two actual phone calls:

Ring.....

Rupert – Hello, Rupert Huse & Son.
Caller – Hi, I bought a wand from you a couple of weeks ago.
Rupert – Great, what can I do for you?
Caller – Well, I was just going through the manual and I was wondering is that really true what you say about not using the wand near electronics?
Rupert – Yes, that's actually one of those warnings that sort of looks like the usual "warning, wear eye and hearing protection when using this ladder" things, but it is actually quite true. Why? What happened?
Caller – Well, do you think the wands electricity could penetrate a wall?
Rupert – If the wall was a standard drywall construction, with 2x4 studs, yes, I could believe that.
Caller – Damn, I think I just destroyed my son's computer. I had my wife tied up last night.
Rupert – Maybe you need to think about mounting that cross on another wall.
Caller – Yeah, guess so.
Rupert – At least your son now has the best "my dog ate my homework" story ever, plus now he knows where babies comes from.

Ring.....

Rupert – Hello, and a bright and sunny day to you from Rupert Huse & Son, how can I help you?
Caller – Rupert, do you remember me? I called and bought a wand about a week ago for my anniversary with my wife?
Rupert – Yes, I remember.
Caller – Rupert, you have to help me, I am trying to get this thing to work and I can't figure out why it's not working right.
Rupert – Hey, weren't you guys going somewhere cool, like Hawaii or something?
Caller – Yes.
Rupert – Wow, how exotic.
Caller – Yeah, well, now I am having a big problem because I am trying to use the contact pad and its not working right. I've got the contact pad on me and I am trying to zap her, nothing is happening. Im really frustrated.
Rupert – You know, I have always thought about going to Hawaii. I mean the surfing must be great, plus I have a real hankering for coconut shrimp and a Mai Tai right about now. Hmmmm.....
Caller – Would you stop with the Mai Tai's and help me.
Rupert – Maybe.....Hey.... wait..... is that lilting female laughter I hear in the background?
Caller – Yes.
Rupert – You sly dog you. Is she tied up to the bed right now?

Caller – Yes, please, you have to help me.
Rupert – You see what happens when you don't read the manual? You get a naked woman tied up on the bed in Hawaii laughing at you. And I have a real good feeling neither her mocking you nor my craving for a Mai Tai is helping your hard on.
Caller – Yes, I guess I was bad.
Rupert – Yes you were, bad boy, bad boy. Say it out loud so she can hear you.
Caller – **I was a real bad boy for not reading the manual and experimenting with myself first.**
Rupert – Good, well now at least one of us is hard. Ok, here's the problem. She is probably on a real nice bed really insulated from the floor and tied with rope, not handcuffs. Go put the wand on the floor, the contact pad under her and take off your shoes. When you touch her, the electricity will run the other way, since you will be grounded, give it a try. I'll wait.
Caller – OK
.....Laughter stops, lots "ouch" in the background.
Caller – Hey, wow, thanks a lot, it works!
Rupert – Great, you owe me a Mai Tai.

The point to be learned here is that none of these people were stupid; they just were very excited about their new purchase and wanted to jump right in. There is nothing wrong with that and in fact it is probably what we all do, especially with purchases of this nature. With electrical equipment though, it really pays to sit down a little bit before hand and think about what you are going to do and how it is all working together. That way, when something doesn't work as expected you will either have figured it out before being with a partner, or will be able to solve it should it arise when you are with someone.

Review:

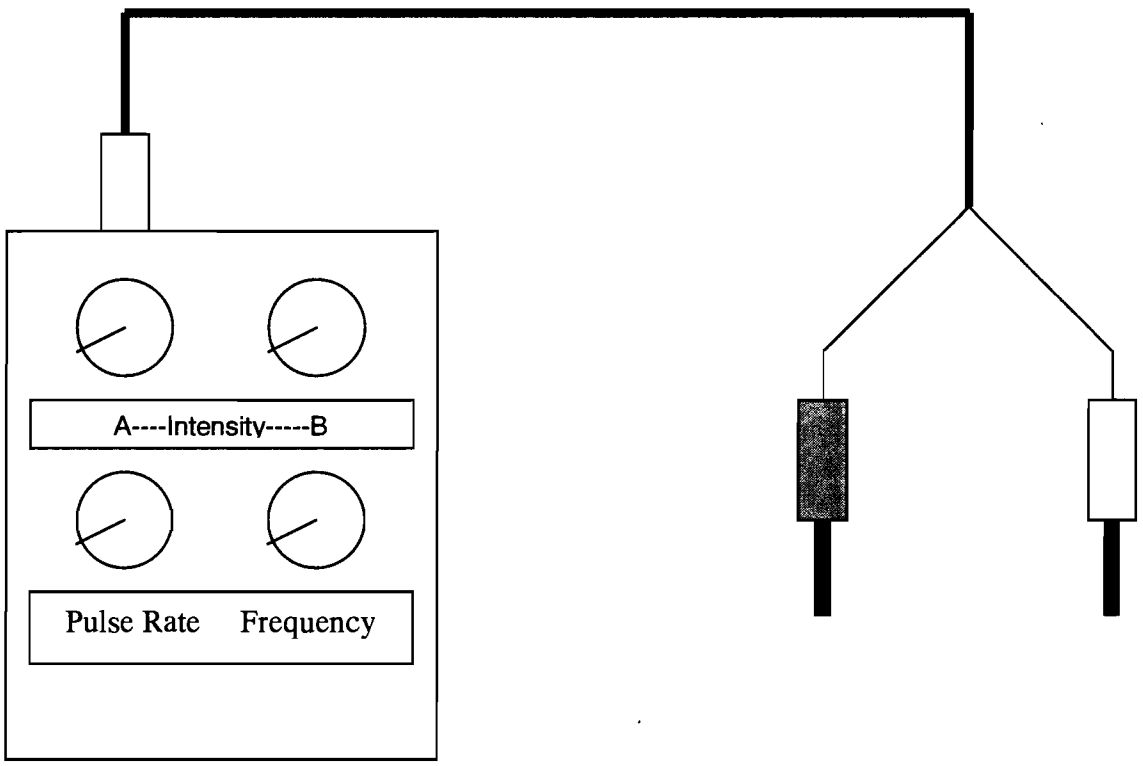
Wands – Take off your watch, clear cell phones from the area and try running the wand over your arm. See how long a spark you can make. Try snapping a spark from the wand to a water pipe. Does the spark seem more intense? Do you know why this is?

TENS – Try hooking up a plug. Turn the box on and touch one contact of the plug. Do you feel any sensation? Try touching two contacts with the fingers from one hand. Do you feel any sensation? Do you understand why you do or don't in each case?

If you are not able to fully understand the results of these experiments you should consider re-reading.

Practical examples for connecting a TENS type units.

Using just the leads that come with most units:

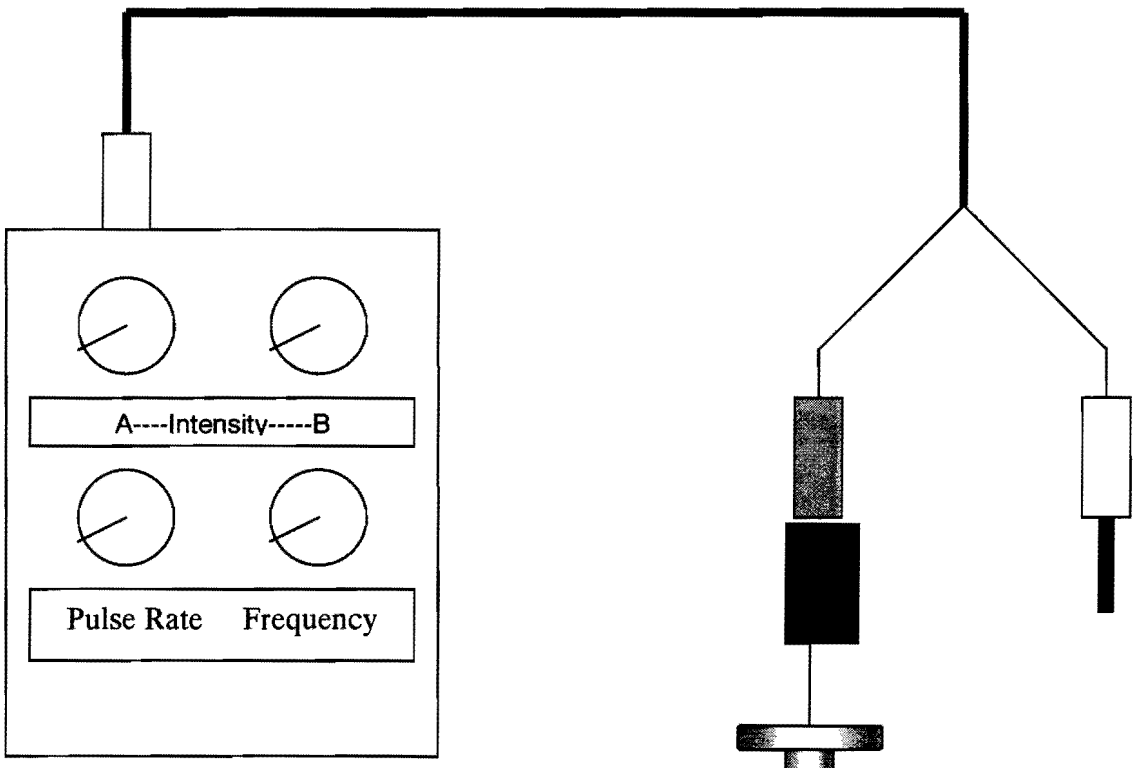


This is the simplest set up there is. The cables are simply plugged into one of the two channels most power sources have. The banana plugs, which are the type of plug found on the leads that come with most units, are spaced an inch or so apart and touched to the skin. One big disadvantage of this set up is that it obviously ties up one hand holding the plugs. The other problem is that if the plugs are touched to the skin while the box is turned on, the subject will feel quite a painful and unpleasant zap. Keep this in mind with this or any other set up. The electrodes should always be in contact with the subject before the power source is turned on. Likewise, the power should be turned off before the electrodes are removed.

Caution – Think about where you are flowing the electricity and what that electrical signal is specifically designed to do by the power source manufacturer.

Generally with the power sources typically used for the purposes we are discussing, the manufacturer has designed them to produce muscle contractions within the body in the area through which the electricity flows. Thus with any set up you are using, think about which muscles the electricity will flow through. It would definitely not be a good idea to try any set up where the electricity is flowing directly through the heart.

Using a single pole plug

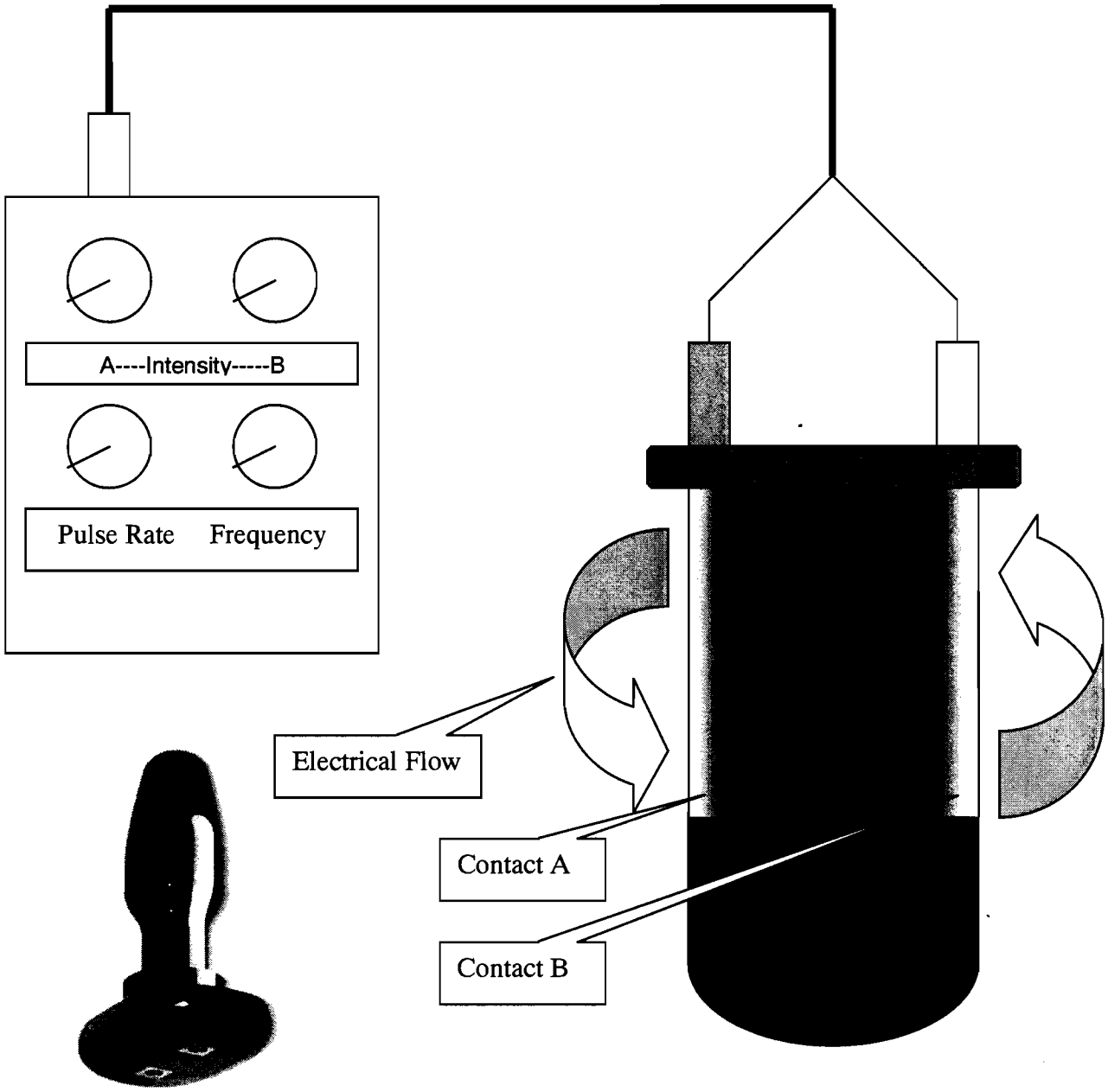


This is perhaps the second simplest set up. On the left is connected a single pole attachment such as one of the Huse Jeweled or Super pony plugs with the horse tail or jewel cap detached. This is inserted either anally or vaginally. If the box is turned on at this point, will a sensation be felt?

The answer is no. No sensation will be felt because the circuit has not been completed.

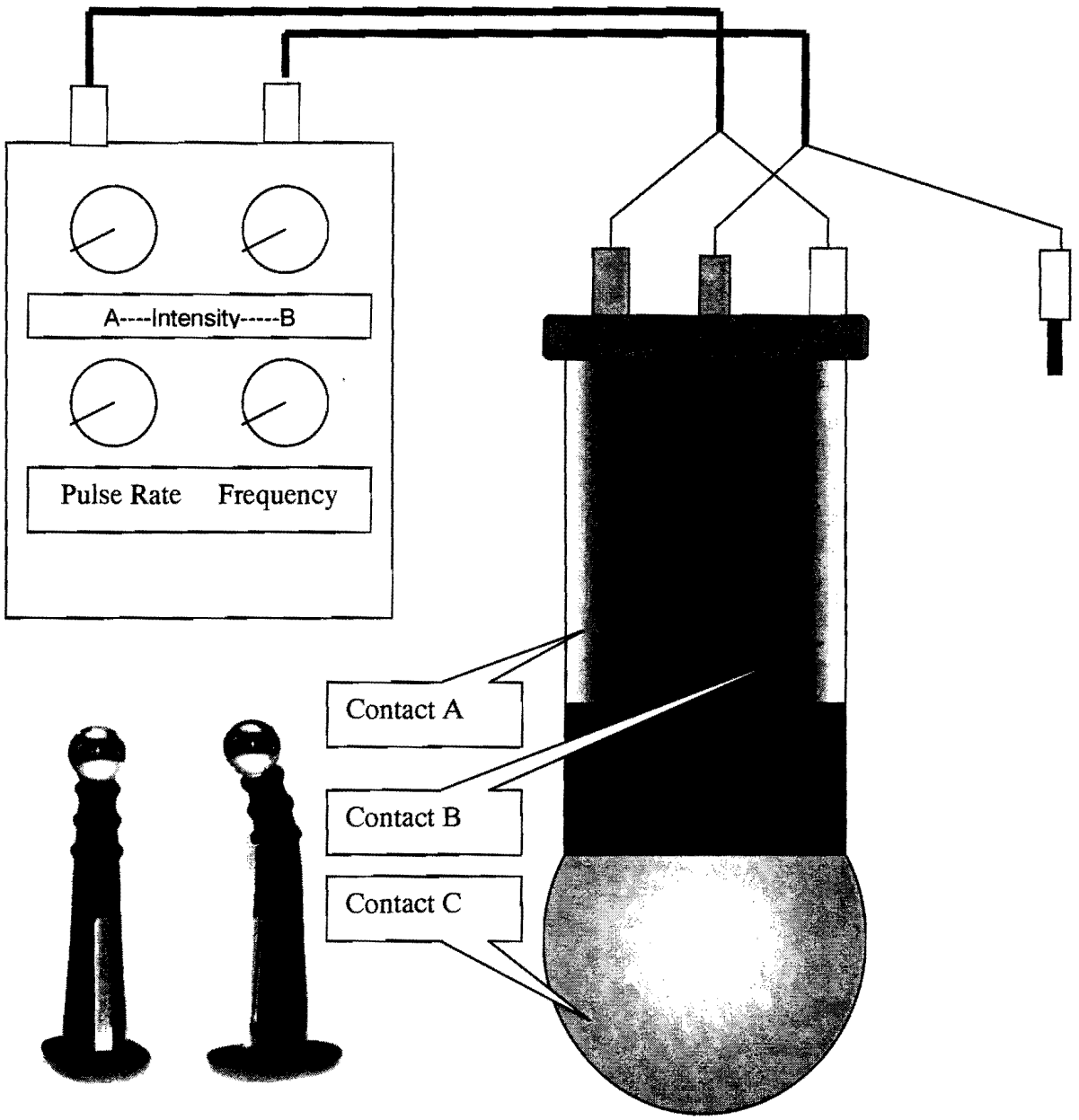
We complete the circuit, and thus impart sensation with the remaining banana plug, in this case the white plug on the right. With this configuration a lot of experimentation with exactly how the electricity causes different effect according to its path through the body can be tried.

Using a two pole plug:



The use of a power source with a two-conductor plug is probably the single most common set up in use. Notice that the electricity when it flows from contact A to contact B does so in a radial pattern. It flows around the circumference of the plug as opposed to axially (along its length). This is significant as it produces quite a different sensation than if the electricity is flowing axially. Plugs with radial rather than axial electrodes do tend to be more expensive as the manufacturing of the former is more complex.

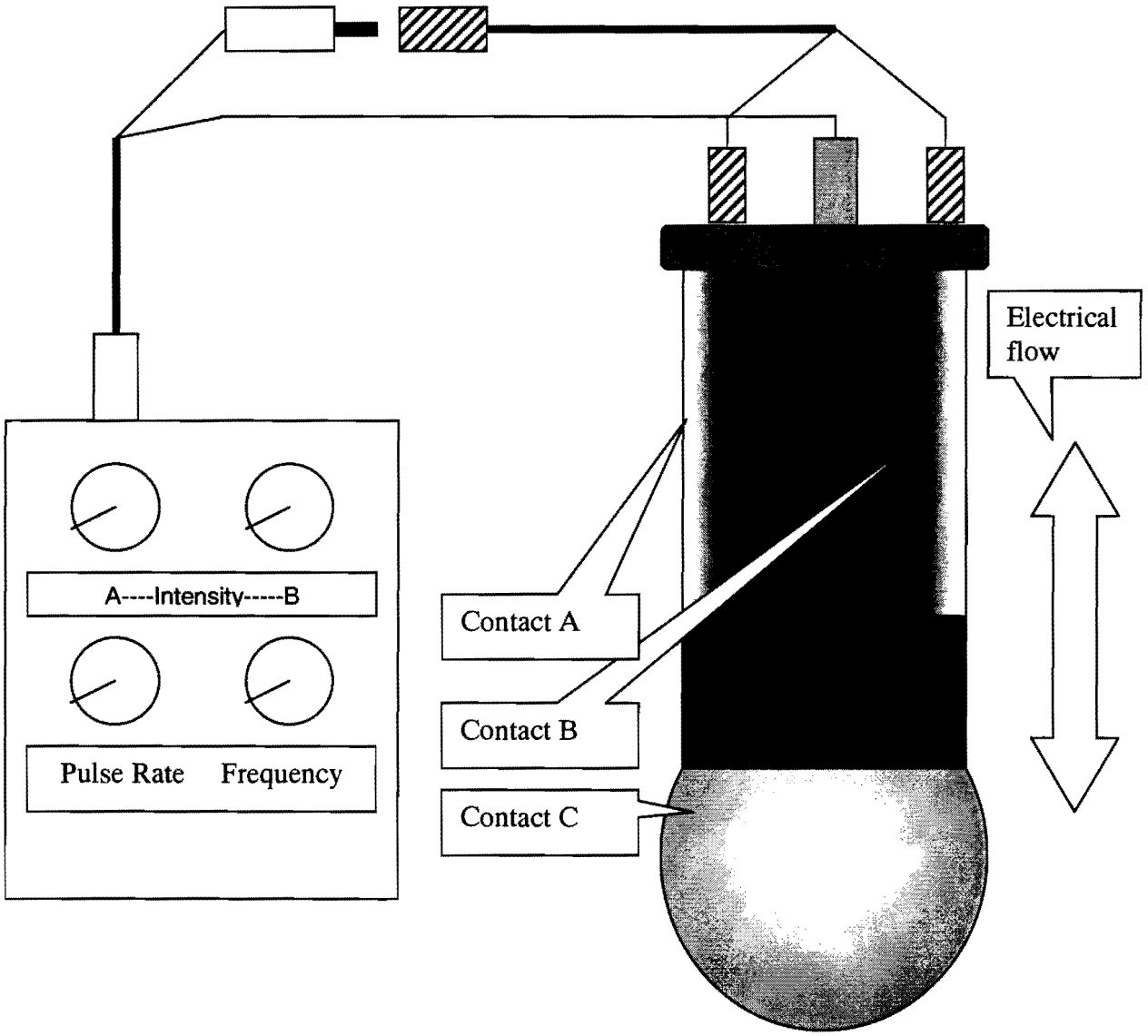
Using a three pole plug:



This set up is quite a bit more complicated. Notice that we are now using both channels of our power source. Also notice that Contacts A and B are connected as in the previous example so our electricity will flow between them in pretty much the same manner as before. Also notice that the leads coming from the B channel on our power source (the channel on the right that we have not used up until this time) attach with one banana plug in the center of our three conductor plug. This is connected to the C contact on the plug. Notice that the other banana plug from this set of leads is not connected to anything. If it remains unconnected, will anything happen with our C contact?

Obviously with this set up what you have is the continuous use of the A channel and now a lot of freedom to experiment with the B channel on the power source. The unconnected banana plug from the B channel can now be touched anywhere, flowing the electricity between contact C and that point. Keep in mind most power sources have a switch to turn on and off each channel independently. With this set up, once the plug is inserted, channel A can be left on continuously. Channel B will have to be switched on after contact is made with the free plug from its set of leads.

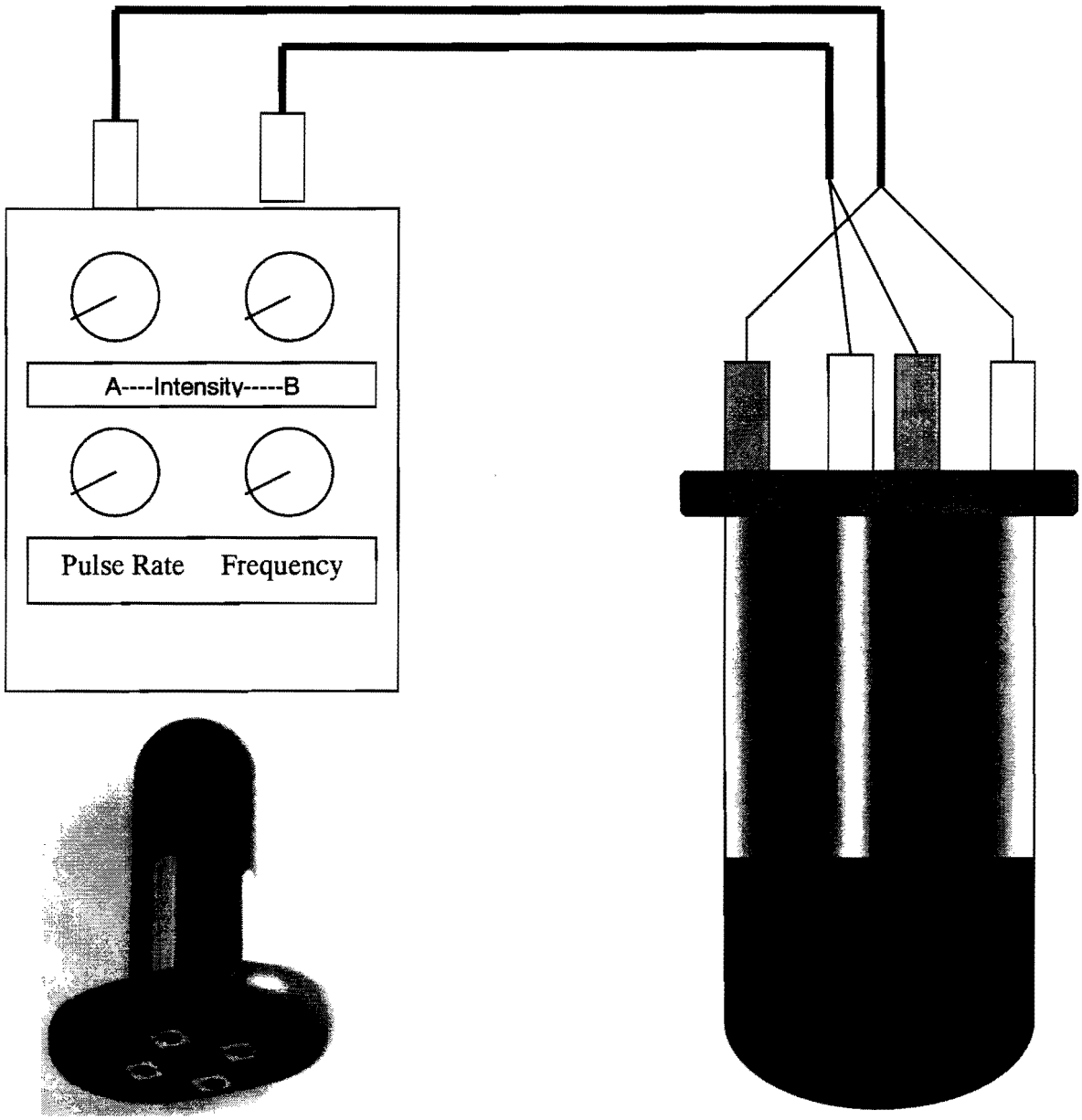
Another set up with the three-conductor plug.



This set up is actually simpler in its effects than the previous one. Notice that we have introduced a new element, a set of leads as indicated by the diagonally slashed ends. This is known as a bridge cable or a Y connector. Basically it is two wires connected together at one end, that end terminated with a banana jack (female). At the other end the two wires are separate and each terminated with a banana plug. What this enables you to do is electrically connect together any two contacts on a plug. Contacts A and B will be

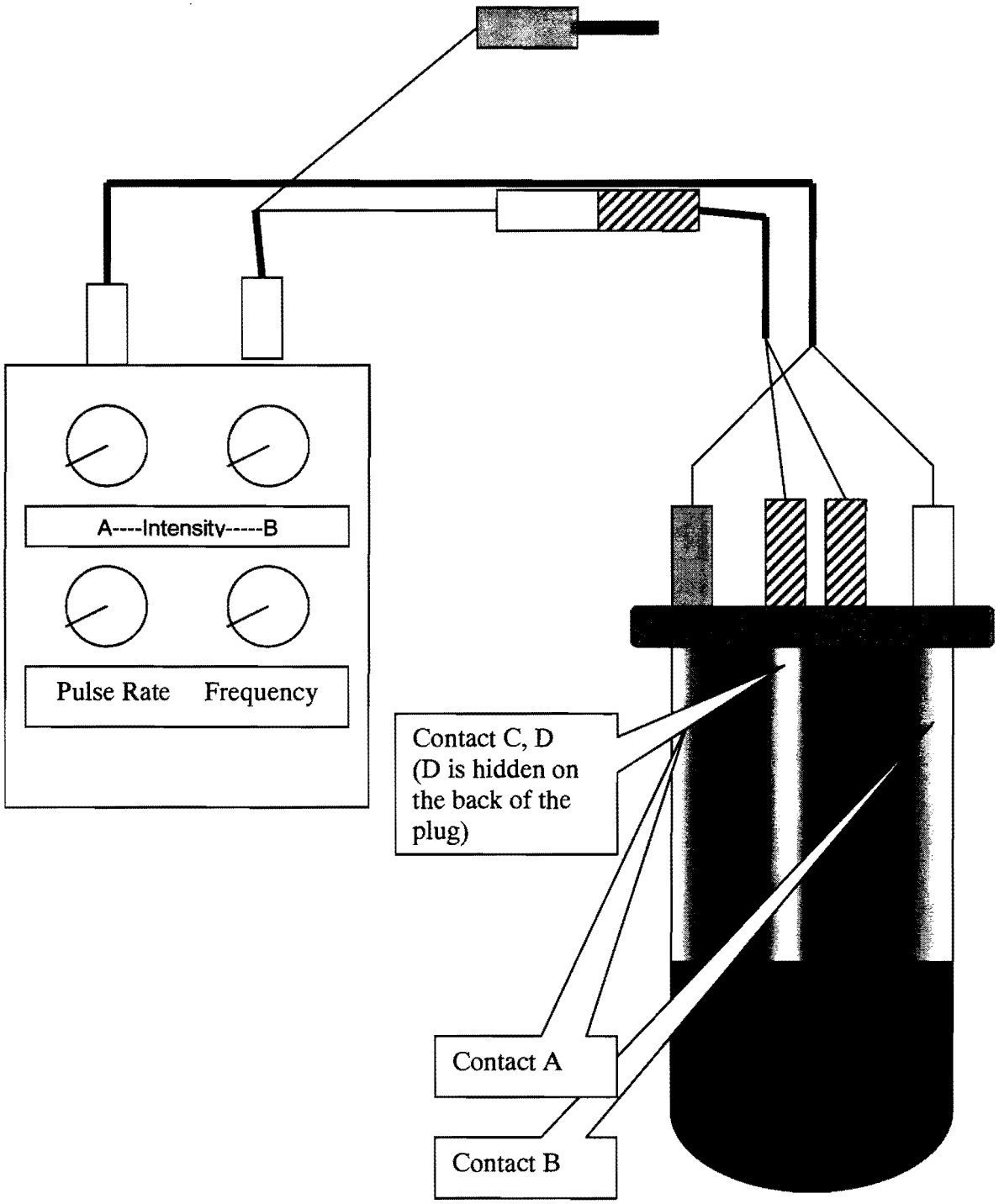
electrically connected and electricity will flow between contact AB and contact C In other words the electricity will flow axially rather than radially.

Four Conductor Plug



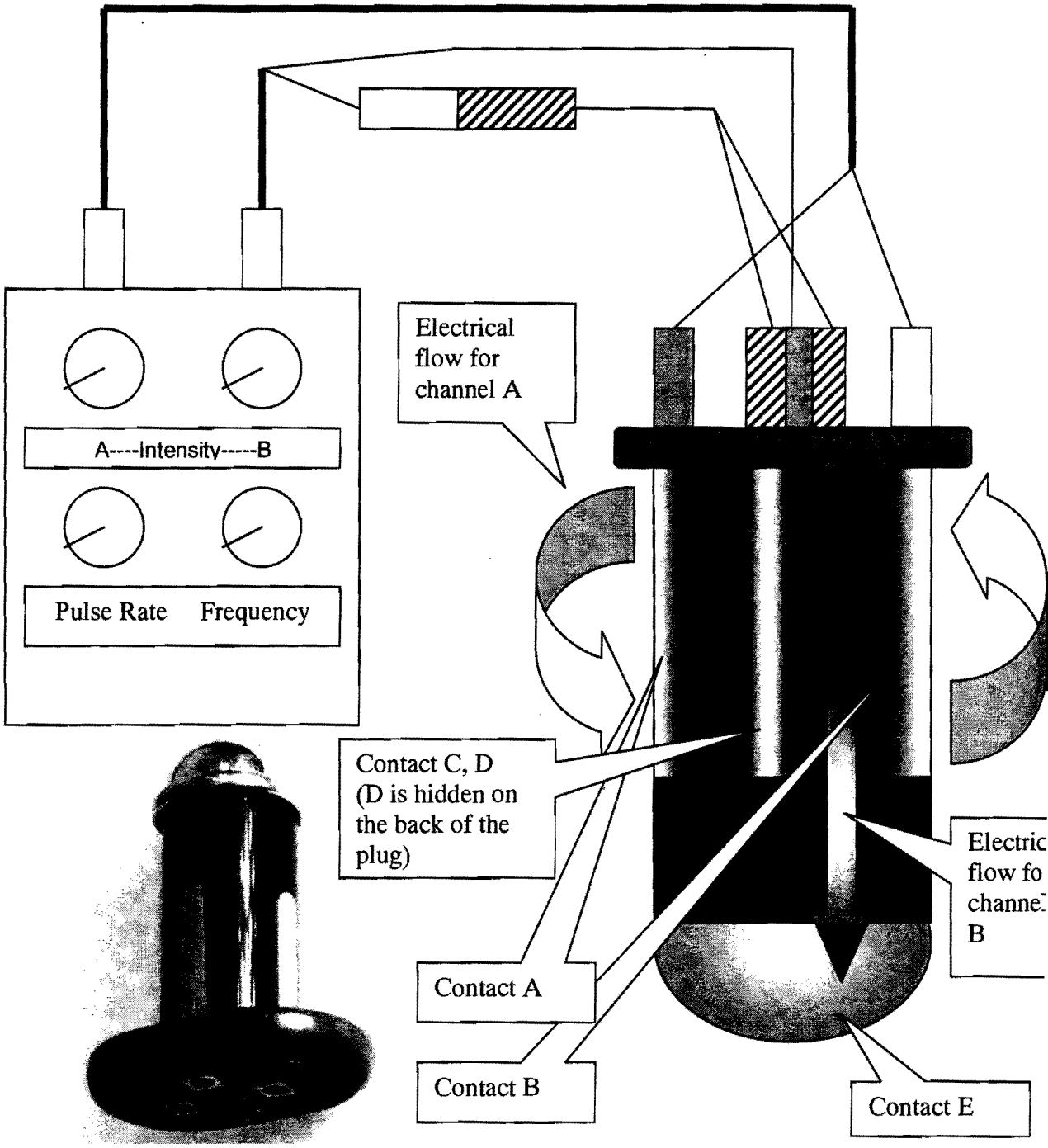
This set up will flow the electricity radially around the plug but has the advantage of being able to switch between channel A and B on the power source. For example, channel A could be used continuously while channel B, pre set to a higher level, could be alternately switched in and out.

Another set up:



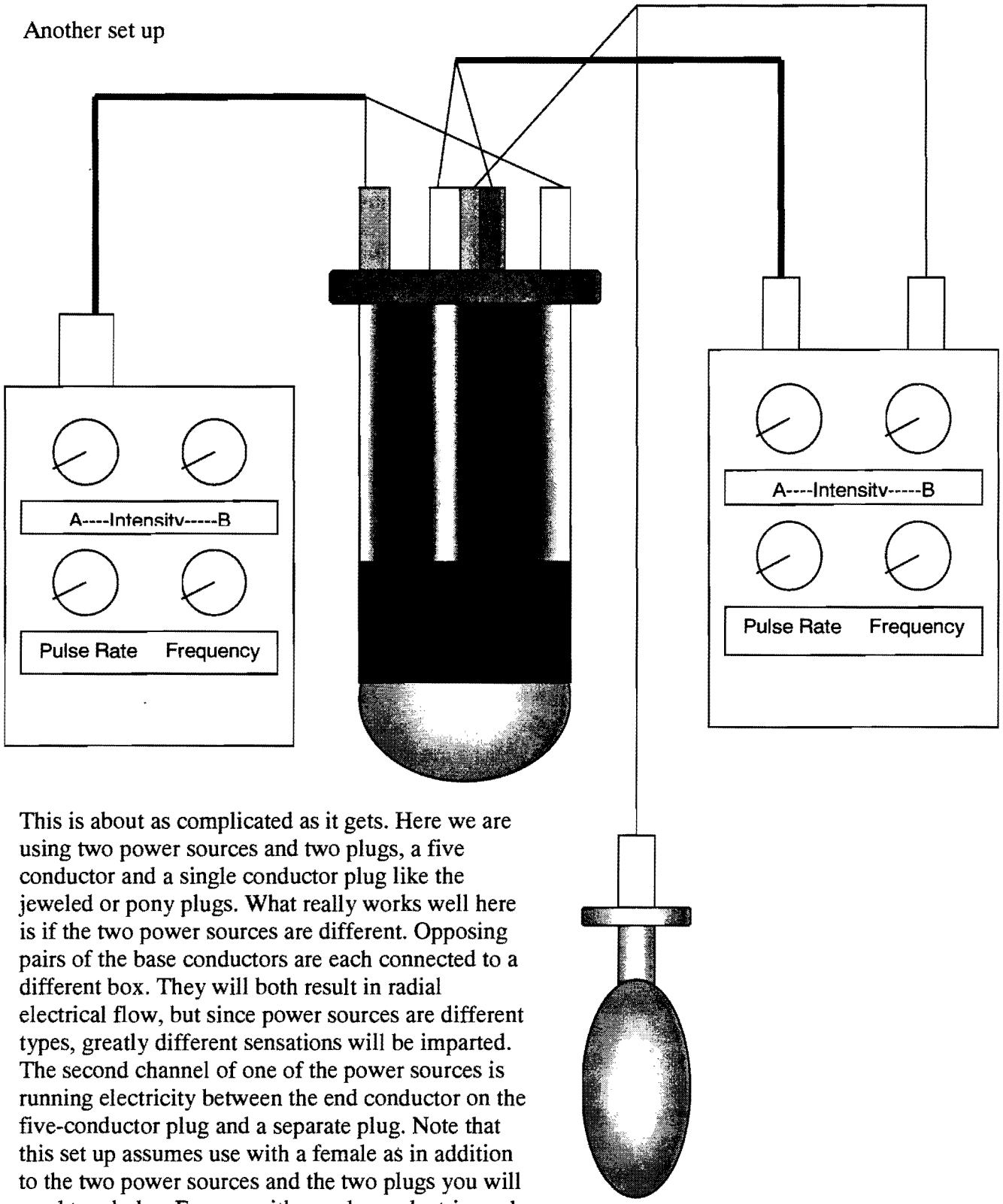
Here we have once again used the bridge connector cable. Electricity will now flow radially around the plug between contacts A and B. Contacts C and D are electrically connected together using the bridge cable. This results in a free banana plug on channel B that could be either touched to the person, or used with a single pole plug.

Five Conductor Plug:



This is a fairly complicated set up. Radial flow, as we have seen in other examples, is controlled by channel A on the power source. Axial flow is accomplished by using the bridge cable to connect contacts C and D and then controlling axial flow between C, D and contact E with channel B.

Another set up



This is about as complicated as it gets. Here we are using two power sources and two plugs, a five conductor and a single conductor plug like the jeweled or pony plugs. What really works well here is if the two power sources are different. Opposing pairs of the base conductors are each connected to a different box. They will both result in radial electrical flow, but since power sources are different types, greatly different sensations will be imparted. The second channel of one of the power sources is running electricity between the end conductor on the five-conductor plug and a separate plug. Note that this set up assumes use with a female as in addition to the two power sources and the two plugs you will need two holes. For use with a male an electric cock band or catheter could be used in place of the single pole plug. A lot of thought would have to go into this set up and one would be highly advised to start out slow.