# Re: How not to wire up an electric grill

***Source:*** http://sci.tech−archive.net/Archive/sci.electronics.design/2008−01/msg01953.html

- *From*: John O'Flaherty <quiasmox@xxxxxxxxx>
- *Date*: Sat, 12 Jan 2008 16:49:26 −0600

On Sat, 12 Jan 2008 14:20:03 −0800, ChairmanOfTheBored
<RUBored@xxxxxxxxxxxxxxx> wrote:

> On Sat, 12 Jan 2008 13:52:43 −0600, John O'Flaherty <quiasmox@xxxxxxxxx>
> wrote:
>
> > On Fri, 11 Jan 2008 21:09:19 −0800, ChairmanOfTheBored
> > <RUBored@xxxxxxxxxxxxxxx> wrote:
> >
> > > On Fri, 11 Jan 2008 07:28:52 −0800 (PST), Mark
> > > <makolber@xxxxxxxxx>
> > > wrote:
> > >
> > > > On Jan 11, 3:29 am, John O'Flaherty
> > > > <quias...@xxxxxxxxx> wrote:
> > > >
> > > > > On Thu, 10 Jan 2008
> > > > > 17:54:26 −0800,
> > > > > ChairmanOfTheBored
> > > > >
> > > > >
> > > > >
> > > > > <RUBo...@xxxxxxxxxxxxxxx>
> > > > > wrote:
> > > > >
> > > > > > On Thu, 10
> > > > > > Jan 2008
> > > > > > 08:57:08
> > > > > > −0500, Rich
> > > > > > Webb
> > > > > > <bbew...@xxxxxxxxxxxxxxxxx>
> > > > > > wrote:

John Devereux wrote:

> Robert Latest <boblat...@xxxxxxxxx> writes:
>
> > Joerg wrote:
> >
> > > Hello Folks,
> >
> > This was posted in a German NG. Now don't do that!
> >
> > http://www.linuxno.de/_data/gallery/
>
> Actually I don't think that's very dangerous. It would be dangerous if,

in
the
case
of
the
power
strip
getting
submerged,
a
substantial
portion
of
the
current
went
through
the
guys'
bodies
but
I
can't
see
how
that
would
happen.

Same
with
the
old
"hairdryer
in
bathtub"
situation.
What
IS
dangerous
is
holding
the
dryer
(or
any
other
unsealed,
mains−powered

device) with wet hands while the rest of the body is well−grounded (as it is when sitting in the tub). What ISN'T dangerous, IMO, is to drop the plugged−in dryer into the tub while someone is sitting in it (but not on the sink or other grounded metal parts), especially if

a FI fuse is fitted.

I couldn't bring myself to try it out to freak out the wife though (she's convinced that 230V can arc about half a meter between blow dryers and water), but I'm sure the biggest danger is that of an immediate divorce.

You are probably right – but perhaps the human body is a better conductor than bath or pool water (being full of salty fluids). So the current might take a short cut!

As I understand it, it's not a case of a short cut but that the current

flows
through
all
available
paths
and
a
person
in
the
bath
or
pool
would
be
part
of,
and
well
coupled
to,
a
non−trivial
subset
of
"all
paths."

You're both
fucking
wrong.

Several
MEGAVolt
lightning
follows
many and or
all paths in
such a
manner as
described,
in SOME
instances,
but not
some
damned AC
line. It

goes to
ground, and
if it gets the
current high
enough,
kicks the
fucking
breaker, just
like it is
supposed to
do.

What it
does NOT
do, is
migrate
over ten feet
and pass
current
through a
body that
does not
even have
an attractor
for it.

What if the body is between
the introduced conductor
and the metal
drain pipe, connected to
ground? If there is a field of
some voltage
established in the water,
with the tremendous wet
skin surface area
removing the natural skin
resistance, and the higher
conductivity of
the ionic flesh, there might
be significant currents
throught the
body. It might only take
about 100 uA through the
heart to make it
fibrillate.

−−
John− Hide quoted text −

− Show quoted text −

> Right, there may be an Amp of current
> flowing directly across the
> submerdged conductors and only a small
> amount of current flowing where
> the person is, imagine the "iron filing force
> field lines" spreading
> out like you see around a magnet. The
> current where the person is may
> be very much smaller compared to the total
> current.
>
> ...BUT it takes only a very small current to
> hurt you.

> Yes, but it also requires that the body be IN the PATH, not
> some lame
> imaginary field lines.

> Sorry, but you are thinking about it incorrectly. There isn't any
> unique "the path". When there is an electric dipole in a uniformly
> conductive medium (such as water), an electric field is established
> that can be represented by directional lines perpendicular to
> equipotential lines. Current will flow along those directional lines
> in proportion to the electric field gradient there. Insertion of
> something more conductive at any point will distort the field so as to
> concentrate current through the more conductive area.

> Take a copper cube with two attachments on opposite faces that are less
> than one tenth the size of the cube. Place a silver rod that is one
> tenth the cube face width in diameter over in the corner of the cube,
> between the two nodes. Pass current... I'd say that the silver rod
> never sees any of it.

I don't agree. You aren't going to see all the current flowing in an infinitely narrow line between the corners− it's going to spread, and in an even sort of way. For example, take a line between the corners of 1 cm^2 cross−section. That will have a certain resistance. In the next layer outward, whatever shell has an equal resistance to that core will carry about the same current.

In any case, there's much more contrast between the conductivity of a body full of ions and a pool full of water than between copper and

silver, even allowing for hard water and chlorine.

> The two guys in the pool represent even less percentage than the rod,
> AND the two nodes are NOT across the face of the pool, and the bottom of
> the pool, they are across two nodes of a fucking power strip. 90% of
> that pool's body of water sees ZERO current.

You don't know that both sides of the line make contact with the pool at the same time, or with the same surface area. You don't know that the guy smiling in the background doesn't have his wet hand lying on the cement patio.

Even if both contacts have equal area and are centered in the pool, there will be nowhere in the pool that actually has zero current. If you believe in electric fields and that they have direction, then field lines aren't imaginary.

My point is not that this situation will result in certain death, but that it is dangerous.
––
John
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