It's my intention that this idea should be a part of the public domain and should never be patented. I also intend that it shall never be monopolized by any government.

This idea was first posted on the internet, and was first declared to be public domain, on Sunday, December 14, 2008.

This document was most recently revised on Friday, April 16, 2021.

This document is approximately 1,244 words long.

I don't know if this idea will actually work. I'm posting it here anyway.

In December of 2008, I had occasion to watch the movie *Fat Man and Little Boy*. It's an account, possibly accurate, of one part of the Manhattan Project. It tells one version of the story of the efforts of the military, the scientists, and the engineers, to develop a working nuclear bomb. I'd watched the movie before but, this time, it got me to thinking about bombs and engineers.

Scientists and engineers are notorious for their inability to do something the simple way. During my career as an engineer, I tried the best that I could to deal with it. I also tried to find ways to simplify things. Usually, my ideas were not well received by my colleagues. See my memoir *Outward Bound*.

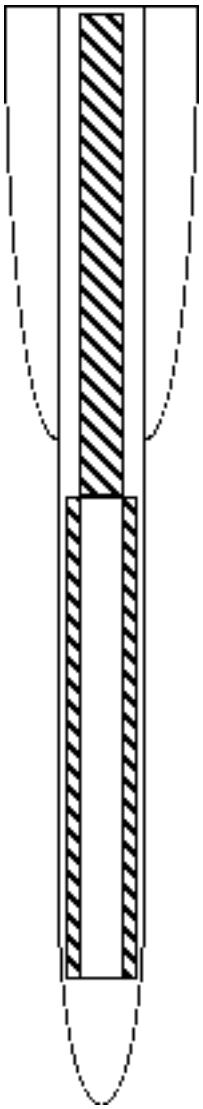
My background is in power generation, so I'm an amateur with regard to bomb design. As I understand it, there are two ways to make a bomb. One of those is the implosion method. The fissionable material, in the shape of a subcritical, hollow sphere is surrounded by conventional explosives. When the conventional explosives are detonated, the resulting implosion compresses the hollow sphere into a solid critical mass. As soon as it becomes a critical mass, it blows itself apart. Thus, the idea is to compress it as much as possible and as quickly as possible. If it's done correctly, then the result is a nuclear explosion. As I understand it, the explosives must be arranged very precisely and exploded with precise timing. So far as I know, there isn't any way to simplify the implosion method.

The other approach is the gun method. A subcritical mass in the shape of a hollow cylinder and another such mass in the shape of a piston, or in whatever variations on those shapes will slide together properly, are put into a cylindrical container. Explosives at one end of the container, or maybe at both ends, drive the piston into the cylinder, forming a critical mass. When the piston and the cylinder become a critical mass, the thing blows itself apart. Thus, the idea is to get the maximum insertion before the critical mass blows itself apart. If it's done correctly, then the result is a nuclear explosion.

The gun method is closely akin to a method of testing that the early scientists used to make their initial estimates of the size and the performance of a critical mass. They called it "tickling the dragon's tail". Thus, the title of this article. I've heard two different versions of that story.

One version of tickling the dragon's tail was told to me by a college professor who instructed one the my nuclear engineering classes at Texas A&M University, many years ago. It went like this. The scientists had arranged to use compressed air to blow a piston of fissionable material through a cylinder of the same material. They didn't know the exact values that they needed to know. That's why they were con-

ducting the experiments. To be on the safe side, they started with the maximum air pressure that they could achieve. That would blow the piston through the cylinder very quickly, minimizing the likelihood that the thing would explode. They intended to detect the nuclear reaction with an amp meter connected to a detector. They began their experiment. As they gradually blew the piston through the cylinder with lower and lower amounts of pressure, causing the critical mass to remain assembled for longer and longer periods of time, they didn't get any deflection of their amp meter. My professor said that they were getting puzzled and some of them were turning away, redoing calculations with their slide rules, wondering where they'd gone wrong. Meanwhile, the technicians continued to lower the air pressure and blow the piston through the cylinder more and more slowly. One time, a radiation detector on the wall at the opposite side of the laboratory alarmed, indicating a high level burst of radiation. Further investigation revealed that the technician had forgotten to remove the shunt from the back of the amp meter. They had come very close to creating a nuclear explosion. I don't know if the story is true. That's the way that the professor told it to us.



The other version of "tickling the dragon's tail" is the one that was depicted in *Fat Man and Little Boy*. In that version of the story, they had the test apparatus oriented vertically and were using a weight to pull the piston through the cylinder. It doesn't really matter. The result is the same in either case. However, the experiments are relevant to this article because they suggest that the speed of assembly of the critical mass using the gun method doesn't need to be very high tech or very fast.

Although I don't think that the implosion method can be simplified, I can think of a very simple way to make a gun type bomb. It would be prudent, for various reasons, to practice with test masses of iron or aluminum or something else besides fissionable material.

The test masses should be installed into a mechanism that will reliably hold them apart but allow them to slide together very easily, when the time comes. It should all fit into a long, slender, aerodynamic cylinder. The accompanying sketch is very simplified but it gives the general idea. Test devices can be dropped from an elevation comparable to that from which the actual bomb will be dropped. The design can be refined until the devices are working correctly. Then, the test masses can be replaced with fissionable material.

The bomb should be dropped from the highest elevation that can be achieved. When it hits the target, inertia will drive the piston into the cylinder, creating a critical mass and a nuclear explosion. It might not work as well as the fancy bombs made by governments. The explosion might not be very big or very efficient. However, if it works at all, then it would probably make a big mess out of, hypothetically speaking of course, an IRS office, an FBI crime lab, or a BATF headquarters building. Hypothetically speaking, of course. I would never suggest any destruction whatsoever, for any reason, of any such facility.

I don't have the remotest idea how to obtain fissionable material and I'm not capable of building a device like the one described in this article, anyway, but I think that maybe it can be done. The men who worked on the Manhattan Project could probably have forgotten more about bomb design between breakfast and supper than I'll ever know, so maybe they thought of my idea and decided that it wouldn't work. On the other hand, maybe they were like the engineers with whom I previously worked. Maybe they just weren't capable of doing something the simple way. Here's another idea to consider. There's a lot more job security in doing it the hard way.

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