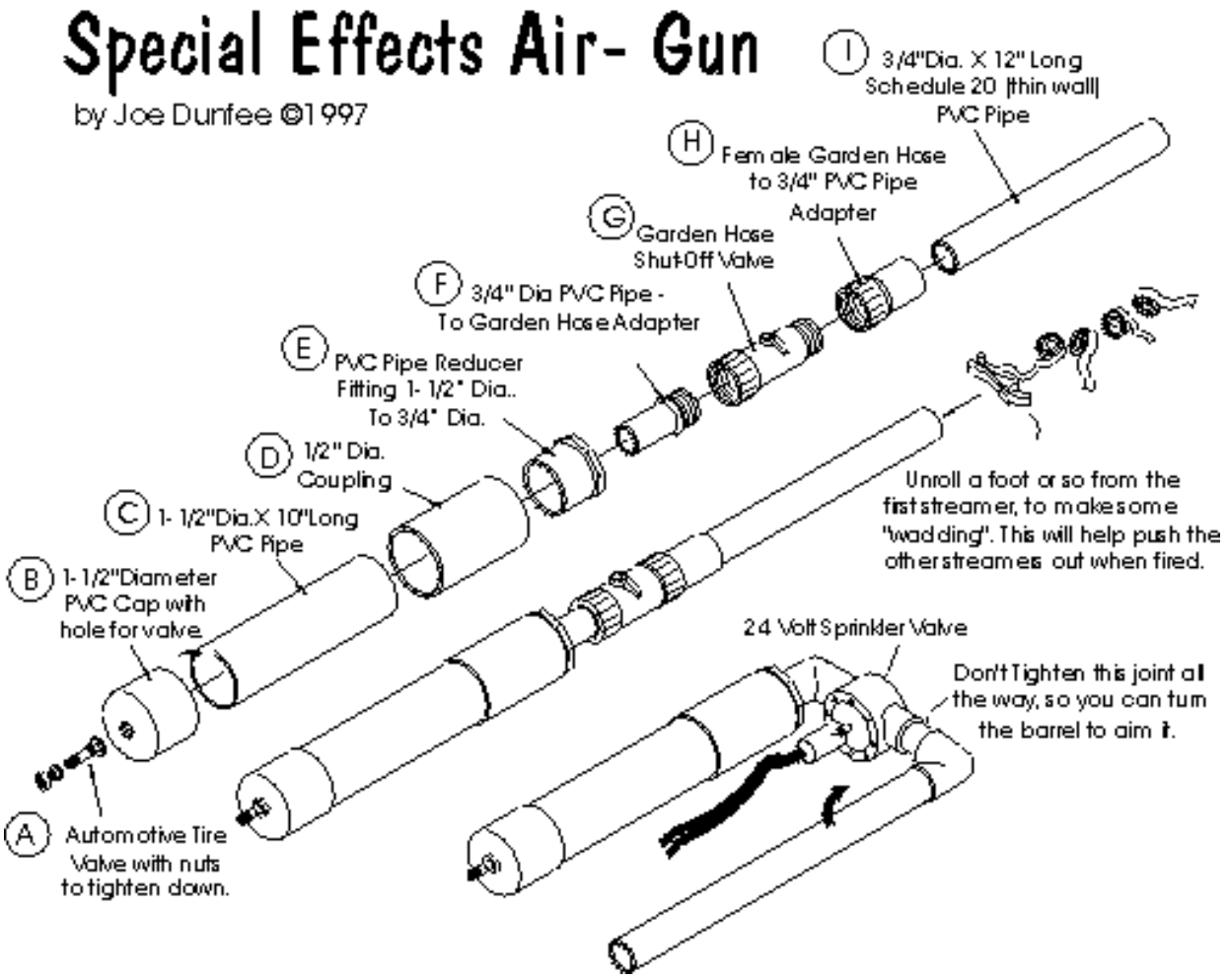

The first time I saw one in action I knew I wanted to get one. I was watching Gary Wooldridge's clown group "Saints in Disguise", when they reached the finish of their clown "air band" number and suddenly ...woosh ...zing ...zowie ... overhead shot those colorful streamers which then floated down on the audience in the sanctuary. What he used were small air-guns that use compressed air to propel the streamers (and sometimes confetti) over the heads of the audience. In the past he had used pyrotechnics (theatrical fireworks), but now uses these air-guns much of the time. It is both safer and very effective. What Gary uses is a commercial product called "AeroTechnics" that uses a high-pressure carbon dioxide cartridge to provide the compressed air. It makes the air-gun very compact (there is a 'magic-wand' air-gun available by the same company), but it also uses up an expensive, special made CO2 cartridge for every use.

I have come up with a home-made air-gun that can be charged with air from an ordinary bicycle pump and can be made with parts from your local hard-ware store. The air-gun is made of PVC pipe and other garden sprinkler fittings, as seen in my illustration. It is as capable of shooting off streamers or confetti as the commercial versions, although it doesn't have the loud "Bang" the CO2 cylinders make. Mine only "Wooshes".

The principal of operation is simple. Air pressure is stored in one part of the gun (Parts A to F), and kept inside the gun with a valve (G) (either manually operated or electric). When the valve is opened the air rushes into the "Barrel" (H-I) of the air-gun and forces out anything that is inside the barrel -

confetti or streamers in our case, but it will work with other things like water or talcum powder. (Flour can ignite when it is in a cloud)

Before I go into the construction details I want you to realize that you may not be able to find the exact parts at your hardware store that I have drawn in the illustration. But once you understand how it works, you can make many changes and it will still work quite well.

You may not find the right sizes of fittings in 1-1/2" Diameter versions, so you can substitute 1-1/4" Diameter pipes and fittings. I sized the barrel so it can handle standard magician's throw streamers, but if you want to shoot confetti you can use larger sizes for bigger loads. But you do that, you may need to make the air-chamber larger as well. You can also make it shorter by getting the necessary fittings to form an elongated "U" shape (which is what I did for the electric version). I have seen commercial versions that use large air-tanks and have 3" diameter barrels to shoot confetti. (known as Confetti Cannons)

I think the most important physical requirements are that the valve open quickly and allow the air through easily. For manual operation - the garden hose valve, and electrically - the sprinkler valve are the only valves I have found that meet these requirements.

Before you assemble anything else, you should first install the automotive tire valve (A) which is used to fill the air chamber. It is the kind that is tightened on with a nut - not the rubber kind which is most popular. An automotive speciality store such as Napa or Discount Auto should have them. Simply drill a hole for it in the end cap and install it following the directions on the package. There will be two rubber gaskets for different sized holes, choose one, discard the other gasket, and drill the proper sized hole.

Since most of the device is made from PVC pipe fittings, you will need to purchase some of the special PVC Pipe Cement sold to glue the fittings together. Make particular effort to clean off any burrs left from cutting the pipe because we need to get a good seal.

For the output valve, there are two ways to go. Manually operated (which is depicted in the first drawing in a unassembled as well as assembled view) requires someone to hold it or the electric version show assembled on the right. Puppeteers may find the manual one the best, since they can hold it backstage. But, I expect most magicians will prefer the electric one because it can be fired remotely so it looks more "magical".

The Manual Version uses some adapters (F,H) so I can connect a garden hose shut-off valve. This is necessary because pipe thread is finer than garden hose thread. If you can't get the PVC-Pipe-to Garden-hose adapters (F,H), you may have to use a pipe-thread-to-garden-hose-thread adapter and instead of the reducer bushing (E) you may have to get a version of (E) that reduces to pipe thread then use the adapter I mentioned. If you use a threaded adapter, you should also purchase and use some Teflon Tape used for the purpose of sealing pipe threads. You should NOT use the PVC pipe cement on any of the threaded joints.

The Electric Version uses a 24 Volt sprinkler valve. The size doesn't matter, and they are available in 3/4" and 1" versions. The valves also come in several shapes and orientations of the pipe connections to them. You will just have to spend some time at the hardware store trying out the different configurations of fittings and elbows to get the design you want. It is not critical that the parts after the valve be air-tight. So I deliberately don't tighten the elbow on the output so I can sit the air-gun on the floor and lift the barrel to aim it up. To power the sprinkler valve, you need to wire two 9 volt

batteries in series (See illustration) to a momentary switch. The voltage only adds up to 18 volts, but that is enough. The batteries are only used momentarily and will last a very long time. All the electrical parts (including a box to hold them) are available at Radio Shack. It should also fairly easy to adapt the electric version to be radio controlled.

After everything is together, close the valve and pump some pressure into it then check for leaks. You can put on some liquid soap or just hold it underwater to look for leaks. I haven't had a problem with leaks in glued joints in the past, but if there is one, you should try to fix it by removing the valve (G) and perhaps putting some Elmer's glue (hmmm perhaps some of the stuff sold in cans to stop leaks in tires would work even better) inside the chamber and trying to make it go to the area of the leak. Then, before it is dry, reassemble it and pump it up with air to force the glue to go into the leaking part.

One addition to my design would be to include an air pressure gauge to be permanently mounted on the air chamber, so that you can see at a glance that it is pressurized, and has not leaked.

In actual operation the air-gun is prepared by closing the garden hose valve and using the tire valve to fill it with air from a bicycle pump to about 60psi. (Well... actually I pump it up to 80psi, but the garden hose parts say they are only able to handle 60psi and I have never had one break at 80psi) In the open end of the smaller pipe I ram several streamers, but with the first one I wad up a bit of the streamer to form a "wadding" (no need to be orderly, just ram them in). Confetti has other loading techniques, which I will describe in a moment. At the right moment in the performance, I aim the air-gun up at an angle of about 45 degrees from behind the puppet stage and then quickly open the garden hose valve with a flick of the finger. (or simply press the button to fire the electric one) The streamers then shoot out 40 or 50 feet.

The streamers I use come in 12,18, & 24 foot lengths and I have only been able to purchase them from places that sell the "AeroTechnic" guns. (that is, theatrical supply houses) Or from Magician Supply stores. They differ from the regular streamers I can find in party supply stores in that they unravel from the outside, rather than from the inside. The streamers are much easier to clean-up than confetti, and children always gather them up for you. I am still looking for a cheaper source for the streamers than the Aerotechnic ones. Any recommendations?

Confetti is much cheaper to use than the streamers. I have experimented with several kinds of confetti and methods of packing it inside the barrel, with the purpose of getting the most firing distance. The most distance was obtained by using the paper dots confetti (not tissue paper kind) and packing them with several layers of the bon-bon cups. That is, one cup followed by a heaping tablespoon of confetti, then another cup, etc. The bon-bon cup helps to hold the bundles of confetti together before they flutter out. This method produced distances up to 40'.

The second best distance was obtained by using large tissue paper confetti, they were 2" circles and heart shapes. This is a much more visible confetti that will stay in the air a long time. As before, you should first wad up a little of the confetti to form a "wad" (of course). The rest of the confetti was loaded by being careful to first get a small stack of the confetti (maybe 15 or so pieces) and then rolling the confetti so it would fit into the barrel. Like the prior method, it works because the stacked confetti stays together a little longer before the pieces separate and they flutter out. As soon as the confetti flutters out - it will stop immediately regardless of how much pressure is behind it.

Other alternative "artillery" to fire includes talcum powder to make an explosion effect, or to shoot out small silks or ribbons. NEVER put anything solid inside, because it can be shot out with

considerable force and hurt someone. Water in the barrel will also work, you can hold it in with some wax paper covering the opening and held in place with a rubber band. But you wouldn't want to get people wet... would you?

I think this air-gun is so effective because, normally the fantasy world you are providing for their entertainment is always "over there" on the stage. But this air-gun allows part of that fantasy world to reach out, surround, and even touch the audience.

For Supplies, as well as the commercial AeroTechnic guns here is one company I recommend. They have a great deal of other effects stuff. However, their lighting is a bit expensive.

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