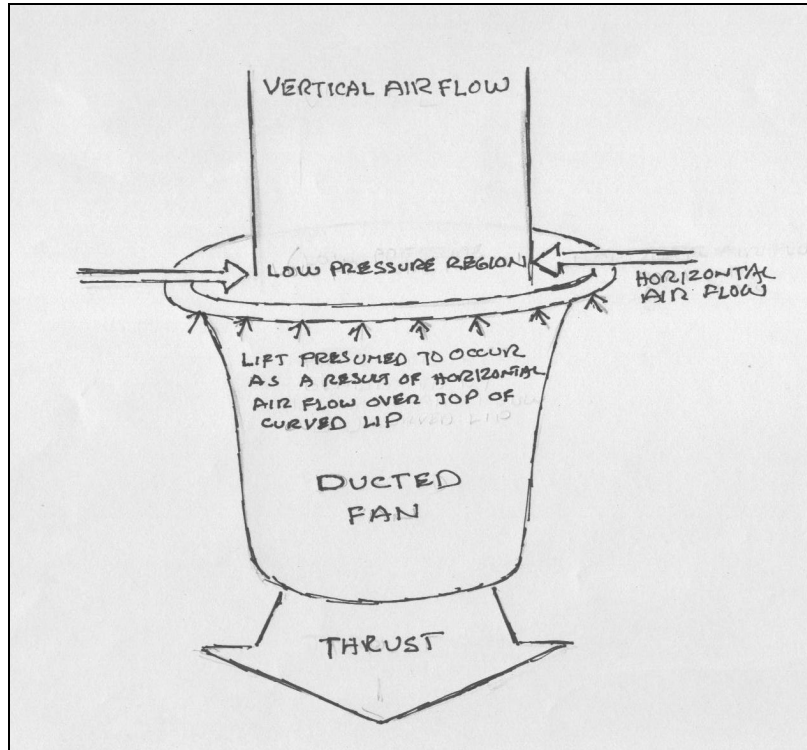


Misunderstanding Ducted Fans

Setting the stage for grander things...



I don't know when I first learned about ducted fans. It could have been in the late 50's when we were still in West Palm Beach or in early 60's after we moved back to Shelby. The place doesn't make any difference. There was just me draped over a chair, or maybe propped up on a slightly soiled bed, poring over an article in Popular Science or Mechanics.

The article showed a man standing on a circular platform that looked like a large drum. The platform hovered about 20 feet in the air. The man was wearing a helmet and holding on to a bar that extended up from the top of the platform. There might have been evidence of turbulence beneath, like blowing dust and debris.

I suppose it was the idea of being levitated that appealed to me and the freedom such movement implied.

Upon reading the article, I learned that the platform was called a ducted fan. This was basically a tube in which fan blades were enclosed. The blades, which were operated by a small gas engine, sucked air in from the top and blew it out the bottom.

As one who read science fiction and owned a copy of the ABC's of Relativity, it was obvious to me that much of the lift was generated by the thrust of air being blown out below. It was like a rocket.

What I misunderstood was the purpose of the horizontal lip that went around the top of the fan. Or, maybe it was the author who got it wrong and I understood him correctly.

The lip was likely just a supplemental feature for channeling air flow into the duct. The real secret of a ducted fan, I have since learned, is the close proximity of fan blade tips to the sides of the duct. This reduces the turbulence and drag that occur at the tip of an unshielded propeller. A ducted fan blows more air and generates more thrust than a propeller by itself.

Ducted fans using this principle have been employed in various Vertical Take Off and Landing (VTOL) aircraft – most still in the experimental or prototype stage. These aircraft look exotic and continue to be featured in magazines like Popular Science and Popular Mechanics. Many are touted as personal airplanes of the future – one in every garage.

My misunderstanding was that I thought the lip was there to direct air flow in a horizontal direction. Air flowing down into the fan would suck air across top of the lip. This fast moving air, would, according to Bernoulli's Principle, which I had read about somewhere, generate upward lift.

Later, I would apply this misunderstanding to a new category of flight, resulting, ultimately, in the airplanes without wings and spaceships with no visible means of support.