FUNDAMENTAL SCIENTIFIC DISCOVERY

REGARDING

THE DIAMOND-SHAPED ACTUATOR

ADVANTAGE OVER

CONVENTIONAL PISTONS

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HYDRAULIC DISPLACEMENT MOTOR FUNDAMENTAL SCIENCE

The foundational point of the following discovery establishes that a diamond-shaped actuator can produce 100% of it's fluid requirements, as illustrated in FIGURE "D", forcing the fluid from a standard piston, while using only 85% of it's work potential. The remaining 15% work potential can be captured as free work. **No other energy source is required.** This paper develops an understanding of this fact.

FIGURE "A"

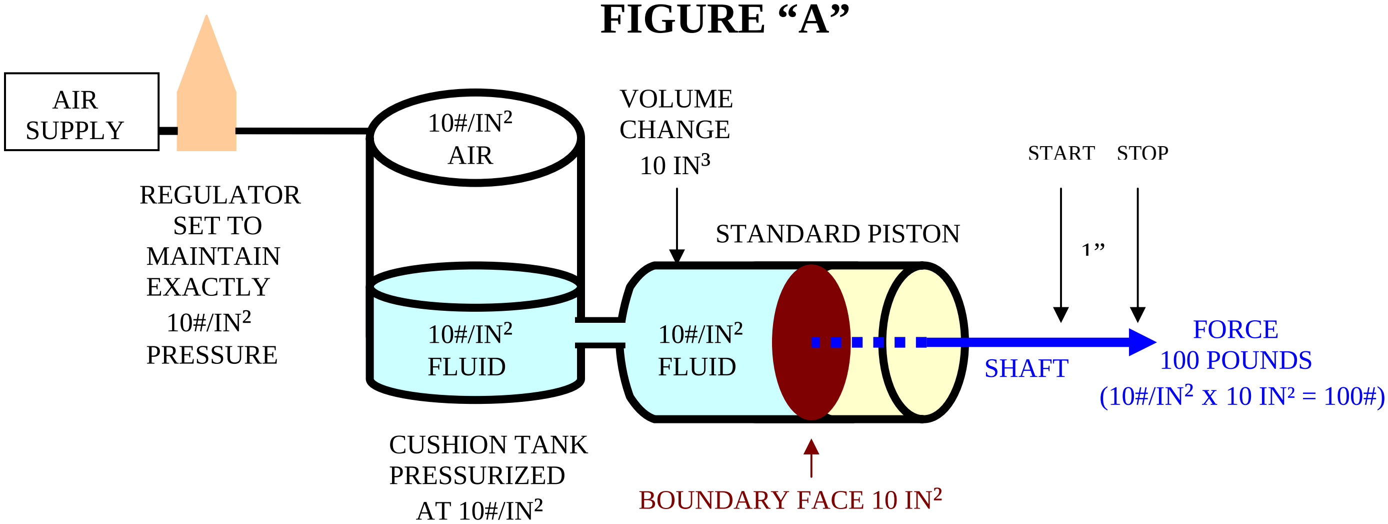

FIGURE "A" illustrates a standard piston with a constant fluid source at 10#/in² pressure, applied to the piston's 10 in² boundary face, resulting in 100 pounds of force applied to the piston's shaft. The travel distance is one inch, consuming 10 in³ of fluid.

FIGURE "B"

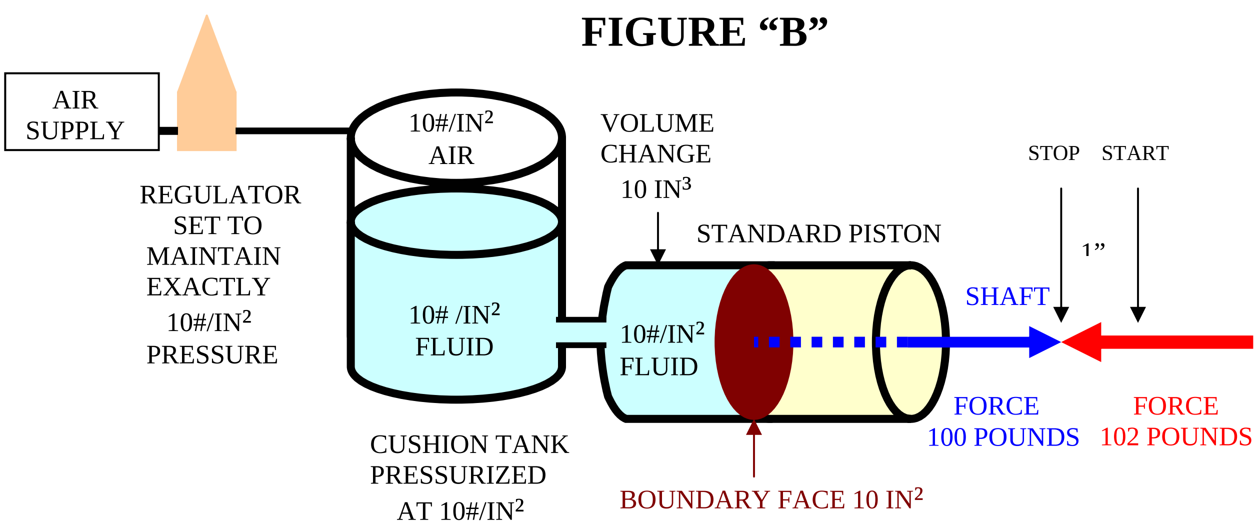

FIGURE "B" illustrates a standard piston with a constant 10#/in² fluid pressure applied to the piston's 10 in² boundary face, resulting in 100 pounds of force applied to the piston's shaft. A 102-pound force is applied to the shaft, over-powering the 100 pounds of force generated by the pressurized fluid. The shaft travels one inch forcing 10 in³ of pressurized fluid from the standard piston back into the cushion tank at 10#/in² pressure.

FIGURE "B" illustrates a standard piston employed as a pump producing 10 in³ of fluid at 10#/in² pressure with an energy source producing 102 pounds of force through a one-inch travel.

FIGURE “C”

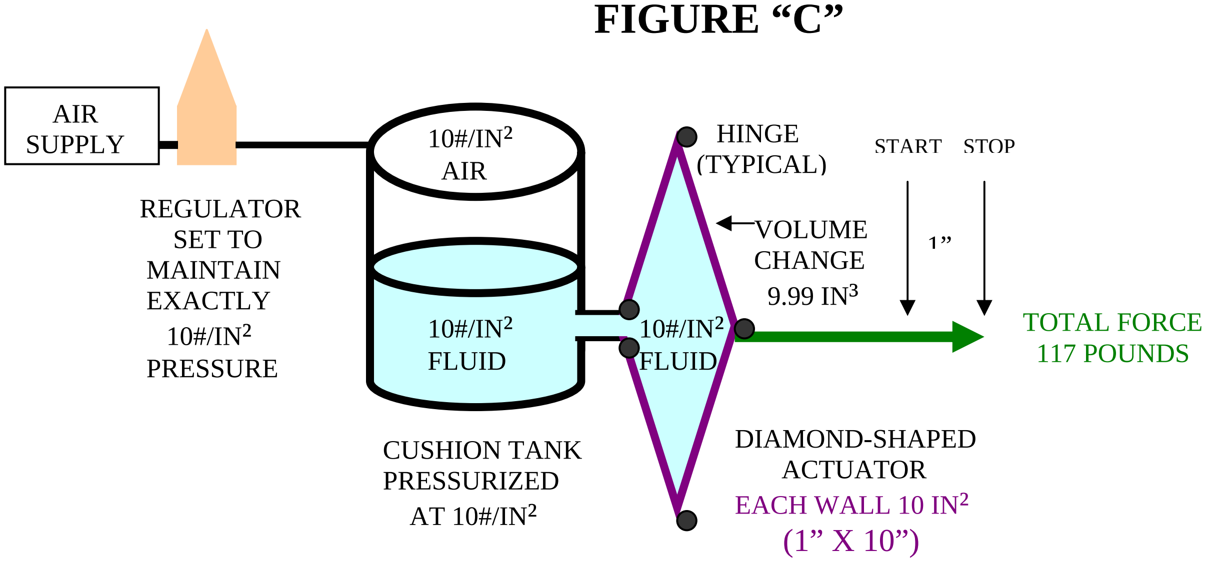

FIGURE “C” illustrates a diamond-shaped actuator with a constant 10#/in² fluid pressure applied to the actuator’s four 10 in², hinged moving walls, resulting in 117 pounds of force at the actuator’s forward tip. The travel is one-inch consuming 9.99 in³ of fluid.

NOTES TO CONSIDER:

-1- The diamond-shaped actuator in FIGURE “C” produces 17% more force, with .01% less fluid than the standard piston in FIGURE “A”.

-2- The fluid in the standard piston in FIGURE “B” does not care what provides the 102 pounds of counter force on the piston’s shaft. If the 102 pounds is applied through one inch, over-powering the 100 pounds of force generated by the fluid, the fluid exits the piston. The 10 in³ of fluid at a pressure of 10#/in² is pumped from the piston and can be used as a fluid source in another device.

-3- The diamond-shaped actuator does not care where it’s 117 pounds of force through one inch is applied.

-4- The diamond-shaped actuator may apply 102 of it’s 117 pounds of force to pump 10 in³ of fluid from the standard piston.

-5- The diamond-shaped actuator can use 9.99 in³ of the 10 in³ it pumped from the standard piston to provide its own fluid requirements.

-6- After completely satisfying its requirement of pressurized fluid, the diamond-shaped actuator has 15 pounds of force remaining through the one inch travel.

-7- FIGURE “D” illustrates the required arrangement.

FIGURE "D"

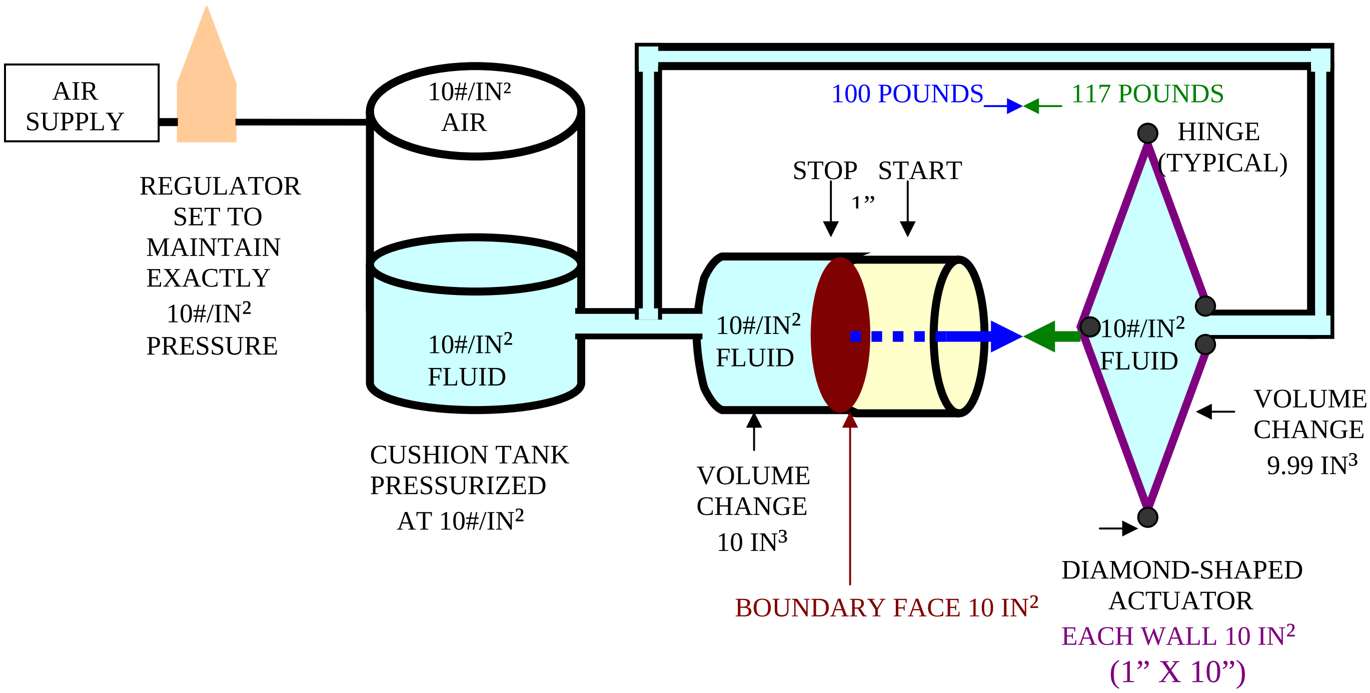

FIGURE 'D" illustrates a standard piston and a diamond-shaped actuator piped to a common pressurized fluid source.

The standard piston attains a total force of 100 pounds while the diamond-shaped actuator attains a total force of 117 pounds when they both experience fluid pressure at 10#/in².

The diamond-shaped actuator forces 10 in³ of fluid at a pressure of 10#/in² from the standard piston.

The diamond-shaped actuator requires 9.99 in³ of the 10 in³ it forced from the standard piston.

The diamond-shaped actuator applies 102 pounds of it's 117 pounds of force to produce its own source of fluid, while simultaneously attaining the 117 pounds of force through one inch.

There is 15 pounds of force through the one-inch travel that can be extracted for external work.

More detail and a control circuit required for a running machine is presented at http://www.apscontrols.ca, in the patent section.