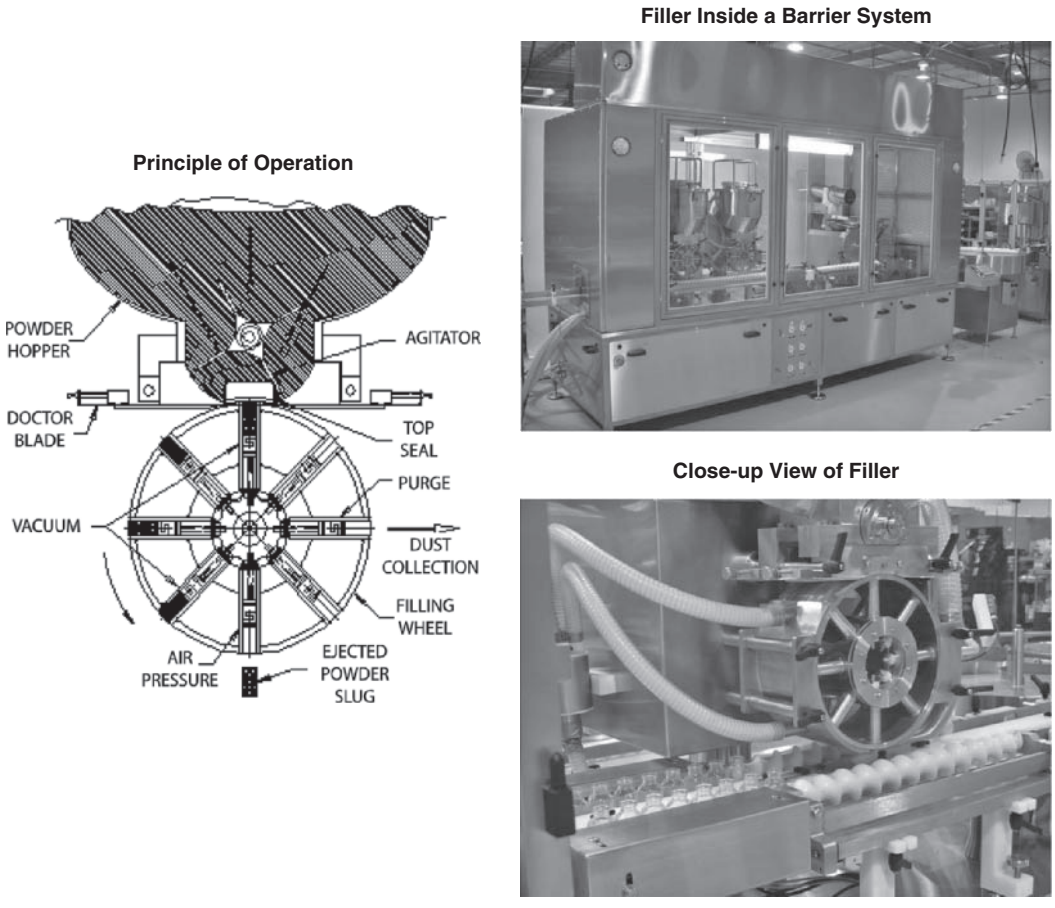


**Figure 19-6** Perry Accofil® sterile powder filling machine. *Source*: Courtesy of M&O Perry Industries, Inc.

the Accofil system is shown in Figure 19-6 along with photos of the filling machine. A metering cylinder contains an adjustable piston with a porous filter head that is impervious to powder, but will pass air. The piston head forms the bottom of the cylinder and can be adjusted to provide a desired powder volume. The vacuum is applied through the piston with filter, which causes the powder to be drawn into the cylinder from a bulk supply hopper. Since the filter material of the piston head passes air but not powder, a compact slug of powder material is formed in the cylinder by the vacuum. When the cylinder is withdrawn from the bulk hopper, a mushroom of powder will come up with the filled cylinder. The excess powder is doctored off the end of the cylinder and remains in the hopper broken down into its original powder form, since the vacuum is no longer applied to it. The powder slug formed is then discharged by replacing the vacuum behind the porous filter with a pulse of low-pressure air. Perry claims a fill accuracy of $\pm 0.5\%$ to 2.0%.

Filling of sterile powders will always offer more challenges than filling of liquids. The issues or problems that may occur in the filling of solids include the following:

1. Dose accuracy container-to-container
2. Content uniformity of the solid has more than one component
3. Environmental humidity not controlled
4. Maintaining aseptic conditions, especially with particulate controls
5. Increased probability of particulate matter in the product.