WHAT IS CLAIMED IS:

1. An apparatus for use in an internal combustion engine having a piston supported in a bore for reciprocal motion including a compression stroke and an expansion stroke, the apparatus comprising:

   an air intake system configured to deliver air to the bore in the cylinder, including a first air intake chamber, a second air intake chamber between the first air intake chamber and the bore, and a one-way valve operative between the first and second air intake chambers, wherein the one way valve permits air to flow through the one way valve only in a direction from the first air intake chamber to the second air intake chamber;

   wherein the air intake system further includes a bypass assembly including a two way valve which, in a closed condition, blocks air flow between the first air intake chamber and the second air intake chamber through the two way valve and, in an open condition, permits air flow between the first air intake chamber and the second air intake chamber through the two way valve.

2. An apparatus as defined in claim 1, wherein the one way valve is configured to open under the influence of vacuum pressure in the bore during the compression stroke of the piston, and to close under the influence of elevated pressure in the bore during the expansion stroke of the piston.

3. An apparatus as defined in claim 2, wherein the one way valve is one of a plurality of one way valves between the first air intake chamber and the second air intake chamber, and each of the one way valves is configured to open under the influence of vacuum pressure in the bore during the compression stroke of the piston, and to close under the influence of elevated pressure in the bore during the expansion stroke of the piston.

4. An apparatus as defined in claim 2, further comprising a control system configured to regulate the open condition of the two way valve during both the compression stroke of the piston and the expansion stroke of the piston.

5. An apparatus as defined in claim 4, wherein the control system is configured to sense an engine operating condition, and to regulate the open condition of the two way valve in response the sensed engine operating condition.

6. An apparatus as defined in claim 1, wherein the bore and the second air intake chamber are contained within a common power cylinder wall, with the second air intake chamber in open communication with the bore.