CLAIMS

1. A valve gate assembly for an injection molding apparatus, comprising:

a manifold having a plurality of passageways for conveying liquid resin from an injection molding machine to a mold cavity;

a plurality of nozzles attached to the manifold, each nozzle having a longitudinal axis and a cylindrical bore extending along the longitudinal axis for conveying liquid resin from the manifold to the mold cavity;

a plurality of valve pins, each valve pin associated with a corresponding one of the nozzles,

wherein each valve pin is configured for linear movement within and along the cylindrical bore to control flow of liquid resin into the mold cavity; and

wherein each valve pin has a head portion;

an actuator having a linearly movable piston rod;

a valve pin plate coupled to the actuator and having a plurality of slots or pockets for receiving and releasably holding a corresponding one of the plurality of valve pin heads; and

a lock for engaging the piston rod and holding the valve pin heads in a fixed position in the slots or pockets.

2. The assembly of claim 1, wherein the valve pin plate has pockets including a portion sized to allow insertion of the valve pin head and a narrower portion for retaining the valve pin head.

3. The assembly of claim 2, in which the plurality of pockets are arranged with the narrowed portions parallel such that the valve pin plate can receive a plurality of valve pin heads and be moved linearly to concurrently position all of the pin heads at the narrower portions of the pockets.

4. The assembly of claim 1, wherein the valve pin plate is disposed within a valve pin plate housing that is releasably coupled to an actuator housing containing a reciprocatable piston coupled to the linearly movable piston rod.

5. The assembly of claim 4, wherein the valve pin plate housing has a circumferential ledge that extends radially inwardly from an upper edge of a wall generally defining the valve pin plate housing, and a vertical circumferential wall extending upwardly from a radially inward edge of the circumferential ledge, such that the piston housing is releasably supported on the valve pin plate housing with a lower edge of the piston housing supported

on the circumferential ledge and a lower end of a radially inwardly facing surface of the piston abutting a radially outwardly facing surface of the vertical circumferential wall.

6. The assembly of claim 5, wherein the radially outwardly facing surface of the vertical circumferential wall has a circumferential groove, and the piston housing is releasably secured to the valve pin plate housing by screws that engage the circumferential groove.

7. The assembly of claim 2, in which the plurality of pockets are arranged such that the actuator and valve pin plate can receive a plurality of valve pin heads and be rotated to concurrently position all of the pin heads at the narrower portions of the pockets.

8. The assembly of claim 7, wherein a U-shaped retaining clip extends around the piston rod and is bolted to the valve pin plate to secure the valve pin plate to the piston rod.

9. The assembly of claim 7, wherein a screw extends radially through the valve pin plate into the narrower portions of the pockets to block rotation of the valve pin plate relative to the valve pins.

10. The assembly of claim 1, wherein the valve pin plate has an aperture that facilitates removal of the valve pin plate from the piston rod when the lock is disengaged from the piston rod.

11. The assembly of claim 1, wherein the lock is a screw received in a threaded bore through an edge of the valve pin plate.

12. A valve gate assembly for an injection molding apparatus, comprising:

(a) a manifold having a plurality of passageways for conveying liquid resin from an injection molding machine to a mold cavity;

(b) a plurality of nozzles attached to the manifold, each nozzle having a longitudinal axis and a cylindrical bore extending along the longitudinal axis for conveying liquid resin from the manifold to the mold cavity;

(c) a plurality of valve pins, each valve pin associated with a corresponding one of the nozzles,

(i) wherein each valve pin is configured for linear movement within and along the cylindrical bore to control flow of liquid resin into the mold cavity; and

(ii) wherein each valve pin has a head portion;

(d) an actuator having a linearly movable piston rod; and

(e) a valve pin plate coupled to the actuator,

(i) wherein the valve pin plate is configured to releasably hold a plurality of valve pin heads to facilitate disassembly of the actuator from the valve gate assembly without removal of the valve pins from the valve gate assembly;

(ii) wherein the valve pin plate is comprised of a plurality of segments that are bolted together; and

(iii) wherein the segments have interfacing surfaces that define pin head retention pockets.