

WHAT IS CLAIMED IS:

1. A valve gate assembly for an injection molding apparatus having hotrunners, comprising:
 - a manifold defining a resin channel for conveying liquid resin from an injection molding machine toward a mold cavity;
 - a nozzle disposed on a lower surface of the heated manifold;
 - a valve pin configured for linear movement within and along a longitudinal axis of the nozzle to control flow through the nozzle;
 - an electric motor and transmission configured to drive the valve pin; and
 - a cooling block or cooling blocks assembled on the heated manifold and supporting the electric motor and transmission.
2. The assembly of claim 1, wherein an adapter plate is disposed between the manifold and the cooling block.
3. The assembly of claim 1, wherein the cooling block or blocks extend along the sides of the motor.
4. The assembly of claim 1, wherein the cooling block or cooling blocks extend over a top of the motor.
5. The assembly of claim 1, wherein the cooling block or cooling blocks extend along the sides and over a top of the motor.
6. The assembly of claim 1, wherein the electric motor has a rotary output shaft.
7. The assembly of claim 1, wherein the transmission comprises rotary to linear converter.

8. The assembly of claim 1, wherein the rotary output shaft has a horizontal axis of rotation and the transmission comprises a first bevel gear coupled to the output shaft, a second bevel gear on a driven shaft having a vertical axis of rotation, the first bevel gear meshed with the second bevel gear, and a rotary to linear converter for converting rotation of the driven shaft to linear movement of the valve pin.
9. The assembly of claim 8, wherein the gear ratio is greater than 2:1.
10. The assembly of claim 8, wherein the gear ratio is 3:1 or greater.
11. The assembly of claim 1, wherein the rotary output shaft has a vertical axis of rotation and the transmission comprises a first gear coupled to the output shaft and a second gear on a driven shaft having a vertical axis, the first gear meshed with the second gear, and a rotary to linear converter for converting rotation of the driven shaft to linear movement of the valve pin.
12. The assembly of claim 2, wherein the adaptor plate defines a spacing between the cooling plate and the manifold that is less than 2 inches.
13. The assembly of claim 2, wherein the adaptor plate defines a spacing between the cooling plate and the manifold that is greater than 0.25 inch.
14. The assembly of claim 2, wherein the adaptor plate defines an air gap between a bottom of the cooling plate and a top of the manifold.
15. The assembly of claim 2, wherein the adaptor plate is comprised of stainless steel.
16. The assembly of claim 2, wherein the adaptor plate is comprised of titanium alloy.

17. The assembly of claim 2, wherein the adaptor plate is comprised of ceramic material.
18. The assembly of claim 1, wherein the cooling block, electric motor and transmission are bounded within a space defined by mold plates that surround the manifold.
19. The assembly of claim 18, wherein the mold plates include a top mold plate having a lower surface and a cavity defined in the lower surface, the electric motor and transmission being disposed within the cavity and at least one of the electric motor and transmission being in thermal contact with a lower wall of the cavity.
20. An injection molding apparatus having hotrunners, comprising:
- a manifold defining a plurality of resin channels for conveying liquid resin from an injection molding machine toward at least one mold cavity;
 - a first nozzle disposed on a lower surface of the heated manifold;
 - a first valve pin configured for linear movement within and along a longitudinal axis of the nozzle to control flow through the nozzle;
 - a first electric motor and first transmission configured to drive the valve pin;
 - a first cooling block on the heated manifold supporting the first electric motor and transmission, wherein the first electric motor and first transmission are spaced apart and operatively connected by an elongated motor shaft;
 - a second nozzle disposed on a lower surface of the heated manifold;
 - a second valve pin configured for linear movement within and along a longitudinal axis of the nozzle to control flow through the nozzle;
 - a second electric motor and second transmission configured to drive the valve pin, wherein the second transmission is at least partially disposed within the space between the first electric motor and first transmission; and
 - a second cooling block assembled on the heated manifold and supporting the second electric motor and second transmission.