

WHAT IS CLAIMED IS:

1. An air conditioning and dehumidification system comprising:
 - an enclosed housing having a wall dividing the housing into first and second air plenums;
 - a refrigeration circuit including an evaporator coil in the first plenum, a condenser coil in the second plenum, and a condenser fan for drawing ambient air into the second plenum and through the condenser and discharging the air downstream from the condenser and to the outside of the housing;
 - a dehumidification system in the housing including a desiccant wheel rotatably mounted in the housing to rotate in a plane perpendicular to the dividing wall whereby one segment of the wheel functioning as the process segment is located in the first plenum and a second segment of the wheel functioning as the regeneration segment is located in the second plenum;
 - an ambient air supply air fan for drawing ambient air into the first plenum through the evaporator and then through the process segment of the desiccant wheel whereby the ambient air in the first plenum is cooled and dehumidified and the regeneration segment of the wheel is regenerated by the air heated in the condenser and drawn into the second plenum by the condenser fan;
 - means for supplying the cooled and dehumidified air from the first plenum to an enclosure and means for discharging the air stream used to regenerate the desiccant wheel from the second plenum;
 - an ambient air bypass defining a third plenum and means for supplying ambient air through the third plenum and selectively to the enclosure as a bypass airstream; and
 - means for selectively cooling the bypass air stream in the third plenum.
2. The system as defined in Claim 1 wherein the means for selectively supplying ambient air through the third plenum includes a bypass fan drawing air from the atmosphere through the means for selectively cooling the bypass air stream and then to the enclosure.

3. The system as defined in Claim 1 wherein the third plenum includes means for selectively supplying ambient air from the first plenum, before it is cooled in the evaporator of the first plenum, to the third plenum.
4. The system as defined in Claim 3 wherein the means for selectively supplying ambient air to the third plenum includes a selectively operable means for directing ambient air from the first plenum upstream of the evaporator in the first plenum.
5. A system as defined in Claim 4 including means downstream of the cooling means in the third plenum for blending cooled air having passed through the cooling means in the third plenum with air leaving the desiccant wheel in the first chamber before being supplied to the enclosure.
6. A system as defined in Claim 1 including means for dividing a portion of the air leaving the condenser in the second plenum into the third plenum.
7. A system as defined in Claim 1, including a heat exchanger means upstream of the evaporator in the first plenum for precooling ambient air before being further cooled in the evaporator in the first plenum or supplied to third plenum.
8. A method for conditioning ambient air for supply to an enclosure comprising the steps of:

cooling a first ambient supply air stream with a cooling coil of a refrigerant system then passing the cooled ambient supply air stream through a segment of a rotating desiccant wheel to reduce the moisture content of the ambient air stream and passing the thus treated air to the enclosure;

regenerating the desiccant wheel by heating a second ambient air stream with the condensing coil of the refrigerant system and passing the heated second ambient air stream through a regeneration segment of the desiccant wheel; and

selectively cooling a supply of ambient air in a bypass plenum, without treatment in the first plenum, and supplying the cooled air from the bypass plenum to the enclosure.

9. The method as defined in Claim 8 wherein the ambient air in the bypass plenum is a third ambient air stream independent of the air streams in the first and second plenums.

10. The method as defined in Claim 8 wherein the ambient air in the bypass plenum is supplied from the ambient air in the first plenum upstream of the evaporator coil in the first plenum.

11. The method as defined in Claim 9 wherein the ambient air in the third plenum is supplied to the first plenum downstream of the desiccant wheel and mixed with the air leaving the process segment of the wheel before being supplied to the enclosure.

12. The method as defined in Claim 8 wherein the step of cooling ambient air in the bypass plenum includes the step of using a second evaporator coil in the bypass plenum independent of the evaporator coil in the first plenum.

13. The method as defined in Claim 8 wherein the step of cooling ambient air in the bypass plenum includes the step of using a chilled water coil to cool the ambient air therein.

14. The method as defined in Claim 8 further including the steps of pretreating ambient air supplied to the first plenum.

15. The system as defined in Claim 1 wherein the means for selectively cooling the bypass air stream is a chilled water coil.

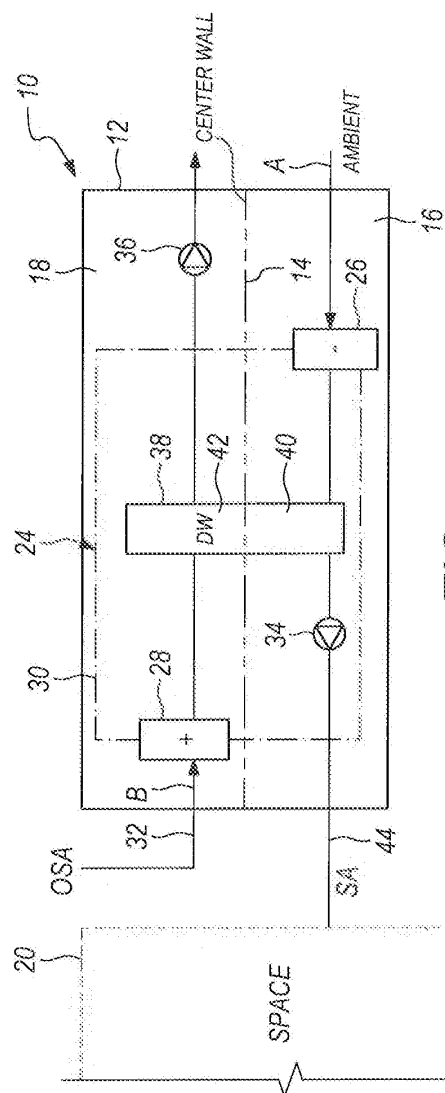


FIG. 1
PRIOR ART

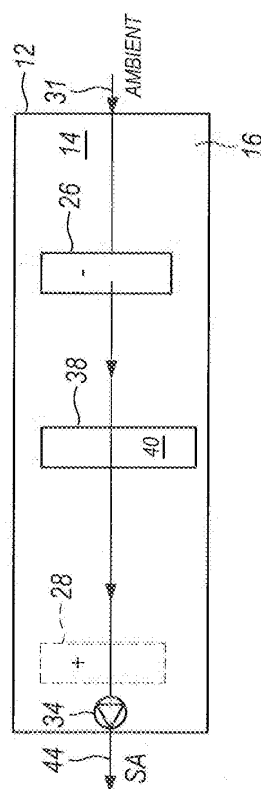


FIG. 2
PRIOR ART

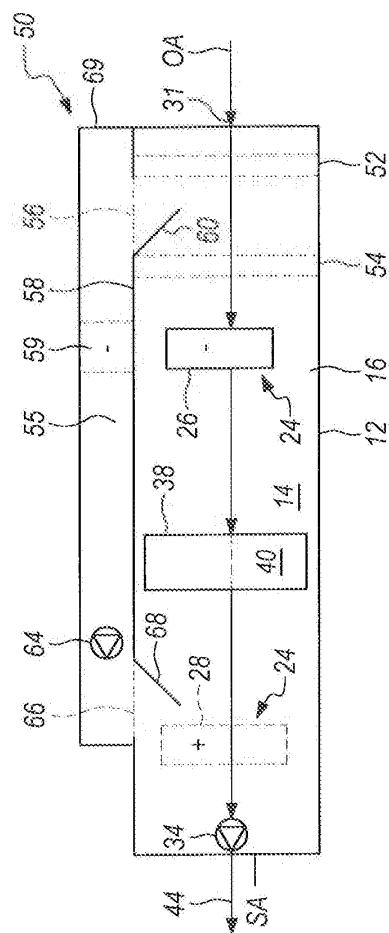


FIG. 3

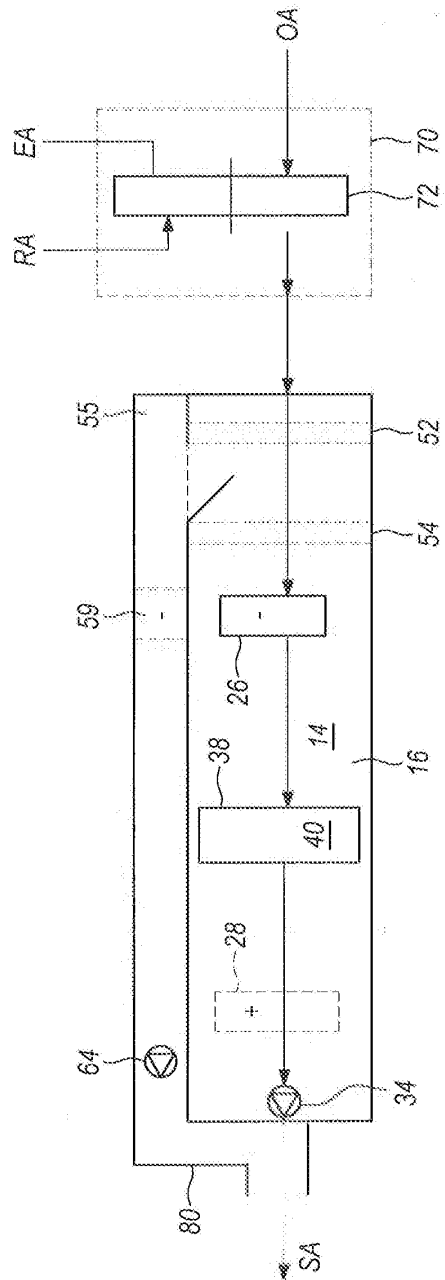


FIG. 3A

