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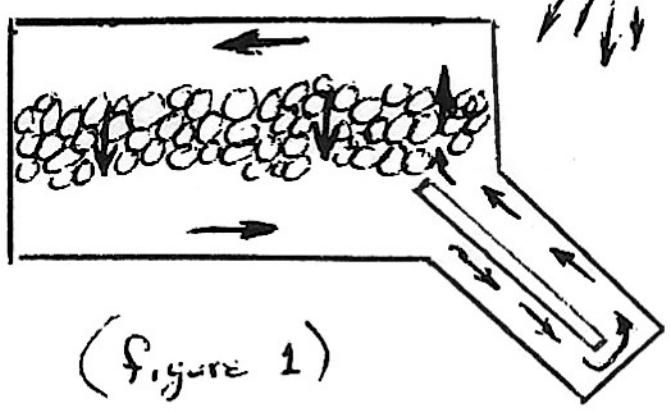
LOOP DESIGN

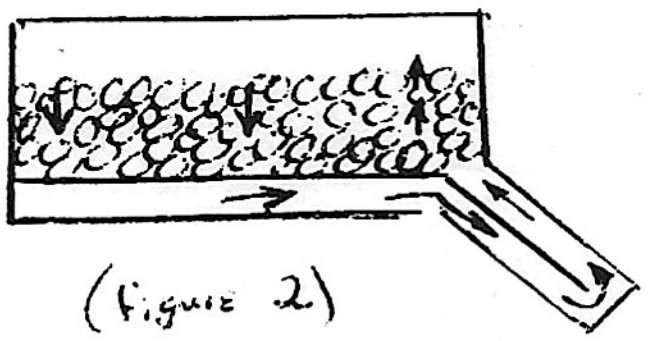
Last week I visited a rock storage air loop collector that had some interesting features in its design. I was at first pessimistic about it, but after considering my own rules which were violated in the design I decided perhaps my rules should be modified. Last issue I went to great lengths to explain why in the storage bin the air should be introduced at the top rather than at the bottom of the rock bin. If it is introduced at the top it spreads the heat evenly throughout the bin; it if is introduced at the bottom (or so I claimed) it burns a hole through the bin and leaves without heating all the rocks. This must be qualified - the important matter is not where the air enters the bin so much as where it leaves. If the hot air enters at the bottom but cannot escape through the top then it will warm all the rock, because although it seeks out the warmest rocks to rise up through it seeks the coolest rocks to descend through. There is increased friction within the bin since the air is both rising and falling through the same cross section, but in many bins this is not a problem.



(Figure 1)

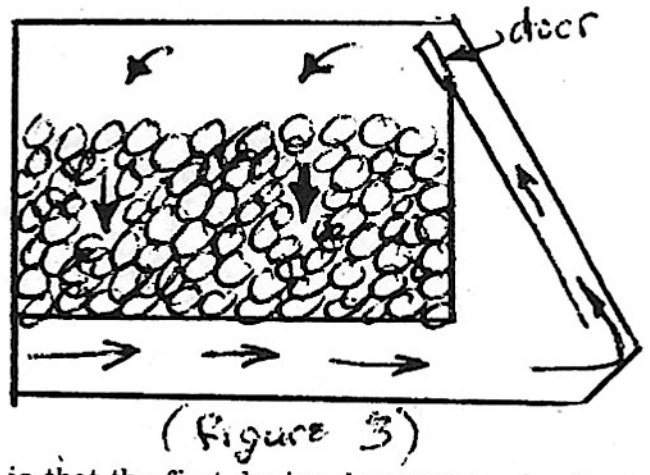
(Sidelight on the evolution of design - the person constructing the solar heater had visited our neighbors' air loop rock storage heating system and evidently misunderstood how it functioned because he explained that his worked in the same way. I am looking forward to hearing how it works this winter since the difference in design may be an advantage.)

The advantage of this design where the collector ends at the bottom of the bin



(Figure 2)

to this design where the collector goes to the top

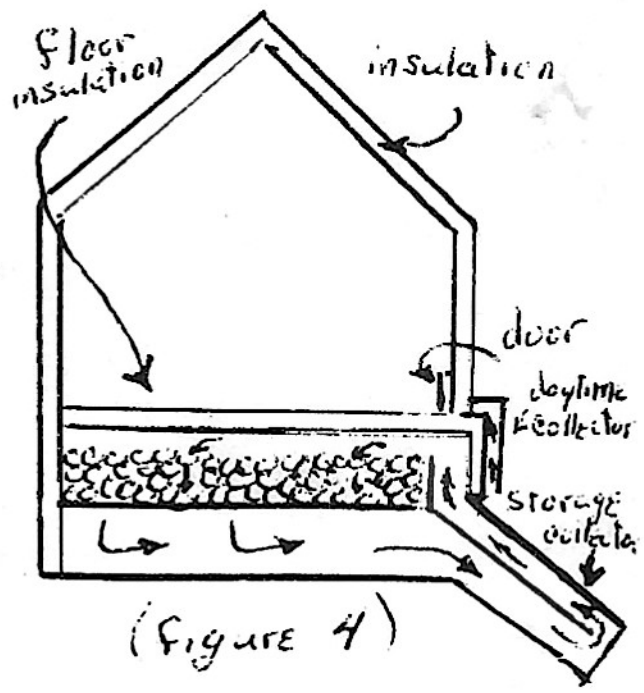


(Figure 3)

is that the first design does not need a door to keep the air in at night - it will not escape out the collector because hot air rises and has no desire to flow down through the collector.

The second design needs a door at the top of the collector which is opened in the day and closed at night This is not an insuperable problem, but it is important to get a tight fitting door and then the door must be operated either manually with a rope or automatically by means of balanced freon cannisters much as the skylid works. We have tried both systems - the freon door is best since it never forgets to open or close but the problem of constructing and balancing a door as long as the collector is wide that doesn't warp as it ages or become hot is not easy or cheap to solve.

I think that in some instances the best solution is to build a system such as



(Figure 4)

in which the collector ends at the bottom of the rock bin where it releases the air to flow up inside the insulated wall and then back down through the rocks.

Then rather than leave the south facing wall of the bin blank a second perpendicular collector can be built over the wall and fed directly into the house with small doors with which it can be shut off. It can heat outside air or be fed return air from the house or rock bin via ducts.

The advantage of this design is that you need no doors or control mechanisms. The system works by itself automatically adding heat to the storage whenever it is sunny.