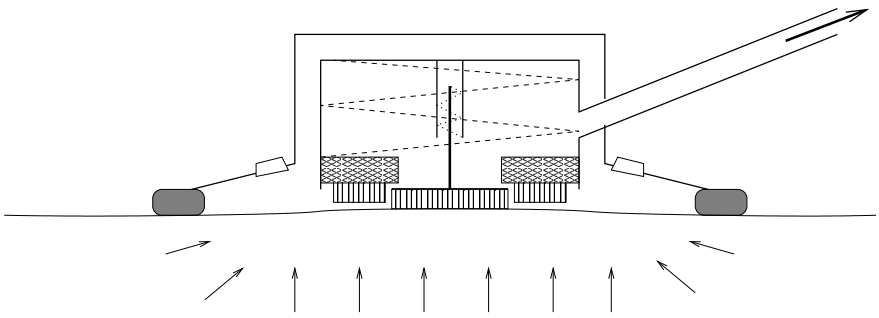
The Bed Cleaner - invention to solve allergy problems

Reinert Korsnes* (last update: 30 October 2003)



- The bed cleaner is a flapping nozzle for vacuum cleaners. It keeps dust moving down in the mattress over a larger area and it produces an upward air stream inside it. The floating dust in this way drift up to the nozzle. Controlled under-pressure below the cover can press up the mattress locally. This makes the shaking extra effective far down in the mattress.
- The bed cleaner specially efficiently cleans mattresses for products from dust mites and which otherwise during special events of movements can enter the lungs of the person in bed. It is therefore intended to solve mite allergy problems for many.

Advantages:

1. Competing nozzles do not shake loose particles so deep into the material and simultaneously over so large area and the air enter into these nozzles from the side.
2. The beating mechanism, which is driven by the vacuum cleaner air stream, is simple (in principle only two parts).
3. It is easy to clean. One may partly consider a rotating brush as a competing product. Note that hair tend to get fixed hard to a rotating brush (in addition to that it shakes only small parts of the mattress simultaneously and air come in from the side - this makes a part of the upper dust in a mattress to "vibrate down"and contribute to an accumulation of dust in the mattress).

*E-mail: reinert.korsnes@chello.no

About technical design

Designed to clean the bed

The significant part of dust mite allergens (excrements from mites) enter the lungs when one moves in the bed. The Bed Cleaner is for cleaning flat areas and one may focus the design for the bed. Carpets can in principle be cleaned by the Bed Cleaner, but this may compromise hygiene, mechanical/technical design parameters and product identity. Carpets may also be washed by water or people with dust mite allergy may simply get rid of carpets.

Designing the flapping mechanism

The strength of the air stream into a vacuum cleaner is in the range 30-60 liters per second. So if the volume behind the piston in the chamber varies one liter (from outer to inner position), it takes about 1/60 - 1/30 of a second for it to move from the outer position to the inner position (assuming the spring stiffness is small enough not significantly to affect the air stream). One can assume spring stiffness large enough and the mass of the piston/ventile small enough so the piston/ventile will move much faster out from the inner position. Hence the flapping frequency will be somehow smaller than 30 times a second (30 Hz) if the air stream is 30 liters per second.

Note the possibility simply to regulate where the ventile stops on its way into the chamber - and hence the possibility to regulate the flapping frequency. Also note that the flapping strength (momentum and energy) is independent of the strength of the vacuum cleaner - though the *flapping frequency* is somehow dependent on the strength of the air stream.

The function of the cover of the flapping mechanism

The regulated under-pressure below the cover of the flapping mechanism has the following function:

- To direct the air stream up through the mattress into the vacuum cleaner (to avoid air flux down into the mattress on the side of the location of treatment).
- To eliminate uncomfortable vibrations for the user.
- To press up (locally) the surface of the mattress (this increases the effectiveness to loosen dust down in it).

The flapping/vibration and the air stream must be tuned together. If the flapping is too hard as compared to the air stream, then some dust will tend to vibrate down into the mattress and get stuck there. If the air stream is too hard as compared to the vibration, then some dust will tend to get stuck due to friction from being pressed to surfaces and traps into the mattress.