What about offering your customers the most silent machine ever?

Noise control: a challenge for our society.

For decades, household appliance manufacturers have registered more than a thousand patents for reducing the vibrations and noises of washing machines during spin phase. This highlights the technical and commercial issues at stake. Some improvements have been made but no actual solution - simple, effective and cost-saving - has been found. Indeed, these machines are still very noisy during spinning phase (75 to 78 dB). Noise-abatement has become a major stake for our society. The consumer is sharp, the standards are more and more demanding. Household appliances, particularly washing-machines, use a lot of energy. The manufacturers have become more concerned by the green and environment dimensions.

The manufacturers who will be the first to innovate and propose a simple, efficient, reliable and cost-saving solution will benefit from a competitive advantage and also from an international recognition by satisfying this huge consumer expectation.

Washing machines and spin extractors

Focus on vibrations and noise

Balancing the drum during the spinning phase results in less noise, faster drying and thus significant energy savings.

Vibration reduction, resulting more silent washing machines, is a response to a basic need of consumers.

Solving the problem

The capillary ring

Our invention is called *Capillary Ring*. This device is particularly intended for balancing high speed rotating elements allowing a significant reduction of vibrations.
This is a real major innovation based on a natural phenomenon: **capillarity**.

This device has no equivalent and is very original in its simplicity and effectiveness. It adapts to the changes of unbalance values and positions in the drum during the spinning phase.

How the capillary ring works

Until now, the operating principle of balancing capillary has been based on the shift of the liquid on the opposite side from the bulk due to the bulk inertia related to the range of movement (impulse) of the drum around its axis of rotation. When the resonance speed of the drum is exceeded, as the drum rotation speed increases, the balancing liquid tends to scatter around the ring under the liquid centrifugal force: the liquid no longer balances anything.

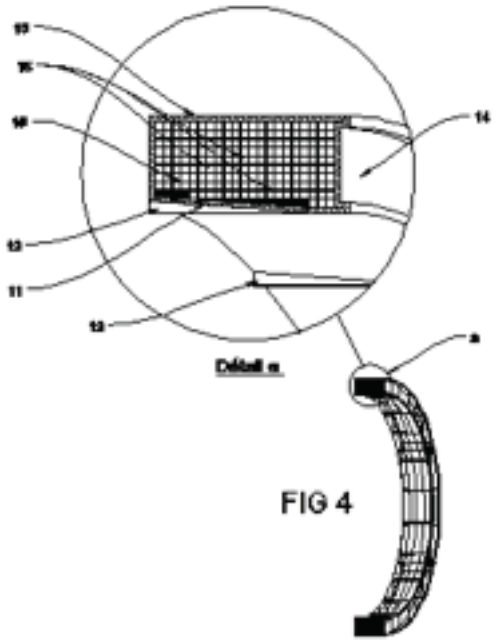


FIG 4

The new thing is that the capillary ring is made of a multitude of little concentric channels with short sections. Their diameter is included between 1 and 3 mm depending on the expected rotation speeds. The operating principle of the capillary ring differs from the previous one by fact that the liquid permanently stays opposite the bulk even at high rotation speed thanks to the capillarity phenomenon allowed by the short section of the multiple channels.

The capillary ring automatically adapts to the bulk size and to its moves in the drum.

The capillary ring is simple. It is totally reliable and it cannot break down.

A dream coming true

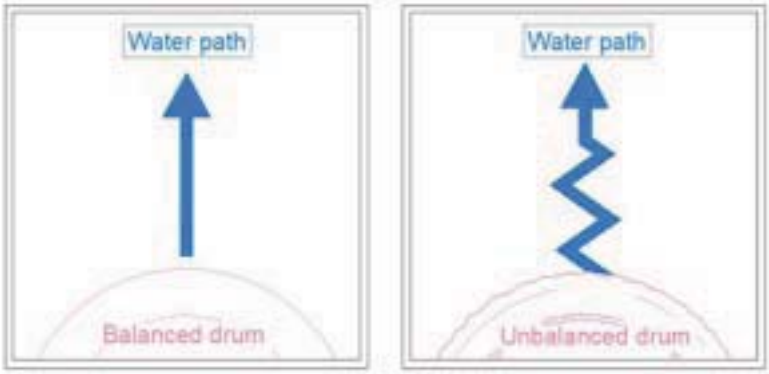
Silent machines.

Manufacturers have been dreaming of it for decades. Thanks to our invention a solution finally exists with:

No electronics
The capillary ring does not include any electronic or electric part, this way there is no fragility or possible break-down.

No moving parts
There is no moving part in the capillary ring, thus no risk of wear.

No water consumption
The capillary ring does not use any water, it is 100% recycable.



Efficiency
A balanced drum guarantees that the linen is well spin-dried.

This device is the only one adapting constantly to the bulk variations (value, position in the drum) as the water is going out of the linen. It is also the only device that makes it possible to balance the drum during each wash cycle because of its great efficiency. The linen is very well spinned because the water particles go out straightly unlike in an unbalanced drum as shown in the diagram cons. For example, a balanced drum rotating at 1000 rpm spins linen in a better way than an unbalanced drum rotating at 1200 rpm. It is also the guarantee of time and energy savings thus it will be quickly dried either in a dryer or in the open air.

Reliability
The capillary ring is protected from hot water by a quite thick polypropylene housing which also makes it possible to be fixed for example to the drum ends. The capillary ring cannot break down. The capillary principle will never be obsolete.

Higher speed
The balancing efficiency provides faster spin-drying.

Very low manufacturing costs
The capillary ring is made from very low cost alveolar polypropylene plates. As it is very simply designed, its cost is low and it can be quickly installed.

Less weight
Washing-machines with less weigh.
Indeed, the drum balancing makes it possible to dramatically reduce the mass inertia and even to suppress it totally. The washing-machine weigh reduction leads to huge financial benefits thanks to the suppression of the mass and to logistic savings.

A very profitable innovation

A better unit margin per machine

- Easy development and manufacturing at a low cost (a few euros) using cheap and familiar components (corrugated plastic sheets and water). The cost is lower than the induced savings (i.e. bulk purchase reduction).
- This innovation makes it possible to increase the unit sale price and offers a very good value for money according to the consumers.
- The performance of the machines equipped with a capillary ring will be a solid asset in the international competition. It will make possible to gain market shares, to increase the number of sales, thus to increase the firm turnover.

- The capillary ring meets the all market needs: vertical and horizontal axis machines and spin extractors for the consumer market, but also for professionals.
- In all product segments (upmarket, mid-range and bottom of the range)
- The performance of the drum balancing, even at high speed, will make it possible to reduce or suppress the use of inertia tests (12 to 15 kg per machine minimum) and allow significant savings on purchases and lighter and lighter machines to be carried (logistic savings).

A green and eco-responsible innovation

The capillary ring does not pollute. The device simplicity, reliability and technical/economical performance make it possible to directly contribute to reducing noise pollution due to vibrations (particularly low-frequencies), to improving consumer life quality and to respecting their building neighbors and to meet more and more demanding legal standards.

The washing-machines being lighter highly improves the ecological footprint of all the supply chain (purchase, transport, handling of loads, no rare products). Also, the energy consumption can be reduced (shorter spin-drying).

Summary

ECONOMICAL BENEFITS	**BRAND IMAGE BENEFITS**
Better unit margin	Innovation
Higher turnover	Competitive advantage
Reduction of some purchases	Higher performance
Low-cost and fast installation	Quality
Logistical cost reduction	Reliability
Easier handling	Green solution
Better value for money	Adapted to standards and to consumer expectations (quality of life)