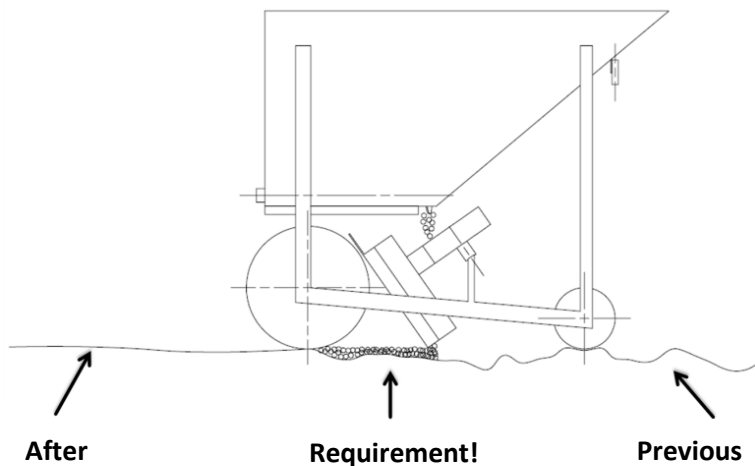


Invitation exposé: relative levelling machine

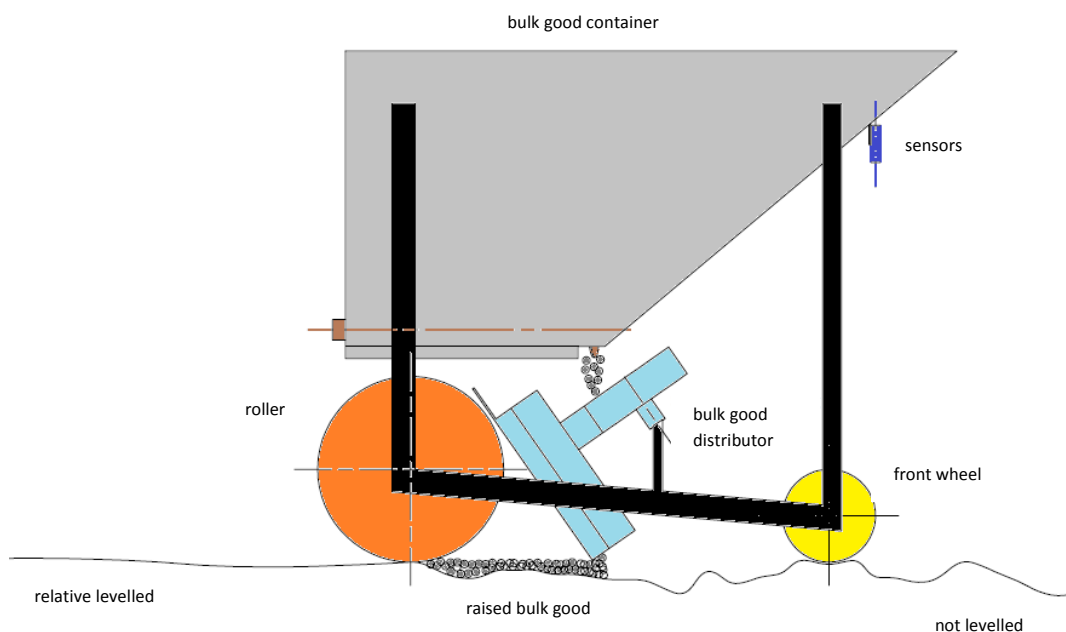
Task of the invitation:

The solution provides an **automated method** for an **economic, efficient and easy local levelling** of walkable surfaces. **Previous methods** are only used in a **limited way** because they are **manual and time-consuming** or **complex and expensive**. Users should be able to level surfaces **without any special know-how** and with a single machine. The levelling should work through applying further material to the surface. Therefore, **hollows become one smooth surface by adding and compressing bulk goods**.



Functioning:

Hollows in a plane are identified through sensor technology and processor unit. The Processor unit calculates the actual surface profile and the target surface profile. Based on these information, it is possible to calculate the missing quantity of bulk goods. The processor unit controls the application of the bulk goods. This leads to a relative levelling after the application and compression. In opposite to usually used absolute levelling approaches, no previous measuring of a fixed point or production of a reference level are required.



Market potential:

Added values of the technology:

- **Minimisation of accident risk** through the reduction of tripping hazard, potholes, etc.
- **Minimisation of energy consumption** through homogeneous physical effort when mowing the lawn of even grounds versus uneven grounds
- **Minimisation of maintenance costs** through reduced loads on even undergrounds such as on vehicles moving on levelled surfaces
- **Minimisation of time and effort** regarding maintenance, cultivation and administration of even grounds (for example mowing the lawn or sowing)
- **Increase of the fun factor** when using even grounds such as play areas like football grounds or cycle paths
- Improve of the **accessibility of previously uneven grounds** for smaller machines like robotic lawn mowers
- **Improvement and optimisation of the aesthetic impressions** of even grounds versus uneven grounds regarding lawns for sunbathing or presentation areas

Fields of application:

- **Levelling of small and big gardens and grassed areas** such as private and public lawns
- Levelling of **industrial areas** like storage areas, utility areas and camping areas
- Levelling of **agricultural areas** such as areas for planting vegetables
- Levelling of direct **accessible and/or drivable grounds** such as parking lots, field paths sidewalks, cycle paths, etc.

Users:

- Rental for **private users** or associations for levelling garden areas, play grounds, court places, etc.
- Machines for sale to **market gardens and landscape gardening companies**
- Machines for sale and for rent to **companies working on paving and roadwork** for levelling the grounds before working further
- Machines for sale and for rent to **local, communal and industrial companies** for levelling local/urban areas (paths, areas, etc.) or industrial areas

Use Case example:

- There are more than 17.500.000 private gardens in Germany. In case of garden levelling every ten years, 1.750.000 levelling processes would be required.
- If levelling processes were done every third day, 120 levelling processes could be done with one machine each year. Therefore, 14.583 levelling machines would be required.
- If 20% of the machines were replaced each year, **2.966 machines would be required for the private gardening sector only in Germany per year.**
- With investment costs for a rental device of about 2.800€ and a rental fee of 40€ per rental, the investment would be paid after 70 levelling processes. This could already be reached within one year.

Costs:

The production costs (single piece production) of a small machine for the application of lawn levelling in the private sector could be less than 2.400€ (including value-added tax).

Extremely lower production costs could be achieved in case of mass production.

The development of a prototype (a small machine for the application of lawn levelling in the private sector) could be realized with an investment of about 40.000€.

The invention or rather **the patent** of the invention **could be bought. Alternatively**, it is possible to conclude **license agreement**. Furthermore, there is the possibility to **establish** cooperation and an **ongoing collaboration**.

Level of development:

The **realization of the machine was determined and verified**. The whole machine was conceptualized and single assemblies were observed in detail. Furthermore, the efficiency was identified and checked.

Literature and patent research were done by myself. The market and stage of technology were evaluated as well as the trade market rights. A detailed patent was created by Dr. Baur, a patent agent (Pae Baur & Weber, Ulm) and submitted to the German Patent Office (10 2016 115 33.8). The request for examination was filed. As it is a German patent, the trade market right is focused on the German market, but could be expanded to other countries until August 2017.