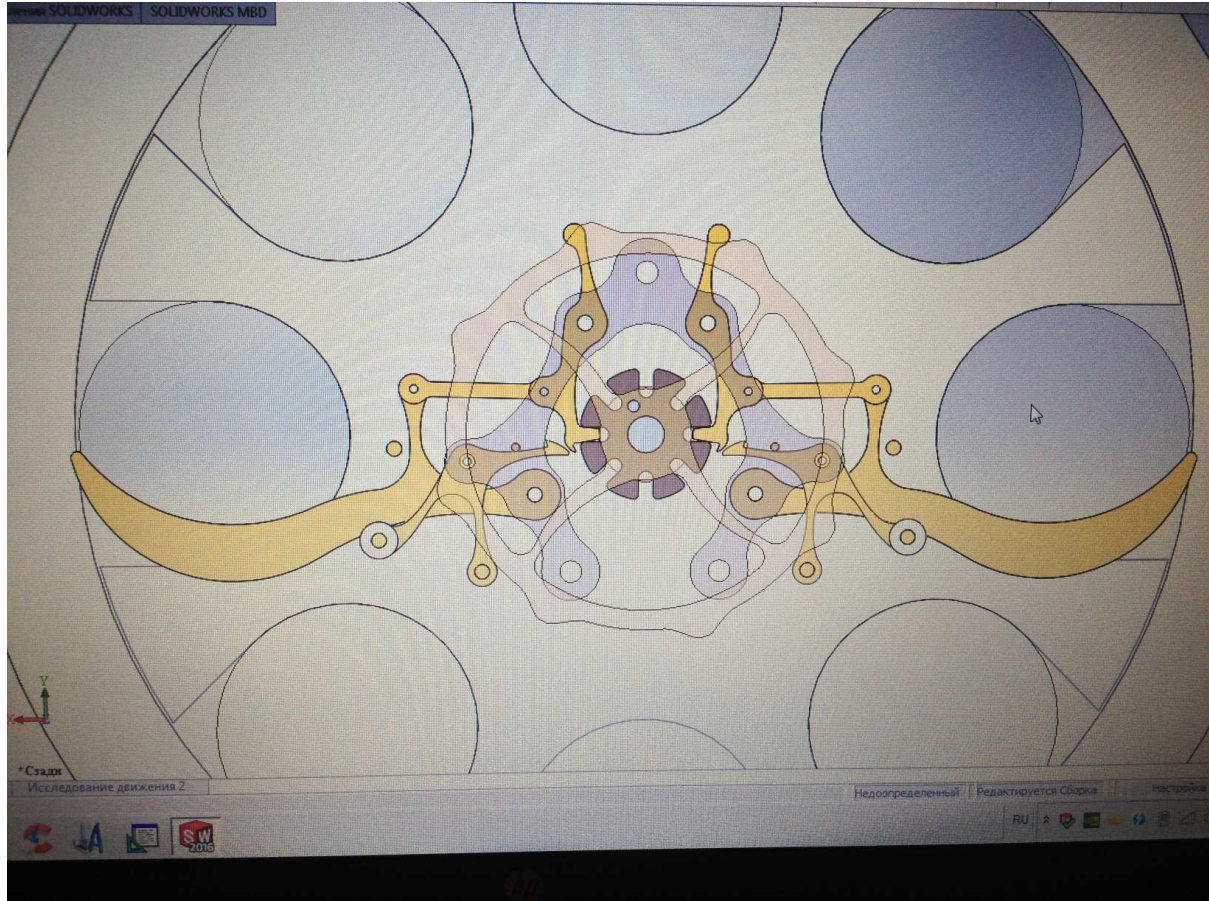# Balls sorting mechanism: design & guidance
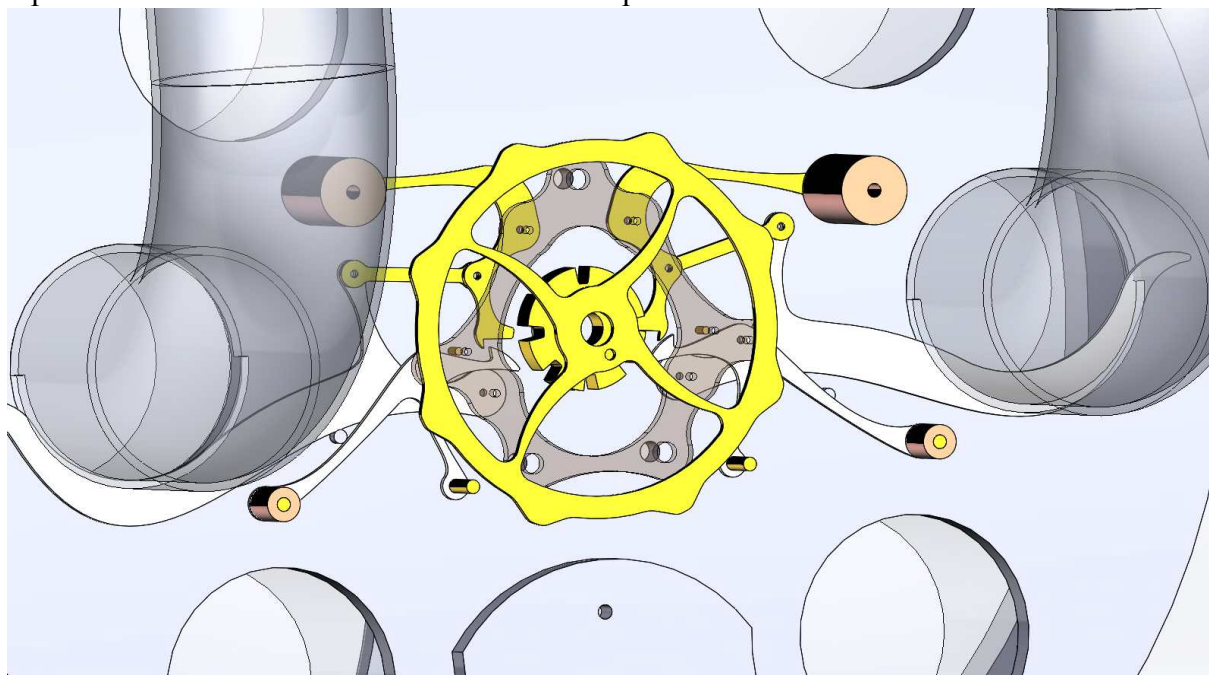
E. Shiryaev

1. Stages of development

Drawing of the unit:

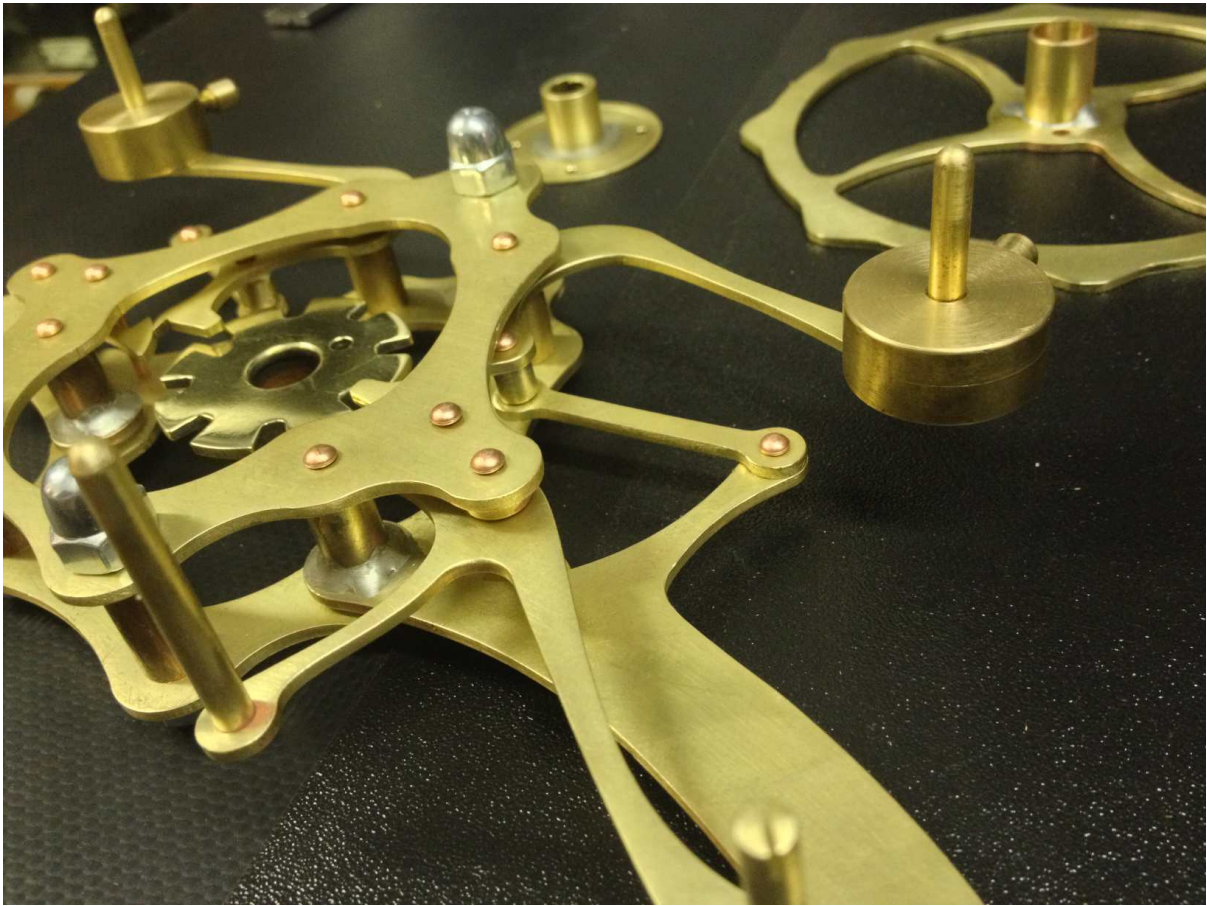Inputs of the unit and its mechanism that excludes operation until both balls have come:

Inner part of weighting cylinder and its carrier:
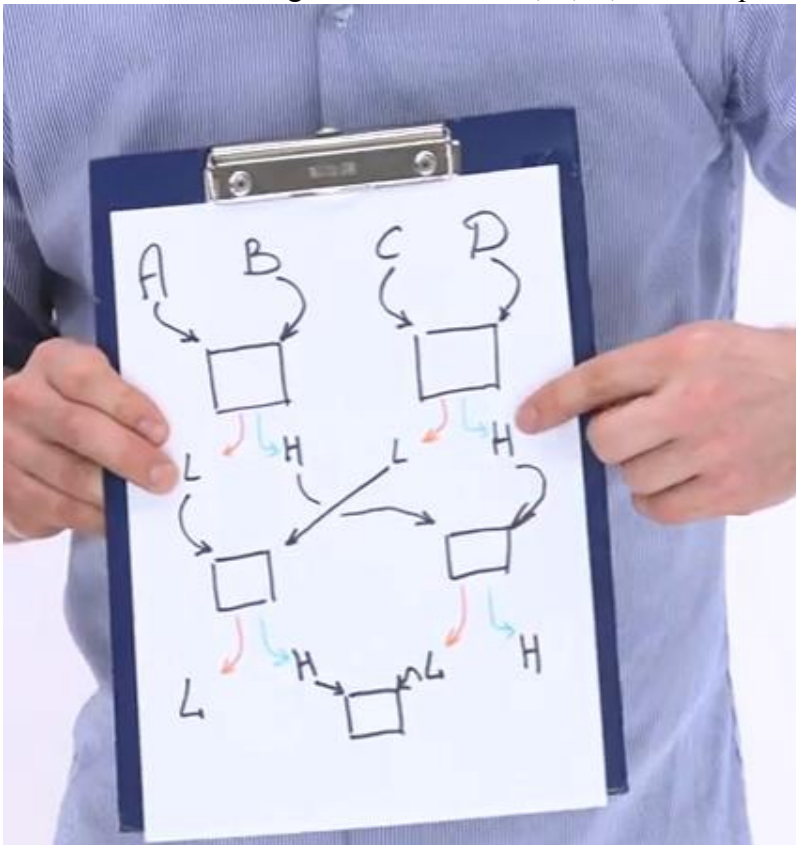

Stopping mechanism produced:

2. Guidance

Let us consider some algorithm for 4 balls A, B, C, D to be specific:

L stands for "Lighter", H for "Heavier" in a comparing pair. This algorithm needs five comparing units for implementation. Arrows denote tubes connecting units.

Visitors are provided with

1. abstract idea of algorithm of sorting objects. It is important to make evident the difference between sorting algorithm and the way a person can put in order several coins grasping them simultaneously in a whole.

2. Review of where these algorithms work on our planet.

2a) Biology in common. Hierarchy in animal society is important since it determines relations and priority. Well formed hierarchy excludes unnecessary conflict and fights in a society. Meanwhile hiearachy itself is built due to sequence of comparements between pairs of individuals.

2b) Special example: pecking order. https://en.wikipedia.org/wiki/Pecking_order.

2c) Sport games. Consider 4 teams in a final stage of a sporing competition. They have two semi-final matches, a final and a match for the third place. After this algorithm is applied to those 4 teams they are considered to be ordered. And at this very moment visitors may be invited to discuss both algorithms: of a sport game regulation and the sorting one.

3. Experiment.

3a) The device is demonstrated in action for the visitors. We get balls in icreasing order in its output.

3b) Perhaps it wouldn't be bad to have a digital scale or a balance to suggest visitors to verify the result.

3c) Experiment is repeted with permutations that visitors would like to make before input.

4. Another sorting algorithm is chosen. Its graphical scheme is presented for the visitors. Tubes connecting comparing units are rearranged and experiment is repeated.