Model 16
Parallel windshield wiper

Date

Name

Class

DESIGN TASK

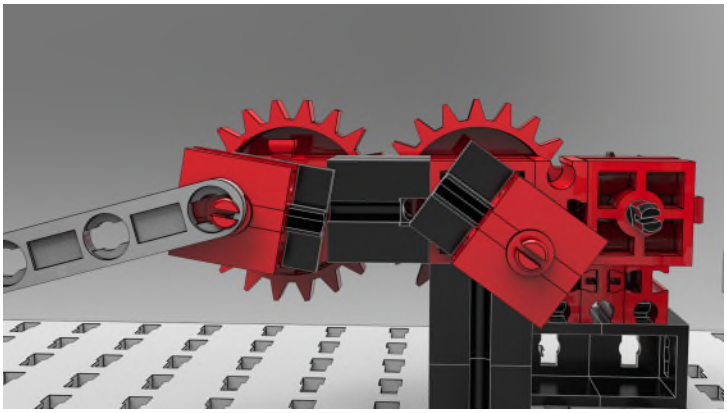
In this version, the wiper blades are always vertical and are also guided across the windshield. This can be seen, for example, on the large windshield of a bus. Construct the model according to the building instructions. Please note that the two cranks for the wiper arms in this model point downwards.

THEMATIC TASK

In the "rest position," the two wiper blades should be at the very outside (in the middle, they would restrict visibility too much). The two eccentrics now need to be adjusted in two ways:

1. Adjust the eccentricity (the distance between the axis of rotation of an eccentric and the attachment point of the I-strut 45 on it) so that a suitable swivel range is achieved. The wiping areas of both wipers should overlap so that the entire windshield is actually wiped.
   The eccentricity must therefore be large enough that the wipers move slightly beyond the middle of the 9 holes in the horizontal static beam between the wipers.

2. The wipers must not interfere with or collide with each other in the middle, as this would block the mechanism. One of the wipers must therefore pivot from the outside to the inside slightly earlier. Each wiper arm has its own eccentric for this purpose. The time offset is achieved by mounting the eccentrics slightly twisted against each other:



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You can achieve this by slightly removing one of the Z20 gears and attaching it offset by one or more teeth. This means that the eccentrics are not at the same angle to the rest of the model when starting. This is called advance (for the eccentric that is already turned slightly further) or lag (for the eccentric that is slightly behind).

If we want the wiper on the driver's side to start first (because it is more important for the driver): Which of the two eccentrics must then lead and which must lag?

EXPERIMENTAL TASK

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1. Play around with the size of the advance/delay between the two eccentrics. How many teeth of offset between the two Z20s result in the model functioning well?

2. What happens if the offset is too large, and what is the disadvantage of this?

APPENDICES

Further information

[1] Wikipedia: Parallelogram guide.

[2] fischerwerke: Lead and lag. In: fischertechnik Experiments+Models, hobby 1 Volume 2, 1973. In the fischertechnik database (PDF, direct link), p. 5053.