

Model 3 (with variants) – crank swing arm Thrust crank and scissor lift



The students are supported in individual tasks by the provision of construction instructions (see appendix) for the construction and solution of the tasks. For tasks where this is useful, this is indicated at the beginning of the solution sheet.

Note on the history of technology: Sliding levers were already used in ancient times to harness the rotary motion of a water wheel for stone saws. They are documented as early as the 3rd century AD. With the further development of the steam engine into the "steam motor" by James Watt (1736-1819), they took on central importance as crankshafts at the end of the 18th century.

Date

Name

Class



DESIGN TASK



A possible design for windshield wipers.

A larger or smaller lever below the connection between the two arms can be used to reduce or increase the lateral deflection of the wiper blades.

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EXPERIMENTAL TASK



1. The feed mechanism requires a wheel with a ratchet so that it only rolls in one direction and locks in the other, thereby "pulling" a sheet of paper underneath it, for example.



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The feed is determined by the eccentric used; in this design, it is approximately 4.75 cm.

2. The stroke of the jack can be increased by extending the worm gear or by adding additional pairs of struts to extend the scissor stroke. The first solution increases the length of the gear. To prevent the scissor stroke from becoming too narrow and structurally unstable, the length of the struts should also be increased by the same amount.

The second solution requires more force for the same stroke, as the distance over which the worm nut is moved remains the same. This reduces the force amplification of the lifting gear.

APPENDICES

Construction instructions and templates for the gears and models:

Model 4: Construction manual for crank swing arm, construction manual for windshield wiper, construction manual for push crank, construction manual for feed gear, construction manual for car jack/scissor lift, [construction manual for car jack/scissor lift with motor](#)

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