

Technologies that increase the efficiency of manual wheelchairs

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ABSTRACT:
According to the WHO definition, assistive technology devices are defined as technical devices or objects used to increase, maintain or improve the functional capabilities of people with disabilities. This definition also includes devices dedicated to people with physical disabilities. According to data from the Centers for Disease Control and Prevention operating within the U.S. Department of Health and Human Services in the United States, the population of people with physical disabilities was 13.7% of the total population. According to other sources, the global population of physically disabled people using a wheelchair to satisfy their locomotion functions is 65 million. In the case of locomotion dysfunction, the most common technical solution to compensate for disability is a wheelchair. The first designs of devices that meet the functional assumptions compensating for mobility disabilities date back to 500 BC. Since then, they have evolved into the currently known manual wheelchair designs featuring large drive wheels connected to strings.

Each wheelchair should be adapted to the individual needs of the user, which are defined by the degree of his disability and lifestyle. Proper adjustment of the wheelchair to the individual needs of the user provides the disabled with the possibility of social integration. According to surveys, people with disabilities want to use wheelchairs not only in everyday life, but also for recreation, e.g. when traveling to non-urbanized places. The operation of a wheelchair in such conditions requires the drive system to generate a driving force that compensates for the increased values of the resistance to motion. During everyday use of a wheelchair, the most common obstacles are architectural barriers, which is particularly noticeable in developing countries. This is due to the fact that building standards for wheelchair users are not respected there.

APPLICATIONS:
Manufacturers of manual wheelchairs and technical devices for the disabled persons.
Manufacturers of foldable wheelchairs with a cross mechanism.

ADVANTAGES and FEATURES

Modification kit for a hybrid electric-manual wheelchair drive system: The possibility of manually driving the trolley with strings * The ability to drive the trolley using only the electric drive * The possibility of manual and electric wheelchair drive at the same time * Deactivation of the electric controller during movement deceleration using the brake lever * The ability to control the battery charge level (acceleration potentiometer with indicator battery charging lever, LCD screen, smartphone) * Ability to monitor operating parameters and configure unit characteristics drive (LCD screen, smartphone) * Backward movement mode * Electrical drive safety switch.

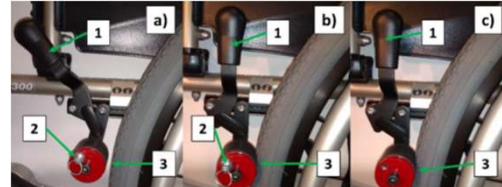
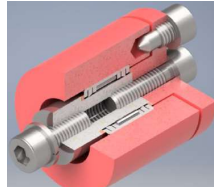
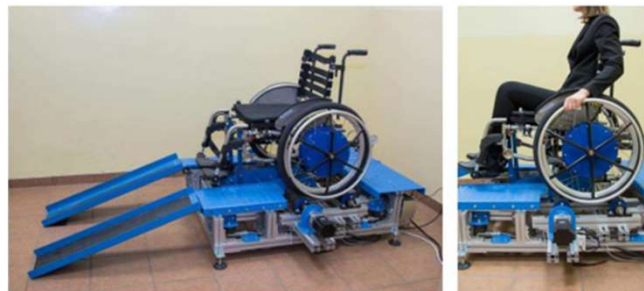
EXTERNAL SHELL VISUALISATION



PROTOTYPE MANUAL DRIVE



PROTOTYPE ELECTRIC DRIVE



Module for universal lever brake of wheelchair wheel construction: 1 - standard wheelchair brake lever, 2 - snap lock, 3 - reversing blockade roller.
Advantages: simple design * adaptation to most lever brakes * low production costs * use in all types of manual wheelchairs

INTELLECTUAL PROPERTY:

1. Testing of wheelchairs on a dynamometer enabling measurement biomechanical parameters resulting from the operation of the manual drive (patent granted no PL 241525 B1, PL 235796 B1)
2. Modification kit for a hybrid electric-manual wheelchair drive system (patent granted no PL 239350 B1)
3. Electric wheelchair gesture control system (patent granted no PL 239443 B1)
4. Manual drive for vehicles, in particular manual wheelchairs (patent granted no PL 239349 B1)
5. Module for universal wheelchair wheel lever brake (patent granted no PL 239693 B1)
6. Module for universal wheelchair wheel lever brake (patent granted no PL 239410 B1)
7. Wheelchair body with mounting assembly (patent granted no PL 239351 B1)
8. Multi-speed hub with traction drive for manual wheelchairs (patent granted no PL 223142 B1)
9. String for the wheel of the wheelchair (patent granted no PL 239411 B1)
10. Aset of cable gears for a wheelchair (patent pending)

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