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TITLE: AUTOMOBILES #2

(WHEELS)

020-AU2 AUTOMOBILES #2 (WHEELS) --- 7 Articles about bizarre wheel designs: Self-turning Wheel, Ilion's Omni-directional wheel, S. Jones' Elastic Spring Wheel, More!
Puncture-proof tires.

Ironclad wheels and rotor blades.

The Mammalian system is being adapted for deceleration in all directions, and to provide a vertical axis, and independent drive and enable the rotor to combine directionally driven and enable the rotor to combine directionally driven.

Mechanics' feet already demonstrate Bill K's...
New Hoop Cycle
Hits Lively Clip
A large rubber-tired hoop is both the body and the traction wheel for an unusual vehicle recently completed by Julius Rose, Glendale, N.Y., auto mechanic. Fitted with a diminutive front wheel steered by means of handlebars, as shown at the right, the curious cycle is powered by a gasoline engine placed between the operator's legs. The machine is said to travel up to fifty miles an hour and to run 250 miles on one gallon of gas.

Engine Runs on Acetylene with New Carburetor
Running an internal-combustion motor on acetylene, a gas generated from calcium carbide and water, instead of gasoline, is made possible by a special carburetor perfected after seventeen months of experimental work by Herman Pederson, of Brooklyn, N.Y. The device employs a pair of small propellers to provide a constant gas pressure, and special graduated supply lines to increase the pressure of the gas before it enters the engine cylinders. In a laboratory test, Pederson states, a motor equipped with this carburetor ran for two hours and thirty-five minutes on acetylene produced from fuel that cost only twenty-three cents, compared with a run slightly more than half as long when the motor operated on a gallon of gasoline that cost eighteen cents. Pederson believes that his carburetor will ultimately make acetylene replace gasoline as a motor fuel.
Self-Installing Snow Chains for Tires

Most people don't think about snow in August, but truck drivers who plan ahead will never again have to install chains on their tires in a freezing snowstorm. Onspot Inc. of Provo, Utah, is distributing a new automatic, dashboard-activated snow chain that works on trucks and buses.

Lou Nackos, marketing director for Onspot, said a driver can activate the Swedish-developed chains in less than two seconds — even while traveling at up to 25 miles per hour — without getting out of the truck. He said it normally takes about 45 minutes to put on conventional truck tire chains in cold weather.

The Onspot device consists of a hard rubber disk with six chains, each about 13 inches long, spaced equally around its circumference. The disk is mounted on a hinged shaft attached to the truck axle.

When the driver pushes a button, an air cylinder pushes the disk down onto the inside of the tire on about a 40-degree angle. As the tire rotates, the disk turns and throws each of the lengths of chain under the tire. When you no longer need the chains, push a button and they rotate back away from the tire.

Nackos said his product is just as strong and effective as conventional chains except in deep snow. “But they are safer than regular chains because they will be used, while about half the time drivers fail to attach their chains when needed because they don’t want to bother,” he insisted.

Nackos said the chains, which cost $995 and take about three hours to install, have been approved for use by the California Highway Pat-
Self-Damping Sprung Wheel

The rim deflects in the vicinity of the contact with the ground or floor.

Marshall Space Flight Center, Alabama

The self-damping sprung wheel provides a shock-absorbing suspension for a wheelchair, reducing the user's discomfort when traversing rough terrain or obstacles. A pair of self-damping sprung wheels are installed in place of the conventional large rear wheels of a standard wheelchair, which the user then operates in the conventional manner.

Other types of shock-absorbing suspensions are not suitable for wheelchairs. For example, when a rigid wheel on a spring suspension encounters an obstacle, the entire wheel is pushed upward, and the top of the wheel can make contact with the user's arm. In addition, the handwheel portion vibrates along with the rest of the wheel; this makes it difficult for the user to grasp and apply force to the handwheel. In contrast, the self-damping sprung wheel does not rise and fall in its entirety; the only part that deflects is a portion of the rim in the vicinity of the contact with the floor, ground, and/or obstacle.

The wheel includes a central hub that turns on conventional bearings, with radial spokes extending from the hub to a flexible rim (see Figure 1). The handwheel is attached to the spokes near their outer ends. A slot in the outer end of each spoke accommodates the radial sliding of a cylindrical knob attached to a rim connector tang. In the normal undeflected condition, the rim spring-loads every cylindrical knob radially outward against a cover plate, which retains the knob in the slot. When a portion of the rim is deflected radially inward by contact with an obstacle, the knob(s) in the affected spoke(s) slide radially inward along the slot(s).

As shown in Figure 2, the rim includes thin inner and outer hoops of molded reinforced plastic, plus an elastomeric intermediate hoop bonded to the inner and outer hoops. Tire-retaining tabs are attached to the outer hoop, and a standard airless polyurethane-foam wheelchair tire is mounted on the tabs. Where part of the tire and rim are deflected inward, the outer hoop is loaded in compression, the inner hoop is loaded in tension, and the elastomeric intermediate hoop is loaded in shear. The shear deformation of the elastomer absorbs the energy stored in the bending of the rim, thereby providing damping.

An alternative version of the wheel could be designed for a bicycle. The tire-retaining tabs and wheelchair tire would be replaced by a continuous-strip retainer and pneumatic tire, the handwheel and its mounting fixtures would be deleted, and the stiffness of the rim would be changed to accommodate greater speeds, and the hub would be modified to accommodate bicycle-style bearings and fork mounting.

This work was done by Bruce Weckendorf of Marshall Space Flight Center. For further information, Circle 27 on the TSP Request Card.

Inquiries concerning rights for the commercial use of this invention should be addressed to the Patent Counsel, Marshall Space Flight Center [see page 20]. Refer to MFS-28632.

Figure 1. The Knob Slides In the Slot to accommodate deflection of the rim.

Figure 2. The Rim Includes Inner and Outer Hoops that bend when an obstacle is encountered. The shear deformation of the elastomeric hoop between them absorbs energy. Thus, the three hoops act together as a damping spring.
United States Patent

Inventor: Bengt Erland Ilon, Stromkurlsvagen
43, 161 38 Bromma, Sweden

Filed: Nov. 13, 1972
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Primary Examiner—M. Henson Wood, Jr.
Assistant Examiner—Reinhard J. Eisenzopf
Attorney, Agent, or Firm—John J. Dennemeyer

ABSTRACT

A wheel for a course stable selfpropelling vehicle, having a centre part rotatable about an axis and a plurality of ground engaging means rotatably mounted on the centre part about the periphery thereof. Each ground engaging means being an elongated roll having its surface convexly vaulted in longitudinal direction and being mounted with its axis extending obliquely with respect to the axis of rotation of the centre part. The spacing between the rolls and the angle between the longitudinal axes of the rolls and the axis of rotation being selected so that the rolls define together an unbroken wheel periphery, seen from a point on an extension of the axis of rotation.

15 Claims, 6 Drawing Figures
OMNIDIRECTIONAL WHEEL

Inventor: Josef F. Blumrich, Huntsville, Ala.
Assignee: The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed: Apr. 17, 1972
Appl. No.: 244,519

U.S. Cl. 180/79.3, 301/5 P
Int. Cl. B62d 5/02
Field of Search 180/79.3, 6.2, 7 R, 8 F, 301/5 P

References Cited
UNITED STATES PATENTS
3,465,843 9/1969 Guinet
FOREIGN PATENTS OR APPLICATIONS
822,660 11/1951 Germany

ABSTRACT
The apparatus of the invention consists of a wheel having a hub with radially disposed spokes which are provided with a plurality of circumferential rim segments. These rim segments carry, between the spokes, rim elements which are rigid relative to their outer support surfaces, and defined in their outer contour to form a part of the circle forming the wheel diameter. The rim segments have provided for each of the rim elements an independent drive means selectively operable when the element is in ground contact to rotatably drive the rim element in a direction of movement perpendicularly lateral to the normal plane of rotation and movement of the wheel. This affords the wheel omnidirectional movement.

5 Claims, 4 Drawing Figures
Reinvented Wheel

As a rigid tire rolls over rough terrain, a vehicle fitted with such wheels can negotiate rough or muddy land, the wheel would also work on such vehicles as tractors or lunar exploration modules.

Springing Along on a Steel Wheel

A new wheel that looks like an inventor’s nightmare has been conceived in England. And far from being a flop, says the designer, his creation has the power to revolutionize transport.

Both the spokes and rim of the wheel are made of elastic spring steel, according to Omni. When the device comes to an obstacle, like a sharp curb or step, the spokes bend like knees, and the tire conforms to the shape of the ground.

The newest wheel: Spokes of elastic spring steel allow its rim to fold around obstacles, rolling over them as if on a cushion of air. Jones has even installed the new wheel on a motorized wheelbarrow on which he hopes will take some of the back-breaking effort out of his gardening.

No-Wheel-Arrow Vehicle

You’ve heard of two- and four-wheel drive, but no-wheel drive? It’s completely practical, claims Dr. Arthur W. Farrall of Michigan State University. He demonstrated a working model called an “inertia propulsion vehicle,” his device uses movable weights and operates on two cycles. An engine turns a cam during the cocking stroke, pushing a weight slowly forward and tightening a spring to which it is attached. During the power stroke, the cam releases the weight, and the spring snaps it back, providing the force to move the vehicle forward. Possibilities include cars that would never slip, tanks that could conquer the toughest terrain, and a tow truck that could move almost anything.

A metal prototype of an invention that could change the drive systems of everything from drill presses to earth movers has been built and refined for use on a standard bicycle frame. The system was built under the sponsorship of the Utah Innovation Center, Salt Lake City, by funds from the National Science Foundation. The inventor, Robert Williams, said his belt-driven transmission could replace the chain, derailier, and gears on today’s 10-speed bicycle, leaving a lighter, quieter, less-expensive vehicle that adjusts speeds automatically within the range between two pulleys. The system uses two pulleys and regulates the speed by changing the ratio between them. The shifts occur vertically within the pulleys themselves as the ring of engagers on which the belt rides expands or contracts. Potential applications include motor driven vehicles, industrial conveyor systems, and machine tools.
Bike Breezes Along With Sail and Propeller

PREVAILING winds are harnessed by a French cyclist who has fitted his bicycle with a sail. Mounted behind the saddle, the canvas opens out like a clamsHELL to take advantage of a following breeze. For traveling against the wind, an odd four-bladed propeller, extending in front of the handlebars and geared to the sprocket wheel, supplements the conventional chain drive.

“PINWHEEL” TIRES that spin in the slip stream as a plane comes in for a landing mean longer tire life and smoother landings. Rubber-and-fabric fins attached to the side walls open to catch the wind and start the wheel turning, then close in the upper part of the revolution. By getting the wheels up nearly to the landing speed of the plane, this plan eliminates the burning and scuffing that result when tires are jerked from a standstill to high speed in a few seconds. The B. F. Goodrich Company developed the self-starting tires, one of which is seen in the photograph above.

NEW BRAKE CLUTCHES ROAD when lowered in front of rear wheels, which roll upon it to a standstill and drag the apronlike pad on the pavement. Designed as an emergency brake, this invention by Arch Robert Jackson, Shavertown, Pa., supplements the regular brake equipment standard on motor cars. It consists of arc-shaped leaf springs to which is secured a rubber mat, the bottom surface of which is corrugated to provide friction on the pavement. For use on icy road surfaces in winter, cables are provided, extending through the rubber. A special hand lever beside the driver controls the raising and lowering of the brakes through cables extending to transverse bars that hold the mats ready in position.

Tire Sections Save Flats. To prevent accidents caused by sudden tire punctures or blowouts, Morris and Leo Frankel, of Los Angeles, Calif., have patented a tire that is divided into eight separate segments, each of which must be individually punctured to cause complete deflation. When one segment is punctured, the adjoining ones expand to fill in the space, permitting the tire to continue in normal operation.
The Frisbee tire

Hans-Erik Hansson has taken a serious stab at reinventing the wheel. His design, a non-pneumatic composite wheel developed in Sweden, is claimed to have low rolling resistance, little external noise, and taut steering response. And although the car may appear to have four flats, the integral tire is puncture-free, so there's no need to carry a spare. "Outwardly it looks like a super-extreme low-profile tire," says Hansson.

Shown in the sectional drawing (below right), the wheel is a bowl-like reinforced plastic molding with a steel hub. It has a flat central disc with the folded circular edge flared slightly outward to form the inner part of the rim. The edge then loops back on itself to form the outer rim, which is bonded to the rubber tread.

Both folded sections of the rim are slotted with 150 parallel cuts around the wheel circumference. These contribute to the tire's flexibility in the area where it makes contact with the road. The slots also provide water drainage to counter hydroplaning, as do small holes in the outer rim between the lines of the tread blocks.

"Our design concentrates tire deformation from wheel-loading and road irregularities very near the road surface, in contrast to the thick air cushion of conventional tires," Hansson explains. "This benefits steering and cornering characteristics. In addition, the tire has a square footprint that has about a 50 percent larger grip area than the usual oval one.

"In lab tests we've measured rolling resistance at up to 30 percent lower than a pneumatic tire," he says. "That's because our composite material has much less internal damping than rubber, which absorbs considerable energy as it's repeatedly compressed and released."

Unfortunately, the low damping of the composite wheel causes tire vibration to reach the car body, creating high internal noise. To counter this, a modified suspension is now being fit-
1. SQUARE WHEELS WORK BETTER than round ones in this system for use on rough terrain. The sharp-cornered treads dig in on snow, mud, sand or steep grades, providing increased traction for trucks, tanks and other military vehicles. At the same time, ingenious self-leveling geometry provides a smooth ride on even surfaces. Each wheel is driven by a pinion gear engaging a star-shaped ring gear. Mounted on a floating axle, the wheel automatically rides upward as the corners approach the ground and downward as the flat segments come around. This produces the effect of a round wheel with all parts of the tread equidistant to the ground, thus permitting the use of high speeds on a level terrain.

Garden Hose Makes Sturdy Tires For Wagons and Tricycles

Tires for wheels of children’s wagons and tricycles can be made from lengths of garden hose. First drill two small holes in the rim equidistant from a spoke and fit the hose to the rim so the ends will meet. Then mark and cut holes in the hose corresponding with those in the rim. Finally, insert wire in the ends of the hose after the openings have been plugged with scraps, pull the wire through the holes in the hose and rim, and twist it to draw the tire tight.

Fred Pennoyer, Bremerton, Wash.

Glass tumblers that have stuck together may be separated by putting cold water in the top one and setting the bottom one in warm water.