March 26, 1963 D. E. CORNELL III, ET AL 3,083,036

OCCUPANT PROPELLED UNICYCLE

Filed May 3, 1961 2 Sheets-Sheet 1

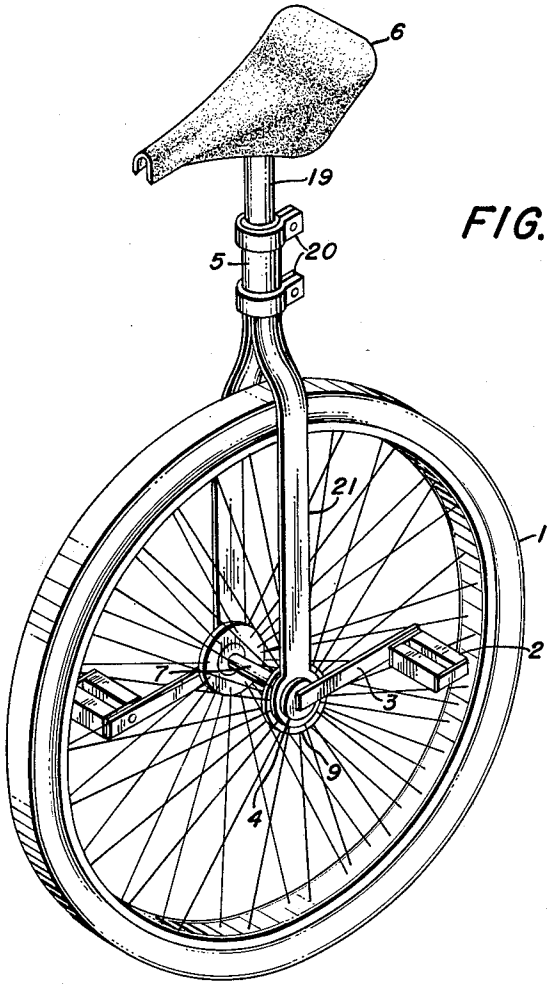
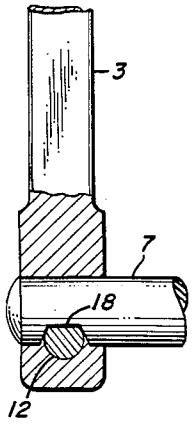


FIG. I

FIG. IV



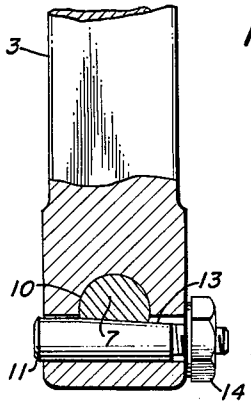


FIG. IV A

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FIG. III

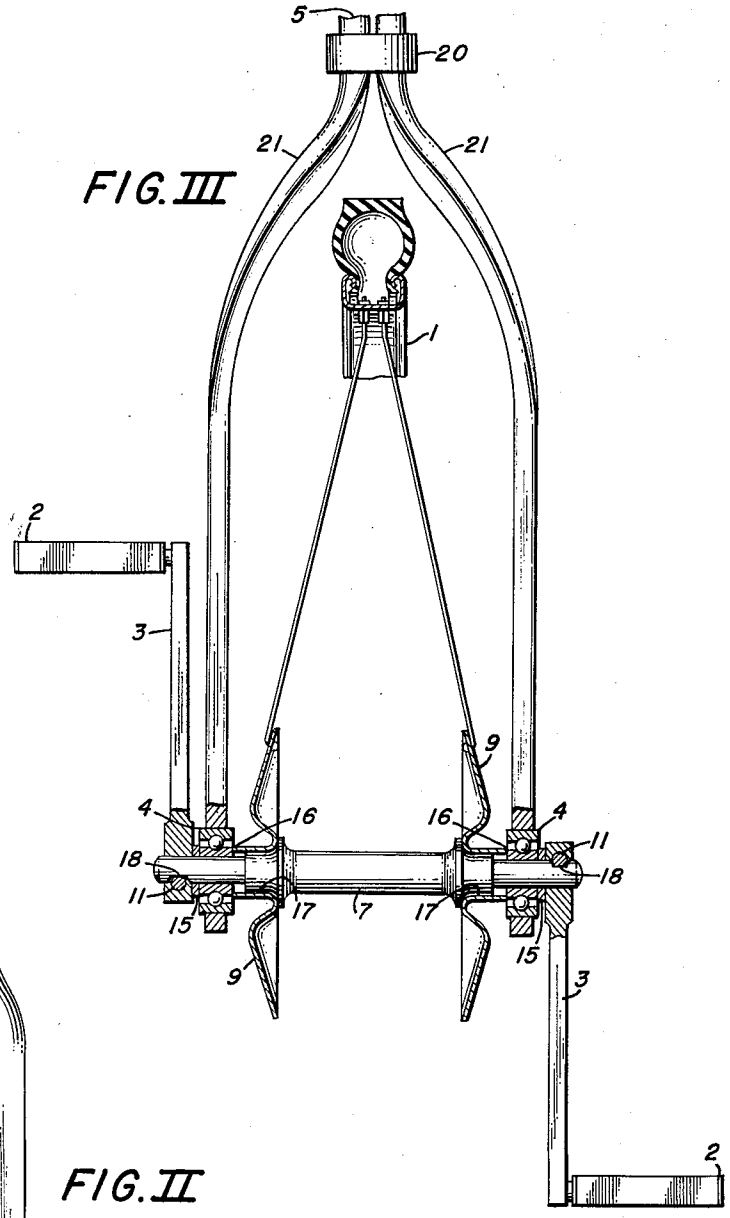
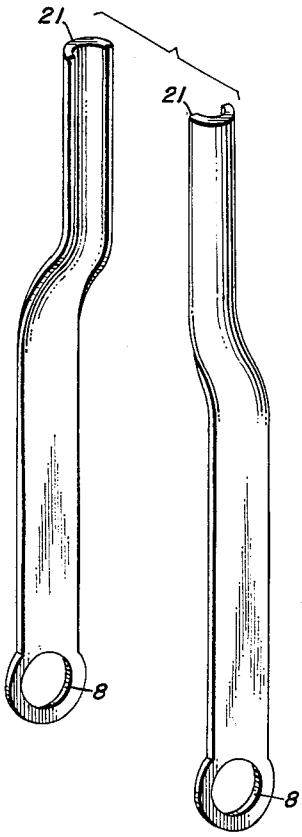


FIG. II



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3,083,036

OCCUPANT PROPELLED UNICYCLE

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5 Claims. (Cl. 280—205)

This invention is directed to a novel cycle vehicle and, more particularly, to a self-propelled unicycle of simplified construction.

In the unicycles developed to date it has been necessary to have a complex and expensive construction far greater than the simplicity of the device might indicate. In particular, the prior art devices comprise a large number of parts for assembly and disassembly for the removal and repair of the wheel and its tire. Furthermore, at the point of delivery for assembly, the large number of parts requires considerable instruction for the initial assembly of the devices or, if transported in assembled form, cause the devices to be awkward and expensive for shipment. In order to provide strong devices there are involved a series of steps including welding, the aggregate of which steps substantially increases the costs.

It is an object of this invention to provide a unicycle having only a few parts.

It is a further object of this invention to provide a unicycle having parts of a relatively low cost.

It is an additional object of this invention to provide a unicycle which is easy to assemble and disassemble.

It is a still further object to provide a unicycle having very high strength to meet the shocks encountered in the use of this relatively unstable device.

Other objects of this invention will be apparent from the following description of a preferred embodiment of the device, from the appended claims and from the appended drawings forming a part of this specification.

In the appended drawing:

FIGURE I is an isometric view of our assembled unicycle.

FIGURE II is an isometric drawing of the basic structural elements of our novel cycle fork with the two parts shown in "exploded" relationship.

FIGURE III is a detailed view of the hub and fork assembly with parts broken away to reveal interior elements, some of which are shown in cross-section.

FIGURE IV is a detail of the arrangement for attaching the crank arm to the shaft.

FIG. IVA is a further detail of the cranking arm attaching arrangement.

Like numbers appearing in the different figures refer to the same or equivalent parts.

The objects of our invention are obtained by providing a self-propelled unicycle vehicle as shown in the drawings, which, as illustrated in general in FIGURE I, comprises the elements of a wheel **1** attached to axle or shaft **7**; pedals **2** on crank arms **3** also attached to axle **7**; bearings **4** fixed at the ends of the arms of fork **5**; seat **6** with a post **19** inserted in the neck of fork **5** so as to be adjustable in height relative to the axle or shaft **7**. The inner races of ball bearings **4** surround and support axle or shaft **7**. The outer races of said ball bearings **4** are friction fit into the circular openings **8** provided at the extremities of the fork **5**.

The crank arm **3** is provided with a circular opening **10** at the extremity opposite to the pedal so as to fit over the end of the axle **7**. In order to hold the crank arm on the shaft to prevent its sliding off the end and also to hold the crank arm so that it will not rotate relative to the shaft, there is provided a flat slot **18** on, and

spaced from the end, of the shaft **7**. Through the crank arm **3** at right angles to the axis of the circular opening **10**, a second and smaller circular opening **12** intersects opening **10** not along a diameter thereof, but on a line a few thousandths closer to the axis of the opening **10** than the bottom surface of slot **18** is displaced from the axis of shaft **7**.

To lock the crank arm to the shaft there is provided a round cotter pin **11** of the same diameter as a hole **12** traversing the crank arm. One side **13** of the cotter pin has a flat surface at an incline to the axis of the cotter pin. At the end of the cotter pin having the largest flat area is provided a securing means such as threads. In assembling the crank arm to the shaft the arm is slid over the end of the shaft so that the hole **12** is in line with the slot on the shaft. The cotter pin **11** is slid through the hole **12** so that the two flat surfaces, that of the cotter pin and that of the shaft, are engaged. A nut **14** is attached to the threads on the cotter pin and draws the cotter pin tight against the flat surface of the shaft.

To prevent contact between the crank arm **3** and the outer race of ball bearing **4** there is provided a washer **15** whose outer diameter is less than the inner diameter of the outer race. On the inner side of the ball bearing **4** to prevent it from sliding too far toward the center or engaging any portion of the wheel there is provided on the shaft and wheel combination a surface **16** which also is lesser diameter than the inner diameter of the outer race of the bearing **4**.

In the preferred embodiment the shaft is a cold rolled steel of at least ⅝" steel rod at the bearing surface. The steel rod is hardened after ultimate forming so as to provide extra strength.

The wheel itself is attached to the shaft by a novel arrangement of this invention through a hub or flange **9** to which the spokes are attached at the inner end.

This hub flange is attached to the shaft preferably by a forced friction fit, the opening **17** of the flange generally conforming in contour to the outside surface of the shaft at the point of contact but being slightly smaller in diameter than the outside surface of the shaft. The fit between the parts is an inerference fit. Although not necessary, it is often desirable to provide corresponding flat surfaces on the outer surface of the shaft and the inner surface of the hole on the hub flange.

By providing a hub flange not an integral part of the shaft, it is feasible to use a sheet metal stock which is stamped into an appropriate shape to correspond with the contour of the shaft and at its outer periphery to be inclined generally inward to correspond with the angle of the spokes from the wheel. The hub flange may be pressed in a single pressing out of cold rolled steel stock of 14 gauge. It may be made out of any other metal of corresponding strength in appropriate thickness by other means, such as machining.

One of the major elements in itself and in the combination of this invention is the novel fork provided. This fork, not only is inexpensive to manufacture, easy to assemble, but it also provides an efficient and quick method for disassembling for access to the wheel and to ship in a disassembled condition. The arrangement also provides a system for adjusting the level of the seat without a separate mechanism.

In the prior art devices the fork is usually made by having the two arms of the fork made of the same piece with the neck being of the second piece welded to the two arms to provide the neck for attachment of a seat in a unicycle or the handle bars in the case of a bicycle.

Alternatively, it is possible to build up a fork arrangement from a series of arms, a neck, a connecting link, and bolts. With these prior art arrangements it is necessary to provide means for removing the wheel at the

extremity of the forks which means are either very complicated or relatively insecure or unsafe. In the present invention the fork 5 comprises two congruent elements 21, which, in the case of a unicycle, are identical so as to reduce the expenses of forming, inventory, and to simplify assembly. Each of these two parts is composed of a flat bar which has been formed in a press to provide two flat arms with enlarged flattened ends to receive the axle bearing at one extremity and to provide a flat S or reverse curve extending into mating semicircular halves at the other extremity. The transverse semi-circular curve in the bar extends through the first or top part, and preferably through the second part, of the flat S curve so as to provide structural strength and rigidity to the fork.

If the flat bars were merely shaped into the reverse or S curve without the transverse or semi-circular curvature, the fork would not have sufficient resistance to deformation and bending at the S curves, particularly at the upper point. It would be possible to overcome that weakness by using larger bar stock but it is preferred, in the interest of reduced weight and cost to provide the binary fork with the double or transverse curvature. Not only are the weight and material cost reduced, but a novel arrangement is also provided for receiving the seat posts. The two halves of the fork are held together by appropriate clamps 20 of standard type such as strap clamps, U brackets or by bolts extending through the two halves. In the preferable embodiment of the present invention of the unicycle, the two halves of the neck do not quite form a full circle. Into the cavity provided by the two halves and the neck, the post of a seat is inserted and held tight therein to an adjustable height by the aforementioned clamps. Another arrangement is to hold the two halves of the neck together by a sleeve that slides over the outside. Combinations of these arrangements may also be used.

While the foregoing specification sets forth the invention in specific terms, it is to be understood that numerous changes in the shape, size and materials may be resorted to without departing from the spirit and scope of the invention as claimed hereinafter and it is contemplated that various changes may be made in the embodiment of the invention herein specifically described without departing from or sacrificing any of the advantages of the invention or any features thereof, and nothing herein shall be construed as limitations upon the invention, its concept or structural embodiment as to the whole or any part thereof except as defined in the appended claims.

What is claimed:

1. A unicycle comprising a fork means including an identical pair of rods shaped into a curved cross section at the upper end so as to produce an almost completely circular hollow tube neck when the pair are brought together, each of said rods extending downwardly into outwardly flaring reverse curves while retaining a curved cross section but ending in flat parallel prong sections with circular openings, clamping means for holding the upper ends of the rods together, ball bearing means fixed into circular opening of each of the prong sections of the fork, an axle rotatably supported in said bearings, a pair of hub flanges attached through an interference fit to said axle in a symmetrically spaced relationship, a spoked wheel having the inner ends of the spokes attached to one of the peripheries of said hub flanges, a pair of pedal crank means attached to the extremities of said axle, and a seat the post of which is inserted in the hollow tube neck formed by the two rods of the fork, said seat and post being held in a pre-determined position by the pressure exerted by the clamp against the rods and in turn on the post of said seat.

2. A unicycle comprising a fork means including an identical pair of rods shaped into a curved cross section at the upper end so as to produce an almost completely

circular hollow tube neck when the pair are brought together, each of said rods extending downwardly into outwardly flaring reverse curves while retaining the curved cross section but ending in flat parallel prong sections with circular openings, means for holding the upper ends of the rods together, bearing means fixed in the circular opening of each of the prong sections of the fork, an axle rotatably supported in said bearings, a pair of hub flanges attached through an interference fit to said axle in a symmetrically spaced relationship, a spoked wheel having the inner ends of the spokes attached to one of the peripheries of said hub flanges, a pair of pedal crank means attached to the extremities of said axle, and a seat the post of which is inserted in the hollow tube neck formed by the two rods of the fork and held tightly by the pressure of the holding means on said rods applied against the post.

3. A unicycle comprising a fork means including an identical pair of rods shaped into a curved cross section at the upper end so as to produce an almost completely circular hollow tube neck when the pair are brought together, each of said rods extending downwardly into outwardly flaring reverse curves while retaining the curved cross section through at least the upper curve but ending in flat parallel prong sections with circular openings, means for holding the upper ends of the rods together, bearing means fixed in the circular opening of the prong sections of the fork, an axle rotatably supported in said bearings, a wheel attached to said axle, a pair of pedal crank means attached to the extremities of said axle, and a seat the post of which is inserted in the hollow tube neck formed by the two rods of the fork and held tightly by the pressure of said rods applied by the holding means.

4. In a unicycle a combination of a fork means including an identical pair of rods shaped into a curved cross section at the upper end so as to produce an almost completely circular hollow tube neck when the pair are brought together, each of said rods extending downwardly into outwardly flaring reverse curves while retaining the curved cross section through at least the upper curve but ending in flat parallel prong sections with circular openings, means for holding the upper ends of the rods together, bearing means fixed in the circular opening of each of the prong sections of the fork, an axle rotatably supported in said bearings, a pair of hub flanges attached through an interference fit to said axle in a symmetrically spaced relationship, a spoked wheel having the inner ends of the spokes attached to one of the peripheries of said hub flanges, a pair of pedal crank means attached to the extremities of said axle, and a seat the post of which is inserted in the hollow tube neck formed by the two rods of the fork and held tightly by the pressure of the holding means on said rods applied against the post.

5. In a unicycle the combination of a fork means including an identical pair of rods shaped into a curved cross section at the upper end so as to provide an almost completely circular hollow tube neck when the pairs are brought together, each of said rods extending downwardly into flaring reverse curves while retaining the curved cross section through at least the upper curve but ending in flat parallel prong sections, means for holding the upper ends of the rods together, and a seat, the post of which is inserted in the hollow tube neck formed by the two rods of the fork and held tightly by the pressure of the holding means on said rods applied against the post.

References Cited in the file of this patent

UNITED STATES PATENTS

324,264	Latta	Aug. 11, 1885
345,465	Waite	July 13, 1886
2,950,127	Phillips	Aug. 23, 1960