An improved motorized folding portable footboard scooter. The rider of the scooter stands upon a scooter platform and directs the scooter. The handle bar folds to facilitate the portability of the scooter. The engine is operationally connected to the transmission, which is operationally connected to the rear tire. Shifting the transmission is accomplished by a control on the handle bar. A smaller lighter engine is used because the transmission allows for the power output of the engine to be optimized for different driving speeds and conditions. The resulting portable motorized foot scooter has greater speed and terrain following characteristics over a non-transmission scooter while still retaining its lightweight portability.
Fig. 2
FOLDING PORTABLE MOTORIZED FOOTBOARD SCOOTER WITH VARYING TRANSMISSION

BACKGROUND

[0001] 1. Field of the Invention

[0002] This invention relates to portable folding motor powered footboard scooters. More particularly a construction of a motorized foot scooter with a variable transmission. Engine drives for scooters are known. Such drives include direct drive via spindle, chain, belt, synchronous tooth belt, and gear. Because of the evolution of footboard motorized scooters there has arisen a need for greater speed and versatility. A portable motorized footboard scooter with a larger engine and a fixed drive would be able to climb hills, transverse sand or loose materials. However, the larger engine and its included weight penalty negate the portability feature by making the scooter too heavy. A scooter with a varying transmission will allow the rider to optimize the available power provided by a small, lightweight engine. Up to this point no one has thought to incorporate a transmission with a portable motorized footboard scooter. Conventional wisdom would dictate that to incorporate a transmission would increase the weight of the portable scooter and reduce or eliminate the portability feature of the scooter. However, this in not the case, by incorporating a transmission the weight penalty of the transmission is offset by use of a lighter engine with less power output. The transmission allows for the power output of the engine to be optimized for different driving speeds and conditions. The resulting portable motorized foot scooter has greater speed and terrain following characteristics while still retaining its lightweight portability.

[0004] Motorized folding portable footboard scooters are known. Such scooters have been available since October 1996 from Martin Manufacturing of Mesa Ariz. under the trade name Martin Monster. A scooter is disclosed with a steer able front wheel and a motor driven rear wheel, a folding handlebar and a footboard for a standing rider. The reader can see and understand that the scooter in Patmont 4821832 and Pepe 5338659 and Patmont 6095274 and Patmont 6012539 have a fixed transmission and no provision is made to vary drive ratios. In Withaus 5494128 and Withaus 5660242 a fluid coupling is utilized. However, no provision is made to change driving ratios other than the slippage of the fluid itself, which only accomplishes a rudimentary clutch. In all the before mentioned designs the scooters are limited in speed and terrain handling ability due to the limited size of the engine used in portable scooters. Until this invention no one thought that a portable motorized foot scooter could be made with a transmission. Transmissions add weight however, this invention allows for a smaller lighter engine to be used with allows for a scooter which is faster and has greater terrain overcoming characteristics due to the selective ratio of the transmission in a light weight portable motorized foot scooter. Transmission with a variable ratio allows the engine power output to be maximized for speed or load requirements. In the prior art, a fixed ratio transmission will work well only in a narrow range of operating conditions. Top speed and load carrying characteristics are a compromise neither top speed or load carrying ability being fully maximized. A further disadvan-

tage of the prior art is the use of a larger engine being necessary to partially compensate for the fixed ratio transmission. The additional engine power requirements being necessary to augment load-carrying characteristics while maintaining reasonable top speed. Further objects and advantages of my invention will become apparent from a consideration of the drawings and ensuing description.

DESCRIPTION OF DRAWINGS

[0005] FIG. 1 is a side view of the scooter
[0006] FIG. 2 is a perspective view of the transmission
[0007] FIG. 3 is a perspective view of the transmission
[0008] FIG. 4 is a side view of the shifting spindle transmission
[0009] FIG. 5 is a top view of the transmission
[0010] FIG. 6 is a top view of the transmission
[0011] FIG. 7 is a top view of the transmission
[0012] FIG. 8 is a top view of the transmission
[0013] FIG. 9 is a top view of the transmission
[0014] FIG. 10 is a side view of the scooter showing folded handle bar.

REFERENCE NUMERALS IN DRAWINGS

[0015] 1 Variable Transmission
[0016] 2 Engine
[0017] 3 Rear tire
[0018] 4A Small Sprocket
[0019] 4B Large Sprocket
[0020] 4C Sprocket Small
[0021] 4D Sprocket Large
[0022] 5 Chain
[0023] 6 Shaft
[0024] 7A Small Gear
[0025] 7B Large Gear
[0026] 8 Handle Bar
[0027] 9 Shifting Control
[0028] 10 Shifting Cable
[0029] 11 Front Tire
[0030] 12 Riders Platform
[0031] 13 Front fork
[0032] 14 Folding Hinge
[0033] 15 Slide Tube
[0034] 16 Brake
[0035] 17 Spring
[0036] 18 Frame
[0037] 19 Chain Adjustor
[0038] 20 Gear Case
US 2003/0085067 A1

May 8, 2003

[0039] 21 Spindle Shifting Cable
[0040] 22 Engine Engage Next Cable
[0041] 23 Splined Shaft
[0042] 24 Bearing Housing for Spindle Shifting
[0043] 25 Bearing
[0044] 26 V Belt
[0045] 27 Large Varying Diameter Pulley
[0046] 28 Small Varying Diameter Pulley
[0047] 29 Engine Pivot
[0048] 30 Engine Neutral and Shifting Spring
[0049] 31 Spindle
[0050] 32 Shock Absorber
[0051] 33 Head Tube
[0052] 34 Fuel Tank
[0053] 35 Frame Pivot
[0054] 36 Clutch
[0055] 37 Latch

OPERATION OF INVENTION

[0056] In FIG. 1 the handle bar 8 is connected to the folding hinge 14. A slide tube 15 is held in place by a spring 17 over hinge 14 to lock the handle bar 8 in an upright position. When slide tube 15 is slid upward against spring 17 the hinge 14 is exposed allowing the handle bar 8 to be folded down. The hinge 14 is connected to the front fork 13 and the front tire 11 is held by the front fork 13. The front wheel 11 is stopped by brake 16. The front fork 13 is supported by frame 18. The frame 18 is connected to the rider's platform. The operator rides standing on the platform. The frame 18 has a shock absorber 32 to absorb road shock. The Engine 2 is connected by shaft 6 to the small gear 7A which turns large gear 7B with both gears contained in gear case 20. The tension of chain 5 can be accomplished by rotating gear case 20 by first loosening chain adjustor 19. Small gear 7A is connected to small sprocket 4A which is connected to large sprocket 4B large sprocket 4B is connected to variable transmission 1 which is contained in the hub of the rear tire 3. Shifting of the variable transmission 1 is accomplished by shifting cable 10 which is connected to the shifting control 9 located on the handle bar 8.

DESCRIPTION OF INVENTION

[0057] Referring to the drawings by characters of reference, FIG. 1 discloses a motorized portable collapsing footboard scooter having a riders platform for the feet of the user. The riders platform 12 is supported by the frame 18 the frame can be of any material which lends structure and resistance to load inputs, such materials might include tubing, plate, composite or a combination of such. FIG. 10 handle bar 8 is of a type having a spring 17 biased reciprocating sleeve slide tube 15 is moved away from hinge 14 steering handle 8 can be secured at latch 37 in the horizontal position. The handle bar can be folded in a variety of ways including hinging the handle bar and fork as a unit. At the forward end, the frame 18 fastens to the head tube 33. This also can be a folding point to assist with the collapsing scooter. As is traditional in such head tubes, this head tube 33 is substantially vertical having only a slight rake to and toward the rear of the scooter. Such a rake is in a common plane defined by handle bar 8 axis and longitudinal axis. Longitudinal axis is taken longitudinal of the scooter chassis and is normal to the turning axis of the front wheel 11 when the front wheel steers in the forward direction. Front wheel 11 or rear wheel 13 such as caliber drum or friction or V-brakes. The frame 18 extends through rides platform 12 at rider's platform notch. Therefore as seen in FIG. 1 frame 18 extends along the bottom of the rider’s platform. The rider's platform 12 is attached to the frame 18 at least at one point. A shock absorber is attached to the frame 18 and allows for the movement of the frame when transversing uneven terrain. A rear tire 3 is supported by means of a frame 18, which forms a box around the rear tire 3 the lower end of which is open. The sides of the box extend down to form a yoke to rotate to receive the rear tire. Adjacent to the rearward end of the frame 18 is an engine 2 preferably a gasoline engine which can be either 2 or 4 stroke however any engine or motor such as an electric motor would work. A fuel tank 34 is located opposite the engine however the location could be anywhere on the scooter. In FIG. 2 the engine 2 is operationally coupled via a chain to a shaft 6 to the small gear 7A which is connected to the large gear 7B which is connected to the small sprocket 4A which is connected to chain 5 which is connected to large sprocket 4B which is connected to the variable transmission 1 which can be of planetary gear construction such as available for the bicycle industry. The transmission also could be of conventional shifting gears however, any means of connection between the engine 2 and the transmission 1 and the transmission 1 and the rear wheel 3 can be used. These can include chain, belts, synchronous tooth belt, gears, direct or spindle. FIG. 6 the transmission 1 also include two pulleys of varying diameter 27 and 28 connected by V Belt 26, the diameter of the pulleys either controlled by manual or automatic control which accomplish a varying transmission and these pulleys being connected to either the rear tire 3 or the engine 2. In FIG. 3 the transmission 1 can also include a stepped or varying diameter drive spindle by either moving the engine 2 up and over the rear tire 3 at its engine pivot 29 against the engine neutral and shifting spring 30 by the controls spindle shifting cable 21 and engine engagement cable 22. This same system in FIG. 4 can use a splined shaft 23 with a bearing housing for spindle shifting 24 and a bearing 25 to allow for a floating attachment point shifted by shifting cable 10 to move different diameter drive spindles over the rear tire 3 accomplishing a varying transmission 1. In FIG. 2A clutch 36 may be employed between the engine 2 and the transmission 1. In FIGS. 5,7,8,9 shows the various arrangements for placement of a transmission between the engine 2 and the rear wheel 3. A shock absorber 32 may be employed where the shock absorber 32 is connected to the frame 18 separated by a frame pivot 35 to accomplish suspension. FIG. 1 and FIG. 10 shows a handle bar 8 arrangement of the motorized folding footboard scooter. A shifting control 9 for selecting the transmission 1 ratios is located on the upper end of the handle bar 8 however any control could be used including a foot control or an automatic control. Various linkages could be employed to connect said shifting controls to the transmission A shifting cable 10 is used. At the upper end of the
handle bar 8 includes a control for acceleration and braking of the scooter. The claims and the specification describe the invention presented and the terms that are employed in the claims draw their meaning from the use of such terms in the specification. The same terms employed in the prior art may be broader in meaning than specifically employed herein. Whenever there is a question between the broader definition of such terms used in the prior art and the more specific use of the terms herein, the more specific meaning is meant. While the invention has been described with a certain degree of particularity it is manifest that many changes may be made in the details of construction and the arrangement of components without departing from the spirit and scope of this disclosure. It is understood that the inventions not limited to the embodiments set forth herein for purposes of exemplifications, but is to be limited only by the scope of the attached claim or claims, including the full range of equivalency to which each element thereof is entitled.

SUMMARY OF THE INVENTION

A folding portable motorized footboard scooter is provided with a chassis for the support of a standing rider upon a rider’s platform. At the front of the chassis bends upward through a notch in the platform upward above the front wheel to support a steering head tube the head tube supports a fork that holds the front wheel. The handle bar folds to reduce the scooters dimensions to facilitate portability The rear wheel is contained in a supporting frame which also hold the engine relation to the rear wheel allowing it to be operatively connected to a varying transmission which is operationally connected to the rear tire. A lightweight more portable scooter can be manufactured that will have greater flexibility in use a higher top speed and greater incline climbing ability while maintaining a very lightweight portable scooter optimize the power output of the engine for the terrain conditions.

What is claimed:

1. A motor powered collapsible foot scooter for the support of a rider compromising in combination
   a front steered wheel
   a collapsing handle bar assembly
   a rear driven wheel
   a platform that supports a standing rider
   a main structural element disposed substantially horizontally along a longitudinal axis supporting along the longitudinal axis the front steered wheel at the forward end of the main structural member. The rear driven wheel supported by at least one frame member at the end of the main structural member, and a platform on the main structural member a motor operatively connected to a transmission, which is operatively connected to the rear wheel.

2. The motor powered collapsible foot scooter of claim 1 wherein the transmission allows for a plurality of driving ratios.

3. The motor powered collapsible foot scooter of claim 1 wherein the transmission is of a planetarily geared configuration.

4. The motor powered collapsible foot scooter of claim 1 wherein the changing of the ratios is accomplished by a handle bar control.

5. The motor powered collapsible foot scooter of claim 1 wherein the changing of the ratios is accomplished by foot control

6. The motor powered collapsible foot scooter of claim 1 wherein the change of ratios is automatic.

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