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HAND OR FOOT OPERATED SCOOTER

Filed Jan. 31, 1957

3 Sheets-Sheet 1

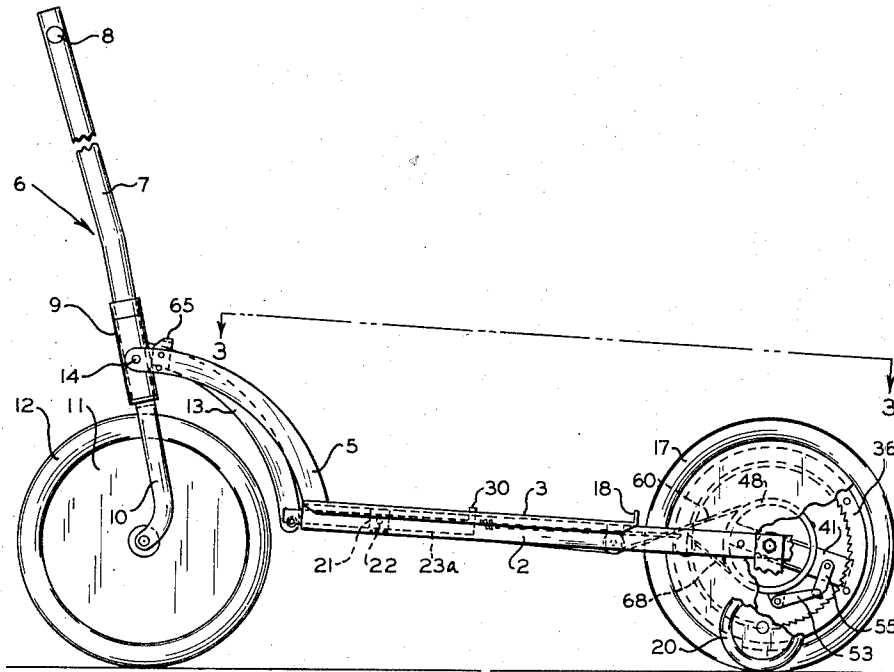


FIG. 1

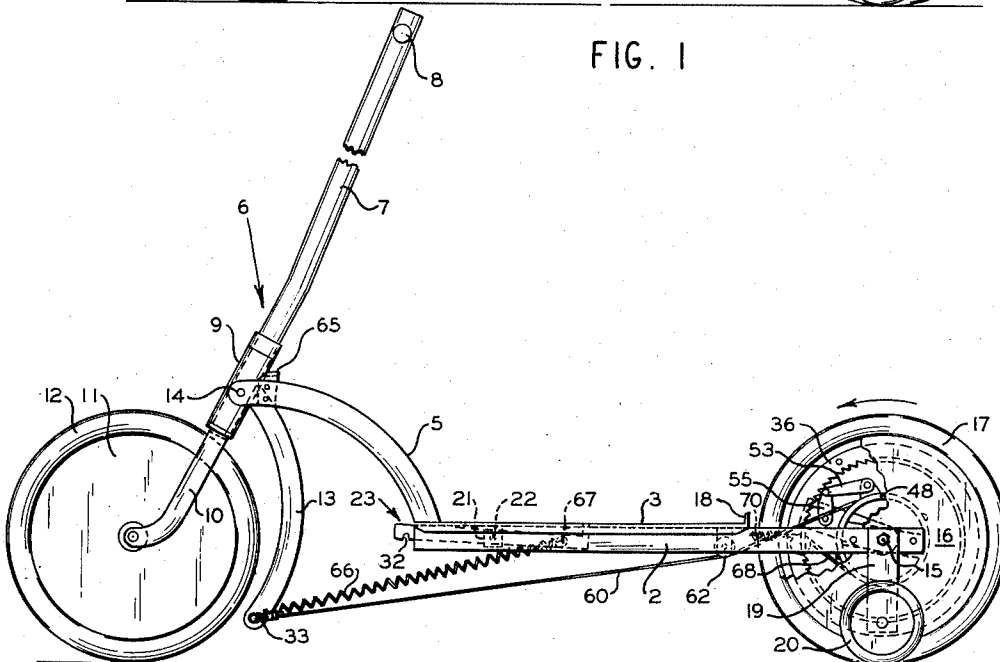


FIG. 2

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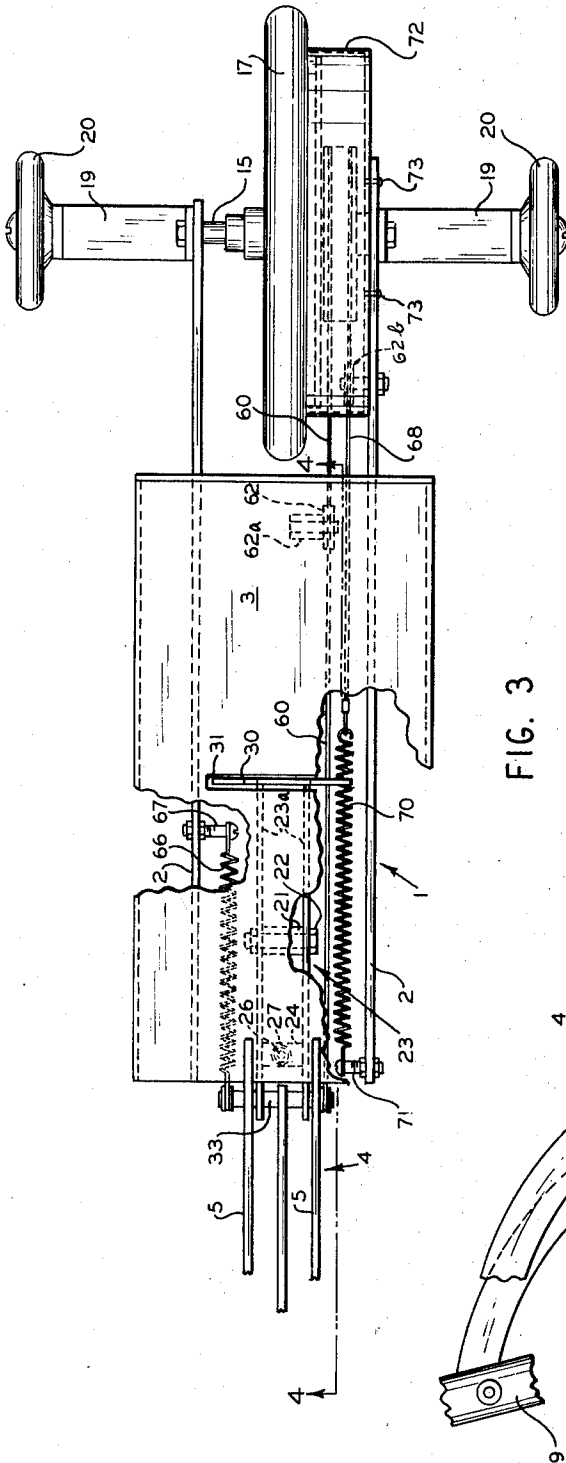


FIG. 3

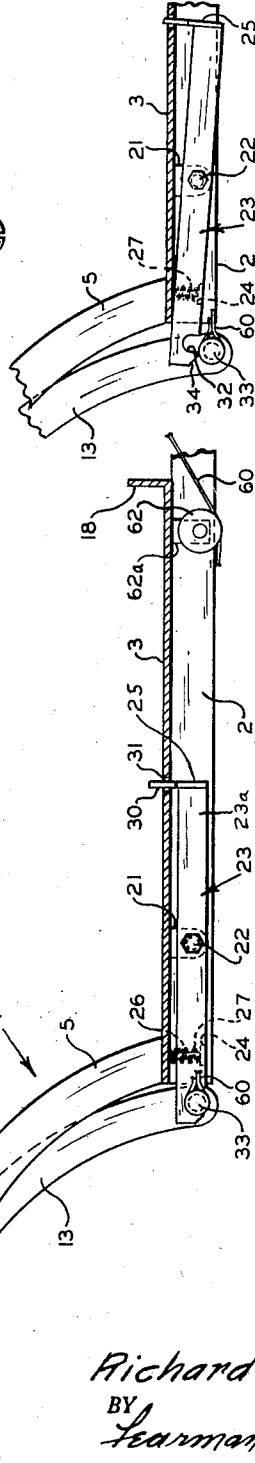
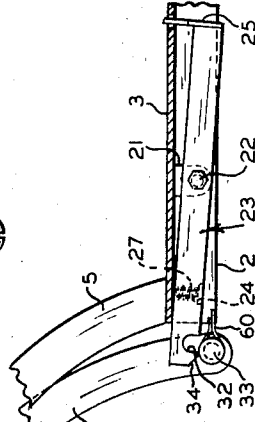


FIG. 4



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3 Sheets-Sheet 3

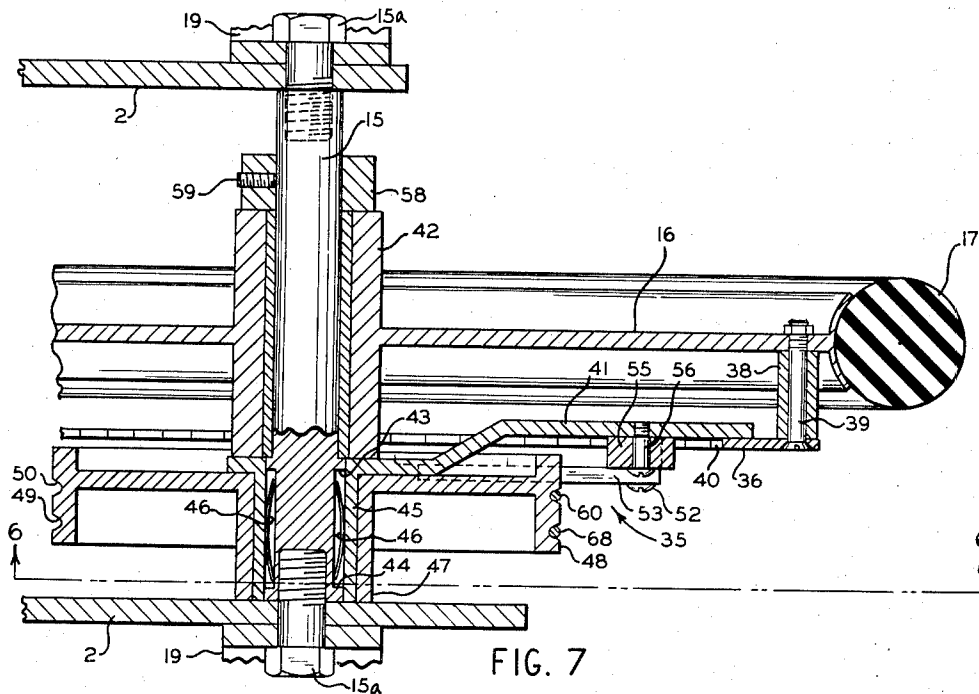


FIG. 7

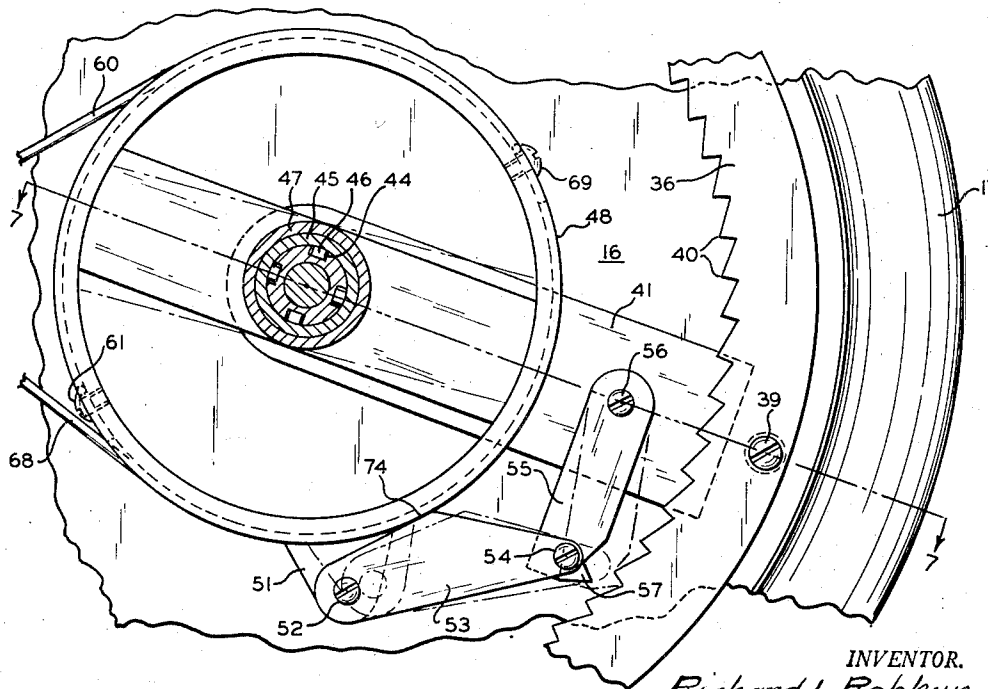


FIG. 6

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HAND OR FOOT OPERATED SCOOTER

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10 Claims. (Cl. 280—243)

This invention relates to scooter constructions and more particularly to scooters which are so constructed as to be propelled optionally by actuation of a push-pull hand bar or by the user's foot.

An object of the invention is to provide a scooter construction capable of being driven either by foot or by a driving hand bar at the election of the user.

Another object of the invention is to provide an optionally hand or foot operated construction having hand bar driving mechanism which does not interfere with foot operation of the scooter.

Another object of the invention is to provide simple and effective means for enabling the scooter to be operated either by hand or by foot.

A further object of the invention is to provide a scooter which is convertible from hand to foot operation and vice-versa while being driven.

A still further object of the invention is to provide an optionally hand or foot operated scooter construction which is capable of being freely coasted irrespective of which form of operation is being used.

Other objects and advantages of the invention will be pointed out specifically or will become apparent from the following description when it is considered in conjunction with the appended claims and the accompanying drawings, in which:

Figure 1 is a side elevational view of a scooter constructed in accordance with the invention and conditioned for foot operation, certain parts being broken away for purposes of illustration;

Figure 2 is a view similar to Figure 1, but showing the parts at the end of a driving stroke of the hand bar;

Figure 3 is an enlarged, fragmentary top plan view of that portion of the apparatus lying between the arrows 3—3 of Figure 1;

Figure 4 is a sectional view taken on the line 4—4 of Figure 3 and showing certain parts of the scooter conditioned for foot operation;

Figure 5 is a fragmentary, sectional detail of the structure shown in Figure 4, but illustrating the position of the parts when the scooter is conditioned for hand bar operation;

Figure 6 is an enlarged, fragmentary, partly sectional elevation of the driving means shown in Figures 1 and 2, the section being taken on the line 6—6 of Figure 7; and

Figure 7 is a sectional view taken on the line 7—7 of Figure 6.

A scooter constructed in accordance with the principles of the invention comprises a framework 1 including a pair of spaced, parallel bars 2 to the upper edges of which is welded or otherwise suitably secured a foot board 3. A yoke member 4 forming a part of the framework comprises a pair of parallel, arcuate bars 5 welded or otherwise suitably secured at corresponding ends to the forward part of the foot board 3 and receiving between their other ends a handlebar assembly 6 including a post 7 having a push-pull hand bar 8 at its upper end and having its lower end rotatably received in a sleeve 9,

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the sleeve also rotatably mounting the upper end of a fork 10 in which is journaled a front wheel 11 which may be equipped with a rubber tire 12 if desired. The handle bar assembly 6 also includes an arcuate part or lever 13 having its upper end rigidly fixed to the sleeve 9 and its lower end projecting below the level of the upper surface of the foot board 3. The handlebar assembly is pivotally mounted at the forward end of the arcuate bars 5 by means of substantially horizontally located pins 14 which are fixed to the sleeve 9 and project through openings formed in the bars 5. The arrangement and construction of the parts thus far described are such that the front wheel 11 is readily steerable by manipulation of the hand bar 8 whereas the entire assembly 6 is pivotable about the axes of the pins 14.

Adjacent to the rear ends of the frame bars 2 is mounted a spindle 15 by means of bolts 15a and on which is journaled a rear wheel 16 which also may be equipped with the rubber tire 17 if desired. Details of the rear wheel mounting will be pointed out subsequently. As is best shown in Figure 3, the rear end of the foot board 3 terminates at a point sufficiently far forward of the rear ends of the frame bars 2 as to provide adequate clearance for the rear wheel 16 and the tire 17. The rear end of the foot board 3 preferably terminates in an upwardly extending flange 18 to prevent the scooter user's foot from inadvertently engaging the rear wheel. If desired, the spindle 15 may be used to mount brackets 19 on which auxiliary wheels 20 are journaled.

Adjacent to the forward end of the foot board 3 and at the under side of the latter, is fixed a block 21 through which extends a pivot stud 22. Pivotaly mounted on the stud 22 is a latch member 23 comprising a pair of bars 23a rigidly secured in parallel relation by a cross piece 24 welded to the two bars 23a adjacent to their forward ends and by a plate 25 welded at the rear ends of the bars 23a. The cross piece 24 mounts a post 26 which is surrounded by a coil spring 27 reacting against the cross piece and the undersurface of the foot board 3 to bias the member 23 to rock about the axis of the stud 22 in a counterclockwise direction as viewed in Figure 4 to its latching position. The plate 25 at the rear ends of the bars 23a is provided with an upstanding extension 30 adapted to project through a transversely extending slot 31 formed in the foot board 3. The forward ends of the bars 23a are provided with notches 32 in their lower edges which are adapted to receive a latch bar 33 fixed to and projecting through the arcuate lever 13. The forward ends of the bars 23a may be formed with cam surfaces as at 34 for a purpose which will be pointed out.

Means is provided for imparting a driving force to the rear wheel 16 when desired and in the illustrative embodiment of the invention the driving means includes a unidirectional clutch device 35 which is most clearly disclosed in Figures 6 and 7. The clutch device includes a ring 36 fixed to the rear wheel by suitable spacers 38 and bolts 39 and equipped on its inner periphery with a plurality of saw-like teeth 40 all of which face in the same circumferential direction. The clutch device also includes an arm 41 mounted adjacent to the hub 42 of the rear wheel 16 on the same spindle 15 which mounts the wheel. As is shown in Figure 7, the spindle 15 is provided with a pair of spaced, annular enlargements 43, 44 forming bearing surfaces for a mounting collar 45 to which the arm 41 is integrally secured. The annular enlargements 43 and 44 provide a space between the spindle 15 and the inner surface of the collar 45 to accommodate a plurality of drag inducing, bowed leaf spring elements 46 for a purpose to be explained. Journaled for rotation on the collar 45 of the arm 41 is the hub 47 of a drum member 48 having a pair of endless, parallel grooves 49 and 50 in its outer periphery.

Referring now particularly to Figure 6, the drum 48 has secured thereto a radially projecting lug or ear 51 to which is pivotally connected by means of a pin 52 one end of a motion transmitting link 53. The other end of the link 53 is pivotally connected by a pin 54 to one end of a pawl 55 having its other end pivotally connected to the arm 41 by means of a pin 56. The radially outwardly facing edge of the pawl 55 is provided at the end adjacent to the pivot pin 54 with a tooth 57 which is adapted to engage any one of the plurality of teeth 40 on the ring 36. When assembling the rear wheel 12 and the parts of the clutch device on the spindle 15, it is important that the arm 41 be maintained in such position that the pawl 55 is in radial alignment with the teeth 40 of the ring 36. This is assured by the cooperation of a locking ring 58 and one of the frame bars 2, the ring 58 being maintained in fixed position on the spindle 15 by a set screw 59.

Means is provided interconnecting the clutch device 35 and the handlebar assembly 6 operable for drivingly engaging the clutch device and the rear wheel in response to pivotal movement of the handlebar assembly in one direction of movement of the latter. The disclosed form of interconnecting means comprises a cable 60 fixed at its forward end to the latch bar 33 carried by the arcuate lever 13, and fixed at its rear end to a binding post 61 mounted on the drum 48, the cable extending substantially three-fourths the distance around the drum and lying in the groove 50. The cable 60 is guided in its movements by a sheave 62 which is journaled in a housing 62a fixed to the under surface of the foot board 3 adjacent to the rear end thereof. The arrangement is such that clockwise rocking of the handlebar assembly 6, as viewed in Figure 1, about its pivot 14 will cause the cable 60 to rotate the drum 48 in a counterclockwise direction so as to impart a driving force to the rear wheel in a manner which will be explained hereinafter. Clockwise rocking of the handlebar assembly 16 may continue until such time as the part 9 engages a stop member 65 mounted on the arcuate frame bars 5, at which point the parts will be in the positions shown in Figure 2. To assist in restoring the parts to the latching positions shown in Figure 1, a tension spring 66 reacts between the latch bar 33 and a post 67 fixed on one of the frame bars 2. To return the drum 48 and the other parts of the clutch device to the positions shown in Figures 6 is a second cable 68 located in the groove 49 and having one of its ends fixed to the drum by means of a binding post 69 and having its other end anchored to a spring 70 which is fixed to a post 71 on one of the frame bars 2. The arrangement of the cable 68 is such that when the handle bar assembly is rocked counterclockwise, as viewed in Figure 2, about its pivot 14 the spring 70 will exert a force on the drum 48 through the cable 68 to rock the drum and the associated parts clockwise as viewed in Figure 6 so as to restore the parts to the positions shown therein. The cable 68 is guided by a sheave 62b similar to the sheave 62a. To prevent injury to a child's fingers and to help keep dirt out of the clutch device, a cup-shaped cover member 72 may be fitted over the drum. The cover may be fixed on the adjacent frame bar 2 by means of screws 73 or the like.

The scooter may be conditioned for driving operation in response to pushing and pulling on the handle bar assembly 6 by the user's stepping on the plate 30 which projects through the foot board 3, thereby causing the latch member 23 to be rocked clockwise as viewed in Figures 1 and 2 so as to release the latch post 33. Thereafter, the assembly 6 will be enabled to be rocked clockwise about the axis of the pin 14 from the position shown in Figure 1. Clockwise rotation of the assembly 6 will initiate, through the intermediary of the arcuate bar 13 and the cable 60, counterclockwise rotation of the drum 48. The lug 51 will move with the drum 48 inasmuch as the lug is fixed to the drum, thereby imparting movement to the link 53 and the adjacent end of the pawl 55. Initial movement of the drum 48 will precede, or lead, move-

ment of the arm 41 due to the restraining influence of the bowed spring elements 46 reacting between the spindle 15 and the collar 45. Stated differently, movement of the arm 41 will lag movement of the drum 48. As the drum moves relatively to the arm 41 the pawl 55 will be projected radially of the axis of rotation of the drum, that is, rocked about its pivot 56 in a counterclockwise direction as viewed in Figure 6, until such time as its tooth 57 engages one of the teeth 40 on the ring 36. The pawl 55 then becomes, in effect, locked with the link 53 so that continued clockwise rocking of the handlebar assembly 6 will cause concomitant rotation of the drum 48 and the arm 41 in a counterclockwise direction as viewed in Figures 1, 2 and 6. The driving force applied to the drum will be imparted to the wheel 16 to cause the latter to rotate in the direction of the arrow in Figure 2 to propel the scooter forwardly.

At any position of the handlebar assembly 6 the latter may be rocked counterclockwise about its pivot 14 whereupon the spring 70 will exert a pull on the cable 68 to impart clockwise rotation to the drum 48 as viewed in Figure 6. Movement of the drum again will precede movement of the arm 41, due to the drag inducing spring elements 46, so that the pawl tooth 57 immediately will be retracted from engagement with the toothed ring 36. Relative movement between the drum 48 and the arm 41 is limited by a cam surface 74 formed on the motion transmission link 53 and located in a position to engage the peripheral edge of the drum 48. Upon engagement of the link 53 with the periphery of the drum 48, the arm 41 and the drum move in unison. To maintain forward motion of the scooter the assembly 6 may be rocked back and forth so as alternately to impart a driving stroke and a return stroke to the clutch mechanism.

When it is desired to disable the clutch device and condition the scooter for foot operation, the assembly 6 may be rocked counterclockwise as viewed in Figure 2 an amount sufficient to cause the latch bar 33 to cam the latch member 23 clockwise as viewed in Figures 1 and 2 and locate the bar 33 below the notches 34 whereupon the spring 26 will cause the forward end of the latch member to drop so as to disable the assembly 6 from further pivotal movement until such time as the latch member is released in the manner previously described. In these positions of the parts the pawl 55 will be in the position shown in Figure 6, that is, out of engagement with the toothed ring 36 so as to permit the scooter to be freely coasted and run backwards if desired.

The disclosed embodiment is representative of a presently preferred form of the invention, but is intended to be illustrative rather than definitive thereof. The invention is defined in the claims.

I claim:

1. A scooter construction operable selectively by hand or foot comprising a framework; a rear wheel; means journaling said rear wheel for rotation on said framework; a handlebar assembly including a steerable front wheel; means mounting said assembly on said framework for pivotal movements about a substantially horizontal axis; a unidirectional clutch device; means mounting said clutch device for driving connection with said rear wheel; means interconnecting said assembly and said clutch device operable upon pivotal movement of said assembly in one direction for drivingly connecting said clutch device and said rear wheel; and means reacting between said framework and said assembly for selectively enabling and disabling pivotal movement of the latter for respectively enabling hand or foot operation of said scooter construction.

2. The construction set forth in claim 1 in which said enabling and disabling means includes a latch member mounted on said frame work and a latch bar mounted on said assembly.

3. The construction set forth in claim 2 including means reacting on said assembly and normally biasing

said assembly and said latch member towards latching positions.

4. A construction as set forth in claim 1 in which said clutch device includes a rotatable drum having a link pivoted thereto; an arm rotatable in response to rotation of said drum and having a pawl pivoted thereto and to said link; means exerting a drag on said arm for causing rotation of the latter to lag rotation of said drum so that said pawl is projected radially outwardly with respect to the axis of rotation of said arm; a toothed member fixed on said rear wheel in the path of projection of said pawl; and in which said interconnecting means is connected to said drum to impart rotation thereto.

5. A scooter construction comprising a framework; a handlebar assembly including a steerable front wheel; means mounting said assembly on said framework for pivotal movement about a substantially horizontal axis; a rear wheel; a spindle supported on said framework and mounting said rear wheel; a toothed member fixed to said rear wheel; an arm journaled on said spindle; a drum journaled on said arm; a pawl pivoted on said arm; a link interconnecting said pawl and said drum; means interconnecting said drum and said assembly operable in response to pivotal movement of the latter in one direction to impart rotation to said drum, rotation of said drum being imparted to said arm via said link and said pawl; means reacting between said arm and said spindle for causing rotation of said drum to lead rotation of said arm and effect projection of said pawl radially of said spindle into engagement with a tooth of said member so that continued rotation of said drum effects rotation of said rear wheel; and means reacting between said framework and said assembly for selectively enabling and disabling pivotal movement of the latter.

6. A scooter construction comprising a framework; a handlebar assembly including a steerable front wheel; means mounting said assembly on said framework for pivotal movement about a substantially horizontal axis; a rear wheel; a spindle supported on said framework and mounting said rear wheel; a toothed member fixed to said rear wheel; an arm journaled on said spindle; a drum journaled on said arm; a pawl pivoted on said arm; a link interconnecting said pawl and said drum; means interconnecting said drum and said assembly operable in response to pivotal movement of the latter in one direction to impart rotation to said drum, rotation of said drum being imparted to said arm via said link and said pawl; means reacting between said arm and said spindle for causing rotation of said arm to lag rotation of said drum and effect projection of said pawl radially of said spindle into engagement with a tooth of said member so that continued rotation of said drum effects rotation of said rear wheel; means connected to said drum for rotating the latter in the opposite direction upon pivotal movement of said assembly in the other direction, rotation of said drum in the opposite direction effecting disengagement of said pawl from said toothed member; and means reacting between said framework and said assembly for selectively enabling and disabling pivotal movement of the latter.

7. A scooter construction comprising a framework; a handlebar assembly including a steerable front wheel; means mounting said assembly on said framework for pivotal movement about a substantially horizontal axis; a rear wheel; a spindle supported on said framework and mounting said rear wheel; a toothed member fixed to said rear wheel; an arm journaled on said spindle; a drum journaled on said arm; a pawl pivoted on said

arm; a link interconnecting said pawl and said drum; means interconnecting said drum and said assembly operable in response to pivotal movement of the latter in one direction to impart rotation to said drum, rotation of said drum being imparted to said arm via said link and said pawl; and means reacting between said arm and said spindle for causing rotation of said arm to lag rotation of said drum and effect projection of said pawl radially of said spindle into engagement with a tooth of said member so that continued rotation of said drum effects rotation of said rear wheel.

8. A scooter construction comprising a framework; a handlebar assembly including a steerable front wheel; means mounting said assembly on said framework for pivotal movement about a substantially horizontal axis; a rear wheel; a spindle supported on said framework and mounting said rear wheel; a toothed member fixed to said rear wheel; an arm journaled on said spindle; a drum journaled on said arm; a pawl pivoted on said arm; a link interconnecting said pawl and said drum; means interconnecting said drum and said assembly operable in response to pivotal movement of the latter in one direction to impart rotation to said drum, rotation of said drum being imparted to said arm via said link and said pawl; means reacting between said arm and said spindle for causing rotation of said arm to lag rotation of said drum and effect projection of said pawl radially of said spindle into engagement with a tooth of said member so that continued rotation of said drum effects rotation of said rear wheel; and means connected to said drum for rotating the latter in the opposite direction upon pivotal movement of said assembly in the other direction, rotation of said drum in the opposite direction effecting disengagement of said pawl from said toothed member.

9. A scooter construction comprising a framework; a handlebar assembly including a steerable front wheel; means mounting said assembly on said framework for pivotal movement about a substantially horizontal axis; a rear wheel; means mounting said rear wheel on said framework for rotation; a unidirectional clutch device comprising a toothed member on said rear wheel, a drum member journaled for rotation about the axis of rotation of said rear wheel, a driving element engageable with said toothed member for driving the latter and said rear wheel, means mounting said element for movement into and out of engagement with said toothed member, and means interconnecting said drum and said element for controlling the movements of the latter in response to rotation of said drum member; and means interconnecting said assembly and said drum member for rotating the latter in response to pivotal movement of said assembly.

10. The construction set forth in claim 9 including means reacting between said framework and said assembly for selectively enabling and disabling pivotal movement of the latter.

References Cited in the file of this patent

UNITED STATES PATENTS

602,461	Mathews	Apr. 19, 1898
889,297	Daly	June 2, 1908
1,529,676	Tornberg	Mar. 17, 1925
1,569,204	Rogers	Jan. 12, 1926
2,081,750	Laborda	May 25, 1937
2,495,128	Panik	Jan. 17, 1950
2,538,060	Thomas	Jan. 16, 1951