April 23, 1940. R. B. MOBECK 2,198,058

EXERCISER

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FIG. 1.

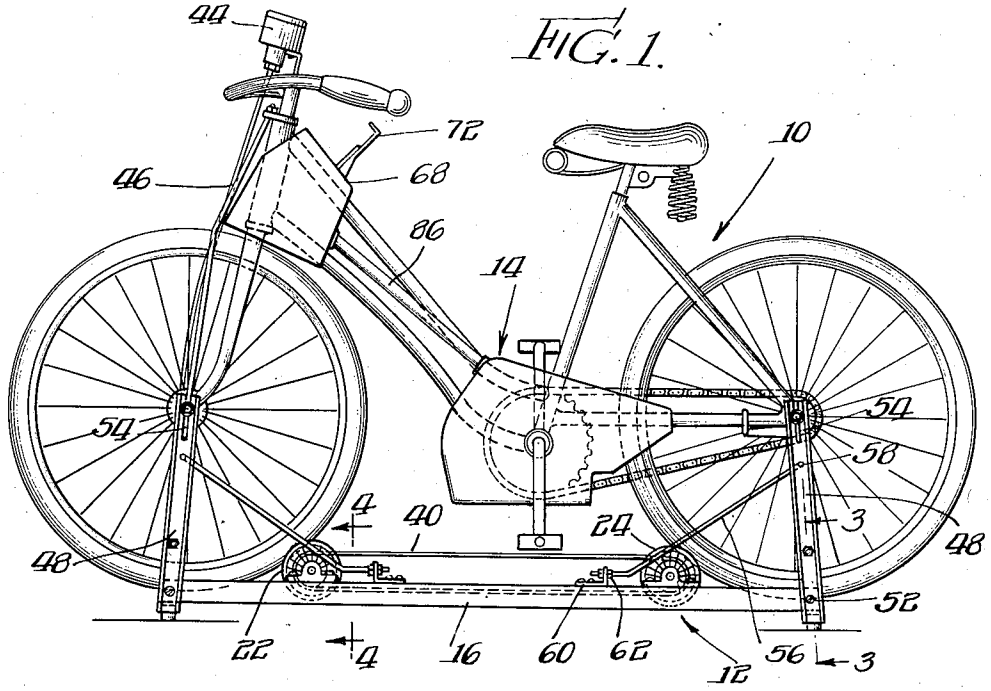


FIG. 2

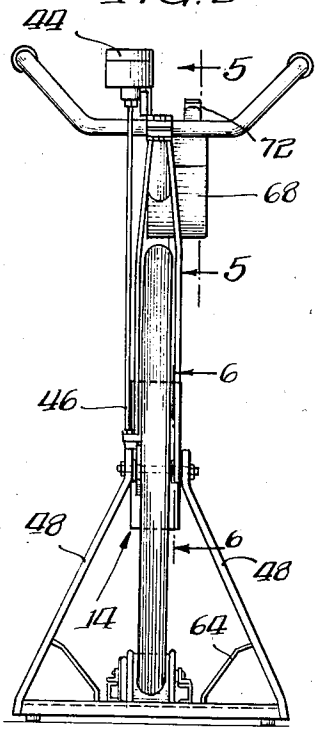


FIG. 3.

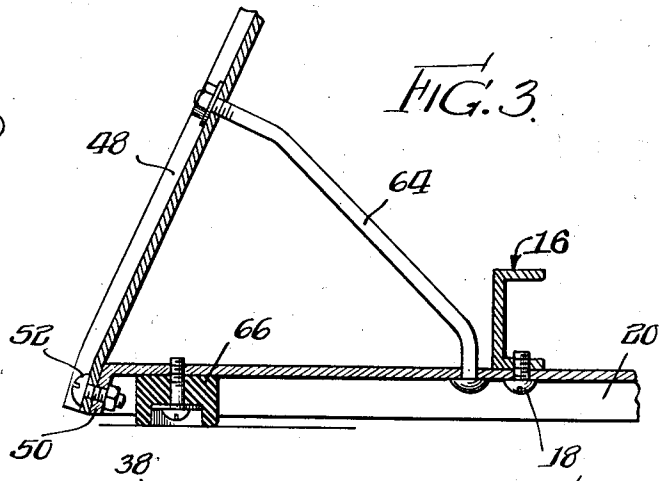
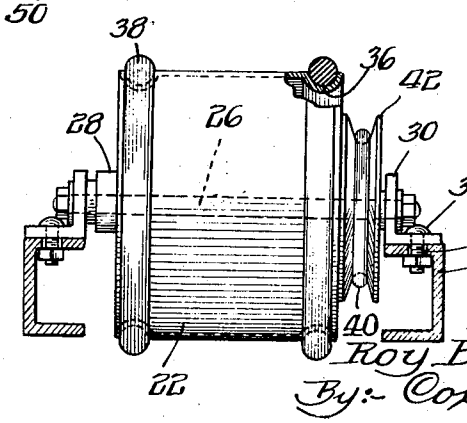


FIG. 4.



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FIG. 5.

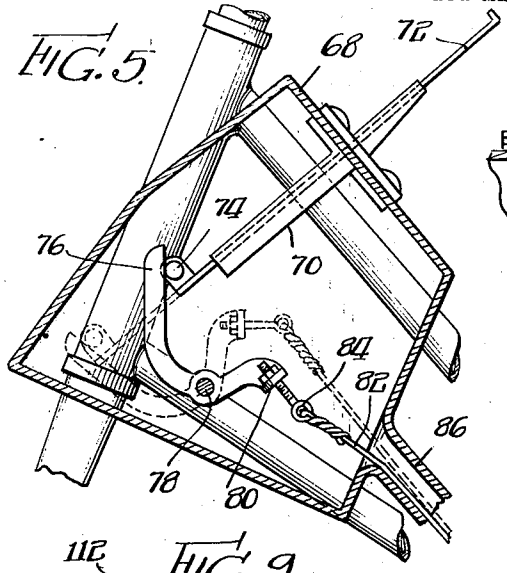


FIG. 7.

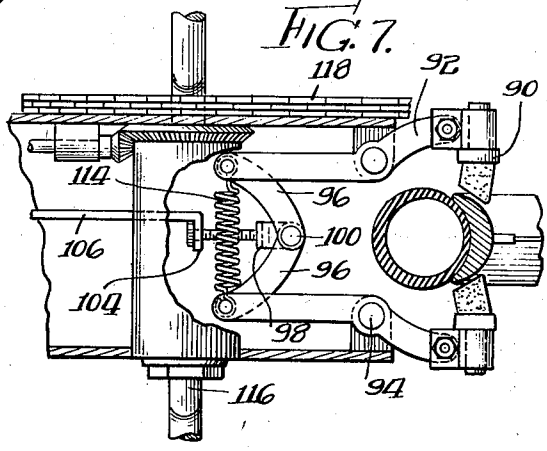


FIG. 9.

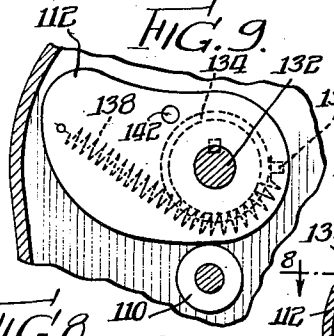


FIG. 6.

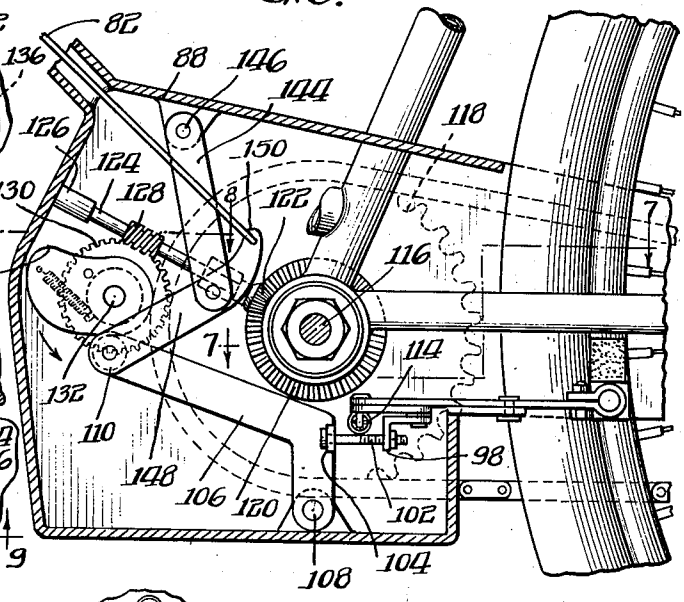
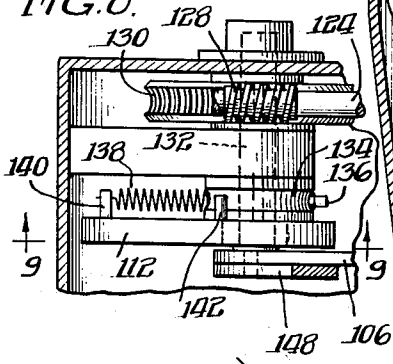


FIG. 8.



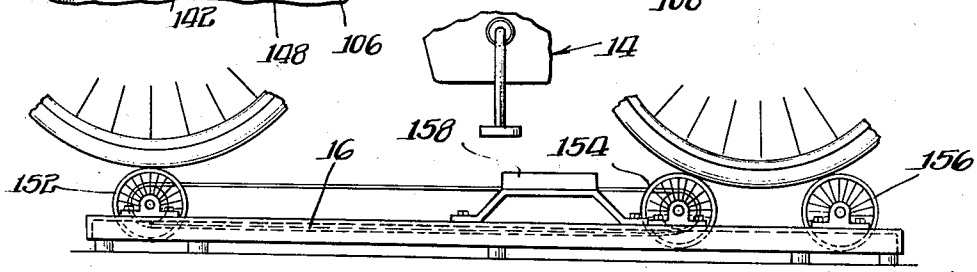


FIG. 10.

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UNITED STATES PATENT OFFICE

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EXERCISER

Roy B. Mobeck, Chicago, Ill.

Application March 14, 1938, Serial No. 195,900

6 Claims. (Cl. 272—73)

The present device relates to an exerciser or amusement device and more particularly to an exerciser simulating a mode of conveyance.

It is an object of the present invention to provide an improved and simplified mounting for a cycle or other vehicle so that the vehicle may be actuated in a more or less conventional manner to derive exercise therefrom without bodily movement of the device as a whole.

The present invention comprehends the provision of a mounting or supporting means for a cycle or manually actuable vehicle such that the cycle may be actuated to derive the normal exercise incident to cycling while the device remains in a predetermined position. In this connection the invention more specifically comprehends the provision of a mounting means such as the above which may be used with any conventional cycle regardless of size or formation and which is additionally provided with adjustable means for controlling the energy necessary to actuate the device.

An additional object of the present invention is to provide a bicycle mounting means for permitting normal actuation of the bicycle in an extremely limited space, which mounting means rigidly supports the cycle in upright and operative position with respect thereto at all times.

A yet further object of the present invention is to provide a cycle mounting and support as above which is provided with simplified means to cause the actuation of a front wheel speedometer, odometer or similar indicating or measuring means in accordance with the conditions prevailing as to speed and distance travelled were the device being actuated as a conveyance.

Another object of the present invention is to provide a control means actuable for selectively rendering the cycle operable or inoperable in accordance with predetermined actuation of the said control means by the operator.

Still another object of the present invention is to provide an improved means for automatically determining the period of operation of the device by the user after predetermined use thereof and more specifically for automatically rendering it necessary to actuate additional control means in order to permit further use thereof.

It is furthermore an object of the present invention to provide a mounting and control means as above for use in conjunction with a bicycle which comprises a minimum number of parts occupying a relatively small space and capable of being manufactured with a minimum of difficulty and expense.

Numerous other objects and advantages will more fully appear during the course and progress of the following specification.

Referring to the drawings:

Figure 1 is a side elevation of a device constructed in accordance with the present invention.

Figure 2 is an end elevation of the device taken from the lefthand side of Figure 1.

Figure 3 is a detailed sectional elevation taken on the line 3—3 in Figure 1.

Figure 4 is a detailed sectional elevation taken on the line 4—4 in Figure 1.

Figure 5 is a sectional elevation taken on the line 5—5 in Figure 2.

Figure 6 is a sectional elevation taken on the line 6—6 in Figure 2.

Figure 7 is a detailed plan section taken on the line 7—7 in Figure 6.

Figure 8 is a detailed sectional plan view taken on the line 8—8 in Figure 6.

Figure 9 is a detailed sectional elevation taken on the line 9—9 in Figure 8.

Figure 10 is a partial elevational view showing an alternative device constructed in accordance with the present invention.

The device, shown in Figures 1 to 9 for the purpose of illustrating the present invention, comprises a bicycle 10, a mounting and supporting structure for supporting the bicycle indicated generally by the numeral 12 and a control device 14 for controlling the operation of the bicycle. The bicycle 10 is of a more or less conventional type and style but various other bicycles or similar devices may be substituted therefor in the structure shown. The supporting or mounting means 12 comprises a pair of longitudinally extending channels 16 which are arranged with their open side facing inwardly and are fastened adjacent either end by means of the machine screws 18 to transversely extending channel members 20, as shown clearly in Figure 3.

A pair of supporting rollers or wheels 22 and 24 extend transversely of the longitudinally extending channels 16, being mounted for rotation on the spindle or shaft 26 through the agency of suitable bearings 28. The shaft 26 in turn is rigidly mounted upon a pair of supporting brackets 30 secured to the channel members 16 by means of machine bolts 32 passing through slots or elongated apertures 34 in the channel members. Attention is specifically directed to the fact that these slots permit longitudinal relative adjustment of the wheels or rollers 22 and

24 with respect to their supporting frame so that the device will accommodate vehicles of widely varying wheel base. Accordingly, if it is desired to substitute a bicycle of different wheel base than the one shown in Figure 1, the machine bolts 32 are loosened and tightened again after the rollers have been adjusted to the proper relative spacing.

Each of the rollers or wheels 22 is provided with annular grooves 36 adjacent its edges in which reside rings 38. These rings may preferably comprise a resilient or elastic material such as rubber which, once slipped into the grooves, will be constrained in the position shown by their own resiliency. These members determine the effective marginal limits of the supporting rollers and at all times act as a barrier to retain the adjacent wheel upon the operative surfaces thereof. In order to assure the driving of the front wheel of the bicycle in normal relationship with respect to the rear wheel, the two rollers 22 and 24 are connected by the drive belt 40 which engages in a pair of V pulleys 42 rigidly mounted on each of the rollers (see Figure 4). It will be apparent, in accordance with this disclosure, that actuation of the bicycle in the normal manner will, accordingly, not only cause rotation of the rear or driving wheel and the roller 24 in contact therewith, but, through the agency of the pulleys 42 and drive belt 40, will rotate the front wheel of the bicycle, thus causing actuation of the speedometer or odometer 44 which has operative connection with the front wheel assembly as at 46, as clearly shown in Figure 1. The belt 40 is preferably extensible so as to permit the single belt to serve in spite of variations in separation of the rollers 22, in accordance with the use of bicycles of varying wheel base.

The bicycle shown in the figures is supported by means of four upright channel supports or arms 48 which are bolted to the down-turned end portion 50 of the transverse channel 20 as at 52. The upper end of these channel arms is formed with longitudinally extending slots 54 of the proper width to accommodate the threaded end portions of the axle of the bicycle. Mounting is accomplished by removing the nuts or fasteners in the end of the axle and firmly re-applying them after the axles have been engaged by the slotted ends of the arms 48, as shown clearly in Figure 1. It has been found that the degree of effort required to actuate the cycle when so mounted can be controlled by vertical adjustment of the cycle in the slots 54. Thus, the nuts on the end of the axle shafts may be tightened against the channels with the axles in any of a plurality of longitudinal positions in the slots 54. Increasing pressure applied between the wheel tread of the bicycle and the adjacent roller by forcing the axle downwardly in the respective slot and maintaining it in this position, in accordance with the present invention, tends to increase the resistance to the operation of the cycle. This provides simple and effective means for determining the degree of exercise to be derived from the machine.

Adjustable spacing of the supporting arms 48 in order to accommodate vehicles of varying wheel base is accomplished by means of the struts 56 which are pivotally attached to the arms as at 58 and have their lower threaded ends passing through the L-shaped lugs 60 which are rigidly fastened to the longitudinally extending channel 16. Adjustment of the pairs of nuts 62 permits selective angular adjustment of the arms 48 about their pivots 52. Similar transverse adjustment is provided for the pairs of oppositely disposed arms 48, as shown more clearly in Figures 2 and 3, and comprises a plurality of bolts or tie-rods 64 engaging in the transverse channel 20 and each supporting arm 48.

When it is desired to position a bicycle on the supporting or mounting frame shown in the figures, the nuts on either side of the axles, as well as the lock nuts 62, are loosened and the ends of the axles inserted through the slots 54. The bolts or tie-rods 64 are next tightened to bring the opposed supporting arms 48 together and engage the respective axles therebetween. After this, the axle nuts are tightened firmly in the position shown and the nuts 62 brought up against the lug 60 until the supporting arms 48 are positioned as shown in Figure 1. Supporting pads or feet 66, preferably of some soft resilient material, are fastened in the transverse channels 20 (see Figure 3) to space the frame with respect to the floor.

The control device 14 is shown more in detail in Figures 5 to 9 inclusive and comprises an upper casing 68 mounted upon the frame of the bicycle near the handle bars (see Figures 1 and 5) and provided with a coin control device 70. The coin control device 70 may comprise any conventional type of mechanism adapted to permit actuation of the device upon the insertion of a coin, for example, and comprises the outer actuating handle 72 which is operatively connected to the roller member 74 supported interiorly of the casing 68. It will be understood, therefore, that when the handle or control member 72 is pressed inwardly after a coin has been properly inserted in the device, the force will be applied directly to the roller 74 to move it to the dotted line position, clearly shown in Figure 5. The roller 74 bears against the side of a bell crank 76 pivotally mounted about the transverse shaft 78 and terminating in the transversely extending lug 80 which is connected with the wire cable 82 through the agency of an adjustable eyelet 84. Accordingly, actuation of the actuating handle 72 to its full inward position will cause the roller 74 to press against the bell crank 76 to force it to the dotted line position and, accordingly, tension the cable 82, for releasing the control device by means hereinafter to be described more in detail. A tubular casing 86 encloses the cable 82 as it extends downwardly to the roller casing 88 which is similarly rigidly mounted on the bicycle frame.

The present invention comprehends the provision of means for automatically bringing the cycle to a gradual but firm stop after a predetermined use thereof and to this end there are provided a pair of brake members 90 rigidly secured to the ends of the levers 92 and adapted to oppositely engage the rim of the rearward bicycle wheel, as shown clearly in Figures 6 and 7.

The brake lever arms are pivotally mounted as at 94 to suitable inwardly extending lugs formed on the side of the casing 88 and are connected at their opposite ends with a toggle mechanism comprising links 96 pivotally secured together and to the actuating lug 98 as at 100. A machine bolt 102 extends freely through the downwardly extending arm of the lug 98, as shown in Figure 6, and through an opposed lug 104 provided on the lever 106. The lever arm 106 is pivoted to the casing 88 as at 108 and bears

on its other end a roller 110 which resides against the surface of the cam 112. It will be obvious from the above disclosure that, when the cam 112 is rotated in the direction of the arrow from the position shown in Figure 6, the roller 110 will be forced downwardly by the cam surface, and the lever 106 rotated in a counter-clockwise direction about its pivot 108, thereby drawing the lug 98 in a lefthand direction, as viewed in Figures 6 and 7, through the agency of the bolt 102, and actuating the toggle mechanism to apply the brakes 90. The brakes and the associated mechanism are normally held in operative position, as shown in the figures, through the agency of the tension spring 114. Attention is particularly directed to the fact that the braking mechanism may be readily adjusted at any time by merely tensioning or loosening the bolt 102.

The cam member is rotated to apply the brakes by means operated from the main drive mechanism of the bicycle and, in this instance, comprising the shaft 116 upon which the bicycle actuating pedals and the drive sprocket 118 are mounted. The crown wheel 120 rigidly keyed to the shaft 116, accordingly, is rotated with the sprocket 118 during operation of the machine and drives a pinion 122 mounted on a shaft 124 which is rotatably journalled in the bosses 126 which are rigid with the casing 88. The shaft 124 carries a worm gear 128 which operatively engages a worm wheel 130 mounted on the transverse shaft 132 which is in turn journalled in the casing 88, as shown in Figure 8. The shaft 132 further carries, for rotation therewith, the annularly grooved disk 134 which has a driving pin 136 radially protruding from its peripheral surface.

The cam 112 is, on the other hand, rotatably mounted on the shaft 132 and is connected to the driven disk 134 through the agency of a tension spring 138 which is secured at one end to the radially extending pin 136 and at its other end to the axially extending pin 140 on the side face of the cam 112. A second pin 142 on the side of the cam 112 is parallel with the pin 140 and seats transversely of the pin 136 in the normal rotational path thereof.

To illustrate the operation of the automatic braking device, it will be apparent that, as the shaft 116 is rotated by the operator of the machine, the shaft 132 and, accordingly, the grooved disk 134 is operated at a reduced rotational speed through the agency of the gear train represented by the gears 120, 122, 128 and 130. Attention is directed to the fact that the tension of the spring 138 is relatively small as compared with the tension of the spring 114 normally holding the brake mechanism in inoperative position so that the disk 134 may be rotated while the cam remains in the position shown in Figures 6 and 9. Figure 9 particularly discloses the relative position of the cam and disk 134 after the disk has been rotated under the influence of normal actuation of the pedals of the bicycle, from the position shown in Figure 6. After a period of use sufficient to bring the pin 136 into contact with the pin 142 the cam becomes directly driven and is subsequently moved with the shaft 132 in the direction of the arrow in Figure 6. As the roller 110 moves up the radially elevated cam surface, the lever 106 is actuated in the manner aforementioned to apply the brakes. It is believed that it will be clear from the above disclosure that the brakes 90 may be applied gently and regularly after a predetermined actuation of the device since the cam 112 may be readily shaped to provide the desired stopping action.

The aforementioned means for releasing the braking mechanism in accordance with means on the coin control casing 68 comprises a toggle composed of the link 144 pivotally mounted as at 146 to the casing 88 and at its other end to the link 148. The link 148 is pivotally mounted at one end upon the shaft of the roller 110 and at its other end is provided with a finger portion 150 attached to the end of the hereinbefore described cable 82.

For the purpose of explaining the operation of the brake releasing mechanism, it will be assumed that the brakes are in operative braking position and so maintained under the influence of the cam 112 pressing against the roller 110 at a radially elevated position on the surface of the cam. If a suitable coin is inserted in the coin control device and the actuating handle 72 forced inwardly to its full extent, the cable 82 will be tensioned to force the toggle levers 144 and 148 in the lefthand direction, as viewed in Figure 6. The toggle action will further spring or rotate the lever 106 in a downward direction so that the roller 110 will clear the outermost projecting portion of the cam 112. The cam, being unconstrained, will thus be dragged, through the tension of the spring 138, rotationally about the shaft 132 and substantially to the position shown in Figure 6. Upon release of tension on the cable 82, the roller 110, under the influence of the spring 114, will be permitted to return to its original radial position with respect to the shaft 132 at which time the brakes 90 will be withdrawn from contact with the rim of the wheel, permitting free operation thereof for such a period as is required for the cam to again automatically cause application of the brakes.

The present invention provides an exercising device which is sturdy and adequate in construction and which may be manufactured from readily available parts without undue difficulty. The device may comprise the conventional type of bicycle or various other types of cycles or vehicles and provides means for rigidly positioning the cycle while it is being used. Moreover, the present invention is more specifically concerned with an exercising device in which all of the characteristics of operation of the cycle are retained so that the conditions of use exactly simulate the exercise derived from the normal physical actuation of the device on the road. So, too, a simple effective means is provided for determining the physical operating effort necessary in analogy with various road conditions.

While one preferred means has been disclosed for controlling operation of the device, it will be obvious that various equivalent modifications may be made in accordance with the spirit of the invention; for example, in place of cam control means, screw control means or various other types of mechanical control elements may be employed.

The control device for the cycle permits smooth and resilient braking action and assures the availability of a substantially fixed, predetermined amount of use during each operative position even though the prior user may have only partially completed his allotted period of actuation.

An alternative type of device constructed in accordance with the present invention is shown

in Figure 10 and comprehends the provision of a frame member having longitudinally extending side channel members 16 as above, spaced by suitable transverse members. This type of device is particularly adapted to users who desire the experience of balancing a bicycle in the same manner as is necessary when it is actuated in the normal manner on the road. Accordingly, in this embodiment the vertical supporting arm structure is omitted and there are provided three transversely extending rollers at 152, 154 and 156, the latter two rollers preferably being positioned under the rear wheel of the vehicle, as shown, on either side of the vertical center-line of the wheel to position the bicycle longitudinally with respect to the mounting frame. A transverse platform 158 is rigidly fastened to the frame and extends to either side thereof to provide a pedestal or rest for the operator while mounting or dismounting.

It is thought that the invention and numerous of its attendant advantages will be understood from the foregoing description and it is obvious that numerous changes may be made in the form, construction and arrangement of the several parts without departing from the spirit or scope of the invention, or sacrificing any of its attendant advantages, the form herein described being a preferred embodiment for the purpose of illustrating the invention.

The invention is hereby claimed as follows:

1. In a device of the class described, a vehicle having a wheel, vehicle drive means operatively connected to the wheel for driving the wheel, a brake operatively associated with the wheel, cam means for causing actuation of the brake, cam drive means having operative connection to the first mentioned drive means and actuated thereby, and a resilient connection between the cam and the cam drive means whereby to permit actuation of the cam after a lost motion period.

2. In a device of the class described, a vehicle having a wheel and a drive means operatively connected with the wheel for driving the wheel, means for resisting rotation of the wheel after a predetermined operation thereof, said last named means comprising a cam drive member operatively connected with said first named drive means and driven therefrom, a cam follower associated with the cam, brake means actuable in accordance with the respective positioning of the cam and the cam follower, and resilient connecting means between said cam and the cam drive member to permit delayed operation of the cam.

3. In a device of the class described, a vehicle having a wheel and a drive means operatively connected with the wheel for driving the wheel, means for resisting rotation of the wheel after a predetermined operation thereof, said last named means comprising a cam drive member operatively connected with said first named drive means and driven therefrom, a cam follower associated with the cam, brake means actuable in accordance with the respective positioning of the cam and the cam follower, resilient connecting means between said cam and the cam drive member to permit delayed operation of the cam, and means for retracting said follower from the cam to permit resilient resetting thereof after actuation of the brake means.

4. In a device of the class described, a bicycle having a wheel and pedal drive means operatively connected with the wheel for driving the wheel, means for resisting rotation of the wheel after predetermined operation thereof, said last named means comprising a cam, cam follower means operative for actuating the rotation resisting means, cam drive means associated with the first named drive means and operated thereby, a resilient lost motion driving connection between the cam and the cam drive means, said resilient means being operable to move the cam when the follower is released, and means for shifting the follower to release the cam for resetting.

5. In an exercising device comprising a cycle, a mounting and supporting means for the cycle and having a fixed frame, rotatably mounted cylinders supportingly engaging the wheels of the cycle, brake means for resisting actuation of the vehicle, cam control means for said brake, the cam control means being operated by predetermined actuation of the cycle, and means selectively operable for resetting the cam means in a starting position wherein the brake is released and the control means set to permit a predetermined period of operation before again actuating the brake.

6. In a mounting means of the class described, a frame, a transversely extending, rotatably mounted roller on the frame and adapted to contact a wheeled vehicle, an opposed pair of spaced, upstanding supporting and positioning members secured to the frame adjacent one end thereof and adapted to extend on opposite sides of a vehicle wheel to oppositely engage a vehicle axle therebetween, and means to fixedly adjust the separation of said positioning members to accomodate vehicle axles of varying dimension, said last named means comprising strut members operatively connected to each supporting member and to the frame and being adapted to fixedly control an angular relationship of each positioning member with respect to the frame, said strut members being selectively adjustable in length for varying said angular relationship whereby to vary the lateral position of portions of the supporting members.

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