United States Patent

Ratcliffe

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[54] **SIMULATED STEERING DEVICE HAVING A MANUALLY CONTROLLED FRICTION RESISTANCE TO STEERING MOVEMENTS**

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[52] **U.S. Cl.** ..... **272/83 A,** 272/DIG. 3, 35/11, 46/1 B, 272/79 R

[51] **Int. Cl.** **A63b 21/22,** A63b 21/00

[58] **Field of Search** 272/DIG. 3, 83, 82; 35/11

[56] **References Cited**

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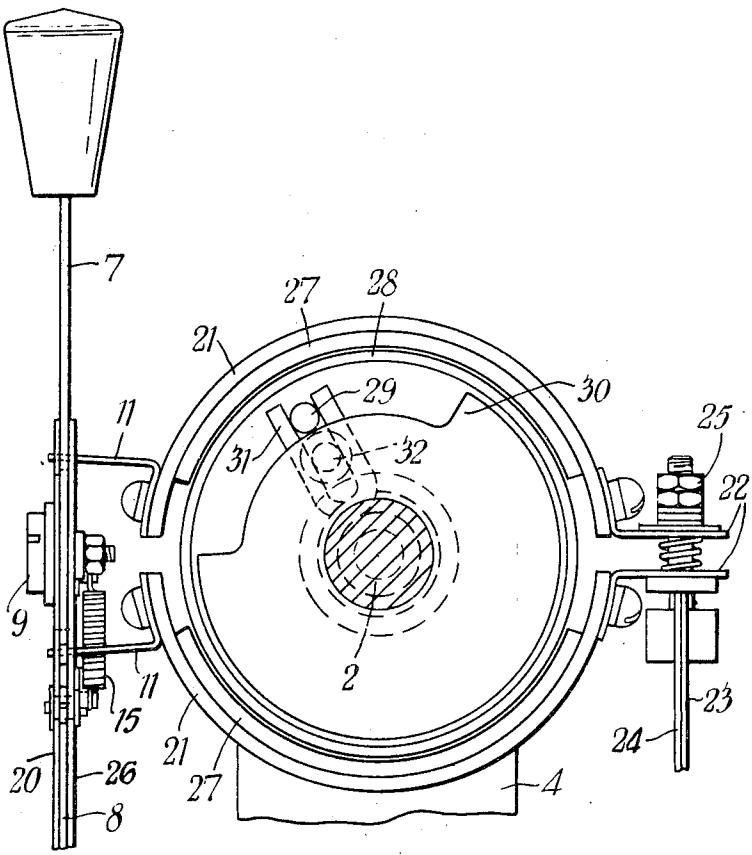
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Assistant Examiner—William R. Browne
Attorney—Waters, Roditi, Schwartz & Nissen

[57] **ABSTRACT**

A portable device for use in driver instruction or physiotherapy and having a steering wheel connected by a friction spindle to a brake which is manually adjustable to vary the friction resistance to rotation of the steering wheel encountered by a user of the device. The rotation of the spindle is transmitted to the brake through a torque transmission spring.

7 Claims, 7 Drawing Figures



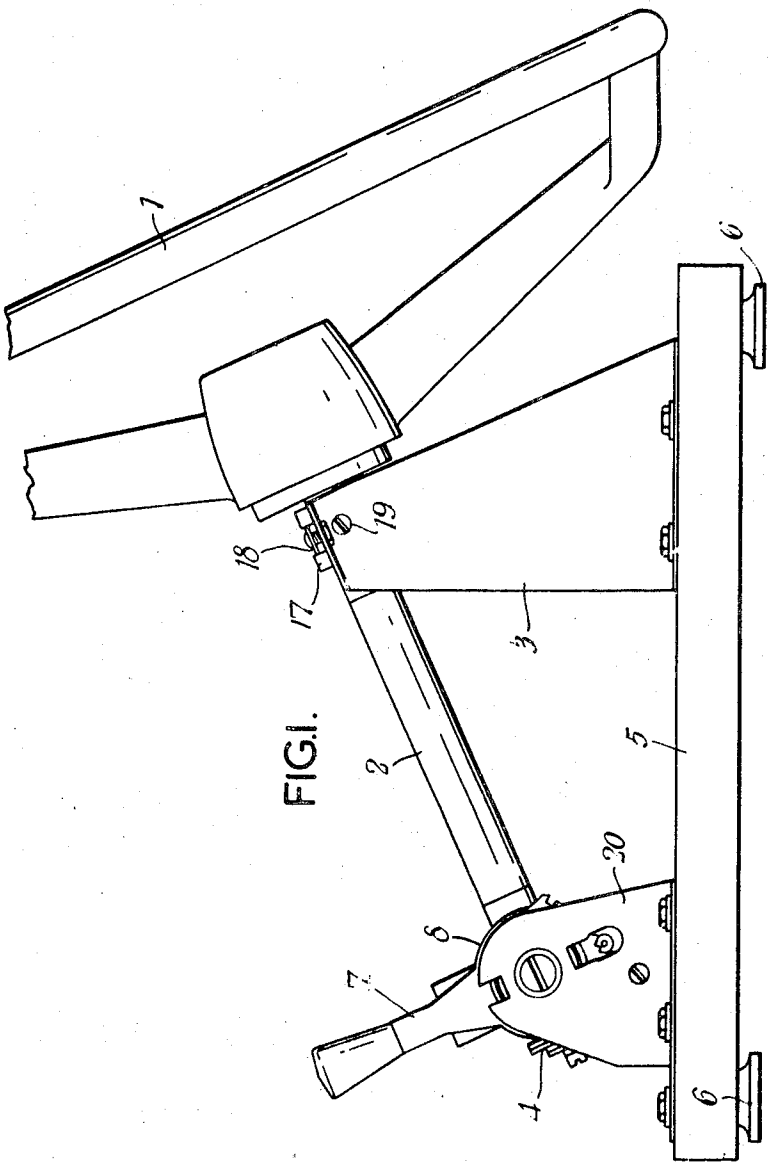


FIG.1.

FIG.2.

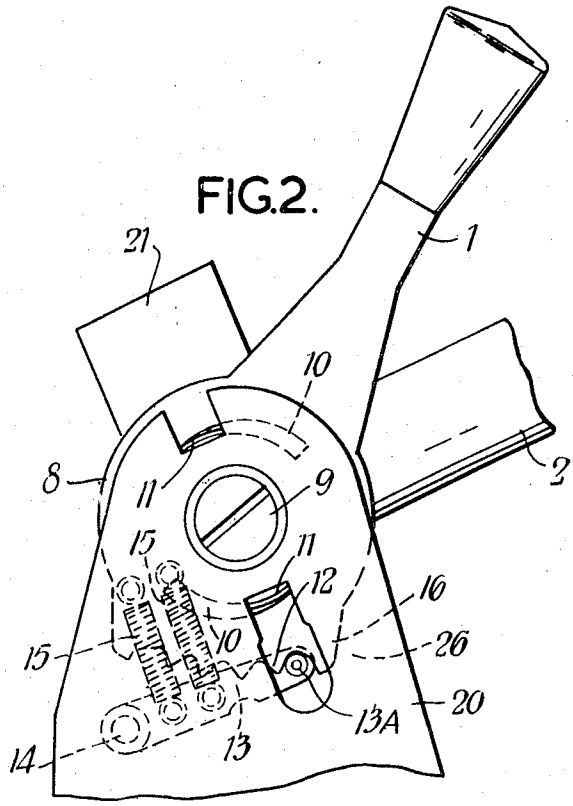

21
1
10
8
11
9
2
15
11
12
16
15
10
26
13A
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14
13

FIG.3.

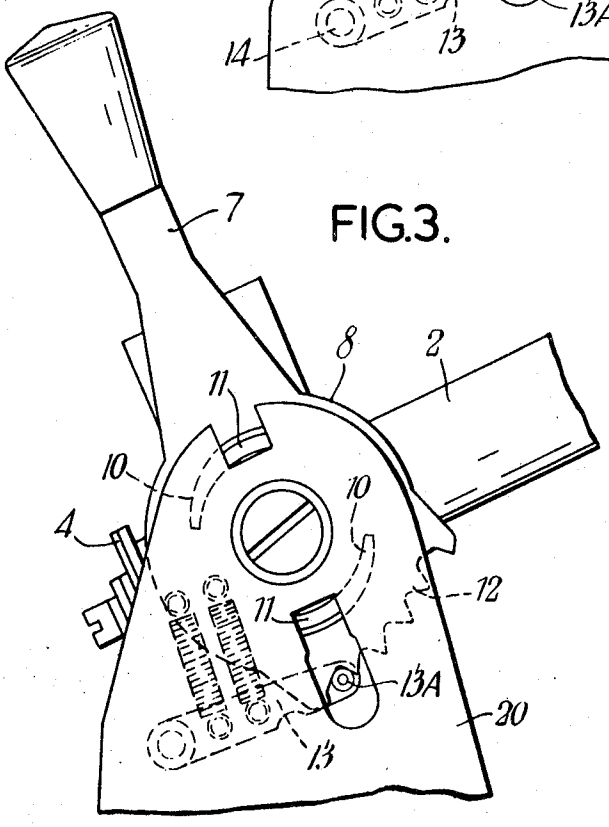
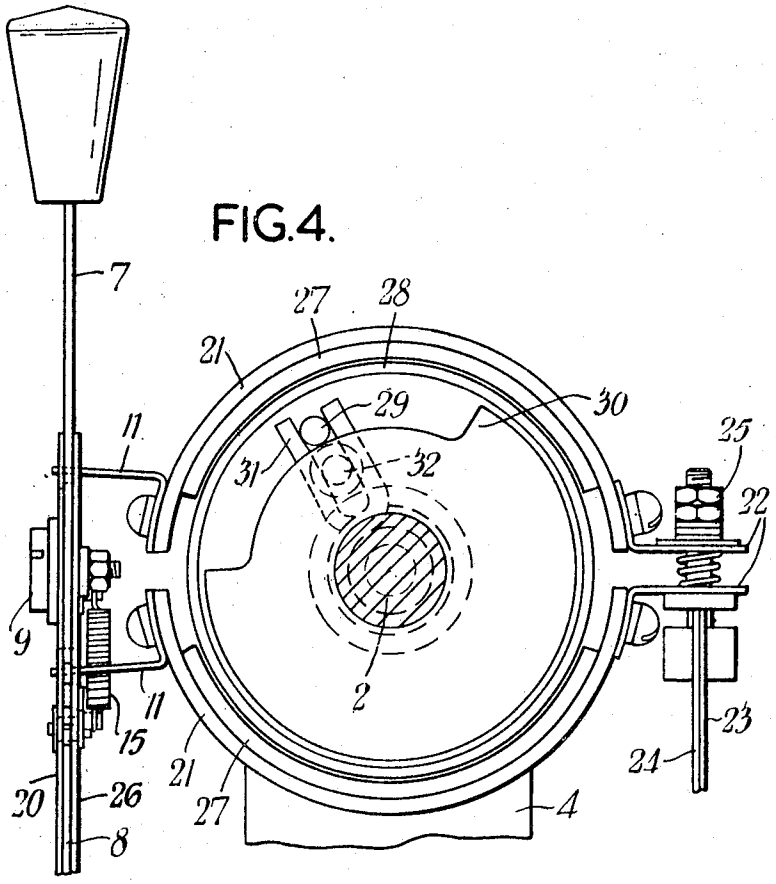

7
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4
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13A
20
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FIG.4.



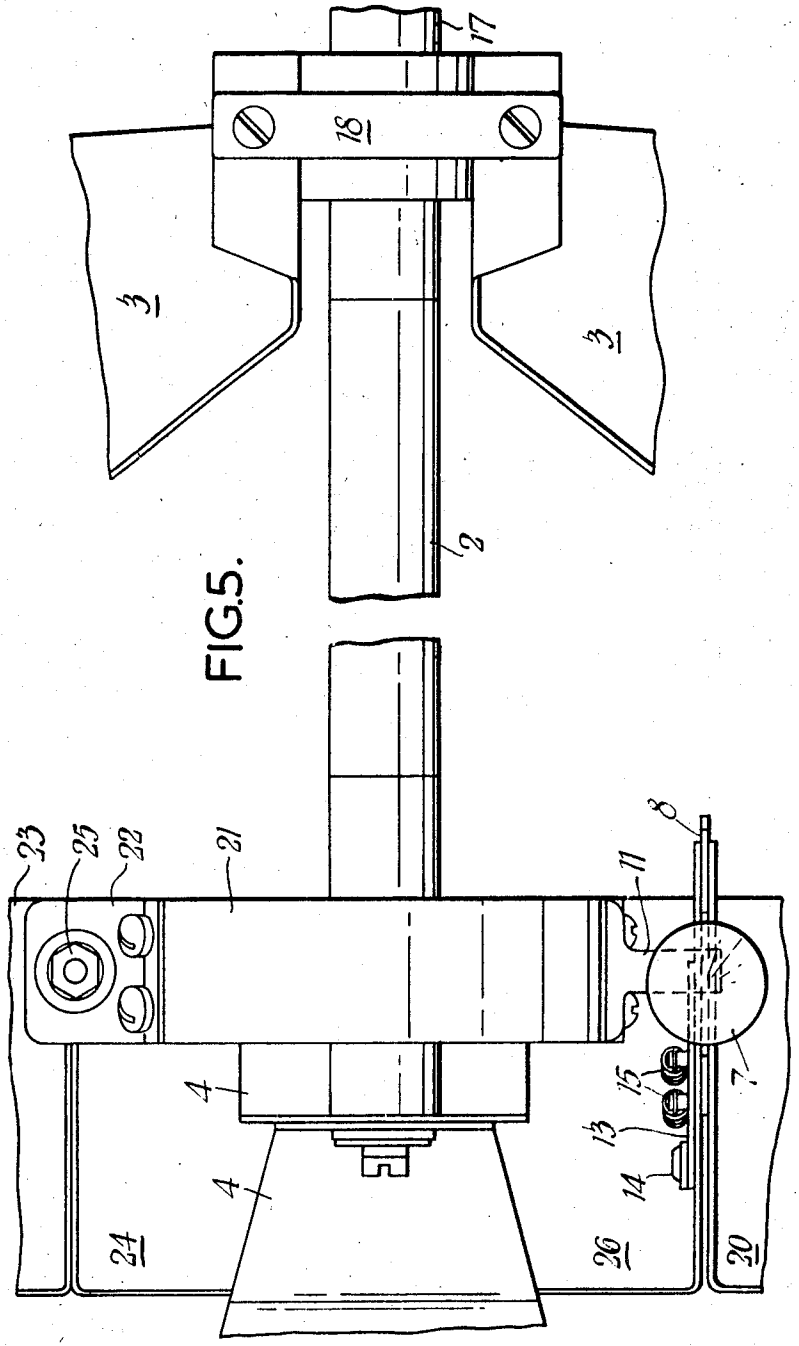


FIG.5.

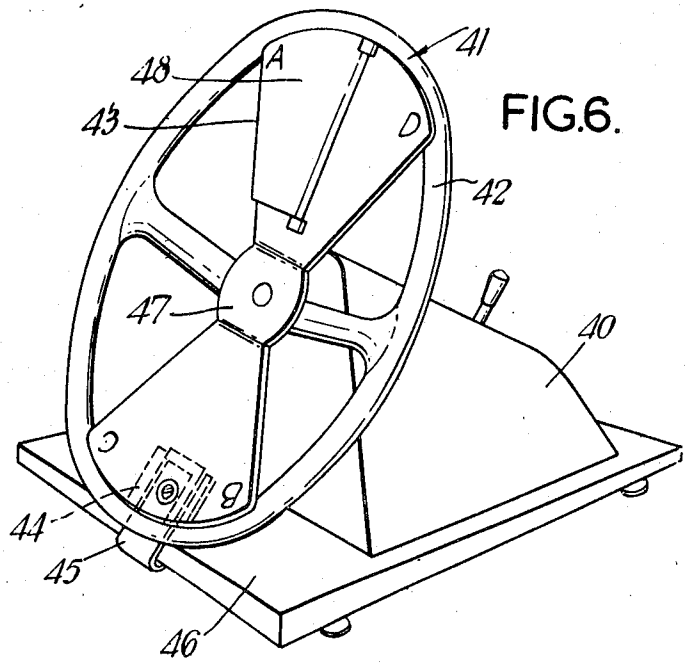


FIG.6.

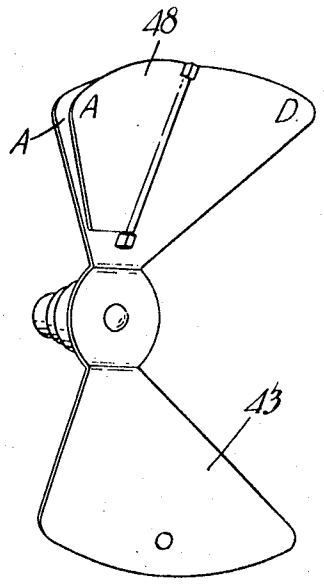


FIG.7.

SIMULATED STEERING DEVICE HAVING A MANUALLY CONTROLLED FRICTION RESISTANCE TO STEERING MOVEMENTS

This invention relates to devices for use in driving instruction or physiotherapy.

In driving instruction, there is often encountered the tendency on the part of the pupil to cross his hands over while turning the steering wheel of the car, particularly while negotiating a sharp turn. This habit is best eliminated, but most people require several lessons to stop this tendency. The invention provides a simple and robust device that may be either portable or mounted on a desk, that can be left at the pupil's home between lessons, and used, for say, 10 minutes each day as an exercise.

This device can also be used in physiotherapy for cases where the hands or arms are affected, providing a more interesting exercise, particularly for children, than merely squeezing a rubber ball, or similar exercises at present used in hospitals.

According to the present invention there is provided a device consisting of a steering wheel connected by a spindle to a frictional brake, said brake being manually adjustable in order to vary the resistance to rotation of the steering wheel.

For a better understanding of the invention, and to show how the same may be carried into effect, reference will now be made, by way of example, to the accompanying drawings, in which:

FIG. 1 is a side view of a device for use in driving instruction or physiotherapy,

FIG. 2 is a side view, to an enlarged scale, of the brake adjusting mechanism of the device of FIG. 1,

FIG. 3 is a further side view of the brake, the adjusting lever thereof being in an opposite extreme position to that shown in FIG. 2,

FIG. 4 is an end view of the brake,

FIG. 5 is a plan view of the brake and associated parts.

Referring to FIG. 1 of the drawings, a steering wheel 1 is mounted on a spindle 2. Side brackets 3 and end brackets 4 support the spindle rotatably on a base 5. The base 5 is provided with rubber suckers 6 in order that it may be temporarily fixed to a desk, shelf or other smooth surface.

The device includes an adjustable brake which consists of a lever 7 integral with a disc 8 mounted on a shaft 9 in mounting plates 20 and 26. The disc 8 has two arcuate slots 10 that are widened in a clockwise direction as seen in FIGS. 2 and 3. Terminal members or projections 11, attached to the ends of brakeshoes 21, engage in said slots 10, so that, on movement of the lever 7 in an anticlockwise direction, the projections are allowed to move farther apart thus slackening the brakeshoes 21. The disc 8 is provided with several teeth 12 on its circumference, these teeth engaging a pin 13A carried by an arm 13, which is pivoted about a rivet 14, the pin 13A being pulled towards the disc 8 by means of two tension springs 15. The pin 13A is prevented from overrunning the teeth 12 by means of stops 16.

FIG. 5 shows the side brackets from above, and also shows the spindle 2 mounted in a brass bush 17 which is fastened to the bracket 3 by bolts 19 shown in FIG. 1. The brass bush 17 has a radially movable section which is pressed onto the spindle 2 by an adjustable spring steel strip 18. The parts 17 and 18 afford a secondary brake whose purpose will be described below. The brakeshoes 21 are semicylindrical, and are each provided at one end with an end piece 22, the shoes 21 being clamped together and to brackets 23 and 24 by a bolt and spring assembly 25. The spring of the assembly 25 urges the end pieces 22 apart and thus tends to maintain the shoes 21 out of contact with a drum 28. At this time, only the secondary brake provides a gentle resistance to the rotation of the spindle 2. To the other ends of the shoes 21 are attached the projections 11 that are inserted into the slots 10 of the lever disc 8. The lever 7 is supported by brackets 20 and 26.

As best shown in FIG. 4, the brakeshoes 21 are provided with frictional linings 27, and, upon the projections 11 being moved towards each other by bringing the pin 13A past at least the first of the teeth 12, said linings 27 grip the drum 28 which is rotatably mounted on the spindle 2. Axially parallel to, and mounted on the base of, the drum 28 is a pin 29. Said pin 29 projects through a cutout in a disc 30 which is rigidly secured to the spindle 2. Wound around the spindle 2 is a helical spring 31, the ends of which project radially at opposite sides of the pin 29 and of a dowel 32. Movement of the spring 31 relative to the drum 28 is effected by the dowel 32 which is fixed to the disc 30. Rotation of the spindle 2 thus tends to tighten the spring 31 and causes one or other of the ends thereof to bear drivingly against the pin 29.

When the linings 27 are in contact with the drum 28, the spring 31 offers progressively increasing resistance to the rotation of the spindle 2 until the force of the spring is sufficient to rotate the drum 28 against the frictional resistance of the brakeshoe 21, or until one of the radial end edges of the cutout in the disc 30 bears against the pin 29 and the drum 28 is positively rotated by the spindle. The spindle 2 self-centers the wheel 2 by returning to its original position relative to the drum 28 on being released. However, the wheel 1 may be in a different angular position from the original if the drum 28 has been rotated as will usually be the case.

The different positions of the lever 7 make the wheel 1 lighter or heavier to turn by giving different degrees of resistance to movement between the two extremes of relatively free movement when the brakeshoes 21 are released completely and maximum resistance to motion when the drum 28 may be rotated positively by the radial end edges of the cutout in the disc 30. The spring 18 and radially movable section of the bush 17 cooperate to produce a light braking effect which prevents the wheel 1 and spindle 2 from spinning freely. This secondary brake also prevents the wheel 1 from oscillating or "kicking back" under the action of the spring 18, when the main brake is fully or partially applied.

The device may be used on other training machines or on motor vehicles, and may be made of polymethyl methacrylate or other rigid plastics or nonplastics materials.

The portable device is shown in its most basic form but can be modified by adding, for example, an imitation dashboard. The lever 7 can be made to look like, but not to function as, an automobile gear lever, and/or can be calibrated to show at a glance what position it is in. The "dashboard" and "gear lever" modifications add interest for children using the device as a toy or in physiotherapy, in which latter field the invention has many possibilities for people of all ages. When the device is to be employed for either driving instruction or physiotherapy, it may be left at the pupil's home for use by him or her as required.

I claim:

1. A portable device for use in driving instruction and physiotherapy, the device comprising a rotatable steering wheel, a frictional brake including a rotatable braked member and braking means, a torque transmission means connecting said steering wheel and said braked member, said torque transmission means including a spindle and a torsion spring, said torsion spring forming the connection between the spindle and the brake so as to provide resiliently opposed forces against movements between the torque transmission means and the braked member, the brake being manually adjustable in order to vary the frictional resistance to rotation of the braked member, and said frictional brake means being operable to provide frictional resistance to turning movements of the steering wheel during a training program.

2. A device as claimed in claim 1, wherein the braked member is a drum movable by said spring, said braking means engaging said drum, said braking means comprising two frictional brakeshoes, for applying pressure to the shoes on the drum.

3. A device as claimed in claim 2, wherein the means for varying the pressure between the brakeshoes and the brakedrum comprises a disc and a lever directly connected to said disc for rotating said disc, the disc two cam spaced apart

slots for receiving terminal members attached to ends of the brakeshoes, whereby rotation of the disc by the lever cams the terminal members and causes the brakeshoes to move toward or away from each other.

4. A device as claimed in claim 3, including a pin for retaining said disc in any one of a number of angular positions, said pin being spring loaded against a plurality of teeth formed on the periphery of said disc.

5. A device as claimed in claim 2, wherein the spindle is rotatably mounted coaxially with the drum, a disc secured to the spindle within the drum, said disc having a periphery shaped to define a cutout portion, a pin secured to the base of the drum and projecting into said cutout portion, the spring comprising a helical spring wound about and secured to the spindle and having substantially radially projecting ends

located on either side of the aforesaid pin and on either side of a pin secured to the disc, rotation of the spindle causes a torsional force to be built up on the drum via the spring, until either that force becomes large enough to overcome the frictional resistance retarding rotation of the drum or one of the end edges of the cutout portion engages the pin secured to the base of the drum and rotates the drum.

6. A device as claimed in claim 1, including bearings mounting the spindle adjacent the ends of the spindle, at least one of which exerts a damping effect on rotation of the spindle.

7. A device as claimed in claim 6, wherein said at least one bearing comprises a bushing having a radially movable section, a spring strip acting against the section so as to urge the latter against the spindle.

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