force applied by a brake shoe **96**. Brake shoe **96** has a shaft **98** with an internal magnet, which interacts with an electromagnetic coil **100**. A centering spring **102** holds the brake shoe in its center position in the absence of an applied current to the coil **100**.

[**0034**] **FIG. 7B** is a top, cutaway view showing coil **100** and brake shaft **98** from the top. **FIG. 7C** is a cutaway side view showing brake shaft **98** with two internal magnets **104** and **106**. The cutaway portion of the coil is shown as squares **100**.

[**0035**] The design of FIGS. **7**A-**7**C is useful when there is limited space in the mouse or other input device. The coil and shaft arrangement can also provide a stronger force than the voice coil of FIGS. **6**A-**6**E. The centering spring is needed because the system of FIGS. **7**A-**7**C is unstable when the voice coil turns the magnetic shaft.

[**0036**] **FIG. 8A** is a side view of yet another embodiment showing a mouse **110** in which limited space is available for mounting an actuator next to wheel **112**. In this embodiment, a plate **114** beneath the wheel has a pair of ribs **116** and **118**. By sliding plate **114** left or right, a braking action is provided by biasing the ribs against the wheel **112**.

[**0037**] **FIG. 8B** shows a top view illustrating the plate, or brake link, **114** which winds around a center ball mechanism of the mouse **120** to a permanent magnet block **122** and coil arrangement **124** at the rear of the mouse. This actuator (the coil and magnets) is on the opposite side of the ball cage **120** from the braking ribs **116** and **118**.

[**0038**] **FIG. 8C** is a perspective view showing just the plate or brake link **114** in isolation. This gives a better view of the plate, including the ribs **116** and **118**, and the magnets **122**. A slot **126** between the magnets is where the coil **124** (on its own PC board) of **FIG. 8B** is mounted. The coil, when activated, will interact with magnets **122**, causing the plate to either move to the right or left as shown in **FIG. 8C**. This system also relies on the movement by the user, since the ribs will come in contact with the wheel, but continued rotating by the user's finger increases the pressure against the rib, providing the resistance feel.

[**0039**] Other variations of the above embodiments could be used. For example, multiple magnet/brake combinations could be used, with one creating a low friction force and another creating a high friction force. Alternately, different sets of brakes could be used for creating resistance in one direction versus the other direction. Multiple pairs of magnets/brakes can create multiple effects which can be individually selected for each direction, and even combined by activating both magnets/brakes for one direction resulting in a very high braking force for that direction.

[**0040**] The above embodiments show actuation using a voice coil or other coil or actuator which has two positions, on and off. Alternately, an analog system could be used to vary the amount of resistance provided by the brake.

[**0041**] As will be understood by those with skill in the art, the present invention may be embodied in other specific forms without departing from the essential characteristics thereof. For example, other braking mechanisms or autoblocking mechanisms than those set forth above could be used. In addition, the wheel could be located on a track ball, joystick, keyboard, game pad or any other input device to an intelligent host, such as a computer or game controller. The input device could be wireless, and derive its power from a battery. Accordingly, the foregoing description is intended to be illustrative, but not limiting, of the scope of the invention which is set forth in the following claims.

What is claimed is:

1. An input device comprising:

a sensor for detecting movement of at least a portion of said input device;

a wheel extending from said input device, said wheel being rotatably mounted about a wheel axis;

an autoblocking mechanism for providing resistance to a force from a user's finger on said wheel, said resistance corresponding to an amount of force applied by said user's finger; and

an actuator, responsive to a control signal, for activating said autoblocking mechanism.

2. The input device of claim 1 wherein autoblocking mechanism comprises a brake which, when activated, contacts an edge of said wheel at an angle such that increased turning of said wheel facilitates a braking force.

3. The input device of claim 1 wherein said actuator comprises an electromagnet.

4. The input device of claim 1 wherein said autoblocking mechanism comprises:

a brake shoe having a concave shape, such that when biased against said wheel by said actuator, said brake shoe contacts said wheel at a first point on said brake shoe, and upon the turning of said wheel by said user, a second point on said brake shoe contacts said wheel.

5. The input device of claim 4 wherein said actuator comprises a voicecoil connected to a pivot arm of said brake shoe, for tilting said brake shoe upon activation of said voicecoil.

6. The input device of claim 4 wherein said actuator tilts said brake shoe down when a user is rotating said wheel down toward said brake shoe, and tilts said brake show up when said user is rotating said wheel up toward said brake shoe.

7. The input device of claim 4 wherein said second point on said brake shoe has an angle to said wheel greater than a friction angle, such that excess force by said user rotating said wheel will cause said wheel to skip.

8. The input device of claim 4 wherein said actuator comprises an electromagnet, and said brake shoe has a shaft with an imbedded magnet, such that an interaction between said electromagnet and said shaft causes said shaft to rotate.

9. The input device of claim 1 wherein said autoblocking mechanism comprises:

a plate positioned on an opposite side of said wheel from said user's finger, said plate having first and second ribs positioned on opposite sides of said wheel, such that lateral movement of said plate causes one of said ribs to engage a periphery of said wheel.

10. The input device of claim 9 wherein said actuator comprises:

a coil and magnet arrangement at an opposite end of said plate from said ribs, one of said coil and magnet being connected to said plate.