

## THE SMOOTH SWING

A child's swing is a wonderful invention which is appreciated by almost all children and by more than a few adults. I, for one, wish that play-areas had big swings for adults!

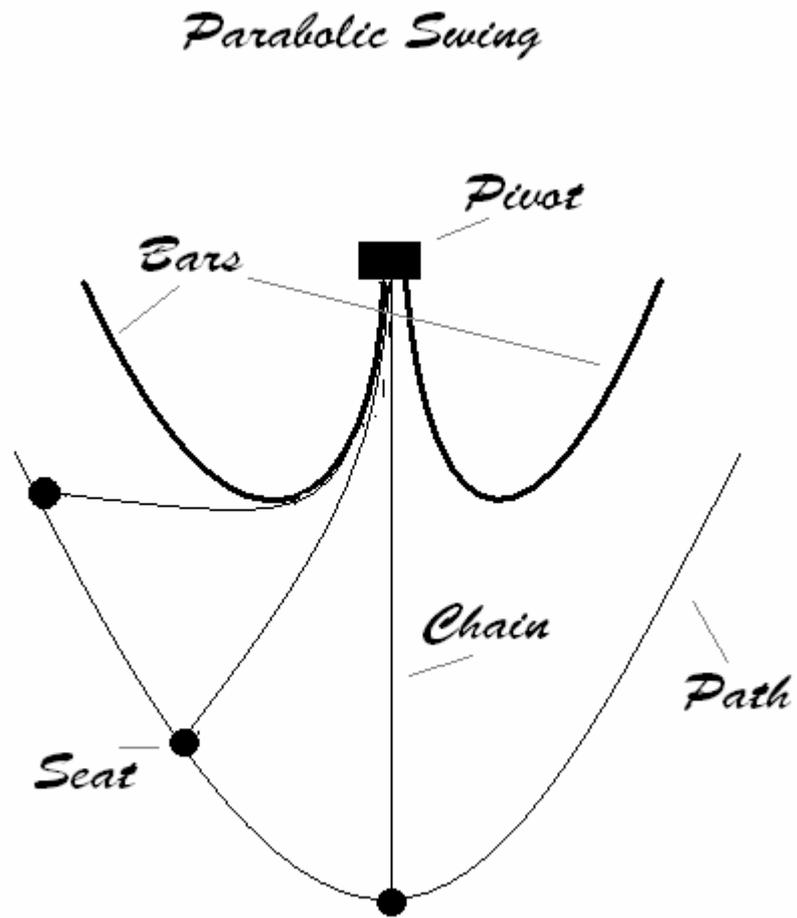
The invention outlined here relates to a simple modification of the traditional recreation park swing. The seat in a traditional swing traces out a circular path, as does the pendulum bob in a simple pendulum clock. However, from the point of view of conservation of energy, a circular path is not ideal as it causes unnecessary accelerations and consequent forces which would be minimised if the path were parabolic.

This fact was well known to some clock makers: pendulum bobs describing circular paths expend more energy and slow down faster than pendulum bobs describing parabolic paths. In order to rectify this, a simple device round the pivot point was introduced in some clocks in order to convert what would be circular motion into approximate parabolic motion of the pendulum bob at the end of the pendulum string or wire.

The same principle may be used on a child's swing. Metal bars of suitable curvature could be attached to the pivot bar of a swing in such a way that the swing would be obliged to follow a path which is more nearly parabolic (see Figure 1). The curvature of the bars is designed so that the motion of the top part of the two ropes or chains is inhibited in such a way that the seat is constrained to follow an approximate parabolic trajectory for good sized oscillations.

The main advantages of this device are:

- the child would experience more nearly smooth simple harmonic motion which would feel safer and more exhilarating,
- the energy required to keep the swing going would be less.



**Figure 1** Bars fitted to swing to extend range of approximate simple harmonic motion

## CLAIM

A simple addition to a child's play-ground swing that guides the swing in a parabolic path making it easier to propel and more fun to ride.

## ABSTRACT

### THE SMOOTH SWING

The invention relates to pairs of specially curved flat bars fitted to the top bar of a child's swing. The purpose of these bars is to constrain the path of the chain in such a way that the seat follows a parabolic trajectory over a certain range of angles. The flat bars are specially shaped so that the effective length of the chain is reduced by the correct amount as the angle of the swing increases in order to make the seat follow a parabolic rather than a circular path. This simple device will improve a swing by making the ride smoother and by requiring less energy to perpetuate the motion.