

CRADLE MOVING DEVICE

This invention relates to a device for moving a cradle.

Traditionally, cradles have been mounted from a support and then caused to rock from side to side in order to encourage a baby to fall asleep. It has been found that the side to side movement can be most uncomfortable for young children. Furthermore, it is often found that it made little difference to the length of time in which a child goes to sleep as to whether or not the cradle is stationary or is rocking from side to side.

In accordance with the present invention, a device for moving a cradle comprises an assembly for supporting a cradle above the ground the assembly being connect to a frame and being movable in a vertical direction relatively to the frame; at least one spring connected between the assembly and the frame; and at least one solenoid operable to attract a magnetic part of the support assembly during upward movement of the assembly, whereby the support assembly is caused in use to move regularly up and down relatively to the frame.

The inventor has found the the up and down movement helps considerably to make young children fall asleep more quickly than with a stationary cradle or with the traditional side to side rocking cradle. Furthermore, the mental and physical growth of the young child is safe-guarded.

Preferably, the amplitude of the up and down movement is small so that the chances of brain damage being caused to the child is minimised.

5 The number of springs used will depend upon the weight of the cradle and child and is selected so that the amplitude of the up and down movement is substantially the same irrespective of the weight of the child and cradle.

10 The use of a solenoid provides a particularly convenient way in which to control the movement of the assembly merely by switching on and off the current supplied to the solenoid. In particular, the or each solenoid may be connected to an electrical time switch which is arranged to supply electric current to the
15 or each solenoid during upward movement of the assembly. Thus, as the assembly starts to move upwards, the time switch triggers 'on' to cause the solenoid to attract the magnetic part of the support assembly for a given period determined by the time switch which will
20 then switch off causing the magnetic force applied by the solenoid to cease and allowing the assembly to drop down under the influence of gravity. As the assembly reaches its lowest point the time switch again triggers 'on' and the oscillation repeats.

25 Preferably, the magnetic part of the assembly associated with the or each solenoid comprises an iron bar which may move vertically through the respective solenoid.

Further adjustment to the device may be made

depending upon the weight of the child in the cradle, if the vertical position of the or each solenoid relatively to the frame is adjustable. This then enables the distance between the solenoid and the magnetic part of the assembly to be adjusted to a preselected value so that the time for which the time switch switches on need not be adjusted. Adjustment of the or each solenoid may be simplified if an indicator of the magnetic part of the assembly is visible.

The device will operate fairly silently which is particularly important, but shock absorbing means may be provided additionally to damp contact between the assembly and the frame during upward movement of the assembly.

An example of a device in accordance with the present invention will now be described with reference to the accompanying drawings, in which:-

Figure 1 is a diagrammatic side elevation of the device with a cradle attached;

Figure 2 is an enlarged view, partly in section, of part of the device shown in Figure 1; and,

Figure 3 is a block circuit diagram showing how the solenoids are operated.

The device comprises a frame having four supporting legs (two shown in Figure 1) and a cross bar 2 welded to the upper ends of the legs 1. A cradle 3, which may be of a conventional type and made of elastic synthetic string providing good ventilation, is suspended from an iron bar 4 by means of two hooks 5. The hooks 5 are provided with locks (not shown) at their lower ends adjacent to the cradle 3 to prevent the cradle overturning. This is particularly important because babies have the habit of rocking their cradle before they fall asleep and thus keeping the cradle 3 in a fixed position will reduce the

chances of the baby falling out. The iron bar 4 is suspended from the cross bar 2 by means of three springs 6 received in apertures 7 in the cross bar 2 and apertures 8 in the iron bar 4. The number of
5 springs used will depend upon the weight of the cradle 3, iron bar 4, and the baby and on the strength of the springs used.

Two more iron bars 9 are attached at each end to the iron bar 4. As may be seen more clearly in Figure
10 2, the lower end of each iron bar 9 is formed as a ball 10 which is freely rotatable in a socket 11 in the iron bar 4. This loose connection compensates for any misalignment of the assembly.

A pair of solenoid housings 12 are suspended
15 from the cross bar 2 by respective hooks 13. Each hook 13 is received in an aperture 14 in a cross bar 2 and hooks under a loop 15 mounted on the solenoid housing 12.

A solenoid 16 is mounted in each solenoid
20 housing 12 by means of a collar 17 attached to a slider 18 which is slidable along a rod 19 attached to the housing 12 by means not shown. A bolt 20 extends through the slider 18 in to engagement with the rod 19 to hold the slider and
25 solenoid in position. The solenoid 16 is mounted about a metallic tube 21 connected to a collar 22 which is itself connected to a slider 23 slidable along the rod 19. A bolt 24 extends through the slider 23 to fix the slider to the rod 19. The iron
30 bar 9 is slidable within the tube 21 which ensures that the iron bar 9 remains coaxial with the solenoid 16, while the metallic nature of the tube 21 absorbs heat created by the solenoid in use. This
35 latter feature is particularly important where the assembly is used for a significant length of time,

for example two to three hours.

5 A plate 25 is welded to the lower part of the bar 9 and carries a thin, vertically extending rod 26. The rod 26 has a cross bar 27 which coincides with the upper end of the bar 9. The cross bar 27 is visible through a slit 28 in the solenoid housing 12 so that the position of the upper end of the rod 9 can be determined. Another slit 29 in the solenoid housing 12 enables access to be obtained
10 to the slider 18.

Shock absorbing material 30 is provided on the under side of the solenoid housing 12 and on the adjacent part of the iron bar 4 to damp any contact between the iron bar 4 and the housing 12 during
15 upward movement of the bar 4.

As may be seen in Figure 3, the solenoids 16 are connected in parallel with each other and in series with a time switch 31 and a variable DC voltage source 32. Typically, the voltage source 32 may supply
20 from 8 volts (for use with babies weighing about 11-12lbs) to 18 volts (for babies weighing over 40lbs).

In use, a baby is placed in the cradle 3, the weight of the baby causing the springs 6 to extend. After the baby has been placed in the cradle 3, the
25 user looks through the slit 28 to find the position of the cross bar 27 which indicates the height of the iron bar 9 in the respective solenoid housing 12. The position of the solenoid 16 relatively to the upper end of the stationary iron bar 9 is then adjusted by
30 loosening the bolt 20 and sliding the slider 18 along the bar 19 until an arrow 33 on the slider 18 is in alignment with the cross bar 27. The position of the arrow 33 is arranged such that when the current through the solenoid 16 is switched on, a magnetic
35 force is created which is sufficient to attract the

iron bar 9 towards the solenoid 16 . After adjustment of the position of each solenoid 16, the time switch 31 is switched on and current is immediately supplied by the voltage source 32 to the two solenoids 16.

5 Each iron bar 9 is then drawn upwardly into its respective solenoid housing 12 until a preselected time interval has elapsed whereupon the time switch 31 will switch off. This causes the magnetic field produced by each solenoid 16 to cease and the assembly,
10 including the cradle 3, will begin the drop under the influence of gravity. As the assembly drops, the springs 6 will extend and as the springs extend to their fullest extent, the time switch will switch on and the assembly will begin to rise partly due to the
15 magnetic field created by each solenoid 16 and partly due to the tension in the springs 6. It has been found that if the distance between each solenoid 16 and the respective iron bar 9 is kept constant, the periods of time for which the magnetic field created
20 by each solenoid 16 should be on and off are the same. In one example, this time interval is 0.66 seconds. This operation then automatically repeats to produce an oscillating movement. Upward movement may be assisted if the iron bars 9 are magnetized.

25 In a typical device, the distance travelled by the cradle 3 in one direction is about 14 centimetres.



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CLAIMS

1. A device for moving a cradle, the device comprising an assembly for supporting a cradle above the ground the assembly being connected to a frame and being movable in a vertical direction relatively to the frame; at least one spring connected between the assembly and the frame; and at least one solenoid operable to attract a magnetic part of the support assembly during upward movement of the assembly, whereby the support assembly is caused in use to move regularly up and down relatively to the frame.
2. A device according to claim 1, wherein the or each solenoid is connected to an electrical time switch which is arranged to supply electric current to the or each solenoid during upward movement of the assembly.
3. A device according to claim 1 or claim 2, wherein the magnetic part of the assembly associated with the or each solenoid comprises an iron bar which may move vertically through the respective solenoid.
4. A device according to any of claims 1 to 3, wherein the vertical position of the or each solenoid relatively to the frame is adjustable.
5. A device according to any of the preceding claims, wherein shock absorbing means are provided to damp contact between the assembly and the frame



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during upward movement of the assembly.

6. A device according to claim 1, substantially as described with reference to the accompanying drawings.