An infant safety gate arranged for mounting between first (3) and second (5) fixing surfaces. The infant safety gate comprises one or more first fixtures (10, 12) for fixing to said first fixing surface (3) and one or more second fixtures (20, 22) for fixing to said second fixing surface (5) spaced from said first fixing surface (3). A barrier gate (30) is provided that hingedly mounts to said one or more first fixtures (10, 12) for movement from a gate open to gate closed position. The barrier gate (30) is also provided with one or more connectors (40, 42) for reversibly connecting with the one or more second fixtures (20, 22) in the gate closed position. Each of said one or more second fixtures (20, 22) has the form of a projecting nipple and each of said one or more connectors (40, 42) defines a trumpet cavity that is arranged for receipt of said projecting nipple.
Infant safety gate

Technical Field

The present invention relates to an infant safety gate of the type that is typically placed at the top or bottom of stairways to prevent an infant gaining access thereto.

Background to the Invention

Infant safety gates are well-known in the prior art, and are generally of two types, which are often referred to as the 'floating' type and the 'fixed' type. The 'floating' type of infant safety gate is reversibly fixed between two fixing surfaces (e.g. stair banister and wall) by respective fixing means locating on either side of the gate. Generally, the fixing means reversibly abut the fixing surfaces, thereby applying fixing pressure thereto. Opening of the gate of the 'floating' type is achieved by loosening both fixing means and physically moving (e.g. by lifting) the gate out of the way, which can involve a certain amount of physical exertion for the user.

On the other hand, the 'fixed' type of infant safety gate is provided on either side with permanent fixing means that are permanently fixed to the two fixing surfaces (e.g. by screw fixing into the wall and/or banister). A reversibly openable gate is then provided between the respective permanent fixing means. Commonly, the gate connects by hinges to the permanent fixing means (generally at upper and lower fixing points) of one fixing surface such that it may be swung open and closed about that hinged connection. The permanent fixing means on the other fixing surface are then provided with a latch or other similar reversible closure means such that the gate may be reversibly latched / unlatched when in the gate closed position. One problem with such 'fixed' types of infant safety gate is that over time the banister-side fixing tends to unduly move outwards (as a result of the outward pressure applied to the banister by the gate during use thereof) such that the spacing between the
respective fixing means on either side increases. Closure and latching of the gate can therefore become more difficult over time as a consequence of this undue movement and increased spacing, which in particular results in the latch not lining up properly.

The present invention provides an infant safety gate of the 'fixed' type, which provides a solution to the aforementioned problem of undue movement and increased spacing over time. In more detail, the infant safety gate of the present invention has fixing means for interaction with the latching side of the gate that define a projecting nipple form, which is arranged on closing of the gate for receipt by the interior of a trumpet form fitting provided to the gate. The shaping and form of this nipple-trumpet closure acts to draw the two parts thereof together like a funnel. Thus, the closure is effective even if the respective fixing means on either side move apart over time.

The present invention also provides an infant safety gate that has a slide open latch mechanism provided thereto. Latching and unlatching of the infant safety gate does not therefore require any lifting movement by the user, which saves physical exertion on the user's part and is also potentially less damaging over time to the fixing surfaces (and in particular, to the banister).

It is an object of the present invention to provide an improved infant safety gate of the 'fixed' type.

Summary of the Invention

According to a first aspect of the present invention there is provided an infant safety gate arranged for mounting between first and second fixing surfaces, said infant safety gate comprising
one or more first fixtures for fixing to said first fixing surface;

one or more second fixtures for fixing to said second fixing surface spaced from said first fixing surface; and

a barrier gate that hingedly mounts to said one or more first fixtures for movement from a gate open to gate closed position, and that is provided with one or more connectors for reversibly connecting with the one or more second fixtures in the gate closed position,

wherein each of said one or more second fixtures has the form of a projecting nipple and each of said one or more connectors defines a trumpet cavity that is arranged for receipt of said projecting nipple.

There is described herein an infant safety gate. The infant safety gate is arranged for mounting between first and second fixing surfaces, which first and second fixing surfaces are spaced from each other and generally face each other (e.g. in opposing fashion). Most typically, one of the fixing surfaces will be a domestic wall and the other fixing surface a banister of a typical domestic stairway. Thus, in this typical use scenario the infant safety gate is used to provide a barrier to prevent infant access to the stairways (i.e. to provide ‘an infant stair gate’). Mounting may then either be at the top or bottom of the stairs as best fits the situation.

The infant safety gate comprises one or more first fixtures for fixing to the first fixing surface and one or more second fixtures for fixing to the second fixing surface, which is spaced from the first fixing surface.

Suitably, the number of first fixtures corresponds to the number of second fixtures. Most typically, there are from two to four first fixtures and also from two to four second fixtures. Suitably, the first and second fixtures are arranged in opposing
pairs, that to say each first fixture fixes to the first fixing surface at a fixing height that corresponds to that at which the second fixture fixes to the second fixing surface.

The first and second fixtures are suitably arranged for screw fixing to the respective first and second fixing surfaces. Washers and other fixing adjuvants may be employed as desired to ensure secure fixing thereof.

In one aspect, one or more of the first fixtures is provided with a length adjuster feature for independently adjusting the length thereof. Thus, the relative positioning of the first fixtures may be adjusted to account for non-uniformity in spacing between the first and second fixing surfaces over the height of the barrier gate. In particular, such independent length adjustment allows for skirting board fitting of the lowermost (i.e. closest to the floor, in use) of the first fixtures, where the spacing between the first and second fixing surfaces is less than at the top part of the gate, where there is no skirting board present.

Suitably, the independent length adjustment of one or more of the first fixtures is provided by a length adjuster that comprises a 'hex nut' feature that suitably comprises a hollow hexagonal form tube that is threaded on the inside and then has two bolts inserted in to it, one from either side. When the 'hex nut' is twisted it draws the two bolts together or moves them apart depending on which way you twist. It is based on either bolt being threaded differently, one normally, and one reverse. Such 'hex nut' features are commonly found as features of length adjusters of tension cables and also used in low volt lighting systems.

The infant safety gate includes a barrier gate that hinged mounts to the one or more first fixtures for movement from a gate open to gate closed position. Typically, a hinge mounting is provided at each first fixture for hinge mounting of the barrier gate. The barrier gate may then be swung open and closed about its hinge mounting. Any suitable configuration of barrier gate may be selected, but most
commonly the gate is arranged to define upper and lower cross-bars with plural slats or rods extending (typically, vertically) there between.

In embodiments, the barrier gate is arranged such that its maximum width may be adjusted, for example by a turnkey adjustment mechanism or a ‘tube within a tube’ adjustment mechanism. This provides flexibility in that it allows for mounting between first and second fixing surfaces of a range of spacings there between. Suitably, the degree of width adjustment is from 0 to 100 mm. Suitably, the width adjustment is provided by each of the upper and lower cross-bars having adjustable length, and a means for setting between a range of maximum width positions. Thus, the barrier gate may be adjusted to account for a range of different spacings between the first and second fixing surfaces over the full height of the barrier gate.

The barrier gate is provided with one or more connectors for reversibly connecting with the one or more second fixtures in the gate closed position. It will be appreciated that in conventional fashion the one or more connectors are provided to the far side of the gate from that which hinge mounts to the one or more first fixtures.

Each of the one or more second fixtures has the form of a projecting nipple and each of the one or more connectors defines a trumpet cavity that is arranged for receipt of the projecting nipple.

In use, the projecting nipple is arranged on closing of the barrier gate for receipt by the cavity (i.e. interior) of a trumpet form fitting provided to the barrier gate. The shaping and form of this nipple-trumpet closure acts to draw the two parts thereof together like a funnel. Thus, the form of the closure is effective even if the respective first and second fixing surfaces on either side move apart over time.

By projecting nipple it is meant a projection that defines an essentially nipple-like form. That is to say, it has nipple form which generally projects outwards from a nipple base to a nipple tip in tapering inwards fashion. The shaping of the nipple form
is generally smooth as facilitates its interaction with and receipt by the trumpet cavity.

The trumpet cavity is arranged for receipt of the projecting nipple (i.e. to form a nipple-trumpet closure). Thus it has an interior form, which generally mirrors that of the projecting nipple and in particular, it smoothly tapers inwardly. The trumpet cavity may in embodiments be formed in a trumpet form fitting, which is provided with a trumpet lip surface surrounding (e.g. provided peripheral or circumferential to) the trumpet cavity. Indeed, the overall form of the fitting may be trumpet-like (i.e. trumpet horn-like) although this is not essential as long as a trumpet cavity provides for the desired closure interaction with the projecting nipple.

In embodiments, each trumpet cavity-defining connector is movably mounted to the barrier gate such that it may move laterally relative thereto (i.e. along a horizontal axis in normal use, that is generally defined by the axis defined between the first and second fixing surfaces). Such movable mounting may for example, be provided as a tube within a tube mounting configuration or alternatively as a rail and carriage mounting. Suitably, each trumpet-cavity defining connector biasedly (e.g. spring) mounts to the barrier gate such that suitably, it biases (e.g. springs) away from the barrier gate (i.e. towards its projecting nipple fitting) when the barrier gate is in the gate closed position.

In other embodiments, the barrier gate is defined by first and second portions, wherein the first portion (e.g. first half) comprises the first fixtures and the second portion (e.g. second half) comprises the connectors for connecting with the second fixtures. Each portion (e.g. half) of the barrier gate is movably mounted relative to the other such that the first portion may move laterally (i.e. along a horizontal axis in normal use, that is generally defined by the axis defined between the first and second fixing surfaces) relative to the second portion. Such movable mounting may for example, be provided as a tube within a tube mounting configuration or alternatively as a rail and carriage mounting of the first barrier gate portion to the
second barrier gate portion. Suitably, the first portion of the barrier gate biasedly (e.g. spring) mounts to the second portion thereof such that suitably, the two portions bias (e.g. spring) away from each other (i.e. such that in the 'gate closed' position the trumpet cavity connector is biased towards its projecting nipple fitting).

Where each trumpet cavity-defining connector movably mounts to the barrier gate, or wherein the barrier gate is defined by first and second portions (e.g. halves) movably mounted to each other, there is suitably provided a lock for reversibly locking that movement. The lock therefore suitably locates between the connector and barrier gate, or between the first and second portions of the barrier gate. In one aspect, the lock takes the form of a push button releasable lock movement (e.g. latch form), which typically projects (e.g. upwardly in normal use) from the barrier gate. In one aspect, the lock takes the form of a twist releasable lock movement (e.g. latch form), which may also be provided with a push button safety release.

In aspects, the lock is provided with an indicator for indicating the locking state (i.e. locked or unlocked) thereof. Suitably, the indicator provides a visual indication of that locking state. Thus for example, a red indicator may indicate the locked state and a green indicator indicate the unlocked state thereof. In one embodiment, movement from the 'red' to 'green' visual indication is by means of a kaleidoscope type visual indicator.

It will be appreciated that the various elements of the infant safety gate herein may be manufactured and supplied separately and/or supplied as a pre-assembly or a kit of parts. The present invention encompasses all of these separate component parts and any assemblies thereof.

Brief Description of the Drawings
The invention will now be described further with reference to the accompanying drawings, in which:

Figure 1 shows a perspective view of an infant safety gate in accord with the present invention;

Figure 2 shows a perspective view of the infant safety gate of Figure 1 as attached between a banister and a wall when in the gate closed position;

Figure 3 shows a perspective view of the infant safety gate of Figure 1 as attached between a banister and a wall when in the gate open position;

Figure 4 shows a perspective view from above of a detail of a first fixture side of the infant safety gate of Figure 1;

Figure 5 shows a perspective view from the side of a detail of a second fixture side of the infant safety gate of Figure 1 with the second fixture detached from the fixing surface;

Figure 6 shows a perspective view from above of a detail of the reversible lock aspect of a second fixture side of the infant safety gate of Figure 1 when in an unlocked state;

Figure 7 shows a perspective view from above of a detail of the reversible lock of Figure 6; and

Figure 8 shows a perspective view from below of a detail of a turnkey adjustment aspect of the reversible lock of Figure 6.
Referring now to the drawings, Figure 1 illustrates an infant safety gate 1 herein. Figures 2 and 3 show that infant safety gate 1 mounted in situ at the top of a stairway, as respectively shown in the ‘gate closed’ and ‘gate open’ positions.

In more detail, the infant safety gate 1 comprises upper 10 and lower 12 first fixtures for fixing to a first fixing surface, which is defined by a wall 3 as shown at Figures 2 and 3. The infant safety gate 1 further comprises upper 20 and lower 22 second fixtures (visible in Figure 3 only) for fixing to a second fixing surface, which is defined by the side of a stair banister 5 as shown at Figures 2 and 3. It will be appreciated that the wall 3 is spaced from the banister 5 and that the safety gate acts to reversibly close off the gap there between such that in use a barrier is presented to an infant. It will also be appreciated that number (i.e. two) of first fixtures 10, 12 corresponds to the number of second fixtures 20, 22 and that the first 10, 12 and second 20, 22 fixtures are arranged in opposing pairs.

Barrier gate 30 hingedly mounts via upper and lower hinge mountings 31, 32 to upper 10 and lower 12 first fixtures for movement from the ‘gate open’ position of Figure 2 to the ‘gate closed’ position of Figure 3. More detail of the hinge mounting and of the screw fixing of the upper 10 and lower 12 first fixtures by means of respective screws 11, 13 may be seen by reference to Figure 4. Optionally, one or more of the first fixtures 10, 12 is provided with a length adjuster (not visible in Figure 4) for adjusting the length thereof.

The infant safety gate 1 is further provided with upper 40 and lower 42 connectors for reversibly connecting with the upper 20 and lower 22 second fixtures when in the ‘gate closed’ position. The nature of the connecting relationship may be better appreciated with reference to Figure 5, which shows details of the upper fixture 20 and its upper connector 40. The lower connector 42 to lower fixture 22 connecting relationship is of a similar type. It may be seen that the upper second fixture 20 has the form of a projecting nipple. That is to say, it defines a nipple base 50, which defines a generally circular rim 52 from which an inwardly-tapering nipple wall 54
projects culminating in a rounded nipple tip 56. Overall, the projecting form of the projecting nipple fixture 20 is smooth, as is preferred for smooth 'funnelling' interaction with its connector 40 feature. The fixture 20 is also provided with a screw 21 for screw-fixing to a fixing surface 5. The upper connector 40 defines a trumpet cavity 60 that is arranged for connecting receipt of the projecting nipple fixture 20. The inner surface of the trumpet cavity 60 is again smooth for smooth 'funnelling' interaction with its projecting nipple 20 feature, and the trumpet cavity 60 is defined within a trumpet fixture 62 (i.e. a fixture having the external appearance of a trumpet horn), which defines a smooth trumpet lip 64 circumferential to the entrance to the trumpet cavity 60.

It will also be seen that the barrier gate 30 is formed in two halves, which are selectively movable relative thereto. Thus, the barrier gate 30 is provided with a first half (right hand side of Figures 1 to 3) defined by first upper 34 and lower 35 tubular form cross-bars with plural rods 33 extending there between. Second half of the barrier gate 30 is defined by second upper 36 and lower 37 tubular form cross-bars with plural rods 33 extending there between. It will be noted that the cross-sectional area (i.e. bore) of the first tubular form cross-bars 34, 35 is narrower than that of the second tubular form cross-bars 36, 37 such that the former 34, 35 are received by the latter 36, 37 in a 'tube-within-a-tube' type mounting. The mounting is provided with biasing means (e.g. an internal spring, not visible in the Figures) such that the first half 34, 35 of the barrier gate 30 is normally biased away from the second half 36, 37 thereof. Thus, the overall width of the barrier gate 30 may be selectively altered by movement of the first tubular cross-bars 34, 35 of the first half of the barrier gate 30 relative to (i.e. within) the second tubular cross-bars 36, 37 of the second half of the barrier gate 30. Such movement acts against the normal biasing force of the biasing means and is subject to locking control by lock 70, as will now be described in with particular reference to Figures 6 to 7.

In more detail, Figure 6 shows a step in a gate opening sequence, wherein the upper cross-bar 36 of the second half of the barrier gate 30 has been moved towards the
upper cross-bar 34 of the first half of the barrier gate 30 (i.e. the tube defining the upper cross-bar 36 receives more of that smaller tube defining the lower cross-bar 34). This action results in the upper connector 42 being moved out of its connecting relationship with its upper projecting nipple fixture 20, and the barrier gate may now be swung open. To achieve this relative motion of second half of barrier gate relative to the first half thereof, lock 70 has first to be released by pushing in of push release button 72 and then twisting of twist release 74. The second half 36, 37 of the barrier gate may now be moved towards the first half 34, 35 thereof by means of pushing action against the internal spring (not visible) of the tube-in-tube mounting, which normally biases those two halves apart from each other. It will be noted that the action of the lock 70 is deliberately designed to be relatively complex (i.e. 'push and then twist' action) such as to resist any attempt by an infant, in use to release the lock 70. It will also be appreciated that to re-engage the lock 70, twist release 74 must be twisted in a reverse sense such that the push button 72 may pop up again.

A visual indicator 80 is further provided to the upper cross-bar 36 for visually indicating the locking state of the barrier gate. A green indication for example, indicates that the gate is open, whereas a red indication indicates that the gate is closed. The indicator 80 is thus responsive to the lock 70 and will generally show a red indication when the push button 72 thereof is in the 'popped out' state. In other embodiments, the indicator 80 may be made responsive to a sensor (e.g. switch or electronic sensor) locating within the trumpet cavity 60 of a connector 40, 42 such that the sensor senses when a projecting nipple second fixture 20 is received therein. Thus, for example the sensor might be activated by interaction with the nipple tip 56 of the projecting nipple 20.

Figure 8 shows a further feature of the infant safety gate 1 herein. A maximum length adjuster mechanism 90 is provided to the upper first cross-bar 34 (the lower first cross-bar 35 is provided with a corresponding feature, not visible in Figure 8) as a maximum width setting for the tube-within-a-tube mounting, as described previously. Turnkey 92 is received within cavity 94 of movable bolt 95 for reversibly locking the
position of that movable bolt 95 within slot 96, thereby defining a maximum length position for the upper 34 (and similarly lower 35) cross-bar. This maximum length adjustment step is designed to be performed once on fitting of the gate 1, and allows for the gate 1 to be fitted to different stairway locations defining a variety of spacings between the first and second fixing surfaces thereof.

The application of which this description and claims form part may be used as a basis for priority in respect of any subsequent application. The claims of such subsequent application may be directed to any feature or combination of features described therein. They may take the form of product, method or use claims and may include, by way of example and without limitation, one or more of the following claims:
Claims

1. An infant safety gate arranged for mounting between first and second fixing surfaces, said infant safety gate comprising
one or more first fixtures for fixing to said first fixing surface;
one or more second fixtures for fixing to said second fixing surface spaced from said first fixing surface; and
a barrier gate that hingedly mounts to said one or more first fixtures for movement from a gate open to gate closed position, and that is provided with one or more connectors for reversibly connecting with the one or more second fixtures in the gate closed position,
wherein each of said one or more second fixtures has the form of a projecting nipple and each of said one or more connectors defines a trumpet cavity that is arranged for receipt of said projecting nipple.

2. An infant safety gate according to claim 1, wherein the number of first fixtures corresponds to the number of second fixtures.

3. An infant safety gate according to either of claims 1 or 2, wherein there are from two to four first fixtures and from two to four second fixtures.

4. An infant safety gate according to either of claims 2 or 3, wherein the first and second fixtures are arranged in opposing pairs.

5. An infant safety gate according to any of claims 1 to 4, wherein the first and second fixtures are arranged for screw fixing to the respective first and second fixing surfaces.
6. An infant safety gate according to any of claims 1 to 5, one or more of the first fixtures is provided with a length adjuster for adjusting the length thereof.

7. An infant safety gate according to any of claims 1 to 6, wherein the barrier gate is provided with upper and lower cross-bars with plural slats or rods extending there between.

8. An infant safety gate according to claim 7, wherein said upper and lower cross-bars are of adjustable maximum length.

9. An infant safety gate according to any of claims 1 to 8, wherein the outer surface of each projecting nipple is smooth and the inner surface of each trumpet cavity is smooth for smooth interaction there between.

10. An infant safety gate according to any of claims 1 to 9, wherein the trumpet cavity is provided to a trumpet fixture having trumpet lips surrounding the trumpet cavity.

11. An infant safety gate according to any of claims 1 to 10, wherein each trumpet cavity-defining connector movably mounts to the barrier gate for movement laterally relative thereto.

12. An infant safety gate according to claim 11, wherein each trumpet cavity-defining connector movably mounts to the barrier gate by means of a tube within a tube mounting.

13. An infant safety gate according to claim 11, wherein each trumpet cavity-defining connector movably mounts to the barrier gate by means of a rail and carriage mounting.
14. An infant safety gate according to any of claims 11 to 13, wherein each trumpet-cavity defining connector biasedly mounts to the barrier gate.

15. An infant safety gate according to claim 14, wherein each trumpet-cavity defining connector biases towards its projecting nipple fitting when the barrier gate is in the gate closed position.

16. An infant safety gate according to any of claims 11 to 15, wherein there is provided a lock for reversibly locking the movement of each trumpet cavity-defining connector relative to the barrier gate.

17. An infant safety gate according to claim 16, wherein the lock locates between at least one trumpet cavity-defining connector and the barrier gate.

18. An infant safety gate according to any of claims 1 to 10, wherein the barrier gate is defined by a first portion and a second portion, wherein the first portion comprises the one or more first fixtures and the second half comprises the one or more connectors.

19. An infant safety gate according to claim 18, wherein said first portion is a first half of the barrier gate and said second portion is a second half of the barrier gate.

20. An infant safety gate according to either of claims 18 or 19, wherein the first portion of the barrier gate mounts to the second portion thereof for movement laterally relative thereto.

21. An infant safety gate according to claim 20, wherein the first portion of the barrier gate movably mounts to the second portion thereof by means of a tube within a tube mounting.
22. An infant safety gate according to claim 20, wherein the first portion of the barrier gate movably mounts to the second portion thereof means of a rail and carriage mounting.

23. An infant safety gate according to any of claims 20 to 22, wherein the first portion of the barrier gate biasedly mounts to the second portion thereof.

24. An infant safety gate according to claim 23, wherein each trumpet-cavity defining connector of the second portion biases towards its projecting nipple fitting when the barrier gate is in the gate closed position.

25. An infant safety gate according to any of claims 20 to 24, wherein there is provided a lock for reversibly locking the movement of the first portion of the barrier gate relative to the second portion thereof.

26. An infant safety gate according to claim 25, wherein the lock locates between the first portion of the barrier gate and the second portion thereof.

27. An infant safety gate according to either claim 17 or claim 26, wherein the lock comprises a push button releasable lock movement.

28. An infant safety gate according to claim 27, wherein said push button releasable lock movement projects from the barrier gate.

29. An infant safety gate according to claim 28, wherein the lock comprises a twist releasable lock movement.

30. An infant safety gate according to claim 29, wherein said twist releasable lock movement is provided with a push button safety release.
31. An infant safety gate according to any of claims 27 to 30, wherein the lock is provided with an indicator for indicating the locking state thereof.

32. An infant safety gate according to claim 31, wherein said indicator provides a visual indication of said locking state.

33. An infant safety gate according to any of claims 1 to 32 in kit of parts form.
**Patents Act 1977: Search Report under Section 17**

**Documents considered to be relevant:**

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**Field of Search:**

Search of GB, EP, WO & US patent documents classified in the following areas of the UKC:

- E1J

Worldwide search of patent documents classified in the following areas of the IPC:

- E06B

The following online and other databases have been used in the preparation of this search report:

- EPODOC, WPI, INTERNET