Abstract: A gate for infant (G) is provided, which comprises an approximately U-shaped frame (1) attached to attaching surfaces (WL, WR), a door member (18) connected to the frame (1), a locking arrangement (58) capable of regulating the opening of the door member (18) from the frame (1) at least at its lower end into the attaching surfaces (WL, WR). The frame (1) comprises two side frames (8L, 8R) and a lower frame (3) formed of a pipe material. A central portion (3a) of the lower frame (3) is located under the door member (18) and is in contact with the floor surface (F), the left and right end portions (3b) of the lower frame (3) are bent so as to be positioned above the central portion (3a). The adjusters (13) are arranged at the sides of the left and right end portions (3b) spaced upwardly from the floor surface (F). The gate for infant (G) is made for easy passage when the door member (18) is open.
Gate For Infant

[Technical Field]
[0001]
This device relates to a gate for infant installed at an entrance of a room or at the stairs etc. in buildings such as houses or facilities for blocking passage of infants, pets and so on.

[Background Art]
[0002]
Conventionally, there have been gates for infants comprising an approximately U-shaped frame to be attached to attaching surfaces, a door member rotatably connected to the frame, a locking arrangement capable of regulating the opening of the door member from the frame and an adjuster for pressing the four corners of the frame onto the attaching surfaces. (For example, see Patent Document 1.)

[Prior Art Document]
[Patent Documents]
[0003]

[Summary of the Device]
[0004]
However, in such conventional gates for infant, the height dimension of the lower frame of the frame facing the floor surface is so large that the lower frame may catch the user's foot and become obstructive.

[0005]
For solving the aforementioned problem, the present device has been made to provide a gate for infant for easy passage when its door member is open.

[Means of Solving the Problem]
[0006]
The gate for infant of the present device is constituted to be mounted on a floor surface in a building to close an opening between two attaching surfaces which are opposed to each other, comprising an approximately U-shaped frame attached to the attaching surfaces, a door member rotatably connected to the frame, a locking arrangement capable of regulating the opening of the door member from the frame and adjusters for pressing both sides of the frame at least at its lower end onto the attaching surfaces, said frame comprising two side frames located at the sides of the attaching surfaces and a lower frame located at the side of the floor surface to connect the lower ends of the side frames to each other, wherein said lower frame is formed of a pipe material having an approximately flat cross-section with its longitudinal section being approximately along the horizontal surface, the central portion of said lower frame located under the door member 18 is in contact with the floor surface F, the left and right end portions of said lower frame facing the side frames are bent so as to be positioned above the central portion located under the door member, and said adjusters are arranged at the sides of the left and right end portions which are spaced
upwardly from the floor surface.

[0007]

In the gate for infant of the present device, since the lower frame is formed of a pipe material having an approximately flat cross-section with its longitudinal section being approximately along the horizontal surface, a large gap is hardly produced between the central portion located under the door member and the floor surface (i.e. the height dimension is small), thus improving the convenience for opening the door member to pass through. Moreover, in the gate for infant of the present device, since the left and right end portions of the lower frame facing the side frames are bent so as to be positioned above the central portion located under the door member and the adjusters are arranged at the sides of the left and right end portions which are spaced upwardly from the floor surface, enough space for adjusting the adjusters can be provided without hindering the attaching work of the gate for infant to the attaching surfaces by locating the left and right end portions upwardly remote from the floor surface even in a constitution where the flat-shaped lower frame is in contact with the floor surface.

[0008]

Therefore, the gate for infant of the present device allows easy passage when the door member is open.

[0009]

In addition, in the gate for infant of the present device, the lower frame may preferably be formed of a pipe material having an approximately oval cross-section to eliminate angular portions from the region rising from the floor surface, thus providing greater usability.

[0010]

Furthermore, in the aforementioned gate, the adjusters may preferably have a constitution where the sides of the side frames can be pressed onto the attaching surfaces by turning an approximately circular operation part of a screw material with its axis being approximately along the horizontal direction and where the lower end of the operation part is projected into the space between the left and right end portions of the lower frame and the floor surface, thus providing a space for turning the operation part between the left and right end portions of the lower frame and the floor surface to facilitate the fastening work of the adjuster.

[Brief Explanation of the Drawings]

[0011]

[Fig. 1]

Fig. 1 is a front view of the gate for infant of the present device installed at an entrance of a room.

[Fig. 2]

Fig. 2 is a partial enlarged vertical sectional view of the gate for infant of an embodiment showing a locking pin for locking the tip end of the door member to the lower frame.

[Fig. 3]

Fig. 3 is a partial enlarged vertical sectional view of a gate for infant of an
embodiment showing a locking pin for locking the tip end of the door member to the lower frame, corresponding to the portion III-III of Fig. 2.

[Fig. 4]

Fig. 4 is a partial enlarged plan view showing a stopper for locking the locking pin of Fig. 2.

[Fig. 5]

Fig. 5 is a partial enlarged vertical sectional view of a gate for infant of an embodiment showing an upper axis part of a rotating axis part.

[Fig. 6]

Fig. 6 is a front view of a fixed side member constituting the upper axis part of Fig. 5.

[Fig. 7]

Fig. 7 is a side view of the fixed side member of Fig. 6.

[Fig. 8]

Fig. 8 is a front view of a movable side member constituting the upper axis part of Fig. 5.

[Fig. 9]

Fig. 9 is a side view of the movable side member of Fig. 8.

[Fig. 10]

Fig. 10 is a partial sectional view of the portion X-X of Fig. 9.

[Fig. 11]

Fig. 11 is a partial enlarged sectional view showing the movable side member rotated relative to the fixed side member at the upper axis part of Fig. 5.

[Fig. 12]

Fig. 12 is a partial enlarged vertical sectional view of a lower axis part at a rotating axis part of a gate for infant of an embodiment.

[Fig. 13]

Fig. 13 is a partial enlarged vertical sectional view showing a part of a locking arrangement of a gate for infant of an embodiment.

[Fig. 14]

Fig. 14 is a partial enlarged vertical sectional view showing the state where both the first projecting piece and the second projecting piece of the locking arrangement of Fig. 13 are unlocked.

[Fig. 15]

Fig. 15 is a partial enlarged front view showing the vicinity of an adjuster located at a lower position of a gate for infant of an embodiment.

[Mode for Carrying Out the Device]

One embodiment of the present device is explained hereinafter with reference to the drawings. The gate for infant (hereafter referred to as "gate") G is, as shown in Fig. 1, installed at an entrance of a room or at the bottom of the stairs etc. in buildings. In the embodiment, the gate G is installed at an entrance D of a room. The gate G is installed on the floor surface F to close the opening O between the attaching surfaces WL and WR which are opposed to each other. In the embodiment, the lateral
direction is set such that the locking arrangement 58 is located at the left side of the door member 18 and the direction along the vertical direction of the door member 18 is explained as the vertical direction unless otherwise specified.

[0013]

As shown in Fig. 1, the gate G comprises an approximately U-shaped frame 1 attached to the attaching surfaces WL and WR, a door member 18 rotatably connected to the frame 1 and a locking arrangement 58 capable of regulating the opening of the door member from the frame 1.

[0014]

The frame 1, as shown in Fig. 1, comprises an approximately U-shaped frame body 2, extension members 12 removably arranged outside the both ends of the frame body 2 to fit to the dimension of the opening of the entrance D and adjusters 13 for placing the frame 1 in close contact with the left and right attaching surfaces WL and WR.

[0015]

The frame body 2 comprises two left and right side frames 8L and 8R facing the attaching surfaces WL and WR as well as a lower frame 3 facing the floor surface F to connect the lower ends of the side frames 8L and 8R to each other. The lower frame 3, formed of a pipe material having an approximately oval cross-section whose longitudinal direction being approximately along the floor surface F (horizontal surface) as shown in Fig. 3, includes a central portion 3a positioned at a center in the lateral direction under the door member 18 and in contact with the floor surface F as well as left and right end portions 3b and 3b which constitute the side frames 8L and 8R at the left and right ends and are bent so as to be spaced upward from the floor surface F and positioned above the central portion 3a for providing a gap HI between the floor surface F for adjusting the adjuster 13 as shown in Fig. 1. The opening width of the gap HI is set such that a gap between the floor surface F can also be generated under each of the pressing plates (operation parts) 14a and 15a of the adjuster 13 located at the both ends of the lower frame 3. In addition, at the lower frame 3 of the embodiment, an axis body 4 which constitutes a lower axis part 52 of a rotating axis part 28 for rotatably connecting a right end 18b of the door member 18 to the right side frame 8R is projected in a right side inclined portion 3c which is arranged inclined to connect the central portion 3a and the right end portion 3b (see Figs. 1 and 12).

[0016]

Also as shown in Figs. 1-4, a stopper 5 capable of locking a locking pin 24 located at the lower end 19b of the tip end side part 19 of the door member 18 is arranged at the left end of the central portion 3a of the lower frame 3. The stopper 5 has a locking hole 6 capable of locking the locking pin 24 at its peripheral edge. In the embodiment, the locking hole 6 has, as shown in Fig. 2 and 4, a hole body 6a in which a tip 24a of the locking pin 24 projecting downward when the door member 18 is closed can be inserted and guide planes 6b at the both sides of the hole body 6a inclined down to the hole body 6a along the lateral direction. The locking hole 6 is formed on the upper side of the stopper 5 in an approximately center in the front and
rear direction, with its upper side being open to be capable of being inserted the locking pin 24 from above. The guide plane 6b formed on the locking hole 6 is constituted such that the locking pin 24 projecting from the lower end 19b can be removed from the hole body 6a when the tip end side part 19 of the door member 18 moves upward to tilt the door member 18 so as to orient the lower end 19b of the tip end side part 19 to the left. The stopper 5 has, at its upper surface, planes 5a inclined in the front and rear directions at both the front and rear sides of the locking hole 6 upward towards the position of the locking hole 6 (see Fig. 3). The inclined plane 5a is constituted to be capable of pushing up the locking pin 24 to guide it toward to the locking hole 6 when the open door member 18 moves to the closing direction to abut the tip 24a of the locking pin 24 on the inclined plane 5a and urges the locking pin 24 to project downward. At both the left and right ends of the lower frame 3 (the outer ends of the left and right end portions 3b), attaching holes not shown are formed for inserting an attaching member 12d formed on an extension member 12 and a screw material 14b of a male side member 14 of the adjuster 13.

[0017]

As shown in Fig. 1, each of the left and right side frames 8L and 8R comprises two support members 9 extending upward from the end portions 3b of the lower frame 3 and an upper connecting rod part 10 connecting the upper ends of the support members 9. In each of the side frames 8L and 8R, a support member 9A, located at the side of the door member 18, is formed of a pipe material having an approximately oval cross-section, and a support member 9B, located at a laterally outer position remote from the door member 18, is formed from a pipe material having an approximately round cross-section. The upper connecting rod part 10, constituted of a square cylindrical pipe material, is arranged to be continuous from the upper end 18c of the door member 18 so as to make the vertical position approximately coincide with that of the upper end 18c (upper horizontal bar part 21U) of the door member 18. Also at the laterally outer ends of the upper connecting rod part 10, not-shown attaching holes are formed for inserting the attaching member 12d formed on the extension member 12 and the screw material 14b of the male side member 14 of the adjuster 13.

[0018]

The extension member 12, having a vertical width dimension approximately equal to that of the side frames 8L and 8R as shown in Fig. 1, comprises a support member 12a located approximately along the vertical direction, an upper bar part 12b projecting laterally inward from the upper end of the support member 12a and a lower bar part 12c projecting laterally inward from the lower end of the support member 12a. The upper bar part 12b and the lower bar part 12c is arranged to be continuous to the lower frame 3 and the upper connecting rod 10 when being attached to the frame body 2. At the tip sides (lateral inner ends) of the upper bar part 12b and the lower bar part 12c, attaching members 12d capable of being inserted into not-shown attaching holes formed on the lower frame 3 and the upper connecting rod 10. At the proximal ends (lateral outer ends) of the upper bar part 12b and the lower bar part 12c, not-shown attaching holes, in which the attaching member 12d of the other extension
member 12 or the screw material 14b of the male side member 14 of the adjuster 13 can be inserted, are formed. The number of the extension members 12 is increased or decreased according to the width dimension of the entrance etc. where the gate is installed. In the embodiment, only one extension member 12 is used at the right side of the frame body 2.

[0019]

As shown in Figs. 1 and 15, the adjuster 13 comprises a male side member 14 and a female side member 15 having a pressing plate (operation part) 14a and 15a respectively. The distance between the pressing plates 14a and 15a can be changed by fastening the male side member 14 to the female side member 15. Specifically, the male side member 14 has a pressing plate 14a and a screw material 14b extending from the pressing plate 14a with its axial center being approximately along the lateral direction, and the female side member 15 comprises a pressing plate 15a having on its center a screw hole 15b into which a screw material 14b can be screwed. The lower ends of the pressing plates (operation parts) 14a and 15a of the male side member 14 and the female side member 15 project below the lower frame 3 into the gap HI. At each of the four corners of the gate G, the adjuster 13 is interposed between the frame body 2 or the extension member 12 and the attaching surface WL, WR to press the pressing plate 14a, 15a onto the attaching surface WL, WR and the frame body 2 or the extension member 12 by turning the pressing plate (operation part) 14a of the male side member 14 while the screw member 14b of the male side member 14 being inserted into a not-shown attaching hole of the frame body 2 or the extension member 12 through the screw hole 15b of the female side member 15 to thereby press the sides of the side frames 8L, 8R onto the attaching surfaces WL, WR to attach the frame 1 to the left and right attaching surfaces WL, WR.

[0020]

As shown in Fig. 1, the door member 18 comprises an upper horizontal bar part 21U and a lower horizontal bar part 21D laterally arranged at the upper and lower ends as well as vertical bar parts 22 vertically arranged to connect the upper horizontal bar part 21U and the lower horizontal bar part 21D, with its left side 18a being the distal end when the door member opens, whereas its right side 18b being rotatably connected to the right side frame 8R of the frame body 8 by the rotating axis part 28. The upper horizontal bar part 21U and the lower horizontal bar part 21D, similarly to the upper connecting rod part 10, are constituted of a square cylindrical pipe material. The vertical bar parts 22 are formed of pipe materials with round cross-sections. A vertical bar part 22A, arranged at the tip end side (the side of the left end 18a) of the door member 18 to constitute the tip end side part 19, is formed of a pipe material having an approximately square cross-section and is constituted to make the lower end 22a project below the lower horizontal bar part 21D. At the lower end 22a of the vertical bar part 22A, a locking pin 24 for locking the lower end 19b of the tip end side part 19 of the door member 18 to the stopper 5 provided on the lower frame 3 is arranged to project downward (see Figs. 2 and 3). In the embodiment, the locking pin 24 is attached so as to be vertically slidable relative to a guide 25 located at the lower end 22a of the vertical bar part 22A such that it is urged
due to its own weight to be kept projected from the door member 18 (vertical bar part 22A). The locking pin 24 can move upward to be pushed into the guide 25 when it is pressed from below. At the upper end of the guide 25, a stopper 25a for preventing excessive upward movement of the locking pin 24 is provided. The locking pin 24, when released from the pressure from below, moves downward due to its own weight to project from the guide 25 (door member 18).

[0021]

As shown in Figs. 1, 5 and 12, the rotating axis part 28 for rotatably connecting the right end 18b of the door member 18 to the right side frame 8R, comprises an upper axis part 29 located at the upper end 18c of the door member 18 and a lower axis part 52 located at the lower end 18d of the door member 18.

[0022]

As shown in Fig. 5, the upper axis part 29 comprises a movable side member 37 formed to project rightward from the upper right end of the door member 18, a fixed side member 30 located at the upper left side of the side frame 8R, a cap member 45 to be inserted in an inner cylindrical part 34 formed at the fixed side member 30 and a coil spring 49 as an urging means interposed between the cap member 45 and an outer cylindrical part 38 formed on the movable side member 37.

[0023]

As shown in Figs. 5-7, the fixed side member 30 comprises an attaching part 31, a base part 32 extending upward from the left side of the attaching part 31 and an inner cylindrical part 34 which is formed to project upward from the base part 32 and is constituted to be capable of being inserted inside an outer cylindrical part 38 formed at the movable side member 37. The inner cylindrical part 34 is constituted to have an approximately cylindrical shape with its upper end being open to allow insertion of an axis part 47 extending from the cap member 45 for bayonet connection. The base part 32 protrudes over the outer periphery of the inner cylindrical part 34 to form a step-like shape with the inner cylindrical part 34, having an approximately cylindrical outer shape with its center approximately coinciding with that of the inner cylindrical part 34 and having on its upper surface an inclined plane part 33 capable of guiding the outer cylindrical part 38 of the rotating movable side member 37. The inclined plane part 33 is formed at the left-half region of the base part 32 (the side of the door member 18) and is laterally inclined to locate the center in the front and rear direction of the left end at a lower position. The inclined part 33 is formed to guide a projected part 42 extending downward from a bottom wall 40 of the outer cylindrical part 38 of the rotating movable side member 37 when the door member 18 opens.

[0024]

In the vicinity of the center of the inclined plane part 33 (at the lowermost left end), a recessed part 33a is formed by recessing the upper surface (see Figs. 6 and 7). The recessed part 33a is constituted to be capable of receiving and locking the tip end of the projected part 42 extending downward from the bottom wall part 40 of the outer cylindrical part 38 of the movable side member 37 when the door member 18 is closed. The depth of the recessed part 33a is set such that the projected part 42 can
pass over the recessed part 33a when the door member 18 opens to move the tip end side part 19 of the left end 18a upward. When the door member 18 opens, the inclined part 33 guides the projected part 42 that passed over the recessed part 33a to be pushed upward as the movable side member 37 rotates. In the embodiment, also in the vicinity of the inclined plane part 33 on the upper surface of the base part 32, a recessed part 32a for receiving the tip end of the projected part 42 is formed by recessing the upper surface as shown in Fig. 6. The base part 32 is constituted to have a gap H2 between the attaching part 31 and the base part 32 capable of being inserted an extension part 41 of the outer cylindrical part 38 of the movable side member 37 (see Fig. 6). The size of the gap H2 is set so as to allow the inclination of the movable side member 37 caused by the inclination of the door member 18 which raises the tip end side part 19 when the door member 18 opens. Moreover, at a region of the attaching part 31 which is right to the lower end of the base part 32 and near the border between the base part 32, a guide plane 31a capable of guiding the outer cylindrical part 38 of the rotating movable side member 37 is formed in correspondence with the inclined plane part 33 which is formed on the base part 32. At the lower right end of the base part 32, the guide plane 31a declines from the center toward both the front and rear sides in correspondence with the inclination of the inclined plane part 33 so as to incline in left and right directions in both the front and rear sides of the lower end of the base part 32. The guide plane 31a is formed for guiding the extension part 41 at the outer cylindrical part 38 of the rotating movable side member 37 when the door 18 opens.

[0025]

As shown in Figs. 5 and 8-10, the movable side member 37 is attached to the right end of the upper horizontal bar part 21U of the door member 18 and comprises the outer cylindrical part 38 formed at the right end 18b of the door member 18 to cover the outer periphery of the inner cylindrical part 34 of the fixed side member 30. As shown in Figs. 5 and 10, the outer cylindrical part 38, constituted to have an approximately cylindrical shape with an open upper end, comprises a cylindrical side wall part 39 and a bottom wall part 40 closing the lower end of the side wall part 39. An insertion hole 41a for inserting the inner cylindrical part 34 is provided at the bottom wall part 40. The inner diameter dimension of the side wall part 39 is set such that the coil spring 49 can be placed between the side wall part 39 and the inner cylindrical part 34. The outer cylindrical part 38 has the cylindrical extension part 41 extending downward the bottom wall part 40 from the side wall part 39. The extension part 41 is constituted to have an open lower end and is formed to be capable of being inserted the base part 32 of the fixed side member 30. At the lower right end region of the extension part 41, an inclined part 41a inclined in the lateral direction to locate the right end at a higher position in correspondence to the inclination of the guide plane 31a formed at the attaching part 31 of the fixed side member 30 is provided. At the left end of the inner circumferential surface of the extension part 41, a projected part 42 projected downward from the lower surface of the bottom wall part 40 is formed (see Figs. 8-10). As aforementioned, the projected part 42 is received in the recessed part 33a formed on the inclined plane part 33 of the
base part 32 of the fixed side member 30 when the door member 18 is closed.  When the door member 18 opens, the projected part 42 rotates together with the door member 18 guided by the inclined plane part 33 formed at the base part 32 of the fixed side member 30 while keeping the tip end plane 42a abut on the inclined plane part 33. The tip end plane 42a is shaped approximately circular in cross section so as to be capable of moving on the inclined plane part 33 smoothly (see Fig. 10).  

[0026] As shown in Fig. 5, the cap member 45 comprises a head part 46 having an approximately disc-like shape and capable of closing the opening at the upper end of the outer cylindrical part 38 of the movable side member 37 and an axis part 47 capable of being bayonet-connected to the inner cylindrical part 34 of the fixed side member 30. The cap member 45 is connected to the fixed side member 30 and rotatably connects the movable side member 37 to the fixed side member 30 by bayonet-connecting the axis part 47 inserted in the inner cylindrical part 34 of the fixed side member 30 to the inner cylindrical part 34 through the coil spring 49 interposed between the head part 46 and the bottom wall part 40 of the movable side member 37. The coil spring 49 is compressed to be inserted in the gap between the outer cylindrical part 38 of the movable side member 37 and the inner cylindrical part 34 of the fixed side member 30 to be interposed between the head part 46 of the cap member 45 and the bottom wall part 40 of the movable side member 37.

[0027] In the gate G of the embodiment, the movable side member 37 rotates while moving upward, guided by the guide plane 33a and the inclined plane part 33 formed on the fixed side member 30 when the door member 18 opens.  At this time, the cap member 45 does not move due to the connection to the fixed side member 30, and only the movable side member 37 rotates and moves upward, as shown in Fig. 11.  Since the bottom wall part 40 abutting the lower end of the coil spring 49 moves together with the movable side member 37, the coil spring 49 located between the head part 46 of the cap member 45 and the bottom wall part 40 is further compressed as the bottom wall part 40 moves.  As a result, when the door member 18 is unhandled after the door member 18 opens, the coil spring 49 is restored to push the bottom wall part 40 downwards.  By this pressing force, the movable side member 37 rotates in a reverse direction while moving downward to rotate the door member in a closing direction.  In other words, in the gate G of the embodiment, when the door member 18 is unhandled after the door member 18 opens, the restoring force of the coil spring 49 automatically closes the door member 18 until the tip end side part 19 is positioned close to the side frame 8L.

[0028] As shown in Fig. 12, the lower axis part 52 comprises a round rod-like axis body 4 projecting from the lower frame 3 and a bearing part 53 located at the side of the right end 18b of the door member 18. As aforementioned, the axis body 4 is positioned at the right side inclined part 3c of the lower frame 3 to extend upward.  The bearing part 53 comprises an insertion hole 54 having an open lower side so as to be capable of being inserted the axis body 4.  The insertion hole 54 has an oval cross
section with its longitudinal direction being approximately along the lateral direction so that when the door member 18 is opened and inclined to raise the tip end side part 19 (the side of the left side 18a) of the door member 18, the inserted axis body 4 allows the inclination of the door member 18 to move inside the insertion hole 54. When the door member 18 is closed, the axis body 4 is positioned close to the left side surface 54a of the insertion hole 54.

[0029]

As shown in Figs. 1 and 13, the locking arrangement 58, capable of regulating the opening of the door member 18 from the frame 1 (frame body 2), is located at the upper end on the side of the left side 18a (the side of the upper end 19a of the tip end side part 19), which is the distal end of the opening. As shown in Fig. 13, the locking arrangement 58 comprises a locking member 62 held by a holding member 59 at the upper left end of the door member 18 (the side of the upper end 19a of the tip end side part 19) and a locked member 70 which is located at the upper right end of the left side frame 8L to be locked by the locking member 62.

[0030]

The holding member 59 made of synthetic resin is attached to the upper end 19a of the tip end side part 19 of the door member 18 while holding the locking member 62. It covers the outer periphery region of the locking member 62 excepting the tip end portions 63a and 64a of the first projected piece 63 and second projected piece 64 described below as well as the upper surface of the operation part 65 to constitute the portion which is held by a user when opening the door member 18. Inside the holding member 59, a locking part 60 for locking a locking piece 68 extending from the proximal ends of the spring pieces 66 and 67 as the urging means extending from the first projecting piece 63 and the second projecting piece 64 is provided.

[0031]

The locking member 62 is constituted as an integrally formed material made of synthetic resin, and comprises, as shown in Fig. 13, the first projected piece 63 and the second projected piece 64 projecting from the left end surface 59a of the holding member 59 located at the tip end side part 19 of the door member 18 to the side of the side frame 8L (leftward), an operation part 65 which can draw the first projected piece 63 inside, spring pieces 66 and 67 for urging the first projected piece 63 and the second projected piece 64 to the direction of the projection (leftward) respectively, and a locking piece 68 for locking the proximal end of each of the spring pieces 66 and 67 to the locking part 60 formed on the holding member 59. The first projected piece 63 has an elongated shape with its longitudinal direction being approximately along the lateral direction and is located so as to make its tip end portion 63a project leftward from the left end surface 59a of the holding member 59. The second projected piece 64 has an elongated shape with its longitudinal direction being inclined in the lateral direction so as to direct its tip end facing the side frame 8L downward immediately below the first projected piece 63 and is located so as to make its tip end portion 64a project leftward from the left end surface 59a of the holding member 59. The amount of the projection of the tip end portions 63a and 64a of the first and second projected pieces 63 and 64 in the lateral direction are set to be
approximately identical to each other.

The thin plate-like spring piece 66 which urges the first projected piece 63 to project from the holding member 59 is formed integrally with the first projected piece 63 to extend from the proximal portion of the first projected piece 63 while being curved so as to project leftward, its proximal end distant from the first projected piece 63 being locked to the locking part 60 of the holding member 59 by a locking piece 68. The thin plate-like spring piece 67 which urges the second projected piece 64 to project from the holding member 59 is formed integrally with the second projected piece 64 to extend from the proximal portion of the second projected piece 64 below the spring piece 66 extending from the first projected piece 63, while being curved so as to project leftward, its proximal end distant from the second projected piece 64 being connected to the locking piece 68 together with the proximal end of the spring piece 66 to be locked to the locking part 60 of the holding member 59 by the locking piece 68. In other words, each of the spring pieces 66 and 67 is constituted to separate from the locking piece 68 in two branches. The approximately sheet-like locking piece 68 extending upward is locked to the locking part 60 formed on the holding member 59. The operation part 65 is connected to the first projected piece 63 and projects upward from the first projected piece 63 to expose its upper surface from the holding member 59. When the operation part 65 held by the holding member 59 to be capable of sliding to the right direction slides rightward, the first projected piece 63 connected to the operation part 65 is drawn in the holding member 59 while bending the spring piece 66 (see Fig. 14). When the operation member 65 is released from the holding state, the spring piece 66 is restored to return the operation part 65 to the state before sliding, and the first projected piece 63 again makes the tip end portion 63a project from the left end surface 59a of the holding member 59.

As shown in Fig. 13, the locked member 70 located at the side of the side frame 8L comprises, on its right end surface 70a which is opposed to the left end surface 59a of the holding member 59, a first locking hole 71 and a second locking hole 72 capable of locking the first projected piece 63 and the second projected piece 64 at the respective peripheral edge. The first locking hole 71, formed on the right end surface 70a of the locked member 70 as a recess having an approximately rectangular cross-section so as to be capable of being inserted the tip end portion 63a of the first projected piece 63 projecting from the holding member 59, regulates the movement of the tip end portion 63a of the first projected piece 63 with its peripheral upper, lower, front and rear side surfaces. The second locking hole 72, located immediately below the first locking hole 71, is formed on the right end surface 70a as a recess having an approximately trapezoidal cross-section with an inclined upper surface 72a. The upper surface 72a of the second locking hole 72 is laterally inclined so as to locate the bottom of the recess at a lower position and to locate the opening of the recess at an upper position. As shown in Fig. 13, the upper surface 72a of the second locking hole 72 has the inclination angle to the lateral (horizontal) direction larger than that of
the second projected piece 64 to the lateral (horizontal) direction, thus being capable of guiding the upwardly moving tip end portion 64a of the second projected piece 4 when lifting the tip end side part 19 of the door member 18 while sliding the operation part 65. Namely, in the embodiment, by lifting the holding member 59 while sliding the operation part 65 rightward and drawing the first projected piece 63 to move the tip end side part 19 of the door member 18 upward, the upwardly moving tip end portion 64a of the second projected piece 64 is guided by the upper surface 72a of the second locking hole 72 to be pushed into the holding member 59 by the upper surface 72a, thus releasing the locked state of the second projected piece 64 to the periphery of the second locking hole 72 of the second projected piece 64 (see Fig. 14).

[0034]

When opening the door member 18 of the gate G of the embodiment, by sliding the operating part 65 rightward while holding the holding member 59 to draw the first projected piece 63 to release the locked state to the periphery of the first locking hole 71 and by lifting the holding member 59 to move the tip end side part 19 of the door member 18 upward, the upwardly moving tip end portion 64a of the second projected piece 64 is guided by the upper surface 72a of the second locking hole 72 to be pushed into the holding member 59 by the upper surface 72a as shown in Fig. 14, thus releasing the locked state of the second projected piece 64 to the periphery of the second locking hole 72 to thereby release the locked state by the locking arrangement 58. Then, by rotating the door member 18 around the rotating axis part 28 to direct the tip end side part 19 forward or backward, the door member 18 can be opened. Thereafter, even when the open door member 18 is unhanded, the door member 18 automatically returns to the state where the tip end side part 19 is positioned close to the side frame 8L due to the restoration of the coil spring 49 located inside the upper axis part 29. Then, by moving the tip end side part 19 downward while inserting the second projected piece 64 into the second locking hole 72 from above along the upper surface 72a from the state where the operation part 65 has been slid rightward to draw the first projected piece 63 and the holding member 59 has been lifted to move the tip end side part 19 upward, the second projected piece 64 can be inserted into the second locking hole 72 to be locked to the periphery of the second locking hole 72. Subsequently, by unhanding the operation part 65, the operation part 65 returns to the state before sliding due to the restoration of the spring piece 66 and the first projected piece 63 again makes the tip end portion 63a project from the left end surface 59a of the holding member 59 to be inserted into the first locking hole 71, thereby locking the first projected piece 63 to the periphery of the first locking hole 71 to lock the opening of the door member 18 from the frame 1 (side frame 8L) by the locking arrangement 58.

[0035]

In the gate G of the embodiment, since the lower frame 3 is formed of a pipe material having an approximately flat cross-section with its longitudinal section being approximately along the horizontal surface, a large gap is hardly produced between the central portion 3a located under the door member 18 and the floor surface F (i.e. the height dimension is small), thus improving the convenience for opening the door
member 18 to pass through. Moreover, in the gate G of the embodiment, since the left and right end portions 3b and 3b of the lower frame 3 facing the side frames 8L and 8R are bent so as to be positioned above the central portion 3a located under the door member 18 and the adjusters 13 are arranged at the sides of the left and right end portions 3b and 3b which are spaced upwardly from the floor surface F, enough space for adjusting the adjusters 13 can be provided without hindering the attaching work of the gate G to the attaching surfaces WL and WR by locating the left and right end portions 3b and 3b upwardly remote from the floor surface F even in a constitution where the flat-shaped lower frame 3 is in contact with the floor surface F.

[0036]

Therefore, the gate G of the embodiment can easily be passed through when opening the door member 18.

[0037]

In addition, since the lower frame 3 of the gate G of the embodiment is formed of a pipe material having an approximately oval cross-section, there is no angular portion in the region rising from the floor surface F, thus providing greater usability. Of course, without taking such point in consideration, the lower frame may be formed of a pipe material with an approximately rectangular cross-section.

[0038]

Furthermore, in the gate G of the embodiment, the adjuster 13 may have a constitution where the sides of the side frames 8L and 8R can be pressed onto the attaching surfaces WL and WR by turning the approximately circular operation part (pressing plate) 14a of the screw material 14b with its axis being approximately along the horizontal direction and where the lower end of the operation part (pressing plate) 14a is projected into the gap HI between the left and right end portions 3b of the lower frame 3 and the floor surface F, thus providing a space H for turning the operation part (pressing plate) 14a between the left and right end portions 3b of the lower frame 3 and the floor surface F to facilitate the fastening work of the adjuster 13.

[Explanation of References]

[0039]

1. Frame
3. Lower Frame
3a. Central Portion
3b. End Portion
8L and 8R. Side Frames
13. Adjuster
14a and 15a. Pressing Plates (Operation Parts)
14b. Screw Material
18. Door Member
D. Entrance
F. Floor Surface
WL and WR. Attaching Surface
G. Gate for Infant (Gate)
CLAIMS

1. A gate for infant mounted on a floor surface in a building to close an opening between two attaching surfaces which are opposed to each other, comprising an approximately U-shaped frame attached to the attaching surfaces, a door member rotatably connected to the frame, a locking arrangement capable of regulating the opening of the door member from the frame and adjusters for pressing both sides of the frame 1 at least at its lower end onto the attaching surfaces, said frame comprising two side frames located at the sides of the attaching surfaces and a lower frame located at the side of the floor surface to connect the lower ends of the side frames to each other, wherein:

    said lower frame is formed of a pipe material having an approximately flat cross-section with its longitudinal section being approximately along the horizontal surface, the central portion of said lower frame located under the door member 18 is in contact with the floor surface F, the left and right end portions of said lower frame facing the side frames are bent so as to be positioned above the central portion located under the door member, and said adjusters are arranged at the sides of the left and right end portions which are spaced upwardly from the floor surface.

2. A gate for infant according to claim 1, wherein said lower frame is formed of a pipe material having an approximately oval cross-section.

3. A gate for infant according to claim 1 or 2, wherein said adjuster has a constitution where the sides of the side frames can be pressed onto the attaching surfaces by turning an approximately circular operation part of a screw material with its axis being approximately along the horizontal direction and where the lower end of the operation part is projected into the gap between the left and right end portions of the lower frame and the floor surface.
INTERNATIONAL SEARCH REPORT

PCT/CN2015/073849

A. CLASSIFICATION OF SUBJECT MATTER

E06B 11/02(2006.01); E06B 5/00(2006.01)

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

E06B; E05C

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

CNABS;CNTXT;CNKI;VEN;DWPI:infant, bab+, child+, pet, door?, frame?, safe+, pass+

C. DOCUMENTS CONSIDERED TO BE RELEVANT

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Date of the actual completion of the international search 29 May 2015
Date of mailing of the international search report 12 June 2015

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