



Europäisches Patentamt
European Patent Office
Office européen des brevets



(11)

EP 1 338 331 A2

(12)

EUROPEAN PATENT APPLICATION

(43) Date of publication:
27.08.2003 Bulletin 2003/35

(51) Int Cl.7: **B01F 9/00**, B01F 9/02
// B28C5/18

(21) Application number: **03250969.7**

(22) Date of filing: **18.02.2003**

(84) Designated Contracting States:
**AT BE BG CH CY CZ DE DK EE ES FI FR GB GR
HU IE IT LI LU MC NL PT SE SI SK TR**
Designated Extension States:
AL LT LV MK RO

(72) Inventor: **Gawron, David Frederick Albert**
Watford Herfordshire WD1 8WH (GB)

(74) Representative: **Gibson, Stewart Harry**
URQUHART-DYKES & LORD,
Three Trinity Court,
21-27 Newport Road
Cardiff CF24 0AA (GB)

(30) Priority: **18.02.2002 GB 0203968**

(71) Applicant: **Gavron Research & Development**
Limited
Watford, Herts WD1 8WH (GB)

(54) **Mixer**

(57) A mixer comprises a stand (30) and a frame which is rotatably mounted to the stand, the frame being arranged to support a removable mixing container, which may comprise a bag (B) or a rigid box.

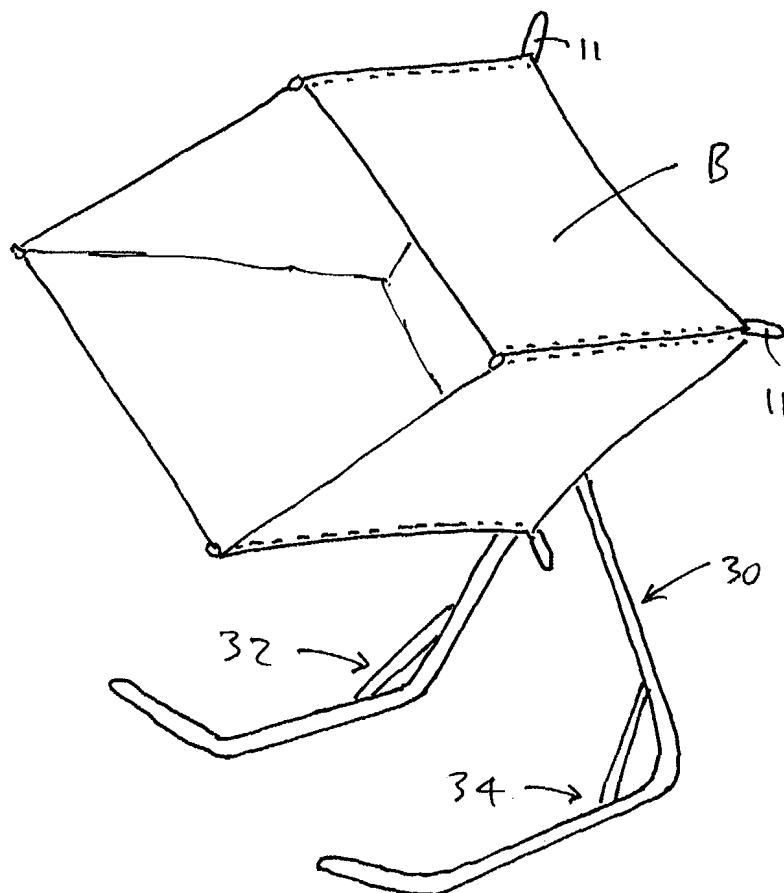


Figure 1

EP 1 338 331 A2

Description

[0001] The present invention relates to a mixer, particularly but not solely to a mixer for mixing cement.

[0002] Cement mixers are usually relatively heavy pieces of equipment which are therefore difficult to transport, and which occupy considerable space and therefore present difficulties for storage. Such cement mixers are therefore not well suited to occasional domestic use.

[0003] We have now devised a mixer which is of simple, relatively light-weight construction and which occupies relatively little space when not in use.

[0004] In accordance with the present invention, there is provided a mixer which comprises a stand and a frame which is rotatably mounted to the stand, the frame being arranged to support a removable mixing container.

[0005] Preferably the stand comprises two generally flat sections pivotally connected together at or adjacent their upper ends. These two sections can be pivoted apart to form a stable support structure when the mixer is in use, or folded together for storage or transport of the mixer.

[0006] Preferably the rotary frame is removable from the stand. Preferably the rotary frame is rotatably mounted to a mount which fits to the top of the stand. Preferably the mount is formed with a downwardly-directed socket which engages over the projecting top of the stand. Preferably the two sections of the stand include projecting top portions which are held together, when engaged within the socket of the mount, in order to hold the two sections of the stand in their pivoted apart condition.

[0007] Preferably the rotary frame comprises four forwardly-directed arms positioned at 90° intervals, for supporting the removable mixing container. For example, the frame may comprise two generally U-shaped elements mounted together at their centres, or four L-shaped elements or one U-shaped element and two L-shaped elements, forming an equivalent structure.

[0008] The mixing container may comprise a bag formed, along the edges between its sides, to receive the respective arms of the rotary frame.

[0009] The mixing container may instead comprise a rigid box formed, along the edges between its sides, to receive the respective arms of the rotary frame. Preferably the box is divided longitudinally into two half-shells which fit together, preferably having longitudinal flanges which mate together.

[0010] In another example, the mixing container may comprise a telescopic box, preferably having an inner flexible bag; this container may be marketed with its parts telescoped together and the container filled with a ready-mix.

[0011] Preferably the mixer is arranged so that the rotary axis of the frame extends forwardly and upwardly at an acute angle to the horizontal.

[0012] Preferably the mixer is arranged so that the

frame can instead be mounted with its axis generally horizontal: the frame may then be used to support a sieve in horizontal orientation.

[0013] Preferably the U-shaped and/or L-shaped elements of the frame can be folded together, to form two spaced-apart pairs of juxtaposed arms: the sieve can then be supported on the two opposed pairs of arms of the frame, via a rim or flange formed along the opposite sides of the sieve.

[0014] Preferably the mount of the mixer comprises two downwardly-directed sockets which are inclined to each other: one of these sockets is used to fit the mount to the top of the stand when the axis of the rotary frame is to lie at an angle to the horizontal (for use of the assembly as a mixer), and the other is used to fit the mount to the stand when the axis of the frame is to lie horizontally (for use of the assembly as a sieve).

[0015] Preferably the rotary frame is formed with grips to enable it to be turned by hand. A handle may be provided for turning the rotary frame via a rotary shaft of the frame. A drive mechanism may be provided, for example a solenoid mechanism driving the rotary frame via a ratchet mechanism.

[0016] Also in accordance with the present invention, there is provided a mixing container for the above-defined mixer, the container having a bottom and a number of sides, the edges between the sides being formed to receive respective arms of said rotary frame.

[0017] Embodiments of the present invention will now be described by way of examples only and with reference to the accompanying drawings, in which:

FIGURE 1 is a view, from the front and one side, of a mixer in accordance with the invention;

FIGURE 2 is a view of the mixer from its rear;

FIGURE 3 is a side view of the mixer;

FIGURE 4 is a schematic view of the rotary frame of the mixer, showing the mixing bag of the mixer being fitted onto the rotary frame;

FIGURE 5 is a side view of the mixing bag, fitted to the rotary frame and in use of the mixer when the materials to be mixed are contained in a separate, disposable bag;

FIGURE 6 is a view of a mixing container in the form of a rigid box, which may be used instead of the mixing bag;

FIGURE 7 is a front end view of the mixing box shown in Figure 6;

FIGURE 8 is a view of a rectangular sieve supported on the arms of the rotary frame once folded flat; FIGURE 9 is a side view of the mixer with the sieve mounted to it;

FIGURE 10 is an enlarged view of the mixer from its rear, showing a solenoid drive mechanism for the mixer;

FIGURE 11 is a longitudinal section through a telescopic mixing container; and

FIGURE 12 is a view of an alternative construction

for the rotary frame.

[0018] Referring to Figures 1 to 4 of the drawings, there is shown a mixer which comprises a rotary frame 10 for supporting a mixing container, the frame 10 being carried on the forward end of a shaft 12 journaled in a mount 20, which is fitted to the top of a stand 30. In the embodiment shown in Figures 1 to 4, the mixing container comprises a removable bag B.

[0019] The rotary frame 10 comprises two generally U-shaped members formed from metal rod or tube, one of the two U-shaped members being fixed at its centre to the shaft 12 and the other U-shaped member being pivoted, at its centre, to the centre of the first U-shaped member. The two U-shaped members accordingly provide four parallel arms 13 which can be positioned at 90° intervals, as shown in Figure 4: alternatively, the two U-shaped members may be turned to lie one-on-the-other as shown in Figures 8 and 9, in which the two arms of one U-shaped member are superimposed on the arms of the other.

[0020] When the arms 13 of the frame 10 are opened out as shown in Figure 4, the mixing bag B may be fitted to it. The mixing bag B is formed of flexible sheet material and has a square bottom, four sides and an open top, and has pockets P formed along the edges between its sides: these pockets are open at the bottom of the bag, but closed at its top. The bag B is fitted onto the frame 10 by engaging the arms 13 of the frame into the pockets P from the bottom of the bag. Loops or ties T are provided at the open ends of the pockets, for looping over the bottom of the frame 10 in order to secure the bag B in place.

[0021] The stand 30 of the mixer comprises two sections 32, 34 which are pivoted together. Each section of the stand comprises a frame formed of metal rod or tube, having a bottom run 35 for resting on the ground, a front portion 36 which extends forwardly and upwardly at an inclined angle, a leg portion 37 which extends upwardly from the rear of the bottom run 35 and is inclined towards the other section, and finally a top portion 38 which projects upwardly from the top of the leg portion 37. A strengthening strut 39 extends between the leg 37 and bottom run 35 of each section of the stand. The two sections 32, 34 of the stand are pivoted together at 33, adjacent the junctions between their leg and top portions 37, 38. The mount 20 is formed with a downwardly-directed socket 22 enabling it to be engaged over the projecting top portions 38 of the two sections 32, 34 of the stand, so mounting the rotary frame 10 to the stand such that the axis of the shaft 12 and rotary frame 10 extends forwardly and upwardly at an inclined angle. When the mount 20 is removed from the top of the stand 30, the two sections 32, 34 of the stand can be pivoted about their connection 33, to bring the portions 37, 35 and 36 of the two sections together, the top portions 38 of the two sections then diverging from each other. The stand 30 is then in a generally flat condition, for storage. It will

be noted that the mount 20 is provided with a handle 21 for lifting it: also a pin 23 is provided for insertion through the top portions 38 of the stand, to retain it in position.

[0022] The frame 10 is formed with grips 11 projecting radially from it at the bottom ends of its arms 13, to enable the mixer to be turned by hand. A handle (not shown) may be fitted to the outer end of the shaft 12, for turning the mixer by hand.

[0023] Referring to Figure 5, the materials to be mixed may be contained in a closed, disposable bag D, which is then placed in the mixer. As the mixer is turned, the inner bag rolls around the inside of the container bag B and its contents become thoroughly mixed.

[0024] Instead of using the mixer bag B, a container in the form of a rigid box 40 may be used, as shown in Figures 6 and 7. This rigid box 40 has a bottom and four sides, with tubular formations 42 provided along the edges between its sides, to receive the arms 13 of the rotary frame 10. In the example shown, the box 40 is divided longitudinally into two half-shells which mate together via respective longitudinal flanges 43. The box can be mounted to the rotary frame in an alternative manner, involving folding the two U-shaped members of the frame flat so that their arms 13 engage the flanges 43 of the box 40 between them.

[0025] An insert (not shown) may be provided for fitting into the bottom of the bag B of Figures 1 to 5 or the box 40 of Figures 6 and 7, the insert having vanes or paddles which aid the mixing process, in use of the mixer.

[0026] Figures 8 and 9 show a rectangular sieve S in use, in place of the mixing container. The frame 10 has its two U-shaped members folded together, so that the two arms 13 of one are superimposed on the two arms 13 of the other. The sieve S has a rim R extending around its outside, at its top, and rests on the two opposed pairs of arms 13 via this rim. The mount 20 is fitted to the top of the stand 30 in a manner such that the shaft 12 is horizontal: thus, the mount 20 is bifurcated in form, with a second socket 24 projecting downwardly at an angle to the first socket 22; Figure 9 shows the mount 20 fitted to the top of the stand by means of this second socket 24.

[0027] An alternative sieve may be provided by a square-section box having its sides formed of mesh, with formations, along the edges between its sides, to receive the arms 13 of the frame 10 when these are positioned 90° intervals.

[0028] Figure 10 shows a drive mechanism for the shaft 12 of the mixer, the mechanism comprising an electromagnetic solenoid 50 having its armature coupled to a spring 52 and to an actuator arm 54: the solenoid 50 and spring 52 are connected across the legs 37 of the stand 30 and the actuator arm is coupled via a ratchet mechanism (not shown) to the outer end of the shaft 12. A controller (not shown) repeatedly energises the solenoid: at each energisation, the armature is pulled in, turning the actuator arm 54 in one direction

through a limited angle; then at each de-energisation of the solenoid. the spring 52 pulls the armature out, returning the actuator arm 54 to its original or rest position. The ratchet mechanism preferably has one setting in which the shaft 12 will be rotated step-wise in a given direction, and another setting in which the shaft 12 will be rotated to-and-fro through a limited angle: the former arrangement is required for use of the assembly as a mixer, whilst the latter arrangement is required for use of the assembly as a sieve.

[0029] Figure 11 shows an alternative form of mixing container 60, comprising a telescopic box of square cross-section and having a bottom part 62 and a top part 64, the top part having an opening 63 in its end wall. The container further comprises a flexible bag 66 forming an inner lining, the bag 66 being positioned within the container with its open end secured, around its periphery, to the inside of the top part 64 of the outer box, adjacent its top end. The bottom part 62 of the outer box is provided with inwardly-projecting vanes 68, over which the inner bag lies, to assist in the mixing process in use of the mixer. The container 60 may be marketed with the inner bag 66 filled with sand and cement ready-mixed and with the two parts 62,64 of the outer box telescoped together. Then in use, these two parts of the outer box are extended and the container 60 is fitted onto the frame 10 of the mixer. the container 60 is provided with formations 69 on the edges of its top and bottom parts, for receiving the arms 13 of the frame 10.

[0030] An alternative construction for the frame 10 is shown in Figure 12, the frame comprising one U-shaped element 70 and two L-shaped elements 72, providing the four arms 13. A pair of plates 74 are fixed either side of the U-shaped element 70, at its centre, and the rotary shaft 12 is fixed to the outer one of these plates: the inner ends of the L-shaped elements 72 are pivoted at 73 between the two plates 74, so that their arms 13 can be swung into juxtaposition with the arms 13 of the U-shaped element 70.

[0031] In general, the frame 10 may be made of round-section or square-section metal tube or rod, or any combination of such materials. In Figure 12, the U-shape and L-shape elements are made up of radial lengths of square-section tube and longitudinal lengths or arms of round-section tube.

Claims

1. A mixer which comprises a stand and a frame which is rotatably mounted to the stand, the frame being arranged to support a removable mixing container.
2. A mixer as claimed in claim 1, in which said stand comprises two generally flat sections pivotally connected together at or adjacent their upper ends, arranged to be opened apart for use or folded together for storage or transport.

3. A mixer as claimed in claim 1 or 2, in which said frame is rotatably mounted to a mount which fits to the top of said stand.

- 5 4. A mixer as claimed in claim 3, in which said mount comprises a downwardly-directed socket which engages over the top of said stand.

- 10 5. A mixer as claimed in claim 4 appended to claim 2, in which said two sections of the stand include projecting top portions which are held together, when engaged within said socket of the mount, to hold said sections opened apart.

- 15 6. A mixer as claimed in any preceding claim, in which said frame comprises four forwardly-directed arms positioned at 90° intervals around the rotary axis of said frame.

- 20 7. A mixer as claimed in claim 6, in which said frame comprises two generally U-shaped elements mounted together at their centres, or one U-shaped element and two L-shaped elements, or four L-shaped elements arranged to provide said arms.

- 25 8. A mixer as claimed in any preceding claim, in which said mixing container comprises a bag of flexible sheet material, said bag having longitudinal formations to receive said arms of said frame.

- 30 9. A mixer as claimed in any one of claims 1 to 7, in which said mixing container comprises a rigid box having longitudinal formations to receive said arms of said frame.

- 35 10. A mixer as claimed in claim 9, in which said box is longitudinally divided into two half-shells.

- 40 11. A mixer as claimed in any preceding claim, arranged so that said frame can be selectively mounted to said stand with its axis inclined forwardly and upwardly, or generally horizontally.

- 45 12. A mixer as claimed in claim 11 appended to claim 4, in which said mount comprises two said sockets inclined to each other.

- 50 13. A mixer as claimed in any preceding claim, arranged to support a sieve in generally horizontal orientation.

14. A mixer as claimed in any preceding claim, further comprising a solenoid drive mechanism.

- 55 15. A mixing container for a mixer as claimed in any preceding claim, the container having a bottom and a number of sides, the edges between the sides being formed to receive respective arms of said rotary frame.

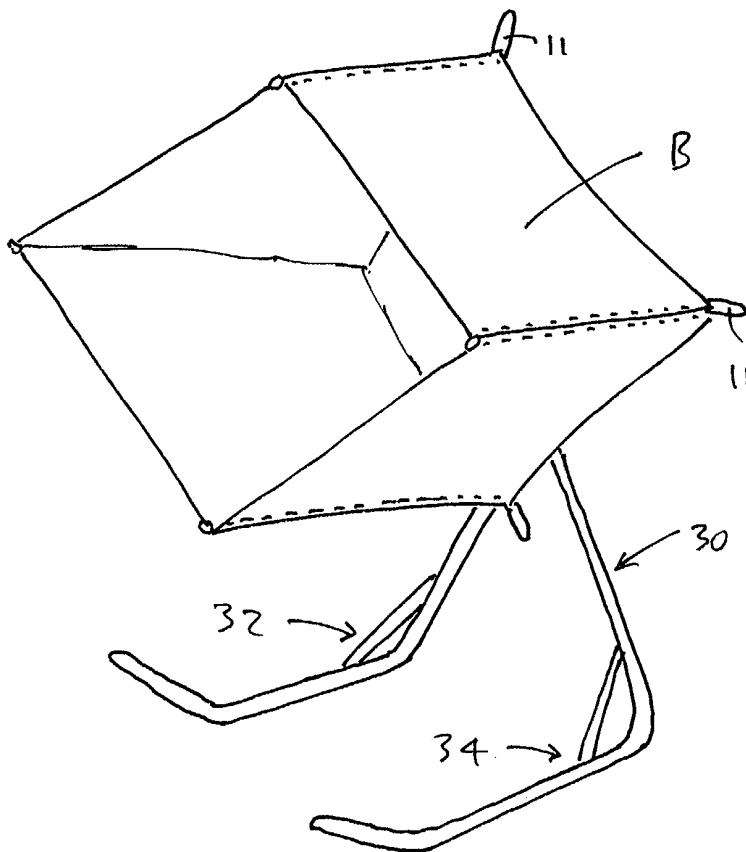


Figure 1

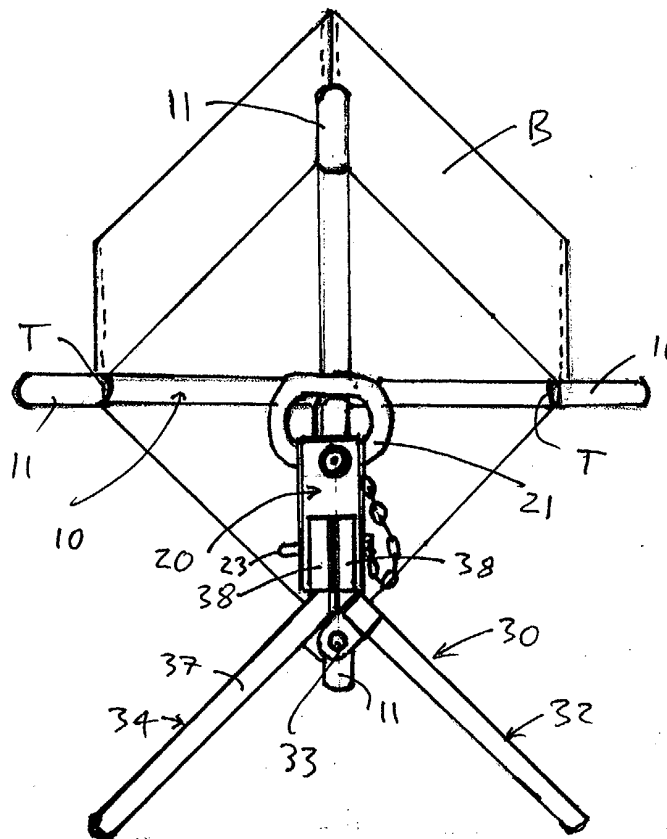


Figure 2

Figure 3

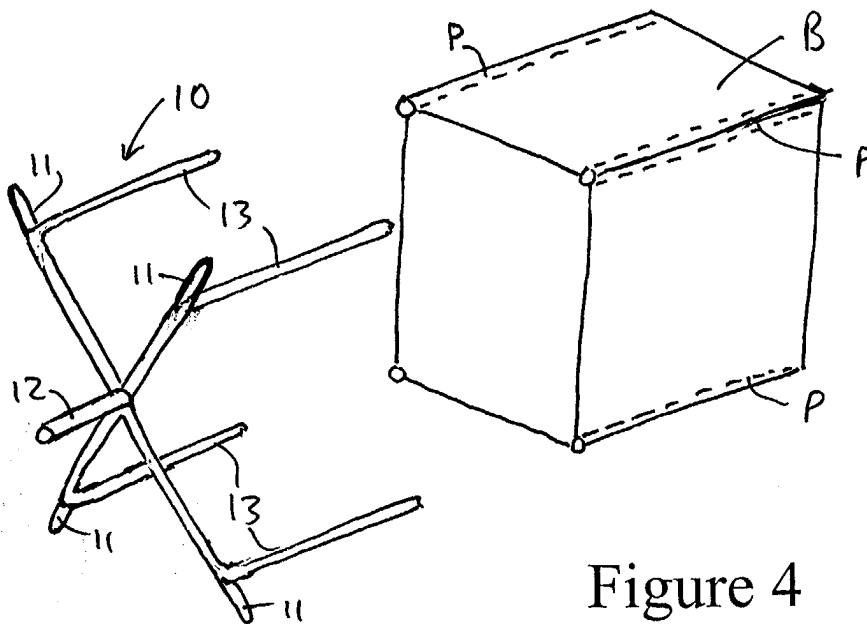
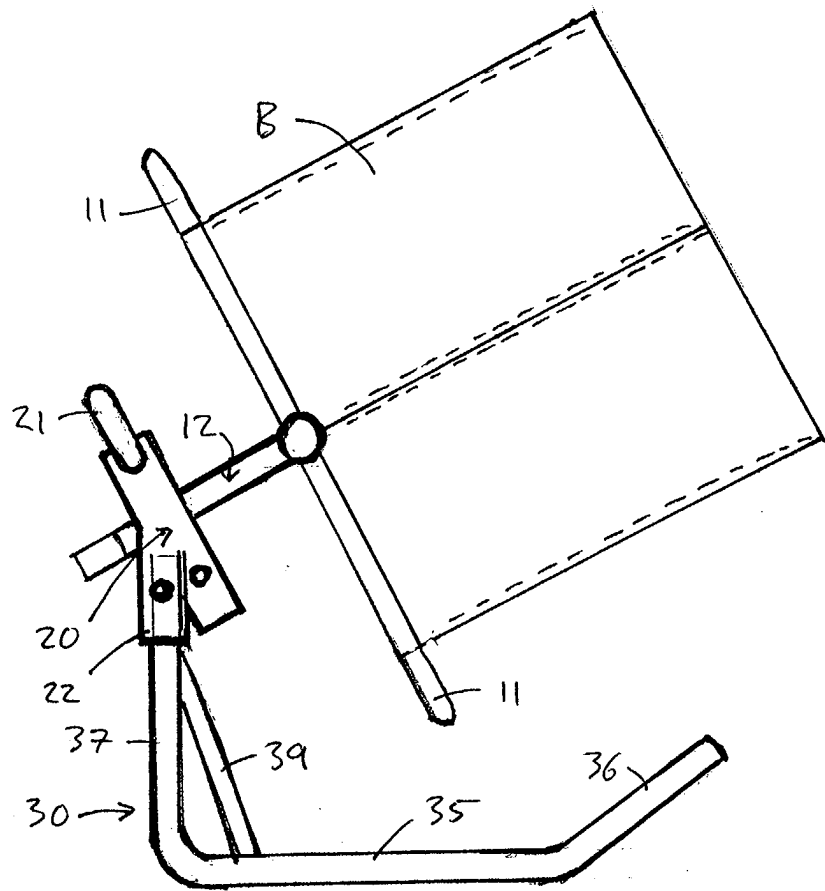


Figure 4

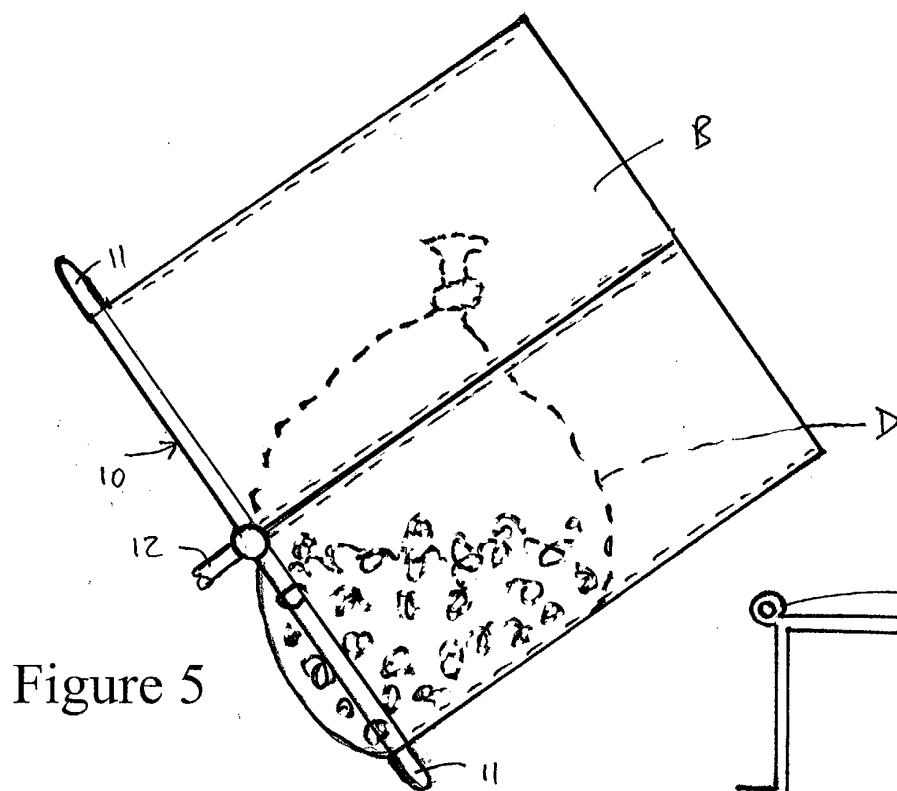


Figure 5

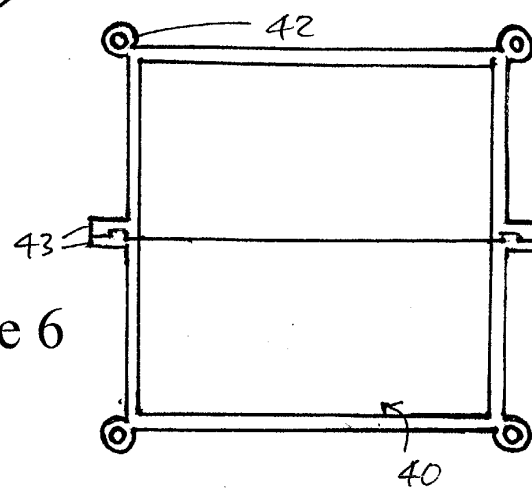


Figure 6

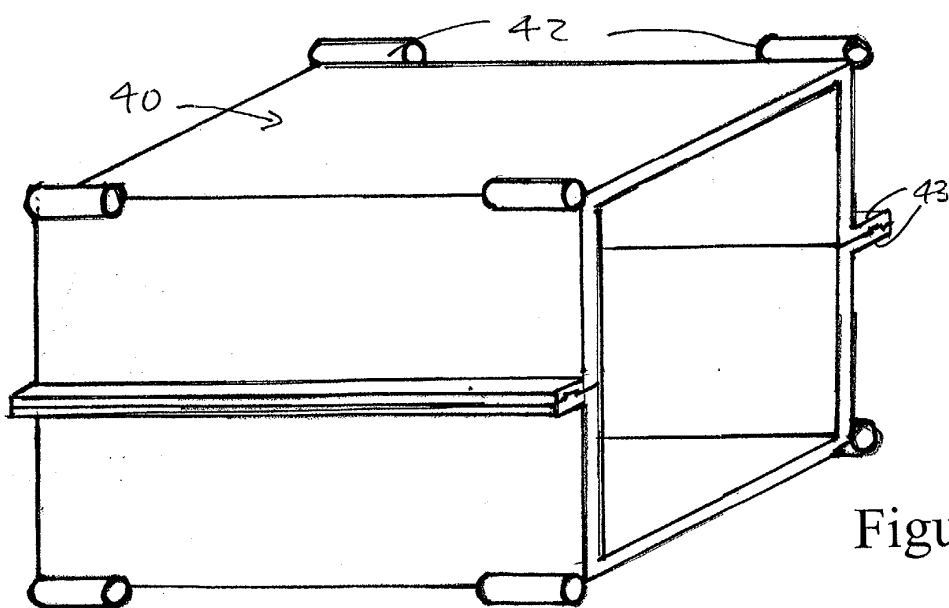
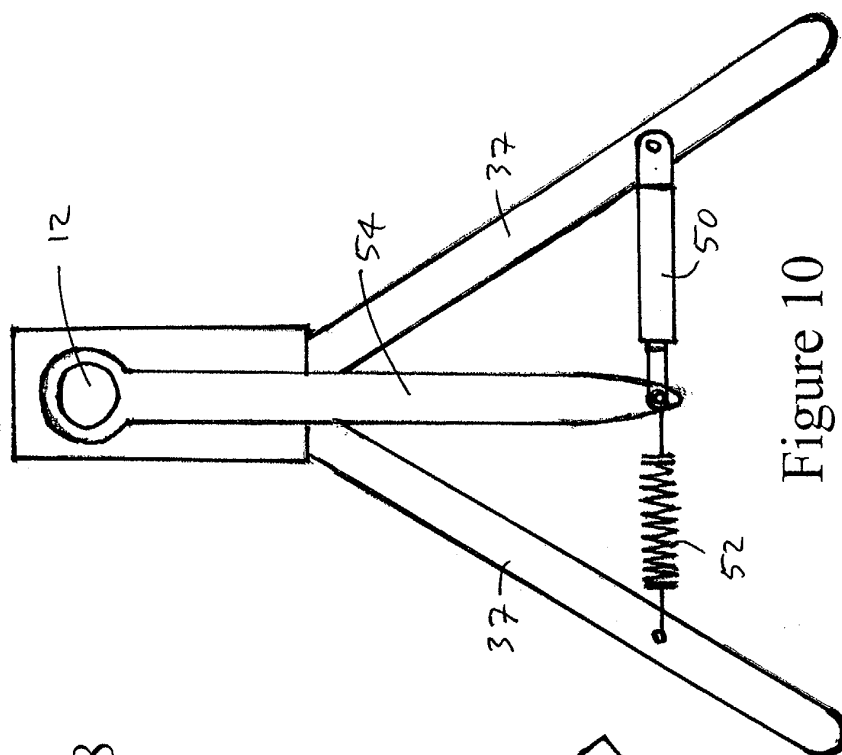
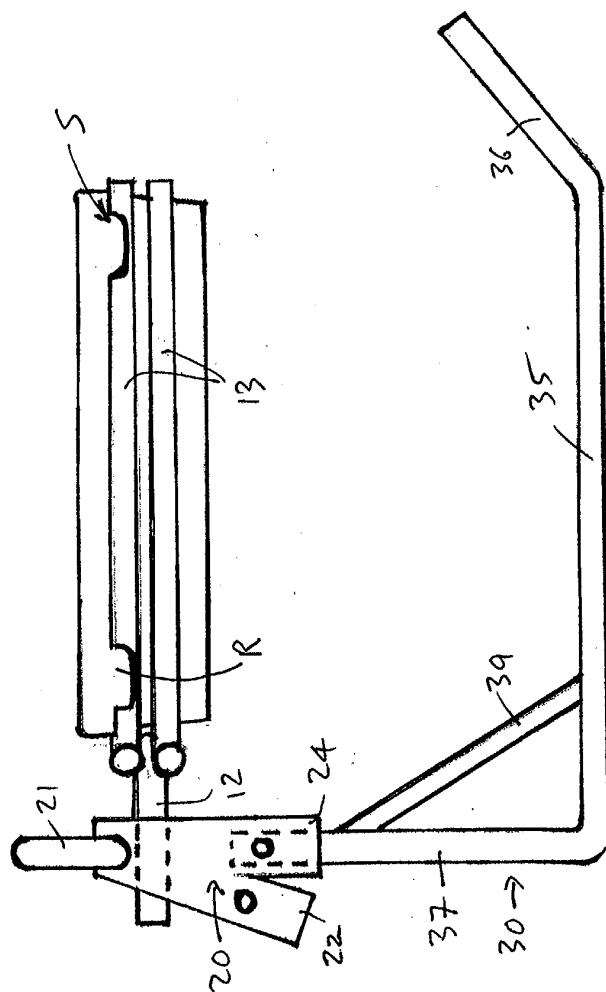
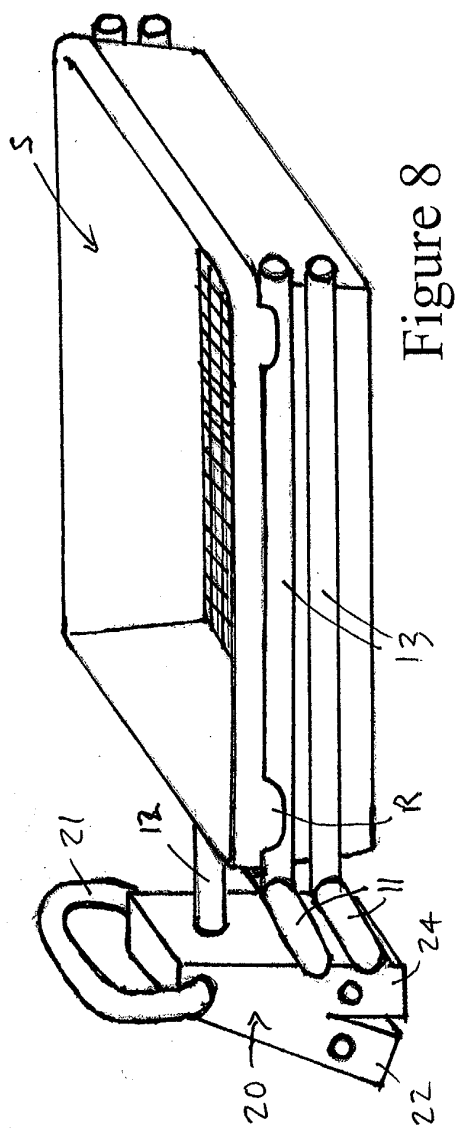


Figure 7



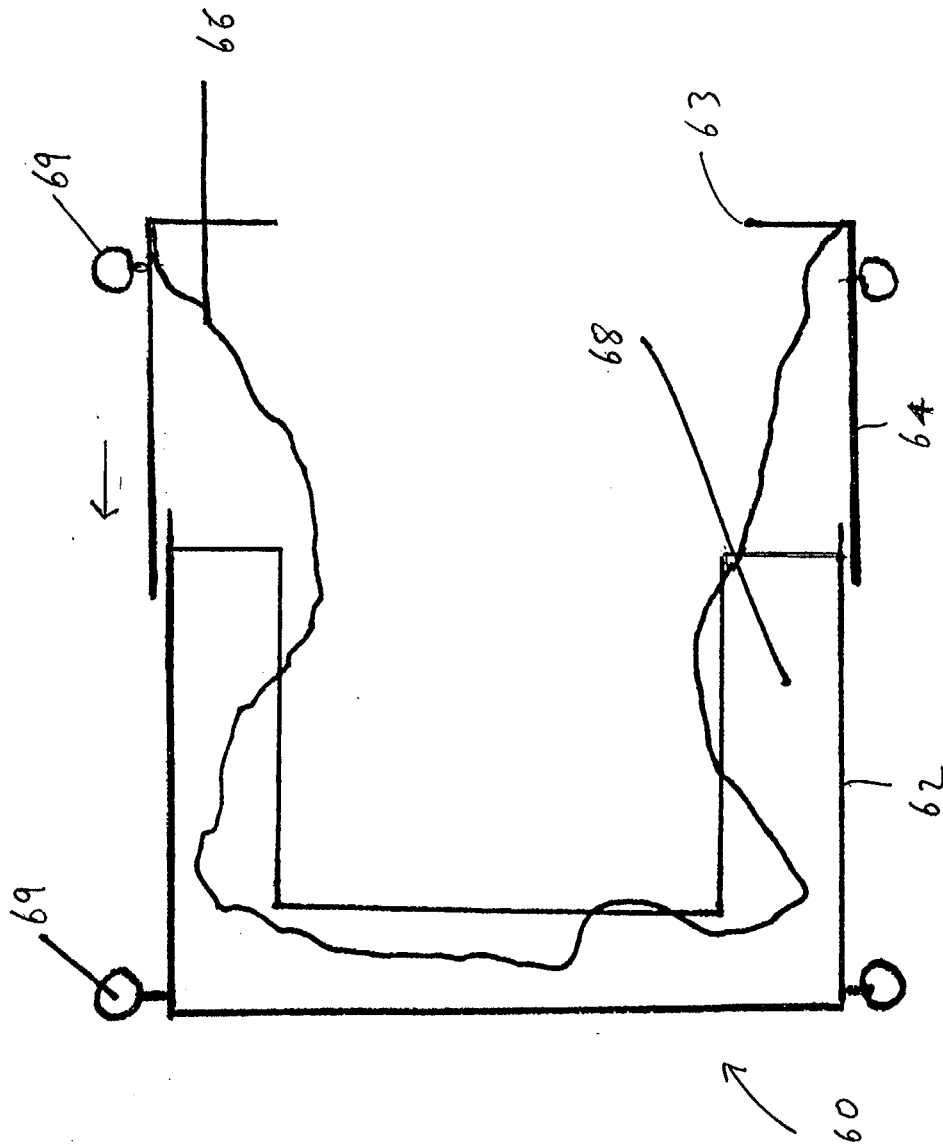


Figure 11

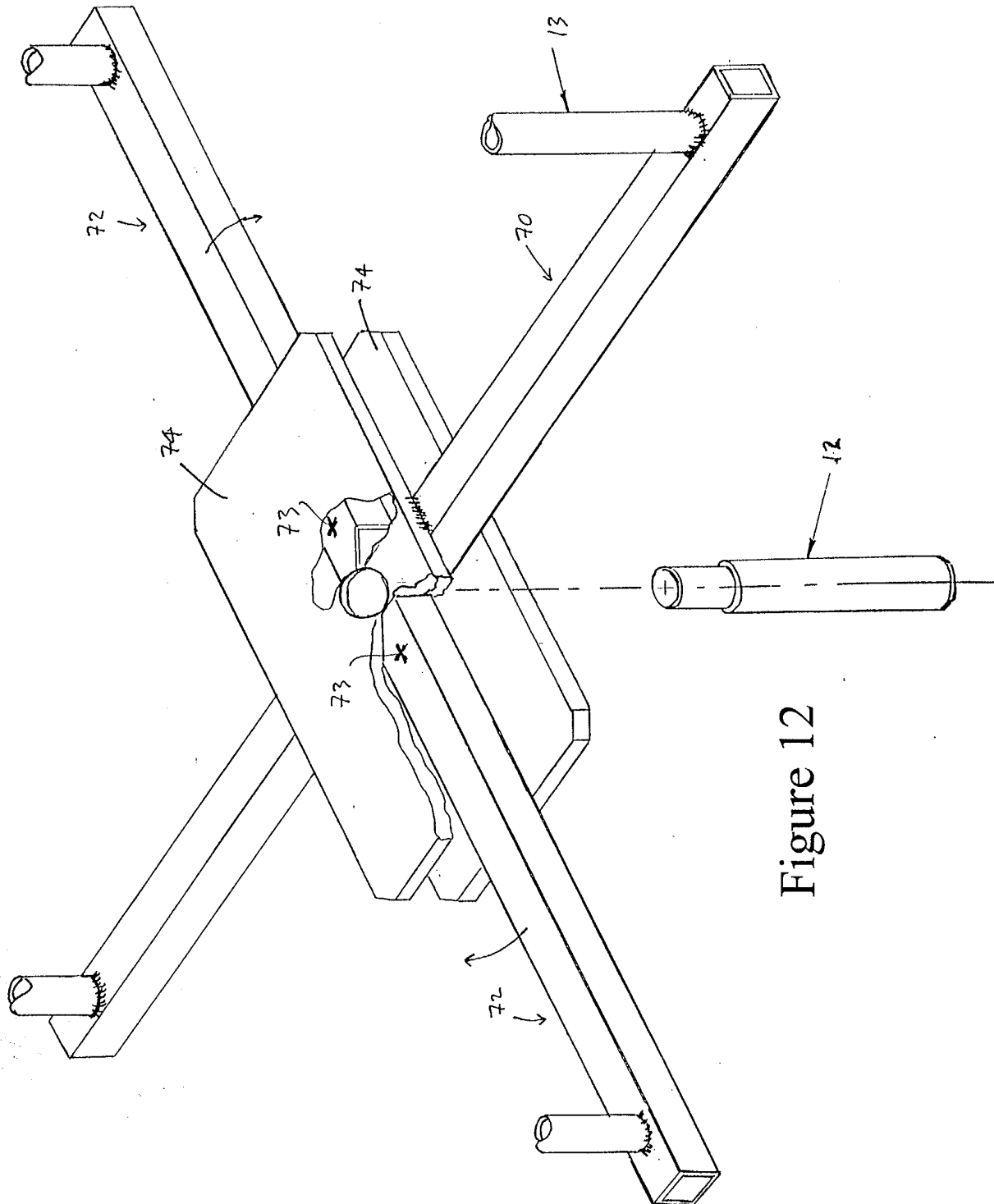


Figure 12