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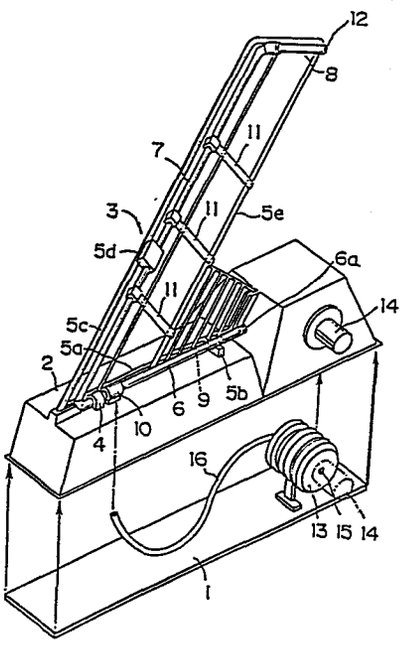
(54) **Air games.**

(57) There is disclosed herein a game apparatus using air pressure which includes a transfer element (9), a course through which compressed air flows and through which the transfer element is forced to move by the compressed air, a scoring pocket (70, 71, 72) formed along the course into which the transfer element enters, an exhaust opening (12), in the vicinity of the final side of the course, and a compressed air-sending member (13), in communication with the starting side of the course and which is operated by the player.



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BACKGROUND AND SUMMARY OF THE INVENTION:

The present invention relates to a portable game which utilizes air pressure for moving transfer elements by compressed air along a course which includes one or more scoring pockets. With the principles of the present invention a wide variety of games embodying different amusement values may be played.

BRIEF DESCRIPTION OF DRAWINGS:

Fig. 1 is a perspective view showing, partly disassembled, a game apparatus utilizing air pressure according to a first embodiment of the present invention;

Fig. 2 is a vertical section view of the air flow pipe which is shown in Fig. 1;

Fig. 3 is a front elevational view of a game apparatus utilizing air pressure according to a second embodiment of the present invention;

Fig. 4 is a sectional view of the game apparatus taken along line IV-IV of Fig. 3;

Fig. 5 is a front elevational view of a game apparatus utilizing air pressure according to a third embodiment of the prevent invention;

Fig. 6 is a sectional view of the game apparatus taken along line VI-VI of Fig. 5;

Fig. 7 is a front elevational view of a game apparatus utilizing air pressure according to a fourth embodiment of the present invention;

Fig. 8 is a sectional view of the game apparatus taken along line VIII-VIII of Fig. 7; and

Fig. 9 is a front elevational view of a game apparatus utilizing air pressure according to a fifth embodiment of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS OF THE INVENTION:

The present invention relates to a game apparatus in which a player controls air pressure to move transfer elements along an air path, in an attempt to deposit the transfer elements into pockets achieving scoring.

The present invention includes transfer elements, a course or path through which compressed air flows and through which the transfer elements are moved by the compressed air, scoring pockets which are formed along the course and into which the transfer elements may enter, an exhaust opening positioned at the end of the course, and a compressed air moving member at the starting side of the course, which is operated by a player.

Preferred embodiments of the present invention will be explained below in detail in conjunction with Figs. 1 to 9.

In the game apparatus which utilizes air pressure according to the first embodiment, as shown in Fig. 1, a box-like rack 2 is placed on a rectangular bottom plate 1. On the rack 2, a generally L-shaped air flow pipe 3 is supported by members 4, 5a, 5b, 5c, 5d and 5e. The air flow pipe 3 is made of a transparent material having a smooth inner wall surface such as a glass pipe or the like, and consists of a horizontal runway pipe 6 positioned along the lengthwise direction of the rack 2 and fixed to the rack 2 by the support members 4 and 5b, the air flow pipe 3 also includes an upwardly tilted pipe 7 which is shaped in succession so as to upwardly rise in a tilted manner from the end of the horizontal runway pipe 6, and a short out-pocket horizontal pipe 8 which is shaped in succession so as to extend in the horizontal direction from the end of the upwardly tilted pipe 7.

The starting portion of the aforesaid horizontal runway pipe 6 is closed by a plug 6a. Further, the horizontal runway pipe 6 is provided near the end portion with an air-sending pipe 10 which opens to the inside of the horizontal runway pipe 6.

The aforesaid upwardly tilted pipe 7 is provided with a predetermined number of (three in this embodiment) tubular "scoring" pockets 11 which extend from the upwardly tilted pipe 7 in a direction at right angle thereto. These "scoring" pockets 11 are displayed in different colors. The ends of the scoring pockets 11 are closed. As shown in Fig. 2, the inlet of each of the scoring pockets 11 is located at position higher than the end of each of the scoring pockets 11. A plug 17 having an exhaust hole 12 is fitted to the end of the aforesaid out-pocket horizontal pipe 8, as seen in Fig. 2.

A plurality of (three in this embodiment) light transfer elements 9 move simultaneously inside the air flow pipe 3 and the scoring pockets 11 in response to air pressure effected and controlled by a player. The color of each of the transfer elements 9 may be the same as the color of each of the scoring pockets 11.

If the aforesaid air flow pipe 3 is formed by bending a cylindrical pipe such as a glass pipe by an ordinary method, the inner diameter of the cylindrical pipe often becomes smaller than the diameter of the transfer element at the juncture of the horizontal runway pipe 6 and the upwardly tilted pipe 7 at the juncture of the upwardly tilted pipe 7 and the out-pocket horizontal pipe 8. Accordingly, it is desirable to form each of such junctures by welding pipes of square shape in cross section.

Among the aforesaid support members 4 and 5a to 5e, the support member 5a extends at the central portion on the outer surface of the rack 2 along the horizontal runway pipe 6. The support member 5b protrudes from the support member 5a in a direction at a right angle near the starting portion of the horizontal runway pipe 6 to support a part of the weight of the air flow pipe 3. The support member 5c has a shape almost corresponding to the shape of the upwardly tilted pipe 7 and the out-pocket horizontal pipe 8. The support member 5d is shaped like a block, through which the upwardly tilted pipe 7 is inserted, and which is contacted to the support member 5c so that the upwardly tilted pipe 7 is secured to the support member 5c. The support member 5e is contacted to the end portion of the scoring pockets 11 to secure them, and the support member 4 secures the final portion of the horizontal runway pipe 6 to the rack 2 from the upper direction. Thus, the support members 4 and 5a to 5e detachably secure the air flow pipe 3 to the rack 2.

In the aforesaid rack 2, a bellows for producing compressed air and transmitting same is supported and disposed on the bottom plate. An air intake hole 15 is formed in the front surface of the bellows 13. The surface of the bellows 13 is engaged with a push button 14 protruding from the front surface of the rack 2. An air-transporting hose 16 extends from the back surface of the bellows 13 and is coupled to the air-transporting pipe 10. When the aforesaid push button 14 is pushed, the bellows 13 contracts transporting compressed air into the air flow pipe 3.

Playing with the present game invention will now be described. First, a player pushes the button 14 when a plurality of the transfer elements 9 are positioned in the horizontal runway pipe 6 near the starting portion where the air-transporting pipe 10 is attached. The bellows 13 contracts to supply compressed air into the air flow pipe 3. Since the air in the air flow pipe 3 flows toward the exhaust hole 12, a condition of negative pressure is established on the starting side of the horizontal runway pipe 6. Therefore, the three transfer elements 9 are sucked or pulled simultaneously, and roll and move toward the final portion of the horizontal runway pipe 6 and the upwardly tilted pipe 7. As the player pushes the push button 14 repeatedly, the transfer elements 9 will eventually reach the scoring pockets 11 or the out-pocket horizontal pipe 8, depending upon the amount and duration of force that is applied.

The game is finished when the transfer elements 9 are all accommodated in any of the scoring pockets 11 or in the scoring pockets 11 having corresponding colors. To return the transfer elements 9 from the scoring pockets 11 to the original position of the horizontal runway pipe 6, the air flow pipe 3 is drawn out from the rack 2 and is fallen down, or the game apparatus as a whole is fallen down.

According to the game apparatus utilizing air pressure of the first embodiment of the present device, the inlets of the scoring pockets 11 are formed at positions higher than the ends of the scoring pockets 11. Therefore, the player must adjust the pushing force and the pushing period for the bellows 13 so that the transfer elements 9 may come to halt instantaneously at the inlets of the scoring pockets 11.

In the game apparatus of the second embodiment, as shown in Figs. 3 and 4, an air-tight transparent plate 22 is positioned in contact with the surface of a rectangular bed plate 21. In the surface of the bed plate 21 is formed a recess portion 23 which has a predetermined depth and a contour comprising a curved surface. A portion of the recess portion 23 located on the right-hand side of the bed plate 21 forms an air flow groove 24 of a U-shape which has such a width that only one transfer element 9 can pass. The air flow groove 24 has a rectilinear transfer element storage portion 24a at a position on its right-hand side. A slide gate 25 is disposed at the lower end of the transfer element storage portion 24a. A plurality of (seven in this embodiment) transfer elements 9 can be stored at the upper position of the slide gate 25.

At the lower end of the air flow groove 24 is located an air-sending port 27 which is open toward the right-hand side in the lateral direction. The air-sending port 27 is in communication with a restorable bellows 13 which protrudes to the front beyond the transparent plate 22. The player may therefore pull the slide gate 25 toward the right to open the transfer element storage portion 24a and remove a suitable number of the transfer elements 9 from the slide gate 25 into the front side of the path, and then push the bellows 13 so that the transfer elements 9 are sent from a transfer element jump-out port 24b of the air flow groove 24 into a game space 30 which is formed on the left-hand side of the recess portion 23.

The game space 30 has a contour generally rectangular in shape, and is constructed like a Japanese pinball game board.

The bed plate 21 has a plurality of pins 32 that are positioned a predetermined distance apart, and has a plurality of (six in this embodiment) scoring pockets 31 which extend in the upper and lower directions of the bed plate 21 and which are arranged in parallel at positions under these pins 32. An exhaust port 12 is provided at the upper left corner portion of the game space 30.

Although the transfer elements 9 are preferably balls or flat discs, other shapes may also be used. The transfer elements 9 are made of such a material that they bound or bounce when they come into collision with pins 32 in the midst of falling onto the scoring pockets 31. Thus, the transfer elements 9 which are propelled by the compressed air from the transfer element jump-out port 24b into the game space 30 come into collision with the pins 32, bound and pass among the pins 32, and are thrown into any of a plurality of the score pockets 31, thus creating great excitement.

In the game apparatus of the third embodiment, as seen in Figs. 5 and 6, there is provided an air flow groove 41 having a shape more complex than the air flow groove 24 in the game apparatus of the second embodiment. In a game space 42, dish-like scoring pockets 44 for receiving the falling transfer elements are arranged among a plurality of pins 32 positioned on a bed plate 43.

A slightly downwardly tilted transfer element storage portion 41a is disposed on the starting side (lower portion in Fig. 5) of the air flow groove 41, and the end of the transfer element storage portion 41a is in communication with the right

lower corner portion of the game space 42. The lower portion of the game space 42 is downwardly tilted toward the transfer element storage portion 41a, and therefore, the transfer elements 9 having finished the game can roll toward the transfer element storage portion 41a due to their own weight. A slide gate 25 is disposed between the right lower corner portion of the game space 42 and the transfer element storage portion 41a. At a position which is separated from the position of the slide gate 25 by a width of one transfer element 9, there is provided an air-sending port 27 in communication with a bellows 13 in a direction at right angles with the transfer element storage portion 41a. The transfer elements 9 are positioned in front of the air-sending port 27. Five transfer elements 9 are arranged on the left side of the slide gate 25. It is possible not only to shoot one transfer element 9, but also to shoot an optional number of the transfer elements 9 at the same time.

The air flow groove 41 comprises a course which rises upright from the starting portion of the transfer element storage portion 41a, then descends, and finally climbs nearly obliquely, and succeeds the right upper corner portion of the game space 42. An exhaust port 12 is formed at the left lower corner portion of the game space 42.

The game is played in the same manner as in the case of the second embodiment. The game apparatus of the third embodiment, however, provides for additional amusement value in that the transfer elements are accelerated in an interesting manner through the curved course after they are shot from the transfer element storage portion 41a by operation of the bellows 13 until they reach the transfer element jump-out port 41b of the air flow

groove 41, and that the game, after it is finished. can switch over to the next game more smoothly and in a shorter period of time than in the case of the second embodiment.

Figs. 7 and 8 illustrate a fourth embodiment of the present invention. As in the second and third embodiments, the game apparatus of this embodiment also has a bed plate 51 in which a curved course is formed, and a transparent plate 22 that is air-tight, and which is overlaid on the surface of the bed plate 51.

An air flow groove 52 formed in the surface of the aforesaid bed plate 51 is sealed in an air-tight manner by the transparent plate 22 and runs continuously in the surface of the bed plate 51. The flow groove 52 is bent in the vertical and lateral directions from the starting side up to the final side, and is formed as an endless path in which a stand-by course 54 on the final side is joined with a straight runway course 53 on the starting side. A slide gate 25 is disposed between the stand-by course 54 and the straight runway course 53. The straight runway course 53 is a straight course which extends in a horizontal direction, and in which an air-transporting port 16 is located, the air-transporting port 16 communicating to a bellows 13 via an air-transporting pipe 17. An exhaust port 12 is formed at the inlet of the stand-by course 54.

A plurality of (four in this embodiment) transfer elements 9 have been accommodated beforehand in the aforesaid stand-by course 54. Among these transfer elements 9, those taken out into the straight runway course 53 by opening the slide gate 25 are transferred toward the final side of the air flow groove 52 due to the compressed air being blown through the air-sending port 16 by operation of the bellows 13.

A clearance of about 0.1 mm exists between the aforesaid transfer elements 9 and the inner wall surface of the air flow groove 52. In this embodiment, it is desirable that the transfer elements 9 be light, small discs.

A curved runway course 55 which rises along a relatively large arch is successively provided with the aforesaid straight runway course 53. A transfer element jump-out port 56 is formed at the end of the curved runway course 55. A variety of straight courses and curved courses are provided in front of the transfer element jump-out port 56.

The aforesaid transfer element jump-out port 56 is joined with a short curved course 57 which is branched at its front portion into an out course 59 having a large arch which leads to an out-pocket 58 having the shape of a cul-de-sac and a curved safe course 60 having the shape of two U-shapes which are vertically connected. With the upper end of the curved safe course 60 is joined a downwardly directed first swollen course 61 consisting of three circularly swollen portions having a sufficiently large width as compared with the diameter of the transfer elements 9. With the first swollen course 61 is joined a downwardly directed second swollen course 63 having the shape of the drum of a violin, via a straight course 62 for raising the transfer elements. In the second swollen course 63, two pins 63a are studded in parallel at the center of the second swollen course 63.

With the outlet of the second swollen course 63 is joined an upwardly directed winding course 64 consisting of four U-shapes which are laterally arrayed and connected together. With the outlet of the winding course 64 is joined a horizontal straight course 65.

An out pocket 66 in the shape of a cul-de-sac is branched downwardly in the vertical direction from the straight course 65. Further, with the outlet of the straight course 65 is joined a vertical U-shaped curved course 67. The outlet at the upper end of the curved course 67 is joined to a downwardly sloping acceleration course 68. With the outlet of the acceleration course 68 is joined an upwardly tilted climbing course 69 which runs nearly in parallel with the acceleration course 68. With the outlet of the climbing course 69 is joined the aforesaid stand-by course 54.

Scoring pockets 70, 71 and 72 are provided along the climbing course 69 at predetermined intervals.

Operation of the fourth embodiment of the present invention will now be described. First, from the plurality of transfer elements 9 stored in the stand-by course 54 one transfer element is taken out into the starting position of the straight runway course 53 by opening the slide gate 25, after which the slide gate is closed. This prevents the compressed air supplied through the port 16 from flowing into the stand-by course 54. Then, the bellows 13 is pushed to transfer the transfer element 9 to the transfer element jump-out port 56 at the end of the curved runway course 55.

Air pressure produced by again pushing the bellows 13 acts on the transfer element 9 which has reached the transfer element jump-out port 56, whereby the transfer element 9 jumps out into the curved course 57. When the transfer element 9 has stopped somewhere in the air flow groove 52, the bellows 13 must be pushed repeatedly to supply new compressed air.

If the transfer element 9 which has come out of the curved course 57 runs too fast, it overruns the inlet of the curved safe course 60, and falls on the out pocket 58 via the out course 59. Therefore, if the feeding rate of the compressed air is adjusted by operating the bellows 13 so that the transfer element 9 may stop at the inlet of the curved safe course 60, the transfer element 9 falls onto the curved safe course 60 due to its own weight. By operating the bellows 13, the transfer element 9 is advanced into the first swollen course 61, into the transfer element rising straight course 62, into the second swollen course 63, and into the winding course 64 which have large resistances. To pass the transfer element through these courses as fast as possible also depends upon the technique employed by the player.

The transfer element 9 which has reached the upper end of the winding course 64 must rapidly run through the straight course 65. If not, it falls on the out-pocket 66. Since the straight course 65 is short and the inlet of the out-pocket 66 very close to the outlet of the winding course 64 and also very close to the inlet of the curved course 67, good technique is required in operating the bellows 13 so that the transfer element 9 may run through the straight course 65 without falling on the out-pocket 66.

The player controls the pushing stroke of the bellows 13 so that the transfer element 9 which has reached the lower end of the climbing course 69 may fall on one of the score pockets 70, 71 and 72. In the climbing course 69, the transfer element 9, which has overrun the inlets of the scoring pockets 70, 71

and 72, falls on the stand-by course 54. When the transfer element 9 does not reach the summit of the climbing course 69, it falls onto the lower end of the climbing course 69 due to its weight. The player then adjusts again the feeding rate of the compressed air by the bellows 13 so that the transfer element may fall on any one of the scoring pockets 70, 71 and 72.

When the transfer elements 9 fall into the out-pockets 58 and 66, the player loses points. When the transfer elements 9 fall into the scoring pockets 70, 71 and 72, the player scores points. The game may be played by competing for the time it takes the transfer elements 9 to enter into any one of the score pockets 70, 71 and 72 and/or for the score.

Fig. 9 illustrates a game apparatus utilizing air pressure according to a fifth embodiment of the present invention. As in the games of the second, third and fourth embodiments, the game apparatus of this embodiment has a bed plate 81 in which straight courses and curved courses are formed, and a transparent air-tight plate 22 which is provided on the surface of the bed plate 81.

An air flow groove 82 is formed symmetrically in the right and left sides in the surface of the bed plate 81, and the side of the starting portion is joined with the side of the final portion, thereby defining an endless path. Along first and second winding courses 83a, 83b in the right and left sides of the air flow groove 82 there are disposed a large number of scoring pockets 84 being expanded toward the lower side of each of the courses.

A horizontal runway course 85 connected to a bellows 13 via an air-sending port 16 and an air-sending pipe 17 on the

right-hand side of the aforesaid game apparatus is horizontally formed at the lower position in the surface of the bed plate 81, and is adjoined with a straight rising course 86. A transfer element jump-out port 87 is formed at the upper end of the straight rising course 86.

The first winding course 83a adjoined to the transfer element jump-out port 87 consists of three downwardly tilted courses 88a, 89a and 90a and two upwardly tilted courses 91a and 92a. The downwardly tilted courses 88a, 89a and 90a have one, three and one score pockets 84, respectively, and the upwardly tilted courses 91a and 92a have two score pockets 84, respectively. These score pockets 84, nine in total, are arranged like a grid.

The second winding course 83b adjoined to the outlet of the downwardly tilted course 90a comprises three upwardly tilted courses 88b, 89b and 90b and two downwardly tilted courses 91b and 92b. Score pockets 84 associated with these tilted courses 88b, 89b, 90b, 91b and 92b, also nine in total, are also arranged like a grid. The outlet of the second winding course 83b is joined with a stand-by course 54. Further, an exhaust port 12 is formed at the outlet of the second winding course 83b.

The transparent plate 22 is overlaid on the aforesaid bed plate 81. If a picture of a butterfly 93 is drawn on the transparent plate 22 leaving the courses transparent in such a manner that a part of the wings of the picture of the butterfly 93 overlap some of the scoring pockets 84, and also if only the surface of the bed plate 81 corresponding to these score pockets

84 is colored white, the transfer elements 9 having various colors fall on the scoring pockets 84, resulting in vividly depicting a butterfly 93.

With this embodiment, amusement is derived by trying to put as many transfer elements 9 as possible into the scoring pockets 84 within a predetermined period of time. However, even after the transfer elements 9 land in the scoring pockets 84 they may fly out of the scoring pockets 84 if the bellows 13 is excessively pushed thereafter when continuing to play the game. In order to skillfully direct all of the transfer elements 9 into the scoring pockets 84 of either the first winding course 83a or the second winding course 83b, or into the scoring pockets 84 of the first and second winding courses 83a and 83b, a high degree of skill is required when operating the bellows 13. Furthermore, by sorting the nine transfer elements 9 into three colors, it is even possible to play a game requiring a high degree of skill such as tick-tack-toe whereby the transfer elements 9 having the same color are introduced into scoring pockets 84 positioned in a vertical, lateral or oblique line.

The game devices according to the second, third, fourth and fifth embodiments of the present invention are shaped flat, and are also compact and not bulky, so that they can be carried in a pocket of clothing or in a bag or the like to enjoy the game indoors or outdoors at any time.

CLAIMS:

1. A game apparatus utilizing air pressure, characterized by at least one transfer element (9), a course (3, 24, 41, 52, 82) through which compressed air flows and through which the transfer element is forced to move by the compressed air, at least one scoring pocket (11, 31, 44, 70, 71, 72, 84) formed along the course into which the transfer element enters an exhaust opening (12) in the vicinity of the final side of the course, and a compressed air-sending member (13) in communication with the starting side of the course, and which is operated by the player.

2. A game apparatus as set forth in either of claims 1, characterized in that said compressed air-sending member is a restorable bellows (13).

3. A game apparatus as set forth in any one of claims 1 or 2, characterized in that said course comprises a recess portion (24, 41, 52, 82) formed in the surface of a bed plate (21, 43, 51, 81) and a plate (22) which is at least partly transparent, air-tight and overlaid on the surface of the bed plate.

4. A game apparatus as set forth in claim 3, charaterized by plurality of pins (32) located on the bed plate (21, 43) in a portion of said course (24, 41).

5. A game apparatus as set forth in claim 4, characterized by a least one scoring pocket (31, 44) positioned among said pins (32) and another scoring pocket positioned among said pins.

6. A game apparatus as set forth in claim 1, characterized in that said transfer elements (9) are classified into different colors.

7. A game apparatus as set forth in claim 3, characterized in that said recess portion is a groove (52) and wherein said course has an out-pocket (58, 66) which is not counted as a score even when the transfer element enters (9).

8. A game apparatus as set forth in claim 7, characterized in that said out-pocket (58) is formed at a place nearer to the starting side of the course than to the scoring pocket (70).

9. A game apparatus utilizing air pressure as set forth in claims 7-8, characterized in that said course (52) consists of a straight course (53) and a curved course (55), and in that the straight course (53) is formed at the lower position of the surface of said bed plate (22) while said curved course (55) is formed in succesion to said straight course.

10. A game apparatus as set forth in claim 9, characterized in that said course (52) has an upwardly titled climbing portion (69) and in that the scoring pocket (70) is formed under said climbing course and open to said climbing course.

11. A game apparatus as set forth in claim 9, characterized in that said course (82) consists of a first winding course (83a) and a second winding course (83b) that are symmetrically arranged on the right and left sides thereof.

12. A game apparatus as set forth in claim 1, characterized in that the final side and the starting side of the course are joined together, so that the transfer element (9) returns to the starting side due to its own weight.

13. A game apparatus as set forth in claim 12, characterized by a slide gate (25) formed between the final side and the starting side of the course.

FIG. 1

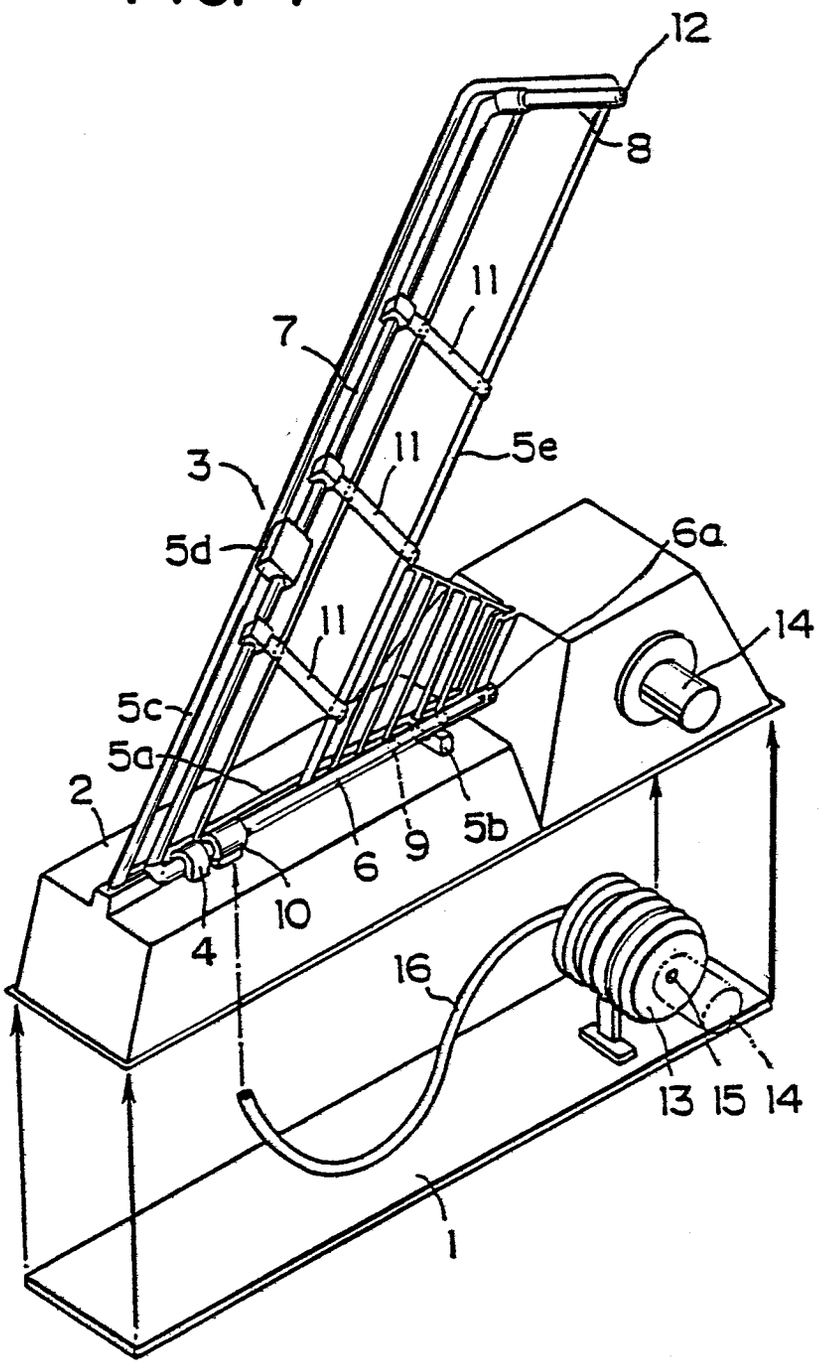

FIG. 2

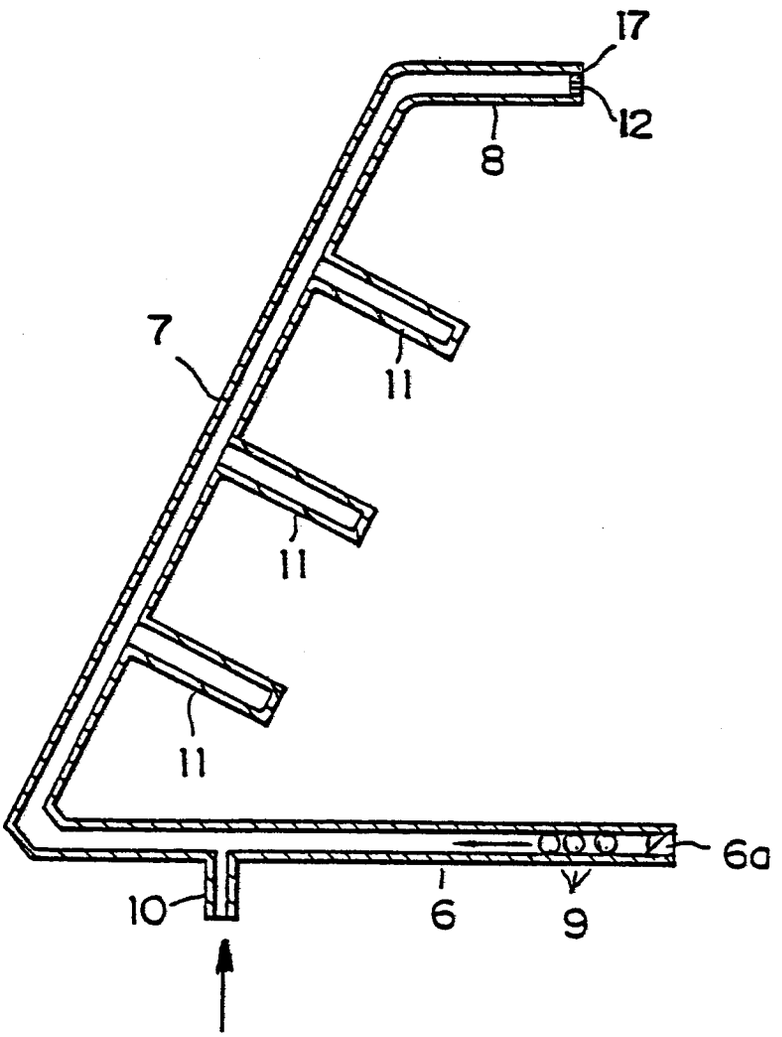

FIG. 3

FIG. 4

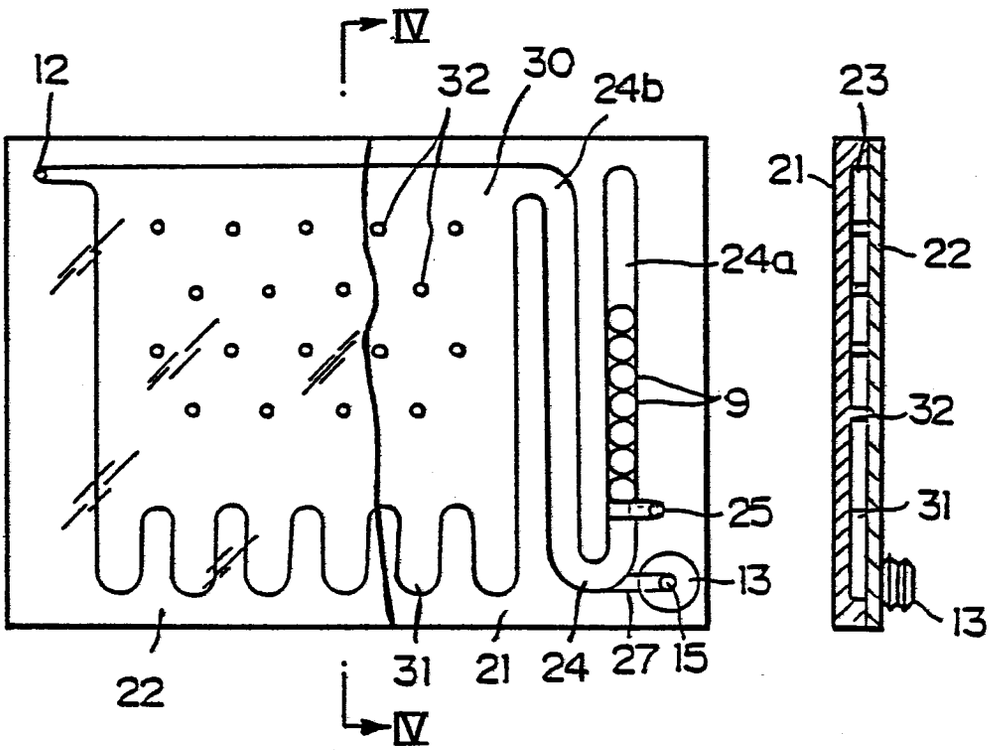

FIG. 5

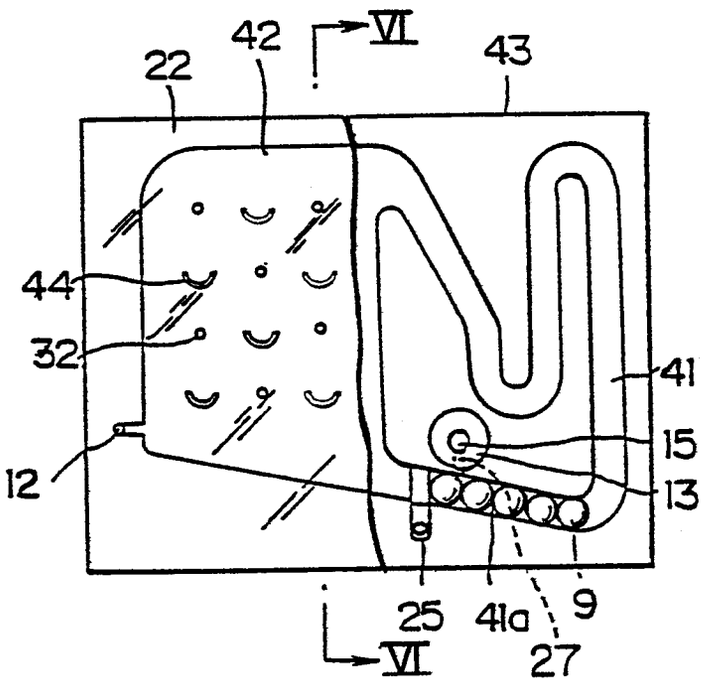

FIG. 6

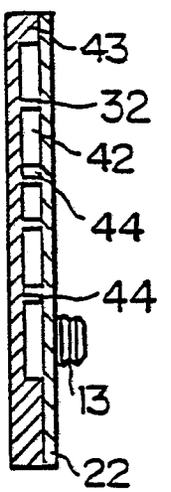

FIG. 7

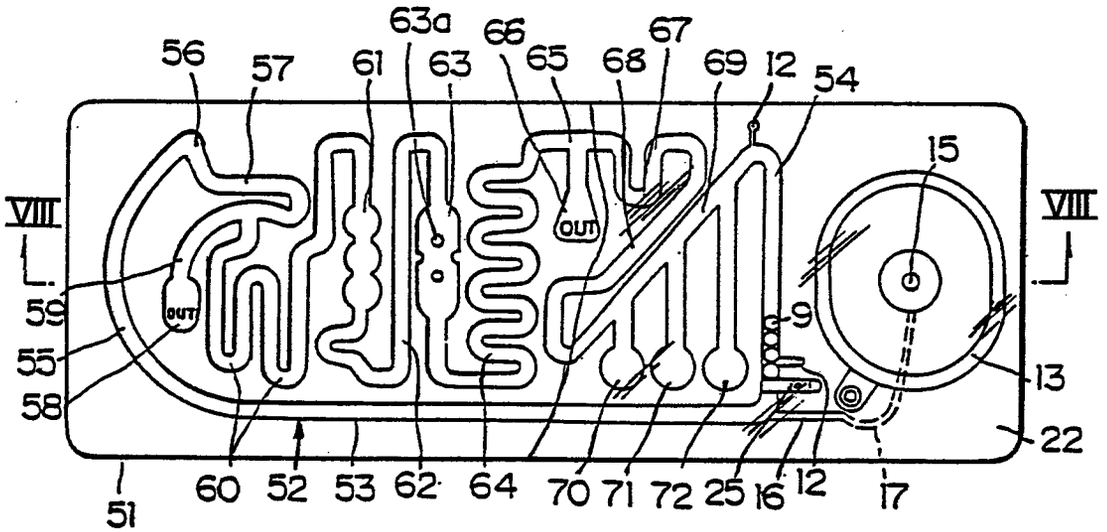
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FIG. 8

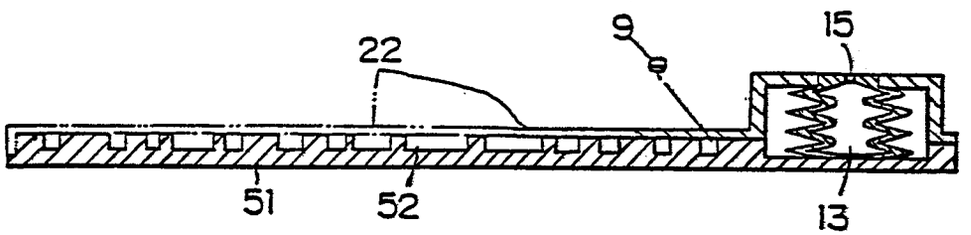
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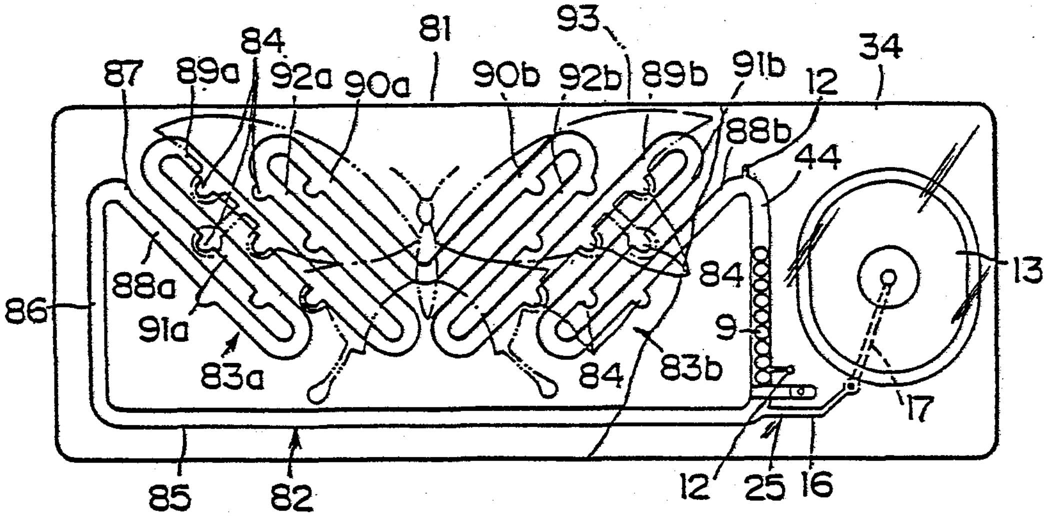
FIG. 9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European Patent Office

EUROPEAN SEARCH REPORT

Application number

EP 84 10 4107

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl. ³)
X	DE-U-1 826 971 (H. GOETZ) * Whole document *	1,3,12	A 63 F 7/04
A	FR-A-2 435 959 (TOMY KOGYO CO. INC.) * Page 3, lines 5-10; figure 6, reference 28 *	2	
A	US-A-3 224 775 (L. RITZ) * Column 2, lines 65-72; column 3, lines 28-38; figure 1 *	4,5	
A	DE-A-2 545 088 (H. WILDI) * Claim 3; figures 1, 2, reference 9 *	7	
A	DE-C- 369 215 (E. CLEVER) * Figure *	10	TECHNICAL FIELDS SEARCHED (Int. Cl. ³)
A	FR-A-2 346 031 (J.-M.C. MONTIBUS) * Claim 1; figure 1, reference 11 *	13	A 63 D 13/00 A 63 F 7/00 A 63 F 9/14 A 63 H 18/00 A 63 H 33/40

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
BERLIN	13-07-1984	CLOT P.F.J.

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