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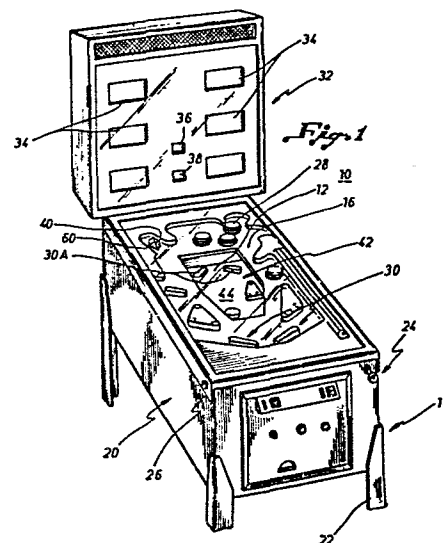
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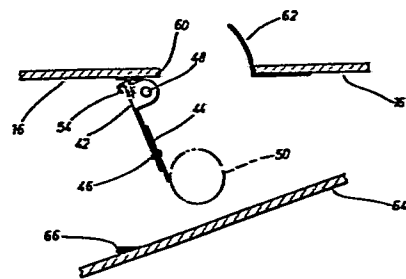
54 Roll-down target for pinball game machine.

57 A roll-down target assembly (40) for a pinball game (10) is disclosed in which a target element (44) is mounted on a target member (42). The target member is movably connected to a playfield (16) such that the target element can be selectively moved by the ball (50) through an opening (60) included on the playfield from one side of the playfield to the other side of the playfield. As the target element is so moved, the ball, guided by a guide element (162), follows the target element through the opening and to the other side of the playfield. The ball then is engaged by a track (64) which transports the ball to a given location on an underlying playfield (12). The ball moves the target element against a biasing spring (54) which urges the target element to one side of the playfield.



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Fig. 4



ROLL-DOWN TARGET FOR PINBALL GAME MACHINE

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This invention relates generally to pinball game machines, and more particularly to a target device for a pinball game.

10 Pinball game machines or pinball games have historically had a single, flat playfield or playboard on which numerous target elements are mounted. The playboard is generally disposed such that it is inclined toward the player, thereby causing the ball in play to roll toward
15 the player. The player manipulates flippers or other similar devices in order to propel the ball back up the incline toward certain targets.

Generally, whenever the ball hits a target, an
20 electrical device is activated to increase the player's score by the number of points attributed to that particular target. In no known pinball game, however, has hitting a target been associated with loss of the ball in play. Generally, loss of the ball in play only occurs
25 when the player fails to propel the ball back up the incline surface of the playboard.

Recent advances in the pinball game art have transformed the traditional single playfield game into a multi-playfield game which can challenge the most demanding players. For example, in United States Patent Application
5 Serial No. 277,324, filed on June 25, 1981 and assigned to the assignee of the present application, a pinball machine is disclosed having a first playfield inclined toward the player and a second playfield disposed below the first and inclined away from the player. This application is hereby
10 incorporated by reference. Such multi-level pinball games, however, create the need for innovative devices for transferring the ball in play from a position on a playfield to a position below the playfield.

15 The present invention provides such an innovative device by providing a roll-down target for transferring a ball in a pinball game from a position on a playfield to a position below the playfield when the ball hits a scoring target.

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According to a preferred embodiment of the present invention, a target assembly includes a target which is movably connected to the playfield and which is urged to a substantially upright position by a biasing element. As
25 the ball in play hits the target, the target is moved relative to the playfield to pass through an opening in the playfield near the target. The ball in play which impacts the target follows the target through the opening. The ball is guided through the opening by a guide element
30 to the position underlying the playfield. The target, being no longer subject to forces imparted to it by the ball in play, moves back to its original upright position under the urging of the biasing element.

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The target assembly is equipped with a suitable electrical device for incrementing the player's score when the roll-down target is hit by the ball in play.

5 It is therefore an object of the present invention to provide a new and improved target assembly for a pinball game.

10 The above noted and other objects and advantages of the present invention will be apparent from the preferred embodiments of the present invention which are described with reference to the accompanying drawings, wherein like members bear like reference numerals, and wherein:

15 Fig. 1 is a perspective view of a pinball game employing a roll-down target according to the invention;

20 Fig. 2 is a cross-sectional view of a roll-down target according to the present invention in which the roll-down target is illustrated in a first upright position;

25 Fig. 3 is a cross-sectional view of the roll-down target according to the present invention in which the roll-down target is illustrated in an intermediate position;

30 Fig. 4 is a cross-sectional view of the roll-down target according to the present invention in which the roll-down target is illustrated in a second position; and

35 Fig. 5 is a cross-sectional view of another embodiment of the roll-down target according to the present invention.

Referring now to Fig. 1, a new and improved pinball game 10 includes a playfield 12 which lies in a plane sloped away from the usual player position 14 for a pinball game. Advantageously, the pinball game 10 also has a playfield 16 having a traditional slope toward the player position 14. The playfield 12 will be referred to herein as the reverse-sloped playfield and the playfield 16 will be referred to as the primary playfield or the conventionally sloped playfield. The playfields 12, 16 have opposite slopes. The term "opposite slope" as referenced to two surfaces means that a ball rolling in a plane passing through both surfaces would roll in one direction on one surface and in the other direction on the other surface.

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In the preferred and illustrated embodiment, the pinball game 10 includes the conventional pinball elements. A cabinet 20 is provided for supporting the playfields 12, 16 using conventional hinges and other brackets. The upper playfield 16 is conventionally hinged (hinge not shown) at the end distant from the player. A set of supporting legs 22 is provided for elevating the cabinet 20 to a height convenient to the pinball player. A plunger or shooter 24, and a set of flipper control switches 26 are disposed on the cabinet 20 near the player position 14. Sets of thumper bumpers 28, flipper mechanisms 30, and other ball-propelling devices such as slingshots, etc., are disposed in a conventional manner on the primary playfield 16. A conventional solenoid-operated out-hole (not shown) is provided to return the ball to the shooter 24 when this ball is lost in play between the flipper mechanisms 30 or when the ball is returned from the lower playfield 12.

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A back glass assembly 32 is supported at the end of the cabinet 20 opposite the player position 14. The back glass assembly 32 has the usual pinball assemblies such as scoring displays 34, a game talley display 36, and ball-in-play display 38.

A conventional pinball controller (not shown) is employed in pinball game 10. Preferably, it is of the microcomputer type and is programmed to control scoring and game play, according to state-of-the-art techniques, in response to operations of the ball-propelling devices. A typical pinball game controller is that used by D. Gottlieb & Co., Northlake, Illinois, for example, in its current pinball games.

Referring now to the reverse-sloped playfield 12, in the preferred and illustrated embodiment it is supported by conventional brackets (not shown) within the cabinet 20 to underlie the primary playfield 16. The brackets may be movably mounted to allow the operator to adjust the angle of inclination of the playfield 12. The playfield 12 is spaced from the playfield 16 and is generally located centrally under the primary playfield 16. The playfield spacing is at least the diameter of a ball and the height of the ball propelling elements on the playfield 12 to allow ball play on the lower playfield 12. The spacing between the playfields 12, 16 extends around the entire periphery of the lower reverse-sloped playfield 12 so that the playfields 12, 16 are not contiguous.

Disposed on the lower playfield 12 are the usual thumper bumpers (not shown), flipper mechanisms 30A and other ball-propelling apparatus. Operation of the

ball-propelling elements on the lower playfield 12 causes scoring on the displays 34 in a conventional manner. As seen from the figures, the flipper mechanisms 30, 30A are disposed to propel the ball in planes of opposite slope
5 during play. The flipper mechanism 30A actively propels the ball toward the player position 14 after the ball has rolled downwardly away from the position 14 toward the mechanism 30.

10 The playfield 16 is specially designed to allow viewing of the lower playfield 12. To this end, one or more window mechanisms are provided in the primary playfield 16. In the illustrated embodiment a single window mechanism 42 is shown. The window mechanism preferably
15 is comprised of a relatively flat, generally transparent material such as a pane 44 of plexiglas. The pane 44 lies in the plane of the primary playfield 16 to minimize disturbance of the roll of the ball during play. As a matter of preference, the pane 44 may be tinted to facilitate
20 viewing of the underlying playfield 12 and to reduce glare.

The playfields 12, 16 are designed to allow them to be confined in a conventional pinball cabinet and yet
25 provide space for one or more roll-down target assemblies 40 which allow transfer of the ball from one playfield to the other.

Referring now to Figs. 2-4, the roll-down target
30 assembly 40 includes a target member having a target bracket 42 and a target element 44. The target element 44 is connected to the target bracket 42, such as by a rivet 46. Other methods of connecting the target element to the target bracket may be employed, or they may be integral.

The target assembly 40 also includes a pivot element 48. The target bracket 42 is movably mounted with respect to the pivot element 48 such that the target element 44 is selectively movable from a position above the playfield 16 as illustrated in Fig. 2 to a position below the playfield as illustrated in Fig. 4. As shown, the preferred motion of the element 44 is pivoted; however, other motions are suitable. A suitable biasing member, such as a spring 54, urges the target bracket 42 to return the element 44 to the position illustrated in Fig. 2.

With continued reference to Fig. 2, during play the ball 50 (illustrated with dashed lines) is propelled toward the target element 44. Prior to the ball hitting the target element, the target element has been urged to the upright position illustrated in Fig. 2 by the biasing member. Once the ball hits the target element 44, however, the force imparted to the target by the ball overcomes the biasing force causing the target member to pivot about the pivot element 48.

An opening 60 is provided in the playfield 16. As the target element 44 pivots about the element 48, the ball follows the target element 44 through the opening 60 included in the playfield 16. The ball is guided into the opening 60 by a guide element 62 which is fixedly connected to the playfield. The guide element 62 prevents the ball from overshooting the opening in the playfield after the target element 44 has been hit.

Referring to Fig. 3, the target element continues to pivot under the influence of the ball 50 until the ball rolls over the edge of the target element, as illustrated in Fig. 4, and onto underlying structure, such as a ball track or the second playfield 12.

Once the force imparted to the target element by the ball is removed, the target element is urged by the biasing member back through the opening 60 and into the position illustrated in Fig. 2.

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As shown in Fig. 4, the structure underlying the opening 60 preferably is a track 64 for transferring the ball to a given location on the underlying playfield. A pair of switch contacts 66 is positioned in the track 64 so that passage of the ball 50 through the opening 60 can be detected for scoring purposes.

Referring now to Fig. 5, another embodiment of the target assembly 40 includes a hole cover 52 which covers the opening 60 when the target assembly is in the upright position. The hole cover 52 is connected to the target bracket 42 and essentially lies in the plane of the playfield 16 when the target bracket is in the position illustrated. As the target element pivots under the influence of the ball 50, the hole cover 52 moves with the target bracket 42, thereby uncovering the opening 60. Alternately, the hole cover may comprise a plurality of members (not illustrated) at least some of which, or all of which, are connected to the playfield 16. The members may be of the "living hinge" type or any other suitable type which permits passage of the target element 44 and the ball 50 through the opening 60.

In the embodiment illustrated in Fig. 5, the ball is guided by the guide element 62 and by a second guide element 63 which extends into the region below the playfield 16. The shape of the guide element 63 is chosen to direct the ball to a desired location under the playfield 16.

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The target member need not be mounted on a pivot element connected to the underside of the playfield. It may be mounted in any suitable fashion which permits passage of both the target element 44 and the ball through the opening 60 in the playfield. Additionally, either or
5 both of the guide elements 62, 63 may be omitted, or they may be an integral part of the playfield, or they may be integral with each other. Moreover, the opening 60 may be chosen sufficiently large so that the target element need not make a large angular movement in order to pass the
10 ball to the underlying position.

The principles, preferred embodiments and modes of operation of the present invention have been described in the foregoing specification. The invention which is
15 intended to be protected herein, however, is not to be construed as limited to the particular forms disclosed, since these are to be regarded as illustrative rather than restrictive. Moreover, variations and changes may be made by those skilled in the art without departing from the
20 spirit of the present invention.

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CLAIMS:

1. A pinball game comprising:
 - 5 a playfield having an opening;
 - a target; and
 - 10 structure movably supporting said target to allow movement of said target through said opening in the playfield between first and second target positions respectively above and below the level of the playfield.
 - 15
2. The pinball game according to claim 1, further comprising:
 - 20 a ball;
 - a track; and
 - 25 structure supporting said track to allow transfer of the ball to a predetermined location after the ball has hit the target.
3. The pinball game according to claim 1, wherein said
 - 30 structure movably supporting the target includes a biasing device.
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4. A target assembly for a pinball game including a ball and a playfield member having an opening, comprising:

a target element; and

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structure movably supporting said target element to allow movement of said target element through said opening in the playfield member between first and second target positions respectively above and below the level of the playfield member.

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5. The target assembly according to claim 4, further comprising:

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a track; and

structure supporting said track to allow transfer of the ball to a predetermined location after the ball has hit the target element.

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6. The target assembly according to claim 4, wherein said structure movably supporting the target includes a biasing device.

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7. A target assembly for a pinball game including a ball and a playfield member having an opening, comprising:

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a target member having a target element;

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structure movably supporting said target member
with respect to said playfield member to allow
movement of said target element through said
opening during a target movement period; and

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means for transferring the ball to a predetermined
location under the playfield member after the
ball has hit the target member, said means
including first means for guiding said ball
through said opening during at least a portion
of said target movement period and second means
disposed to receive said ball after passage
through said opening for guiding said ball to
said predetermined location.

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8. The target assembly according to claim 7,

wherein said first means comprises:

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a guide member; and

structure supporting said guide member to allow
receipt of said ball by said guide member;
and

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wherein said second means comprises:

a track; and

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structure supporting said track to allow receipt
of said ball and to allow transfer of said ball
to said predetermined location.

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9. A target assembly for a pinball game including a playfield member having an opening, comprising:

a target member having a target element;

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structure movably supporting said target element to allow movement of said target element through said opening in the playfield member between first and second target positions respectively above and below the level of the playfield member; and

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structure connected to said target member to at least partially close the opening in the playfield member when said target element is in said first target position.

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10. A target assembly for a pinball game including a playfield member having an opening, comprising:

20

a target element;

structure movably supporting said target element to allow passage of said target element through said opening in the playfield member between first and second target positions respectively above and below the playfield member; and

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means selectively allowing passage of said target element for at least partially closing said opening in the playfield.

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11. The target assembly of claim 10, wherein said means comprises a plurality of members, at least one of said members being connected to said playfield member.

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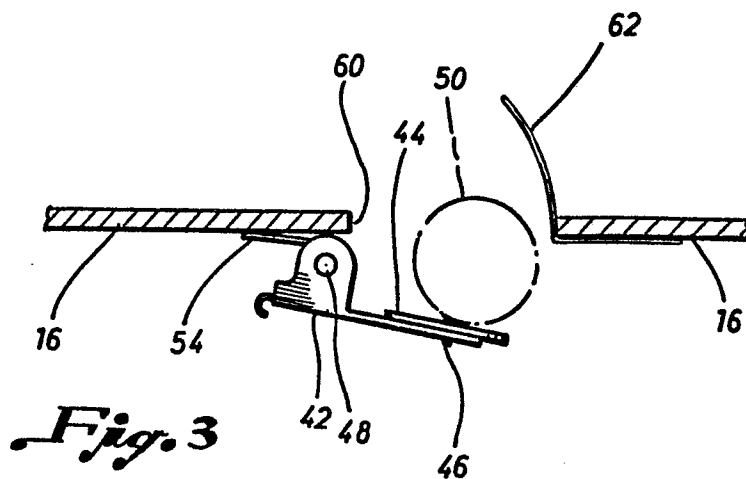
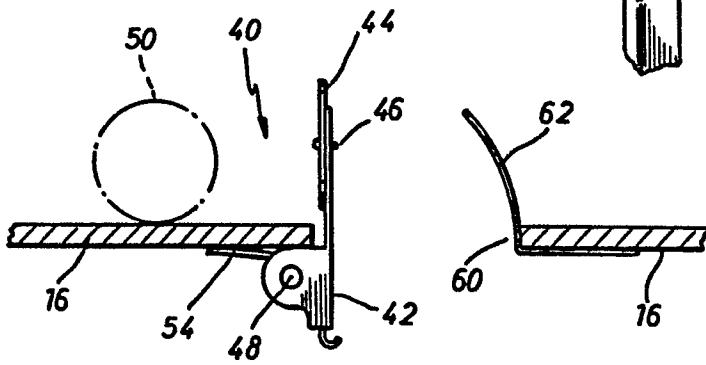
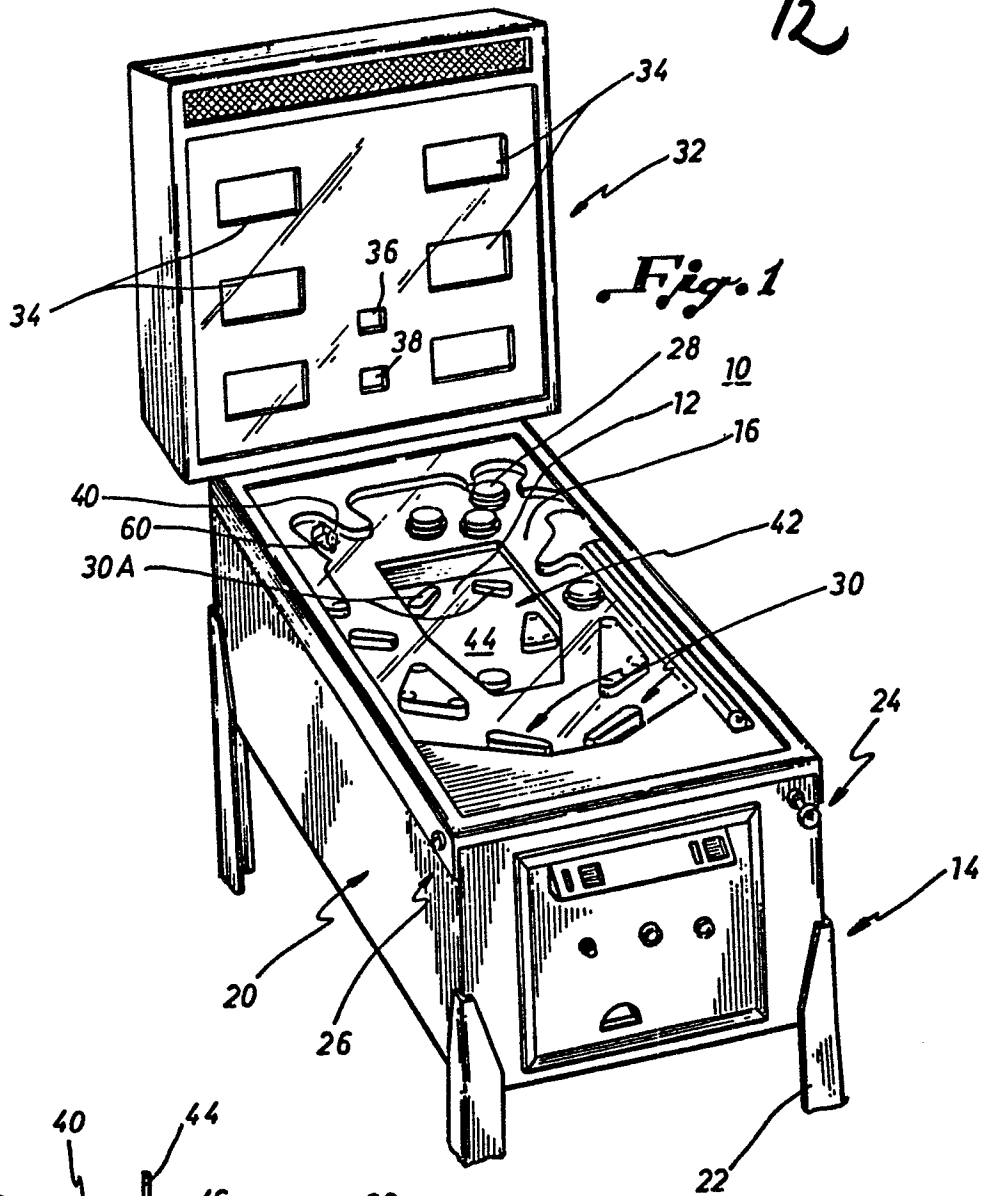
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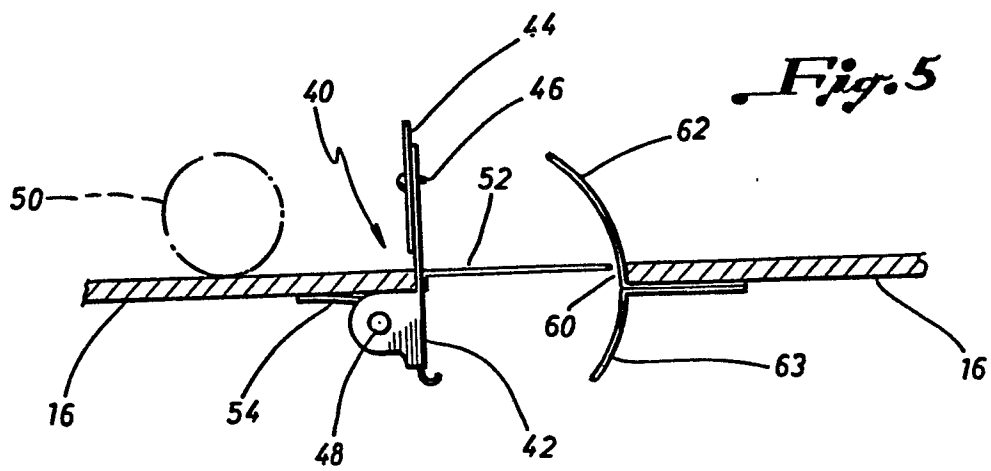
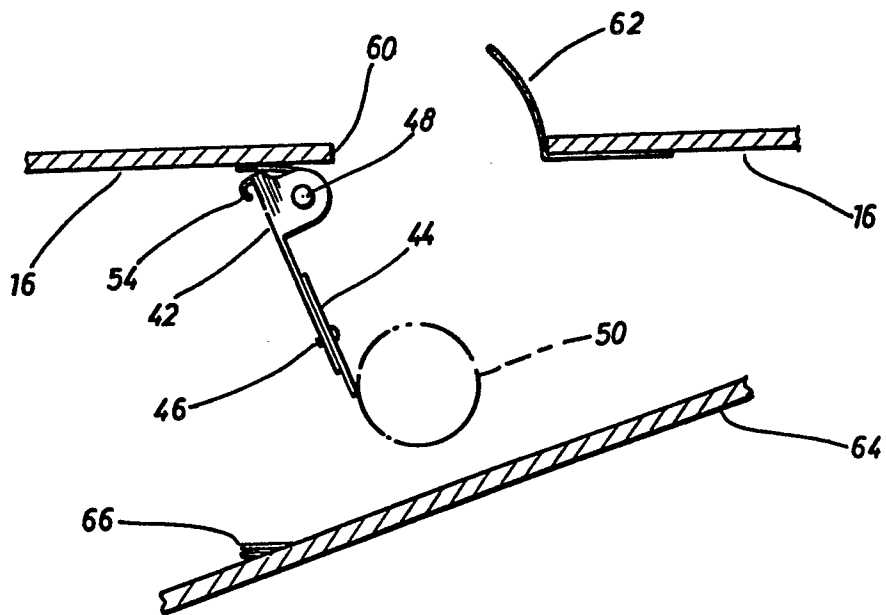
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Fig. 4



European Patent
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EUROPEAN SEARCH REPORT

0078914

Application number

EP 82 10 9162

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)
A	--- US-A-2 167 352 (F.W. FALCK) * Page 2, right-hand column, lines 69-75; page 3, left-hand column, lines 1-6 *	1,2,5	A 63 F 7/00 A 63 F 7/30
A	--- US-A-4 180 267 (G.A.J. HARROP) * Claims 1, 4; page 3, lines 41-44; figures 1, 2 *	1,3,4,6	
A	--- US-A-2 103 191 (E.P. STEIN et al.) * Page 2, right-hand column, lines 33-50; figure 4 *	1,7-9	
A	--- FR-A-1 524 021 (M. CHABAUD) * Abstract; figure *	9-11	TECHNICAL FIELDS SEARCHED (Int. Cl. 3)
P,A	--- EP-A-0 051 374 (WILLIAMS ELECTRONICS, INC.) * Claims 1, 4; figures 1, 3 * -----	1	A 63 D 13/00 A 63 F 7/00 G 07 F 17/38
The present search report has been drawn up for all claims			
Place of search BERLIN		Date of completion of the search 19-01-1983	Examiner CLOT P.F.J.
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			