

# PATENT SPECIFICATION

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## (54) IMPROVEMENTS IN OR RELATING TO SPRING PROJECTORS

(71) We, MECCANO LIMITED, of PO Box No. 4, Binns Road, Liverpool L13 1DA, a British Company, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:-

10 This invention relates to spring-loaded projectors.

15 According to the invention, there is provided a spring-loaded projector, which comprises a missile-holding member having arranged at an edge thereof at least one missile-holding cut-out, open at the edge to a width equal to the maximum width of the cut-out, a body member having a wall in which there is provided a cut-out whose width is equal to or greater than that of the missile-holding cut-out, the missile-holding member and the wall of the body member being relatively movable such that the missile-holding cut-out may be moved from a position wherein the cut-out is closed by the wall to the firing position wherein the missile-holding cut-out opens through the cut-out in the wall, and a spring positioned relative to the cut-out in the wall of the body member such that, in use, it is capable of propelling a missile out of the missile-holding cut-out and through the cut-out in the wall when the missile holding cut-out is in the firing position, the spring being tensioned by contact with the missile as it is moved toward the firing position.

20 In a preferred embodiment of the invention, the missile-holding member is rotatable about a pivot attached to the body member, the missile-holding cut-out faces radially outwardly of the pivot, and the wall is at a constant radius from the pivot. The missile-holding member is preferably a planar disc rotatable about its axis and having a plurality of missile-holding cut-outs, eight

being particularly suitable. The body member may comprise a planar disc having the wall perpendicular thereto at the circumference of the disc, the missile-holding member being rotatable about the axis of the disc.

25 The spring may be a helical spring mounted with its axis parallel to but spaced from the wall and having an arm extending parallel to the missile-holding member, the free end of the arm being adjacent the cut-out in the wall, whereby, in use, as the missile is moved in the missile-holding member towards the cut-out in the wall it is forced between the arm and the wall so that the arm moves away from the wall and the spring tension is increased, becoming a maximum when the missile reaches the firing position.

30 A cover member may be provided in the form of a planar disc, having a diameter greater than that of the body member, and having a wall perpendicular thereto around its circumference, the wall having a cut-out therein corresponding to that in the wall of the body member, so that, when the cover member is placed over the body member so that the walls are adjacent one another and coaxial, the cut-outs in the walls may be aligned. The planar disc of the cover member may be provided with a hole there-through in such a position that a missile may be inserted through the hole into a missile-holding cut-out. A handle may engage the missile-holding member through a hole at the centre of the planar disc of the cover member to enable the missile-holding member to be rotated.

35 The missiles may be of any shape which may fit the cut-outs, a suitable shape being a cylinder, the cut-outs thus being rectangular.

40 The invention will be further described with reference to the accompanying drawing of a preferred embodiment. The device has

POOR QUALITY

a missile-holding member or magazine 1, which is in the form of a disc 2 having a hub 3 at its centre. Around the circumference of the disc are arranged eight slots 4 opening to the circumference of the disc. The magazine is rotatably mounted within a body member or inner drum 5 by means of a screw 6 and a washer 7, the screw 6 being received in a hole (not shown) in a dependent pin 23 forming part of a handle or firing lever 18, described in more detail below. The inner drum has a slot 8 in its wall 9 which corresponds in width to the slots 4 in the magazine 1. A cover member or outer drum 10 is mounted upon the inner drum 5 and magazine 1, so that a cut-out 11 in its wall 12 is aligned with the cut-out 8 in the inner drum 5.

The outer drum 10 has mounted on its inner disc surface a post 13 upon which is seated a helical spring 14, having an arm 15 which contacts the hub 3 of the magazine 1, and a firing arm 16 extending towards the cut-out 11 in the wall 12. A loading hole 17 is provided in the disc of the outer drum 10 diametrically opposite the slot 11. The handle or firing lever 18 engages the magazine 1 through a hole 19 in the outer drum 10 by means of a tongue 20 which is inserted into a slot 21 in the hub 3.

The firing mechanism may fire any suitably sized missile although a cylindrical missile as illustrated in the drawing (22) is preferred. A missile is fired by inserting it into a slot 4 in the magazine 1 through the loading hole 17, and turning the firing lever 18 clockwise, as viewed from above the device. As the missile comes into contact with the firing arm 16 of the helical spring 14 it urges it towards the centre of the drum 10, thus tensioning the arm. As the missile approaches the firing slot 11 (8), the force on the missile outwardly of the centre of the drum increases, reaching a maximum when the slot 4 in the magazine is positioned adjacent the slots 8, 11 in the drums 5, 10 whereupon the missile is ejected from the device. Continuous rotation of the lever 18 whilst feeding missiles into the loading hole 17 would permit a succession of missiles to be fired.

The invention provides a spring projector which is cheap and simple to construct and which enables a number of missiles to be projected in succession without a separate spring-tensioning action at each shot. The projector of the invention is particularly applicable to toy weapons.

#### WHAT WE CLAIM IS:-

1. A spring-loaded projector, which comprises a missile-holding member having arranged at an edge thereof at least one missile-holding cut-out, open at the edge to a width equal to the maximum width of the cut-out, a body member having a wall in

which there is provided a cut-out whose width is equal to or greater than that of the missile-holding cut-out, the missile-holding member and the wall of the body member being relatively movable such that the missile-holding cut-out may be moved from a position wherein the cut-out is closed by the wall to the firing position wherein the missile-holding cut-out opens through the cut-out in the wall, and a spring positioned relative to the cut-out in the wall of the body member such that, in use, it is capable of propelling a missile out of the missile-holding cut-out and through the cut-out in the wall when the missile-holding cut-out is in the firing position, the spring being tensioned by contact with the missile as it is moved toward the firing position.

2. A projector according to claim 1, wherein the missile-holding member is rotatable about a pivot attached to the body member, the missile-holding cut-out faces radially outwardly of the pivot, and the wall is at a constant radius from the pivot.

3. A projector according to claim 2, wherein the missile-holding member is a planar disc rotatable about its axis and having a plurality of missile-holding cut-outs.

4. A projector according to claim 3, wherein the disc has eight missile-holding cut-outs uniformly spaced around its circumference.

5. A projector according to claim 2, 3 or 4, wherein the body member comprises a planar disc having the wall perpendicular thereto at the circumference of the disc, the missile-holding member being rotatable about the axis of the disc.

6. A projector according to any preceding claim, wherein the spring is a helical spring mounted with its axis parallel to but spaced from the wall and having an arm extending parallel to the missile-holding member, the free end of the arm being adjacent the cut-out in the wall, whereby, in use, as the missile is moved in the missile-holding member towards the cut-out in the wall it is forced between the arm and the wall so that the arm moves away from the wall and the spring tension is increased, becoming a maximum when the missile reaches the firing position.

7. A projector according to claim 5, which comprises a cover member in the form of a planar disc, having a diameter greater than that of the body member, and having a wall perpendicular thereto around its circumference, the wall having a cut-out therein corresponding to that in the wall of the body member, so that, when the cover member is placed over the body member so that the walls are adjacent one another and coaxial, the cut-outs in the walls may be aligned.

8. A projector according to claim 6,

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- wherein the planar disc of the cover member has a hole therethrough in such a position that a missile may be inserted through the hole into a missile-holding cut-out.
- 5 9. A projector according to claim 6 or 7, which comprises a handle which engages the missile-holding member through a hole at the centre of the planar disc of the cover member to enable the missile-holding member to be rotated.
- 10 10. A spring-loaded projector substan-
- tially as described with reference to the accompanying drawing.
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