(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Publication number: **0 119 569**
A2

(12) EUROPEAN PATENT APPLICATION

(21) Application number: **84102637.0**

(22) Date of filing: **10.03.84**

(51) Int. Cl.³: **F 41 F 3/04**

(30) Priority: **19.03.83 GB 8307679**

(43) Date of publication of application: **26.09.84 Bulletin 84/39**

(84) Designated Contracting States: **BE DE FR IT SE**

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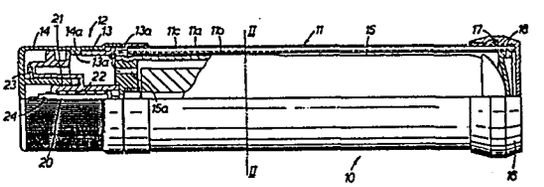
(54) Hand held rocket launcher.

(57) The rocket launcher comprises a launch tube 11 mounted on a handle 14, the handle being rotatable relative to, and about the axis of, the launch tube to operate a striker 20 for firing a rocket 10 located within the launch tube. The launch tube is of hollow wall construction and permits propulsion gases discharged from the rocket upon ignition to enter the space between the walls 11a, 11b, and flow forwardly, out of contact with the rocket, discharging from outlets at the forward end of the tube.



EP 0 119 569 A2

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TITLE MODIFIED
see front page

HOLLOW WALLS

IMPROVEMENTS IN ROCKET LAUNCHERS

This invention relates to rocket launchers, and in particular to hand-held rocket launchers for launching, for example, parachute flares.

Hand held rocket launchers usually comprise a launch tube in which a rocket is secured by an end cap, the cap being removed either manually before firing, or as a result of firing, the rocket. Such a rocket is often launched under distress or other difficult conditions. It is therefore important that the firing of the rocket should take place simply but accurately and when required, without interference from the end cap if this is removed by firing of the rocket.

In prior art rocket launchers propulsion gases have been vented either rearwardly through the base of the launch tube, which in the case of hand-held rocket launchers represents a hazardous situation, or forwardly along the side of the rocket. In the latter case, if the rocket has been a close fit within the launch tube, firing of the rocket has created a gas pressure within the launcher at the rearward end of the rocket. This has tended to expel the rocket before

the rocket motor has achieved full ignition. If however the rocket has been a loose fit within the launch tube so that the propulsion gases have been able to escape between tne rocket and the wall of the launch tube, the movement of the rocket down the launch tube has been erratic and the trajectory of the rocket has been unpredictable.

According to tne present invention there is provided a rocket launcher, adapted to be hand-held, and comprising a launch tube having a cylindrical wall which has a rocket discharge opening at its forward end and is secured to a striker assembly at its rearward end. The wall of the launch tube is hollow to provide one or more gas flow passages extending therealong from one or more inlets, open to the interior of the launch tube adjacent its rearward end, to one or more outlets at its forward end, to permit propulsion gases emitted from discharge nozzles at the rearward end of the rocket to be conducted to said forward end of the launch tube out of contact with the rocket.

Preferably the launch tube is provided with an end cap which is fitted to the forward end of the launch tube to cover the outlet of said one or more gas flow

passages. Upon firing of the rocket, the closure cap, if not directly removed manually, will be blown off the end of the launch tube by gas discharge from such passages before the rocket leaves the launch tube and accordingly does not impede the progress of the rocket. It will thus be seen that manual removal of the closure cap is not necessary.

A packing member is located in contact with the forward end of the rocket and the inside of the launch tube. The packing member is retained in the launch tube by friction and is ejected as the rocket leaves the launch tube.

The invention is illustrated by way of example in the accompanying drawing in which:-

Fig. 1 is a side elevation, part sectioned, of a hand-held rocket launcher, and

Fig. 2 is a section on the line II-II of Fig. 1.

As shown in the drawing, the launcher 10 comprises a launch tube 11 mounted on a striker assembly 12, the striker assembly including a generally cylindrical housing 13 and a tubular handle 14 mounted for

rotation on the housing 13. The striker assembly will be described further below, but it is sufficient to say, at this stage, that the launcher is operated by the user holding the launch tube 11 in one hand, the handle 14 in the other hand and, after release of a safety device, rotating the handle relative to the launch tube to operate the striker.

The present invention is primarily directed to the launch tube 11 which is a cylinder of hollow wall construction, in particular having outer and inner walls 11a,11b, interconnected by webs 11d to leave a passage, or particularly a multiplicity of passages, 11c between the inner and outer walls for the passage of gases resulting from tne firing of a rocket 15 contained within the launch tube. The launch tube is conveniently a one- piece plastics extrusion moulding.

Tne launch tube is mounted in the open forward end of the housing 13 by forming a step 13a around the inside of the lip of the housing 13 and fitting the launch tube 11 into the forward end of the housing so that the outer wall 11a of the tube 11 rests on the step, leaving the passages 11c open to the interior of the launch tube 11 and of the housing 13 to provide gas

inlets to the passages. At the forward end of the launch tube, the passages 11c open on to the end surface of the launch tube to provide a plurality of gas outlets.

The forward end of the launch tube is closed by an end cap 16 which fits resiliently over this end and which engages the outer side of the launch tube to form a seal, conveniently using an O ring seal 17..

This end cap 16 is designed to be blown off the end of the launch tube, upon firing tne rocket, by propulsion gases which initially are discharged rearwardly from the rearward end of the rocket. These gases then reverse direction, enter and flow forwardly along the passages 11c and discharge from tne forward end of the passages 11c against the inside of the end cap, creating sufficient pressure to blow the end cap off the launch tube.

Tne rocket 15, which conveniently is of the solid propellant type, has an igniter located centraliy at its rearward end to be struck by a striker, and a number of angled discharge nozzles 15a at its rearward end designed not only to propel the rocket but also to impart spin to the rocket for stabilisation.

The result of the flow of propulsion gas through the passages 11c of the launch tube, by-passing the rocket, is not only to remove the end cap 16 and so prevent it from impeding the flight of the rocket, but also to prevent an undesirable pressure rise within the launch tube 11 behind the rocket which would tend to drive the rocket out of the launch tube before the emission of propulsion gas had imparted the necessary thrust to the rocket.

A disc-shaped packing member 18 is fitted into the forward end of the launch tube to engage the inside of the launcn tube conveniently through an O-ring seal 19 and to contact the forward end of tne rocket 15. This packing member engages the launch tube with sufficient friction to prevent discharge of the rocket prior to full ignition.

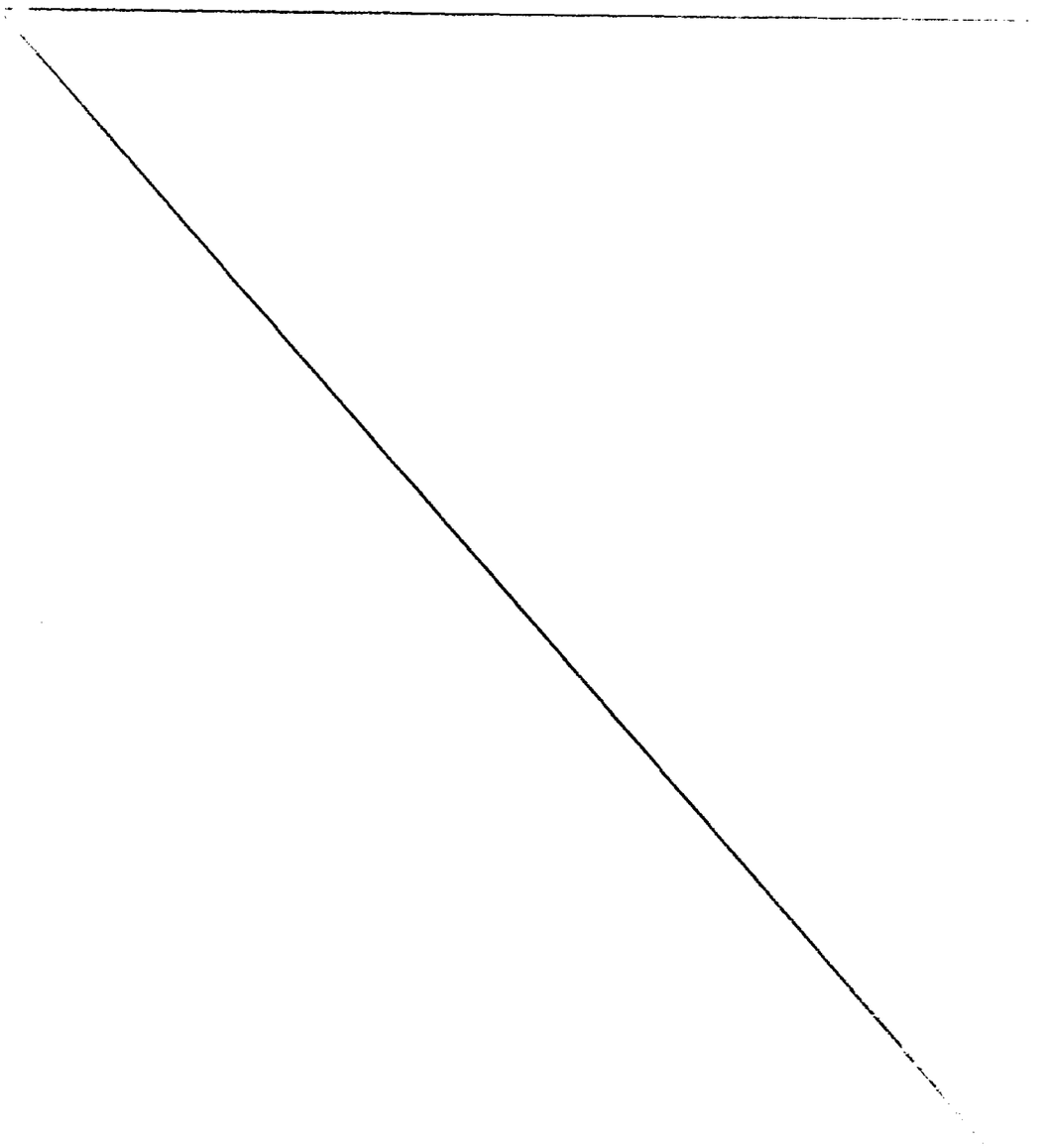
The striker assembly 12 can be formed as described in detail in British Patent Specification No. 869341.

In the present embodiment, the assembly 12 comprises, in addition to housing 13, a striker 20 slidable longitudinally, on the axis of the launch tube, within a sleeve 21 and biased by a spring 22. Tne sleeve 21 is secured to the housing 13 by an annular cam 23

which bridges between the sleeve 21 and housing 13. The annular cam is formed, over each semi-circle of its surface length, with a slow rise fast drop cam profile. At its rearward end the striker carries a transverse pin 24 whose ends engage the cam profiles and are held in contact therewith by the spring 22. The pin 20 also engages in slots (not shown) in the handle which extend parallel to the launch tube axis. Thus upon rotation of the handle 14 relative to the launch tube 11, the pin 20 is caused to ride up the slow rise cam profiles, simultaneously compressing the spring, until the pin drops over the fast drop profiles and allows the striker to be driven forward by tne spring against tne igniter of the rocket.

The striker is preferably provided with a safety device in the form of a projection 14a on the inside of the handle 14 which engages in a slot 13a in the housing 13 (or vice versa). The slot has a first short circumferential portion leading into an axial portion and thence into second full circumferential portion. Each portion contains a neck or other obstruction past which the projection must be pushed, each obstruction providing sufficient resistance to movement of the projection to prevent inadvertent use.

In order therefore to fire the rocket, the handle must be (1) rotated past the first obstruction into a READY position, (2) moved axially past the second obstruction into a ARMED position, and (3) rotated past the third obstruction to the FIRE position, in which the striker spring is loaded and then released to strike the igniter.



CLAIMS

1. A rocket launcher, adapted to be hand-held, and comprising a launch tube having a cylindrical wall which has a rocket discharge opening at its forward end and is secured to a striker assembly at its rearward end, characterised in that said cylindrical wall is hollow and provides one or more gas flow passages extending therealong from one or more inlets, open to the interior of the launch tube adjacent its rearward end, to one or more outlets at its forward end, said passages permitting propulsion gases emitted from discharge nozzles at the rearward end of the rocket to be conducted to said forward end of the launch tube out of contact with the rocket.

2. A rocket launcher according to claim 1 characterised in that the tube comprises coaxial inner and outer cylindrical wall members interconnected by spacers.

3. A rocket launcher according to claim 1 or claim 2 characterised by a cap which fits over the end of the cylindrical wall and is removable by discharge of the rocket, or by discharge of rocket gases from said outlets.

4. A rocket launcher according to any preceding claim characterised by a packing member fitted within, and in frictional engagement with, the forward end of the launch tube to prevent the discharge of the rocket prior to full ignition.

5. A rocket launcher according to any preceding claim characterised in that said striker assembly includes a striker and handle rotatable about the axis of the launch tube to operate the striker.

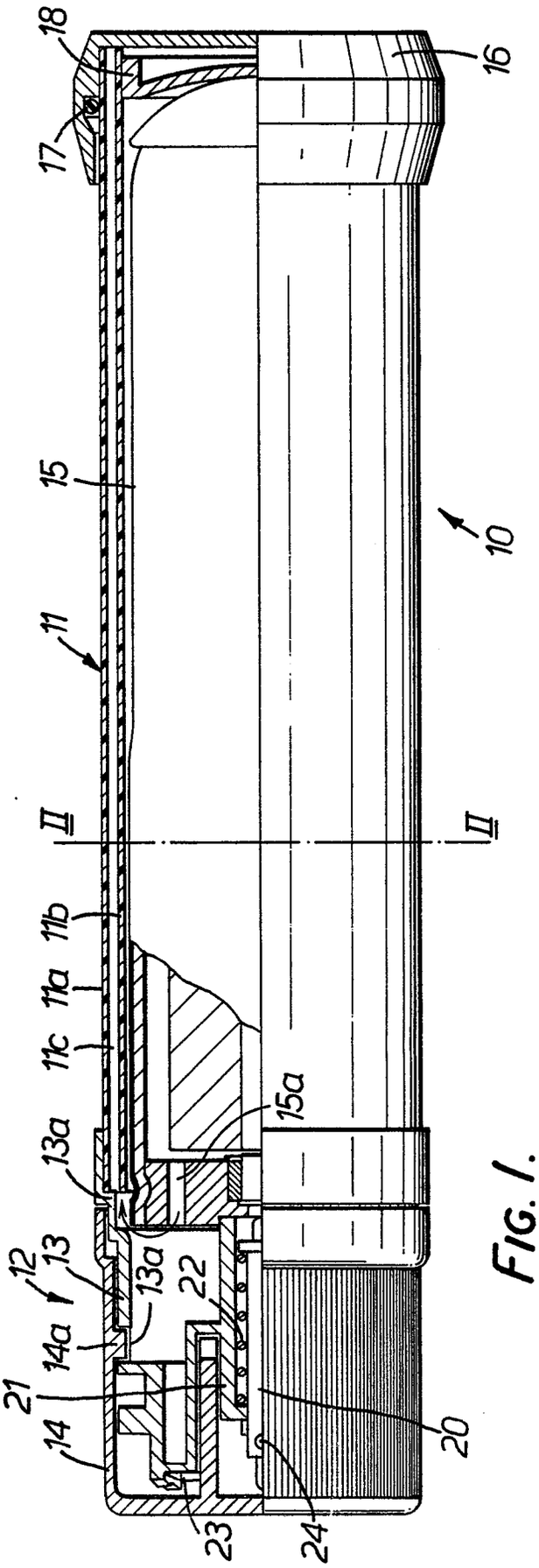

18
16
17
15
10
11
II
II
11b
11a
11c
13a
15a
12
13
13a
22
14a
21
14
20
23
24

FIG. 1.

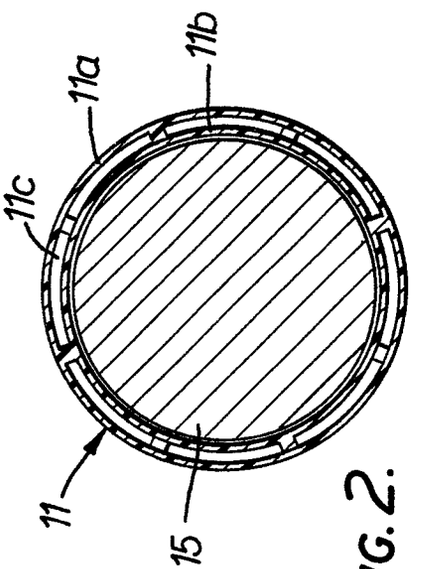

11b
11a
11c
11
15

FIG. 2.