PATENT EXAMINATION BOARD

DRAFTING OF PATENT SPECIFICATIONS – GROUP 2(e)

SUPPLEMENTARY EXAM

Paper 2

October 2025

Examiner: L Steyn
Moderator: J Whittaker

Time: 6 Hours

Total marks: 100

This paper consists of 5 pages (including this cover page) and 6 sheets of figures (of which 3 need to be handed in)

Instructions:

- Answer all questions
- Write legibly

A prospective new client writes to you as follows:

I work in the field of so-called *less-than-lethal* personal protection and security devices. The use of lethal force by law enforcement agencies or personnel, private security companies, or even private citizens as defensive or self-defensive measures is generally met with dissent. Internationally, legislative and regulatory requirements generally tend to dissuade the use of lethal force and instead lean towards defensive regimes in the less-than-lethal sphere.

For example, currently in the USA, proposed legislative changes seek to require law enforcement personnel to employ less-than-lethal force to incapacitate an attacker, before resorting to lethal force.

In most cases, the effective range or accuracy of known or currently available less-than-lethal devices render these devices ineffective. Best known examples include tasers and lachrymatory substances such as mace (also known as pepper spray). Tasers are accurate and effective to a maximum of 15 feet. This falls within the currently permissible "shoot to kill" range of 21 feet. Consequently, the current less-than-lethal devices' inefficiency, inaccuracy and in-utility seem to render adherence to the proposed legislative provisions impractical. In some cases, the use of tasers is viewed as excessive use of force, and annually, as many as a thousand "wrongful deaths" are attributable to the use of tasers in failed attempts to use less-than-lethal force by law enforcement agencies.

Also available are launchers (similar to paintball guns) shooting frangible projectiles filled with a lachrymatory substance. Even though these devices have increased ranges, they remain notoriously inaccurate, bulky, impractical and ergonomically unfriendly.

Known less-than-lethal pistols comprise a body with a grip portion, a barrel, a canister of compressed gas and a valve assembly arranged to vent gas to propel a projectile received within the barrel upon actuation by a trigger.

In a bid to reduce the overall size of the less-than-lethal device, some devices make use of a canister, having a sealed mouth, which is received within the body. Such devices then include a puncture mechanism for puncturing the sealed mouth, to allow compressed gas to flow towards the valve assembly.

Due to leakage of compressed gas, seals of the canisters ideally need to be punctured immediately before use. The trigger mechanisms therefore include puncture mechanisms for this purpose.

Figure A below shows a known puncture mechanism comprising a piercing pin which is displaceable towards the canister by a cam surface on the trigger. The pin includes a spring which returns it to an inoperative position, and therefore, the pin is actuated each time the trigger is pulled. This configuration is associated with two known drawbacks: Firstly, when piercing the seal of the cannister, the pin is, while the trigger is pulled, situated within the hole created thereby, which inhibits the flow of gas from the canister. Accordingly, at least initially, gas flow is restricted, meaning that not enough pressure builds up within the device, and the first projectile is therefore not fired at a sufficient velocity. The first shot is therefore usually wasted. This can be particularly dangerous in emergency situations. Secondly, since the pin is actuated each time the trigger is pulled, sensitivity in the trigger pull is lost.

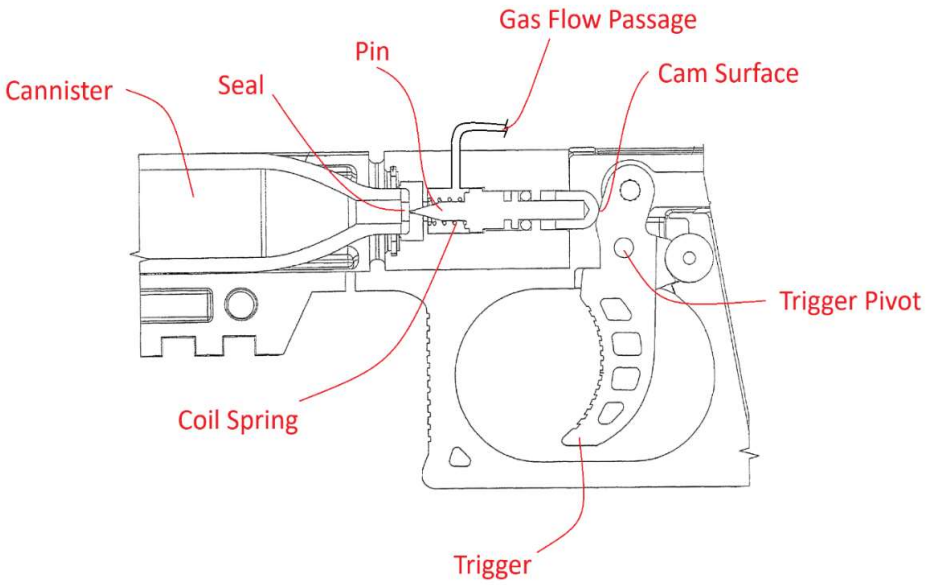

Figure A - Prior Art

U.S. Pat. No. 8,726,895B2 describes an improvement to the aforementioned puncture mechanism, in that an accumulator is provided that needs to reach a predetermined pressure before a shot is fired. This ensures that sufficient pressure has built up before a shot can be fired. The downside of this is the fact that the first trigger pull doesn't launch a projectile, and projectiles are therefore only

fired from the second trigger pull. Again, this may result in a delay before projectiles are fired, which may prove dangerous in emergency situations. This patent also does not solve the issues relating to trigger-pull insensitivity caused by actuating the pin each time the trigger is pulled.

I am in the process of developing a less-than-lethal pistol of my own, which is shown in Figure B below (some body panels have been removed to show some of the internal components). I believe my less-than-lethal pistol will overcome the drawbacks of current less-than-lethal pistols. To achieve this, I have developed a new puncture mechanism, which is shown in three consecutive operational states in figures 1 to 3.

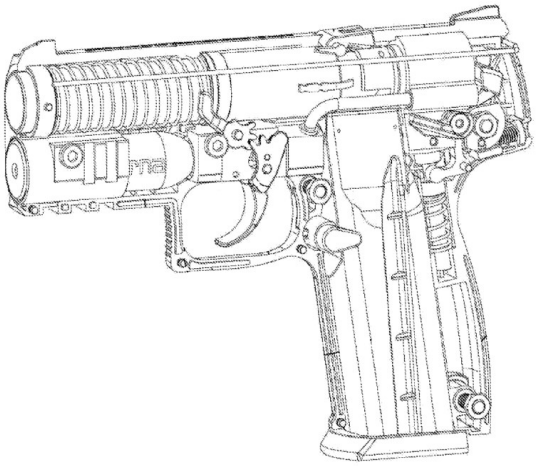

Figure B: My less-than-lethal pistol

As shown in figures 1 to 3, a standard compressed gas canister (A) with a seal (B) covering its opening is mounted to the puncture mechanism. A valve assembly (not shown) is arranged, upon actuation of a trigger (E), to vent compressed gas for propelling a projectile (also not shown) from the barrel of my less-than-lethal pistol. A plunger body (C) is installed within a body of the mechanism. A pin (D) extends across the plunger body and a surface of the trigger (E) pushes against the pin when the trigger is pulled, moving the plunger body forwards (as shown in figure 2). The plunger body has a sharp tip (K) which pierces the seal. The plunger body also has a first seal (F) which seals against a mouth of the canister when the plunger body is pushed forwards, and a second seal (G) which creates a seal between the plunger body and the body of the mechanism.

Since the trigger pushes loosely against the pin and since there is no coil spring installed, the plunger body remains in the forwards position when the trigger is released (this is shown in figure 3).

The plunger body has a channel (H) through which compressed gas flows from the canister to a gas flow passage (I) which leads to the valve assembly (not shown).

A chamber (J) is defined between the plunger body and the gas flow passage. This chamber is, in use, filled with compressed gas which presses against a rear surface of the plunger body, which forces the first seal into contact with the mouth of the canister, and therefore urges the plunger body forwards. Once the canister is spent and removed, pressure in the chamber falls away and the plunger body can return to its original position.

My invention ensures that the puncture mechanism doesn't need to be actuated with each trigger pull, which removes the issue of a loss of trigger pull sensitivity associated with the prior art. Furthermore, the channel in the plunger body allows pressurised gas to flow from the canister through the passage to the valve assembly, immediately upon piercing the seal, allowing a sufficient build-up of pressure to fire a shot at an acceptable velocity on the first pull of the trigger.

Question: You are required to draft a patent specification for the invention including at least the following:

1. Title
2. Background to the invention
3. Brief description of the drawings
4. Description of the illustrated embodiment
5. Claims
6. Abstract

Note that no "Summary of the Invention" is required.

Also note that a set of figures without reference numerals is provided – please hand these in with your answer sheet and include the reference numerals you used (your reference numerals may differ from those used above).