PATENTS EXAMINATION BOARD

Subject: The Drafting of Patent Specifications - Paper 2

Date: June 2022

Time: 09h00 - 13h00 (although candidates requiring extra time are entitled to an additional two hours)

Examiners: L Cilliers
V Williams

Moderator: J D Whittaker

Attached is an instruction from your client detailing an invention. You are required to draft a full patent specification for your client's invention. The full patent specification must include: (1) a background to the invention, (2) a brief description of the drawings, (3) a detailed description of the invention, (4) a set of patent claims, and (5) an abstract. **No summary of the invention (consistories) is required.**

Marks will be allocated as follows:

- 60% of the marks will be allocated to the claims.
- 40% of the marks will be allocated to the rest of the specification.

In order to obtain a pass for this paper, candidates must obtain not less than 40% for each of these two sections.

The paper includes a set of drawings with basic numbering and one set with no numbering. Please hand in a fully numbered set of drawings.

Your client writes:

As you know, I am an avid cross-country mountain biker, and I pride myself in my climbing ability on steep ascents. I have, however, recently come to realise that I lose a lot of time against my competitors on fast and technical descents. I asked one of my experienced downhill mountain biking friends to provide some insights into ways in which I can improve my speed on the descents. He lent me one of his downhill mountain bikes for a while, and I was quite surprised by how much faster and how much more confidently I could approach descents. After a while, I realised that the seat of his downhill bike is in a much lower position than the seat on my cross-country mountain bike.

A lower seat enables you to lower your centre of gravity while descending, and also allows more relative movement between yourself and the bike (by using your legs to absorb more of the bumps along the way). This vastly improves handling of the bike.

As you know, the seat of a bike is fitted to a seat post, which is, in turn, supported by the frame of the bike.

The height of the seat post is adjustable relative to the frame to enable adjustment according to the length of the rider. The seat post is fixed relative to the frame of the bike by means of a simple ring-shaped clamp with an adjustment nut. See the figures below.

It is not feasible for me to lower my seat for normal use, because it would hamper my normal riding. In an attempt to replicate the findings made on the down-hill bike, on my cross-country bike, I replaced the seat post clamp with a well-known quick-release clamp, as shown below.

This enabled me to lower my seat before a technical descent, and return the seat to its normal position after the descent. Again, with the lowered seat, I was amazed by how much faster and more comfortable I was during descents, and soon, I was breaking all my personal records on the descents at my local trail park.

The use of the quick-release seat post clamp, has two drawbacks:

1) It is time-consuming to adjust the height of the seat, even if the quick-release coupling is used, as you have to stop and get off the bicycle to pull the seat back up, which means it isn't necessarily feasible to use this during races; and

2) You don't necessarily return the seat to exactly the same position each time, which could hamper your speed on flat sections or ascents, and even in the long run, cause injuries.

I have therefore come up with a new idea, which solves all of these problems. I call it the "dropper seat post". I am confident that this will revolutionise cross-country mountain bike racing, and will soon become an essential part of any mountain biker's kit.

My dropper seat post replaces a normal seat post completely. As shown in Figures 1 and 2, my dropper seat post comprises two tubes (1 and 2) that are telescopically displaceable relative to one another. A metal spring (3) is located at the bottom of the operatively lower tube (2). It will be clear from my sketch that the spring urges the operatively upper tube (to which the saddle will in use be connected) upwards. In this example the inner seat tube (1) has two holes (6a) and (6b) provided at different positions along its length. A lock (4), having a slideable pin (5), is mounted to the outside of the outer seat tube (2) and the pin can be slid in and out to engage or disengage a hole (6a, 6b).

The lock is activated by a trigger mounted to the handlebar of the bike, with a cable extending between the trigger and the lock. I suppose I could come up with a cheaper version where the lock is activated by simply pulling it out manually against a spring bias.

Under normal circumstances, the dropper seat post is configured in an "operational" configuration, as shown in figure 1. The pin (5) now extends through a hole in the outer seat tube (2) and into the first hole (6a) and therefore prevents the inner seat tube (1) from sliding relative to the outer seat tube (2). When the lock is activated, the pin is retracted, and the inner seat tube (1) is free to slide relative to the outer seat tube (2). The rider uses his or her weight to push down on the seat, causing the inner seat tube to slide deeper into the outer seat tube (2) (in the process, compressing the spring (3)). The trigger is released, and when aligned, the pin (5) slides into the second hole (6b), to lock the dropper seat post in a "dropped" configuration.

When the rider activates the lock again (and provided the rider is not putting weight on the seat), the pin (5) is retracted from the second hole (6b), and the spring (3) pushes the inner seat tube (1), upwards, until the dropper seat post is again configured in the operational configuration.

What makes the dropper seat post great, is the fact that the seat is retained in the "dropped" configuration by the lock (4), which ensures that the seat does not interfere with the rider during a tricky descent, but then automatically returns to the operational configuration, when the rider wants to use the saddle again. The pin (5) locating in the first hole (6a) means that the seat always returns to the same operational position.

Even though my initial tests show that this embodiment of my invention works very well, I believe there is room for improvement and further development, and I have started thinking about a few improvements. One possible shortcoming of my first idea is that the positions that the seat can be locked in is dependent on the number and positions of the holes in the tube. A rider therefore cannot lock the seat in any desired position. A design that overcomes this shortcoming is shown in figures 3 and 4.

In this case the bottom of the inner seat tube (1) now defines a first piston (10), which slides within the outer seat tube (2). The outer seat tube (2) includes a partitioning wall (11), with a flow opening (12). The partitioning wall (11) divides the outer seat tube (2) into a first chamber (13) and a second chamber (14). A bottom of the second chamber (14) is defined by a second piston (15), which is movable within the outer seat tube (2), and which is arranged in contact with a spring (3).

The lock (4) of my previous design is now replaced by a flow control valve (16) arranged in the flow opening (12). The flow control valve (16) is again actuated by a trigger on the handlebar.

The first chamber (13) and second chamber (14) are filled with a hydraulic fluid, which, as you know, is incompressible.

The dropper seat post is shown in the operational configuration, in figure 3. The flow control valve (16) is normally closed, which means that the hydraulic fluid in the first chamber (13), cannot flow into the second chamber (14), and the inner seat tube (1) is therefore locked relative to the outer seat tube (2).

When the trigger is pulled, the flow control valve (16) is opened. Again, when the weight of the rider bears down on the seat, the inner seat tube (1) slides down deeper into the outer seat tube (2). The first piston (10) now displaces hydraulic fluid from the first chamber (13), through the flow opening (12) and the open flow control valve (16), into the second chamber (14). In the process, the second piston (15) is pushed down, and the spring (3) is compressed. When a desired height of the seat is reached, the rider releases the trigger, and the flow control valve (16) closes. Since the hydraulic fluid can no longer flow between the two chambers, the dropper seat post is effectively configured and locked in the dropped configuration.

When the rider pulls the trigger again, the flow control valve (16) is opened. With the weight of the rider off the seat, the spring (3) pushes the second piston (15) upwards, causing hydraulic fluid to flow from the second chamber (14) to the first chamber (13), in turn pushing the first piston upwards, and configuring the dropper seat post into the operational configuration.

In my view, the second embodiment of my invention is going to be the better solution, but I do think there is a market for the more rudimentary but cheaper first embodiment, and I would therefore like to protect both.

What is also important for me is that my invention is suitable to be sold on its own – i.e. as a replacement part for use with existing bicycles having prior art seat posts that can be replaced, and existing saddles that they may want to continue using.

I am keen to get going, but need your assistance.

Please prepare and file a patent application.

- END -

Set 1 – Limited numbering

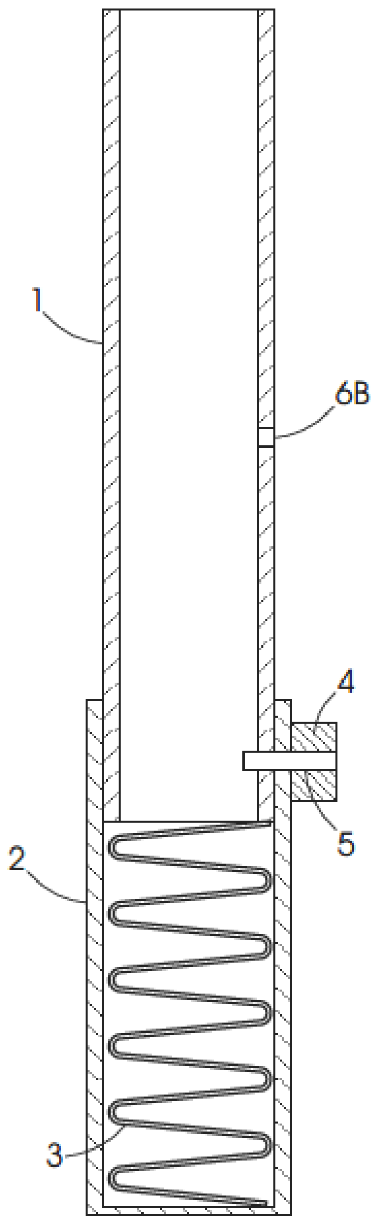

Fig. 1

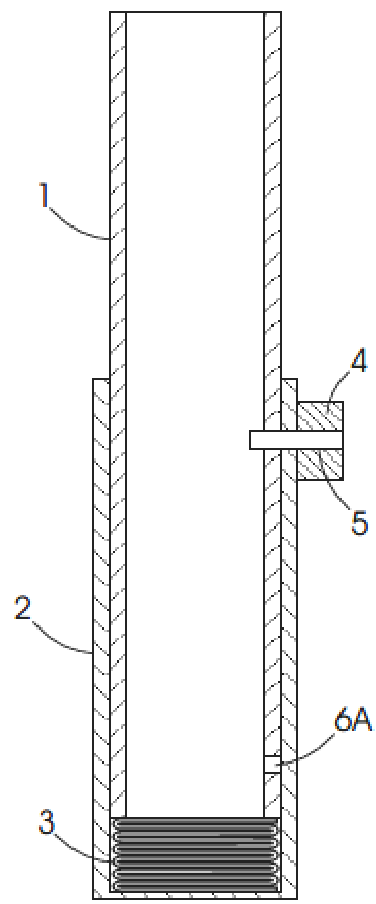

Fig. 2

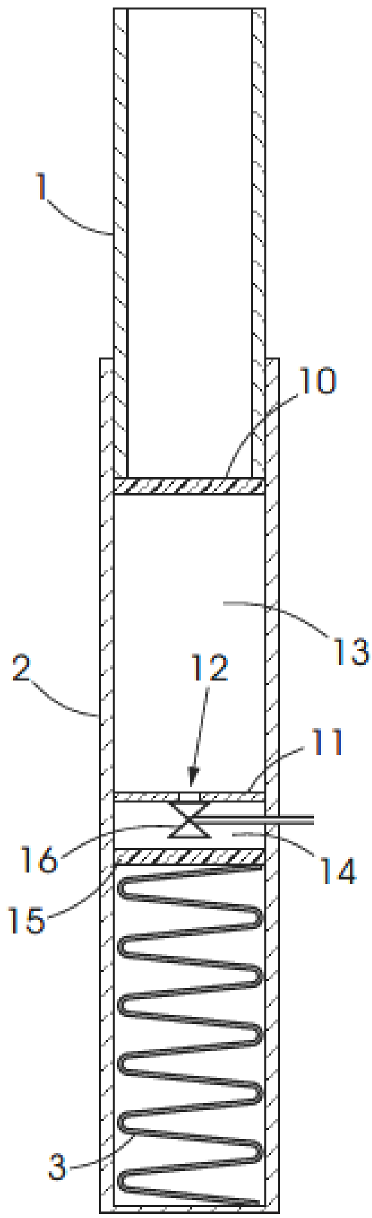

Fig. 3

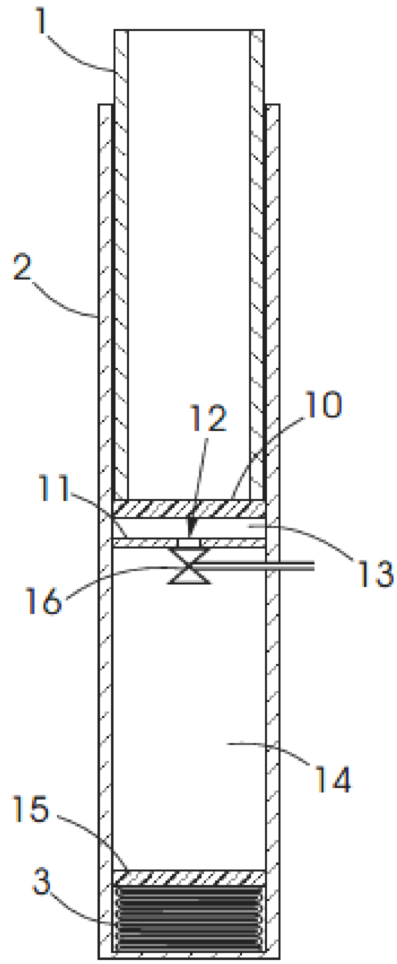

Fig. 4

Set 2 – Hand in with comprehensive numbering

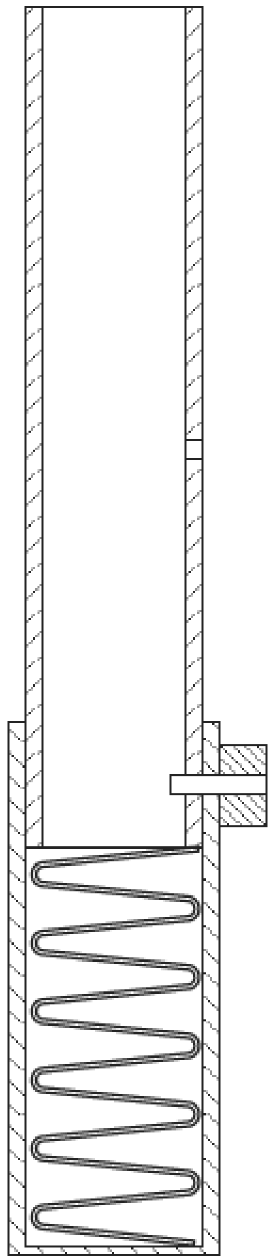

Fig. 1

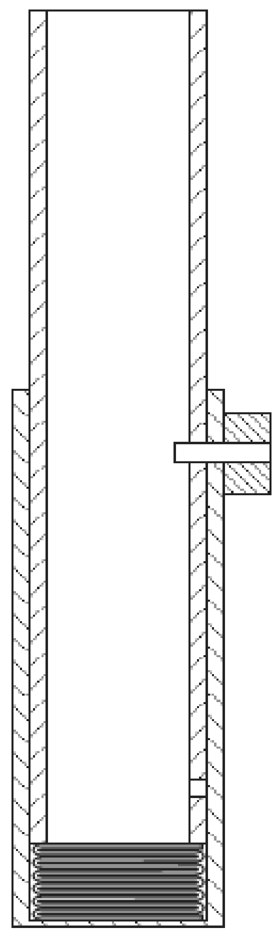

Fig. 2

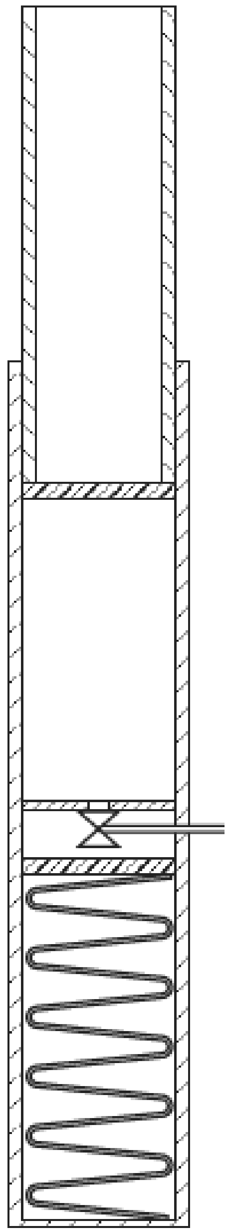

Fig. 3

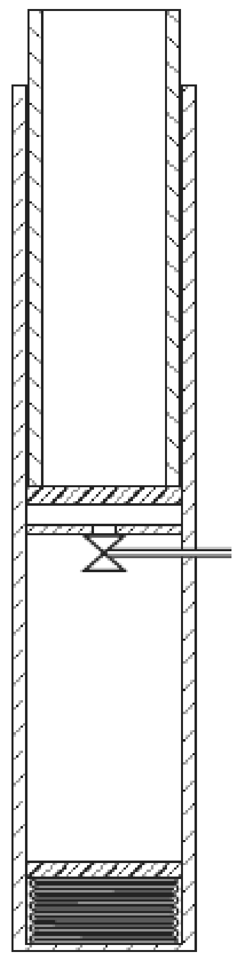

Fig. 4