

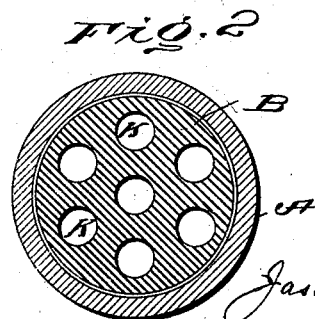
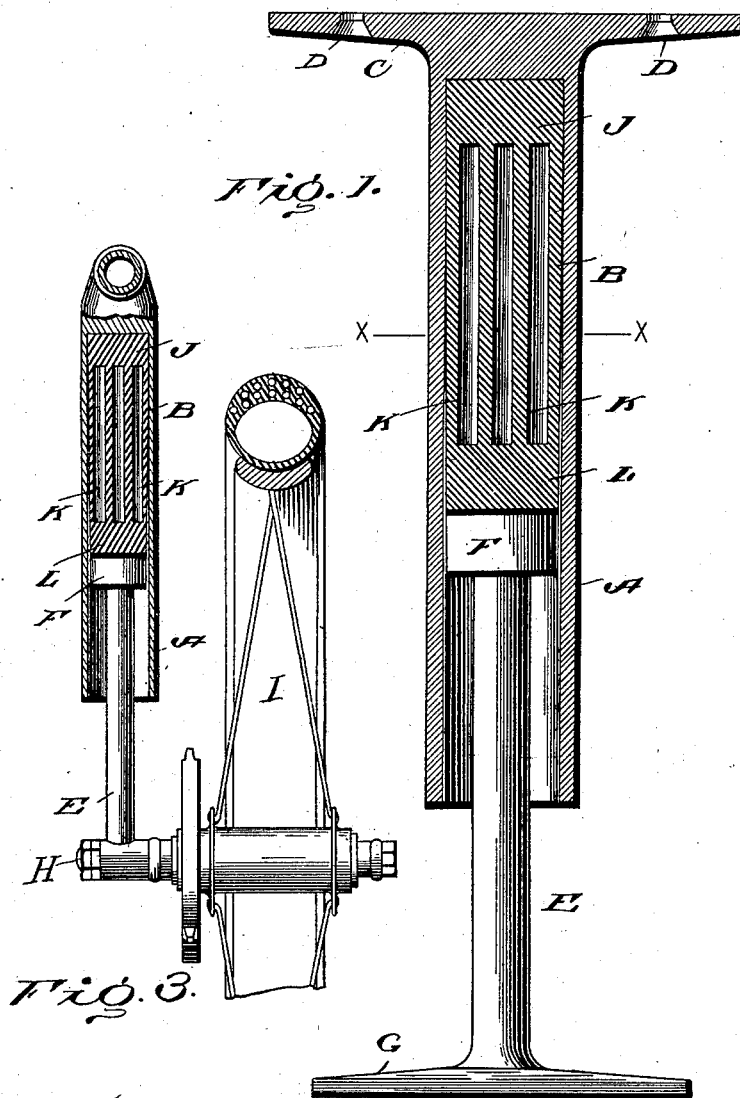
No. 647,246.

Patented Apr. 10, 1900.

J. C. ANDERSON.
PNEUMATIC SPRING.

(Application filed Sept. 16, 1899.)

(No Model.)



Witnesses

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UNITED STATES PATENT OFFICE.

JAMES C. ANDERSON, OF HIGHLAND PARK, ILLINOIS.

PNEUMATIC SPRING.

SPECIFICATION forming part of Letters Patent No. 647,246, dated April 10, 1900.

Application filed September 16, 1899. Serial No. 730,688. (No model.)

To all whom it may concern:

Be it known that I, JAMES C. ANDERSON, a citizen of the United States, residing at Highland Park, in the county of Lake and State of Illinois, have invented certain new and useful Improvements in Pneumatic Springs; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to certain new and useful improvements in pneumatic springs especially adapted for use with automobiles and similar vehicles, but also capable of use elsewhere.

It has for its object to provide a spring which while it shall be strong and durable shall be comparatively light of weight and readily repaired or removed.

With these ends in view my invention consists in the details of construction and arrangement hereinafter explained.

In order that those skilled in the art to which my invention appertains may fully understand the same, I will proceed to describe the construction and operation of my improved spring, referring by letters to the accompanying drawings, in which—

Figure 1 represents a central vertical section of a spring embodying my invention; Fig. 2, a transverse section taken at the line $x x$ of Fig. 1; and Fig. 3, a detail view, on a smaller scale, partly in elevation and partly in section, showing one of my improved springs as applied to the axle of an automobile-wheel.

Similar letters of reference indicate like parts in the several figures of the drawings.

A represents a case or housing which may be cylindrical or of any other design in cross-section, though I prefer the form shown. This casing is open at the bottom to receive the spring proper, B, and is formed with a head C of any preferred form for securement to the body to be supported. At Fig. 1 this is simply a flat head with suitable bolt or screw holes D, while at Fig. 3 I have shown it in the form of a tube.

E is a piston or support formed with a head F and foot G. The head is adapted to fit loosely within the case or housing A and to reciprocate therein, and the foot may be of

any shape and construction adapting it for securement in place. In Fig. 1 this is shown flat, while in Fig. 3 it is shown in the form of a short tube adapted to be journaled upon the axle H of an automobile-wheel I. The spring proper, B, is constructed of rubber with a solid head J and with a central and a series of surrounding longitudinal air-chambers K, each of which is separated from the others and surrounded by a wall, and as the spring is compressed between the closed head of the cylinder A and the head F of the piston E the walls surrounding the air-chambers K will be increased in cross-section and consequently press against the contained compressed air, while at the same time the necessary approach of the head J and foot L will also be against the yielding resistance of the contained compressed air, thus making the spring very effective as such.

L is a solid foot similar to the head J, adapted to seal the ends of the air-chambers K when the air is introduced in liquid form in the manner described in a pending application for improvement in pneumatic tires filed by me on the 21st day of July, 1899, Serial No. 724,682.

Although preferring the employment of liquid air and sealing both ends of the tubes by the heads J and F, as shown, I may, if desired, provide the air-cells with ordinary air-valves and inflate the air-chamber by the use of an ordinary air-pump.

The diameter of the spring-body B bears such relation to the diameter of the housing A that the body may be compressed between the head C of the casing and the head F of the piston E sufficiently to give the necessary degree of spring action.

I am aware that it has been proposed to confine within an open-ended cylinder and between it and a piston a rubber body containing atmospheric air and that it has also been proposed to use a series of such rubber bodies, with interposed metallic plates; but it will be readily understood that the contained air is practically of no value as a sustaining-spring, especially when used with heavy vehicles, and that as one of the characteristics of rubber is that it cannot be forced within itself (being non-compressible) the side walls of the rubber bodies, such as described, will simply col-

lapse or fold accordion-like, as the air-pressure within is not sufficient to prevent such action.

From the construction and arrangement
5 shown it will be seen that the housing or casing A and piston E may be made comparatively light, and that the spring-body B, composed of rubber and loaded or inflated with
10 air, will also necessarily be very light, while at the same time a maximum degree of strength is secured, and it will also be seen that if at any time it should become necessary or desirable to remove the spring-body B for renewal or repair it will be necessary
15 only to withdraw the piston E from the casing, whereupon the spring-body B will fall out by gravity or may be withdrawn with a suitable tool.

Many changes may be made in the details
20 of construction without departing from the spirit of my invention, which rests in the idea of a body composed of rubber and having a series of longitudinal air-cells surrounded by intervening walls and highly inflated with

compressed air and closed at each end by comparatively-thick heads confined between the
25 closed head of a suitable receptacle and the head of a reciprocating piston, as hereinbefore fully explained.

What I claim as new, and desire to secure
30 by Letters Patent, is—

A spring composed of a hollow box or casing open at one end and a reciprocating piston, each adapted to be secured in place relatively to each other, in combination with a
35 rubber body interposed between the head of the casing and the head of the piston and composed of a solid head and foot, and a series of independent interior longitudinal air-cells
40 inflated with highly-compressed air, substantially as and for the purpose set forth.

In testimony whereof I affix my signature in presence of two witnesses.

JAMES C. ANDERSON.

Witnesses:

N. CURTIS LAMMOND,
D. G. STUART.