(No Model.)

2 Sheets—Sheet 1.

W. KOWALEFF.

PNEUMATIC SPRING.

No. 598,102. Patented Feb. 1, 1898.

Fig. 5.

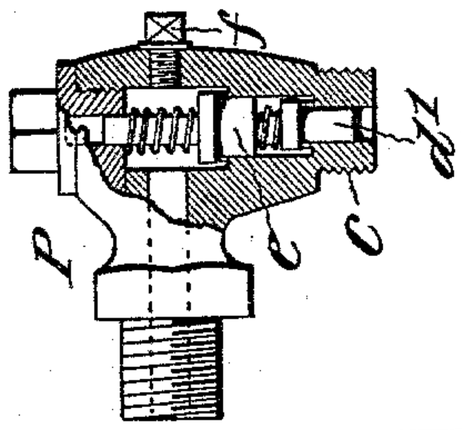


Fig. 6.

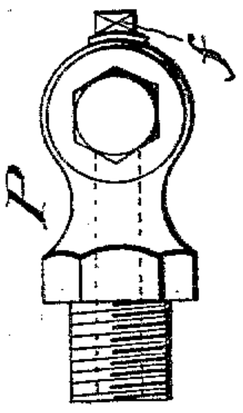
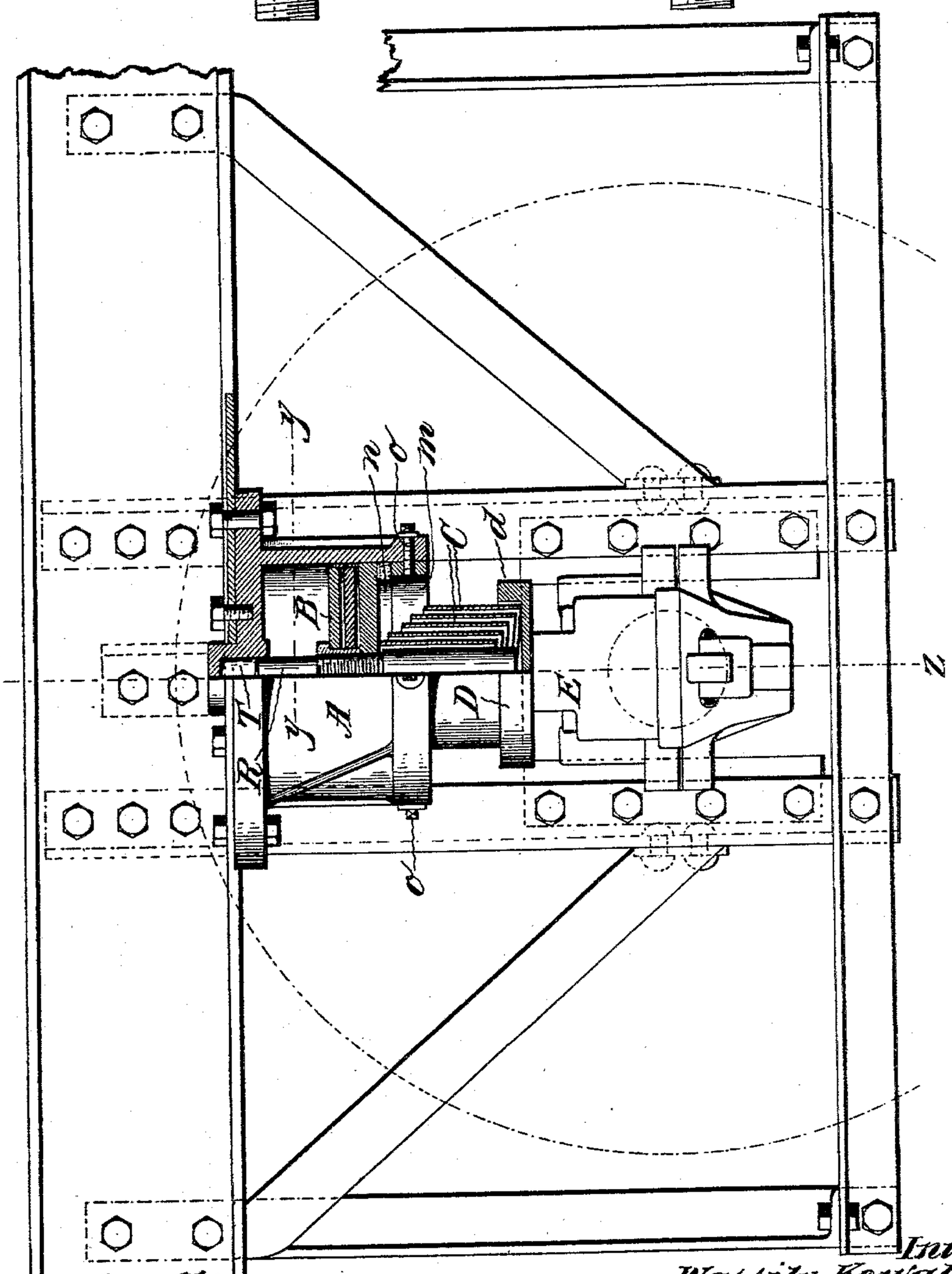


Fig. 1.



Witnesses:
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(No Model.) 2 Sheets—Sheet 2.

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Fig. 3.

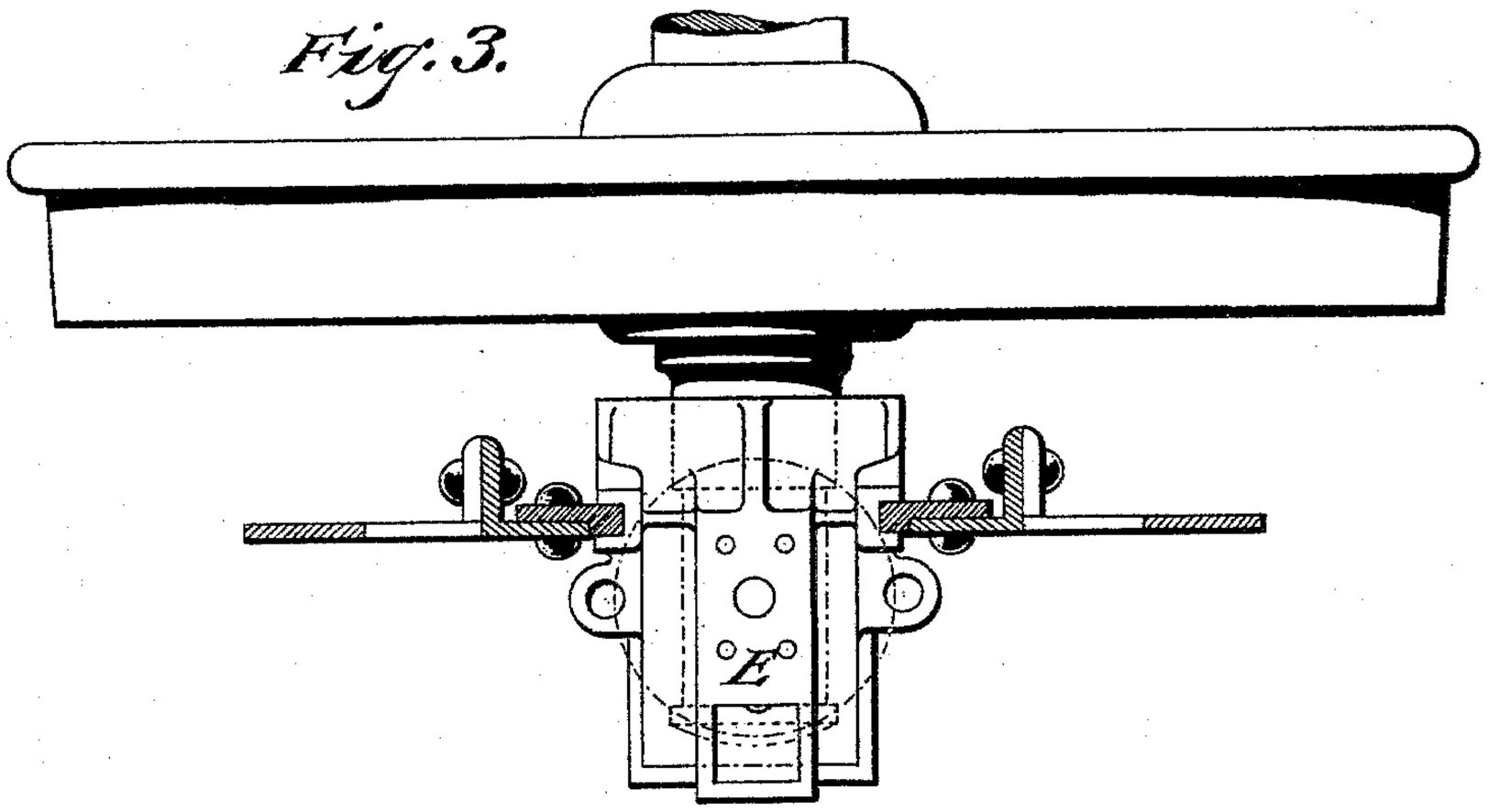


Fig. 4.

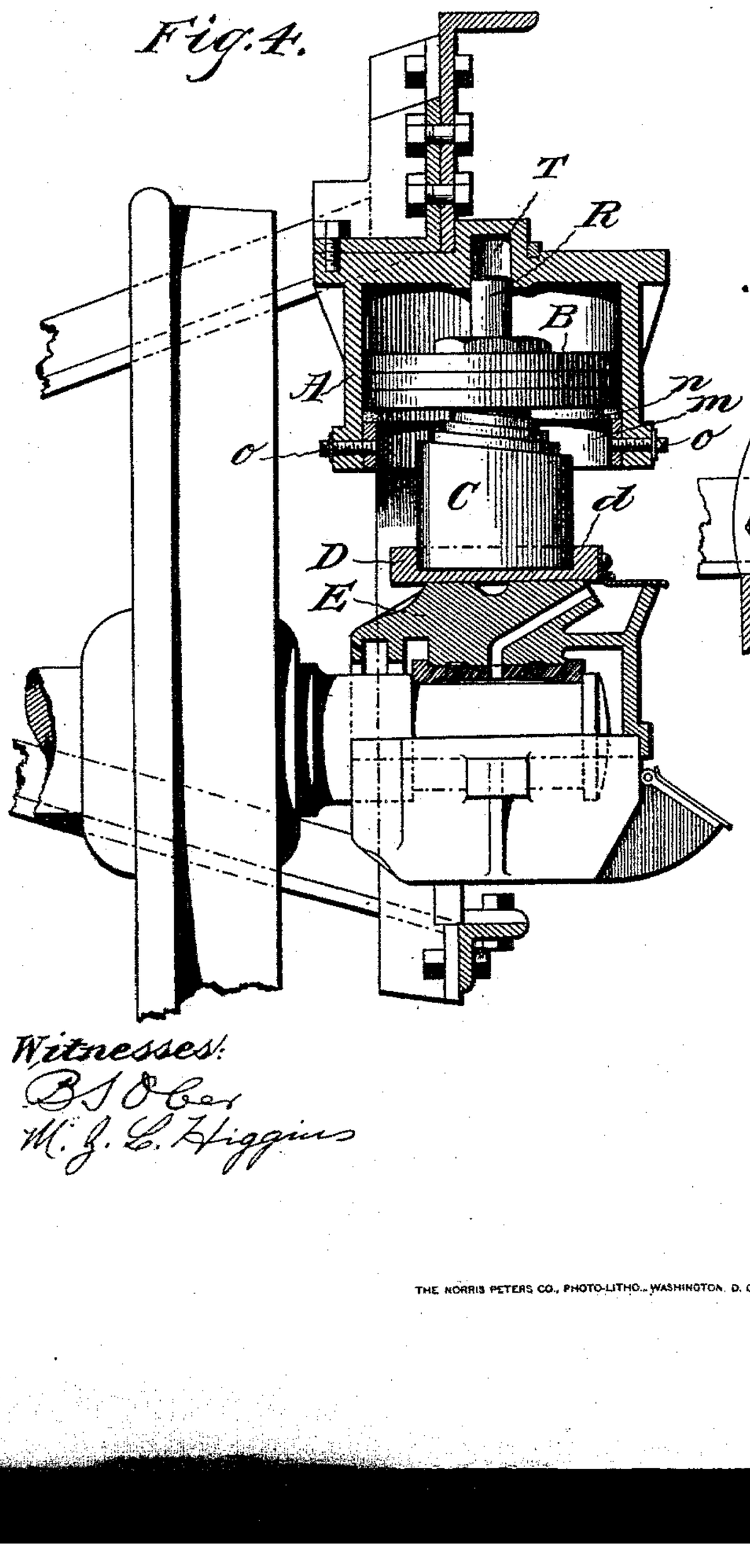
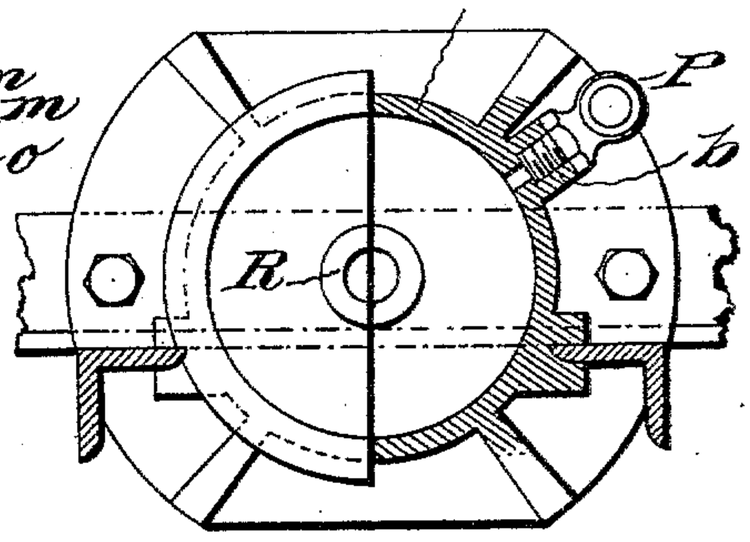


Fig. 2.



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UNITED STATES PATENT OFFICE.

WASSILY KOWALEFF, OF OOFA, RUSSIA.

PNEUMATIC SPRING.

SPECIFICATION forming part of Letters Patent No. 598,102, dated February 1, 1898.

Application filed July 23, 1896. Serial No. 600,307. (No model.)

To all whom it may concern:

Be it known that I, WASSILY KOWALEFF, a subject of the Emperor of Russia, and a resident of Oofa, in the Empire of Russia, have invented certain new and useful Improvements in Pneumatic Springs, of which the following is a specification.

My invention relates to pneumatic springs, and more particularly springs adapted to be used on railway-cars, which give a much better and easier yield to jars than the ordinary springs now in use.

Referring to the drawings, Figure 1 is an elevation, partly in section, showing my improved spring in position. Fig. 2 is a bottom view, partly in section, said section taken on the line *y y* of Fig. 1. Fig. 3 is a top plan view of the journal-box, showing the seat for the spring. Fig. 4 is a vertical section on line *Z Z* of Fig. 1. Figs. 5 and 6 are a vertical section and plan, respectively, of the double valve placed between the air-cylinder of the spring and compressed-air-supply pipes.

The cylinder A, which is bolted to the main trusses of the car, carries a suitably-packed piston B, the rod R of which projects on both sides of the piston. The upper portion of the rod R, being guided in a suitable extension T on the head of the cylinder, serves to keep the piston, and consequently the air-pressure, in a vertical direction, and also prevents wear, as the piston and cylinder are both subjected to many shocks and twists that would soon wear the packing from an unguided piston, notwithstanding the fact that its stroke is very small. The other end of the piston-rod is contained within the coil of and serves to keep the spiral spring C in position on its seat D on the journal-box. The seat D is a flanged plate placed upon the journal-box E and keeps the spring C from expanding by means of a peripheral flange *d*.

At the bottom of the cylinder A, I provide a guard-ring *m*, held in place by bolts *o* or other suitable means, and above which is a ring *n*, of rubber, leather, or other yielding material, so that in case air is supplied at a greater pressure than necessary the piston B will not be forced from the cylinder. This may also be prevented by having a suitable exhaust-port (not shown) in the cylinder at the lower limit of the piston-stroke, and thus prevent the high tension of the air in the cylinder from forming too hard a cushion.

If for any reason no air could be supplied to the cylinder A and the double valve hereinafter described and the piston was not air-tight, so that no air remained in the cylinder, the piston would rest against the head of the cylinder and still have a yielding support in the spring C. If the spring C be also deteriorated by long use, then the lower end of the piston-rod will rest upon the plate D and the train proceed to its destination, where the necessary repairs could be made.

The double valve P is screwed into a nipple *b* on the cylinder A, and to the portion *c* is attached the pipe of a Westinghouse or other air-brake system. The valves *d'* and *e* are two superposed spring-seated valves contained in the casing P. *f* is a screw-plug for emptying the air-cylinder whenever it is desired to do so.

It is obvious that when air is supplied through suitable connections from the engine and the valves *d* and *e* to the cylinder A it is held therein, forming a cushion, and when the air is cut off by releasing the pressure from the engine the air cannot escape on account of the closing of the double valve P, the valves *d'* and *e* being always normally seated and only open when the pressure of the air supplied exceeds that contained in the cylinder.

I connect my springs with the air-brake system, so that whenever the brakes are applied the pneumatic springs are supplied with air also, so that the air is kept practically at a constant tension in the cylinder.

Having thus described my invention, what I claim as new therein, and desire to secure by Letters Patent, is—

In a pneumatic spring an air-cylinder carrying a suitable piston having its rod projecting on both sides thereof, a guide in the piston-head for one end of the rod and the other end mounted in a spring resting in a seat on the journal-box, means for supplying air to the cylinder and a suitable valve to prevent the escape of air from the cylinder when the supply is cut off, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

WASSILY KOWALEFF.

Witnesses:
N. TSCHEKALOFF,
J. BLAU.