(No Model.)

S. WHITLOCK.

AIR CUSHIONING DEVICE.

No. 538,003. Patented Apr. 23, 1895.

Fig. 1

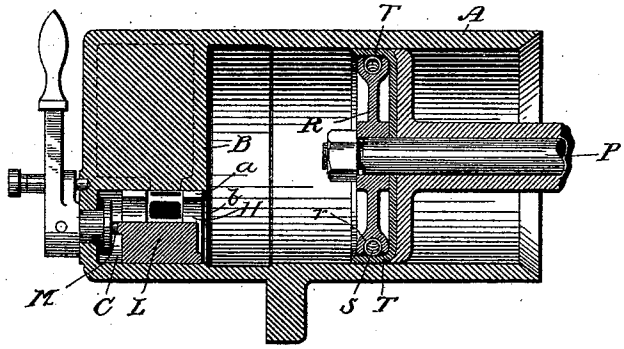


Fig. 2

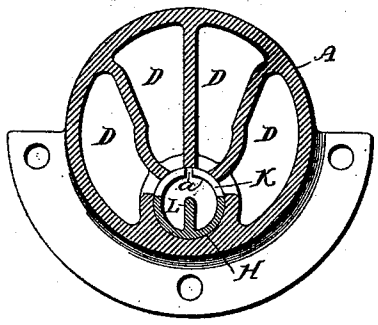


Fig. 3

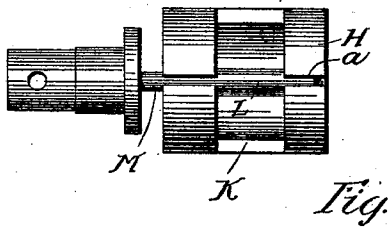


Fig. 4.

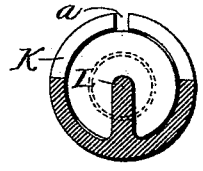
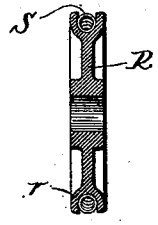


Fig. 5.



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UNITED STATES PATENT OFFICE.

STURGES WHITLOCK, OF SHELTON, CONNECTICUT.

AIR-CUSHIONING DEVICE.

SPECIFICATION forming part of Letters Patent No. 538,003, dated April 23, 1895.

Application filed November 19, 1894. Serial No. 529,336. (No model.)

To all whom it may concern:

Be it known that I, STURGES WHITLOCK, of Shelton, in the county of Fairfield and State of Connecticut, have invented a new and useful Improvement in Air-Cushioning Devices, of which the following is a specification.

The object of my invention is to improve upon the air cushioning devices which form the subject of a previous patent granted to me, dated September 4, 1883, and numbered 284,524; the object and character of such invention being thus stated in the former patent: "The object of my invention is to make the cushion adjustable outside the air cylinder; and it consists in combining with the air or cushion cylinder one or more auxiliary cylinders or air chambers communicating with the cushioned chamber."

My present improvement consists in the construction and arrangement of parts, whereby I am able to comprise the whole apparatus of main and auxiliary cylinders within a single casting, and am able to use a single valve for each and all of the auxiliary chambers, instead of using a separate valve for each auxiliary cylinder as in the former patent. Furthermore, I avoid the necessity of pipes or conduits leading from one cylinder to another. My improved apparatus is thus simpler and cheaper, composed of fewer parts, and free from certain defects existing in the former apparatus, such as the accumulation of water in the pipes, and the necessity for making a number of tight joints.

In the drawings, Figure 1 represents a longitudinal section of the air compressing apparatus; Fig. 2, a cross section, showing the arrangement of auxiliary chambers within the apparatus, and the relation of the valve thereto. Figs. 3 and 4 show the valve in detail, and Fig. 5 is a detail of the piston.

Similar letters indicate like parts in all figures.

A is the cylindrical casting, open at one end, within which the main and auxiliary chambers are comprised, and which is divided into two parts by a diaphragm B, pierced with an opening at *b*, leading into a cylindrical valve chamber marked C. That portion of the cylinder which is behind the diaphragm is again divided, as shown in Fig. 2, into two or more chambers, D D.D, each having an independent port opening into the valve chamber C; said ports being arranged in proximity to each other, so as to occupy less than one-half of the internal circumference of the circular valve chamber.

H is the body of the valve, consisting of a cylindrical shell of thin, springy material, slit lengthwise at *a*, and provided with a side port K.

L is a fin secured to the interior of the shell.

M is the valve stem attached to the fin.

By this construction and arrangement of parts I provide for a spring fit in the valve seat without loss of stiffness and rigidity in those parts of the valve subject to strains of torsion. The greater the internal pressure within the valve, the tighter the valve will fit; the slit *a* being so located with reference to the port or ports to be opened that no leakage can occur through the slit. The valve is also light and easily constructed. I prefer to make a snug fit between the valve and its seat before slitting the shell.

When the valve is rotated as many of said auxiliary chambers as may be desired can be thrown into communication with the main cylinder. The said valve is operated by a handle, projecting through the casting A.

P in Fig. 1 represents the piston, which differs from ordinary pistons in the construction and arrangement of parts, whereby the leather cup packing of the piston is uniformly distended by the pressure of a spiral spring which bears equally on every point of its circumference.

In Figs. 1 and 5 R is the metal piston head, of smaller diameter than the cylinder in which it is to be used, and formed with an annular groove *n*. T is the leather cup packing of ordinary construction. S is a spiral spring normally longer than the circumference of the piston head.

The ends of the spiral spring are joined together, and it is placed in a state of compression between the cup packing and the groove *r*, so as to encircle the piston head. The groove prevents the spring from escaping, and at the same time the spring may readily be removed and replaced, or a new one substituted. The effort of the compressed

spiral spring is to elongate, and in this effort it exercises a uniform radial pressure on the interior of the leather packing.

The operation of the device as an adjustable air cushion is apparent.

When the valve is turned so as to shut off all communication with the auxiliary chambers, the cushion produced by the descent of the piston into the cylinder will have a given power. Should it be desired to vary this cushion, so as to make it less powerful or its effect more gradual, the valve may be turned so as to open one, two, three or all of the auxiliary chambers indicated in Fig. 2 into communication with the main cylinder.

The whole apparatus is within a single shell and its adjustment controlled by a single handle on the valve stem. The absence of long air passages avoids loss of power from air friction, and consequently all the energy developed by the compression of the air cushion is available to assist the return stroke of the piston. Perfect drainage is provided for by locating the auxiliary chambers above the valve chest as shown in the drawings, and thus no accumulation of water is possible, to alter the uniform capacity of the air chambers, or to be blown out into the compression cylinder at the risk of injuring the mechanism.

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

1. In an air cushioning device the combination of the casting A, comprising a compression cylinder, a cylindrical valve chest communicating therewith and two or more auxiliary chambers, the said auxiliary chambers having openings arranged close together in the side wall of the said valve chest, of a cylindrical valve within said valve chest, opening into the compression cylinder and provided with a side opening large enough to include all of the ports of the auxiliary chambers, whereby communication between the compression cylinder and all of the said auxiliary chambers is controlled by a single valve, substantially as and for the purpose described.

2. In an air cushioning device the combination with the casting A, comprising a compression cylinder, a cylindrical valve chest located behind and opening into the compression cylinder, and two or more auxiliary chambers located above the said valve chest and opening into the same, of the valve F operating within said valve chest and adapted to open and shut all the ports of the auxiliary chambers successively, substantially as and for the purpose described.

STURGES WHITLOCK.

Witnesses:
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