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T. D., J. C. & H. A. PRESCOTT.

COMPRESSED AIR RESERVOIR.

(Application filed Aug. 27, 1901.)

(No Model.)

Fig. I.

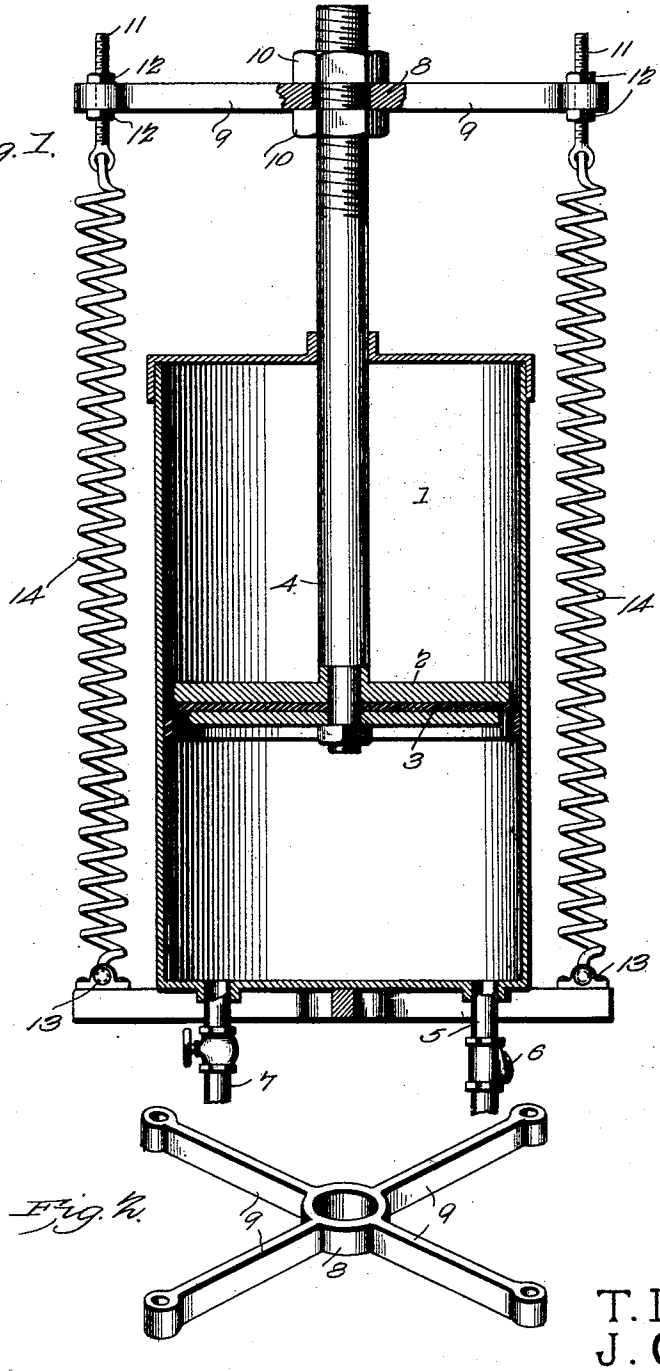

Fig. II.

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UNITED STATES PATENT OFFICE.

THOMAS D. PRESCOTT, OF PHILADELPHIA, AND JAMES C. PRESCOTT AND HENRY A. PRESCOTT, OF MINERSVILLE, PENNSYLVANIA, ASSIGNORS OF ONE-FIFTH TO HENRY BELL, OF PHILADELPHIA, PENNSYLVANIA.

COMPRESSED-AIR RESERVOIR.

SPECIFICATION forming part of Letters Patent No. 710,889, dated October 7, 1902.

Application filed August 27, 1901. Serial No. 73,494. (No model.)

To all whom it may concern:

Be it known that we, THOMAS D. PRESCOTT, residing at Philadelphia, county of Philadelphia, and JAMES C. PRESCOTT and HENRY A. PRESCOTT, residing at Minersville, in the county of Schuylkill, State of Pennsylvania, citizens of the United States, have invented a new and useful Compressed-Air Reservoir, of which the following is a specification.

Our invention relates to certain improvements in reservoirs for the storage of air under pressure, and is adapted for use in connection with compressed-air-operated mechanisms and tools of a variety of classes.

The principal object of our invention is to provide a storing device or reservoir in which the air is held and compressed by the force exerted by extensible springs acting under a tensional strain, as more fully set forth hereinafter.

A further object of the invention is to provide in connection with a device of this class for the adjustment of the springs to effect a greater or less pressure on the air and to divide the work to be performed among a number of operating-springs, so that by the employment of a number of light springs whose combined force or strength will produce the desired effect a much greater range of effective movement may be obtained than by the employment of a single spring of sufficient strength for the purpose.

With these and other objects in view our invention consists in the novel construction and arrangement of parts hereinafter more fully described, shown in the accompanying drawings, and particularly pointed out in the appended claim.

In the accompanying drawings, Figure 1 is a transverse elevation of a compressed-air-storing device constructed and arranged in accordance with our invention. Fig. 2 is a detached perspective view of a detail of construction of the device.

Similar numerals of reference indicate corresponding parts throughout figures of the drawings.

1 designates a cylindrical reservoir or chamber of sufficient diameter and length to contain a quantity of air suitable for the work which it is intended to perform. In the reservoir is a closely-fitting piston 2, provided with a suitable packing 3 and connected to a piston-rod 4, the upper end of which passes out through the head of the reservoir. Air is forced into the reservoir by a pump or other mechanism through a pipe 5, having a check-valve 6, and is delivered from the reservoir through a discharge-pipe 7, leading to the mechanism to be operated.

The upper end of the piston-rod 4 is threaded, and on such threaded end is the hub 8 of a spider having radiating arms 9, the outer ends of which project beyond the line of the reservoir. On the threaded end of the piston-rod at points above and below the spider-hub 8 are adjustable nuts 10, which may be turned on the threads to effect a longitudinal adjustment of the spider with respect to the piston-rod. At the outer end of each of the arms 9 is an opening through which passes an eyebolt 11, threaded for the reception of adjusting-nuts 12.

The eyebolts 11 are connected to fixed eyes 13 by tensional springs 14, the tensional strain of which may be increased or decreased simultaneously by the adjusting-nuts 10, operating on the spider-hub, or each spring may receive an independent adjustment in order that the strain may be equalized on all of the spider-arms by turning the adjusting-nuts 12.

The air to be stored is forced through pipe 5 into the reservoir and moves the piston 2 against the action of the tension-springs until a sufficient quantity of air has been stored for the desired purpose, or a predetermined quantity may be at all times maintained within the reservoir by any suitable governing mechanism for automatically starting the air-pump as the quantity of air within the reservoir decreases.

In devices of this class as heretofore constructed it has been usual to employ a compression-spring for resisting the upward movement of the piston to maintain the desired pressure on the air; but in such devices the exceedingly-limited range of effective movement of a compression-spring having suffi-

cient strength for the purpose has limited the size and effectiveness of the device. Where a compression-spring is employed the strength of the spring increases so rapidly in proportion to the degree of compression that only a comparatively small volume of air can be forced into the reservoir unless the pressure be increased to a degree considerably above that required for ordinary purposes, necessitating the construction of much stronger reservoirs at a material increase in initial cost. The quicker action of such a spring, due to its limited movement, will, moreover, result in an uneven and fluctuating discharge of air from the reservoir. A further objection to the employment of compression-springs for this purpose resides in the fact that such springs being contained within the cylinder the range of movement of the piston is limited and the spring cannot be adjusted from the exterior of the reservoir.

In the employment of tensional springs we have found in practice that the increase in strength of the spring is much less rapid in proportion to the movement of the piston than is the case with a compression-spring, and by the employment of such tension-springs the entire reservoir may be filled with air at a much lower pressure in proportion to degree of movement of the piston, and that the discharge of air will be even and regular, the springs having a much greater range of effective movement than compression-springs and maintaining an even pressure on the air. It has also been found that a much greater range of movement and much better results are obtained in practice by the employment of a plurality of springs the combined strength of which is proportioned to the degree of pressure to be obtained than where a single spring is used, the lighter springs yielding to a greater degree and with a more even degree of expansion in proportion to the movement of the piston than where a single spring is used.

The provision for adjusting the strength of the springs enables us to maintain in the reservoir a supply of air at any predetermined pressure, and as each spring is adjustable independent of its fellows the pressure or strain on the arms of the spider may be equalized.

Having thus described our invention, what we claim is—

A compressed-air-storing device, comprising in combination, a closed cylinder having fixed upper and lower heads, an inlet-pipe 5 connected to the lower head, a check-valve 6 in said pipe, a valved discharge-pipe 7 also leading into the lower end of the cylinder, a piston 2 fitting snugly within the cylinder, a piston-rod 4 extending out through a guiding-opening in the upper cylinder-head and provided with a threaded upper end, a spider comprising a central hub 8 and a series of equidistant radially-projecting arms, each having at the outer end a vertically-disposed bolt-receiving opening, upper and lower nuts 10 carried by the threaded upper end of the piston-rod and engaging respectively with the upper and lower sides of the spider-hub, thereby to permit of the vertical adjustment of said spider on the piston, and the upper nut serving not only to lock the spider in position but to maintain the same in a horizontal plane by clamping it against the lower nut, a series of eyebolts adapted one to each of the openings in the spider-arms and having upper and lower adjusting-nuts, a series of coiled springs of equal size and strength, having their upper ends connected to the eyebolts, a base supporting the cylinder, fixed eyes 13 carried by said base and in alinement with the spider-arms, the lower ends of said springs being secured to said fixed eyes, substantially as specified.

In testimony that we claim the foregoing as our own we have hereto affixed our signatures in the presence of two witnesses.

THOMAS D. PRESCOTT.
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HENRY A. PRESCOTT.

Witnesses as to Thomas D. Prescott:
F. J. KING,
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Witnesses as to James C. and Henry A. Prescott:
JNO. TAYLOR,
HENRY KLEIBENSTEIN.