

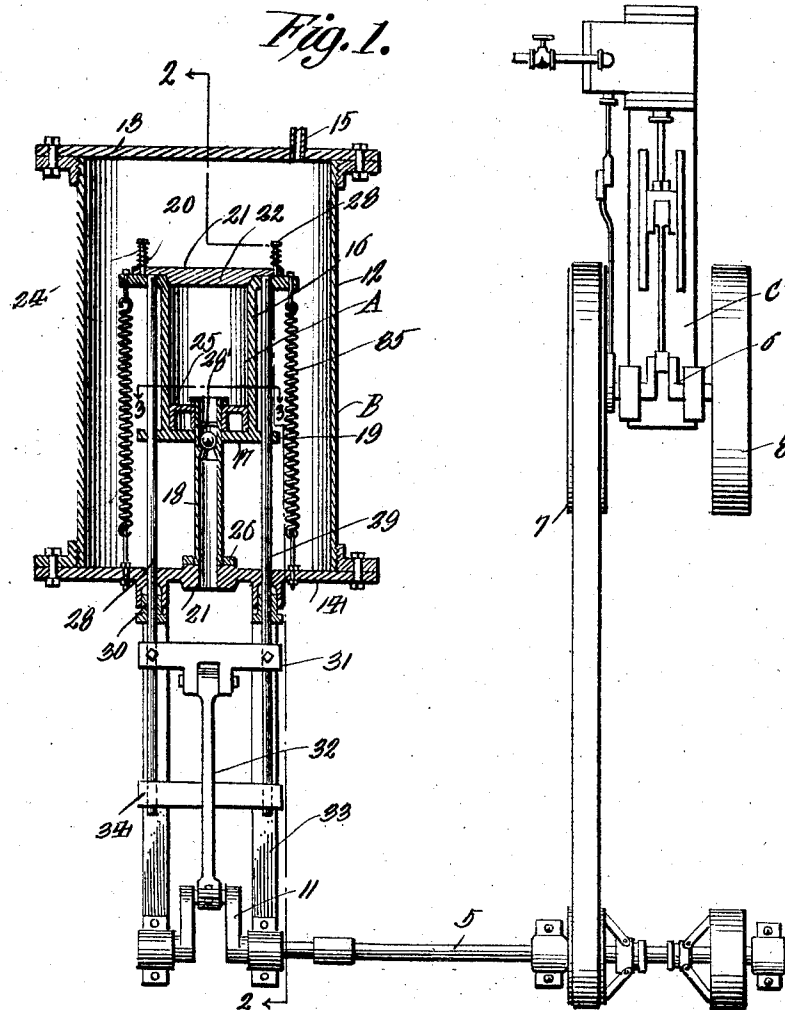
Dec. 21 , 1926.

W. E. CHAPMAN

AIR COMPRESSOR

1,611,849

Original Filed March 3, 1924 2 Sheets-Sheet 1



WITNESSES

Gaym Spring
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Fig. 2.

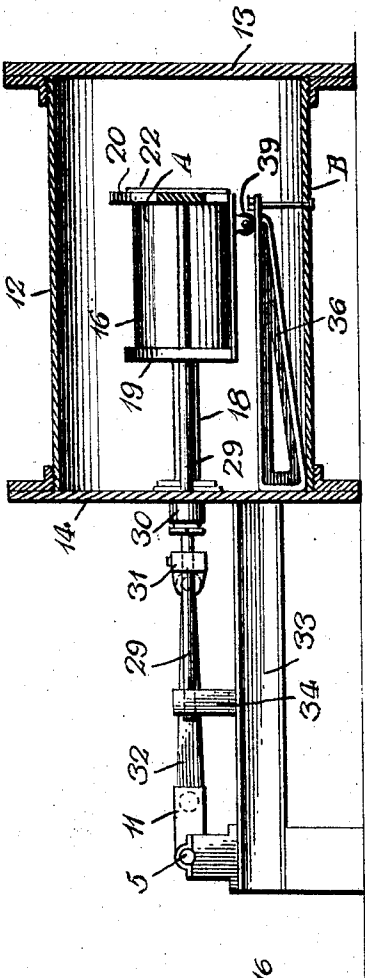
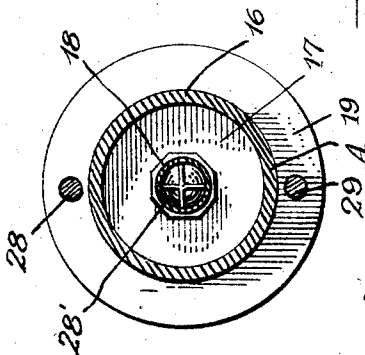


Fig. 3.



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UNITED STATES PATENT OFFICE.

WILLIAM E. CHAPMAN, OF FLORA, MISSISSIPPI.

AIR COMPRESSOR.

Continuation of application Serial No. 696,677, filed March 3, 1924. This application filed June 22, 1925.
Serial No. 38,837.

This invention appertains to an improved device for compressing and storing air and is a continuation of my prior application Serial No. 696,677, filed March 3rd, 1924.

5 The primary object of the present invention is to provide a novel air compressor arranged directly within an air storage tank, whereby the compressed air will flow directly from the compressor into the tank.

10 Another object of the invention is to provide novel means for constructing the compressor so as to insure the proper operation thereof and the compression of the air to a high degree.

15 A further object of the invention is to provide resilient means cooperating with the compressor on the compressing stroke thereof to insure the proper operation of the compressor on the working stroke and to balance the compressor on the working and non-working stroke.

20 A further object of the invention is to provide novel means mounting the compressor directly within the air storage tank and novel means for operating the compressor from a line shaft.

25 A still further object of the invention is to provide an improved air compressor of the above character, which will be durable and efficient in use, one that will be simple and easy to manufacture and one which can be placed upon the market at a reasonable cost.

30 With these and other objects in view, the invention consists in the novel construction, arrangement and formation of parts, as will be hereinafter more specifically described, claimed, and illustrated in the accompanying drawings, in which drawings:

35 Figure 1 is a plan view of the improved air compressing apparatus, showing the air compressor and storage tank in section.

40 Figure 2 is a section through an air compressor taken on the line 2—2 of Figure 1 looking in the direction of the arrow.

45 Figure 3 is a detail horizontal section through the compressor taken on the line 3—3 of Figure 1 looking in the direction of the arrow.

50 Referring to the drawings in detail, wherein similar reference characters designate corresponding parts throughout the several views, the letter A generally indicates the improved air compressor and B a storage tank for the compressed air. The compressor A is operated from a line shaft 5

which can be actuated in any desired way, such as by an engine C.

The engine C utilized for operating the air compressor A can be of any desired size, 60 type or make, and will not be described in detail. As shown, however, the same includes a crank shaft 6 having secured thereon drive and balance wheels 7 and 8 respectively. A pulley belt 9 is trained about 65 the drive wheel 7 and about a pulley wheel 10 secured to the line shaft 5. One end of the line shaft 5 is provided with a crank or throw arm 11 as can be clearly seen by referring to Figure 1 of the drawings. 70

The air storage tank B can also be of any size and include a cylindrical drum 12 having heads 13 and 14 connected to the opposite ends thereof. The head 13 is provided with an air outlet pipe 15 for permitting the 75 air to be conveyed to the desired point when the same is to be used.

The improved air compressor A comprises a reciprocatory cylinder 16 which can be arranged centrally within the container B 80 and if preferred one end of the cylinder can be provided with an inwardly directed flange 17 for snugly engaging a hollow piston rod 18 for forming guides for the cylinder during reciprocation thereof, as will be 85 hereinafter more fully described. An outwardly directed angular flange 19 is formed on the same end of the cylinder while the opposite inner end of the cylinder is provided with an outwardly directed flange 20 90 of a greater width than the flange 19. The inner end of the cylinder is also provided with a beveled valve seat 21 on which is adapted to sit a relatively heavy flat valve 22 which also forms the cylinder head. This 95 flat valve cylinder head 22 is slidably mounted on suitable guide pins 23 carried by the flange 20 and expansion springs 24 are coiled about pins 23 for engaging the head or valve 22 for normally holding the same on 100 the seat for closing the cylinder. The inner end of the hollow piston rod 18 receives any preferred type of piston 25 for snugly engaging the walls of a cylinder 16. It is to be noted, however, that the hollow piston 105 rod 18 extends entirely through piston 25. The outer end of the hollow piston rod 18 is secured to the head 14 of the container B as at 26 and communicating with the said hollow cylinder is a hollow boss 27 formed on 110 the head 14. The hollow boss 27 and the hollow piston rod 18 permit the entrance of

air into the cylinder for the compression thereof. A suitable one way check valve 28' is arranged in the hollow piston rod and is normally held on its seat during the compression of the air in the cylinder. During the intake stroke of the cylinder, the valve is lifted from off of its seat by the inrushing air coming into the cylinder. Suitable guides and operating rods 28 and 29 slidably extend into the tank B through suitable stuffing boxes 30 carried by the head 14 of the tank. These rods 28 and 29 extend through the flanges 19 and 20 and are secured thereto in any preferred way. The outer ends of these rods are connected to a cross head 31 to which is connected a piston rod 32. The piston rod 32 is in turn connected to the throw or crank arm 11 of the line shaft 5.

A suitable support 33 can be provided for the tank A and a guide bar 34 can be carried thereby for slidably receiving the rods 28 and 29 to facilitate the guiding thereof during the operation of the line shaft.

On the down stroke of the cross head 31 the cylinder 16 will be moved toward the rigid piston 25 and the air will be compressed in the cylinder. When the air reaches a pressure which will overcome the tension of the springs 24 the valve or cylinder head 22 will be lifted from off of its seat and the compressed air will escape into the storage tank B. On the up stroke of the cross head 31 the cylinder will move away from the piston and the head 14 can suck in a new charge of air through the hollow piston rod 18 and the ball valve 28 will be raised.

In order to balance the compressor and to facilitate the compressing of the air on the working stroke, contractile coil springs 35 are arranged on each side of the cylinder, and the opposite terminals of these springs are connected respectively to the head 14 and the flange 20 of the cylinder. These springs will be expanded on the upper stroke of the cylinder and will contract on the down stroke to help in the compressing of the air.

In order to further guide the cylinder during the reciprocatory movement thereof, a guide track 36 can be arranged directly within the tank at one side thereof. This guide track is adapted to be engaged by a

guide roller connected directly with the cylinder.

From the foregoing description, it can be seen that I have provided a novel compressor arranged directly within the storage tank with novel means for introducing the air to be compressed within the compressor and novel means for permitting exhausting of the compressed air directly into the storage tank.

Changes in detail may be made without departing from the spirit or the scope of this invention, but what I claim as new is:

1. In a device of the character described, a compressed air storage tank, a line crank shaft, an air compressor located within the tank including the hollow rigid piston rod carried by the tank and communicating with the atmosphere, a piston secured about the rod, a reciprocatory cylinder mounted upon the piston, a guide rigidly secured to the tank below the cylinder, a roller carried by the cylinder engaging the guide, a flat pressure valve carried by the inner end of the cylinder and forming the head therefor, spring means normally holding the valve upon its seat, a check valve arranged within the hollow piston rod, means connecting the line shaft with the cylinder, and contractile coil springs connecting the piston with the tank for normally urging the cylinder toward the piston.

2. In a device of the class described, a storage tank, an air compressor arranged within the storage tank including a rigid hollow piston rod carried by one end of the tank communicating with the atmosphere, a piston surrounding the inner end of the hollow piston rod, a cylinder reciprocally mounted upon the piston having outwardly extending flanges formed on the opposite ends thereof, guide rods extending through and secured to the flanges and slidably through one end of the tank, a guide for the rods, a cross head connected with the rods, means for operating said cross head, and contractile coil springs secured to the innermost flange of the cylinder and to the tank for normally urging the cylinder toward the piston.

In testimony whereof I affix my signature.

WILLIAM E. CHAPMAN.