J. G. SAURENMANN.

COMPRESSED AIR MACHINE.

APPLICATION FILED JUNE 30, 1911.

1,023,041. **Patented Apr. 9, 1912.**

Fig. 2.

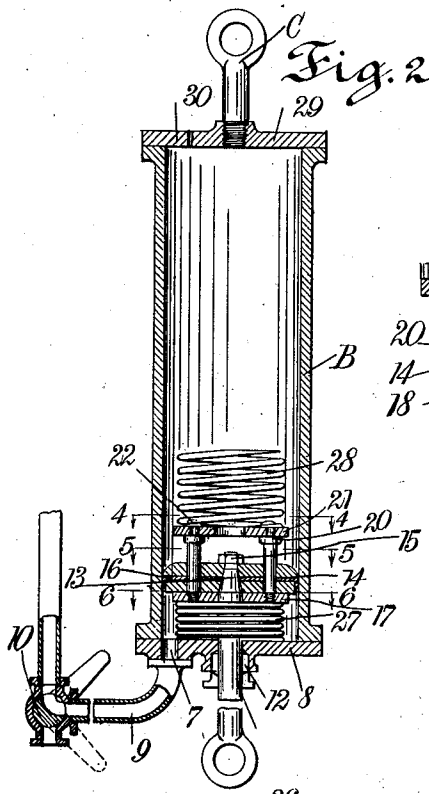


Fig. 3.

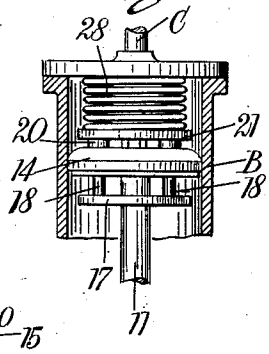


Fig. 1.

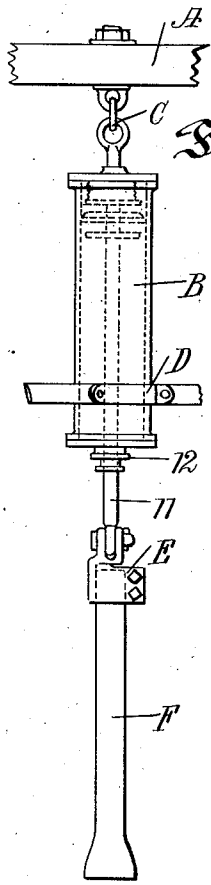


Fig. 4.

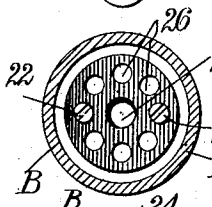


Fig. 5.

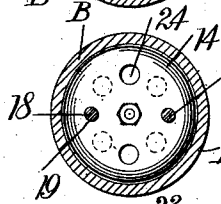
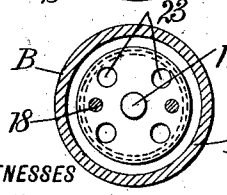
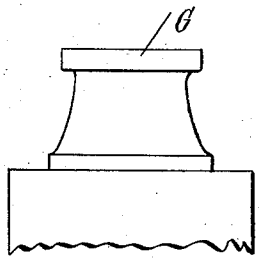


Fig. 6.





WITNESSES

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UNITED STATES PATENT OFFICE.

JACOB GILMORE SAURENMANN, OF CANADIAN, TEXAS, ASSIGNOR OF ONE-HALF TO GEORGE GERLACH, OF CANADIAN, TEXAS.

COMPRESSED-AIR MACHINE.

1,023,041. Specification of Letters Patent. Patented Apr. 9, 1912.

Application filed June 30, 1911. Serial No. 636,241.

To all whom it may concern:

Be it known that I, JACOB GILMORE SAURENMANN, a citizen of the United States, and a resident of Canadian, in the county of Hemphill and State of Texas, have invented a new and Improved Compressed-Air Machine, of which the following is a full, clear, and exact description.

My invention relates to an automatically acting compressed air machine where a reciprocating action is desired.

An object of my invention is to provide a machine of the above indicated character which will be automatic and positive in its action, which may be operated with the minimum amount of compressed fluid, and which has relatively few parts that might get out of order.

I attain the above outlined object by disposing in a compressed air cylinder, a piston head having apertures extending therethrough, which head moves in a cage, said cage affording communication through the apertures in said piston head when at the upper limit of its stroke, to permit the escape of compressed air against the piston head, thus permitting the piston head and its attached mechanism to fall by gravity into position to close the apertures through the piston head, thereby permitting the compressed fluid to reinsert itself and repeat the cycle of operation.

With the above and other objects in view, as will more fully hereinafter appear, the present invention consists in certain novel details of construction and arrangement of parts hereinafter fully described, illustrated in the accompanying drawings and more particularly pointed out in the appended claims.

Reference is to be had to the accompanying drawings, forming part of this specification, in which similar characters of reference indicate corresponding parts in all the figures, and in which—

Figure 1 is a side elevation showing a preferred embodiment of my invention applied to a welding hammer; Fig. 2 is a vertical sectional view taken through the cylinder and compressed air control means with the piston head in the lower portion of the cylinder; Fig. 3 is a vertical sectional view through the upper part of the cylinder and showing the piston head in raised position; Fig. 4 is a horizontal transverse section taken on the line 4—4 of Fig. 2 and looking in the direction of the arrow; Fig. 5 is a horizontal transverse section taken on the line 5—5 of Fig. 2 and looking in the direction of the arrow; and Fig. 6 is a horizontal transverse section taken on the line 6—6 of Fig. 2 and looking in the direction of the arrow.

As shown more particularly in Fig. 1, to an overhanging support A is freely suspended a cylinder B, by means of a link connection C, which cylinder and its coacting parts more particularly constitute the subject-matter of my invention. The cylinder is held in position by means of bands D, the piston rod of which cylinder carries a depending tool clutch E, which clutch carries a welding tool or hammer F reciprocating toward an anvil G upon which the welded article is supported during the process of welding.

While the invention is herein described in reference to a welding machine, it is to be undertsood that this is mere embodiment of the invention which relates more particularly to the cylinder B.

Compressed air is conveyed to the cylinder B through an inlet 7 to one side of the center of the bottom head 8 of said cylinder. The compressed air is led through the pipe connection 9 and is controlled by a cut-out cock 10 disposed in said pipe connection. Depending centrally through the head 8 is a piston stem 11 surrounded by the customary packing 12, the inner end of which stem is truncated as shown at 13, positioned on which truncated portion is a piston head 14 held firmly in position on the stem by means of a jam nut 15 threaded on the extreme end of the stem 11 and bearing on the piston head 14. The piston head comprises two disks, between which two disks is disposed a packing 16, to prevent the passage of air from below to above the piston head between the head and the sides of the cylinder.

Disposed below the piston head 14 is a lower valve plate, threaded into which valve plate is a pair of pins 18 disposed diametrically opposite each other. These pins pass through alined apertures 19 in the piston head 14, so as to permit said piston head to move vertically on said pins, the upper end of each of said pins having a shoulder 20, upon which shoulders rests an upper plate

21, which upper plate is firmly held in position on the pins by means of cap screws 22. It will be seen that the upper plate 21, the lower plate 17 and the oppositely-disposed pins 18, form a carriage movable with the piston stem 11 and affording a guideway and support for the piston head which is movable relative to the plates 17 and 21. This movable head and lower plate constitute the automatic valve control that controls the pressure actuating the piston stem. The lower valve plate 17 has extending therethrough four apertures 23, two on each side of a diametrical line passing through the pins 18 in position sixty degrees from each other, and from the pins, as shown more particularly in Fig. 6. The piston head 14 has extending therethrough two apertures 24, one on each side of the diametrical line passing through the pins 18 and positioned at an angle of ninety degrees from the pins, as shown more particularly in Fig. 5. The upper plate 21 has a central aperture 25 of a diameter slightly larger than the greatest diameter of the nut 15, so that said nut may fit within said aperture when the piston head is at the upper limit of its stroke, as shown in Fig. 3. The plate 21 is of slightly smaller diameter than the internal diameter of the cylinder B, so as to permit the ready escape of air about said plate to the upper part of the cylinder, and in order to facilitate this passage of air there is disposed in the upper plate, a series of apertures 26, in this case shown to be six in number, three on each side of the transverse line connecting the pins 18. Surrounding the piston stem 11 and beneath the lower plate 17 is a coil compression spring 27 adapted to cushion the drop of the piston stem and head, and resting on the top of the plate 21 is a coil compression spring 28 adapted to ride on said plate and to contact with the head 29 of the cylinder B, in order to react on the plate 17 to force it out of contact with the piston head 14 to permit the escape of the compressed air.

In its operation, compressed air is admitted by means of the pipe connection 9 through the cutout cock 10, which will admit the compressed air to the lower part of the cylinder below the piston head 14. The air cannot escape due to the fact that the apertures 23 are out of alinement with the aperture 24, thus forming an air closed piston head. The force of the air will drive the piston head and stem and its attached mechanisms upward through the cylinder B, until the spring 28 comes in contact with the head 29, to cushion the cage formed by the lower plate 17, the upper plate 21 and the pins 18, but due to the fact that the pins are longer than the thickness of the piston head 14, the said head will be guided along the pins, thereby separating the lower plate 17 from the piston head 14. This will open communication between the part of the cylinder below the piston head and the part above, permitting the compressed air to pass through the apertures 23 and 24 about the upper plate 21 and through the apertures 26 to and out the exhaust 30. Due to the weight of the piston head, stem and connecting mechanism, the device will drop in the cylinder until the lower plate 17 comes in contact with the spring 27, which will hold the cage in position and the piston head will continue to move until the plate 17 and the head 14 are in contact, thereby closing communication through the apertures 23 and 24. The closed apertures will again form an air-tight piston head and the compressed air will again force the head and stem upward, and the cycle of operation is automatically repeated. The plate 21 and the spring 28 may be omitted if desired.

While a preferred embodiment of the invention has been described, it is to be understood that many changes could be made in the above construction and many apparently widely different embodiments of this invention could be made without departing from the scope thereof.

It is intended that all matters contained herein in the above description or shown in the accompanying drawings, shall be interpreted as illustrative and not in a limiting sense. It is also to be understood that the language used in the following claims is intended to cover the full scope of the invention and is not to be given any narrower construction than the prior art demands, and that materials, sizes and relativities of parts are non-essential, except as called for in the claims.

Having thus described my invention, I claim as new and desire to secure by Letters Patent:

1. In combination, a cylinder, a piston head reciprocating in said cylinder, a cage comprising a plate positioned above said head and a plate positioned below said head, and pins connecting said plates and passing through said head, said head movable on said pins, one of said plates having apertures extending therethrough, said head having apertures extending out of alinement with the apertures in said plate, said head and apertured plate being normally superposed to close the passage between all of said apertures.

2. In combination, a cylinder, a piston head reciprocating in said cylinder, a cage comprising a plate positioned above said head and a plate positioned below said head, pins connecting said plates and passing through said head, said head movable on said pins, one of said plates having apertures extending therethrough, said head

having apertures extending out of alinement with the apertures in said plate, said head and apertured plate being normally superposed to close the passage between all of said apertures, and a spring holding said apertured plate away from said piston head at one end of the stroke.

3. In combination, a cylinder, a piston head reciprocating in said cylinder, a cage comprising a plate positioned above said head and a plate positioned below said head, pins connecting said plates and passing through said head, said head movable on said pins, one of said plates having apertures extending therethrough, said head having apertures extending out of alinement with the apertures in said plate, said head and apertured plate being normally superposed to close the passage between all of said apertures, a spring holding said apertured plate away from said piston head at one end of the stroke, and a spring acting at the opposite end of the cylinder to engage said apertured plate with said piston head.

4. In combination with a cylinder, a piston head reciprocating in said cylinder, said head having apertures extending therethrough, an apertured plate positioned on one side of said head, a plate positioned on the opposite side of said head, pins connecting said plates and forming a guide for said head, compressed fluid means forcing said head and plates in one direction, means operable at the end of the stroke to disengage said apertured plate from said head, to permit the escape of the compressed fluid, means permitting the return of said head and plates to the initial position, and means at the initial position forcing said head and plates in contact, to close the apertures through said head.

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

JACOB GILMORE SAURENMANN.

Witnesses:
C. GERLACH,
E. A. NIPPOLD.