C. P. AUGUSTINE.

AIR COMPRESSOR.

APPLICATION FILED APR. 19, 1911.

1,035,139.

Patented Aug. 13, 1912.

3 SHEETS—SHEET 1.

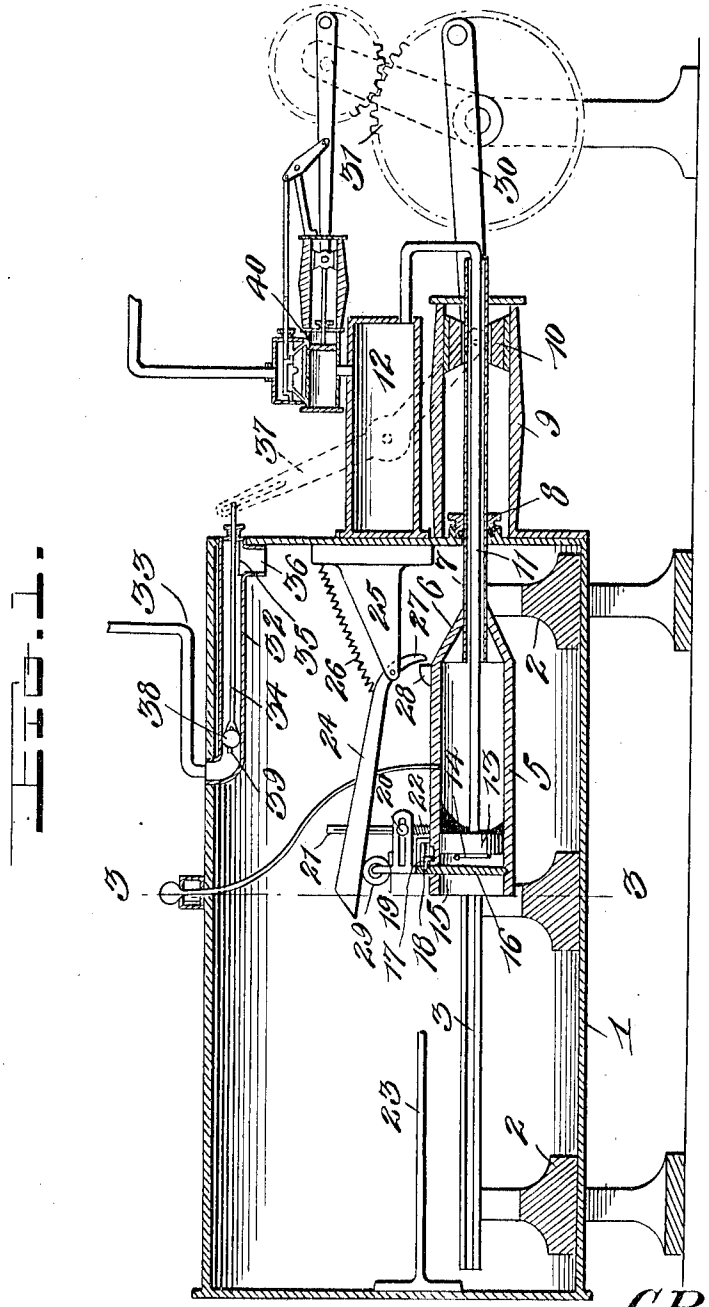


Fig. 1.

Witnesses

Chas. L. Griesbauer.

L. G. Ellis.

Inventor

C. P. Augustine,

By Watson E. Coleman.

Attorney

COLUMBIA PLANOGRAPH CO., WASHINGTON, D. C.

C. P. AUGUSTINE.

AIR COMPRESSOR.

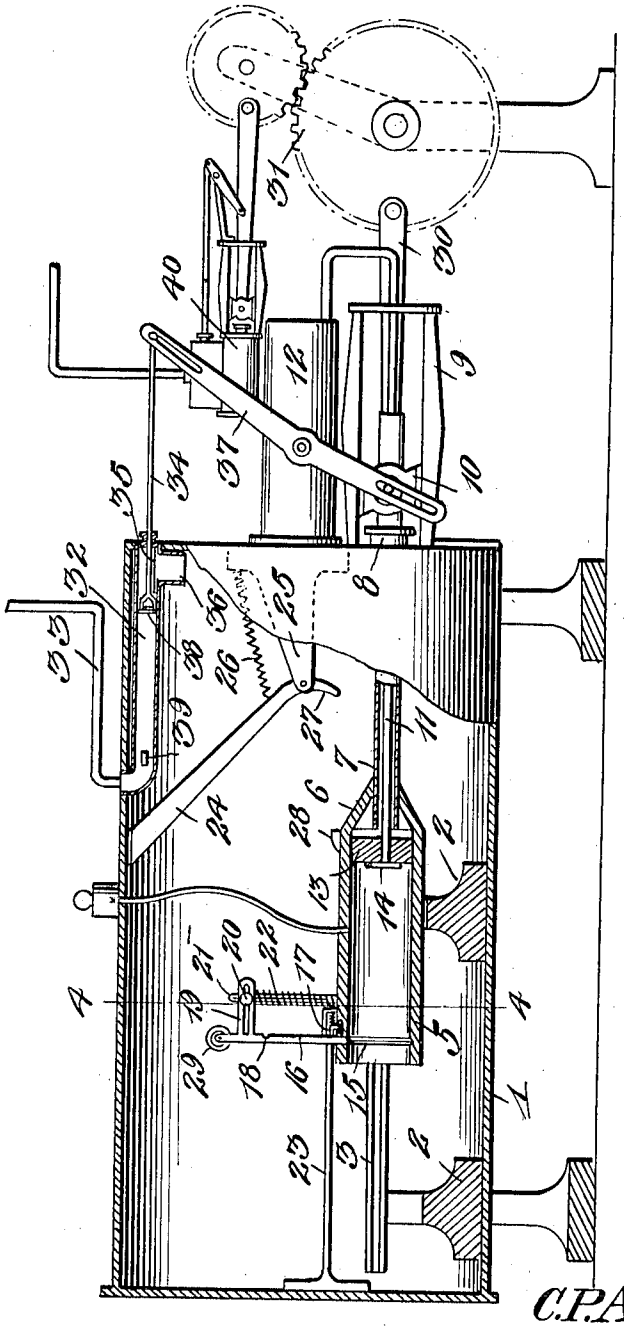
APPLICATION FILED APR. 19, 1911.

1,035,139.

Patented Aug. 13, 1912.

3 SHEETS—SHEET 2.

FIG. 2.



Witnesses

Chas. K. Griesbauer.

L. G. Ellis.

Inventor

C. P. Augustine,

By Watson E. Coleman

Attorney

COLUMBIA PLANOGRAPH CO., WASHINGTON, D. C.

C. P. AUGUSTINE.

AIR COMPRESSOR.

APPLICATION FILED APR. 19, 1911.

1,035,139.

Patented Aug. 13, 1912.

3 SHEETS—SHEET 3.

FIG. 3.

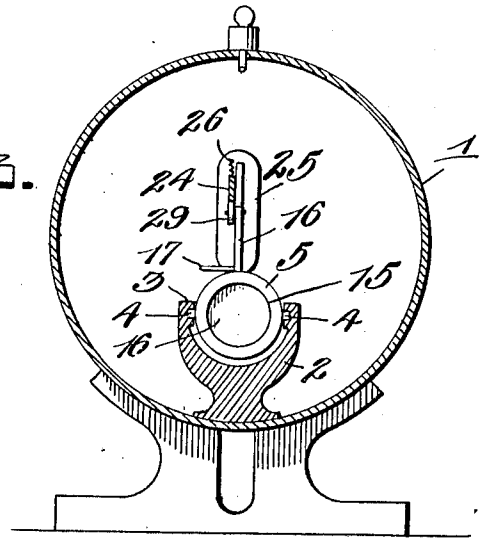
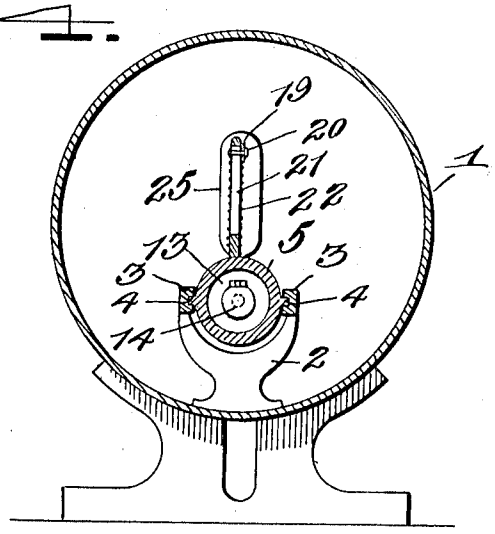


FIG. 4.



Witnesses

Chas. L. Griesbauer.

L. G. Ellis.

Inventor

C. P. Augustine,

By Watson E. Coleman.

Attorney

COLUMBIA PLANOGRAPH CO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

CHARLES P. AUGUSTINE, OF HAMILTON, MONTANA.

AIR-COMPRESSOR.

1,035,139. Specification of Letters Patent. Patented Aug. 13, 1912.

Application filed April 19, 1911. Serial No. 622,077.

To all whom it may concern:

Be it known that I, CHARLES P. AUGUSTINE, a citizen of the United States, residing at Hamilton, in the county of Ravalli and State of Montana, have invented certain new and useful Improvements in Air-Compressors, of which the following is a specification, reference being had to the accompanying drawings.

My invention relates to new and useful improvements in air compressors and my object is to provide a machine of this character wherein there is provided a sliding cylinder and stationary piston which compresses the air.

A further object of the invention resides in providing an enlarged storage tank provided with tracks upon which the sliding cylinder is adapted to move.

A further object resides in the provision of a piston comprising a tubular member having connection with a source of air supply and having a head mounted on one end thereof, and a still further object resides in providing the end of the tubular member having the head thereon with a suction or flap valve.

A further object is to provide a sliding cylinder with a trip valve, which valve is adapted to form the head of said cylinder when in its closed position.

A still further object is to provide improved means for operating said trip valve at the termination of the strokes of said cylinder.

A further object resides in providing means for controlling the discharge of air from said storage tank.

With these and numerous other objects in view, my invention consists in the novel features of construction, combination and arrangement of parts as will be hereinafter referred to and more particularly pointed out in the specification and claims.

In the accompanying drawing forming a part of this application, Figure 1 is a vertical longitudinal section through the device showing the sliding cylinder at the extremity of one of its strokes. Fig. 2 is a similar view showing the sliding cylinder in a different position within the storage tank. Fig. 3 is a transverse section through the machine as seen on line 3—3, Fig. 1, and, Fig. 4 is a transverse section as seen on line 4—4, Fig. 2.

In carrying out my invention, I shall refer to the drawings in which similar reference characters designate corresponding parts throughout the several views and in which—

1 indicates a substantially cylindrical tank for the storage of air, in which is mounted a plurality of supports 2 having a pair of grooved tracks 3 formed on the upper ends thereof, the grooves of said tracks 3 receiving the lateral flanges 4 of a cylinder 5, whereby said cylinder is capable of sliding movement on said tracks. Said cylinder has one end thereof designed conically in shape, as disclosed at 6, and said conical portion is mounted on a suction pipe or the like 7 which passes through an opening on one end of said tank 1 and extends some distance within said cylinder 5. At the point on said tank 1 where said pipe 7 extends therethrough, the same is provided with a packing or the like 8 and said pipe 7 is guided beyond the tank 1 by being extended through an opening in one end of a frame 9 which is secured to one end of said tank 1. Said suction pipe 7 has also mounted thereon a crank box or block 10 which is slidable in said frame 9 as the suction pipe is reciprocated to reciprocate the cylinder. Extending through said suction pipe 7 is a smaller pipe 11, one end of which is connected with any source of air supply such as a tank 12 and the opposite end thereof extends within the cylinder 5 and has mounted on the end thereof a piston head 13. This piston head 13 fits snugly in the inner walls of said cylinder 5, and the extreme end of said pipe 11 upon which the cylinder head is mounted, is provided with a flap valve 14, the purpose of which will be hereinafter and more particularly described. The end of said cylinder 5 opposite that which is formed conically, is left open, as shown at 15, and in place of a cylinder head at this point, I provide a trip valve 16 which forms a substantial head at that point when in its closed position. This trip valve is substantially equal in size and shape to the inner diameter of said cylinder and is held in its closed position by means of the spring-held bolt 17 carried on the outer periphery of said cylinder 5, which bolt is adapted to enter the socket 18 in said valve. Said valve is also provided with a laterally extending frame 19 through which extends a pin or the like 20 which is slidably mounted in a vertically extending bar 21 carried on said cylinder 5,

and encircling said bar is a coil spring 22 which tends to normally force said pin to the upper extremity of said bar 21. It will be appreciated, therefore, that when said bolt 17 is in position to lock the trip valve in its closed position, any force applied to said pin so as to release it from its effective position, will allow said valve 16 to be automatically raised to its ineffective position. Mounted in one end of tank 1 above the tracks 3 and in alinement with said pin 18, is a bar 23, which bar is so positioned that when said piston is slid to its one extremity, the end of said bar will engage said spring-held bolt 17 and remove the same from its effective position, thereby allowing said valve 16 to be raised to its open position by means of the spring 22. In order to provide for the closing of said valve 16 automatically when said cylinder reaches the other extremity of its moving path, I provide a lever 24 pivoted adjacent one end to a bracket or the like 25 which is secured to the inner face of the end of the tank opposite that carrying the bar 23. This lever 24 is normally held upward by means of a coil spring 26 having one end thereof engaged with said lever and the opposite end with the bracket 25, and the lower end of said lever 24 is arcuately designed, as at 27, and extended in the path of a lug 28 carried on the outer periphery of said cylinder 5. As the cylinder is moved to this extremity of its path, said lug contacts with the curved end of said lever and forces the opposite end thereof downwardly into engagement with a head or the like 29 carried on the upper end of said valve 16, and as the outer end of said lever is forced downwardly, the same will, in turn, force said valve to its closed position and when the socket 18 thereof registers with the spring-held bolt 17, the same will be retained in such closed position. The following stroke of the cylinder, therefore, will have said valve closed to form a substantial head therefor, which valve will be again opened automatically at the extremity of this stroke by means of the bar 23.

As stated previously, the cylinder 5 is slidably arranged within the member 1 and in order to provide for this sliding movement, I provide an arm 30 one end of which is pivotally engaged with the block 10 while the opposite end is eccentrically pivoted to one face of a drive wheel 31. Power is then applied to the drive wheel 31 from any source desired. I have also provided for the control of the discharge of the air after it has been compressed in said tank 1, and to this extent, I provide in the upper portion of said tank, a pipe 32, one end of which extends through the top of said tank and connects with a feed pipe 33, and the opposite end thereof extends through one end of said tank. This last referred to end, however, is closed and has an opening therein through which extends a rod 34 and said closure is also provided with an inwardly extending pin 35. The pipe 32 is also provided with a downwardly facing opening 36 to allow the air from said tank 1 to pass therethrough, and the rod 34 has the outer end thereof, which extends beyond the tank 1, mounted in a slot at one end of a rocking arm 37. This rocking arm may be pivoted to any desired point, but, as shown in my drawings, I have disclosed the same pivotally mounted on the tank 12, and the opposite end of said rocking arm 37 is also provided with a slot through which extends a pin carried by the block or box 10. It will be appreciated from this structure, that as the block 10 is reciprocated to in turn reciprocate the cylinder, the arm 37 will be rocked and the rod 34 reciprocated in the pipe 32, and said rod is bifurcated at its free end to pivotally receive therein a circular disk or head 38, said disk being pivoted on a vertical axis and designed to swing in one direction only in view of a stop formed at the free end of said rod 34. When this disk 38 is properly disposed against the stop, the same is substantially perpendicular to the axis of the pipe 32, thereby forming a substantial closure therefor, and as the arm 37 is rocked to reciprocate the rod 34, the air in the tank will be drawn through the opening 36 into said tank or pipe 32. The movement of the arm 37 which will provide such a suction will dispose the free end of the rod 34, that is the end having the disk 38, toward the end of the pipe 32 to which the pipe 33 is connected and formed on the inner wall of said pipe 32 at this extremity of the path of the rod 34 is a lug 39 which is adapted to contact with said disk 38 and swing the same on its pivot. This disposal of the disk out of a plane perpendicular to the axis of the pipe 32 will permit the air which is drawn from the tank 1 to make its exit through the corresponding movement of the arm 37, said disk being adapted to be disposed to its initial position by means of a stem or pin 35 carried at the opposite end of the tube 32. The disposition of the disk 38 again to its initial position, that is in a plane at right angles to the axis of the pipe 32, will prevent the further escape of the air through said pipe. It will be seen from the structure, that the strokes of the rod 34 will be opposite the strokes of the cylinder 5 so that the escape of the air from the tank 1 through the pipe 32 will be alternate to the compressing of the air from the cylinder within the tank 1. Although I have described this particular manner of controlling the escape of the compressed air from the tank 1, I do not wish to limit myself to

this structure and may state that any desired means may be provided for this purpose without departing from the spirit of the invention. The pipe 33 which connects with one end of the pipe 32 is, as stated, a feed pipe to the extent of feeding compressed air to any desired apparatus, for any desired purpose whatsoever.

In operation, it will be seen that power is first applied in any manner to the drive wheel 31, which will reciprocate the suction pipe 7 and the cylinder 5 mounted thereon. It is understood that the valve 16 is closed at this time so that a suction will be formed between the stationary piston head 13 and the valve 16, which at this point forms a substantial head for the cylinder and the suction therebetween will open the flap valve 14 and draw air therethrough from the supply tank 12. As the cylinder reaches the one extremity of its path, the bar 23 will engage the spring-held bolt 17 and allow the valve 16 to be opened automatically, thereby allowing the air, which has been sucked from the supply tank, to escape within the tank 1. The cylinder will then be drawn back to its original position and as the same reaches the other extremity of its path, the lug 28 will engage the curved end 27 of the lever 24, forcing the free end of said lever downwardly and in turn closing the valve 16. The next stroke of the lever will, of course, be the same as first described. As stated before, the strokes of the rod 34 are opposite to the strokes of the sliding cylinder and when said cylinder is in the position, as shown in Fig. 1, wherein the trip valve is closed, the air is being allowed to escape from the tank 1 and when said cylinder is in the position, as disclosed in Fig. 2, that is, discharging the air which has been drawn through the pipe 11, the escape of air through the pipe 32 is being stopped, as the pivoted head 38 has been turned to its proper position by means of the pin 35 at that point.

From the foregoing, it will be seen that I have provided an air compressor in which there is provided a storage tank having a stationary piston and a sliding cylinder mounted therein and it will further be seen that said tank is provided with tracks for the sliding cylinder. It will still further be seen that I have provided a novel and improved means of compressing air by providing the stationary piston comprising a tubular member having a head mounted thereon, said tubular member being provided with a flap valve at the extreme end thereof and a sliding cylinder for said piston having a trip valve thereon, which valve temporarily forms a head for said cylinder when in its closed position. Furthermore, it will be seen that with the improved means, as disclosed and described, said trip valve will be positively and automatically opened and closed at the extremities of the path of said moving cylinder. It will still further be seen that by providing a mechanism, as above described, for the escape of the compressed air from the tank 1, the cylinder will encounter little or no friction on its return stroke.

From the foregoing, it will be seen that I have provided a simple means for compressing air and one which will be extremely effective in operation.

What I claim is:—

1. In an air compressor of the class described, the combination with a source of supply; of a tank, a pipe having connection with said source of supply and extending within said tank, said pipe being provided at its end with a flap valve, a piston head mounted on the end of said pipe within said tank, a cylinder for said piston head slidably mounted in said tank, said cylinder being provided adjacent one end thereof with a trip valve, means to automatically open and close said valve, and means to reciprocate said cylinder.

2. In an air compressor, the combination with source of supply; of a tank, a pipe having connection with the source of supply and extending within said tank, the free end of said pipe being provided with a flap valve, a piston head mounted on said pipe within said tank, a cylinder for said piston head slidably mounted within said tank, an additional pipe surrounding the first referred to pipe and extending within said cylinder, a valve at the opposite end of said cylinder, means to automatically open and close the same, and means to reciprocate said cylinder

3. In an air compressor, the combination with a source of supply; of a tank, a stationary piston within said tank having connection with the source of supply, said piston being provided with a valve at the end thereof, a cylinder for said piston slidably mounted in said tank, said cylinder having one head thereof removed, a trip valve on the cylinder at the open end thereof, and means to reciprocate said cylinder.

4. In an air compressor, the combination with a source of supply; of a tank, a stationary piston mounted therein having connection with the source of supply, said piston being provided with a valve at the end thereof for the control of the air supply therefrom, a cylinder for the piston slidably mounted within said tank and having one head thereof removed, a valve carried by said cylinder at the open end thereof, means to automatically open and close said valve, and means to reciprocate said cylinder.

5. In an air compressor of the class described, the combination with a source of

supply; of a tank, a stationary piston mounted in said tank having connection with the source of supply, said piston being provided with a valve for the control of the air therefrom, a cylinder for said piston slidably mounted in said tank and having one of the heads thereof removed, means to reciprocate said cylinder, a valve carried by said cylinder adjacent the open end thereof, means at one extremity of the path of said cylinder for opening the last referred to valve, and additional means at the opposite extremity for automatically closing said valve.

6. In an air compressor, the combination with a source of supply; of a piston having connection therewith, said piston being provided with a valve for the control of the air therefrom, a sliding cylinder for said piston having one head thereof removed, a valve carried by said cylinder adapted to be normally disposed in its open position, means carried by said cylinder for retaining the same in its closed position, means to reciprocate said cylinder, and additional means for automatically opening and closing said valve as said cylinder is reciprocated.

7. In a device of the character described, the combination with an air supply; of a tank, a stationary piston mounted within said tank and having communication with said air supply, said piston being provided with a valve to control the supply of air therefrom, a cylinder for said piston slidably mounted in said tank, a spring-held valve carried by said cylinder, means to retain said valve in closed position to form a substantial head for said cylinder, means to reciprocate said cylinder, and additional means to automatically open and close said cylinder during the reciprocation thereof.

8. In a device of the character described, the combination with an air supply; of a tank, a stationary piston mounted within said tank and having communication with the air supply, said piston having a valve at the end thereof to control the air therefrom, a cylinder for said piston slidably mounted in said tank, a spring-operated valve carried by the cylinder forming a substantial head for the same when in its closed position, a spring-held bolt carried by said cylinder cooperating with the valve to retain the same in its closed position, means to reciprocate said cylinder, means at one end of said tank for moving said spring-held bolt from its effective position to allow the cylinder valve to be opened, and means at the opposite end of said tank adapted to coöperate with portions of said cylinder for closing the last referred to valve.

In testimony whereof I hereunto affix my signature in the presence of two witnesses.

CHARLES P. AUGUSTINE.

Witnesses:
G. C. ARNEST,
M. F. GUINON.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."