No. 886,257. PATENTED APR. 28, 1908.

C. H. SERGEANT.

CONTROLLING MECHANISM FOR PNEUMATIC TOOLS.

APPLICATION FILED JAN. 21, 1904.

2 SHEETS—SHEET 1.

Fig. 1,

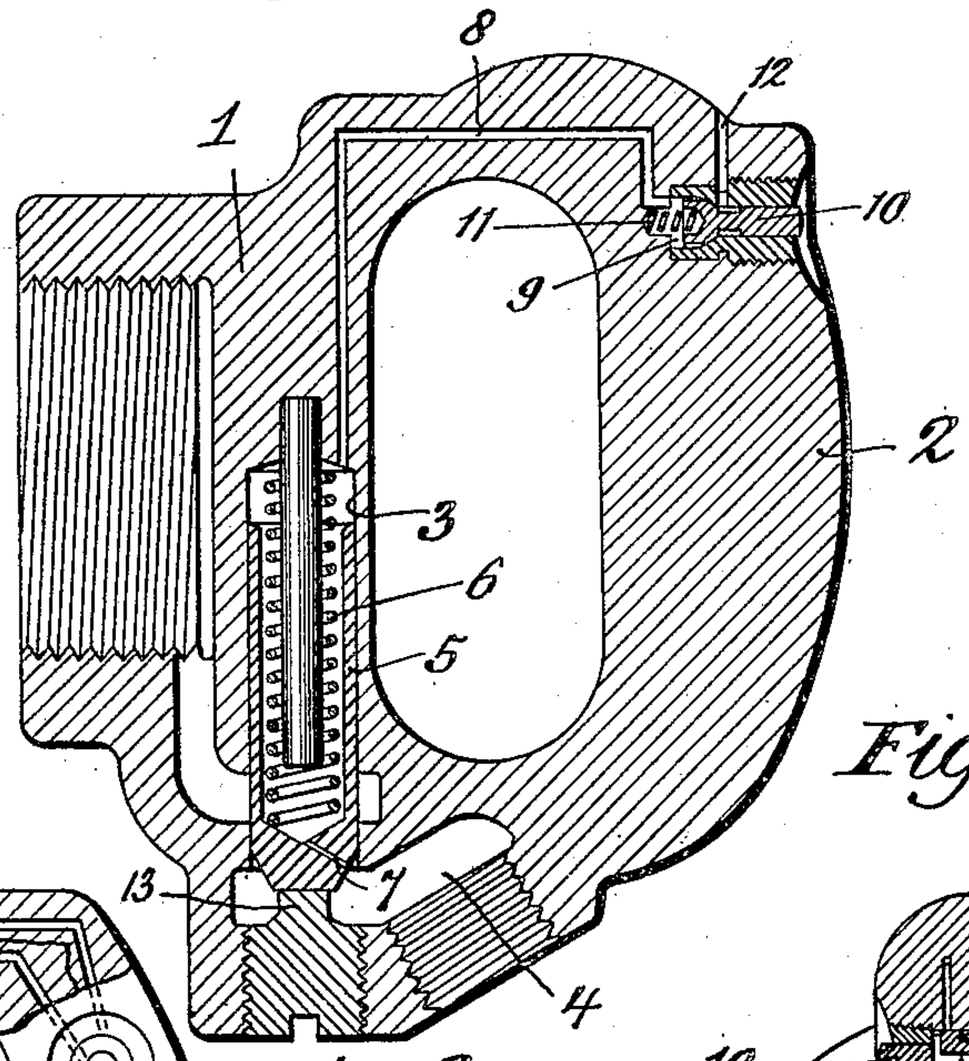


Fig. 3,

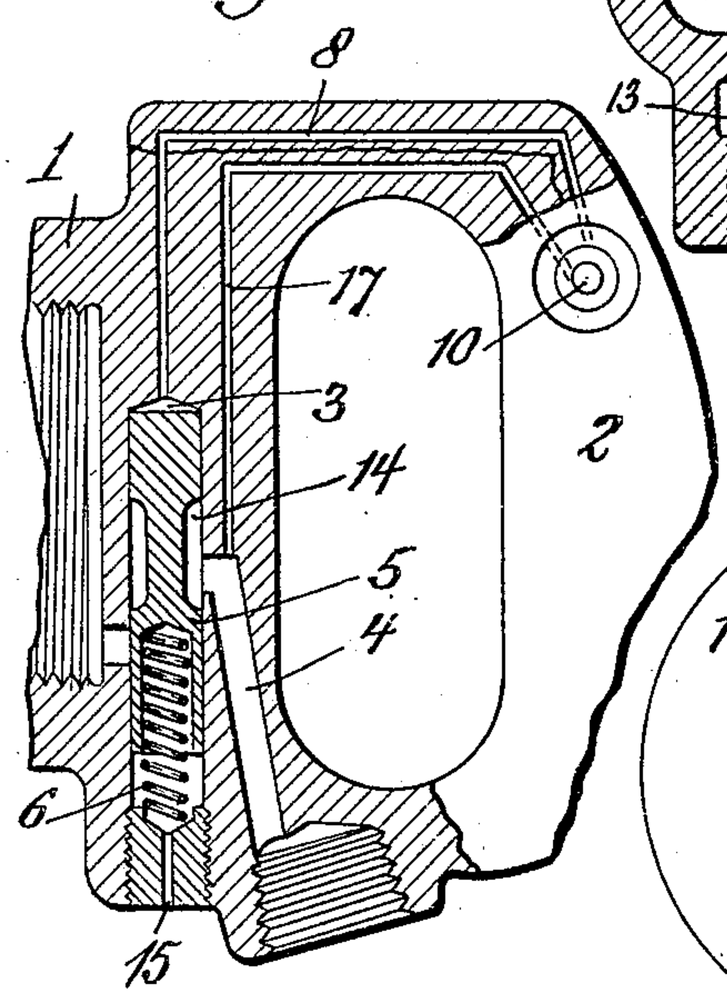


Fig. 2,

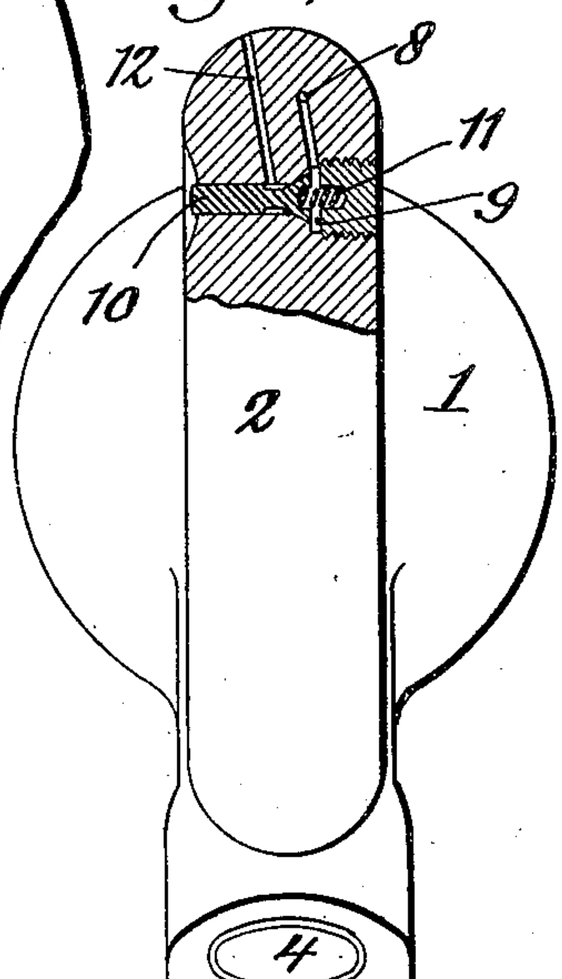
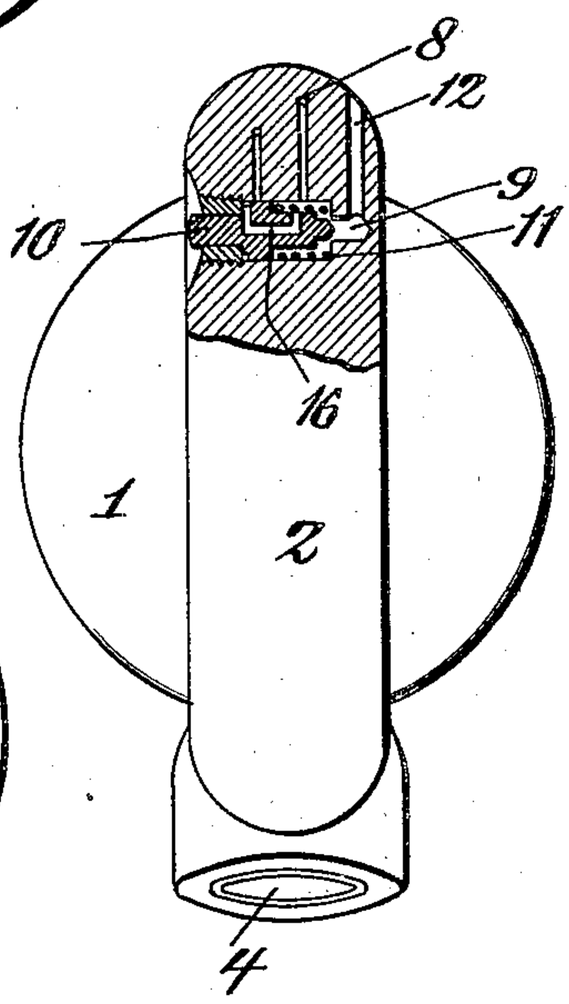


Fig. 4,



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E. L. Hall

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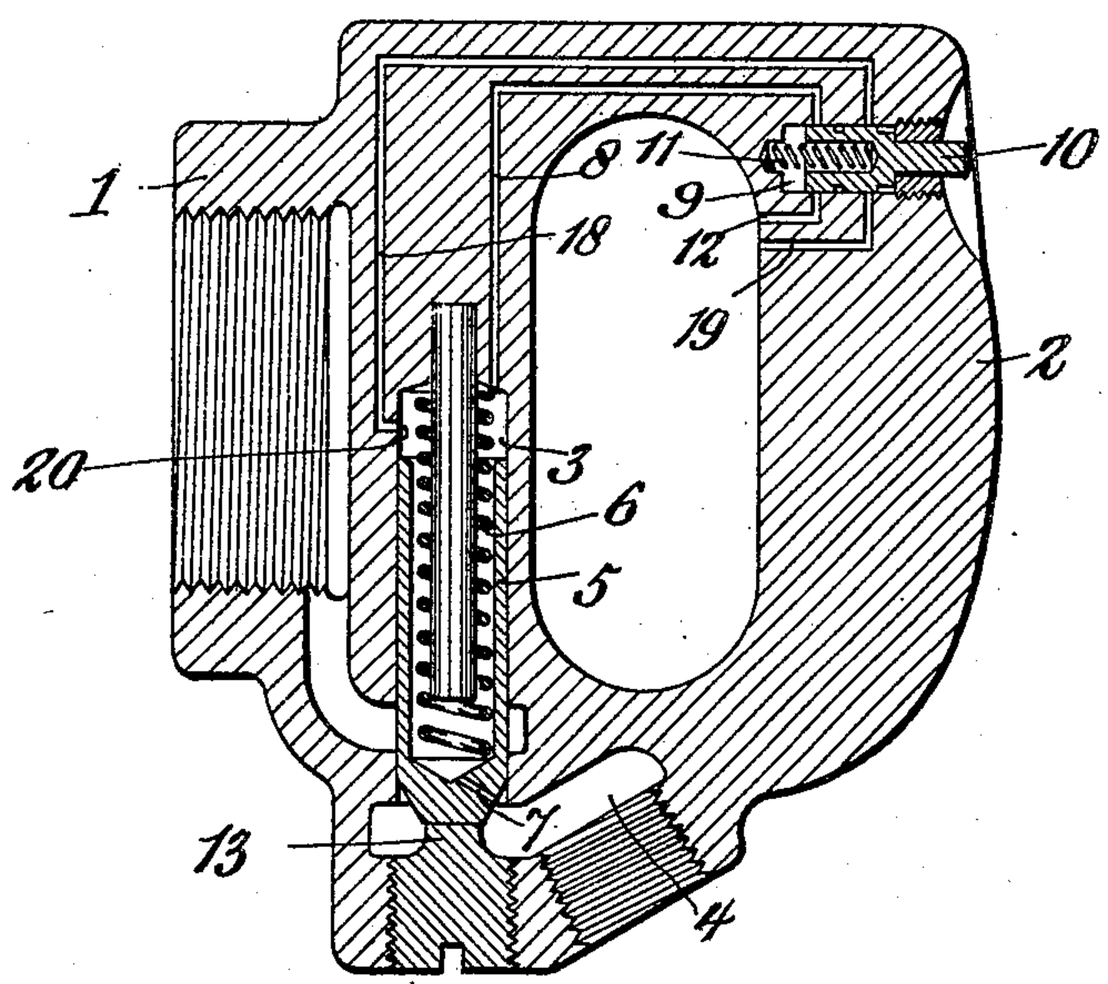
2 SHEETS—SHEET 2.

Fig. 5,



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UNITED STATES PATENT OFFICE.

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CONTROLLING MECHANISM FOR PNEUMATIC TOOLS.

No. 886,257. Specification of Letters Patent. Patented April 28, 1908.

Application filed January 21, 1904. Serial No. 189,940.

To all whom it may concern:

Be it known that I, CHARLES H. SERGEANT, a citizen of the United States of America, and resident of the borough of Brooklyn, county of Kings, State of New York, have invented certain new and useful Improvements in Controlling Mechanism for Pneumatic Tools, of which the following is a specification, reference being had to the accompanying drawings, forming a part thereof.

This invention relates to pneumatic tools, and particularly to improvements in controlling mechanism therefor.

My invention consists in the combination, with a pressure actuated throttle valve, of a hand operated auxiliary valve for controlling the throttle valve.

The object of my invention is to provide means for the control of the throttle valve which shall require but little exertion to operate it, and necessitate but a slight movement.

My invention further consists in certain novel details of construction and combination of parts, as will hereinafter be more fully pointed out.

I will now proceed to describe a device embodying my invention, and will then point out the novel features in claims.

In the drawings—Figure 1 is a view in central vertical section through a pneumatic tool handle having controlling mechanism embodying my invention. Fig. 2 is a view in end elevation of a handle, with the grasping portion partially broken away in vertical transverse section, showing an auxiliary hand operated valve somewhat differently located to that shown in Fig. 1. Fig. 3 is a view in central vertical transverse section of a handle showing a somewhat modified construction. Fig. 4 is an end elevation of the handle shown in Fig. 3, a portion thereof being broken away in vertical transverse section to illustrate the form and construction of the hand operated auxiliary valve therein employed, and certain of the ports and passages controlled thereby. Fig. 5 is a view in central vertical section of a further modified construction showing means whereby the main throttle valve may be held at a point intermediate its full open and closed positions, under control of the auxiliary hand operated valve.

In the drawings, I have illustrated only the hand portion of a pneumatic tool, as the precise form and construction of the remainder of the tool is immaterial, so far as this invention is concerned. The handle, as is usual, comprises a head block 1 adapted to be secured in any suitable manner to the cylinder or shell of the tool, and forming usually the rear cylinder head; and a grasping portion 2 arranged to be grasped by the hand in the support of the tool.

The head block portion of the handle is bored out at 3 to form a valve chamber for the main throttle valve, and an inlet duct 4 communicates with the lower end of said valve chamber. A cup-shaped valve 5 of the piston type is fitted to the valve chamber 3, and is arranged to reciprocate therein. A spring 6 tends to force the valve 5 downwardly, and to close communication between the inlet duct 4 and the interior of the tool.

The valve 5 illustrated in Fig. 1, has a small passage 7 therethrough, such passage affording communication for the fluid under pressure in the inlet duct 4 between opposite ends of the valve chamber 3 and upon opposite sides of the valve 5, so as to balance the said valve as to fluid pressure. The valve thus balanced as to fluid pressure, will be forced downwardly to close the inlet duct by the spring 6.

Leading from the upper end of the valve chamber 3 is a discharge passage 8 communicating at its other end with an auxiliary valve chamber 9 arranged in the grasping portion of the handle 2. Mounted in the auxiliary valve chamber 9 is an auxiliary hand operated valve 10, the stem of which projects outwardly in a convenient position to be engaged by the hand of an operator. The valve 10 is actuated by a spring 11 in a direction to seat it, and may be opened by pressure upon its stem applied by the thumb or finger of an operator. When opened, communication is afforded between the discharge passage 8 and an exhaust opening 12 opening to atmosphere. When, therefore, the valve 10 is open, the upper end of the throttle valve chamber 3 is opened through the discharge passage 8 and exhaust 12 to the atmosphere, so as to permit the fluid under pressure therein to be discharged. The passage 7 in the valve 5 is of smaller capacity

than the discharge passage 8 and exhaust 12, so that at such times the valve 5 will be unbalanced as to fluid pressure, that is to say, the fluid pressure beneath the valve will be greater than that above it, and the valve will be forced open against the resistance of the spring 6. In such position, the inlet duct 4 will be in free communication with the interior of the tool to admit motive fluid thereto. When the valve 10 is permitted to close, the fluid under pressure, passing through the passage 7, will accumulate at the rear of the valve 5, and the valve will once more be balanced as to fluid pressure, whereupon the spring 6 will return the valve to its lowermost position to close passage through the inlet duct. A stop 13 is arranged to limit the downward movement of the said valve.

The auxiliary valve may be arranged in any convenient position, with its stem projecting at any desirable point. In Fig. 1 I have shown the stem of the valve as projecting rearwardly from the grasping portion. In Fig. 2 I have shown the valve transversely arranged in the grasping portion of the handle with the stem projecting through the side thereof. The precise location will be entirely a matter of convenience and taste, as its position or location has no definite relation with the location of the main throttle valve, the connection between the two being through the discharge passage 8, which may follow around any portion of the handle, as may be necessary.

In Fig. 1 I have shown the valve as normally balanced as to fluid pressure by admission of fluid under pressure upon both ends of the valve, and the over-balancing of such pressure under control of the hand operated auxiliary valve by decreasing or releasing the pressure upon one side. In Fig. 3 I have shown the valve balanced as to fluid pressure by arranging the valve normally open on both sides to atmosphere, and have provided means for over-balancing the valve to operate it by admission of motive fluid to one end thereof. This may be effected by opening the inlet duct 4 into a portion 14 of the chamber 3, arranged by reducing the diameter of the piston valve intermediate its ends, and by opening the lower end of the chamber 3 on the lower side of the valve 5 to atmosphere through a passage 15. The upper end of the chamber 3 at the upper side of the valve 5 is open to atmosphere through the discharge passage 8 and exhaust passage 12. In this instance the normal position of the controlling valve 10 is such as to leave the passages 8 and 12 in free communication.

When it is desired to operate the tool, the stem of the valve 10 will be depressed by hand, first closing the connection between the passages 8 and 12, and then connecting the passage 8, through a cross-over port 16 in the said valve, with a passage 17 leading to the main inlet duct 4. This latter operation of the valve 10 will admit live motive fluid to the upper end of the valve chamber 3, and against the upper side of the valve to force same downwardly against the action of the spring 6 to open the inlet duct 4 to the interior of the tool. Release of the hand operated valve 10 will close the passage 17 and connect the passages 8 and 12 to exhaust the upper end of the chamber 3 and permit the valve to be moved upward again under spring tension to close the inlet duct.

In Fig. 5 I have shown a further modified construction, wherein the valve 5 is arranged to have an intermediate position. For this purpose, I have shown a secondary discharge passage 18 and a secondary exhaust 19. The first movement of the valve 10 in this construction will connect the discharge passage 18 with the exhaust 19, causing the valve 5 to be moved upward under live motive fluid pressure, until the upper end of the valve over-rides the port 20, at which point the passage 18 connects with the valve chamber 3. After the valve has over-ridden the port 20, pressure will again accumulate at the rear of the valve to oppose its further movement. The location of the port 20 is so arranged that, when just covered by the valve, the position of the valve will be such as to permit a small quantity of motive fluid only to pass from the inlet duct to the interior of the tool. When it is desired to give the valve 5 full opening, the valve 10 may be pushed all the way in, thereby connecting the passages 8 and 12, as in the construction shown in Fig. 1, whereupon the valve will move to its uppermost position, giving full admission of live motive fluid to the interior of the tool.

What I claim is:

1. In a pneumatic tool handle, the combination of a main throttle valve, means for counterbalancing the same by the fluid pressure, a spring acting on said valve to aid such pressure in seating the valve, and a hand-operated auxiliary valve for controlling the movements of said main valve.

2. In a pneumatic tool handle, the combination with a handle having an air inlet duct therein, a valve for controlling same, means for counterbalancing the same by the fluid pressure, a spring acting on said valve to aid such pressure in seating the valve of an auxiliary hand operated valve controlling movement of said first named valve.

3. In a pneumatic tool handle, the combination with a valve chamber a throttle valve fitted thereto, means for counterbalancing the same by the fluid pressure, a spring acting on said valve to aid such pressure in seating the valve said valve chamber having a port or passage leading therefrom, of an auxiliary hand operated valve for controlling passage of fluid through said port or passage.

4. In a pneumatic tool handle, the combination with a valve chamber and a main throttle valve fitted thereto and normally balanced as to fluid pressure, said valve spring-actuated in one direction, of an auxiliary hand operated valve arranged in its operation to overbalance the main valve as to fluid pressure in a direction opposite to the direction of spring actuation.

5. In a pneumatic tool handle, the combination with a valve chamber, a main fluid pressure operated throttle valve fitted thereto, and a spring tending to force said valve in one direction, of an auxiliary hand operated valve for controlling the fluid pressure to operate said valve in a direction opposing the action of said spring.

6. In a pneumatic tool handle, the combination with a handle comprising a head block and a grasping portion, of a main throttle valve mounted in the head block, means for counterbalancing the same by the fluid pressure, a spring acting on said valve to aid such pressure in seating the valve and an auxiliary hand operated valve for controlling movements of said main valve, mounted in the grasping portion of the handle.

7. In a pneumatic tool handle, the combination with a valve chamber and a throttle valve fitted thereto, and having a balancing passage connecting the said valve chamber upon opposite sides of said valve, and a spring acting on said valve to aid the fluid pressure in seating the valve of an auxiliary hand operated valve controlling exhaust from one end of said valve chamber, said exhaust having a greater capacity than the said balancing passage.

8. In a pneumatic tool handle, the combination with a valve chamber opening at one end to an inlet duct for motive fluid, and having an exhaust passage leading from the other end, and a throttle valve fitted to said chamber and arranged to control passage of fluid through said inlet duct, said valve having a balancing passage therethrough of less capacity than said exhaust passage, means for counterbalancing the same by the fluid pressure, a spring acting on said valve to aid such pressure in seating the valve of a hand operated auxiliary valve controlling said exhaust passage.

9. In a pneumatic tool handle, the combination with a valve chamber opening at one end to an inlet duct for motive fluid, and having an exhaust passage leading from the other end, a throttle valve fitted to said chamber and arranged to control passage of fluid through said inlet duct, said valve having a balancing passage therethrough of less capacity than said exhaust passage, and a spring acting against the valve in one direction, of a hand operated auxiliary valve controlling said exhaust passage.

10. In a pneumatic tool handle, a grasping part free from air passages, a balanced valve, an air passage leading to one end of said valve, means for permitting passage of air to the other end thereof, and means for relieving the pressure upon the latter end thereof.

11. In a pneumatic tool handle, a grasping portion, a valve, an air supply passage to one end of said valve, an opening in said valve permitting passage of air longitudinally therethrough, and means for exhausting the air thus passed.

12. In a pneumatic tool handle, a valve balanced by air pressure, means for maintaining said pressure by permitting the passage of air through said valve, and means for exhausting the air from one end of said valve.

13. In a pneumatic tool handle, the combination of a valve, a spring pressing against one end thereof, means for admitting air to the opposite end thereof, means for permitting air to pass longitudinally through said valve, and means for permitting said air to be exhausted at will.

14. In a pneumatic tool handle, a longitudinally movable valve, means for admitting air to one end thereof, an aperture extending longitudinally of said valve, and means for exhausting the air so admitted.

15. In a pneumatic tool handle, a valve balanced by air pressure at one end and by air and spring pressure at the opposite end thereof, and means for exhausting the air from one end thereof.

16. In a pneumatic tool handle, a longitudinally movable valve having an aperture in one end thereof, means for admitting air to said end, and means for exhausting air from the opposite end thereof.

17. In a pneumatic tool handle, a balanced valve having an aperture longitudinally therethrough and hand-operated means for exhausting air from one end of said valve.

18. In a pneumatic tool handle, an opening, a valve movable longitudinally therein, means for admitting air to one end of said valve, means for permitting passage of air to the other end thereof inside of said opening, and means for exhausting the air from one end thereof.

19. In a pneumatic tool handle, a balanced valve, an opening within which said valve moves, means for permitting a passage of air from one end of said valve to the other end thereof, and a manually controlled exhaust passage leading to the atmosphere.

20. In a pneumatic tool handle, a longitudinally-apertured valve, a passage for admitting air to one end thereof, a spring pressing upon the opposite end thereof, and a controllable exhaust passage from the end upon which said spring presses.

21. In a pneumatic tool handle, a passage, a valve movable longitudinally therein and of less area than said passage, means for admitting air to one end of said valve and an

exhausting device for permitting the escape of air from the opposite end thereof.

22. In a pneumatic tool handle, a balanced valve, means for maintaining the balance of said valve by permitting the passage of air through it, an exhaust passage, a conical seat therein, a regulating pin adapted to coact with said seat, means for retaining said pin in contact with said seat, and means for unseating said pin.

23. In a pneumatic tool handle, a balanced valve, a counter-balancing port therethrough, an exhaust passage having a regulator therein and a port leading from one end of said valve into said exhaust passage.

24. In a pneumatic tool handle, a balanced valve, a counter-balancing port therethrough, an exhaust passage, a regulator therein and a groove in said regulator through which the air may exhaust according to requirements.

In witness whereof, I have hereunto set my hand.

CHARLES H. SERGEANT.

Witnesses:
C. F. CARRINGTON,
C. L. HALL.