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C. H. HAESELER.

THROTTLE VALVE MECHANISM FOR PNEUMATIC HAMMERS.

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NO MODEL.

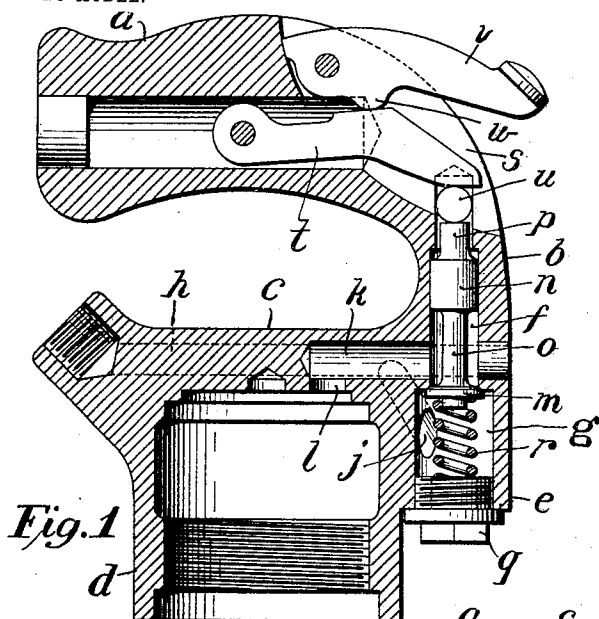
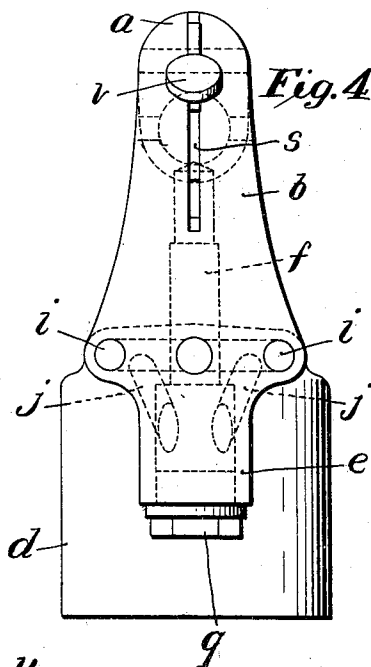


Fig. 2

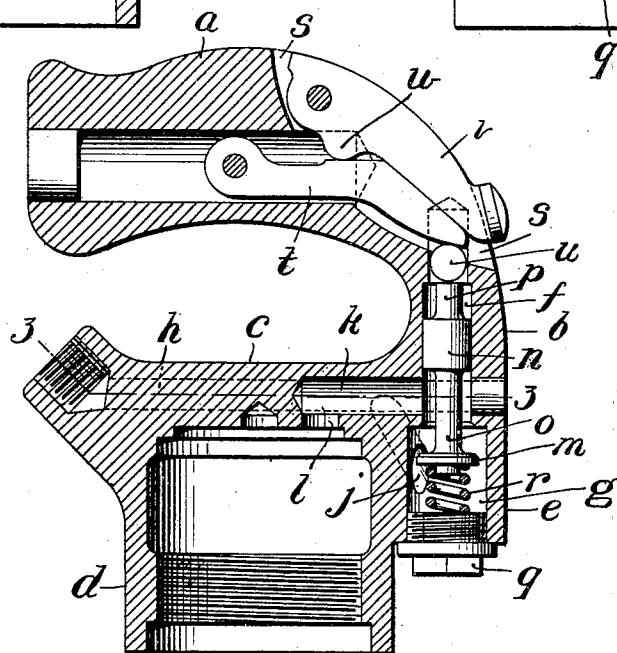
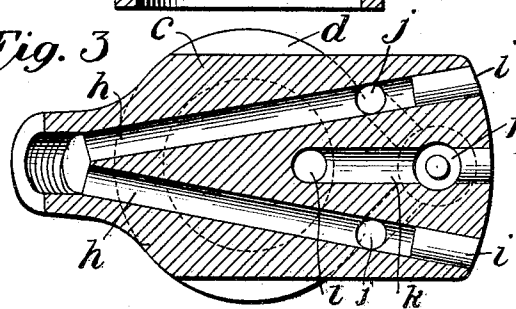


Fig. 3



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THROTTLE-VALVE MECHANISM FOR PNEUMATIC HAMMERS.

SPECIFICATION forming part of Letters Patent No. 768,898, dated August 30, 1904.

Application filed March 11, 1904. Serial No. 197,628. (No model.)

To all whom it may concern:

Be it known that I, CHARLES H. HAESELER, a citizen of the United States, residing at Philadelphia, county of Philadelphia, and State of Pennsylvania, have invented a new and useful Improvement in Throttle-Valve Mechanism for Pneumatic Hammers, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, which form a part of this specification.

My invention relates to the throttle-valve mechanism for controlling the entrance of motive fluid into the cylinder portion of a pneumatic hammer:

Various types of throttle-valve mechanism have gone into practical use, prominent among which are, first, the type in which the operating-lever is pivoted in a recess in the grasping portion of the handle and extends above the same into such position that when the operator grasps the handle his thumb naturally and without special volition depresses such operating-lever, and thereby through appropriate connections operates the throttle-valve to open the duct leading to the head-block of the cylinder, and, secondly, the type in which a trigger is located in the open space between the head-block of the cylinder and the grasping portion of the hammer and which is therefore in such position that when the operator firmly grasps the handle his fingers naturally close upon the trigger and raise it toward the grasping portion of the handle, thereby through appropriate connections operating the throttle-valve. Of these two types of throttle-valve mechanism the first is preferred by most operators, probably for the reason that the pressure is more conveniently applied by the thumb than by the fingers and probably also because the pressure exerted to depress the operating-lever is applied in the same direction as the very considerable pressure required to hold the tool to its work, whereas the trigger is operated by exerting a pressure in the direction opposite to that which must be applied to the tool as a whole.

The trigger type, however, has the advantage of readily lending itself to the location of the valve and air-duct in the head-block of the cylinder, whereas with the thumb-pressed lever it has heretofore been deemed impracticable to locate the valve and air-duct in any other place than in the grasping portion of the handle, or at least the neck connecting the grasping portion of the handle with the head-block. The disadvantage of leading the compressed air through the grasping portion of the handle or the neck portion thereof is that the air compressed to several atmospheres is very cold, and consequently chills the grasping portion of the handle to such an extent as to greatly annoy the operator.

The main object of my invention is to design a throttle-valve mechanism in which the thumb-pressed type of operating-lever is adhered to, while the air-duct is located substantially and preferably entirely outside the handle, thus attaining the combined advantages separately existing in old constructions—namely, superior convenience in location of the operating-lever and avoidance of cooling of the handle.

The invention consists of a throttle-valve mechanism having the features in combination set out in the preceding paragraph and of certain general and specific details of construction and arrangement illustrated in the accompanying drawings and hereinafter described and claimed.

In the drawings, Figure 1 is a vertical section of the handle and head-block, showing the locking mechanism in its normal inoperative position and the throttle-valve closed. Fig. 2 is a similar view showing the locking mechanism in operating position and the valve open. Fig. 3 is a horizontal section on the line 3 3 of Fig. 2, and Fig. 4 is an end elevation.

a is the grasping portion of the handle, connected with the head-block *c* by the neck *b*, thereby leaving between the handle and head-block an open space, into which the fingers of the operator extend when the tool is in use.

The head-block is preferably integral with the handle and is provided with a depending annular flange *d*, having an internal screw-thread by means of which the cylinder (not shown) may be secured thereto, the head-block when in position thus forming, in effect, the upper end of the cylinder.

The head-block *e* is provided with an offset *e* in line with the neck *b* of the handle. In this offset and neck is formed the valve-chamber, the upper end *f* of which is somewhat contracted, while the enlarged lower end *g* is closed by means of the nut *g*.

The supply-duct for the compressed air or the motive fluid is composed of two portions—the ingress portion, leading to the widened part of the valve-chamber, and the egress portion, leading from the contracted part of the valve-chamber to the interior of the head-block or cylinder. Specifically the construction of these passages is as follows: Two ingress-passages *h h*, bored through the upper part of the head-block along the line of its longer dimension, converge toward and terminate in a common screw-threaded orifice with which a hose from the source of supply may be connected. The opposite ends of these passages, located on either side of the valve-chamber, are closed by means of plugs *i i*. Short passages *j j* connect the passages *h h* with ports in the enlarged lower end of the valve-chamber. An egress-passage *k*, also bored in the upper part of the head-block, extends from a port in the contracted upper end of the valve-chamber to a point over the hollow interior of the head-block or cylinder, with which the passage *k* communicates by means of a port *l*.

m n o p represent the throttle-valve, the head *m* of which rests normally against the shoulder formed at the junction of the enlarged and reduced portions of the valve-chamber and closes communication between the same. The stem of the valve consists of the cylindrical portion *n*, fitting closely within the reduced part of the valve-chamber, the contracted intermediate portion *o*, connecting the head *m* and cylindrical portion *n*, and the reduced upper end *p*. A spring *r* is confined between the valve-head *m* and the lower closed end of the valve-chamber and normally holds the valve-head on its seat.

s is a narrow recess extending within the grasping portion of the handle. *t* is a lever pivoted at one end within the recess and extending toward and into the neck portion of the handle, where it contacts with the upper end *p* of the valve, or an antifric-tion-ball *u* may be interposed between the end *p* of the valve and the free end of lever *t*. *v* is the operating-lever or thumb-piece, pivoted at one end within the recess and extending normally without the recess into a position overhanging the neck *b*, where it may be conveniently engaged by the thumb of the operator. *w* is a rounded projection near the pivotal

end of the operating-lever, said projection engaging the upper side of the lever *t* about midway of the latter's length.

Normally the spring *r* uplifts the valve, raising the lever *t*, which in turn raises the operating-lever *w* into the position shown in Fig. 1. When the operator grasps the handle, his thumb engages the operating-lever *w* and forces it into the recess *s*, thereby depressing lever *t* and the valve against the tension of the spring *r*, as shown in Fig. 2. The valve-head *m* is thus unseated, and the motive fluid, which has already flown into passages *h h* and *j j* and the enlarged lower end *g* of the valve-chamber, passes around the head and stem of the valve into the reduced portion of the valve-chamber, thence passing through passage *k* and port *l* into the cylinder. When the operator releases his grasp of the handle, the spring *r* at once acts to seat the valve, which in turn returns lever *t* and operating-lever *v* to their normal positions.

The arrangement of the supply-ducts shown, whereby the passages *h h j j* for the incoming pressure fluid are disposed on both sides of the passage *k*, leading from the valve-chamber direct to the cylinder, possesses special advantages, although the precise arrangement is not essential to the embodiment of my invention. The arrangement of the valve-chamber partly within the neck and partly within the head-block is also advantageous.

The arrangement described of a supply-duct wholly without the handle and a thumb-lever projecting above the grasping portion of the handle is effected without any substantial modification in shape of the ordinary handle beyond the provision of the offset *e* to contain the inlet end of the valve-chamber and receive the head of the valve.

While it is apparent from what is stated in the opening paragraphs of this specification that the main object of my invention is to combine a thumb-pressed operating-lever projecting beyond the grasping portion of the handle with an air-duct located without the handle or in the head-block, still I do not, except in those claims where it is specifically claimed, confine myself to the use of such an operating-handle in combination with the novel construction and arrangement of head-block and air-passages and novel arrangement of valve-chamber and valve, which in and of themselves possess decided advantages over the arrangements of these parts heretofore in use.

Having now fully described my invention, what I claim, and desire to protect by Letters Patent, is—

1. In a pneumatic hammer, the combination with the head-block and the handle, of a valve-chamber at one side of said head-block, an ingress-passage extending to said valve-chamber through said head-block from the

other side thereof, an egress-passage extending within said head-block from said valve-chamber to the interior of the head-block, a valve in said valve-chamber and an operating-lever connected with said valve.

2. In a pneumatic hammer, the combination, with the head-block and the grasping and neck portions of the handle, of a valve-chamber at one side of said head-block, an ingress-passage extending to said valve-chamber through said head-block from the other side thereof, an egress-passage extending within said head-block from said valve-chamber to the interior of the head-block, a valve in said valve-chamber, and an operating-lever extending into and pivoted within a recess in the handle and normally projecting above the handle and connected with said valve.

3. In a pneumatic hammer, the combination, with the head-block and the handle, of a valve-chamber at one side of said head-block, an egress-passage extending from said valve-chamber through the upper portion of the head-block into the interior thereof, a pair of ingress-passages also in the upper portion of the head-block, one on each side of the egress-passage, said passages communicating with the valve-chamber and converging toward the other side of the head-block, a valve in the valve-chamber, and an operating-lever connected with said valve.

4. In a pneumatic hammer, the combination, with the head-block and the grasping and neck portions of the handle, of a valve-chamber at one side of said head-block, two ingress-passages communicating with said valve-chamber and extending therefrom through the upper portion of the head-block and converging toward the other side thereof, an egress-passage communicating with said valve-chamber and extending through the upper portion of the head-block into the interior thereof, and an operating-lever pivoted within a recess in the handle and normally projecting above the handle and connected with said valve.

5. In a pneumatic hammer, the combination, with the head-block and the handle, of a valve-chamber at one side of said head-block, a pair of passages having a common opening at the side of said head-block and extending therethrough toward the valve-chamber, a passage connecting each of the first-named passages with the valve-chamber, a fifth passage communicating with the valve-chamber and extending within the head-block to the interior thereof, a valve in the valve-chamber, and an operating-lever connected with said valve.

6. In a pneumatic hammer, the combination, with the head-block and the grasping and neck portions of the handle, of a valve-chamber at one side of said head-block, a passage within the head-block communicating at one end with the interior thereof and at the other

end with said valve-chamber, a pair of passages having a common opening at the side of the head-block and extending therethrough toward the valve-chamber, a second pair of passages connecting the first pair of passages with the valve-chamber, a valve in the valve-chamber, and an operating-lever pivoted at one end within a recess in the grasping portion of the handle, the other end normally projecting without and beyond the same and connected with said valve.

7. In a pneumatic hammer, the combination, with the head-block and the neck and grasping portions of the handle, of an offset on the head-block below and in line with said neck, a valve-chamber formed partly in said offset and partly in said neck, an ingress-passage extending through the head-block from the valve-chamber to the other side thereof, an egress-passage extending within the head-block from the valve-chamber to the interior of the head-block, a valve in said chamber and a lever for operating said valve.

8. In a pneumatic hammer, the combination, with the head-block and the neck and grasping portions of the handle, of an offset on the head-block below and in line with said neck, a valve-chamber formed partly in said offset and partly in said neck, an ingress-passage extending through the head-block from the valve-chamber to the other side thereof, an egress-passage extending within the head-block from the valve-chamber to the interior of the head-block, a valve in said chamber, and an operating-lever pivoted within a recess in the grasping portion of the handle and normally extending beyond the same and connected with said valve.

9. In a pneumatic hammer, the combination, with the head-block and the neck and grasping portions of the handle, of an offset on the head-block below and in line with said neck, a valve-chamber formed partly in said offset and partly in said neck, a pair of ingress-passages having a common opening at one end and extending through the head-block toward said offset and communicating with said valve-chamber, an egress-passage between said pair of passages extending within said head-block from the interior thereof toward said offset and communicating with said valve-chamber, a valve in said valve-chamber, and a lever for operating said valve.

10. In a pneumatic hammer, the combination, with the head-block and the neck and grasping portions of the handle, of an offset on the head-block below and in line with said neck, a valve-chamber formed partly in said offset and partly in said neck, a pair of ingress-passages having a common opening at one end and extending through the head-block toward said offset and communicating with said valve-chamber, an egress-passage between said pair of passages extending within said head-block from the interior thereof

toward said offset and communicating with said valve-chamber, a valve in said valve-chamber, and an operating-lever pivoted within a recess in the grasping portion of the handle and normally projecting without and beyond
5 the same and connected with said valve.

11. In a pneumatic hammer, the combination, with the grasping and neck portions of the handle and the head-block connected to
10 the latter, of a pressure-supply duct within the head-block, a valve and valve-chamber interposed in said duct, a lever pivoted at one end within a recess in said handle and at the other end engaging said valve, and an operating-lever also pivoted at one end within said
15 recess and engaging the first lever between its ends and having its free end projecting without the handle.

12. In a pneumatic hammer, the combination, with the handle and the head-block to which the handle is connected, of a pressure-supply duct wholly without the handle, a valve and valve-chamber interposed in said duct,
20 two levers each pivoted at one end within a recess in said handle, one lever engaging the valve at its free end and the other lever engaging the first lever between its ends and normally extending without the handle.

13. In a pneumatic hammer, the combination, with the head-block and the neck and grasping portions of the handle, of an offset on the head-block below and in line with said neck, a valve-chamber formed partly in said offset and partly in said neck, a pressure-supply duct in which said chamber is interposed,
30 a valve in said chamber, two levers each pivoted at one end within a recess in said handle, one lever engaging the valve at its free end and the other lever engaging the first lever between its ends and normally extending
40 without the handle.

14. In a pneumatic hammer, the combination with the head-block and the handle, of a valve-chamber at one side of said head-block,
45 an egress-passage extending from said valve-chamber through the upper portion of the head-block into the interior thereof, a pair of ingress-passages also in the upper portion of the head-block, one on each side of the egress-passage, said passages communicating with the valve-chamber and converging toward the other side of the head-block, a valve in the valve-chamber, a lever pivoted at one end within a recess in said handle and at the other
50 end engaging said valve, and an operating-lever also pivoted at one end within said recess and engaging the first lever between its ends and having its free end projecting without the handle.

15. In a pneumatic hammer, the combination with the head-block and the neck and grasping portions of the handle, of an offset on the head-block below and in line with said neck, a valve-chamber formed partly in said
60 offset and partly in said neck, a pair of in-

gress-passages, having a common opening at one end and extending through the head-block toward said offset and communicating with said valve-chamber, an egress-passage between said pair of passages extending within
70 said head-block from the interior thereof, toward said offset and communicating with said valve-chamber, a valve in said valve-chamber, two levers each pivoted at one end within a recess in said handle, one lever engaging the
75 valve at its free end and the other lever engaging the first lever between its ends and normally extending without the handle.

16. In a pneumatic hammer, the combination, with the grasping and neck portions of the handle and the head-block connected with the latter, of a valve-chamber formed partly in the neck and partly in the head-block, a valve seated in said chamber and normally closing communication between the two ends
80 thereof, a spring holding said valve in its normal position, a pair of ingress-passages within the head-block communicating with one end of said valve-chamber and converging toward a common opening at the other side of said head-block, an egress-passage within the head-block between the pair of ingress-passages and communicating with the other end said valve-chamber and the interior of the head-block, and an operating-lever adapted, when
90 operated, to lift said valve off its seat and thereby open communication between the two ends of the valve-chamber.

17. In a pneumatic hammer, the combination, with the grasping and neck portions of the handle and the head-block connected with the latter, of a valve-chamber formed partly in the neck and partly in the head-block, a valve seated in said chamber and normally closing communication between the two ends thereof,
100 a spring holding said valve in its normal position, a pair of ingress-passages within the head-block communicating with one end of said valve-chamber and converging toward a common opening at the other side of said head-block, an egress-passage within the head-block between the pair of ingress-passages and communicating with the other end of said valve-chamber and the interior of the head-block, a lever pivoted at one end within a recess in the grasping portion of the handle, the other end of said lever engaging said valve, and an operating-lever also pivoted within said recess and engaging the first lever and projecting without the handle, whereby the operating-lever may be moved to lift said valve off its seat and open communication between the ingress and egress passages.

In testimony of which invention I have hereunto set my hand, at Philadelphia, on this 3d
120 day of March, 1904.

CHARLES H. HAESELER.

Witnesses:

M. M. HAMILTON,
WILLIAM B. MARKS.