THE AMERICAN SOCIETY OF
MECHANICAL ENGINEERS

# TRANSACTIONS

## VOLUME 38

NEW ORLEANS MEETING
NEW YORK MEETING
1916


NEW YORK
PUBLISHED BY THE SOCIETY
29 WEST 39TH STREET
1917

No. 1580

# NECROLOGY

## CHESTER BIDWELL ALBREE

Chester Bidwell Albree was born at Allegheny, Pa., on April 8, 1862. He received his preparatory education in the Western University of Pennsylvania and his technical education at the Worcester Polytechnic Institute in Massachusetts, from which he was graduated with the degree of B. S. in 1884. Following his graduation Mr. Albree spent a year in travel, visiting manufactories in various cities, and selling lubricating oils. Before entering into business with his father, he worked in the drawing room at Thomas Carlin's Sons in Allegheny. The remainder of his business life was spent in establishing and managing The Chester B. Albree Iron Works.

While his principal business was ornamental iron, Mr. Albree started to manufacture pneumatic compression riveters in 1900, and did all the designing of these machines himself. He originated the very successful universal bail, whereby a suspended machine may be turned in any position by merely swinging it through a bail, so constructed as to keep always the center of gravity of the machine at the same height, and thus preserve stable equilibrium. Among his other valuable patents was one covering an automatic pneumatic compression riveter which does away with the adjustment screw entirely. He was widely known as a manufacturer and designer of bridge railing, and many of his beautiful designs can be seen in all parts of the United States.

Mr. Albree was a past-president of the Engineers' Society of Western Pennsylvania and a member of the American Association for the Advancement of Science. He became a member of this Society in 1886. He died on May 27, 1916.

## ROBERT ALLISON

Robert Allison was born at Middletown, Durham County, England, on December 25, 1827, but was brought to this country by his parents when very young. He received his early education in the schools of Shamokin, Northumberland County, Pa., which were taught by farmers for four months during the year.

(No Model.)

# C. B. ALBREE.

## RIVETING AND PRESSING MACHINE.

No. 558,140. Patented Apr. 14, 1896.

Fig. 2.

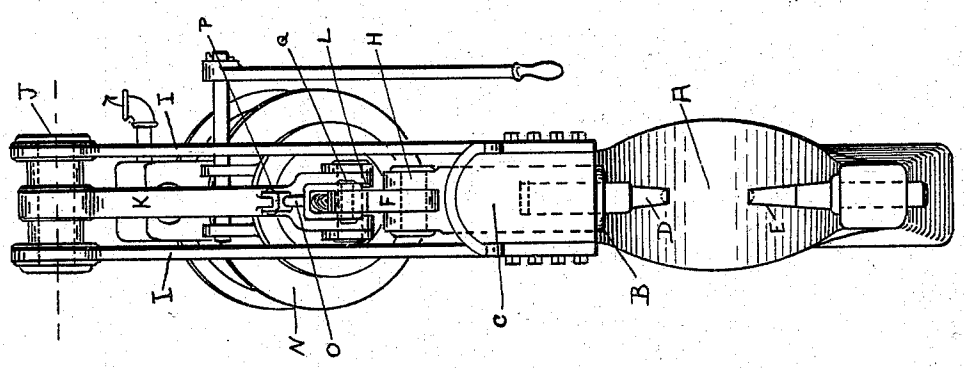



Fig. 3.

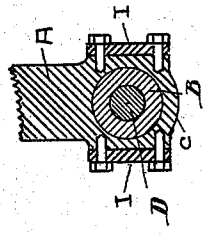
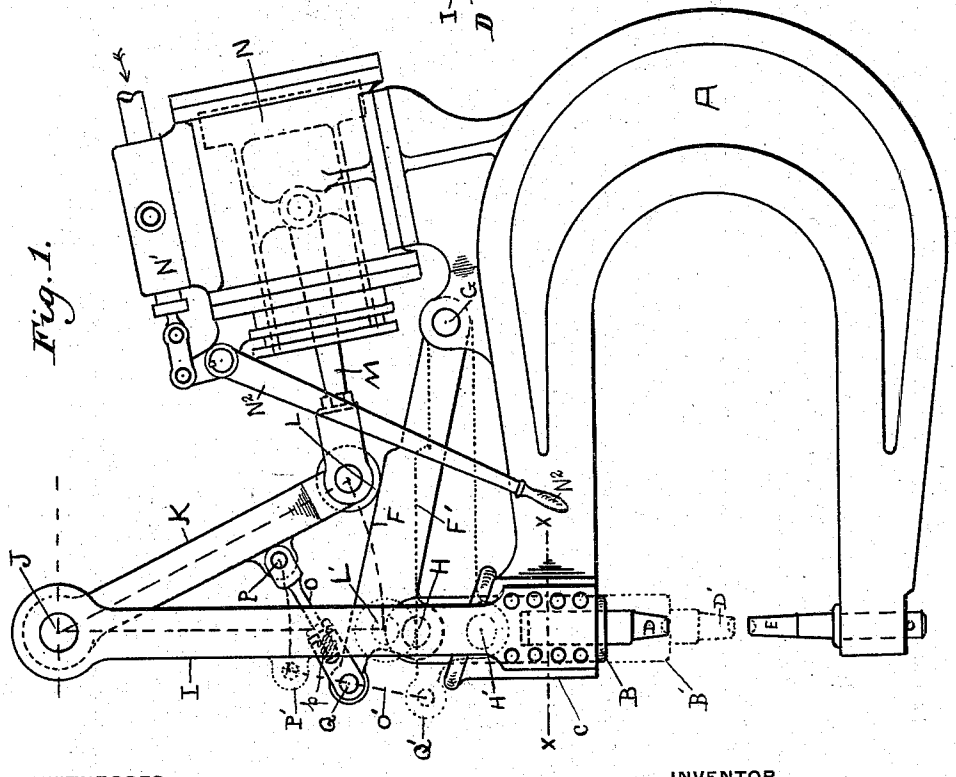



Fig. 1.




WITNESSES

Thomas W. Bakewell

T. A. Connolly

INVENTOR

Chester B. Albree.

# UNITED STATES PATENT OFFICE.

CHESTER B. ALBREE, OF ALLEGHENY, PENNSYLVANIA.

## RIVETING AND PRESSING MACHINE.

SPECIFICATION forming part of Letters Patent No. 558,140, dated April 14, 1896.

Application filed January 9, 1896. Serial No. 574,904. (No model.)

*To all whom it may concern:*

Be it known that I, CHESTER B. ALBREE, of Allegheny, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Riveting and Pressing Machines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 shows in side elevation a riveting-machine constructed in accordance with my invention. Fig. 2 is a front elevation thereof. Fig. 3 is a horizontal section on the line *x x* of Fig. 1.

Like symbols indicate like parts in each.

My invention relates to an improvement adapted for use in machines for riveting by pressure or in machines applying pressure for other purposes in such manner that the greatest pressure is exerted at or near the end of the stroke, and although in this specification I describe the invention particularly as applied to riveting-machines I do not intend to limit myself thereto, but wish to cover its use for any purpose for which it may be adapted.

In the drawings, A represents the frame of the riveting-machine.

B is the riveting-plunger, which moves, vertically, in a suitable guide or hub C in the frame, and D E are the riveting-dies, the moving die D being fixed to the plunger and the stationary die E being fixed to the frame.

The motor by which the plunger is actuated is a cylinder N, having a reciprocating piston and a piston-rod M, operated by steam, compressed air, or water, or any other type of motor, such as an electric motor, or even hand-levers, for giving longitudinal motion to the piston or other rod M may be employed.

N′ is a valve governed by a hand-lever $N^2$, by means of which the operation of the motor may be controlled. Power is transmitted from the motor to the die-plunger through a lever or bar F, pivoted at one end at G to the machine-frame and at the other end pivoted to the upper end of the plunger B by means of a pin H, fitting in a somewhat elongated hole. At the end of the piston-rod M there is preferably an antifriction-roller L, which rides upon the upper side of the lever F, and as this lever is inclined relatively to the path of motion of the roller when the plunger is in its most elevated position, as shown in the drawings, longitudinal motion of the piston-rod will cause the roller to act thereon with a wedge-like action and to turn the lever on its pivot G, thereby depressing the plunger B and moving the die D toward its companion die E. To hold the roller L in contact with the lever during such motion of the piston-rod and to take up the strain of the work, I employ a swinging arm K, pivoted at one end to the piston-rod at the axis of the roller L and pivoted at the other end at J to bars or posts I I, which extend from the frame A and in effect constitute part of the frame. By reason of the use of said swinging arm when the piston-rod is projected the roller at its end moves in the arc of a circle, (shown by dottted lines,) and the lateral thrust thereon is taken up by the swinging arm and post.

O is a lifting-bar connecting the arm K at a point P to the lever F at a point Q. This lifting-bar is divided and fitted with a spring *p*, so as to have some loose motion, the purpose being that when the piston-rod is retracted the retraction of the swinging arm K, acting through the rod O, will lift the lever F.

The operation of the machine is as follows: The work to be riveted is interposed between the dies D E, and the parts being in the position shown by full lines in Fig. 1 the cylinder N is operated so as to project the piston-rod M, and the roller L, moving along the surface of the lever F, will force it down, thus moving the plunger B within its guide and pressing the moving die upon the rivet with great pressure. The dotted lines in the drawings and the reference-figures designated by the prime (′) mark show the parts in the positions which they occupy at the end of the stroke.

The action of the inclined lever F with the end of the piston-rod rolling or sliding in contact therewith is such that the speed of motion of the plunger decreases as the plunger advances, and that the slowest motion and the greatest pressure is exerted upon the work at the end of the stroke when the rivet is being finally upset and shaped and when the greatest pressure is needed. On the re-

turn stroke of the piston the lever F is lifted by means of the lifting-rod O, and the parts are thus restored to the positions shown in the drawings; but, although the lifting-rod is a convenient device for this purpose, it is not essential, for the same work can be performed by a spring, weight, or other counterbalance acting upon the lever.

The advantages of my invention are many and will be apparent to those skilled in the art.

The apparatus which I have described is simple in construction, compact, durable, and easy to maintain in working order, and it affords means for riveting in the most effective manner, giving the greatest pressure at the time when it is most needed and distributing the strains of work upon the proper parts of the machine.

I claim—

1. A machine for pressing or riveting, comprising a plunger which carries the moving die or tool, mechanism such as a cylinder having a reciprocating part adapted to impart motion to the plunger, a lever connected with the plunger and inclined to the path of motion of said reciprocating part and in sliding contact therewith, and a swinging arm pivotally connected to the frame of the machine and connected also with said reciprocating part for holding the latter to its working contact with the lever, substantially as described.

2. A machine for pressing or riveting comprising a plunger which carries the moving die or tool, mechanism such as a cylinder having a reciprocating part adapted to impart motion to the plunger, a lever connected with the plunger and inclined to the path of motion of said reciprocating part and in sliding contact therewith, a swinging arm pivotally connected to the frame of the machine and connected also with said reciprocating part for holding the latter to its working contact with the lever, and a roller bearing between said reciprocating part and the lever, substantially as described.

3. A machine for pressing or riveting comprising a plunger which carries the moving die or tool, mechanism such as a cylinder having a reciprocating part adapted to impart motion to the plunger, a lever connected with the plunger and inclined to the path of motion of said reciprocating part and in sliding contact therewith, a swinging arm pivotally connected to the frame of the machine and connected also with said reciprocating part for holding the latter to its working contact with the lever, and a lifting rod or connection connecting the swinging arm with the lever, substantially as described.

4. A machine for pressing or riveting comprising a plunger which carries the moving die or tool, mechanism such as a cylinder having a reciprocating part adapted to impart motion to the plunger, a bar connected with the plunger and inclined to the path of motion of said reciprocating part and in sliding contact therewith, a swinging arm pivotally connected to the frame of the machine and connected also with said reciprocating part for holding the latter to its working contact with the bar, and a lifting rod or connection connecting the swinging arm with the bar, substantially as described.

In testimony whereof I have hereunto set my hand.

CHESTER B. ALBREE.

Witnesses:

G. I. HOLDSHIP,

H. M. CORWIN.

(No Model.)

# C. B. ALBREE.

## PNEUMATIC TOOL.

No. 572,324. Patented Dec. 1, 1896.

*Fig. 1.*

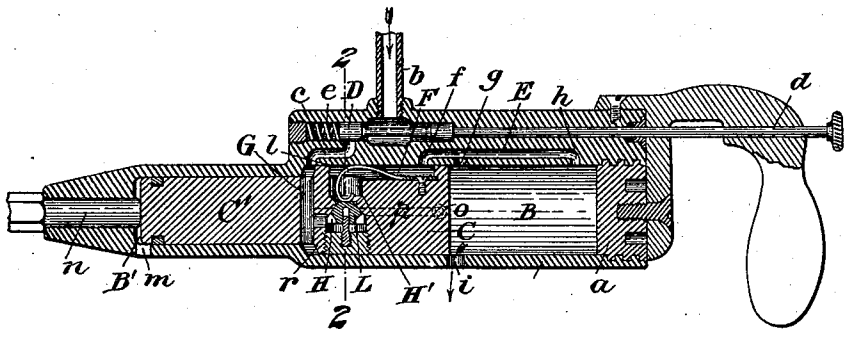



*Fig. 2.*

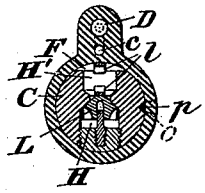



*Fig. 3.*

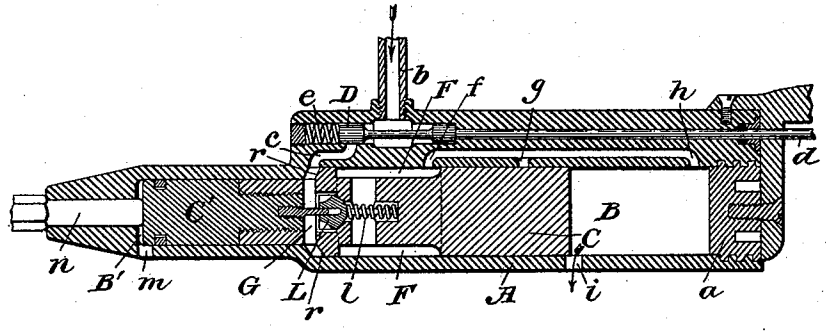
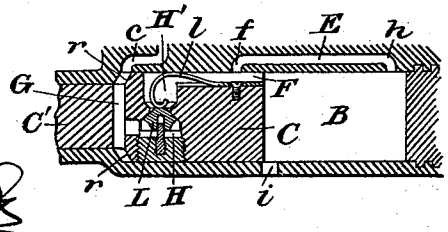



*Fig. 4.*




WITNESSES

T. A. Somers

P. M. Corwin

INVENTOR

Chester B. Albree

by Bakewell & Bakewell

his attys.

# UNITED STATES PATENT OFFICE.

CHESTER B. ALBREE, OF ALLEGHENY, PENNSYLVANIA.

## PNEUMATIC TOOL.

SPECIFICATION forming part of Letters Patent No. 572,324, dated December 1, 1896.

Application filed May 15, 1896. Serial No. 591,638. (No model.)

*To all whom it may concern:*

Be it known that I, CHESTER B. ALBREE, of Allegheny, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Pneumatic Tools, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a longitudinal section of my improved mechanism. Fig. 2 is a cross-section on line 2 2, and Figs. 3 and 4 are longitudinal sections of modified forms.

My invention relates to that class of pneumatic or steam reciprocating motors or tools known as the "valveless" tools, in which the piston itself operates as the controlling-valve to govern the admission and exhaust of pressure, and it is designed to afford an increase in the efficiency of the motor or tool without a corresponding increase in the pneumatic or steam pressure required. The mechanism hereinafter described that is used for containing and actuating the piston is of a type well known and in general use, and the specific form shown in the accompanying drawings may be varied without departure from my invention.

In the drawings, A indicates the body of the machine, having a cylinder B B′, provided with a removable head *a*.

C C′ is the piston, the two parts of which are of unequal diameters.

D is an inlet-valve controlling the admission of steam or air under pressure through supply-pipe *b* to inlet-port *c*. It is provided with suitable means for opening and closing, (herein represented by a rod *d* and closing-spring *e*.)

*f g h* are ports in cylinder B, connected by a by-pass E, and *i* is the exhaust-port, so placed in relation to the piston C that it is uncovered thereby only at the end of the outward or working stroke.

F is a passage or recess in piston C of a length sufficient to uncover and connect with port *f* when the piston is at the end of its outward or working stroke.

*r* is an annular shoulder at the end of the piston C, upon which the pressure is exerted in its inward stroke. The piston C has a valve-chamber H H′ communicating through a port G with the exterior of the piston at the shoulder *r*, and having therein a valve L, preferably of the puppet type, adapted to close the passage between the parts H and H′ of the chamber in the piston and normally retained in an open position by the pressure of a spring *l*.

*m* is an air-vent in the outer portion of the chamber B′, which serves to prevent the formation of an air-cushion.

*n* indicates the shank of the tool inserted in its proper position.

*o* is a pin projecting inwardly from the cylinder B, adjustable by means of its threaded portion, which fits in a corresponding slot *p* in piston C (indicated in Fig. 1 by broken lines) and serves as a guide to preserve the relation of passage F to the ports *f g h*, as indicated.

In Fig. 3 I show a modification in which the chamber F of Fig. 1 is an annular recess in the circumference of the piston C, whereby the necessity of the guiding-pin and slot is avoided, and in Fig. 4 I show yet another modification in which port *g* is omitted, and passage F of Fig. 1 connects directly with cylinder B by means of an opening through the face of piston C.

The operation is as follows: Steam or air under pressure is admitted through the inlet-pipe *b*, by means of valve D, to port *c* and exerting a pressure on shoulder *r* of the piston C causes it to recede from the position as shown in Figs. 1, 3, and 4. At the same time pressure is exerted upon valve L through passage G and chamber H, overcoming the pressure of spring *l*, and the pressure in chambers B E and passage F being practically neutral causes said valve L to close, thus preventing any communication between port *c* and passage F and through port *f* with chamber B. When the shoulder *r* of the piston has passed port *f*, pressure is instantly exerted therethrough to the passage E and through port *h* to the cylinder B and upon the entire surface of the face of the piston C, thus causing a reversal of its motion. By reason of port *g* pressure is exerted through chamber H′ and passage F upon valve L, and being equal and balanced upon both sides of said valve allows it to be moved into an open position by the spring *l*, thus permitting com-

munication between inlet-port *c* and passage F after the shoulder *r* has passed port *f* on the outward or working stroke of the piston. There is communication, therefore, between inlet-port *c* and cylinder B in the rear of the piston throughout the entire outward or working stroke. As the piston reaches the end of this stroke it uncovers the exhaust-port *i*, and by reducing the pressure in the cylinder B causes a corresponding reduction of pressure on the valve L, thereby causing said valve to close by reason of the constant pressure through the passage G. The piston and the valve L are then in their original positions and the operation as above described is repeated.

In Fig. 3 I show a modification of the device in which the valve L is set in a position lengthwise of the piston instead of being transverse, as in Fig. 1, and in which the passage F extends entirely around the piston. In Fig. 4 I show a modification wherein the necessity of using the port *g* is obviated by causing passage F to connect directly with cylinder B. Many other changes may be made without departure from my invention as defined in the claims.

The advantages of my improvement will be appreciated by those skilled in the art to which it relates. Its parts are few in number, simple in construction, durable, and in operation entirely automatic.

Hitherto in the operation of motors of the class to which my invention relates there has been and must of necessity be a loss of power in the outward or working stroke. The pressure upon the shoulder *r* or forward end of the piston necessary to produce the return motion of the piston is constant, and while in the ordinary style of tool when the said shoulder of the piston has passed the port *f* in its inward stroke the full pressure is admitted through port *f* to the cylinder B and permits the exertion of the full pressure upon the larger surface of the piston, it is almost instantly cut off through the closing of the port *f* on the outward stroke of the piston, and the force of said stroke thereafter depends upon that proportion of the pressure due to the expansion of the steam or air in the cylinder B in excess of the constant pressure on the other end of the piston that tends to retard the stroke.

By the use of my invention this loss in the outward or working stroke is entirely removed, since the pressure upon each side of valve L is equal, after the opening of port *f*, to the pressure by the passage of shoulder *r* in the inward stroke of the piston and remains open during the outward stroke by reason of this equality of pressure thereon remaining constant. There is therefore a free passage for the steam or air from the inlet *c* to the cylinder B back of the piston during the entire outward or working stroke, or until the opening of the exhaust-port *i*.

The apparatus may be used for actuating rock-drills, for hand chipping or calking tools, and for any other purpose where a rapid reciprocating motion is desired.

I claim—

1. A reciprocating tool having a cylinder and piston, an exhaust-port, a port adapted to be uncovered at the end of the instroke of the piston to admit fluid-pressure to the rear of the piston and to cause its initial outstroke, a passage through the piston to admit fluid-pressure to the rear of the piston after the beginning of the outstroke, and a valve which controls said port and is closed automatically when the pressure at the rear of the piston is reduced by exhaustion.

2. A reciprocating tool having a cylinder and piston, an exhaust-port, a port adapted to be uncovered during the instroke of the piston to admit fluid-pressure to the rear of the piston and to cause its initial outstroke, a passage through the piston to admit fluid-pressure to the rear of the piston thereafter, and a valve which controls said port and is closed automatically when the pressure at the rear of the piston is reduced by exhaustion, said valve being subjected on one side to the closing pressure from the cylinder at the outer end of the piston and on the other side to the pressure from the inner end thereof.

3. A reciprocating tool having a cylinder and piston, an exhaust-port, a port adapted to be uncovered during the instroke of the piston to admit fluid-pressure to the rear of the piston and to cause its initial outstroke, a chamber H, H′ in the piston, a passage F adapted to register with a port leading to the rear portion of the cylinder, a check-valve in said passage, and a valve-controlled port admitting fluid to the forward portion of the cylinder.

4. A reciprocating tool having a cylinder and piston, the effective area of the piston exposed to pressure being greater at the rear end than at the forward end, and a pressure-inlet port, admitting constant fluid-pressure to the smaller end of the piston, an exhaust-port, a port adapted to be uncovered during the instroke of the piston to admit fluid-pressure to the rear of the piston and to cause its initial outstroke, a passage through the piston to admit fluid-pressure to the rear of the piston thereafter, and a valve which controls said port and is closed automatically when the pressure at the rear of the piston is reduced by exhaustion.

In testimony whereof I have hereunto set my hand.

CHESTER B. ALBREE.

Witnesses:
THOMAS W. BAKEWELL,
G. I. HOLDSHIP.

No. 884,971.

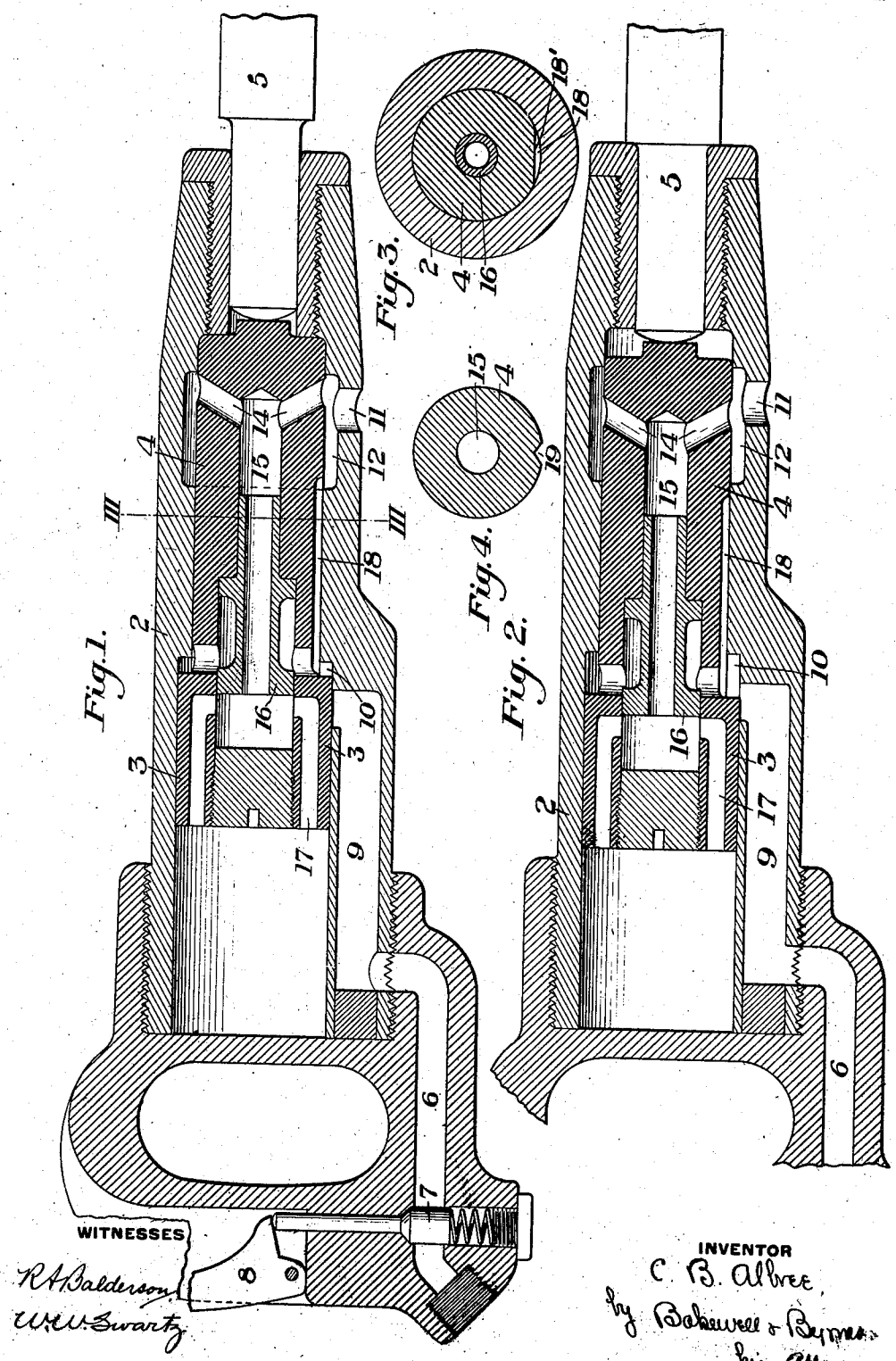
PATENTED APR. 14, 1908.

C. B. ALBREE.

PNEUMATIC TOOL.

APPLICATION FILED DEC. 20, 1906.

2 SHEETS—SHEET 1.




WITNESSES

R. A. Balderson

W. W. Swartz

INVENTOR

C. B. Albree,

by Bakewell & Byrnes

his Attys

No. 884,971. PATENTED APR. 14, 1908.

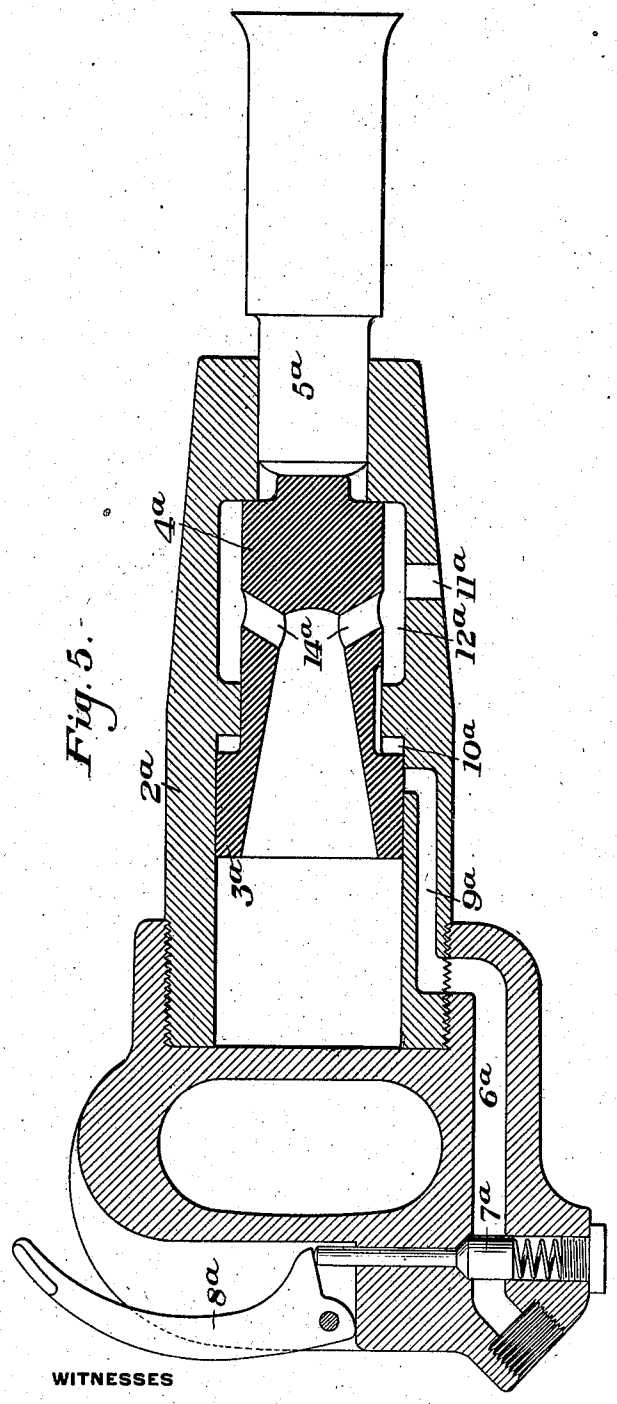
C. B. ALBREE.

PNEUMATIC TOOL.

APPLICATION FILED DEC. 20, 1906

2 SHEETS—SHEET 2.

Fig. 5.




WITNESSES

R. A. Balderson

W. W. Swartz

INVENTOR

C. B. Albree,

by Bakewell & Byrnes

his Attys.

# UNITED STATES PATENT OFFICE.

CHESTER B. ALBREE, OF ALLEGHENY, PENNSYLVANIA, ASSIGNOR TO THE CHESTER B. ALBREE IRON WORKS COMPANY, OF ALLEGHENY, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

## PNEUMATIC TOOL.

No. 884,971. Specification of Letters Patent. Patented April 14, 1908.

Application filed December 20, 1906. Serial No. 348,772.

*To all whom it may concern:*

Be it known that I, CHESTER B. ALBREE, of Allegheny, Allegheny county, Pennsylvania, have invented a new and useful Pneumatic Tool, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a longitudinal section showing my invention as applied to a pneumatic riveter; Fig. 2 is a similar view showing the parts in another position; Fig. 3 is a cross-section on the line III—III of Fig. 1; Fig. 4 is a detail view showing another form of the leakage channel; and Fig. 5 is a view similar to Fig. 1 showing the invention applied to another type of pneumatic tool.

My invention relates to the class of pneumatic tools of the reciprocatory type, and is designed to provide a simple and effective construction whereby reciprocation of the tool does not begin until it is pressed against the work. Heretofore the attachments for obtaining this result have been complicated and expensive, whereas my improvement is of little or no cost, and can be readily applied to tools and motors of different types. The use of my improvement prevents breaking of the piston, cylinder, and other parts, and injury by forcible projection of the working tool into space.

In the drawings, referring to the form of Figs. 1 to 4 inclusive, in which I show the invention as applied to a pneumatic riveter having an inertia valve, 2 represents the cylinder or barrel having a bore of two different diameters receiving the piston having portions 3 and 4 of different diameters. The front end of the piston acts upon the reciprocating riveting tool or tool of other character 5. 6 is the inlet port which in the form shown, leads through the handle, and is controlled by spring-pressed valve 7 operated by the hand lever 8. The inlet passage 9 is closed by the enlarged portion 3 of the piston when at the extreme forward end of its travel; the bore for this enlarged portion extending somewhat beyond the inlet opening, as shown at 10. The exhaust port or ports 11 lead from an annular chamber 12 around the portion 4 of the piston, this chamber communicating by ports 14 with a hole or chamber 15 containing a hollow inertia valve 16. Passages 17 lead through the enlarged portion 3 of the piston to allow entrance of fluid to the inertia valve; and a longitudinal exhaust passage 18 is formed along the outer surface of the portion 4 of the piston.

In using the tool, when the inlet valve 7 is opened fluid will enter the inlet channel 9 but cannot actuate the piston, owing to the covering of the inlet port by the piston. When, however, the tool 5 is pressed against the work its rear end moves the piston rearwardly in the cylinder and partially uncovers the inlet port after having closed the exhaust passage 18. The piston will then reciprocate in the ordinary manner to actuate the tool, the inertia valve performing the same functions as in former constructions.

The exhaust passage 18 prevents the pressure below the piston due to air from port 6 entering the portion 10 of the bore, from starting the tool into motion. This channel is of such a length that when the tool forces the piston back a sufficient distance it is cut off from exhausting to the atmosphere. This supplemental exhaust port or channel may be formed by simply grooving or recessing one side of the reduced portion of the piston in any desired form, or by forming a port or passage in the cylinder wall, or by a combination of both. In any case, if the fluid under pressure leaks past the piston portion 3, or is normally permitted below the portion 3, it will enter this exhaust channel and pass freely to the atmosphere and not press against the piston and set it into motion. In Fig. 3 the port is formed by a flattened face 18′, while in Fig. 4 I show an angular groove or recess 19.

The improvement may be easily applied to pneumatic tools having motors of different types. Thus in Fig. 5 I show the invention applied to the valveless type of motor wherein the piston has differential diameters. In this form, parts similar to those in Figs. 1 and 2, are designated by similar numerals with the letter "a" applied thereto. In this case the fluid in the rear of the piston passes directly into the piston cavity 20 and thence through the port $14^a$ to the exhaust, no valve being used.

In the form of Figs. 1 to 4, if the tool is brought into a vertically extending position such that gravity will cause the piston to drop down far enough to open the inlet port, then of course the tool will make one forward stroke even where it is not pressed against the work to force back the piston. In this case,

however, the movement of the piston will stop after one forward stroke, since this stroke will carry it far enough to cover the inlet port, the obstruction consisting of the pressed-back tool being removed in such case.

The advantages of my invention result from the use of the supplemental exhaust passage controlled by the movement of the piston and so located as to be open to the atmosphere only when the piston is at the forward end of its possible stroke. By the use of this supplemental channel no pressure can collect beneath the piston, which must rest stationary until such exhaust passage is closed by forcibly pushing the piston back. This supplemental passage relieves any pressure beneath the piston, whether formed from air leaking through a closed admission port or from a full supply through an open admission port. In the latter case, there would be a waste of air, but such is preferable to permanently injuring the tool, and such waste could be immediately stopped by simply allowing the throttle valve to cut off the supply of motive fluid. The desirable function of not starting the motor until the tool is pressed against the work is therefore obtained without extra parts or attachments and at little or no cost. The complexion of the tool is but slightly increased, and its life is greatly increased, while the chance of an accident by projecting the working tool into space is obviated. To save air the tool can be arranged to cover the admission port when the addition exhaust port is open; but although desirable this is not essential.

The form of the motor may be widely varied, and the invention may be applied to any pneumatic tool whether used for riveting, chipping, or other work.

I claim:—

1. A reciprocating percussive engine of the fluid pressure type, having supply and exhaust ports controlling normal action of the piston, and provided with an additional exhaust passage controlled by the position of the piston, and always in communication with the space in front of the piston, said passage being open to the atmosphere only when the piston is at the extreme end of its forward stroke and closed by the piston in the other portions of its stroke; substantially as described.

2. A reciprocating percussive engine of the fluid pressure type, having inlet and exhaust ports controlling the normal action of the piston, the inlet port being near the forward end of the cylinder and closed by the piston when at the extreme forward end of its stroke, said engine having a supplemental exhaust port controlled by the piston and always in communication with the space in front of the piston, said exhaust port being open to the atmosphere only when the piston is at the extreme end of its forward stroke and closing the inlet port; substantially as described.

In testimony whereof, I have hereunto set my hand.

CHESTER B. ALBREE.

Witnesses:
JOHN MILLER,
H. M. CORWIN.

(No Model.)

# C. B. ALBREE.

## BLANK FOR TURNBUCKLES.

No. 549,888. Patented Nov. 19, 1895.

Fig 1.

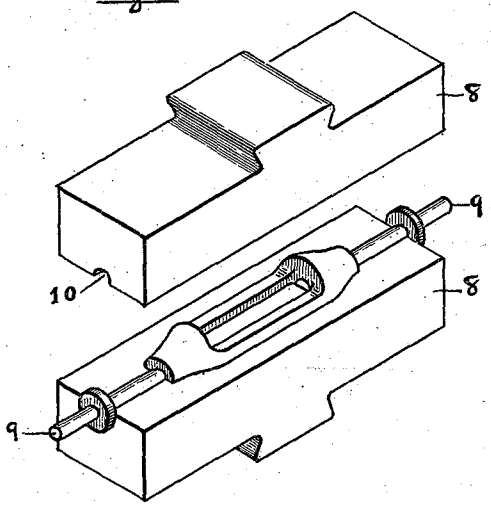



Fig 2.

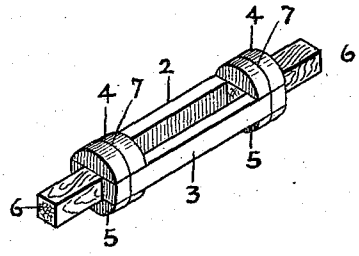



Fig 3.

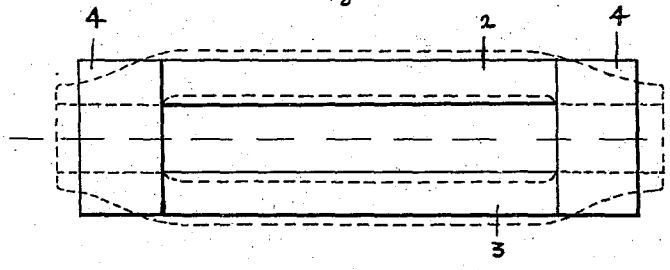



Fig 4.

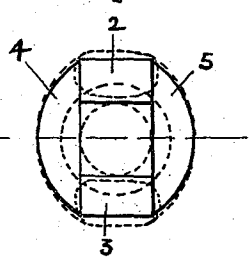



Fig 5.

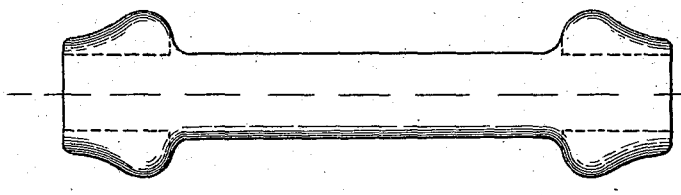
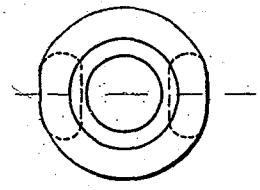


Fig 6.



WITNESSES

Thomas W. Bakewell

Samuel K. Bakewell

INVENTOR

Chester B. Albree.

# UNITED STATES PATENT OFFICE.

CHESTER B. ALBREE, OF ALLEGHENY, PENNSYLVANIA.

## BLANK FOR TURNBUCKLES.

SPECIFICATION forming part of Letters Patent No. 549,888, dated November 19, 1895.

Application filed January 31, 1895. Serial No. 536,881. (No model.)

*To all whom it may concern:*

Be it known that I, CHESTER B. ALBREE, of Allegheny, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Blanks for Turnbuckles, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a perspective view of a set of turnbuckle-dies containing a turnbuckle which has been made according to my invention. Fig. 2 is a perspective view of the blank. Fig. 3 is a plan view of the blank, illustrating by dotted lines the manner in which the metal is caused to flow when the blank is compressed in the dies. Fig. 4 is an end view thereof. Fig. 5 is a view showing the finished turnbuckle in side elevation. Fig. 6 is an end view of the finished turnbuckle.

In my improved method of making turnbuckles the blank is composed of a number of assembled pieces, as shown in Fig. 2. Thus I set two bars of iron 2 3 parallel with each other in the position desired to be occupied by the straps of the buckle, and place two iron blocks 4 5 on opposite sides of the end portions of the bars extending between and connecting the same. Plugs 6 6, of wood, clay, or other destructible or removable material, are placed in the end holes between the side bars and blocks, in order, by filling these holes, to enable the parts to be held together, and the blocks 4 5 and side bars are then tied together by bands or wires of metal 7 7. When the parts have been assembled in this manner, the composite blank is placed in a heating-furnace and is raised to a welding heat, and by this the parts of the blank are caused to adhere to each other, the bands 7 7 are usually burned off, and the plugs 6 6, being of wood or other material, are destroyed or removed. The heated blank is then placed in dies 8 8, the shape of whose matrix is that of the finished buckle. Mandrels 9 9 are inserted into the holes at the ends of the blank, and then, by forcible lateral compression of the dies, the parts of the blank are solidly welded together, and, by being squeezed into the cavities of the dies and against the mandrels, the ends are reduced to the shape proper for the nuts or heads of the buckle. The mandrels are then withdrawn, and the then completely-forged article is removed from the dies and is ready to be tapped in the usual manner. The dies which I use are clearly illustrated in Fig. 1. The end portions of the matrix are of the form of the finished ends of the buckle. The cavities for the side bars are preferably shaped so as to flatten the bars somewhat and to afford clearance to the metal, and at the end of the matrix-cavity are grooves 10 to receive and hold the mandrels.

It should be understood that the shape of the dies may be modified in order to produce buckles of other forms, that they may be adapted to the manufacture of rope-sockets and clevis-nuts by the same method as above described, that instead of using blocks 4 5 having curved surfaces, other suitably-shaped blocks may be employed, that the pieces of the blank need not be of such nature as to afford square end holes, and may be shaped differently from those shown in the drawings, and that the process may be otherwise modified within the scope of the invention, as stated in the claim.

The advantages of the invention are that it affords a very cheap and effective mode of making turnbuckles, the blanks are easy to assemble, and are constituted of cheap and easily-obtainable forms.

The blank constituted as described above can also be shaped and welded in side-working dies in a machine of ordinary construction, and I am thus enabled to dispense with the use of expensive apparatus.

I claim—

A blank for the manufacture of turnbuckles, the same comprising parallel separated side-bars having separate metal blocks placed on opposite sides of the end portions of the side-bars; substantially as described.

In testimony whereof I have hereunto set my hand.

CHESTER B. ALBREE.

Witnesses:
THOMAS W. BAKEWELL,
W. B. CORWIN.