

1,041,057.

Patented Oct. 15, 1912.

Fig. 1.

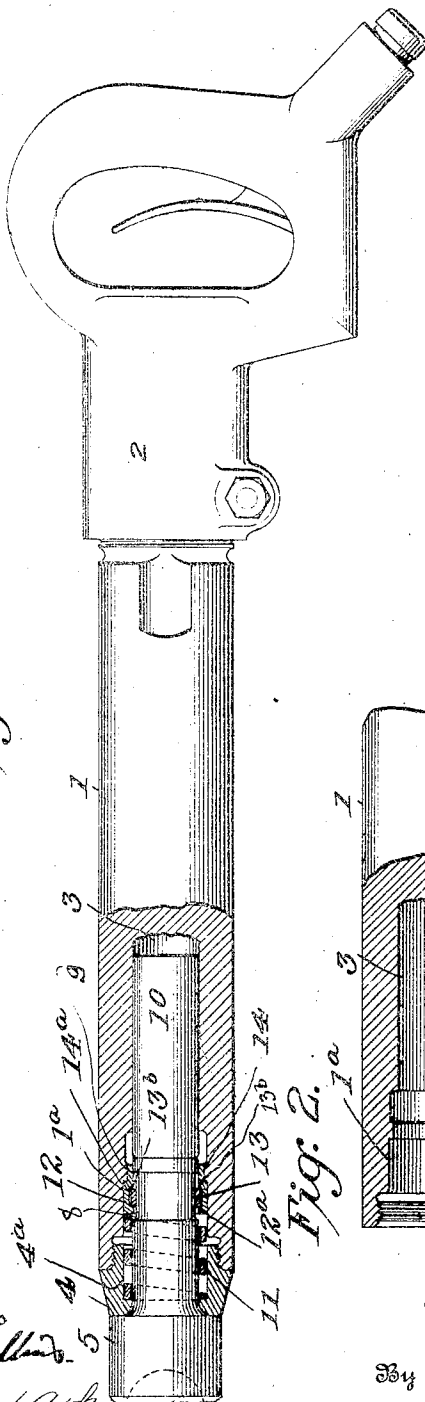


Fig. 2.

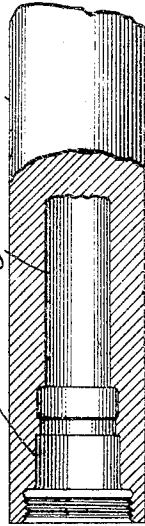


Fig. 6.

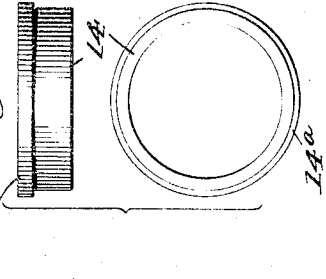


Fig. 5.

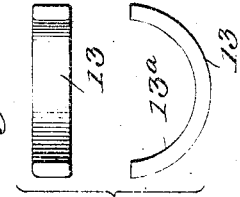


Fig. 4.

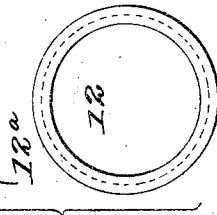
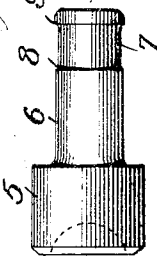


Fig. 3.



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LOUIS G. FISCHER, OF HARRISBURG, PENNSYLVANIA.

PNEUMATIC-HAMMER DEVICE.

1,041,057.

Specification of Letters Patent.

Patented Oct. 15, 1912.

Application filed February 14, 1911. Serial No. 603,574.

To all whom it may concern:

Be it known that I, LOUIS G. FISCHER, a citizen of the United States, residing at Harrisburg, in the county of Dauphin and State of Pennsylvania, have invented certain new and useful Improvements in Pneumatic-Hammer Devices, of which the following is a specification, reference being had therein to the accompanying drawing.

My invention relates to pneumatically-operated devices and, more particularly, to the class thereof which includes riveting hammers, chipping hammers, and the like.

An object of my invention is to provide in devices of the character specified, means for retaining and for preventing the accidental displacement of the riveting or other tool from the barrel in which it is normally supported; and, also, to make the parts of such construction and form that they may be interchanged when it is desired to substitute a tool of different size or character.

In the accompanying drawings, wherein I have illustrated one of several possible embodiments of my invention, Figure 1 is a view in sectional elevation illustrative of my invention; Fig. 2 is a fragmentary view in sectional elevation of the barrel with the other parts removed; Fig. 3 is an elevational view of the riveting tool or die; and Figs. 4, 5 and 6 are detail views of certain parts of the device.

Referring to the drawings, the reference-numeral 1 designates the hammer-barrel forming a part of the hand-supported structure of a pneumatic-hammer, herein designated generally by 2, and which is of well-known form and construction and which is to be connected with a suitable source of power. The barrel is provided with a central bore 3 and at its end with a nose-element 4 threaded or otherwise secured in the barrel. This nose-element is so formed as to constitute a guide and support for a riveting or other form of tool or member 5. The tool, in the preferred embodiment of my invention, is formed with a shank or stem 6 adapted to extend into the bore 3 of the barrel. Near its rear end, the shank is of reduced dimensions to provide a circumferentially-reduced portion 7 and two opposed shoulders 8 and 9.

Arranged in axial alinement with the tool-shank is a plunger 10 which reciprocates in the barrel-bore and actuates the tool-

member. The bore of that portion of the barrel which surrounds the shank of the tool-member is of somewhat greater diameter than that in which the plunger moves. This provides a chamber 1^a. The nose-element 4 is similarly bored to provide a chamber 4^a. Disposed within the chambers 1^a and 4^a, and encircling the shanked portion of the tool, is a member-controlling instrumentality in the form of a resilient element or spring 11. Means for operatively connecting the spring to the tool-member and for retaining the same in the barrel, are provided, as shown, and these means comprise a holding-ring 12 of diameter greater than that of the reduced portion of the shank of the tool-member as shown, and formed with a flange 12^a against which one end of the spring 11 bears, and, as will be seen, the opposite end of the spring engaging the end-wall of the chamber 4^a formed in the nose-element.

The periphery of the holding-ring 12 slidingly engages the wall of the chamber 1^a of the barrel. Encompassed by said ring is a split-ring 13 which, as shown, is of sufficient diameter to embrace the reduced portion of the shanked tool-member. One edge of said split-ring engages the inwardly-extending flange 12^a of the ring 12, while its opposite edge, as well as the proximate edge of the encompassing ring 12, is engaged by the flanged portion 14^a of a hardened steel bushing 14 having a driving fit in the bore of the barrel 1. As shown, the holding ring 12 and the split ring 13 are distinct from the shanked portion of the tool in the sense that they are non-integral therewith. By reason of this construction and arrangement, the tool may have a movement independently of these holding elements. In this way, the cushioning of the tool, by means of the compression-spring 11, is more effectually accomplished, and, moreover, these parts may be quickly returned to normal position under the action of the spring.

As clearly appears in Fig. 1, the extremity of the shanked portion of the tool-member is slidingly supported and guided by said bushing 14. By reason of the fact that the plane of the inner face 13^a of the split-ring 13 is nearer the axis of the tool-member than is that of the shoulder 9, an abutment-edge 13^b is thereby constituted and, as this

is in the path of travel of the shoulder 9 of the shank, it will be engaged and shifted thereby when the tool is actuated by the plunger, as aforementioned. Then, as said split-ring abuts, at its opposite edge against the flange 12^a of the ring 12, it will shift said holding-ring 12 and cause it to flex or compress the spring and thereby tension it so that it will thereafter return the tool and adjunctive parts to their predetermined initial positions.

It is to be noted that, normally, the spring holds the ring 12 against the hardened steel bushing 14; moreover, that said ring not only encompasses the split-ring but tends to operatively hold it in place; and, furthermore, that the reduced portion of the shank is of a width (in the direction of the axis of the shank) to allow a predetermined degree of outward movement of the tool-member before the shoulder 9 thereon impinges against the holding-ring 12 and, by reason of the latter being in engagement with the spring 11, the blow of the plunger is cushioned thereon. The distance from the shoulder 9 to the edge of the holding-ring 12 is somewhat less than the width of said ring, so that, (when the tool-member is being positioned in the barrel) the spring must be compressed to an extent equal to the aforementioned distance between the shank-shoulder 9 and the edge of the ring 12 before the split-ring 13 can be inserted into the bore of the holding-ring 12. When so positioned, the rings, etc., are locked upon the shanked portion of the tool-member and cannot be displaced or fall off when said member is withdrawn from the hammer-barrel for the purpose, for instance, of substituting a different size or form of tool or die.

In structures of this kind, it is an important desideratum to provide means for holding tool-members by the shanked portion thereof; and, moreover, to house these holding-instrumentalities within the barrel so that they cannot be injured or damaged in any way; and, furthermore, to thus arrange these parts so that they shall not add to the length, diameter, or weight of the hammer-barrel or of the tool-member. I have, therefore, provided a safety-device for pneumatic-hammers to preclude the accidental displacement of the tool-member, which might result in its loss or in its striking and injuring any person standing nearby.

The invention is applicable to various forms of pneumatic-hammer structures, including pneumatic chipping-hammers, etc.

While I have herein described my invention with considerable detail, it is nevertheless to be understood that I do not limit myself to such details except in so far as such details may be specified in the claims. More-

over, it is obvious that it is susceptible of a wide range of modification without departing from the spirit of the invention.

The hardened steel bushing 14 may, from time to time, be renewed, as the same becomes worn. The principal point of wear in the structure occurs upon this bushing; hence, it is desirable that it be possible to substitute a new one at any necessary time. By reason of this renewability of the bushing, the life of the hammer is greatly prolonged. This feature is, therefore, an important one.

Having thus described my invention, the construction of one embodiment thereof, and the manner of operating the same, what I claim is:

1. In a riveting device, the combination of a barrel, a pneumatically-operated riveting-tool-member supported therein and provided with a shank having a circumferentially-reduced portion, a resilient tool-controlling member disposed in juxtaposition to said tool-member, a nose-element mounted at one end of said barrel for supporting and guiding the tool-member, means for movably retaining the shanked portion of said tool-member in said barrel comprising a split-ring encompassing the reduced portion of the shank, a holding-ring encircling said split-ring, and a bushing encircling said shanked portion of the tool-member and abutting the holding and split-rings.

2. In a riveting device, the combination of a barrel, a pneumatically-operated tool-member supported therein and having a shank, a resilient tool-controlling member disposed in juxtaposition to said shanked portion of the tool-member, means for operatively retaining said shanked portion in said barrel comprising a plurality of superposed rings encompassing said shanked portion and shiftable therewith, and an end-supporting and guiding member immovably secured within the barrel and upon which said member has a sliding engagement, and means carried by said tool-member and cooperating with said retaining means for preventing accidental displacement of the tool-member from the barrel.

3. In a pneumatically-operated device, the combination of a barrel, a tool-member adapted to be reciprocally supported thereby, a tool-controlling member disposed in juxtaposition to a portion of said tool-member, and means within said barrel for operatively retaining the tool-member therein comprising a shiftable encircling member and a member-engaging element shiftable with said member, and means carried by said tool-member and cooperating with said retaining means for preventing thrusting of said tool-member from the barrel while acting under the influence of said tool-controlling member.

4. A pneumatically-operated device including in combination, a containing-member, a tool-member movably supported thereon, tool-controlling means juxtaposed to said tool-member, an instrumentality arranged in juxtaposition to said tool-member and in operative engagement with said tool-controlling means and movable in one direction to actuate the latter and adapted to be itself actuated in the opposite direction under the influence of said controlling means, and means carried by said tool-member and co-acting with said instrumentality to prevent a thrusting of said tool-member out of its containing member.

5. A pneumatically-operated device including in combination, a barrel-member, a tool-member adapted to be reciprocated therein, means for actuating said tool-member including a cushioning instrumentality within said barrel and adapted to be compressed by said tool-member, member-holding means within said barrel and comprising a plurality of encircling elements distinct from said tool member and cushioning instrumentality, one at least of which encircling elements is shiftable with said tool-member to compress said cushioning instrumentality, and means formed on said tool-member and co-acting with the shiftable encircling element to prevent displacement of said tool-member from the barrel-member.

6. A pneumatically-operated device including in combination, a barrel-member, a tool-member adapted to be reciprocated therein, means for actuating said tool-member including a cushioning instrumentality within said barrel and adapted to be compressed by said tool-member, member-holding means within said barrel and comprising a plurality of encircling elements distinct from said tool member and cushioning instrumentality, one at least of which encircling elements is shiftable with said tool-member to compress said cushioning instrumentality, and another of said encircling elements being adapted to support one end of said tool-member.

7. A pneumatically-operated device including in combination, a barrel-member, a nose-element threaded into said barrel-member, a tool-member slidably supported in said barrel and extending through said nose-element, a spring encircling said tool-member and housed in part in said nose-element, and member-holding means housed within said barrel distinct from said tool-member and adapted to engage and flex said spring.

8. A pneumatically-operated device including in combination, a barrel-member, a nose-element threaded into said barrel-member, a tool-member slidably supported in said barrel and extending through said nose-member, a spring encircling said tool-member

and housed in part in said nose-member, member-holding means housed within said barrel and adapted to engage and flex said spring, and including a flanged ring abutting against said spring and a bushing engaged by said tool-member.

9. A pneumatically-operated device including in combination, a barrel-member, a nose-element threaded into said barrel-member, a tool-member slidably supported in said barrel and extending through said nose-member, a spring encircling said tool-member and housed in part in said nose-member, member-holding means housed within said barrel and adapted to engage and flex said spring, and including a flanged ring abutting against said spring and a shouldered bushing abutting against said ring and engaged by said tool-member.

10. A pneumatically-operated device including in combination, a barrel-member, a nose-element threaded into said barrel-member, a tool-member slidably supported in said barrel and extending through said nose-element, a spring encircling said tool-member and housed in part in said nose-element, member-holding means housed within said barrel and adapted to engage and flex said spring, and including a flanged ring abutting against said spring, a split-ring encompassed by said flanged ring and adapted to be engaged by said tool-member, and a shouldered bushing abutting against said flanged and split rings.

11. A pneumatically-operated device including in combination, a barrel, a tool-member movably operated therein, a tool controlling member encircling said tool member within said barrel, means within the barrel and encircling said tool member and disposed to engage said tool controlling member to actuate the same, and a locking instrumentality housed within the barrel and distinct from the tool member and engaging the same to hold it against accidental displacement from the barrel.

12. A pneumatically-operated device including in combination, a barrel, a tool-member movably operated therein, a tool controlling member encircling said tool member within said barrel, means within the barrel and encircling said tool member and disposed to engage said tool controlling member to actuate the same, and a locking instrumentality housed within the barrel and distinct from the tool member and engaging the same to hold it against accidental displacement from the barrel, said locking instrumentality including a split ring and an encircling holding ring.

13. A pneumatically-operated device including in combination, a barrel, a tool-member movably supported therein, a tool-controlling member juxtaposed to said tool-member, means arranged in operative en-

gagement with said tool-member and operating to actuate said tool-controlling member and comprising a split ring encircling said tool-member, and a holding ring encompassing said split ring, and a bushing engaging the proximate edges of the holding and split rings.

14. A pneumatically-operated device including in combination, a barrel, a tool-member movably supported therein and provided with an annular shoulder, a tool-member movably supported therein, a tool-controlling member juxtaposed to said tool-member, means arranged in operative engagement with said tool-member and operating to compress said tool-controlling member and comprising a split ring encircling said tool-member, and a holding ring encompassing said split ring, and a bushing engaging the proximate edges of the holding and split rings, said annular shoulder having a sliding engagement with said bushing.

15. A pneumatically-operated device including in combination, a barrel, a tool-member movably supported therein, a tool-controlling member juxtaposed to said tool-member, means arranged in operative engagement with said tool-member and operating to compress said tool-controlling member and comprising a split ring encircling said tool-member, and a holding ring encompassing said split ring, and a bushing engaging the proximate edges of the holding and split rings, said holding ring, at its edge opposite to the bushing, engaging the tool-controlling member.

16. A pneumatically-operated device including in combination, a barrel, a tool-member movably supported therein and having a shank, an encircling spring arranged in juxtaposition to said tool-shank, a holding ring having one of its edges normally in engagement with said spring, a split ring interposed between said holding ring and the tool-shank, and a bushing also encircling said shank and normally in engagement with the proximate edges of said holding and split rings.

17. A pneumatically-operated device including in combination, a barrel, a tool-member movably supported therein and having a shank provided with shoulders, an encircling spring arranged in juxtaposition to said shank, a holding ring having one of its edges normally in engagement with said spring, a split ring interposed between said holding ring and the tool-shank, and a bushing encircling said tool-shank and having one of its edges normally in engagement with the proximate edges of said holding and split rings and provided with a bearing face for guiding said shouldered shank during the movement of the tool-member.

18. A pneumatically-operated device including in combination, a barrel, a tool-

member movably supported therein and having a shank provided with a plurality of shoulders, and an encircling spring arranged in juxtaposition to said shank, a holding ring having one of its edges normally in engagement with said spring, a split ring interposed between said holding ring and the tool-shank, and a bushing encircling said shank and constantly in engagement with the same, one of the shoulders on the shank of the tool-member being adapted, when the latter moves in one direction, to engage said split ring and thereby shift it and the holding ring, said holding ring having a flange adapted to engage an edge of the split ring and, under the influence of the encircling spring, cause said split ring to be returned to normal position.

19. A pneumatically-operated device including in combination, a barrel, a nose-element threaded into said barrel, a tool-member movably supported therein, a tool-controlling member housed within the barrel and nose-element in juxtaposition to said tool member, an annular element encircling said tool-member, a holding ring encompassing said annular element, the annular element and the holding ring both being of a diameter less than that of the bore of the nose-element and operating to limit the movement of the tool-member, and means for actuating said tool-member in one direction, whereby said tool-controlling member is flexed so that it will in turn actuate said tool-member in the opposite direction.

20. A pneumatically-operated device including in combination, a barrel, a nose-element threaded into said barrel, a tool-member movably supported therein, a tool-controlling member housed within the barrel and nose-element in juxtaposition to said tool member, an annular element encircling said tool-member, a holding ring encompassing said annular member, the annular element, the holding ring, and the tool-controlling member all being of a diameter less than that of the bore of the nose-element and operating to limit the movement of the tool-member, and means for actuating said tool-member in one direction, whereby said tool-controlling member is flexed to adapt it to actuate the tool-member in an opposite direction.

21. A pneumatically-operated tool including in combination, a barrel, a tool-member movably supported therein, a compression-spring encircling said tool-member, a holding ring encircling said tool-member and arranged in juxtaposition to said compression-spring, a second ring interposed between said holding ring and the tool-member, the edges of the holding ring and the second ring alining, and a bushing arranged against the alined edges of the holding and second rings.

22. A pneumatically-operated device including in combination, a barrel, a tool-member movably supported therein and provided with a circumferential groove forming two engaging shoulders, a compression-spring encircling said tool-member, a split ring encircling the grooved portion, of said tool-member, a holding ring encompassing said split ring, and a bushing arranged adjacent to the proximate edges of said holding and split rings, one shoulder on the tool-member being adapted to engage the

split ring when the tool-member is moved in one direction whereby said spring is compressed, the portion of the holding ring engaged by said spring being flanged and adapted, under the influence of said spring, to return the split ring to normal position. 15
In testimony whereof I affix my signature in presence of two witnesses.

LOUIS G. FISCHER.

Witnesses:

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