Dec. 13, 1927. 1,652,374

J. L. PRICE

PNEUMATIC HAMMER

Filed May 17, 1922 2 Sheets-Sheet 1

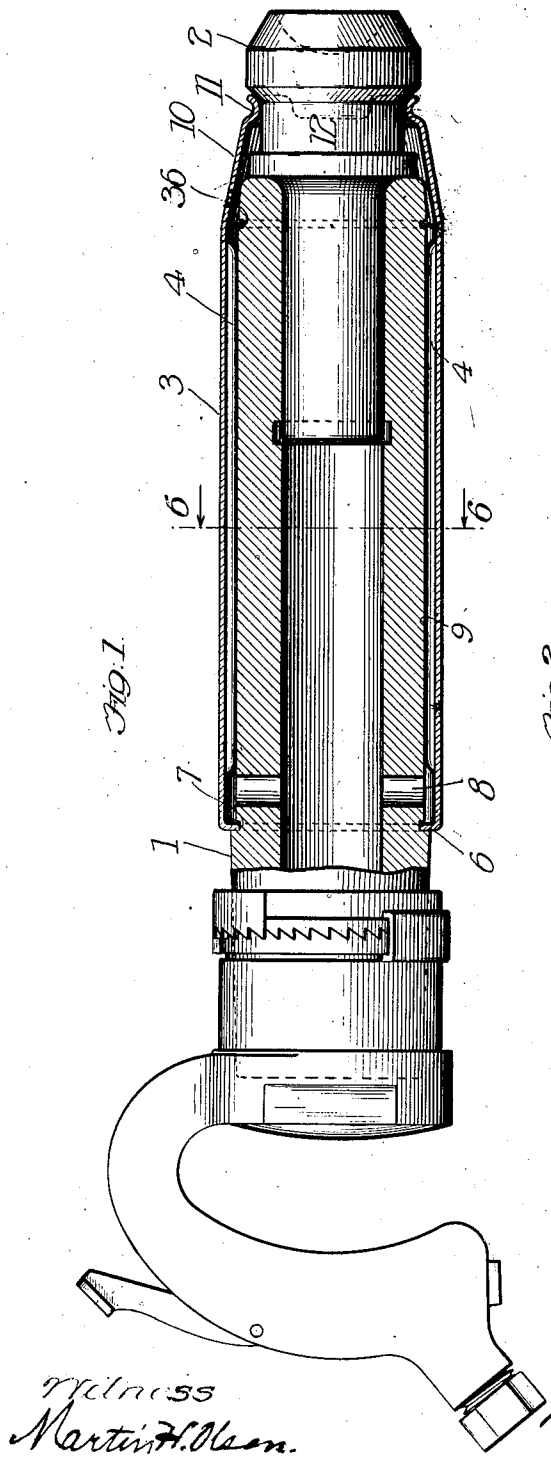



Fig. 1.

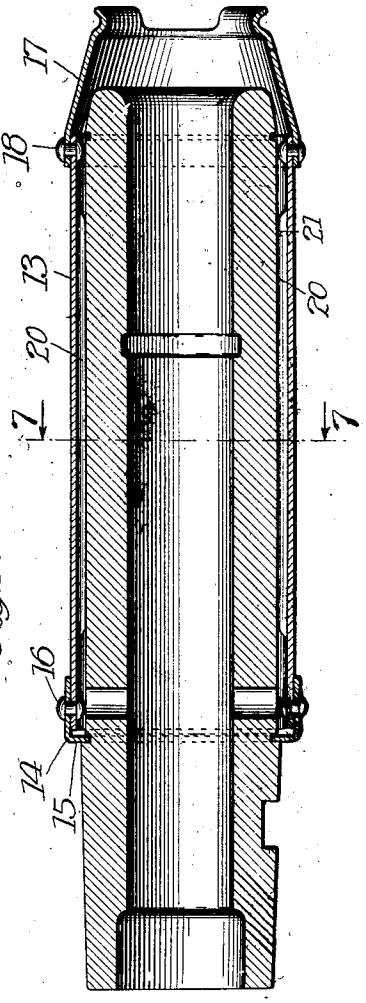



Fig. 2.

Witness
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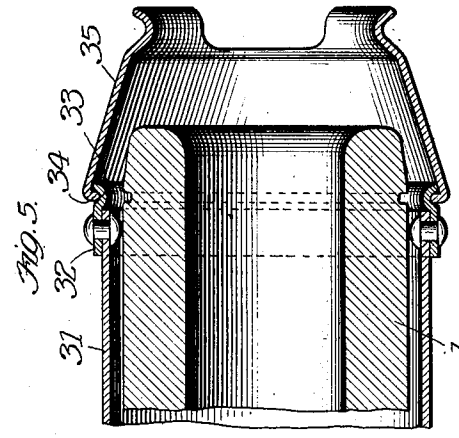



Fig. 5.

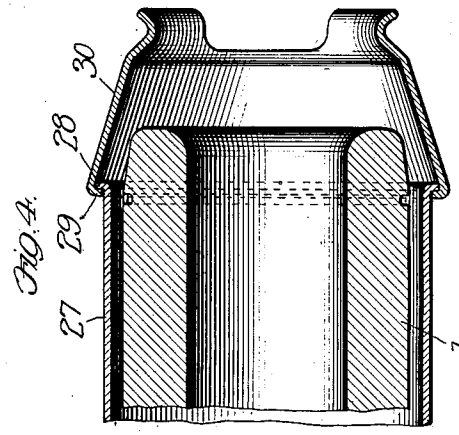



Fig. 4.

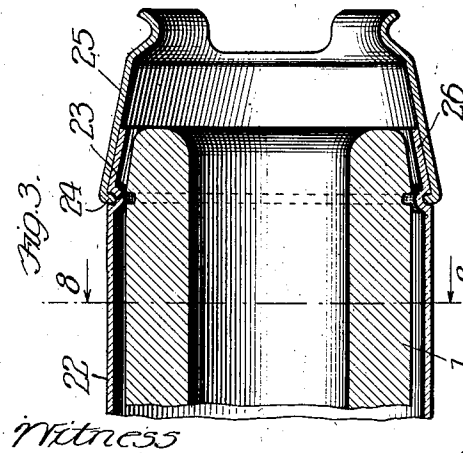



Fig. 3.

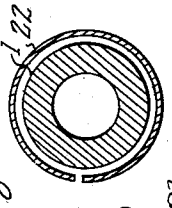



Fig. 8

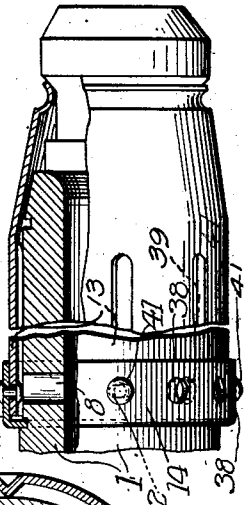



Fig. 10.

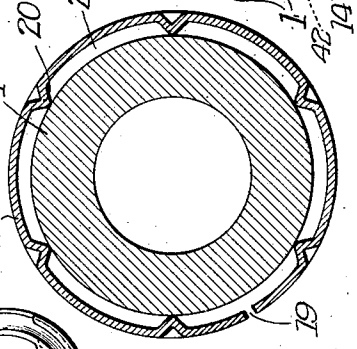



Fig. 7.

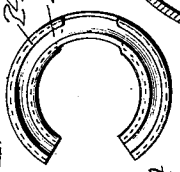



Fig. 11.

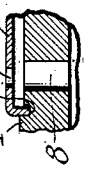



Fig. 9.

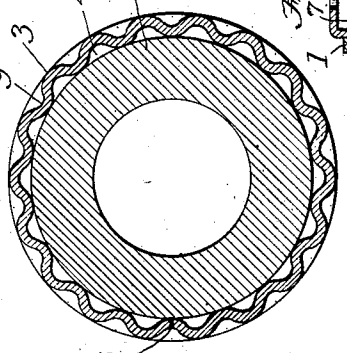



Fig. 6.

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Patented Dec. 13, 1927. 1,652,374

# UNITED STATES PATENT OFFICE.

JACOB L. PRICE, OF DOBBS FERRY, NEW YORK, ASSIGNOR TO CHICAGO PNEUMATIC TOOL COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW JERSEY.

## PNEUMATIC HAMMER.

Application filed May 17, 1922. Serial No. 561,608.

My invention has relation to pneumatic hammers, more particularly that type of hammers known as riveting hammers. Such hammers are used in the driving of red hot rivets, the heat of which is communicated to the rivet set as well as the hammer cylinder with injurious effect, especially upon the rivet set whose life and efficiency is materially shortened and decreased. The object of my invention is to provide simple and efficient means, readily applicable to standard pneumatic hammers without change thereto, for utilizing the exhaust air from the hammer for cooling the sides of the cylinder and the rivet set. The various features of advantage and utility in my structure will be apparent from the description hereinafter given.

In the drawings, Fig. 1 is a view partly in elevation and partly in section of a riveting hammer embodying my invention; Fig. 2 a section of a hammer cylinder with a modified form of structure applied thereto; Fig. 3 a section of the front end of the cylinder showing in section a modified form of construction as respects the front end of my device or shell; Figs. 4 and 5, still other modifications of the front end structure of my device or shell. Figs. 6, 7 and 8 sections on the corresponding section lines indicated on Figs. 1, 2 and 3, illustrating different formations of the shell body; Figs. 9 and 10 detail views of modified forms of construction; and Fig. 11 a plan view of the regular clip.

It will be understood from the above description of the drawings and from the hereinafter specification, that my invention may partake of different forms, both as to the shell body and as to the front end formation thereof. As to such latter feature, I prefer to make the device as a combined cooling device and rivet set clip, such clip being used to detachably hold the usual rivet set. However, my invention in its broader aspect is not limited to such combined or integral structure inasmuch as the shell proper is the generic idea in connection with which an integral rivet set clip may be used at the front end or provision made for the attachment of a separate rivet set clip or even the usual and well-known clip which is detachably fastened and applied to the hammer cylinder itself. The preferred form of the device which is shown in Fig. 1 performs the three functions of an exhaust deflector, cooling device for the cylinder and rivet set, and of a rivet set clip.

In Fig. 1 there is shown the usual hammer cylinder 1 and the usual rivet set 2 inserted in the front end of the cylinder. The cooling means comprises a shell having a body portion 3 applied to and surrounding the outer walls or surface of the cylinder but spaced therefrom in suitable manner so as to provide for a space 4 between it and the cylinder. This shell is made of thin suitable material such as sheet metal and preferably slit longitudinally as shown at 5 in Fig. 6. This shell has at its forward end an inturned flange 6 which engages with a circumferential groove 7 in the cylinder, just in rear of the exhaust ports 8 of the hammer. By preference and as shown in Fig. 6, the shell is corrugated, thereby providing inwardly directed longitudinal ribs 9 which constitute spacing means for the shell and permit of the longitudinal air passages 4. The flutes or corrugations may run to any desired extent along the length of the shell but by preference (as shown) the ends of the shell, including the clip portion at the front end are left plain.

In the preferred form now being described, the shell is formed at its front end into a rivet set clip integral therewith. Consequently, the front end of the shell 3 is provided with an inwardly tapering portion or walls 10 near whose outer end there is provided a circumferential bead 11, engaging the usual wide groove 12 of the rivet set.

My device is readily applied to standard hammer cylinders the same being already provided with a groove 7 which holds the usual exhaust deflector. In use, the exhaust air from the hammer passing through the exhaust ports 8 is conducted forwardly through the passages 4 and discharged against the rivet set, finally escaping through the forward end and sides of the clip portion of the shell. As a result, the exhaust air is properly deflected, the walls of the hammer cylinder and the body or die end of the rivet set are cooled by the expansion and discharge of this exhaust air. Moreover, the corrugated character of the shell body affords a good grip for one hand of the operator in the manipulation of the hammer.

Referring to the modification illustrated in Figs. 2 and 7, the shell body 13 is made

separate from its end portions, the rear portion 14 being in the form of a sleeve or ring with an inturned flange 15 and being secured to the shell by suitable means as by the rivets 16. The front or clip portion 17 is in the form of a rivet set clip and is secured to the shell body 13 in suitable manner as by means of rivets 18. As shown in Fig. 7, the shell is longitudinally slit at 19 and has inwardly directed ribs 20 forming spacers to thereby provide passages 21 between the shell and cylinder.

Referring to Figs. 3, 4 and 5, I have shown modified constructions of the forward end of the shell, whereby the rivet set clip may be made entirely separate and detachable therefrom. Referring to Fig. 3, the shell body 22 is provided near its forward end with an inwardly directed bead 23 adapted to receive the inturned flange 24 of a separate clip 25. In this form, the extreme forward end of the shell in advance of the bead 23 is tapered inwardly as shown at 26 to form a support for the inner portion of the clip. This figure of the drawing also serves to illustrate the use of a plain cylindrical form of shell as shown in Fig. 8. When this plain shell is used, the spacing thereof from the cylinder may be made dependent upon the flange 6 or when used in connection with the structure of Figs. 2 and 5 the inner heads of the fastening rivets 16 and 18 may be utilized as spacers.

In Fig. 4 the shell body 27 is provided with an out-turned end flange 28 over which engages the inturned flange 29 of the separate and detachable clip 30. In Fig. 5 the shell body 31 has secured thereto at its forward end a separate ring 32 which is provided with a circumferential groove 33 to receive the inwardly directed flange 34 of the separate and detachable clip 35.

It will be understood that the usual circumferential groove 36 on standard riveting hammers may be left thereon or not, as may be found desirable, thereby permitting of the use of my device or the use of the usual rivet set clip which engages such groove 36 in the well-known manner.

According to the structures above described, practically all of the exhaust air from the hammer is conducted to the front end thereof, that is all of such exhaust air except that small quantity which may escape through the longitudinal slit in the shell. However, the amount of the exhaust air so utilized for the cooling effect may be reduced as desired. For this purpose, I have shown, in Fig. 9, an outlet hole 37 (one or more may be provided) in the shell adjacent the exhaust ports of the hammer. In Fig. 10, I have shown a series of such outlet holes 38, 39 which may be entirely closed or opened to any desired degree. In this construction, the shell and the end ring 40 have a relative movement rotarily by reason of the pin (41) and slot (42) connection between them so as to control these holes 38 and 39, one set of which are in the shell and the other in the ring 40.

I claim:—

1. In combination with a pneumatic hammer cylinder having air exhaust ports located near its rearward end, a shell surrounding the cylinder and conducting exhaust air from said ports along the outer surface of the cylinder to the front end thereof, said shell being of spring material and slit longitudinally and means utilizing the resiliency of said shell for removably retaining the latter on said cylinder.

2. In a pneumatic hammer, in combination, a handle, a cylinder secured to said handle and having exhaust ports located near its rearward or handle end, a shell of spring material and slit longitudinally surrounding said cylinder, for conducting exhaust air from said ports along the outer surface of the cylinder to the front thereof, cooperating means on said cylinder and on one end of said shell utilizing the resiliency of said shell to retain the latter on said cylinder, and means spacing said shell from said cylinder.

3. In a pneumatic hammer, in combination, a handle, a cylinder secured to said handle and having exhaust ports located near its rearward or handle end, a shell of spring material and slit longitudinally surrounding said cylinder for conducting exhaust air from said ports along the outer surface of the cylinder to the front thereof, and cooperating means on said cylinder and on one end of said shell utilizing the resiliency of said shell to retain the latter on said cylinder, said shell having an outlet hole for exhausting directly to atmosphere a portion of the exhaust air from the hammer.

4. In combination with a pneumatic hammer cylinder having air exhaust ports located near its rearward end, a shell surrounding the cylinder and conducting exhaust air from said ports along the outer surface of the cylinder to the front end thereof, and means for predetermining the amount of such exhaust air conducted by the shell to the front end of the cylinder.

5. In combination with a pneumatic hammer cylinder having air exhaust ports located near its rearward end, a shell surrounding the cylinder and conducting exhaust air from said ports along the outer surface of the cylinder to the front end thereof, and means for exhausting directly to atmosphere a portion of the exhaust air from the hammer, thereby reducing the amount of the exhaust air so conducted by the shell to the front end of the cylinder.

6. In combination with a pneumatic hammer cylinder having air exhaust ports lo-

cated near its rearward end, a shell surrounding the cylinder and conducting exhaust air from said ports along the outer surface of the cylinder to the front end thereof, said shell being provided at its rearward end at a point adjacent said exhaust ports of the cylinder with an outlet hole for exhausting directly to atmosphere a portion of the exhaust air from the hammer, and means for regulating the amount of exhaust through said hole.

7. In combination with a pneumatic hammer cylinder having air exhaust ports located near its rearward end, a shell surrounding the cylinder and conducting exhaust air from said ports along the outer surface of the cylinder to the front end thereof, said shell having at its rearward end a rotatably adjustable ring, such shell and ring having outlet holes adapted to register and to be controlled by adjustment of the ring, so as to regulate the amount of exhaust of air directly to the atmosphere.

8. In combination with a pneumatic hammer cylinder having air exhaust ports located near its rearward end, a shell surrounding the cylinder and conducting exhaust air from said ports along the outer surface of the cylinder to the front end thereof, said shell being longitudinally corrugated to provide ribs spacing the shell from the cylinder, whereby the ribs engaging said cylinder prevent relative movement of the latter within the shell and provide longitudinal passages for the exhaust air.

9. In combination with a pneumatic hammer cylinder having air exhaust ports located near its rearward end, a shell surrounding the cylinder and conducting exhaust air from said ports along the outer surface of the cylinder to the front end thereof, said shell being of thin sheet metal longitudinally slit and longitudinally corrugated to provide ribs spacing the shell from the cylinder.

10. In a pneumatic hammer in combination, a handle, a cylinder secured to said handle and having air exhaust ports located near its rearward or handle end, a shell of thin sheet material longitudinally slit surrounding the cylinder and conducting exhaust air from said ports along the outer surface of the cylinder to the front end thereof, said cylinder having a circumferential groove and said shell having at its rearward end a flange engaging said groove whereby said shell is maintained in assembled relation with said cylinder.

11. In a pneumatic hammer in combination, a handle, a cylinder secured to said handle and having air exhaust ports located near its rearward or handle end, a shell secured to and surrounding the cylinder and conducting exhaust air from said ports along the outer surface of the cylinder to the front end thereof, said shell having at its forward end means for detachably holding the working tool of the hammer.

12. In combination with a pneumatic hammer cylinder having air exhaust ports located near its rearward end, a shell surrounding the cylinder and conducting exhaust air from said ports along the outer surface of the cylinder to the front end thereof, the forward end of the shell being formed as an integral clip for detachably holding the working tool of the hammer.

13. In combination with a pneumatic hammer cylinder having air exhaust ports located near its rearward end, a shell surrounding the cylinder and conducting exhaust air from said ports along the outer surface of the cylinder to the front end thereof, the front end of such shell being formed to detachably hold the working tool of the hammer and to discharge the exhaust air upon such tool.

14. In combination with a pneumatic hammer cylinder having air exhaust ports located near its rearward end, a shell surrounding the cylinder and conducting exhaust air from said ports along the outer surface of the cylinder to the front end thereof, said shell being longitudinally split and having its front end extended beyond the front end of the cylinder and formed to detachably hold the working tool of the hammer.

15. A shell adapted to be mounted upon and to surround the cylinder of a pneumatic hammer having exhaust ports so as to conduct exhaust air from said ports along said cylinder and to provide a cool grip for the operator, said shell comprising a sleeve of sheet material longitudinally split having means utilizing its own resiliency to removably retain it on the hammer cylinder and additional means for maintaining it in spaced relation with said cylinder.

16. A shell adapted to be mounted upon and to surround the cylinder of a pneumatic hammer having exhaust ports and a groove rearwardly of said ports so as to conduct exhaust air from said ports along said cylinder and to provide a cool grip for the operator, said shell comprising an elongate sleeve of thin spring material having one end inturned to form a flange arranged to engage said cylinder groove.

17. A shell adapted to be mounted upon and to surround the cylinder of a pneumatic hammer having exhaust ports and a transverse groove rearwardly of said ports so as to conduct exhaust air from said ports along said cylinder and to provide a cool grip for the operator, said shell comprising an elongate sleeve of thin spring material having one end inturned to form a flange arranged to engage said cylinder groove, and having portions thereof indented to provide means for spacing the shell from said cylinder.

18. A shell adapted to be mounted upon

and to surround the cylinder of a pneumatic hammer having exhaust ports and an annular groove rearwardly of said ports so as to conduct exhaust air from said ports along said cylinder and to provide a cool grip for the operator, said shell comprising an elongate sleeve of thin spring material having one end inturned to form a flange arranged to engage said cylinder groove, and being longitudinally corrugated to provide ribs spacing the shell from said cylinder.

19. A shell adapted to be mounted upon and to surround the cylinder of a pneumatic hammer having exhaust ports, a groove and a projecting working tool, so as to conduct exhaust air from said ports along said cylinder and to provide a cool grip for the operator, said shell comprising an elongate sleeve of thin spring material having one end inturned to form a flange arranged to engage said cylinder groove, and having at its other end means for detachably holding the working tool of the hammer.

20. A shell adapted to surround the cylinder of a pneumatic hammer having exhaust ports and to be secured thereto rearwardly of said exhaust ports so as to conduct exhaust air along the exterior of the cylinder to the front end thereof, said shell comprising an elongate sleeve of thin spring material having an outlet port disposed adjacent the cylinder exhaust ports for exhausting directly to atmosphere a portion of the exhaust of the hammer.

21. A shell adapted to surround the cylinder of a pneumatic hammer having exhaust ports and to be secured thereto rearwardly of said exhaust ports so as to conduct exhaust air along the exterior of the cylinder to the front end thereof, said shell comprising an elongate sleeve of thin spring material having an outlet port disposed adjacent the cylinder exhaust ports for exhausting directly to atmosphere a portion of the exhaust of the hammer, and having means for regulating the amount of exhaust through said hole.

22. A shell adapted to surround the cylinder of a pneumatic hammer having exhaust ports and a projecting working tool, and to be secured thereto rearwardly of said exhaust ports so as to conduct exhaust air along the exterior of the cylinder to the front end thereof, said shell comprising an elongate sleeve of thin spring material having at its rearward end a rotatably adjustable ring, the shell and ring having ports adapted to register and to be controlled by adjustment of said ring so as to regulate the amount of exhaust air passed directly to atmosphere, said shell having at its forward end means for detachably holding the working tool of the hammer.

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