CUSHIONING MEANS FOR TOOLS

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This invention relates to cushioning means incorporated in the handles of portable power actuated impact tools, such as riveting hammers, chipping hammers and the like, to relieve the hand of the operator grasping the handles of vibration and sting during the operation of the tools.

One of the objects of our invention is to have the cushioning means maintain that section of the handle which is grasped by the hand of the operator in holding and operating the tool out of metallic contact with the other section of the handle which connects the handle to the barrel of the tool whereby the shocks and jars to which the barrel and the coupling section of the handle are subjected in the operation of the tool will not be transmitted to the hand grasping section of the handle to tire and sting the hand of the operator as heretofore.

A further object of our invention is to connect the cushioning means to both sections of the handle whereby the two sections will be connected together through the cushioning means and enable the handle to be applied to and be removed from the barrel of the tool as a unit or single fixture.

A further object of our invention is to provide the cushioning means of resilient rubber and to vulcanize the rubber to both of the handle sections whereby the rubber cushion is connected to both sections and the sections are connected together through the cushion.

A further object of our invention is to have the cushioning means exposed on the outer side of the tool whereby the cushioning means is not enclosed within the tool and is free to expand exteriorly thereof.

A further object of our invention is to interpose the cushioning means between the handle sections whereby the coupling section which has adjustable connection with the barrel may have direct contact with the distributing valve assembly at the inner end of the barrel for clamping it tightly and solidly against the barrel on securing the handle to the barrel and thus prevent a loss of power of the tool by preventing leakage of the pressure fluid from the barrel at its contact with the valve device.

The invention consists further in the features hereinafter described and claimed.

In the accompanying drawings:

Fig. 1 is a longitudinal sectional view with parts in elevation of a pneumatic chipping hammer equipped with a cushioning handle of our invention;

Fig. 2 is a transverse sectional view taken on line 2—2 of Fig. 1; and

Fig. 3 is a perspective view of the cushioning member.

In the drawing, 1 indicates the barrel of the tool providing a cylinder for the hammering piston or impact member 2. The latter is reciprocated in the barrel by pressure fluid, such as compressed air, for imparting the necessary blows on a chisel or other working element 3 on the front end of the barrel. The element 3 is supported in a nozzle 4 in the front end of the barrel as in tools of this general character.

The handle for the tool is secured to the rear end of the barrel and in accordance with our invention is made in two parts 5 and 6. The part 5, which constitutes the coupling section for the handle, is in the form of a cap having a tubular portion 5a to fit over the rear end of the barrel and having endwise adjustable connection therewith as at 7. The connection shown comprises internal screw threads in the tubular portion of the cap and external screw threads on the barrel. A locking means 8 carried by the barrel at the inner end of the cap is employed for holding the cap 5 against rotation after it has been screwed on the barrel to the extent necessary to secure the handle to the barrel and to clamp the distributing valve device 9 for the piston 2 against the rear end of the barrel. It will be noted that the cap 5 encloses the valve device and has an end wall 10 for direct contact therewith. By this construction, the valve device has metal to metal contact with the barrel and the cap, respectively, and thus the cap may tightly and solidly clamp the valve device against the inner end of the barrel to prevent leakage between them. This is an important feature of our invention, as the cushioning means to be presently described while relieving the hand grasping section 6 of the handle of vibrations, does not prevent a tight and solid joint being obtained between the valve device and the adjacent end of the barrel.

The cushioning means comprises a ring or annulus 11 of resilient material such as live rubber. The ring 11 is incorporated in the handle construction between the parts 5 and 6, seating on the end wall 10 of the part 5 and in a cavity 12 in the opposed portion of the part 6. The ring 11 fills the space between the parts 5 and 6 and holds the part 6 out of metallic contact with the part 5. Thus vibrations imparted to the part 5 from the barrel in the operation of the tool are not transmitted to the part 6 and the hand of the operator grasping part 6 is relieved of these vibrations.
vibrations and their resultant sting. The ring 11 is solid, thus providing a solid mass of cushioning material filling the entire space between the handle and the coupling sections occupied by the ring and extending continuously from one section to the other. This conditions the cushioning means to absorb shocks and vibrations at all times and functions whenever and at the instant desired.

The handle section 6 may be of the open-grip type as shown in the drawing, and is provided with a passage 13 for supplying pressure fluid to the barrel of the tool through the distributing ring 14. A throttle valve 14 is mounted in the section 6 for controlling the flow of pressure fluid through the passage 13. The throttle valve is of the self-closing type, a spring being provided for the purpose. A lever 15 is fastened on the section 6 adjacent to the throttle valve for operating it.

The lever is designed to open the throttle valve and is within the reach of the thumb of the operator's hand grasping the handle section 6. A nipple 16 is connected to the section 6 at the entrance end of the passage 13 whereby a pressure supply hose (not shown) may be attached to the tool.

The handle section 6 is provided with a tubular projection 17 forming an extension for the passage 13. This projection extends through the cushioning member 11 and into an opening 18 provided in the end wall 19 of the handle part 5 for supplying pressure fluid to the barrel of the tool through the cushioning means. The opening 18 registers with the inlet opening of the valve block 9. The cushioning member 11 fits about the projection 17 and the latter serves to hold the cushioning member in place between the handle sections and in central relation with respect thereto.

The opening 18 is slightly larger than the portion of the projection 17 extending into the opening whereby a clearance space, indicated at a, is provided between the parts to prevent any metal to metal contact between the handle parts 5 and 6 and thereby avoid the transmission of vibrations from the barrel to the handle section 6 in the operation of the tool.

The cushioning member 11 in accordance with our invention is permanently united to the handle sections 5 and 6 as by vulcanizing or fusing the member 11 to these parts. This not only connects the sections together to render the handle a single unit, but also enables the sections to have relative movement in the functioning of the cushioning member in relieving the handle sections of vibrations. Moreover the inter-connection of the cushioning member with the handle sections enables the handle as a unit to be screwed onto the barrel with sufficient tightness to tightly and solidly clamp the valve block against the adjacent end of the barrel, yet retaining the flexibility of the connection to absorb these vibrations. It will be noted that the cushioning member 11 is exposed on the outer side of the tool and thus is free to expand in response to vibrations in the operation of the tool.

The invention has no reference to the particular form of the tool in so far as the porting arrangement is concerned for supplying pressure fluid to and exhausting it from the opposite end of the barrel to reciprocate the piston element 2 therein. The tool shown in the drawing is of the type which operates on the principle disclosed in the Reinhold A. Norling Patent No. 1,881,886 granted October 11, 1932. The valve block 9 contains a plate valve 18 which as disclosed in said patent is shifted lateraly in a chamber in the block by the action of the pressure fluid on its opposite side. The porting arrangement is such that the supply of the pressure fluid to the opposite ends of the barrel is controlled by the shifting of this plate valve. It is not necessary here to describe the action of the distributing valve except to state generally that the tool disclosed in the present drawing has the necessary porting arrangement, including exhaust ports 20 which are disposed in the coupling section 5 of the handle and opening directly to the atmosphere as shown.

The projection 17 forms a continuation of the cavity 12 and in conjunction therewith provides an inter-fitting connection between the cushioning member 11 and the handle section 6. The latter may be provided about the outer edge of the cavity with a ridge-like flange 21 which seats in a groove 22 provided about the outer edge of the cushioning member. The end wall 19 of the coupling section 5 may be provided with a tapered projection 23 about its opening 18 for the purpose of providing a tapered seat for the portion of the cushioning member adjacent the opening 18. This enables the projection 17 to pass completely through the cushioning member 11 whereby to eliminate oil in the inlet air coming into contact with the rubber cushion. It is of course to be understood that the handle sections are made of metal and that the cushioning member is fused or vulcanized to these metal parts.

The details of the construction and arrangement of parts shown and described may be variously changed and modified without departing from the spirit and scope of our invention except as pointed out in the appended claims.

We claim as our invention:
1. In a portable pneumatic hammer having a barrel, a cushioned handle secured to one end of the barrel and having spaced sections, one section coupling the handle to the barrel and the other section being provided with a hand grasping portion having a pressure fluid supply passage therein, a cushion member of solid resilient rubber interposed between Said sections for relieving the hand grasping section of vibrations imparted to the coupling section from the barrel, said cushion member being exposed on the outer side of the tool for expansion laterally of the barrel, and a tubular member connected with the supply passage in the hand grasping section and extending into the coupling section through the cushion member for conveying pressure fluid for operating the tool from the handle to the barrel, said tubular member being out of contact with the coupling section of the handle.
2. In a portable pneumatic hammer having a barrel and a hammering piston therein, a valve block seated on the inner end of the barrel and having a distributing valve for controlling the supply of pressure fluid to the barrel for reciprocating the piston, a cushioned handle secured to the inner end of the barrel over the valve block and having spaced sections, one section being provided with a hand grasping portion having a pressure fluid supply passage therein, and the other section being screwed on the barrel and having an end wall engageable directly against the valve block for tightly clamping the same on the barrel, a cushion member of solid resilient rubber interposed between and vulcanized to said end wall and the section of the handle having...
the hand grasping portion for relieving the latter of vibrations imparted to the coupling section from the barrel, said cushion member being free to expand laterally of the barrel, and a tubular member connected to the supply passage in the hand grasping portion and extending into the coupling section through the cushion member for conveying pressure fluid for operating the tool from the handle to the barrel, said end wall having an opening to receive the tubular member and being out of contact therewith.

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