

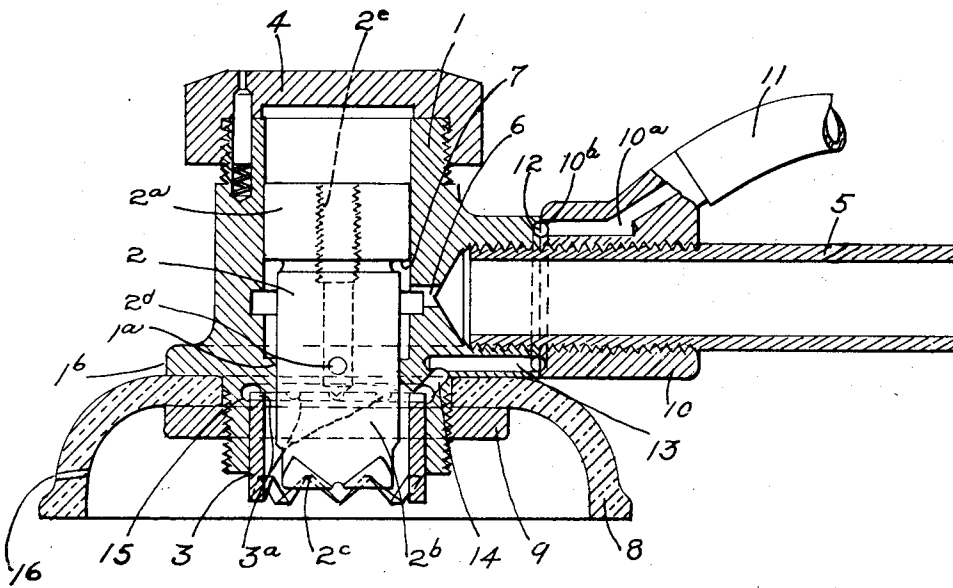
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SCALING HAMMER

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SCALING HAMMER.

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This invention relates in general to percussive tools, and in particular to tools of this type adapted and intended for use in removing the scale or incrustated coating which gathers in boilers, oil storage tanks, and the like. In cleaning oil storage tanks there is considerable danger due to the fact that inflammable and explosive gases are frequently present which may be set off by a spark produced by the percussive implement used to loosen and break up the scale.

Among the objects of the invention are to devise a percussive implement of the described type which can be safely used in gas laden atmospheres, to surround the cutting or operation end of the tool with a non-inflammable atmosphere, to quench any sparks which may be produced and to prevent them from reaching any inflammable or explosive gas in the vicinity, and in general to improve prior devices of the described type and to increase the safety factor.

The invention may be considered as consisting in the insulating of the operative end of the tool from the surrounding atmosphere. A flexible cup shaped member of rubber or other suitable material may be utilized for this purpose. Such a member does not interfere with the operation of the tool and provides a pocket or chamber around the cutting parts which may be supplied with air or even with a gas which does not support combustion. If the percussive tool is of the fluid pressure type the exhaust motive fluid may be discharged into this chamber. In addition or alternatively any suitable spark quenching liquid may be fed into the chamber adjacent the cutting parts of the tool to eliminate all danger. Such liquid may assist in the cutting operation or in carrying away the cuttings and may make a tighter connection between the cup shaped member and the surface operated upon.

In order to illustrate the invention, the accompanying drawing shows a vertical sectional view of one concrete embodiment.

The scaling hammer disclosed in the accompanying drawing is of the fluid-pressure valveless type and comprises a cylinder 1 having a differential bore in which reciprocates a piston 2 having a head 2^a and a reduced extension 2^b, the impacting end of the latter being serrated or otherwise formed as indicated at 2^c to break up the scale. A hardened sleeve 3 is pressed into the front cylinder bore

and is provided with teeth to assist in breaking up the scale. The rear end of the cylinder is sealed by a cap 4. Motive fluid, such as compressed air, admitted through hollow handle 5, under control of a throttle valve (not shown) enters at port 6 and has access to the forward portion of the piston chamber so that the pressure area 7 provided by the projection of head 2^a is continuously subjected to fluid pressure. This tends to drive piston 2 rearwardly until one or more radial ports 2^d in the piston extension 2^b pass upwardly of and beyond the inwardly extending flange 1^a of the cylinder, whereupon motive fluid passes through these ports into the rearwardly directed axial bore 2^e of the piston so that pressure accumulates against the large rear head of the piston overcoming the pressure against constant area 7 to drive the piston forwardly to deliver its blow. As the piston delivers its blow, radial ports 2^d pass downwardly of and beyond flange 1^a and the pressure fluid at the rear of the piston chamber passes to exhaust between sleeve 3 and the forward extension 2^b of the piston, whereupon the constant pressure against area 7 returns the piston, thus completing the cycle.

In order to avoid danger from sparks resulting from the blows of the impact member which might set off inflammable or explosive gases, suitable means are provided for insulating the portion of the work which is under the direct action of the tool. To this end the operative parts of the tool are enclosed by a flexible member 8 of suitable material adapted yieldingly to engage the plane or curved surfaces upon which the tool operates. This member is preferably cup shaped and of molded rubber. It has a central perforation adapted to be passed over the lower end of cylinder 1 and to be clamped against a radially projecting flange 1^b by a nut 9. As will be apparent from the previous description the exhaust motive fluid from the tool is discharged about the operative portions thereof and within the chamber provided by member 8 when the tool is pressed against the work. This substantially continues admission of a non-inflammable operating fluid together with the close engagement of member 8 with the work effectively prevents danger of fire or explosion from sparks.

As an added precaution and for the posi-

tive quenching of any spark that may be produced, the invention contemplates the admission of a suitable liquid to the chamber provided by member 8. To this end the jam nut 10 for motive fluid handle 5 has a hose connection at 11 communicating with a passage 10^a in the nut which terminates in an annular groove 10^b which registers with a similar annular groove 12 in the tool cylinder, whence extends passages 13 and 14 to an annular groove 15 in the front cylinder bore from which access to the interior of the sleeve 3 is provided by a series of slots 3^a in the inner edge of sleeve 3. Any desired liquid, such as water, under the control of a suitable valve (not shown) may thus be directed into the chamber provided by member 8 and around the cutting portions of the tool. The liquid operates, not only to quench all sparks, but also to assist in loosening the scale and in making a tight connection between member 8 and the surface being worked upon. If the admission of either air or liquid, or both, within member 8 develops an excessive or undesirable pressure, one or more ports 16 of suitable size may be provided in member 8 to relieve the pressure.

While a preferred form of the invention has been herein shown and described, it is to be understood that the invention is not limited to the specific details thereof, but covers all changes, modifications, and adaptations within the scope of the appended claims.

I claim as my invention:

1. The combination with a percussive tool having operative parts including a striking element for working upon plane or curved surfaces of a flexible member inclosing said parts and arranged to engage such surfaces, the range of movement of said striking element being wholly within the confines of said tool and said member.

2. The combination with a percussive tool having operative parts including a striking element for working upon plane or curved surfaces of a cup shaped member of molded rubber inclosing said parts and arranged to engage such surfaces, the range of movement of said striking element being wholly within the confines of said tool and said member, and means for discharging the exhaust motive fluid of said tool adjacent said parts and within said member.

3. In combination, a fluid pressure percussive tool having impact parts, a flexible member secured to the outer end of said tool to inclose the impact parts thereof and to engage the work, the range of movement of said parts being wholly within the confines of said tool and said member, means for directing the exhaust motive fluid into said member, and means for feeding a spark quenching liquid into said member.

4. In combination, a fluid pressure percus-

sive tool, having work engaging parts, a rubber cup secured to the outer end of said tool to inclose the work engaging parts thereof, the range of movement of said parts being wholly within the confines of said tool and said cup, means directing the exhaust motive fluid into said cup, and means for feeding water into said cup adjacent said parts.

5. In combination, a fluid pressure percussive tool, a cup-shaped member of flexible material clamped to said tool adjacent its end to enclose the impacting parts thereof, a rigid conduit for motive fluid to operate said tool, a jam nut for said conduit, and means including a passage in said nut for feeding liquid within said member.

6. In combination, a fluid pressure percussive tool, a cup-shaped member of flexible material clamped to said tool adjacent its end to enclose the impacting parts thereof, a rigid conduit for motive fluid to operate said tool, a jam nut for said conduit, and means for conducting liquid into said member comprising a passage in said nut terminating in an annular groove in the end face thereof and a passage in said tool arranged to communicate with said groove.

7. In combination, a fluid pressure percussive tool having a cylinder, a piston reciprocable within said cylinder and having an impact end, a sleeve having cutting teeth secured in the end of said cylinder and surrounding the impact end of said piston, a cup-shaped rubber member clamped to said cylinder and surrounding said sleeve, means for supplying motive fluid to said tool, and means for discharging liquid between said sleeve and said piston and within said member.

8. In combination, a fluid pressure percussive tool having a cylinder, a piston reciprocable within said cylinder and having an impact end, a sleeve secured in the end of said cylinder and surrounding the impact end of said piston, a cup-shaped rubber member clamped to said cylinder and surrounding said sleeve, a rigid conduit secured to said cylinder to supply motive fluid thereto, a jam nut for said conduit, a fluid connection to said nut, and passages including slots in said sleeve for discharging fluid between said sleeve and said piston and within said member.

9. In combination, a fluid pressure percussive tool having a cylinder, a piston reciprocable within said cylinder and having an impact end, a sleeve secured in the end of said cylinder and surrounding the impact end of said piston, a cup-shaped rubber member clamped to said cylinder and surrounding said sleeve, a rigid conduit secured to said cylinder to supply motive fluid thereto, a jam nut for said conduit, a fluid connection to said nut, passages including slots in said

sleeve for discharging fluid between said sleeve and said piston and within said member, and means for directing the exhaust motive fluid within said member.

5 10. In combination, a fluid pressure percussive tool having a cylinder, a piston reciprocable within said cylinder and having an impact end arranged directly to engage the work, a sleeve secured in the end of said cylinder and surrounding the impact end of said piston, a cup-shaped rubber member clamped to said cylinder and surrounding said sleeve, and means for discharging the exhaust motive fluid between said sleeve and piston within said member.

15 11. In combination, a fluid pressure percussive tool having a cylinder, a piston reciprocable within said cylinder and having an impact end provided with cutting teeth, a sleeve secured in the end of said cylinder and surrounding the impact end of said piston, a cup-shaped rubber member clamped to said cylinder and surrounding said sleeve, means for discharging the exhaust motive fluid between said sleeve and piston within said member, and means for discharging water within said member.

20 12. In combination, a fluid pressure percussive tool having a cylinder, a piston reciprocable within said cylinder and having an impact end, a sleeve having cutting teeth secured in the end of said cylinder and surrounding the impact end of said piston, a cup-shaped rubber member clamped to said cylinder and surrounding said sleeve, means for discharging the exhaust motive fluid between said sleeve and piston within said member, means for discharging water within said member, and means for partly relieving the pressure within said member when in engagement with the work.

40 13. In combination, a fluid pressure percussive tool, a flexible member secured to the

outer end of said tool and extending beyond the impact parts thereof, said member being arranged to inclose said parts and to engage the work, means for directing the exhaust motive fluid into said member, means for feeding a spark quenching liquid into said member, and means for partly relieving the pressure within said member when in engagement with the work.

14. In combination, a fluid pressure percussive tool, a flexible member secured to the outer end of said tool and extending beyond the impact parts thereof, said member being arranged to inclose said parts and to engage the work, means for directing the exhaust motive fluid into said member, and means for feeding a spark quenching liquid into said member, said member having a port for relieving excessive pressure.

15. The combination with a percussive tool having operating parts for working upon plane or curved surfaces, of a flexible member inclosing said parts and arranged to engage such surfaces, the range of movement of said parts being within the confines of said tool and said member, means for discharging fluid adjacent said parts and within said member, and means for partly relieving excessive pressure therein.

16. The combination with a percussive tool having operating parts for working upon plane or curved surfaces, of a flexible member inclosing said parts and arranged to engage such surfaces, the range of movement of said parts being within the confines of said tool and said member, and means for discharging fluid adjacent said parts and within said member, said member having a port in the wall thereof to relieve excessive pressure.

Signed by me at Detroit, in the county of Wayne, and State of Michigan this 7 day of October 1926.

EDWARD W. STEVENS.