

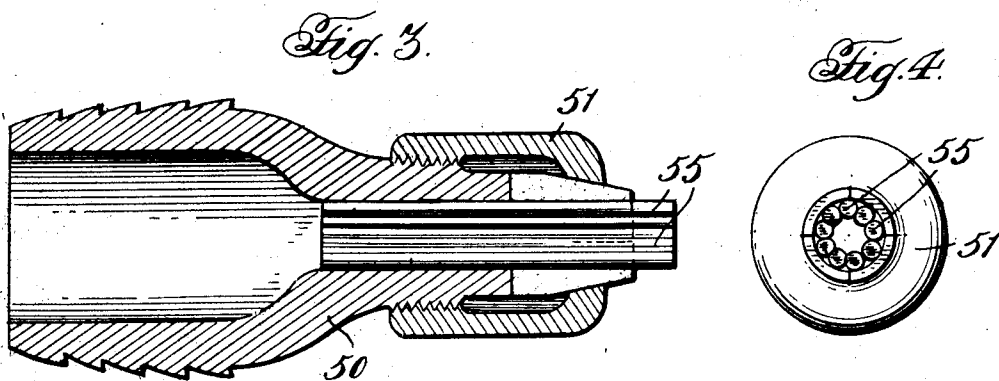
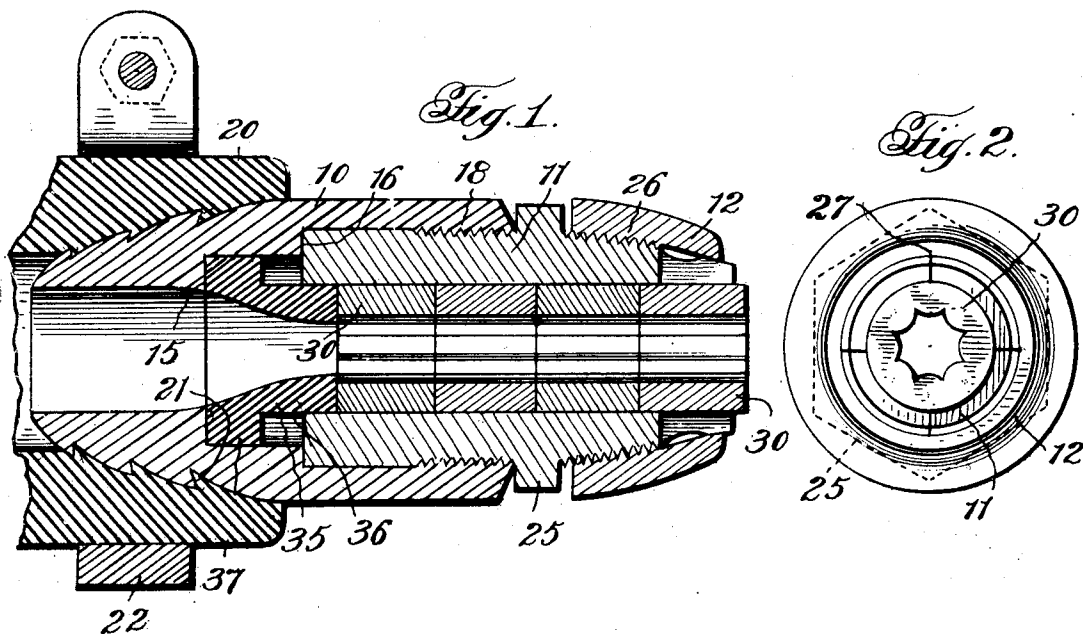
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C. N. FAIRCHILD

SAND BLAST NOZZLE

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SAND-BLAST NOZZLE.

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This invention relates to nozzles and has for its principal object the provision of a nozzle particularly applicable for use in sand blasting. A further object of the invention lies in the provision of a nozzle having a removable lining composed of a number of similar parts so that the nozzle can repeatedly be renewed by replacing merely one of these parts at a time.

In sand blasting the nozzles wear away very rapidly and while the cost of each individual nozzle is not great the total cost of nozzles per day amounts to an appreciable figure, since at the present time the best nozzles known to me have an average life not appreciably greater than thirty minutes. As placed in the machine the usual nozzle has a cylindrical bore which in use increases in diameter slowly at the initial end and at a much greater rate at the exit end, so that when the nozzle is thrown away the bore has a very distinct bell shape which is quite objectionable due to the spreading of the sand discharged and the very much greater volume of air discharged per pound of sand, the latter being discharged at a regular rate, irrespective of the increasing diameter of the bore. It would not be so bad if the amount of sand could be regulated in accordance with the number of cubic feet of air discharged per minute, but with constant delivery of sand as is almost the invariable custom, the enlargement of the hole becomes quite objectionable.

I propose to reduce the amount of wear in these nozzles by having a removable lining of a material which will not wear any faster than the usual nozzle and which may be a better grade of material since there is so much less of it to buy. In its preferred form the invention contemplates the use of a removable lining made up of a number of similar sections in one form of which only the exit section is rejected, and the nozzle is then filled by advancing the remaining sections toward the discharge end and by inserting a new section in the entrance end, and in the other form the entire lining is renewed.

Figure 1 is a section through a nozzle which embodies my invention in its preferred form.

Figure 2 is an end view.

Figure 3 shows a modified nozzle.

Figure 4 is an end view of the device of Figure 3.

In the preferred form shown in Figure 1, the nozzle is formed of a number of pieces, a socket 10, a sleeve 11, and a cap 12 which are threaded together to form a complete nozzle with the removable lining sections.

The socket member 10 is counterbored to form shoulders 15 and 16 and is threaded as at 18 to grip the sleeve 11. At its inner end the socket 10 is appreciably tapered and is serrated as at 20 to form with the hose 21 a secure fastening when the hose clamp 22 is applied in customary manner.

At its center the sleeve 11 is hexagonal as at 25 but is elsewhere circular in cross section and is threaded to fit the portion 18 of the socket and is also threaded as at 26 to engage the cap 12, so that as the cap 12 is applied the forward end of the sleeve will be clamped against the removable lining sections 30, the forward end of the sleeve 11 being radially slit as at 27 for this purpose and the coacting surfaces being smoothly conical as customary in such devices.

Each of the removable sections 30 has a smooth cylindrical outside and a bore which may be smoothly cylindrical but where expense does not hinder is preferably of the reversed fluted form shown in Figure 2. While I prefer the reverse fluting I realize fully that the expense of making the sections in this shape is very great and it may be that in practice the majority, if not all of the sections, will be made with smooth cylindrical bores as the pieces may in this way be produced at a very low cost. The inner section 35 has a cylindrical surface 36 of exactly the same diameter as the section 30 but has a larger diameter end 37 which engages the shoulder 15 of the socket. The sleeve 11 has a snug fit with the surface 36 and when the parts are in working position the rear end of the sleeve 11 is in contact with the shoulder 16. The end lining section 35 is relatively permanent; the wear on this is very slight and it may, if desired, be made of a much more expensive material than the sections 30. At the present time, while I realize the advantages of ceramic material I plan making all of the parts of the device of metal, the sections 30 and the section 35 being of a very high grade chilled cast iron.

If the individual sections 30 are shaped as in the preferred form the nozzle is continued in use until the bore of the end section 30 be-

comes smooth: if the sections 30 each have a bore in their initial form the nozzle is continued in use until the end section 30 has become distinctly bell-shaped. When it is desired to replace a section the cap is loosened and the sleeve and cap are removed from the socket by means of the hexagonal nut 25, leaving the rear section 35 in place in the socket. A new section 30 is now inserted in the rear end of the sleeve 11, there being room for this section at all times by reason of the projection of the smaller diameter of the rear section 35 into the bore of the sleeve. With the cap still loose, but preferably somewhat tightened, the sleeve 11 is screwed into the socket 10 which it will be noted is fast to the hose. The screwing up of the sleeve causes the end section 35 to engage the new section 30 and to push all of the sections toward the nozzle end, thus ejecting the worn section 30. By now tightening the cap 12 the nozzle as a whole is again ready for use.

The device just described is suitable for any size sand nozzle with which I am familiar and for the larger sizes, is the best form I am acquainted with. When I use a smaller nozzle however, I find the form shown in Figure 3 somewhat preferable as it is much simpler and has a very long life. In this form the socket 50 extends the entire length of the nozzle and the cap 51 which has a threaded engagement with it clamps the slotted tapered end of the socket in the manner as described with the larger form. In this modification however, the lining is totally different. While the lining is still composed of a plurality of similar sections and the bore is still preferably of the reverse flute type the individual sections in this modification each extend the entire length of the bore. The lining in this modification is composed of a plurality of rods 55 preferably ranging from the clear diameter of the bore (when six rods are used) to somewhat less than half the diameter of the unrestricted bore. These individual rods are of chilled iron and when the cap 51 is screwed up tight they will be bound tightly against each other at the exit end which engagement I find holds them very well at the rear end as well and while usually there is a seepage of sand dust between the rods at their rear end that is not at all objec-

tionable and in fact forms a protecting coat for the rear end of the bore of the socket 50.

In this modification when the bore formed by the rods wears to substantially cylindrical shape the cap 51 is removed and the rods pulled from the socket and replaced by a complete set of rods. The replacing of the rods is quite simple and while I have devised a simple machine for replacing the rods it is perfectly satisfactory to lay the rods about a mandrel, insert the mandrel and rods within the socket, remove the mandrel and then drive the rods home with a mallet.

What I claim is:—

1. A nozzle having a lining composed of a plurality of sections, each having the same cross section.

2. A nozzle having a lining composed of a plurality of similar sections forming together a reversed fluted bore.

3. A sand blast nozzle having a plurality of unconnected cylindrical sections forming a lining.

4. A sand blast nozzle comprising a holder having a cylindrical bore of greater size than the nozzle opening, a plurality of independent sections slidable in said bore, and means for retaining said sections in the holder.

5. A holder for a sand blast nozzle consisting of a member having a cylindrical bore to receive a removable cylindrical lining, means at one end for securing the nozzle to the sand blast device, and means at the other end for retaining the lining in place.

6. A cylindrical lining section for a sand blast nozzle having an axial length of less than its diameter.

7. The section of claim 6 composed of porcelain.

8. A nozzle having a tapered slit end, a cap having a tapered portion to engage said tapered end and a renewable lining composed of a plurality of similar sections and adapted to be clamped in place by said cap.

9. In a sand blast nozzle, a member having a smooth cylindrical bore and having one end radially slit, a lining composed of a plurality of similar sections slidable within said bore, and means to engage the slit end of said member to clamp said lining.

In testimony whereof I affix my signature.
CHARLES N. FAIRCHILD.