

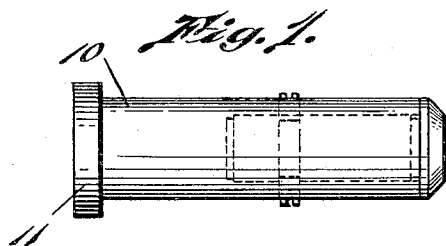
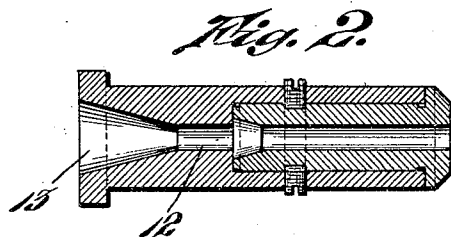
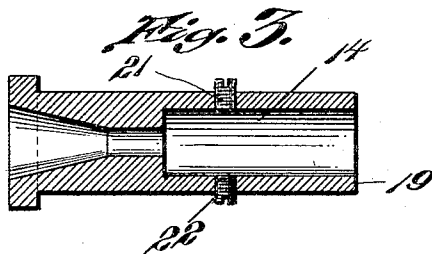
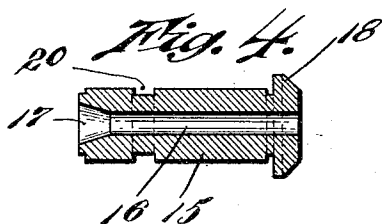
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SAND BLAST NOZZLE

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SAND BLAST NOZZLE

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This invention relates to sand blasting and particularly to the nozzle for directing the flow of sand against the material which is to be abraded or cut, such as a stone or the like, and the invention has for its object to provide a device by which a better control of the nozzle may be had while providing quicker cutting action and requiring less pressure of air.

10 In the accompanying drawing:

Fig. 1 is a side elevation of the nozzle.

Fig. 2 is a central sectional view thereof.

Fig. 3 is a central sectional view with the lining member removed.

15 Fig. 4 is a central sectional view of the lining member alone.

Cutting stone surfaces such as providing an initial, character or design in the surface of the material is frequently carried on by means of a sand blasting process which consist in forcing sand by means of compressed air against the surface of the material to be cut. The sand and air are directed against the surface of the material by a nozzle usually formed of cast iron and round in cross-section tapering slightly from its larger receiving end to its narrower discharge end, with a flange extending outwardly from the larger end for coupling it to a flexible hose through which the air and sand are passed. This nozzle has a bore extending throughout its length which is generally conical at its receiving end and of uniform diameter the remaining portion thereof.

35 About ninety pounds of air pressure is customarily used for the forcing of sand through this nozzle against the material to be cut, and it is experienced that the sand will wear the inner bore of the cast iron nozzle from a point adjacent the choke portion intermediate its ends to the discharge end thereof on a gradually increasing taper, the diameter of which will enlarge the longer the nozzle is in use. The wearing takes place at the discharge end first and to such an extent that the end of about twenty minutes run the bore of the nozzle is so large at its discharge end that it is impractical for further control and must be removed from the hose to which it is attached and

discarded, and a new nozzle replaced in position.

It is an object of this invention to provide a nozzle which will overcome many of these objections enumerated which I have accomplished by providing a nozzle of a shorter length than the customary four-inch nozzle and enlarged the bore at the discharge end to a diameter sufficient to receive a bushing or a lining sleeve or member of a special alloy steel which is of a material different than the body to better resist the wear of the abrasing sand and which may be readily removed from the body of the nozzle to be replaced by another lining member as necessary, and by shortening the length of the nozzle and providing a bushing of this character I find that I am able to materially reduce the air pressure required and provide a nozzle which will operate many times longer than the nozzle now in practical use, and one in which the lining member when worn may be replaced without detachment of the nozzle from the delivery hose, whereby to greatly save the time of the operator; and the following is a detailed description of the present embodiment of this invention illustrating the preferred means by which these advantageous results may be accomplished.

With reference to the drawing, 10 designates the body member of the nozzle which is provided with an externally projecting flange 11 located adjacent its receiving end for the purpose of coupling the nozzle to the supply hose. This nozzle is provided with a bore of a varying diameter throughout the length of the nozzle. At a point intermediate the ends of the nozzle, the bore is restricted to provide a choke portion 12 from which there flares outwardly a receiving portion of the bore 13, the same being somewhat conforming to the surface of a cone, and from the forward end of the choke portion the bore is enlarged at 14 and cylindrical in shape which receives the lining member 15 through which there extends a bore 16 of a size substantially the same but slightly smaller than the choke portion 12, which is enlarged to provide a flaring por-

tion 17 at one end having a diameter larger than the choke portion 12. This lining member is provided with a flanged end 18 to abut against the end 19 of the nozzle and is also provided with a groove 20 extending annularly about the nozzle into which the threaded studs 21 and 22 extend to prevent removal of the lining member from the nozzle body.

The over all length of the nozzle is shortening materially from the usual four-inch nozzle, the same being in length substantially two and one-half inches, and I find that a construction of this character permits of a reduction of the air pressure for sand blasting from substantially ninety pounds to forty-five pounds.

The material of the lining sleeve is of a special alloy steel which is hardened and provides a greater resistance to wear than the cast body portion, and as this sleeve is readily removable the same may be replaced without detachment of the nozzle from the delivery hose to which it is attached.

In the wearing of nozzle of this character it is found that the greater wear takes place at the discharge end than along the bore intermediate the ends of the nozzle, but a certain amount of wear will occur at the choke portion 12 which will gradually increase its size, and thus I have provided the flaring portion 17 at the receiving end of the lining sleeve so that no shoulder will be formed in the replacement of linings after the choke portion has become somewhat enlarged.

I also have found that the flared portion 17 is a means of controlling the direction of wear on the lining or sleeve and that an angle of about thirty degrees to the axis is such a taper that will cause wear to take place to enlarge the bore of the sleeve in a uniform diameter cylindrical in shape and with the walls parallel to the axis. If the taper were more abrupt than this amount the wear would cause the bore to have a greater diameter at the discharge end and a smaller diameter at the choke portion, while if the taper were long the wear would cause a greater diameter at the inner choke end of the sleeve and a smaller diameter at the discharge end, there being a taper in either case which is governed in diameter and amount of taper by the angle 17 of the flare.

When the choke portion has become enlarged to the extent of the larger diameter of the flare of the lining sleeve member, it will be necessary to discard the nozzle, but I have found that as the greater wear occurs at the discharge end, about ten lining sleeves may be used before the choke portion becomes so enlarged, thus I have provided a construction which permits of better control and quicker cutting operating with less air

pressure, and one which saves the time of the operator materially in that he is not required to change the nozzle as frequently, and when a change is necessary a quicker change from one lining member to another may be had.

I also find that I may use a smaller choke opening 12 than heretofore used without danger of unduly clogging the nozzle and which is more effective when the same is used for lettering, as better control is afforded.

The foregoing description is directed solely towards the construction illustrated, but I desire it to be understood that I reserve the privilege of resorting to all the mechanical changes to which the device is susceptible, the invention being defined and limited only by the terms of the appended claims.

I claim:

1. A sand blast nozzle of the type through which all of the sand and air passes from its receiving end to its discharge end comprising a body member having a longitudinal bore therethrough, said bore having a flaring portion at its receiving end followed successively from said flaring portion to its discharge end by a cylindrical portion, a frusto conical portion and a cylindrical portion, the second said cylindrical portion being of a length sufficient to prevent the bore from wearing to an outwardly flaring shape at the discharge end portion of the nozzle.

2. A sand blast nozzle of the type through which all of the sand and air passes from its receiving end to its discharge end comprising a body member having a centrally located bore therethrough, said bore having successively from its receiving end to its discharge end frusto conical, cylindrical, frusto conical and cylindrical portions, the last said cylindrical portion being of a length greater than the length of any of the other said portions to prevent the bore from wearing to an outwardly flaring shape at the discharge end portion of the nozzle.

3. A sand blast nozzle of the type through which all of the sand and air passes from its receiving end to its discharge end comprising a body member having a longitudinal bore therethrough said bore, having a flaring portion at its receiving end followed successively from said flaring portion to its discharge end by a cylindrical portion, a frusto conical portion and a cylindrical portion, said cylindrical portions being of substantially equal diameters and the second said cylindrical portion being of a length sufficient to prevent the bore from wearing to an outwardly flaring shape at the discharge end portion of the nozzle.

4. A sand blast nozzle of the type through which all of the sand and air passes from its receiving end to its discharge end compris-

ing a body member having a centrally located bore therethrough, said bore having successively from its receiving end to its discharge end frustro conical, cylindrical, frustro conical and cylindrical portions, said cylindrical portions being initially of substantially equal diameters, and the second said cylindrical portion being of a length greater than the first said cylindrical portion and of sufficient length to prevent the bore from wearing to an outwardly flaring shape at the discharge end portion of the nozzle.

5. A sand blast nozzle of the type through which all of the sand and air passes from its receiving end to its discharge end comprising a body member having a bore longitudinally extending therethrough, said bore having a flaring portion at its receiving end followed by a cylindrical portion of the bore of a size smaller than said flaring portion and then followed by a control portion of the bore which is of larger diameter than said cylindrical portion and finally followed by a cylindrical portion of the bore of smaller diameter than said control portion extending to the discharge opposite end of said body member and of a length to prevent the bore from wearing to an outwardly flaring shape at the discharge end portion of the nozzle.

6. A sand blast nozzle of the type through which all of the sand and air passes from its receiving end to its discharge end comprising a body member having a centrally located bore therethrough, said bore being frustro conical at one end followed by a cylindrical portion of the bore of smaller size than the opening in the frustro conical end and then followed by a control portion of the bore which is of larger diameter than the said small cylindrical bore, and finally followed by a cylindrical bore of smaller size than said control portion extending to the opposite end of said body member and of a length greater than the length of any of the other mentioned portions of said bore and of sufficient length to prevent the bore from wearing to an outwardly flaring shape at the discharge end portion of the nozzle.

7. A sand blast nozzle of the type through which all of the sand and air passes from its receiving end to its discharge end comprising a body member having a longitudinally extending bore therethrough, said bore being flaring at one end and cylindrical at the other with a cylindrical bore of smaller size than the entrance opening in said flaring end and also smaller than the cylindrical bore in the other end, a liner member inserted in the end of the cylindrical bore of the body member with its major portion housed therein, said liner member having a cylindrical bore therethrough of a length at least twice the length of the said cylindrical

bore in the body member and of a sufficient length to prevent the discharge end portion of the bore liner member from becoming outwardly flaring, said liner bore having an enlargement at the inner end which is larger than the smaller bore in said body member, and means for fastening the body member and liner member together.

8. A sand blast nozzle of the type through which all of the sand and air passes from its receiving end to its discharge end comprising a body member having a centrally located bore therethrough, said bore being frustro conical at one end and cylindrical at the other with a cylindrical bore of smaller size than the entrance opening in said frustro conical end and also smaller than the cylindrical bore in the other end, a liner member inserted in the end of the cylindrical bore of the body member with its major portion housed therein, said liner member having a cylindrical bore therethrough of a length at least twice the length of the said cylindrical bore in the body member and of a sufficient length to prevent the discharge end portion of the bore liner member from becoming outwardly flaring, said liner bore having a frustro conical enlargement at the inner end which is larger than the smaller bore in said body member, and means for fastening the body member and liner member together.

In testimony whereof I affix my signature.

ABRAHAM HOYLE.