April 19, 1938. G. F. RHODES 2,114,573

SAND BLASTING PROCESS

Filed April 4, 1936

Fig. 1.

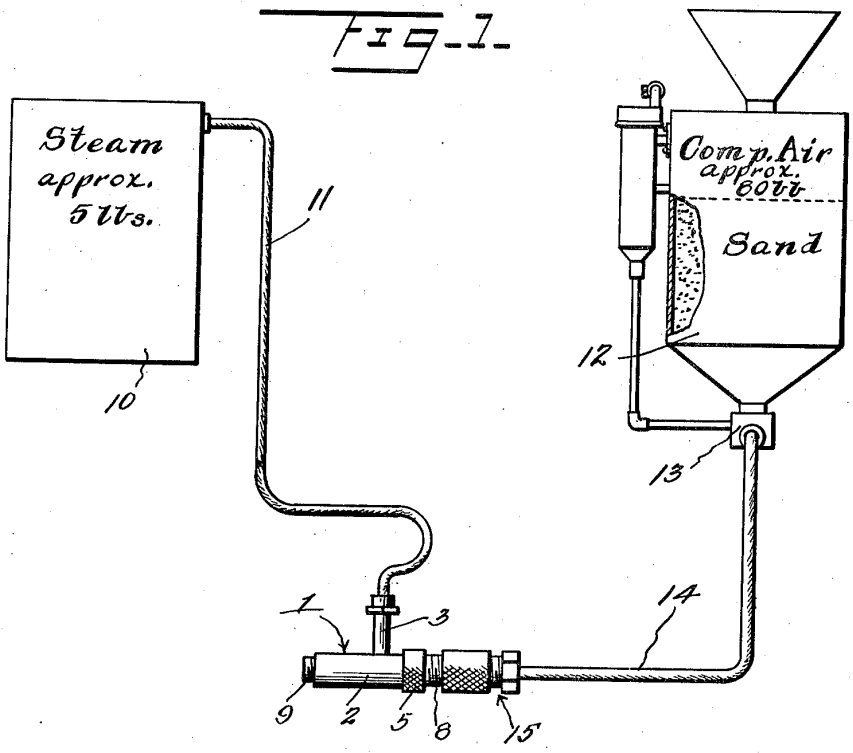
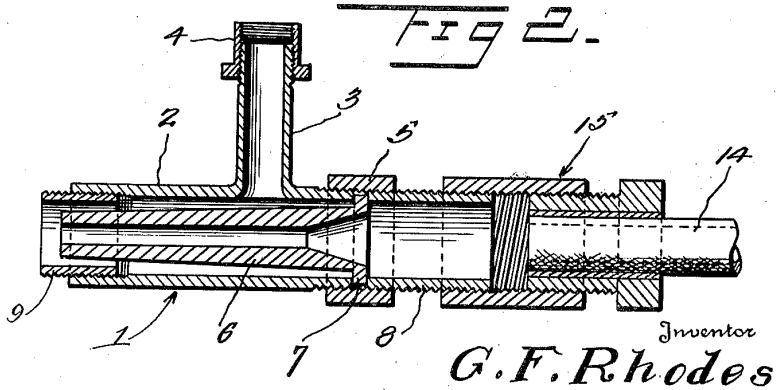


Fig. 2.



Inventor
G. F. Rhodes
By Watson E. Coleman
Attorney

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SAND BLASTING PROCESS

George F. Rhodes, Alexandria, Va.

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5 Claims. (Cl. 51—278)

This invention relates to the class of cleaning and pertains particularly to cleaning by sand blasting and steam.

The primary object of the present invention is to provide an improved method of handling sand and steam or other moisture carrying fluid for the cleaning of stone or other surfaces, whereby certain advantages are obtained over the processes at present in use.

In the present method of cleaning stone or other surfaces by the use of sand and steam, there is employed a nozzle from which the sand and steam are discharged and the nozzle is constructed to produce an atomizer effect by which the steam is passed through under high pressure and is relied upon to draw or suck the sand from a feed line into and through the nozzle for discharge against the surface being cleaned. This process has several undesirable features amongst which are the rebounding of the sand from the surface being cleaned so that a dust cloud is created which is undesirable and unhealthy for the workmen; the uneven or intermittent impingement of the sand against the surface so that an uneven surface results or one which is badly pitted by the sand particles, and the backing up of the steam pressure in the nozzle, causing the nozzle to clog, because of the back pressure created and also because of the wetting of the sand to an undesirable degree. The method of the present process as above described fails to project the sand from the nozzle against the work in the necessary steady stream for the production of an evenly cleaned and smooth or flat surface, and after using the cleaning method at present in vogue, the surface is found to be uneven, pitted and only partly cleaned.

The present invention broadly contemplates the process of projecting the sand under pressure and surrounding the sand jet with a steam jet of low pressure whereby the desired moistening of the sand and surface to be cleaned is obtained and the sand is smothered down or made to hug the surface so that it will not rebound into the face of the workman or create an undesirable cloud of dust in the vicinity of the workman.

The invention will be best understood from a consideration of the following detailed description taken in connection with the accompanying drawing forming part of this specification, with the understanding, however, that the invention is not confined to any strict conformity with the showing of the drawing but may be changed or modified so long as such changes or modifications mark no material departure from the salient features of the invention as expressed in the appended claims.

In the drawing:

Figure 1 is a view illustrating diagrammatically the association of the units employed whereby the present method may be carried out.

Fig. 2 is a longitudinal sectional view thru the nozzle employed in carrying out the cleaning process.

In carrying out the invention according to the present process, there is employed a suitable nozzle which is indicated generally by the numeral 1, and which comprises a barrel 2 having a lateral tubular inlet 2 with a coupling means 4 upon its outer end for facilitating the attachment of a steam hose thereto. The rear end of the barrel 2 is threaded to receive the coupling 5, and disposed in the barrel is a sand nozzle 6 which is flanged at its rear end, as indicated at 7, and held in position longitudinally in the barrel by means of the nipple 8 which is coupled with the barrel by the coupling 5 and held in abutting relation with the flange 7 in the manner illustrated. At its forward end the barrel 2 is internally threaded to receive a steam extension nozzle 9 which surrounds the outlet end of the sand nozzle 6 and extends slightly beyond the said end of the same. This steam nozzle 9 may be removed for replacement by one of greater or lesser length according to the desires of the workman. By the use of steam nozzles of different lengths or by adjusting the steam nozzle longitudinally so as to vary the distance from the discharge end of the sand nozzle 6 and the outer end of the steam nozzle, the sand as it leaves the sand nozzle, can be kept closely surrounded with steam for a regulated period so that the amount of moisture which it will take up or which may be imparted thereto, can be finely or accurately controlled.

In association with the nozzle there is employed a suitable source of steam under relatively low pressure such, for example, as the boiler which is conventionally shown and indicated by the numeral 10, from which a steam hose 11 leads for attachment by means of the coupling 4 to the lateral inlet arm 3 of the nozzle.

A sand receptacle 12 having an outlet 13 is coupled by means of the hose 14 with the nipple 8 of the nozzle, through the medium of the couplings indicated generally by the numeral 15. This sand receptacle 12 contains in addition to the sand, relatively highly compressed air so that the sand will be forced under suitable pres-

sure through the central sand nozzle 6. While different degrees of relative pressure between the sand container and the steam receptacle may be employed, as an illustration, the sand may be maintained under a pressure of approximately eighty pounds to the square inch, while the steam may be employed under the relatively small or low pressure of five pounds to the square inch. When the sand is ejected from the nozzle structure it will leave the central nozzle or tube 6 in a comparatively solid stream and under comparatively high pressure and the steam in leaving the steam nozzle 9, will form a cylindrical envelope about the sand stream but will impinge upon the surface being cleaned relatively lightly. By this means, the moisture laden steam or other gas will supply the necessary moisture to the surface and to the sand and will also cover the sand as it hits and spreads out upon the surface so as to smother it or cause it to hug the surface. By this means, the desired cleaning action of the sand is obtained without any undesirable and disagreeable effect of having the sand scattered or thrown back from the surface and forming a dust cloud around the workman.

From the foregoing, it will be apparent that sand cleaning operations may be carried out with all of the satisfactory results which can be obtained by any of the methods at present in use but without having the annoying conditions attendant upon the present methods as a result of blasting the sand and steam both under high pressure against the surface and in addition discharging the steam at an angle to the path of travel of the sand so that the sand cannot be prevented from scattering and forming a dust cloud as it does under the present processes.

Another important advantage of the present system over the systems now in use, resides in the fact that the present method or system of sand blasting gives an even steady flow of sand against the surface being cleaned, whereas with other systems the sand flows unevenly, and this is particularly true in connection with the systems using the steam for sucking the sand from the nozzle.

The method herein described distinguishes from former methods in an important manner, in that the granular material is elevated by means other than suction created by the fluid with which it is projected from the discharge nozzle. With this method, the force at the point of impingement can be regulated in accordance with the work to be done, that is, if the work involves the cleaning of soft stone or other material by means of sand and steam, the air pressure behind the sand may be reduced and the steam pressure may be kept the same or raised as may be found necessary and if the material being cleaned is hard stone or other hard substance then the pressure of air behind the sand can be increased and the steam pressure changed as may be found suitable.

In addition to employing the present method for cleaning by sand and steam, as previously described, the same method may be used for depositing cement in cement coating or other jobs which, at the present time, are handled by what is known as the "Gunniting process". In this connection the cement may be discharged in place of the sand and the steam supplied through the nozzle provides the necessary moisture for caking and effecting the adherence of the cement.

Because of the fact that the sand is supplied to the discharge nozzle by air pressure applied in the sand tank and the steam does not have to function as a means for drawing the sand to the nozzle as is the practice at present followed, it is not necessary to carry the sand receptacle on a scaffold, therefore, the nozzle can be carried to great heights and can be moved back and forth as necessary without inconvenience to the workmen as it is not necessary to keep shifting the sand receptacle or carry it up with the nozzle as is necessary in the sand cleaning process as at present followed.

What is claimed is:

1. The herein-described method of sand cleaning which comprises directing a stream of sand under pressure against the surface to be cleaned and discharging at the same time against the surface a tubular stream of moisture laden fluid in surrounding relation with the sand stream.

2. The herein-described method of applying sand or other granular material to a surface, which comprises discharging the material under relatively high pressure against the surface and enveloping the stream of material with moisture laden fluid and effecting the discharge of the latter against the said surface under a relatively low degree of pressure.

3. The method of sand cleaning which comprises discharging against the surface to be cleaned a stream of sand under high pressure and enveloping the sand stream with an envelope of steam under relatively low pressure and discharging the steam in a concentric path with the sand stream against the said surface whereby the surface and sand are moistened and the sand is made to hug the surface.

4. The herein described method of forcibly discharging a fluent granular material against a body, which comprises forcing a stream of the material under applied pressure through a suitable discharging unit, and controlling the rebound and lateral spread of the material when it contacts the body by surrounding the discharged granular stream with a moisture laden fluid stream, until and after the body is contacted by the material.

5. The method of applying granular material to a surface, which comprises conducting the material from a source of supply and discharging it against the surface solely by means of air under pressure exerting its force against the material constantly from the source of supply, and enveloping the air projected stream of material with a concentric stream of moist fluid under pressure prior to and at the time of impingement of the material on the surface whereby the granules of material will become moistened and the enveloping stream of fluid will operate to control scattering of the same.

GEORGE F. RHODES.