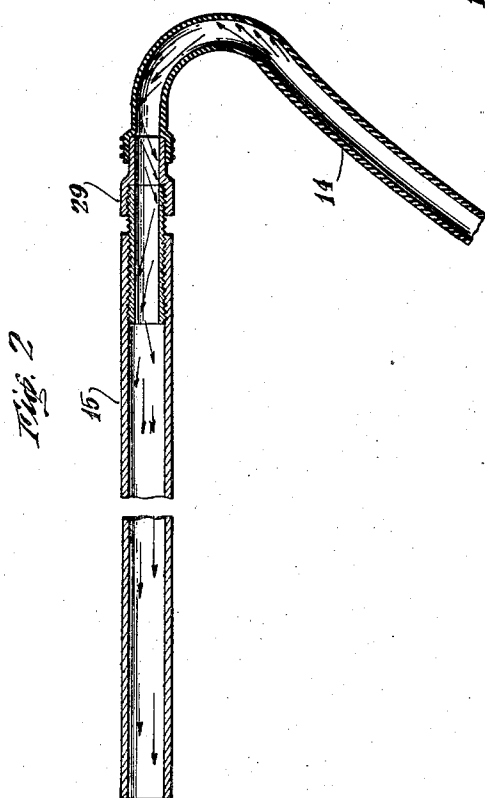
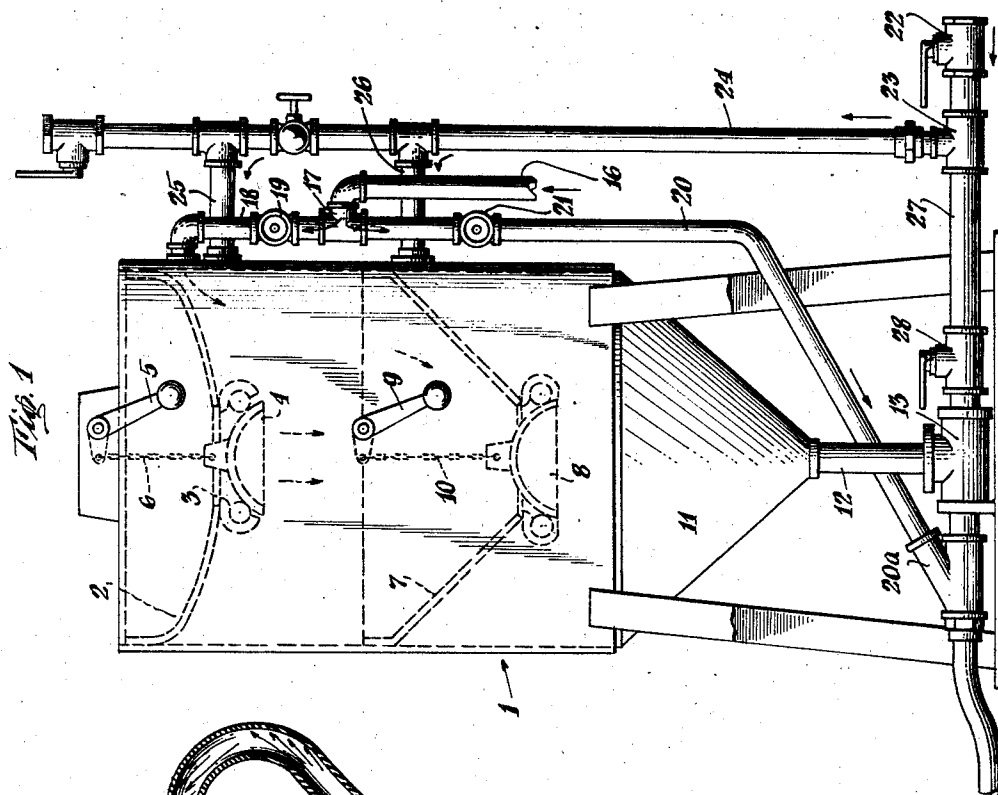


Oct. 22, 1946.

W. STARK ET AL
SAND BLASTING APPARATUS

2,409,722

Filed Jan. 16, 1945



INVENTORS
William Stark
Alphonsus P. Gately

BY Frederick W. Barker

ATTORNEY

UNITED STATES PATENT OFFICE

2,409,722

SAND BLASTING APPARATUS

William Stark and Alphonsus P. Gately, Wilmington, Calif., assignors to Todd Shipyards Corporation, New York, N. Y., a corporation of New York

Application January 16, 1945, Serial No. 573,034

4 Claims. (Cl. 51—8)

1

This invention relates to the cleansing of ships' hulls and our improvements consist in the use of an air pressure projected stream of sand and water whereof the proportion of sand employed is considerably less than has heretofore been the practice; and further, in causing the mingled sand and water to be ejected, for impingement upon the surface to be cleansed, through a terminal pipe of suitable length and diameter in place of the usual nozzle.

In actual service we have used one third the usual quantity of sand in what is known as wet sand blasting, with a propellant of air at 90 lbs. pressure, the usual flexible hose having coupled thereto, instead of the usual nozzle, a six foot length of $\frac{3}{4}$ inch pipe, from which the abrasive mixture is directed against the work surface.

This use of the six foot length of $\frac{3}{4}$ inch pipe appears to be the reason for the results that are attained, in other words a thorough cleaning of the entire paint surface from the shell of the ship, bringing it down to bare metal. We can also modify the use of this method to just remove the loose paint, barnacles, rust, etc., and leave the original coat of paint intact, as by varying the space between the pipe end and surface, and by varying the angle of attack. This cannot be done with the full use of a dry sand blast or a full wet blast employing the usual nozzle, which takes off everything in its path. It appears that, through the use of the smaller proportion of sand than is commonly employed in the practice of sand blasting the ship's side is hit with a higher pressure of water which has an abrasive, namely sand, suspended in its stream, the abrasive adding a cutting edge to the force of water sufficient to allow the water, propelled by air pressure, to hold the sand in suspension and act as a cutting edge against the corrosion to be removed.

Our experiments, leading up to the use of the terminal six foot $\frac{3}{4}$ inch pipe length included trials with the hose alone, without nozzle or terminal pipe length; and with twelve inch length of $\frac{3}{4}$ inch pipe and have gained no result whatsoever.

But when we put the six foot length of $\frac{3}{4}$ inch pipe on the end of the hose, we get the desired results stated in our method of cleaning.

Other features and advantages of our invention will hereinafter appear.

In the drawing:

Figure 1 is an elevation of the entire apparatus, and

Fig. 2 is an enlarged detail, in section, of a

2

hose portion as coupled to a terminal pipe length.

In said figures let 1 indicate a casing having at its upper part a container 2 to receive a quota of sand. Said container is provided with a bottom orifice 3, guarded by a valve 4, normally held closed by a lever 5 and chain 6. Upon release of valve 4 the sand contents of container 2 will fall into a hopper 7 which also is guarded by a valve 8 that is normally held seated against the bottom opening of said hopper as by a lever 9 and chain 10. Then, upon opening the valve 8 the sand therein will fall through the converged base portion 11 of the casing, through a vertical pipe 12 and a T 13 constituting an ejector, and be able to pass into the hose 14 that leads to the ejection pipe 15. Water, from a source not herein shown, is introduced into the casing, at a point near its upper portion as through a pipe 16, T 17, and pipe section 18, the latter controlled by a valve 19. From the T 17 a pipe 20, controlled by a valve 21, depends to a T or fitting 20a which connects with the hose 14.

Air, under suitable pressure is supplied, by way of a valve 22 and T 23, to a vertical pipe 24, which has branches 25, 26 that connect with the casing respectively at upper and midway portions thereof to afford the necessary operating pressure. Also the T 23 connects with a horizontal pipe 27 that, controlled by a valve 28, extends through T 20a to hose 14.

In operation, with the sand quota in container 2 released into hopper 7 water through pipe 16, valve 19 being opened, flows into casing 1, to fill it, and valve 8 is opened so that mingled sand and water may pass into the hose; also valve 22 is opened to permit air, under pressure, to pass up pipe 24 and issue through branches 25, 26 into the casing to supply the requisite force for propelling the mingled sand and water through the hose and its terminal ejection pipe 15.

The air pressure upon the mixture may be augmented by opening the valve 28, thus permitting the direct application of propelling force upon the mixture entering the hose.

A suggested theory as to the efficient behaviour of the six foot $\frac{3}{4}$ inch terminal pipe is as follows:

The air propelled sand and water, in passing through the hose, has a tendency to separate in such passage, because, a length of the hose lying on the dock surface, the water will flow there-through at a lower level than the sand, and it is not until a bend in the hose occurs near the point where said hose connects with pipe 15, as by coupling 29, such bend caused as by the operator raising the pipe for service, that commingling

3

sets up between the sand and water, and the mingled sand and water, air pressure propelled, attain a complete mixture in their traverse of the six foot $\frac{3}{4}$ inch terminal pipe, enabling the water suspended sand particles to perform their abrading action with high efficiency.

We do not wish our invention to be limited by the exact measurements of the terminal pipe herein set forth, although in all our experiments and work done we have had the best results with a terminal pipe that is six feet long and of $\frac{3}{4}$ inch diameter.

Variations within the spirit and scope of our invention are equally comprehended by the foregoing disclosure.

We claim:

1. A sand blasting apparatus comprising a casing to receive sand and water, a flexible hose extending from said casing, means for applying air, under pressure, to force the sand and water from said casing and through said hose, and a pipe of approximately six feet in length whose inside diameter is equal throughout, connected directly to and forming the terminal of said hose and serving as a mixing passageway for the sand and water while directing the mixture against a work surface.

2. A sand blasting apparatus comprising a casing to receive sand and water, a flexible hose extending from said casing, means for applying air, under pressure, to force the sand and water from said casing and through said hose, and a

4

pipe of approximately six feet in length and approximately $\frac{3}{4}$ of an inch in diameter throughout, connected directly to and forming the terminal of said hose and serving as a mixing passageway for the sand and water while directing the mixture against a work surface.

3. In a sand blasting apparatus intended for the cleansing of ships' hulls, a casing to receive sand and water, a flexible hose of length sufficient to lie on the dock surface between the apparatus and ship, means for applying air, under pressure, to force sand and water from said casing and through said hose, in which the water by gravity separates from the sand, and a pipe of approximately six feet in length and approximately $\frac{3}{4}$ of an inch in diameter throughout, said pipe connected directly to and forming the terminal of said hose and serving as a mixing passageway for the sand and water while directing the mixture against a ship's hull.

4. In a sand blasting apparatus, a supply tank containing abradant mixture including a liquid and having at its outlet an ejector connected with a source of air under pressure to expel the abradant from the tank, a fitting connected with the ejector and to which is connected a source of liquid for admixture with the abradant, a hose connected to the outlet of said fitting and having at its terminal end a nozzle comprised of a length of pipe having a uniform bore.

WILLIAM STARK.

ALPHONSUS P. GATELY.