E. J. CAREY.

APPARATUS FOR PICKLING METAL.

APPLICATION FILED JULY 17, 1908.

1,066,993. Patented July 8, 1913.

Fig. 1.

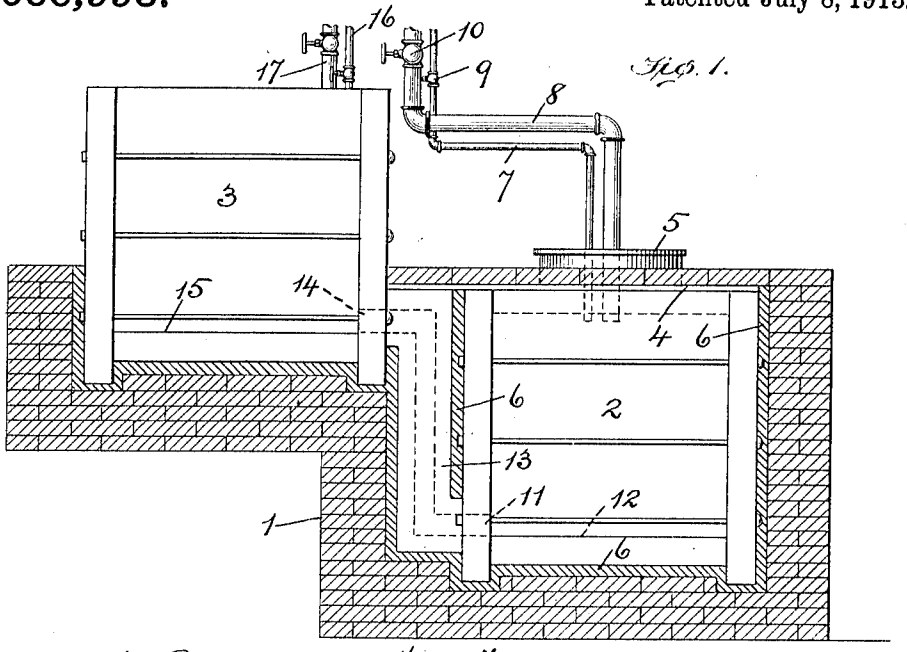
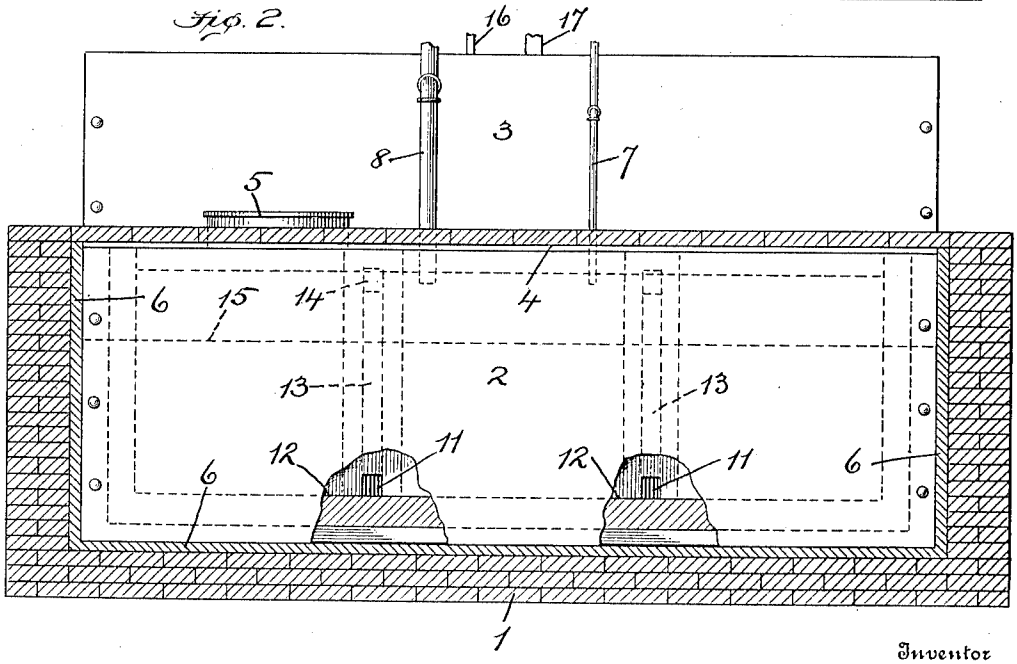


Fig. 2.



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APPARATUS FOR PICKLING METAL.

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To all whom it may concern:

Be it known that I, EDWARD J. CAREY, a citizen of the United States, residing at Baltimore, in the State of Maryland, have invented certain new and useful Improvements in Apparatus for Pickling Metal, of which the following is a specification.

This invention relates to an improved apparatus for pickling metal and is particularly applicable for use in pickling sheet metal articles such as buckets, pails and other articles, to prepare them for further treatment, such as galvanizing.

The object of the invention is to combine two tanks one higher than the other which have a communication from the bottom of one to the bottom of the other and to seal the lower tank while leaving the higher tank open so that the pickling solution may be drained by gravity from the higher to the lower tank and be forced back from the lower to the higher tank and held in the latter by air pressure which latter will agitate the solution during the pickling operation.

With these and other objects in view the invention is illustrated in the accompanying drawing in which,—

Figure 1, shows a vertical sectional elevation of the apparatus, and Fig. 2, a side elevation of the tanks and a longitudinal section through the foundation therefor.

Referring to the drawing the numeral, 1, designates the foundation which may consist of any suitable structure such as wood, stone, brick or concrete so as to sustain suitably constructed tanks, 2, and, 3, in different horizontal planes.

In the preferred form or embodiment of the invention I employ two wooden tanks which I sustain on a brick foundation so that one tank, 3, will have an elevated position with respect to the other tank, 2, in order that the solution may flow by gravity from the higher to the lower tank. The tank, 2, may be termed the solution-storage tank and in the present instance this tank is the lower one of the two. It is both air and liquid tight being provided with a cover, 4, having a manhole, 5, therein and preferably incased in a cement filling 6. An air-supply pipe, 7, enters this storage tank, 2, through the cover and an air-outlet pipe, 8, also extends through the cover and is in communication with the interior of the said tank. Valves, 9, and, 10, are provided in the two air-pipes—the valve, 9, controlling air-supply, and the valve, 10, the air-outlet. This storage tank is also provided with one or more ports, 11, adjacent its bottom, 12, see Fig. 2 and passages, 13, extend upwardly from said ports and are to communicate with the elevated tank as will presently be described. The upper or higher tank, 3, is normally open or without a cover and this tank is also provided with one or more ports, 14, adjacent its bottom, 15, which connect or communicate with the passages, 13, leading upwardly from the tank, 2.

A steam pipe, 16, enters the tank, 3, as does also a water supply pipe, 17,—the steam pipe serving to keep the solution in the tank hot, while the water pipe enables a fresh supply of water to be admitted whenever desired, such as when preparing the solution.

It is obvious that the tanks may be sustained on any suitable structure and that instead of the passages, 13, the tanks may be connected by mere pipes,—the object being merely to provide communication between the two tanks.

While suitable valves may be provided in the passages, 13, between the two tanks I prefer to leave those passages open as in the operation of the apparatus, advantages are gained by leaving said passages open.

In practice I first prepare the solution,—the quantity depending upon the number and character of the articles to be treated at one time but for example say about three-fourths the capacity of one of the tanks. After the solution is prepared it is allowed to run into the lower tank, 2, through the passages, 13, at which time the valve, 9, will be closed but the valve, 10, in the air outlet pipe open, so that the air in the tank, 2, may escape to permit the liquid in tank, 3, to flow therein. After the liquid has flowed from the tank, 3, the articles to be pickled will be packed in the empty tank in the usual manner, and when ready, the valve, 10, in the outlet pipe, 8, will be closed and the valve, 9, in the air-supply pipe will be opened, so as to admit air into the storage tank, 2, on top of the solution. As this tank is closed at the top the air pressure on top of the liquid will force the latter from the tank through the ports, 11, and up the passages, 13, into the tank, 3, where the articles have been packed for pickling. After the liquid has all been forced from the storage tank I

prefer to continue supplying air thereto to keep the liquid in tank, 3, instead of providing a valve in the passage, 13, because the passage of air through the liquid serves to continuously agitate the solution while the pickling operation is carried on and good results are thereby attained. During this operation the valve in the steam pipe, 16, will be opened so as to heat the solution as the best results are obtained when the solution is heated. After the pickling has been completed and it is desired to drain off the liquid and to remove the articles from the tank, 3, all that is necessary is the closing of valve, 9, to shut off the air and the opening of valve, 10, to permit the escape of air from tank, 2, whereupon the liquid in tank, 3, will flow by gravity from tank, 3, back into tank, 2.

It is obvious that the solution level in tank, 3, may be varied and maintained at any given point by cutting off the air supply pipe when the desired level has been reached.

It will be seen that the scale or other deposit usually left in pickling tanks will be drained off by the solution flowing back into the storage tank and will settle on the bottom of the latter where it will remain until it becomes necessary to clean it out, which can readily be done through the manhole.

Having thus described my invention what I claim and desire to secure by Letters Patent is,—

1. A pickling apparatus comprising two tanks or receptacles, one of which is elevated with respect to the other, the lower of the two tanks being sealed and the higher of the two tanks being open and the bottom part of one tank being in communication with the bottom part of the other tank and means for supplying air to and exhausting air from the upper part of the lower sealed tank, whereby liquid may be run from the higher tank to the lower sealed tank when the air outlet is open and thus drain the higher open tank to permit it to be packed with articles to be pickled and whereby upon closing the air outlet and opening the air inlet to the sealed tank, air may be admitted to the sealed tank to force the solution back into the higher open tank in which the pickling takes place.

2. A pickling apparatus comprising two tanks or receptacles side-by-side, one of which is elevated with respect to the other,— the lower of the two tanks being sealed and the higher of said two tanks being open and the bottom part of one tank being in communication with the bottom part of the other tank, an air-supply pipe entering the upper part of the lower sealed tank; an air outlet pipe also entering the upper part of the said lower sealed tank whereby liquid may be run from the higher open tank into the lower sealed tank when the air outlet pipe is open and thus drain the higher open tank to permit it to be packed with articles to be pickled and also whereby upon closing the air outlet pipe of the sealed tank and opening the air pipe, air may be admitted to the sealed tank and force the solution back into the higher open tank in which the pickling takes place and keep the solution in the higher tank agitated during the pickling operation.

In testimony whereof I affix my signature in presence of two witnesses.

EDWARD J. CAREY.

Witnesses:
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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents. Washington, D. C."