May 17, 1932. C. W. HALLER 1,859,085

PICKLING APPARATUS FOR RODS, TUBES, AND BARS

Original Filed Aug. 28, 1929 2 Sheets-Sheet 1

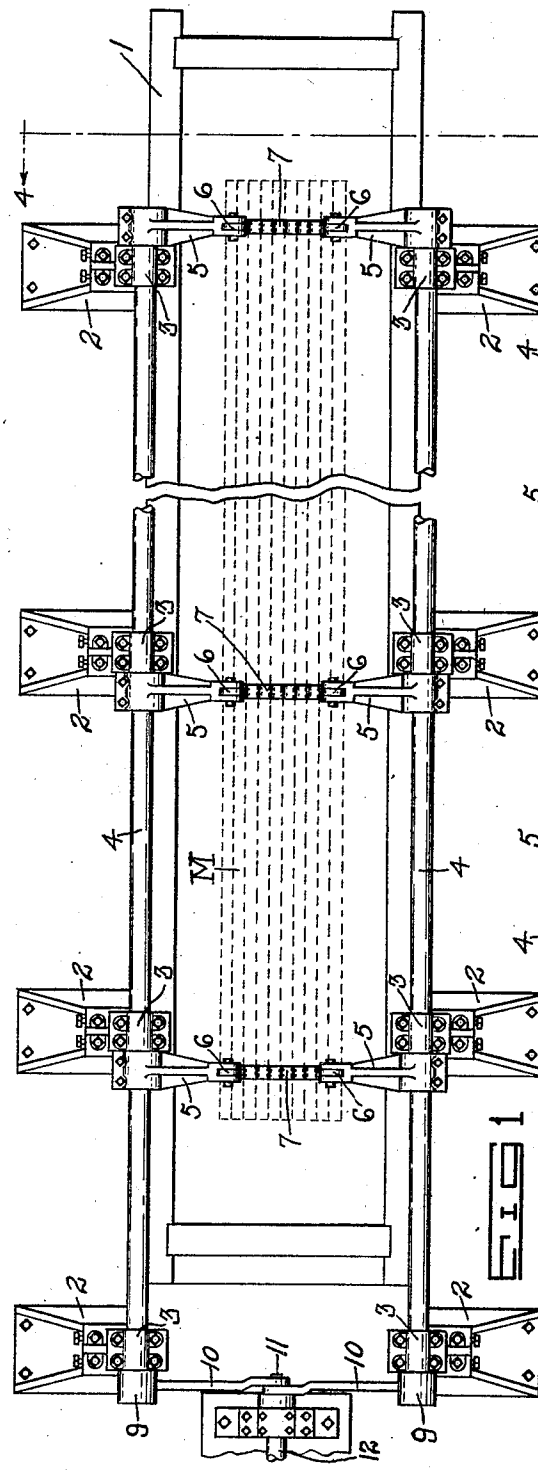


FIG 1

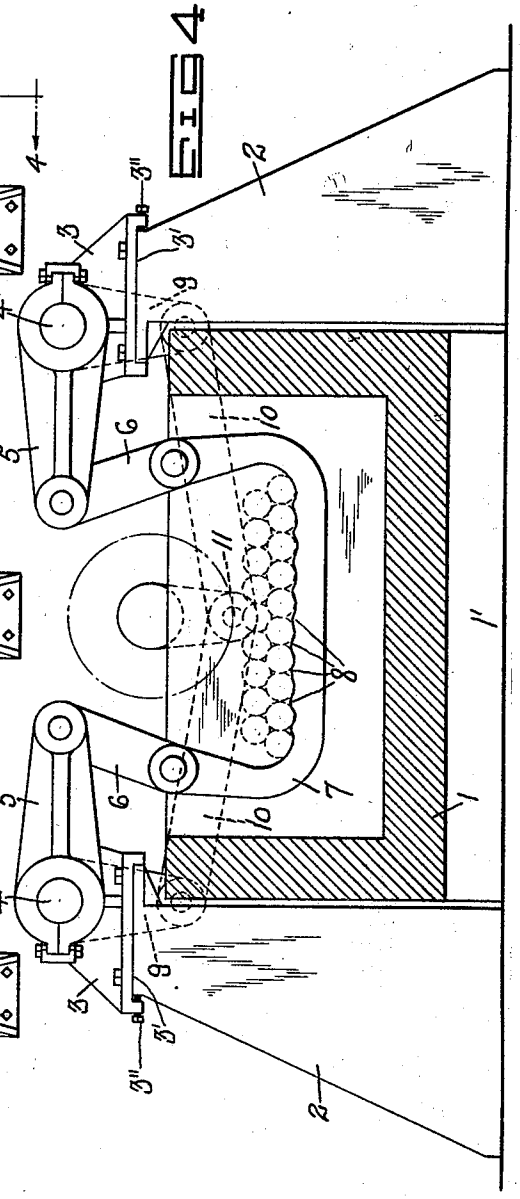


FIG 4

INVENTOR

BY Chas. W. Haller

H. E. Dunlap

ATTORNEY

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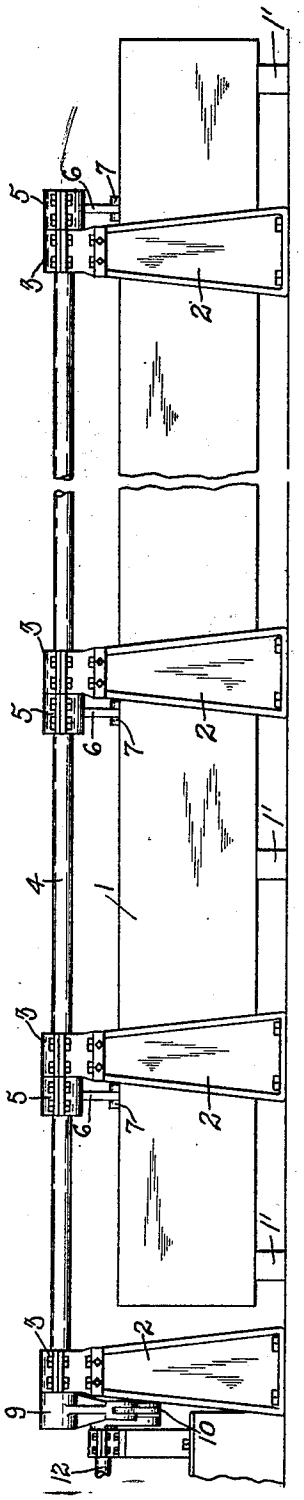


FIG 2

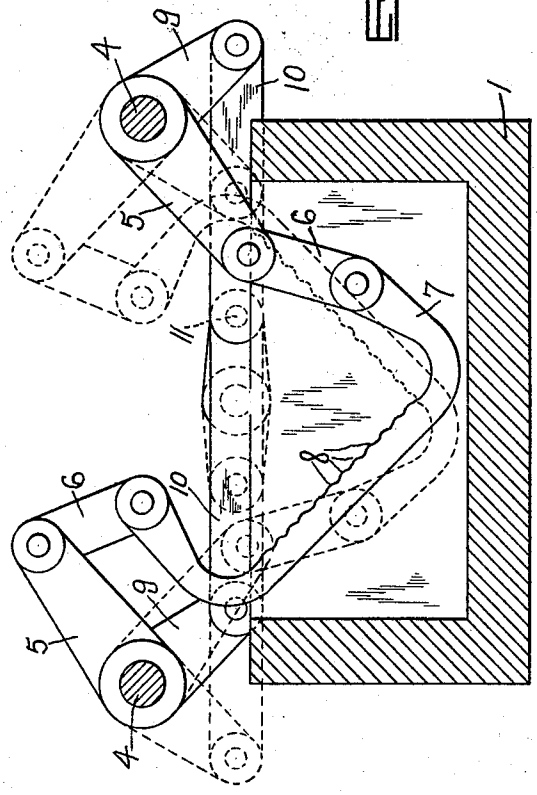


FIG 3

INVENTOR
Chas. W. Haller
BY H. E. Dunlap
ATTORNEY

Patented May 17, 1932 1,859,085

UNITED STATES PATENT OFFICE

CHARLES W. HALLER, OF WHEELING, WEST VIRGINIA, ASSIGNOR TO WHEELING BRONZE CASTING COMPANY, OF WHEELING, WEST VIRGINIA, A CORPORATION OF WEST VIRGINIA

PICKLING APPARATUS FOR RODS, TUBES, AND BARS

Application filed August 28, 1929, Serial No. 388,949. Renewed August 22, 1931.

This invention relates broadly to pickling apparatus, and more particularly to an apparatus for pickling metal tubing, rods, shafting and like slender or attenuated articles or strips.

The primary object of the invention is to provide apparatus of this character which has novel and improved means for subjecting the entire surface of the articles to the action of the pickling fluid.

A further object of the invention is to provide a device of the character mentioned in which the articles are given a swinging movement laterally through the pickling fluid and, at the same time, are caused to rotate by alternate tipping of the ends of the cradle or carrier in which the articles are held.

A further object of the invention is to provide pickling apparatus for effectually loosening and removing scale from the inner walls of tubing.

A still further object of the invention is to provide apparatus of this character, wherein the material to be pickled may be easily and quickly loaded into and unloaded from the apparatus.

A still further object of the invention is to provide apparatus of the type mentioned which is of simple and economical construction and which embodies a minimum of parts that are compactly organized and which are effective for the ends in view.

In describing the invention in detail, reference is herein had to the accompanying drawings, in which Fig. 1 is a top plan view of the invention; Fig. 2 is a side elevation; Fig. 3 is a cross sectional view, illustrating the movements of the arms, links and cradles, and showing the same in full lines at one extreme of their movements and in dotted lines at the other limit of their movements; and Fig. 4 is a section on the line 4—4, Fig. 1, showing the parts during the loading or unloading of the cradle.

In proceeding in accordance with the present invention, a pickling tank 1, conveniently of rectangular form, is provided and is supported on base members 1′. A series of standards 2 are disposed along each of the sides of the tank in close juxtaposition thereto and are arranged in spaced relation.

To the upper end of each of said standards 2, a head or bearing 3 is secured. Advantageously the bearings are formed to provide ways 3′ which receive the upper ends of the standards 2, and bolts 3″ secure the bearings in place. A shaft 4 is journaled in each of the series of bearings and is held thereby above the top of the tank. Said shafts extend longitudinally of the tank and have radial arms 5 secured thereto, the arms 5 extending inwardly toward one another. Links 6 are pivoted to the inner ends of said arms and depend therefrom, their lower ends being pivotally connected to the upwardly projecting side members of substantially U-shaped slings or cradles 7, said cradles having their bottoms roughened or serrated, as indicated at 8, for a purpose later to be described.

At one end of the shafts 4, arms 9 are secured and depend therefrom, the arms 9 being pivoted to driving links 10, which latter in turn are pivoted to a crank arm or eccentric 11, the element 11 being mounted on a shaft 12 which is driven through any suitable source of power.

In operation, the apparatus is disposed with the cradles 7 in the position indicated in Fig. 4, whereupon the rods, tubes, or other articles M are placed in the cradles or slings 7, power being then applied to the shaft 12. By reference to Fig. 3, it will be seen that the cradles 7 will thereupon be given a movement in which said cradles are oscillated or reciprocated laterally of the tank and, at the same time, the ends of the cradles will be alternately tipped, thus causing the material to gravitate and have a forced rolling movement, as distinguished from body sliding thereof without rolling. Thus, the material is swung laterally through the fluid or is bodily reciprocated and, due to the alternate tilting of the ends of the carriers or cradles, a forced rotating movement of the material is had.

It will further be noted that a tank of minimum width can be employed, since the range of movement of the cradles (laterally of the tank) is relatively small.

It will be understood, of course, that the number of cradles employed can be varied.

What is claimed is—

1. In combination with a pickling tank, a series of columns on each side of the tank, shafts rotatably supported by the columns and extending longitudinally of and adjacent to the sides of the tank, radial arms on the shafts extending inwardly in overlying relation to the tank, links pivoted to the inner ends of the arms and depending therefrom, substantially U-shaped cradles having their bottoms roughened and the upper ends of their sides pivoted to the lower ends of the links, a crank arm disposed to aline with the space centrally between the shafts, arms depending from the shafts, driving links pivoted to the crank arm and to the lower ends of the depending arms of the shafts, and means to impart rotary movements to the crank arm.

2. In combination with a pickling tank, a series of columns on each side of the tank, shafts rotatably supported by the columns and extending longitudinally of and adjacent to the sides of the tank, radial arms on the shafts extending inwardly in overlying relation to the tank, links pivoted to the inner ends of the arms and depending therefrom, substantially U-shaped cradles having their bottoms roughened and the upper ends of their sides pivoted to the lower ends of the links, and means to oscillate the shafts in unison whereby to impart a combined bodily reciprocating movement of the cradles laterally of the tank and alternate tilting of the ends of the cradles.

3. In combination with a pickling fluid containing tank, cradles in the tank to support the material to be pickled, and means to impart a combined bodily reciprocation of the cradles laterally of the tank and alternate tilting of the ends of the cradles.

4. In combination with a pickling tank, cradles in said tank to support the material to be pickled, and means to impart a combined bodily reciprocation of the cradles laterally of the tank and alternate tilting of the ends of the cradles, the bottoms of said cradles being roughened.

5. In combination with a pickling tank, cradles in said tank to support the material to be pickled, means to impart a combined bodily reciprocation of the cradles laterally of the tank and alternate tilting of the ends of the cradles, and means to cause rolling of the material upon tilting of the cradles.

6. In combination with a pickling fluid containing tank, material supporting means in the tank, and means to cause swinging of the supporting means and thereby of the material through the fluid and laterally of the tank and simultaneous rotary shifting movement of the material.

7. In combination with a pickling fluid containing tank, material supporting means in the tank, and means to cause swinging of the supporting means laterally of the tank and simultaneous alternate tilting of the ends of said supporting means.

8. In combination with a pickling tank, material supporting means in said tank, and means to cause combined swinging of the supporting means laterally of the tank and simultaneous alternate tilting of the ends of the supporting means, said supporting means being roughened to cause rolling of the material upon tilting of the supporting means.

9. In combination with a pickling tank, material supporting means in said tank, means to cause combined swinging of the supporting means laterally of the tank and simultaneous alternate tilting of the ends of the supporting means, and means to cause rolling of the material.

10. In combination with a pickling tank, material supporting means in the tank, means for oscillating said supporting means laterally relative to the tank, and means to effect rolling of the material borne by the supporting means during the oscillating movements of the latter.

In testimony whereof, I affix my signature.

CHARLES W. HALLER.