J. T. MOLTRUP.

METHOD OF AND APPARATUS FOR PICKLING RODS, PIPES, AND THE LIKE.

APPLICATION FILED JULY 10, 1920.

1,393,633.

Patented Oct. 11, 1921.

2 SHEETS—SHEET 1.

Fig. 1.

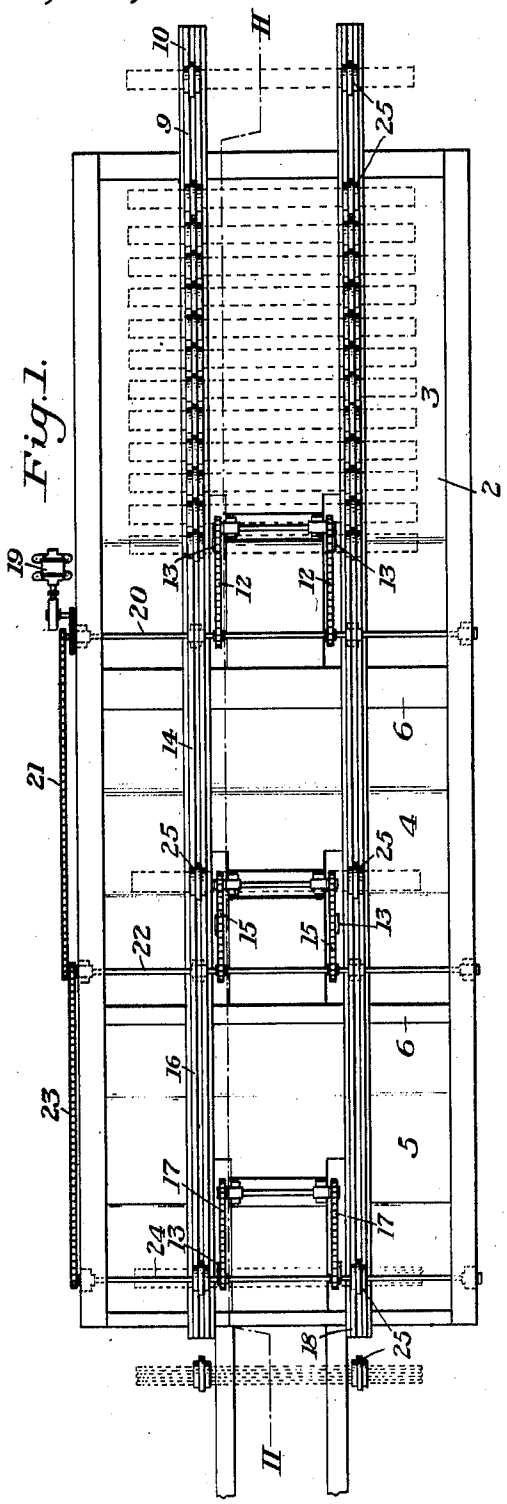
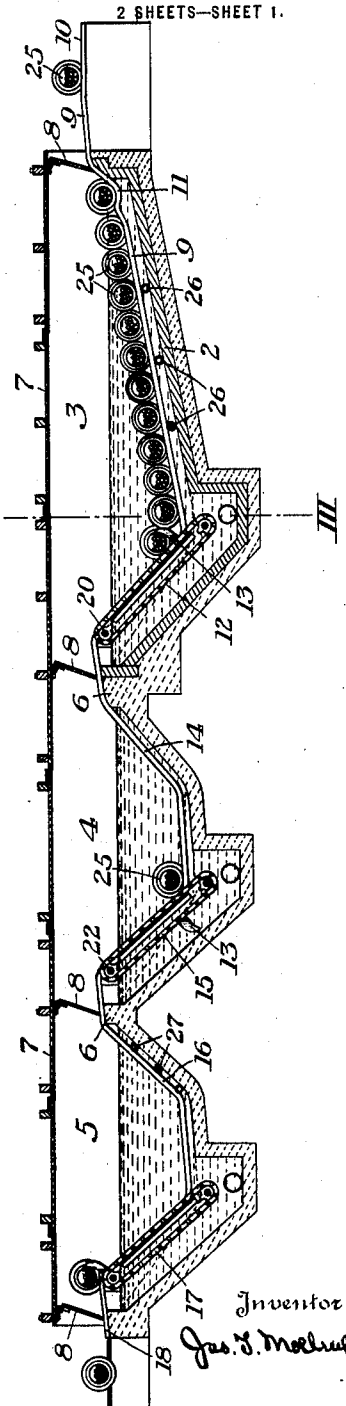


Fig. 2.



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2 SHEETS—SHEET 2.

Fig. 3.

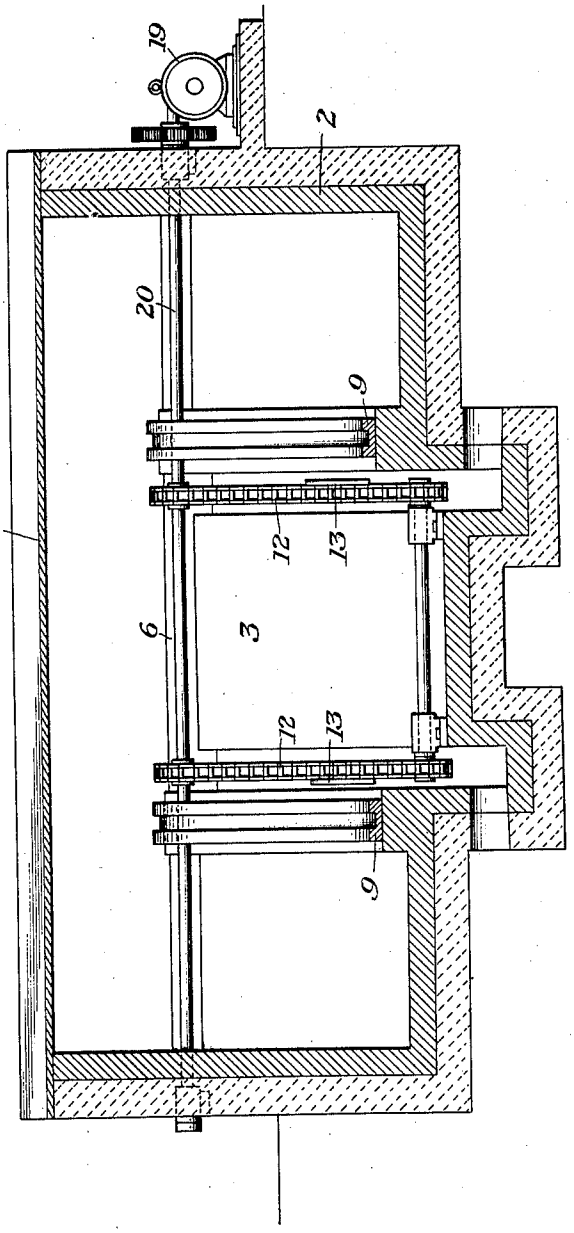
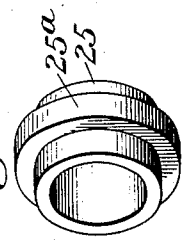


Fig. 4.



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UNITED STATES PATENT OFFICE.

JAMES T. MOLTRUP, OF BEAVER FALLS, PENNSYLVANIA.

METHOD OF AND APPARATUS FOR PICKLING RODS, PIPES, AND THE LIKE.

1,393,633. Specification of Letters Patent. Patented Oct. 11, 1921.

Application filed July 10, 1920. Serial No. 395,240.

To all whom it may concern:

Be it known that I, JAMES T. MOLTRUP, a citizen of the United States, residing at Beaver Falls, Beaver county, Pennsylvania, have invented a new and useful Improvement in Methods of and Apparatus for Pickling Rods, Pipes, and the like, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a plan view of a preferred form of pickling apparatus embodying my invention, with the top cover removed.

Fig. 2 is a section on the line II—II of Fig. 1.

Fig. 3 is a section on the line III—III of Fig. 2, and

Fig. 4 is a perspective view of one of the carriers.

My invention has relation to a method of and apparatus for pickling rods, pipes and other elongated metal articles, which are capable of being handled in bundles or bunches.

The object of my invention is to provide a method and means whereby articles of the above specified character may be thoroughly and effectively pickled in a minimum time and with a minimum of manual handling. My invention, in its preferred form, also provides a method and apparatus of the above described character wherein the rods or other articles after being pickled are automatically transferred to one or more washing baths.

The nature of my invention will be best understood by reference to the accompanying drawings in which I have shown one form of apparatus embodying my invention and which will now be described, it being premised, however, that various changes can be made in the details of construction, arrangement and combination of the various parts without departing from the spirit and scope of my invention as defined in the appended claims.

In these drawings, the numeral 2 designates a tank or receptacle which may be conveniently constructed of concrete and which is divided into a pickling compartment 3, a water-wash compartment 4, and an alkaline-wash compartment 5, these three compartments being arranged in series, and separated from each other by portions 6 of the bottom of the tank which are raised above the normal liquid level in the compartments.

The entire tank is preferably provided with a suitable cover 7; and the entrance to the compartment 3, the communication between the compartments 3 and 4, and 4 and 5, and the exit opening from the compartment 5, are preferably normally closed by swinging doors 8 which are arranged to open in the direction of the travel of the material through the compartments.

9 designate grooved tracks which are inclined downwardly within the pickling compartment 3 and which are also extended outwardly beyond the entrance to said compartment to form an entrance runway 10. Adjacent to the inner side of the door 8 at the entrance to the compartment 3 these tracks are preferably provided with depressions 11, the purpose of which will presently appear. Adjacent to the lower portions of these tracks, are conveyer chains 12 arranged between upwardly inclined portions of the tracks, each of these chains being provided with a conveyer arm or finger 13. These chains extend upwardly and forwardly within the forward end of the compartment 3 and are arranged to deliver onto the portions 14 of the tracks which extend downwardly and forwardly into the compartment 4, and thence upwardly at the outer side of conveyer chains 15 which are similar to the conveyer chains 12 in location and arrangement. These conveyer chains 15, in turn, are arranged to discharge onto track portions 16 in the compartment 5 and which are similar to the track portions 14. These tracks in turn are provided with a third pair of conveyer chains 17 similar to the chains before described, and which are arranged to deliver onto a runway extension 18 of said chains leading out through the door 8 at the discharge end of the apparatus. The track portions 9, 14, 16 and 18 preferably extend continuously through the apparatus and act as guides for the carriers while they are on the conveyers, as well as between the conveyers.

The three sets of conveyer chains are preferably driven in unison by any suitable means. For this purpose, I have shown an electric motor 19 which is geared to a transverse shaft 20 which actuates the chains 12 and which is, in turn, connected by a driving chain 21 with a second transverse shaft 22 which drives the chains 15. The shaft 22

is connected by a driving chain 23 with a third transverse shaft 24 which drives the conveyer chain 17.

25 designates carriers which are of ring form with a central portion 25ª of larger diameter adapted to grooves in the tracks before described, and end portions of smaller diameter which bear upon the tracks at each side of the groove.

The method of operation is as follows:

The rods, pipes, or other articles to be pickled are assembled in bundles or bunches, and each bundle or bunch is inserted in two of the carriers 25. The bundles or bunches are not large enough to entirely fill the carriers, thereby leaving sufficient room for the articles to roll or tumble within the carriers. These carriers with the articles therein are then placed on the runway 10 and are successively rolled in to the compartment 3 on the tracks 9. The depressions 11 in these tracks act to check the momentum of each pair of carriers as they roll into the tank compartment, but are not sufficiently deep to permanently arrest the movement of such carriers. This operation is repeated until there are a series of carriers in said compartment extending to the conveyers 12, as shown in Fig. 2. As each carrier reaches the lower end of the tracks 9, it is caught by the conveyer fingers 13 and taken up to the track portions 14 and into the water-wash compartment 4. After rolling down the tracks in this compartment, it is taken by the conveyer chains 15 and delivered to the track portions 16. It passes in a similar manner through the compartment 5 and is delivered by the chains 17 onto the runway 18. In starting the operation with an empty tank, it will be necessary to return the first few bunches of articles which pass through the apparatus to the compartment 3 for further treatment. Thereafter each bunch or bundle is held in the pickling compartment long enough to insure complete pickling, the chains 12 being driven at such a speed as to remove one of the bundles or bunches at desired intervals. For instance, if the compartment 3 is made to contain twelve bundles or bunches with their carriers, and an hour is required for the pickling operation, the chains 12 are driven at such a speed as to remove one of the bundles or bunches every five minutes.

The angle of the tracks in the several compartments is such that the carriers will roll on these tracks, instead of sliding. This rolling movement of the carrier constitutes an important feature of my invention, since the rods or other articles being pickled are thereby caused to be tumbled as they are carried through the several baths. This insures that substantially all portions of each article will be uniformly pickled.

Owing to the fact that the pickling compartment is tightly closed, being without openings to the surrounding air except during the short intervals when the swinging door 8 at the entrance end is opened to admit a new charge, it will be apparent that the fumes from the bath are substantially confined within the compartment and are prevented from escaping in any great quantity. The pickle bath may be heated in any usual or suitable manner as by means of pipes 26 which are arranged to discharge live steam into the pickle liquid. Similar heating pipes 27 may be provided for the alkali wash compartment.

While I prefer to provide the apparatus with one or more wash compartments arranged in series with the pickle bath compartment, I desire it understood that my invention may be used in connection with the pickle bath alone and the subsequent washes be given in any suitable manner.

The apparatus can be made of any desired capacity so that it will be capable of handling any desired number of articles. The operation is entirely mechanical from the time the articles are introduced into the pickling compartment until they leave the last wash compartment. This enables the work to be done with a minimum amount of manual labor. The fact that the compartments are closed also operates to prevent to a large extent loss of heat and enables the operations to be carried on in a shorter time than is possible with an open bath.

I claim:

1. The herein described method of pickling, which comprises placing the articles to be pickled in a carrier, moving the carrier bodily through a pickling bath, and causing the articles to move within the carrier during their progress through said bath, substantially as described.

2. The herein described method of pickling, which comprises placing the articles to be pickled in a carrier, moving the carrier through a pickling bath, and causing the carrier to rotate about a changing axis while moving through said bath to thereby cause a tumbling movement of the articles in the carrier, substantially as described.

3. The herein described method of pickling, which comprises placing the articles to be pickled in a carrier, moving the carrier through a pickling bath, causing the articles to move within the carrier during their progress through said bath, and then transferring the carrier with the articles therein to a washing bath, substantially as described.

4. The herein described method of pickling, which comprises placing the articles to be pickled in a carrier, moving the car-

rier in succession through a pickling bath and one or more washing baths, and causing the carriers to rotate as they move through said baths, substantially as described.

5. Pickling apparatus, comprising a bath-containing receptacle having a downwardly inclined track or guide therein, and carriers for the articles to be pickled adapted to roll on the said track or guide, substantially as described.

6. The herein described method of pickling, which comprises placing the articles to be pickled in a carrier in which the articles are free to change their position, and causing the carrier to roll through a pickling bath, substantially as described.

7. The herein described method of pickling, which comprises placing the articles to be pickled in suitable carriers in which they are free to shift their relative positions, and causing said carriers to roll through a pickling bath, substantially as described.

8. Pickling apparatus, comprising a bath-containing receptacle and carriers for the articles to be pickled adapted to roll in said receptacle, said carriers being relatively short as compared to the length of the articles to be pickled, substantially as described.

9. Pickling apparatus, comprising a bath receptacle having downwardly inclined tracks therein, carriers for the articles to be pickled adapted to roll on said tracks, and means for discharging the carriers one by one with the articles therein at the exit end of the receptacle, substantially as described.

10. Pickling apparatus, comprising a bath-containing receptacle having downwardly inclined tracks therein, said tracks having depressions adjacent the entrance end of the receptacle, and relatively short cylindrical carriers arranged to surround bundles or bunches of the articles to be pickled and to roll on said tracks, substantially as described.

11. Pickling apparatus, comprising a plurality of communicating compartments arranged in longitudinal series, tracks extending downwardly into each of said compartments, carriers adapted to travel on said tracks, and conveyers arranged to receive the carriers and deliver them from one compartment to the next compartment or to an exit leading from the last compartment, substantially as described.

12. Pickling apparatus, comprising a series of communicating closed compartments arranged in longitudinal series, tracks extending downwardly into each compartment, a conveyer in each compartment adjacent to the lower portions of said tracks, and closures normally closing communication between said compartments and between the end compartments and the surrounding air, substantially as described.

13. Pickling apparatus, comprising an inclosed compartment having entrance and exit doors, tracks leading downwardly into the compartment from the entrance door, and a conveyer leading upwardly from the lower portions of said tracks to a point near the exit door, substantially as described.

14. Pickling apparatus, comprising an inclosed compartment having entrance and exit doors, tracks leading downwardly into the compartment from the entrance door, and a conveyer leading upwardly from the lower portions of said tracks to a point near the exit door, together with carriers adapted to receive the articles to be pickled and to travel by gravity on said tracks, substantially as described.

In testimony whereof, I have hereunto set my hand.

JAMES T. MOLTRUP.