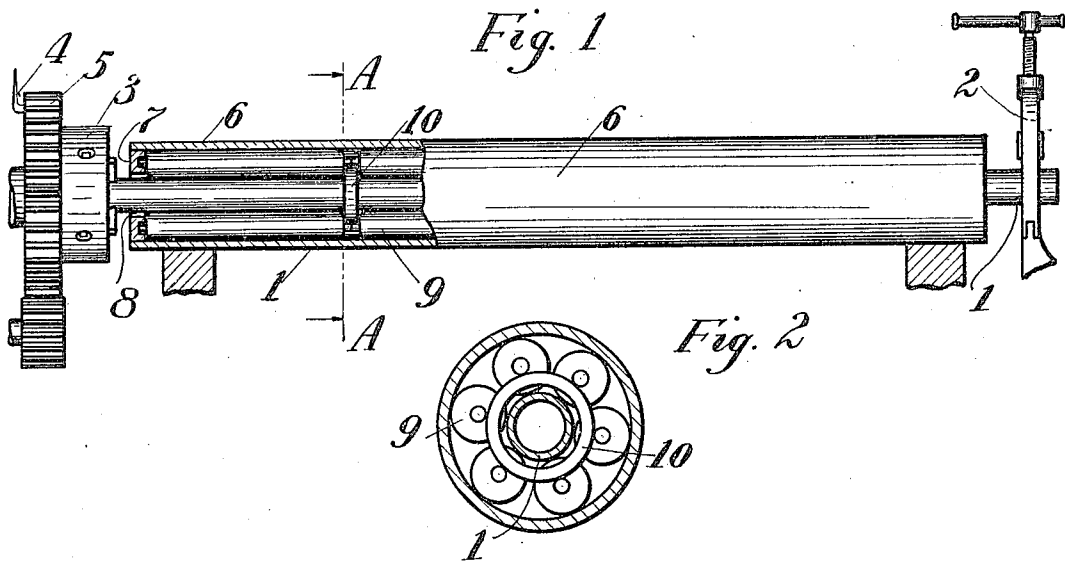


H. A. F. PETERSEN.
 PROCESS OF REMOVING SCALE FROM PIPE.
 APPLICATION FILED SEPT. 25, 1908.

962,462.

Patented June 28, 1910.



Witnesses:

Edwin Phelps
 Mary M. Hillman

Inventor:

Herby A. F. Petersen
 By Hummelen & Hummelen
 Attorneys.

UNITED STATES PATENT OFFICE.

HERLUF A. F. PETERSEN, OF CHICAGO, ILLINOIS, ASSIGNOR TO J. H. W. PETERSEN, OF CHICAGO, ILLINOIS.

PROCESS OF REMOVING SCALE FROM PIPE.

962,462.

Specification of Letters Patent. Patented June 28, 1910.

Application filed September 25, 1908. Serial No. 455,347.

To all whom it may concern:

Be it known that I, HERLUF A. F. PETERSEN, a subject of the King of Denmark, and a resident of Chicago, Cook county, Illinois, have invented certain new and useful Improvements in Processes of Removing Scale from Pipe, of which the following is a specification.

The main object of my invention is to provide an improved method for removing scale from pipes without bending of the metal and without subjecting it to acids, such as are used in the pickling process. This object is accomplished by the following process and may be carried out by means of the apparatus illustrated in the accompanying drawings.

Figure 1 is an elevation, partly sectional, of a specific form of apparatus for twisting pipe while at the same time preventing lateral distortion thereof. Fig. 2 is a section of the pipe supporting means, on the line A—A of Fig. 1.

In carrying out the hereindescribed process, the pipe is rigidly held at one end, as may be done by means of a pipe vise, and is supported throughout its length in a suitable casing or series of supports which will hold the pipe substantially straight; the other end is then engaged by suitable means and rotated axially until the pipe has been twisted sufficiently to remove or loosen the scale. I find that a twist of about four complete turns in a pipe of about 20 feet length and from one-half inch to one inch in diameter is sufficient for removing practically all of the scale. I have used this process on iron pipes having walls of about $\frac{1}{16}$ to $\frac{1}{8}$ of an inch in thickness.

I am aware that the scale has heretofore been removed from metal pipes by means of a bending process in which the pipe is passed through a series of rolls which are so placed as to cause the pipe to be bent in wave-like form in passing through the rolls. This disturbance of the metal tends to remove the scale, but through the frequent lateral bending, results in crystallizing the metal and making it brittle, while in my twisting process the metal retains its pliability and can thereafter be bent much more frequently without breaking. A further disadvantage of the roller process is that in passing between the rolls the surface of the metal is polished to some extent so as to close the

natural pores and thus interfere with the adhesion of enamel or electro-plating.

I have found my process particularly useful on pipes which are afterward enameled and used as electric conduits. The old pickling process for removing scale made such surface less suitable for retaining enamel or electro-plate by corroding and thus roughening and also eating off a substantial part of the metal so as to reduce the thickness of the walls. An additional advantage of my twisting process over the roller process is that in the roller process the ends of the pipe are frequently bent up when they leave the last roller so that this bent part must be cut off or straightened.

When a pipe is twisted, as by rotating its ends in opposite directions, the molecules of the material of the pipe are caused to assume changed positions with respect to each other and the surface areas become spirally or diagonally distorted without however becoming ridged or roughened. The stress upon the homogeneous parts of the pipe is evenly distributed throughout the mass of the material, but the stress upon loose or partly loose surface scales is unevenly distributed and causes the scales to be broken and to chip off. Furthermore, the relative movement of the molecules of the twisted pipe is in circumferential paths and therefore parallel with the surfaces of cleavage of the scales. Twisting of the pipe is therefore more effective for removing scales than transverse bending and accomplishes better results with less molecular disturbance of the material.

In Figs. 1 and 2, the pipe from which the scale is to be removed is designated 1. One end of the pipe 1 is held in a vise 2 while its opposite end is gripped in the jaws of a rotatable chuck 3 arranged for causing torsional twisting of the pipe. The chuck 3 should be so arranged that its rotation shall be controlled so that each length of pipe which is twisted in the apparatus will receive the same amount of twisting. If the apparatus is operated by hand, a pointer 4 on one of the gears 5 may be used in connection with a dial not shown, to indicate when the desired amount of twisting is completed. The pipe 1 is supported throughout its entire length between the vise 2 and the chuck 3 by means of an anti-friction roller support which comprises an outer tubu-

lar casing 6 having a head 7 at each end, said heads having axial apertures 8 of such size as to allow a pipe of a certain size to be freely slipped endwise through the casing 6.

5 Anti-friction rollers 9 are inclosed within the casing 6, and are supported by the heads 7 and rings 10. The rollers 9 are preferably a plurality of short segments placed end to end and independently rotatable, so
10 that there will be a minimum of circumferential friction between the pipe 1 and the rollers 9. The ends of the rollers 9 are tapered so that the pipe 1 will freely enter the space in the center of the annular series
15 of rollers, as indicated in Fig. 2. It will be seen that when the pipe is supported as in Fig. 1, all parts of the periphery of the pipe will be braced against distortion from a true circular contour by the twisting action.

20 I am aware that pipes have been twisted experimentally for the purpose of determining their torsional strength and manner of rupture when broken by torsional strains, but, as far as I am aware, no process like the
25 one herein described and claimed has ever been put into practice by others than myself for the purpose of removing scale from

pipe; neither has such twisting of pipes, so far as I am aware, been put into practice by others, for any purpose, in such manner as to
30 avoid such distortion of the pipes as would necessitate their being straightened before being put upon the market.

What I claim as my invention and desire to secure by Letters Patent is,—

35 1. The process of removing scale from pipe by twisting of the pipe while supporting its periphery against distortion.

2. The process of removing scale from pipe by rotating one part thereof axially
40 with respect to another part so as to twist the pipe and at the same time supporting the intermediate parts of the pipe against distortion.

3. The process of removing scale from
45 metal pipe which consists in twisting the pipe while it is braced throughout its length against axial distortion.

Signed at Chicago this 23rd day of September, 1908.

HERLUF A. F. PETERSEN.

Witnesses:

EUGENE A. RUMMLER,
CARRIE M. SHERWOOD.