S. M. CUTTER.

METHOD OF AND APPARATUS FOR TREATING MATERIAL.

APPLICATION FILED MAR. 2, 1915.

1,202,368.

Patented Oct. 24, 1916.

Fig. 1.

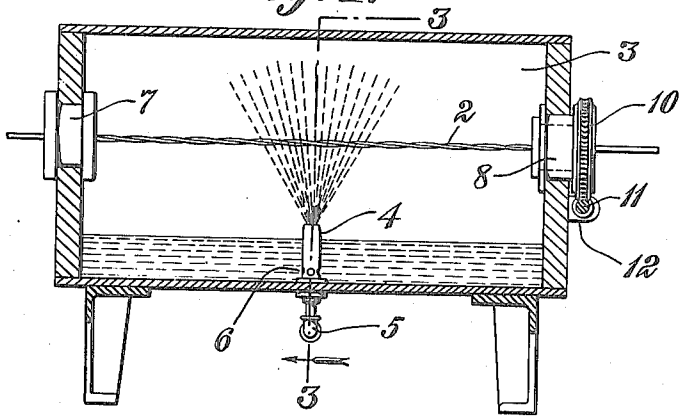


Fig. 3.

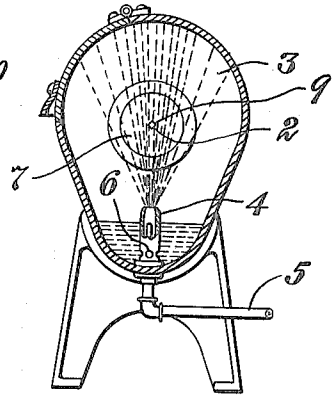


Fig. 2.

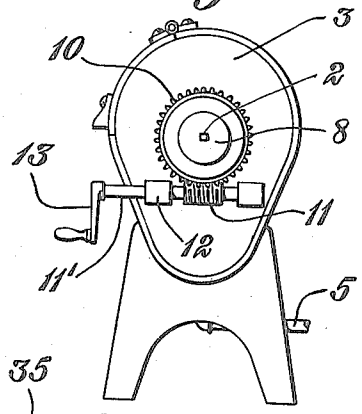


Fig. 4.

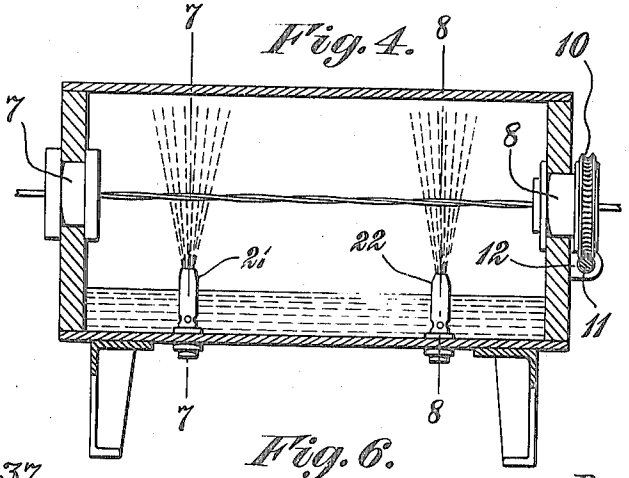


Fig. 5.

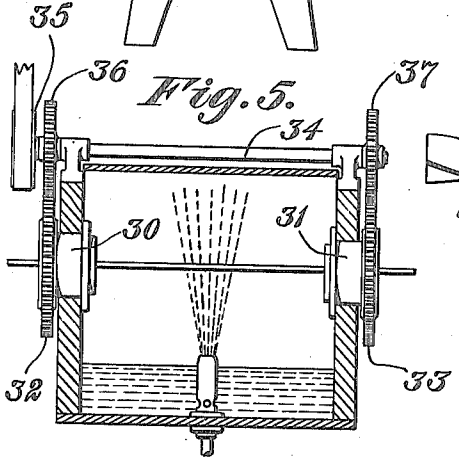


Fig. 6.

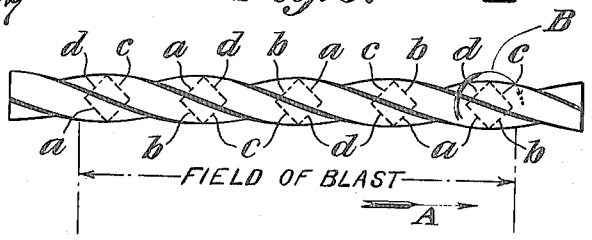


Fig. 7.

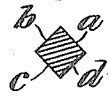
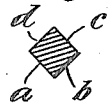


Fig. 8.



Witnesses:

Inventor:
S. M. Cutter
By his Attorney,

UNITED STATES PATENT OFFICE.

SOLOMON M. CUTTER, OF WETHERSFIELD, CONNECTICUT, ASSIGNOR TO THE CAPEWELL HORSE NAIL COMPANY, OF HARTFORD, CONNECTICUT, A CORPORATION OF CONNECTICUT.

METHOD OF AND APPARATUS FOR TREATING MATERIAL.

1,202,368. Specification of Letters Patent. Patented Oct. 24, 1916.

Application filed March 2, 1915. Serial No. 11,633.

To all whom it may concern:

Be it known that I, SOLOMON M. CUTTER, a citizen of the United States, residing at Wethersfield, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Methods of and Apparatus for Treating Material, of which the following is a specification.

This invention relates to a method or process of treating strip material. The term strip is herein used in a broad sense to include lengths of material of relatively restricted transverse sectional area which in form may be solid or hollow, defined by a curve or curves, triangular, rectangular, or polygonal. The method involved is applicable without material modification in many cases, it being especially adapted, however, for effecting the removal of "scale" from metal rods or wire.

Heretofore in finishing such stock it has been customary to submit it to a cleaning process involving a considerable number of operations, including crimping, acid treatment, washing and baking and requiring bulky cumbersome apparatus. Inasmuch as each of the several operations mentioned necessitates re-handling of the stock a proportionately large force of operatives has been required to do the work. After the stock is thoroughly cleaned it is drawn through a die or dies to reduce its area in cross section to the dimensions and form required. The method or process comprising the present invention may immediately precede the reducing operation and it is applicable to completely fulfill its function upon the stock as the latter passes in a continuous movement to the drawing die or dies.

The primary object of my invention as evinced by the foregoing statements is the provision of a simple and efficient method of treating material in a continuous, rapid and inexpensive manner.

Other objects of the invention will hereinafter appear.

In the drawings accompanying and forming part of the present specification there is shown in detail one convenient form of embodiment of the invention. It is, however, to be understood that the invention is not limited to the embodiment herein shown and described, as the present improvement is susceptible of material variation within a scope defined by the appended claims.

Referring to the drawings,—Figure 1 is a longitudinal sectional view of apparatus for carrying out the process included in the present invention. Fig. 2 is an end view of the tank shown in Fig. 1 showing a guiding device. Fig. 3 is a sectional view on line 3—3 of Fig. 1. Fig. 4 is a longitudinal sectional view of a modified form of the apparatus shown in Fig. 1. Fig. 5 is a view similar to Fig. 1 showing still another form of apparatus. Fig. 6 is a detail diagrammatic view drawn to an exaggerated scale. Figs. 7 and 8 are enlarged sectional views respectively on lines 7—7 and 8—8 of Fig. 4.

Like characters of reference designate similar parts throughout the several views of the drawings.

The material to be treated may consist of a wire or rod, as 2, its form in cross section being shown as rectangular. Preferably a section of said rod is inclosed in a box or tank, as 3, for confining the cleaning substance, which is directed in a blast against the rod through a suitable nozzle, as 4. The cleaning material which may comprise a mixture of sand and water can be advantageously supplied to the blast nozzle by locating the latter in the bottom of the tank. In this position the base of the nozzle will be surrounded by the cleaning material so that a blast of steam or air supplied through the pipe 5 and forced through said nozzle will carry with it a quantity of sand and water drawn through the holes 6.

In the end walls of the tank 3 are supported guides, as 7 and 8, for maintaining the rod within the field of the sand-blast. An opening 9 in the guide 7 receives the stock as it is introduced into the tank 3. The walls of said opening engage the lateral surfaces of the stock, which is prevented thereby from rotating about its longitudinal axis, although it is free to move in the direction thereof.

The guide 8 oppositely disposed with respect to the guide 7 confines stock held therein against relative rotation, and it will

be apparent therefore that the stock extending through and between the two guides 7 and 8 is positively held against rotation relative to both of said guides. It follows that the stock between the guides, will, if one of them is rotated, be twisted about its longitudinal axis. As very desirable results, hereinafter apparent, accrue through such twisting of the stock, means are provided in connection with one of the guides for turning it with respect to the other. Said means shown in connection with guide 8 may consist of a worm gear 10 rigid with the guide, and a worm 11 in mesh with the gear, mounted on a shaft 11′ journaled in a suitable support 12, and provided with a crank 13.

Referring to Fig. 6 it will be observed that by twisting the stock sufficiently a full turn thereof may be restricted within the field of the blast. Due to this twisted condition of that portion of the rod between the guides 7 and 8 all of the lateral surfaces of said rod will traverse spiral paths as the rod is moved in the direction of its length. This fact will be clearly apparent from observation of the dotted lines in Fig. 6, which indicate the relative position of the sides of the stock at separated successive points. Assuming the stock to be passing through the guides in the direction indicated by the arrow "A" in the twisted condition in which it is shown, the sides *a*,—*b*,—*c*,—*d*,—constantly change their position or rotate about the longitudinal axis of the stock in the direction indicated by arrow B. It follows that each surface will be presented to the blast at all angles, from that of a plane extending transversely at right angles to the blast, to planes extending parallel therewith. This described twisting of the stock serves to effect a cleavage of the brittle scale or outer surface thereof from the homogenous ductile interior metal and the objectionable part thus loosened is thoroughly removed by the particles of sand which impinge thereupon at every angle. Finally as the stock passes through the drawing die in guide 8 it is reduced and straightened into the required condition.

The modified form of apparatus shown in Fig. 4 is practically like that of Fig. 1. It differs therefrom only in the number of nozzles employed, there being two in this case designated, respectively, by 21 and 22. When two nozzles are employed they may be spaced to direct the respective blasts therefrom at separated areas on the length of stock within the blast chamber, and the twist in the stock will be so regulated as to present opposite corners of said stock to the respective blasts (see Figs. 7 and 8) whereby two adjacent sides of the stock will be impinged by one blast and the other two adjacent sides of the stock will be impinged by the other blast.

As shown in Fig. 5 the blast chamber is furnished with but one blast nozzle, as in Fig. 1, but in this modified form of the apparatus guides 30 and 31 corresponding to guides 7 and 8 are each rotatably mounted and each has secured thereto a gear, as 32 and 33, respectively. Suitably mounted on the blast chamber is a shaft 34, driven by a pulley 35, and provided with gears 36, 37, which mesh respectively with the gears 32 and 33. In this arrangement of the apparatus no twisting action is applied to the stock, instead it is simply rotated as it passes in the direction of its length, such rotation being imparted by the guides which are rotated in unison by the mechanism described. The speed of this rotary motion is so proportioned to the speed of the longitudinal motion as to effect a presentation of all surfaces of the stock to the action of the blast.

What I claim is:

1. Apparatus for treating strip material including in combination, a blast nozzle, guides for holding a strip in position to be impinged by a blast from said nozzle, and means for relatively moving said guides to twist the strip.

2. The method of treating strip material which consists in subjecting a section of a longitudinally moving strip simultaneously to a twisting action to loosen the scale therefrom and to a blast directed thereagainst to remove the loosened scale.

3. The method of treating strip material which consists in guiding a strip in a path in which it is twisted about its longitudinal axis, and directing against the twisted portion of said strip a blast whereby all lateral surfaces of the strip are impinged by the blast.

4. The method of treating strip material which consists in guiding a strip in a path in which it is twisted about its longitudinal axis and directing against the twisted portion of said strip separated blasts whereby all lateral surfaces of the strip are impinged by a blast.

5. The method of treating strip material which consists in subjecting a section of a strip to a twisting action to loosen the scale thereon and directing a blast against the loosened scale to remove the same.

6. The method of treating strip material which consists in subjecting a section of a strip simultaneously to a twisting action to loosen the scale therefrom and to a blast directed thereagainst to remove the loosened scale.

7. The method of treating strip material which consists in passing a strip longitudinally through a pair of guides positioned to effect rotary motion of the stock therebetween when the strip is moved longitudinally and directing a blast against the rotatable portion of the strip.

8. Apparatus for treating strip material including in combination a blast nozzle, and means for guiding a portion of a strip in a helical path so related to said nozzle as to cause each side of said strip to be similarly presented toward the nozzle during a single passage of the strip through said path.

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

SOLOMON M. CUTTER.

Witnesses:
L. L. GAYLORD,
F. E. ANDERSON.