May 25, 1926. 1,585,663

W. B. GEORGE

MEANS FOR CLEANING CASTINGS AND THE LIKE

Filed Nov. 28, 1924

Fig. 10.

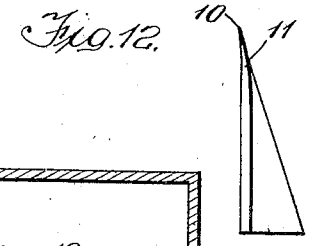


Fig. 12.

Fig. 7.

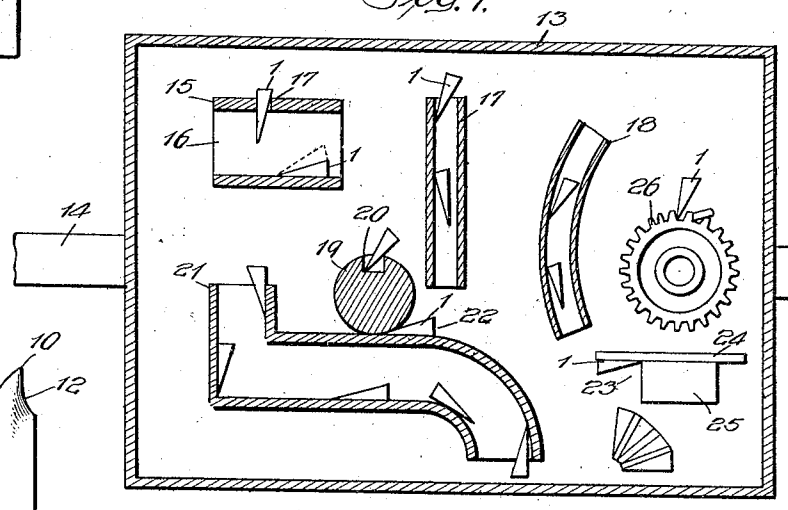


Fig. 11.

Fig. 8.

Fig. 1.

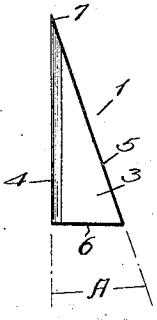


Fig. 2.

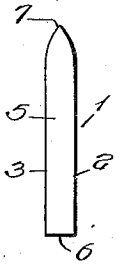


Fig. 9.

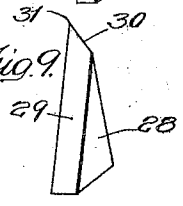


Fig. 3.

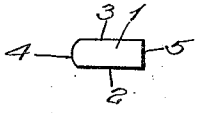


Fig. 5.

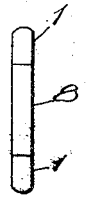


Fig. 6.

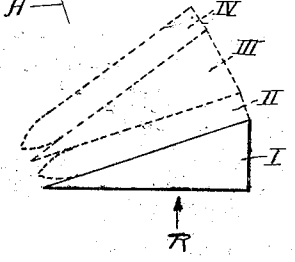
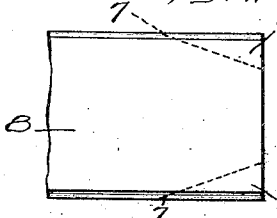


Fig. 4.



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UNITED STATES PATENT OFFICE.

WILLIAM B. GEORGE, OF CHICAGO, ILLINOIS.

MEANS FOR CLEANING CASTINGS AND THE LIKE.

Application filed November 28, 1924. Serial No. 752,552.

My invention relates to means for cleaning castings and the like.

The practice in foundries and machine shops in cleaning castings, punchings and the like, is to dispose the articles to be cleaned in a mass in a tumbling barrel or rattling drum in sufficient quantity to cause the articles or pieces to rub against each other with considerable friction as the drum is rotated, the amount of material disposed in the drum being sufficient to permit a rolling of the pieces over each other as the drum is rotated. Where relatively large pieces are disposed in the rattler or tumbler, it is customary to insert blocks of wood to keep the parts from too violent impact, and also it is customary to introduce into the charge of material to be rattled a number of pieces of castings known as "stars."

I have observed the action of these so-called stars which are generally nothing more than rectangular pieces of hard material, such as cast iron, and I find that they are not well adapted to enter all of the crevices and openings which castings contain.

I have conceived the desirability of providing a star or cleaner which will have a shape inherently adapted to a greater variety of uses than the stars at present employed and which will perform cleaning operations and other functions which cannot be performed by devices of the prior art.

I have conceived the desirability of a cleaning device which has the ability to enter a recess or opening as small as it is practicable to form in sand castings. This device is a triangular piece of steel the sides of which are preferably parallel and the edges of which meet at an acute angle, and one edge is preferably rounded so that the device ends in a sharp point. Instead of having the edge rounded, it may be inclined to the companion edge so as to secure the desired sharp point. This piece of steel is hardened and it serves both by its sharp corners and by the sharp point to clean thoroughly casting or other articles with which it is tumbled.

This device having a sharp point and being wedge-shaped, will force its way between articles having contacting surfaces, whether flat or convex, or convex and concave.

Devices of the prior art have been symmetrical or substantially symmetrical so that rotation or tumbling of the same in a barrel tended to cause them to lie continuously in the same transverse plane of revolution without any force tending to move them back and forth.

I find that the device of my invention has the remarkable faculty of traveling laterally from end to end of the drum automatically reversing itself. It is readily seen that the wedge shape of the cleaner of my invention produces a diagonal travel with consequent greater uniformity of cleaning than has heretofore been possible.

Now, in order to acquaint those skilled in the art with the manner of constructing and operating my device, I shall describe in connection with the accompanying drawings a specific embodiment of the same.

In the drawings:—

Fig. 1 is a side view of a cleaner embodying my invention;

Fig. 2 is an edge view of the same taken from the right of Fig. 1;

Fig. 3 is an end view taken from the bottom of Fig. 1;

Fig. 4 is a plan view of the strip from which the cleaner is cut;

Fig. 5 is an end view of the same;

Fig. 6 is a diagram illustrating the mode of travel of the cleaner of my invention;

Fig. 7 is a diagrammatic section through a tumbling barrel showing the mode of operation of the device of my invention;

Fig. 8 is an isometric view of a modified form of cleaner;

Fig. 9 is similarly an isometric view of another modification.

Figs. 10, 11 and 12 are side and opposite end elevations respectively of a modification.

The cleaner 1 of my invention in its preferred form consists of a flat piece of steel, the opposite sides 2 and 3 of which are substantially parallel. One edge thereof indicated at 4 is rounded or convex, and the other edge 5 is flat, the plane of which lies substantially normal to the planes of the sides 2 and 3. The bottom 6 is preferably flat and also is normal to the planes of the sides 2 and 3, and preferably lies at a right angle to the convex edge 4. The edges 4 and 5 lie at an acute angle A to each other, this angle being in the illustration approximately 22½ degrees, but the same may be varied widely, as will be apparent from the following. The convex edge 4 and the flat

edge 5 at their edge of meeting produce a relatively sharp convex edge terminating in a point 7. This convex point is of great utility in the operation of the device. In the construction or formation of the device I employ a flat or slightly tapered piece of steel, as indicated at 8 in Figs. 4 and 5, and by means of a power shear I clip off the corners indicated at 1—1 in Figs. 4 and 5, and shearing action producing the cleaner shown in Figs. 1, 2 and 3, inclusive.

I find that in the trimming of the ends of springs for automobiles and the like, it is possible to produce the cleaners according to my invention by suitably forming the angle of clipping such that it will produce the desired shape of the piece 1.

The wedge-shape pieces 1 are then heated to substantially cherry red heat and are quenched in oil or water to harden them. They may be otherwise hardened by heat treating, as is well understood by those skilled in the art. The resulting structure is a hard tough piece of steel preferably less than glass hard and being sufficiently tough to withstand the impact of the constant hammering in the tumbler.

In shearing off the corners 1 from the bar 8, I find that it is preferable to start the bite or pinch of the shears at the acute angle or corner 7, since this produces an edge which is slightly different from the true plane shown in Figs. 1 to 3, and it produces a point 10 which is shaped slightly differently from the symmetrical point shown in Figs. 1 to 3. That is to say, the bite of the shears first engaging the acute angle tends to force the metal down and to bend the same outwardly as indicated at 11 in Fig. 12. This outward bend has a flat side, as is apparent from Fig. 12, with a convex curve. The opposite edge of the point 10, indicated at reference numeral 12 in Figs. 10 and 11, is formed with a concaved curve, and this edge is sharp. At the same time, the surface adjacent said concave edge 12 is also concaved, giving this entire point a somewhat helical twist and the adjacent edge is slightly convex down towards the base of the cleaner.

The point 10 and the sharp edge 12 have the ability to enter crevices and recesses which cannot otherwise be cleaned.

Now, I wish to call attention to an important property of the present device, namely, that as it is tumbled in a drum or barrel, it does not tend to remain in the same transverse plane, but tends to play laterally from end to end of the drum and thus secure a greater effective cleaning action than is secured by devices of the prior art. It makes relatively no difference as to the initial distribution of these cleaners among the castings or other devices to be cleaned, they tend to distribute themselves evenly because of the tendency to travel, and even if they were not distributed evenly they would travel back and forth from end to end of the drum so as to secure the desired effect.

Attention is now called to Fig. 6 in which in position I the cleaner lies flat on one side. Assume now that it is rolled upwardly on the drawing in the general direction indicated by the arrow R. The next position which the cleaner will assume is shown at II. In this position it stands on one edge. The next position is shown at III and its subsequent position is shown at IV. Thus it will be observed that the wedge shape of the device secures the important function of lateral travel of the cleaner with longitudinal motion of the drum or other surface upon which the device rolls.

Now I have indicated in Fig. 7 a number of the important uses which the cleaner of my invention has, the tumbling drum 13 is rotated on the trunnions 14 so that the castings or other articles to be cleaned, together with the cleaners 1 are rattled over each other. At 15 I have shown a hollow tubular casting having the open bore 16 and a lateral opening 17. Even though the opening 17 is small, it will be seen that the cleaner 1 is able to enter the same, and, with the progress of rattling and vibration, it will clean said opening 17.

The open bore 16 is readily reached by a cleaner as will be apparent from the drawing.

At 17 I have shown a relatively long tubular casting which can readily be cleaned with the cleaners 1, whether the same happens to lie lengthwise with respect to the axis of the drum, or transverse. If the tube 17 lies lengthwise with respect to the drum, then the lateral travel of the stars 1 will induce them to enter the opening in the tube 17 and clean out the same rapidly. The same thing is true of a curved tube, as indicated at 18.

At 19 I have indicated a generally spherical casting having a recess 20, and it can be seen that the same will readily be cleaned by the entry of the sharp point of a cleaner. At 21 I have indicated a tubular casting having reverse bends and sharp corners and it will be appreciated at once that this is readily cleaned inside and outside by the cleaners of my invention.

I have illustrated at 22 how one of the cleaners will force its way between the ball 19 and the tube 21 to get between them in case they are nested together during their travel in the drum.

At 23 I have indicated how one of the cleaners will be able to force its way between a plate 24 and a block 25, these parts having flat surfaces which could not be separated by a device of the prior art.

At 26 I have indicated a gear wheel and it will be apparent how the cleaners of my invention are able to clean the teeth of the gear wheel because of the sharp points which they carry.

Now, it will be apparent that the device of my invention has marked utility due to the shape and hardness which it possesses. While the device of my invention preferably has the end 6 at right angles to the edge 4 so that the device in plan defines a right angle triangle, it is to be understood that the relation of the angles may be varied widely without departing from the spirit of the invention. The essential feature is a relatively sharp and long corner which preferably, but not necessarily, should end in a point. In Fig. 8 I have indicated a device which ends in a sharp edge 27 which is like a chisel, the opposite edges meeting in a straight line substantially at right angles to the planes of the two sides.

In Fig. 9 I have shown an isosceles triangle as forming the face 28, the opposite face being a similar but larger isosceles triangle, the edges such as 29 meeting in a line 30 which is not normal to the faces, such as 28, and it produces the diagonal edge and a sharp point at 31.

The opposite faces do not need to be strictly parallel, and relatively wide variations in contour are possible.

I do not intend to be limited to the details shown or described.

I claim:—

As an article of manufacture, a hardened wedge shaped piece of metal having parallel flat sides and edges disposed at an angle to each other, one edge being rounded and the two edges meeting in a point.

In witness whereof, I hereunto subscribe my name this 25 day of November, 1924.

WILLIAM B. GEORGE.