Jan. 8, 1935. L. S. TRACHSEL 1,986,987

FOUNDRY EQUIPMENT

Filed Sept. 14, 1933

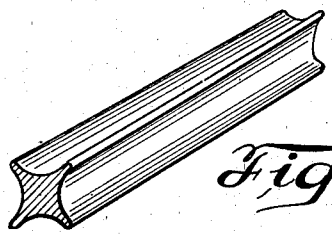

Fig. 1.

Fig. 7.

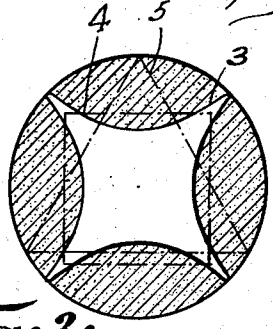

Fig. 3.

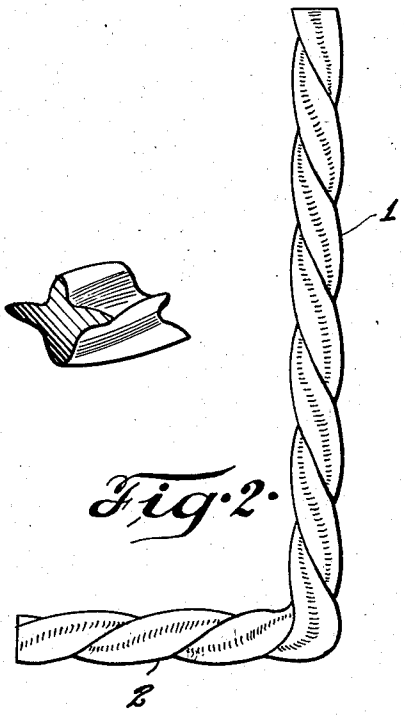

Fig. 2.

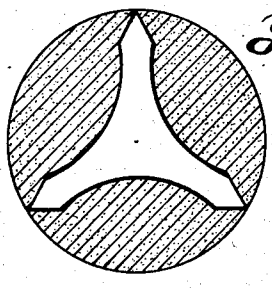

Fig. 4.

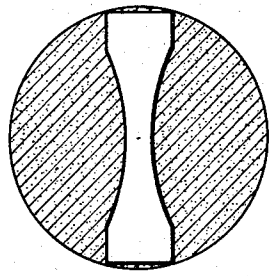

Fig. 5.

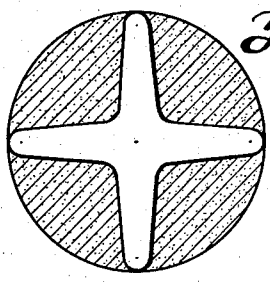

Fig. 6.

INVENTOR
Louis S. Trachsel
By Rosemary Bedell
ATTORNEY

Patented Jan. 8, 1935 1,986,987

UNITED STATES PATENT OFFICE

1,986,987

FOUNDRY EQUIPMENT

Louis S. Trachsel, Franklin, Pa., assignor to Chicago Railway Equipment Company, Chicago, Ill., a corporation of Illinois

Application September 14, 1933, Serial No. 689,335

7 Claims. (Cl. 22—111)

This invention relates to equipment for use in molding and cleaning castings in foundries.

In order to prevent the sand in large or deep molds from falling away from the parting face, or from the surface of the mold cavity, it is customary to insert metal bars, called gaggers, in the sand, which bars are rammed with the pattern. The usual form of gagger has a leg which extends transversely to the parting face of the mold and is gripped and sustained by the sand, and an angularly disposed toe extending substantially parallel to the parting face for sustaining the sand. Gaggers have heretofore been made from bars of square, triangular, or other regular polygonal or curvilinear section and have been provided with variously shaped nobs, ribs or interstices for improving the sand gripping qualities of the gagger. Also gaggers have been formed of rods of flat-sided square or triangular section twisted to provide ridges extending helically around the bar.

Small castings are commonly cleaned of adhering sand after molding by being placed in a revolving box or "tumbling barrel" together with small pieces of metal called "foundry stars" which strike the cast metal during rotation, jarring or breaking loose sand particles. The "stars" preferably have sharp points, or edges, but it is obvious that these are subject to considerable wear and eventually the edges become blunt. Foundry stars, for facility in manufacture, have heretofore been made of diagonally cut short sections of twisted square or other flat-sided section bars. Such stars, however, have rather blunt edges which are quickly dulled. The stars are also conveniently made from the same twisted bar stock from which gaggers are made.

The main object of the present invention is to provide a novel metal bar stock which is adapted by simple operations to be formed into gaggers and foundry stars, both of which, due to the novel shaping of the stock, constitute substantial improvements upon similar devices heretofore known.

A more detailed object of the invention is to provide a gagger having greater sand gripping capacity per unit of weight than other gaggers.

Another detail object is to provide an improved foundry star adapted to longer retain its sharp edges and corners than the stars heretofore in use.

These objects and others hereafter appearing are attained by my invention which consists substantially of bar stock of hard material, preferably metal, with sides longitudinally grooved, the bar being twisted in a manner to cause the grooves and edge ridges to extend helically around the bar substantially in the form of a screw thread. Such a bar may then be bent L-shaped to form a gagger having substantial advantages over previously known gaggers, and may also be cut, preferably diagonally, in short sections to form improved foundry stars.

In the accompanying drawing illustrating the invention—

Figure 1 is an isometric view of a portion of one form of grooved bar, such as may be used in forming the novel stock, before twisting.

Figure 2 is a view of a completed gagger.

Figures 3 to 6, inclusive, are diagrammatic views illustrating various grooved shapes which may be utilized in the practice of the invention.

Figure 7 is a perspective view of a foundry star formed from the stock used in forming the gagger in Figure 2.

In Figure 1 of the drawing is illustrated a portion of a short length of a four-sided section grooved bar which is twisted to form the novel bar stock. In Figure 2 the twisted grooved bar is shown bent L-shaped to form a gagger and includes a leg 1 which is usually disposed in the mold at an angle to the parting face and is sustained by the sand and a toe 2 which extends substantially parallel with the parting face and constitutes the sand sustaining portion.

In Figure 3 in solid lines and in Figures 5 and 6 are shown end views of grooved bars of various shapes which may be advantageously used in forming the gagger. Figure 3 represents at 3 a grooved four-sided bar, as in Figures 1 and 2, and Figures 4, 5 and 6 represent, respectively, grooved three-sided, grooved relatively flat, and star section bars, the star section bar being considered as of four-sided section with deep longitudinal recesses. In these figures is also illustrated in section approximately the amount of sand that would be broached from the mold if the gagger were withdrawn without being rotated.

The helical ridges of the twisted bar form, in effect, screw threads and the sand gripping power of a gagger formed from such a bar is equal to the force required to shear off from the surrounding rammed sand the helicoidal masses of sand between the ridges or threads which are broached out when the gagger is withdrawn from the mold without turning. The total area of surface sheared approximately equals the surface area of the broached cylinder and, accordingly, the sand gripping power of the gagger is proportional to the size of this cylinder or, in other words, the

circumference of the circle circumscribed about a transverse section of the gagger, where the length is constant. The gripping power also, obviously, depends upon the density of the sand.

Thus as between gaggers formed of twisted shapes the cross sections of which may be inscribed within the same circle, the gagger having the least area of cross section and which will broach out the most sand will be the most economical and efficient; that is, will have the greatest sand gripping capacity per unit of its weight. Obviously, as between gaggers of equal areas of cross sections, the gagger inscribed within the largest circle will have the greatest sand gripping capacity.

To illustrate the above, in Figure 3, superimposed upon the representation of the grooved four-sided section bar, are shown in broken lines a square, at 4, and an equilateral triangle, at 5, having the same areas as the solid line figure. If the broken lines are assumed to represent gagger cross sections, it will be seen that the grooved four-sided gagger will broach out a cylinder of greater circumference and, accordingly, have greater gripping power than the plain side square gagger. The grooved four-sided gagger will have approximately the same gripping capacity as the triangular plain side gagger shown.

The grooved bar shapes shown in Figures 4, 5, and 6 will all form gaggers more economical and more efficient than bars similarly shaped but with ungrooved plain sides. The bar in Figure 6 is of star-section, according to the popular understanding of the term "star" when applied to shapes; that is, the section of the bar has a series of points or salients disposed around its periphery. The star-section bar may be considered a form of longitudinally grooved bar. Alated bars having any number of wings or ribs may also be used. Obviously, the depth and shape of the grooves or longitudinal recesses between the ridges are limited only by manufacturing expedients and the strength of the metal. As a general proposition, the longitudinally grooved bars, if sufficiently deeply grooved, form more efficient and economical gaggers of the twisted type than plain side bars.

The gagger may be formed Z-shaped, hooked, or of any other suitable shape. In any case, the sand sustaining toe or hook portion of the gagger will function better when helically recessed as deeply as is expedient. This is because the helicoidal masses of sand between the ridges serve to sustain the sand directly beneath the toe portion.

The novel twisted grooved bar stock may also be cut in short sections as illustrated in Figure 7, and advantageously used as foundry stars. Preferably, though not necessarily the twisted bar is cut along diagonal lines for this purpose. As previously suggested, it is desirable that foundry stars have relatively sharp edges and/or points in order to more effectually dislodge sand particles clinging to the castings. Due to the grooving of the metal, the edges and points of the stars, formed of the novel bar stock, will be sharper than where the stars are cut from bars of regular polygonal section and also the edges will retain their sharpness for a longer period of use. Such stars are, therefore, improvements over stars heretofore in use, and may be readily formed from the novel twisted grooved bar stock described above.

The novel bar stock forming the subject of the present invention may be formed of a bar of substantially any number of sides grooved longitudinally and twisted about its axis. The novel grooved, twisted bar may also be advantageously used in straight or otherwise shaped lengths as a core rod or in other instances where it is desired to support, reinforce, or anchor a body of packed granular material such as sand. In all such cases, due to its distinctive contour, the grooved, twisted bar will function better than previous types of bars applied to similar uses. The bar also has advantages irrespective of its sand sustaining qualities, for instance, when used as an element of a grating tread. The invention is otherwise not limited to the exact details of the embodiments shown, but may be varied as previously suggested, and exclusive use of all such modifications as come within the scope of the appended claims is contemplated.

What is claimed is:

1. A gagger for use in foundry molds comprising a portion to be sustained by the sand in the mold and formed of a multi-sided bar twisted about its axis with its sides longitudinally grooved and forming helices, and a portion disposed at an angle to said first mentioned portion for sustaining the sand.

2. A gagger for use in foundry molds comprising an L-shaped multi-sided bar of uniform cross section with its sides grooved, the bar being twisted to cause the grooves to extend helically around the axis of the bar.

3. A gagger for use in foundry molds and formed of a bar with a longitudinal recess in its surface, said bar being twisted to cause the recess to extend helically around the bar axis and being bent in the shape of an L to form a sand retaining leg and a leg adapted to be gripped by the sand.

4. A gagger comprising a four-sided L-shaped bar with its sides longitudinally grooved and twisted to cause the grooves to extend around the bar.

5. A gagger comprising a three-sided L-shaped bar with its sides longitudinally grooved and twisted to cause the grooves to extend around the bar.

6. A member for sustaining, reinforcing or anchoring a body of packed, granular material and comprising a multi-sided bar with its sides concaved transversely of the bar and forming longitudinal grooves, the bar being twisted to cause said grooves to extend helically therearound and the bar being bent substantially at right angles intermediate its ends to form a material-sustained part and a material-sustaining part suspended therefrom.

7. A molder's gagger comprising a bar twisted about its axis and bent into an L-shape, the cross-section of the bar resembling a star in having a plurality of apices with concave side faces between said apices.

LOUIS S. TRACHSEL.