

UNITED STATES PATENT OFFICE

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PROCESS IN THE MANUFACTURE OF SHAPES FROM STEEL BARS

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This invention relates to a process in the manufacture of steel bar stock into various shapes whereby the ultimate finish of the stock is improved, the cost of manufacture is reduced and defective stock is detected in its initial stages of manufacture.

This process has to do with the removal of scale from the stock as it is received from the rolling mill, by an automatic grinding arrangement which leaves the surface smooth and uniform for a polished finish, and enables seams, cracks or flaws to be readily detected. This grinding process is applied over the entire bar in straight lengths before it is bent to shape so that the entire surface has the same finish without regard to its ultimate shape. This invention is carried out at a comparatively low cost in manufacture.

It is well known that steel bars as they are delivered by the mill are coated by a rolling scale which is indented into the surface and can be removed only by abrasion. This scale usually develops during the rolling process while the hot bar is rolled. The scale flakes onto the rollers and is thereby rolled into the bar causing hollow spots and pits in the surface of the metal which is removed by resurfacing the metal by a grinding process. The scale and the uneven surface of the metal often conceals defects in the bars such as cracks or seams which, by former methods of manufacture, could not be detected until the final grinding and polishing after the manufacture was completed.

It has been the practice to take bars, for instance for automobile bumpers, "pickle" the bar as it is received from the mill to remove the rust, heat and form to the shape desired, then temper and heat-treat and finally grind and polish the accessible surface for japanning or electro-plating. The grinding process in this case including, tumbling, sand-blasting and pickling, as well as grinding by an abrasive wheel. In this process, it will be noted that the grinding is applied after tempering and shaping with the result that only part of the bar is accessible and usually it has to be fed to the grinding wheels by hand. As the surface of the bar

is exceedingly hard, the process is slow and the grinding wheels are rapidly worn out.

The process described in this invention is particularly applicable to bar stock which is bent to form without drawing or swedging. The grinding operation is performed on the bar stock in straight lengths before it is worked, hardened or tempered. This enables the bar to be fed into an automatic grinding machine having abrasive members of varying degrees of fineness, progressively arranged, so that the bar is resurfaced with a smooth, uniform finish in the most direct and least expensive manner. The imperfections of the metal can easily be detected after grinding in this manner so that imperfect bars can be rejected without further manufacture. The bar stock is then heated to a dull red and bent to form; after which, it is again heated to a cherry red, tempered in oil or water and heat-treated to draw the temper as desired. At this stage it is found that the surface can be polished on a grease wheel, or emery mop, without the use of a variety of abrasive wheels, leaving a bright, lustrous finish for japanning or electro-plating.

This process may be carried out by the arrangement shown in the drawings, in which, Fig. 1 is a plan view of a straight bar as it is received from the mill in the process of grinding, Fig. 2 shows the ultimate shape to which this bar may be formed, and Fig. 3 is a side elevation corresponding to Fig. 1.

The bar 11 is of rectangular shape and may be any indefinite length, in the case of bumper bar stock, a common size is two inches wide and one quarter inch thick. This bar is fed to the rollers in the direction indicated by the arrow, first engaging roller 12, then roller 13 and then roller 14; similar rollers being provided on the underside of the bar as indicated in Fig. 3 so that the bar is ground as it passes between these rollers. Any number of rollers may be provided driven by mechanism not shown in the drawing and the bar is fed to the rollers automatically by mechanism well understood in this art which has not been illustrated in the drawing. The bar is arranged to engage the coarser rollers or grinding wheels first such

as 12 and to engage the finer grinders last such as 14 thereby leaving a finished surface of close grain and without scratches.

The edges of the bar, it will be noted are finished in a manner corresponding with the sides, these edges being engaged by a pair of opposing grinders 15, a second pair 16 and a third pair 17 each progressively of different degrees of fineness. These grinders are driven by mechanism not shown in the drawing. By this process, it will be observed, that the entire surface of the sides and edges of the bar are ground and polished as a first operation, when the bar is straight and before it is tempered. This grinding is performed automatically in a machine and the attendant is not exposed to the dust from the grinding wheels which is most disagreeable in hand grinding operations.

The bar stock after grinding can be heated and bent to form and tempered without materially injuring the surface left by the grinding. For instance the bar 11 may be bent to the form shown in Fig. 2 curved as at 22 and with eyes 21 formed in each end. Bars in this shape are invariably ground and polished by an operator holding them against a grinding wheel. It is apparent, however, that such an operation cannot grind and polish the curved ends of the bar, and a bar in this shape could not be fed to an automatic grinding machine.

In practice this process has not only reduced the time and the labor necessary for grinding bar stock but it also saves in the cost of manufacture by enabling defective material to be detected in the initial stages of manufacture.

Having thus described my invention, I claim:

The process in producing polished articles from commercial rolled bars of steel as supplied by the rolling mill, comprising grinding the bar in straight lengths while cold by an automatically operated grinding mechanism, then heating, bending to shape without drawing or swedging, tempering and finally, polishing.

Signed at New York, in the county of New York and State of New York, this 16th day of June, 1925.

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