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PROCESS OF TREATING STEEL SHEETS

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This invention relates to a process for finishing rolling sheet metal, particularly sheet iron or sheet steel.

The principal objects of the present invention are the provision of a process whereby the amount of scrap in the production of such sheets, as compared to previous practice, is reduced, the grain size of the metal is maintained at minimum dimensions, a number of usual defects are largely eliminated, by means of which one or more of the steps conventionally employed may be eliminated, which results in such sheets being formed at a relatively low cost, and which results in a more perfect product throughout.

While the present invention is particularly applicable for use in connection with so-called "drawing" sheets, that is, sheets which in being employed for manufacturing various articles are subjected to a drawing process, it is not to be understood that it is entirely limited to such sheets, but may be employed with advantage in connection with other types of sheets and sheets of various types and kinds of metal, and this will be kept in mind although in the following description reference will be made mainly to drawing sheets.

The above being among the objects of the present invention, the same consists in certain steps and succession of operations as described below.

It is well recognized in the art that it is desirable in most cases, and necessary in many cases, that drawing sheets be perfectly smooth, of even thickness, and free from various imperfections and blemishes, and, in addition, particularly where the extent of the drawing operation is to be relatively great, and where the smoothness of the surface after drawing is important, that the grain size of the metal in the sheets be fine.

It is conventional practice that after such sheets have come sheared from the mill in the state known as "hot rolled" to first normalize the sheet by suitable heat treatment, then pickle it and then cold roll it one or more times (sometimes preceded by roller leveling). In most cases the sheets are then subject to a box-annealing treatment, after which they are usually again roller leveled, which operation is usually followed by one or more cold rolling operations. The mechanism necessary for carrying out these various steps being well known in the art, no drawings are deemed necessary to illustrate the same. I have found that the box-annealing treatment tends to increase the grain size of the metal, and, therefore, is undesirable in this respect, although in many cases it has heretofore been found necessary in order to bring the sheet to the proper stage of perfection. It is also a relatively slow and costly operation.

It has, to my knowledge, been heretofore attempted, and is followed in some cases at the present time, to subject the hot rolled sheets to a cold rolling operation prior to the normalizing treatment, this being commonly known as a "flat pass", but in all such cases that I am aware of I have found that particularly where the sheets exceed forty inches in width, a relatively great percentage of scrap results, due mainly to the pinching or crowding of the metal.

In fact, it is extremely unusual to find that the amount of scrap resulting from such cold rolling operation prior to the normalizing treatment is less than 6%, and it is obvious that this percentage of scrap entails an enormous loss to the manufacturer over a period of time. I have found that this percentage of scrap in the cold rolling operation before normalizing may be reduced to less than 1% if the hot rolled sheets are roller leveled, or subjected to an equivalent operation, before they are cold rolled. I have found that where the hot rolled sheets are cold rolled before the normalizing treatment, then the box-annealing treatment and any other operations that follow the same may be dispensed with without materially affecting the usefulness of the product, and will, in fact, increase its quality due to the maintenance of a small grain size of the metal. These constitute the gist of the present invention.

In accordance with the present invention I take the hot rolled sheets from the rolling mill and first put them, preferably in single thickness, through a roller level, preferably

while in a water bath, and then put them, preferably in single thickness, through a cold rolling operation, preferably while in a water bath. The sheets after the cold rolling operation may, if desired, be artifically dried, particularly where there may be a considerable length of time between cold rolling operation and the normalizing treatment. The sheets are then subjected to a normalizing treatment, are then pickled to remove the surface scale, and are then subjected to one or more cold rolling operations before and after which they are preferably roller leveled to place them in flat condition. The sheets thus obtained are of uniform and fine texture; their surfaces are exceptionally free from various blemishes; and the sheet as a whole is free of defects and is admirably adapted for the purpose for which it is to serve. It is not to be understood that such sheets may not be thereafter subjected to a box-annealing roller leveling, and cold rolling, if desired, but I have found that ordinarily such operations are unnecessary and therefore the expense of the same may be eliminated.

Formal changes may be made in the specific embodiments of the invention described without departing from the spirit or substance of the broad invention, the scope of which is commensurate with the appended claims.

I claim:

1. In the manufacture of metal sheets, the step of subjecting the sheets to a roller leveling operation and then to a cold rolling operation, between the hot rolling operation and the normalizing treatment.

2. In the manufacture of metal sheets, the steps of subjecting hot rolled sheets first to a roller leveling operation in the presence of water, then to a cold rolling operation, then to a normalizing treatment, and then to suitable finishing operations.

3. In the manufacture of metal sheets, the successive steps of subjecting hot rolled sheets to a roller leveling operation, to a cold rolling operation in the presence of water, to a normalizing treatment, and then to suitable finishing operations.

4. In the manufacture of metal sheets, the successive steps of subjecting hot rolled sheets to a roller leveling operation in the presence of water, to a cold rolling operation in the presence of water, to a normalizing treatment, and then to suitable finishing operations.

5. In the manufacture of metal sheets, the successive steps of subjecting hot rolled sheets to a roller leveling operation in the presence of water, to a cold rolling operation in the presence of water, to a drying treatment, to a normalizing treatment, and then to suitable finishing operations.

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