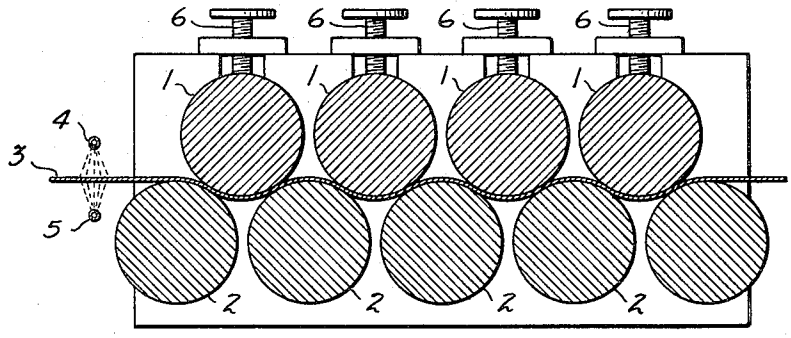
April 11, 1939. H. A. MONTGOMERY 2,153,811

PROCESS OF TREATING SHEET METAL FOR DRAWING AND THE LIKE

Filed Nov. 5, 1936



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Patented Apr. 11, 1939 2,153,811

UNITED STATES PATENT OFFICE

2,153,811

PROCESS OF TREATING SHEET METAL FOR DRAWING AND THE LIKE

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Application November 5, 1936, Serial No. 109,337

11 Claims. (Cl. 153—10)

This invention relates to the treatment or conditioning of sheet metal preparatory to stamping or drawing operations.

Sheet steel, such as ordinarily used for stamping or drawing operations, is frequently not homogeneous throughout and contains portions which are harder than other portions. When submitted to deforming operations, ridges, high spots and low spots are often produced in the article, due to the softer areas of metal stretching out in drawing the metal. Such irregularities on the surface of the sheet metal are commonly known as "stretcher strains" and are quite apparent. It requires expensive finishing processes, such as polishing, buffing or the like, to eliminate such defects, so that the metal stampings can be used for many purposes, such as for fenders or body portions of an automobile and the like.

In order to eliminate as far as possible such stretcher strains from the sheet metal before it is submitted to the stamping or drawing operation, it is customary to pass the sheets through a cold rolling machine known as a "roller leveler" or "buckler", which conditions the metal so that it may be drawn with greater ease and, when drawn, will have fewer surface irregularities. This machine has upper and lower rows of rolls. The lower row consists of a plurality of spaced rolls in stationary bearings, with a common drive, and the upper row consists of a plurality of adjustable rolls arranged in staggered relation with respect to the rolls of the lower row. These upper rolls may be adjustable individually or in any suitable combinations to give the desired amount of bending and pressure for the thickness of the metal being rolled. The rolls are positioned alternately between the lower rolls. In passing the sheet metal through such a machine the metal passes between the rolls and is caused to take a sinuous path, thus bending each portion of the sheet, both above and below the normal plane of the sheet. If there is any slippage, due to lubrication, between the metal and the rolls during the reverse bending operation, the surface of the metal is marred. Kerosene or some similar light hydrocarbon is ordinarily applied to the sheet that is to be roller leveled to wash away the dirt and grit and any grease that may be present on the sheet. Such a light hydrocarbon as kerosene does not prevent the driven rolls of the roller leveler from obtaining a good grip on the sheet, so that the sheet may be readily fed through the machine without slippage.

While such a process of treatment of the sheet metal before stamping or drawing aids in the elimination of surface irregularities, it does not entirely prevent the formation of ridges and high spots. The articles produced by drawing sheets so treated usually require a further finishing process, such as buffing, polishing and the like, to give the article a smooth surface. Furthermore, in processes now used there is considerable breakage and unevenness of the sheets due to uneven elongation of the metal.

An object of the present invention is to provide a method for treating sheet metal prior to drawing, such that the drawn articles produced will be free from unevenness and surface irregularities and will elongate uniformly and have a smooth finish, so that surface finishing operations are unnecessary, or greatly lessened.

Another object of the invention is to provide a method of treating the sheet metal prior to drawing, which permits the metal to be drawn with greater ease and uniformity, thereby reducing the amount of breakage in the drawing process.

A further object of this invention is to provide a composition which will not only prevent the formation of surface irregularities in the drawing operation but will act to inhibit corrosion prior to and after the stamping or drawing operation.

Other objects and advantages of this invention will be apparent from the following description of the process.

According to the present invention it has been found that if a sheet of metal, such as sheet steel, is treated with a composition comprising a saponifiable fatty substance containing some free fatty acid, in a suitable solvent, and the sheet is passed through the rolls of a buckling machine, such composition is very effective in preventing stretcher strains and in putting the sheet in condition so that when it is subjected to molecular movement during a stamping or drawing operation the finished article will have a more continuous smooth surface and require less refinishing.

In the accompanying drawing there is shown diagrammatically a buckling machine consisting of upper rolls 1 and lower rolls 2 between which rolls the sheet metal 3 passes, and by which the successive portions of the sheet are bent in opposite directions and squeezed between the rolls. The treating composition is shown as applied to the sheets by spray nozzles 4 and 5. One set of rolls is preferably vertically adjustable to give the desired amount of bending and pressure for the thickness of the metal being rolled. In the

drawing the upper set of rolls 1 is indicated as being so adjustable by screws 6 which raise or lower bearing blocks (not shown) on rolls 1.

The liquid treating composition may be a solution in some hydrocarbon vehicle of a suitable fatty acid, such as oleic, palmitic or arachidic, or any fatty substance containing some free fatty acid. The vehicle may be a mineral oil, such as kerosene, naphtha, or fuel oil, or any other suitable vehicle that will not disadvantageously affect the metal and will spread a film of the fatty acid or fat thereon. It is desirable to have the treating composition contain from about .5% to 10% free fatty acid.

One commercial fatty substance which is readily obtainable and efficient for use in the treating composition is wool fat, which contains lanolin, degras and recovered grease. Wool fat contains some free fatty acid. A treating composition consisting of about 5% to 25% wool fat, and preferably about 15%, dissolved in kerosene or other suitable hydrocarbon vehicle, has been found to be very satisfactory.

The exact action of such composition on the sheet of metal, whereby passing the sheet through the buckling machine and the stamping or drawing thereof subsequently is facilitated and a smooth article produced, is not known. The fatty acid in the presence of kerosene or some other suitable solvent apparently finds its way into the pores and infinitesimal cracks that may be produced in the buckling and squeezing of the metal as it is bent back and forth in passing through the rolls.

The free fatty acid in the composition decreases the surface tension and increases the wetting power of the composition, and this may be the reason why the material finds its way into the pores and infinitesimal cracks of the metal as it is passed through the rolls and squeezed therebetween.

The metal coming from the buckling machine, treated with a fatty acid solution as above described, may be drawn more uniformly and with considerably greater ease, and the drawn article has a smoother and more polished surface. It has also been found that the drawing of sheets so treated produces a smooth condition on the dies, and that there is considerably less breakage of the sheets in the drawing operation. The malleability of the metal seems in some measure to be affected.

Another advantage of the present invention is that the sheets of metal may be run through the buckling machine and stored for a considerable period of time before the stamping or drawing operation without rusting or corroding.

The treating composition can be applied to the sheets in any suitable way, such as by immersion of the sheet therein or by spraying it thereon, or applying it to the rolls of the buckling machine.

Furthermore, it will be understood that the present invention is not limited to the specific details set forth in the foregoing examples, which should be construed as illustrative, and not by way of limitation, and in view of the numerous modifications which may be effected therein without departing from the spirit and scope of this invention, it is desired that only such limitations be imposed as are indicated in the appended claims.

What I claim is:

1. The process of drawing sheet metal which comprises treating the sheet with a fatty acid in solution, subjecting the sheet to reverse bending operations, and drawing the sheet while said treating solution is disposed on said sheet.

2. The process of drawing sheet metal which comprises preparing the metal by coating surfaces thereof with a light hydrocarbon having about .5% to 10% fatty acid in solution, passing the metal while cold between rolls which cause reverse bending of each portion of the sheet, and drawing the metal while so coated.

3. The process of drawing sheet metal which comprises treating the metal prior to drawing by applying a solution of fatty acid to the metal, passing the metal through rolls in such a manner that it is caused to take a sinuous path, thereby working the solution into the surface of the metal, and leaving the solution on the metal for drawing.

4. The process of drawing sheet metal which comprises treating the metal prior to drawing by applying a solution comprising about 5% to 25% of a wool fat in a light hydrocarbon solvent, passing the metal through rolls in such a manner that it is caused to take a sinuous path, thereby working the solution into the surface of the metal, and leaving the solution on the metal for drawing.

5. The process of forming drawn articles from sheet metal, which comprises passing the sheet metal through rolls which cause it to take a sinuous path, while the metal is coated with a solution containing .5% to 10% of free fatty acid in a light mineral oil solvent, and then drawing the metal while coated with said solution.

6. The process of forming sheet metal articles by drawing and the like, which comprises preparing the metal by passing the metal while cold between rolls which cause reverse bending of each portion of the sheet while the metal is coated with a composition comprising a fatty acid dissolved in a light mineral oil, and leaving the coating on the metal for drawing.

7. The process of forming articles from sheet metal by drawing and the like which comprises applying a composition comprising a fatty substance dissolved in a light hydrocarbon vehicle which will spread a film of the fatty substance onto the surface of the sheet, subjecting the sheet to a reverse bending operation, thereby working the solution well into the surface of the sheet, and forming the article while the composition has a film of the fatty substance thereon.

8. The process of drawing sheet steel which comprises preparing the metal by applying a light hydrocarbon, containing a small portion of a fatty substance in solution, to both sides of the sheet, reversely bending the sheet a plurality of times and simultaneously rolling the sheet, whereby the physical condition of the sheet is modified to improve its drawing properties, and drawing the metal with said solution applied thereto.

9. In the process of drawing sheet metal to produce an article having a relatively smooth polished surface, the steps of coating the sheet with a solution of a fatty acid in a light hydrocarbon solvent, successively bending the metal in one direction and then in the other direction a plurality of times while simultaneously squeezing the metal, and allowing the coating to stay on the metal until drawn.

10. The process of producing drawn sheet metal articles having a smooth finish free from irregularities and defects, which comprises applying a treating solution of a fatty substance dissolved in a light hydrocarbon to the surface of the sheet, thoroughly working the solution

into the sheet surface by reverse bending thereof, and drawing the sheet to form the drawn article, while said treating solution is applied thereto.

11. The process of producing drawn sheet metal articles having a smooth finish free from irregularities and defects, which comprises applying a treating solution of about 5 to 25% of a fatty substance dissolved in a light hydrocarbon to the surface of the sheet, thoroughly working the solution into the sheet surface by reverse bending thereof, and drawing the sheet without removing the treating solution.

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