

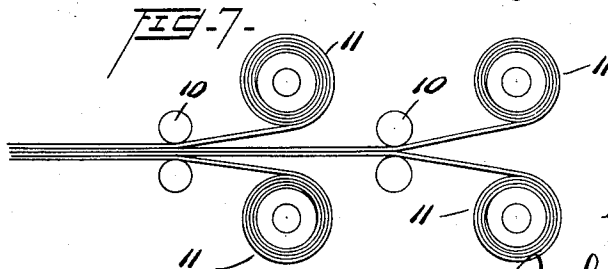
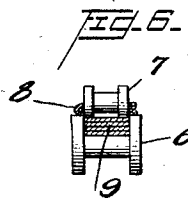
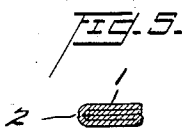
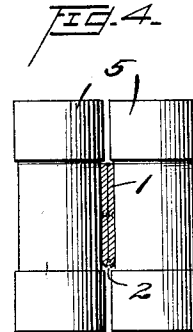
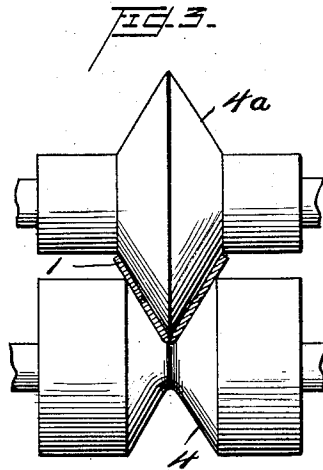
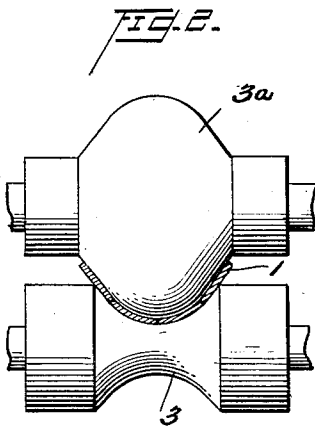
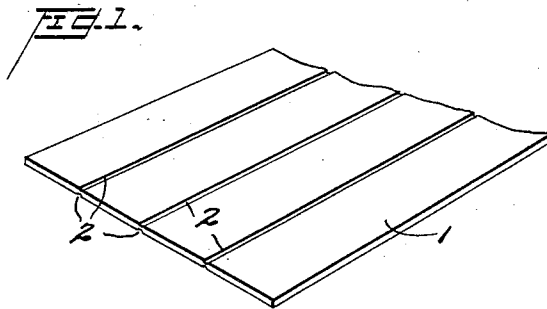
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H. P. PARROCK

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PRODUCTION OF STRIP STEEL

Filed March 18, 1927



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PRODUCTION OF STRIP STEEL

Application filed March 18, 1927. Serial No. 176,385.

My invention relates to the production of strip steel. The present method of making strip steel consists in rolling a suitable slab or bar into heavy strips while hot, in a continuous mill to as low a gauge as may be demanded, within the limits of the process. To make light strips, the strips so produced are cold rolled down to light gauges. Or, by a method recently adopted, a suitable slab is rolled hot in a continuous mill, the slab being of sheet width such as 36 inches to 48 inches wide, until it has been reduced to 16 to 20 gauge. It is then either coiled for subsequent cold rolling in a continuous mill to light gauges, or it may be rolled directly to light gauges in a continuous mill, regardless of its temperature. This sheet may then be split into narrow or strip widths.

These methods however are more expensive than the method I propose when used for the purpose of producing narrow strip widths.

In producing strips according to my invention, I take stock in the form of long strips, for example 120 feet long by 16 inches wide by $\frac{1}{8}$ of an inch thick, heated to a dull red heat either by reheating a coil in a suitable furnace or as it comes from the finishing pass of the heavy mill, and fold it lengthwise either by a plain fold or any other suitable fold, to provide for instance, an eight ply fold, each ply being 2 inches wide. The folded stock is sheared when cold along its edges and the strips separated and coiled.

In the accompanying drawing I have disclosed an arrangement of apparatus which may be used for accomplishing the desired result although it is apparent to those skilled in the art that other equally efficient means might be devised for accomplishing the same result.

Referring now to the drawings:

Fig. 1 is a perspective view of a portion of a sheet of marked or grooved stock preparatory to rolling;

Fig. 2 is an elevation of the first pass of rolls, the sheet being shown in section.

Fig. 3 is a similar view of the rolls for the second pass.

Fig. 4 is a similar view of the rolls for the third pass.

Fig. 5 shows in section a four ply folded strip.

Fig. 6 shows a machine for shearing the edges of the folded strip.

Fig. 7 shows the coiling device.

The sheet 1 before being fed to the folding rolls is first marked or grooved, as at 2, longitudinally on either one or both sides, for the purpose of facilitating folding and to reduce buckling when coiling a multiple ply strip. This can be done on the last pass of the heavy stock mill, or on the feed rolls serving the folding machine. In ordinary work, the latter method is the simpler.

The sheet as it is fed to the No. 1 pass of the rolls is hot and is preliminarily bent as shown by the rolls 3 and 3^a, the concave surface of one roll coacting with the convex surface of the other. From the No. 1 pass, the sheet is continuously fed forward to the angle rolls 4 and 4^a, the sheet as it leaves these rolls being about half way folded. After leaving the angle rolls 4 and 4^a the sheet is continuously fed between the vertical squeeze rolls 5, wherein the first ply of the fold is completed, the metal sheet having been bent flat along the line 2.

If all that it is desired to make is a two ply fold then the sheet may proceed directly to the shears or to a coiling mechanism as hereinafter described. If it is desired to make a four ply fold then the sheet may go through another series of folding operations similar to that just described. In fact there can be as many repetitions of folding as is within the possibilities of the stock being worked upon. While the rolls are shown in a horizontal position they are equally operable in the vertical position.

After the sheet has been folded into as many ply as desired, it may then pass directly while still hot into a continuous rolling mill and be rolled down to the desired gauge or it may be recoiled for use in the trade or for future rolling. The temperature of rolling is such that sticking of plys does not take place, as in the older sheet mill process. The metal is also rolled down much

more rapidly in ply than it could be done on a cold mill, singly.

The folded sheet when cold may thereafter be fed to a shearing machine of any suitable type such as is shown in Fig. 7 wherein there is a lower roll 6 coacting with an upper roll 7, which shears off the folded edges 8 of the strip pile 9.

Inasmuch as the metal is sheared after the final pass through the rolls, it does not have the ragged edges of cold rolled strip, which generally must be sheared on the edges after final rolling.

The superposed plies of strips from the shearing operation are fed between pinch or squeeze rolls 10 which guide and feed the stock and also "break" or "start" the plies on each other to loosen them and to relieve sticking. The separated strips are then fed to coiling rolls 11.

The value of my method lies in folding strip stock to conserve heat, thus being enabled to produce very light gauges at a cost much below that of cold rolling strip singly. In rolling the very lightest gauges from the heavier stocks, it will sometimes be necessary to reheat, but my method is still less expensive than single cold rolling, with respect to power, strength of mill and speed of reduction. Furthermore cold rolled strip does not have the soft properties of hot rolled stock, unless annealed.

By folding the stock, it can be reduced much faster in rolling, in a given mill than rolling single sheets. By rolling in a pack the heat is conserved more than in a single sheet on account of the relatively less radiating surface. This means that the stock can be worked on that much longer before it cools than is the case of single strip rolling.

If comparison is made with cold rolling, which must be done in single strips under known methods, the method of rolling in multiple plies is evidently less expensive. The cold mill in order to produce the light gauges, must intermittently anneal to relieve strain. In hot rolling in folds, strains are not set up as in cold rolling.

From the above description it will be clear that I take a long strip of metal of standard specifications heated to the temperature below the sticking point of the plies to each other as in old fashioned sheet practice and fold it lengthwise into as many folds as desired and thereafter further reduce the gauge by rolling while hot. The metal may then be rolled into a coil for future use or it may be passed through a shearing machine to cut the edges of the fold, the separate strips then being coiled in their final condition.

While I have described and illustrated my invention in connection with apparatus for making a simple fold, it is within the spirit of my invention that other methods and ap-

paratus for folding in other ways may be employed.

I therefore desire the present embodiment to be considered as illustrative and not restrictive, reference being had to the appended claims rather than to the foregoing description to indicate the scope of the invention.

Having described my invention what I claim as new and desire to secure by Letters Patent is:

What I claim is:

1. The method of producing strip steel which comprises progressively folding a long strip lengthwise and reducing the gauge of it while hot and thereafter cutting the folded strip along its edges to separate the plies of the fold.

2. The method of producing strip steel which comprises the steps of progressively folding a long strip lengthwise, reducing the gauge by rolling while hot and cutting it lengthwise to produce a plurality of strips.

3. The method of producing strip steel which comprises folding a long strip lengthwise by feeding it continuously through forming and gauge reducing rolls while hot and cutting it lengthwise to produce a plurality of strips.

4. The method of producing strip steel which comprises folding a long strip lengthwise by feeding it continuously through forming rolls while hot, thereafter further reducing the gauge by rolling and cutting it lengthwise to produce a plurality of strips.

5. The method of producing strip steel which comprises folding a long strip lengthwise while hot by feeding it continuously through forming rolls, thereafter further reducing the gauge by rolling while hot and then cutting the folded strip along its edges to separate the plies of the fold.

6. The method of producing strip steel which comprises folding a long strip lengthwise and reducing the gauge by rolling while hot, thereafter cutting, while cold, the folded strip along its edges, feeding the stock between squeeze rolls to facilitate separating the plies and thereafter separately coiling each ply.

7. The method of producing strip steel which comprises folding a long strip lengthwise while hot and thereafter cutting the folded strip along its edges to separate the plies of the fold, feeding the stock between squeeze rolls to facilitate separating the plies and thereafter separately coiling each ply.

8. The method of producing strip metal which comprises progressively folding a long strip along its longitudinal axis, progressively rolling the folded strip to reduce the gauge and thereafter cutting the folded strip along its edges to separate the plies of the fold.

9. The method of producing strip metal which comprises progressively folding and rolling a long strip along its longitudinal

axis to reduce its gauge by feeding it continuously between rolls and thereafter cutting the folded strip along its edges to separate the plies of the fold.

5 10. The method of producing strip metal which comprises progressively folding and rolling strip stock to reduce its gauge and cutting it lengthwise to produce a plurality of strips.

HARRY P. PARROCK