

UNITED STATES PATENT OFFICE

2,076,793

PROCESS TO PREVENT STICKING DURING ANNEALING

Lambert A. Salender, Ashland, Ky., assignor to
The American Rolling Mill Company, Middle-
town, Ohio, a corporation of Ohio

No Drawing. Application June 5, 1935, Serial
No 25,125

5 Claims. (Cl. 148—4)

My invention relates to the provision of a dried film of soap on sheet metal which acts as a separator to prevent sticking during annealing.

5 I am aware that it has previously been suggested to wash pickled steel and iron plates with a soapy solution, and then wash and dry the plates prior to annealing in order to alleviate sticking during annealing, but as distinguished
10 from this, which I do not believe to be effective, my invention relates to the formation of a film of soap, which is not washed off, but is very thin, so as not to interfere with subsequent treatment of the metal.

15 In carrying out my invention, I have had the best success in employing a soap solution of potassium or soft soap, although other soaps will partially satisfy my requirements. For example, I have employed a solution made up of one gal-
20 lon of potassium soap or soft soap, mixed with three gallons of water, the soft soap itself prior to being thinned with water containing over 60% of water in its composition.

I apply the soap solution preferably by allowing
25 it to drip on the top roll of the mill, whereupon the last cold rolling operation is performed on the sheets. I find that by the use of this soap solution it is unnecessary to employ any roll oil as a lubricant on this last cold rolling mill, and
30 the lubricant is spread on the sheet in a very fine, uniformly distributed film, by the action of the rolls. As the sheets are conveyed from this final cold rolling treatment, they will ordinarily be dried by passing them through flannel drying rolls; and I find it advantageous at times
35 to run the solution on to the sheets prior to these drying rolls, in addition to the film applied to the rolls.

40 The film that is formed on the sheet in one practice has been calculated to weigh less than .010 of a gram per square foot of surface. It dries on the sheet into a continuous thin coating without tendency to split up or collect in granules or lumps as occurs with other separators. The
45 result is that the sheets can be stored for a number of days prior to annealing without the development of rust.

Not only is the film to which I have referred useful as a substitute for lubricant in the rolling operation, but it also has utility during anneal-
50 ing. In the annealing step, the sheets are piled together in the usual way. The presence of the soap film on the sheets very adequately prevents sticking during annealing, and is very economical in use. Under the annealing heat the soap, of

course, decomposes, but it leaves as a residue only a very slight carbonaceous deposit which does not discolor the sheets, and is usually notice-
5 able only if the sheets are wiped with a cloth, or if the hand is passed over the sheets. Nevertheless, sticking under ordinary annealing conditions appears to be entirely prevented.

The substitution of a soap solution in the latter stages of cold rolling does not increase the cost over the ordinary use of roll oil, operates efficient-
10 ly during the rolling process, and acts as a sufficient separator upon annealing, which roll oil does not do.

With a film of .010 of a gram per square foot of surface, such potassium carbonate as would remain after driving off the fatty acid, would be in the neighborhood of .003 of a gram per square
15 foot, which is entirely negligible.

It is not necessary that the film of soap be as thin as noted, as .05 gram per square foot of sheet surface has been employed and no doubt
20 a film of even greater thickness would not be deleterious. It is probable that due to the heat in the sheets themselves at the end of the cold rolling operation, the soap is immediately converted to an anhydrous condition, if not carbonized, and that in any event, potassium carbonate is what serves as a separator in the annealing operation. As heretofore stated, potas-
25 sium soaps need not be employed, and sodium soaps or combined sodium and potassium soaps of the various fatty acids employed in soap manufacture, will serve my purpose. One advantage of the potassium soaps is that a rich solution can be readily formed, which does not tend
30 to become jelly-like at room temperature, thus interfering with pouring. While I have described a particular mode of application of the soap solution, and while this mode of application has the advantage of lubrication in the rolls as noted above, other methods of applying would satisfy
35 my main purpose.

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

1. That process in the production of sheets which consists in applying on the rolls when cold rolling the same, a solution of soap, thereby forming a film on the sheets, and after the drying of said film, annealing the said sheets in piles, said
40 film serving as a separator to prevent sticking.

2. That process in the production of sheets which consists in applying on the rolls when cold rolling the same, a solution of predominantly potassium soap, thereby forming a film on the
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sheets, and after the drying of said film, annealing the said sheets in piles, said film serving as a separator to prevent sticking.

3. That process in the production of sheet
5 metal which consists in cold rolling the sheets in the presence of a lubricant solution of soap prior to final drying of the sheets, imposing a further coating of said solution completing the drying of said sheets, then piling the said sheets
10 and annealing the same.

4. That process in the production of sheets which comprises the steps of applying to the sheets a solution of soap, drying the sheets so

as to leave a thin film of soap thereon, and annealing the said sheets in a pile, the said film serving as a separator during annealing to prevent sticking.

5. That process in the production of sheets 5 which comprises the steps of applying to the sheets a soap solution predominantly of potassium soap, drying the sheets so as to leave a thin film of the soap thereon, and annealing the said sheets in a pile, the said film serving as a separator during annealing to prevent sticking. 10

LAMBERT A. SALENDER.