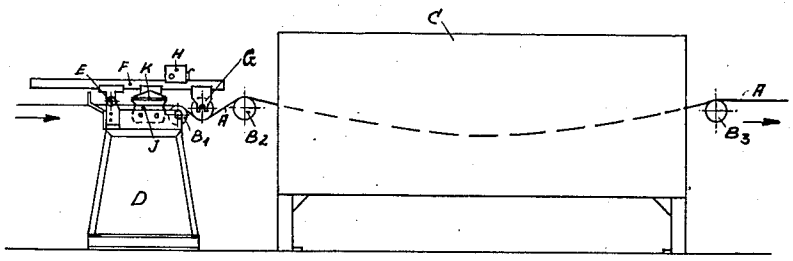
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TENSIONING DEVICE FOR MAINTAINING A GIVEN CATENARY CURVE IN METAL STRIPS CONTINUOUSLY PULLED THROUGH AN ANNEALING FURNACE

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TENSIONING DEVICE FOR MAINTAINING A GIVEN CATENARY CURVE IN METAL STRIPS CONTINUOUSLY PULLED THROUGH AN ANNEALING FURNACE

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In continuous annealing furnaces with free catenary curve of the heating zone for strip material it is necessary to keep the sag or hang of such material constant by means of adjustment.

The permissible amount of sag is governed first by the shape or form of the furnace inside (the strip must not on principle be allowed to touch the interior of the furnace and should be kept at a uniform distance from the muffle walls) and again by the maximum admissible pulling strain for a given cross section and annealing temperature of strip which may be exerted on such strip, without stretching it. The sag is inversely proportional to the tension prevailing in the strip.

The method of regulating the tension in the case of a uniform pulling drive, by means of brake located at the entrance to the furnace is known. For this purpose the known types of brake are sliding or drag brakes, or roller brakes with hand adjusted braking action.

This method however, is too coarse and unreliable to avoid with certainty that the strips touch the furnace interior, or that they are not subjected to stretching strain, or to snatch or sudden oscillations caused by temporary retardation or stoppages at the delivery end.

According to the present invention, the brake action working directly upon the passing strip is full-automatic in application, being governed directly by the tension in the material itself, in such manner that, by means of a feeler, the tension in the strip is gauged. The feeler so coacts with the variable brake, that upon the tension becoming greater, the brake action is automatically reduced, whilst in the event of the tension relaxing, the brake action is automatically increased.

Methods are known which maintain a constant tension in feeding strip material by varying the pulling force.

An apparatus is already known with one mechanism for feeding wire or strip material into a heating chamber and with a second mechanism leading the treated material therefrom, the second mechanism being frictionally driven and the effect of such drive being controlled by a brake device actuated in response to the degree of slackness of the material between the two mechanisms. This method requires a rather complicated arrangement of two different driving mechanisms. The varying degree of slackness is used for controlling, by means of a friction brake, the speed of the mechanism carrying the heated material away from the furnace.

Another tensioning device is using a pair of movably mounted pulling rolls with counterpoise for regulating the pulling force.

The inertia of this arrangement and therefore the time lag is considerable. In the present invention there is only one mechanism with constant pull for the transport of the material required, this mechanism being located at the side where the material is leaving the furnace. The whole device is very simple. The varying degree of slackness is used for increase or reduction of the brake action working immediately upon the running material. This device can be subdivided laterally in a simple manner for regulating the sag of several strips running through the furnace at the same time.

In the accompanying drawing which illustrates one embodiment of the invention Figure 1 is a side view embodying the features of the invention. The strip material A to be annealed runs in the direction of the arrow, through the furnace C, pulled by a constant force and guided by the guide rollers B_1, B_2, B_3. At the front end of the furnace is the brake device D, consisting of the lower fixed brake shoe J and the upper movable K. The upper shoe of the brake is connected with the lever F which is free to move about the fulcrum E. At the end of lever F is located the feeler roller G, which, in continuous contact with the strip as it travels along, gauges its tension. So long as the tension remains constant, the brake pressure also remains constant. If the tension relaxes, then the feeler roller G sinks down further, thereby increasing the brake pressure. If the tension

becomes greater, then the roller G rises with the strip, thereby reducing the brake pressure.

On the lever F is a sliding weight H, which is used for obtaining the normal sag according to thickness and material of the strip, by adjusting it along the lever to the corresponding normal brake pressure. The brake effect is originated by the lever F exerting a pressure through the upper shoe K directly upon the passing strip. Although the illustrated manner is showing the preferred embodiment of the invention, any other known type of brake working directly of the passing strip and any other known means for adjusting the brake pressure and for coaction between the feeler roller and the brake may be used.

What I claim is:

In a tensioning device for maintaining a constant catenary curve in metal strips continuously pulled through an annealing furnace, a brake located at the entrance side of the furnace with adjustable braking effect working directly upon the passing strip and a feeler for measuring the slackness of the strip, said feeler coacting with the brake in such manner that with increased slackness the brake is loaded and with increased tension the brake is released.

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