Aug. 22, 1950 P. BLAIN 2,519,818

ROLLING MILL WITH SET ELONGATION

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Fig. 1.

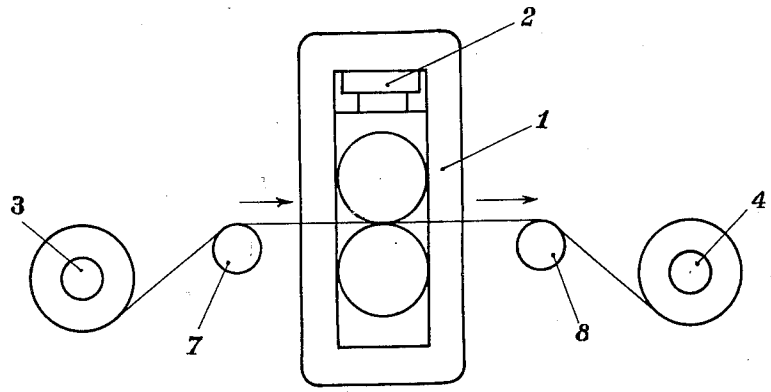

Fig. 2.

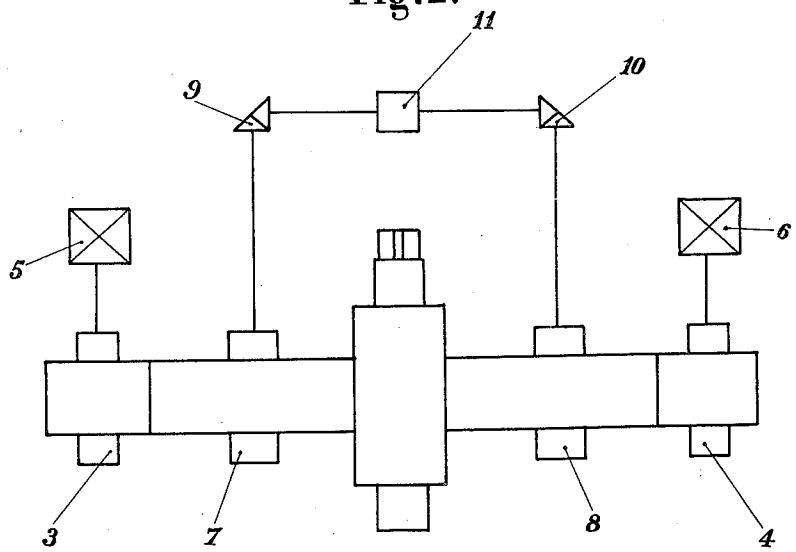

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Fig. 3.

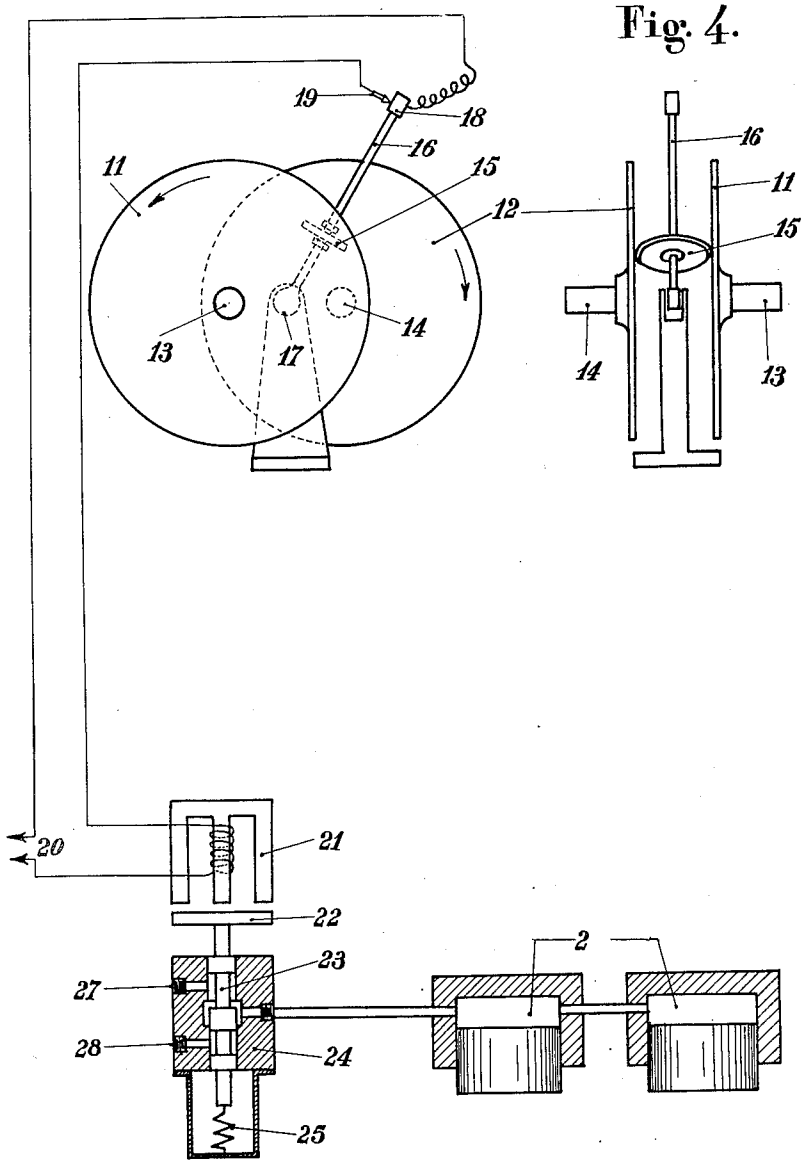

Fig. 4.

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ROLLING MILL WITH SET ELONGATION

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1 Claim. (Cl. 80—56)

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A rolling mill with a set elongation is a mill that allows the reduction in thickness of a band in a given ratio, consequently a stretching of the band in the same ratio whatever may be the thickness of the band as it enters the rolls.

In accordance with a known form of execution of such a mill, drawing set in which the band travels are located respectively fore and aft of the mill stand; each set contains a certain number of rollers that are interconnected by gearing arranged so that the peripheral speed of all the rollers of one set is the same; in addition, the two drawing sets are interconnected by a mechanical drive ensuring a fixed ratio between their respective speeds.

The rolled band, that unrolls from a first winding drum, travels in the force drawing appliance, into the mill, then into the aft drawing appliance to roll up finally on the second winding drum; it cannot slip on the rollers of the first drawing set or on those of the second set, so there is necessarily an elongation in the mill in the ratio that there is between the peripheral speeds of the rollers of the first set and that of the second set and this is so whatever may be the thickness of the band going into the rolling mill.

My invention has for its object a mill with set elongation in which the closure of the rolls is regulated at each instant by the action of a contrivance for measuring the ratio of the speeds of the band as it enters and as it leaves the rolls.

To do this, the band can travel fore and aft of the rollstand on driving rollers that transmit their movement to a contrivance that controls the adjusting or the slackening of the mill depending on whether the relative speed of the rollers is below or above a fixed ratio.

The attached drawing shows as an example a form of execution of my invention.

Figs. 1 and 2 show diagrammatically the mill respectively in elevation and in plan view.

Figs. 3 and 4 show similar side and front views of the regulating contrivance.

The stand 1 of the rolling mill is furnished with a hydraulic adjusting jack 2; the band unrolls from the drum 3 to wind on to the drum 4; after rolling, the drums are driven respectively by motors 5 and 6, in such a way that the band is under tensile strain as it enters and as it leaves the rolls; the driving rollers 7 and 8 are drawn by the band. These rollers transmit their movement through gears 9 and 10 to a contrivance 11 that closes a contact when the ratio of the peripheral speeds of the rollers 7 and 8 falls below

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a given figure and opens this contact when the ratio exceeds this figure. This contact is placed in a circuit comprising an electromotive force and an electro-magnet that controls a hydraulic relay putting the adjusting jacks in communication with high-pressure mains if the ratio of the speeds of the rollers is too low and with the exhaust if this ratio is too high. In such conditions, the rolling pressure is fixed at an average figure such that the band, whatever its thickness as it enters the rolls, undergoes in its travel through the mill the exact elongation for which the contrivance 11 is regulated.

For this purpose, the disc 11 is controlled by the roller on the "in"side 7 and the parallel disc 12 is controlled by the roller on the "out"side 8 (Figs. 3 and 4). These two discs are placed opposite to each other with their planes parallel but with their axes 13 and 14 set back. A small wheel 15 turns round an axis 16 hinged at 17 to a point midway on the line of the centres of the axes 13 and 14, and bears on the two plates that turn in opposite directions. In these conditions, the axis 16 takes a position that depends only on the figure of the ratio of the speeds of the discs 11 and 12, i. e. of the ratio of the speeds of the rollers at the entry and exit from the rolls if the drives between rollers and discs are the same on the "in" and "out" sides; a ferrule 18 insulated with reference to ground fixed on the axis 16 cooperates with contact 19 so placed that its position can be regulated in line with the elongation that is desired during the travel through the rolls. A circuit connects a suitable E. M. F. 20, the contact 18—19 and an electromagnet 21 that can attract a blade 22 attached to the ram 23 of a hydraulic distributor 24. In the position shown, taking the contact 18—19 as open, the ram and the blade of the hydraulic distributor are, in their lower position, urged by the spring 25. Under these conditions, communication is made by the distributor between the adjusting jacks 2 and the exhaust 27. When contact is established at 18—19, the blade is attracted and the hydraulic distributor 24 links up the adjusting jacks 26 with an inlet of high-pressure water 28. The hydraulic distributor thus puts alternatively the jacks in communication with the exhaust or with the high-pressure mains as the elongation that the band undergoes in the rolling mill exceeds the predetermined ratio or falls below this figure. On an average, the elongation of the band has then this predetermined figure and the fluctuations above and be-

low this elongation can be reduced to a very low amount.

Instead of direct action of the hydraulic distributor on the feed of high-pressure water to the jacks, these jacks can be connected on the high pressure side of a hydraulic multiplicator while the distributor delivers water at a lower pressure to the low pressure side of the multiplicator.

It is also possible to design a form of execution of my improved rolling mill with set elongation in which the mill is furnished with a mechanical adjusting device with screws or wedges, with the adjusting regulated automatically in line with the readings supplied by the contrivance 11 that measures at each moment the elongation that the band undergoes in the rolling mill.

Obviously, the form of execution that has been described above with reference to the attached drawings has been offered purely as a guide and by no means as a limitation, and my invention allows the application of any device that provides for the adjustment of the adjusting of the rolling mill stand in line with the ratio of the speeds of the band as it leaves and as it enters the rolling mill.

What I claim as my invention and desire to secure by Letters Patent is:

A rolling mill with set elongation comprising

a set of rolls for changing the cross-section of a strip of material, means for adjusting said rolls, strip driven means at the inlet side and strip driven means at the outlet side of said set of rolls, two parallel discs rotatable about parallel axes offset in relation to each other, a rod rocking about an axis located midway between the axes of said discs, a roller loosely mounted on said rod and frictionally driven against the two said discs, means to cause said discs to rotate in opposite directions at speeds which are respectively proportional to the speeds of said strip driven means at the inlet and outlet sides of said set of rolls, an electric switch controlled by the rockings of said rod and means for causing said switch to control said adjusting means.

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