

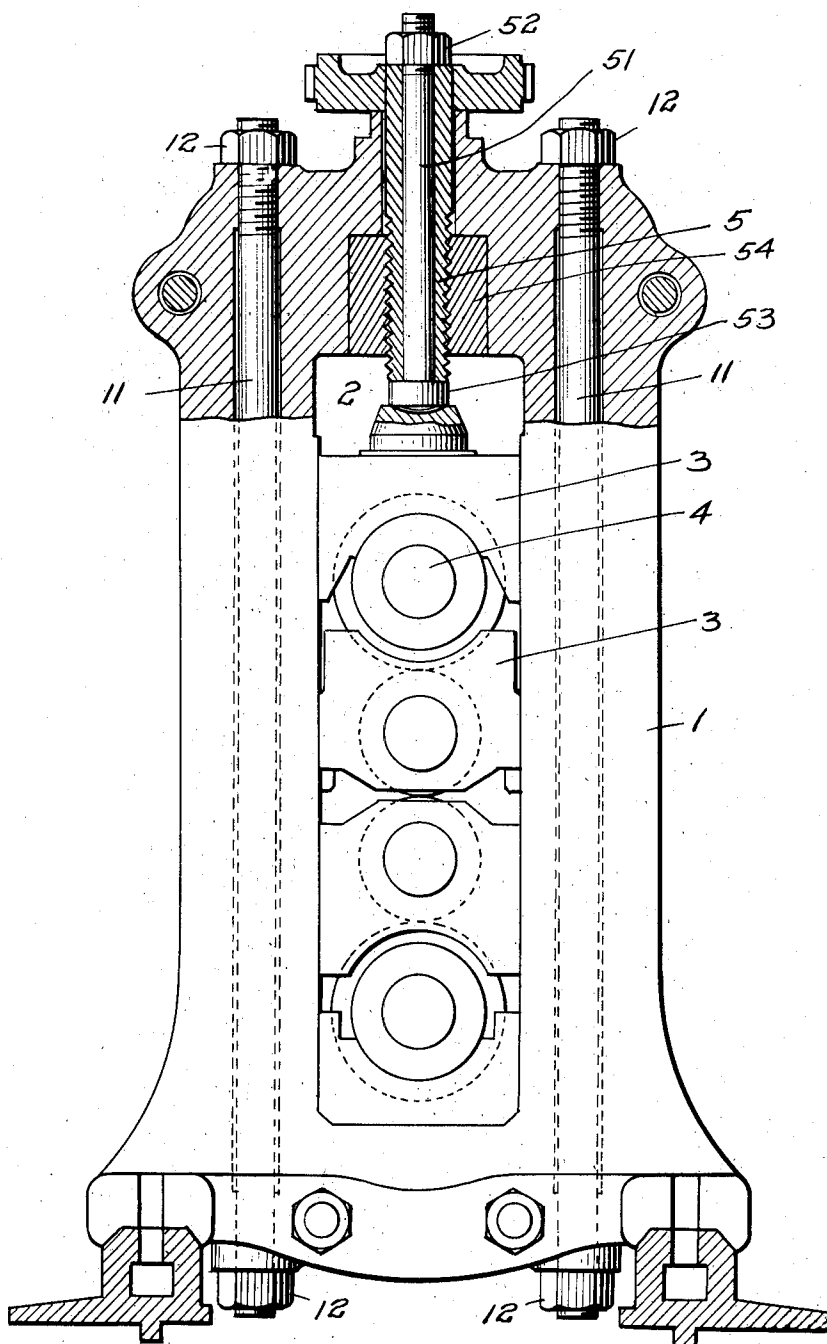
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ROLLING MILL

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WITNESSES

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ROLLING MILL.

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My invention relates to improvements in rolling mills, and the object in view is a rolling mill capable of producing rolled articles much more accurately controlled and defined in the matter of thickness than hitherto has been possible.

variations of the nature indicated are of a value such as to become an appreciable and a substantial fraction of the intended thickness. The rolled sheet then varies greatly in gauge.

In the accompanying drawings a roll stand embodying my invention is shown partly in side elevation and partly in vertical section. The plane of section is transverse to the axes of the rolls and medial through the housing at one end of the roll stand coincident with the axis of the screw by which the rolls are adjusted within the housing.

The difficulty here dwelt upon, attending the rolling of the lighter gauges of steel, has been recognized, and attempt has been made to overcome it. The present day practice is to screw the rolls down not to contact merely, but to screw down further, and to "take up the slack", so to speak. That is to say, initially to stretch the substance of the housing. In consequence, the housing under rolling strain will not yield to as great a degree as otherwise it would, and a larger component of the strain is effective in the attenuation of the material, but even this expedient is incapable of giving accurate definition, and irregularity cannot by such known means be adequately eliminated.

The roll housing 1 here shown is essentially a heavy block of suitable material, ordinarily of cast iron, provided with an elongate and ordinarily a vertically extending eye 2. The opposite sides of this eye are parallel and between these parallel faces pillow blocks 31, 32 are carried. The rolls at their ends are journaled in the pillow blocks and one at least of each pair of rolls is by its necks 4 journaled between a pair of pillow blocks 31, 32. A screw 5 threaded in the body of the housing and extending downward in the major axis of the eye, engages the uppermost pillow block 31 from above; it holds the assembly in place; and it is turned down or up alternately to diminish or to increase the width of the roll pass. The mill stand here shown is that of a four-high mill with one roll pass, but in that particular the drawing is exemplary merely; the invention is not limited to any such particular feature.

It is the object of my invention to diminish and even to eliminate the give of the housing when under rolling stress, and so to render the material itself more completely and entirely responsive to the rolling strain and in consequence to attain a rolled article of more minutely uniform thickness; a result of more notable value in the case of sheets of lighter gauges.

In the rolling of particular articles, and particularly in the cold rolling of sheet steel as hitherto conducted, the strain of rolling expresses itself in part, but only in part in the diminished thickness and the incidental elongation of the material; it expresses itself also in the "give" or stretching of the body of the housing. This stretching of the housing itself is an uncertain factor in the problem of rolling, in consequence of which small irregularities appear, small divergences from the intended thickness to which the rolled material is reduced. And these divergences are as a matter of practical experience hitherto, irregular and uncontrollable. In rolling steel of heavier gauge such small irregularities are of relatively little importance, but in rolling lighter gauges,

The housing is essentially an integral casting; the eye which is formed in it is formed from end to end in an integral body of metal, and through this integral body the screw 5 penetrates. The integral body of the housing is penetrated throughout its vertical extent, that is to say in the direction in which the rolling strain is primarily exerted, by two tension bolts 11, one on either side of the eye 2 within which the rolls are journaled. These bolts are applied hot and the nuts 12 upon them are tightened while the bolts are still hot and in relatively expanded condition, so that when cooled to uniform temperature with the body 1 of the housing they exert upon the housing compressive strain. To the extent then that the strain of rolling which tends to stretch the housing is met by the compressive strain which these bolts exert, there is no yielding, and the strain expresses itself as is intended, in the reduction of the thickness of and in the incidental elongation of the material being rolled. And manifestly it becomes a practical matter so to exert com-

pressive strain upon the housing that the strains of rolling will be wholly counteracted, and substantially all the strain will go into the attenuation of the material. In
5 such wise the actual attenuation of the sheet may be predetermined with a precision hitherto unattained.

It is not, however, the body of the housing alone which in this matter comes to be
10 reckoned with, there is distortion within the body of screw 5. And similarly as I strengthen the body of the housing against distortion under rolling strain, I strengthen the screw 5 also. I place within it also a
15 tension bolt 51, and I screw the nut 52 upon this bolt to place while the bolt is in hot and expanded condition so that when cooled to uniform temperature with the body of screw 5, the screw as a whole is under compression.
20 The head 53 of bolt 51 immediately engages the pillow block 3, while it is the body 5 of the screw which being externally screw-threaded is engaged by the nut 54 within the body of housing 1. The strain of rolling
25 therefore which tends to effect compression and distortion of the screw, exerted upon an already compressed body, is the more securely resisted, with the result that the strain expresses itself in far larger degree,
30 and with substantial completeness in the attenuation of the material. Thus I produce

a rolled article of more accurately predetermined and controlled thickness.

I claim as my invention:

1. In a rolling mill a housing provided 35 with an eye, the housing being integral throughout the extent of such eye, and a pair of rolls journalled each at one of its ends within such eye, the housing being reinforced with a pair of tension bolts shrunk 40 to place and extending one on each side of such eye.

2. In a rolling mill a housing, a pair of rolls journalled each at one end within the housing, and a screw mounted in said housing 45 and holding the rolls in place, the said screw being compound, the screw thread being formed upon one of its parts and the thrust-delivering surface being formed upon another of its parts and such parts being 50 shrunk to place, each relatively to the other.

3. In a rolling mill a pair of rolls journalled each at one of its ends within a one-piece housing, and a screw mounted in said housing and holding the rolls in place, the 55 housing being reenforced with a tension bolt shrunk to place, and the screw being reenforced with a tension bolt shrunk to place.

In testimony whereof I have hereunto set my hand.

LLOYD JONES.