J. E. MONTGOMERY.

FRICTION DRIVE FOR THE TOP ROLLS OF ROLLING MILLS.

APPLICATION FILED SEPT. 5, 1919.

1,342,343.

Patented June 1, 1920.

2 SHEETS—SHEET 1.

FIG. I

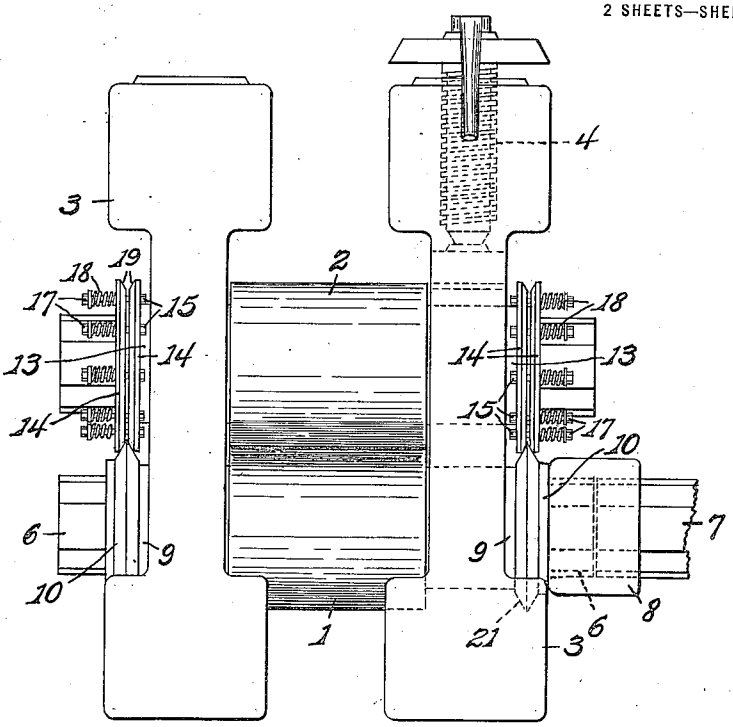
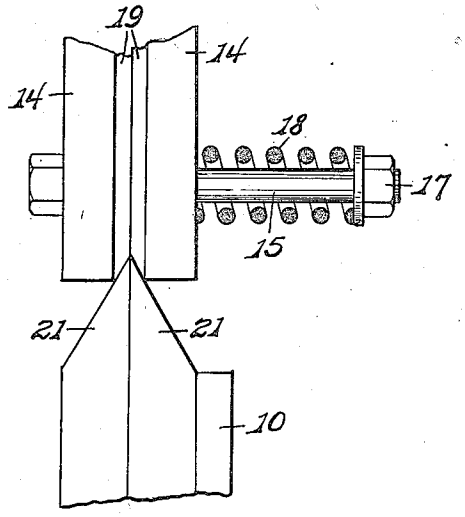


FIG. 3



WITNESSES

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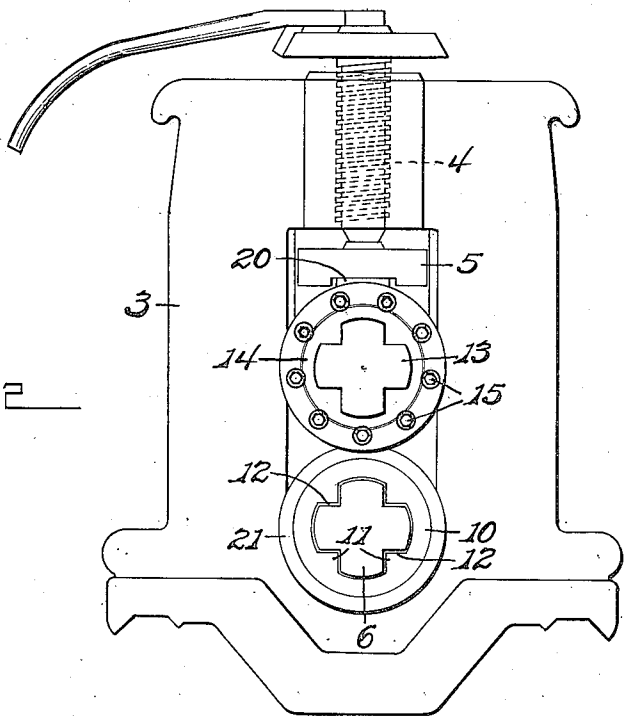


Fig. 2

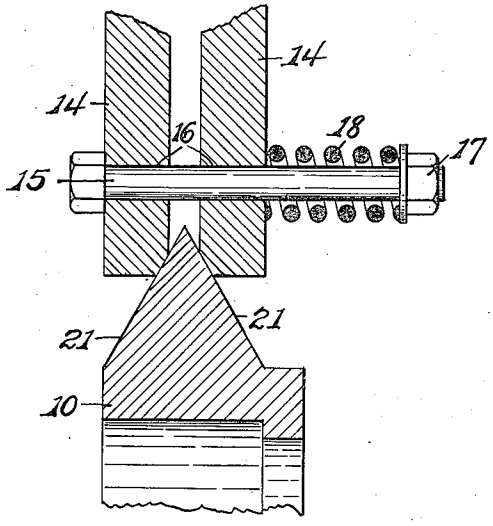


Fig. 4

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FRICTION-DRIVE FOR THE TOP ROLLS OF ROLLING-MILLS.

1,342,343. Specification of Letters Patent. Patented June 1, 1920.

Application filed September 5, 1919. Serial No. 321,874.

To all whom it may concern:

Be it known that I, JULIAN EARL MONTGOMERY, a citizen of the United States of America, and resident of Wheeling, county of Ohio, and State of West Virginia, have invented certain new and useful Improvements in Friction-Drives for the Top Rolls of Rolling-Mills, of which the following is a specification.

This invention relates broadly to rolling mills, and more specifically to a friction drive and balance for the upper rolls of such mills.

The primary object of the invention is to provide means whereby the vertically movable roll of a rolling mill is frictionally driven from the positively driven roll irrespective of the positions assumed by said vertically movable roll relative to said positively driven roll when said rolls are in operation.

A further object is to provide apparatus which constitutes a balance for the top roll of a rolling mill and also means whereby said top roll is driven by friction from the bottom roll when the mill is idling—that is, when no material is passing between said rolls.

A still further object is to provide a device of the character mentioned designed not only to displace the usual driving gears or pinions, but also to provide an adjustable balance whereby the top roll of the mill may be supported at any desired distance from the bottom roll.

With these and other objects in view, the invention resides in the features of construction, arrangement of parts and combinations of elements which will hereinafter be fully described, reference being had to the accompanying drawings, in which—

Figure 1 is a front elevation of a set of rolls, illustrating the application of my invention;

Fig. 2 is an end view of the same;

Fig. 3 is an enlarged edge view of the engaging portions of the friction disks, showing the relative positions assumed thereby when the top roll is elevated thereon to the limit of its vertical operating movement; and

Fig. 4 is a sectional view of the same, showing the positions taken by said disks when the top roll is supported upon or adjacent to the lower roll.

Referring to said drawings, 1 indicates the bottom roll and 2 the top roll of a rolling mill of a common type, said rolls being mounted on the usual housings 3 which carry adjusting screws 4 whereby the usual riders 5 and underlying brasses 20 are adjusted with respect to the necks of the top roll 2 to regulate the distance of said roll from the bottom roll. The bottom roll is driven in the ordinary manner, the wabbler 6 thereof being coupled to a drive-spindle 7 by means of the usual coupling box 8.

Mounted upon each of the opposite necks 9 of the bottom roll 1 is a collar-like disk 10 having a V-shaped beveled peripheral edge with the opposite beveled faces 21 disposed at corresponding angles and meeting, preferably, at an acute angle, as shown. Formed integral with said disk on the outer face thereof are angular radial directed pods 11 designed to seat more or less closely within the recesses 12 of the wabbler 6 so that said disk is positively driven through rotation of said roll 1. While said disk may be otherwise mounted upon the roll neck, it is preferred that it be slipped over said neck with its pods 11 received in the recesses 12 of the wabbler, as aforesaid, and that the coupling box 8 be closely fitted against the outer faces of said pods, as shown in Fig. 1.

Loosely mounted upon each of the necks 13 of the top roll is a pair of like disks 14 which are connected by means of a plurality of horizontally disposed bolts 15 that are loosely received in holes 16 provided therefor in said disks. Interposed between the outer face of the outer disk 14 and an adjusting nut 17 carried by the outer end of each bolt 15 is a spiral bolt-encircling spring 18. Said springs tend to maintain said disks with their opposing faces in seated relation one with the other, as shown in Fig. 3, and are adapted to yield to permit lateral separation of said disks, as shown in Figs. 1 and 4.

The opposing faces of the disks 14 are provided with corresponding peripheral inclined surfaces or bevels 19 the angles of which correspond with those of the beveled faces 21 forming the V-shaped edge of the disk 10. Said disks 14 and the disk 10 are so disposed relatively and are of such sizes that, irrespective of the position taken by the top roll between its limits of vertical movement—that is, between the position in which said roll rests directly upon the bot-

tom roll and the extreme elevated position that is permitted by the adjustment of the riders 5 and brasses 20—the bevels or inclined surfaces 10 of the disks 14 remain firmly seated upon the opposite inclined faces 21 of the beveled edge of the disk 10.

In Fig. 4 is illustrated the relative positions occupied by the various disks either when the rolls 1 and 2 are in direct contact or in an intermediate elevated position, the apex or extreme edge of the uppermost portion of the beveled edge of the disk 10 being disposed between the lowermost portions of the opposing faces of the disks 14, which latter have their beveled surfaces 19 resting upon the opposite beveled faces 21 of said disk 10 below said apex. In such engaged position of the rolls the disks 14 are lowered with respect to the disk 10 which acts in the manner of a wedge to separate said disks 14 against the tension of the springs 18.

Fig. 3 illustrates the relation of the various disks in the most widely separated position of the rolls in which they are operative for communicating motion to the top roll. In such position the apex or extreme edge of the uppermost portion of the beveled edge of disk 10 is received at the bottom of the lowermost portion of the channel formed by the bevels 19 of the disks 14 when the opposing faces of the latter are seated one on the other.

In practice, the tension of the springs 18 is adjusted so that the disks 14 will coöperate with the disk 10 to sustain the weight of the top roll, supporting or balancing the latter at any desired elevation above the bottom roll. The adjusting screws are then adjusted to lower the top roll to the extent desired, according to the thickness of the material which is to be acted upon. Obviously the necessity for the provision of the weights or heavy springs commonly employed as balances for the top roll is obviated by the structure described.

The weight of the top roll borne by the loosely carried disks 14 will suffice under ordinary conditions to create sufficient friction between said disks and the roll to drive the latter when the disks are rotated. When undue driving strains are created, said disks will manifestly slip either with respect to the neck of the upper roll or with respect to the driving disk 10, and in either case no injury to the parts will result.

The disks 14 are effectually prevented by the disk 10 from slipping off the roll neck 13, said disk 10 having a portion of its periphery at all times disposed between said disks 14.

What is claimed is—

1. A friction drive and balance for the adjustable top roll of a rolling mill, comprising, in combination with the rolls of such mill, a driving disk carried by the bottom roll, a pair of relatively movable members carried by said top roll in overlying relation to said driving disk, and resilient means whereby said members are maintained in such relation to each other that they seat upon said driving disk for balancing said top roll.

2. A friction drive and balance for the adjustable top roll of a rolling mill, comprising, in combination with the rolls of such mill, a driving disk carried by the bottom roll, a pair of relatively movable members carried by said top roll in overlying relation to said driving disk, and resilient tension means whereby said members are yieldingly held against relative separating movement, the peripheral edge of said disk being received between peripheral portions of said members and constituting a seat upon which said members rest throughout the range of vertical adjustment of said top roll.

3. A friction drive and balance for the adjustable top roll of a rolling mill, comprising, in combination with the rolls of such mill, a driving disk carried by the bottom roll, a pair of parallel disks carried by said top roll and relatively movable on the latter toward and away from contacting positions, the peripheral edge of said driving disk being received between the peripheral edges of said parallel disks, and resilient means whereby said parallel disks are maintained in seated frictional relation to said edge of the driving disk throughout the range of vertical adjustment of said top roll, said resilient means being adapted for adjustment for increasing and decreasing the friction between said parallel disks and said driving disk.

4. A device of the character described, comprising, in combination with the rolls of a rolling mill, the top roll being adjustable, a driving disk carried upon the neck of the bottom roll of said mill and having pods fitted in the recesses of the wabbler of said lower roll, said disk having its peripheral edge beveled into V shape, a pair of parallel disks carried by the top roll, the peripheries of the adjacent faces of said parallel disks being beveled at angles corresponding to the angles of the bevel of the driving disk, said driving disk having its beleved edge disposed between the parallel disks in frictional engagement with the beveled surfaces of the latter, and adjustable tension means whereby said engagement is maintained throughout the range of vertical adjustment of the top roll, said disks being adapted to serve both as balancing means and driving means for said top roll.

5. A friction drive and balance for the

adjustable top roll of a rolling mill, comprising in combination with the rolls and adjusting screws for the top roll, a driving disk carried upon the neck of the bottom roll, said disk having its peripheral edge beveled into V shape, a pair of parallel disks loosely carried by the top roll, the peripheries of the opposing faces of said parallel disks being beveled at angles corresponding to the angles of the bevel of the driving disk, adjustable tension means yieldingly maintaining said parallel disks against separation, said driving disk having its beveled edge disposed between and in frictional supporting relation to the beveled surfaces of said parallel disks whereby the top roll is balanced in an elevated working position, said driving disk being adapted, under the adjusting pressure applied to the top roll through said adjusting screws, to wedge said parallel disks apart against the tension of said tension means and to drive said top roll through its frictional engagement with said parallel disks.

6. A friction drive and balance for the adjustable top roll of a rolling mill, comprising, in combination with the rolls of such mill, a pair of disks mounted upon each end of said top roll, the disks of each pair being relatively movable longitudinally on said roll, yieldable means tending to maintain said disks with their opposing faces in close proximity, said opposing faces having peripheral bevels whereby an annular groove or channel is constituted when said faces are in engagement, and a driving disk carried by the bottom roll of said mill, said driving disk having a beveled peripheral edge providing opposite surfaces relatively inclined to correspond with the bevels of the first mentioned disks, said driving disk being adapted to have the first mentioned disks ride thereon with the bevels of the latter resting upon the opposite inclined surfaces of the latter throughout the range of vertical adjustment of the top roll.

7. The combination with the rolls of a rolling mill, and adjusting screws for the top roll of such mill, of a driving disk carried by the bottom roll, said disk having its peripheral edge beveled into V shape, a pair of parallel disks carried by the top roll, the peripheries of the opposing faces of said parallel disks being beveled at angles corresponding to the angles of the bevel of the driving disk, said parallel disks being located on opposite sides of said peripheral edge of the driving disk, bolts connecting said parallel disks and carrying adjustable tension springs whereby said disks may be adjusted relative to said peripheral edge of the driving disk, said parallel disks being adapted to have their beveled surfaces seat upon the opposite sides of the bevel of the driving disk both for balancing the top roll in an elevated position with respect to said bottom roll and for imparting rotation to the top roll through their frictional contact with the rotating driving disk.

In testimony whereof, I affix my signature.

JULIAN EARL MONTGOMERY.