July 27, 1937. H. H. SCHMID 2,087,927

EDGING MILL

Filed Jan. 28, 1936 2 Sheets-Sheet 1

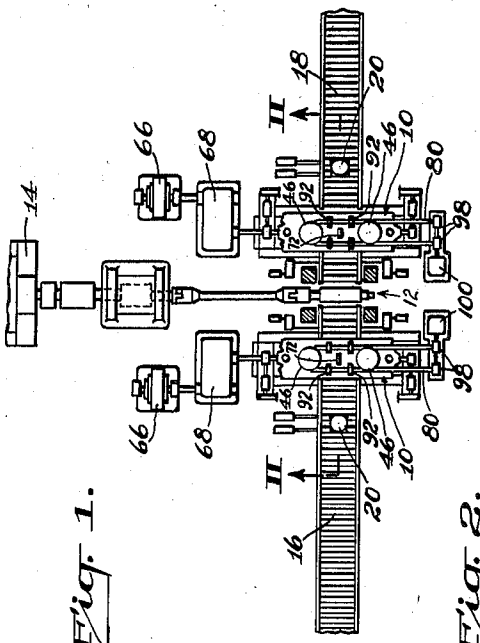


Fig. 1.

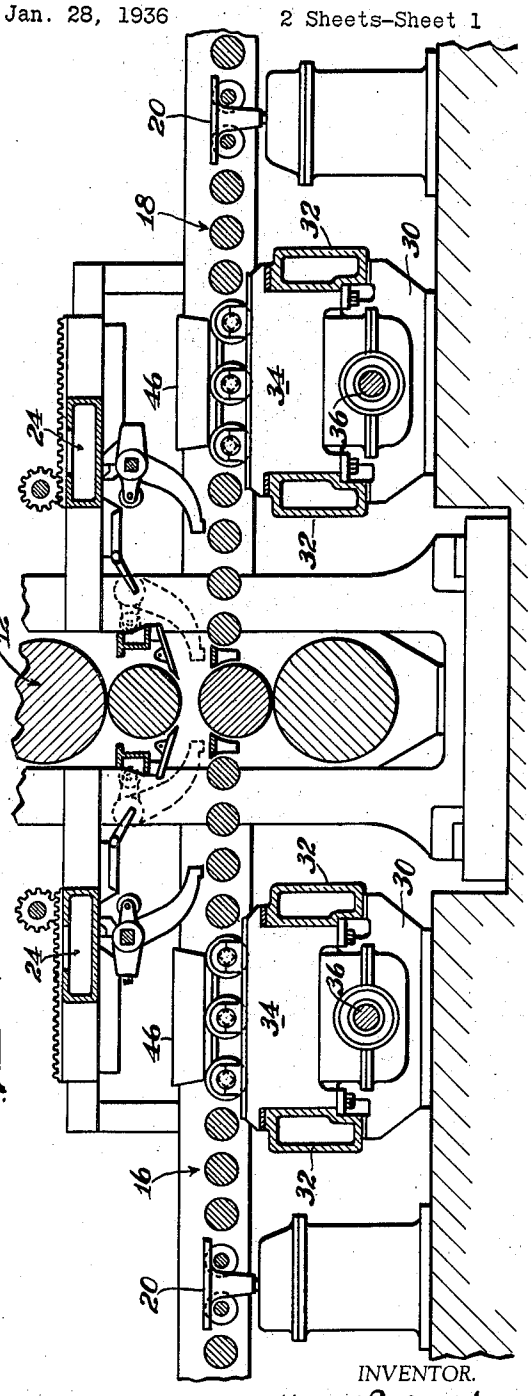


Fig. 2.

WITNESSES

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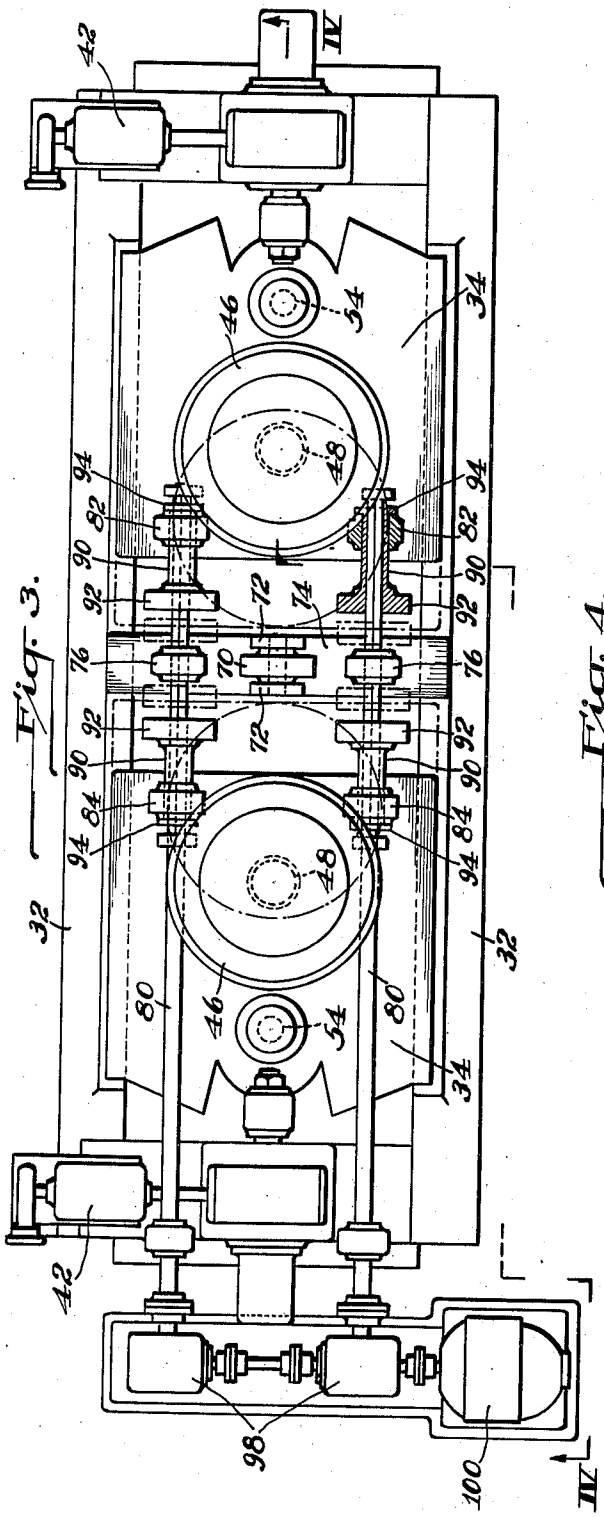


Fig. 3.

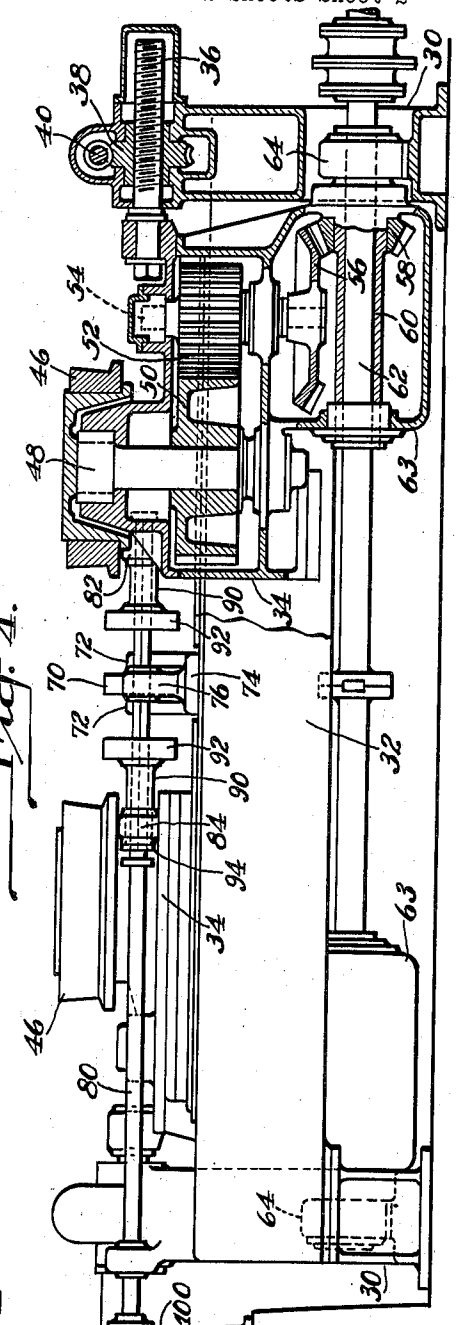


Fig. 4.

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Patented July 27, 1937 2,087,927

UNITED STATES PATENT OFFICE

2,087,927

EDGING MILL

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Application January 28, 1936, Serial No. 61,146

10 Claims. (Cl. 30—33)

This invention relates to edging mills of the type adapted to roll the edges of metal strip and more particularly is concerned with the provision of conveyor rollers for adequately supporting the metal strip in its passage through the mill.

It is the general object of my invention to provide an edging mill having adjustably positioned driven edging rolls with a driven conveyor for supporting the metal strip in its passage through the mill regardless of the position of the edging rolls. Specifically it is among the objects of my invention to provide a mill of the character described which is sturdy, long-wearing, easily operated, and relatively inexpensive in original and maintenance costs and which can be used to edge metal strip of various widths.

The foregoing and other objects of my invention are achieved by the provision of an edging mill including rolls adjustable toward and from each other so as to adapt the rolls to handling metal strip of widely different widths with a plurality of rollers positioned between the edging rolls and supporting the metal strip with means operated by the supports for the edging rolls for automatically spacing the rollers between the edging rolls regardless of the distance between them.

In the accompanying drawings Fig. 1 is a plan view, partly broken away, of a pair of edging mills and associated conveyors of my present invention incorporated with a reversing mill; Fig. 2 is a vertical cross-sectional view taken on line II—II of Fig. 1 but on a larger scale; Fig. 3 is a plan view of one of the edging mills illustrated in Fig. 1 but on a larger scale; and Fig. 4 is a vertical cross-sectional view taken on line IV—IV of Fig. 3.

While the edging mill and associated mechanism of my invention may be incorporated to handle metal strip or the like in various relations it is specifically adapted to be used with reversing or continuous metal rolling mills and has accordingly been illustrated in Figs. 1 and 2 of the accompanying drawings in use with a reversing mill. In these figures of the drawings the numerals **10** indicate generally a pair of my improved edging mills associated with a reversing mill **12** operated by suitable reversible drive power means **14**. Incorporated with the assembly are conveyors **16** and **18** of standard bed-roller form adapted to carry the metal strip to and from the edging mills and the reversing mill. Turn-tables **20** of known type may be employed with the conveyors **16** and **18** as illustrated to handle the metal strip or slabs passing to the edging rolls and reversing mill, and therefore will not be described in detail. The reversing mill **12** may include slab pushers **24** of any standard character.

The particular embodiment of my improved edging mill illustrated in Figs. 2, 3 and 4 of the drawings comprises a base **30**, mounting side frames **32** which slidably carry boxes **34** as best seen in Figs. 2 and 3. The position of each box **34** upon the side frames **32** is controlled by a screw **36** threaded into a worm gear **38** operated by a worm **40** which is driven by a motor **42**.

Each box **34** rotatably journals an edging roll **46** which is mounted upon a spindle **48**. To the lower end of each spindle **48** is secured a gear **50** which meshes with a gear **52** fixed upon a shaft **54** likewise journalled in the box **34**. The lower end of the shaft **54** carries a bevel gear **56** which engages with a bevel gear **58** fixed to a sleeve **60** slidably keyed to drive shaft **62** but journalled in and carried with an extension **63** of the box **34**. The drive shaft **62** is carried in bearings **64** in the base **30** and is driven by a reversible motor **66** through a reduction gear box **68**.

Associated with the edging rolls **46** are means for supporting a metal slab, sheet or strip in its passage between the edging rolls. In the form of the invention illustrated these supporting or conveying means comprise a roll **70** journalled in suitable brackets **72** upon a cross-bar **74** fixed at the middle of the side frames **32** of the edging mill. The cross-bar **74** likewise journals and supports in laterally spaced bearings **76** a pair of shafts **80** extending parallel to the side frames **32**. The shafts **80** are also journalled in bearings **82** and **84** on the boxes **34** as hereafter more fully described. Each shaft **80** carries a pair of sleeves **90** positioned respectively between bearings **76** and **84**, and bearings **76** and **82** and extending slidably through the bearings **82** and **84**. In order to drive the sleeves **90** with the shafts **80** while permitting sliding movement therebetween the shafts may be made polygonal in cross section with the sleeves being formed with mating bores. Integral with or secured to each sleeve **90** are a roller **92** and a flange **94**. As seen in Fig. 3 the sleeves **90** extend through the bearings **82** and **84** so that the limit of the axial movement of each sleeve **90** in its bearing **82** or **84** is determined by the roller **92** and flange **94**. The shafts **80** are driven through gear boxes **98** by a reversible motor **100** as seen in Fig. 3.

In the operation of the apparatus just described the edging rolls **46** may be set relatively far apart by running the motors **42** to turn worms **40**, worm gears **38**, and screws **36** to move the boxes **34**

mounting the rolls **46** to their outermost positions in the side frames **32**. In the movement of the rolls **46** to this outer position the bearings **82** and **84** pick up the flanges **94** of the sleeves **90** and move the sleeves and their associated rollers **92** out upon the shafts **80** so that wide metal slabs or strip are given a support clear out to the edging rolls.

When, however, the edging rolls **46** are moved in closer together to work on narrower metal strip or slabs the inward movement of the boxes **34** carrying the edging rolls causes the bearings **82** and **84** on the boxes to slide on the sleeves **90** until the bearings engage with the rollers **92**. Continued movement of the edging rolls towards each other causes the bearings **82** and **84** to pick up the rollers **92** and the sleeves **90** and move them inwardly on the shafts **80** towards the bearings **76**. Thus the rolls **92** are brought into the dotted position shown in Fig. 3 when the rolls **46** are in the dotted position shown. It will, accordingly, be recognized that an adequate conveyor support for the metal strip or slabs passing between the edging rolls is provided regardless of the distance between these rolls.

The edging rolls **46** are driven during their normal operation by applying power to the shaft **62** by motor **66** which operates through bevel gears **58** and **56**, shaft **54** and gears **52** and **50** to drive spindles **48** carrying the edging rolls. The drive to the edging rolls is maintained even though the boxes **34** carrying the edging rolls are moved in and out on the side frames **32** by the screws **36** as heretofore explained. This is because each bevel gear **58** is mounted upon the sleeve **60** journalled in extension **63** of box **34** but splined to the shaft **62** so that the movement of each box **34** on the side frames **32** merely causes the sleeve **60** to slide along shaft **62**.

The conveyor rollers **92** between the edging rolls are positively driven by shafts **80** through gear boxes **98** from motor **100** during the operation of the edging mill. This drive is not affected by changes in the lateral positions of the edging rolls. However, the conveyor rollers **92** position themselves evenly between the edging rolls upon adjustment of the edging rolls to or from each other. It is evident that the position of the conveyor rollers is automatically and directly controlled by the position of the edging rolls.

The objects of my invention are achieved by the edging mill herein described in that the mill is provided with conveyor means for fully supporting metal passing through the mill regardless of the spacing between the edging rolls. The conveyor means are laterally adjustable with the edging rolls and are controlled by the same adjustment. The mechanism is sturdy, easily operated and inexpensive in initial and maintenance costs.

While in accordance with the patent statutes one embodiment of my invention has been illustrated and described in detail, it should be understood that the invention is not limited thereto or thereby but is defined in the appended claims.

I claim:

1. Apparatus for rolling strip comprising edging rolls adapted to engage with the strip edges, means for adjustably mounting and driving the edging rolls, said means including a frame positioned at right angles to the passage of the strip, a separate box housing journalling each edging roll and slidably mounted on the frame, screw and worm gear mechanism for controlling the position of each housing on the frame, a gear mounted integrally with each edging roll, a gear journalled in each housing and meshing with the integral gear including a drive shaft journalled in the frame, means for driving the shaft, splined gear mechanism for connecting the shaft and the gears regardless of the position of each housing, conveyor rollers positioned between the edging rolls, means operatively connected with the edging roll housings for determining the position of the conveyor rolls, and means independent of the edging rolls for driving the conveyor rollers.

2. Apparatus for rolling strip comprising a frame, a pair of edging rolls, a separate housing journalling each edging roll and slidably mounted on the frame, screw and worm gear mechanism for controlling the position of each housing on the frame, a drive shaft journalled in the frame, mechanism for driving the edging rolls from the shaft regardless of the position of each housing, and a pair of conveyor means adjustably positioned between the edging rolls but on both sides of a line connecting the centers of the edging rolls and laterally movable with the edging rolls.

3. In combination in a metal rolling mill, edging rolls for controlling the width of the metal, reversible means for driving the rolls, means for adjustably mounting the rolls to change the width of the metal and a plurality of rollers positioned between the edging rolls and spaced laterally therefrom, said rollers supporting the metal fed therebetween, and means for automatically spacing the rollers substantially equally between the edging rolls regardless of the distance between the edging rolls.

4. In combination in a metal rolling mill, edging rolls for controlling the width of the metal being worked, means for adjustably mounting the rolls to change the width of the metal and a plurality of rollers positioned between the edging rolls and supporting the metal fed therebetween, means controlled by the edging roll mounting means for automatically spacing the rollers substantially equally between the edging rolls and for changing the lateral distance between the rollers and the edging rolls.

5. In combination in a metal strip edging mill, edging rolls for controlling the width of the metal, reversible means for driving the rolls, means for adjustably mounting the rolls to change the width of the metal and a plurality of rollers positioned between the edging rolls and supporting the metal as fed to the thickness rolls, reversible means for driving the rollers, and means for changing the spacing between the rollers only when the distance between the edging rolls is varied more than a predetermined amount.

6. The combination in an edging mill of rolls, means mounting the rolls for adjustment toward and from each other, means for driving the rolls regardless of their position, a conveyor for supporting metal strip or slabs fed to the mill, a conveyor for supporting the metal strip or slabs fed from the mill, and a conveyor for supporting the full width of the metal strip or slabs when in the mill regardless of the position of the edging rolls, said last-named conveyor including a plurality of rollers spaced laterally of the edging rolls, means for driving the rollers and means directly associated with the edging rolls for changing the lateral distance between the rollers and the nearest edging roll when the distance between the edging rolls is changed.

7. The combination in an edging mill of rolls, means mounting the rolls for adjustment toward and from each other, means for driving the rolls

regardless of their position, a conveyor for supporting the full width of the metal strip or slabs when in the mill regardless of the position of the edging rolls, said conveyor including a plurality of rollers, means for driving the rollers and means directly associated with the edging rolls for changing the lateral distance between the rollers and the edging rolls when the distance between the edging rolls is changed.

8. The combination in an edging mill of laterally adjustable edging rolls, a plurality of conveyor rollers positioned between the rolls, and means directly controlled by the position of the edging rolls for controlling the position of at least some of the rollers after a predetermined movement of the edging rolls.

9. The combination in an edging mill of rolls, means mounting the rolls for adjustment toward and from each other, means for driving the rolls regardless of their position, a conveyor for supporting metal strip or slabs fed to the mill, a conveyor for supporting the metal strip or slabs fed from the mill, a conveyor for supporting the full width of the metal strip or slabs when in the mill regardless of the position of the edging rolls, said last-named conveyor including a plurality of rollers, and means for moving the rollers laterally relatively to the nearest associated edging roll.

10. An edging mill including edging rolls, means mounting the rolls for adjustment to and from each other, conveyor rollers between the edging rolls and laterally spaced therefrom, and means for changing the lateral distance between the edging rolls and the nearest conveyor roller when the distance between the edging rolls is changed.

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