V. E. EDWARDS.

CONVEYER FOR ROLLING MILLS.

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1,179,510. Patented Apr. 18, 1916.

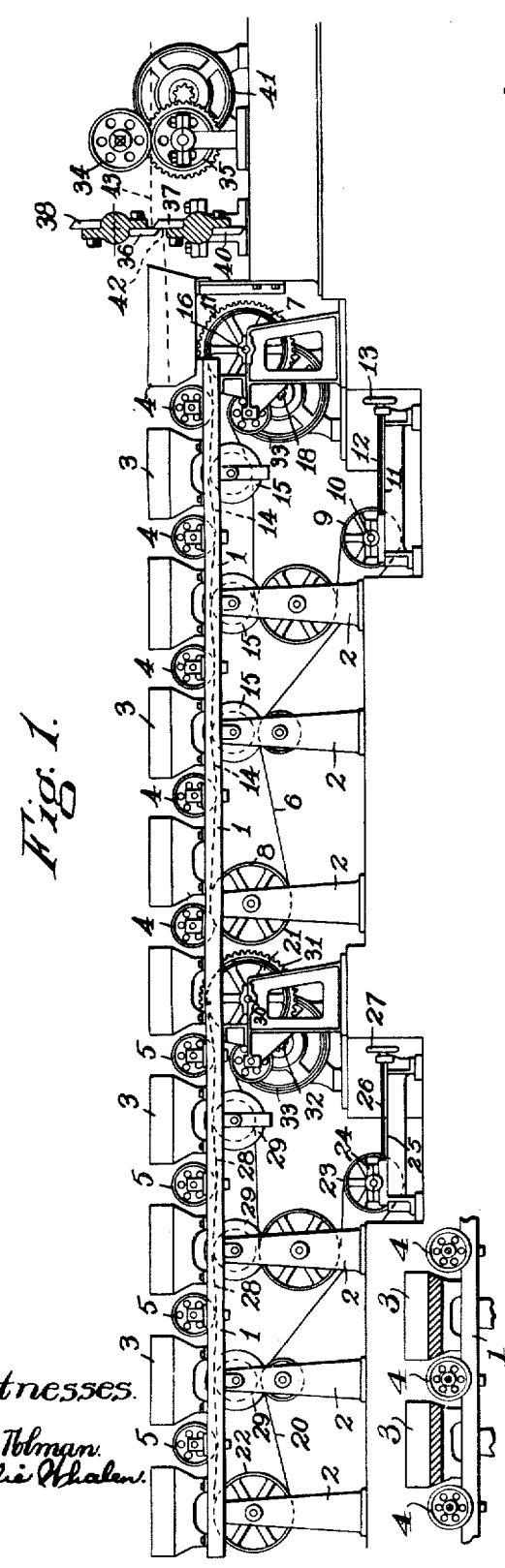


Fig. 1.

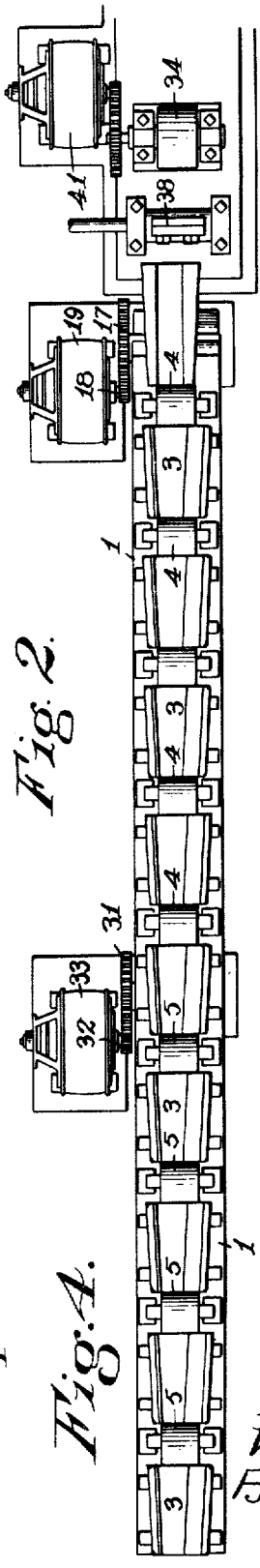


Fig. 2.



Fig. 3.

Fig. 4.

Witnesses.

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CONVEYER FOR ROLLING-MILLS.

1,179,510. Specification of Letters Patent. Patented Apr. 18, 1916.

Application filed August 10, 1909. Serial No. 512,227.

To all whom it may concern:

Be it known that I, VICTOR E. EDWARDS, a citizen of the United States, residing at Worcester, in the county of Worcester and Commonwealth of Massachusetts, have invented a new and useful Improvement in Conveyers for Rolling-Mills, of which the following is a specification, accompanied by drawings forming a part of the same, in which—

Figure 1 represents a side view of a conveyer embodying my present invention. Fig. 2 is a plan view of a portion of my improved conveyer. Fig. 3 is a diagrammatic view showing a series of overlapping metal strips and illustrating the operation of the conveyer. Fig. 4 is a longitudinal vertical section of a portion of the conveyer showing two of the guides 3 and the adjacent rolls 4.

Similar reference characters refer to similar parts in the different figures.

My present invention relates to a conveyer for metal bars, designed to be employed in connection with a metal rolling mill, and preferably, with a metal cutting shear.

The objects of my invention are to simplify and render more compact the driving mechanism of the conveyer, and also to secure an overlapping or shingling effect of the metal bars as they are fed upon and transferred by the conveyer. This conveyer is designed to transfer the metal bars to the ordinary piling rolls by which the bars are piled preparatory to removal. In order to accomplish an even and balanced pile slower speed of the piling rolls than of the remainder of the rolling mill is necessary. And this overlapping or shingling effect of the metal bars is designed to reduce sufficiently the speed of the metal bars as they are delivered from the mill to allow of their convenient handling by the piling rolls. I accomplish these objects by the construction and arrangement of parts as hereinafter described and pointed out in the annexed claims.

In the accompanying drawing my invention is illustrated in connection with a rotary metal cutting shear and a pair of feed rolls, by which the metal to be severed is projected between the edges of the rotating shear blades. In the preferred embodiment of my present invention, as illustrated in Fig. 1 of the drawings and hereinafter described, the cutting mechanism, consisting in the present instance of a rotary shear, is made to perform the additional function of depressing the end of the severed piece below the plane in which the succeeding continuous piece is fed to the cutting mechanism.

Referring to the accompanying drawings, 1 denotes a longitudinal table or frame supported on posts 2, on which are mounted guides 3 and the conveyer rolls 4 and 5. The rolls 4 are driven by an independent driving mechanism and constitute the first section of the conveyer. The rolls 5 are driven by a second independent driving mechanism at a lower rate of speed and constitute the second section of the conveyer.

The two sections of conveyer rolls are sufficient to illustrate the character of my present invention, but the number of sections can be increased if desired. The rolls 4 are rotated by their frictional contact with the endless belt 6 which passes over a driving pulley 7 and an idler pulley 8. The tension of the belt 6 is maintained by a tightening pulley 9 journaled in bearings 10 which are adjustable along ways 11 by means of a screw 12 and a hand wheel 13. The upper half of the belt 6 which is brought into contact with the conveyer rolls 4, as indicated by the broken line 14, is preferably supported at intervals upon flanged pulleys 15 which are spaced between the conveyer rolls 4. The driving pulley 7 is carried upon a shaft 16 which is provided with a gear wheel 17 which engages a pinion 18 on the shaft of a motor 19.

The conveyer rolls 5 are similarly driven by an endless belt 20 which passes over a driving pulley 21, an idler pulley 22 and a tightening pulley 23, journaled in bearings 24 which are adjustable along ways 25 by a screw 26 and a hand wheel 27. The upper half of the belt 20 which is brought into contact with the conveyer rolls 5, as indicated by the broken line 28, is preferably supported at intervals upon the flanged pulleys 29 which are supported between the conveyer rolls 5. The driving pulley 21 is carried upon a shaft 30 which is provided with a gear 31 which engages a pinion 32 on the shaft of a motor 33 arranged to drive the conveyer rolls 5 at a slower speed than that of the conveyer rolls 4. At the receiving end of the conveyer are a pair of feed rolls 1

34 and 35 by which a continuous strip of metal is fed to the conveyer, in the present instance, between rotating shear blades 36, 37, 38 and 40. The feed rolls 34 and 35 are rotated by an independent motor 41 by which a continuous strip of metal is fed between the rotating shear blades at a longitudinal speed in excess of the speed of the severed pieces as they are moved by the conveyer rolls 4. In place of the feed rolls 34 and 35 the continuous strip may be delivered directly to the shear by the final rolls of the rolling mill.

The continuous strip of metal as fed by the feed rolls 34 and 35 is presented to the shear in a plane higher that the plane of the supporting surfaces of the conveyer rolls. The upper shear blades 36 and 38 are rotated in synchronism with the lower shear blades 37 and 40 by any suitable mechanism and at a speed determined by the desired length of the severed pieces.

The upper and lower shear blades overlap during each cutting operation with the rear side of the upper blade, contacting with the front side of the lower blade so that the overlapping cutting edge of the upper blade in severing a piece from a continuous strip will crowd the rear end of the severed piece downward into a position indicated by the broken line 42, Fig. 1, and into a plane below the plane in which the continuous strip is being fed, as indicated by the broken line 43.

The depression of the rear end of the severed piece, accomplished in the present instance by means of the upper shear blade, allows the advancing end of the continuous strip as it is projected between the shear blades to pass over and overlap the rear end of the severed piece due to the decreased speed of the severed piece as it is moved forward by the conveyer rolls 4, thereby producing an overlapping or shingling effect of the metal as each piece is severed from the continuous strip.

The successive pieces, as they are severed from the continuous strip, overlap each other a distance determined by the difference in speed between the continuous strip, as determined by the feed rolls, and the severed strip, as determined by the conveyer rolls 4. The overlapping pieces pass forward on the conveyer table through the guides 3 and over the rolls 4 until they pass upon the second section of the conveyer table. As each severed piece moves upon the conveyer rolls 5 its speed is reduced below the speed of the succeeding pieces which are being moved forward by the conveyer rolls 4, causing an increase in the overlapping or shingling effect between each pair of contiguous pieces as they pass from the first to the second section of the conveyer. The overlapping of the severed pieces may be still further increased by adding other sections to the conveyer with the speed of each succeeding section reduced. The amount of shingling or overlapping is determined by the difference in speed between the speed of the feeding mechanism, which in ordinary cases will run at the speed of the rolling mill, and of the piling rolls which run at the speed necessary to produce a desirable pile; and by the amount of overlapping of the pieces of metal necessary to reduce their speed sufficiently.

In Fig. 3 I have illustrated in diagram the overlapping or shingling effect of my improved conveyer, in which the line a represents the advancing end of a continuous strip just before it is severed at the point a'. The line b denotes the preceding severed piece with its rear end overlapped by the strip a as shown at b' due to the difference in speed between the feed rolls and the conveyer rolls 4. The line c denotes the next preceding piece, the rear end of which is overlapped by the advancing end of the piece b, as denoted at c'. The line d denotes the next preceding piece which is partially moved upon the slower feed rolls 5, while the piece c has been moved forward at a higher speed which has increased the amount of overlap between it and the piece d, as shown at d'. The line e denotes the next preceding piece with the overlap of the piece d still further increased by the difference in the speed of the conveyer rolls 4 and 5, as denoted at e'.

In the present instance I have shown my improved conveyer as employed in conducting longitudinal severed pieces cut from a continuous strip by means of a suitable cutting mechanism, with the first overlap of the several pieces accomplished by a difference in speed between the first conveyer rolls and the feeding mechanism, and having the rear ends of the severed pieces depressed below the plane of the continuous strip by the action of the cutting mechanism itself, as I thereby simplify the mechanism and avoid the introduction of independent means for depressing the severed piece. I do not confine myself, however, to the employment of a shear for depressing the end of the severed strip as I contemplate the use of a conveyer with severed strips which are successively fed to the first section of the conveyer by a suitable feeding mechanism. Furthermore, it will be apparent that the above described shingling effect may be obtained by elevating the forward edge of a severed strip above the plane of the preceding strip which is passing onto the conveyer rolls.

I claim,

1. A conveyer for rolling mills, comprising a series of rotating conveyer rolls ar-

ranged in separate sections, with a multiplicity of rolls in each section, means for rotating the rolls in each section at a uniform speed, but at a lower speed than the rolls of the next preceding section, and a series of guides for conducting the metal across said sections.

2. A conveyer for rolling mills having a series of rotating conveyer rolls, a feeding mechanism arranged to feed metal to said conveyer rolls in a plane above the plane of the supporting surfaces of said rolls, means for actuating said feeding mechanism, and means for actuating said conveyer rolls at a lower speed than the speed of said feeding mechanism.

3. A conveyer for rolling mills, comprising a series of rotating conveyer rolls arranged in sections, with a multiplicity of rolls in each section, means for rotating the rolls in each section at a uniform speed, but at a lower speed than the rolls of the next preceding section, guides for conducting the metal from one section to another, and means for feeding the metal to the receiving end of the conveyer at a higher speed than the speed of the first section of conveyer rolls.

4. A conveyer for rolling mills, having a series of rotating conveyer rolls, means for rotating said rolls, a pair of rolls at the receiving end of said conveyer for feeding successive strips of metal to said conveyer rolls, and means for rotating said pair of rolls at a higher peripheral speed than the peripheral speed of said conveyer rolls.

5. A conveyer for rolling mills, comprising a series of conveyer rolls, means for rotating said rolls at a uniform speed, and means for feeding successive strips of metal to said rolls in a plane above the supporting surface of the rolls and at a higher speed than the peripheral speed of the rolls.

6. A conveyer for rolling mills, having a series of rotating conveyer rolls divided into sections, and a feeding mechanism arranged to feed metal to the first of said sections in a plane above the plane of said first of said sections and at a speed greater than the speed of said first of said sections.

7. A conveyer for rolling mills, having a series of rotating conveyer rolls divided into sections, a feeding mechanism arranged to feed metal to the first of said sections in a plane above the plane of said first of said sections and at a speed greater than the speed of said first of said sections, and means for rotating the rolls of each successive section at a lower rate of speed.

8. A conveyer for rolling mills, having a series of rotating rolls divided into sections, means for rotating each section independently at a single rate of speed, said rotating means arranged to drive successive sections each at a slower rate of speed, and feeding means arranged to feed pieces of metal to said conveyer on a plane above the plane of the conveyer and at a higher rate of speed than the fastest of said sections.

9. A conveyer for rolling mills, comprising means for succesively feeding separate strips of metal in a single plane, and means for continuing the forward movement of said strips below said plane and at a reduced speed.

Dated this sixth day of August, 1909.

VICTOR E. EDWARDS.

Witnesses:
W. A. WINN,
GEORGE H. TAFT.

Corrections in Letters Patent No. 1,179,510.

It is hereby certified that in Letters Patent No. 1,179,510, granted April 18, 1916, upon the application of Victor E. Edwards, of Worcester, Massachusetts, for an improvement in "Conveyers for Rolling-Mills," errors appear in the printed specification requiring correction as follows: Page 2, line 16, for the word "that" read *than;* same page, line 107, for the word "several" read *severed;* and that the said Letters Patent should be read with these corrections therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 23d day of May, A. D., 1916.

[SEAL.]

J. T. NEWTON,

Acting Commissioner of Patents.

Cl. 193—1.