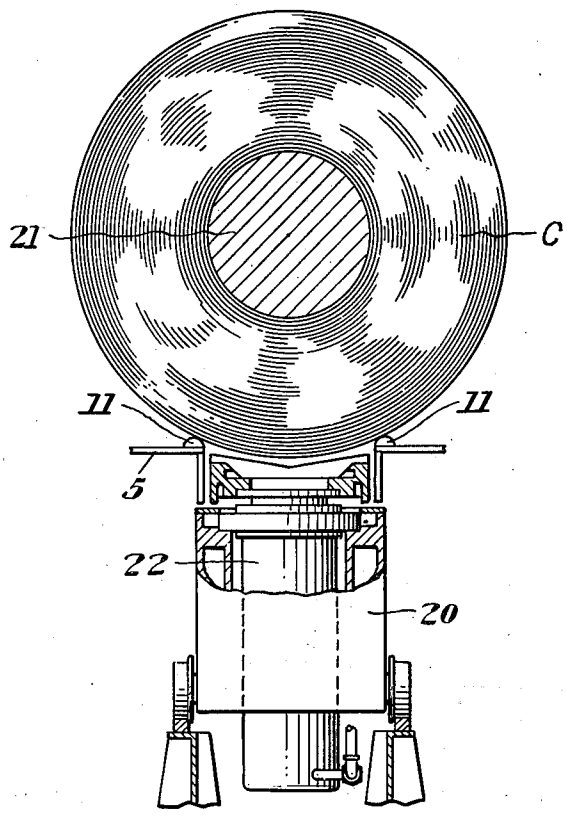
Oct. 12, 1943. J. A. CAMPBELL 2,331,374

CONVEYING APPARATUS

Filed May 26, 1942 4 Sheets-Sheet 1

Fig. 1.



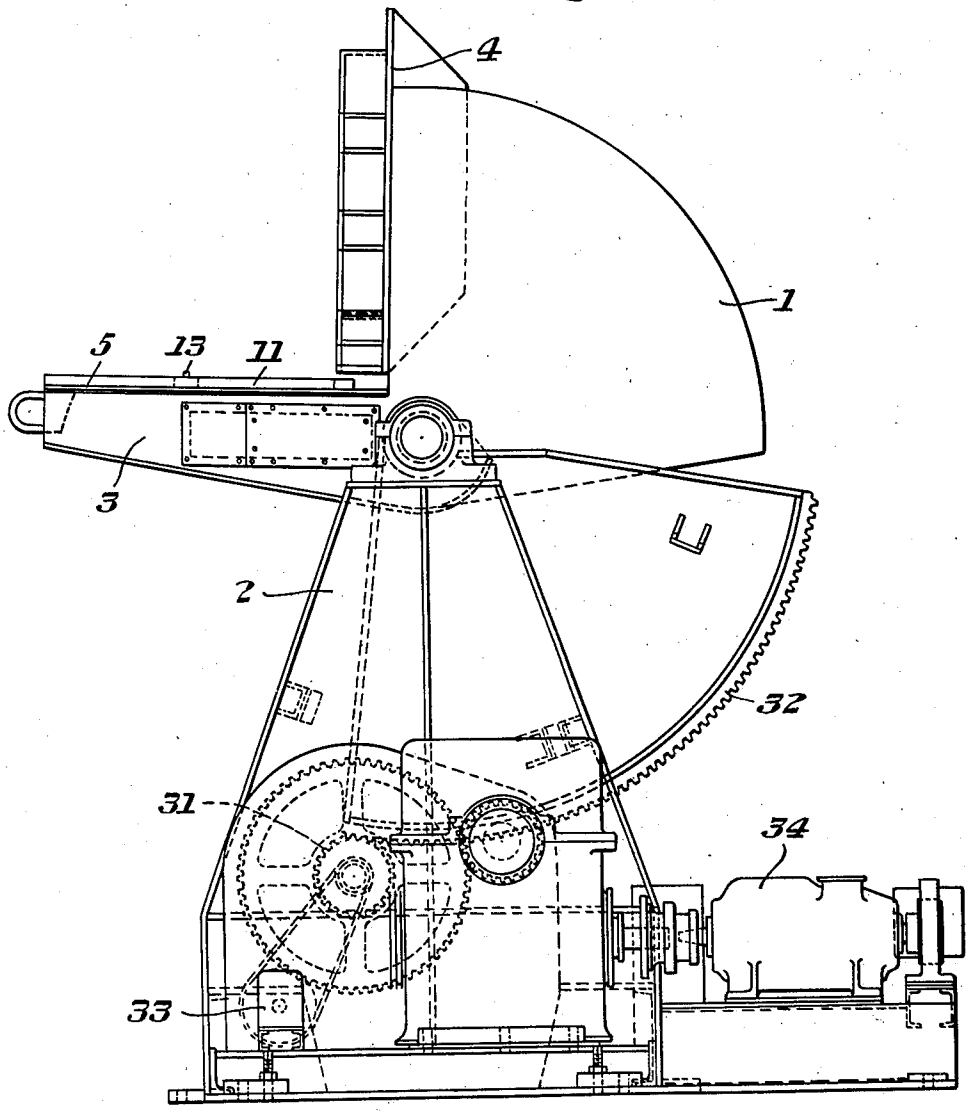
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Fig. 2.



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Fig. 5.

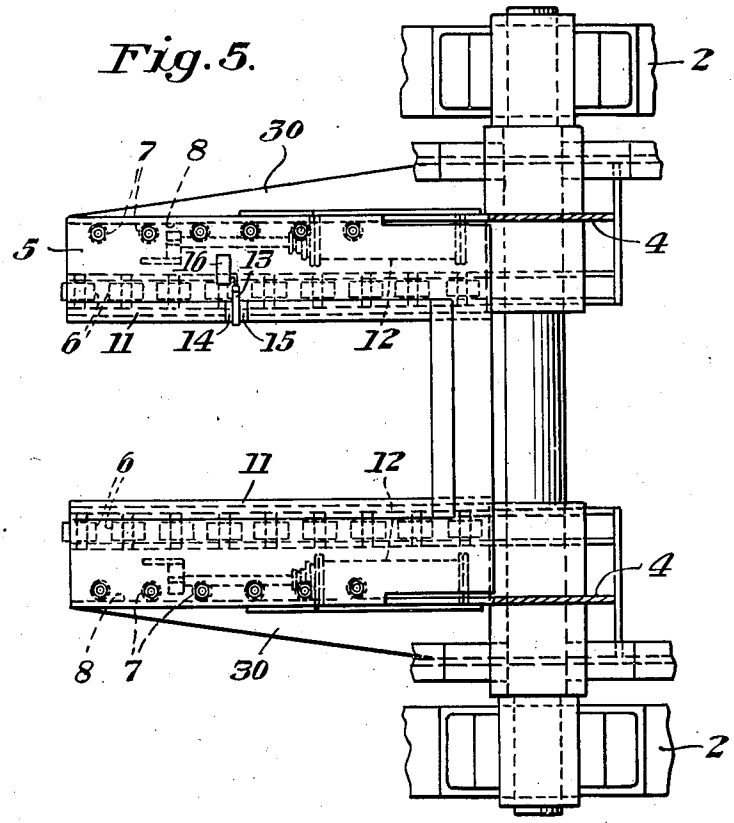
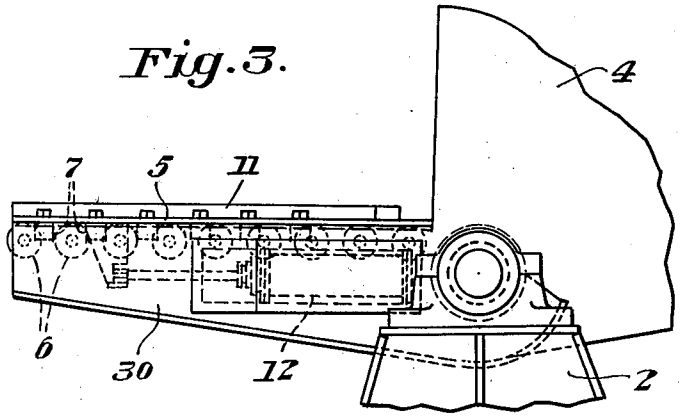


Fig. 3.



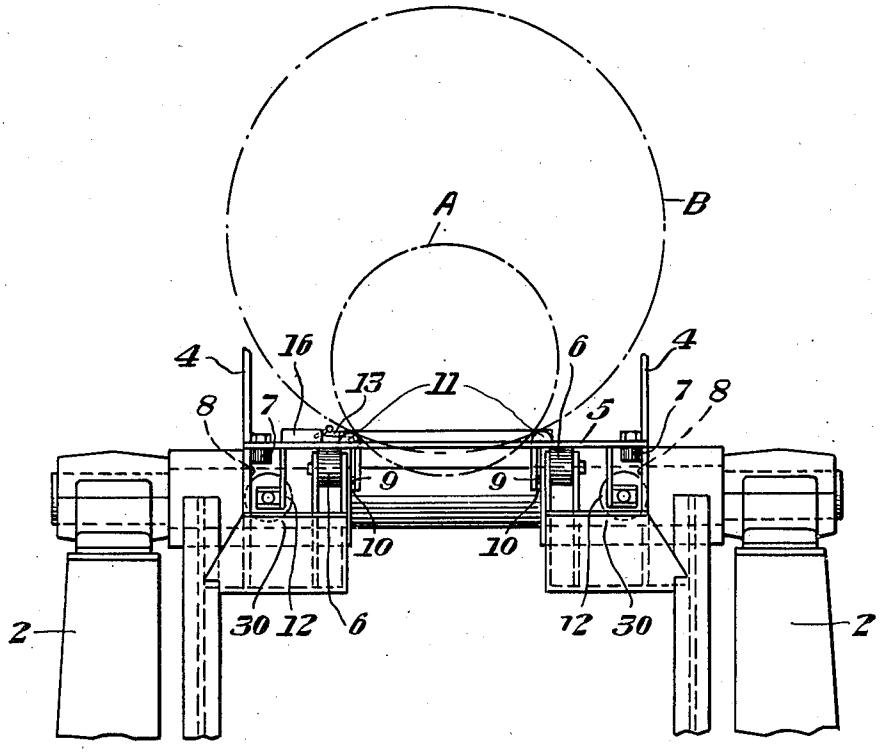
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Fig. 4.



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UNITED STATES PATENT OFFICE

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CONVEYING APPARATUS

John A. Campbell, Pittsburgh, Pa.

Application May 26, 1942, Serial No. 444,525

1 Claim. (Cl. 214—1)

This invention relates to conveying apparatus, and particularly to a piece of equipment known in mill-parlance as an up-ender, used in strip mills in the conveyance of coils of strip metal. The objects in view are the correcting and overcoming of imperfections and inadequacies of up-enders heretofore used, and the handling of coils of such material under mill conditions with expedition and with avoidance of marring or disfiguring of the material handled.

In the accompanying drawings,

Figure 1 is a view showing in elevation and section means for taking up the burden of a coil of strip, for removing it from the spindle of a coiler, and for bringing it to position in the up-ender.

Figure 2 is a view in side elevation of up-ender of this invention.

Figures 3, 4, and 5 are fragmentary views, showing the up-ender to larger scale; Figure 3 is a view in side elevation, Figure 4 in end elevation, and Figure 5 in plan.

The up-ender consists essentially of a coil-handling block 1 pivoted on a standard 2. The coil-handling block has two table-like supporting arms that extend in planes at right angles to one another. As seen in Figures 2 and 3, the upper face of arm 3 extends horizontally, while the opposed face of arm 4 rises vertically from the right-hand end of the horizontal face of arm 3. Means are provided for swinging the block 1 upon the standard through a range of 90° and in clockwise direction from the position shown in Figure 2. The means here shown consist in a motor 34 which, through suitable transmission drives a pinion 31. The pinion 31 meshes with a segmental rack 32 that forms an integral part of block 1. From the shaft that carries pinion 31 a limit switch 33 may be operated, to bring the block 1 precisely to the limit of its range of intended swing in either or in both directions.

In the course of operation, a coil of strip of essentially cylindrical shape is brought to position, resting upon its side upon arm 3. The block 1 is then first turned slightly in clockwise direction, whereupon the heavy coil slides upon arm 3 until it comes to endwise abutment upon the face of arm 4. The turning of the block 1 is then continued until the face of arm 4 comes to horizontal position, and when this has been done the coil rests on its end and with its whole weight upon arm 4. The arm 4 is so particularly constructed as to allow the fingers of suitable lifting apparatus (not shown) to be intruded beneath the coil, and upon those fingers the coil is raised and borne away. Such are the general features and characteristics of up-enders heretofore in service.

This invention is found in refinements in detail of such a structure. It has been usual to equip the coil-receiving arm (the arm 3 of block 1) with a double line of rollers, to receive and sustain the coil and to facilitate the advance of the coil to abutment upon the face of the coil-delivering arm 4; the rollers must be such in contour of surface as to receive coils of widely varying diameters; and, with rollers shaped to the requirements indicated, there has been unavoidable marring of heavy coils by the indentation of these rollers.

This invention involves the provision of a carriage mounted to move in right-line course upon the coil-receiving arm of the up-ender in direction of advance toward and recession from the coil-delivery arm and adapted immediately to receive the coil and to sustain the coil without movement of the coil upon it, while movement of the carriage itself brings the coil to end abutment upon the face of the coil-delivering arm of the up-ender. The carriage is provided with a seat upon which coils of widely varying sizes and weights may be rested, and the up-ender will handle the coils without any marring.

The arm 3 conveniently takes the double form best seen in Figures 4 and 5 and consists of two spaced-apart symmetrical portions 30, 30. The carriage 5 is formed of the square-cornered U shape best seen in Figure 5, with the opening of the U to the left. The spacing of the opposite branches of the U corresponds to that of the portions 30 of the arm. The carriage is sustained by the resting of the plates that form its opposite parallel branches upon rollers 6 idly journaled in the portions 30 of the arm itself. The carriage is further provided with rows of rollers 7 that turn idly upon vertical axes, and that engage properly disposed vertical surfaces 8 upon the arm, to take care of lateral thrust and to hold the moving car to aligned position. Overlapping ledges 9, 10 duplicated upon the two sides of the double structure, secure the carriage against accidental overturning.

Along the inner edges of the branches of the U-shaped carriage extend rails 11. Upon these rails in the operation of the up-ender the coil is brought immediately to rest. The rails are of upwardly rounded contour. Figure 4 indicates in broken lines the positions A and B of two coils, one of small diameter and weight and the other of large, at rest upon rails 11. It may be

understood that the smaller diameter thus indicated is twenty-six inches and the larger sixty. It will be seen that in both cases (and, of course, in the case of any intermediate size) the cylindrical coil rests tangentially upon the rounded contours of the rails; and it will be understood that the weight of the load is distributed on lines of contact throughout the width of the coil of strip. The weight being so distributed, there is no indentation.

In operation a buggy **20**, Figure 1, is run to position beneath a coil C of strip upon a spindle **21** upon which it has been coiled, and a lift **22** mounted on the buggy is operated to take the weight of the coil. The buggy is then run along its tracks, removing the coil from the spindle and bringing it to position above the rails **11** of the up-ender. The lift then is lowered, the coil is deposited on the rails, and the buggy is run away. The block **1** is then turned clockwise (Figure 2) through a slight angle, and thereupon carriage **5** rolls down the slight declivity under gravity until the coil abuts upon the face of arm **4**. Continued turning of the block **1** through a range of ninety degrees brings the coil to position, resting on end and with its whole weight upon arm **4**. Removal of the coil from **4** follows, in conventional manner.

After turning the block **1** back through ninety degrees to the position shown in Figure 2, the carriage may be manually returned to coil-receiving position by movement thereof upon the rollers **6** and **7**.

Means may be provided as disclosed in Boyer Patent No. 2,268,693, issued January 6, 1942, whereby the carriage **5** may be returned automatically to coil-receiving position after the discharge of a coil therefrom, said means including fluid pressure cylinders **12**, a coil-engaging lever **13** disposed in a break in one of the rails **11** and pivotally mounted between blocks **14** and **15**, said lever **13** actuating switch **16** in a suitable electric circuit. By such means, as the coil is discharged from the up-ender carriage, the control of fluid supply to the cylinders **12** is regulated to automatically return the carriage **5** to coil-receiving position. Such means are disclosed herein by way of illustration only, since the same are not part of the present invention.

I claim:

In an up-ender for a cylindrical burden consisting of a pivotally mounted block with two angularly extending arms, the invention herein described which consists of a carriage mounted upon one arm and having a seat for a burden formed of two parallel rails that extend in direction perpendicular to the face of the other arm, the carriage being movable in its mounting in right-line course and in the direction in which the rails extend, whereby the carriage is adapted to receive a coil resting by its cylindrical side upon the rails and to carry the so resting coil to end abutment upon such other arm.

JOHN A. CAMPBELL.