Sept. 7, 1937. H. H. TALBOT 2,092,540

COIL UNLOADER

Filed May 14, 1935 2 Sheets-Sheet 1

Fig. 1.

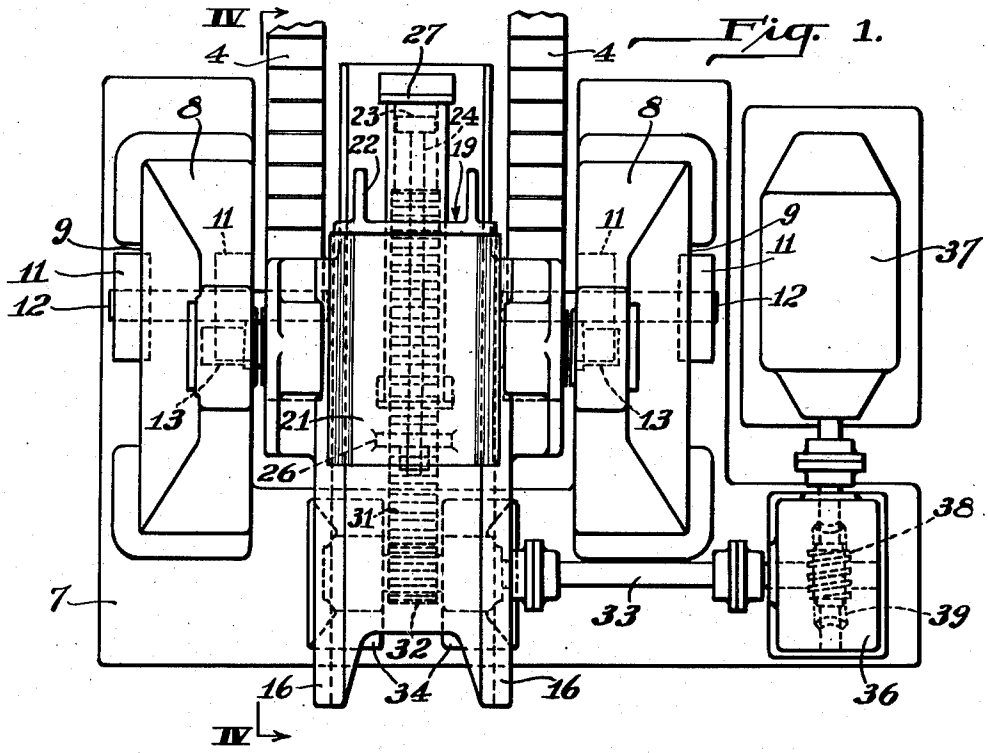

Fig. 2.

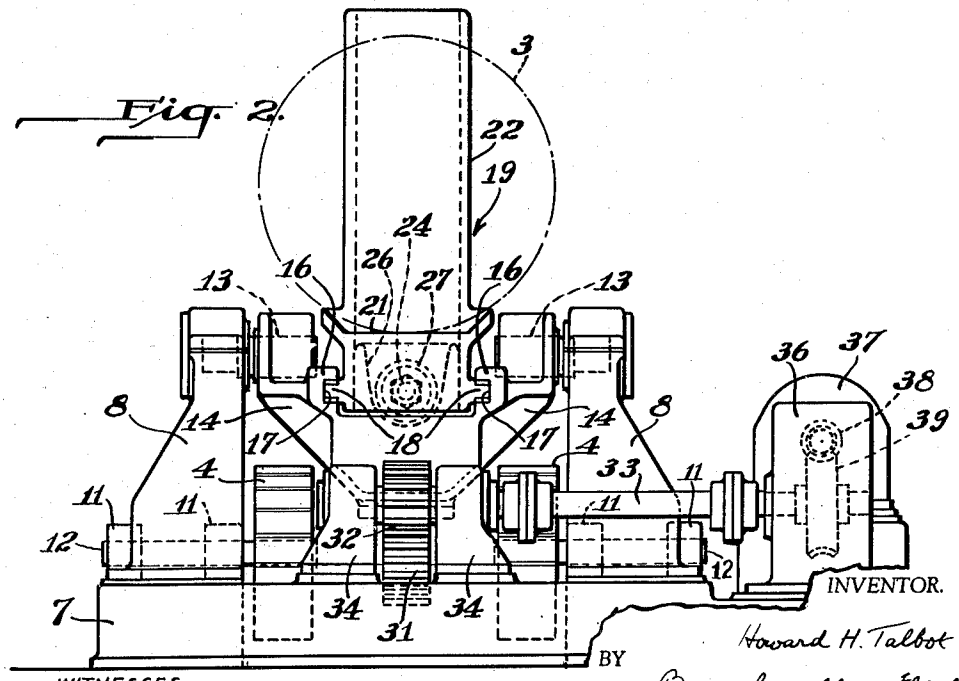

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Fig. 3.

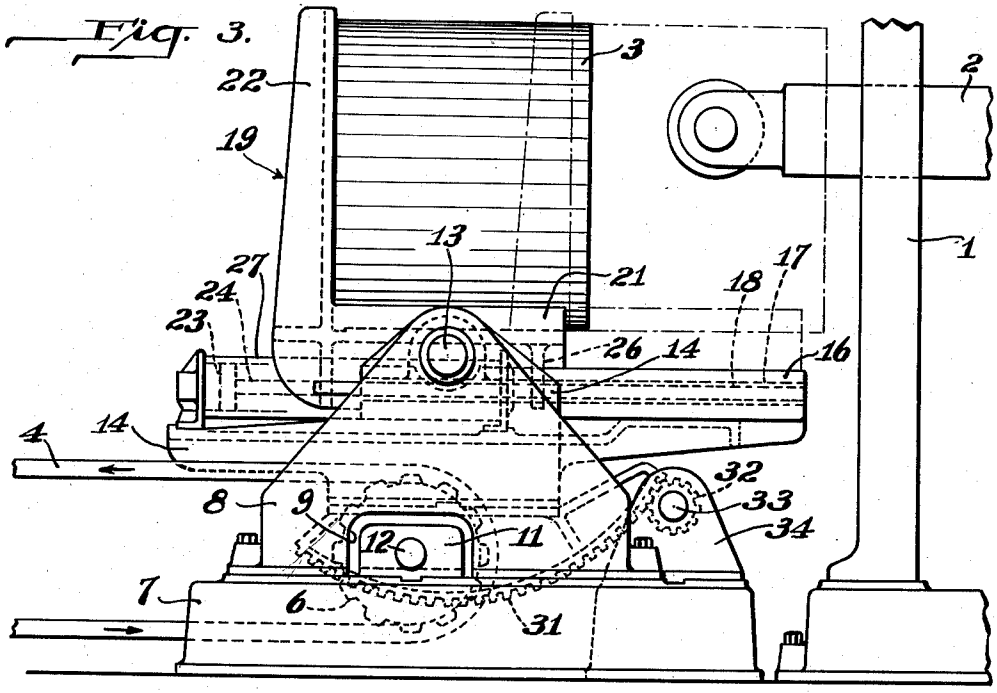
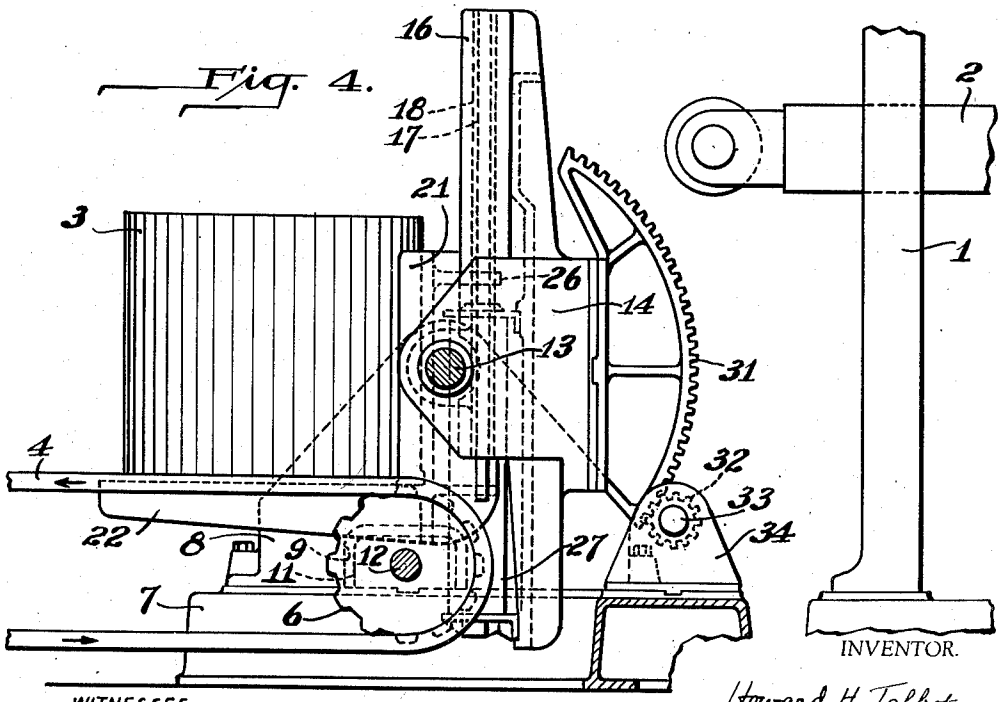


Fig. 4.



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COIL UNLOADER

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Application May 14, 1935, Serial No. 21,308

13 Claims. (Cl. 214—130)

This invention relates to coil unloaders for strip reels, and is a species of the invention disclosed in my copending application Serial No. 21,309, filed May 14, 1935.

In the reeling of metal strip it is highly desirable to remove each coil of strip from the reel as fast as it is formed so as to leave the reel free to form the next coil. With the use of hot strip reels, such as those disclosed in Biggert et al. Patent No. 1,850,312, in which the coils are red hot, manual manipulation of the coils is out of question. Accordingly, coil unloaders are used which automatically transfer red hot coils from strip reels to conveyors on which the coils are taken away to be stored or to have further operations performed thereon.

In general, these unloaders comprise a counterbalanced tiltable support for receiving the coil as it is ejected from the reel and for carrying it in an arcuate path down to the conveyor, and means such as a dash pot operating in conjunction with the counterbalance for preventing the support from tilting away from the reel too rapidly under the weight of the coil. However, if the coil is large and heavy the dash pot and counterbalance do not offer sufficient resistance to the weight of the coil to prevent the support from tilting too rapidly and setting the coil down on the conveyor too hard; while if the coil is relatively light its weight may not be sufficient to tilt the support against the resistance of the counterbalance. Another disadvantage of such an unloader is that it is not adapted to receive coils which vary in width to much extent.

It is among the objects of this invention to provide a coal unloader which is adapted to receive coils varying materially in width; which transfers coils from a hot strip reel to a coil conveyor at a predetermined speed unaffected by the weight of a coil on the unloader; which is simple in operation; and which does not damage the coil.

The preferred embodiment of the invention is illustrated in the accompanying drawings in which Fig. 1 is a plan view of a coil unloader; Fig. 2 an end view thereof; Fig. 3 a side view of the unloader in its coil-receiving position; and Fig. 4 a view taken on the line IV—IV of Fig. 1 showing the coil transferred to a conveyor.

Referring to the drawings, in Figs. 3 and 4 there is shown one end of a hot strip reel 1 with a mandrel 2 projecting therefrom around which hot metal strip is coiled and from which it is removed in the form of a coil 3 by a stripper (not shown). Spaced from the reel is a coil conveyor including two horizontally spaced chains 4 travelling around sprockets 6, the distance between the chains being less than the diameter of the smallest coil formed by the reel.

For the purpose of receiving each successive coil of hot strip from the reel as fast as it is formed and transferring it to the conveyor, a coil unloader is disposed between the reel and conveyor. Mounted on the base 7 of the unloader is a pair of spaced pedestals 8 provided in their lower portions with windows 9. Rigidly mounted on base 7 in each of these windows is a pair of blocks 11 from which project a stub shaft 12 on which the adjoining sprocket 6 is mounted. In the upper ends of the pedestals there are mounted inwardly-projecting stub shafts 13 from the projecting ends of which between the pedestals a frame 14, substantially U-shape in cross section, is pivotally suspended.

The base of the frame extends from a point below the projecting end of mandrel 2 rearwardly between the chains of the conveyor. As shown in Fig. 2, at each side of the frame there is an upright flange 16 extending from the front of the frame to a point behind shafts 12, the flanges being provided with ways 17 in which laterally projecting flanges 18 of a coil-receiving carriage 19 are slidably mounted. The carriage is materially shorter than the frame and consists of a transversely concave base portion 21 on which coils are deposited when they are stripped from the mandrel, and an integral upright portion 22 at the end adjacent the conveyor. When coils are formed in the reel which are so small that they will roll sideways on the base of the carriage, filler blocks can be used to take up the excess space to hold the coils stationary.

Due to the sliding connection between carriage 19 and frame 14, the carriage can be moved towards and away from reel 1 and the projecting mandrel so as to receive coils of hot strip of different widths, this being one of the principal features of this invention. That is, for receiving a narrow coil, such as one twenty-four inches wide, the carriage is moved toward the reel to a position corresponding somewhat to the position indicated in dotted lines in Fig. 3, after which it is returned to the position shown in full lines, while for receiving a wide coil the carriage is moved away from the reel the necessary distance.

The movement of the carriage on the frame is effected preferably by a piston 23 connected by a piston rod 24 to a flange 26 depending from the bottom of the carriage near its front end. The piston is disposed in a long cylinder

27 mounted on the rear portion of the frame, fluid under pressure being supplied at will or automatically to either end of the cylinder in any suitable manner (not shown) for moving the carriage back and forth on the frame.

In order to transfer a coil of hot strip from the reel to the conveyor, fluid under pressure is admitted to the rear end of cylinder 27 to move the carriage as near to the reel as is necessary for receiving the particular width coil that is being formed at that time. As soon as the stripper has moved the coil from the mandrel to the carriage, fluid pressure is supplied to the front end of the cylinder to move the carriage back to its original position which is approximately at the center of the frame. The frame and carriage are then tilted backwardly as a unit through an arc of approximately 90°, whereby upright portion 22 of the carriage becomes a support for the adjoining end of the coil, as shown in Fig. 4. As this upright portion of the carriage passes between and below the upper surfaces of the conveyor chains, the coil is deposited on the chains by which it is carried away for storage or to have other operations performed on it.

The tilting of the carriage and frame is accomplished by a gear and segment connection, the lower portion of frame 14 being provided with a depending segment 31 having gear teeth on its periphery. Meshing with the segment teeth at the end of the segment nearest the reel is a pinion 32 which is mounted on a horizontal shaft 33 journaled in pedestals 34 and driven from a speed-reducing gear box 36 at one side of base 7 (Figs. 1 and 2). The gears in box 36 are driven by an electric motor 37 which is operated whenever it is desired to tilt the frame and carriage.

It is another feature of this invention that the motor shaft is provided in the gear box with a worm 38 which meshes with a worm gear 39 mounted on shaft 33 so that the weight of a coil on the carriage cannot cause shaft 33 to be turned faster than it is being driven by the motor. In other words, the worm serves as a brake which prevents heavy coils from increasing the tilting speed of the frame and carriage and becoming damaged by being set down too hard on the conveyor. The result is that coils of various sizes and weights are transferred to the conveyor at a predetermined speed unaffected by the weight of the coils on the unloader.

According to the provisions of the patent statutes, I have explained the principle and mode of operation of my invention and have illustrated and described what I now consider to represent its best embodiment. However, I desire to have it understood that, within the scope of the appended claims, the invention may be practiced otherwise than as specifically illustrated and described.

I claim:

1. A coil unloader for use between a strip reel and a coil conveyor, comprising a support, a carriage associated therewith and movable substantially horizontally towards and away from the reel for receiving therefrom coils of strip of different widths, means for effecting said horizontal movement of the carriage, said support being stationary while said carriage is receiving a coil of strip, and separate means mounted in fixed position for moving the carriage from its coil-receiving position to a position adjacent the conveyor to thereby deposit coils thereon.

2. A coil unloader for use between a strip reel and a coil conveyor, comprising a support, a carriage associated therewith and movable substantially horizontally towards and away from the reel for receiving therefrom coils of strip of different widths, means mounted below said carriage for effecting said horizontal movement of the carriage, said support being stationary while said carriage is receiving a coil of strip, and means mounted in fixed position on said support for tilting the carriage from the reel to the conveyor to transfer said coils to the conveyor.

3. A coil unloader for use between a strip reel and a coil conveyor having horizontally spaced chains, comprising a support disposed between the reel and conveyor, a carriage associated with the support and movable substantially horizontally towards and away from the reel for receiving therefrom coils of strip of different widths, said carriage including a base portion and a relatively narrow upright portion at the end nearest the conveyor, means for effecting said horizontal movement of the carriage, and means for tilting the carriage until said upright portion is disposed between and below the upper surface of the conveyor chains, whereby coils are transferred from the reel to the conveyor.

4. A coil unloader for use between a strip reel and a coil conveyor, comprising a support, a carriage associated therewith and movable substantially horizontally towards and away from the reel for receiving therefrom coils of strip of different widths, means for effecting said horizontal movement of the carriage, said support being stationary while said carriage is receiving a coil of strip, and means mounted in fixed position for tilting the carriage from the reel to the conveyor to transfer said coils to the conveyor, said tilting means including means for holding the tilting speed to a predetermined speed unaffected by variation in weights of coils on the carriage.

5. A coil unloader for use between a strip reel and a coil conveyor, comprising a support, a carriage associated therewith and movable substantially horizontally towards and away from the reel for receiving therefrom coils of strip of different widths, means for effecting said horizontal movement of the carriage, said support being stationary while said carriage is receiving a coil of strip, and means mounted in fixed position for tilting the carriage from the reel to the conveyor to transfer said coils to the conveyor, said tilting means including a rotatable shaft having thereon a worm gear driven by a worm, whereby said tilting movement is held at a substantially uniform speed by said worm regardless of the weight of a coil on the carriage.

6. A coil unloader for use between a strip reel and a coil conveyor, comprising a support, a frame movably mounted thereon, a carriage movably mounted on the frame for movement substantially horizontally towards and away from the reel for receiving therefrom coils of strip of different widths, means for moving the carriage on the frame, said support being stationary while said carriage is receiving a coil of strip, and means for moving the carriage and frame as a unit from the coil-receiving position to a position adjacent the conveyor to thereby deposit coils thereon.

7. A coil unloader for use between a strip reel and a coil conveyor, comprising a support, a frame movably mounted thereon, a carriage slid-

ably mounted on the frame for movement substantially horizontally towards and away from the reel for receiving therefrom coils of strip of different widths, means for sliding the carriage on the frame, said support being stationary while said carriage is receiving a coil of strip, and means for moving the carriage and frame as a unit in a vertical plane through an arcuate path from the coil-receiving position to a position adjacent the conveyor to thereby deposit coils thereon on end.

8. A coil unloader for use between a strip reel and a coil conveyor, comprising a support, a frame movably mounted thereon, a carriage adjustably mounted on the frame for movement substantially horizontally towards and away from the reel for receiving therefrom coils of strip of different widths, fluid pressure means for moving the carriage on the frame, said support being stationary while said carriage is receiving a coil of strip, and means for moving the carriage and frame as a unit from the coil-receiving position to a position adjacent the conveyor to thereby deposit coils thereon.

9. A coil unloader for use between a strip reel and a coil conveyor, comprising a support, a frame movably mounted thereon, a carriage movably mounted on the frame for movement substantially horizontally towards and away from the reel for receiving therefrom coils of strip of different widths, a fluid pressure cylinder mounted on the frame, a piston disposed in the cylinder, a piston rod connecting the piston to the carriage for reciprocating the carriage on the frame, said support being stationary while said carriage is receiving a coil of strip, and means for moving the carriage and frame as a unit from the coil-receiving position to a position adjacent the conveyor to thereby deposit coils thereon.

10. A coil unloader for use between a strip reel and a chain conveyor having horizontally spaced chains, comprising a support, a frame pivotally mounted thereon on a horizontal axis, a carriage movably mounted on the frame for movement substantially horizontally towards and away from the reel for receiving therefrom coils of different widths, said carriage including a base portion and a relatively narrow upright portion at the end nearest the conveyor, means for moving the carriage on the frame, and means for tilting the carriage and frame as a unit until said upright portion of the carriage is disposed between and below the upper surface of the chains of the conveyor, whereby coils are received from the reel and deposited on the conveyor.

11. A coil unloader for use between a strip reel and a coil conveyor, comprising a support, a frame movably mounted thereon, a carriage adjustably mounted on the frame for movement substantially horizontally towards and away from the reel for receiving therefrom coils of strip of different widths, means for moving the carriage on the frame, said support being stationary while said carriage is receiving a coil of strip, and means for moving the carriage and frame as a unit from the coil-receiving position to a position adjacent the conveyor to thereby deposit coils thereon, said frame-moving means including means for restricting the speed of the frame movement to a predetermined speed unaffected by variation in weights of coils on the carriage.

12. A coil unloader for use between a strip reel and a coil conveyor, comprising a support, a frame pivotally mounted thereon on a horizontal axis, a carriage movably mounted on the frame for movement substantially horizontally towards and away from the reel for receiving therefrom coils of strip of different widths, means for moving the carriage on the frame, said support being stationary while said carriage is receiving a coil of strip, a gear segment depending from the frame, a pinion meshing with the segment for tilting the frame and carriage to deposit coils on the conveyor, means for rotating said pinion, a worm gear for driving said pinion-rotating means, and means for driving the worm gear.

13. In combination, a strip reel, a carriage disposed adjacent thereto, means for moving the carriage in a straight horizontal line towards and away from the reel for receiving therefrom coils of strip of different widths, a coil conveyor disposed below the carriage, and means independent of said first-mentioned means for moving the carriage from the reel to a position adjacent the conveyor to deposit coils on it.

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