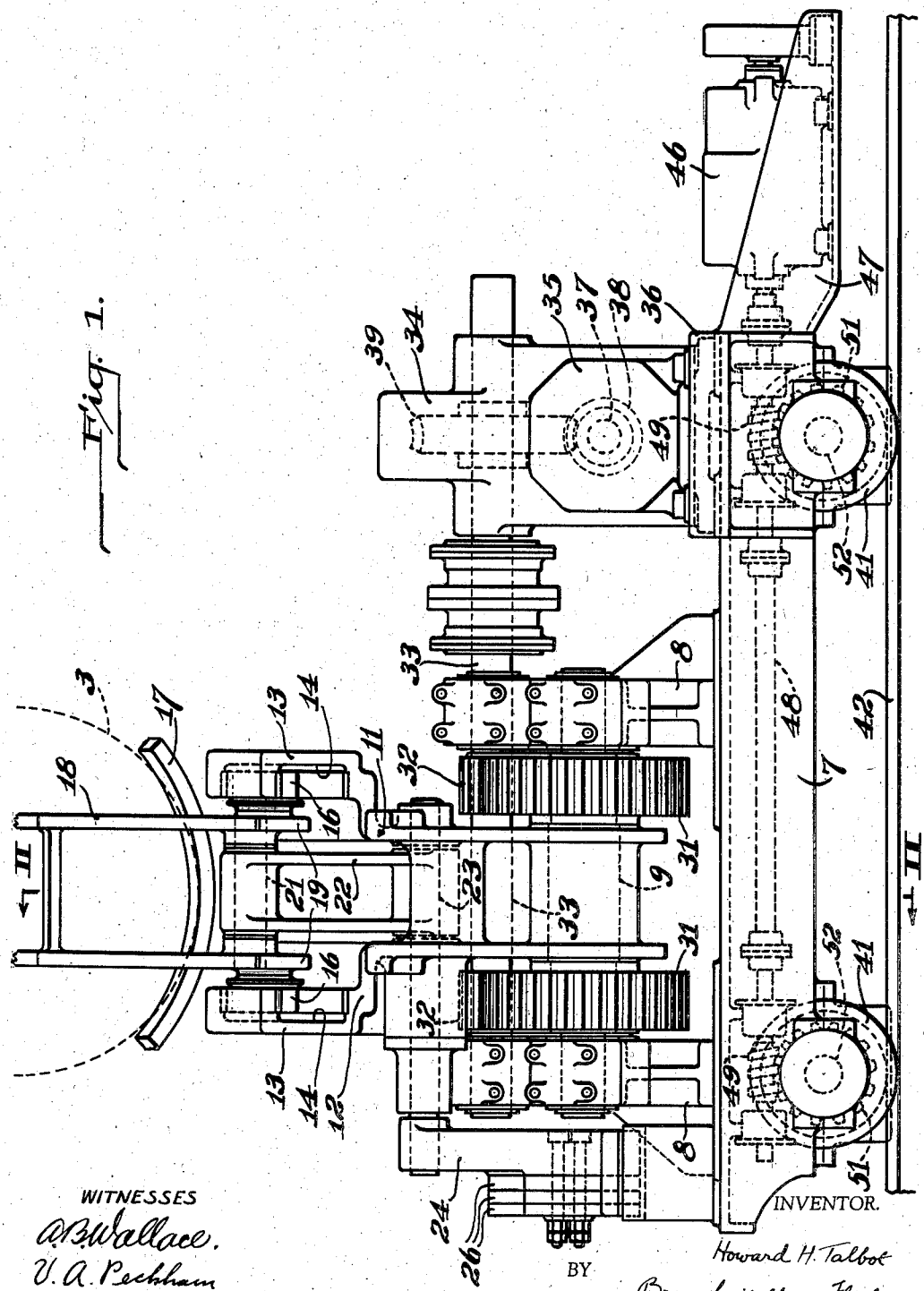
Sept. 7, 1937. H. H. TALBOT 2,092,539

COIL UNLOADER

Filed May 14, 1935 3 Sheets-Sheet 1

Fig. 1.



WITNESSES

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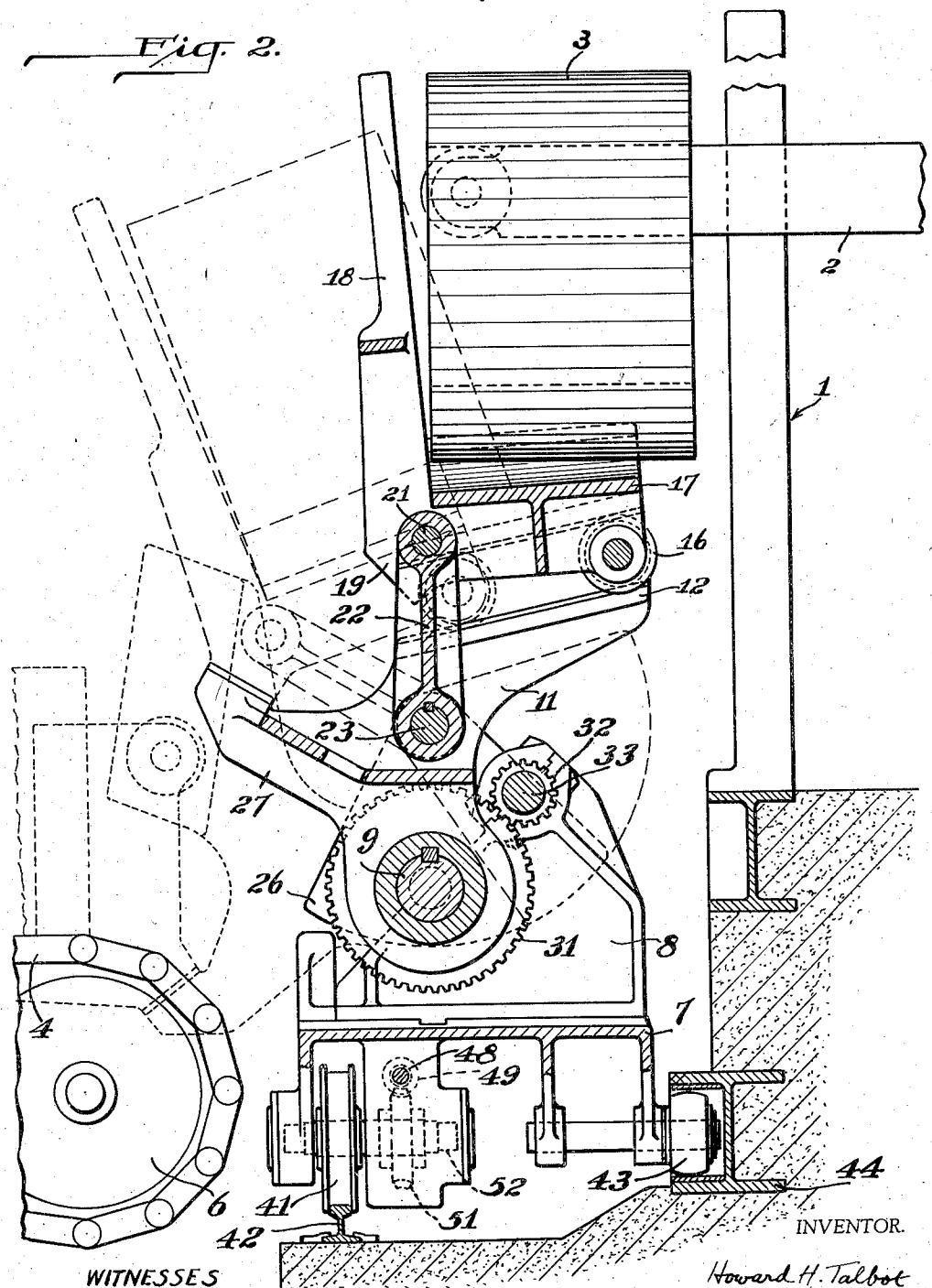
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Fig. 2.



WITNESSES

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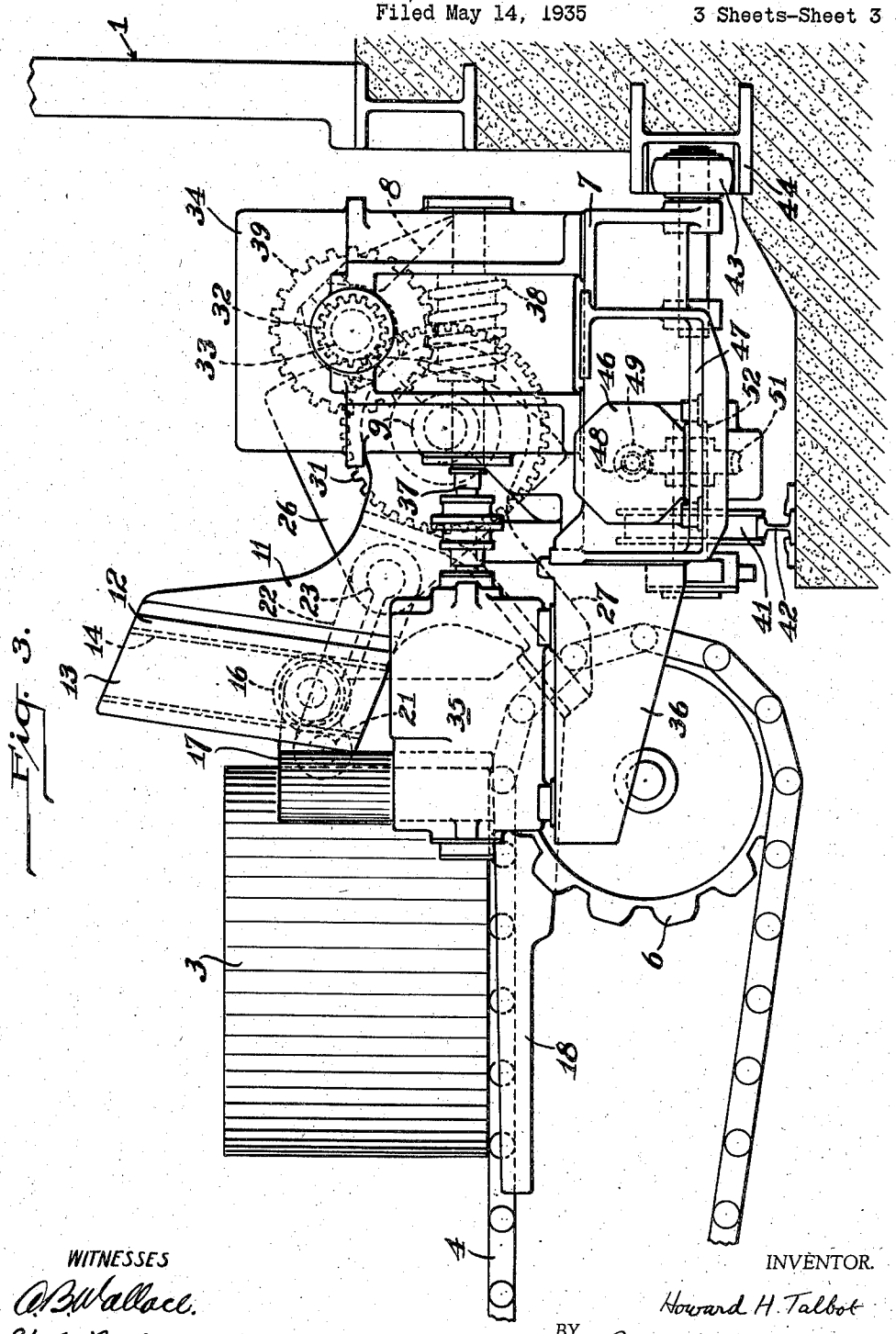


Fig. 3.

WITNESSES

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2,092,539

UNITED STATES PATENT OFFICE

2,092,539

COIL UNLOADER

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Application May 14, 1935, Serial No. 21,309

17 Claims. (Cl. 214—130)

This invention relates to coil unloaders for strip reels, my copending application Serial No. 21,308, filed May 14, 1935, disclosing a species of this invention.

In the reeling of metal strip at the end of a continuous hot strip mill it is highly desirable to remove each coil of strip from the reel as quickly as possible 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 the 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 and the dash-pot. Other serious disadvantages of such an unloader are that it is not adapted to receive coils which vary in width to much extent, nor to deposit them on a conveyor that is offset laterally relative to the reel.

It is among the objects of this invention to provide a coil unloader which is adapted to receive coils varying materially in width; which automatically adjusts itself to accommodate coils of different widths; which transfers coils from a strip reel to a coil conveyor at a predetermined speed unaffected by the weight of the coil on the unloader; which is movable laterally relative to a reel; 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 side view of a coil unloader; Fig. 2 a view taken on the line II—II of Fig. 1; and Fig. 3 an end view of the unloader in coil-discharging position.

Referring to the drawings, there is shown in Fig. 2 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, but not necessarily in line with, the reel is a coil conveyor including horizontally spaced chains 4 traveling around sprockets 6. In the embodiment shown, the top of the conveyor is on a lower level than the base of the reel.

For the purpose of receiving each successive coil of strip from the reel as fast as it is formed and transferring it to the conveyor, a coil unloader is disposed at the end of the reel in the space extending between it and the conveyor. Mounted on the base 7 of the unloader is a pair of spaced pedestals 8 in one side of which a shaft 9 is journaled. Rigidly mounted on this shaft between the pedestals is an upwardly projecting frame 11 provided with a carriage-supporting portion 12 extending toward the reel. At each side of portion 12 there is an upright flange 13 extending its full length, the flanges being provided with ways 14 in which rollers 16, journaled in the front end of carriage 17, are disposed for movement toward and away from the reel.

The base of the carriage is of substantially the same length as the carriage-supporting portion of the frame, and is transversely concave for the reception of coils when they are stripped from the mandrel. When coils are formed in the reel which are so small that they can roll sideways on the base of the carriage, filler blocks can be used to take up the excess space to hold the coils stationary. The end portion 18 of the carriage farthest from the reel extends upwardly to form a backstop for coils being stripped from the mandrel, and a support for them when the carriage is at the opposite end of its path of travel.

The rear end of the carriage base is provided with a pair of downwardly projecting spaced flanges 19 in which a shaft 21 is horizontally mounted. Journaled on this shaft is the upper end of a lever 22 the lower end of which is rigidly mounted on a horizontal shaft 23 journaled in the frame below its carriage-supporting portion and projecting laterally therefrom. The outer end of this shaft is provided with a downwardly projecting crank 24 to the free end of which a plurality of counterweights 26 is detachably connected for normally holding the carriage upright on portion 12 of the frame.

While a coil is being pushed off the mandrel by the stripper it engages upright portion 18 of the carriage and moves it backwards on the carriage-supporting portion of the frame against the resistance of the counterweights which are thereby swung upwardly towards the reel. As soon as the coil has been stripped free of the reel the weight of the coil carries the carriage slowly on back to the position shown in broken lines in Fig. 2 where its movement is arrested by rearwardly projecting arm 27 of the frame. From this point the carriage and frame are tilted backwardly as a unit by means presently to be described, during which time upright portion 18 of the carriage becomes a support for the ad-

joining end of the coil. As portion 18 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. This last position of the frame and carriage is indicated in Fig. 2 by dotted lines, and in Fig. 3 by full lines.

As soon as the coil is removed by the conveyor from the carriage, the counterweights return the empty carriage to its coil-receiving position on the frame, and the frame and carriage are tilted back to their upright position.

The coil shown in the drawings is one of the widest that is formed in the reel, but it is a feature of this invention that the carriage can accommodate it because the carriage moves away from the reel in the manner just described as the coil is ejected therefrom. This adjustment for coil size occurs automatically, as will have been noted. With the wide coil shown, the carriage is substantially in contact with back-stop arm 27 by the time the coil is clear of the mandrel; however, whether a coil be wide or narrow, the weight of the coil moves the carriage to the back-stop arm regardless of the position of the carriage when the coil leaves the mandrel. The speed of the carriage is regulated by the number or size of counterweights mounted on crank 24, so that the carriage does not strike the back-stop too hard when large coils are being removed from the reel.

The tilting of the carriage and frame as a unit is accomplished in the following manner. Rigidly mounted on shaft 9 between each side of the lower portion of the frame and the adjacent pedestal is a spur gear 31, as shown in Fig. 1. These gears mesh with pinions 32 mounted on a horizontal shaft 33 journaled in the tops of the pedestals and projecting therefrom at the side opposite to the counterweights where it is driven through a gear reduction unit 34 by an electric motor 35 mounted on a lateral extension 36 of base 7. Rotation of this shaft by the motor tilts the frame with the carriage in the desired direction.

As shown in Fig. 3, motor shaft 37 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 and frame can not 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 advantageous 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.

When this coil unloader is used with a reel and conveyor which are offset horizontally relative to each other, or when it is used for transferring coils from a plurality of reels to a single conveyor, the base of the unloader is provided on one side with flanged wheels 41 that travel on a track 42 disposed between the reel and conveyor. The opposite side of the base is provided with rollers 43 that travel between the flanges of a horizontally disposed H-beam 44 partially embedded in the foundation for the reel so as to prevent the unloader as a whole from being tipped and upset by the weight of a coil on the carriage.

Power for moving the unloader along the tracks is supplied by an electric motor 46, mounted on an extension 47 of base 7, that drives a horizontal shaft 48 journaled beneath the base where it is provided with worm gears 49 that turn pinions 51 mounted on wheel shafts 52.

By merely changing the size or number of counterweights 26 in accordance with the weight of the coils being formed at any given time, safe transfer of the coils from the reel to the conveyor is assured. This is true whether the conveyor is in line with the reel or offset laterally therefrom, and even though the top of the conveyor is on a level considerably below the base of the reel.

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, means for moving the carriage towards the reel for receiving therefrom coils of strip of different widths, said support being disposed in fixed position 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 towards and away from the reel for receiving therefrom coils of strip of different widths, said support being disposed in fixed position 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 and deposit them on end.

3. A coil unloader for use between a strip reel and a conveyor having horizontally spaced chains, comprising a support, a carriage associated therewith and movable 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, 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 towards and away from the reel for receiving therefrom coils of strip of different widths, said support being disposed in fixed position 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 weight 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 towards and away from the reel for receiving therefrom

coils of strip of different widths, said support being disposed in fixed position 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 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 towards and away from the reel for receiving therefrom coils of strip of different widths, 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 slidably mounted on the frame for movement towards and away from the reel for receiving therefrom coils of strip of different widths, 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 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 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, 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 conveyor chains, whereby coils are received from the reel and deposited on the conveyor.

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 towards and away from the reel for receiving therefrom coils of strip of different widths, 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.

10. A coil unloader for use between a strip reel and a coil conveyor, comprising a support, a carriage associated therewith and movable towards and away from the reel for receiving therefrom coils of different widths, a counterweight connected to the carriage for biasing it towards the reel, and means for moving the carriage from its coil-receiving position to a position adjacent the conveyor to thereby deposit coils thereon.

11. A coil unloader for use between a strip reel and a coil conveyor, comprising a support, a carriage associated therewith and movable towards and away from the reel for receiving therefrom coils of different widths, a counterweight connected to the carriage for biasing it towards the reel, and means for tilting the carriage from the reel to the conveyor to transfer said coils to the conveyor.

12. 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 towards and away from the reel for receiving therefrom coils of different widths, means having its central portion pivoted on the frame and its upper end pivoted on the carriage, a counterweight detachably connected to the lower end of said means for biasing the carriage towards the reel, and means for tilting the carriage and frame as a unit from the coil-receiving position to a position adjacent the conveyor to thereby deposit coils thereon.

13. A coil unloader for use between a strip reel and a coil conveyor, comprising a support, a frame movably mounted thereon and provided in its upper portion with a generally horizontal track, a carriage, the end of said carriage nearest the reel being connected to the track, said carriage being movable on the track towards and away from the reel for receiving therefrom coils of different widths, means having its central portion pivoted on the frame and its upper end pivoted on the carriage on the end farthest from the reel, a counterweight detachably mounted on the lower end of said means for biasing the carriage towards the reel, and means for tilting the carriage and frame as a unit from the coil-receiving position to a position adjacent the conveyor to thereby deposit coils thereon.

14. A coil unloader for use between a strip reel and a coil conveyor offset laterally relative to the reel, comprising a support movable from a position adjacent the reel to a position adjacent the conveyor, means for moving the support, a frame pivotally mounted on the support, a carriage movably mounted on the frame for movement towards and away from the reel for receiving therefrom coils of different widths, and means for tilting the carriage and frame as a unit from the coil-receiving position to the coil-discharging position.

15. A coil unloader for use between a strip reel and coil-receiving means, comprising transfer means, a coil-receiving carriage adjustably mounted on said transfer means, and means for actuating the transfer means to transfer said carriage from a position adjacent the reel to a position adjacent said receiving means.

16. A coil unloader for use between a strip reel and a coil conveyor, comprising a carriage, means for biasing the carriage toward the reel for receiving therefrom coils of strip, said carriage being adapted to be moved away from the reel by coils ejected therefrom, and means for moving the carriage from its coil-receiving position to a position adjacent the conveyor to thereby deposit coils thereon.

17. In combination, a strip reel, a carriage disposed adjacent thereto, means for moving the carriage toward the reel for receiving therefrom coils of strip, said means being displaceable to accommodate the carriage to coils of different widths ejected from said reel, a coil conveyor disposed below said 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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