ROLL FEEDER WITH A TRACTION UNIT

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ABSTRACT

A roll feeder for feeding a steel sheet to a processing machine for processing is disclosed to include a rack, which has a hub that supports a roll of steel sheet and is rotated to let off the steel sheet, a roll feeding unit, which has sheet-transfer roller sets for transferring the steel sheet from the rack to the processing machine and a roller leveler for leveling the steel sheet, and a traction unit, which is provided between the rack and the roll feeding unit and controlled to pull the steel sheet from the hub to the roll feeding unit.
ROLL FEEDER WITH A TRACTION UNIT

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates generally to a roll feeder for feeding sheet material, and more particularly, to a roll feeder with a traction unit.

2. Description of the Related Art

A conventional roll feeder, as shown in FIG. 1, comprises a rack 1, a roll feeding unit 2, a roller conveyor 3 provided between the rack 1 and the roll feeding unit 2, and lifting support 4 mounted in the bottom side of the rack 1 and adapted to support the steel sheet and the guide the steel sheet to the roll feeding unit 2.

This design of roll feeder has numerous drawbacks as outlined hereinafter:

Material feeding requires an experienced worker. When the steel sheet 5 is let off from the rack 1, it is difficult to guide and transfer the curved leading end of the steel sheet 5 to the roll feeding unit 2. Only an experienced worker can properly control the rack 1, the lifting support 4 and the guide frame 6 of the roller conveyor 3 to transfer the steel sheet 5 to the roll feeding unit 2 smoothly.

It takes a long time to feed the material. During feeding operation, the worker must carefully control the speed to let off the steel sheet 5 and the lifting elevation of the lifting support 4 and the swinging angle of the guide frame 6 of the roller conveyor 3 so that the steel sheet 5 can smoothly be guided into the roller conveyor 3 and carried by the roller conveyor 3 to the roll feeding unit 2.

The lead end of the steel sheet 5 may curve upward during delivery, causing an accident. When lifting the lifting support 4 to guide the lead end of the steel sheet 5 into the roller conveyor 3, the worker must control the air cylinder 7 to adjust the swinging of the guide frame 6. In proper control of the guide frame 6 may let the lead end of the steel sheet 5 curve upward suddenly, resulting in an accident.

SUMMARY OF THE INVENTION

The present invention has been accomplished under the circumstances to provide a roll feeder, which eliminates the aforesaid problems. It is therefore the main object of the present invention to provide a roll feeder, which automatically pulls the supplied steel sheet to the roll feeding unit for feeding to save operating time. It is another object of the present invention to provide a roll feeder, which automatically flattens the feeding steel sheet, preventing the lead end of the steel sheet from curving upwards.

To achieve this and other objects of the present invention, the roll feeder comprises a rack, a roll feeding unit, and a traction unit. The rack comprises a hub adapted to support a roll of steel sheet and to let off the steel sheet. The roll feeding unit is adapted to transfer the steel sheet from the rack, comprising two sheet-transfer roller sets adapted to transfer the steel sheet, and a roller lever set between the two sheet-transfer roller sets and adapted to level the steel sheet. The traction unit is provided between the rack and the roll feeding unit and adapted to pull the steel sheet from the hub to the roll feeding unit.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a side view of a roll feeder according to the prior art.

FIG. 2 is a side view of a roll feeder according to the present invention.

FIG. 3 is an enlarged view of a part of the present invention, showing the tractor seized the lead end of the steel sheet.

FIG. 4 is a schematic drawing of the present invention showing the tractor pulled the steel sheet toward the roll feeding unit.

FIG. 5 is similar to FIG. 4 but showing the rammer operated.

FIG. 6 is a schematic drawing of the present invention, showing the steel sheet delivered through the traction unit, the rammer, and the roll feeding unit.

FIG. 7 is an enlarged view of a part of the present invention, showing an alternate form of the tractor.

DETAILED DESCRIPTION OF THE INVENTION

Referring to FIG. 2, a roll feeder in accordance with the present invention is shown comprised of a rack 10, a roll feeding unit 20, a traction unit 30, and a rammer 40.

The rack 10 comprises a hub 11, an expander 12 provided at the center of the hub 11 and adapted to expand and support a roll of steel sheet on the hub 11, a limiter 13 disposed at one side of the hub 11 and adapted to limit the position of the steel sheet on the hub 11 by means of an air pressure, a holding down device 14 disposed at one side of the hub 11 opposite to the limiter 13 and adapted to hold down the steel sheet on the hub 11, and a lifting support 15 spaced below the hub 11 and adapted to support the steel sheet. A respective air cylinder drives the holding down device 14 and the lifting support 15.

The roll feeding unit 20 is provided behind the rack 10, comprising a first sheet-transfer roller set 21 and a second sheet-transfer roller set 22 adapted to transfer the steel sheet from the hub 11, and a roller leveler 23 provided between the first sheet-transfer roller set 21 and a second sheet-transfer roller set 22 and adapted to level the curving part of the steel sheet.

The traction unit 30 is provided between the rack 10 and the roller feeding unit 20 and adapted to pull the steel sheet from the rack 10 toward the roller feeding unit 20.

The traction unit 30 comprises a material receiver 301, which is a material entrance having a width gradually increasing toward the rack 10, a track 31 extending from the material receiver 301 to the first sheet-transfer roller set 21 of the roller feeding unit 20, a tractor 32 movable between two ends of the track 31 and adapted to pull the steel sheet from the material receiver 301 to the first sheet-transfer roller set 21 of the roller feeding unit 20, a plurality of sprockets 33 arranged around the track 31, a transmission chain 34 mounted on the sprockets 33, a drive chain 36...
coupled to one of the sprockets 33, a motor 35 adapted to drive the drive chain 36, and a plurality of guide rollers 37 mounted in the track 31 and adapted to guide the steel sheet forward.

[0023] The rammer 40 is installed in the track 31 and adapted to flatten the steel sheet, comprising a movable upper ramming die 41, a fixed bottom die 42, a first hydraulic cylinder 43 controlled to reciprocate the movable upper ramming die 41 relative to the fixed bottom die 42, a pressure roller 44 adapted to stop the transferring steel sheet from curving upwards, a second hydraulic cylinder 45 controlled to adjust the elevation of the pressure roller 44, a motor 46, and a chain 47 driven by the motor 46 to rotate the pressure roller 44.

[0024] Referring to FIG. 3, the tractor 32 comprises a body 321, which has an opening 322 facing the material receiver 301, a fixed jaw 323 fastened to the top side of the opening 322, a movable jaw 324 pivoted to the bottom side of the opening 322, and sprocket means 341 provided at the body 321 and meshed with the transmission chain 34 for enabling the tractor 32 to work with the sprockets 33 and the transmission chain 34. The fixed jaw 323 and the movable jaw 324 have teeth for grasping the transferring steel sheet in the opening 322.

[0025] Referring to FIGS. 2 and 3 again, after loading of a roll of steel sheet on the hub 11, the expander 12, the limiter 13, the holding down device 14 and the lifting support 15 are respectively operated. During continuous rotation of the hub 11 to let off the steel sheet, the lead end A of the steel sheet falls to the lifting support 15, which lifts the lead end A of the steel sheet to the material receiver 301 of the traction unit 30. When the lead end A of the steel sheet entered the opening 322 of the tractor 32 at the first end of the track 31, the traction unit 30 is started to catch the lead end A of the steel sheet with the fixed jaw 323 and the movable jaw 324 and to further pull the lead end A of the steel sheet forward. The material receiver 301 comprises two swinging frames 302,303 respectively pivoted to the traction unit 30. The swinging frames 302,303 have a respective curved panel 304,305 arranged in a double-bevel manner.

[0026] Referring to FIG. 4, during continuous rotation of the hub 11 of the rack 10, the track 31 is gradually loosened from the hub 11, and the tractor 32 pulls the lead end A of the steel sheet to the first sheet-transfer roller set 21 of the roller feeding unit 20. After the tractor 32 seized the lead end A of the steel sheet, the swinging frames 302,303 are turned outwards relative to each other to move the curved panels 304,305 apart, preventing friction between the curved panels 304,305 and the transferring steel sheet.

[0027] Referring to FIG. 5, during continuous operation of the roller feeder, the lead end A of the steel sheet is moved through the rammer 40. At this time, the first hydraulic cylinder 43 is controlled to reciprocate the movable upper ramming die 41 relative to the fixed bottom die 42 to ram the transferring steel sheet to a flatten status, and at the same time the tractor 32 continuously pulls the lead end A of the steel sheet to the first sheet-transfer roller set 21 of the roller feeding unit 20. When the tractor 32 is approaching the first sheet-transfer roller set 21 of the roller feeding unit 20, the second hydraulic cylinder 45 is controlled to press the pressure roller 44 on the transferring steel sheet against the guide rollers 37 to prevent backward displacement of the transferring steel sheet upon release of the tractor 32 from the lead end A of the steel sheet.

[0028] Referring to FIG. 6, after having moved to the second end of the track 31, the tractor 32 releases the transferring steel sheet. Because the second end of the track 31 slopes at an angle, the tractor 32 does not hinder forward delivery of the transferring steel sheet. Following rotation of the hub 11 of the rack 10 and the pressure roller 44, the lead end A of the steel sheet is moved into the first sheet-transfer roller set 21 of the roller feeding unit 20, and then leveled by the roller leveler 23 carried forwards by the second sheet-transfer roller set 22 for further processing by a processing machine.

[0029] FIG. 7 shows an alternate form of the tractor according to the present invention. According to this embodiment, the lead end A of the steel sheet has at least one hole A1, and the tractor 32 has at least one peg 38 for engaging the at least one hole A1 upon passing of the lead end A of the steel sheet into the traction unit 30.

[0030] Although particular embodiments of the invention have been described in detail for purposes of illustration, various modifications and enhancements may be made without departing from the spirit and scope of the invention. Accordingly, the invention is not to be limited except as by the appended claims.

What is claimed is:

1. A roll feeder comprising:
   a rack, said rack comprising a hub adapted to support a roll of steel sheet and to let off the steel sheet;
   a roll feeding unit adapted to transfer the steel sheet from said rack, said roll feeding unit comprising sheet-transfer roller set means adapted to transfer the steel sheet, and a roller leveler adapted to level the steel sheet; and
   a traction unit provided between said rack and said roll feeding unit and adapted to pull the steel sheet from said hub to said roll feeding unit.

2. The roll feeder as claimed in claim 1, wherein said traction unit comprises a track extending between said rack and said roll feeding unit, and a tractor movable between two distal ends of said track and adapted to pull the steel sheet from said hub to said roll feeding unit.

3. The roll feeder as claimed in claim 2, wherein said tractor comprises jaw means adapted to seize the steel sheet from said hub.

4. The roll feeder as claimed in claim 2, wherein said tractor comprises hook means adapted to catch the steel sheet from said hub.

5. The roll feeder as claimed in claim 1, wherein said traction unit comprises a material receiver, said material receiver having a material entrance for receiving the steel sheet from said hub, said material entrance having a width gradually increasing toward said rack.

6. The roll feeder as claimed in claim 2, wherein said traction unit further comprises a plurality of sprockets arranged around said track, a transmission chain mounted on said sprockets and fastened to said tractor for moving said tractor along said track upon rotation of said sprockets.
7. The roll feeder as claimed in claim 2, wherein said tractor comprises a body, said body having an opening, a toothed fixed jaw and a toothed movable jaw provided inside the opening of said body.

8. The roll feeder as claimed in claim 6, wherein said material receiver comprises two swinging frames bilaterally pivoted to said traction unit, said swinging frames each having a curved panel, the two curved panels of said swinging frames being arranged in a double-bevel manner.

9. The roll feeder as claimed in claim 7, wherein said toothed movable jaw is pivotally mounted in the opening of said body.

10. The roll feeder as claimed in claim 2, wherein said traction unit further comprises a plurality of guide rollers mounted in said track and adapted to guide the steel sheet forwards.

11. The roll feeder as claimed in claim 2, further comprising a rammer installed in said track and adapted to flatten the steel sheet.

12. The roll feeder as claimed in claim 11, wherein said rammer comprises a fixed bottom die, and a movable upper ramming die vertically movable relative to said fixed bottom die.

13. The roll feeder as claimed in claim 2, further comprising a pressure roller installed in said track and adapted to stop the steel sheet from curving upwards.

14. The roll feeder as claimed in claim 2, wherein said tractor comprises a peg adapted to hook in a hole in the lead end of the steel sheet being let off from said hub.

15. The roll feeder as claimed in claim 1, wherein said sheet-transfer roller set means of said roll feeding unit comprises a first sheet-transfer roller set and a second sheet-transfer roller set, and said roller leveler is set between said first sheet-transfer roller set and said second sheet-transfer roller set.

16. The roll feeder as claimed in claim 1, wherein said rack further comprises an expander installed in said hub and adapted to expand the roll of steel sheet being loaded on said hub.

17. The roll feeder as claimed in claim 1, wherein said rack further comprises a first sheet-transfer roller set and a second sheet-transfer roller set, and said roller leveler is set between said first sheet-transfer roller set and said second sheet-transfer roller set.

18. The roll feeder as claimed in claim 1, wherein said rack further comprises a holding down device disposed at one side of said hub and adapted to hold down a roll of steel sheet on said hub.

19. The roll feeder as claimed in claim 1, wherein said rack further comprises a lifting support spaced below said hub and adapted to support the lead end of the steel sheet being loaded on said hub.

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