Nov. 4, 1947. D. O. OLSON 2,430,075

APPARATUS FOR HANDLING COILS

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Fig. 1

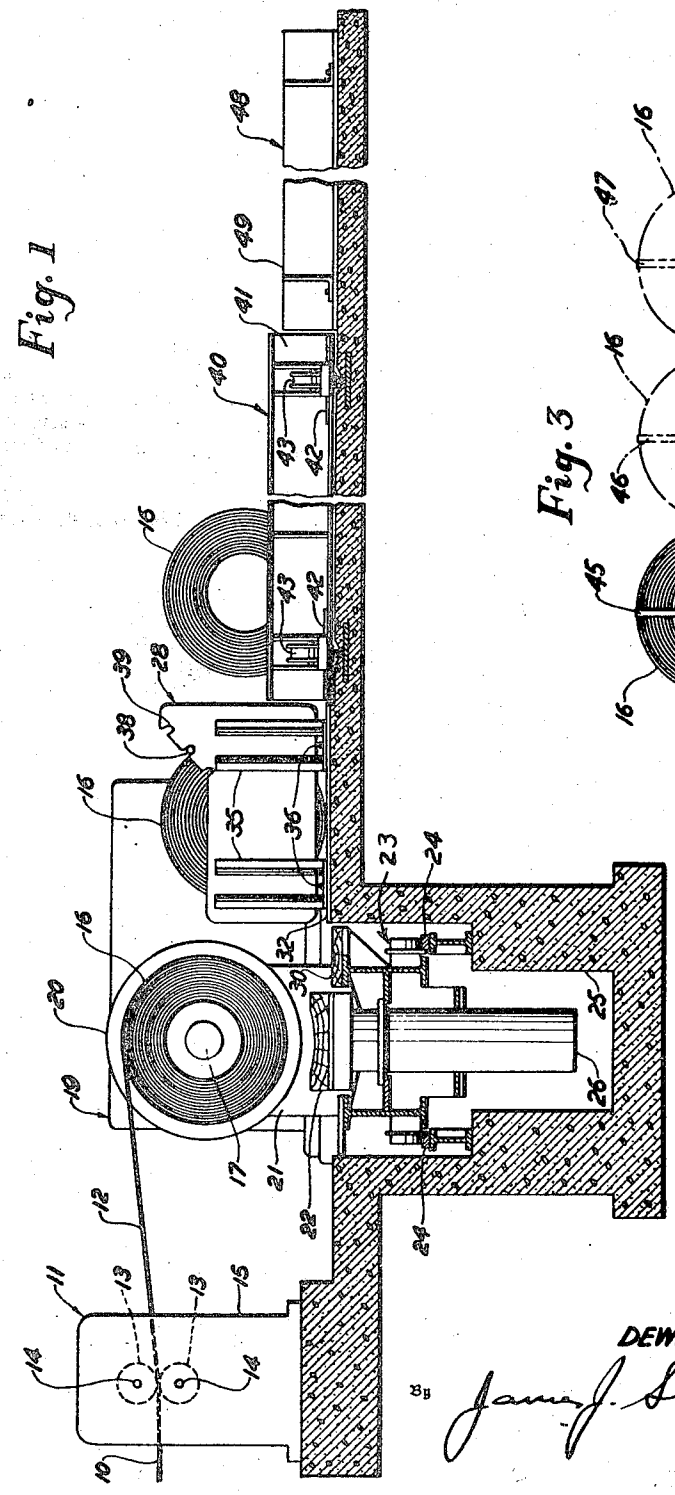
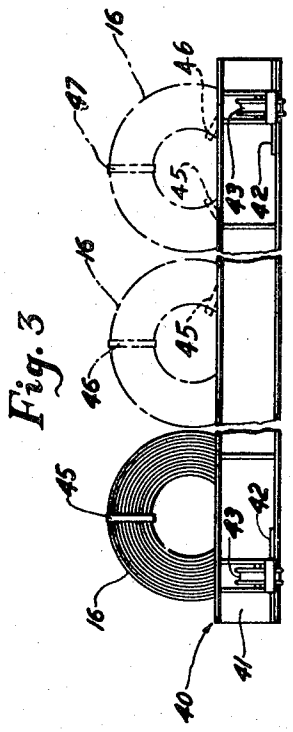


Fig. 3



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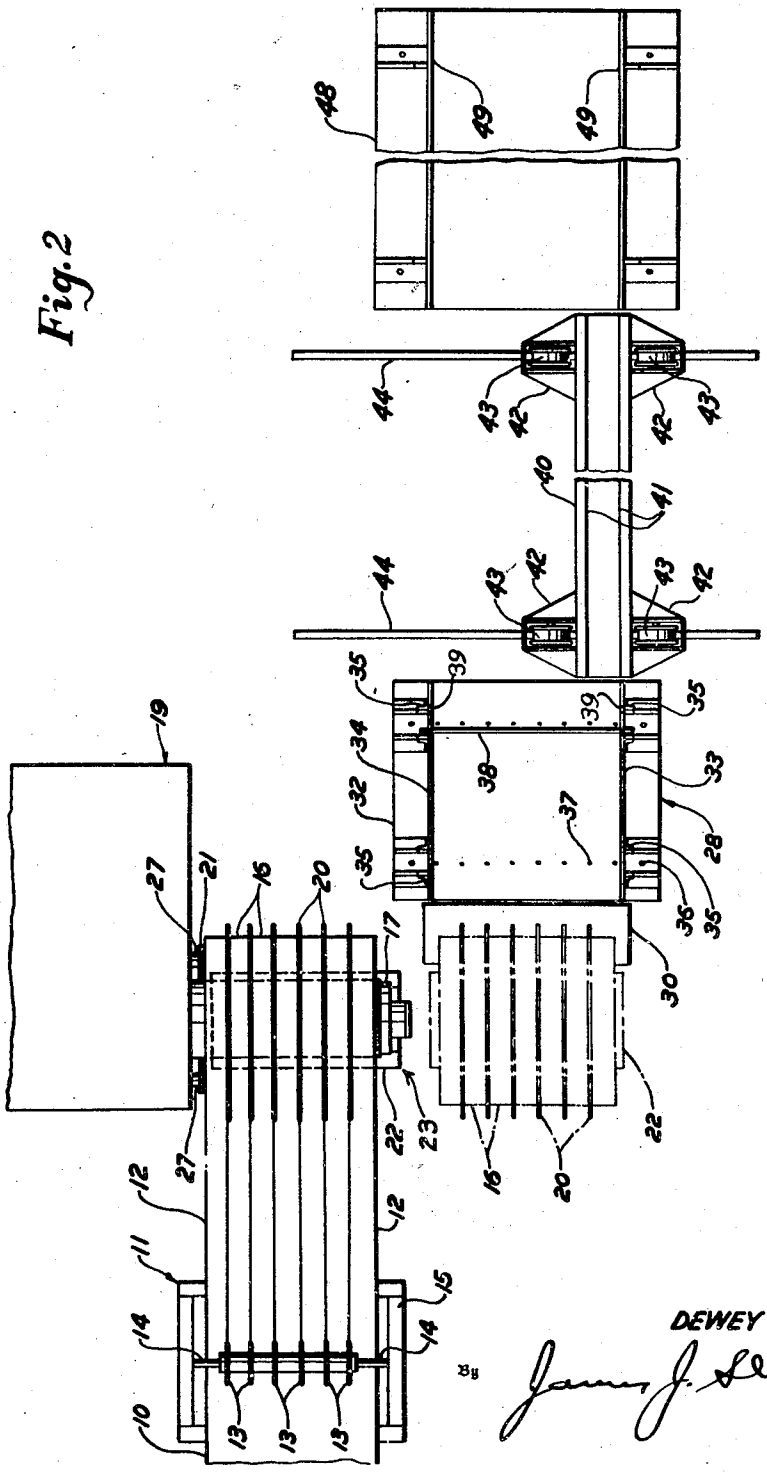
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Fig. 2



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Patented Nov. 4, 1947

2,430,075

UNITED STATES PATENT OFFICE

2,430,075

APPARATUS FOR HANDLING COILS

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Application March 26, 1945, Serial No. 584,971

7 Claims. (Cl. 242—79)

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This invention relates to apparatus for handling coils and is particularly concerned with apparatus for handling relatively heavy, narrow coils of sheet material, such as steel strip, during banding of the coils.

In the production of steel strip, the steel is rolled into a long, relatively wide strip of the required thickness and then coiled at the mill. The various customers require a wide variety of relatively narrow coils of different and special widths. The general practice is for the mill to store the wide coils and then to slit the strip of each coil into a plurality of relatively narrow bands of the width specified by the customer in his order. The relatively wide steel strip is uncoiled and passed through a slitter which cuts the strip into relatively narrow bands or ribbons of the desired width which are rewound into coils on a coiler. These coils are removed from the coiler and rolled out onto the floor and retaining bands applied to the coils to prevent uncoiling during shipment. Normally, two men are required to apply the bands and hold the coil upright on its edge. A major portion of these coils have a width that is only a small fraction of the diameter and as these coils often weigh from 600 to 1000 lbs. each, handling the coils is quite hazardous for they readily tip over and seriously injure the men handling the coils. Numerous accidents have resulted especially when handling the narrow coils. Further, it is the general practice to use a crane, such as the usual overhead mill crane, to shift the coils even relatively short distances which increases the time the crane is tied up and may force other crews to wait in idleness until the crane is free.

It is an object of the present invention to provide an improved apparatus for handling relatively narrow steel coils safely without damage to the operator, especially during the attaching of retaining bands to the coil and which is so constructed and arranged that a helper is not needed to hold the coil while bands are being applied.

Another object of the present invention is to provide a coil handling apparatus constructed and arranged to permit the successive and simultaneous banding of a series of coils.

A further object of the present invention is to provide a coil handling apparatus which is economical to manufacture, install and operate.

While the present invention is primarily concerned with and will be described in connection with apparatus for handling coils of steel strip, it is to be understood that my apparatus may be used for handling coils of other materials.

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The present invention provides an apparatus that is particularly useful in handling a plurality of coils after they have been removed from the usual coiler and includes a coil receiving box for receiving and holding the coils in side by side relationship and a banding trough having coil restraining sides spaced apart sufficiently to receive a single coil therebetween and spaced close enough together to hold the coil on its edge and prevent it from tipping over during application of the bands. The banding trough is supported for movement in a direction transverse to the coils so that as a first coil is rolled along the trough, the trough may be moved into alignment with a second coil. Thus, a plurality of coils may be banded simultaneously in the trough.

These and other objects and advantages will become more apparent from the following detailed description and the accompanying drawings, in which:

Figure 1 is a side elevational view of an apparatus embodying the present invention;

Figure 2 is a plan view of the apparatus of Figure 1; and

Figure 3 is a side elevational view of the banding trough of Figure 1.

Referring to the drawings, the wide steel strip 10 is passed through a slitting mechanism 11 including slitting elements 13 mounted on upper and lower shafts 14 supported in the frame 15. The slitting elements 13 cut the wide strip 10 into a plurality of narrow bands or strips 12 which are wound into coils 16 on the reel 17 of the coiler 19. Annular rings 20 are placed on the reel 17 and between the coils 16 to keep them separate. Preferably the power driven reel 17 pulls the strip 10 through the slitter 11. After the coils 16 are of the desired size, the reel 17 is contracted and hydraulic pressure is applied to the U-shaped plate 21 mounted on rods 27 to push the coils 16 and the annular rings 20 onto a platform 22 of buggy 23.

The buggy 23 is mounted on rails 24 in a pit 25 below the normal floor level and includes the buggy platform 22 supported for vertical movement by a hydraulic cylinder 26. When it is time to remove the coils 16 from the reel 17, fluid is admitted to the lower, head end of hydraulic cylinder 26 to raise the buggy platform 22 up to a position engaging or adjacent the coils 16. Pressure is then applied to the U-shaped plate 21 to push the coils off reel 17 and simultaneously the buggy 23 is moved in the same direction as the coils so that the coils 16 are transformed to the buggy platform 22 in a side by side relationship

having the same relative positions as when on the reel 17. The buggy 23 is then moved along the rails 24 and into alignment with the coil receiving container or box 28 at which time the coils are in the position shown in broken lines in Figure 2. The annular separator rings 20 are then removed from between the coils 16.

The slitter 11, coiler 19 and buggy 23 form no part of the present invention and may be of any type heretofore used in the steel mill or may be of any other type deemed suitable. Each of these mechanisms is a standard item well known to those skilled in the art.

Heretofore, it has been the customary practice to lower the buggy platform 22 and the supported coils 16 and to then tilt the platform 22 so as to roll the coils out onto the wooden platform 30 from which the coils are manually rolled onto the floor 31 and then banded or from which the coils may be removed by the mill crane onto the floor in position for banding.

The coils 16 are rolled from the platform 30 into the coil receiving box 28 which includes a base plate 32 attached to the floor 31 in any suitable manner and includes side plates 33 and 34 each supported by two brackets 35. Each bracket 35 is fastened to the base plate 32 by means of a bolt 36. A plurality of spaced threaded bolt holes 37 are provided to permit adjustment of the side plates 33 and 34 toward and away from each other so that the distance between the side plates can be adjusted so as to equal approximately the total width of the coils 16. A bar 38 mounted in the proper pair of notches 39 prevents the coils from rolling out of the far side of the receiving box 28. A plurality of notches 39 are provided so that the position of the bar 38 may be adjusted to provide a stop adjustable in accordance with the size of the coils 16.

The banding trough 40 includes spaced apart side walls 41 supported on two trucks 42 including wheels 43 mounted on the respective rails 44. The banding trough 40 is movable along the rails 44 in a direction transverse to the coils 16 and into successive alignment with each coil 16 in box 28. The walls 41 are spaced apart a sufficient distance to receive the widest coil 16 which normally will be cut and are close enough together to prevent event the narrowest coil 16 from tipping over so that the coils 16 are securely supported during the banding operation. The length of trough 40 is preferably as great as the circumference of the largest coil.

Assuming that the coils 16 are in the coil receiving box 28, the bar 38 is normally removed and a first, end coil is rolled into the trough 40, and a top band 45 is applied around the coil as shown in Figure 3. The end of the trough 40 is adjacent the coil receiving box 28 so that there is no chance for the coil to tip over while being rolled into the trough. After the first coil has been banded with the single band 45, it is rolled along the trough toward the right sufficiently to turn it through about 120° and a second band 46 is applied around the top as indicated in broken lines in Figure 3. While the first coil is being moved along the trough and having its second band 46 applied thereto, the trough 40 is manually moved along the rails 44 and into alignment with a second coil. The second coil is then rolled into the trough and a band applied as previously described. After the first and second coils have been banded, each coil is rolled along the trough toward the right and through about 120° and a third band 47 is applied around the top of the first coil and the second band 46 is applied around the top of the second coil. While the first two coils are being rolled along the trough 40 and are being banded, the trough is moved along the rails 44 into alignment with a third coil which is banded as previously described. After the desired number of bands have been applied to the first coil, the completely banded first coil is rolled from the trough into the storage box 48 and the second and third coils are moved along the trough and banded, and simultaneously a fourth coil is moved into the banding trough. Thus, coils are being banded while the trough 40 is being moved into alignment with a next coil and this next coil is being rolled into the trough. This apparatus provides means for continuously banding the coils and for simultaneously banding a plurality of coils so that there is little lost time.

After the coils have been banded, they are rolled into the storage box 48 including coil-supporting side walls 49. Preferably the walls 49 are spaced apart that distance which will permit the number of coils to be supported therebetween in a side by side relationship that will form a load for the crane. As the coil storage box can receive any desired number of coils 16 and as it is not necessary or even desirable to use the crane at any time during the banding of the coils or movement of the coils into position to be banded, the crane is not tied up and does not cause other crews to wait in idleness until the crane is available.

Having described a preferred embodiment of my invention in detail it is obvious that various modifications may be made therein or that some features may be used without others all without departing from the spirit and scope of my invention except as specifically set forth in the accompanying claims.

I claim:

1. Apparatus for handling coils of strip material, said apparatus comprising, in combination, means for coiling a plurality of lengths of the strip material into coils; a container for receiving the coils in side by side relationship; means for moving the coils from said coiling means to said coil receiving container; a trough having restraining sides spaced apart sufficiently to receive a single coil therebetween and close enough together to hold the coil on its edge and prevent its tipping over, said trough being long enough to receive a plurality of coils at the same time; and means supporting said trough for movement into successive alignment with each of the coils in said coil receiving container.

2. Apparatus for handling coils of steel strip and similar material of varying widths in combination with means for simultaneously coiling a plurality of steel strips into coils, said apparatus comprising, in combination, a coil receiving box for receiving the coils in side by side relationship, said box having two opposed sides relatively adjustable toward and away from each other so that the total distance between said sides is substantially equal to the total width of all the coils; a trough constructed and arranged to receive and support said coils, said trough and said coil receiving box being movable relative to each other in a direction to successively bring said trough into alignment with each of the coils in said coil receiving box.

3. Apparatus for handling coils of steel strip during banding of the coils, said apparatus comprising, in combination, means for coiling a plurality of lengths of steel strip into coils; a coil

receiving box for receiving the coils in side by side relationship, said box having two opposed sides relatively adjustable toward and away from each other, the distance between said sides being substantially equal to the total width of said plurality of coils; means for moving the coils in side by side relationship from said coiler to said coil receiving box; an elongated banding trough; and transverse rails supporting said trough, said trough being movable along said rails into alignment with any one of said coils in said receiving box, said trough including sides spaced apart sufficiently to receive a single coil therebetween and close enough to hold said coil and prevent its tipping over.

4. Apparatus for handling steel strip coils during banding of the coils, said apparatus comprising a coil receiving box for receiving and supporting a plurality of coils in side by side relationship; a banding trough having coil restraining sides spaced apart sufficiently to receive a single coil therebetween and close enough to hold a coil on its edge and prevent its tipping over; and means supporting the banding trough for movement into alignment with any one of the plurality of coils in said receiving box, the length of said trough being as great as the circumference of one of said coils.

5. Apparatus for handling steel strip coils during banding of the coils, said apparatus comprising a coil receiving box for receiving and supporting a plurality of coils in side by side relationship, said coil receiving box having two opposed sides relatively adjustable toward and away from each other so that the total distance between said sides is substantially equal to the total width of said coils; a banding trough having coil restraining sides spaced apart sufficiently to receive a single coil therebetween and close enough to hold a coil on its edge and prevent its tipping over; and means supporting the banding trough for movement into alignment with any one of the plurality of coils in said receiving box, the length of said trough being as great as the periphery of one of said coils.

6. Apparatus for handling steel strip coils during banding of the coils, said apparatus comprising a coil receiving box for receiving and supporting a plurality of coils in side by side relationship, said coil receiving box having two opposed sides relatively adjustable toward and away from each other so that the total distance between said sides is always substantially equal to the total width of said coils; a banding trough having coil restraining sides spaced apart sufficiently to receive a single coil therebetween and close enough to hold a coil on its edge and prevent its tipping over; and means supporting the banding trough for movement into alignment with any one of the plurality of coils in said receiving box, the length of said trough being as great as the periphery of one of said coils; and an adjustable stop associated with said coil receiving box movable to a position to prevent said coils from rolling out of said coil receiving box in a direction towards said banding trough and movable to an inoperative position to permit rolling of any one of said coils in a direction toward said banding trough.

7. Apparatus for handling coils of different widths and diameters of steel strip and similar materials, said apparatus comprising, in combination, means for coiling a plurality of lengths of steel strip into coils in a side by side relationship; a coil receiving box for receiving the coils in a side by side relationship, said box including spaced apart sides for holding the coils in an upright position, said sides being adjustable toward and away from each other; means for moving the coils in side by side relationship from said coiling means to a position adjacent said coil receiving box and into a position to be rolled into said coil receiving box in said side by side relationship; rails extending in a direction transverse to the side of said coils; a banding trough movably supported on said rails and movable into successive alignment with any one of the coils in said box, said trough including sides spaced apart sufficiently to receive one coil therebetween and close enough together so as to prevent tipping over of the coil, the length of said trough being at least equal to the circumference of the largest coil; and a coil storage box positioned to receive the banded coils from said banding trough.

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