Nov. 9, 1965 F. M. LITTELL 3,216,672

DOUBLE CONE REEL STRUCTURE

Filed Feb. 4, 1964 3 Sheets-Sheet 1

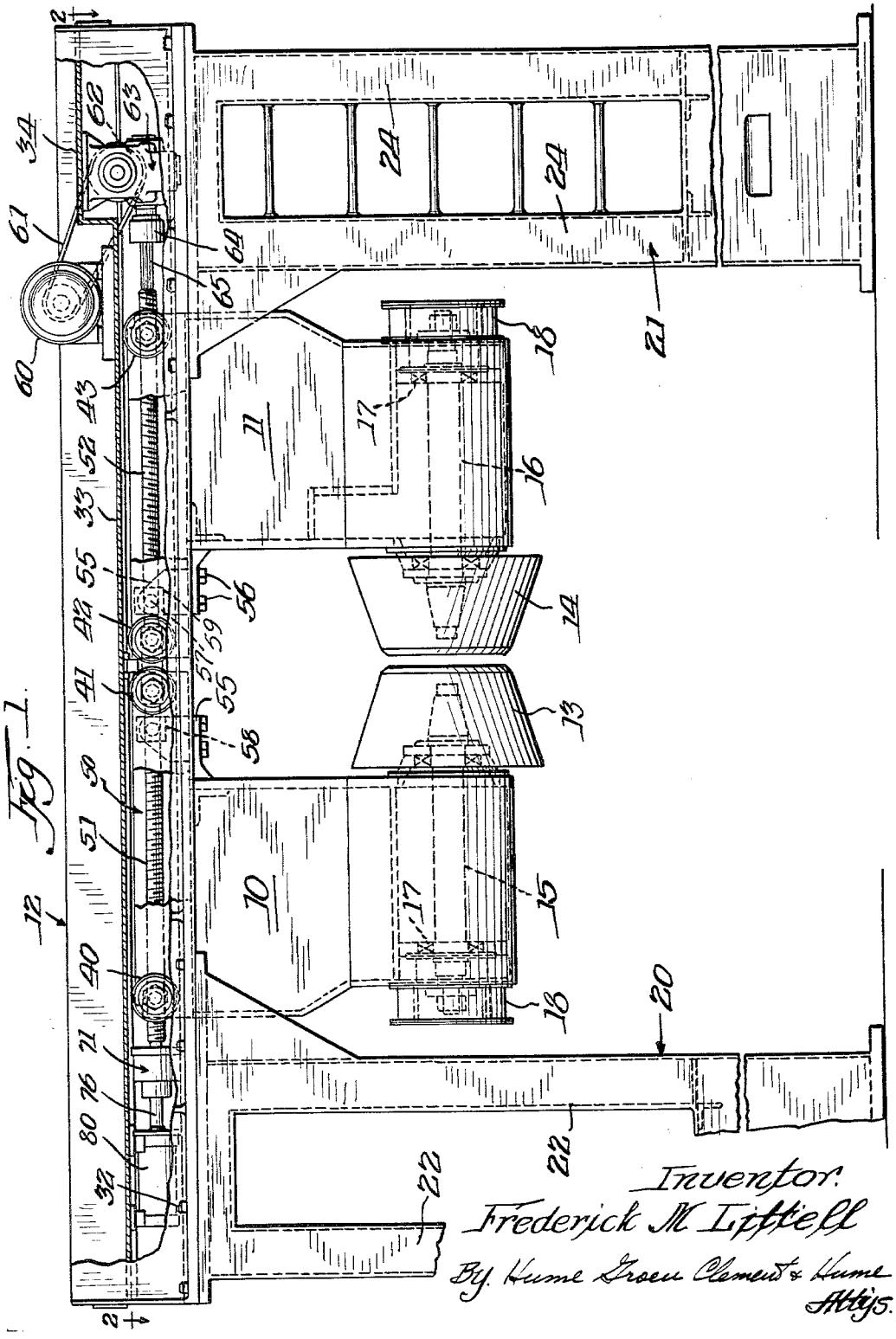

Fig. 1.

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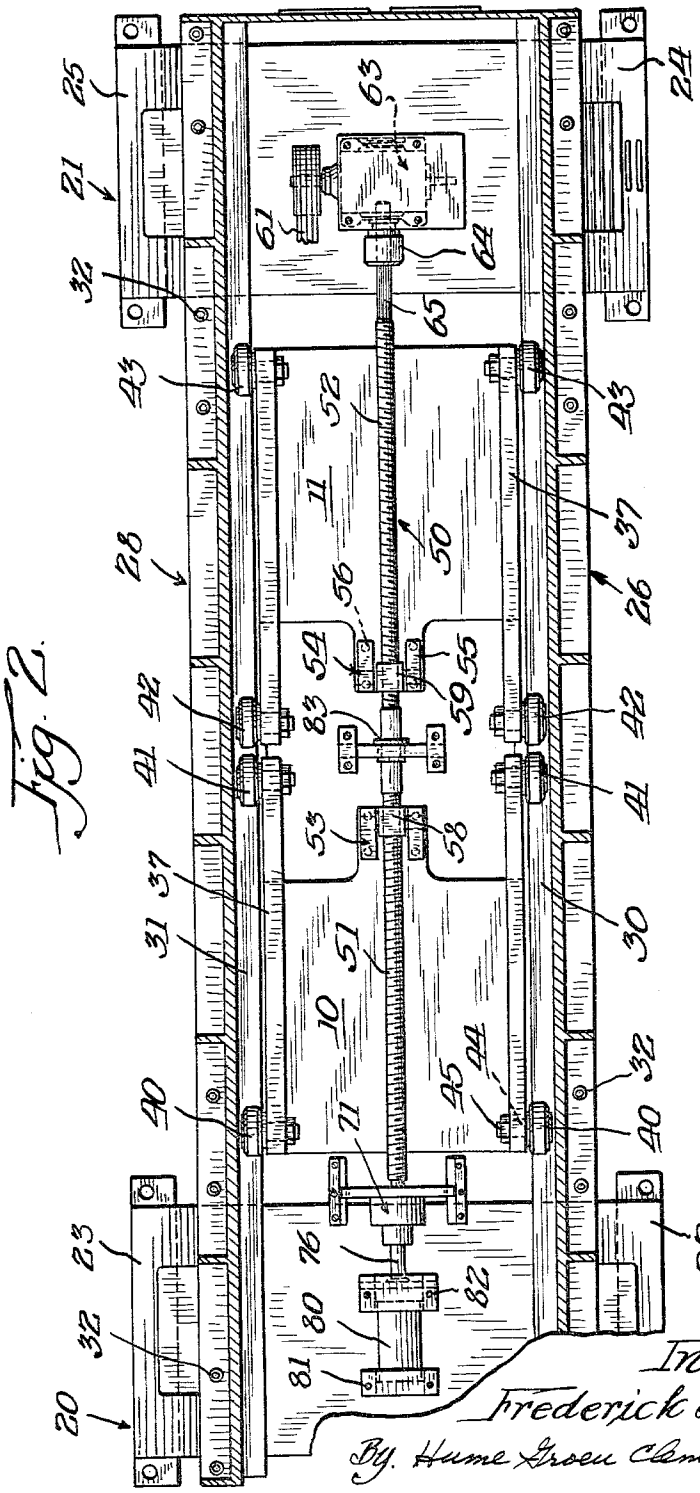

Fig. 2.

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Fig. 3

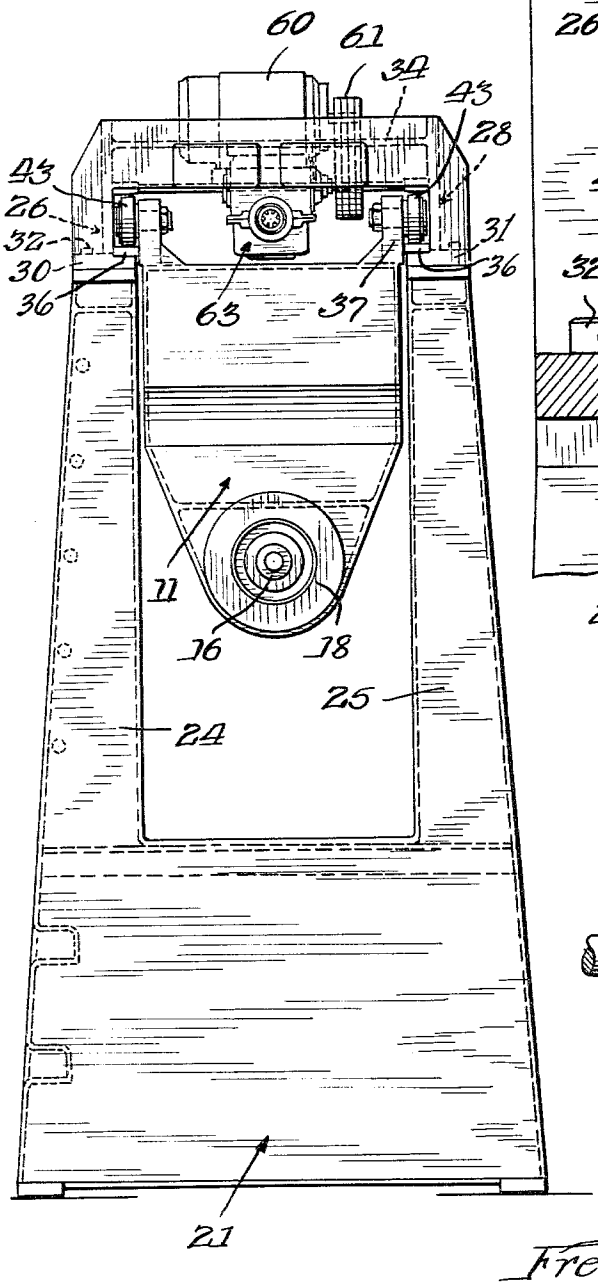


Fig. 4.

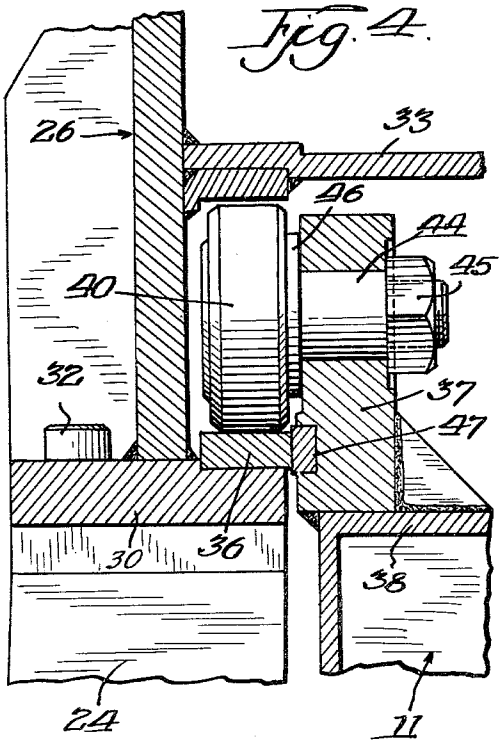
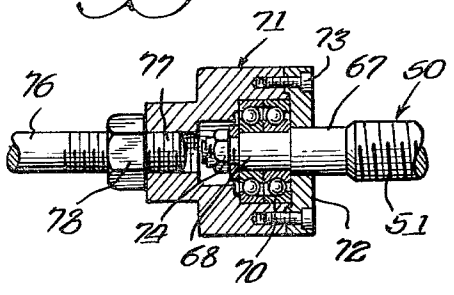


Fig. 5.



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DOUBLE CONE REEL STRUCTURE

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3 Claims. (Cl. 242—78.6)

The invention relates to reels for supporting coils of metal stock for rotation and has reference to an overhead double cone reel structure for supporting coils of metal stock from an elevated track and which will provide an unobstructed passageway between the frame supports for the coil supporting members and below the supported coil.

The reel structure of the invention is an improvement over the double cone reel shown in the patent to Littell 2,662,698, granted December 15, 1953, and which provides a pair of coil supporting members adapted to have rolling movement on guideways. The members support the coil for rotation and also for bodily movement in lateral directions as regards the reel in order that the coil may be accurately centered and aligned with the machine or apparatus positioned for receiving the stock material from the coil. When the guideways or track elements on which the coil supporting members are adapted to have rolling movement are located on the floor, they obstruct the passageway below the supported coil, since they are disposed transversely of the passageway. In the reel structure as contemplated by the present invention, the coil supporting members are suspended for rolling movement on overhead track elements and thus the passageway below the supported coil and between the frame supports for the coil supporting members remain free and unobstructed.

Another object of the invention is to provide an improved double cone reel which will employ spaced track elements for supporting and guiding the rollers of the coil supporting members and wherein the rollers are fixed to upper extensions of the coil supporting members so that the members are suspended for rolling movement on the track elements.

A further object is to provide a double cone reel which will support the coil from an elevated track structure and wherein the members for so supporting the coil may be moved bodily in lateral directions for centering the supported coil.

With these and various other objects in view the invention may consist of certain novel features of construction and operation, as will be more fully described and particularly pointed out in the specification, drawings and claims appended thereto.

In the drawings which illustrate an embodiment of the device and wherein like reference characters are used to designate like parts—

FIGURE 1 is a side elevational view of a double cone reel constructed in accordance with and embodying the improved features of the present invention;

FIGURE 2 is a longitudinal sectional view taken substantially on the horizontal line 2—2 of FIGURE 1 and showing the operating shaft for the coil supporting members;

FIGURE 3 is an elevational view of the right hand end of the double cone reel structure shown in FIGURE 2;

FIGURE 4 is a detail sectional view showing one of the rollers for the coil supporting members and also illustrating associated structure whereby the roller has rolling contact on a track member; and

FIGURE 5 is a detail sectional view showing the ball bearing connection between the hydraulic power cylinder and the threaded operating shaft.

The coil handling apparatus selected for illustrating the

present invention essentially consists of coil supporting members **10** and **11** which are supported for substantially frictionless rolling movement on elevated track elements forming part of and provided by the unitary frame structure generally designated by the numeral **12**. Each coil supporting member journals a coil engaging cone **13** and **14** by means of the shafts **15** and **16**, respectively. The bearings for the shafts are indicated by numeral **17** and a friction brake device such as **18** may be fixed to the extending rear end of each shaft.

The unitary frame **12** essentially consists of frame supports **20** and **21**, which are box-like in construction particularly in the vicinity of their base. Each of the upright supports **20** and **21** are bifurcated to provide frame members such as **22** and **23** for frame support **20**, and **24** and **25** for frame support **21**. The bifurcated construction of the said frame supports is clearly illustrated in FIGURES 1 and 3 wherein it will be observed that the frame members **22** and the frame members **23** of support **20** are respectively joined at their upper ends and that frame members **24** and **25** of the support **21** are likewise joined respectively at their upper ends. The longitudinal girders **26** and **28** comprise the basic elements of the overhead frame structure. The said girders have a configuration in transverse section simulating conventional beam structure for strength purposes and each girder provides a track element such as **30** for the girder **26** and **31** for the girder **28**. Securing bolts or similar fastening means **32** are provided for fixedly securing the girders at their respective ends to the frame members. The left hand girder **26**, FIGURE 3, is secured to the frame members **22** at one end, and at its opposite end said girder is similarly secured to the frame members **24**. The right hand girder **28** is fixedly secured in a similar manner to the frame members **23** at one end and to the frame members **25** at its opposite end. Thus the girders extend longitudinally of the overhead frame structure **12** from end to end thereof, and in addition to physically connecting the frame supports **20** and **21** the girders provide the spaced track elements **30** and **31**. The frame structure is completed by the top wall **33** having an elevated portion **34** at its right hand end, FIGURE 1. Said top wall **33** and portion **34** are suitably secured to the vertical walls provided by the spaced girders **26** and **28**. For this purpose the top wall **33** including the portion **34** may be welded to the girders as best shown in FIGURE 4.

The coil supporting members **10** and **11** are adapted to have substantially frictionless rolling movement on the track elements **30** and **31** for which purpose the said elements are each provided with a hardened steel insert **36**, FIGURE 4. The insert extends for the length of each track element and the rollers have contact therewith. Each coil supporting member has an upstanding rail **37**, suitably welded to the top wall **38** of the member on each side thereof and the rails carry the rollers for suspending each member for rolling movement on its track elements. The front rollers **40** and the rear rollers **41** support the member **10**, FIGURE 2, and front and rear rollers **42** and **43**, respectively, support the member **11**. Each roller is journalled by means of a stud shaft **44** which is locked in position on its rail **37** by means of the threaded nut **45**. A spacing ring **46** may be interposed between each roller and its respective rail **37** in order to properly space the roller so that it overlies and contacts an insert **36**. Also, each rail **37** may be provided with an insert **47** for taking up wear such as would develop between a rail and an insert **36** as the coil supporting members move longitudinally on the track elements.

In the operation of placing a coil of metal stock on the double cone reel as herein disclosed, it is required

that the coil supporting members **10** and **11** be spaced apart a distance greater than the width of the coil so that the cones **13** and **14** will be located on respective sides of the coil. The coil is then elevated to align the center opening in the coil with the cones and then the members **10** and **11** are moved in a direction towards each other. This simultaneous movement of the members towards and from each other is accomplished by means of a threaded shaft indicated by numeral **50**. Said shaft extends from one end of the coil handling apparatus to substantially adjacent the other end and the shaft has two threaded sections, one section **51** having right hand threads and the other section **52** having left hand threads. Structure **53** which is fixed to the coil supporting member **10**, FIGURES 1 and 2, has threaded relation with section **51** of the threaded shaft **50**, whereas structure **54** fixed to the coil supporting member **11** has threaded relation with section **52**.

Each structure **53** and **54** includes a pair of spaced lugs such as **55** secured to its member by the securing screws **56**. The lugs journal the pins **57** which project laterally from a block **58** as regards structure **53**, and from a block **59** as regards structure **54**. Each block is thus pivotally carried by a pair of spaced lugs provided by its coil supporting member and as regards block **58**, the same has threaded connection with section **51** of the threaded operating shaft, with block **59** having threaded connection in a similar manner with section **52**. It will, therefore, be manifestly clear that as the shaft **50** is rotated in one direction, the right and left hand threads on the sections, respectively, will cause movement of the coil supporting members and thus movement of the cones in a direction away from each other. However, opposite rotation of shaft **50** will effect movement of the members and thus the cones in a direction towards each other.

The shaft **50** is rotated by motor **60** suitably supported on the top wall **33** adjacent the wall portion **34**. Belts such as **61** operatively connect the electric motor to the pulley **62** of gear reducing mechanism such as indicated by numeral **63** fixed to the underside of the wall portion **34**. Said gear reducing mechanism **63** provides a part **64** which receives the spline end **65** of the operating shaft **50**. The spline is provided so as to permit longitudinal movement of the operating shaft **50** while maintaining a connected relation between the said shaft and the gear reducing mechanism **63**. It will be understood that the part **64** provides a member having an internal spline for receiving the section **65** and the parts are so constructed and arranged that axial movement of shaft **50** can take place for a length which may vary from six inches to a foot, depending on the size of the coil handling apparatus.

At its other end the threaded shaft **50** is journalled for rotation as best shown in FIGURE 5. The shaft is reduced at this end to provide portions **67** and **68**, the latter portion mounting the ball bearing assembly **70**. The housing **71** is provided for the ball bearing assembly and following assembly of the parts within the housing, its open end is closed by cover **72** suitably secured to the housing by the bolts **73**. The securing nut **74** is threaded to the end of shaft **50** so as to hold the ball bearing assembly **70** in place on the shaft and the nut may be locked in turn by a cotter pin. The piston rod **76** extends from the right hand end of the housing **71**, being threadedly secured to the housing at **77** and suitably locked in threaded relation by the nut **78**. The piston rod accordingly constitutes a rear extension as regards housing **71** and for all practical purposes could be an integral part of the housing. The piston rod **76** is part of the hydraulic cylinder **80** suitably fixed at **81** and at **82** to the underside of the top wall **33**. The hydraulic cylinder **80** provides the necessary power for recentering the coil of stock. The respective ends of the cylinder **80** are connected by conduits, not shown, which will admit and exhaust a pressure fluid from the cylinder on respective sides of the piston within the cylinder. When it is desired to place a coil of stock on the double cone reel, the cones **13** and **14** are moved apart by rotation of the shaft **50** for effecting movement in a direction away from each of the members **10** and **11**. The coil is then placed between the cones, whereupon the threaded shaft **50** is rotated in opposite directions to effect movement of the coil supporting members and thus movement of the cones toward each other.

It may be assumed for purposes of discussion that the coil is off-center, say, for example, in a direction towards the left. As a result, cone **13** will contact the coil before cone **14**. However, no harm is done to the coil due to initial contact therewith of cone **13**, since it will be understood that the entire unit including the supporting members **10** and **11** and the threaded connecting shaft **50** constitutes a floating unit during this operation. In addition axial movement of the shaft **50** is especially provided for by the journalling bushing **83** fixed to the underside of the top wall **33**. Movement of the threaded shaft **50** and cone **14** in a direction towards the left necessarily results from continued rotation of the threaded shaft following initial contact of cone **13** with the coil. Presently both cones will have the desired contacting engagement with the coil for rotatably supporting the coil in the conventional manner as desired. Although the coil is now supported for rotation, nevertheless the coil is off-center. For recentering the coil the entire unitary assembly including the coil, the cones which have contacting relation therewith, the members **10** and **11** and their threaded connecting shaft **50**, are all moved laterally in a direction towards the right by actuation in this direction of the piston rod **76** effected by the hydraulic cylinder **80**. When the coil has reached the desired center position, actuation of the hydraulic cylinder **80** is terminated and the coil will remain in centered position unless the unitary assembly is again moved in either direction by further energization of the power means.

The members **10** and **11** function as movable carriages in supporting the coil on the overhead track structure. The weight of said coil supporting carriages, together with the weight of a coil, is transmitted by the rollers to the overhead track elements. Said rollers distribute the weight equally so that the carriages are able to move freely in directions towards and away from each other. By thus suspending the coil from an overhead support the passageway below the coil remains unobstructed. This is desirable from the operator's standpoint, since the coil may be more readily wheeled and elevated into place on the cones, and more easily serviced during the uncoiling operation.

The invention is not to be limited to or by details of construction of the particular embodiment thereof illustrated by the drawings, as various other forms of the device will, of course, be apparent to those skilled in the art without departing from the spirit of the invention or the scope of the claims.

What is claimed is:

1. In coil handling apparatus, in combination, a pair of spaced frame supports, each of said frame supports having a bifurcated upper end portion to form transversely spaced frame members, track elements supported by the frame members in spaced elevated position, a pair of coil supporting members suspended from the track elements, a pair of rollers on each side of a coil supporting member and having rolling contact with a track element for mounting the coil supporting members for movement, a notatable screw shaft extending lengthwise parallel to and between the track elements and having right and left hand threaded sections in threaded engagement with the coil supporting members respectively, means for rotating the screw shaft to simultaneously move said coil supporting members toward or away from each other, and centering means including a spline connection interposed between the means for rotating the shaft and the said shaft, and power means

at the end of the screw shaft opposite the spline connection for moving the same in a lengthwise direction.

2. In coil handling apparatus, as defined by claim 1, additionally including a rail fixed to each of the coil supporting members and projecting upwardly from its coil supporting member, and stud shafts fixed to the rails respectively for journalling the rollers.

3. In coil handling apparatus in combination, a frame assembly including a pair of spaced frame supports each having a bifurcated upper end to form transversely disposed spaced frame members, a pair of spaced track elements supported by the frame supports, one track element being fixed at each end to one frame member of a frame support, and the other track element being fixed at each end to the other frame member of a frame support, a pair of coil supporting members suspended from the track elements and adapted to move between the spaced frame supports in directions towards and away from each other, rollers carried by each coil supporting member at the upper end thereof and having contact with the track elements for mounting the coil supporting members whereby to permit said movement, and means for effecting such movement of the coil supporting members including a

threaded shaft extending lengthwise of the frame assembly and between and parallel to the track elements and being journalled by the frame assembly, said threaded shaft having a right hand threaded section in operative connection with one coil supporting member and having a left hand threaded section in operative connection with the other coil supporting member, and power means for rotating the threaded shaft.

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