Nov. 16, 1965 W. E. HERRMANN 3,217,862

ROLL STAND CONSTRUCTION FOR BELT CONVEYORS

Filed July 25, 1962 3 Sheets-Sheet 1

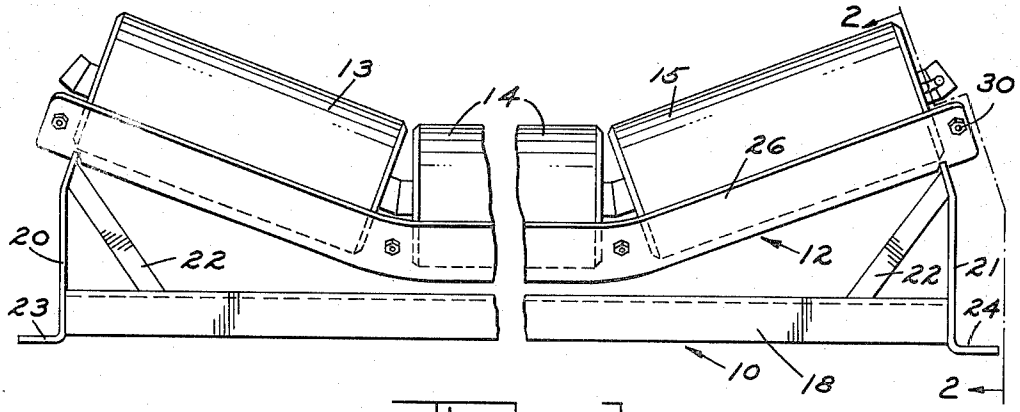


FIG. 1

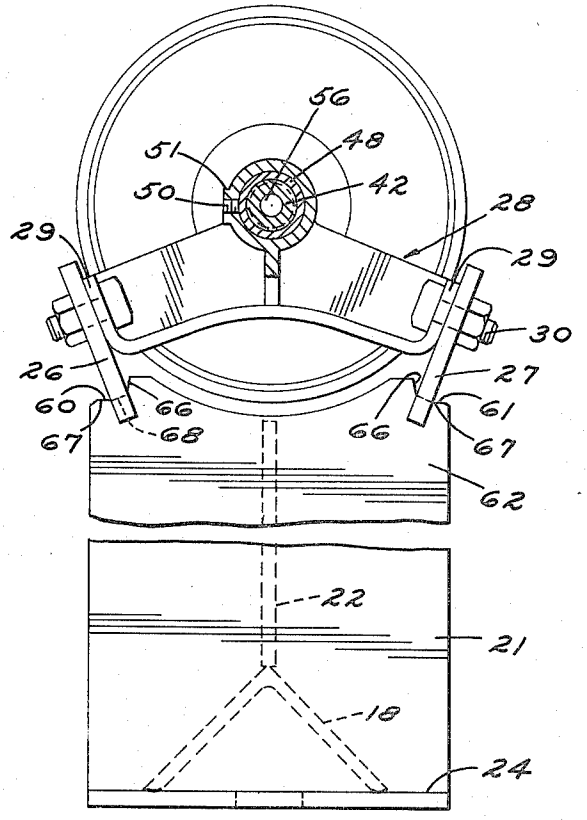


FIG. 2

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Filed July 25, 1962 3 Sheets-Sheet 2

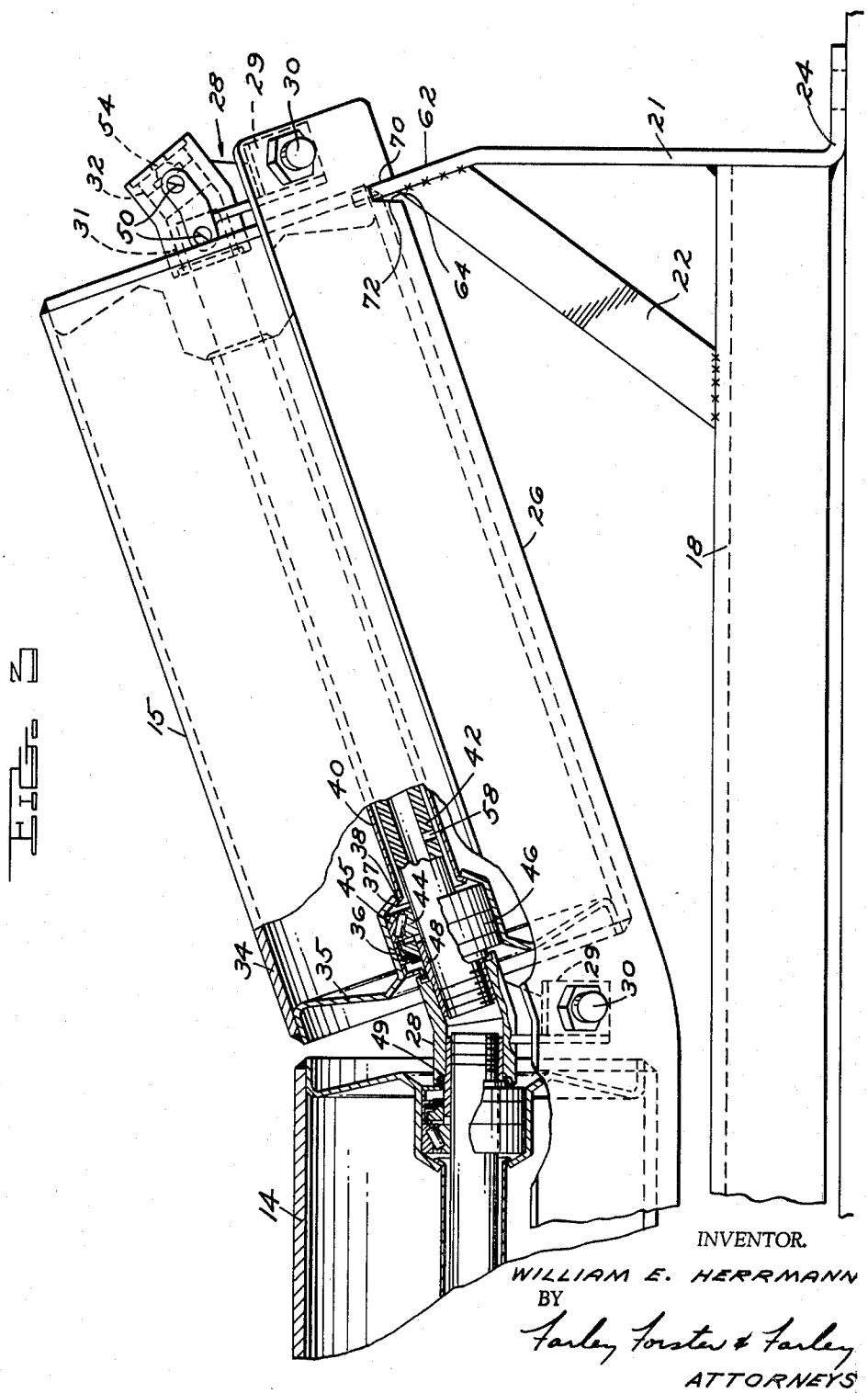


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FIG. 4

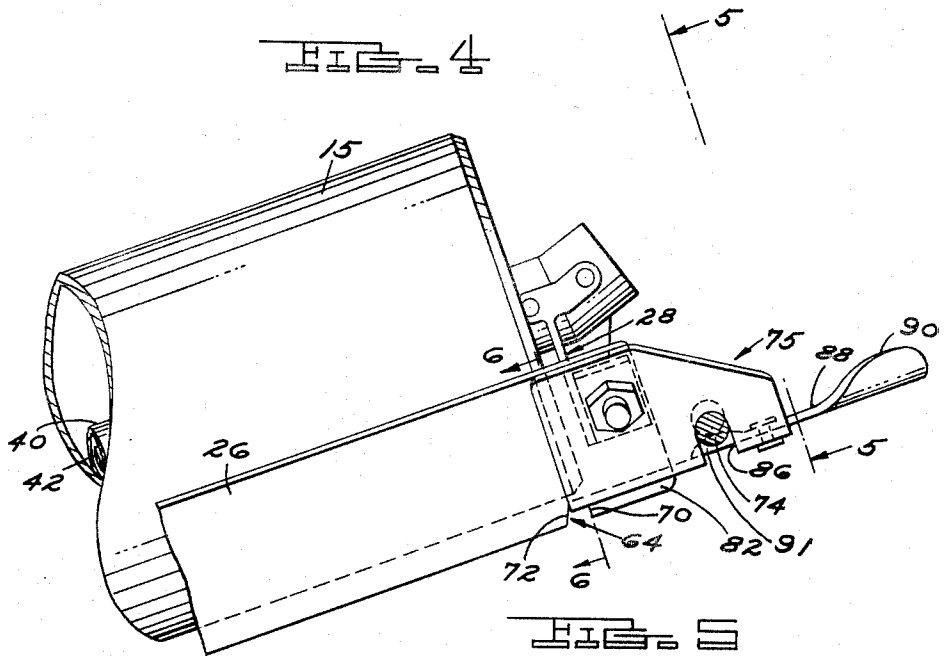


FIG. 5

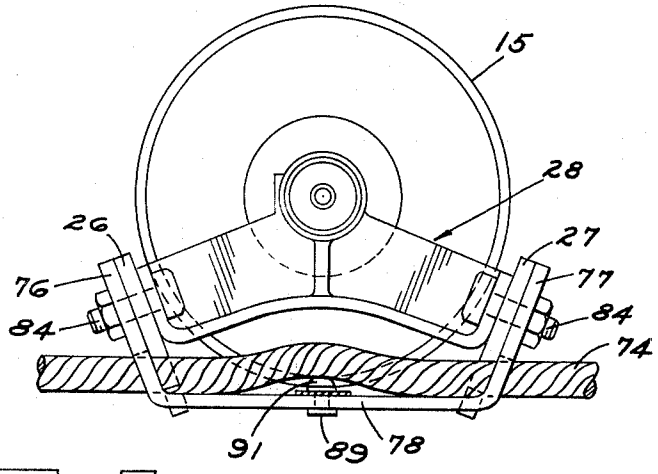
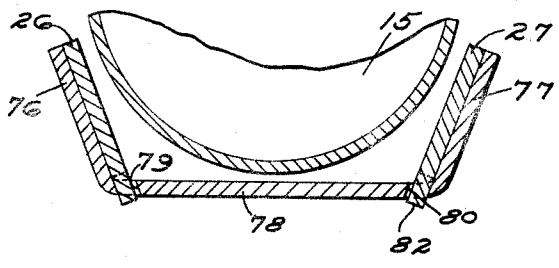


FIG. 6



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3,217,862

ROLL STAND CONSTRUCTION FOR BELT CONVEYORS

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4 Claims. (Cl. 198—192)

This invention relates to an improved construction for a belt conveyor roll stand, particularly a roll stand of the troughing type in which the rolls at each end of the stand are mounted with their axes in upwardly inclined relation to a center roll.

The overall object of the invention is to provide a roll stand, consisting of the combination of a support and a roll assembly, which offers a very simplified and effective construction for the roll assembly, and which provides means whereby the roll assembly can be mounted on the support or removed from the support without tools. This is a great advantage, considering the fact that with roll stands of conventional construction now in use, the expense of removing and replacing idler rolls can easily exceed the cost thereof.

A roll stand constructed in accordance with the invention consists of a pair of supporting members, a roll assembly including a sub-frame, and means for detachably connecting the sub-frame to the supporting members consisting of surfaces provided on the sub-frame and supporting members and disposed transversely and longitudinally of the roll stand, these surfaces being mutually engageable solely by relative movement between the roll assembly and supporting frame.

Preferred features include the provision of a roll assembly in which the sub-frame is composed simply of a pair of parallel bars interconnected by a plurality of roll mounting brackets. Each bracket is constructed so as to serve as the common support for adjacent ends of a pair of rolls, or as a common mounting for a single roll and a grease fitting.

The inter-engaging surfaces between the supporting members and roll assembly sub-frame are preferably tapered in directions both longitudinally and transversely of the roll stand so that the roll assembly will be properly centered and held on the supporting members when these surfaces are placed in engagement.

In the preferred construction to be disclosed the same basic roll assembly can be employed with roll stand supporting members either in the form of a pair of parallel cables, or in the form of an individual supporting frame for each stand. Where the roll assembly is suspended between cables, a mounting bracket is attached to each end of the roll assembly sub-frame and held in position thereon at least in part by the same notched surfaces employed to secure the roll assembly between members of a supporting frame.

Other preferred features and advantages will be brought out in the following description of the presently preferred representative embodiments of the invention disclosed in the accompanying drawings which consist of the following views:

FIGURE 1, a side elevation of a roll stand;

FIGURE 2, an enlarged end elevation taken as indicated by the line 2—2 of FIG. 1;

FIGURE 3, an enlarged fragmentary side elevation with portions thereof being shown in section;

FIGURE 4, a fragmentary side elevation of one end of a roll assembly equipped with a mounting bracket for securing the roll assembly to a supporting cable;

FIGURE 5, an end elevation taken as indicated by the line 5—5 of FIG. 4; and

FIGURE 6, a fragmentary sectional elevation taken as indicated by the line 6—6 of FIG. 4.

The construction shown in FIGS. 1–3 includes two main components, a supporting frame **10** and a roll assembly **12** which includes three idler rolls **13**, **14** and **15** mounted in conventional relation for a troughing type idler stand—the axis of each of the outboard rolls **13** and **15** being upwardly inclined relative to the axis of the generally horizontal center roll **14**.

Only the upper portion of the supporting frame **10** is shown, it being understood that this portion would be mounted upon a suitable stand to place the rolls at the desired operating level. The illustrated portion of the supporting frame includes a transverse angle-section member **18**, a pair of upright end members **20** and **21** and suitable braces **22** all connected together to form a rigid structure. End members **20** and **21** have horizontal lower flanges **23** and **24** for securing the sub-frame portion **10** to the stand mentioned above.

The roll assembly **12** includes a sub-frame on which the rolls **13**, **14** and **15** are mounted and which consists simply in a pair of frame bars **26** and **27** extending longitudinally of the roll axes and interconnected in spaced downwardly converging relation by means of a plurality of identical roll mounting brackets **28** having terminal flanges **29** abutting and connected to the frame bars **26** and **27** by bolts **30**.

As best shown in FIG. 3, each of the mounting brackets **28** is adapted to provide a common support for the adjacent ends of a pair of rolls, the mounting bracket having a pair of end-to-end sockets **31** and **32** formed therein in angular axial relation.

Each of the rolls **13**, **14** and **15** is similar in construction, including an outer cylindrical shell **34**, a pair of end members **35** each having an annular bearing receiving socket **36** terminating in an inwardly directed portion **37** which is engaged by the flared end **38** of a grease sleeve **40**. A tubular axle **42** extends through the sleeve **40**, clearance being provided between the outside diameter of the axle **42** and inside diameter of the sleeve **40** to form a lubricant reservoir. The roll is mounted on the axle **42** by a bearing assembly adjacent each end of the latter, each bearing assembly including a bearing whose inner race **44** is mounted on the axle and whose outer race **45** engages the cylindrical socket **36** in the roll end member **35**, a suitable bearing seal **46**, and a bearing adjusting collar **48** which is threaded on the axle **42**.

The adjusting collar **48** slidably fits within one of the sockets **31** or **32** of a mounting bracket **28** to a limit defined by a shoulder **49** on the collar, and one of a pair of set screws **50** mounted in a boss **51** at the side of the bracket can be screwed into engagement with the collar **48** thus securing the roll to the mounting bracket and at the same time locking the collar in proper position on the axle **42**.

At each end of the roll assembly where only one roll is supported by a mounting bracket **28**, a grease fitting **54** is slipped within the mounting bracket socket **32** and held in position by the other set screw **50**. Here the angular axial relation of the mounting bracket socket **32** to mounting bracket socket **31** results in placing the grease fitting in a convenient attitude for ready access thereto. Grease supplied to the roll assembly through the fittings **54** is forced through the center **56** (FIG. 2) of the roll axle, through a hole **58** formed therein inboard of each bearing assembly, into the grease reservoir between the axle and grease tube **40** and to the bearing assemblies. The entire roll assembly can thus be lubricated from either or both of the ends thereof.

The structure formed by the combination of rolls, mounting brackets and frame bars **26** and **27** is a unitary

assembly, and means are provided for detachably securing this roll assembly to the supporting frame **10** comprising inter-engaging surfaces on the roll assembly and supporting frame which are disposed both longitudinally and transversely with respect to the roll stand and which when placed in engagement locate and retain the roll assembly in proper position on the supporting frame. These inter-engaging surfaces are best shown in FIGS. 2 and 3 and include a pair of notches **60** and **61** formed in the corners of the upper portion **62** of the frame end members **20** and **21**, and a notch **64** formed in the lower edge of each of the frame bars **26** and **27** adjacent each end thereof. The upwardly facing notches **60** and **61** formed in the supporting frame each include a pair of inwardly tapered surfaces **66** and **67** and an abutment surface **68** which is disposed so as to extend normal to the frame bar engaged thereby. Each of the downwardly facing notches **64** in the frame bars include inwardly tapered surfaces **70** and **72**, the surface **70** extending parallel to the upper portion **62** of a frame end member. Portion **62** of the frame end members **20** and **21** is shaped so as to extend substantially normal to the frame bars at the point of engagement, or in other words substantially normal to the axis of the roll adjacent this location.

It can thus be seen from a comparison of FIGS. 2 and 3, that when a roll assembly is moved vertically relative to the supporting frame to place the various notches into engagement, the combination of the longitudinally extending surfaces of notches **60** and **61** and the transversely extending surfaces of notches **64**, together with the tapered relation of the surfaces on all of these notches, will positively locate the roll assembly on the supporting frame in proper centered relationship relative thereto and positively retain the roll assembly against relative movement in directions longitudinally and transversely of the roll axes. Any relative vertical movement will be resisted by the weight of the roll assembly together with the weight of the belt and any load supported thereby.

In the constructions shown in FIGS. 4–6, the same basic roll assembly construction is suspended between a pair of supporting members each consisting of a flexible cable **74**. An adapter mounting bracket **75** is secured to each end of the roll assembly frame bars. This bracket **75** is generally U-shaped in end elevation as shown in FIG. 5, having angularly related upstanding portions **76** and **77** conforming to the angle of convergence between the frame bars **26** and **27**, and a transverse base portion **78**. A pair of slots **79** and **80** (FIG. 6) are formed in the sides of the base portion **78** adjacent each of the upstanding portions **76** and **77**, these slots each being adapted to receive the tang portion **82** of one of the frame bars, which extends between the end of the frame bar and the notch **64**. The bracket **75** is further secured between the frame bars **26** and **27** by bolts **84** which also engage the roll mounting bracket **28**.

Means are also provided in this construction for detachably connecting the roll assembly frame to the supporting members or cables **74**. This means includes a slot cut through the side and base portions of the bracket to provide a pair of notches **86** for engaging the cable **74**. A manually movable element **88** is pivotally connected at **89** to the base portion **78** of the bracket **75**, this element including a handle portion **90** and a cable engaging tongue **91** which can be positioned under the cable **74** to deform it intermediate the notches **86** in the bracket side portions **76** and **77** and thus provide inter-engaging

surfaces between the supporting cable and roll assembly which are disposed transversely of the roll stand.

With either construction, no tools are required to mount a roll assembly on the supporting members or to remove a roll assembly therefrom. The labor and hence the cost of erecting and maintaining the roll stands of the invention is greatly reduced. If a roll assembly becomes defective, it can readily be removed and replaced by another assembly in proper working order.

While preferred embodiments have been described above in detail, it will be understood that numerous modifications might be resorted to without departing from the scope of the invention as defined in the following claims.

I claim:

1. A belt conveyor roll stand comprising:

a pair of supporting members spaced transversely of the direction of belt travel,

a roll assembly consisting of a pair of flat sheet metal frame bars, bracket means rigidly interconnecting said frame bars in spaced downwardly converging relation and at least one roll supported by said bracket means for rotation on an axis intermediate the frame bars;

means for detachably connecting said roll assembly to said supporting members including a notch formed in the lower edge of each frame bar adjacent each end thereof thereby providing a pair of notches in the frame bars at each end of the roll assembly;

and means on the upper portion of each of said supporting members for engagement by one pair of notches on the roll assembly frame bars to locate and retain the roll assembly on the supporting members.

2. A belt conveyor roll stand as claimed in claim **1** wherein said means on the upper portion of each of said supporting members comprises a pair of upwardly facing notches formed in each supporting member, each upwardly facing notch having a bottom surface and side walls converging inwardly towards said bottom surface.

3. A belt conveyor roll stand as claimed in claim **1** wherein a plurality of rolls are supported by said bracket means including a center roll and a pair of outboard rolls, said frame bars each having a central portion and end portions each extending in upwardly inclined relation to said central portion to define a corresponding axial angular relation between said center and outboard rolls, and the said upper portion of each supporting member extending essentially perpendicular to the rotational axis of the outboard roll adjacent thereto.

4. A belt conveyor roll stand as claimed in claim **3** wherein each notch in the frame bars extends essentially perpendicular to the adjacent outboard roll axis and is provided with side walls which converge inwardly of the edge of the frame bar in which the notch is formed.

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