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E. H. ZIEBER.

ADJUSTABLE CONVEYER ROLLER.

APPLICATION FILED MAY 26, 1915.

Patented Dec. 19, 1916.

2 SHEETS—SHEET 1.

1,208,883.

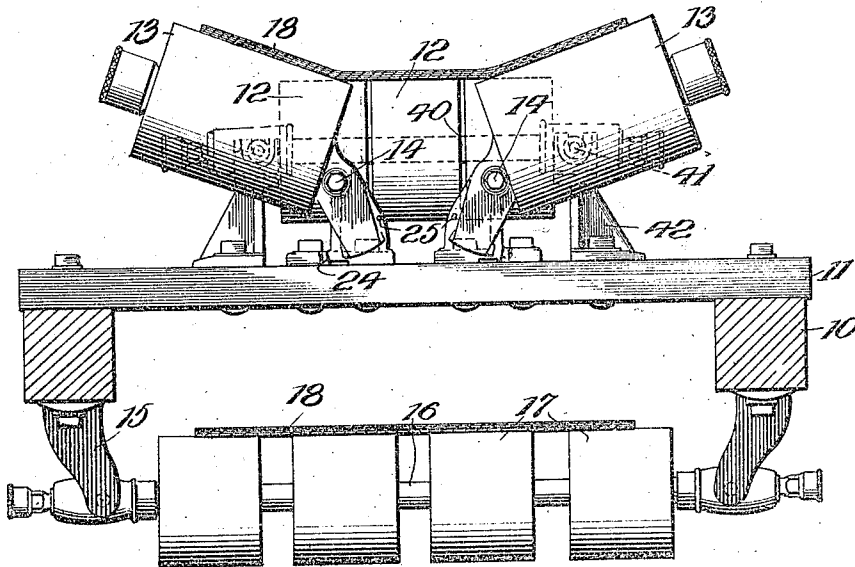


FIG. 1.

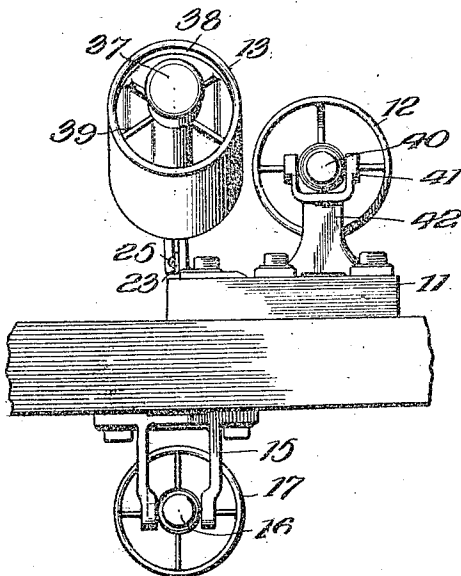


FIG. 2.

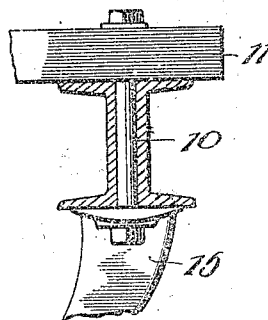


FIG. 5.

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*Fig. 3.*

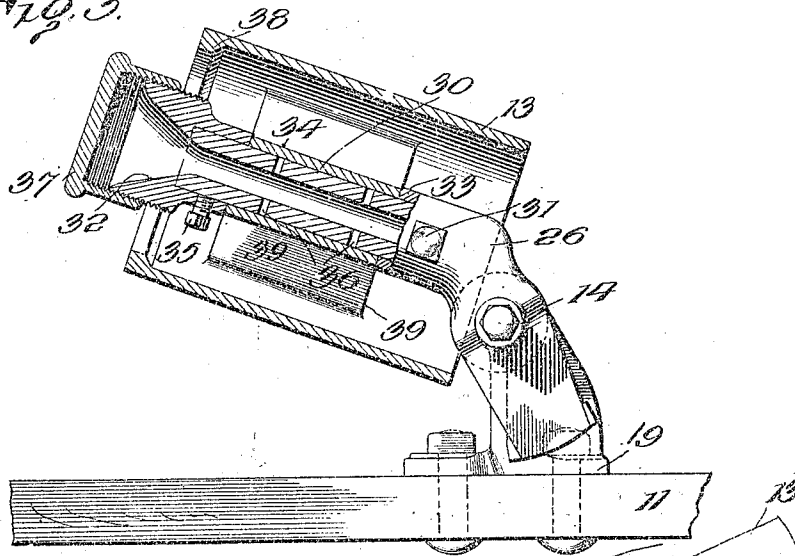
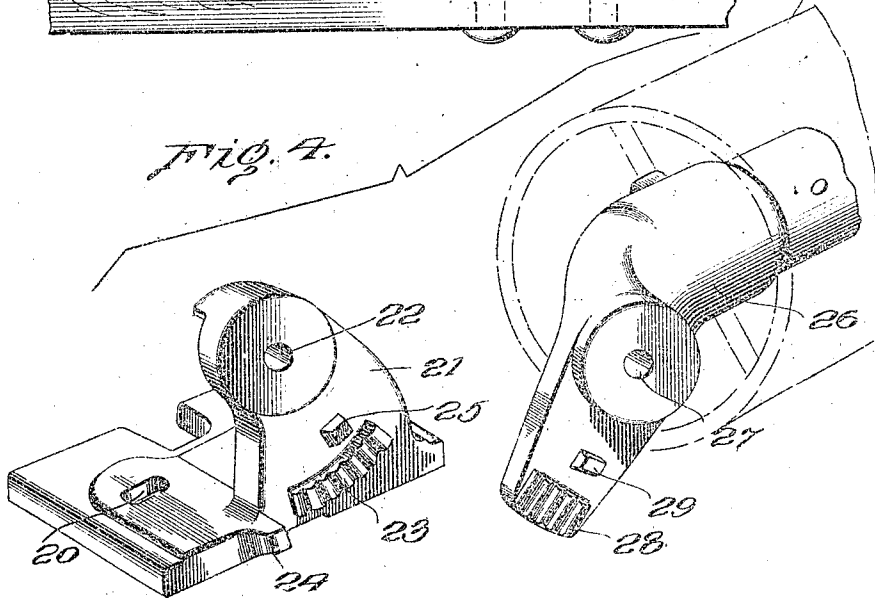


*Fig. 4.*



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# UNITED STATES PATENT OFFICE.

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## ADJUSTABLE CONVEYER-ROLLER.

1,208,883.

Specification of Letters Patent.

Patented Dec. 19, 1916.

Application filed May 26, 1915. Serial No. 30,851.

*To all whom it may concern:*

Be it known that I, EDWARD H. ZIEBER, a citizen of the United States of America, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Adjustable Conveyer-Rollers, of which the following is a specification.

This invention relates to supports for belt conveyers and in its more intense aspect to what may be broadly termed troughing roller supports for belts, or the like, used for conveying various kinds of material.

One of the objects of the present invention is to provide a practical and highly efficient roller support for conveyer belts which will be cheap to manufacture and install.

Another object is to provide a durable device of the first above mentioned character having few parts rendering the structure simple in construction.

A further object is to provide a device of the first above mentioned character in which the parts are substantially interchangeable whereby each unit may be increased or decreased in size with a minimum amount of trouble to meet new requirements.

A further object is to provide a roller support in which the parts are so positioned, constructed and arranged, both individually and with respect to others as to permit free movement of the parts and prevent binding and stoppage of the rollers under all working conditions, thereby greatly increasing the life of the apparatus and belt.

Other objects, will be in part obvious from the annexed drawings and in part indicated in connection therewith by the following analysis of this invention.

This invention accordingly consists in the features of construction, combination of parts and in the unique relations of the members and in the relative proportioning and disposition thereof, all as more completely outlined herein.

To enable others skilled in the art so fully to comprehend the underlying features thereof that they may embody the same by the numerous modifications in structure and relation contemplated by this invention, drawings depicting a preferred form have been annexed as a part of this disclosure, and in such drawings, like characters of reference denote corresponding parts throughout all the views, in which—

Figure 1 is an elevational view of one

unit with the belt in section showing the complete upper and lower supporting rollers; Fig. 2 is a side elevation of the same mechanism; Fig. 3 is a sectional view of one of the troughing rollers showing its construction and manner of lubrication; Fig. 4 is a perspective view showing the base and supporting arm for one of the troughing rollers in separated position; Fig. 5 is a detail view.

As is well known to those familiar with the art, belt conveyers comprise a belt of any desired length traveling over a series of substantially horizontally disposed rollers, and upper outer ones which are tilted up a slight angle to form a trough for maintaining the material along the central lines of the belt. At one end of the conveyer there is a driving pulley for moving the belt and returning it to the opposite end over a second series of rollers beneath the first series preferably in flat form. The material is placed upon the belt in any desired manner as by a trough feed or the like and may be removed when and where desired.

Referring now to the drawings in detail and particularly Fig. 1, 10 denotes a framework of wood, or metal as shown in Fig. 5, extending in the direction of the conveyer and is provided at intervals with transverse members or stringers 11 carrying one or a set of separate rollers on its upper surface. This set comprises a plurality of horizontally disposed rollers 12 of the same diameter varying in number according to the width of the belt traveling thereon. At each side of the set of rollers 12 is a troughing roller 13, independently and separately mounted at an angle to the axis of the rollers 12 but both lying in a vertical plane adjacent that of the rollers 12. This angle of adjustment varies in handling different materials and may be adjusted about a pivot clamp bolt 14 to meet different requirements.

On the under side of the framework 10 are secured brackets 15 in which are trunnioned the opposite ends of a shaft 16 carrying one or more return rollers 17. Thus, the belt, indicated at 18, travels over the rollers 12 on the upper side of the framework to convey the material and after passing over an end driving pulley (not shown) returns on the under rollers 17 to the opposite end of the conveyer.

In Figs. 3 and 4, there is shown in detail

one of the troughing rollers 13 and its supporting bracket. This bracket comprises a base member 19 provided with holes 20 through which fastening bolts are adapted to pass to secure the base to the transverse stringer or member 11. At one side is a relatively heavy upwardly projecting flanged web 21 provided with a central transverse pivot hole 22 for the bolt 14. Near the lower part of this flanged web 21 are a series of V-shaped teeth 23 and stop lugs 24 and 25. The supporting spindle and swinging arm 26 shown at the right of Fig. 4 is provided with a corresponding transverse opening 27 through which the pivot pin or bolt 14 shown in Fig. 3 is adapted to pass to engage the opening or hole 22. At the lower part of the arm or member 26 there is provided a second series of V-shaped teeth 28 and a stop lug 29. It is to be understood that the parts are placed adjacent to each other in such a manner as to have the two sets of teeth 23 and 28 coast when the clamping pivot bolt 14 is tightened. The lugs 24, 25 and 29 will limit the angular movement of the roller 13 in both directions within proper degrees.

The teeth 23 and 28 are large and strong because of their being positioned relatively remote with respect to the pivot point 14 whereby a wide tooth is obtained with a variation of approximately five degrees for each tooth. Thus, the supporting member 26 may be positioned at either 10°, 15° or 20° from the horizontal. This method of adjustment by means of the teeth on the bracket and swinging arm has material advantages over a set screw or clamp nut in that adjustment can be obtained in steps, one tooth at a time and all of the pulleys of the series may be positively positioned at exactly the same angle, a condition which is highly desirable in order to make the belt run true.

It may be noted that a belt should be troughed only as much as necessary to keep material from spilling and experience has shown that the maximum angle at which a belt may be troughed without cracking in the direction of its length is approximately 20°. There is very little to be gained in capacity by using a steeper angle, for 20° is amply sufficient to accomplish the desired results and without premature destruction of the belt, by causing longitudinal cracks. These troughing rollers 13 are preferably lubricated by means of compression grease cups which are more desirable than ball bearings for use in dusty places where belt conveyers are so frequently employed. This form of lubrication is shown in Fig. 3 in which the swinging arm 26 is provided with a separate hollow spindle 30 held in place by a set screw 31 engaged at its opposite end by a slightly protruding threaded grease

cup 32. It is to be noted that a slight shoulder 33 is formed between the swinging arm 26 and the spindle 30 against which the hub 34 of the troughing roller 13 is adapted to rest. The grease cup 32 at the end of the spindle 30 engages the opposite end of the hub and prevents accidental removal of the roller, the parts being held in place by set nut 35. One or more perforations 36 are provided in the center and lower end of the spindle through which the grease is forced to efficiently lubricate the bearing as a threaded cap 37 is screwed down. In this manner, the grease always works from the center toward the outer edges of the hub and prevents any dust or dirt from entering the bearing.

The troughing roller 13 is provided with a reinforcing bead 38, thus making it impossible for the rim to wear away by the swaying of the belt, and leave a sharp edge to cut the belt. This bead also greatly strengthens the outer and exposed portion of the troughing roller and renders it capable of withstanding impact from accidental sources. These pulleys which are approximately six inches in diameter have their faces machined absolutely true with respect to the bore of the hub 34 and when mounted in series on the same shaft make a true smooth running roller which will not wear the surface of the belt or cause the belt to vibrate to any material extent. A plurality of webs 39 are provided between the hub 34 and the periphery of the roller, as may be necessary to give the pulley sufficient strength without necessarily increasing its weight and cost of manufacture.

The adjustable troughing rollers are so mounted with respect to the horizontal rollers 12 as to overlap the outer edges of the end rollers as clearly shown in Fig. 1. This feature together with the fact that the inside or lower edge of the troughing roller is considerably below the top line of the center rollers 12 eliminates the possibility of the belt coming in contact with the adjacent edges of either of the rollers at the point where it bends, thus materially increasing the life of the belt, as the sharp edges of the pulleys cause the belt to wear more rapidly than the smooth surfaces of the rollers.

Shaft 40 carrying the horizontal rollers 12, is mounted in self-adjusting bearings at each end. These bearings which are in the form of trunnions 41 near the upper part of brackets 42 secured to the transverse stringer member 11, are free to adjust themselves automatically to accommodate the rollers to any warping or unevenness of the stringers, hence the possibility of the shaft binding in the bearings and ceasing to revolve is eliminated. This feature is very advantageous for a belt

is worn very rapidly by slipping over rollers which do not turn freely as their rims are soon worn away, presenting holes whose knife-like edges cut the belt.

Experiments have conclusively proven that the highest efficiency is attained by having a relatively large portion of the belt width running flat with the bending or troughing taking place near the edges. By this construction the strains in the belt due to bending are located near the edges of the belt where the abrasive action of the carried material is less. Furthermore, the wide flat rollers steady the belt and greatly reduce its tendency to sway and run unevenly.

As shown clearly in Fig. 2, it will be noted that the elements forming each supporting unit are separate, that is the troughing rollers 13 are mounted on independent brackets at one side of the horizontal rollers 12, thereby permitting a replacing or repairing of either without the necessity of stopping the belt or disturbing the others. The rollers 12 being in units may be added to or decreased should a change in width of belt be desired by merely varying the length of the supporting shaft.

It is believed to be unnecessary to go into detail statement of the operation of this device in view of the above description of this construction and its characteristics.

The device is simple, practical and highly efficient and the parts are so constructed and arranged as to permit ready interchanging or repairing as may be necessary. The danger of stopping of the rotation of the rollers is practically eliminated, due to the method and means of lubricating and mounting the various rollers permitting automatic adjustment and thereby the life of the rollers and belt is materially lengthened. In short the invention is believed to accomplish, among others, all of the objects and advantages above set forth.

Without further analysis, the foregoing will so fully reveal the gist of this invention that others can by applying current knowledge readily adapt it for various applications without omitting certain features that, from the standpoint of the prior art, fairly constitute essential characteristics of the generic or specific aspects of this invention, and therefore such adaptation should and is intended to be comprehended within the meaning and range of equivalency of the following claims.

I claim:

1. In a device of the character described, in combination, a horizontal roller, separate and independent troughing rollers at each side thereof materially overlapping said

first mentioned roller, and means for adjusting said troughing rollers comprising a support, and a swinging arm on said support, said last mentioned parts having co-acting means whereby the rollers of several sets are insured a uniform adjustment.

2. In a device of the character described, in combination, a horizontal roller, separate and independent troughing rollers at each side thereof materially overlapping said first mentioned roller, and means for adjusting said troughing rollers comprising a support, and a swinging arm on said support, coacting means on said support and arm adapted to be clamped into intermeshing relation and insure uniform adjustment and means for limiting the movement of said swinging arm with respect to its support.

3. In a device of the character described, in combination, a troughing roller having central supporting webs, reinforcing means at its upper edge being materially thicker in the direction of the axis of the roller, and a support about which the roller is adapted to turn.

4. In a device of the character described, in combination, a troughing roller, a support for said roller inclined upwardly with respect to the horizontal and a relatively thick and long reinforcing bead on the upper inner edge of said roller adapted to prevent wear to a sharp edge by a belt traveling thereon should said roller be prevented from turning upon its support.

5. In a device of the character described, in combination, troughing rollers, independent fixed supports therefor, each having a plurality of lugs, swinging arms pivotally mounted on said supports and carrying co-acting lugs positioned relatively remote from the pivot points adapted to engage said first mentioned lugs to prevent the adjustment of said troughing rollers beyond predetermined limits, and coacting means on said support and swinging arms adapted to insure uniform adjustment.

6. In a device of the character described, in combination, a supporting bracket, an arm carried thereby, a roller mounted upon said arm and intermeshing means on said bracket and arm permitting the angle of inclination to be varied and held in adjusted position.

In testimony whereof I affix my signature in presence of two witnesses.

EDWARD H. ZIEBER.

Witnesses:

DAVID MCBURNEY,  
H. M. MCBURNEY.