June 1, 1971 A. D. PENN 3,581,360

ROLLER FOR SPRING BELT CONVEYORS

Filed March 24, 1969

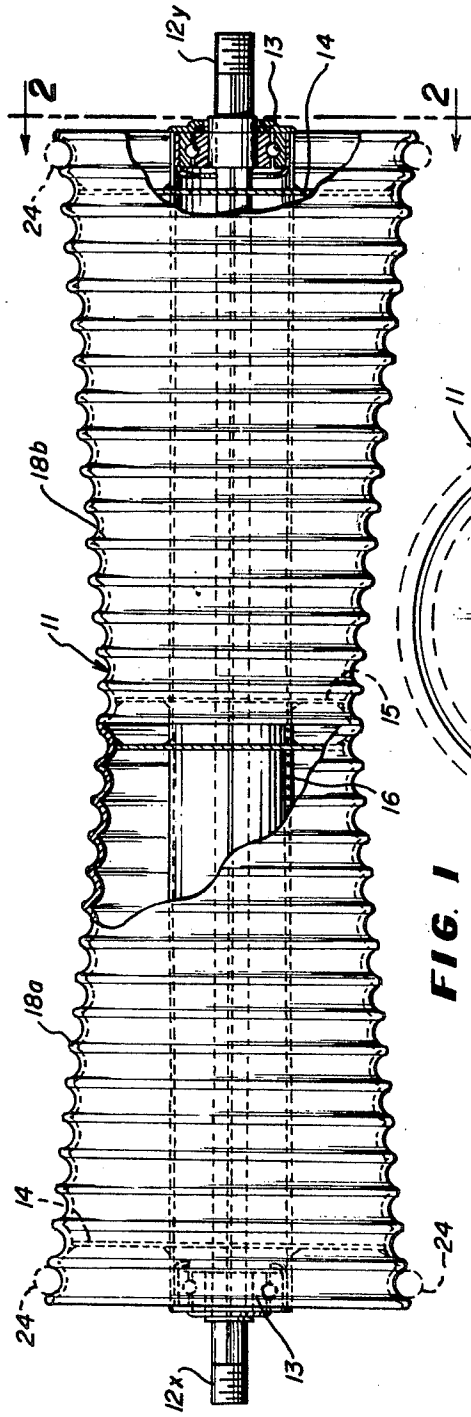


FIG. 1

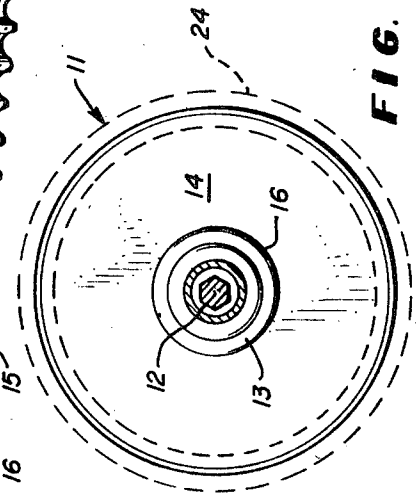


FIG. 2

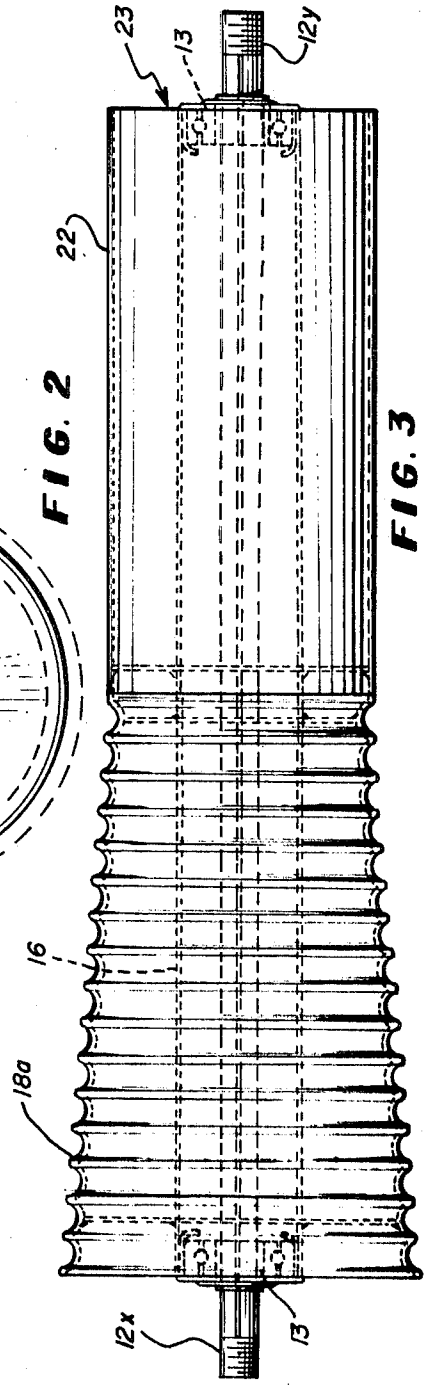


FIG. 3

INVENTOR.
Abe D. Penn

BY

ATTORNEYS

United States Patent Office 3,581,360 Patented June 1, 1971

3,581,360

ROLLER FOR SPRING BELT CONVEYORS

Abe D. Penn, 1220 S. Acoma St.,
Denver, Colo. 80223

Filed Mar. 24, 1969, Ser. No. 809,682
Int. Cl. B65g 15/60, 39/071
U.S. Cl. 29—116 9 Claims

ABSTRACT OF THE DISCLOSURE

A roller for conveyors of the type having a plurality of elongated coil springs in endless formation interfitting roller grooves and forming part of the power transmission system of the conveyor as well as supporting objects being conveyed on a stretch of the endless surface, said roller comprising a hollow central shaft, means at each end for supporting the shaft for rotation, a shell having at least one portion tapering outwardly from an intermediate supported position to a second supported position at an outer end of the shaft, and the exterior tapering surface being grooved throughout substantially its lengthwise extent for supporting coil spring components of the conveyor.

This invention relates to improvements in the grooved rollers or pulleys of spring belt conveyor assemblies of the type shown and described in F. P. Gray et al. Pat. No. 3,279,587, granted Oct. 18, 1966.

As described in said patent, such a conveyor is particularly effective in the transport of bagged material and retaining the conveyed objects in orderly arrangement on the conveying surfaces even when the conveyors include turning portions where the full turn may involve a change in direction of as much as 90°. The advantages of the cast metal roller over the wooden rollers of earlier usage has been noted in the patent specification. Accordingly, it appears unnecessary to elaborate on the advantage of such a construction in the present description.

The present invention incorporates several innovations in its practice, all of which contribute to the economy, durability and efficiency of the rollers. The preferred practice involves forming the roller of steel components using a standard type steel tubing as the interior support member, which in one embodiment also serves as a central shaft. An exterior shell, preferably a two-part assembly, is formed from rolled sheet metal blanks which are supported by rigid connection with the tubular component at its ends and in an intermediate portion. When two sections form the shell, they may be secured in the assembly in end abutting relation and do not require other joining.

By employing a rolling procedure with the sheet metal blanks, the corrugated or grooved surface effect is obtained in the rolling operation and does not require special casting or machining. When a central shaft is provided interiorly of the tubular member, it also is standard stock cut to the desired length and not requiring special casting or machining. When components are fastened, this is conveniently done by welding which provides the rigid structural effect even though the components so secured are relatively lightweight materials.

Finally, heavy gauge keeper springs are installed in the outermost grooves of the roller with their exposed surfaces extending a substantial distance beyond the grooved surfaces so as to prevent conveyed objects from migrating to the sides and falling from the supporting surfaces. It will be apparent that only minor buffing is required after the shell components are formed in the rolling treatment and the entire assembly procedure is quick and low cost without special skills.

Accordingly, it is an object of my invention to provide a roller for spring belt conveyors which is lightweight, durable and capable of operation over protracted periods without excessive wear or structural deterioration.

Another object of this invention is to provide a basic roller design utilizing separable components permitting use of the same components in assemblies having a double tapering grooved surface or a single tapering grooved surface adjoining a smooth cylindrical surface as required for a given installation.

A further object of my invention is to provide a lightweight, double-tapering, grooved roller of relatively high structural strength which is produced at low cost and operated over protracted periods without undue operating and maintenance expense.

Other objects reside in novel details of construction and novel combinations and arrangements of parts, all of which will be described fully in the course of the following description.

The practice of my invention will be described with reference to the accompanying drawings illustrating typical embodiments of my inventive concept. In the drawings, in the several views of which like parts bear similar reference numerals.

FIG. 1 is a front elevation, partially broken to show interior parts in sections, of a roller assembly utilizing a double-tapering belt-supporting surface;

FIG. 2 is an end elevation shown as a section taken along the line **2—2**, FIG. 1, and which also is a representative section through the FIG. 3 assembly; and

FIG. 3 is a front elevation of another roller assembly having a single tapering belt-supporting surface, and with interior parts shown in dash lines.

The form of roller assembly shown in FIG. 1 is adapted to use in regular or linear conveying stretches of a belt conveyor assembly and is also suited for use in curved stretches which do not involve abrupt changes in direction. As shown, the roller designated generally as **11** comprises a central shaft **12** mounted in bearings **13** of the anti-friction type shown as ball bearings and stub shaft portions **12***x* and **12***y* extend outwardly from the ends of roller **11** to support it for rotation as in a spring belt conveyor assembly.

Disc-like end supports **14** and intermediate supports **15** are mounted on a tubular member **16** extending throughout the length of roller **11** and forming a peripheral closure for the bearing assemblies **13**. A shell **18** formed of two abutting sections **18***a* and **18***b* has a rigid connection **17** with the supports **14** and **15** which also are in rigid or welded connection with tubular member **16** as shown at **20**. While the two-part assembly just described is preferred because of simplified forming and assembly procedures, it may be formed as a one-piece assembly if desired.

One of the advantages of having a two-piece shell assembly is that only one size and shape of shell needs to be produced and it can be mounted either as a right hand or a left hand section in the assembly, thereby reducing fabricating costs and simplifying assembly procedures. The welding of the inner end of the shell sections **18***a* and **18***b* to the intermediate support members **15** provides the desired rigid assembly.

In preferred practice, the welding is first completed at the interior of the shell adjacent the intermediate supports **15** and thereafter the discs **14** are mounted on the tubular member **16** and welded thereto and also the contacting surfaces of the shell. Shell section **18***a* is a left hand unit as viewed in FIG. 1 and the other section **18***b* is a right hand unit. As both are of the same shape and size, the mounting of the sections in end abutting relation with their narrower ends to the interior and their exterior ends extending to the exterior sides or ends of the roller, makes

the assembly a lightweight balanced structure, the components of which are secured as a rigid structure and which have required very little machining in the fabrication and assembly. This arrangement of rotary surfaces tends to keep the articles deposited on the conveyor in orderly arrangement and the articles are prevented from travel outwardly across the end of the roller by the provision of heavy gauge keeper springs **24** which are formed as endless members which are placed in tight interfitting relation to the outermost groove of each of the sections **18***a* and **18***b* and thus prevent any articles being conveyed from traveling across the outer edges of the roller.

The arrangement shown in FIG. 3 is essentially the same as in FIG. 1 with respect to the left hand one-half of the roller **11***a* and similar reference numerals have been applied to the lefthand one-half of FIG. 3 and the corresponding portion of FIG. 1. The righthand one-half of the FIG. 3 roller comprises a cylinder **22** having a smooth external surface and disposed in end abutting relation to the shell section **18***a*. This arrangement is employed for driving associated rollers around abrupt curves and the exterior surface of the roller designated generally as **23** in FIG. 3 is to provide a driving surface at the outside of the turn and an inner conveying surface at the inside of the turn. The smooth surface **22** does not provide any guiding function for the spring belt units, but merely a stabilizing support therefore and the actual drive of such units is received from other rollers about which their ends extend which are forward and rearward of the roller **23** in the conveyor arrangement.

As clearly shown in FIG. 3, the tubular member **16** extends entirely through the lengthwise extent of the roller and a single shaft **25**, preferably a hex shaft, as shown, extends throughout the shell.

I claim:

1. A pulley or roller for conveyors of the type having elongated coil springs in endless formation interfitting grooves of spaced pulleys and forming part of the power transmission system of the conveyor and providing object supports in one conveyor stretch comprising a central shaft, a shell having at least one exterior portion flaring outwardly from a rigid connection with an intermediate support structure to another rigid connection with a second support structure adjacent an outer end of the shaft, bearing means at each end of the roller for supporting the shell for rotation on said shaft, and the exterior flaring surface being grooved throughout substantially its lengthwise extent for supporting coil spring components of the conveyor in side-by-side arrangement.

2. A pulley as defined in claim **1**, having the center lines of the pulley grooves transverse to the length-wise axis of the pulley.

3. A pulley as defined in claim **1**, in which the means supporting the pulley at its ends includes a stub shaft mounted in anti-friction bearings disposed within a closed end of the pulley.

4. A pulley as defined in claim **1**, having a heavy gauge keeper spring fitted in the outermost groove of the flaring surface for preventing inwardly disposed conveyed objects from accidentally jumping over the ends of the pulley.

5. A pulley or roller for conveyors of the type having elongated coil springs in endless formation interfitting gooves of spaced pulleys and forming part of the power transmission system of the conveyor and providing object supports in one conveyor stretch comprising a central shaft, a shell having two exterior portions flaring outwardly from a rigid connection with an intermediate support structure to another rigid connection with an outer support structure adjacent an outer end of the shaft, bearing means at each end of the roller for supporting the shell for rotation on said shaft, and the exterior double-flaring surface being grooved throughout substantially its lengthwise extent for supporting coil spring components of the conveyor in side-by-side arrangement.

6. A pulley as defined in claim **5**, in which supporting means connect said central shaft with the intermediate support structure.

7. A pulley as defined in claim **5**, having a tubular body extending throughout the interior of the pulley in encompassing relation to the shaft, and housing end bearings on the shaft, disc-like closure means adjacent the ends of the pulley forming a rigid support between the shell and said tubular body, and at least one disc-like member forming a rigid support between the tubular body and an intermediate portion of the shell.

8. A pulley or roller for conveyors of the type having elongated coil springs in endless formation interfitting grooves of spaced pulleys and forming part of the power transmission system of the conveyor and providing object supports in one conveyor stretch comprising a central shaft, a shell having at least one portion flaring outwardly from an intermediate support structure to a second support structure adjacent an outer end of the shaft and having a cylindrical extension portion supported at the other end of the shaft, bearing means at each end of the pulley for supporting the shell for rotation on said shaft, and the exterior flaring surface being grooved throughout substantially its lengthwise extent for supporting coil spring components of the conveyor in side-by-side arrangement.

9. A pulley as defined in claim **8**, in which the cylindrical portion and the narrower end of the flaring portion are approximately the same diameter.

References Cited

UNITED STATES PATENTS

807,916	12/1905	Edmund	198—190X
1,069,362	8/1913	Wegner	198—190X
1,445,107	2/1923	Scott et al.	74—230.5
1,648,626	11/1927	Smith	29—148.4R
1,742,454	1/1930	Der Hoef	29—148.4R
1,887,279	11/1932	Bendit	74—230.5
2,072,646	3/1937	Ocanasek	74—230.01X
2,336,981	12/1943	Clickner	29—124
3,279,587	10/1966	Gray et al.	198—190
3,272,454	9/1966	Lane et al.	242—117
3,428,034	2/1969	MacAfee et al.	74—6

FOREIGN PATENTS

735,959	6/1943	Germany	29—116
358,497	4/1938	Italy	29—116
1,009,491	3/1952	France	74—230.5
2,849	2/1960	Great Britain	242—117

WALTER A. SCHEEL, Primary Examiner

L. G. MACHLIN, Assistant Examiner

U.S. Cl. X.R.

198—190