March 17, 1953 E. V. RINEHART 2,631,718

DRIVE FOR CONVEYER BELTS

Filed June 8, 1951

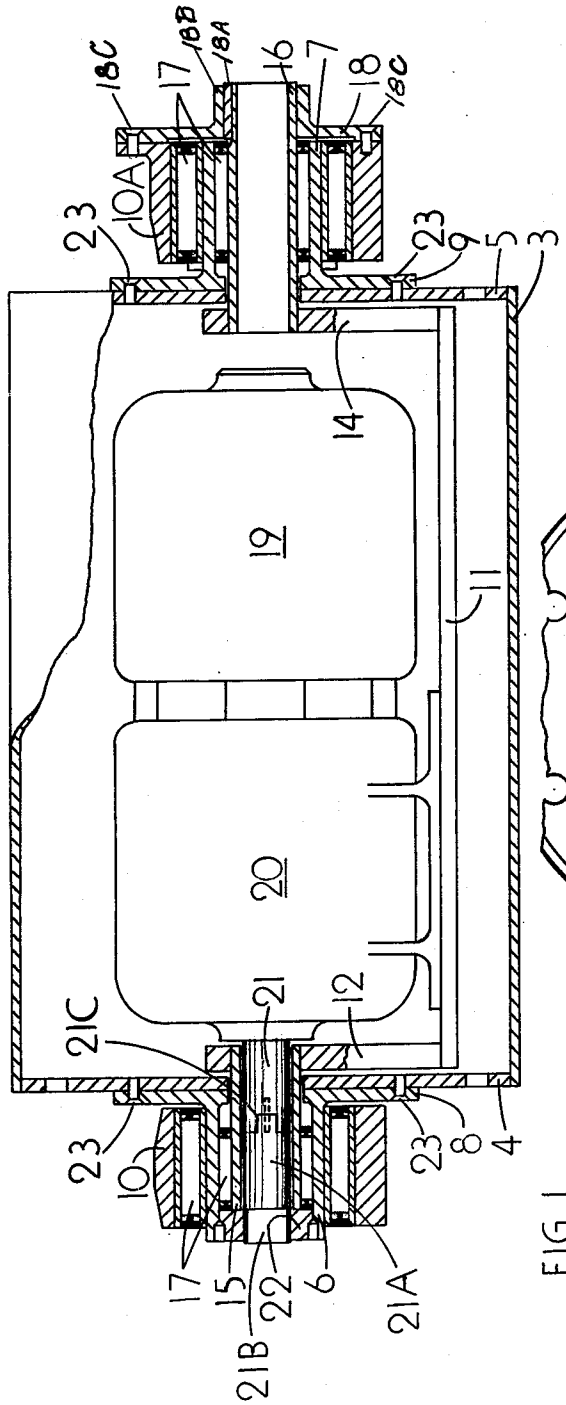


FIG. 1

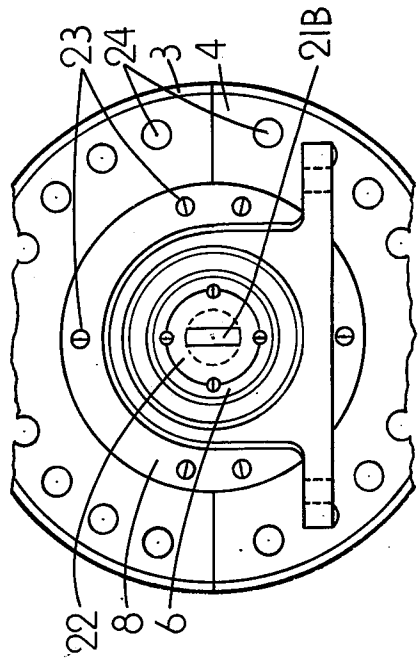


FIG. 2

INVENTOR.
E. V. RINEHART

BY
Harold M. Blackburn
ATTORNEY

Patented Mar. 17, 1953 2,631,718

UNITED STATES PATENT OFFICE

2,631,718

DRIVE FOR CONVEYER BELTS

Ernest V. Rinehart, Sterling, Ill., assignor of one-half to Lourde T. Renner, Sterling, Ill.

Application June 8, 1951, Serial No. 230,518

4 Claims. (Cl. 198—203)

1

The present invention relates to the art of pulleys for conveyor belts.

Conveyor belts are normally driven from an external source of power, such as a motor, which is connected, as by belts, to drive one of the conveyor belt pulleys. As a space saver, the motor is frequently located within the endless conveyor belt. Regardless of whether the motor is so located, or is located externally, there is the immediate problem of plant safety from either the gears or belts which are employed for the driving connection.

Objects of the present invention are the provision of improved driving pulleys for conveyor belts, the provision of driving pulleys in which the drive mechanism is contained therein, and the provision of conveyor belt drive pulleys which avoid the hazards normally encountered. I have, also, such further objects, advantages, and capabilities as will hereafter appear and as are inherent in the structure disclosed herein. My invention further resides in the combination, construction, and arrangement of parts illustrated in the accompanying drawings and, while I have shown therein what is now regarded as the preferred embodiment of this invention, I desire the same to be regarded as illustrative only and not to be interpreted in a limiting sense.

A preferred form of the present invention is shown in the accompanying drawings, in which

Fig. 1 is a longitudinal axial section, and

Fig. 2 is a left end view of the structure shown in Fig. 1.

In the specific form of this invention shown, a pulley cylinder 3 is provided with heads 4 and 5 which may be either welded in place or bolted to the cylinder 3 to provide ready access to the drive structure therein. Each of heads 4 and 5 has secured thereto a hollow stub shaft 6 and 7, secured to the heads 4 and 5 by flange plates 8 and 9. The stub shafts 6 and 7 are supported for rotation by conventional pillow blocks 10 and 10A, which, in turn, are supported from the frame of the conveyor. The pulley cylinder 3, heads 4 and 5, and stub shafts 6 and 7 rotate as a unit.

A power unit frame is contained within the pulley cylinder 3. This frame is constituted of a plate 11 and arms 12 and 14 at the ends thereof. The arms 12 and 14 carry hollow shafts 15 and 16, respectively, which shafts are in axial alignment with the axis of the pulley cylinder 3. The hollow shafts 15 and 16 extend through the heads 4 and 5 to and within the stub shafts 6 and 7. Suitable bearings, such as roller bearings 17, are provided to facilitate relative rotation of the hollow stub shafts 6 and 7 and the hollow shafts

2

15 and 16. The hollow shaft 16, which extends beyond the hollow stub shaft 7, is keyed to the locking flange plate 18, which is bolted to the pillow block 10A. The power unit frame is thereby held against rotation. A key 18A serves as securing means between the shaft 16 and the flange 18B. A further securing means 18C secures the locking flange plate 18 to the pillow block 10A. Therefore, since 10A is secured against rotation, it results in the locking flange plate 18 not being rotated, and this results in the flange 18B and the hollow shaft 16 being held against rotation. Since the shaft 16 does not rotate, this results in the arm 14 being held fixed, and plate 11, which is secured to the arms 12 and 14, remains stationary and supports motor 19 and speed reducer 20. The motor 19 and speed reducer 20, with a low speed drive shaft 21, are mounted on the power unit frame and, since the shaft 16 is hollow, it can be employed for wiring power to the motor 19.

The low speed drive shaft 21 is in alignment with an extension 21A which acts as a universal joint to prevent breaking in case of misalignment of the unit comprising the motor 19 and the speed reducer 20. The extension 21A has a tongue 21B which fits into a slot in a driving plate or nut 22, which is held by Allen set screws in the hollow stub shaft 6.

Shaft sections 21 and 21A are connected by a tongue and groove connection, and also by a pin. The latter prevents sliding of section 21A relatively to section 21, and prevents breakage of the shaft in event hollow shafts 15 and 16 are not perfectly in alignment. As will be noted from Fig. 2, the end of section 21A is flattened, as shown at 21B. This flattened section or tongue 21B fits in a similarly shaped opening in the drive plate or nut 22 and serves as a driving connection between the speed reducer 20 and the drive plate 22. Hence, the drive is from shaft 21, section 21A, drive plate 22, hollow shaft 6, head 4, and drum 3.

In operation, the stationary structure includes the pillow blocks 10, locking flange plate 18, the power unit frame, which is constituted of the plate 11, the arms 12 and 14, and shafts 15 and 16, together with the motor 19 and the speed reducer 20. When power is delivered to the motor 19, the speed reducer 20, driven thereby, rotates the shaft 21. Shaft 21 is in driving engagement, through section 21A, tongue 21B, and drive plate 22 with the stub shaft 6, and causes rotation thereof. Since stub shaft 6 is fixed with respect to the pulley cylinder 3, driving of the cylinder is effected. By removal of three bolts 23, at each

end of the cylinder 3, one-half thereof can be removed to expose the motor 19 and the speed reducer 20 for any necessary work connected therewith. Necessary ventilation is provided by the holes 24 in the heads 4 and 5.

Pillow block 10A is connected to whatever is necessary to support the same and it has locking flange plate 18 secured thereto. The locking flange plate 18 is counter-bored on the inside to prevent rubbing of the shaft 7 on the flange plate.

The present application is, in part, a continuation of application, Serial No. 136,034, now abandoned.

It is of course understood that the specific description of structure set forth above may be departed from without departing from the spirit of my invention as disclosed herein and as defined by the appended claims.

Having now described my invention, I claim:

1. A conveyor drive pulley, comprising a pulley cylinder having heads, hollow stub shafts fixed to said heads axially thereof and mounted for rotation of said shafts and cylinder, a frame within said cylinder and provided with hollow fixed shafts extending into said hollow stub shafts, said frame extending throughout the length of said cylinder, the frame being supported entirely and solely by said hollow fixed shafts, said frame being fixed in relation to the cylinder, the cylinder being rotatable about said frame, pillow blocks for supporting said hollow fixed shafts, one of said pillow blocks holding said hollow fixed shafts against rotation, a power unit mounted upon said fixed frame and having a drive shaft in alignment with the other of said hollow fixed shafts, and means drivingly engaging said drive shaft and the adjacent hollow stub shaft through said other hollow fixed shaft.

2. A conveyor drive pulley comprising a drum provided with hollow shafts extending axially from the ends of the drum and mounted thereby for rotation, a fixed frame within said drum having a first tubular shaft extending through a first one of said hollow shafts and said frame being held against rotation, said frame having a second tubular shaft extending into the second of said hollow shafts, a power unit mounted on said frame and having a drive shaft extending into said second tubular shaft, said second tubular shaft being fixed, and means extending into said second tubular shaft in driven engagement with said drive shaft and fixed to the second hollow shaft, whereby, upon rotation of said drive shaft, said means and said drum are rotated.

3. A driving unit for a conveyor belt comprising supports, a drum for the belt or conveyor to run over, a supporting unit inside of the drum, hollow shafts extending axially through the ends of the drum and mounted in said supports, holding means to which the outer end of one of said hollow shafts is secured to prevent rotation thereof and of the supporting unit in the drum, driving means, having a rotatable shaft, supported by said supporting unit, said driving means being fixed in position and being connected in driving relation to said drum, and said rotatable shaft being divided into parts connected together by a tongue and groove connection whereby power may be transmitted from the driving means to the drum and misalignment of the axle and the hollow shaft will not cause breaking of the shaft.

4. A conveyor drive pulley comprising a drum having axially extending hollow shafts, fixed pillow blocks in which the axially extending hollow shafts are mounted for rotation, a locking flanged plate fixed to the end of one of the pillow blocks, a first hollow shaft extending through one end of the drum and receiving the drum in rotatable relation, a key connecting the said first hollow shaft and the locking flanged plate fixed to the pillow block, a similar non-rotatable shaft extending through the other end of the drum, extending partly through the second pillow block, an axially extending second hollow shaft being rotatable in the second pillow block, the second hollow shaft having a driving plate secured relatively non-rotatably in the end thereof, said plate having a non-circular hole therethrough in axial alignment with the non-rotatable shaft extending through the second end of the drum, a frame suspended from the non-rotatable hollow shafts, a power unit supported on the frame, a sectional shaft extending through the non-rotatable shaft at the second end of the drum, said sectional shaft being connected in driving relation with the shaft of the power unit, and roller bearings between the pillow blocks and the hollow shafts.

ERNEST V. RINEHART.

No references cited.