

May 15, 1951

W. A. JOHNSTON
TUMBLING APPARATUS

2,552,855

Filed Aug. 10, 1946

2 Sheets-Sheet 1

FIG. 1.

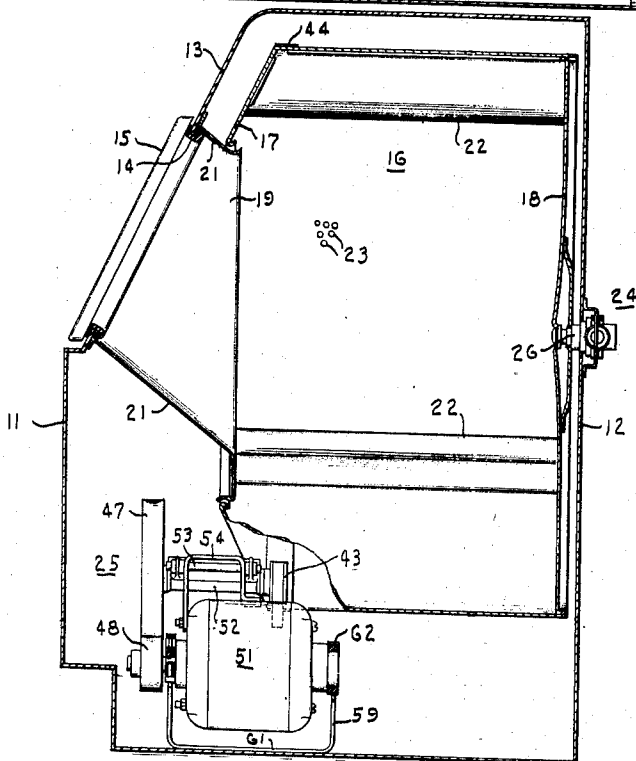
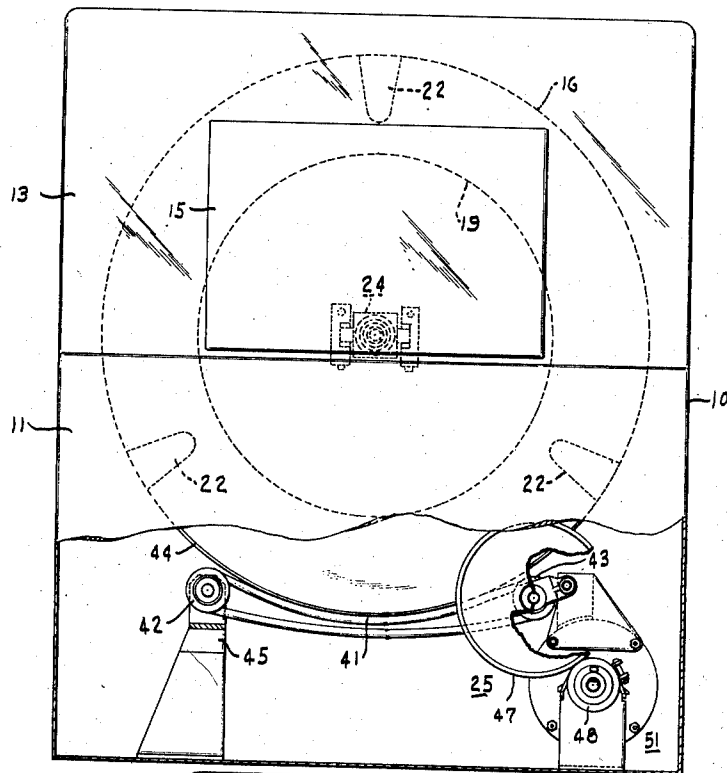


FIG. 2.

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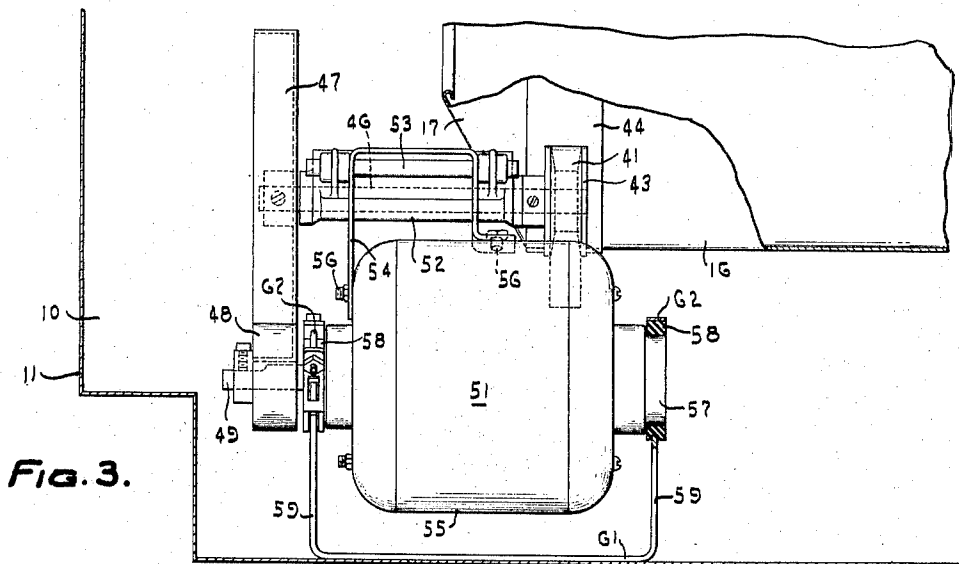


Fig. 3.

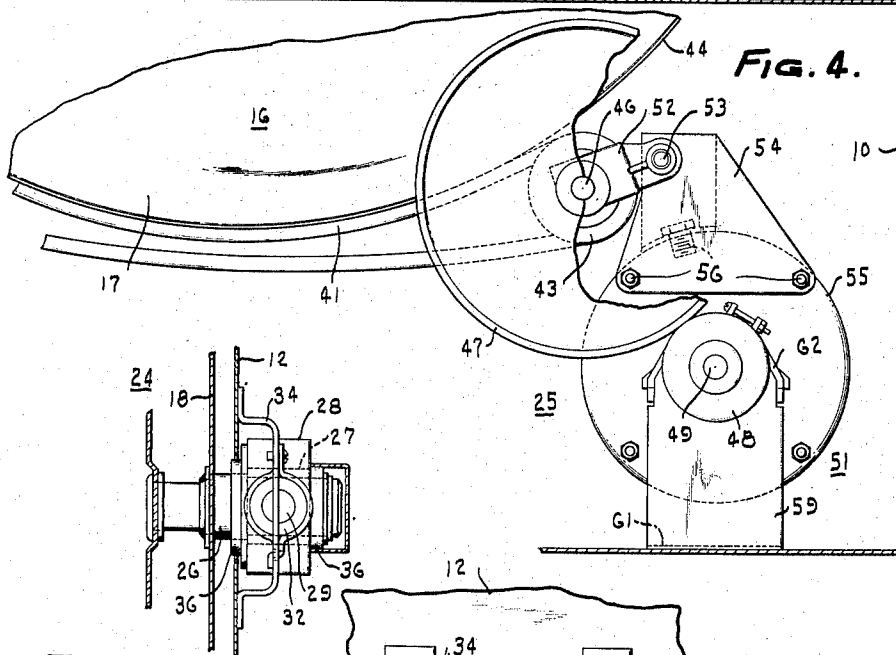


Fig. 4.

Fig. 5.

WITNESSES:
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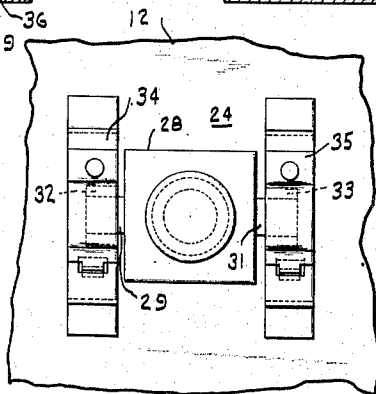


Fig. 6.

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TUMBLING APPARATUS

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Application August 10, 1946, Serial No. 689,657

4 Claims. (Cl. 259—81)

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My invention relates to apparatus for tumbling fabrics or the like and has for an object to provide improved apparatus of this kind.

A further object of the invention is to provide an improved friction drive mechanism for rotating the basket of a tumbler of this kind wherein slippage between the drive mechanism and the basket is prevented.

While not limited thereto, this invention is particularly adaptable to a domestic laundry tumbler or drier of the type having a generally cylindrical, rotatable basket, usually of perforate construction and in which damp fabrics are tumbled or dried. The basket is usually of sheet metal construction and is rotated at a speed of approximately 50 R. P. M. I propose to journal the shaft of the basket, which shaft projects from the rear end thereof, in a bearing having limited rocking movement so that the axis of the basket may move in a vertical plane. The front end of the basket is provided with a driving band which is saddled in a belt, the latter being carried by spaced pulleys disposed below the band and which are rotated.

The spacing of the pulleys is sufficient to provide a relatively large arc of contact between the belt and driving band whereby slipping of the belt relative the driving band is prevented. The belt defines the support for the front end of the basket and provides for up and down movement of the axis of the basket caused by any eccentricity of the driving band.

The foregoing and other objects are effected by my invention as will be apparent from the following description and claims taken in connection with the accompanying drawings, forming a part of this application, in which:

Fig. 1 is a front view of a domestic tumbler constructed and arranged in accordance with my invention;

Fig. 2 is a vertical section through the drier with portions shown in elevation;

Fig. 3 is an enlarged view of a portion of Fig. 2, showing more clearly the motor-driven transmission;

Fig. 4 is a front view of the apparatus shown in Fig. 3;

Fig. 5 is an enlarged view of the pivoted bearing for the basket shown in Fig. 2; and

Fig. 6 is a rear elevation of the bearing structure shown in Fig. 5.

Referring now to the drawings, I have shown my improved drive mechanism applied to a domestic clothes tumbler including an outer casing structure 10 having a front wall 11 and a rear

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wall 12, an upper portion 13 of the front wall 11 being inclined as shown in Fig. 2. The wall portion 13 is provided with an access opening 14 which is closed by a suitable hinged cover 15. Arranged within the housing 10 is a generally cylindrical basket 16 having a front wall 17 of frusto-conical configuration and a rear wall 18. A relatively large opening 19 is formed in the front wall 17, which opening communicates with the opening 14 in the outer casing.

As shown in Fig. 2, an inclined chute structure 21, the outer end of which is fixed to the wall portion 13 and the inner end of which communicates with the interior of the basket 16, serves to guide fabrics dropped through the opening 14 to the interior of the basket. The interior of the basket 16 is provided with a plurality of vanes or baffles 22 which extend radially inwardly of the basket for tumbling the fabrics as the basket is rotated. The entire side wall of the basket 16 may be perforate for the circulation of air through the basket, a few of the perforations being shown at 23. In this connection, the tumbler may also be used as a drier provided with heating means (not shown) which heats the air circulating through the perforations 23.

The basket 16 is supported within the housing 10 by means of a bearing structure, generally indicated at 24, and a friction drive mechanism, generally indicated at 25. As best shown in Figs. 2, 5 and 6, the basket 16 has a stub shaft 26 secured to the rear wall 18 of the basket in any well-understood manner. The stub shaft 26 is journaled in a sleeve bearing 27 carried in a bearing block 28. The latter is provided with transversely-extending trunnions 29 and 31 which are rockably carried by respective sleeves 32 and 33. The support for the sleeves 32 and 33 is provided by a pair of respective brackets 34 and 35 suitably secured to the rear wall 12 of the housing structure 10. The arrangement is such that the bearing block 28 may rock relative the casing 10 to afford up and down movement of the axis of the basket in a generally vertical plane. Movement of the stub shaft 26 axially of the bearing 27 is prevented by spaced shoulders 36 which are fixed to the stub shaft 26 and which engage opposed ends of the bearing block 28.

The bearing structure 24, just described, provides a support for the rear end of the basket and the front end of the basket is supported by the friction drive mechanism 25 which will now be described. This mechanism 25 includes an endless belt 41 carried by spaced pulleys 42 and 43, which belt 41 defines a saddle for a driving

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band 44 externally carried by the basket 16. The band may be a separate element fixed to the basket, or the band may be defined by a portion of the basket. The pulley 42 is journaled in a suitable bracket 45 carried by the housing structure 10 in any well-understood manner. The pulley 43 is fixed to a rotatable jack shaft 46, the latter having a friction wheel 47 secured thereto and engaging a roller 48 secured to the shaft 49 of an electric motor, generally indicated at 51. The jack shaft 46 is rotatably supported by a floating bearing indicated at 52 and pivoted, as shown at 53, to a bracket 54, the latter being fixed to the frame 55 of the motor 51. As best shown at 56 in Figs. 3 and 4, the bracket 54 is bolted to the motor frame 55.

The motor 51 may be of any well-understood construction, but preferably is of the resiliently-supported type. As best shown in Fig. 3, the frame 55 of the motor is provided with axially-extending annular bosses, one of which is shown at 57, projecting from opposite ends thereof. The bosses 57 are gripped by encompassing resilient rubber rings 58 which are seated in respectively upwardly-extending arms 59 of a motor bracket 61. The latter is supported by the housing 10 in any suitable manner. The resilient rings 58 are firmly clamped to the arms 59 by suitable clamps 62 carried by the arms 59. Since this method of resiliently supporting an electric motor is well understood in the art, a more detailed description thereof is deemed unnecessary. However, it is pointed out that torsional and other noise-producing vibrations originating in the motor 51 are damped by the resilient rings 58 and are not transmitted to the supporting bracket 59 or the housing 10 of the tumbler.

During operation of the tumbler, the motor shaft 49 and roller 48 are rotated counterclockwise so that the friction wheel 47 and the pulley 43 are rotated clockwise. The upper side of the belt 41 in contact with the driving band 44 is in tension so that counterclockwise rotation of the basket 16 is effected. The tensioned belt 41 supports a substantial portion of the weight of the basket and imparts an upward force to the basket in opposition to gravity. Since the arc of contact between the belt 41 and the band 44 is relatively large, slipping of the belt relative to the basket is precluded. The arc of contact and the pressure between the driving band 44 and the belt 41 are maintained substantially constant regardless of any eccentricity of the driving band 44, inasmuch as eccentricity of the band 44 would merely cause the basket to float upwardly and downwardly during rotation. This is an important feature of the driving mechanism as it is well understood that close tolerances cannot be maintained in the manufacture of relatively large sheet metal basket structures of the type illustrated.

During inactive periods of the apparatus, the tension in the upper side of the belt 41 is relieved and the weight of the basket will cause it to move downwardly a small amount in the saddle of the belt. At this time, the driving band 44 is supported mainly on two points of the belt, which points are on radii of the band 44, which respectively intersect the axes of the pulleys 42 and 43.

During operation of the tumbler, there is a torsional counterclockwise force imparted to the motor frame 55 due to the weight of the basket 16 on the belt 41. Since the motor shaft 49 operates counterclockwise, there is a clockwise re-

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active force imparted to the motor frame 55 by the field of the motor, as is well understood. This reactive force opposes the counterclockwise force due to the weight of the basket so that the torsional force imparted to the resilient rings 58 is minimized. During inactive periods of the apparatus, there is substantially no torsional force imparted to the rings 58 because, as set forth heretofore, the force components due to gravity are along radii intersecting the respective axes of the pulleys 42 and 43 and, therefore, there is substantially no turning moment imparted to the motor frame at this time.

From the foregoing description, it will be apparent that I have provided an improved friction drive for a tumbler or the like wherein slipping of the driving belt relative to the basket is precluded regardless of any eccentricity of the basket structure. The belt is so arranged that it supports a portion of the weight of the basket and provides for floating of the basket upwardly and downwardly if the latter is eccentric. Where a resiliently-mounted motor is employed for driving the basket, the invention substantially minimizes the forces imparted to the resilient mounting during operation of the tumbler. The drive mechanism is quiet in operation, a very desirable feature in domestic apparatus of this kind, and may be readily serviced since the entire drive mechanism may be applied to and removed from the tumbler as a unit without any close adjustment or alignment of the drive mechanism with the rear bearing of the basket.

While I have shown my invention in but one form, it will be obvious to those skilled in the art that it is not so limited, but is susceptible of various changes and modifications without departing from the spirit thereof.

What I claim is:

1. In apparatus for tumbling fabrics or the like, the combination of a basket for containing the fabrics and rotatable about an axis extending in a generally horizontal direction, a shaft carrying one end of the basket and arranged coaxially thereof, a bearing for the shaft, means supporting the bearing and providing for rocking movement thereof in a substantially vertical plane, a driving band coaxially of the shaft and carried by the basket, said band being axially spaced from the shaft, a plurality of horizontally spaced pulleys disposed below the axis of the basket and beneath the band, an endless belt having an inner driven surface engaging the pulleys and an outer driving surface engaging an arcuate portion of the band for supporting the basket, and means for rotating the pulleys.

2. In apparatus for tumbling fabrics or the like, the combination of a housing, a basket rotatable about a generally horizontal axis within the housing, a bearing carried by the housing, means supporting said bearing for rocking movement in a substantially vertical plane, a shaft fixed to the basket and journaled in said bearing, a driving band carried by the basket and spaced axially from the shaft, a pair of horizontally spaced pulleys disposed below the axis of the basket and beneath said band, an endless belt having an inner surface carried by the pulleys and an outer surface engaging an arcuate portion of the band, said belt defining, at least in part, a support for the basket, and a motor driven means connected to one of the pulleys for the rotation thereof in such direction that the portion of the belt engaging the basket is in tension.

3. In apparatus for tumbling fabrics or the

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like, the combination of a basket rotatable about a generally horizontal axis, a shaft supporting one end of the basket, a bearing for said shaft, means for supporting the bearing and providing for rocking movement thereof in a generally vertical plane, a driving band carried by the basket and axially spaced from said shaft, a pair of pulleys spaced apart beneath said band, an endless belt running upon said pulleys and engaging an arc of said band for supporting said basket, a motor having a frame, resilient means supporting the frame, bearing means for one of said pulleys carried by the motor frame, means driven by the motor for rotating said one pulley in such direction that the reactive force imparted to the motor frame during operation of the motor opposes the force imparted to the belt and said bearing means due to the weight of the basket.

4. In apparatus for tumbling fabrics or the like, the combination of a supporting structure, a basket rotatable about a generally horizontal axis, said basket having a circular driving band formed on one end thereof, a shaft coaxially of

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the band and extending from the opposite end of the basket, bearing means supporting said shaft and carried by the supporting structure, a pair of horizontally spaced pulleys disposed below the axis of the basket and beneath the driving band, an endless belt having an inner surface engaging the pulleys and an outer surface engaging an arcuate portion of the band intermediate the pulleys, and a motor driven transmission connected to one of said pulleys for rotation thereof in such direction that the portion of the belt engaging the band is in tension.

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