Oct. 14, 1941. T. E. D. BILDE 2,259,197

PACKING FOR DISHWASHING MACHINES

Filed June 20, 1939

Fig. 1

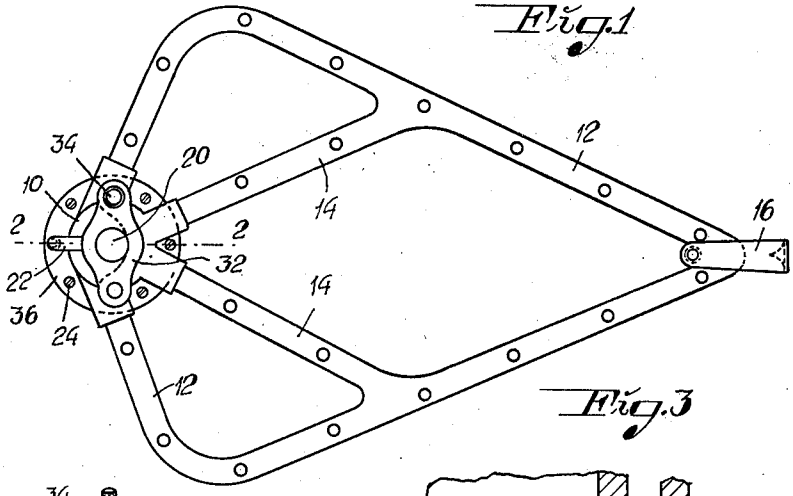



Fig. 3

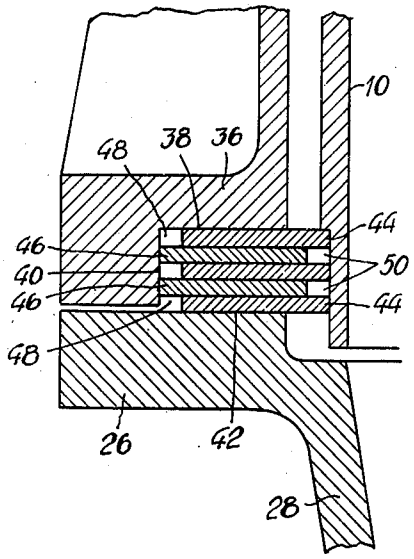
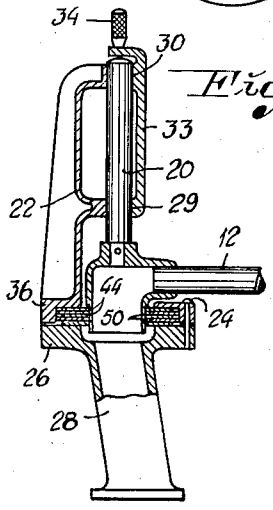



Fig. 2




*Inventor:*

*Tord E. D. Bilde,*

*By* Cushman Darby & Cushman

*Attys.*

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## PACKING FOR DISHWASHING MACHINES

Tord Erik Daniel Bilde, Ulvsunda, Sweden, assignor to Bolinder's Fabriks Aktiebolag, Stockholm, Sweden, a corporation of Sweden

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1 Claim. (Cl. 285—96.8)

The present invention relates to packing means for dish washing machines between surfaces on a fixed part and a rotatably movable part for conveying a fluid, for instance a fixed frame and a spray pipe for a dish spraying liquid rotatably or turnably mounted in said frame. In arrangements of this type it was hitherto difficult to effect an effectively tight seal between the parts without simultaneously reducing the movability of the movable part. An unobstructed movability can be attained only at the cost of the tightness and, on the other hand, the movability is reduced on increased effectivity of the packing due to increased friction. The movable part may even come to a standstill, for instance on account of foreign particles brought along by the passing fluid, such as a contaminated washing liquid, getting jammed between the sealing surfaces.

The principal object of the invention is to provide a packing means of the class described ensuring a good tightness between the parts and simultaneously an unobstructive movability of the movable part.

Another object of the invention is to provide a packing means of the class described preventing foreign matter contained in the passing fluid from being jammed between the surfaces of the parts thereby reducing the movability of the movable part.

A further object of the invention is to provide a packing means of the class described comprising one or more plane or substantially plane annular sheets or disks arranged between the surfaces of the parts, said disk or disks providing by one of their edge surfaces a sealing surface against the surface of one of the parts substantially in the direction of flow of the fluid and by one of its plane surfaces a sealing surface against the other part substantially perpendicular to said direction while forming at the other edge a clearance with the surface of the last-mentioned part. The clearance or clearance formed by the disk or disks divide the sealing surfaces into a plurality of small partial surfaces thus reducing the frictional engagement with the movable part to the advantage of an easy movability thereof, and further these clearances permit a certain adjustability of the disks in radial direction which further promotes said movability. Although in certain cases good tightness and easy movability of the movable part may be attained simultaneously by using a single disk, it is preferred in most cases to use a plurality of such disks.

According to a preferred embodiment, the packing means comprises a plurality of annular plane or substantially plane disks piled onto each other and forming a disk packet, in which every other disk at its one edge bears tightly on the surface of the one part, e. g. the fixed part, and at its other edge forms a clearance with the surface of the other part, e. g. the movable part, and in which every other disk is arranged in opposite manner, that is at its one edge bears tightly on the surface of the movable part and at its other end forms a clearance with the surface of the fixed part, the engagement of the disks with the surface of the movable part being such as to permit easy rotation of said part.

The disks may have the form of cylindrical rings arranged concentrically to the turning axis of the movable part and they may consist of metal, fibre, hard rubber, textile material, products of artificial resins such as the product reggistered by trade-mark Bakelite or the like.

The invention will be more fully described with reference to the accompanying drawing illustrating by way of example the invention as applied to a swingable spray pipe for a circulating washing liquid mounted for rotation in a fixed frame.

On the drawing—

Fig. 1 is a plan view of the spray pipe and Fig. 2 a partial sectional view along the line 2—2 in Fig. 1. Fig. 3 shows a similar section of the packing proper on an enlarged scale.

The spray pipe comprises a substantially cylindrical inlet part 10 and perforated pipes 12 issuing from said part and forming substantially a trapezium as well as two perforated pipes 14 also issuing from the inlet part 10 and connected with the opposite sides of the trapezium. Provided at the outer corner of the trapezium is a reversing nozzle 16 of a type known per se by which on operation the spray pipe is swung to and fro.

Connected to the inlet part 10 by means of a pin 18 is a vertical shaft 20 mounted in a bracket 22 which by means of screws 24 is connected to an upper flange 26 on a fixed inlet pipe 28 for washing liquid. The bearings 29 and 30 for the shaft 20 are formed by semi-cylindrical bushes on the bracket 22 and similar semi-cylindrical bushes on a plate 32 pivoted to the bracket and lockable thereto by a pin 34. The inlet part 10 of the spray pipe engages a lower cylindrical sleeve 36 of the bracket 22, said sleeve having on its inside a peripheral recess which has a plane or substantially plane horizontal upper surface 38, a plane or substantially plane vertical lateral surface 40 concentric with the cylindrical outer surface of the inlet part and which is open

at its bottom. Together with the plane or substantially plane horizontal upper surface **42** of the flange **26** of the inlet pipe **28** said recess forms an annular housing in which the packing according to the invention is arranged.

Inserted into this housing are packing disks in the form of cylindrical rings **44** and **46**. Every second disk **44** has an internal diameter equal or substantially equal to the external diameter of the inlet part **10** and an external diameter slightly less than the bottom diameter of the annular housing so as to form a clearance with the surface **40** on the fixed bracket **22**, whereas every second disk **46** has an external diameter equal or substantially equal to the bottom diameter of the annular housing and an internal diameter slightly greater than the external diameter of the inlet part **10** so as to form a clearance **50** with said inlet part. Consequently, the packing disks have a tight fit alternately against the cylindrical surface of the inlet part **10** and the cylindrical bottom surface **40** of the annular housing. On account of these clearances the disks **44**, **46** obtain a certain adjustability in radial direction. Further, the thickness of the disk packet is slightly less than the distance between the surfaces **38**, **42** so as to give the disks a certain adjustability also in axial direction.

Under the action of the flow of the liquid the disks are pressed axially against each other and the uppermost disk against the upper surface **38** of the annular housing ensuring a good sealing along the labyrinth principle. If the flow of the liquid is not great enough to compress the disks sufficiently in axial direction, it is possible to provide a spring, for instance between the lowermost disk and the upper surface **42** of the flange **26**. As the sealing surfaces of the disks **44** bearing on the cylindrical surface of the inlet part **10** are each relatively small the friction on said inlet part will be small, and, thus, the spray pipe will be easily movable, said movability being increased by the adjustability of the disks in radial direction without the tightness of the packing being thereby reduced. This easy movability of the spray pipe is not reduced by foreign particles contained in the liquid coming in between the sealing surfaces. If such a particle wedges its way between the inlet part **10** and the lowermost disk **44** it will practically immediately enter the clearance **50** between the inlet part and the adjacent disk **46** in which space it can no longer exercise any braking action on said part. From this clearance the particle then enters the next clearance **50** and so on, until it has passed through the entire packing.

The invention is not limited to the embodiment shown which may be varied in several respects without departing from the scope of the invention.

What I claim is:

In combination with a dish washing machine having a fixed part provided with a housing, a rotatable spray pipe extending into the housing and spaced from the side wall thereof, packing means mounted in said housing, said packing means including a plurality of superimposed disks through which the spray pipe extends, said disks being normally axially displaceable relative to one another, alternate disks each having its inner peripheral edge bearing against the spray pipe and its outer peripheral edge spaced from the adjacent wall of the housing, the other disks each having an outer peripheral edge bearing against the adjacent wall of the housing and an inner peripheral edge spaced from the spray pipe, the engagement of the disks with the spray pipe being such as to permit rotation of the latter, said fixed part having a passage for conducting liquid to the spray pipe, and the bottom disk being exposed to the liquid as it flows through the fixed part so as to cause the disks to be moved bodily upwardly and the top disk to be pressed tightly against the adjacent wall of the housing by the liquid pressure and to be withdrawn therefrom when the liquid pressure is cut off.

TORD ERIK DANIEL BILDE.