Aug. 29, 1967 J. KAISER 3,338,045

ADJUSTABLE HOLDING MEANS FOR SELF-LUBRICATING SPINNING OR TWISTING RINGS FOR SPINNING OR TWISTING MACHINES

Filed Oct. 20, 1965 3 Sheets-Sheet 1

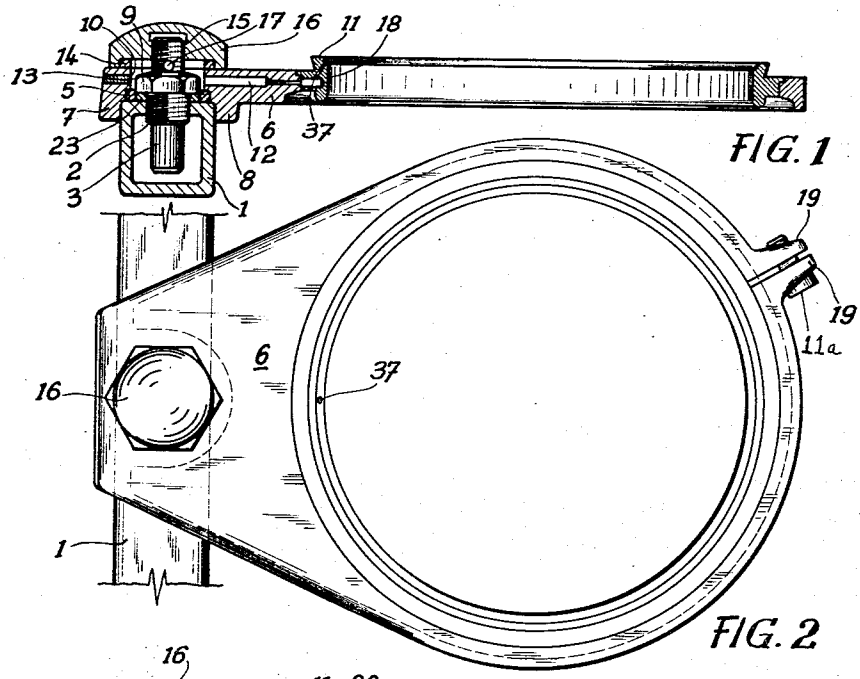

FIG. 1

FIG. 2

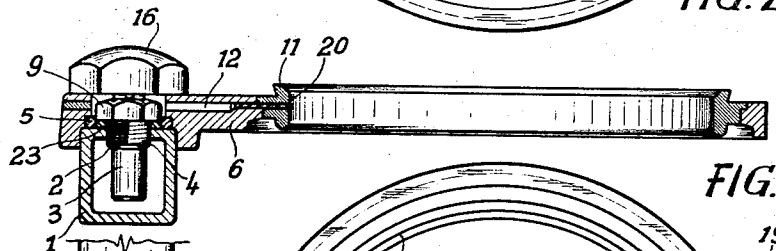

FIG. 3

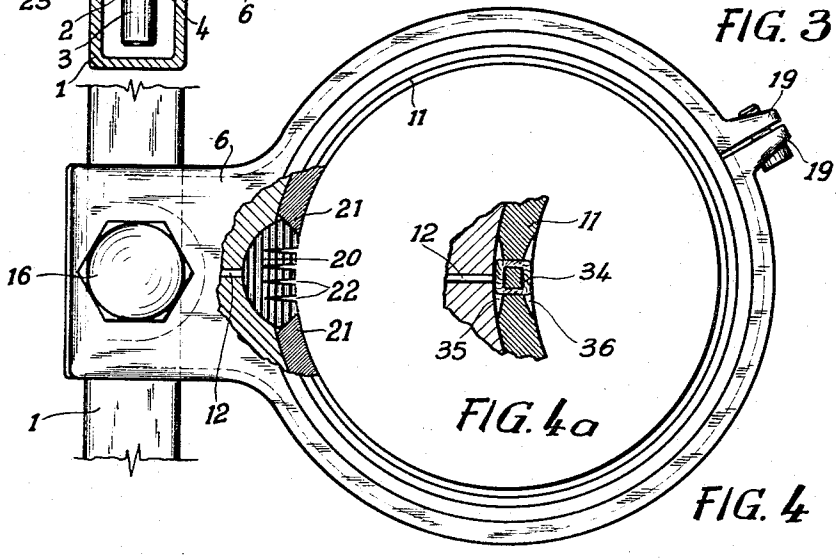

FIG. 4a

FIG. 4

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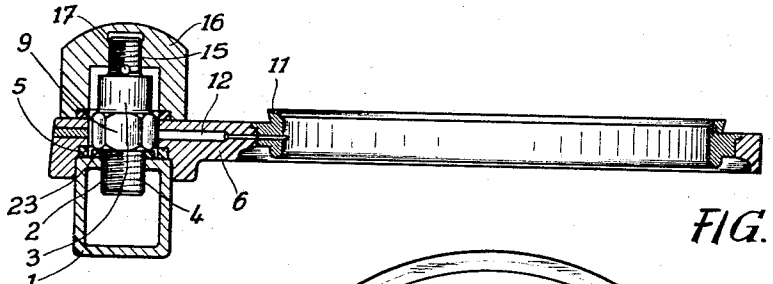

FIG. 5

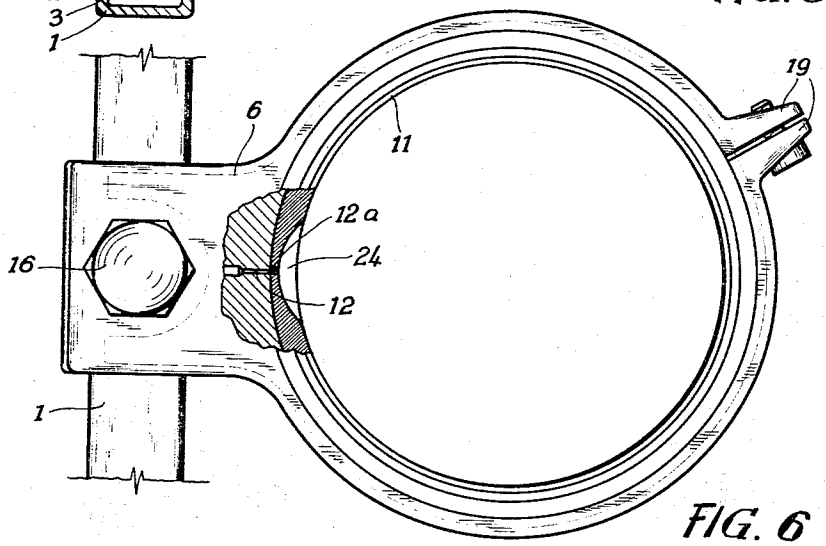

FIG. 6

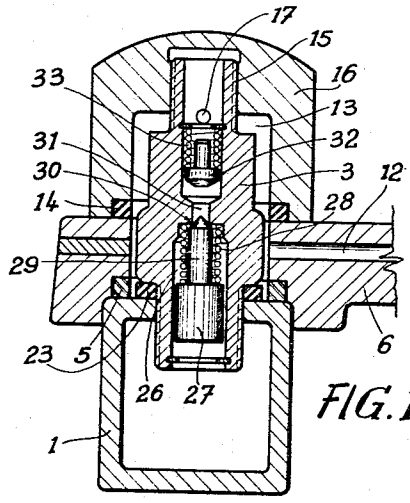

FIG. 13

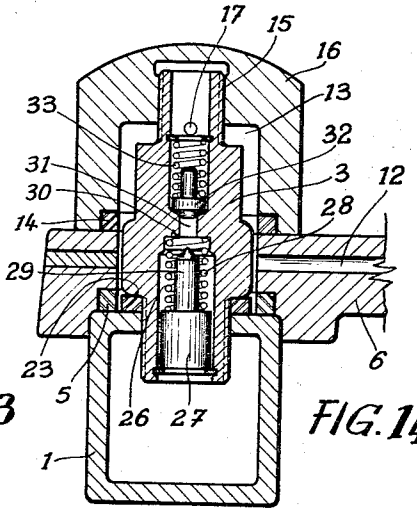

FIG. 14

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ADJUSTABLE HOLDING MEANS FOR SELF-LUBRICATING
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SPINNING OR TWISTING MACHINES
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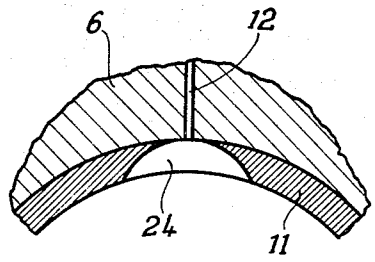

FIG. 7

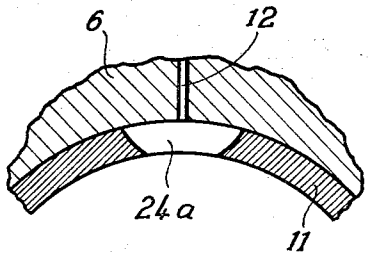

FIG. 8

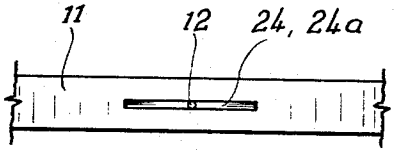

FIG. 9

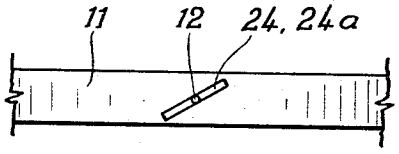

FIG. 10

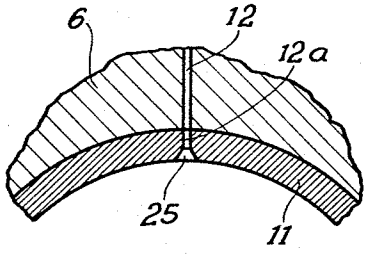

FIG. 11

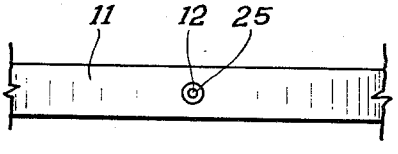

FIG. 12

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3,338,045

ADJUSTABLE HOLDING MEANS FOR SELF-LUBRICATING SPINNING OR TWISTING RINGS FOR SPINNING OR TWISTING MACHINES

Johann Kaiser, Waldshut, Germany, assignor to Chr. Mann Maschinenfabrik, Waldshut, Germany

Filed Oct. 20, 1965, Ser. No. 498,677
9 Claims. (Cl. 57—120)

The present invention relates to an adjustable holding arrangement for self-lubricating spinning or twisting rings on spinning and/or twisting machines, in which the ring rail is designated as a holding tube serving for the supply of lubricant. Holding arrangements of this type are known and described for instance in German Patents 1,102,616 and 1,139,780. The object of the arrangement in German Patent 1,102,616 consists in the provision of adjustable holding means for self-lubricating spinning or twisting machines which will permit a precise centric adjustment of the ring with regard to the spindle axis and also a particularly favorable supply of the lubricant. To this end, a tube is provided which serves simultaneously as lubricant feeding means and as ring rail to which the rings are connected adjacent to each other by means of one ring holder each. Each of the ring holders is connected to the tube in a lubricant-tight manner by means of a clamping member surrounding the respective ring holder. Each ring holder furthermore comprises a lubricant feeding conduit communicating with a bore in the tube while the lubricating wicks of the individual rings extend through the conduit and the bore into the tube so that the lubricant is withdrawn by the wick from the tube and fed to the inner surface of the ring. German Patent 1,139,780 concerns a simplification of the above mentioned arrangement and an improvement of the connection between individual ring holder and tube. This simplification and improvement consists in that the tube has a non-round cross section with at least a plane outer surface, and in that a uni-laterally protruding portion of the ring holder is provided which forms a clamping member and uni-laterally protrudes in or parallel to the plane of the ring. The protruding portion is laterally adjustably connected in a pressure medium-tight manner to the plane surface of the tube by means of screws. With the above mentioned heretofore known holding arrangements, the supply of the lubricant from the holding tube forming the ring rail is effected by wicks while the suction ability of the wicks will determine the quantity of lubricant being fed to the inner surface of the rings. However, the suction ability of such wicks will decrease in the course of time due to soiling and resination of the lubricant as, for instance, of oil or the like. Furthermore, the lubricant requirement may considerably vary depending on the conditions of operation and the condition of the rings and runner. These conditions cannot be taken care of by means of a lubricant conveying wick.

While the employment of a tubular ring rail simultaneously serving as lubricant conveying means represents a considerable structural simplification over lubrication systems having lubricant conveying conduits independent of the ring rail, a metering-out of the quantity of lubricant in conformity with the runner speed and the frictional conditions will not be possible.

It is, therefore, an object of the present invention to provide a holding arrangement of the type involved which will overcome the above mentioned drawbacks.

It is another object of this invention to provide an adjustable holding arrangement which will permit a feeding of said quantities of lubricant to the rings in a continuous manner or at intervals while making superfluous the employment of wicks extending from the lubricant feeding pipe formed by the ring rail through the passage of the ring holder to the inner side of the rings.

It is also an object of this invention to provide an improvement of that type of holding arrangement for self-lubricating spinning and twisting rings on spinning or twisting machines, in which the ring rail serves as holding tube for the lubricant supply and in which the ring holder is sealingly connected to the ring rail while conduit means extend into the inside of the ring for conveying lubricant to the ring from the ring rail. Such an arrangement is described for instance in German Patents 1,102,616 and 1,139,780.

These and other objects and advantages of the invention will appear more clearly from the following specification in connection with the accompanying drawings, in which:

FIG. 1 illustrates a section through a holding tube of square cross section with a ring holder and spinning ring mounted thereon.

FIG. 2 is a top view of the holding arrangement according to FIG. 1.

FIG. 3 illustrates a section similar to that of FIG. 1 but slightly modified thereover.

FIG. 4 is a top view of the holding arrangement according to FIG. 3.

FIG. 4*a* illustrates in section the lubricating point of a ring according to the present invention.

FIG. 5 is a section similar to that of FIG. 1 but differing therefrom in that the passage interconnecting the holding tube and the inside of the spinning ring leads into the latter with a slot-like widening portion.

FIG. 6 illustrates partly in top view and partly in section the holding arrangement according to FIG. 5.

FIG. 7 is a partial section through the passage leading to the inside of the spinning ring, the mouth of said passage being slightly modified over that of FIG. 6.

FIG. 8 is a partial section similar to that of FIG. 7 but slightly modified thereover.

FIG. 9 is a front view of the passage opening of FIG. 7.

FIG. 10 is a front view of a slot-like passage opening arranged at an angle with regard to the plane of the spinning ring.

FIG. 11 is a partial section similar to that of FIG. 7 but illustrating a slightly modified mouth of the passage.

FIG. 12 is a front view of the mouth of the passage of FIG. 11.

FIG. 13 illustrates a section through the ring holder with the holding tube and metering valve.

FIG. 14 is a section similar to that of FIG. 13 but illustrating the metering device in a position different from that of FIG. 13.

According to the present invention, the holding tube is connected to a pressure producer working continuously or at intervals while a metering device preceding the conduit means in the ring holder is connected to the holding tube and serves simultaneousuly for connecting the ring holder to the holding tube. In this connection, provision may be made for laterally adjusting the ring holder as described for instance in connection with the holding arrangement according to the above mentioned German patents. By providing a metering device as set forth above which takes over the transmission of the lubricant into the lubricating passage in the ring holder and conveys the lubricant to the interior of the respective ring, the quantity of lubricant can be precisely adjusted to the desired amount and can be adapted to the respective requirements so that the traveller speed and the frictional conditions can be precisely taken care of. The metering device may be formed by a metering valve.

More specifically, according to the present invention, the metering element has a threaded shank which is

threaded into the holding tube while its free shank portion extends through the ring holder which is clamped to the holding tube by means of a threaded cap. This cap sealingly covers the annular chamber within the range of the discharge opening of the metering element and its connection with the conduit means in the ring holder. Depending on the size of the annular chamber within the range of the discharge opening of the metering element, it is possible to displace the ring holder on the holding tube to a greater or less extent in order thus to center the ring precisely in conformity with the spindle axis.

When the holding tubes have a round cross section, the connecting bores into which the metering elements are screwed will have plane milled off portions.

The discharge of the lubricant from the conduit means to the inner side of the ring and the distribution of the lubricant over the surface may be equalized and improved according to the present invention by having the conduit means, which connect the lubricant feeding pipe with the inner side of the ring, provided with a broadened section which leads into the inner side of the ring.

Inasmuch as the lubricant passes through the conduit means under pressure, the broadened section will produce a decrease in the pressure which decrease will to a certain extent result in an atomizing of the lubricant and thus to a better distribution on the inner side of the ring whereby an improved distribution of the lubricant over the entire ring surface will be effected by the traveller.

In general, according to the present invention, the conduit means may lead into the inner side of the ring through a conically shaped broadened section.

According to another embodiment of the invention, the conduit means may be provided with a slot-shaped broadened section located in the central plane of the ring and leading into the interior of the ring.

Finally, in order to assure a good distribution of the lubricant over the entire height of the inner surface of the ring, and to improve the distribution, it is possible to provide the conduit means with a slit-shaped broadened section which is inclined to the plane of the ring and leads into the interior of the ring.

A good distribution of the lubricant may according to the present invention also be effected by inserting a porous body in the ring holder, in the conduit means thereof, or in that end of the conduit means which is adjacent said ring, or into the ring. Such porous body may consist of felt or another non-metallic or metallic porous material. This porous body will on one hand store the lubricant passing through the conduit means and will assure a uniform discharge while on the other hand it will prevent the lubricant from flowing in undue quantities to the inner side of the ring if at times the oncoming quantity of lubricant is in excess of the quantity of lubricant required by the ring. The porous body may be located for instance in a broadened section of the lubricant means or in a broadened section at the end of the conduit means, or in the extension of the conduit means in the ring. According to another embodiment, the porous body may be arranged in the ring holder or also in the ring at the end of the conduit means.

The discharge of the lubricant by the porous body to the traveller, for instance at the inner wall of the ring, may according to the present invention furthermore be improved by providing the porous body adjacent said ring with notches in which the lubricant may collect.

The support for the porous body in the ring holder may be assured by designing the porous body as circular disc segment which is located in the conduit plane of the ring holder while said porous body is on both side of the axis of the conduit means embraced by the ring and the central section of said segment is left free.

For purposes of dispensing lubricant to the traveller, the ring may at the exit of the conduit means be provided with a short wick bent into itself. The wick is received

by a recess in the inner and outer wall surface of the ring and extends through bores in the ring.

In order to assure a seal at the connecting surface between the tube and the ring holder and also to assure a complete seal of the annular chamber provided within the range of the discharge opening of the measuring element in the ring holder, according to the present invention, between holding tube and ring holder on one hand and between ring holder and screw cap on the other hand, there are inserted sealing discs. These sealing discs are of particular importance when the annular chamber is so selected that a material displacement of the ring holder on the connecting surface of the holding tube should be possible. The maximum displacement will be determined by the distance between the free shank of the measuring element and the inner wall of the receiving bore in the ring holder.

Referring now to the drawings in detail, the arrangement shown therein comprises a holding tube **1** of square cross section which has its upper wall provided with a threaded bore **2** into which is threaded a threaded shank **4** of a measuring valve **3**. The holding tube **1** may extend over the entire length of the spinning or twisting machine to be equipped with the arrangement according to the invention or may extend over a portion only of the machine. The holding tube **1** carries spinning ring holders spaced from each other in conformity with the spindle spacing.

Mounted upon the top surface of holding tube **1** through the intervention of a sealing ring or gasket **5** is a ring holder **6** which is provided with extensions **7** and **8** laterally engaging tube **1** with or without play. When an engagement without play is effected, ring holder **6** will from the very start be definitely located transverse to tube **1**. When ring holder **6** is mounted on tube **1**, the polygonal head **9** of the measuring valve **3** extends into the bore **10** in ring holder **6** while between the polygonal head **9** and the inner wall of bore **10** there prevails a play which permits a corresponding offsetting of ring holder **6** with regard to the axis of measuring valve **3**. The gasket or seal between tube **1** and valve **3** makes up the seal **23**. In the ring holder **6**, there extends a lubricating passage **12** in the direction toward the axis of spinning ring **11**, said lubricating passage **12** starting in annular chamber **13** in the ring holder **6**. A threaded cap **16** is threaded onto the threaded end **15** of measuring valve **3** while a sealing ring **14** is interposed. Threaded shank **15** has a discharge valve opening **17** through which the lubricant fed by a lubricating pump will be able to pass from holding tube **1** into annular chamber **13** and from here through conduit **12** to the inner wall **18** of spinning ring **11**. Spinning ring **11** is, as shown in FIG. 2, surrounded by ring holder **6** and clamped therein by tightening a screw **11***a* which passes through clamping flanges **19** and threadedly engages that clamping flange which is remote from the head of screw **11***a*.

The above mentioned features are provided with the holding means of FIGS. 1 and 2 and also with the holding means of FIGS. 3 and 4. With the embodiment of FIGS. 3 and 4, in distinction from the embodiment of FIGS. 1 and 2, there is provided a body **20** in ring holder **6** in the plane of the passage **12**. This porous body **20** has the shape of a circular segment. The end of passage **12** opens circularly toward ring **11** and in this broadened section receives the porous body **20**. Ring **11** is cut open within the range of porous body **20** in such a way that the pointed ends **21** of ring **11** extend somewhat in front of the porous body **20**. In this way, body **20** is prevented from detaching itself from the broadened section in ring holder **6** in the direction toward the axis of the spinning ring. Within the free section of the porous body **20** between the ends **21** of ring **11**, porous body **20** is provided with notches **22** which hold lubricant ready for dispensing.

While according to the embodiment of FIGS. 1 and 2, the lubricant is, by means of a central lubricating pump, pumped out of the holding tube **1** through the measuring

valve 3 into passage 12 from where it passes to the inner side 18 of spinning ring 11 while the supply of the lubricant is effected continuously or at intervals, it will be appreciated that with the embodiment according to FIGS. 3 and 4, the lubricant passes through passage 12 into the porous body 20 which in its turn continuously gives off the lubricant while the notches 22 assure a certain storage of lubricant in the direction range of the inner surface 11 of the ring. Also in this instance, the supply of the lubricant to the porous body 20 may be effected continuously or at intervals. According to the illustrated example, the porous body 20 extends partially into the ring holder 6 at the end of the passage and partially into ring 11. However, it is also possible to do without the engagement of the porous body 20 with the ring holder 6 and to mount the body 20 directly in the ring holder 6 either in the broadened portion at the end of passage 12 or in the broadened portion of passage 12 approximately at half of its length.

According to the arrangement illustrated in FIG. 4*a*, the porous body 20 of FIGS. 3 and 4 has been replaced by a short wick 34 wound into itself. Wick 34 extends through bores in ring 11 and is received in recesses 35, 36 provided in the inner and outer wall surface of ring 11.

The embodiment according to FIGS. 5 and 6 substantially corresponds to the embodiments of FIGS. 1 to 4 and, therefore, corresponding parts of FIGS. 5 and 6 have been designated with the same reference numerals as in FIGS. 1 to 4. In contradistinction to the above described embodiments of the invention, according to FIGS. 5 and 6, the passage 12 in ring holder 6 does not retain its cross section at its mouth as in FIGS. 1 and 2 nor is it provided with a broadened section in which a porous body 30 is arranged. Passage 12 is rather provided with a slot-like crescent-shaped broadened section which may be made, for instance, by means of a disc miller, said slot extending in the form of a flat slot in the central plane of ring 11. No insertion of a porous body or a wick is provided. With this embodiment, the lubricant entering into the broadened section 24 will be subjected to a reduction in pressure which results in a distribution of the lubricant over the entire discharge cross section so that the circulating ring traveller will be subjected to a more uniform wetting by the lubricant.

Instead of providing a crescent-shaped broadening portion or recess as shown in FIG. 6, said crescent-shaped portion may extend through the ring 11. This is simpler from a manufacturing standpoint because a passage bore 12*a* in the ring itself as it is shown in FIG. 6 may be omitted.

FIG. 8 illustrates that a slot-like broadening portion 24*a* may also be arranged in an inverse manner in ring 11 without jeopardizing or impeding the distribution of the lubricant when it leaves the passage. However, in this instance, the slot-like broadening portion 24*a* can, for instance, be more easily milled into ring 11.

Slots 24, 24*a* may extend into the intermediate plane of ring 11 as shown in FIG. 9. It is, however, also possible to provide the slot-like widened sections 24 and 24*a* so that they are inclined with regard to the ring plane as shown in FIG. 10.

Instead of a slot-shaped broadening, also a conical broadening 25 according to FIGS. 11 and 12 may be provided whereby the lubricant when leaving the passage 12 may expand to a certain extent and may be able better to distribute itself on the inner side.

FIGS. 13 and 14 illustrate on a somewhat enlarged scale the measuring valve 3 and, more specifically, according to FIG. 13 in the position when a pressure shock occurs and according to FIG. 14 prior to the occurrence of the pressure shock.

In the interior of the valve housing of measuring valve 3, there is provided a piston 27 movable with play in the cylinder bore 26. Piston 27 is by means of a spring 28 continuously urged downwardly. As will be seen from FIGS. 13 and 14, the piston shank 29 has its tip or point

opposite valve seat 30, which is directly followed by a passage 31 on which the spring loaded valve piston 32 is mounted. A spring 33 acts upon valve piston 32. When the pressure medium in holding tube 1 is under no pressure, piston 27 will occupy its position shown in FIG. 14 while the lubricant is permitted to pass around piston 27 in view of the there prevailing play and may pass over piston 27 around piston shank 29. When the lubricant in holding tube 1 is subjected to a pressure shock, piston 27 will be displaced toward the valve seat 30 in conformity with FIG. 13. The lubricant above piston 27 is pressed through bore 31 until the seating of valve shank 29 on valve seat 30 prevents a further post-flowing of lubricant. The lubricant pressed into bore 31 lifts valve piston 32 from its seat so that the lubricant flows around the valve piston 32 upwardly and through bore 17 passes into chamber 13 which communicates with passage 12 in the ring holder. In this way, each pressure shock in the lubricant in holding tube 1 will bring about the entry of a certain adjustable quantity of lubricant into passage 12 and further toward the inner surface of ring 11. By selecting the thrust of springs 28 and 33, the measured quantity of the lubricant can be adjusted and can be varied by exchanging the springs. In this way, it will be assured that a certain quantity of lubricant will with each pressure shock pass to the inner surface of the ring. The total quantity during the operation can be ascertained and determined by the number of the pressure shocks.

It is, of course, to be understood that the present invention is, by no means, limited to the particular arrangements shown in the drawings but also comprises any modifications within the scope of the appended claims.

What is claimed is:

1. The combination in a spinning frame of: a support rail in the form of a tube, a ring holder detachably engaging said rail and extending therefrom, a spinning ring mounted in said ring holder, conduit means extending from the inner periphery of said spinning ring therethrough and into said ring holder to the region where the holder engages the rail, measuring valve means interposed between said conduit means and said rail to control the transfer of fluid from the interior of said rail to said conduit means, and means detachably connected to said measuring valve means and in cooperation therewith detachably connecting said ring holder to said rail.

2. The combination in a spinning frame of: a support rail in the form of a tube, a ring holder detachably engaging said rail and extending therefrom, a spinning ring mounted in said ring holder, conduit means extending from the inner periphery of said spinning ring therethrough and into said ring holder to the region where the holder engages the rail, measuring valve means interposed between said conduit means and said rail to control the transfer of lubricant from said rail to said spinning ring, said valve means comprising an element threaded into said rail and having a shank portion extending from the rail, said ring holder having an aperture therein loosely receiving said shank portion and communicating with said conduit means, a threaded cap threaded on the end of said shank portion and detachably clamping said ring holder to said rail and having clearance from said shank portion below the threaded end thereof so that the interior of the cap is in fluid communication with said aperture, and sealing means between the cap and the ring holder and between the ring holder and the rail.

3. The arrangement according to claim 2 in which said conduit means broadens out where it communicates with said ring.

4. The arrangement according to claim 2 in which said conduit means includes a conical terminal region at the end adjacent the said inner periphery of said spinning ring.

5. The arrangement according to claim 2 in which said conduit means includes a slot-like broadened section adjacent the said inner periphery of said spinning ring.

6. The arrangement according to claim 5 in which said

slot-like section is disposed at an angle to the plane of the said spinning ring.

7. An arrangement according to claim 1, in which the portion of the said conduit means disposed in said spinning ring is in the form of two laterally spaced passageways, recesses on both the inner and outer peripheries of said spinning ring in which said passageways open, and at least one loop of wicking wound through said passageways and disposed within the limits of said recesses, the terminal end of said conduit means in said ring holder adjacent the spinning ring communicating with the said recess on the outer periphery of said spinning ring.

8. An arrangement according to claim 2 in which said measuring valve means comprises a first normally open valve in the rail end of said passage responsive to surges of fluid from the rail into said passage for moving toward closed position and a second valve in the passage at the cap end thereof in the form of a normally closed check valve opening in response to fluid flow from said rail through said passage to the interior of said cap.

9. The combination in a spinning frame: a horizontal tubular support rail, a ring holder engaging the top of said rail and extending horizontally therefrom, a spinning ring mounted in the outer end of said ring holder, conduit means extending from the inner periphery of said spinning ring therethrough to the outer periphery thereof and then through said ring holder to the region where the ring holder engages the rail, measuring valve means interposed between said conduit means and said rail to control the transfer of lubricant from said rail to said spinning ring, said valve means comprising a stud connected to the rail and extending upwardly therefrom, said ring holder having an aperture surrounding said member with play and communicating with said conduit means, and a cap threaded on the upper end of said stud and clamping said ring holder to said rail, said stud being provided with passage means extending therethrough and providing fluid communication between the interior of said rail and said aperture.

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FRANK J. COHEN, *Primary Examiner.*

J. PETRAKES, *Assistant Examiner.*