A. G. G. SALENIUS.

LUBRICATING SYSTEM FOR CENTRIFUGAL MACHINES.

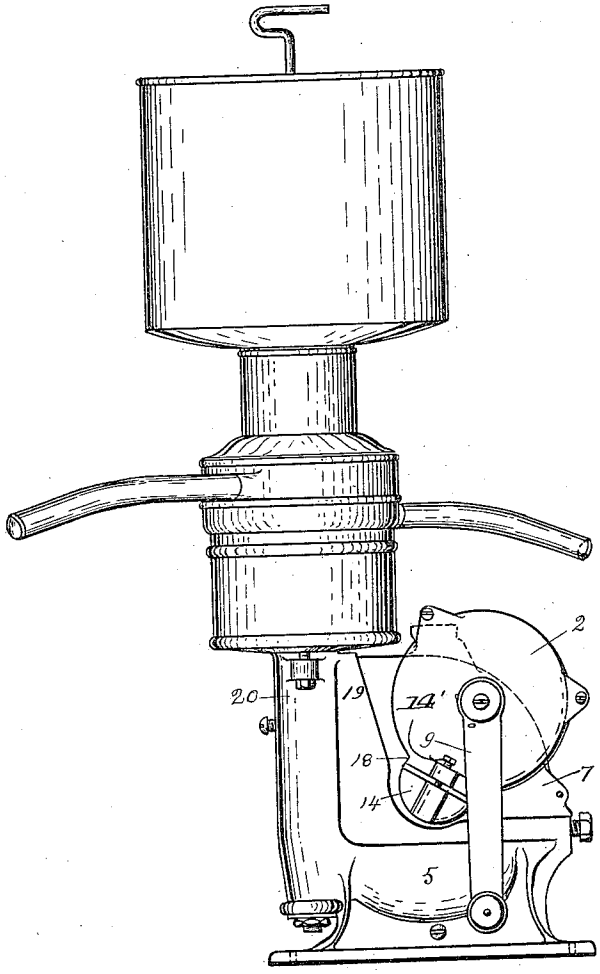
APPLICATION FILED JAN. 5, 1910.

1,045,751.

Patented Nov. 26, 1912.

4 SHEETS—SHEET 1.

Fig. 1



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4 SHEETS—SHEET 2.

Fig. 2.

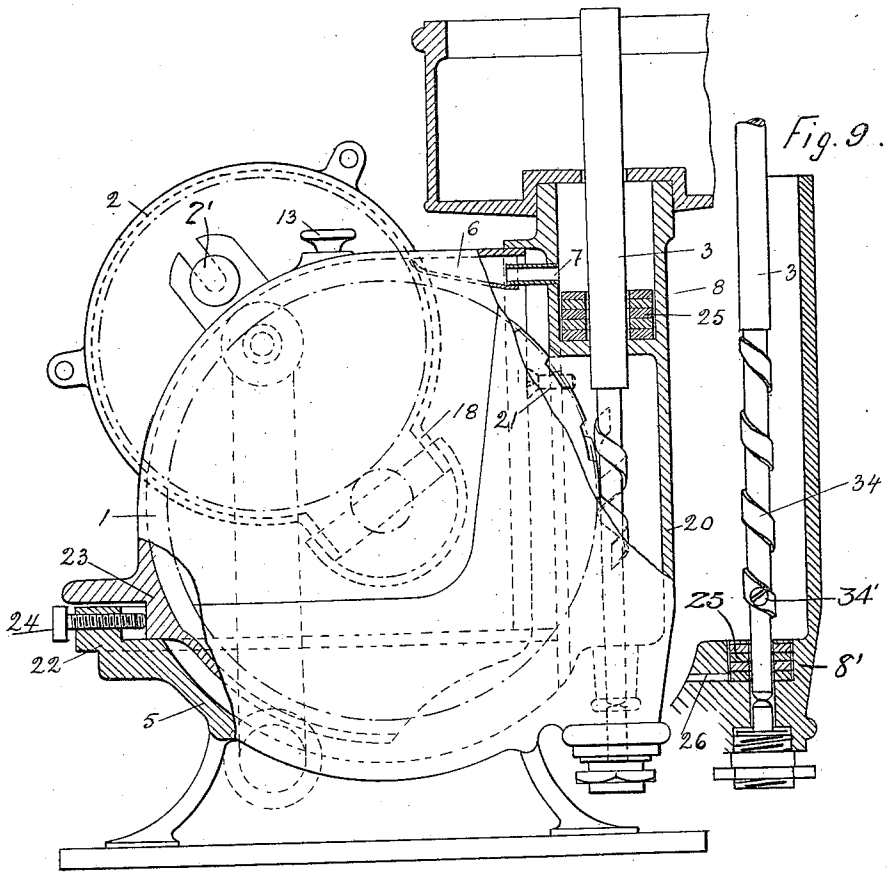

Fig. 9.

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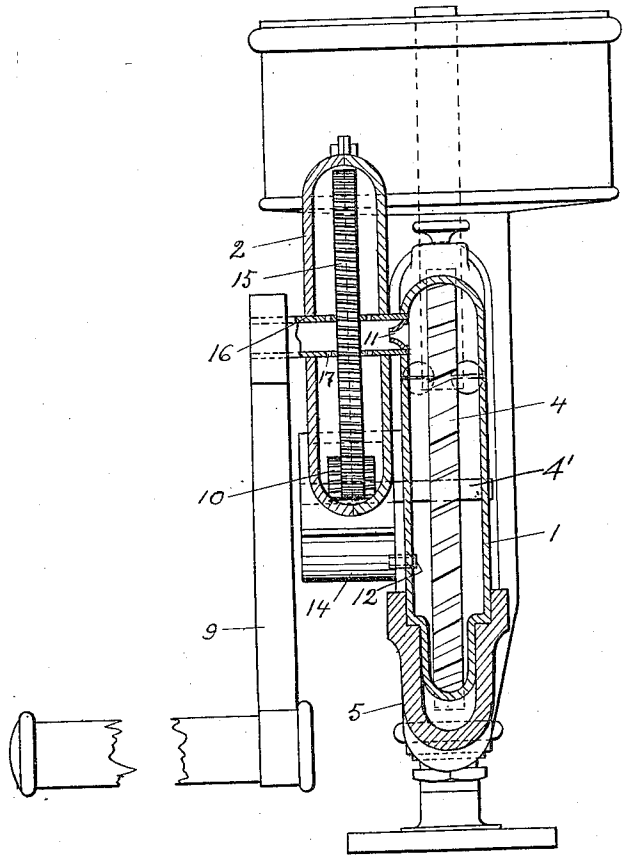
4 SHEETS—SHEET 3.

Fig. 3.



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4 SHEETS—SHEET 4.

Fig. 4.

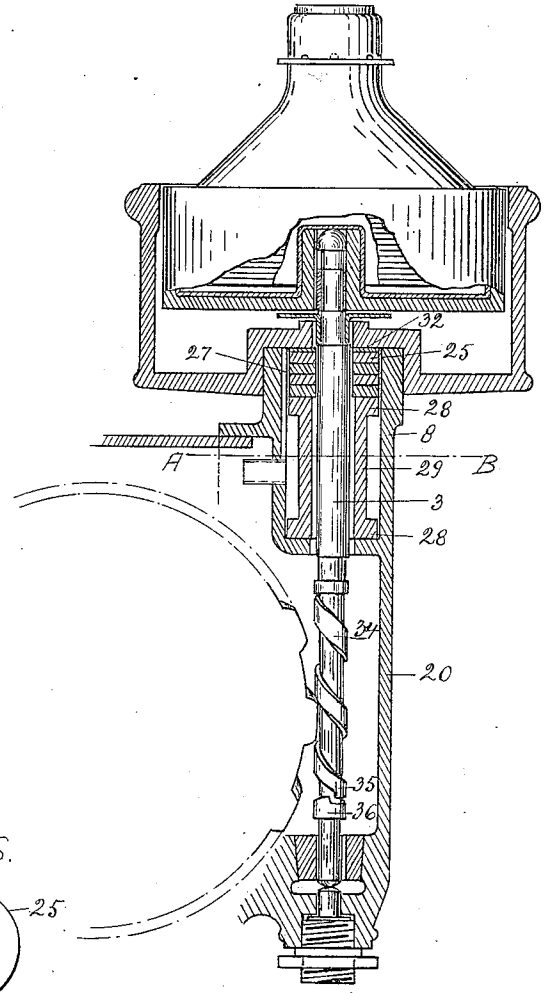


Fig. 5.

A - B.

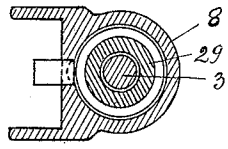


Fig. 7.

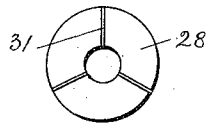


Fig. 8.

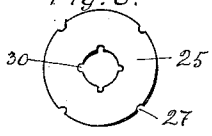
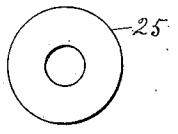


Fig. 6.



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UNITED STATES PATENT OFFICE.

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LUBRICATING SYSTEM FOR CENTRIFUGAL MACHINES.

1,045,751. Specification of Letters Patent. Patented Nov. 26, 1912.

Application filed January 5, 1910. Serial No. 536,490.

To all whom it may concern:

Be it known that I, ANDERS GUSTAF GUNNAR SALENIUS, of Svedenborgsgatan 2, Stockholm, Sweden, have invented certain new and useful Improvements in Lubricating Systems for Centrifugal Machines, of which the following is a specification.

This invention relates to improvements in centrifugal machines and has to do more particularly with an improved and novel construction of driving mechanism therefor.

One of the novel features of the invention consists in providing a casing for the driving mechanism and for the usual spindle, operated thereby, said casing being so constructed and arranged as to provide circuits for the lubricating oil whereby in the operation of the driving mechanism the oil is caused to pass from one part of the mechanism through other parts and return to its original or starting receptacle.

A further novel feature of the invention relates to an improved form of thread for the centrifugal spindle whereby the latter is permitted to rotate freely with respect to the thread, in one direction, and whereby it is positively engaged by the thread to impart rotation to said spindle when driving power is applied to the thread in another direction. The improved construction of thread is also designed and arranged for the purpose of practically eliminating wear and is constructed to yield to the action of the element in driving connection therewith.

A further novel feature consists in so mounting the driving pinion and constructing the casing in which such pinion is mounted so as to permit of adjustment of the pinion with respect to the spindle to take up wear.

The invention also includes a novel construction of spindle bearing in which means is provided for centering the spindle in the bearing and also preventing lubricants from escaping too freely therefrom.

The invention includes other novel features and details of constructions which will be more fully described in connection with the accompanying drawings and which will be more particularly pointed out and ascertained in and by the appended claims.

In the drawings:—Figure 1 is an exterior side elevation of a centrifugal machine embodying my invention. Fig. 2 is a view partly in elevation, partly in section of my improved driving mechanism. Fig. 3 is an end view, partly in section and partly in elevation, of the driving mechanism. Fig. 4 is a side view partly in elevation and partly in section of the driving mechanism. Fig. 5 is a sectional view on line A—B of Fig. 4. Fig. 6 is a detail plan view of one of the disks used in the bearing of the spindle. Fig. 7 is a top view of one of the parts used in the spindle bearing. Fig. 8 is a plan view of one of the disks. Fig. 9 is a sectional view of a modified form of spindle showing its lower end mounted in a bearing therefor.

Like numerals of reference designate similar parts throughout the different figures of the drawings.

As shown, the driving mechanism includes a spindle 3 driven by a pinion 4, which latter is operated by gears 10 and 15 and a crank 9. A main casing is provided for the spindle 3 and pinion 4 and a second casing for the gears 10 and 15, and said main casing, as shown, consists of an oil containing or base portion 5 and an upper inclosing portion 1. The base portion 5 is provided with a housing 20 for the spindle 3 and the housing 20 has upper and lower bearings for said spindle. The upper bearing 8 comprises a hollow portion in the housing 20 having an opening in its lower wall for the spindle 3. A plurality of disks 25 are loosely seated in the lower part of the bearing 8 and surround the spindle 3 and serve to center the same and also to prevent the oil from escaping too freely from the bearing 8. The oil will surround the disks 25 and enter between the same before it flows downwardly about the spindle 3 and it will therefore be seen that the disks 25 serve as a centering and oil retaining means. Above the disks 25 a tube 7 communicates with a receiver 6 in the casing 1 and is adapted to deliver oil thrown from the pinion 4 through tube 7 into the bearing 8 and upon the disks 25. As shown in Fig. 9 the lower bearing 8′ is provided with a cavity for receiving a plurality of disks 25 which surround the lower end of the spindle 3 and perform practically the same function as the disks 25 in the upper bearings 8. A duct or passage 26 serves to deliver the oil from the lower bearing 8′ to the base or receiving portion 5. It will thus be seen that as the

pinion 4 sweeps through the oil contained in the base 5 and throws portions thereof into the container 6 that the oil will pass into the upper bearing 8 and down the spindle 3 into the lower bearing 8′ and will be therefrom returned to the base 5. This construction, constitutes one complete circuit for the oil.

The base 5 is provided with a horizontal shouldered portion 22 on which the upper part 1 of the casing rests. The upper part 1 is provided with a shoulder 23 and said upper part may be adjusted horizontally by means such as a screw 24. The housing 20 is provided with an overhanging flange embracing the right hand side of the upper part 1 as shown in Figs. 2 and 4, and the three parts hereinbefore described constitute a complete inclosure for the spindle 3 and the pinion 4. The pinion 4 is rotatably mounted in the upper part 1 and by adjusting said upper part 1 the proper mesh engagement between the pinion 4 and spindle 3 may be readily obtained, and furthermore, should the meshing parts wear the resulting extra play can be quickly and readily taken up by adjustment of the upper part 1. The pinion 4 is mounted upon a shaft 4′ which projects through one side of the casing 1 and carries on its projecting end a gear 10. The gear 10 meshes with a gear wheel 15 mounted upon a driving or crank shaft 16 and the latter is provided with a crank 9, hereinbefore referred to.

For the purpose of inclosing the gears 10 and 15 and providing an oil circuit for lubricating such parts from the main casing a second casing is mounted on the main casing. Said second casing comprises an oil retaining or cup portion 14 rigidly mounted upon the upper part 1 and an adjustable portion 2 having an extension 18 fitting in the cup 14 and arranged to be adjustable therein. The upper part 2 may be adjusted by a slot and screw device 2′ and also by an adjusting screw 14′, as shown in Fig. 1. A passage or duct 12 communicates between the cup 14 and the casing 1 and discharges from the cup 14 into the lower or receiving portion 5 of the main casing. The crank shaft 16 is preferably hollow and is provided with apertures or perforations 17 which discharge into the cup 14. The crank shaft 16 has a bearing in the upper portion of the part 1 of the main casing and a funnel 11 permits oil thrown from the pinion 4 to enter the hollow shaft 16 and pass downwardly therethrough into the cup 14. The circuit thus formed insures proper lubrication of the parts arranged in the second casing.

From the foregoing description it will be noted that the second casing is mounted wholly upon the upper part 1 so that when the latter is adjusted all of the driving gearings will be simultaneously moved in unison toward or from the spindle 3 so that the adjustment of the gearing with respect to the spindle 3 will not effect or disturb the adjustment of the several constituent elements of the gearing with respect to each other. In the upper part of the casing 1 a supply inlet 13 is provided for introducing oil.

Next referring to the improved construction of thread for the spindle, and to Figs. 2, 4, and 9, it will be noted that the thread of the spindle is formed by a resilient strip of material 34 spirally wound about the spindle in a manner to engage the teeth of the pinion 4. In the form shown in Fig. 9 the thread 34 is secured at its lower end to the spindle by a screw 34′. In the form shown in Fig. 4 a shoulder 36 is formed on the spindle 3 and faces in a direction opposite the direction of drive of the spindle. On the lower end of the spring thread 34 a shoulder 35 is provided arranged for engagement with the shoulder 36 and facing in the direction of drive of the spindle. It will be readily seen from this construction that when the spindle 3 is driven the shoulder 35 will engage the shoulder 36 so that the thread 34 will be locked non-rotatively on the spindle 3 and rotation will be imparted to the spindle 3 by the pinion 4. If the operator should release the crank and permit the latter to rotate idly or if the operator should hold the crank stationary, then the shoulder 36 would advance freely and the spindle would be permitted to rotate idly under momentum. Furthermore by means of this construction any such starting of the crank 9 would not throw any great strain on the teeth of the pinion 4 as the thread 34 would yield slightly and prevent breaking of the teeth of the pinion 4. By means of this arrangement cast iron pinions can be used and a great saving is effected in the cost of production.

In the form of upper bearing shown in Fig. 4 a sleeve 29, provided with upper and lower bearings 28, is arranged in the hollow bearing and loosely surrounds the upper end of the spindle 3. The inlet 7 discharges preferably, although not necessarily, between said flanges 28. The disks 25, in this construction, are mounted in superposed relation on the upper flanges 28 and surround the upper end of the spindle 3. As the oil rises in the bearings it gains access to the parts by means of suitable grooves and channels 27, 30 and 31 and is permitted to descend about the spindle 3 into the lower bearings.

I claim:—

1. In a centrifugal machine, the combination with a main casing adapted to contain

oil in its lower part, a centrifugal driving spindle mounted in said casing, a main pinion mounted in said casing for operating said spindle and projecting into the oil in the lower part of said casing, a second and substantially closed casing containing oil and communicating with said main casing to convey the oil from one casing to the other, and gearing in said second casing for driving said main pinion.

2. In a centrifugal machine, the combination with a main casing adapted to contain oil in its lower part, a centrifugal driving spindle mounted in said casing, a main pinion mounted in said casing, for operating said spindle and projecting into the oil in said casing, a second casing containing oil and communicating with said main casing, a hollow crank shaft in said second casing opening into said main casing to receive the oil thrown from said pinion and provided with perforations discharging into said second casing, and gearing operated by said crank shaft and disposed in said second casing for driving said pinion.

3. In a device of the class described, the combination with a plurality of casings each containing oil and a separating wall therebetween, and gearings in said casings engaging the oil to circulate the same, the gearing in one casing being operatively connected with the gearing in the other casing, said casings having communications with each other at a plurality of points to form a complete circuit for the oil, substantially as and for the purposes set forth.

4. In a centrifugal machine, the combination with a casing having spindle bearings and adapted to contain oil in its lower portion 5, a centrifugal spindle mounted in said bearings, a hood 1 loosely mounted on said lower portion 5, a pinion mounted in said hood for driving said spindle, and means for adjusting said hood to operatively engage said pinion with said spindle.

5. In a centrifugal machine, the combination with a main casing, gearing in said casing for the machine, a second casing adjustably mounted on said main casing and provided with an extension, an oil containing portion for said second casing mounted on said main casing and connected with said extension, and gearing in said second casing and oil containing portion for operating the gearing in said main casing.

6. In a device of the class described, the combination with a plurality of casings having oil containing portions, a wall separating said casings, gearing in said casings engaging the oil in said portions to circulate the oil through said casings, the gearing in one casing being operatively connected with the gearing in the other casing, said casings having communication with each other at a plurality of vertically spaced points to form a complete circuit for the oil, substantially as and for the purposes set forth.

In testimony whereof I affix my signature in presence of two witnesses.

ANDERS GUSTAF GUNNAR SALENIUS.

Witnesses:
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ANNA SÖDERSTRÖM.