Feb. 19, 1935. J. B. WALKER 1,991,713

LUBRICANT TESTING AND DEMONSTRATING DEVICE

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Fig. 1.

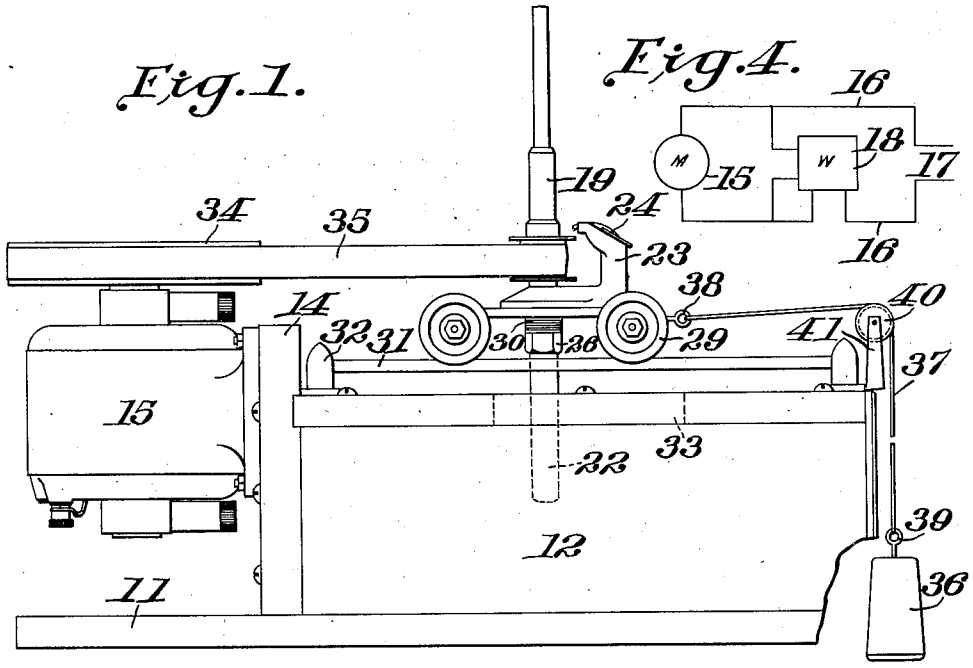


Fig. 4.

Fig. 2.

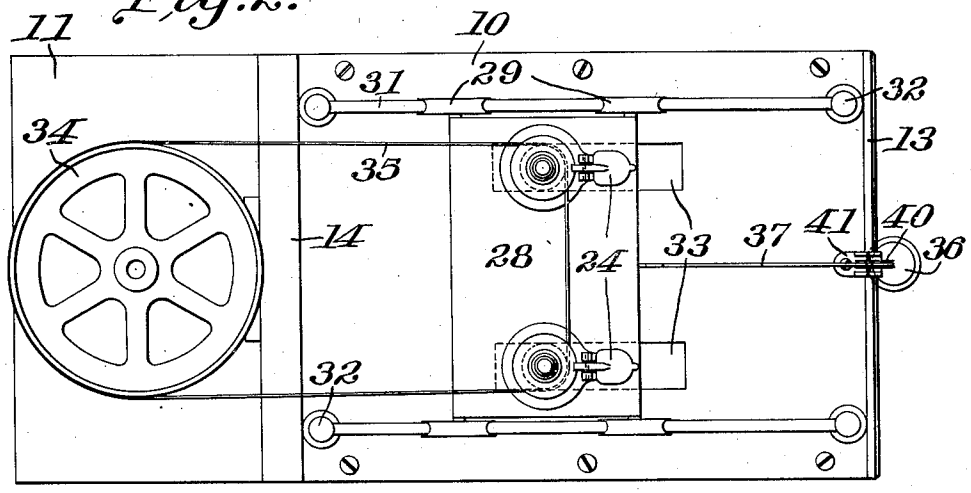
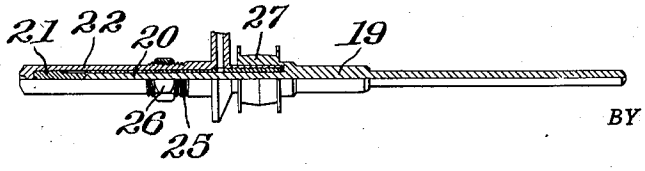


Fig. 3.



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LUBRICANT TESTING AND DEMONSTRATING DEVICE

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4 Claims. (Cl. 73—51)

This invention relates to testing and demonstrating apparatus, more particularly to apparatus for testing or comparing liquids such as lubricants and for demonstrating the lubricating qualities of such liquids, when used, for instance, as lubricants for certain parts of textile machinery.

The principal object of the invention is the provision of a device for testing and comparing lubricants which will accurately indicate differences in their lubricating qualities while the lubricants are being used in the same machinery and under substantially the same conditions which would be present during normal operation of that machinery.

A further object of the invention is the provision of a portable testing and demonstrating machine which will be compact, readily transportable, and adapted to be quickly set up at any point such as on a desk or table of an office, so that the tests or comparisons of the lubricants can be made conveniently and quickly.

The device is especially applicable for the testing and comparing of oils used to lubricate the spindles of textile machines. If a lubricating oil were to be tested directly in the textile machine it would be necessary for the machine to be operated for some considerable time and by so doing several factors which might easily produce errors would present themselves, for instance temperature and humidity variations and differences in the number of bobbins being spun. Furthermore, the making of such a test directly on the machine would require a considerable length of time to remove the old oil, clean the spindles and replace with a different oil.

In carrying out the invention a carrying case is provided, this case serving as a housing and support for one or more spindles and their bearing sockets or bases as taken directly from the textile machine. An electric motor is provided to drive the spindles at substantially the same speed at which they would be driven when used in spinning, and the spindle bases or sockets are mounted on an adjustable carriage so that the belt connecting the spindles with the motor will be under the same tension as if in actual service. A wattmeter is connected in the motor circuit and serves to indicate the power used in driving the spindles. By placing first one and then another lubricant in the spindle bases and noting the power consumption as indicated by the wattmeter, an accurate comparison of the resistance and lubricating qualities of the oils can be made.

For a better understanding of the invention reference may be had to the accompanying drawing wherein Fig. 1 is a side elevation of the device with the cover removed and the spindles in place; Fig. 2 is a plan view; Fig. 3 a quarter sectional longitudinal view of a spindle with its bearing and socket, while Fig. 4 is a diagram of the electrical connections.

Referring to the drawing, a case or housing 10 is provided, this housing being preferably formed of a base 11 and a box-like compartment 12. The compartment 12 is provided with a slidable drawer the front of which is shown at 13 and which may be used as a carrying case for instruments or small tools and the wire or cord used to connect the device with a source of electrical supply. At the rear of the drawer compartment 12 is an upright member 14 which serves as a support for an electric motor 15. The motor 15 is provided with suitable cord connections shown diagrammatically at 16 in Fig. 4, this cord serving to connect the motor to a suitable source of electrical supply 17. A wattmeter 18 is connected in the motor circuit and serves to indicate the amount of power used by the motor when driving the rotatable elements or spindles, as will be explained more fully hereinafter.

While various parts of a machine might be used in testing or comparing the lubricants to be considered, I have illustrated spindles 19 such as are used in large quantities in the spinning machines used in the textile industry. As will be observed with reference to Fig. 3 the spindle 19 is provided with a depending portion 20 mounted in a bearing 21 which, in turn, is supported by a base or socket 22. The socket member 22 is provided with a hollow extension 23 having a hinged cap or cover 24 for excluding dust or foreign substances from the interior thereof. The extension 23 serves as a filling nozzle through which oil may be placed in the bearing socket 22 to lubricate the spindle bearing 21. The exterior of the bearing socket 22 is provided with threads 25 and a suitable nut 26 which is normally used in securing the socket in position in the spinning machine. The spindle 19 is provided with a pulley 27 through which rotary motion is transmitted to the spindle in normal operation. The spindle 19 with its bearing 21 and bearing socket 22 does not form a part of my invention and has been illustrated and described in detail only so that its connection with the remainder of the apparatus will be more clearly understood.

In accordance with my invention I have pro-

vided a base member or carriage 28 which may be formed of a rectangular piece of sheet metal and at the corners of which are affixed bearings for a plurality of pulley wheels 29. The carriage 28 is provided with a pair of openings through which two of the sockets 22 are placed and secured by means of the nuts 26 and suitable washers 30 as is more clearly shown in Fig. 1. A pair of rods 31 are mounted on the top of the housing compartment 12 between suitable supports 32 and these rods serve as a track for the pulley wheels 29 and on which the carriage 28 may move in a horizontal direction. A pair of slotted openings 33 are formed in the upper wall of the compartment 12 and the lower portions of the sockets 22 extend downwardly through these slots in a manner such that the carriage 28 may move freely toward or away from the motor 15. The motor 15 is provided with a pulley 34, while a driving belt 35 serves to transmit motion from the motor to the pulleys 27 of the spindles 19.

As has been explained hereinbefore, it is desirable that the spindles 19 be driven at substantially the same speed at which they would be driven in actual operation in a spinning machine and that the other conditions of actual operation be approximated as closely as possible. For these reasons, the belt or tape 35 is of a size and weight similar to the belt used to drive the spindles in the spinning machine and, in order to maintain the same tension in the belt that would be present in actual operation, I have provided tensioning means comprising a weight 36 adapted to be attached to the carriage 28 by means of a cord 37 and suitable screw eyes 38 and 39. The cord 37 passes over a pulley 40 supported from the upper surface of the compartment 12 by means of a bracket 41. It is obvious that the weight 36 will tend to pull the carriage toward the right as in Fig. 1 and will thus maintain a predetermined tension in the belt 35. The track rods 31 and the cooperating pulley wheels 29 serve to support the carriage 28 in a horizontal position and also to reduce the friction to a minimum so that in case the belt 35 should stretch, the weight 36 will pull the carriage to the right and maintain the belt tension constant. Since the rods 31 serve only as a track for the carriage 28, they may be replaced by any other suitable supports such as a pair of angle irons.

A cover, not shown, is preferably provided and this cover will be of a size and shape such that it may be placed over the housing 10 and attached to the base 11.

When transporting the apparatus from place to place the weight 36 is, of course, disconnected and the spindles 19 with their sockets 22 will preferably be removed from the base member 28 of the carriage.

In setting up the apparatus for a demonstration the cover is removed from the device and the spindles 19 and sockets 22 are secured to the carriage 28 by means of the nuts 26, and the weight 36 and cord 37 are attached to the screw eye 38. The belt 35 is then passed around the pulleys 34 and 27 and the motor connected to a convenient source of electrical supply. The wattmeter 18 is connected in the motor circuit as shown on Fig. 4. A lubricating oil may then be placed in the sockets 22 and the motor 15 may be operated to rotate the spindle 19 in its bearings. The wattmeter 18 will indicate the power used by the motor in rotating the spindles and after a notation of the wattmeter reading has been made the spindles should be removed from the sockets 22 and the interior of the sockets 22 and bearings 21 should be thoroughly cleaned. The spindles and bearings may then be replaced and a second or different lubricating oil may be placed in the sockets and the test repeated. The wattmeter will, of course, show the power used by the motor in driving the spindles 19 while the latter are lubricated by means of the second lubricant and a comparison of the two oils can thus be made by merely noting the difference in power consumption as evidenced by the wattmeter readings.

It is obvious that my apparatus will serve a useful purpose in demonstrating, for instance to an executive or purchasing agent, the advantages of a particular lubricating oil. The device may be operated by first using the same type of lubricant which has been used in the factory or plant in which the demonstration is to be made after which a second or better lubricant may be substituted and the test repeated. The wattmeter will show a lower power consumption when the better lubricant is being used, and it will thus be shown clearly to the executive for which the demonstration is being made that if the second lubricant were used in his plant the total power consumption would be lower and the plant could be operated more efficiently and at a lower cost. If it is desired, the person for whom the demonstration is being made may furnish a pair of spindles with their bearings and sockets as taken directly from one of his own machines and these bearings can be placed in the carriage 28 and test conducted as described hereinbefore. This will perhaps impress upon the observer even more clearly the fact that the second lubricant should be used in the machines in his mill.

The apparatus can also be used in the laboratory for comparing the qualities of several different lubricating oils. The wattmeter reading noted when using one oil may be taken as a standard and the readings taken when using the other oils may be compared to this first reading to show the relative qualities of the oils tested.

There are many other uses to which the device may be put, among them being the determination of the amount of increase in power necessary for a predetermined increase in spindle speed, also the difference in power consumption when using bobbins of different sizes, and the amount and effect of windage at high speeds. A comparsion can also be made between the relative advantages or disadvantages of sleeve and ball bearings when using the same or different lubricants.

Obviously many modifications and variations of the invention, as heretofore set forth, may be made without departing from the spirit and scope thereof. and therefore only such limitations should be imposed as are indicated in the appended claims.

I claim:

1. In a portable apparatus for comparing and testing lubricants, a housing, a rotatable element, a bearing for said element, means for supplying a lubricant to said bearing, an electric motor for driving said element, a drive belt connecting said motor and said element so that said element will be rotated thereby, a wattmeter connected in the circuit of said motor to indicate the power necessary to drive said element, and means for placing and maintaining a predetermined tension on said belt, said last named means comprising a carriage slidably mounted on said housing, said bearing being supported on said carriage, and means for

biasing said carriage in one direction so as to maintain a predetermined tension on said belt.

2. In a portable demonstrating device, a housing, a carriage slidably mounted on said housing, a lubricating bearing supported by said carriage, a member rotatably mounted in said bearing, an electric motor supported by said housing, a drive belt connection between said motor and said element, means for biasing said carriage in one direction so as to maintain a predetermined tension in said belt, and a meter connected in circuit with said motor so as to indicate the amount of power consumed by said motor in rotating said element.

3. In a portable demonstrating device, a housing, a rotatable member, an electric motor secured to said housing, a drive belt connecting said motor with said member, a lubricating bearing for said member, means for slidably supporting said bearing on said housing so as to maintain a tension in said drive belt, said means comprising a track secured to said housing and a carriage mounted on said track, said bearing being supported by said carriage, and means for biasing said carriage in a direction away from said motor.

4. In a device for comparing and testing lubricants, a housing, a rotatable member, an electric motor secured to said housing, a drive belt connecting said motor with said member, a lubricating bearing for said member, means for slidably supporting said bearing on said housing so as to maintain a tension in said drive belt, said means comprising a track secured to said housing and a carriage mounted on said track, said bearing being supported by said carriage, means for biasing said carriage in a direction away from said motor, and a wattmeter connected in circuit with said electric motor so as to indicate the power used by said motor in driving said rotatable member.

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