No. 760,833. PATENTED MAY 24, 1904.

F. E. WOLF.

SPEED INDICATOR.

APPLICATION FILED SEPT. 11, 1903.

NO MODEL.

Fig. 1.

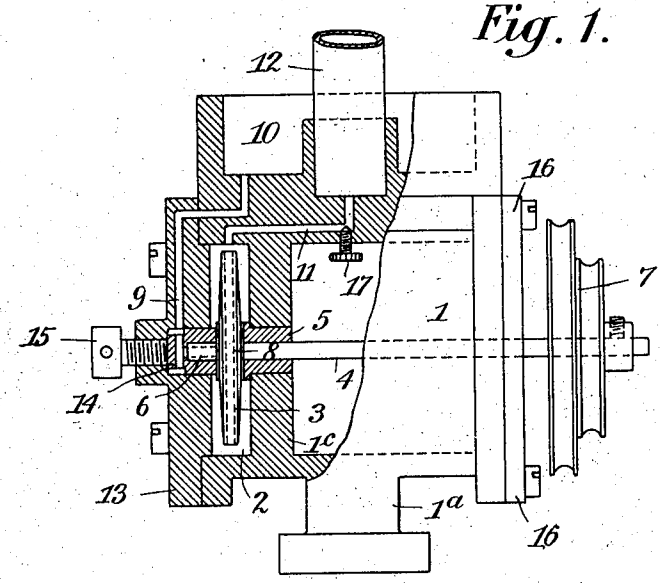
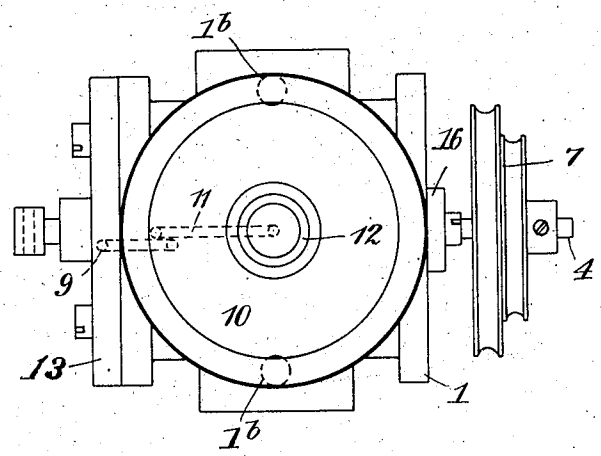


Fig. 2.



Witnesses
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No. 760,833. Patented May 24, 1904.

UNITED STATES PATENT OFFICE.

FRANZ EMIL WOLF, OF BERLIN, GERMANY, ASSIGNOR TO DEUTSCHE INDUSTRIE-WERKE AKT.-GES., OF BERLIN, GERMANY.

SPEED-INDICATOR.

SPECIFICATION forming part of Letters Patent No. 760,833, dated May 24, 1904.

Application filed September 11, 1903. Serial No. 172,718. (No model.)

To all whom it may concern:

Be it known that I, FRANZ EMIL WOLF, a citizen of the Empire of Germany, residing at Berlin, in the Empire of Germany, have invented a new and useful Speed-Indicator, of which the following is a specification.

There are already known speed-indicators of a certain description in which a star-like wheel is mounted to turn within a closed cylinder, which latter communicates on the one part with a liquid-supply pipe and on the other part with an ascending tube, so that on setting the star-like wheel into rotation a centrifugal force will be produced in the liquid within the cylinder which is to cause the liquid to rise in the ascending tube. These known speed-indicators present, however, several disadvantages. The faces of the several blades of the star-like wheel pass each along the port of the ascending tube once on every revolution, so that this port is temporarily partly or wholly closed and the liquid in the ascending tube is withdrawn from the influence of the centrifugal force. In consequence of this the level of the liquid in the ascending tube will be liable to constant variations, so that it is impossible to read off the exact speed. The faces and the lateral edges of the star-like wheel are necessarily so arranged as to be close to the internal walls of the cylinder in order to produce the effect aimed at. The constant contact between the said faces and edges of the wheel and the internal walls will produce a considerable friction, so that the tightness will be destroyed in a very short time by the respective surfaces wearing off. Then the speed-indicator will fail to work properly and its exactitude will be lost.

My invention relates to improvements in speed-indicators of this kind, whereby the said defects are avoided; and the objects of my improvement are, first, to provide a round chamber of any cross-section which is connected with a liquid-reservoir, and thereby constantly filled with liquid; second, to provide within this chamber a round disk of any cross-section and having two or several closed channels reaching from its hollow axle to its periphery, so that on putting this disk into rotation a centrifugal force will be produced in the liquid filling its channels, and thereby a pressure exerted upon the liquid in the chamber and in the ascending tube for causing it to rise in the latter, and, third, to leave an annular space between the disk and the chamber, so that the port leading to the ascending tube is never partly or wholly closed, and all the friction between the disk and the internal walls of the chamber is avoided. I attain these objects by the speed-indicator illustrated in a mode of execution in the accompanying drawings, in which—

Figure 1 is partly a vertical longitudinal sectional view and partly an elevation of the speed-indicator, the ascending tube being partly broken away; and Fig. 2 is a plan view of the same.

Similar characters of reference refer to similar parts in the two views.

1 denotes a casing or cylinder within which a cylindrical chamber 2 is formed. The casing 1 is provided with a suitable foot-plate 1^a and can be secured on any convenient supporting-plate by means of bolts passing through the holes 1^b 1^b. On the right end the casing 1 may be assumed to be open and provided with a vertical cross-piece 16, in which a horizontal driving-shaft 4 is mounted to turn. This shaft carries two belt or rope pulleys 7 of different diameters for driving it. The chamber 2 is closed by a cover 13, having a longitudinally-adjustable bearing 14 for the shaft 4. In the back 1^c of the chamber 2 also a bearing 5 is provided for the shaft 4. This bearing 5 bears with its shoulder against the back 1^c, and between it and the other bearing 14 a flat round disk 3 is fastened on the shaft 4 to revolve within the chamber 2. The bearing 14 can be adjusted close to the disk 3 by means of an adjusting-screw 15. The disk 3 is provided with two opposed radial perforations 8, reaching to the periphery, and the left end of the shaft 4 is longitudinally bored until the central plane of the disk 3 and here bored across, so that the longitudinal perforation 6 communicates with the two radial perforations 8.

On the top the casing 1 is formed to a liquid-

reservoir 10, which is put into communication with the chamber 2 by means of a channel 9 in the casing 1 and in the cover 13; also, by means of an annular space around the smaller end of the bearing 14 and by suitable perforations in the latter; further, by the perforations 6 and 8 in shaft 4 and disk 3. In the central part of the liquid-reservoir 10 an ascending tube 12 of a convenient height is secured, which is put into communication with the chamber 2 by means of a channel 11. It will now be evident that on filling the reservoir 10 with any liquid—for instance, quicksilver—not only the chamber 2 will be filled with this liquid, but also the level of the liquid in the ascending tube 12 will be the same as in the reservoir as long as the apparatus is at rest. The speed is determined by the height of the liquid in the tube, and this height may be determined by marks on the tube or by placing a scale alongside the tube in a well-known manner.

A belt or cord is placed around either of the two lace-pulleys 7 and a suitable pulley on the respective shaft, the speed of which is to be ascertained. When this shaft is rotated, it will also drive the shaft 4 with the disk 3, when the centrifugal force of the liquid in the perforations 8 of the disk 3 will exert a certain pressure on the liquid within the chamber 2 and cause it to flow through the channel 11 into the ascending tube 12 and rise in the latter, while a part of the liquid in the reservoir 10 will be drawn in and passed through the disk 3. When the level of the liquid in the ascending tube 12 ceases to rise, its height above the level in the reservoir 10 being in a certain well-known proportion to the speed may be indicated in any one of many ways—as, for instance, by the use of a scale. (Not, however, herein shown.)

For varying the sensitiveness of the speed-indicator an adjusting-screw 17 is preferably provided, by means of which the area of the channel 11 can be regulated.

From the above description it will be evident that in this speed-indicator the orifice in the chamber 2 leading to the channel 11 can never be closed by the disk 3 or otherwise and, further, that there can be no friction between the disk 3 and the internal walls of the casing 1. For these reasons this gage will ever work properly, and its exactitude cannot be impaired, but will remain unaltered.

The speed-indicator described so far can be varied in many respects without deviating from the spirit of my invention. The driving-pulleys 7 can be replaced by other driving means. The bearing 5 may be replaced by a stuffing-box. The disk 3 may have more than two opposed radial perforations, and these perforations may also be curved, or they may be replaced by channels of any shape. The disk 3 itself may have any other cross-section, the only essential point being that it be round and have no ladles open on the sides. The adjusting-screw 17 can be placed horizontally or otherwise.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In a speed-indicator, the combination with a liquid-reservoir, of a chamber, a disk mounted to revolve freely within said chamber and provided with a plurality of channels reaching to the periphery, a channel for conducting the liquid from said liquid-reservoir to the channels in said disk, means for driving said disk, an ascending tube the lower end of which is beneath the level in said liquid-reservoir, and a channel for conducting the liquid from said chamber to said ascending tube.

2. In a speed-indicator, the combination with a liquid-reservoir, of a chamber beneath said liquid-reservoir, a shaft passing through said chamber, a round disk mounted on said shaft to revolve freely within said chamber and provided with a plurality of channels reaching to the periphery, a channel for conducting the liquid from said liquid-reservoir to said closed channels in said round disk, means for driving said shaft, an ascending tube the lower end of which is beneath the level in said liquid-reservoir, a second channel for conducting the liquid from said chamber to said ascending tube, and a device for regulating the area of said second channel.

3. In a speed-indicator, the combination with a casing having a chamber and formed on the top as a liquid-reservoir, of an ascending tube secured in said casing and projecting above said liquid-reservoir, a cover for closing said chamber, a shaft mounted in said casing to revolve and passing through said chamber into said cover and provided on this part with a longitudinal bore and within said chamber with a cross-perforation, means for driving said shaft, a round disk fastened on said shaft to revolve freely within said chamber and provided with a plurality of radial channels communicating with said longitudinal bore and said cross-perforation of said shaft and reaching to the periphery, a channel through said cover and communicating with said liquid-reservoir and said longitudinal bore of said shaft, a second channel communicating with said chamber and said ascending tube, a device for regulating the area of said second channel, and means for tightening said shaft in said chamber.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

FRANZ EMIL WOLF.

Witnesses:
WOLDEMAR HAUPT,
HENRY HASPER.