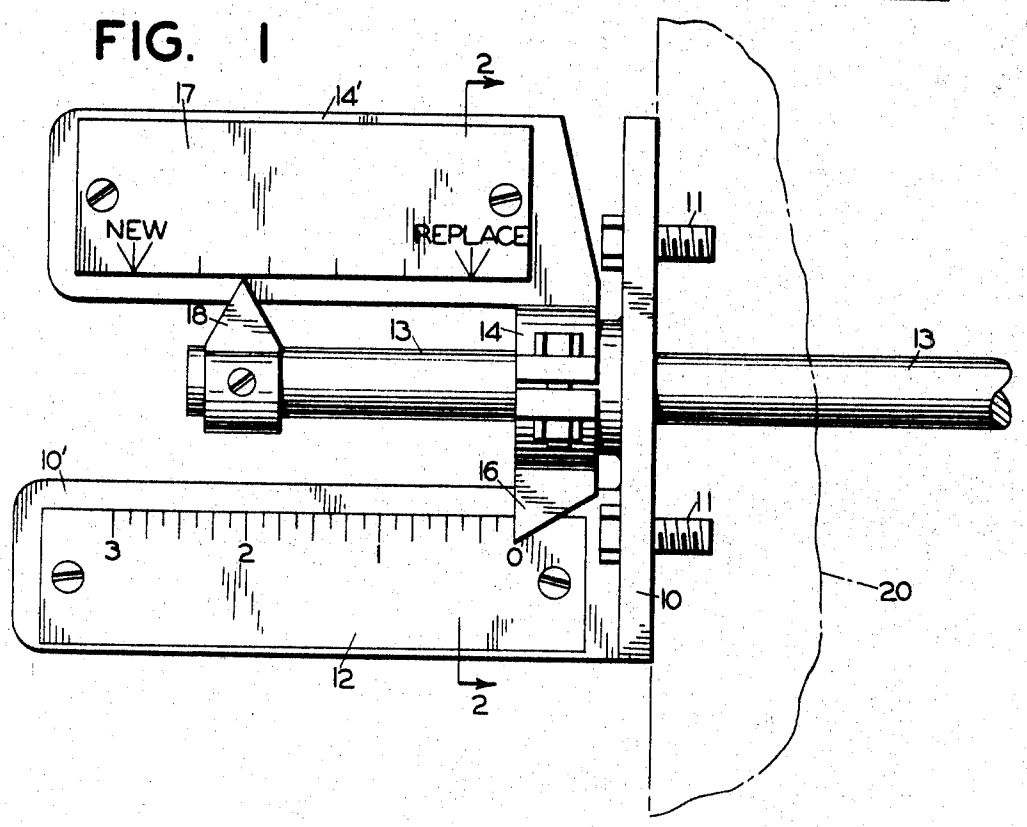
April 15, 1969 R. B. KIRKWOOD 3,438,351

MEANS FOR SIMULTANEOUSLY INDICATING THE SPACING BETWEEN TWO OPPOSED ATTRITIONING ELEMENTS AND THEIR CONDITION OF WEAR

Filed Sept. 2, 1966

Sheet 1 of 2

FIG. 1



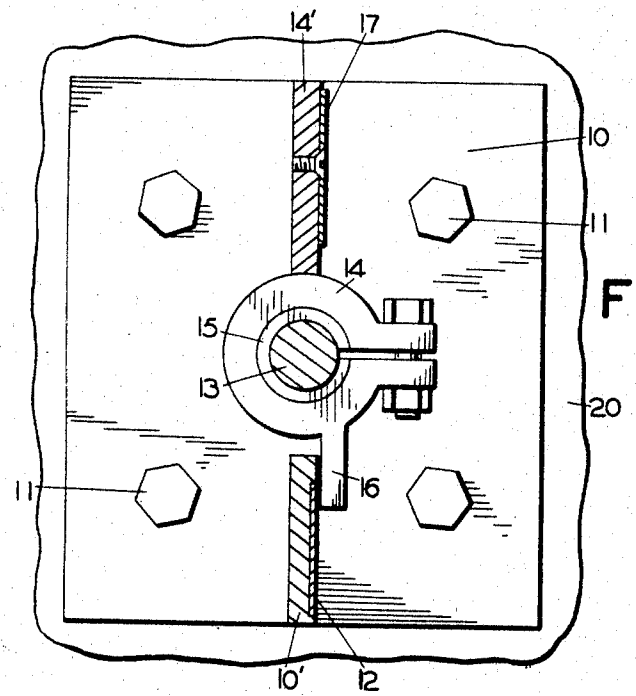




FIG. 2

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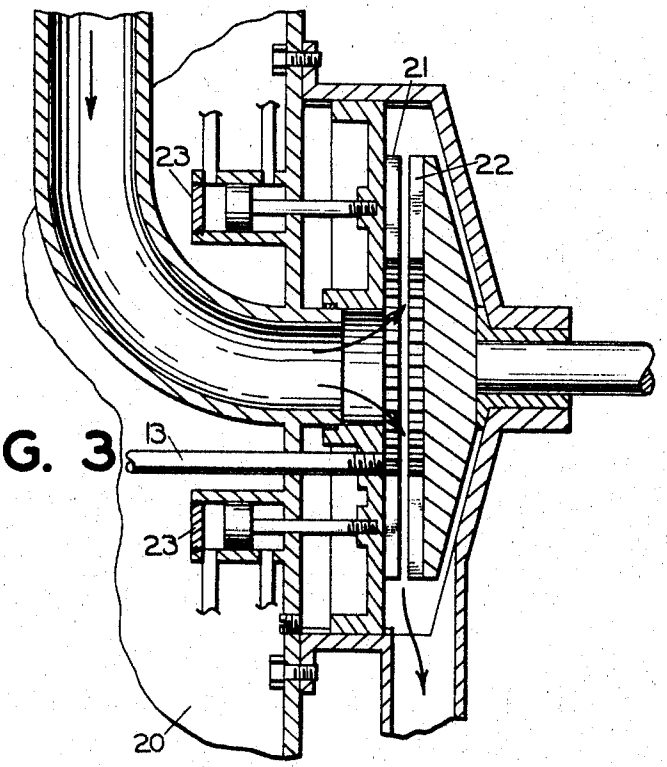
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Filed Sept. 2, 1966 Sheet 2 of 2

FIG. 3




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3,438,351

# MEANS FOR SIMULTANEOUSLY INDICATING THE SPACING BETWEEN TWO OPPOSED ATTRITIONING ELEMENTS AND THEIR CONDITION OF WEAR

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Int. Cl. G09f 9/00
U.S. Cl. 116—124 3 Claims

## ABSTRACT OF THE DISCLOSURE

A rod attached to the axially-adjustable element in a pair of axially-aligned attritioning elements and sliding through a stationary member; a slidable bracket on the rod engaging the member when the axially-adjustable element is brought into actual contact with the opposing element at each setting; a pointer on the bracket moving over a stationary scale to indicate the actual spacing between the elements when separated; a second scale carried by the slidable bracket; and a pointer fixed on the rod indicating on the second scale the amount of wear of the elements at each setting.

This invention relates to grinding or attritioning devices in which the attritioning action is performed by a pair of elements presenting opposed attritioning surfaces, and in which one of the elements is rotated at a different speed with respect to the other, particularly where one element alone is rotated while the other remains stationary, and also in which the spacing or gap between the two attritioning elements is adjustable.

The invention relates especially to such attritioning devices as pulp treating machines having a pair of opposed axially aligned attritioning elements, one of which, commonly referred to as a rotor, is rotated, and the other of which, commonly referred to as the stator, is not rotated, and with one of these two elements being adjustable in an axial direction for adjusting the spacing between them while the other remains in fixed axial position.

In such pulp treating machines, as is well known, very careful adjustment and control of the spacing between the opposed attritioning surfaces of the two elements is most essential for efficient performance. However, since wear of the attritioning surfaces gradually occurs with use, such wear should also be taken into consideration with the adjustment of the spacing or gap. Furthermore, it is desirable to know at any time the amount of wear which has taken place on the attritioning surfaces.

The object of the present invention is to provide an improved indicating assembly for such attritioning devices which will show not only the spacing between the opposed attritioning elements or surfaces, but also the extent of wear which has taken place on them.

A related object of the invention is to provide improved means for indicating the gap or spacing between opposed attritioning surfaces in which compensation for wear on the attritioning surfaces will automatically be made each time the means indicating the gap between them is reset, with the result that the gap or spacing indicated will be the actual and true spacing.

A further object is to provide practical and efficient means for indicating both the correct or actual spacing between two such elements and the amount of wear on their opposed surfaces, which means will be simple and relatively inexpensive and will present no maintenance problem.



The manner in which the improved double purpose indicator assembly of the present invention is constructed and the manner in which it functions will be readily apparent from the following brief description with reference to the accompanying drawing.

In the drawing:

FIG. 1 is a front elevation of the indicating assembly by itself; FIG. 2 is a section on line 2—2 of FIG. 1; and FIG. 3 is a fragmentary sectional elevation drawn to a smaller scale, of a well-known type of pulp-refining machine on which the indicating assembly may be used. In FIG. 1 the reference character **10** indicates a stationary member or bracket which is firmly secured, for example by bolts **11** or any other suitable means, to the casing for the attritioning device or pulp refining machine, a portion of which is indicated at **20** in broken line. The stationary member or bracket **10** has an extending portion **10'** on which a horizontal scale **12** is mounted.

An indicator rod **13** has one end (thus the right hand end as viewed in the drawing) connected with the axially-movable element of the attritioning device. For example, and for the purpose of this description, it may be assumed that the rod **13** is fastened to the axially-adjustable "stator" **21** of the pulp-refining machine of FIG. 3. In this machine the attritioning element **22**, which constitutes the "rotor," is not axially adjustable. The "stator" **21** is not rotatable but is axially adjustable through the medium of a plurality of hydraulic cylinders indicated at **23**. However, in the event the "rotor" of the pulp refiner should be the axially adjustable element due to the fact that the rotor shaft is mounted in a bearing housing which in turn is movable so as to enable the rotor shaft and rotor to be moved in an axial direction, then the rod **13** would be attached to such bearing housing. The rod **13** is slidable in an aperture provided in the stationary member or bracket **10** (FIGS. 1 and 2).

A separate indicator bracket **14** is mounted on the rod **13** by means of a sliding friction bushing **15** (FIG. 2). This bracket **14** has a pointer **16** which moves over the scale **12** on the extending portion **10'** of the stationary member **10**. The pointer **16** is so arranged that when the indicator bracket **14** is in engagement with the stationary member **10**, as shown in the drawing, the pointer **16** will indicate the zero mark on the scale **12**, and the bracket **14** is so set on the rod **13** at the time of installation that when the two opposed attritioning elements are in actual contact (for example, when the axially-movable "stator" **21** (FIG. 3) has been moved into contact with the "rotor" **22**) the bracket **14** will be moved by the rod **13** into contact with the stationary member **10** and the pointer **16** will be positioned at the zero mark on the scale **12** as shown in the drawing, thus indicating that there is no spacing between the opposed attritioning elements. Then subsequently, as the axially-movable element **21** is moved away from contact with the opposing element **22**, the pointer **16** will indicate on the scale **12** the gap or spacing between the two elements.

With the development of wear on the opposed surfaces of the two attritioning elements, the rod **13** will be moved slightly further (to the right as viewed in FIG. 1) each time the device is reset by the bringing of the axially-adjustable element into contact with the opposing element. However, the fact that the indicator bracket **14** is mounted on the rod **13** by the frictionally slidable bushing **15**, enables the rod to be pulled further (to the right) while the bracket **14** is held against the stationary member **10** when the wear on the attritioning surfaces makes this possible. Consequently, when the axially-movable element is subsequently moved away from the opposed attritioning element after each re-setting of the device, the pointer **16** will always indicate on the scale **12** the exact

spacing between the attritioning elements regardless of the wear which may have taken place on the opposed surfaces.

The slidable cooperating indicator bracket **14** has an extending portion **14'** on which is mounted a wear-indicating scale **17**. A second pointer **18** is rigidly mounted on the rod **13** to move over the scale **17** whenever the rod **13** is moved relatively with respect to the indicator bracket **14**. Thus, as wear on the opposed attritioning surfaces causes the rod **13** to be moved further (to the right) with respect to the stationary member **10**, and also with respect to the indicator bracket **14**, each time the device is reset by the bringing of the two opposed elements into contact with each other, the pointer **18** would indicate on the scale **17** the extent of wear which has occurred. At the same time, when the axially-movable element is again moved away from the opposing element for the operation of the attritioning device or pulp refining machine, the position of the pointer **18** with respect to the scale **17** will not change although the pointer **16** moves with respect to the stationary scale **12** and indicates the actual spacing or gap between the opposed attritioning surfaces.

Consequently, with each resetting of the indicating assembly, by the bringing of the axially-movable attritioning element into contact with the opposing attritioning element in the attritioning device, the adjusting of the two indicators, the one for the wear on the surfaces and the one for the spacing between the surfaces, takes place automatically.

I claim:

**1.** In an attritioning device having a pair of opposed axially-aligned attritioning elements, one of which is rotated relatively with respect to the other and one of which is movable in an axial direction for adjusting the gap between the elements, an indicator rod connected with and moving in unison in the same axial direction with the axially-movable element, a stationary member, a bearing for said rod in said stationary member, said rod slidable in said bearing, an indicator bracket mounted on said rod beyond said bearing, a friction bushing slidably holding said bracket on said rod, said bracket so positioned on said rod that said bracket will be brought into engagement with said stationary member whenever said axially-movable attritioning element is moved into actual contact with the other opposed attritioning element, cooperating indicating means on said stationary member and on said rod for indicating the gap between said opposed elements, and separate cooperating indicating means on said rod and on said bracket for automatically indicating the extent to which said rod is moved relatively with respect to said bracket, and thereby the extent of wear on said opposed attritioning elements, when the bringing of said elements into face to face contact with each other causes said rod to move in said bracket while said bracket is held by said stationary member.



**2.** In a pulp refining machine having a pair of axially-aligned attritioning elements comprising a stator and a rotor and means for moving the stator in an axial direction for adjusting the spacing between stator and rotor, an indicator rod attached to and in axial alignment with the stator, a stationary member, a bearing for said rod in said stationary member, said rod slidable in said bearing, an indicator bracket mounted on said rod beyond said bearing, a friction bushing slidably holding said bracket on said rod, said bracket so positioned on said rod that said bracket will be brought into engagement with said stationary member whenever said stator is moved into actual contact with the rotor, cooperating indicating means on said stationary member and on said rod for indicating the spacing between said stator and said rotor, and separate cooperating indicating means on said rod and on said bracket for automatically indicating the extent to which said rod is moved with respect to said bracket, and thereby the extent of wear on the opposed faces of said stator and rotor, when the moving of said stator into contact with said rotor causes said rod to move in said bracket while said bracket is held by said stationary member.

**3.** The combination set forth in claim **2** with said first mentioned cooperating indicating means comprising an indicator scale on said stationary member and a pointer on said bracket moving over said scale, and with said second mentioned cooperating means comprising an indicator scale on said bracket and a pointer element on said rod arranged to move over said latter mentioned indicating scale.


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