

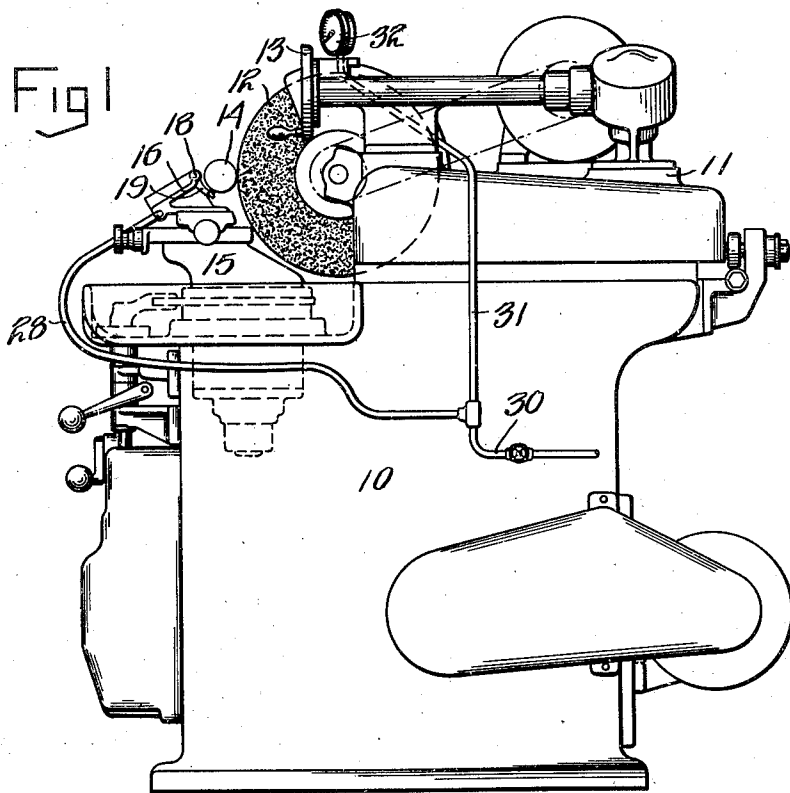
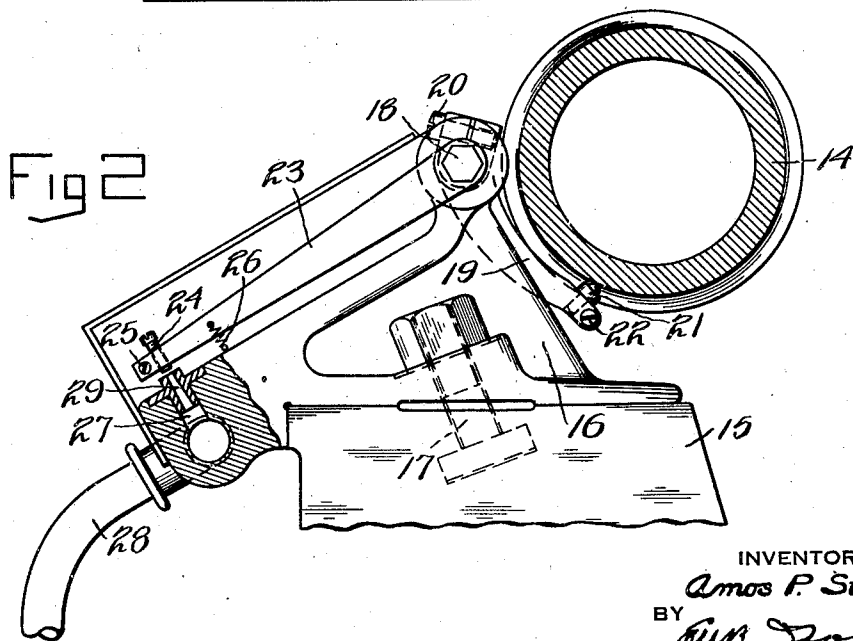
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SIZING DEVICE

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SIZING DEVICE

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3 Claims. (Cl. 33—172)

This invention relates to sizing devices and its object is to provide a device which is extremely sensitive to variations in the size of the work with means for indicating such variations.

A further object is to provide a sizing device having a sizing element and an indicator which may be positioned some distance from the work being sized.

Referring to the accompanying drawing, which is made a part hereof and on which similar reference characters indicate similar parts,

Figure 1 is an end elevation of a grinding machine showing my device applied thereto, and

Figure 2, an end elevation of a grinding machine showing the details of the device and showing it applied to the sizing of a ball race.

For purposes of illustration the invention will be shown and described as applied to a grinding machine and the grinding machine selected for illustrative purposes is one for grinding internal races of ball bearings. The invention, however, is in no sense limited to grinding ball races nor is it necessarily limited to grinding machines for obviously it could be adapted to other machines with equal appropriateness.

In the drawing numeral 10 refers to the bed of a grinding machine having a wheel base 11 supporting a grinding wheel 12. Conventional mechanism 13 is provided for adjusting the wheel base toward and from a work piece 14 here shown as the inside race for ball bearings. The work is mounted in any suitable way upon an oscillating work support 15 so that the groove in the work may be rotated about the periphery of the grinding wheel to properly grind the groove in the periphery of the work. Means for gauging the size of the work consists of a bracket 16 secured upon the oscillating work support 15 by means of bolts 17 or other securing means. In the upper side of this bracket is a bearing for a shaft 18 upon which shaft is mounted an arm 19. The arm is split at its upper end to fit around the shaft 18 and is secured to the shaft by means of a tightening screw 20. A rough adjustment of the arm 19 about the shaft 18 is provided by the screw 20. The lower end of the arm 19 carries a contact point 21 which is secured in position by means of a screw 22. Secured to the shaft 18 and preferably on the side of the bracket 16 opposite from the arm 19 is a lever or arm 23. This lever is rigidly secured to the shaft 18. The outer end of the arm 23 carries an adjustable screw 24 which is locked in adjusted position by means of a screw 25 which passes through the end of the arm at right

angles to the screw 24. A tension spring 26 is attached to the bracket 16 and to the arm 23 and tends to hold the contact element 21 in engagement with the work. Within the bracket 16 is a chamber 27 with which communicates a fluid pressure line 28. A restricted nozzle element 29 is positioned in communication with the chamber 27. Fluid under pressure is permitted to issue from the line 28 through the chamber 27 and the restricted opening in the nozzle 29 escaping between the outer end of the nozzle and the inner end of the adjustable screw 24 carried by the arm 23. The restricted opening in the nozzle 29 tapers toward the outlet. By reason of this structure the stream of air issuing from the nozzle is held together for a greater distance from the end of the nozzle than if the walls of the restriction were parallel or flared. The fluid conduit 28 is preferably flexible to permit the necessary oscillation of the work support 15. This conduit is attached to a fluid line 30 in which fluid is confined under a relatively constant pressure. In communication with the fluid line 28 is another fluid conduit 31 which is attached to a pressure gauge 32. The gauge 32 may be mounted upon the wheel base so as to be in convenient view of an operator of a machine or it may be positioned in any other suitable or convenient place as there is no connection between it and any operating part of the wheel base.

In operation with fluid under a given pressure in the line 30 and with the element 24 at a predetermined position from the nozzle 29, fluid may escape through the line 28 at a constant rate. This will affect the pressure in the line 28 and in the line 31 which pressure will register on the gauge 32. As the excess stock is removed from the work the contact element 21 swings counterclockwise about its pivot point 18 bringing screw 24 nearer to the nozzle 29 and restricting the flow of fluid through the nozzle. As the work decreases in size the pressure in lines 28 and 31 builds up and this increased pressure may be indicated on the gauge 32. Before starting a grinding operation the gauge will preferably have been set so that when the hand or marker is at a predetermined point it will indicate that the work is reduced to the correct size. From the foregoing description it will be apparent that I have provided a very sensitive device which will indicate when work has been ground to the desired size.

It will be obvious to those skilled in the art that various changes may be made in my device without departing from the spirit of the inven-

tion and therefore I do not limit myself to what is shown in the drawing and described in the specification, but only as indicated in the appended claims.

5 Having thus fully described my said invention, what I claim as new and desire to secure by Letters Patent, is:

1. In a grinding machine, the combination of
a grinding wheel and a work sizing device in-
10 cluding a nozzle from which fluid under pres-
sure issues, a fluid pressure controlled means
connected to the nozzle for indicating changes in
pressure and thereby the size of the work as it
15 is being ground, a pivoted lever having one end
thereof associated with said nozzle for control-
ling the flow of fluid from said nozzle, and means
carried by the lever and contacting with the sur-
face of the work being ground whereby the po-
20 sition of the lever is determined by the surface
of the work, said lever and said nozzle being dis-
posed so that the fluid flow from the nozzle is
decreased as the work approaches finished size.

2. In a grinding machine, the combination of
a grinding wheel and a work sizing device in-
25 cluding a nozzle from which fluid under pressure
issues, a fluid pressure controlled means con-
nected to the nozzle for indicating changes in
pressure and thereby the size of the work as it is
being ground, a pivoted lever having one end
30 thereof disposed adjacent said nozzle, a member
capable of adjustment to different set positions

on said lever and disposed opposite said nozzle
for controlling the flow of fluid from said nozzle,
and means carried by the lever and contacting
with the surface of the work being ground where-
5 by the position of the lever is determined by the
surface of the work, said lever and said nozzle
being disposed so that the fluid flow from the
nozzle is decreased as the work approaches fin-
ished size.

3. In a grinding machine, the combination of 10
a grinding wheel and a work sizing device in-
cluding a nozzle from which fluid under pressure
issues, a fluid pressure controlled means con-
nected to the nozzle for indicating changes in
15 pressure and thereby the size of the work as it is
being ground, a pivoted lever having one end
thereof disposed adjacent said nozzle, a member
capable of adjustment to different set positions
on said lever and disposed opposite said nozzle
20 for controlling the flow of fluid from said nozzle,
and means carried by the lever and contacting
with the surface of the work being ground
whereby the position of the lever is determined
by the surface of the work, said lever being piv-
25 oted intermediate its ends and arranged relative
to said nozzle so that all movements of the lever
caused by the decrease in the size of the work
causes the adjustable member carried thereby to
be moved toward the nozzle for decreasing the
30 fluid flow from the nozzle.

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