Nov. 27, 1923. 1,475,614

A. WILLIAMS

HEAD ADJUSTMENT FOR GRINDING MACHINES

Filed Nov. 2, 1920 2 Sheets-Sheet 1

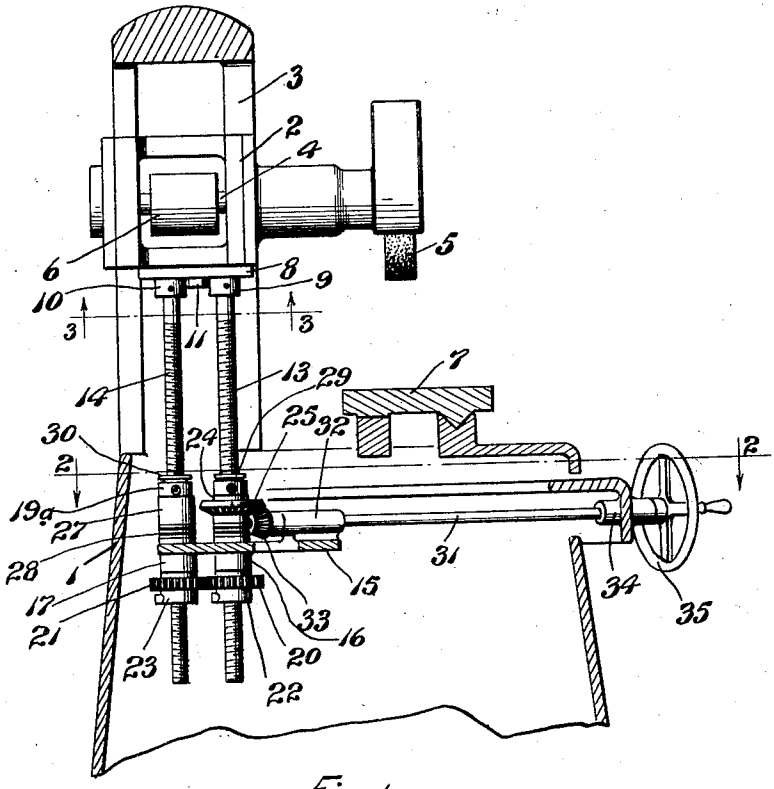


Fig. 1.

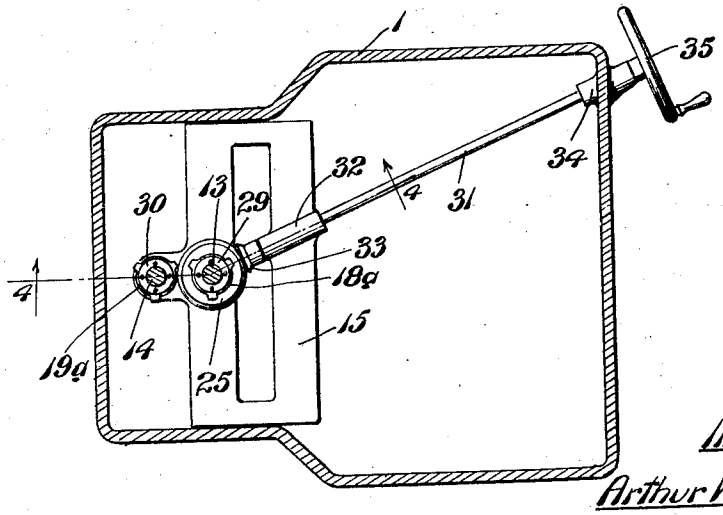


Fig. 2.

Inventor
Arthur Williams

By Frank E. Liverance, Jr.
Attorney

Nov. 27, 1923. 1,475,614

A. WILLIAMS

HEAD ADJUSTMENT FOR GRINDING MACHINES

Filed Nov. 2, 1920 2 Sheets-Sheet 2

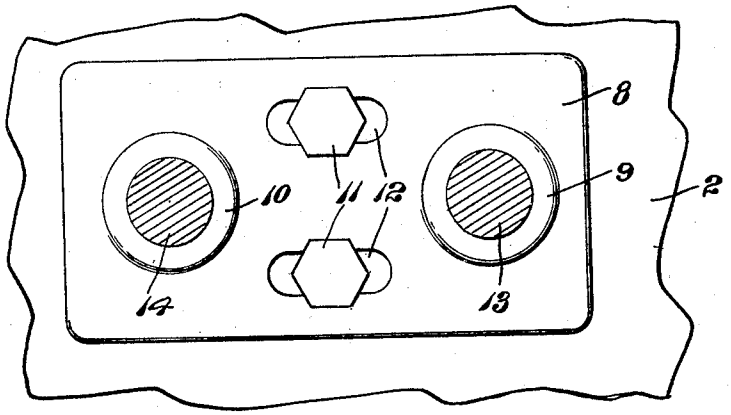


Fig. 3.

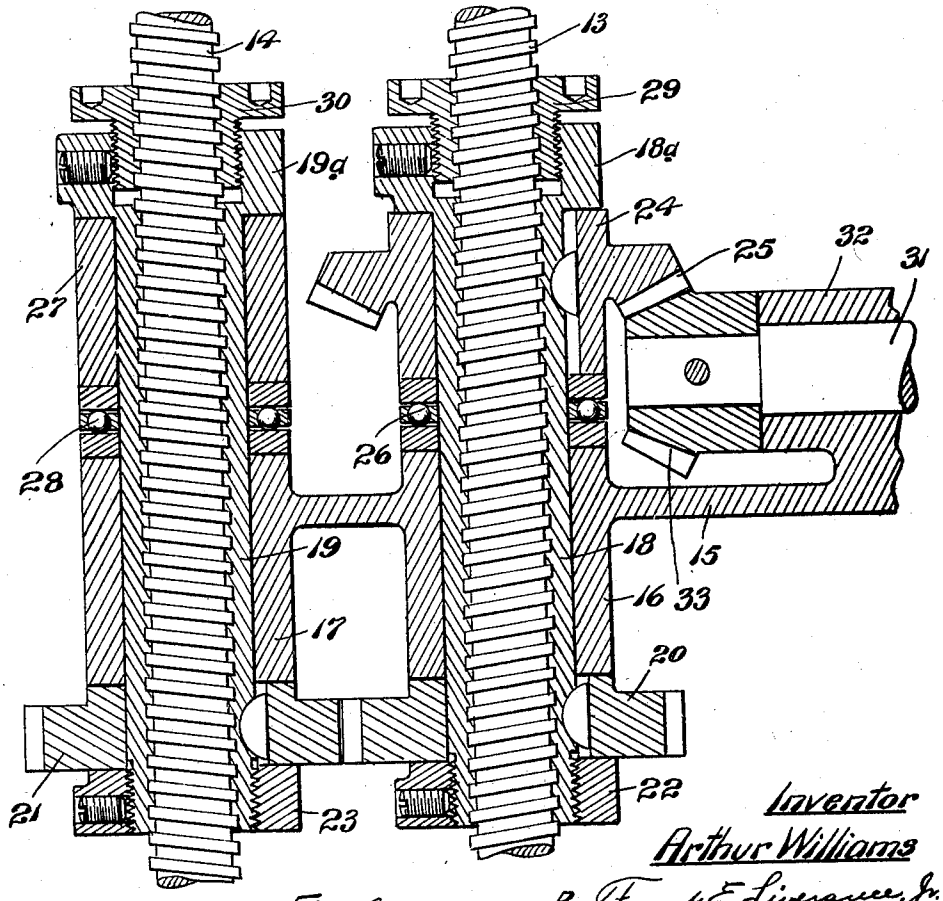


Fig. 4.

Inventor
Arthur Williams
By Frank E. Liverance, Jr.
Attorney

Patented Nov. 27, 1923. 1,475,614

UNITED STATES PATENT OFFICE.

ARTHUR WILLIAMS, OF GRAND RAPIDS, MICHIGAN, ASSIGNOR TO WILMARTH & MORMAN COMPANY, OF GRAND RAPIDS, MICHIGAN, A CORPORATION OF MICHIGAN.

HEAD ADJUSTMENT FOR GRINDING MACHINES.

Application filed November 2, 1920. Serial No. 421,338.

To all whom it may concern:

Be it known that I, ARTHUR WILLIAMS, a citizen of the United States of America, residing at Grand Rapids, in the county of Kent and State of Michigan, have invented certain new and useful Improvements in Head Adjustments for Grinding Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to grinding machines. It is particularly concerned with grinding machines which are known as "surface grinders" and in which a table on which the work is held is mounted for movement below the grinding wheel designed to act on the work, and which wheel must be adjusted with respect to the work. The grinding wheel is mounted on a vertically adjustable head, and my invention is primarily concerned with new means and mechanism for accomplishing the adjustment of the head vertically. It is an object and purpose of the invention to provide an adjustment for grinding machine heads which is positive in its action, and which particularly insures against variation or movement of the head after once adjusted, supporting the same positively against vibration or any possible change of position. A further object of the invention is to provide a head adjustment dual in its structure and with coacting adjusting parts which counteract each other in so far as any possible tilting of the head with respect to the supporting frame of the machine or the table thereof is concerned. A still further object of the invention is to provide an adjusting mechanism for grinding machine heads which is freely and easily operable from the front of the machine and which simultaneously operates the two similar parts of the adjusting mechanism. Many other objects and purposes than those enumerated will appear fully and in detail as understanding of the invention is had from the following description, taken in connection with the accompanying drawing, in which,

Fig. 1 is a fragmentary vertical section taken through a grinding machine equipped with my invention, the head adjusting mechanism appearing in side elevation.

Fig. 2 is a horizontal section on the plane of line 2—2, of Fig. 1.

Fig. 3 is a horizontal section taken on the plane of line 3—3, of Fig. 1 and looking upwardly in the direction indicated by the arrows, the view being enlarged, and

Fig. 4 is a fragmentary enlarged vertical section taken substantially on the plane of the broken line 4—4, of Fig. 2.

Like reference characters refer to like parts in the different figures of the drawings.

On the supporting frame 1 of the grinding machine, a head 2 is slidably mounted between guides 3 extending vertically above the main supporting casting of the machine. A shaft 4 is rotatably mounted in the head on the front end of which a grinding wheel 5 is secured. The shaft is driven by a belt passing around a pulley 6 on the shaft or in any other suitable manner, and the grinding wheel 5 is located above the table 7 slidably mounted on the supporting frame and to which the work to be ground is secured.

A plate 8 having two downwardly extending bosses 9 and 10 is secured to the under side of the head by screws 11 passing through slots 12 in the plate, permitting a limited adjustment of the plate on the head. Two screws 13 and 14 at their upper ends enter the bosses 9 and 10 and are pinned or otherwise permanently secured thereto, extending downwardly therefrom as shown. The screws are oppositely threaded, one being cut with right hand threads and the other with left hand threads.

A plate 15 is located horizontally between the sides of the support 1 and permanently connected thereto, being formed with two bearings 16 and 17 having vertical openings therethrough and in which two sleeve nuts 18 and 19 are rotatably mounted. These sleeve nuts are interiorly threaded and oppositely for the reception of the screws 13 and 14, as shown. Two spur gears 20 and 21 in mesh with each other are keyed to the lower ends of sleeves 18 and 19, respectively, and are held in place by nuts 22 and 23 threaded on to the lower ends of the sleeves and held against accidental loosening by locking

screws threaded through the nuts against the sleeves.

A sleeve 24 having a bevelled gear 25 formed thereon is keyed to the sleeve nut 18, a ball bearing 26 being interposed between the lower end of the sleeve 24 and the upper end of the bearing 16. A sleeve 27 is positioned around the upper portion of sleeve nut 19 and a similar ball bearing 28 interposed between its lower end and the upper end of bearing 17. The upper ends of the sleeve nuts 18 and 19 are enlarged as indicated at 18^a and 19^a and bear against the upper ends of sleeves 24 and 27. Each enlarged upper end 18^a and 19^a is interiorly bored and threaded at its upper portion and adjusting nuts 29 and 30 interiorly threaded to engage the screws 13 and 14 are inserted into said openings and locked in place by locking screws as shown, this being for the purpose of taking up wear between the screws and the sleeve nuts through which they pass.

A shaft 31 is rotatably mounted at its inner end in a bearing 32 formed integrally with plate 15 and at its inner end carries a bevelled pinion 33 in mesh with the gear 25 heretofore described. The shaft extends horizontally outward through a bearing 34 on the support 1, and at its outer end has a hand wheel 35 attached thereto for manual operation.

It is obvious that on turning the hand wheel 35, a simultaneous rotary movement is imparted to sleeve nuts 18 and 19 but in opposite directions through the gearing connections made by gears 20 and 21, said gears being identical in diameter and number of teeth. The screws 13 and 14 are threaded with the same number of threads to the inch, and being threaded oppositely, the rotary movement of the sleeve nuts 18 and 19 in opposite directions serve to move the screws 13 and 14 in the same directions and in equal amounts, thereby moving the head 2 up or down, dependent upon the direction of turning of the hand wheel.

With a construction of the character described, the head is positively held against any tilting that would raise or lower the grinding wheel with respect to the head or change the axis of shaft 4 from true horizontal position. The positioning of screws 13 and 14 one at each side of the vertical center line of guides 3 insures this, and in addition, the opposite movement of sleeve nuts 18 and 19 on the two screws serves to counteract any play between the screws and sleeve nuts and cause the head to always follow an absolutely true vertical path of movement. This is very important in grinding machines where the work is ground to very fine limits and insures true and accurate grinding. In addition, the operation of the head to change position thereof is directly at the front of the machine where the operator may clearly see the positioning of the wheel 5 with respect to the work as the adjusting operation is being done. The construction is practical and serviceable in all respects and has proven its worth from actual practice. Various changes of detail of construction may be resorted to without departing from the invention defined in the appended claims and I consider that the invention comprehends all forms of construction falling within the scope of said claims.

I claim:

1. In a grinding machine, a head carrying a grinding wheel, two spaced apart oppositely threaded screws attached to and extending downwardly from the head, oppositely interiorly threaded sleeve nuts through which the screws pass, means for rotatably mounting the sleeve nuts and holding them against vertical movements, intermeshing gears on the sleeve nuts whereby when one is rotated in one direction the other is rotated in the opposite direction, and manually operated means connected with one of the sleeve nuts to rotate the same, substantially as described.

2. In a grinding machine, a head carrying a grinding wheel, means for mounting the head for vertical movements, two oppositely threaded screws attached at their upper ends to the head and depending therefrom in spaced parallel relation, a horizontal support fixed below the head, said support having two bearings therein, oppositely threaded sleeve nuts rotatably mounted in said bearings, said screws passing through the nuts, two intermeshing gears attached one to the lower end of each sleeve, a combined sleeve and bevelled gear attached to one of the sleeve nuts, a horizontal shaft extending to the front of the machine, a hand wheel on the front end of the shaft, and a bevelled pinion on the inner end of the shaft in engagement with the bevelled gear, substantially as and for the purposes described.

3. In a grinding machine, a head carrying a grinding wheel, means for mounting the head for verical movements, two oppositely threaded screws attached at their upper ends to the head and depending therefrom in parallel relation, two oppositely threaded sleeves into which said screws are received, means for mounting the sleeves for rotative movement, means for manually rotating one of the sleeves, and a single gear secured to each sleeve, said gears being in mesh with each other whereby when one sleeve is rotated, the other sleeve is simultaneously rotated in the opposite direction.

4. In a grinding machine, a head carrying a grinding wheel, means for mounting the head for vertical movements, two oppositely threaded screws attached at their upper ends

to the head and depending therefrom in parallel relation, two oppositely threaded sleeves into which said screws are received, means for mounting the sleeves for rotative movement, a single gear secured to each sleeve, said gears being of the same size and in mesh with each other, a horizontal shaft extending from the front of the grinding machine toward one of the sleeves, and gearing connections between said shaft and said sleeve for driving the sleeve from the shaft.

In testimony whereof I affix my signature.

ARTHUR WILLIAMS.