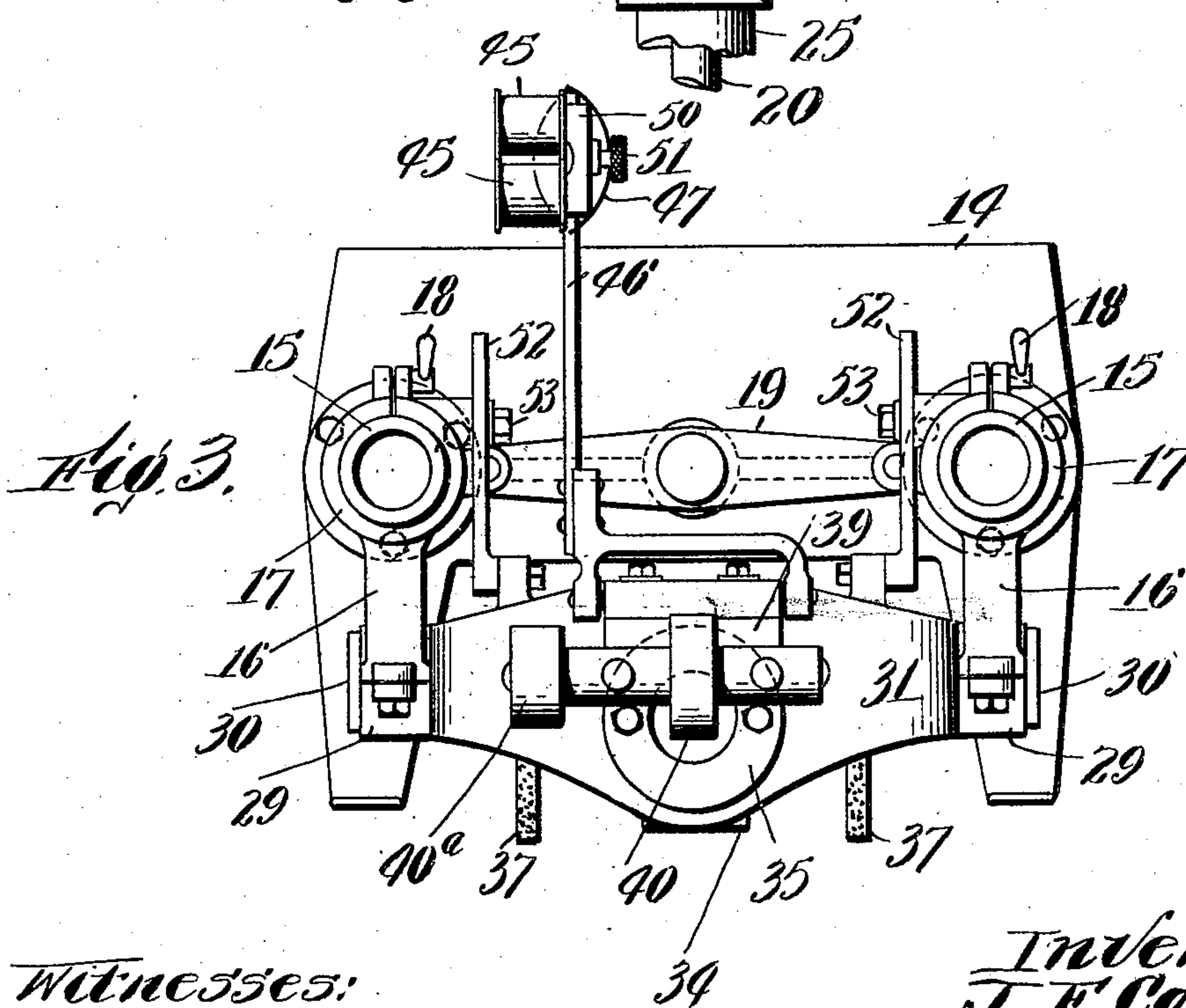
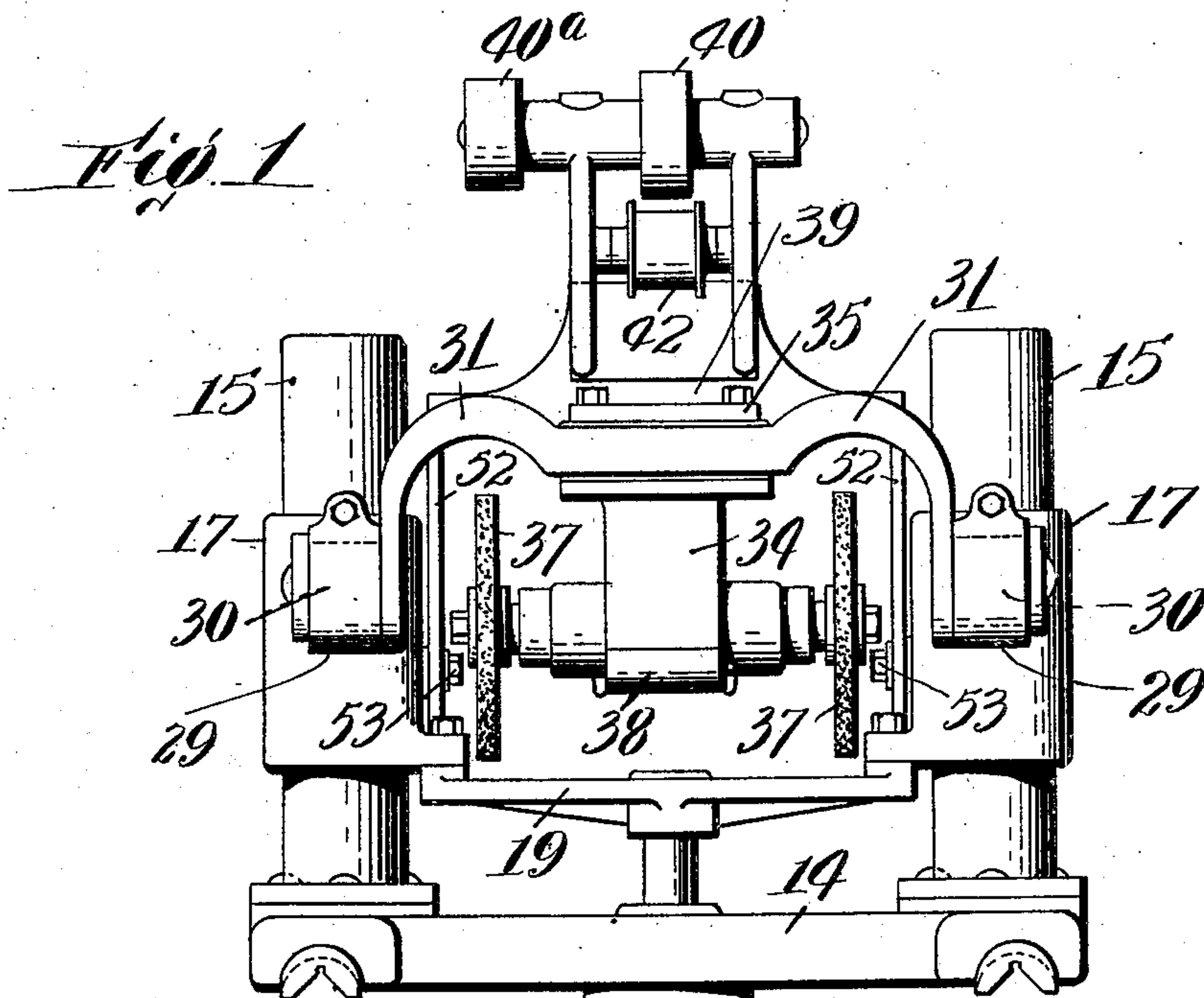


No. 877,170.

PATENTED JAN. 21, 1908.

J. F. CARLSON.  
GRINDING MACHINE.  
APPLICATION FILED MAY 29, 1907.

2 SHEETS—SHEET 1.



Witnesses:

C. F. Hesson  
E. M. Allen.

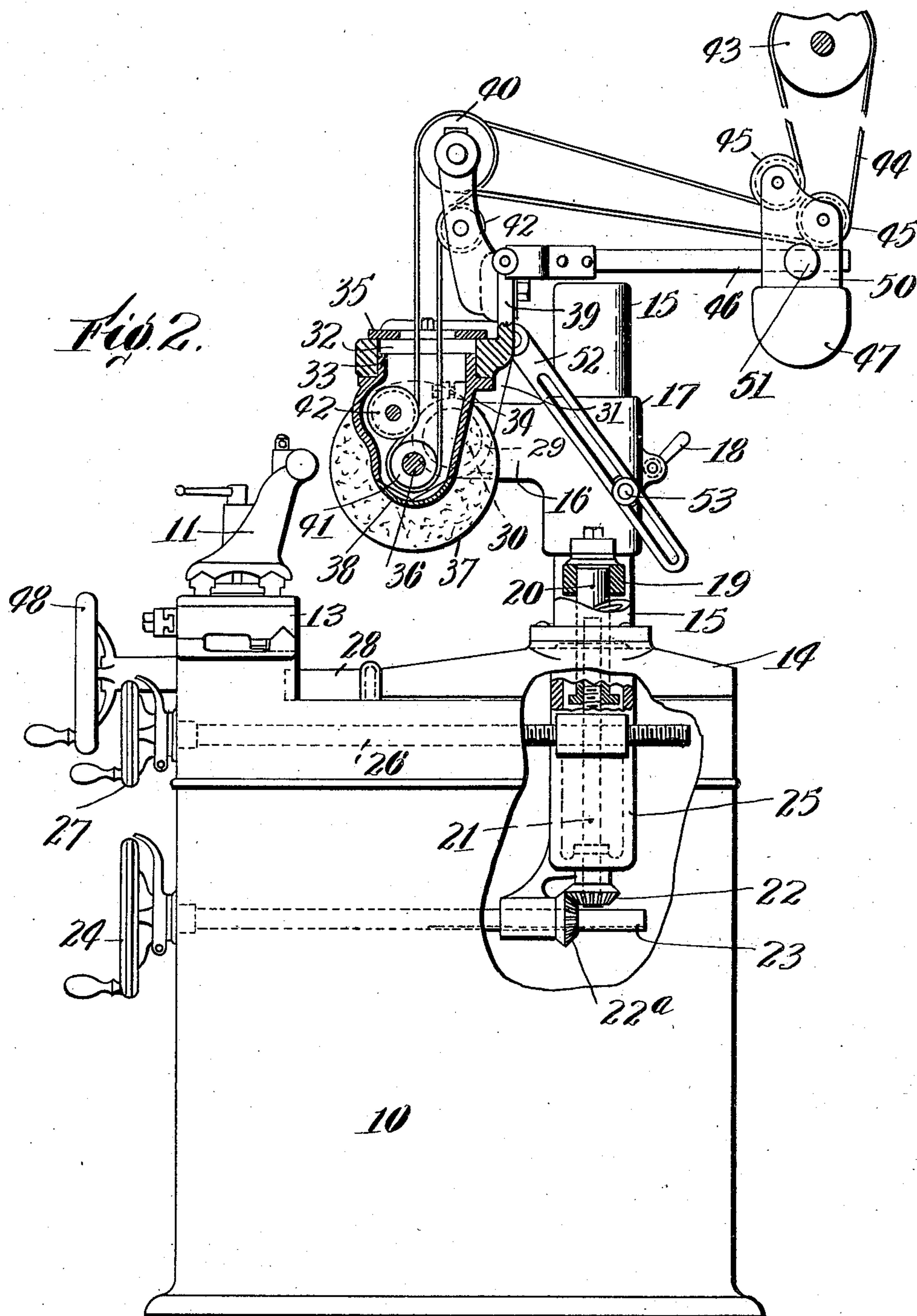
Inventor:  
J. F. Carlson  
By Attorneys  
Southgate & Southgate.

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# UNITED STATES PATENT OFFICE.

JOHN F. CARLSON, OF WORCESTER, MASSACHUSETTS.

## GRINDING-MACHINE.

No. 877,170.

Specification of Letters Patent.

Patented Jan. 21, 1908.

Application filed May 29, 1907. Serial No. 376,392.

*To all whom it may concern:*

Be it known that I, JOHN F. CARLSON, a citizen of the United States, residing at Worcester, in the county of Worcester and State of Massachusetts, have invented a new and useful Grinding-Machine; of which the following is a specification.

This invention relates to grinding machines, the principal object being to provide simple and efficient means whereby the grinding tool can be universally adjusted without interference with the driving thereof.

Further objects of the invention are to provide a head mounted to swing on a horizontal axis, said head having a shaft for supporting a grinding tool or tools or the like located adjacent to the axis on which the head is to swing, so that in the swinging of the head it will not move through a very wide arc, but will have sufficient range of adjustment for all ordinary purposes, the horizontal position of the head being adjustable also in the usual way; to provide means for fixing the head in any desired angular position; to provide a driving arrangement for the shaft so located that the belt can be turned through any desired angle for adjustment on a vertical axis without interfering with the driving thereof; to provide an improved construction of guiding pulleys for driving the machine when it is adjusted, consisting of a movable frame on which is a weighted slide for supporting the pulleys, and generally to improve the construction and operation of machines of this character.

Further objects and advantages of the invention will appear hereinafter.

Reference is to be had to the accompanying drawings which constitute a part of this specification, in which

Figure 1 is a front elevation of part of a grinding machine constructed in accordance with the principles of my invention, parts being broken away to show the interior construction. Fig. 2 is a side elevation partly in section, and Fig. 3 is a plan of the portion of the machine which supports the grinding tool, the main frame of the machine being omitted.

I have shown the device as applied to a stand or frame 10 of ordinary construction, this frame having as usual, an adjustable pair of centers 11, and a carriage 13. These parts as usual hold the work to be operated upon and may be constructed in any desired way.

On the frame I mount a platform 14 provided with gibs or the like to take up wear, and carrying a pair of upright guides 15. Slidably mounted on these guides is a head 16, this head being provided with split collars 17 and handles 18 for tightening the collars on the guides and holding the head in adjusted position.

Extending across the space between the two collars is a plate 19 which is connected with a cylinder 20. This cylinder extends down through an opening in the platform 14, and is provided with a screw-threaded opening for receiving a screw 21. This screw is employed for the purpose of raising and lowering the head; and in order to conveniently provide for accomplishing this object, I have shown the screw as carrying a bevel gear or pinion 22 meshing with a similar gear or pinion 22<sup>a</sup>, the latter being provided with a key slidably mounted in a long keyway on a rotatable shaft 23. This shaft is provided with a hand-wheel 24 for the purpose of manipulating it. Obviously the rotation of the hand-wheel causes the head to rise and fall on the guides when the collars 17 are loosened.

In order that the whole device may slide forward and back from the work, a second screw-threaded opening is provided in a casing 25 which is connected with the platform 14, and a screw 26 having a hand-wheel 27 is provided for giving the device the desired motion.

It is to be understood that the reason for providing the long keyway in the shaft 23 is to permit the longitudinal motion of the casing 25, which carries the screw 21 and also affords a bearing for the screws connected therewith.

To protect the ways in which the platform 14 reciprocates, I have shown a cap 28 mounted on the end of the platform and covering the ways when the platform is adjusted.

The head 16 is provided for the purpose of supporting one or more grinding elements or tools of a similar character; and in order to provide additional adjustments for the grinder, I have located on the head a pair of split collars 29 adapted to be tightened in any ordinary manner and provided with bearings for a pair of studs 30 having their axes in alinement and projecting in opposite directions from a forked support 31, which has an opening 32. Obviously this support can be tilted about a horizontal axis,



and the opening 32 constitutes a bearing in which is located a cylinder 33 having a casing 34 and held in position in the bearing by a cap 35 bolted to the casing.

5 The casing 34 is designed to support a shaft 36 on which the grinding tool 37 is mounted, and is provided with a removable cap 38, whereby the bearings can be easily inspected, although at ordinary times they  
10 are fully protected from dust and the like.

It will be seen from the construction so far described that the grinding tool or tools or other implement mounted on the shaft 36 can be adjusted vertically, can be swung on  
15 a horizontal pivot, and can also be turned on a vertical axis.

It is to be observed that the axis of the studs 30 while being a little distance from that of the shaft 36 is near enough to the  
20 same so that when the head is turned on the studs 30, the grinding wheels will not travel over a very great distance, although their range of motion will be sufficient for all purposes.

25 In order to provide for holding the parts in adjusted angular positions after adjustment has been made, the support 31 is provided with a pivoted arm 52 having a longitudinal slot therein adapted to be secured in fixed  
30 position by a bolt 53 or the like on the head 16. It will be seen that with this construction the angular position of the casing with respect to the studs 30 can be adjusted and fixed.

35 The remainder of my invention relates more especially to the manner in which I have provided for driving the shaft 36 independently of the several adjustments. For this purpose I have mounted on the support  
40 31 a bracket 39. This bracket is provided with arms which carry bearings for supporting a shaft carrying a pair of pulleys 40 and 40<sup>a</sup>. One of these pulleys is connected by belt with a pulley 41 on the shaft 36, guide  
45 pulleys 42 being provided one in the casing and one supported by the arms of the bracket 39 for holding the belt in position on the pulley 41. As this belt is supported by pulleys which turn and move at all times with the  
50 support 31, it will be obvious that the vertical adjustment and the adjustment on the horizontal axis can take place without interfering with the operation of this belt; while the adjustment on the vertical axis  
55 is also possible on account of the fact that the belt can twist as the pulley 41 is turned on an axis passing through the center of itself and the pulley 40 which carries the belt. These pulleys are preferably so located  
60 that both strands of the belt are substantially parallel and vertical. In order to drive this part of the apparatus, the pulley 40<sup>a</sup> is connected with a main driving pulley 43 by a belt 44 which passes over the surface  
65 of a pair of guide pulleys 45 located on a slide

50 slidably mounted on a frame 46 which is pivoted to the bracket 39. The slide is provided with a weight 47 depending from it for normally holding the guide pulleys 45 down, and providing for adjustments in the vertical  
70 position of the head 16. It will be obvious that as the frame 46 is free to turn on its pivot and the slide 50 may be adjusted to any desired position on the frame and held by the  
75 adjusting screw 51, this adjustment will not affect the driving of any of the belts, while the adjustment about the horizontal axis is provided for in the same manner. The adjustment on the vertical axis obviously does  
80 not affect this part of the drive, as it is confined to the portion located between the pulleys 40 and 41.

The operation of the device had been described during the description of the elements illustrated in the drawings, and need not  
85 be summarized. It will be understood, of course, that the usual hand-wheel 48 is provided for manipulating the main carriage bearing the head and tail centers, or that any other construction for the main frame may  
90 be employed. It is also to be understood that many modifications in the construction of the other parts of the device can be made by a person skilled in the art, without departing from the spirit of my invention as ex-  
95 pressed in the claims.

Having thus fully described my invention, what I claim and desire to secure by Letters-Patent is:—

1. In a grinding machine, the combination 100 of a frame, a guide mounted thereon, a head movably mounted on the guide, a support carried by said head and adjustable about a horizontal axis, and means on the support for carrying a grinding tool and operating  
105 the same independently of the adjustment of the support upon its axis.

2. In a grinding machine, the combination 110 of a main frame, a guide movably mounted thereon, means for adjusting said guide along the frame, a head mounted on said guide, a screw connected with said head for adjusting it vertically on the guide, and means for manipulating said screw in all positions of the  
115 guide.

3. The combination of a main frame, a platform reciprocatably mounted thereon, a guide mounted on said platform, a head vertically adjustable on the guide, a screw connected with said head for adjusting its position on the guide, a casing in which said  
120 screw is journaled, means for moving the casing and platform laterally on the main frame, a shaft for rotating said screw and having an elongated keyway, and a gear mounted on  
125 the casing and adapted to operate the screw, said gear having a key adapted to slide in said keyway.

4. The combination of a main frame, a guide movably mounted thereon, means for 130



moving said guide along the frame, a head movably mounted on the guide, means for raising and lowering said head on the guide, a support carried by said means for the support for carrying a grinding tool.

5 5. The combination of a vertically adjustable head, a support pivotally mounted thereon on a horizontal axis, a casing swiveled on the support on a vertical axis, a shaft  
10 mounted on said casing, a pulley on said shaft, and a pulley journaled on said support in line with the pulley on the shaft.

15 6. The combination of a vertically adjustable head, a support pivoted thereon on a horizontal axis, a casing swiveled on the support on a vertical axis, a shaft mounted in bearings on the lower part of said casing, and a removable cap constituting the bottom of said casing and located under said shaft.

20 7. The combination of a vertically adjustable head, a support pivoted thereto, a casing swiveled on the support on an axis at right angles to that on which the support is pivoted, a shaft journaled on said casing, a  
25 pulley on the shaft, a pulley mounted above the first named pulley and carried in bearings on the support, whereby the casing can be turned on one axis and the support on another without interfering with the driving of  
30 one pulley from the other.

8. The combination of an adjustable head, a support pivotally mounted thereon, a casing swiveled on said support, a shaft carried by said casing, a pulley on the shaft, a second  
35 pulley journaled on the support in line with the first pulley, a belt connecting said pulleys, a shaft on which the second pulley is mounted, a third pulley mounted on said shaft, and means for driving the third pulley  
40 independently of the location of the head, support, and casing on the machine.

9. The combination of an adjustable head, a support adjustably mounted thereon, a casing swiveled on said support, a shaft journaled on said casing, a shaft journaled on the support, means for driving the first shaft from the second, a pulley on the second  
45 shaft, a frame pivotally mounted on the support, a pair of guide pulleys on the frame, a driving pulley, and a belt connecting the first named pulley with the driving pulley and guided by said guide pulleys.

10. The combination of an adjustable support, a pulley journaled thereon, a driving  
55 pulley, a belt connecting the driving pulley with the first named pulley, a frame pivoted on said support, a pair of guide pulleys on said frame engaging opposite strands of said belt, and a weight for normally holding the  
60 guide pulleys in depressed position.

11. A driving device comprising an adjustable support, a shaft thereon, a pulley on said shaft, a frame pivotally mounted at one end on said support, a pair of guide pulleys near  
65 the opposite end of the frame, a belt for driv-

ing the first named pulley engaging said guide pulleys and passing therefrom at an angle to its direction between them and the first named pulley, a driving pulley for said belt located beyond the guide pulleys, and a  
70 weight located on the frame near said guide pulleys for keeping the belt taut.

12. The combination of a head, a support pivotally mounted thereon on a horizontal axis, a casing swiveled on the support on a  
75 vertical axis, a shaft mounted on said casing, and means on the support for driving the shaft.

13. The combination of a head, a casing supported thereby, a shaft mounted in bearings on the lower part of said casing, and a removable cap constituting the bottom of said casing and located under said shaft.

14. The combination with an adjustable support, of a pulley journaled thereon, a  
85 driving pulley, a belt connecting the driving pulley with the first named pulley, a frame movably mounted on said support, a slide movably mounted on said frame, and a guide pulley on said slide engaging said belt.  
90

15. The combination with an adjustable support, of a pulley journaled thereon, a driving pulley, a belt connecting the driving pulley with the first named pulley, a frame movably mounted on said support, a slide  
95 movably mounted on said frame, a guide pulley on said slide engaging said belt, and a weight on said slide for normally holding the guide pulley in depressed position.

16. The combination with a vertically adjustable head, of a support pivoted thereto, a casing swiveled on the support on an axis at an angle to that at which the support is pivoted, a shaft journaled on said casing, a pulley on the shaft a pulley mounted above  
105 the first named pulley and carried in bearings on the support, a belt connecting said pulleys, a guide pulley in the casing engaging one strand of the belt, and a guide pulley journaled on said support and engaging the  
110 other strand of the belt.

17. In a grinding machine, the combination of a frame, a guide mounted thereon, a head movably mounted on the guide, a pair of studs on said head located with their axes  
115 in alinement, a support mounted to swing on said stud, a casing carried by said support, means located partly in said casing for carrying a grinding tool and operating the same independently of the adjustment of the support upon its axis, the axis of said studs intersecting the casing.  
120

18. In a grinding machine, the combination of a frame, a guide mounted thereon, a head movably mounted on the guide, studs  
125 mounted on said head in alinement with each other, a fork-shaped support pivotally carried by said studs, a casing mounted on said support between the studs, a shaft supported by said casing for supporting grinding wheels  
130



or the like, the axis of said studs being adjacent to the axis of said shaft and intersecting the casing, a pulley on said shaft inside the casing, and means carried by said support for driving said pulley independently of the adjustment thereof, said casing being swiveled to turn on a horizontal axis.

19. In a grinding machine, the combination of an adjustable head comprising two members connected together, a pair of studs, one mounted on each member, said studs being in alinement, a fork-shaped support pivotally mounted on said studs, means carried by the support for supporting a grinding tool and operating the same, and means connected with said support and with said head adjusting the angular position of said support on the studs as a center.

20. In a grinding machine, the combination of a head, a support pivoted thereon to swing about a horizontal axis, means carried by the support for supporting and operating a grinding tool, a link pivotally connected with said support and having a longitudinal slot, and a bolt mounted on said head for engaging the link and holding it in adjusted position to fix the angular position of said support.

In testimony whereof I have hereunto set my hand, in the presence of two subscribing witnesses.

JOHN F. CARLSON.

Witnesses:

ALBERT E. FAY,  
J. ELMER HALL.