

No. 865,426.

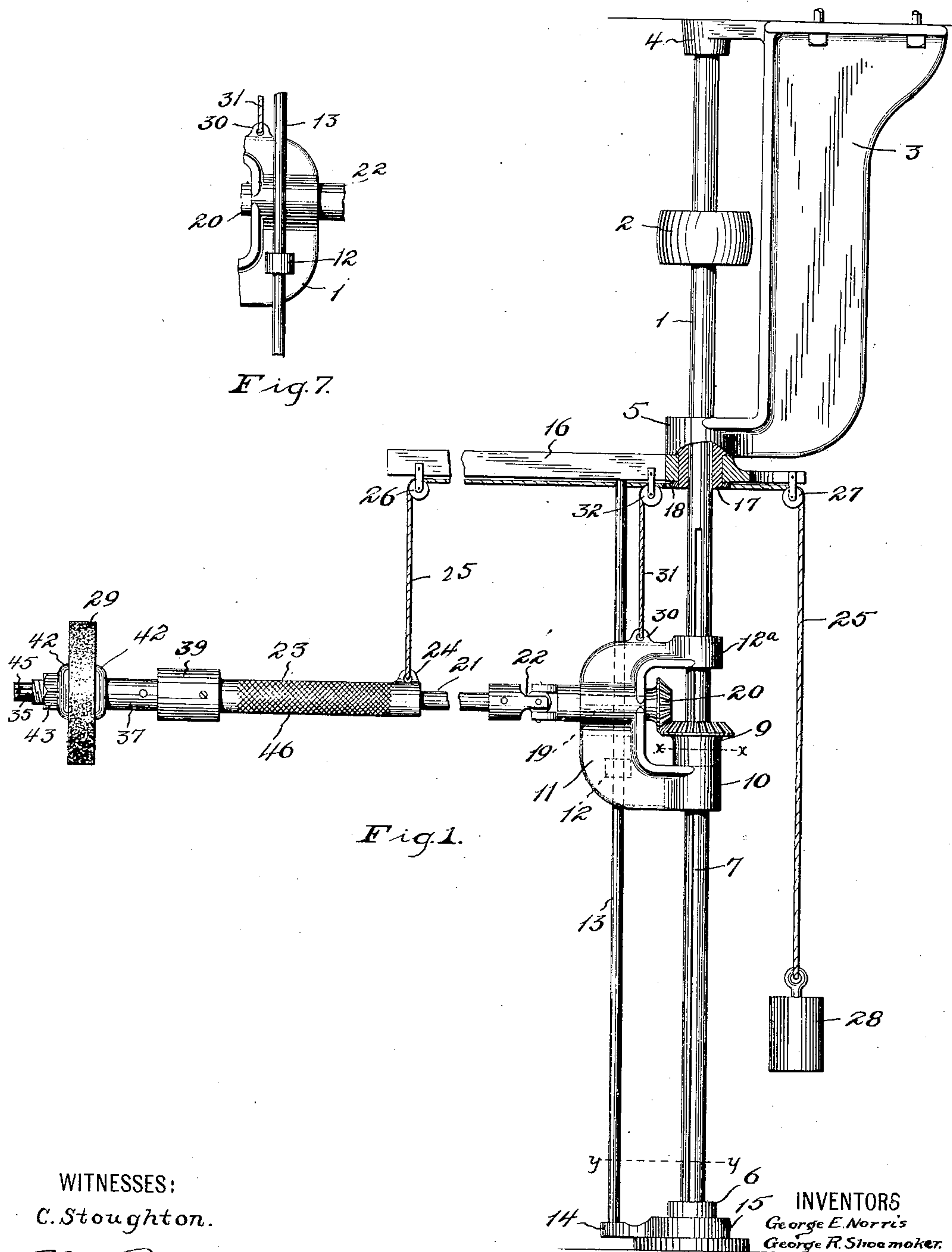
PATENTED SEPT. 10, 1907.

G. E. NORRIS & G. R. SHOEMAKER.

GRINDING APPARATUS.

APPLICATION FILED MAY 26, 1906.

2 SHEETS—SHEET 1.



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2 SHEETS—SHEET 2.

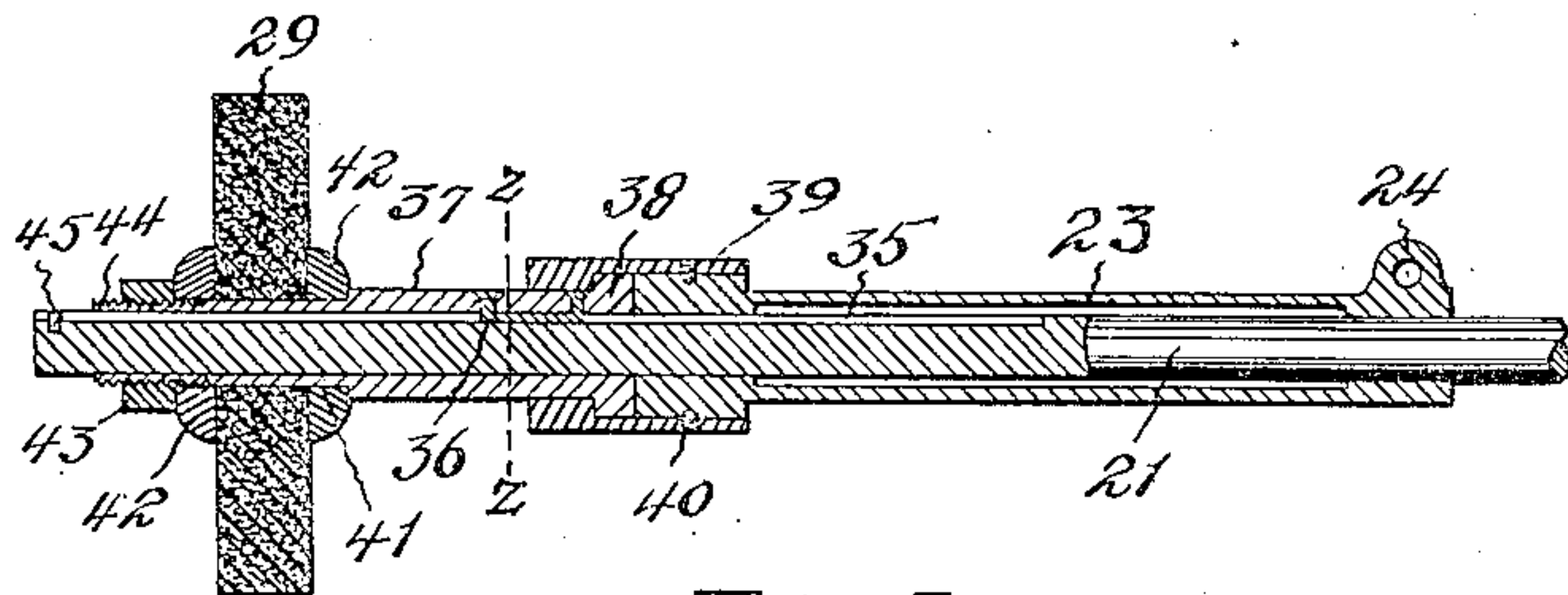


Fig. 3.

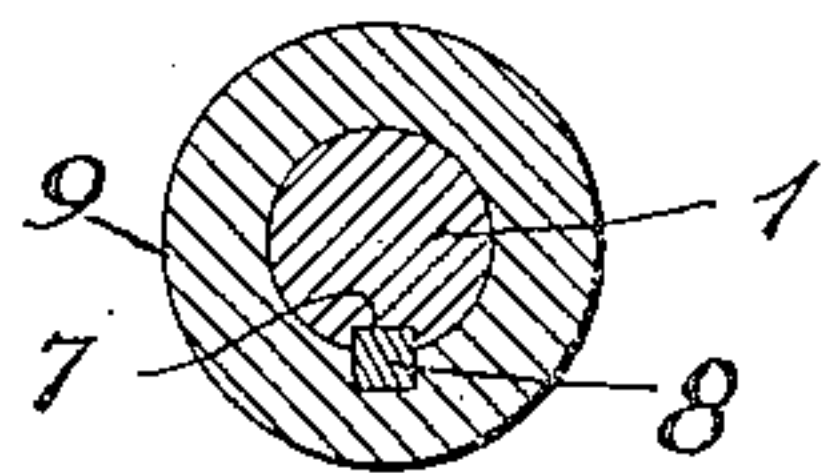


Fig. 4.

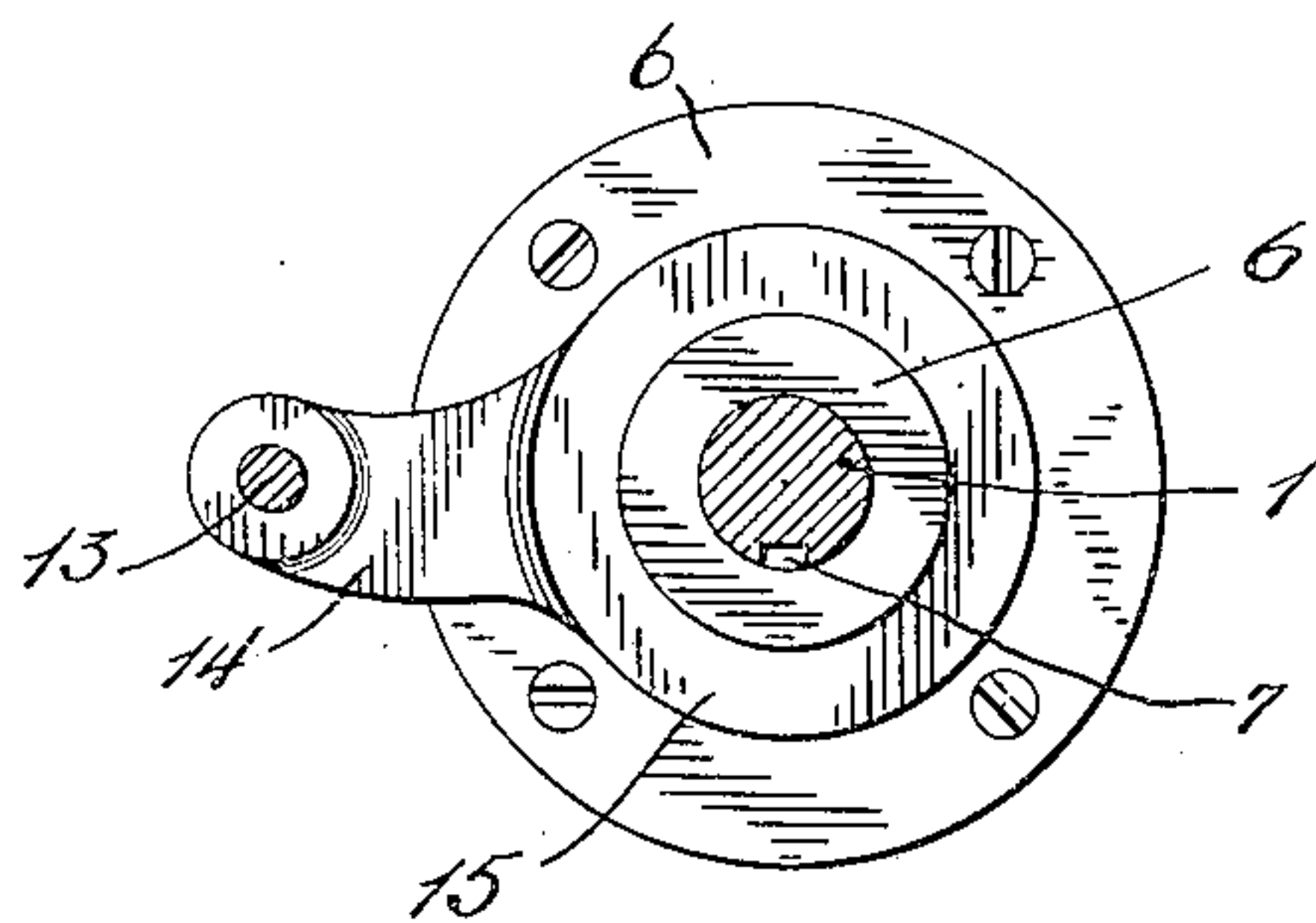


Fig. 5.

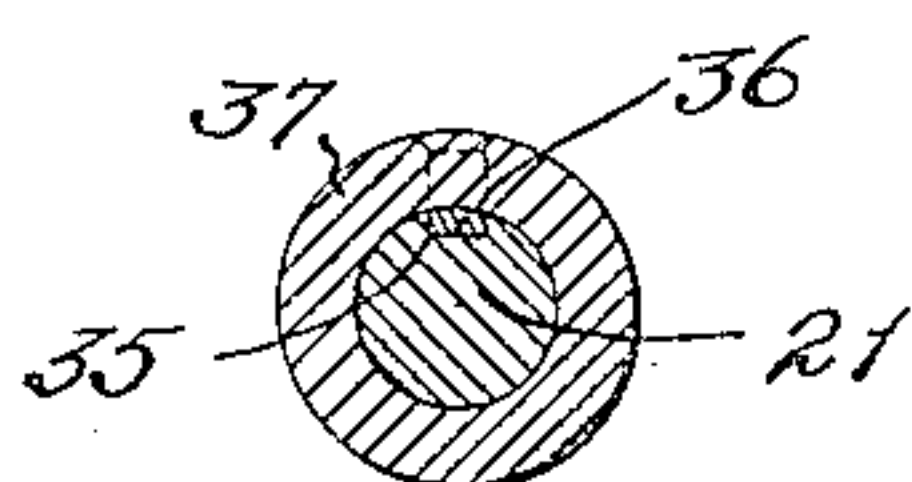
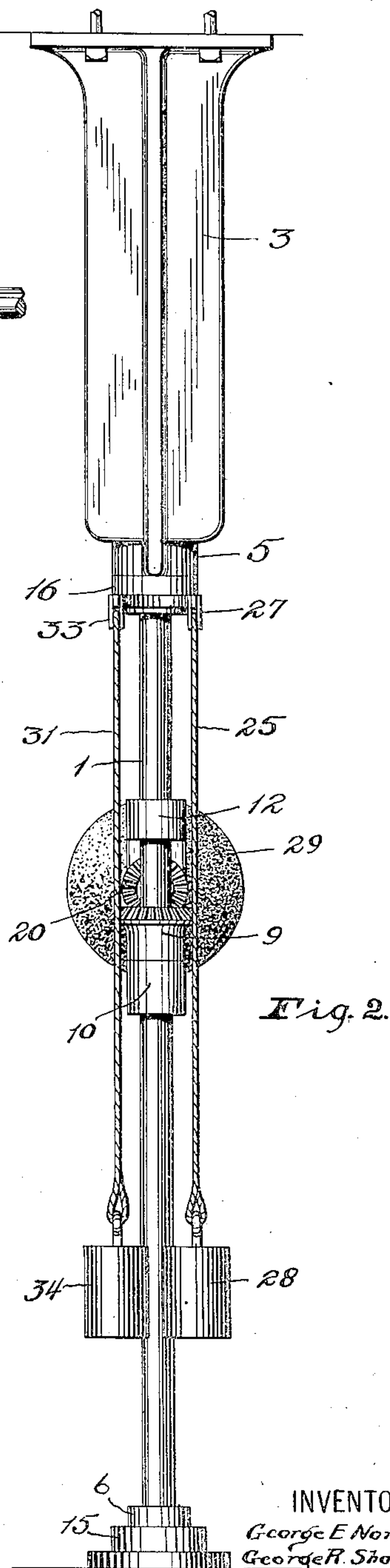


Fig. 6.

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# UNITED STATES PATENT OFFICE.

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## GRINDING APPARATUS.

No. 865,426.

Specification of Letters Patent.

Patented Sept. 10, 1907.

Application filed May 26, 1906. Serial No. 318,969.

*To all whom it may concern:*

Be it known that we, GEORGE E. NORRIS and GEORGE R. SHOEMAKER, citizens of the United States, residing at Columbus, in the county of Franklin and State of Ohio, have invented certain new and useful Improvements in Grinding Apparatus, of which the following is a specification.

Our invention relates to a new and useful improvement in universally mounted grinding wheels.

10 The object of the invention is to provide a suitable support for an emery wheel or the like, whereby the said wheel while rotating may be swung in any direction or applied to any point of operation within its reach.

15 Another feature resides in means for holding the wheel in its adjusted position.

Finally the object of the invention is to provide a device of the character described that will be strong, durable and efficient and one in which the several parts will not be liable to get out of working order.

20 With the above and other objects in view, the invention consists of the novel details of construction and operation, a preferable embodiment of which is described in the specification and illustrated in the accompanying drawings, wherein—

25 Figure 1 is a view in elevation showing the bearing box of the shaft hanger and a portion of the supporting beam broken away. Fig. 2 is a rear elevation. Fig. 3 is a partial longitudinal sectional view of the driven shaft and its component parts. Fig. 4 is a horizontal sectional view taken on the line *x x* of Fig. 1. Fig. 5 is a horizontal sectional view taken on the line *y y* of Fig. 1. Fig. 6 is a transverse vertical sectional view taken on the line *z z* of Fig. 3, and Fig. 7 is a detail elevation of a portion of the bearing yoke and its component parts.

30 In the drawings, the numeral 1 designates the drive shaft upon which is mounted the band pulley 2. A hanger 3 is formed with a projecting bearing head 4 which receives the upper end of the shaft 1 and at its lower end with the bearing box 5 through which the shaft passes. A bearing base 6 supports the shaft at its lower end. The shaft is rotatable in the parts described and is provided with the longitudinal key-way 7 in which the key 8 of the beveled pinion 9 engages, thus causing the pinion to turn with the shaft, but allowing it to be moved vertically thereon. The pinion is supported upon the collar 10 of the yoke 11, which is otherwise held in position by the upper collar 12<sup>a</sup> which encircles the shaft 1 in a similar manner to the collar 10. The yoke 11 is formed with an eye-lug 12 through which passes an upright rod 13. The rod 13 is supported at its lower end upon the arm 14 of the ring 15 encircling the base 6; while at its upper end, it is secured in the beam 16. The beam 16 is loosely supported upon the downwardly projecting collar 17

of the bearing box 5 and is held in place by a retaining ring 18 engaged with the said collar. By this arrangement, it will be seen that the yoke, the beam and the base are connected and caused to swing in unison. 60 The yoke 11 supports the shaft 19 which carries on its inner end the bevel gear 20 meshing with the pinion 9, thus receiving motion therefrom.

A driven shaft 21 is connected to the shaft 16 by means of the universal joint 22, such a connection allowing the driven shaft to be swung in any direction without interfering with its rotation. A sleeve 23 encircles the driven shaft and is provided with bearing points at each end. The sleeve is formed at its inner end with an eye 24 in which is secured the end of a rope or cable 25. The rope 25 passes over a pulley 26 mounted upon the outer end of the beam 16 and then continues rearwardly and down over the pulley 27 mounted upon the rear end of said beam. The rope 25 has secured at its lower or free end a counterbalancing weight 28 75 which counterbalances the sleeve 23 and its component parts, so that the emery wheel 29 may be held in any position to which it is moved. The yoke 11 is also formed with an eye 30 from which extends a rope or cable 31 passing over the pulleys 32 and 33 and carrying at its lower end a counterbalancing weight 34 similar to the weight 28 which serves to counterbalance the yoke 11 and hold it in its adjusted position when it is moved either up or down upon the shaft 1. The driven shaft 21 is provided with a longitudinal key way 35 into 85 which projects the key 36 of the wheel supporting sleeve 37. The sleeve 37 is formed with a flanged head 38 which is rotatably disposed within and caused to move longitudinally upon the shaft with the sleeve 23, by means of the internally flanged collar 39 which is secured to the sleeve 23 by set screws 40. It will thus be seen that motion from the driven shaft is imparted to the sleeve 37 by means of the key 36, but owing to the key-way 35, the sleeve 37 may be moved longitudinally upon the shaft and said longitudinal movement 95 is effected by moving the sleeve 23 to which the said sleeve 37 is rotatably connected. The sleeve 37 is formed with a shouldered reduced portion 41 upon which the emery or other grinding wheel 29 is secured by means of the rings 42 and the nut 43 which engages the screw threaded end 44 of the said reduced portion. A set screw 45 disposed in the key-way 35 near its outer end, prevents the sleeve 37 and therefore the sleeve 23, from being accidentally disengaged from the driven shaft 21 when the said parts are moved outward. 105 It is obvious that by reason of the yoke 11 and its counterbalancing weight 34, that the wheel mounted on the sleeve 37 may be swung horizontally in a circle or by raising or lowering the said yoke, points at different elevations may be readily operated upon. The operator grasping the roughened surface 46 of the sleeve 23 may by reason of the universal joint 22, swing the



emery wheel 29 in any direction irrespective of the position of the yoke. It is to be further observed that the counterbalancing weights 28 and 34 will hold the sleeve 23 or the yoke 11 in the positions to which they are moved and also that during the movement of the said parts, the rotation of the said wheel is not in any way hampered, nor is the speed decreased. The wheel 29 may be moved longitudinally upon the shaft 21 so as to operate upon work at various points.

From the above it will be apparent that the grinding wheel may be successfully operated at any angle and may be expeditiously and easily moved from one position to another.

Having now fully described our invention, what we claim and desire to secure by Letters Patent is,

1. In a device of the character described, a drive shaft, a yoke movably supported upon the drive shaft, and a grinding wheel universally supported from the yoke and driven by the drive shaft, in combination with a support swingingly mounted about the drive shaft, counterbalancing means suspended from the support for holding the grinding wheel in position, counterbalancing means suspended from the support and connected to the yoke for holding the same in position, and means for causing the yoke and the support to swing in unison.

2. In a device of the character described, the combination with a drive shaft having a key-way, of a pinion having a projection engaging in the key-way longitudinally

movable upon the shaft, a vertically and horizontally movable yoke loosely engaging the shaft, counterbalancing means for holding the yoke in vertical position, a gear rotatably supported from the yoke engaging with the pinion, a driven shaft universally connected with the gear, a sleeve longitudinally movable upon the driven shaft, a grinding wheel connected to the sleeve and the driven shaft, and counterbalancing means connected to the sleeve for supporting the grinding wheel in position.

3. In a device of the character described, the combination with a vertical drive shaft, of a driven shaft, a support for the driven shaft which is slidably disposed upon the vertical drive shaft, connections between the drive shaft and the driven shaft, a horizontal sleeve, a shaft journaled in said sleeve, a grinding wheel secured to said shaft, a universal connection between the last named shaft and the driven shaft, a flexible member secured to the support which is slidably disposed upon the drive shaft, a supporting pulley over which said flexible member passes, a counter weight carried by said flexible member, a second flexible member connected to the horizontal sleeve, a supporting pulley over which said second flexible member passes and a counter-weight connected to said second flexible member.

In testimony whereof we affix our signatures in presence of two witnesses.

GEORGE E. NORRIS.  
GEORGE R. SHOEMAKER.

Witnesses:

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M. L. WALKER.