B. M. W. HANSON.

GRINDING MACHINE.

APPLICATION FILED APR. 9, 1910.

983,226.

Patented Jan. 31, 1911

3 SHEETS—SHEET 1.

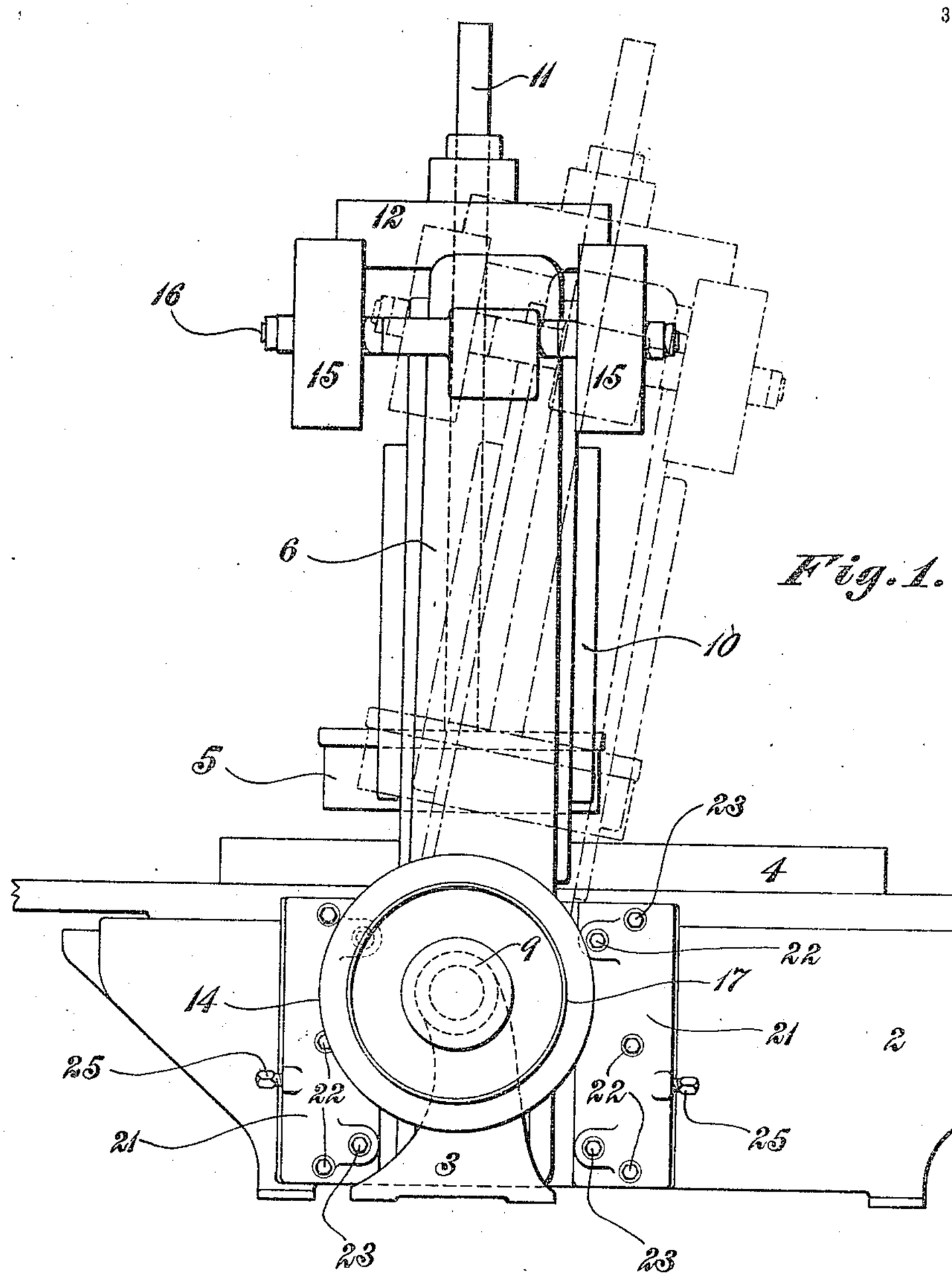

Fig. 1.

Witnesses:

Inventor:
B.M.W. Hanson
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3 SHEETS—SHEET 2.

Fig. 2.

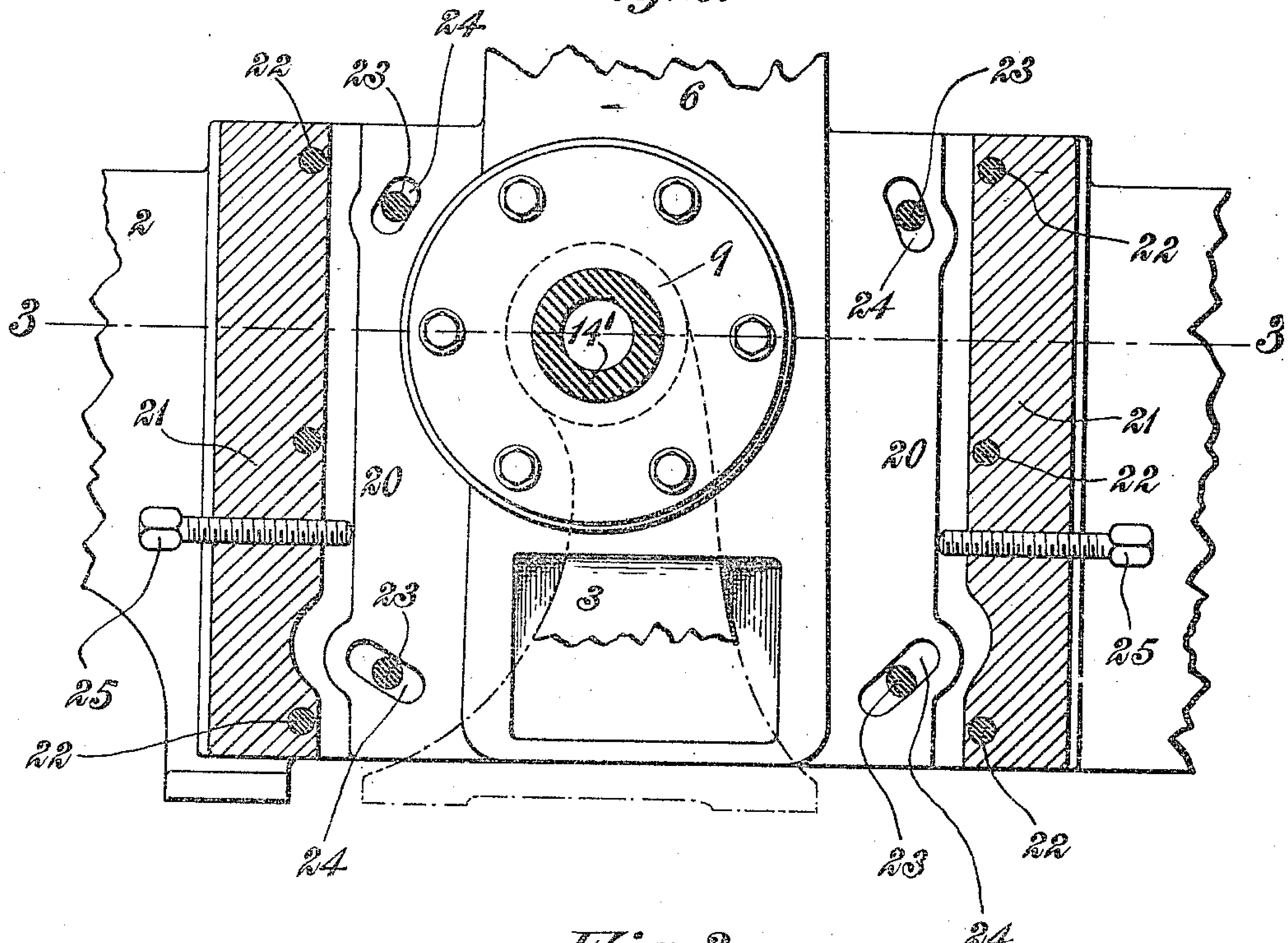
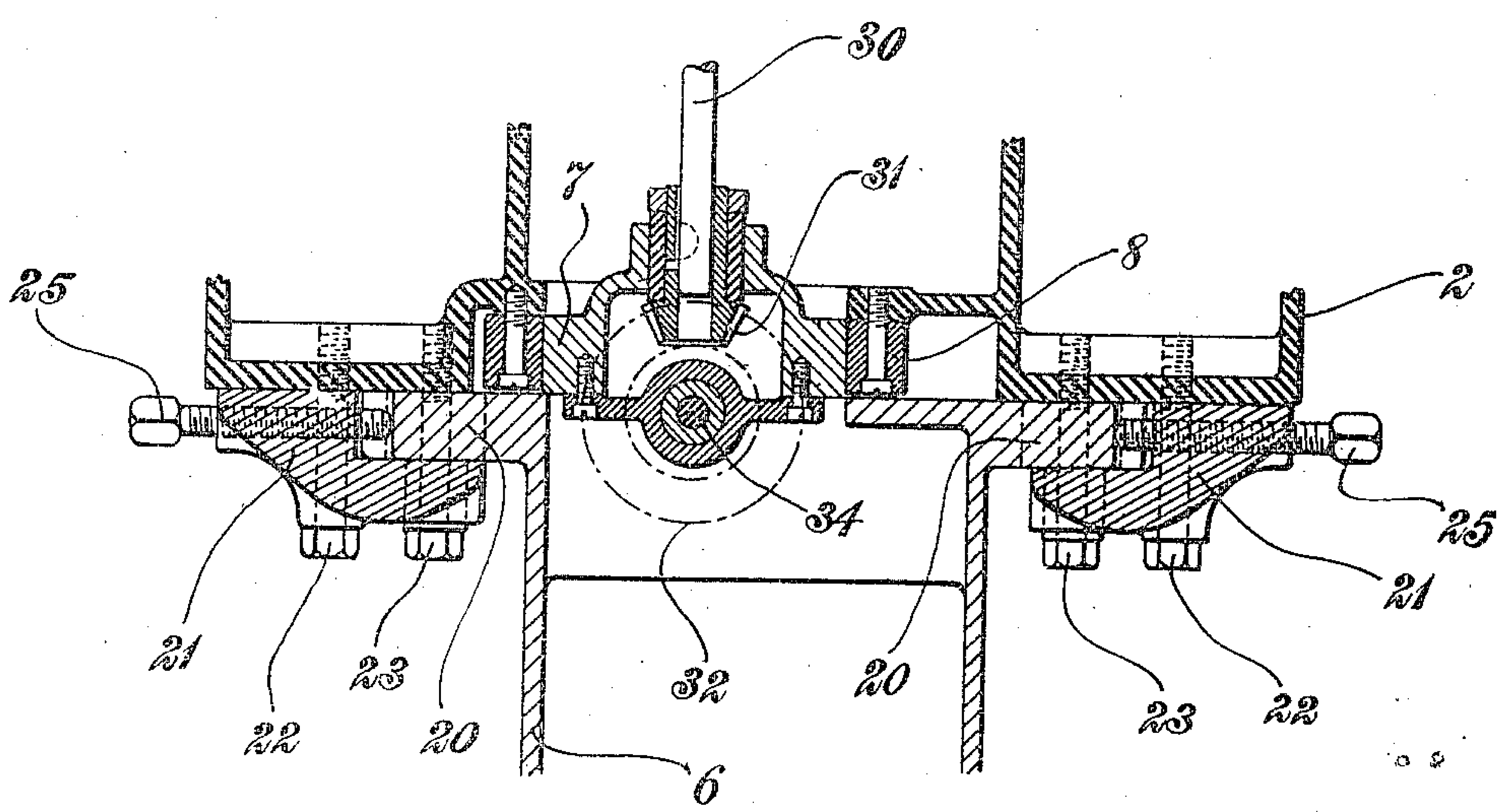


Fig. 3.



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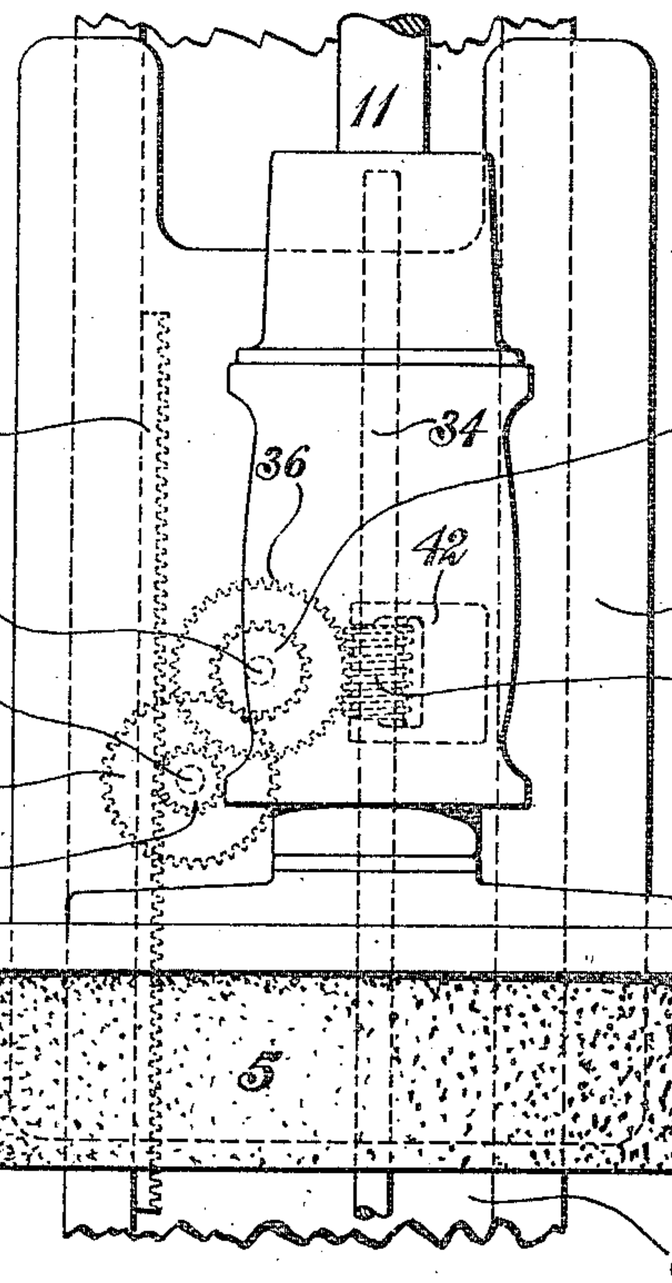

Fig. 5.

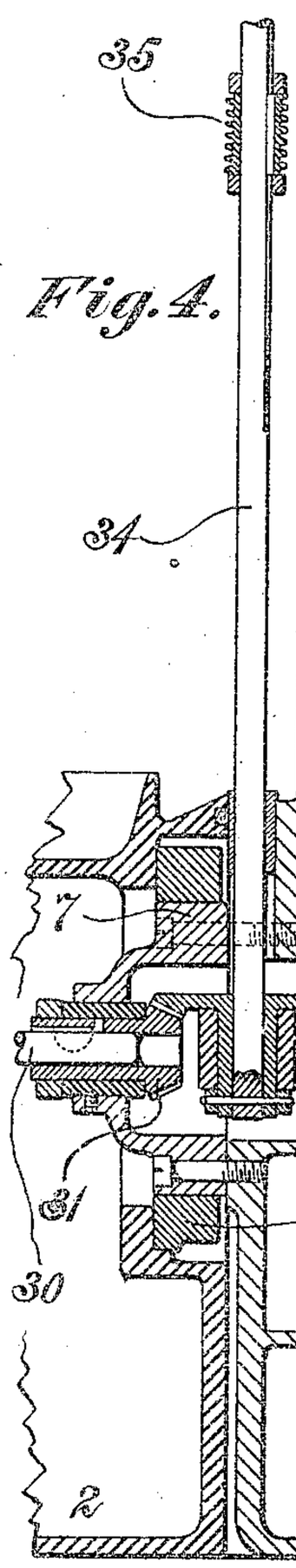

Fig. 4.

Witnesses:

T. G. Sloan

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UNITED STATES PATENT OFFICE.

BENGT M. W. HANSON, OF HARTFORD, CONNECTICUT, ASSIGNOR TO PRATT & WHITNEY COMPANY, OF HARTFORD, CONNECTICUT, A CORPORATION OF NEW JERSEY.

GRINDING-MACHINE.

983,226. Specification of Letters Patent. Patented Jan. 31, 1911.

Application filed April 9, 1910. Serial No. 554,450.

To all whom it may concern:

Be it known that I, BENGT M. W. HANSON, a citizen of the United States, residing at Hartford, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Grinding-Machines, of which the following is a specification.

This invention relates to grinding machines.

A grinding machine generally comprises a rotary disk or wheel, and the best driving effect therefor can be obtained by utilizing belting, in that, the disk or wheel can be operated at a higher speed with such a type of drive than by the use of gears.

It is one of the primary purposes of my invention to provide a machine of this type, having a tiltable tool carrier and belt-driving mechanism, in connection with the tool on said tool carrier, comprising a primary or driving pulley and a secondary or driven pulley, the parts being so related that the tool carrier, which is usually in the form of a swinging column, can be adjusted without affecting the proper working relation between the two pulleys, it being understood that the tilting of the carrier or column, is utilized to secure concaved work.

Another object of the invention is to provide mechanism for feeding the tool in such manner that the various adjustments of the column or tool carrier affect in no wise the proper feed of the tool, being as might be remarked, in the present instance, a step by step one.

In the drawings accompanying and forming part of the present specification, I illustrate in detail one convenient form of embodiment of the invention, which to enable those skilled in the art to practice said invention will be set forth fully in the following description, while the novelty of the invention will be included in the claims succeeding the said description.

Referring to said drawings: Figure 1 is a front elevation of a grinding machine including my invention. Fig. 2 is a rear elevation partially in section and with parts removed, of the base and a portion of the column of the apparatus. Fig. 3 is a horizontal section on the line 3—3 of Fig. 2. Fig. 4 is a vertical section of the base or bed and certain coöperating parts, and, Fig. 5 is a front elevation of the column and the grinding or reducing wheel.

Like characters refer to like parts throughout the several figures.

The different parts of the machine may be carried by a bed or base as 2 and a leg or foot piece 3, associated with the bed, the two parts being adapted to present together a three-point support. The bed 2 sustains a reciprocatory work support 4, but as this in itself forms no part of the present invention, it is not necessary to describe in detail the construction and mode of operation of the same. The tool is represented as consisting of a grinding wheel or disk 5 and it will be clear that when the lower flat face of said wheel or disk, which is the active portion thereof, is presented at an angle to the carriage 4, concaved work will be the result and by varying this angular relation, which is secured by the tilting of the column 6, the character of the concavity can be regulated. The column 6 is shown provided at its forward side with a forwardly-projecting hub 7, which turns or rocks, in a ring 8 rigidly fitted in an opening in the rear side of the bed 2, said hub 7 being connected with the column 6 in some suitable manner, for instance, by screws. The leg or foot-piece 3, is provided at its upper end with a hub 9 fitted within an opening in the rear of the column 6, said hub 9 being substantially in line with the hub 7, said two hubs constituting suitable pivots or trunnions for the column.

The tool 5 is carried by the head 10, which slides up and down in suitable ways in said column 6, said tool 5 being fastened in some convenient manner to the shaft 11 supported by suitable bearings upon said column. It will, therefore, be evident that upon rotation of the shaft 11 the grinding wheel or tool 5 will be turned. The feed motion of the wheel is secured in the present case by the intermittent downward movement of the head 10. The shaft 11 is shown as having fastened at its upper end a driven pulley 12 which receives the belt 13 extending from the driving pulley 14, the belt also passing around the guide or idler pulleys 15 supported at opposite ends of the shaft 16, carried by the column 6 and transverse to the shaft 10. The pulley 14 rotates on the shaft 14′, which is tubular and which is fitted in the hub 9,

being held from displacement by the cap plate or disk 14'' suitably connected therewith as by screws. It will be seen that the pulley 14 and tiltable column 6 turn about an axis in common, that is to say, they are coaxial, so that there will always be a proper driving relation between the pulley 14 and the pulley 12 in all the angular adjustments of the tiltable column 6. The pulley 14 may be operated in any desirable manner, for instance, by the pulley 17, the two being ordinarily connected together for this purpose, the pulley 17 in practice being preferably driven by an overhead pulley. (Not shown). It is conceivable, of course, that the pulley 14 might be otherwise operated.

The tiltable column 6 is shown provided at, or near, its lower end with lateral flanges 20, which bear against the bed or base 2 as best indicated in Fig. 3. Connected with the base or bed 2 and overlying these flanges 20 are gibs or clamping members 21. The gibs or clamping members 21 are connected with the bed 2 by the outer and inner sets of screws 22 and 23 respectively, the inner screws 23 extending through arcuate slots 24 in the two flanges 20, as indicated in Fig. 2, these slots being concentric with the axis of motion of the tiltable column 6. I have shown as tapped into the bodies of the gibs or clamping members 21, adjusting screws 25, the inner ends of which bear against the outer edges of the two flanges 20. It will be assumed that all the screws occupy the positions shown in Fig. 3 and it is necessary to adjust the column 6 toward the left in said figure. To accomplish this the screws 22 and 23 are backed out, thereby freeing the column 6 from clamping effect, the screw 25 on the left is then run out the desired distance, after which the other screw 25 is run in, the latter serving to swing the column over until the flange 20 on the left abuts against the companion screw 25 at which point the screws 22 and 23 will be set up to maintain the adjustment. In view of the fact that there are two sets of screws operative in connection with each clamping member or gib 21, there is no possibility of the column falling forward when said screws are loosened or backed out to obtain the adjustment of said column.

There is shown extending through the bed or base 2 from front to rear thereof, the shaft 30. This shaft is common in grinding machines and is given an intermittent movement so as to effect, through the aid of intermediate parts, the feeding action of the head 10 and therefore the grinding wheel 5. It is therefore unnecessary to describe in detail the character of the operating means for said shaft; they may be of the usual or any other desired character. This shaft 30, it will be observed, is coaxial with the tiltable column 6 and it is shown having at its inner end a bevel pinion 31 in mesh with the bevel gear 32 at the lower end of the shaft 34 supported by suitable bearings on the tiltable column 6 and adapted therefore to swing therewith.

Splined or feathered, to the approximately upright shaft 34 is a worm 35 in mesh with a worm gear 36, the shaft 37 of which is supported by the head 10 and carries a pinion 37′ in mesh with a spur-gear 38, the shaft 39 of which carries a pinion 40 in mesh with the rack bar 41 fastened in some suitable manner to the column 6, the two shafts 37 and 39 being rotatively supported by bearings on the head 10. Said head 10 is equipped with a forked member 42 suitably fastened thereto and which receives between its branches the worm 35. It will therefore be evident that on each forward motion of the shaft 30 the grinding wheel 5 through the described connections will be advanced or fed downward one step.

What I claim is:

1. A grinding machine comprising a bed provided with a reciprocatory work support, a tiltable column, a reducing member, means for rotating said reducing member, comprising driving and driven pulleys, the driving pulley being coaxial with the tiltable column, a rotary shaft also coaxial with said tiltable column, and means operated by said shaft for imparting an advancing movement to the reducing member.

2. A grinding machine comprising a bed provided with a reciprocatory work support, a tiltable column provided with a reducing member for the work, mechanism for rotating said reducing member, comprising driving and driven pulleys the driving pulley being coaxial with said column, a rotary shaft also coaxial with the column, a shaft supported by the column, to swing therewith and operatively connected with said first mentioned shaft, and means operative by the second shaft for advancing the reducing member.

In testimony whereof I affix my signature in presence of two witnesses.

BENGT M. W. HANSON.

Witnesses:

W. U. STORRS,

H. W. KILBOURNE.