

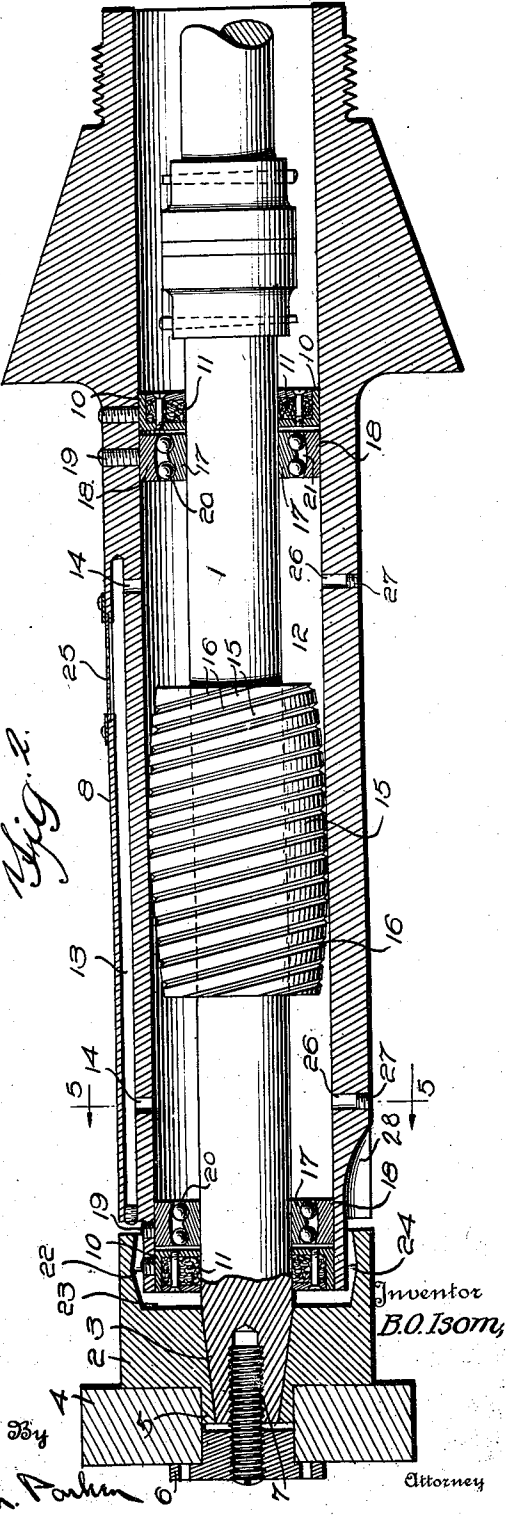
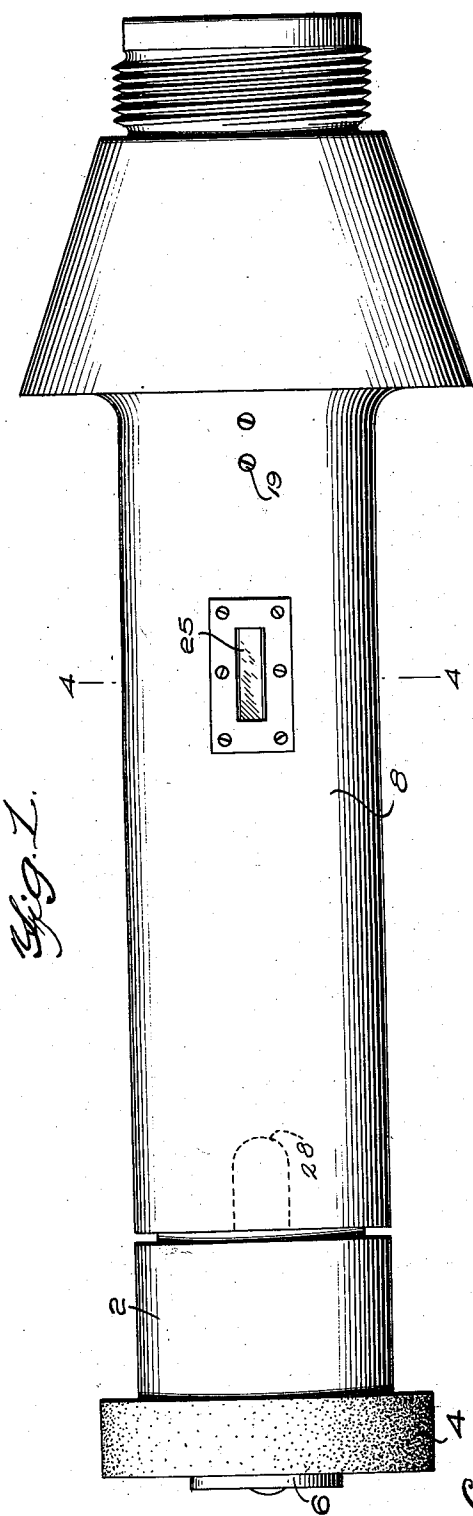
Dec. 18, 1923.

1,478,338

B. O. ISOM

SPINDLE

Original Filed Sept. 6, 1921 2 Sheets-Sheet 1



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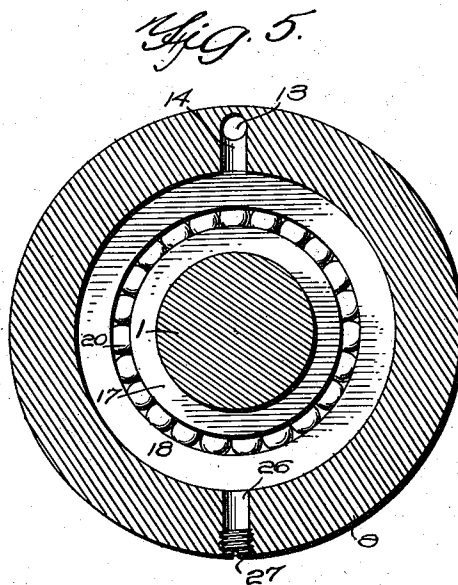
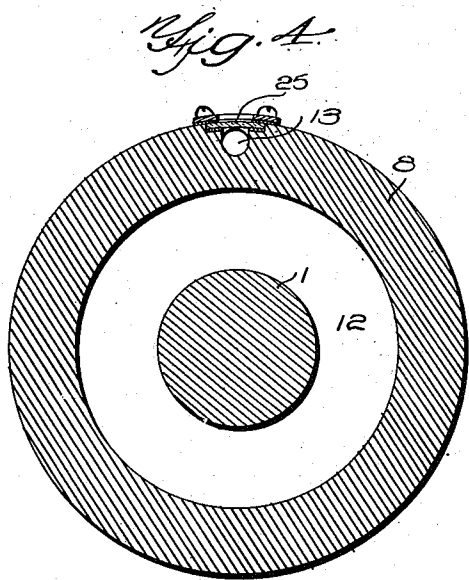
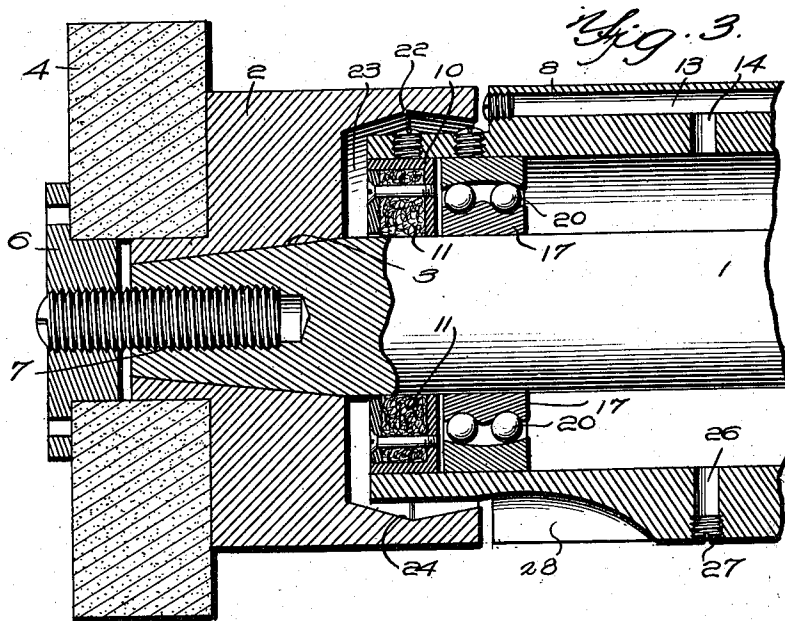
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SPINDLE

Original Filed Sept. 6, 1921 2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE.

BENJAMIN O. ISOM, OF MARYSVILLE, MICHIGAN.

SPINDLE.

Application filed September 6, 1921, Serial No. 498,850. Renewed May 9, 1923.

To all whom it may concern:

Be it known that I, BENJAMIN O. ISOM, a citizen of the United States, residing at Marysville, in the county of Saint Clair and State of Michigan, have invented certain new and useful Improvements in Spindles, of which the following is a specification.

This invention relates to spindles for grinding machines, and more particularly to a balanced oil thrust grinding spindle.

An object of the invention is the provision of a grinding spindle which will eliminate chattering.

A further object is the provision of an oil thrust which will retain the spindle in a balanced position at all times.

In the accompanying drawings, I have shown one embodiment of the invention. In this showing:

Figure 1 is a plan view,

Figure 2 is a vertical central sectional view,

Figure 3 is a view similar to Figure 2 on an enlarged scale,

Figure 4 is a transverse sectional view on line 4—4 of Figure 1, and,

Figure 5 is a similar view on line 5—5 of Figure 2.

Referring to the drawings, the reference numeral 1 designates the spindle which is driven in any suitable manner. The spindle is provided with a fly wheel 2 arranged upon the front end thereof. As shown, the end of the spindle is tapered, as at 3, and is adapted to be received in a tapered opening in the fly wheel. The grinding element 4, shown as an emery wheel, is arranged on a hub 5 carried by the fly wheel. An end plate 6 is adapted to retain the fly wheel and grinding element on the spindle, the end plate being provided with a suitable fastening element, such as a bolt 7, received in a central opening in the spindle.

A housing 8 is arranged over the spindle. This housing is adapted to receive the oil by means of which the spindle is balanced. The ends of the housing are provided with suitable packing boxes 10, adapted to contain the packing 11 of felt or other suitable material forming an oil chamber 12 surrounding the spindle. The housing is provided with a passage 13 formed in the wall thereof

and communicating with the interior of the housing by means of ports 14. The spindle is provided with an enlarged portion 15 having spiral grooves or threads 16. As shown, the center of the enlarged portion is of greater thickness than the ends forming a slight clearance at the center and being spaced considerable distance from the housing at each end.

The spindle is provided with a pair of ball bearing race rings 17 which are secured thereto in any suitable manner. I have found that the sections carried by the spindle may be pressed thereon and similar sections 18 are pressed in the housing and are further retained in position by means of screws 19. Each of the inner bearing rings is provided with a pair of grooves for the reception of bearings 20, and the outer bearing ring is provided with a face 21 drawn on a radius from the center of the shaft, whereby the face 21 is concentric throughout its width to the axis of the shaft.

The fly wheel 2 is provided with a peripheral flange 22 at its rear end forming an oil trap 23. The inner face of the flange inclines toward the center, forming a trough 24 which will retain any oil that passes through the packing box. The housing is provided with a window 25 arranged over the passage 13 whereby the flow of oil through the passage may be seen. The housing is further provided with drain openings 26, normally closed by plugs 27. A suitable opening 28 may be provided in the end of the housing to permit access to the oil trap 23.

The oil thrust is as follows: The ends of the housing 8 are provided with suitable stuffing boxes 10, adapted to contain the packing 11 of felt or other suitable material forming an oil chamber 12 around spindle 1. The spindle is provided with an enlarged portion 15 which is pressed upon it and placed about half way between packing boxes, thus making oil chambers on each side about the same. This enlarged portion 15 acts as a pump, as it has a right hand spiral groove full length of it, and is tapered at each end, so as to give the oil a lead. The largest diameter of 15 has a small clearance of housing, when the spindle is in motion,

which turns to the right, the spiral groove, which is flooded with oil from front chamber carries oil to back chamber, then through rear part 14 into the over pass return passage 13 then through front part 14 back into front chamber. It is again in contact with the spiral, which again passes it through. It is by this means that I obtain the one way steady thrust all the time, as the spiral or screw running in oil has the same effect as a boat propeller running in water, it carries the oil to the rear, and thrusts itself to front, thus taking up all the play in the bearings. The oil return over pass 13 is provided with a glass window 25 so that operator may see when more oil is needed.

The amount of thrust can be adjusted by means of either finer pitch thread or greater. If less thrust is needed, then a finer pitch thread, for a greater thrust, then a larger lead through would be required.

In the manufacture of emery wheels it has been found that the density of the mass varies slightly throughout so that such wheels are slightly out of balance. This faulty balance results in the chattering of the emery wheel shaft when the wheel is revolved at grinding speed. The momentum of the fly-wheel 2, which is perfectly true on spindle 1, overcomes the faulty balance of the emery wheel and makes it run smoothly. Another feature of the fly-wheel 2 is the oil trap. The rear of the fly wheel has flange 22, which extends over end of housing 8. The inner face of this flange 22 inclines toward center forming a trough 24, which will catch what little oil may work past the packing box 10. A drop of oil on a moving part will run to the highest point, therefore, what little oil may work past the packing box 10 will be retained in trough 24, by centrifugal force as stated. A suitable opening 28 is milled in end of housing 8 adjacent the fly wheel 2, so that operator may wipe out oil from trough 24 when necessary.

It is to be understood that the form of my invention herewith shown and described is to be taken as a preferred example of the same, and that various changes in the shape, size, and arrangement of parts may be resorted to without departing from the spirit of the invention or the scope of the subjoined claims.

Having thus described my invention, I claim:

1. In a device of the character described, a spindle, a housing surrounding the spindle and forming an oil chamber, a threaded enlargement arranged on said spindle within the chamber and adapted to pump oil in a direction opposite to the direction of thrust on the spindle, and means for returning the oil to the opposite end of the housing.

2. In a device of the character described, a spindle, a housing surrounding the spindle, packing boxes arranged between said housing and said spindle to form an oil chamber, self-aligning bearings arranged between said spindle and said housing, means for pumping oil through said chamber in the direction opposite to the direction of thrust on the spindle, and means for returning the oil to one end of the oil chamber.

3. In a device of the character described, a spindle, a housing surrounding said spindle, means for feeding oil through the space between the housing and the spindle in a direction opposite to the direction of thrust on the spindle, packing boxes arranged at the opposite ends of the housing, and bearings arranged between said housing and said spindle, said bearings comprising members having race-ways secured to the spindle, rollers arranged in said race-ways, and members secured to the housing and provided with a contacting face formed on a radius described from the center of the spindle.

4. In a device of the character described, a spindle, a housing surrounding the spindle and spaced therefrom, packing glands arranged at opposite ends of said housing between the housing and said spindle to form an oil chamber, self-aligning bearings mounted within the ends of said housing adjacent said glands and between the housing and said spindle, and means for pumping oil in one direction within said housing, said housing being provided with an oil passage communicating with the interior of the housing upon opposite sides of said pumping means.

5. In a device of the character described, a spindle, a housing surrounding the spindle and spaced therefrom, packing glands arranged at opposite ends of said housing between the housing and said spindle to form an oil chamber, self-aligning bearings mounted within the ends of said housing adjacent said glands and between the housing and said spindle, means for pumping oil in one direction within said housing, said housing being provided with an oil passage communicating with the interior of the housing upon opposite sides of said pumping means, and a member mounted at one end of said spindle and adapted to collect and retain leakage of oil past the adjacent gland.

6. In a device of the character described, a spindle, a housing surrounding the spindle and spaced therefrom, packing glands arranged at opposite ends of said housing between the housing and said spindle to form an oil chamber, self-aligning bearings mounted within the ends of said housing adjacent said glands and between the hous-

ing and said spindle, means for pumping the adjacent end of said housing, said flange
oil in one direction within said housing, said being provided with an internal trough. 10
housing being provided with an oil passage
communicating with the interior of the
5 housing upon opposite sides of said pump- In testimony whereof I affix my signature
ing means, and a fly wheel mounted upon in presence of two witnesses.
one end of said spindle, said wheel including
a longitudinal peripheral flange surrounding BENJAMIN O. ISOM.

Witnesses:

CARL A. WAGNER,
R. S. CAMPBELL.