Aug. 13, 1935. A. SCRIVENER 2,010,965

PRECISION GRINDING MACHINE

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Fig. 1.

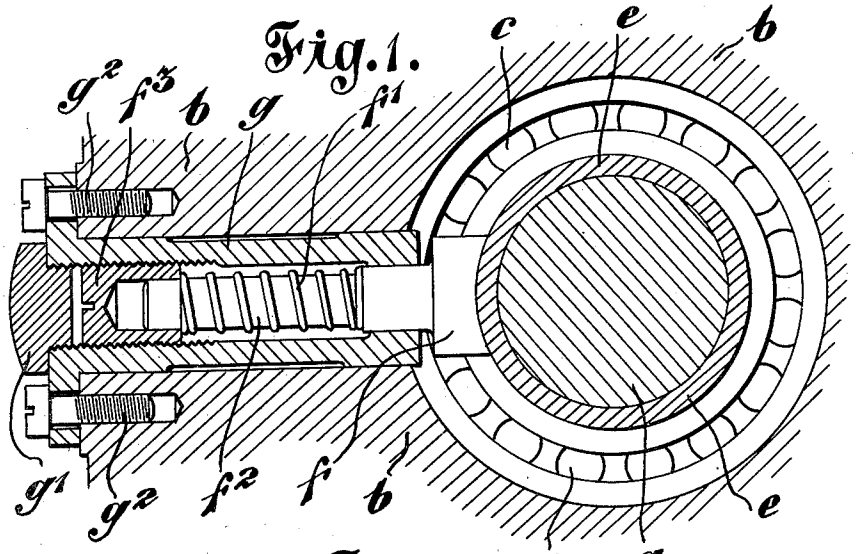
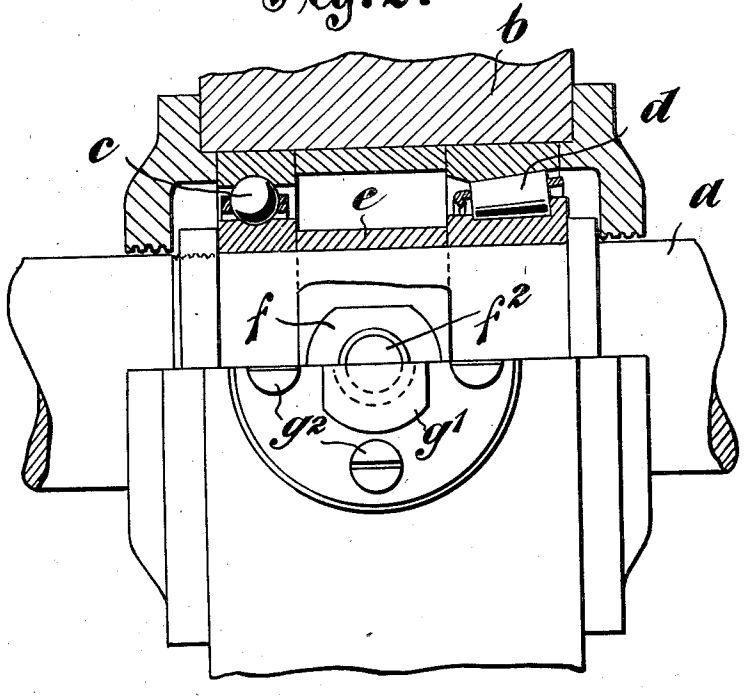


Fig. 2.



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PRECISION GRINDING MACHINE

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4 Claims. (Cl. 308—189)

This invention has reference to improvements in connection with precision grinding machines of the type in which the spindle is equipped with anti-friction bearings.

In grinding machines of this type it is found that minute vibrations are produced by the component members of the anti-friction bearings within which the spindle is housed, and that this vibration is detrimental both to the accuracy and finish of the work being ground and also to the life of the bearings.

The present improvements are designed with the object of neutralizing or damping-out these minute vibrations, and of thereby avoiding the consequent inconvenience referred to.

According to the present invention, in a precision grinding machine of the type referred to, a predetermined braking load is applied to the spindle so as to operate in direct or indirect opposition to any load applied by the action of the grinding wheel, said braking load being controllable or adjustable to suit particular requirements, for example by means of an adjustable compression spring.

In order that the invention may be clearly understood and readily carried into practice, reference may be had to the appended explanatory sheet of drawing, in which:—

Figure 1 illustrates in transverse sectional elevation, and Figure 2 in longitudinal sectional elevation, vibration damper mechanism constructed according to the present invention.

In a convenient method of carrying the invention into effect, the spindle *a* of the grinding machine is supported at axially spaced points within a suitable housing *b* by means of anti-friction bearings *c* and *d*, which may either be of ball or roller type or both, and the spindle *a* so mounted is fitted with a hardened steel sleeve or bush *e* concentric with the bearings and secured in a convenient position relative to the bearings, the sleeve or bush being fixed for example in an intermediate position on the spindle, between the two annular sets of bearings *c* and *d* which abut on opposite ends of the sleeve or bush as shown. A predetermined braking load is applied to the spindle by means of a bronze brake shoe or equivalent friction pad *f* or brake band engageable with the outer surface of the sleeve or bush *e*, the braking load of this shoe or member *f* being predetermined under control of a spiral compression spring f^1 mounted upon the stem f^2 carrying the shoe or member *f* and located within a barrel *g* disposed within the housing *b* in a position at right angles to the axis of the spindle, the spring f^1 being set by means of a retaining and adjusting screw block f^3 also fitted into the barrel under the protection of a terminal screw cap g^1, and the barrel being fixed in position by means of a series of screwed studs g^2 passing through an apertured terminal flange of the barrel into engagement with internally screw-threaded sockets in the housing as shown.

The normal bearing point of the brake shoe or member *f* upon the sleeve or bush is preferably located for maximum efficiency on a radial line diametrically opposed to the normal line of the load applied to the spindle by the action of the grinding wheel during its working period, and it will be seen that on the predetermined load being applied to the brake shoe or band by a pre-setting of its control spring f^1 and screw f^3 an effective damping-out of all vibration of the anti-friction bearings is obtained, resulting in the desired enhancement of the accuracy and finish of the work being ground, and ensuring also a longer working life of the bearings, as due to the absence of vibration the spindle is constrained to rotate in a true path about its axis, thereby reducing shock on the component members of the bearings.

What I claim as my invention and desire to secure by Letters Patent is:

1. A rotary shaft and means for dampening vibration thereof, said means comprising a brake shoe operatively engaging the shaft, a stem rigid with and extending outwardly from said brake shoe, a fixedly mounted sleeve into which said stem extends and in which said stem, adjacent to the brake shoe, has closely fitting slidable bearing engagement, a bored block threaded within said sleeve, the outer end of said stem being disposed within the bore of said block and having closely fitting slidable bearing engagement therewith, and a spring interposed between said block and said brake shoe to be adjustably compressed by rotation of said block to maintain a constant pressure of the brake shoe against the shaft.

2. A rotary shaft and means for dampening vibration thereof, said means comprising a brake shoe operatively engaging the shaft, a stem rigid with said brake shoe and extending outwardly therefrom, a fixedly mounted sleeve into which said stem extends and in which said stem, adjacent to the brake shoe, has closely fitting slidable bearing engagement, a block threaded within said sleeve, the outer end of the stem having closely fitting bearing engagement with said block, and means whereby rotation of the block

varies the pressure of the brake shoe against the shaft.

3. A rotary shaft and means for dampening vibration thereof, said means comprising a brake shoe operatively engaging the shaft, a stem rigid with said brake shoe and extending outwardly therefrom, a fixedly mounted sleeve into which said stem extends and in which said stem, adjacent to the brake shoe, has closely fitting slidable bearing engagement, a block threaded within said sleeve, the outer end of the stem having closely fitting slidable bearing engagement with said block, a shoulder on said stem, and yieldable means interposed between said shoulder and said block to be compressed by inward screwing of said block within said sleeve to maintain the brake shoe engaged under pressure with the shaft.

4. In a precision grinding machine, a housing, spaced bearings within said housing, a grinding wheel shaft journaled in said bearings, a brake shoe operatively engaging said shaft between said bearings, a stem rigid with said brake shoe and extending outwardly therefrom, the housing having a bore, a sleeve closely fitted within said bore and fastened securely to the housing, the stem extending into said sleeve and having closely fitting slidable bearing engagement therewith adjacent to the brake shoe, a block threaded within said sleeve, the outer end of the stem having closely fitting slidable bearing engagement with said block, a shoulder on the stem, and yieldable means interposed between said shoulder and said block to be compressed by inward threading of the block to maintain the brake shoe engaged under constant pressure with said shaft.

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