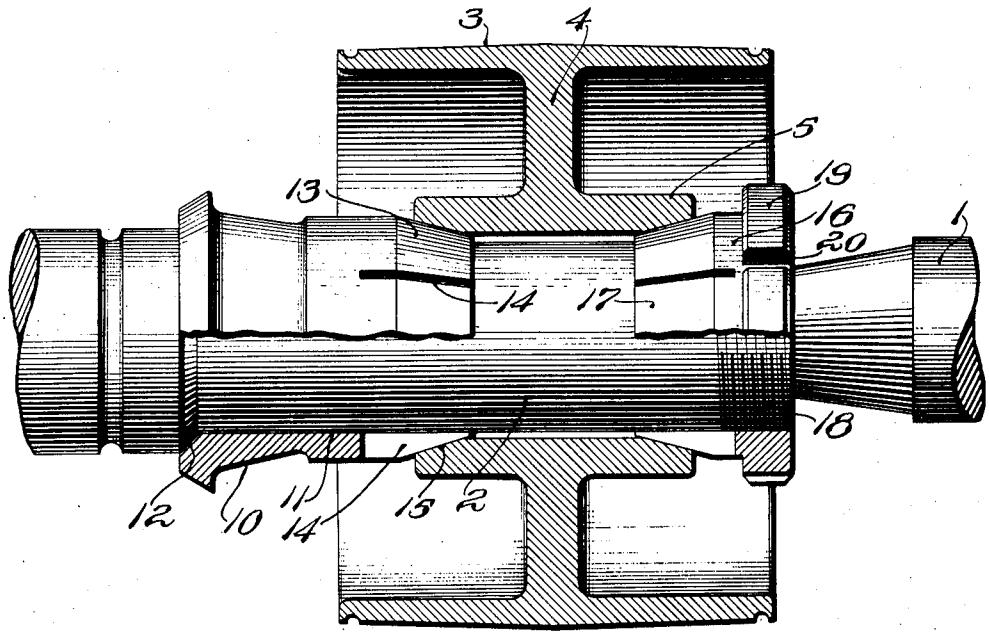
C. H. NORTON.

MOUNTING FOR GRINDING MACHINE SPINDLES.

APPLICATION FILED JUNE 3, 1919.

1,382,606. Patented June 21, 1921.



INVENTOR

Charles H. Norton

BY

Clayton R. Jenks

ATTORNEY

UNITED STATES PATENT OFFICE.

CHARLES H. NORTON, OF WORCESTER, MASSACHUSETTS, ASSIGNOR TO NORTON COMPANY, OF WORCESTER, MASSACHUSETTS, A CORPORATION OF MASSACHUSETTS.

MOUNTING FOR GRINDING-MACHINE SPINDLES.

1,382,606. Specification of Letters Patent. Patented June 21, 1921.

Application filed June 3, 1919. Serial No. 301,548.

To all whom it may concern:

Be it known that I, CHARLES H. NORTON, a citizen of the United States of America, residing at Worcester, in the county of Worcester and State of Massachusetts, have invented certain new and useful Improvements in Mountings for Grinding-Machine Spindles, of which the following is a full, clear, and exact specification.

My invention relates to the mounting of pulleys, gears or sprockets on the spindles of cylindrical grinding machines.

Long experience has shown that the ordinary key or set screw mounting does not secure the results necessary in cylindrical grinding, but that eventually the pulley or gear becomes loose enough to cause blemishes in the highly finished surfaces of the work ground. Therefore, it has been necessary to so fit the surface of the hole to the surface of the spindle by hand scraping that when in place the pulley and spindle become practically one solid piece. They cannot be forced together in the old, well-known way, because the pulley or gear must be removed frequently, and yet we must secure the same result as if forced together. For these reasons it has been impossible to interchange the pulleys and spindles of well made cylindrical grinding machines.

It is accordingly an object of my invention to provide such a necessary rigid connection between a pulley and its spindle and yet enable one to utilize interchangeable parts and mount a pulley accurately at a low expense and by means of simple operations. Further objects will be apparent from the following disclosure.

Referring to the drawing, the figure is a section, with parts shown in elevation, of a pulley mounted on a grinding wheel spindle, as embodying one phase of my invention.

In accordance with this invention, I provide a pulley, or a gear sprocket, or other similar member adapted to be fixed relative to a spindle on a grinding machine, with a hole which is considerably larger than the spindle on which it is to be mounted, so that there is no necessity for accurately fitting these parts together, and I wedge the pulley on the spindle by means of two cone members which are adapted to be forced into intimate engagement with the inner surface of the hole and the outer surface of the spindle.

In the construction illustrated, the spindle 1 is preferably provided with a smooth cylindrical portion 2 on which the pulley 3 is to be mounted. The pulley, which may be of the usual construction, comprises a web 4 and hub 5 having an inner surface, which has been made of larger circumference than that of the spindle over which it is to be mounted, these sizes being so proportioned that my conical wedges may be forced to a sufficient distance between the pulley and the spindle to hold the pulley in place.

In order to provide a driving connection between the spindle and the pulley and to center the latter accurately, I provide a wedge part on the spindle, which may be integral therewith, but is preferably in the form of a collar 10 adapted to be located in a proper position for the pulley. This collar, as illustrated, may have a carefully formed inner cylindrical surface 11 which is fitted accurately to the cylindrical portion of the spindle to provide a sliding or wringing fit. The longitudinal movement of the collar is limited by suitable means, such as a shoulder 12 provided on the spindle, which is shown in the present embodiment as being beveled and engaging a corresponding bevel on the collar. This collar comprises an inwardly tapering conical portion 13 which is preferably provided with a plurality of slots 14 equidistantly spaced around the cone, thereby forming separated clamping fingers or wedges. The bevel of this cone or the fingers is such as to provide a gradually sloping surface or a thin wedge so that the cone may be forced to a considerable distance between the spindle and the hub and center the latter and fix it firmly in place. The inner surface of the hub is also preferably provided at its ends with tapering or beveled portions 15 which should have the same angle of slope as the cone against which it is adapted to be fitted.

In order to support and center the opposite end of the hub, a second collar 16 is provided. This also has a tapering split cone or separated fingers 17 adapted to engage the adjacent inner beveled surface of the pulley. In order to force the cones into place, I provide a nut adapted to coöperate with threads 18 on the spindle. This nut is preferably made integral with the conical collar in order that the wedge fingers may be removed as well as forced into place with-

out difficulty. For this purpose, I form a head 19 on the collar 16 and provide it with slots 20 adapted to be engaged by a spanner wrench, or the collar may be manipulated and adjusted by other suitable means. The fingers are not threaded but are freely movable relative to the spindle in order that they may be deformed or wedged into place against the pulley surface, and the inner surfaces of these cones and the spindle are made cylindrical to provide for easy assemblage of the parts. It is to be noted that this mounting device is symmetrical with respect to the axis of the pulley, so that if accurately made it will not affect the balance of the rotating parts. It is necessary in this art that the pulley be accurately made and balanced and that the spindle be rotated without vibration. My construction as described permits this balance to be easily obtained.

The method of assembling this device is obvious. By means of such a construction, I may first locate the cone 10, then put the pulley in place and give it a driving connection with the spindle merely by tightening up the outer adjustable collar 16 which in its forward movement forces the pulley not only against the opposite cone but also upon the fingers of the adjustable collar itself. By this means the pulley is not only given a driving connection with the spindle ordinarily without the aid of a key but it is accurately centered, due to the fact that it is supported at both ends of the hub by the cones and since the latter are of uniform thickness throughout. In order to remove the pulley it is merely necessary to apply a wrench or other tool to the head 19 and turn the cone portion out from engagement with the pulley, after which the latter may be taken off from the other cone. A new pulley may be inserted or the old one may be replaced and accurately centered and otherwise positioned.

It is to be noted that the term "pulley" is used broadly in this case to cover not only what is ordinarily known as a pulley but also gears, sprockets, etc., which are mounted on a spindle for transmitting rotative motion. This invention has been described as applied to a grinding machine spindle since this is a machine in which the spindle carrying the grinding wheel must be mounted accurately and rotated at a high velocity without vibration and in which refinement of operation and extreme accuracy in results is necessary.

What I claim is:—

1. In combination, a grinding machine spindle, a pulley having a hole mounted on and spaced from the spindle, a wedge shaped part projecting between one end of the hole and the spindle, a collar adjustably mounted on the spindle and provided with inwardly projecting, separated, wedge shaped fingers adapted to extend between the spindle and the opposite end of the hole and means for moving the adjustable collar to force said fingers between the pulley and the spindle whereby the pulley may be fixedly mounted and centered on the spindle for a driving connection.

2. In combination, a grinding machine spindle, a pulley, a hub thereon provided with a hole having inwardly tapering surfaces adjacent to the ends thereof, said hub being loosely mounted on the spindle, a collar movably mounted on said spindle and having inwardly tapering, separated fingers projecting between the spindle and one of said tapering surfaces, means to limit the axial movement of said collar, an adjustable collar having inwardly tapering separated fingers engaging the other tapering surface of the hub and means for moving the adjustable collar to force said fingers between the spindle and pulley hub or for withdrawing the same therefrom, whereby the pulley may be removably mounted on the spindle and centered for a driving connection.

3. In combination, a grinding machine spindle having a cylindrical surface, a pulley, a hub thereon provided with a hole having inwardly tapering surfaces adjacent to the ends thereof, said hub being mounted on and spaced from the spindle, a collar slidably fitted on said spindle and having inwardly tapering, spaced fingers projecting between the spindle and one inwardly tapering surface of the hub, a shoulder on the spindle adapted to limit the longitudinal movement of said collar, an adjustable collar comprising inwardly tapering, separated fingers engaging the other tapering surface of the hub, said collar being screw threaded and coöperating with threads on the spindle whereby it may be adjusted to force the tapering fingers firmly between the hub and spindle and center the pulley for driving purposes and for removing the same therefrom.

Signed at Worcester, Massachusetts, this 2nd day of June, 1919.

CHARLES H. NORTON.