J. PARKER.

CUTTER HOLDING DEVICE FOR MILLING MACHINES.

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Fig. 1.

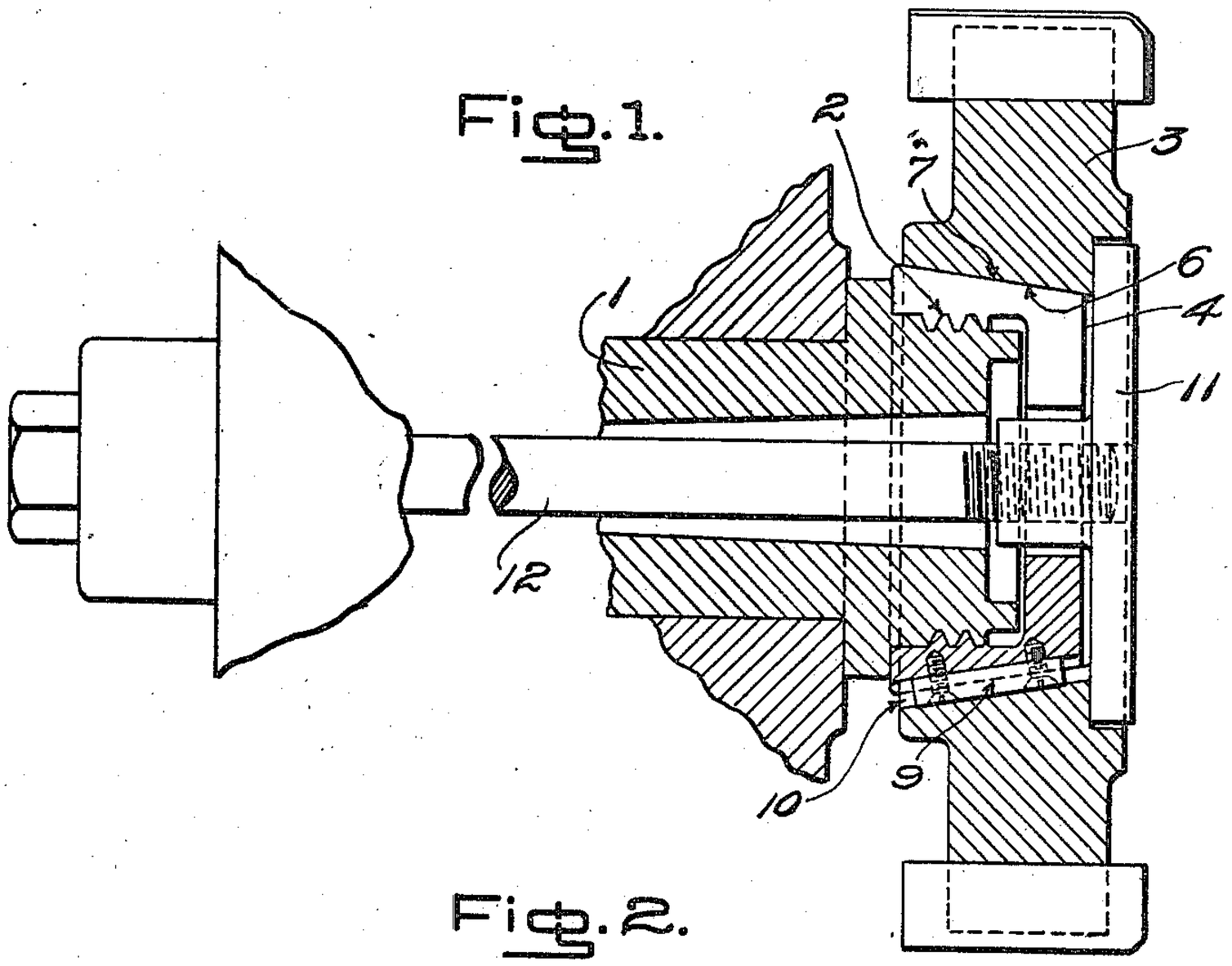
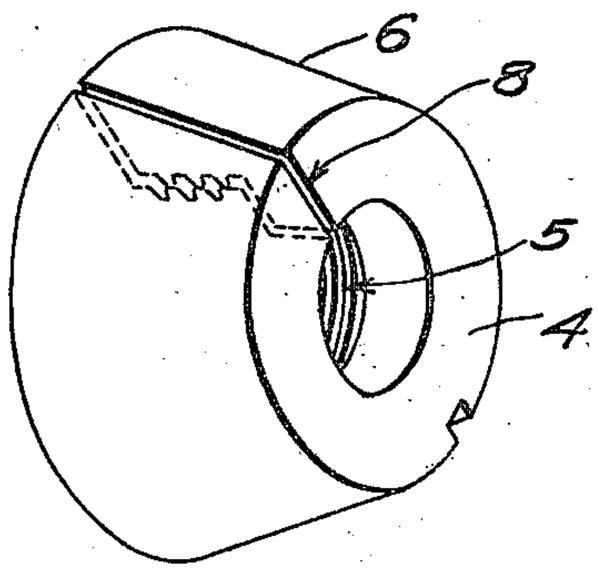


Fig. 2.



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UNITED STATES PATENT OFFICE.

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CUTTER-HOLDING DEVICE FOR MILLING-MACHINES.

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To all whom it may concern:

Be it known that I, JOHN PARKER, a subject of the King of Great Britain, residing at Providence, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Cutter-Holding Devices for Milling-Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

The invention relates to cutter securing devices for milling or similar machines, and more particularly to devices adapted to secure large face mills to the spindles of milling machines.

It has heretofore been the usual practice to secure face mills to the spindles of milling machines by screwing them directly on to the nose of the spindle; the direction of the screw thread being such that the resistance offered to the cutter by the work tends to screw the mill more tightly on to the spindle. In using large mills, the resistance offered by the work, and the repeated blows upon the mill as the cutting blades come successively into action, frequently drive the mill so firmly on to the nose of the spindle that great difficulty is experienced in removing it. In many cases, after a severe milling operation, it is impracticable to remove the mill without applying sufficient force to strip the thread on the spindle or mill, or otherwise injure the mill or spindle. In the case of large face mills, it has also been found desirable to provide the mill with a long hub having a hole extending diametrically through it in front of the end of the spindle to receive a bar by which sufficient force can be applied to screw off the mill. This brings the cutter blades beyond the end of the spindle, so that the mill is not supported to the best advantage, and is liable to chatter when making a heavy cut.

It is the object of the present invention to provide novel and improved devices for securing face mills or other cutters to the spindles of milling or similar machines which will firmly support the cutter and enable it to be readily removed without danger of injury to the cutter or spindle. To this end the invention contemplates the provision of a split sleeve adapted to engage the screw thread on the nose of the spindle, and provided with a tapered periphery fitting a corresponding hole in the center of the cutter or mill. The cutter may be held on the sleeve by any suitable means, and in the preferred embodiment of the invention, is so held by a plate or washer drawn firmly against the outer side of the mill by a bolt passing through the spindle. The mill is thus drawn firmly on to the sleeve, so that the sleeve tightly hugs the spindle, and an effective driving friction between the tapered surfaces on the cutter and sleeve is secured. The tapered portion of the sleeve permits the mill to be readily removed with the application of little or no force when the binding bolt is loosened, and the split sleeve then opens so that it may be easily removed from the spindle without danger of injury thereto.

The invention will be readily understood from an inspection of the accompanying drawings, and the following detailed description of the construction illustrated therein.

In the drawings Figure 1 is a sectional elevation showing so much of a milling machine spindle as is necessary for an understanding of the present invention, and Fig. 2 is a perspective view of the split sleeve for securing the cutter to the nose of the spindle.

As shown in the drawings, the spindle 1 of the milling machine or other similar machine, is provided with the usual screw threaded end or nose 2 for receiving and supporting various tools or cutters which may be secured to the end of the spindle. The means for securing the large face mill 3 to the end of the spindle comprises a sleeve 4 provided with an interior screw thread 5 for engaging the screw thread on the nose of the spindle, and a tapered periphery 6. The hub or center of the mill 3 is provided with a tapered bore 7 adapted to fit the tapered periphery of the sleeve. The sleeve is split at 8 so that it will closely hug the end of the spindle when the mill is drawn on to its tapered periphery, and will open so that it may be readily removed from the spindle when the mill is removed. The sleeve may also be provided with a key 9 for engaging a keyway 10 formed in the bore of the mill, although this key is not essential, since the friction between the sleeve and mill

will be found sufficient to drive the mill even under severe conditions. The mill is drawn firmly on to the sleeve by a retaining plate or washer 11 adapted to engage the front end of the mill, and provided with a screw threaded bore for engaging the thread on the end of a bolt 12 which passes through the spindle.

In securing the mill to the end of the spindle, the sleeve 4 is first screwed on to the spindle, and then the mill is placed in position on the sleeve and drawn firmly on to the sleeve by tightening the bolt 12. As the mill is drawn on to the tapered periphery of the split sleeve, the sleeve is caused to tightly hug the spindle, so that the mill is firmly and rigidly supported upon the end of the spindle, and an effective driving friction is secured between the sleeve and mill. The resistance offered to the cutting blades of the mill by the work tends to crowd the thread of the sleeve up the thread on the spindle, and thus spread or open the sleeve. This tends to increase the friction between the sleeve and the mill with the increase in the resistance offered by the work. When the mill is to be removed, the bolt 12 is unscrewed from the binding plate 11. The taper 6 on the sleeve 4 is sufficiently steep to permit the removal of the mill 3 without the application of any considerable force. As soon as the mill is removed the sleeve 4 is released so that it may open and be readily unscrewed from the end of the spindle.

The construction described not only enables large face mills to be readily applied to and removed from the spindle of a milling machine, but also enables the mill to be supported so that the cutting plane of the blades is close to the end of the spindle, with a resulting increase in the rigidity with which the cutters are supported.

A further advantage of this construction is that it enables the same mills to be utilized upon different machines having spindles of different diameters or different pitches of screw threads. By providing a series of sleeves 4 adapted to fit the spindles of the different machines, the same set of face mills may be used, thus avoiding the excessive expense incident to providing a different set of mills for each machine. This construction also requires no change in the spindles, so that the use of the mills and tools already on hand and adapted to be screwed upon the nose of the spindle is not interfered with.

While it is preferred to employ the specific construction and arrangement of parts shown and described, it will be understood that this construction and arrangement is not essential, except so far as set forth in the claims, and may be varied without departing from the invention.

Having explained the nature and object of the invention, and specifically described one form in which it may be embodied, what I claim is:—

1. A cutter securing device comprising a split sleeve having an interior screw thread for engaging the thread on the nose of a spindle and having a tapered periphery to engage a cutter having a correspondingly tapered bore, and means for holding the cutter on the sleeve, substantially as described.

2. A cutter securing device comprising a split sleeve having an interior thread for engaging the thread on the nose of a spindle and having a tapered periphery to engage a cutter having a correspondingly tapered bore, a retaining plate for holding the cutter on the sleeve, and a bolt connected with the plate for drawing the cutter on to the sleeve, substantially as described.

3. A cutter securing means, having, in combination, a hollow spindle provided with a screw threaded nose, a split sleeve having an interior thread for engaging the thread on the nose of the spindle and having a tapered periphery to engage a cutter having a correspondingly tapered bore, a retaining plate, and a bolt connected with the plate and extending through the spindle for drawing the cutter on to the sleeve, substantially as described.

4. A cutter securing device comprising a split sleeve having an interior screw thread for engaging the thread on the nose of the spindle and having a tapered surface to engage a corresponding surface within the bore of the cutter, and means for holding the cutter on the sleeve, substantially as described.

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