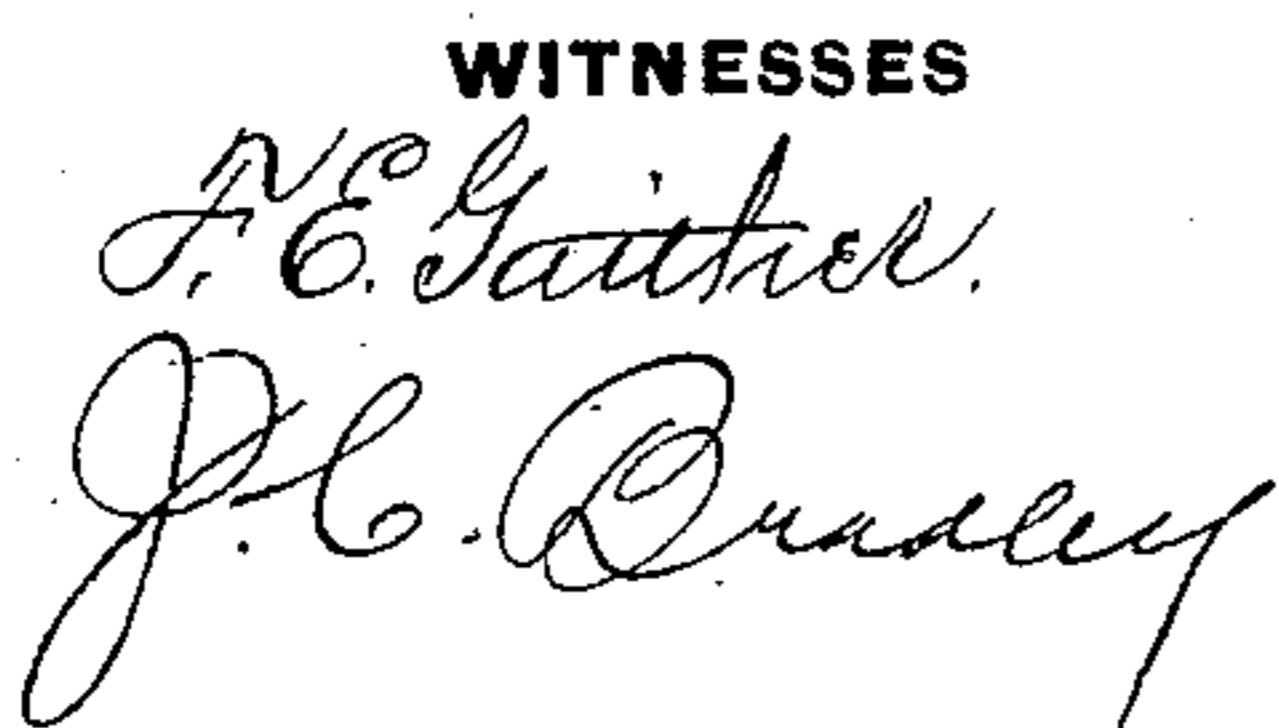


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INVENTOR

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MILLING-MACHINE.

No. 929,599.

Specification of Letters Patent.

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Original application filed November 13, 1905, Serial No. 287,020. Divided and this application filed June 6, 1906. Serial No. 320,391.

To all whom it may concern:

Be it known that I, JAMES E. KEY, a citizen of the United States, residing at Wilmerding, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Milling-Machines, of which the following is a specification.

The invention relates to milling machines and particularly to the work holders for rotatively supporting the work adjacent to the cutter, and has for its objects; to provide a work-holder from which the blanks may be conveniently removed and replaced with slight disarrangement of the operating parts; to provide a holder in which the mandrel is removably secured and in which provision is made for holding such mandrel securely in central position; and finally to provide a holder having means for taking up the wear and securing all the parts together in such a way as to avoid lost motion and consequent inaccuracy of work. These and other advantages are attained by my construction one form of which is illustrated in the accompanying drawings in which—

The figure is a transverse view through the milling machine equipped with my work-holder.

The work-holder in which my invention resides is designed primarily to be used in a milling machine in the production of herring bone gears, as set forth fully in my co-pending application Serial Number 287,020 of which the present application is a division, but it is applicable also to all relations in which work is supported rotarily in order to be fed past a cutter. As shown in the drawings, A is the bed of the machine, B is the cutter adapted to be driven by any desired train of gearing, C is the carriage reciprocable by means of the screw D, E is the work-holder in which my invention particularly resides mounted upon the reciprocatory carriage C and driven rotarily through the train of gearing F connected to the screw D at one end of the train and to the gear 1 for turning the holder at the other. The means for rotarily supporting the holder comprises the two bearings 2 and 3 which are mounted upon the carriage on either side of the work. The bearing 3 is secured to the carriage frame by means of the bolts 4 and is designed to be moved to

the right when the bolts 4 are released in order to permit of the removal of the blanks from the holder. The bearing 2 is, as shown, very long in order to provide a secure support for the heavy blanks and the mandrel when the bearing 3 has been moved to the right and hence is not in position to support the outer end of the mandrel. The means for turning the work includes the sleeve 5 carried by the bearing 2 which sleeve is provided with a shoulder 6 at one end and the screw threaded portion 7 and at the other end is adapted to carry the gear 1 and also has a screw threaded portion 8 for receiving the nut 9 for holding the sleeve securely in position with the shoulder 6 against the bearing 2 and also for holding the gear 1 upon the sleeve. Fitting in the sleeve 5 is the carrying mandrel 10 which mandrel is tapered at its left hand end to fit a corresponding recess in the sleeve and is held tightly in such tapered recess by means of a stud 10' screw threaded at either end and secured at its outer end by means of the nut 12. The right hand end of the mandrel is as shown mounted in the bearing 3. To clamp the blanks 13 laterally, the two side plates 14 and 15 are provided and are adapted to press tightly against the sides of the blanks and hold them rigidly in position. The side plate 14 is secured to the sleeve upon the screw end 7 and the plate 15 is held relatively thereto by means of the bolts 17 which extend through the spaces in the gear blanks and hold the two plates in position. It will be seen from this that the side plate 14 which is screwed onto the driving sleeve 5 constitutes the driving means for turning the set of gear blanks which blanks are slidingly supported upon the mandrel as is also the end member 15. It will therefore be apparent that if desired the two end pieces and the set of blanks may be removed from the mandrel intact by simply removing the bearing 3 and unscrewing the side member 14 together with the blanks 13 and the side member 15. It will also be seen that the construction makes provisions for taking up all lost motion or looseness of parts due to wear or other causes as the sleeve 5 may be tightened by simply tightening the nut 9, the mandrel 10 can be adjusted in its tapered recess by means of the nut 12 and the side member 15 can be tightened by means of the

nuts on the ends of the bolts 17. The slack may therefore be taken up and the lost motion and consequent inaccuracy of work resulting from any looseness can be easily avoided. Ordinarily the work will be removed by simply removing the bearing 3, the side member 15, and sliding the work blanks 13 endwise off of the mandrel 10 which is rigidly supported by means of the long bearing 2.

Having thus described my invention and illustrated its use, what I claim as new and desire to secure by Letters Patent, is the following:

15 1. A blank holding device comprising a bearing, a drive sleeve in the bearing, a side plate detachably secured to one end thereof, a mandrel secured in the sleeve, a second side plate, and means for securing it to the first side plate.

20 2. A blank holding device comprising a bearing, a drive sleeve in the bearing, a side plate screw threaded to one end thereof, a

driving means secured to the other end thereof, a mandrel fitting in the sleeve, positive means for securing the mandrel in position, a second side plate and means for securing it to the first side plate.

3. A blank holding device comprising a main bearing, a sleeve mounted therein, means for turning such sleeve, a side plate detachably mounted upon the sleeve, a mandrel removably secured in the sleeve, another side plate slidably mounted on the outer end of the mandrel, means for clamping the side plates together, and a longitudinally movable end bearing for supporting the outer end of the mandrel.

In testimony whereof I have hereunto signed my name in the presence of the two subscribed witnesses.

JAMES E. KEY.

Witnesses:

EDMUND SIMPSON,
F. E. GAITHER.