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B. P. GRAVES

OVERARM FOR MILLING MACHINES

Filed June 16, 1925

Fig. 1

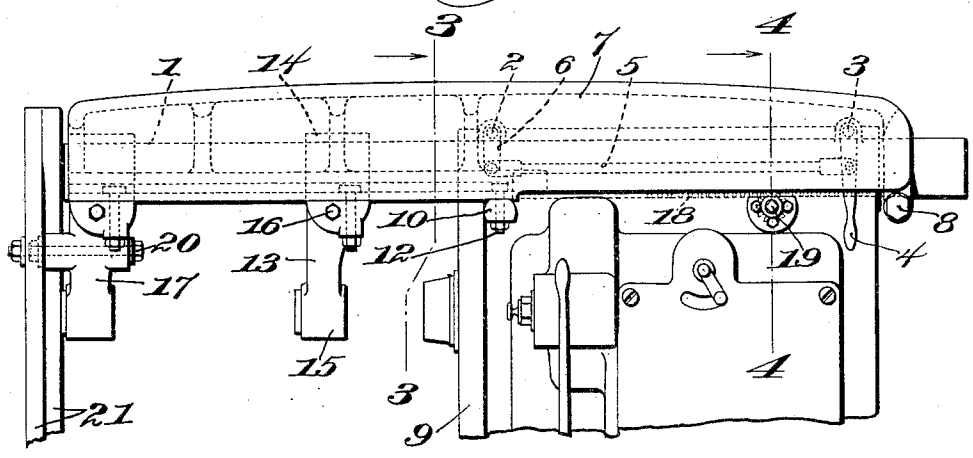


Fig. 2

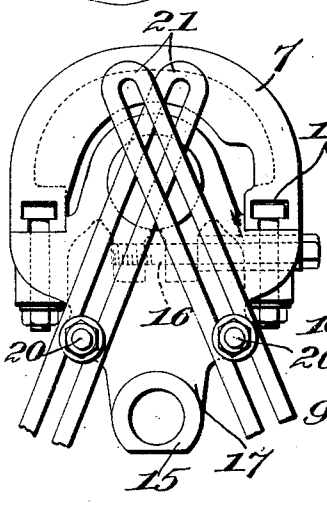


Fig. 3

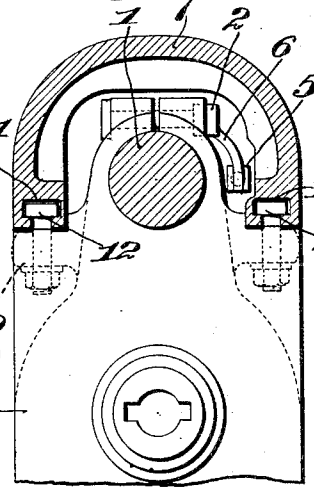
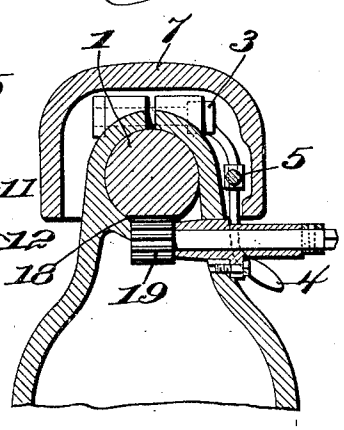


Fig. 4



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UNITED STATES PATENT OFFICE.

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OVERARM FOR MILLING MACHINES.

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The overarm commonly used in milling machines consists of a cylindrical bar adjustably clamped in the upper portion of the machine column in a bearing parallel to the spindle. The advantages of this form of overarm are well recognized. The principal object of the present invention is to provide an overarm structure for milling machines which shall retain the valuable features of this form of arm while affording a much more rigid support for the outbearing hanger, or arbor yoke. Other objects of the invention are to provide an overarm structure of simple and improved construction capable of rigidly supporting the arbor yoke so as to prevent any possibility of misalignment of the arbor under the thrust of the milling cutters even on the heaviest work for which the machine is designed.

The invention is herein shown as embodied in an overarm structure comprising a cylindrical bar functioning mainly as a centering and supporting unit for the arbor yoke, or for the various attachments used on the machine, and a substantially semi-cylindrical cap member engaging the arbor yoke so as to brace the yoke against the thrust of the cutters, which cap member overlies and embraces the cylindrical bar and is clamped or otherwise secured at its rear end to the bar. The cylindrical bar and cap member thus form a single compound arm which can be adjusted as a unit with relation to the machine column, and also by disconnecting the cap member from the cylindrical bar the bar can be used alone in the same manner as the form of arm commonly used, and with the same attachments. It is to be understood, however, that certain features of the present invention in their broader aspects are not limited to an overarm construction which comprises a cylindrical bar, or to a construction in which the cap member or arbor yoke bracing member is secured to the bar.

The several features of the present invention will be readily understood by those skilled in the art from the following description taken in connection with the accompanying drawings which illustrate an overarm construction embodying the invention in its preferred form.

Referring to the drawings, Fig. 1 is a view in side elevation of the upper portion of the column of a milling machine of well-known construction with the improved overarm structure applied thereto; Fig. 2 is an end view illustrating the manner in which an arbor yoke is supported and braced by the cylindrical bar and cap member of the overarm structure, and also illustrating an improved construction for connecting an arm brace to the overarm at the outer end of the arm; Fig. 3 is a sectional view on the line 3—3 of Fig. 1 illustrating particularly the manner in which the cap member is supported and guided upon the machine column; and Fig. 4 is a sectional view on the line 4—4 of Fig. 1 illustrating particularly the mechanism for adjusting the overarm to cause it to project more or less beyond the face of the column and the mechanism for clamping the cylindrical bar of the overarm structure in adjusted position.

As has been stated, the improved overarm structure herein shown comprises a cylindrical bar which serves as a centering and supporting unit for the arbor yoke and a cap member which engages the arbor yoke and acts as a bracing member for the yoke. The cylindrical bar is indicated at 1 and is, or may be, identical as to size and location with the cylindrical overarm commonly used on this type of machine. The bar engages bearings in the upper end of the machine column through which it may be adjusted longitudinally and by which it is maintained in accurate alignment with the spindle of the machine. The bar is locked in adjusted position by clamping bolts 2 and 3, and to enable these bolts to be readily manipulated by the operator the bolt 3 is provided with a hand lever 4, and this lever is connected by a link 5 to an arm 6 connected to the bolt 2.

The cap member of the overarm structure is indicated at 7. This member is substantially semi-circular, or semi-elliptical, in cross section and overlies and partially encloses the cylindrical bar and fits over the top of the column. At its rear end the cap member is secured to the cylindrical bar 1 by a clamping bolt 8, and throughout substantially its front half portion it is provided at its lower edges with horizontal bearing surfaces which are arranged to rest and slide upon horizontal bearing surfaces formed on the column at the upper portion of the face 9 of the column and on lugs 10 projecting laterally from the column back

of the face. The lower edges of the front portion of the cap member are provided with T-shaped slots 11, and these slots are engaged by T bolts 12 which project through the lugs 10 on the column and securely and rigidly clamp the cap member to the column.

An arbor yoke is indicated at 13 and is provided with the usual bearings 14 and 15 for the cylindrical bar of the overarm and for the cutter arbor. The arbor yoke is formed with a split clamp, and a clamping bolt 16 is provided by which it may be secured in position on the cylindrical bar. The arbor yoke is formed with projections, or ears, extending laterally on each side of the cylindrical bar 1 and beneath the horizontal bearing surfaces on the lower edges of the cap member 7. These lateral projections of the arbor yoke at their upper sides are provided with horizontal bearing surfaces which fit snugly against the horizontal bearing surfaces on the cap member. The bearing surfaces on the cap member are parallel with the axis of the cylindrical bar, and thus the arbor yoke is engaged and braced by these bearing surfaces in all positions of adjustment with relation to the face of the column.

It will be noted that the cylindrical bar of the overarm structure can be securely clamped to the column of the machine and that the cap member, in addition to being clamped to the cylindrical bar, can be securely bolted to the machine column. The two members of the overarm structure being clamped together and being fastened to the machine column individually, afford an unusually rugged support for the arbor yoke which is amply strong enough to resist the stress of any cut within the capacity of the machine. The arbor yoke can not only be clamped to the cylindrical bar 1, but also T-shaped bolts may be provided passing through the ears of the arbor yoke and engaging the T slots in the cap member, by which the arbor yoke may be firmly bolted to the cap member. This greatly increases the rigidity of the arbor yoke and more effectively resists any tendency of misalignment of the arbor caused by the thrust of the cutters.

The great rigidity which is provided for the arbor yoke and arbor by the improved overarm construction of the present invention makes it possible to operate the machine satisfactorily without an arm brace when necessary or desirable. When an arm brace is used the form illustrated in Figs. 1 and 2 provides an extremely rigid and efficient construction which takes advantage of the rigidity of both the cylindrical bar and the cap piece. To secure this result, the arms or members of the brace are connected to both the bar and the cap piece through a second arbor yoke 17 similar to the arbor yoke 13 and secured in the same way to the bar and cap piece near their outer ends. This arbor yoke is provided with perforated bosses to receive clamping bolts 20 which pass through slots in the arms 21 of the brace and through these bosses.

To enable the overarm structure to be quickly and easily adjusted, the cylindrical bar 1 is provided on the bottom near its rear end with a rack 18 which is engaged by a pinion shaft 19 journaled in the machine column below and at right angles to the bar. The outer end of this pinion shaft is squared to adapt it to receive a hand crank. As will be obvious, to adjust the entire overarm structure it is merely necessary to loosen the clamping bolts 12 and rotate the pinion shaft 19. The cylindrical bar 1 can be adjusted individually by loosening the clamping bolt 8 which secures the cap piece to the bar and then rotating the pinion shaft.

Attachments designed for use only with a cylindrical overarm can be used on a machine equipped with the improved overarm structure of the present invention by setting the cap member back out of position and adjusting the cylindrical bar so as to permit the attachment to be fastened to it. When attachments are to be used that must be bolted to the column, or when large face milling cutters are to be used, the complete overarm structure can be run back until flush with the face of the column and the attachment or cutter mounted on the machine in the usual manner.

The invention having been thus described, what is claimed is:

1. The combination with the column of a milling machine of an overarm comprising a cylindrical bar adjustably secured in the column, an arbor yoke mounted on the bar, an arbor yoke bracing member forming part of the overarm engaging the arbor yoke and secured to the forward part of the column, and means for securing said member at its rear end to the bar.

2. The combination with the column of a milling machine of an overarm comprising a longitudinally adjustable bar mounted in the column, a longitudinally adjustable yoke bracing cap member overlying the bar, means for securing the cap to the forward part of the column and at its rear end to the bar, and an arbor yoke mounted on the bar provided with laterally projecting ears underlying and engaging the under edges of the cap member.

3. The combination with the column of a milling machine of an overarm comprising a cylindrical bar adjustably mounted in the column, an arbor yoke mounted on the bar, an arbor yoke bracing member engaging the arbor yoke, means for adjustably securing the member to the forward part of the column, and means for detachably securing said member at its rear end to the bar to

permit a simultaneous adjustment of said member and bar or an independent use of the bar.

4. The combination with the column of a milling machine of an overarm comprising a longitudinally adjustable cylindrical bar mounted in the column, a substantially semi-cylindrical longitudinally adjustable cap piece overlying the bar and provided with bearing surfaces parallel to the axis of the bar, an arbor yoke mounted on the bar provided with bearing surfaces engaging the bearing surfaces on the cap piece, means for adjustably securing the cap piece to the forward part of the column, and means for securing the cap piece at its rear end to the bar.

5. The combination with the column of a milling machine of an overarm comprising a cylindrical bar mounted in the column, a substantially semi-cylindrical cap piece overlying the bar and secured at its rear end to the bar, said cap piece being provided on its lower edges with bearing surfaces parallel to the axis of the bar arranged to engage bearing surfaces on the column, means provided at the forward part of the column for clamping together the bearing surfaces of the cap member and the column, and an arbor yoke mounted on the bar provided with laterally projecting ears underlying and engaging the bearing surfaces on the cap piece.

In testimony whereof I have signed my name to this specification.

BENJAMIN P. GRAVES.