Dec. 5, 1944. S. WELSBY ET AL 2,364,259

EXPANDING REAMER

Filed Dec. 12, 1941

Fig. 1.

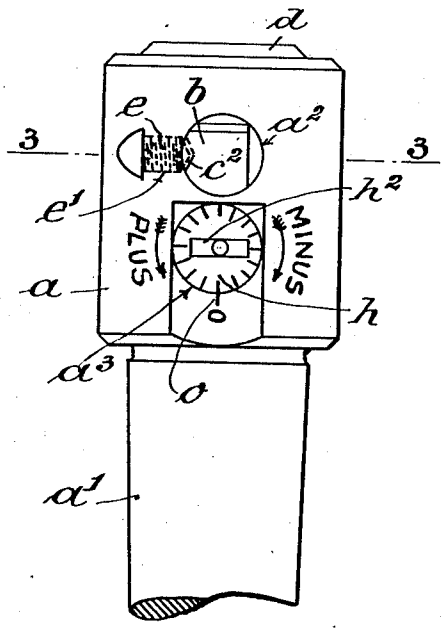


Fig. 2.

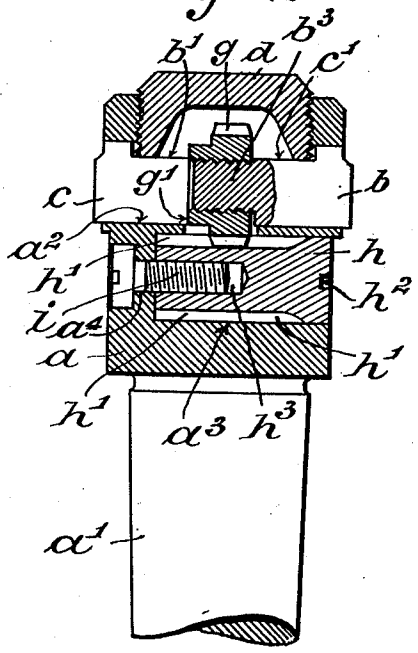
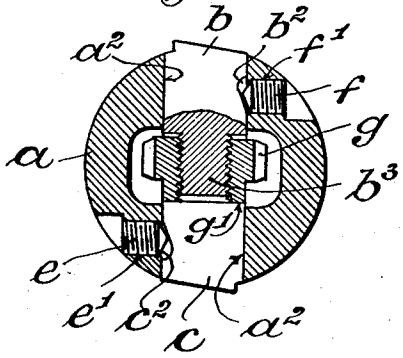


Fig. 3.



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EXPANDING REAMER

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4 Claims. (Cl. 77—58)

The invention relates to expanding reamers of the type in which a pair of cutters are free to "float" or slide in a direction at right angles to the direction of rotation, so that they may be capable of adjusting themselves, if necessary, to inaccuracies in relative alignment of the tool and the work.

A reamer of the type referred to is known in which adjustments in the effective diameter of the tool are made possible by the provision, between the inner ends of the two cutters, of a spur wheel carrying a micrometer screw which works in a longitudinal threaded opening in one of the cutters. Rotation of the adjusting screw is made possible by meshing the spur wheel referred to with a pinion mounted on an axis parallel to that of the cutters and providing means whereby, when desired, the pinion can be rotated and, after the required adjustment of the cutters has been effected, locked in position.

The present invention has for its object to improve upon a reamer of the general construction above referred to both as to the number of parts employed and to their form.

A reamer according to the present invention is characterised in that the reamer head has a transverse opening of circular section in which fit slidably two cutters also of circular section and having near their inner ends flats which are engaged by a cap member screwed into a threaded opening in the end face of the head. The flats on the cutters are so fashioned as to permit of the cutters having the desired maximum extent of "float," and to enable the permissible amount of float to be adjusted below the maximum each cutter has a conical recess into which enters the point of a screw working through a threaded opening in the wall of the head.

A screw projects axially from the inner end of one cutter, and on this screw is mounted the internally-threaded boss of a spur wheel. This wheel, which is prevented from moving axially of the head, meshes with longitudinal teeth on an adjusting spindle rotatable in a recess in the head parallel to the opening in which the cutters work, and a clamping screw is provided to enable the adjusting spindle to be clamped in adjusted position.

A reamer according to the invention will more fully be described with reference to the accompanying drawing, in which:

Fig. 1 is an elevation;

Fig. 2 a sectional elevation; and

Fig. 3 a cross section on the line 3—3 in Fig. 1, of such a reamer.

Referring to the drawing, a head a integral with a shank a' has near its extremity a transverse opening a^2 of circular section in which fit slidably two cutters b and c also of circular section. The inner end portions of the cutters are provided with flats b' and c' which are engaged by a cap member d screwed into a threaded opening in the end face of the head a. The cutters are thus prevented from turning in the opening a^2 in which they are housed, and the flats b' and c' on the cutters are so fashioned in relation to the diameter of the cap member d as to permit the cutters to have the desired maximum extent of "float." To enable the extent of permissible float to be adjusted each cutter has a recess b^2 or c^2 into which enters the conical point of a screw e or f working through a threaded opening e' or f' in the wall of the head a. By causing the points of the screws e and f to extend a greater or less distance into the recesses b^2 and c^2 the lateral sliding limit to which the cutters can float is determined.

A screw b^3 is made integral with and co-axial with the cutter b, and a spur gear g works on this screw b^3 and bears against the inner end of the cutter c.

The spur gear g which is prevented from moving axially of the head and has limited axial movement on the screw b^3, meshes with longitudinal teeth h' on an adjusting spindle h housed in a recess a^3 in the head a parallel to the opening a^2 in which the cutters b and c work.

The outer end of the adjusting spindle h has a saw-cut h^2 by means of which it can be turned, and said outer end is also appropriately divided (see Fig. 1) to co-operate with an indicating mark 0 on the head a.

The inner end of the adjusting spindle h has an axial threaded recess h^3 into which extends the threaded inner end of a clamping screw i extending through an opening a^4 in the head a coaxial with the opening a^3 in which the adjusting spindle works. Slackening of this clamping screw i enables the adjusting spindle h to be turned for the purpose of adjusting the cutters to the desired effective diameter, and re-tightening of the clamping screw clamps the inner end surface of the adjusting spindle against the inner end face of the recess a^3 in which said spindle is housed.

A reamer according to the invention presents the advantage that it employs few parts; it is robust in construction; it is easily adjusted; and it does not call for the use of any springs.

Having thus described our invention, what we

claim as new and desire to secure by Letters Patent is:

1. An expanding reamer comprising a reamer head having a transverse opening of circular section through said head, and having a threaded opening in the end face of said head, two cutters of circular section slidably accommodated in said transverse opening, flats on said cutters and providing shoulders adjacent the outer ends of same, a cap member screwed into said threaded opening in the end face of said reamer head and cooperating with the flats on the cutters to prevent turning of the cutters in the transverse opening through the head, said cap member being engageable with said cutter shoulders to limit inward movement of the cutters, and the exterior diameter of the inner end of said cap member being less than the spacement of the cutter shoulders when the inner ends of the cutters are in engagement whereby to admit of axial floating of the cutters at all times.

2. The structure of claim 1, and screws working in threaded openings in the head and having taper points, the cutters having transverse edge recesses into which the tapered points of the screws extend in order to limit, according to the adjustment of the screws, the amount of axial direction float permissible to the cutters.

3. The structure of claim 1, a threaded inner end portion on one cutter, a spur gear working on said threaded portion and bearing with one of its end faces against the inner end of the other cutter, means to turn said spur gear, and means incorporated in said turning means to lock the spur gear against rotation after adjustment.

4. The structure of claim 1, a threaded inner end portion on one cutter, a spur gear working on said threaded portion and bearing with one of its end faces against the inner end of the other cutter, an adjusting spindle housed in a recess on the head parallel to the opening in which the cutters work, longitudinal teeth on said spindle with which the aforesaid spur gear meshes, an axial threaded recess in the inner end of the adjusting spindle, and a clamping screw extending through an opening in the head coaxial with that housing the adjusting spindle, said clamping screw working in the threaded axial recess in the inner end of the adjusting spindle whereby to support one end of the latter and being adapted to bind the inner end of the adjusting spindle against the inner end of the recess in which said spindle is housed.

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