A clamp for a member with an internal flange which includes two nuts mounted on a threaded stud extending from a clamping surface. The outside nut has a plurality of shafts spaced equidistantly around the stud and extending axially toward the inside nut. On each shaft a wing is free to pivot inside or outside the outer diameter of the nut. The inside nut has a plurality of stops, one projecting between each pair of wings, and requires significant torque to rotate. Therefore as the outside nut is tightened, the wings are spread by the stops to engage the inner flange and hold the clamped member against the clamping surface; and as the outside nut is loosened the stops retract the wings so the clamped piece can be removed from the stud.

2 Claims, 5 Drawing Figures
CLAMP FOR A MEMBER WITH AN INTERNAL FLANGE

SUMMARY OF THE INVENTION

My invention concerns a clamp to hold a piece with an internal flange. The invention arose as the solution to a problem of a lathe operator who must clamp internally flanged workpieces to the lathe faceplate. This has been done in the past with a nut and C-washer on a threaded stud or shaft projecting from a clamping surface on the lathe faceplate. The C-washer, however, is a loose part that is easily dropped while the clamp is being used or lost when the clamp is not being used. Sometimes a swing clamp is used in place of the C-washer. Repeated lifting of this heavy clamp, however, is tiring for the lathe operator. In addition, a wrench must always be handy to tighten the nut.

My invention, however, consists of a small clamp which remains on the stud at all times and has no loose pieces to be lost. Although it can be used generally with a wrench, it can be adapted for use on a lathe so that no wrench is needed. A preferred embodiment of my invention is described in more detail in the accompanying drawings and the following specification.

DESCRIPTION OF THE DRAWINGS

FIG. 1 shows a preferred embodiment of my invention.

FIG. 2 is an exploded view of the embodiment shown in FIG. 1.

FIG. 3 is a view along the line 3—3 in FIG. 1 when the clamp is being tightened.

FIG. 4 is a view along line 3—3 in FIG. 1 when the clamp is being loosened.

FIG. 5 shows my invention mounted for use on a lathe.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to FIG. 1, a threaded stud 2 is mounted in a wall such as a lathe faceplate 4 perpendicular to a clamping surface 6 of the faceplate 4. A nut 8 is threadedably mounted on the stud 2. Details of this nut, as well as of other parts of the clamp, can be seen more clearly in FIG. 2. The nut 8 has flats 10 for receiving a wrench. A plurality of threaded shafts 12, in this embodiment shown as two in number, project from the nut 8 toward the clamping surface 6. The shafts 12 are spaced equidistantly apart in a circle around the stud 2; in this case the shafts 12 are 180° apart. On each of the shafts 12 is threaded a wing 14, which is free to pivot through a small arc about its shaft 12. Each wing 14 has a first contacting surface 20 comparatively far from the pivot axis, a second contacting surface 22 closer to the pivoting axis and on the other side of it and a third contacting surface 24 connecting the first contact surface 20 with the second contacting surface 22.

A teaser nut 16 is threadably mounted on the stud 2 and bears a plurality of stops 18 which project toward the nut 8. The number of stops 18 is equal to the number of wings 14; and the stops 18 are equally spaced around the stud 2 so that each stop 18 projects between two of the wings 14. Nut 16 is split at 19 for resilience and is sufficiently tight on the stud that it exerts a significant resistance to rotation. As the nut 8 is rotated in a direction to move it along the stud 2 toward the clamping surface 6, the contacting surfaces 20 of the wings 14 contact the stops 18 and are pivoted outward by the stops 18 because of the torque required to drive nut 16 until a part of the contacting surfaces 24 about the stud 2 and prevent further spreading of the wings 14. With the wings 14 in this position, as shown in FIG. 3, they extend farther in a radial direction than the outer diameter of the nut 8 or the teaser nut 16 and cause the teaser nut 16 to rotate along with the nut 8. If the direction of rotation of nut 8 is reversed, the contacting surfaces 22 of the wings 14 are pushed against the stops 18; and the wings 14 are retracted into the position shown in FIG. 4, where no portion of them extends beyond the outer diameter of the nut 8 or the teaser nut 16. With the clamp in this position the teaser nut 16 rotates with the nut 8 in its new direction.

Referring again to FIG. 1, the clamp is used with the workpiece 26 which has an internal flange 28 defining a hole 30 which is slightly larger than the outside diameter of the nut 8 and teaser nut 16. With the clamp in the position shown in FIG. 4, the workpiece 26 is slipped over the clamp and stud 2 until it abuts the clamping surface 6 of faceplate 4. As the nut 8 is rotated to move toward the workpiece 26, the wings 14 are spread. These wings 14 about the inner flange 28 of the workpiece 26; and the nut 8 is tightened on the stud 2 to hold the workpiece 26 in place by clamping between the wings 14 and the faceplate 4. When it is desired to release the workpiece 26 the nut 8 is rotated to loosen its pressure and the wings 14 are thus retracted so that the workpiece 26 can be slipped off over the clamps.

In FIG. 5, the clamp is shown installed on a lathe 32 for cutting by tools 52. The threaded stud 2 is hollow; and through it extends a shaft 34. The stud 2 is fixed to the faceplate 4, which is turned by a motor, not shown; and the shaft 34 is turned by a hand wheel 36 through shaft 38, pulley 40, belt 42 and pulley 44. A wrench member 46, which engages the flats 10 of nut 8, is held on the end of the shaft 34 by a pin 48. The wrench member 46 causes the nut 8 to turn with the shaft 34; and, since its outer diameter is no larger than the outer diameter of the nut 8, it does not interfere with the operation of the clamp.

To use the lathe, the operator slides the workpiece 26 over the clamp. He then turns the hand wheel 36 in one direction until the wings 14 clamp the workpiece 26 tightly against the lathe faceplate 40. The motor of the lathe 32 will then turn the workpiece 26. When the operator decides to remove the workpiece 26 from the lathe 32, he stops the lathe and turns the hand wheel 36 in the direction opposite to that for tightening and thus loosens the nut 8 to retract the wings 14.

It can be seen that my clamp is a useful device with other possible embodiments and applications that will occur to those skilled in the art. Therefore, the invention should not be limited to the embodiments shown. 1 claim:

1. A clamp comprising, in combination: a member with a clamping surface; a threaded stud projecting perpendicularly from the clamping surface; a first nut on the threaded stud; a plurality of wings pivotally mounted on the first nut for pivoting through a predetermined sector about axes parallel to the threaded stud, each wing having a first contacting surface for pivoting radically out-
ward from the threaded stud and a second contacting surface for pivoting radially inward toward the threaded stud;
a second nut on the threaded stud;
a plurality of stops on the second nut, each stop projecting between two wings for engagement with the first contacting surface of a wing when the first nut is rotated for advancement toward the clamping surface and engagement with the second contacting surface of a wing when the first nut is rotated for recession from the clamping surface.

2. A clamp to hold a member with an internal flange to a faceplate which comprises, in combination:
a stud projecting from the faceplate;
a first nut threadably mounted on the stud, the first nut having an outer diameter smaller than the inner diameter of the internal flange;
a plurality of wings pivotally mounted on the first nut, each wing extending a distance from the axis of the stud which varies as the wing is pivoted;
a second nut threadably mounted on the stud, the second nut having an outer diameter smaller than the inner diameter of the internal flange and exhibiting frictional resistance to rotation of the stud;
and a plurality of stops on the second nut, the stops projecting between adjacent wings on the first nut and capable of interaction with the wings upon rotation of the first nut toward the faceplate to spread the wings outside the inner diameter of the internal flange and upon rotation of the first nut away from the faceplate to retract the wings within the inner diameter of the internal flange.

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