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CHUCK

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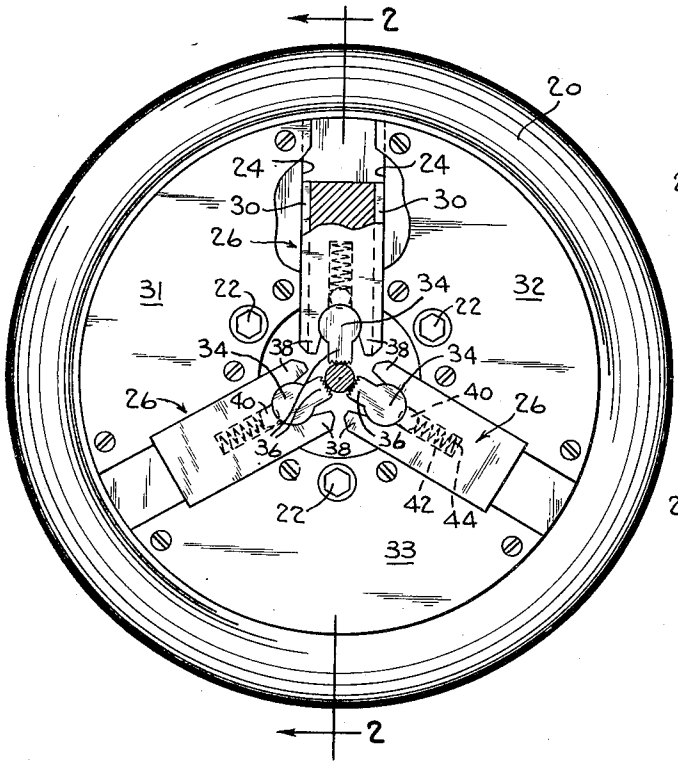


FIG. 1

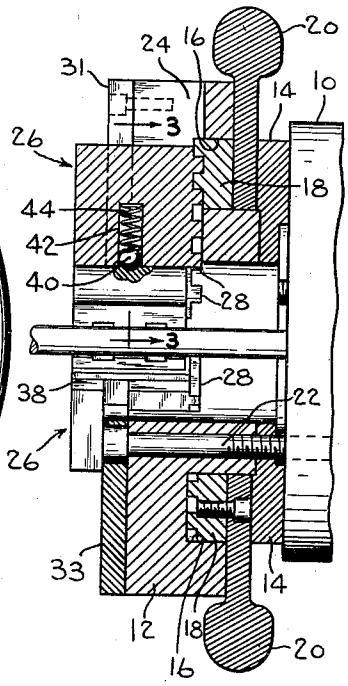


FIG. 2

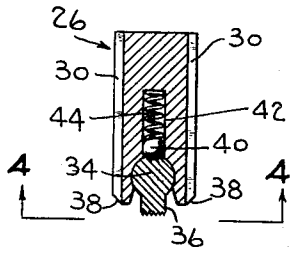


FIG. 3

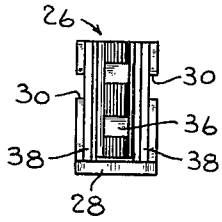


FIG. 4

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CHUCK

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8 Claims. (Cl. 279—123)

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This invention relates to scroll type chucks and particularly to provision of new and improved jaws for scroll chucks.

Scroll type chucks have been known for many years but have not, to date, met with much commercial success. In these chucks a scroll is manually manipulated to move a plurality of jaws in radially to center and engage the work piece. The chucks of the prior art are not able to exert sufficient gripping force on many types of work. The prior art jaws could not be replaced readily when worn. These objections, coupled with the high cost of the complicated structures utilized, prevented wide acceptance of these chucks in spite of their obviously desirable simple operation.

An object of this invention is to provide a scroll type chuck capable of exerting great gripping force on the work piece.

Another object is to provide readily replaceable jaws for chucks.

A further object is to simplify scroll type chucks.

Still another object is to provide a scroll chuck which may be manually manipulated while obtaining sufficient gripping force.

A still further object is to provide a scroll chuck which grips the work for rotation in either direction.

Another object is to provide jaws which exert a gripping force on the work in proportion to the force tending to rotate the work in the jaws.

Other objects and advantages will be pointed out in, or be apparent from, the specification and claims, as will obvious modifications of the single embodiment shown in the drawings, in which:

Fig. 1 is a front elevation of the improved chuck;

Fig. 2 is a vertical cross section taken on line 2—2 of Fig. 1;

Fig. 3 is a section taken on line 3—3 of Fig. 2 through a jaw carrier and a jaw; and

Fig. 4 is a view from line 4—4 on Fig. 2.

Referring to the drawings in detail, the chuck is adapted to be connected to a machine spindle 10 and includes a main body member 12 and a rear plate 14. The rear face of body 12 is provided with an annular cut 16 receiving scroll 18 which is connected to hand wheel 20 projecting beyond the periphery of the body. The hand wheel 20 and scroll 18 are sandwiched between the body 12 and rear plate 14 and are adapted for rotation relative to the chuck head. Three through bolts 22, 22, 22 pass through the

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body 12 and rear plate 14 and into the spindle 10 to mount the chuck on the spindle for rotation therewith.

The forward portion of body 12 is provided with three radial slots 24, 24, 24, each of which is adapted to receive a jaw carrier 26 having segmental scroll teeth 28 on the rear face thereof for engagement with the manually actuated scroll 18. Of course, the segmental teeth on the back of the carriers are properly offset with respect to each other so that the carriers will be equidistant from the center at all times. The sides of carriers 26 are provided with slots 30 adapted to receive the radial edges of the three face plates 31, 32, 33 which serve to guide the carriers and retain them within the chuck head. With the carriers guided by the face plates in this manner they are limited to radial reciprocal movement as the hand wheel is rotated with respect to the chuck head. It will be appreciated that the hand wheel may be rotated to accommodate work pieces of various diameters.

The inner end of each carrier is provided with a generally cylindrical groove or seat parallel to the axis of the chuck and adapted to receive the cylindrical bearing portion 34 of jaws 36. Since the seat in the carrier is greater than 180 degrees, it serves to retain the jaw within the carrier. The inner face of jaw 36 is serrated and normally tangential to the radius so that cocking the jaw in its seat will introduce a camming action tending to increase the gripping force between the jaw and the work in the direction determined by the direction of chuck rotation. The cocking of the jaw with respect to its carrier is limited in either direction by the leg portions 38, 38 of the carrier as may be seen in Figs. 1 and 3.

When the work is released by rotating the hand wheel to move the carriers outwardly, the jaws return to a position wherein they are adapted to engage the work at their point of largest radius in order to insure a full camming action upon the next cycle of operation by virtue of the rear of the bearing portion 34 of the jaws 36 being provided with a rounded depression adapted to receive ball 40 mounted in radial socket 42 in carrier 26 and biased inwardly by means of compressed spring 44. Thus, as may be seen in Figs. 1 and 3, ball 40, cooperating with the depression in the jaw, serves to bias the jaw into a radial position. When the jaw engages the work and cocks, the ball moves back into socket 42 slightly, but upon release of the work the spring 44 forces the ball back into the depres-

sion to return the jaw to its normal position. The ball 40 also serves to prevent the jaw from moving longitudinally (parallel to the chuck axis) in the carrier. However, a direct longitudinal force on the jaw will push the ball into the socket to permit the jaw to be moved from the carrier. A worn jaw is replaced by aligning a replacement jaw with the worn one and driving the worn jaw out of the socket while following up with the new jaw. When the replacement jaw is properly aligned the ball is urged into the depression to hold the new jaw in place.

This simple jaw mounting serves to properly position the jaws when not engaging work and to retain the jaws within the carriers while permitting the jaw to be rapidly replaced. This mounting does away with the necessity of face plates or other devices for retaining the jaw in the carrier. The number of parts is reduced and the operation and servicing of the chuck is simplified. Since the camming action is obtainable in either direction, thus chuck may be employed on pipe cutting machines as well as lathes, etc. This camming action serves to increase the gripping force as the resistance to rotation is increased, thus insuring against slips.

Although but one embodiment of the present invention has been illustrated and described, it will be apparent to those skilled in the art that various changes and modifications may be made therein without departing from the spirit of the invention or from the scope of the appended claims.

I claim:

1. In a chuck of the type having a jaw carrier radially reciprocal by virtue of engagement of teeth on the carrier with a manually operated scroll, an open-ended cylindrical socket in said carrier, a jaw including a cylindrical bearing portion seated in said socket and having a gripping portion adapted to engage a work piece, and spring means acting on said jaws to bias the jaw to a radial position and to retain the jaw within said socket.

2. In a chuck of the type having a jaw carrier radially reciprocal by virtue of engagement of teeth on the carrier with a manually operated scroll, an open-ended cylindrical socket in said carrier, said socket having a cut-out portion, a cylindrical bearing seated in said socket, a jaw carried by said bearing and projecting inwardly through said cut-out portion in a generally radial direction, said jaw being adapted to engage a work piece, and spring means acting on said bearing to bias the jaw to a radial position and to retain the bearing within said socket.

3. In a chuck of the type having a jaw carrier radially reciprocal by virtue of engagement of teeth on the carrier with a manually operated scroll, an open-ended cylindrical socket in said carrier, said socket wall having a cut-out portion, a cylindrical bearing seated in said socket, a jaw carried by said bearing and projecting inwardly through said cut-out portion in a generally radial direction, said jaw being adapted to engage a work piece, said jaw being adapted for deviation from the radial position by oscillating said bearing in said socket between limits determined by abutment of the jaw with the socket wall adjacent each side of said cut-out portion, and spring means acting on said bearing to bias the jaw to a radial position and to retain the bearing in said socket.

4. In a chuck of the type having a jaw carrier radially reciprocal by virtue of engagement of

teeth carried by the carrier with a manually operated scroll, an open-ended cylindrical socket in said carrier, a cylindrical bearing seated in said socket, a jaw carried by said bearing and projecting inwardly in a generally radial direction, said jaw being adapted to engage a work piece, a bore in said carrier terminating at said socket, and spring means mounted in said bore and acting on the bearing to bias the jaw to a radial position and to retain the bearing in said socket.

5. In a chuck of the type having a jaw carrier radially reciprocal by virtue of engagement of teeth carried by the carrier with a manually operated scroll, an open-ended cylindrical socket in said carrier, said socket wall having a cut-out portion, a cylindrical bearing seated in said socket, a jaw carried by said bearing and projecting inwardly through said cut-out portion in a generally radial direction, said jaw being adapted to engage a work piece and being adapted for deviation from the radial position by oscillating said bearing in said socket between limits determined by abutment of the jaw with the socket wall adjacent each side of the cut-out portion, a bore in said carrier terminating at said socket, and spring means mounted in said bore and acting on the bearing to bias the jaw to a radial position and to retain the bearing in said socket.

6. In a chuck of the type having a jaw carrier radially reciprocal by virtue of engagement of teeth carried by the carrier with a manually operated scroll, an open-ended cylindrical socket in said carrier, a cylindrical bearing seated in said socket, a jaw carried by said bearing and projecting inwardly in a generally radial direction, said jaw being adapted to engage a work piece, a bore in said carrier terminating at said socket, a depression in said bearing and adapted to face said bore when said jaw is radially positioned, and spring means in said bore and acting on said depression to bias the jaw to a radial position and to retain the bearing in said socket.

7. In a chuck of the type having a jaw carrier radially reciprocal by virtue of engagement of teeth carried by the carrier with a manually operated scroll, an open-ended cylindrical socket in said carrier, said socket wall having a cut-out portion, a cylindrical bearing seated in said socket, a jaw carried by said bearing and projecting inwardly through said cut-out portion in a generally radial direction, said jaw being adapted to engage a work piece and being adapted for deviation from the radial position by oscillating said bearing in said socket between limits determined by abutment of the jaw with the socket wall adjacent each side of said cut-out portion, a bore in said carrier and terminating at said socket, a depression in said bearing adapted to face said bore when said jaw is radially positioned, and spring means in said bore and acting on said depression to bias the jaw to a radial position and to retain the bearing in said socket.

8. In a chuck, a carrier adapted for radially reciprocal movement toward and away from a work piece, an open ended cylindrical socket in said carrier parallel to the work piece axis, a bearing seated in said socket, a jaw carried by said bearing and projecting radially toward said work axis, and spring means acting on said bearing to bias the jaw to a radial position and to retain the bearing in said socket.

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