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S. BAXENDALE

2,087,868

FEED COLLET

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FIG.1.

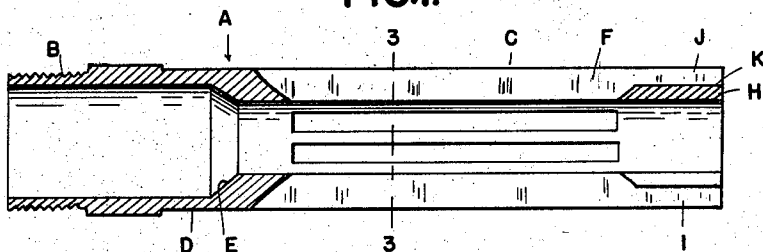


FIG.2.

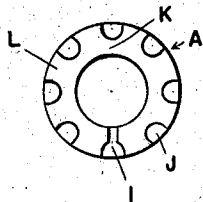


FIG.3.

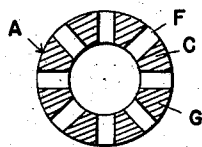


FIG.4.

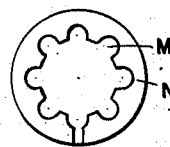


FIG.5.

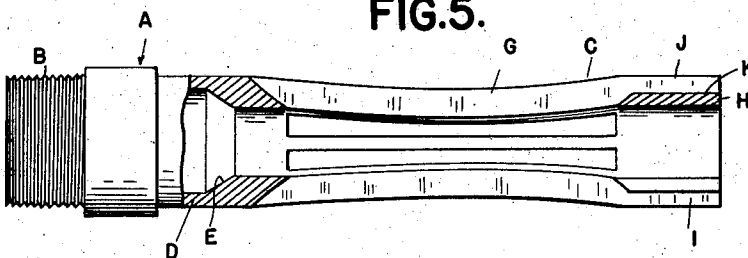
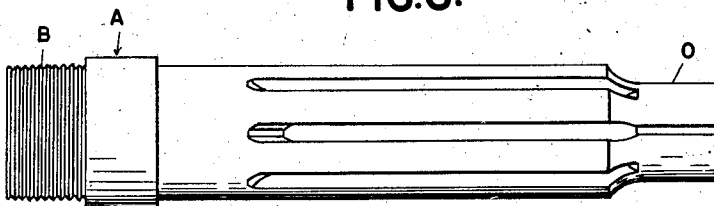


FIG.6.



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FEED COLLET

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8 Claims. (Cl. 29—62)

The invention relates to feed collets of that type employed in automatic machines for successively feeding the stock bar forward. It is the object of the invention to obtain a construction which has a longer life than constructions heretofore devised and which has various other advantages as hereinafter set forth.

In the drawing:

Figure 1 is a longitudinal section through a feed collet of my improved construction as originally made;

Figure 2 is an end elevation thereof;

Figure 3 is a cross-section on line 3—3 of Figure 1;

Figure 4 is an end elevation similar to Figure 2 of a slightly modified construction;

Figure 5 is a section similar to Figure 1 showing the construction after adjustment to compensate for wear;

Figure 6 is a side elevation showing a modified construction.

In the present state of the art various forms of feed collets have been devised all of which have the common feature that the stock bar fed therethrough is resiliently clamped. In certain constructions this has been accomplished by forming the collet of a tube, the original internal diameter of which is greater than the external diameter of the stock bar. This tube is then slotted radially at a plurality of points around its circumference, and the bars between the slots are bowed inward so as to resiliently bear against the stock bar. With such construction the collet may be continued in use until wear in its gripping surface has so enlarged the diameter thereof that it will no longer form a gripping engagement of the work. The construction has, however, the disadvantage that the point of bearing on the work is some distance in rear of the end of the collet so that it will cease feeding before all of the stock bar has been used.

It is the object of the present invention to obtain a construction which has a longer life than that of the construction above described and which further is adapted to continue feeding the stock bar until the rear end thereof has reached approximately the front end of the collet, the detailed construction being as follows.

A is a tubular member preferably formed of steel, the rear end of which has an externally threaded portion B for connection with the actuating member of the feed. Internally this rear portion is of a greater diameter than the stock bar to be fed, but forward of this portion the internal diameter of the tube is reduced to slightly

less than the external diameter of the stock. Externally the tube A is originally of substantially equal diameter throughout its length, so that the forward portion C has a very much greater wall thickness than the portion D in rear thereof. Between the portions C and D the bore of the tube has a tapered portion E extending from the larger to the smaller diameter. F are longitudinally extending slots passing radially through the wall of the portion C and dividing the same into a series of wedge-shaped bars G. Forward of these slots is a portion H having only a single slot I extending therethrough. The portion H is, however, provided with a series of grooves J which divide its circumference into alternate thin portions K and thick portions L.

The collet fashioned as above described is then heat treated so as to harden the portion C to lessen the wear thereof. The temper is, however, drawn in the portion of the collet in rear of the line 3—3 and preferably also in the portion H.

During initial use, the collet is the same as above described and by reason of the fact that the internal diameter of the portion C is slightly less than the external diameter of the stock bar. This portion will resiliently grip the stock bar so as to feed it forward into engagement with the holding chuck (not shown). During the rearward movement of the collet, the stock will slide through the portion C and will then again advance the stock bar during the succeeding forward movement. The expansion of the collet required to receive the stock bar is permitted both on account of the slots F and also by reason of the slot I in the forward portion H. The rear end of the portion C first comes in contact with the stock bar which will expand the same moving with it the forward portion so that initially the gripping of the stock is only in the rear part of the portion C. However, when the end of the stock bar advances beyond this point the forward end of the collet will close against the same continuing the feed as long as any portion of the bar remains within the collet.

The sliding movement of the collet over the stock bar each time that it is moved in a rearward direction has a wearing effect on the gripping surface in spite of the fact that the surface has been hardened and thus after a certain amount of use the internal diameter of the portion C will be enlarged to a point where it will no longer successfully clamp the bar. This inoperative condition can be corrected by applying external pressure to the portion C sufficient to deform the same and to bow the bars G inward.

Such deformation is permitted by reason of the fact that the temper is drawn in the rear part of the portion C and thus the collet is again restored to operative condition. Such operation may be repeated as often as necessary until the thickness of the bars G is reduced to a point where they no longer have the strength to properly grip the work. However, as the original external diameter of the collet is considerably greater than that of the stock bar, this provides gripping bars G of sufficient thickness to have a much longer life than with the originally inwardly bowed bars of constructions heretofore used.

Another feature of my improvement is in the provision of the grooves K in the portion H of the collet. This portion must also be reduced in diameter when the internal surface thereof has been enlarged by wear, and the grooves J which form the thin portions K distribute the bending around the entire circumference. A similar effect can be produced by the modified construction shown in Figure 4 where grooves M are arranged in the internal surface of the portion H thereby forming thinned portions N which are distributed around the circumference.

With the modification shown in Figure 6 the rear end of the collet is turned down as indicated at O. This renders it still more yieldable to adjust itself to the stock bar.

What I claim as my invention is:

1. A feed collet comprising a tubular member of substantially uniform external diameter throughout the greater portion of its length having an internal diameter in the rear portion thereof which is greater than the external diameter of the stock bar to be fed and an internal diameter in the forward portion which is slightly less than the external diameter of said stock bar forming a relatively thick surrounding wall, said thick wall forward portion being provided with a circumferentially distributed series of slots extending radially through the walls thereof and terminating in rear of the forward end, one of said slots extending to said forward end, and deformable bars between said slots permitting of radially inward deformation to compensate for wear.

2. A feed collet comprising a tubular member of substantially uniform external diameter throughout the greater portion of its length having an internal diameter in the rear portion thereof which is greater than the external diameter of the stock bar to be fed, an internal diameter in the forward portion thereof which is slightly less than said external diameter of the stock bar forming a relatively thick surrounding wall and a tapering portion connecting the portions of larger and smaller internal diameter, said thick wall forward portion being provided with a circumferentially distributed series of slots extending radially through the walls thereof and terminating in rear of the forward end, one of said slots extending to said forward end, the bars between said slots having a hardened forward por-

tion and a softer deformable portion in rear thereof whereby said bars may be adjusted inward to compensate for wear.

3. In a feed collet, the combination with a thick wall tubular member provided with an intermediate portion having a circumferentially distributed series of radial slots therethrough forming gripping bars therebetween, one of said slots extending to the forward end and a circumferentially distributed series of grooves in the portion of said member forward of said slots permitting of circumferential contraction of such portion.

4. In a feed collet, the combination with a thick wall tubular member provided with an intermediate portion having a circumferentially distributed series of radial slots therethrough forming gripping bars therebetween, one of said slots extending to the forward end and a circumferentially distributed series of external longitudinally extending grooves in the portion forward of said slots permitting of circumferential contraction of the same.

5. In a feed collet, the combination with a thick wall tubular member provided with an intermediate portion having a circumferentially distributed series of radial slots therethrough forming gripping bars therebetween, one of said slots extending to the forward end and a circumferentially distributed series of internal longitudinally extending grooves in the portion forward of said slots permitting of circumferential contraction of the same.

6. A feed collet comprising a tubular member having a relatively thick wall for the greater portion of its length and thin wall portions at opposite ends thereof, the internal diameter of said thick wall portion and extending to the forward end of the tube being slightly less than the external diameter of the stock bar to be fed therethrough, said thick wall portion being provided with a circumferentially distributed series of slots extending radially through the wall and one of said slots extending to the forward end.

7. In a feed collet, the combination with a thick wall tubular member provided with an intermediate portion having a circumferentially distributed series of radial slots therethrough forming gripping bars therebetween, one of said slots extending to the forward end, the internal diameter of said tube being enlarged at the rear end and the external diameter being reduced at the forward end to form relatively thin wall portions.

8. In a feed collet, the combination with a thick wall tubular member provided with an intermediate portion having a circumferentially distributed series of radial slots therethrough forming gripping bars therebetween, one of said slots extending to the forward end, the internal diameter of said tube being enlarged at the rear end and the external diameter being reduced at the forward end to form relatively thin wall portions, the forward portion of the tube being hardened and the portion in rear thereof being relatively soft.

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