March 24, 1942. I. H. SHEFFER 2,277,260

COLLET

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FIG. 1.

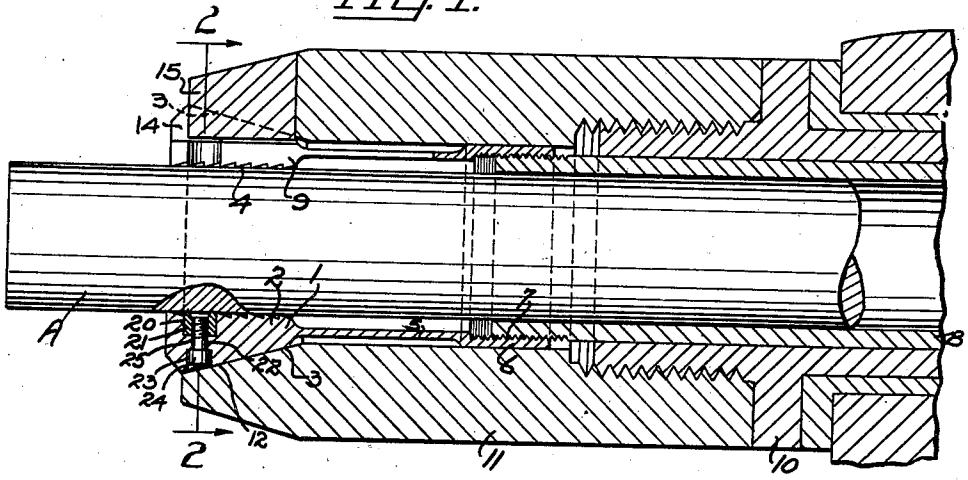



FIG. 2.

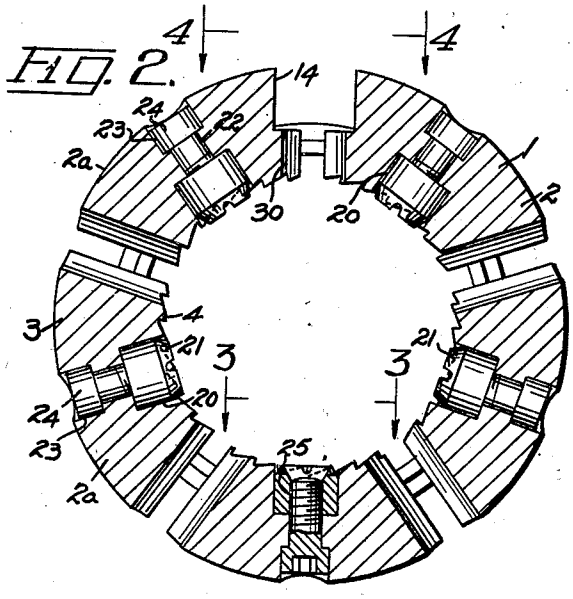



FIG. 4.

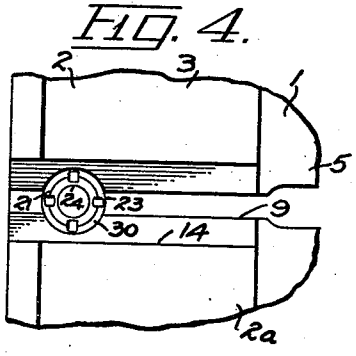
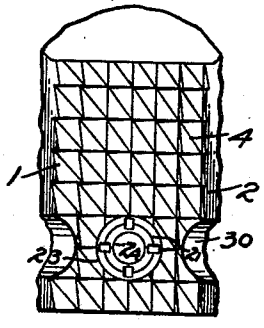



FIG. 3.




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Fig. 5.

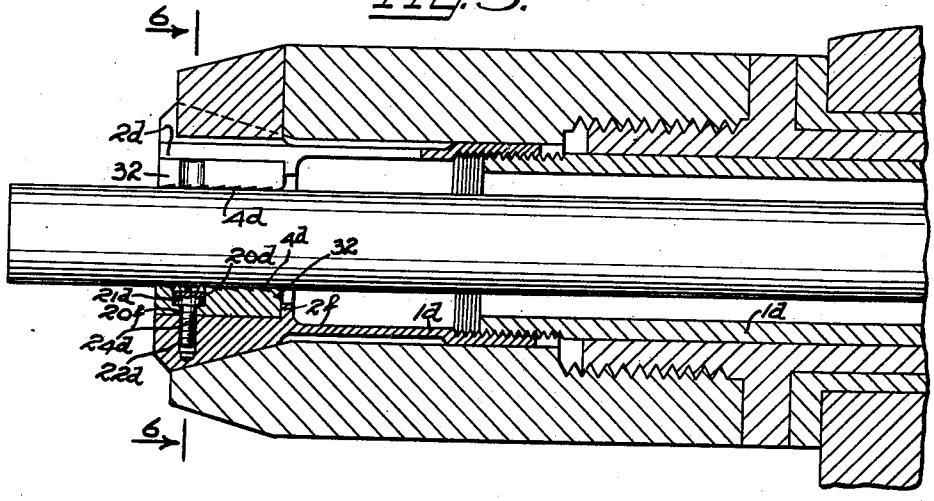
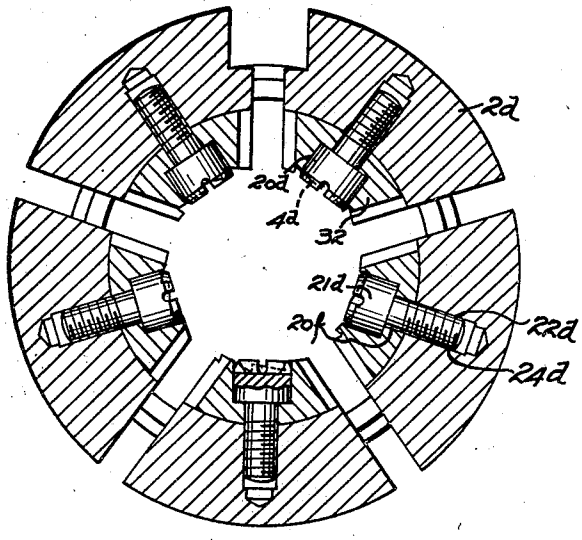



Fig. 6.




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FIG. 7.

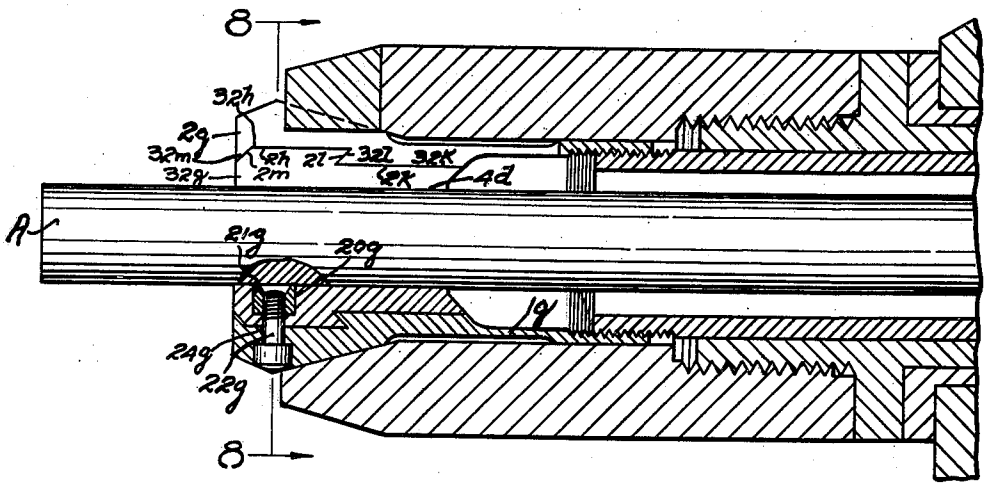
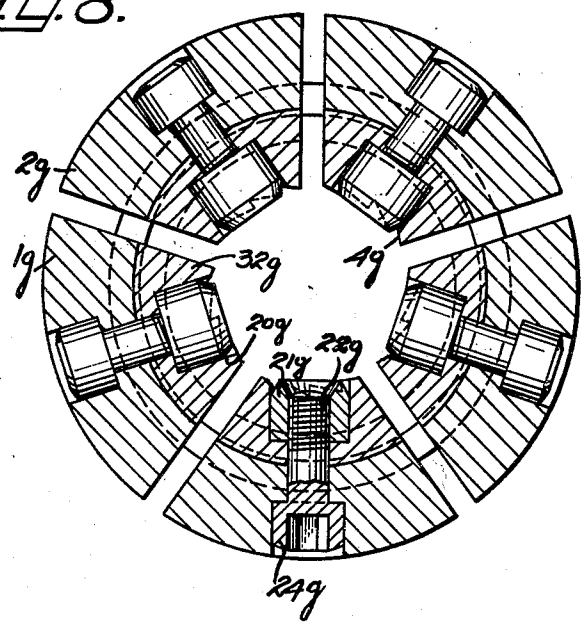



FIG. 8.




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Patented Mar. 24, 1942

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# UNITED STATES PATENT OFFICE

2,277,260

## COLLET

Irving H. Sheffer, Detroit, Mich.

Application October 16, 1939, Serial No. 299,613

7 Claims. (Cl. 279—51)

This invention relates to improvements in collets. I am, of course, aware that a collet has for a long time been in general use wherein the front portion is divided into segments and its bore is serrated to engage the work, and wherein the outer periphery of this front portion is tapered for movement in a correspondingly tapered housing so that as the collet is moved axially in one direction the segments are forced inwardly into engagement with stock passing through the collet to hold it immovable. It may here be remarked, however, that a collet so constructed will not satisfactorily grip hot rolled steel or other stock the periphery of which does not conform to close dimensional limits, because the stock tends to rock when it is only engaged upon its high spots by the collet.

It is an object of this invention to provide such a collet wherein auxiliary gripping means project inwardly of the collet serrations to firmly engage the stock and reinforce the hold obtained by the serrations. Thus I aim to provide a collet by which the periphery of stock even if somewhat distorted may be rigidly and immovably held.

Another object of the invention is to provide such a collet wherein the auxiliary gripping means are readily removable so that new ones may be quickly and easily substituted when the original ones become worn.

A further object of the invention is to provide such a collet which is relatively cheap and simple to manufacture and which is efficient in operation.

Yet another object of the invention is to provide a collet in one embodiment of which removable pads are provided having auxiliary gripping means so arranged thereon that they retain the pads in position.

Having thus briefly stated some of the objects and advantages of the invention I will now proceed to describe it with the aid of the accompanying drawings, in which:

Figure 1 illustrates a longitudinal, sectional view showing the collet in position in a machine.

Figure 2 is an enlarged section on the line 2—2 of Figure 1.

Figures 3 and 4 are views on the lines 3—3 and 4—4 respectively of Figure 2.

Figure 5 shows a longitudinal section of a modified form of my collet, and

Figure 6 is an enlarged section on the line 6—6 of Figure 5.

Figure 7 is a longitudinal section showing a further modification of the invention, and

Figure 8 is an enlarged section on the line 8—8 of Figure 7.

Referring first to Figures 1 to 4, 1 designates a collet which is substantially annular throughout its length. The front portion or head 2 has a circular outer periphery which is inwardly and rearwardly tapered from its front extremity, and its bore 4 is serrated to engage and grip work or stock A which extends through it. 5 denotes the intermediate portion of the collet which terminates at its rear extremity in a closed collar 6 which is internally threaded to engage the external thread 7 upon the front extremity of a hollow collet tube 8 through which the stock A also extends.

Formed through the head 2 and extending rearwardly through the intermediate collet portion 5 are a plurality of radial slots 9 the width of which is usually increased in the said intermediate portion 5. The slots 9 divide the head 2 into a plurality of segments 2*a*.

Mounted upon the machine spindle 10 is a housing 11, the front extremity of which has a forwardly and outwardly tapered bore 12 to correspond with and engage the tapered outer periphery 3 of the collet. 14 denotes a keyway formed in the outer periphery 3 of the collet head. This keyway extends centrally across and longitudinally with one of the slots 9 and receives a key 15 which, in the case shown, is formed integral with the housing 11.

When the collet tube 8 is moved axially rearward it draws back the head 2 and causes its segments 2*a* to be forced inwardly by contact with the tapered bore 12 of the housing. Thus the serrated head bore 4 is brought into gripping relation with the work A.

So far the parts described are those of a conventional collet and its co-relating parts. It is found, however, that while this collet satisfactorily engages the periphery of work which is uniform as to size throughout its length and circumference, it does not hold the work rigid and immovable if there are high and low spots at intervals along and around its circumference.

In a collet made according to my invention I provide internal and radial counterbores 20 in the segments 2*a*. In each counterbore I arrange a button or gripping member 21 of slightly greater thickness than the depth of the counterbore. On the outer faces of these buttons narrow, outwardly projecting biting edges are formed which are frequently substantially circular in form.

One method of holding these buttons 21 upon

the base of the counterbores 20 is to provide small passages 22 concentric with the latter through the head 2 to connect the said counterbores with other external counterbores 23, and to provide screws 24, with their heads in the external counterbores, to engage threaded openings 25 formed in the said buttons.

Where there are an odd number of slots 9 in the collet I prefer to provide circular openings 30 through the head 2 to provide ready access to the bore of the head for formation of the internal counterbores 20. These openings 30 are of greater diameter than the width of the slots 9 and have their centers upon the longitudinal center lines of the latter.

In the modified arrangement shown in Figures 5 and 6, the head 2*d* of the collet 1*d* is bored to receive segmental pads 32 having serrated gripping surfaces 4*d*. At the rear extremity of the head inwardly projecting shoulders 2*f* are formed against which the inner faces of the pads 32 bear. Formed radially in the inner faces of the pad segments 32 are counterbores 20*d*, which extend partway through the pads. Extending concentrically from the bases of the counterbores 20*d* are smaller concentric openings 20*f*. When the pads 32 are in position these openings 20*f* register with tapped holds 22*d* formed in the collet head 2*d*. In this case the buttons 21*d* constitute the heads of screws 24*d* which project through the pad openings 20*f* and are in threaded engagement with the tapped holes 22*d* in the collet head.

In the modification shown in Figures 7 and 8, the head 2*g* of the collet 1*g* is bored to receive segmental pads 32*g* having gripping faces 4*g*. The outer peripheral portions of the pads 32*g* are of larger diameter towards the front as shown at 32*h* and of smaller diameter towards the rear as shown at 32*k* to fit into correspondingly bored portions 2h and 2*k* respectively of the head 2*g*. Moreover between these two bore portions in the head 2*g* an annular shoulder 2*l* is formed against which corresponding portions 32*l* of the pads rest. The front extremity of the bore of the head 2*g* is also tapered as shown at 2*m* to engage correspondingly tapered portions 32*m* of the pads 32*g*. Thus the pads are held relative to the head 2*g* during movement of the stock A in either direction therethrough.

Formed radially in the inner faces of the pads 32*g* are counterbores 20*g* to receive buttons 21*g* which are internally threaded to engage screws 24*g* which extend through openings 22*g* in the heads 2*g*. The heads of the screws 24*g* lie in external counterbores formed in the heads 2*g* at the outer extremities of the openings 22*g* and concentric therewith. It will also be noted that these screws 24*g* are provided with countersunk multi-sided heads, as shown in Figure 8, which are accessible when the pads are in position, and the collet mounted upon the machine. Consequently insertion or removal of the pads can be easily and quickly accomplished provided the stock A is removed or pushed back far enough in the collet to clear the pads.

From the foregoing it will be readily seen that the buttons or gripping members 21, 21*d* or 21*g* are readily removable so that others may be substituted when their biting edges become worn; and that the buttons effectively grip the periphery of stock of somewhat irregular contour as they are set, say ten-one thousandths of an inch, in advance of the gripping surfaces or faces 4, 4*d* or 4*g* which also assist in holding the stock. Moreover when the buttons are also employed with the pads they also hold the latter in place.

While in the foregoing the preferred embodiments of the invention have been described and shown it is understood that these constructions are susceptible to such further alterations and modifications as fall within the scope of the appended claims.

What I claim is:

1. A collet comprising a tubular housing, a tubular member mounted therein through which work is adapted to be fed, said member being longitudinally split from one extremity into a plurality of separated segments, coacting means on the housing and member for forcing the segments inwardly to constrict that portion of the bore of said member, the bore of the segments being serrated to grip the periphery of the work, said segments having radial openings formed therein, buttons seated in said openings having serrated faces projecting inwardly slightly beyond the serrated bore of the segments to bite into the work so that the serrated bore of the segments is spaced a slightly greater radial distance from the axis of the work than the serrated faces of the buttons, and means holding said buttons in position.

2. A collet including the combination set forth in claim 1, wherein the serrated faces of the buttons are disposed at right angles to an imaginary line drawn radially from the axis of the work.

3. A collet comprising a tubular member through which work is adapted to extend, said tubular member being split longitudinally from one extremity by a plurality of slots so that the split portion may be forced radially inward around the work, pads mounted in the bore of the tubular member, the pads having counterbores formed in their inner faces, a button seated in each counterbore and projecting inwardly therefrom, and means holding each button upon the base of its counterbore.

4. A collet comprising the combination set forth in claim 3, wherein means are provided upon the tubular member holding the pads against longitudinal movement.

5. A collet comprising the combination set forth in claim 3, wherein the means holding the buttons upon the bases of the counterbores also extend into the member to hold the pads immovable in the latter.

6. A collet comprising the combination set forth in claim 1, wherein the buttons are annular and have threaded bores, and wherein the means holding the buttons immovable consist of screws projecting inwardly through the tubular member one in engagement with the threaded bore of each button.

7. A collet comprising the combination set forth in claim 1, wherein the means holding the buttons immovable consist of a screw shank formed integral with each button, and wherein the tubular member is provided with tapped holes to receive said shanks.

IRVING H. SHEFFER.