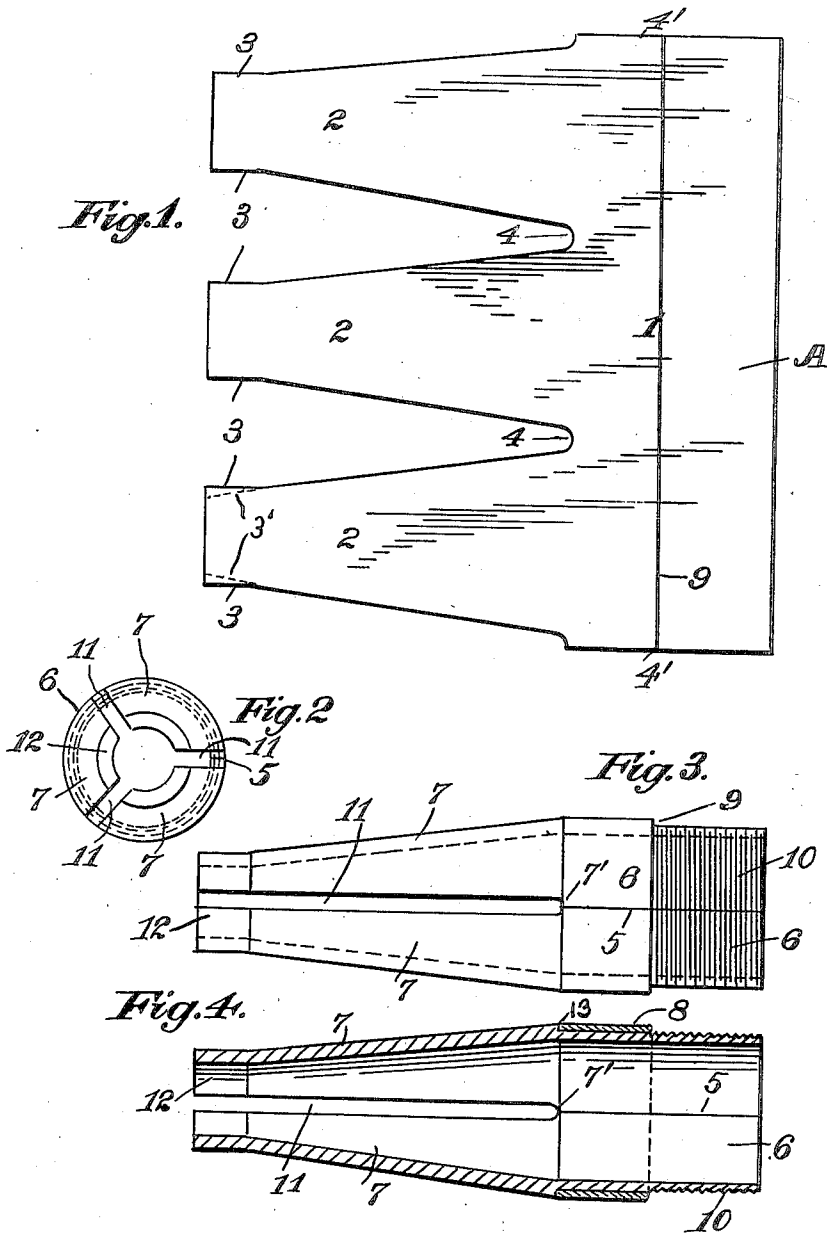


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 FEED COLLET AND METHOD OF MAKING THE SAME.
 APPLICATION FILED OCT. 18, 1920.

1,433,878.

Patented Oct. 31, 1922.



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UNITED STATES PATENT OFFICE.

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FEED COLLET AND METHOD OF MAKING THE SAME.

Application filed October 18, 1920. Serial No. 417,646.

To all whom it may concern:

Be it known that we, CHARLES J. FANCHER and ROBERT A. JOHNSON, both citizens of the United States, residing at Windsor, in the
5 county of Windsor and State of Vermont, have jointly invented certain new and useful Improvements in Feed Collets and Methods of Making the Same, of which the following is a specification.
10 This invention is an improvement in part of the subject matter of our pending application for improvement in feed collets and method of making the same, Serial No. 434,841, filed January 3, 1921, renewal of ap-
15 plication filed February 13, 1920, Serial No. 358,501, and relates to feed collets and method of making the same, similar to that disclosed in the above application and likewise designed to be used with automatic or hand-
20 operated screw machines, bar forming machines, metal working machines and the like for feeding the stock or work and has to do with the provision of an improved feed collet and process for making feed collets
25 whereby the construction of a strong, durable, efficient, inexpensive and easily manufactured feeding device of this type readily adapted to perform the various functions for which it is designed and intended, is obtained. Heretofore, it has been the practice
30 to manufacture feed collets of this general type from solid stock by boring out and then slotting the same. Considerable disadvantage and waste has resulted from this practice due to the fact that all material drilled
35 out is wasted and power is consumed in the operation. This method also leaves the inner surface of the collet weaker than the outer surface, and it is this inner surface
40 which is subjected to the greatest strain in use. Thus, feed collets constructed in this manner are neither as strong and durable nor as cheaply manufactured nor as satisfactory as those manufactured by the following
45 described method: In the manufacture of feed collets drilled or bored from a solid stock or bar it has been necessary when the collet was to be used with a square or hexagon or oval-shaped piece of stock to provide
50 the ends of the fingers with bushings or thickened portions, usually called pads, so as to conform to the shape of the stock to be fed. This is not only difficult, but is an expensive operation and frequently results in

the breakage of the collet in use for the rea- 55
son that the formation of these pads or thickened portions provided a shoulder on the inside of the collet against which the end of a new bar of stock, being fed into the collet, strikes and thus frequently breaks off one or 60
more of the fingers.

In addition, it has not been heretofore practicable in a feed collet of this kind to form the fingers of tapered form.

Moreover, it has been necessary, from a 65
practical standpoint, to drill transverse holes at the bases of the slots so as to prevent the formation of angles at this point, which angle-formation was a material drawback in the hardening of the collet. The drilling of 70
these holes at the bases of the slots necessarily took away a portion of the metal at the base of the fingers and consequently left the neck at this point narrower than the free ends of the fingers, so that the fingers 75
were weaker at this point than at any other point. Consequently the fingers frequently broke off at this point. Moreover, the drilling of a collet from a solid bar left on the inside thereof score marks or grooves, which 80
materially weakened the walls of the fingers, and furthermore it was difficult in practice to so drill a bar that the walls and fingers would be uniform; consequently one finger
would be thinner than another, thus result- 85
ing in a weak collet. Detachable collets of drilled form have been the only ones, so far as we are aware, that have ever been made or used prior to the present improvement. In our collet the fingers may not only be 90
tapered so that the bases thereof are of increased width compared with the front ends thereof, but no transversely drilled holes are necessary, and in which as the fingers are pressed toward the center or axis of the col- 95
let they may be formed to the desired shape of the stock to be fed as hexagonal, oval, square or otherwise, without the formation of pads or bushings on the interior thereof, and consequently without the formation of 100
any abrupt shoulders for the stock to strike against.

Moreover, since the collet is formed from a flat sheet metal blank which has been pressed between rollers it follows that the 105
metal of the fingers is uniform at all points, and therefore there is no scoring or grooving of the interior of the collet to weaken it and

consequently, the collet being uniform it is more effectively tempered or hardened than is the case where the walls are of different thicknesses.

5 It is the object of this invention to do away with these disadvantages, and in carrying out this method we take a sheet, preferably steel, which in the making has been subjected to a powerful compressing action, 10 thereby increasing the density of the steel and laying the grain thereof lengthwise of the sheet. The blank for the collet is then stamped or otherwise formed out of the sheet with the grain in some instances running 15 lengthwise of the finger pieces, that is to say, when cut from hard sheet steel the grain preferably runs lengthwise of the finger pieces, but when cut from soft sheet steel it can be cut either with or across the grain. 20 Hence when the blank is rolled or formed up by pressure with the finger pieces, the inner surface is as strong as the outer surface. The contiguous edges of the joint formed in this manner are secured or joined together 25 in any suitable way, such for instance as by butt-welding, by a soft steel ring binder, by both, or in any other desired manner.

Other objects of this invention will appear as the description proceeds, reference 30 being had to the accompanying drawings forming a part of this specification wherein like reference characters indicate corresponding parts in the several views, and wherein Fig. 1 is a plan view of a blank 35 from which a preferred form of collet is made; Fig. 2 is an end view of a feed collet after being formed from the blank; Fig. 3 is a side elevation of a collet; and Fig. 4 is a central longitudinal section thereof disclosing the use of the ring binder. 40

In carrying out our method of manufacturing feed collets, we provide a metal blank A, struck from or stamped out of a piece of sheet steel, which was in the making thereof subjected to pressure, as for 45 instance by means of the customary rolls used in producing pressed steel plates. The metal, having been subjected to pressure, both surfaces of the blank will have an increased density and will have the same density 50 after the collet is formed therefrom, and furthermore the grain of the metal in this manner may, if desired, be laid lengthwise of the sheet. Moreover, by reason of 55 this pressure, the walls of the metal are of uniform thickness throughout.

The blank comprises a substantially rectangular body 1, and a plurality of finger pieces 2 extending or projecting from one 60 of the longer sides of the body. As shown in our preferred embodiment, each finger piece 2 has a tapered formation and terminates at its outer end in a gripping portion, the lateral edges of which are so 65 shaped, as hereinafter more fully described,

so as to permit the formation of a bore having a gripping surface of variable size to accommodate the work at hand. This tapered formation of the fingers, since they are of increased width at the base 70 thereof, as compared with the free ends thereof, gives greater strength and resiliency to the fingers, and in practice it has been demonstrated by a long series of tests 75 that the fingers made in this way do not break off at the bases as has frequently occurred with the collets made by drilling a solid bar of stock in which the fingers are not tapered, and in which transverse holes 80 have been drilled at the bases of the fingers, thus making the necks thereof of less width than the free ends of the fingers.

The blank is then formed or rolled up in any desired manner as by suitable sidewise pressure into the shape illustrated in Figs. 85 2, 3 and 4 with the end edges 4' of the body forming a butt joint 5. The body part thus forms substantially a cylinder with a bore therethrough, after which the finger pieces 2 are by another operation bent, pressed or 90 otherwise formed into the fingers 7, the outer surfaces of which are preferably curved as shown in Fig. 2 and the terminal portions 3 form parallel gripping surfaces of any desired shape to accommodate the 95 nature of the work. In other words, the fingers are pressed toward the center or axis of the collet and to the shape desired, that is to say, if the collet is to be used with a hexagonal or oval or square piece, then the 100 ends of the fingers are pressed into this shape, thus doing away with the necessity of forming pads or bushings on the interior of the fingers, and consequently doing away with the formation of any abrupt shoulder 105 on the interior of the collet. Hence the finger portions form substantially a frustum of a cone as shown in Figs. 3 and 4. The contiguous edges of the joint 5 of the cylindrical body 6 may then be joined or 110 secured together merely by a process of butt-welding of the material at that place as shown in Fig. 3, or by employing a soft steel ring or ring binder 8, or by both, as seen in Fig. 4, or in any other desired or 115 suitable way. If the ring binder 8 is employed, it is forced over the body 6 to hold the rolled parts together or to aid in holding the parts together in case they have been 120 previously butt-welded, or otherwise connected.

The ring binder 8 is located adjacent to the roots 7' of the fingers 7 and covers about one-half of the exterior surface of the body 6, which is turned down on the outside sufficiently to form a shoulder between contiguous parts of said body and the roots 7' of the fingers 7. The body 6, if desired, may be turned down to form an exterior shoulder 9 about midway between the outer and 130

inner ends of said body or the shoulder may be formed by pressing in a die in such manner as to offset it and form such shoulder.

However, the exposed end of the ring 8, if such is employed, may serve in place of such shoulder, and the body is exteriorly screw-threaded between the shoulder or the end of the binder and the outer end of the body, as shown at 10. This screw-threaded portion of the collet affords means for attaching the collet to the feed tube or other work holding member in the machine in which the collet is employed. By forming the collet from sheet metal however, it is practicable and therefore preferable to press the shoulder into the collet rather than to form it by turning down or cutting away the metal. By cutting away the metal obviously the thickness of the collet at this point where the threads are formed is reduced, and therefore the collet is weakened, whereas by forming the shoulder by pressing it into the metal the thickness of the metal and uniformity thereof is maintained, which is a very material advantage and gives a much better body for the formation of the thread.

In our preferred form shown, the fingers 7 may be separated from each other by slots 11, the side edges of which are substantially parallel due to the clearance 4 at the junction between the body 1 and the finger pieces 2. When the blank is rolled or formed up to produce the collet the terminals 3 of the finger pieces 2 are rolled or drawn together into a curved elongated portion to form an extended gripping surface of less diameter than that of the body 6 and having a bore therethrough of any desired shape to conform to the size of the work or stock. During this operation the finger pieces 2 are given a tapering configuration both exteriorly and interiorly whereby they will have substantially a conical shape.

In practice, in order to provide a bore of variable size having a gripping surface of the required size to accommodate any size of work or stock, the edges 3 forming the terminal portions 12 may be cut as shown in full lines, Fig. 1 or tapered to conform to the taper of the body portions of the fingers, as shown at 3' in dotted lines, or they may be shaped in any other desired manner according to the size of the work to be gripped, it being understood that when the gripping portions are shaped as shown at 3' the gripping bore of the collet may be formed of smaller size to grip a smaller piece of work than when the gripping portions are cut at any taper intermediate the lines 3' and 3.

As will be observed, the fingers 7 are highly resilient and the terminal portions 12 through which extend the axial bore for the work or stock, provide surfaces for gripping such stock or the work. Thus due to

the resiliency of the fingers they can readily grip the work for the purpose of feeding.

It will of course be understood that the fingers of the collets may be varied as desired in the manner of their construction and shape so as to conform to the various sizes of the work or bars of stock employed, and to the shape in cross section of such bars or rods, i. e. round, square, hexagonal, etc.

It will be further understood that we do not confine ourselves to the exact details of construction or arrangement of parts disclosed, but may make such changes as will come within the scope of the appended claims.

We claim as our invention:

1. A feed collet having a body, and a resilient gripping portion, said body having a pressed shoulder therein.

2. A sheet metal feed collet comprising a threaded body having a pressed shoulder therein, and resilient spaced gripping fingers.

3. A sheet steel feed collet comprising a threaded body having a pressed shoulder therein, and resilient spaced gripping tapered fingers.

4. A sheet steel feed collet comprising a threaded body having a pressed shoulder therein, and resilient spaced gripping tapered fingers, said fingers terminating in elongated gripping portions.

5. A sheet steel feed collet formed from a flat blank into a tubular member, said collet comprising a threaded body having a pressed shoulder therein, and a plurality of tapered, resilient, spaced gripping portions provided with gripping surfaces conforming to the shape of the bar to be fed.

6. A sheet steel feed collet formed from a flat blank of substantially uniform thickness into a tubular member with the opposed edges butt-welded, said collet comprising a threaded body having a pressed transverse shoulder therein, and a plurality of hardened tapered, resilient, spaced fingers provided with gripping elongated surfaces at their outer ends conforming to the shape of the bar to be fed.

7. The method of making a feed collet, which consists in bending a flat blank into a cylinder with the free edges held in juxtaposition, and pressing into said blank a shoulder formed portion.

8. The method of forming a feed collet, which consists in stamping a flat metal blank to form a body and finger pieces, and pressing into such body a shoulder, then bending the blank into a tube and securing the edges thereof together.

9. The method of making a feed collet, which consists in bending a flat blank into a cylinder with the free edges held in juxtaposition, said cylinder comprising a thread-

ed body portion and a plurality of projecting tapered resilient fingers, and pressing into said body portion a shoulder formed portion.

5 10. The method of forming a feed collet, which consists in stamping a flat metal blank to form a body and finger pieces, and pressing into such body a shoulder, then bending the blank into a tube and securing the edges together, then pressing the 10 finger pieces toward the center and simultaneously compressing said fingers into a form to conform to the shape of the stock to be fed.

15 11. The method of forming a feed collet, which consists in stamping a flat metal blank to form a body and taper finger pieces, and pressing into such body a shoulder, then bending the blank into a tube and securing 20 the edges together, then pressing the finger pieces toward the center, and simultaneously compressing said fingers into a form to conform to the shape of the stock to be fed.

25 12. The method of making a feed collet, which consists in first shaping a flat metal blank to form a body and tapered finger pieces and pressing into such body a transversely extending shoulder, then bending the blank into substantially a cylinder with 30 the finger pieces forming substantially a frustum of a cone and terminating in gripping surfaces, and then joining the contiguous edges together.

35 13. The method of making a feed collet, which consists in first shaping a flat metal blank to form a body and tapered finger pieces and pressing into such body a transversely extending shoulder, then bending the blank into substantially a cylinder with 40 the finger pieces forming substantially a frustum of a cone and terminating in gripping surfaces, then joining the contiguous edges together, and during the formation of the gripping surfaces shaping the same 45 to conform to the shape of the stock to be fed.

50 14. The method of making a feed collet, which consists in first forming a flat metal blank having a body portion and projecting fingers and pressing into the blank a shouldered portion for the reception of 55 threads, then bending the blank into a tube and securing the edges together, and then subjecting the fingers to pressure thereby to press the same toward the axis of the blank to form gripping surfaces.

15. The method of making a feed collet, which consists in first forming a flat metal

blank having a body portion and projecting fingers and pressing into the blank a 60 shouldered portion for the reception of threads, then bending the blank into a tube and securing the edges together, and then subjecting the fingers to pressure thereby to press the same toward the axis of the blank 65 to form gripping surfaces and to shape such gripping surfaces to conform to the shape of the stock to be fed.

16. The method of making a feed collet, which consists in first forming a flat metal 70 blank having a body portion and projecting fingers and pressing into the blank a shouldered portion for the reception of threads, then bending the blank into a tube and securing the edges together, and then 75 subjecting the fingers to pressure thereby to press the same toward the axis of the blank to form elongated gripping surfaces.

17. The method of making a feed collet, which consists in first forming a flat metal 80 blank having a body portion and projecting fingers and pressing into the blank a shouldered portion for the reception of threads, then bending the blank into a tube and securing the edges together, and then 85 subjecting the fingers to pressure thereby to press the same toward the axis of the blank to form elongated gripping surfaces and to shape such gripping surfaces to conform to the shape of the stock to be fed. 90

18. The method of forming a feed collet, which consists in stamping from a flat metal blank a body and a plurality of tapered finger pieces and pressing into such body a transverse shoulder, then bending the 95 blank into a tube and securing the edges together as by butt-welding, then pressing the finger pieces toward the center and into position to form elongated gripping surfaces with such elongated gripping surfaces 100 shaped to conform to the shape of the stock to be fed, then threading said shouldered body part, and then hardening said collet.

19. The method of forming a feed collet, which consists in bending a flat metal blank 105 to form a substantially tubular member comprising a body and spaced projecting resilient gripping members; then pressing a part of said gripping members toward the center to form gripping surfaces, and during the formation of said collet pressing a 110 shoulder into said body portion.

Signed at Windsor, Vermont, this 13th day of October 1920.

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