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H. J. PARSONS
SPRINGS FOR FEED CHUCKS

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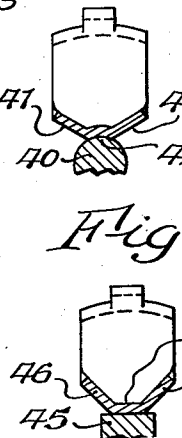
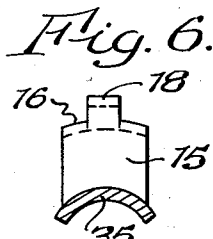
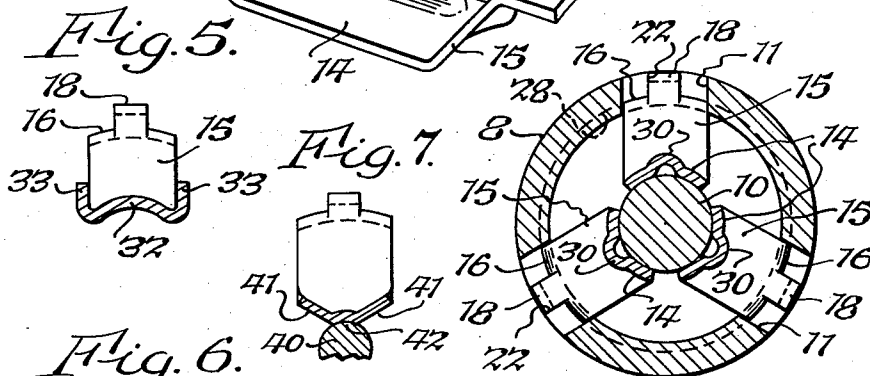
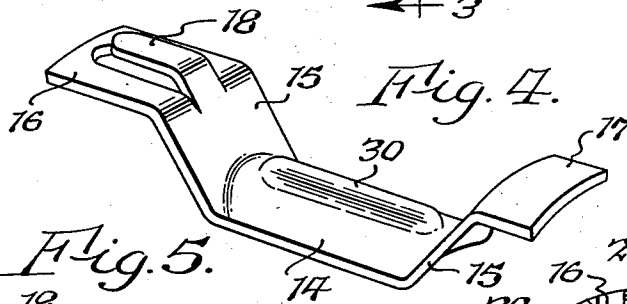
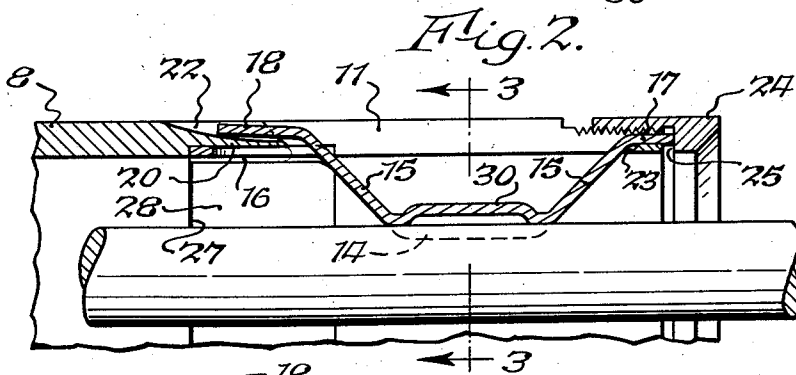
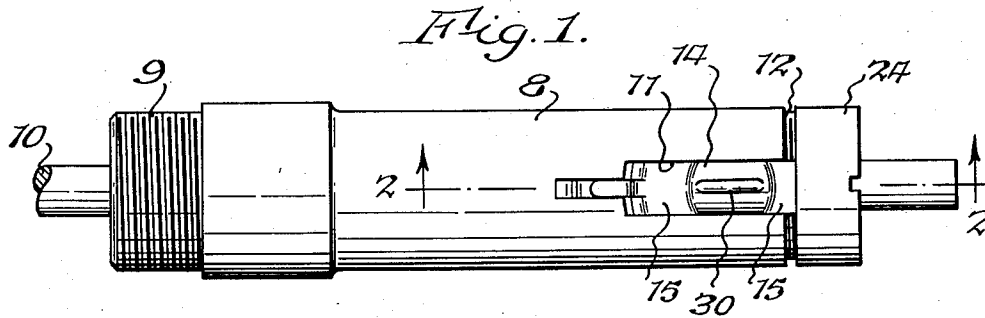


Fig. 3.

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SPRINGS FOR FEED CHUCKS

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This invention relates to improvements in feed chucks or feed fingers of the kind commonly used for advancing stock in automatic screw machines, lathes or the like. More particularly this invention relates to improvements in springs for use in connection with feed chucks of this type.

One of the objects of this invention is to provide springs of this type which are so constructed as to materially increase the pressure which the springs are capable of exerting against the stock to be fed, so that springs of relatively thin material may be used to accomplish the work which would otherwise require heavier springs. Another object is to provide springs of this kind which will have the maximum area of contact with the stock, and thus provide longer wear of the springs.

Other objects and advantages will be apparent from the following description of one embodiment of the invention and the novel features will be particularly pointed out hereinafter in connection with the appended claims.

In the accompanying drawings:

Fig. 1 is a side view of a feed chuck or finger embodying this invention, showing the same holding stock in the form of a rod.

Fig. 2 is a fragmentary central sectional elevation thereof, on line 2-2, Fig. 1.

Fig. 3 is a transverse sectional elevation thereof, in an enlarged scale, on line 3-3, Fig. 2.

Fig. 4 is a perspective view of the spring shown in Figs. 1 to 3.

Fig. 5 is a transverse sectional view of a spring of modified construction.

Fig. 6 is a similar cross sectional view of a spring of another modified construction.

Figs. 7 and 8 are similar cross sectional views of springs formed for operation on stock of small sizes.

In Figs. 1 to 3, I have shown by way of example, one embodiment of a spring holder of a feed chuck on which my improved springs may be used. These springs, however, may be used on holders of other constructions. In the holder illustrated by way of example, 8 represents a tubular body member which is provided at the receiving end thereof with a threaded part 9 formed for threaded engagement with the usual rotating feed tube which is advanced in the direction of its axis whenever stock is to be fed forwardly. 10 represents by way of example a piece of stock of a circular cross section with which the feed chuck may cooperate, but it will be understood that the feed chuck may cooperate with stock of many different sizes and cross sectional shapes. The body member 8 is provided at intervals about the periphery of the same with slots or cut-out portions 11 arranged intermediate of the ends of the body member adjacent to the leading end thereof. Any desired number of these slots may be provided, three being shown in the construction illustrated. Beyond the ends of these slots, the particular body member shown is provided at its dis-

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charge end with a part 12 of reduced diameter which is threaded on the exterior surface thereof.

The springs embodying my invention are removably arranged in the slots 11 of the body member. These 5 springs are preferably made of flat material, each bent to form a middle or intermediate portion 14 which extends toward the axis of the body member into position to engage the stock. This intermediate portion terminates at opposite ends thereof in outwardly extending inclined or diverging portions 15 formed integral with the inter- 10 mediate portion of the spring and these diverging portions terminate in ends 16 and 17 which extend substantially parallel with the intermediate portion of the spring.

The springs may be releasably secured on the holders: of the feed chucks in any suitable or desired manner, and in the construction shown by way of example, the ends 16 of the springs are bifurcated, for example, by partly punching out of each spring a finger 18 and offsetting the same from the remainder of the end 16 of the spring. 20 This forms a space between the finger 18 and the remainder of the spring end into which a part 20 of the body member of the feed chuck may extend to loosely support the springs on a body member, the part 20 constituting the bottom of an inclined groove 22 cut into the body member at the inner end of each slot 11.

The other ends 17 of the springs lie in flat grooves or recesses 23 formed in the threaded parts 12 of the body member. The springs extend beyond the end of the body member into position to be engaged by a shoulder 25 30 formed on a sleeve 24 which has a threaded engagement with the threaded end of the part 12 of the body member. The threaded part of the sleeve extends over the ends 17 of the springs so as to confine these ends in the recesses 23. When the sleeve is turned so as to move 35 axially toward the left in Figs. 1 and 2, pressure will be applied to the leading ends 17 of the springs by the shoulder 25, thus exerting pressure on the springs tending to bend the middle or intermediate parts 14 thereof toward the axis of the body member 8 and into engagement with stock which is being fed by the feed chuck. 40 The body portion is preferably also provided with an interval groove or recess 28 forming a shoulder 27 against which the ends 16 of the springs bear when pressure is applied to the other end of the springs by means of the sleeve 24.

It is desirable in the springs of feed chucks of this type to provide the maximum surface of contact between these intermediate parts 14 of the spring and the stock to be fed and it is also desirable in order to obtain the maximum pressure against the stock to hold the ends 16 50 and 17 of the springs against bending and thus concentrate the bending of the springs on the inclined or diverging portions 15. For this purpose, the outer face of the end 17 bears against the screw threads of the sleeve 24 and the outer surface of the end 16 of the spring, except for the finger 18 bears against the inner surface of the body portion.

In order to increase the resistance of the intermediate or middle portion of each spring against buckling or bending and to cause the same to contact with the maximum surface of the stock, the intermediate portion 14 is in the construction shown in Figs. 1 to 4 provided with a longitudinally extending reinforcing bead 30 which is preferably arranged intermediate of the side edges of the intermediate portion of the spring. This bead, consequently, materially increases the resistance of the intermediate portion of each spring against bending or buckling, and thus holds this intermediate portion in contact to the maximum extent with the stock 10. Consequently, 65 when severe outward pressure is exerted by the stock against the springs of the feed chuck, these springs will bend at the inclined parts 15 thereof in such manner

that these inclined parts will assume curved positions toward one or the other side of the position shown in Fig. 2.

Similar reinforcement of the intermediate portions of the springs may be accomplished by means of the construction shown in Fig. 5, in which the intermediate portion 32 of the spring is provided along opposite edges thereof with outwardly extending flanges 33. These flanges operate in a manner similar to the bead 30 shown in Figs. 1 to 4 to reinforce the intermediate portion of the spring against buckling or bending. These reinforcing flanges 33 will extend along the edges only of the part 14 and not along the inclined portions 15 of the spring.

In some cases, it is sufficient if the intermediate portions of the springs are merely made of a greater width than shown in Figs. 1 to 4. In Fig. 6, I have shown a cross section of a spring of this type in which the middle portion 35 is materially wider than the diverging portions 15, so that the greater width of the intermediate portion will afford greater resistance to bending. It is, of course, also possible to provide this wider intermediate portion with a bead such as shown in Figs. 1 to 4, but in most cases such a bead is not necessary if the intermediate part is of sufficient width. When the intermediate portions 35 of the springs are made of greater width as shown in Fig. 6, it may also be desirable to increase the width of the slots 11 in the body member.

In Figs. 7 and 8, I have shown springs constructed for the two-fold purpose of reinforcing the intermediate or stock-contacting portion thereof and also to enable the springs to operate on small sized stock of diameters which are materially less than the widths of the springs. In Fig. 7, 40 represents stock of small size in circular cross section, and in this case, the intermediate portions of the springs are made with two inclined sides or flanges 41 terminating in a curved stock-engaging part 42. These inclined sides may be so formed that when three springs are used in a chuck to hold the work, the inclined sides will not interfere or contact with each other in gripping the work. At the same time these inclined sides or flanges, by extending at angles to the middle part 42, serve to reinforce this middle part 42 and thus prevent buckling or bending of the intermediate part of the spring, due to pressure applied to the ends thereof.

Fig. 8 shows a similar idea applied to springs used for gripping square workpieces 45. In this case, inclined sides or flanges 46 of the intermediate portions of the springs extend at angles of about 45 degrees from the longitudinal, middle flat parts 47 of the intermediate portions of the springs. If four of these springs are employed in a chuck to grip the four sides of the stock, these inclined sides or flanges 46 of the several springs will be out of contact with corresponding parts of other springs so as not to interfere with the gripping of the stock, and of course, these inclined sides also serve to reinforce the intermediate portions of the springs, so that the flexing of the springs will take place at the inclined parts thereof as described in connection with the preceding figures.

When the feed chuck is used in connection with round stock of relatively small diameter, the intermediate portions 14 of the springs are also curved transversely to fit the stock and this transverse curvature supplements the bead 30, the flanges 33 or the increased width as shown in Fig. 6. If, however, the feed chuck is used in connection with stock of square or hexagonal cross section, the intermediate portions of the springs are without any transverse curvature and springs for use on round stock of large diameters have only a slightly transverse curvature at their intermediate portions. Consequently, in springs of this type, the intermediate portions will readily bend or buckle when in use, which interferes seriously with the proper gripping and feeding of the stock. It is, therefore, necessary to make the reinforcing parts of such

springs much more pronounced than in the case of springs designed to operate on round stock of small diameter.

By reinforcing the intermediate portions of the springs and also mounting the springs in the body portion of the feed chuck so that the ends of the springs will be held against flexing, the flexing of the springs will be restricted entirely to the inclined diverging portions 15 of the springs. It takes considerably more force to flex these intermediate portions out of their straight positions as shown in Fig. 2 than it would be to bend the other parts of the springs, and consequently, by preventing buckling or bending of the intermediate portions of the springs, the springs can be made of lighter stock than would otherwise be required. By preventing buckling of the intermediate portions of the springs, a substantially uniform engagement of the inner faces of these portions of the springs with the stock is assured, thus assuring proper feeding of the stock and also reducing the wear on the intermediate portions of the springs, thereby increasing the life of the same.

Feed chucks equipped with springs as herein described operate in the same manner as feed chucks of prior constructions. When the front end of the workpiece 10, which is held and rotated by a collet, not shown, has been operated upon and cut off, the collet opens to release the workpiece, whereupon the feed chuck moves forwardly to advance the rotating workpiece to the required extent. The collet then again closes to grip the workpiece and rotate the same while the outer, front end thereof is being operated on by the usual cutting tools. While this takes place, the feed chuck moves back to its original position with the springs bearing against the workpiece, in readiness to repeat the operation.

It will be understood that various changes in the details, materials, and arrangements of parts which have been herein described and illustrated in order to explain the nature of the invention, may be made by those skilled in the art within the principle and scope of the invention, as expressed in the appended claims.

I claim as my invention:

1. A spring for use in a feed chuck, said spring having an intermediate stock gripping portion terminating at its ends in two diverging outwardly projecting portions, said diverging portions terminating in ends extending substantially parallel to said intermediate portion, said intermediate portion being of a cross sectional shape to fit the stock to be gripped and also having a reinforcing portion extending lengthwise thereof for increasing the resistance of said intermediate portion to bending and preventing buckling of parts of said intermediate portion out of contact with the stock and concentrating the flexing of the spring on said diverging portions of the spring.

2. A spring according to claim 1 in which said reinforcing portion is in the form of a bead extending lengthwise of said intermediate portion from the face thereof opposite to the stock engaging face.

3. A spring according to claim 1 in which said reinforcing portion is in the form of a flange formed integral with said intermediate portion and extending lengthwise thereof.

4. A spring for use in a feed chuck, said spring having an intermediate stock gripping portion terminating at its ends in two diverging outwardly projecting portions, said diverging portions terminating in ends extending substantially parallel to said intermediate portion, said intermediate portion being of a cross sectional shape to fit the stock to be gripped and also being of greater width than said diverging portions to increase the resistance of said intermediate portion to bending, to provide increased area of contact with the stock and to concentrate the flexing of said spring on said diverging portions.

5. A spring for use on a feed chuck for gripping and intermittently advancing stock, said spring having an intermediate, stock-engaging portion which is of arched, cross-sectional shape to fit the stock being gripped to engage an extended surface of the stock to reduce wear

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of said spring and to resist buckling said intermediate portion and thus moving portions of said intermediate portion out of engagement with the stock, said intermediate, stock-engaging portion terminating at opposite ends thereof in inclined, diverging portions which are substantially flat and capable of being flexed when pressure is exerted on the same by said intermediate portion, said diverging portions terminating in ends which extend substantially parallel to said intermediate portion, said intermediate portion, because of its curved, cross-sectional shape, serving to transmit forces to said diverging portions without material changes in shape of said intermediate portion, said diverging portions being capable of being flexed by forces exerted thereon by said intermediate portion

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and yieldingly exerting corresponding forces on said intermediate portion for pressing the same against the stock.

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