June 10, 1952 J. KREBS, JR 2,599,764

MACHINE FOR REMOVING THREADED DIES FROM MOLDED PARTS

Filed Nov. 3, 1949 2 SHEETS—SHEET 1

FIG. 1

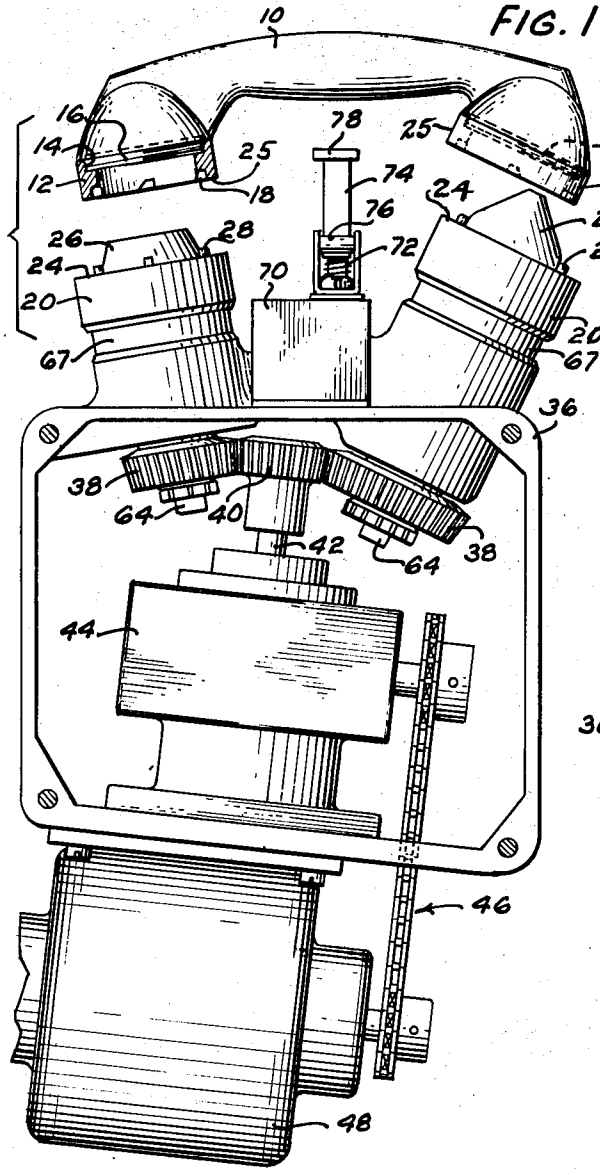


FIG. 2

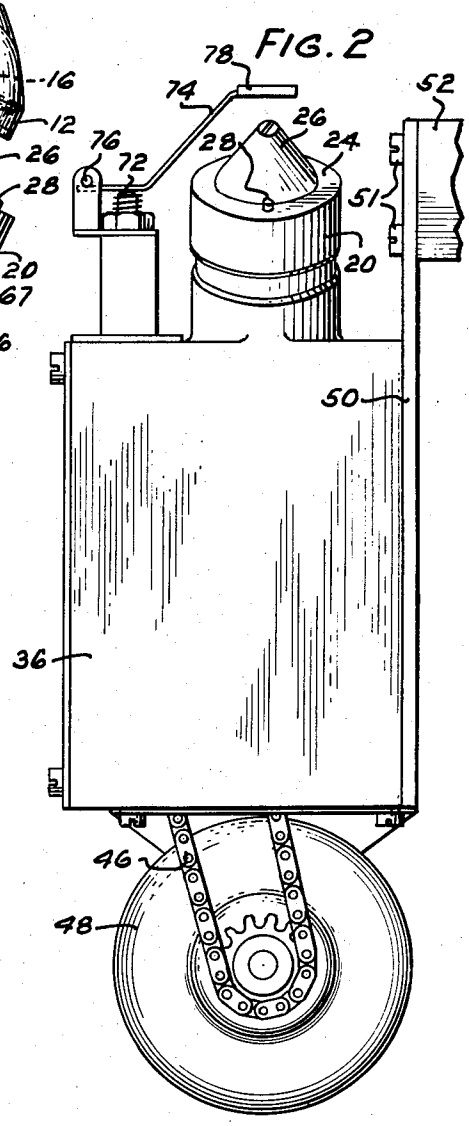


FIG. 3

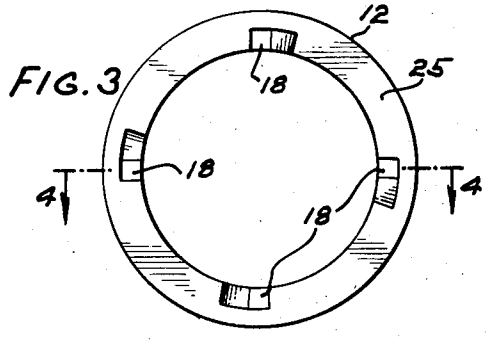
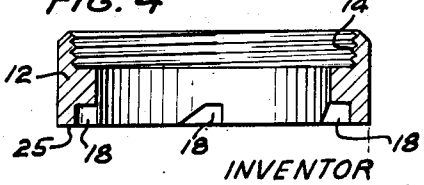


FIG. 4



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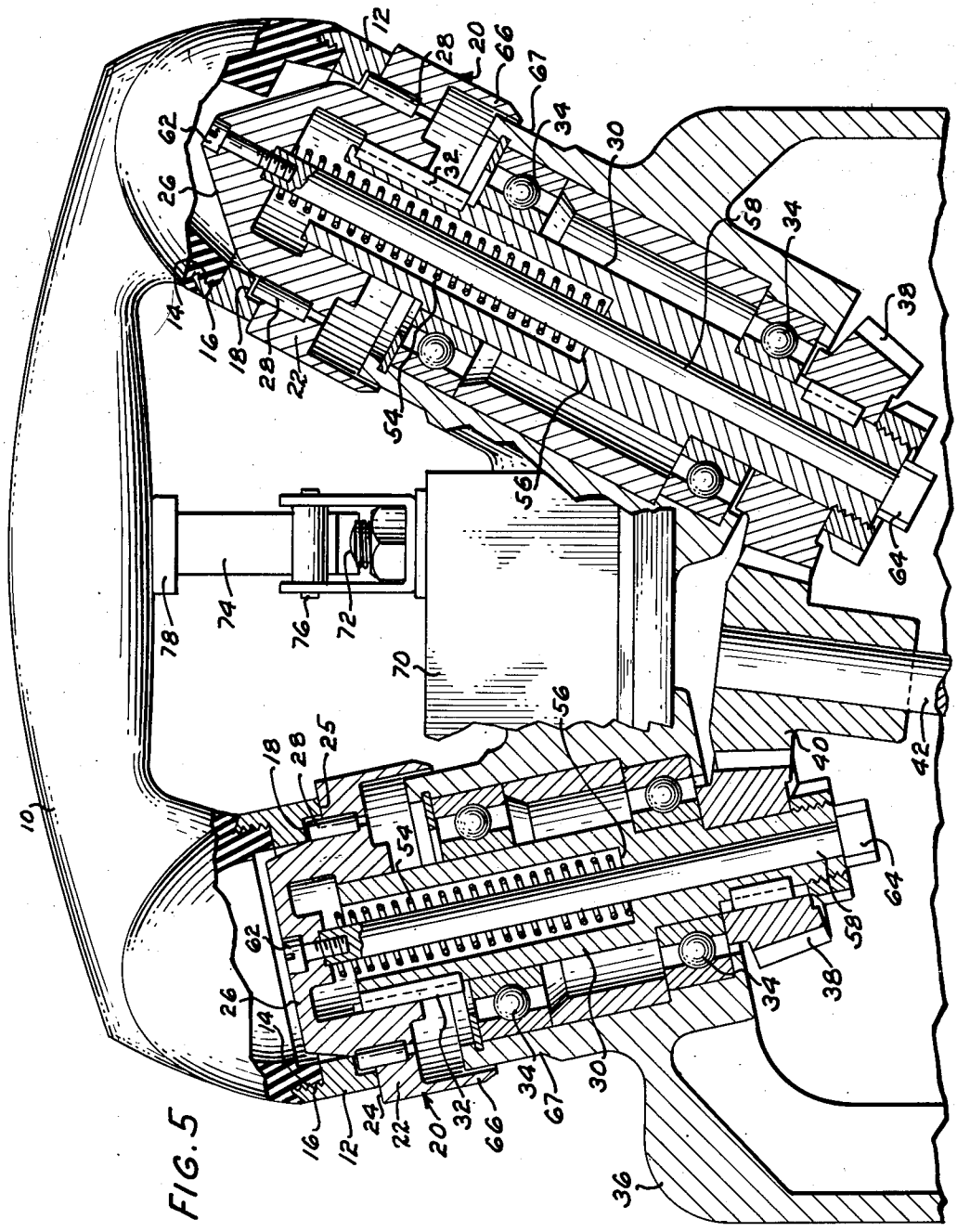


FIG. 5

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MACHINE FOR REMOVING THREADED DIES FROM MOLDED PARTS

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8 Claims. (Cl. 81—57)

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This invention relates to a die extracting machine and more particularly to a device for simultaneously unscrewing a pair of thread forming annular dies from a molded handle of a telephone handset in which the removable dies are disposed on converging axes.

It is the object of the present invention to provide a mechanism for simultaneously removing a pair of thread forming die members from a molded article.

In accordance with one embodiment of the invention two rotatable die removing heads mounted on shafts for rotation about converging axes corresponding to the converging axes of the pair of annular dies on the molded article are normally positioned to be engaged by the annular dies to establish a driving connection therewith. The shafts are connected through gearing to a motor which is controlled by switch means spring biased to open position and actuated to closed position by an article moved into operative position in engagement with the heads. The dies, which move axially with the heads as the dies are being unscrewed from the molded article, are interlocked with the heads and prevent the removal of the article which holds the switch closed, and upon removal of the dies from the article the switch raises the article and is restored to open position to stop the motor.

Other objects and features of the invention will be apparent by reference to the following detailed description thereof, and the accompanying drawings, in which

Fig. 1 is a vertical front elevational view of the extracting machine with the article shown in spaced relation thereto,

Fig. 2 is a side elevational view of the machine,

Fig. 3 is a bottom view of one of the thread forming die rings,

Fig. 4 is a sectional view of the die ring taken on the line 4—4 of Fig. 3; and

Fig. 5 is an enlarged detailed vertical sectional view of a portion of the extracting machine with a molded article in operative position thereon.

In the molding of the handle 10 of a telephone handset, annular die members or rings 12 having internal threaded portions 14 are inserted in the mold to form the external threaded end portions 16 on the ends of the handle member 10. The threaded portions 16 and the dies 12 are disposed at an angle relative to each other and in coaxial relationship with predetermined converging axes. The annular dies 12 remain on the handle 10 when the handle is removed from the mold and have to be removed therefrom. Each die 12 is

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provided with a plurality of notches 18—18 which may be engaged with a rotatable tool to unscrew the rings from the article.

The simultaneous removal of the thread rings 12 from the handle 10 is expeditiously achieved in the present extracting machine which comprises a pair of rotatable die removing heads 20—20 adapted to be engaged by the dies 12 for removing the dies from the handle 10. Each of the heads comprise a cylindrical member or disc 22 having a flat surface 24 engageable with the end surface 25 of the dies and an upwardly projecting concentric conical portion 26 telescopingly engageable with the annular dies for aligning the dies relative to the heads 20. A pair of diametrically opposed pins 28 secured to the upper portion of the driving head is engageable in the slots 18 of a thread ring and forms a driving connection therewith for imparting rotation to the thread ring.

Each head is mounted for rotation with and for limited axial movement on a hollow shaft 30 through a spline 32. The hollow shafts 30 are supported in bearings 34 mounted in a suitable framework or housing 36, and are disposed at a predetermined angle relative to each other for rotation about converging axis which correspond to those of the threaded portions 16 and the dies 12 on the article 10. At the lower ends of the hollow shafts 30 are secured beveled gears 38 which mesh with a beveled gear 40 secured to a drive shaft 42 of a gear reducer unit 44 which in turn is secured to the housing 36. A sprocket and chain connection 46 connects the gear reducer 44 to an electric driving motor 48 also mounted on the housing 36. The housing 36 may be supported in any suitable manner. In the embodiment disclosed herein, the housing 36 is secured to a back plate 50 which is fastened by bolts 51 to one side of a bench or table 52, (Fig. 2).

Mounted for rotation with the hollow shafts 30 and for axial movement relative thereto, the heads 20 are urged upwardly to their normal position as indicated in Fig. 5 by helical springs 54, one end of each of which is seated on a shoulder 56 on the hollow shaft 30 and the other end of which engages the head 20. A rod 58 slidably mounted in each of the hollow shafts 30 and secured at one end by a machine screw 62 to the head 20, and having a head or shoulder 64 at its other end engageable with the end of the shaft 30 serves to limit the upward movement of the heads 20. A cylindrical skirt 66 on each of the heads encircles a portion of bosses 67—67 formed on the housing 36.

The die extracting machine is provided with

control means for controlling the rotation of the heads in response to the placing of an article 10 into operative position on the machine. In the embodiment shown herein, the control means comprises a switch 70 secured to the upper portion of the housing 36 and to one side of the heads 20 and has a spring biased plunger 72 stressed for movement upwardly to its normal open position shown in Fig. 2. A switch operating lever 74 pivotally connected to the switch 70 at 76 has its end portion 78 positioned in the path of movement of an article 10 when the article is moved into operative position on the machine and is engaged and actuated by the article to its closed position to start the motor and rotate the heads 20.

Thus when it is desired to remove the pair of thread forming dies 12 from the article 10, the article 10 is placed in operative position on the machine with the pair of dies positioned in engagement with the heads 20. This movement of the article 10 into engagement with the machine depresses the lever 74 and actuates the switch 70 from its open position to its closed position to cause the actuation of the motor 48 and the rotation of the heads 20 which impart rotation to the dies 12 to unscrew them from the threaded portion 16 of the article 10. During the die removing operation the article 10 is held stationary while the thread rings 12 thereon, and the heads 20 of the machine are moved axially in a downward direction until the dies 12 have been unscrewed from the threaded portion 16 of the article when the article 10 is raised, and switch 70 and the heads 20 are restored to their normal position. Because of the angular disposition of the dies 12 and the heads 20 during the die removing operation, an interlocking connection is established between the heads 20 and the dies 12 which holds the article in its operative position against the spring biased lever 78 and serves to keep the switch 70 closed and the motor and the heads 20 rotating until the dies 12 have been unscrewed from the threaded portion 16, at which time the article 10 is free to move thereby permitting the plunger 72 and lever 74 to raise the article and restore the switch 70 to its open position to stop the operation of the machine. The article 10 and the pair of thread rings 12 may then be removed individually from the machine.

It is essential that both of the die rings 12 become unscrewed from the threaded ends 16 of the article 10 at approximately the same instant to insure that both die rings are removed from the article before the lever 74 is permitted to be raised and cause the actuation of the switch 70 to stop the operation of the machine. When the number of threads on one of the threaded ends 16 of the article 10 is greater than on the other end, as in the embodiment illustrated herein, the ratio of the gears 38 is such as to vary the rate of rotation of the heads 20 to accomplish the simultaneous removal of the die rings from the article.

It is to be understood that the above-described arrangements are simply illustrative of the application of the principles of the invention. Numerous other arrangements may be readily devised by those skilled in the art which will embody the principles of the invention and fall within the spirit and scope thereof.

What is claimed is:

1. A die extracting machine comprising a pair of rotatable die removing elements having means forming interlocking engagement with a pair of threaded die rings on an article, means mounting said elements for rotation about converging axes and for limited axial movement from a normal position toward the intersection of said axes, spring means for yieldably urging said elements to their normal positions, drive means including a motor for simultaneously rotating said elements, and switch means engageable with said article when said article is moved into operative position in said machine to effect the actuation of said driving means to unscrew said threaded die rings from said article.

2. A die extracting machine comprising a pair of rotatable die removing elements having means forming interlocking engagement with a pair of annular thread forming dies on an article, means mounting said elements for rotation about converging axes and for limited axial movement from predetermined normal positions toward the intersection of said axes, spring means stressing said elements for movement to their normal positions, drive means including a motor for simultaneously rotating said elements, switch means actuatable by an article moved into operative position in said machine to effect the actuation of said drive means to unscrew said dies from said article, and resilient means for stressing said article for movement from said operative position for moving said article upon completion of the unscrewing of said dies therefrom to stop said drive means.

3. A mechanism for removing a pair of thread forming dies from a molded article wherein the dies are angularly disposed with respect to each other on the article comprising a pair of rotatable heads having a normal position and adapted to be engaged by the dies on the molded article and having means forming an interlocking driving connection with the dies, means mounting said heads for rotation about converging axes and for limited axial movement, driving means including an electric motor for simultaneously rotating said heads, resilient means for yieldably retaining said heads in said normal position and permitting axial movement of said heads as the dies are unscrewed from said molded article, and control means for effecting the actuation of said drive means including a switch actuated by the movement of the molded article into operative engagement with said heads.

4. A mechanism for unscrewing a pair of thread forming dies from a molded article wherein the dies are disposed on predetermined converging axes comprising a pair of shafts, supporting means mounting said shafts for rotation about converging axes corresponding to said predetermined converging axes, driving means operatively connected to said shafts for simultaneously rotating said shafts, heads mounted for rotation with and for limited axial movement on said shafts, said heads having a normal position adapted to engage said thread forming dies on said molded article and having means forming an interlocking driving connection with said dies, said heads and said dies being movable axially during the unscrewing of the dies from the molded article, resilient means for normally retaining said heads in said normal position and permitting axial movement of said heads, control means for effecting the actuation of said driving means including a member movable from a normal first position to a second position by the placing of a molded article into operative engagement with the heads, said article being held against removal during the die unscrewing op-

eration by the interlocking connection between the heads, the dies and said molded article, and resilient means for returning said member to said first position and moving said article thereon upon completion of the unscrewing of the dies from the article to stop the actuation of said driving means.

5. A mechanism for removing a pair of annular thread forming dies from a molded article wherein the dies are disposed about predetermined converging axes comprising a pair of shafts, supporting means mounting said shafts for rotation about converging axes corresponding to said predetermined converging axes, driving means operatively connected to said shafts for simultaneously rotating said shafts, heads mounted for rotation with and for axial movement relative to said shafts, said heads having a normal position adapted to receive said annular dies on said molded article, circular aligning shoulders on said head concentric with the axis of rotation thereof telescopingly engageable with the annular dies for aligning the dies relative to the heads, means on said heads engageable with said annular dies to form an interlocking engagement therewith for imparting rotation thereto, means limiting the axial movement of said heads in one direction to said normal position, and spring means for yieldably retaining said heads in normal position and permitting axial movement of said heads as the annular dies are unscrewed for said molded article.

6. A mechanism for removing a pair of annular notched thread forming dies from a molded article wherein the dies are disposed about predetermined converging axes comprising a pair of hollow shafts, supporting means mounting said shafts for rotation about converging axes corresponding to said predetermined converging axes, a beveled gear fixed to one end of each of said shafts, drive means including a beveled gear meshing with the bevel gears on said shafts for rotating said shafts, die removing heads on the opposite ends of said shafts, means mounting said heads for rotation with and for limited axial movement on said shafts, conical members on said heads concentric with the axes of rotation thereof engageable with the annular die for aligning the die relative to the heads, a plurality of members on said heads engageable in the notches in said annular dies for establishing a driving connection between said heads and said annular dies, spring means disposed within said hollow shafts for moving the heads to a normal position and permitting the heads to move axially during the unscrewing of the annular dies from the molded article, and stop members on said heads extending axially within said hollow shafts and having shoulders thereon engageable with said shafts for limiting

the movement axially in one direction of said heads to said normal position.

7. A mechanism for removing a pair of thread forming dies from a molded article, wherein the dies are angularly disposed with respect to each other on the article, comprising a pair of rotatable heads having a normal position adapted to be engaged by the dies on the molded article and having means forming an interlocking driving connection with the dies, means mounting said heads for rotation about converging axes and for limited axial movement, driving means for rotating said heads, resilient means for yieldably retaining said heads in said normal position and permitting axial movement of said heads as the dies are unscrewed from said molded article, and control means for effecting the actuation of said drive means including an element actuated by the movement of the molded article into operative engagement with said heads.

8. A mechanism for removing thread forming dies from a molded article comprising a plurality of rotatable heads having a normal position and adapted to be engaged by the dies on the molded article and having means forming an interlocking driving connection with the dies, means mounting said heads for rotation and for limited axial movement, driving means for rotating said heads, resilient means for returning said heads to said normal position and permitting axial movement of said heads as the dies are unscrewed from said molded article, a movable element having a normal position and actuatable to a second position by the movement of the article into operative engagement with said heads, control means including said element for effecting the actuation of said drive means in response to the movement of said element to said second position, and resilient means for returning said element to said normal position upon completion of the unscrewing of the dies from the article to stop the actuation of said driving means.

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