Sept. 9, 1924. 1,507,621

R. H. PERRY ET AL

SWAGER WITH WEDGE MOTION

Filed Jan. 28, 1922 3 Sheets-Sheet 1

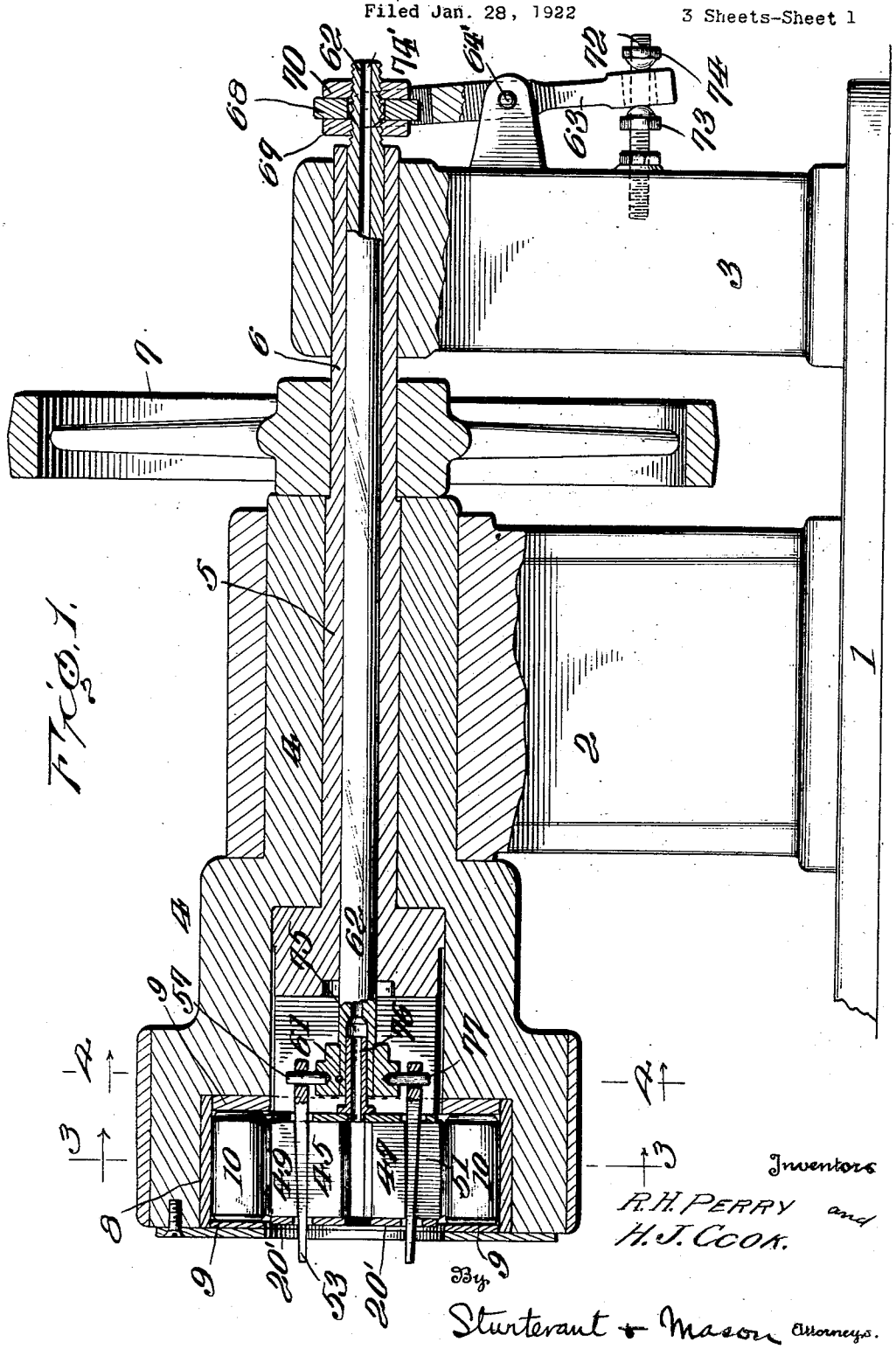


Fig. 1.

Inventors
R. H. PERRY and
H. J. COOK.
By
Sturtevant & Mason Attorneys.

Sept. 9, 1924. 1,507,621

R. H. PERRY ET AL

SWAGER WITH WEDGE MOTION

Filed Jan. 28, 1922 3 Sheets-Sheet 2

Fig. 3.

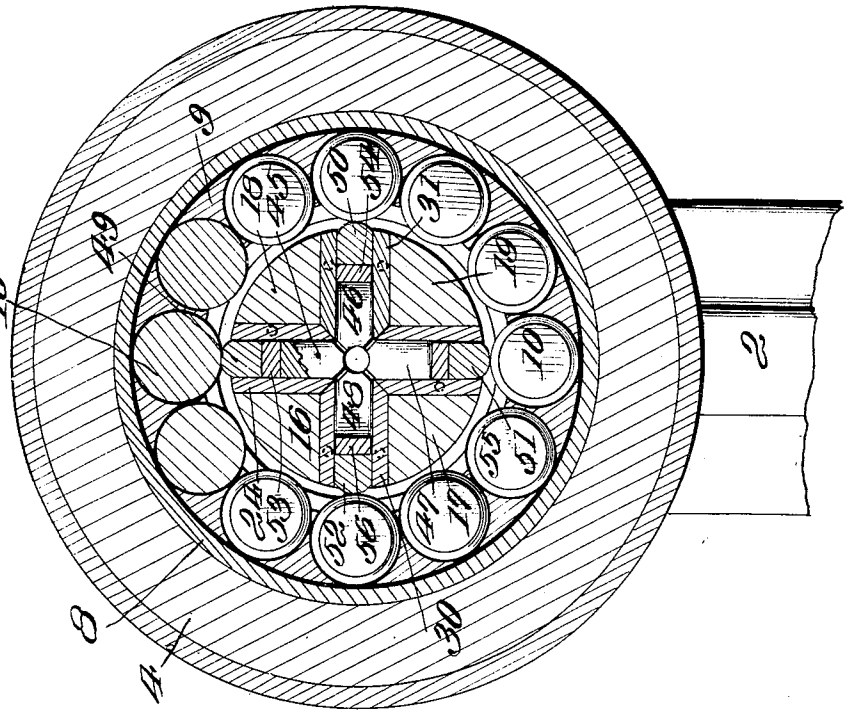
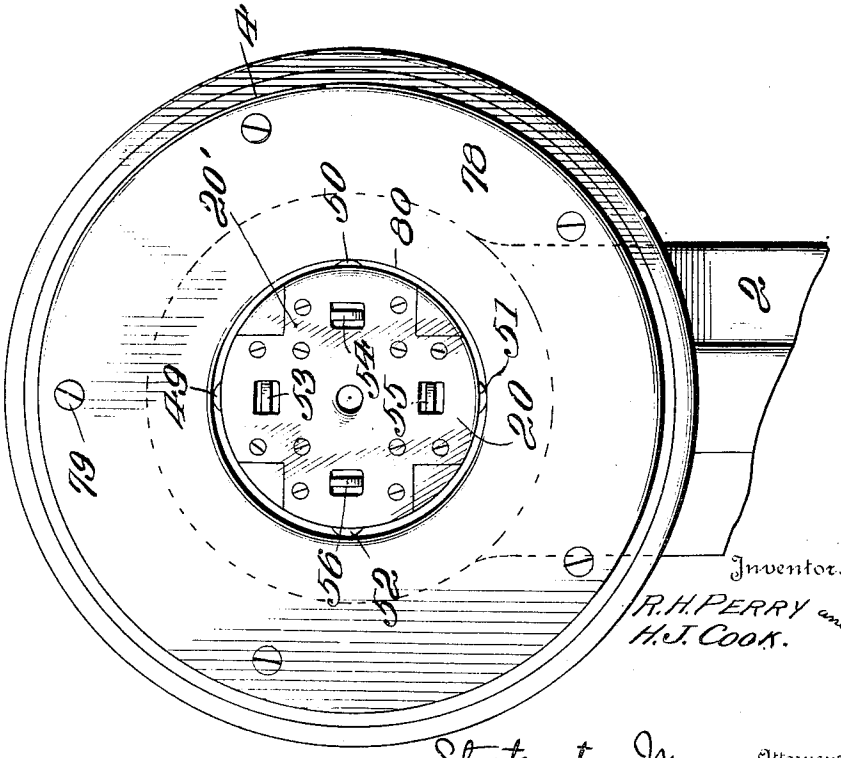


Fig. 2.



Inventors
R. H. PERRY and
H. J. COOK.

Sturtevant & Mason Attorneys

Sept. 9, 1924. 1,507,621

R. H. PERRY ET AL

SWAGER WITH WEDGE MOTION

Filed Jan. 28, 1922 3 Sheets-Sheet 3

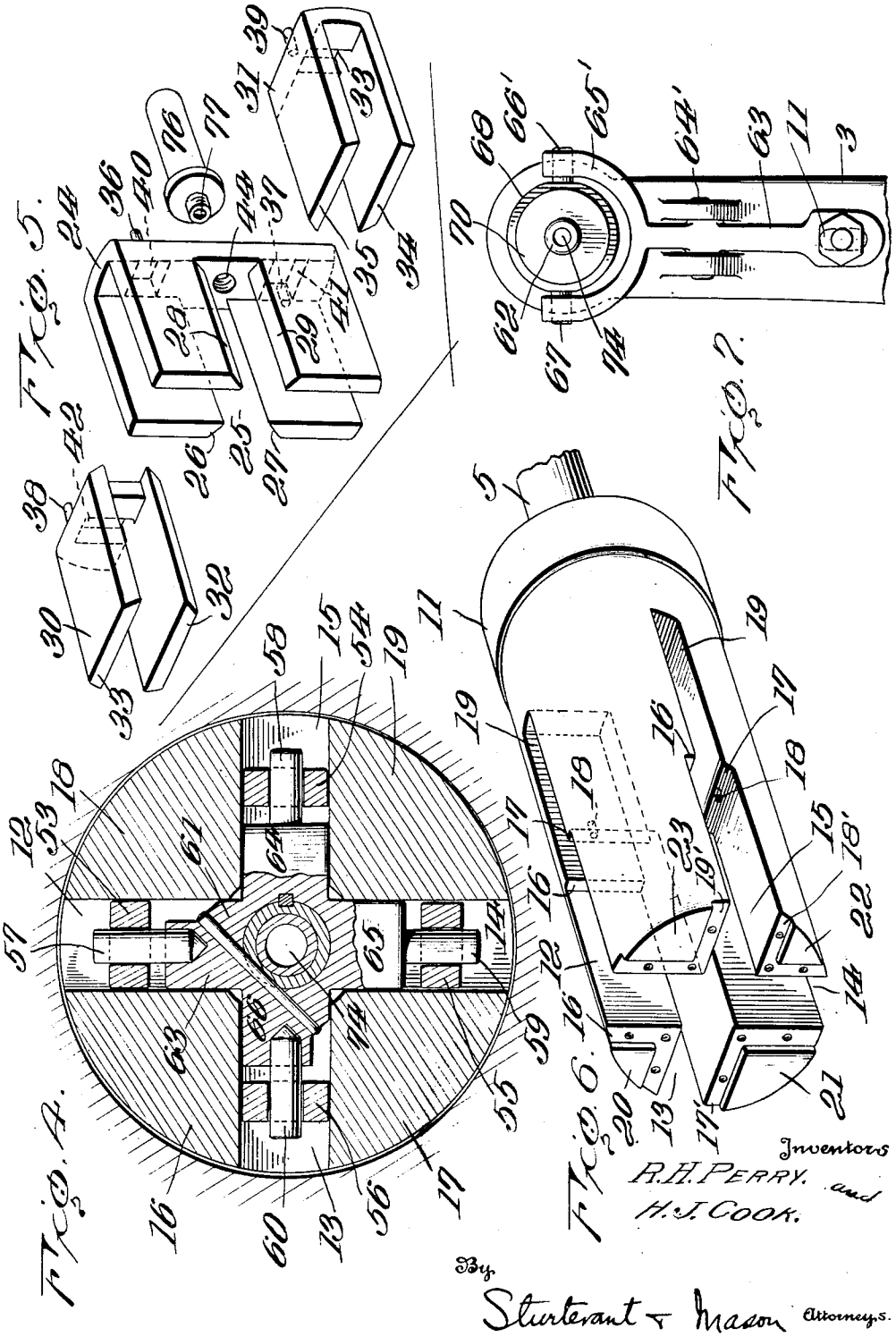


Fig. 5.

Fig. 7.

Fig. 4.

Fig. 6.

Inventors
R. H. PERRY. and
H. J. COOK.

By
Sturtevant & Mason Attorneys.

Patented Sept. 9, 1924. 1,507,621

UNITED STATES PATENT OFFICE.

RALPH H. PERRY AND HARMON J. COOK, OF TORRINGTON, CONNECTICUT, ASSIGNORS TO THE TORRINGTON COMPANY, OF TORRINGTON, CONNECTICUT, A CORPORATION OF CONNECTICUT.

SWAGER WITH WEDGE MOTION.

Application filed January 28, 1922. Serial No. 532,397.

To all whom it may concern:

Be it known that we, RALPH H. PERRY and HARMON J. COOK, citizens of the United States, residing at Torrington, in the county of Litchfield, State of Connecticut, have invented certain new and useful Improvements in Swagers with Wedge Motion, of which the following is a description, reference being had to the accompanying drawing and to the figures of reference marked thereon.

The invention relates to new and useful improvements in swaging machines, and more particularly to a swaging machine having opposed cooperating swaging dies which are adapted for swaging particularly wire stock, small rods, and the like.

An object of the invention is to provide a swaging machine with a plurality of pairs of swaging dies, which dies rotate about the stock being swaged and are simultaneously actuated to swage the stock during their rotation.

A further object of the invention is to provide a swaging machine of the above type wherein the actuating means for the swaging dies is free to travel so that the working position of the dies is caused to travel about the stock during the swaging thereof.

A still further object of the invention is to provide a swaging machine of the above type with means for varying the radial working position of the dies whereby blanks may be swaged to different sizes.

A still further object of the invention is to provide a swaging machine of the above type with radially moving dies and wear plates therefor, which can be readily replaced after they become worn.

A still further object of the invention is to provide wedges for shifting the radial working position of the dies and means for adjusting the wedges which is simple in construction and which may be readily manipulated to set the wedges in any desired position.

These and other objects will in part be obvious and will in part be hereinafter more fully disclosed.

Referring now to the accompanying drawings:—

Figure 1 is a side sectional view of the invention;

Fig. 2 is a front view thereof;

Fig. 3 is a section on the line 3—3 of Fig. 1;

Fig. 4 is a section on the line 4—4 of Fig. 1;

Fig. 5 is a detail perspective view of the wear blocks and hollow sleeve;

Fig. 6 is a detail perspective view of the slotted end of the spindle, and

Fig. 7 is a detail view of the wedge rod adjusting means.

The invention in its broadest aspect is directed to a swaging machine having a plurality of pairs of co-operation swaing dies. The dies in each pair are arranged on opposite sides or substantially so, of the stock being swaged. These dies are all mounted in a rotatable head and are so constructed as to be moved radially of the head in swaging the stock. Actuating means is provided for simultaneously moving all of the swaging dies into engagement with the stock. This actuating means operates intermittently on the swaging dies and is preferably in the form of rollers mounted loosely in a spacing ring which holds the rollers a predetermined distance apart, but at the same time permits the rollers to freely rotate and to travel bodily about the center of the rotating head. The traveling of the rollers about the center of the rotating head causes the traveling of the working position of the rotating dies and thus it is that the stock may be swaged from every angle and a very perfectly rounded article produced. The swaging dies are operated by backers which engage the rollers and between the backers and the swaging dies are wedges which may be simultaneously moved in or out manually for changing the radial working position of the swaging dies so as to swage blanks to varying sizes. The swaging dies are mounted in radial grooves in the rotating head and wear plates are provided which may be readily removed and replaced on which said swaging dies reciprocate. A hardened wear ring is also provided in the stationary housing within which said supporting head rotates. This hardened ring is concentric to the axis of rotation of the head, and forms an abutment for the rollers which operate the swaging dies. As the swaging die passes a roller, it turns it slightly and causes it to

roll along the hardened ring and this is what causes the rollers to travel in the same direction as the rotating head, but of course, at a much slower speed.

Referring now to the drawings in detail, the invention comprises a base 1 supporting the spaced standards 2 and 3, the former supporting the hollow stationary housing 4 in which is rotatably mounted the spindle 5, the outer end 6 of which is supported by the standard 3. Spindle 5 is driven by the pulley 7 keyed of fixed thereto. Said spindle carries the head 11 for the swaging dies.

The housing 4 is formed with bores or concavities of two different diameters. The front bore is of larger diameter than the rear bore. In the front bore or recess is seated the hardened steel ring 8 within which is disposed a roll rack 9 which as shown clearly in Fig. 3, acts as a keeper, spacer or roll retainer for the die operating rolls 10. This roll rack 9 is formed circumferentially with a desired number of equally spaced bores into which the rolls loosely fit. These bores in the roll rack open onto the inner and outer peripheral faces of the rack, the inner opening being sufficiently large to permit the rolls to project sufficiently to operate the swaging dies as hereinafter described. This roll rack 9 then, merely acts as a roll spacer or keeper, the rolls being free to rotate on the inner peripheral face of the ring 8, thus eliminating wear of the roll rack. The roll rack 9 makes a loose fit in its seat or bore of the housing 4 and is free to rotate therein so as to permit the die operating members or rolls to shift circumferentially in the head.

The front portion of the spindle 5 is formed with an enlarged head 11 as above noted and said head is provided with spaced slots or guideways 12, 13, 14 and 15. The number of such slots depends upon the number of pairs of dies desired, the number varying from 2, 4 or 6. It has been found that four dies afford a much more desirable swaging action than two dies.

In one form, these slots are designed with internal shoulders 16 and 17 formed with dowel-pin recesses or bores 18. The shoulders are easily formed by forming the guideways narrower at the rear portion of the head 11 as at 19. The front faces of the segments 20, 21, 22 and 23, which are formed by the radial intersecting slots or guideways 12, 13, 14 and 15 are preferably cut away as at 16′, 17′, 18′ and 19′ and formed with screw holes to receive a front plate or cover 20′ formed with a central opening for the insertion of the wire or stock between the dies. The slots 12 to 15 form guideways for the reciprocable dies and backers or followers. In order to prevent excessive wear of these slots, they are preferably lined with wear pieces. The preferred construction of the wear blocks is illustrated in Fig. 5. The block 24 is formed somewhat U-shaped with a transverse slot 25 through both legs thereof. The faces of these slots 25 are beveled as at 26, 27, 28 and 29 to form seats for joining beveled faces of two additional wear blocks 30 and 31 which are also substantially U-shape. The wear block 30 has the beveled faces 32 and 33 while the block 31 has the beveled faces 34 and 35. By inclining these faces as described, the wear blocks make a neat and close fit at the converging point of the radial guideways, as clearly shown in Fig. 3. The block 24 is formed with the rearwardly projecting dowel pins 36 and 37 and the blocks 30 and 31 are formed with the rearwardly projecting pins 38 and 39. These respective pins fit snugly in the holes formed in the shouldered faces 16 and 17 of the slots 12, 13, 14 and 15. In addition, each wear block is provided with a slot through which pass the wedges as hereinafter set forth. The block 24 is provided with the upper and lower slots 40 and 41, respectively, while the blocks 30 and 31 are formed with the slots 42 and 43, respectively. Block 24 is likewise formed with a central threaded bore 44.

The dies 45, 46, 47 and 48 are arranged in the guideways and slide on the rear blocks. The backers or followers 49, 50, 51 and 52 are likewise arranged in the guideways and slide on wear blocks. Between these backers and their respective dies are disposed the wedges 53, 54, 55 and 56, as is well known in the art. These wedges pass rearwardly as shown in Fig. 1, and are perforated at their inner ends to loosely receive pins 57, 58, 59 and 60 projecting from a wedge opening yoke 61.

This yoke 61 is keyed to the inner end of a wedge operating rod 62 which extends rearwardly through the inner bore of the spindle 5. This yoke slides in the slotted portion of the spindle and to this end is provided with four radial arms 63, 64, 65 and 66 which fit in the slots 12, 13, 14 and 15 to prevent rotation of the yoke relative to the spindle.

The outer end of the rod 62 projects beyond the spindle 6 and is threaded to form an adjustable connection with an operating lever 63. This lever is pivoted to standard 3 at 64′. The upper end of the lever is furcated as at 65′ to engage pins 66′ and 67 projecting outwardly from a plate 68 loosely fitting over the threads of rod 62. This plate is held in adjusted position on rod 62 by means of the nuts 69 and 70 disposed on either side of the plate. The lower end of lever 63 is formed with an elongated slot 71 through which passes a threaded rod 72 screwed into the standard

3. The adjusting nuts 73 and 74 hold the lever 63 in its position of adjustment.

For the purpose of supplying lubricant to the face of the dies, the rod 62 is bored internally to form a conduit 74′ through which oil may be pumped by means of a connection to its outer threaded end. This conduit 74′ extends the entire length of the rod and communicates with an enlarged recess 75 which telescopingly receives a sleeve 76 bored as at 77 and threaded at its extreme end to thread into the hole 44 of the wear plate 24. By this construction, the lubricant is conducted to the faces of the dies and the wire stock as it is being swaged. The front face of the head 4 is enclosed by a plate 78 attached thereto by screws 79 and provided with a central recess 80. This conduit also permits the wire stock to extend through the spindle if desirable.

Referring now to the operation of the device, it will be evident that when a wire rod or other piece of round stock is inserted in any suitable manner through the central opening in the plate 20 and into the central passageway of the spindle into swaging position between the dies and when the head 11 is rotated, the backers 49, 50, 51 and 52 will be simultaneously and intermittently brought into contact with the rolls 10 and will roll over the same thereby forcing the dies simultaneously inwardly to effect the desired swaging action. The dies and backers are thrown immediately outwardly after they have passed over a roll, by centrifugal force. When the backers pass over the suceeding roll, they are again forced inwardly as before. In this manner, the wire stock is given a succession of swaging blows by the dies which are arranged about the circumference of the stock, so that a true round swaging is effected, although we do not wish to be limited necessarily to round swaging.

Since the die operating rolls are free to rotate within the head, their positions are constantly shifting as the head rotates, so that the dies are operated at constantly varying points about the circumference of the round stock. This construction also insures a truer round swage, free of fins or ribs.

When it is desired to shift the radial working position of the dies to give the finished article a greater or less diameter, the wedge operating rod is adjusted by means of the lever 63, to slide the yoke 61 inwardly or outwardly as is evident. During this sliding movement of the yoke, the sleeve 76 telescopes within the recess 75 of the rods 62 so that the discharge of oil to the die faces is not interrupted.

It is obvious that minor changes may be made in the details of construction and the arrangement of the parts without departing from the spirit of the invention as set forth in the appended claims.

Having thus described the invention, what we claim as new and desire to secure by Letters-Patent, is—

1. A rotary swaging machine including in combination, a housing, a rotary head located within the housing and having a plurality of radial grooves, a plurality of pairs of swaging dies located in said radial grooves, a backer associated with each swaging die and located in the respective groove of the rotating head containing the swaging die, wedges interposed between the swaging dies and the backer, a series of rotating members located between the housing and the rotating head and adapted to engage simultaneously the backers for operating the swaging dies, and means for simultaneously shifting said wedges for varying the radial working position of the dies.

2. A rotary swaging machine including in combination a housing, a rotary head located within the housing and having a plurality of radial grooves, a plurality of pairs of swaging dies located in said radial grooves, a backer associated with each swaging die and located in the respective groove of the rotating head containing the swaging die, wedges interposed between the swaging dies and the backer, a series of rotating members located between the housing and the rotating head and adapted to engage simultaneously the backers for operating the swaging dies, and means for simultaneously shifting the wedges for varying to the same extent the radial working position of the swaging dies.

3. A rotary swaging machine including in combination a housing, a rotary spindle mounted in the housing and carrying a radially slotted head, a plurality of pairs of swaging dies mounted in the radial slots in said supporting head, a backer for each die mounted in the respective slots of the rotating head containing the swaging die, a wedge located between each swaging die and its backer, a rod extending from the spindle, a yoke fixed to the rod, said wedges being operatively connected to the yoke whereby the shifting of the rod simultaneously varies the position of the wedges.

4. A rotary swaging machine including in combination, a housing, a rotary spindle mounted in the housing and carrying a radially slotted head, a plurality of swaging dies mounted in the radial slots in said supporting head, a backer for each die mounted in the respective slot of the rotating head containing the swaging die, a wedge located between each swaging die and its backer, a rod extending from the spindle, a yoke fixed

to the rod, radial pins carried by the yoke, each wedge having a perforation engaging loosely over the pin whereby said rod may be moved endwise for shifting the position of the wedges.

5. In a swaging machine, a stationary hollow head, die operating members mounted therein, a hollow rotatable spindle provided with a central work receiving passage and a plurality of guideways intersecting the same, a die and backer arranged in each guideway for operation by said members on rotation of said spindle, an apertured rod operable through said spindle, a yoke carried by said spindle, a wedge disposed between said die and its backer, means connecting each wedge to said yoke, a hollow sleeve attached to said spindle and telescoping within said rod, said sleeve forming a lubricating connection between the aperture of said rod and said work receiving passage of the spindle.

In testimony whereof, we affix our signatures.

RALPH H. PERRY.
HARMON J. COOK.