

No. 835,328.

PATENTED NOV. 6, 1906.

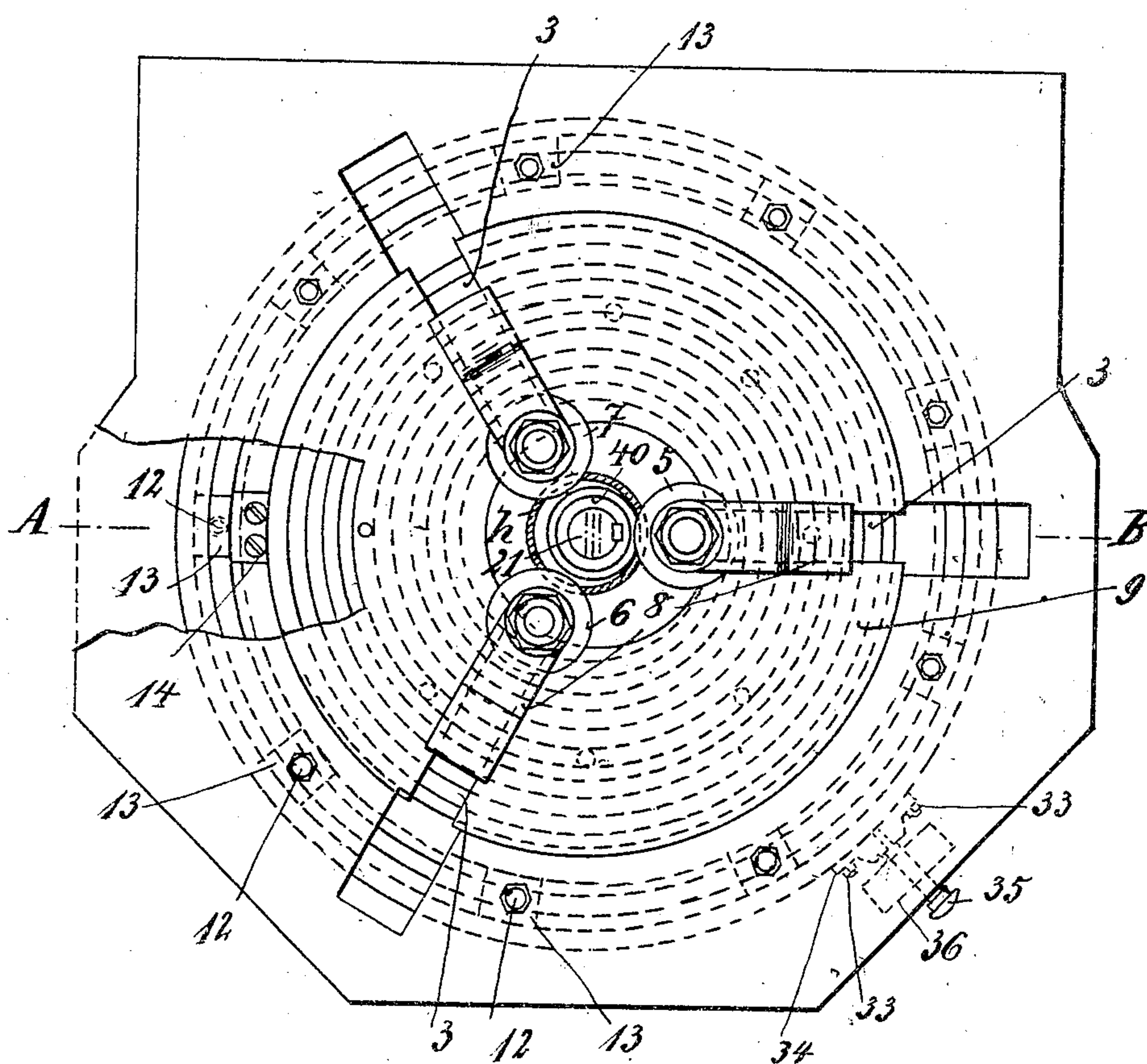
S. SCHNEIDER.

APPARATUS FOR PREPARING RINGS FOR BALL BEARINGS.

APPLICATION FILED JULY 10, 1905.

2 SHEETS—SHEET 1.

Fig. 1.



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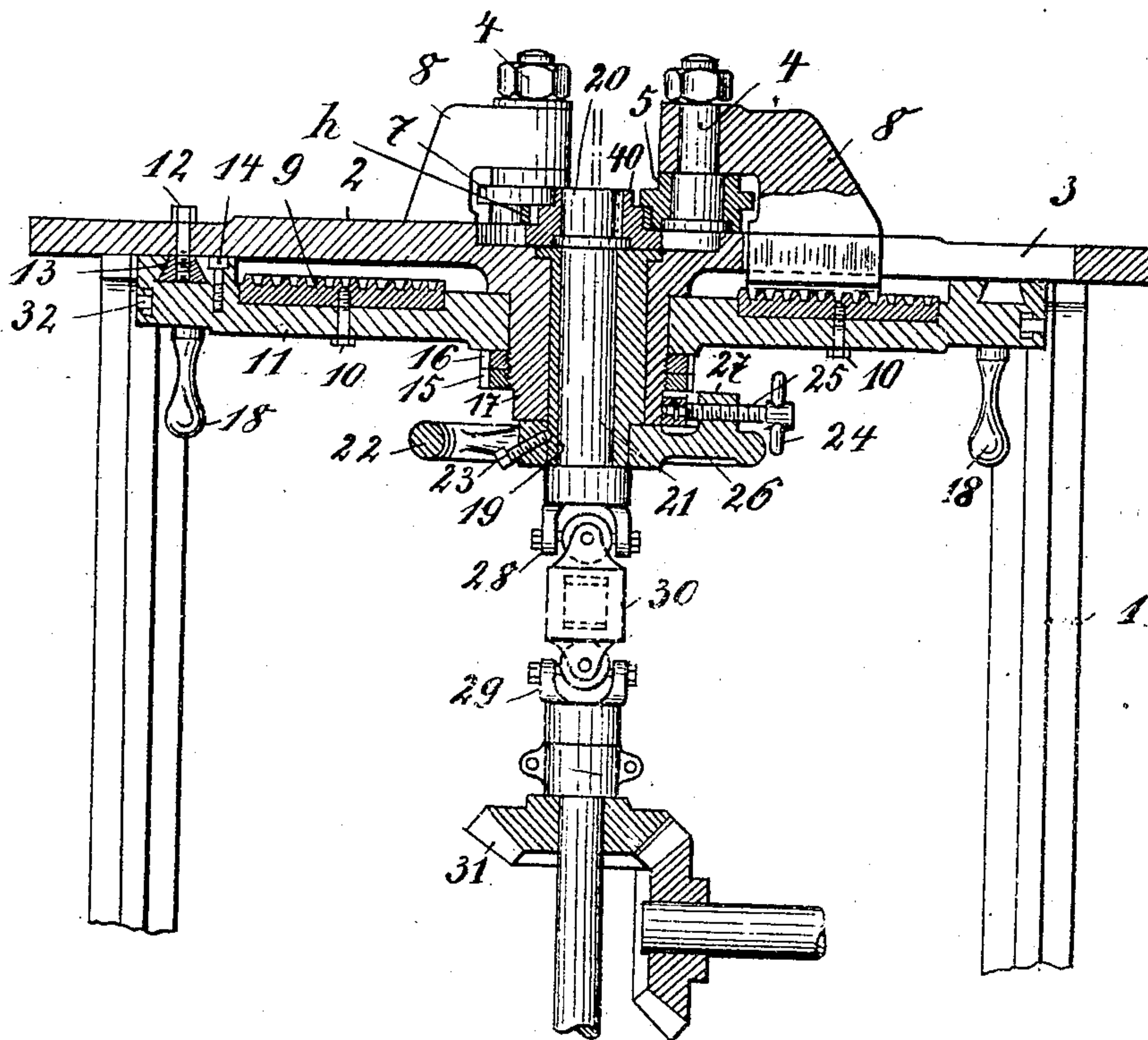
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2 SHEETS—SHEET 2.

Fig. 2.



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APPARATUS FOR PREPARING RINGS FOR BALL-BEARINGS.

No. 835,328.

Specification of Letters Patent.

Patented Nov. 6, 1906.

Application filed July 10, 1905. Serial No. 269,011.

To all whom it may concern:

Be it known that I, STEFAN SCHNEIDER, a subject of the German Emperor, and a resident of Charlottenburg, Germany, have invented a certain new and useful Improvement in Apparatus for Preparing Rings for Ball-Bearings, of which the following is a specification.

This invention relates to apparatus for preparing rings for ball-bearings.

In the specification of my copending application for Letters Patent, Serial No. 269,010, I have described a method of preparing such rings wherein preparatory to the rolling out of the rings the same are subjected to a hammering operation in a radial direction, so as to remove the internal stresses in the rings.

The present invention consists in a rolling apparatus for rolling out the rings subsequent to the hammering operation and is illustrated in the accompanying drawings, in which—

Figure 1 is a plan of the rolling apparatus; Fig. 2, a section along the line A B of Fig. 1.

As in previously-known rolling apparatus the material to be rolled is placed between several external rolls and one internal roll. In order that the external rolls may be simultaneously and uniformly adjusted in radial direction, they are arranged on a surface plate provided on its front face with a spiral thread, so that on rotation of the plate the supports, each of which carries one external roll, are moved radially in slots in a disk. Such an arrangement, previously used for quite distinct purposes, has proved particularly valuable in the rolling out of ball-bearing rings, which require uniform treatment. The adjustment of the internal roll is obtained by mounting that part of the driving-shaft for the internal roll in an eccentric bush capable of adjustment. The internal roll is employed as the driving-roll.

Referring to the drawings, the rolling apparatus comprises a number of uprights 1, which support a horizontal plate 2. The latter has preferably three radial guides 3, equidistant from one another, for receiving the supports 8, carrying, by means of bolts 4, the external rolls 5, 6, and 7. The guiding-slots 3 are enlarged at their outer ends, so as to enable the supports to be fitted or removed. The lower sides of the supports are screw-threaded and by engaging the spiral thread of an annulus 9 receive a radial movement from the latter. The annulus 9 is preferably secured by studs 10 to a horizontal face-plate

11, so as to be rotated therewith on turning the latter. The guidance of the plate 11 is effected by means of the dovetailed annular pieces 13, secured by studs 12 to the plate 2. The guidance of the plate 11 is further effected by means of a nut 16, secured by a nut 15, both of which are screwed on a projecting boss 17, integral with the plate 2. On the base of the plate are a number of handles 18, so as to enable the plate to be turned and the supports to be moved radially.

Within the boss 17 is a bush 19, formed, preferably, of brass or other suitable material, which is retained by a flange 20 in a recess in the boss 17. The bush 19 has an eccentric bore for receiving a shaft 21, keyed to the internal roll 40. The bush 19 projects from the lower part of the boss 17, so as to receive a hand-wheel 22, secured by means of screws 23. By rotating the hand-wheel 22 the eccentricity of the shaft 21 and of the internal roll 40 is altered. The hand-wheel is secured in the desired position by a clamp-block 26, secured by means of the spindle 25, having a handle 24. A lug 27 on the hand-wheel 22 serves as a nut for the spindle 25.

The actuation of the shaft is effected, preferably, through the intermediary of two universal joints 28 29, between which is a shaft portion 30. Power is transmitted from a motor in the usual way, the drawings showing bevel-gearing for this purpose.

To secure the plate 11 in position the plate 11 is provided on its outer cylindrical face with a groove 32, entered by the heads and stems of two screws 33, which press the block 34 against the periphery of the plate 11. A conical perforation in the block serves to receive the point of a pin 35, which, by means of a small support 36, is secured to the lower side of the plate 2. By withdrawing the pin 35 from the conical perforation the plate 11 is freed, so that a new movement of the plate is possible. When the desired position is obtained, it is sufficient to press in the pin 35 into the conical perforation in the block 34 in order to secure the plate in its desired position.

After the ball-bearing ring *h* has been made ready for the rolling operation the same is fitted in the rolling apparatus so that the three external rolls 5, 6, and 7 make contact simultaneously with its outer face. The number of external rolls may of course be varied; but the treble arrangement is preferable, so as to obtain accurate adjustment. The adjustment of the external rolls according to

the size of the ring is effected by turning the plate 11, and when the external rolls are in the desired position the inner roll 40 is adjusted to suit by turning hand-wheel 22 until the inner roll bears against the inner face of the ring. The position of the internal roll must be such that the same lies radially of one of the three external rolls. The internal roll thus forms the pressure-roll. The oppositely-disposed roll (in the position shown in Fig. 1 the roll 5) forms the counter-pressure roll. The rolls 6 and 7 serve as guide-rolls. After the position of the external and internal rolls has been determined the plate 11 and the hand-wheel 22 are secured in the manner described.

The rolling apparatus is set in motion in the usual manner.

According to the height and cross-section of the ring to be treated rolls of different profile may be employed. For instance, the embodiment shown in Figs. 1 and 2 shows an annular rib on the periphery of each external roll which engages over the material to be rolled, while on the lower part of the internal roll a rib is provided, serving as a support for the ring.

If the supports are not suited for supporting rings of the desired size and form, then, as well as changing the rolls, the supports carrying the same may also be changed and are removed by slipping them through the enlarged portions of the slots 3.

It will be seen that according to the invention a double adjustment is provided for. The construction is such that without varying the axial position of the inner roll 40 the external rolls 5, 6, and 7 can be simultaneously adjusted radially and that without varying the axial position of the rolls 5, 6, and 7 the inner roll may be adjusted radially. Thus it is possible to effect simultaneous adjustment of all the rolls. This is of importance in the production of ball-bearing rings, as in this way the frequently-recurring requirement of being able with a definite internal diameter

to vary the external diameter, and vice versa, is simply and satisfactorily met. In this way it is possible by using a single apparatus to produce in minimum time the required number of sizes of rings.

Having now described my invention, what I claim, and desire to secure by Letters Patent of the United States, is—

1. The improved apparatus for rolling ball-bearing rings, comprising, in combination, an external counter-pressure roll and a plurality of guide-rolls acting externally of the ring, a counter-pressure roll engaging the inner face of the ring, means for adjusting said external roll and external guide-roll simultaneously, a driving-shaft for the internal pressure-roll, the upper part of said shaft having a universal-joint connection with the main part of said shaft, a connection between said upper part and the internal roll, and means for adjusting the internal roll independently of the external rolls, substantially as described.

2. The improved apparatus for rolling ball-bearing rings, comprising, in combination, an external counter-pressure roll and a plurality of guide-rolls acting externally of the ring, a pressure-roll engaging the inner face of the ring, a spirally-grooved plate having radial slots for adjusting the external rolls uniformly and simultaneously, a driving-shaft for the internal roll, the upper part of said shaft having a universal-joint connection with the main part of the shaft, a connection between said upper part and the internal roll, and an eccentric bush for said upper part, said bush serving as a means for adjusting the internal roll independently of the external rolls, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

STEFAN SCHNEIDER.

Witnesses:

HENRY HASPER,
WOLDEMAR HAUPT.